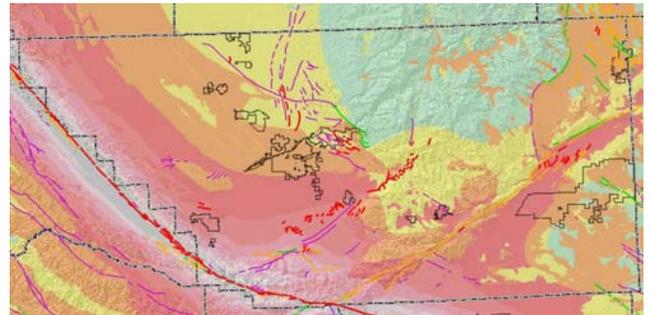
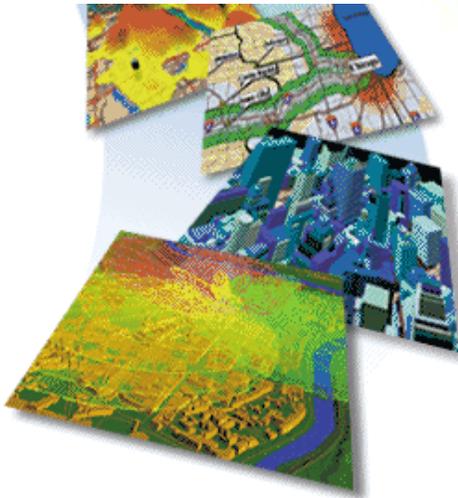


November 2005

Kern County, California Multi-Hazard Mitigation Plan



KERN COUNTY, CALIFORNIA MULTI-HAZARD MITIGATION PLAN

November 2005

**Developed in compliance with the Disaster Mitigation Act of 2000
by the Kern County Fire Department Office of Emergency Services**

with professional planning services provided by:

**Robert Olson Associates, Inc.
Folsom, California**

and

**AMEC Earth and Environmental, Inc.
Lakewood, Colorado
Santa Barbara, California**

Approved by the Kern County Board of Supervisors on:

Approved by the California Office of Emergency Services on:

Approved by the Federal Emergency Management Agency Region IX on:

EXECUTIVE SUMMARY

The purpose of hazard mitigation and this plan is to reduce or eliminate long-term risk to people and property from natural hazards and their effects in Kern County, California. This plan has been prepared to meet the Disaster Mitigation Act of 2000 (DMA 2000) requirements in order to maintain Kern's eligibility for FEMA Pre-Disaster Mitigation (PDM) and Hazard Mitigation Grant Programs (HMGP). More importantly, this plan and planning process lays out the strategy that will enable Kern County to become less vulnerable to future disaster losses.

The process followed a methodology prescribed by FEMA. It began with the formation of a Hazard Mitigation Planning Committee (HMPC) comprised of key County, City, Special District and Stakeholder representatives. The planning process examined the recorded history of losses resulting from natural hazards, and analyzed the future risks posed to the county by these hazards. Kern County is vulnerable to several natural hazards that are identified, profiled, and analyzed in the plan. Earthquakes, wildfires, floods and drought are some of the hazards that can have a significant impact on the County.

The plan puts forth several mitigation goals and objectives that are based on the results of the risk assessment. The plan includes specific recommendations for actions that can mitigate future disaster losses. The plan also includes a review of the County's current capabilities to reduce hazard impacts. The multi-jurisdictional plan includes the County, and the incorporated municipalities Arvin, Bakersfield, California City, Delano, Maricopa, McFarland, Ridgecrest, Shafter, Taft, Tehachapi, Wasco. This plan also covers 45 special districts that include school, recreation and park, water, community service, and other districts. This plan has been formally adopted by each participating entity and is required to be updated a minimum of every five years.

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Multi-Hazard Mitigation Plan

1.0 Introduction

SCOPE

Hazard Mitigation is defined as any sustained action taken to reduce or eliminate long-term risk to human life and property from hazards. Hazard Mitigation Planning is the process through which natural hazards that threaten communities are identified, likely impacts of those hazards are determined, mitigation goals are set, and appropriate strategies that would lessen the impacts are determined, prioritized, and implemented. This plan documents the Kern County Hazard Mitigation Planning Process, identifies natural hazards and risks within the County, and identifies the County's hazard mitigation strategy to make Kern County less vulnerable and more disaster resistant and sustainable. Information in the plan can also be used to help guide and coordinate mitigation activities and local policy decisions for future land use decisions.

Master Goal/Mission Statement of the Kern County Multi Hazard Mitigation Plan:

“To develop sustainable communities to preserve life, protect property, the environment, and the economy from natural hazards.”

The Kern County Multi-Hazard Mitigation Plan is a multi-jurisdictional plan that covers the following incorporated communities that participated in the planning process:

- Kern County
- City of Arvin
- City of Bakersfield
- City of California City
- City of Delano
- City of Maricopa
- City of McFarland
- City of Ridgecrest
- City of Shafter
- City of Taft
- City of Tehachapi
- City of Wasco

This plan also covers 45 additional special districts and organizations within Kern County that meet the FEMA definition of “local government” and participated in the planning process. The types of districts and organizations include:

- Community service districts (6)
- Recreation and park districts (2)

- School districts (19)
- Airport districts (2)
- Mosquito abatement district (1)
- Sanitation districts (3)
- Water districts (11), and
- Healthcare Organization (1)

Representatives for each organization participating in this planning process are listed in Appendix B.

This plan addresses natural hazards only. Although the participants of the Kern County Hazard Mitigation Planning Committee (HMPC) recognize that FEMA is both encouraging and promoting communities to integrate human-caused hazards into the mitigation planning process, the scope of this effort did not address these human-caused hazards for two reasons. First, many of the planning activities for the mitigation of human-caused hazards are either underway or complete, and have been developed by a different set of organizations. Secondly, DMA requires extensive public information and input, and this is in direct conflict with the confidentiality necessary in planning for the fight against chemical, biological, and radiological terrorism. The HMPC determined it was not in the community's best interest to publicly share specific information about the area's vulnerability to human-caused hazards.

PURPOSE AND NEED

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

FEMA, the Federal Emergency Management Agency, now a part of the Department of Homeland Security, has made reducing losses from natural disasters one of its primary goals. Hazard Mitigation Planning and subsequent implementation of projects, measures, and policies developed through those plans, is the primary mechanism in achieving these goals. Success in reducing disaster damages has taken place as the result of mitigation projects implemented as a result of mitigation planning.

This plan was developed pursuant to the DMA regulations published in the *Federal Register* Volume 67, Number 38, Tuesday, February 26, 2002 (PL 106-390, hereafter referred to as DMA). Section 104 of DMA revises the Robert T. Stafford Disaster Relief and Emergency Assistance Act by adding Section 322, which provides new and revitalized emphasis on hazard mitigation, including adding a new requirement for local mitigation plans. These new local mitigation-planning regulations are implemented through 44 CFR Part 201.6.

DMA requires state and local governments to develop Hazard Mitigation Plans in order to maintain their eligibility for certain federal disaster assistance and hazard mitigation funding programs. Compliance with these requirements will maintain continued eligibility for certain Hazard Mitigation grant programs from FEMA for each organization that participated in this planning process. Communities at risk from natural disasters can not afford to jeopardize this funding.

More importantly, proactive mitigation planning at the local level can help reduce the cost of disaster response and recovery to property owners and government by protecting critical community facilities, reducing liability exposure, and minimizing overall community impacts and disruption. Kern County has been affected by several disasters in the past and is committed to reducing disaster impacts and maintaining eligibility for federal mitigation grant funding.

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Multi-Hazard Mitigation Plan

2.0 County Profile

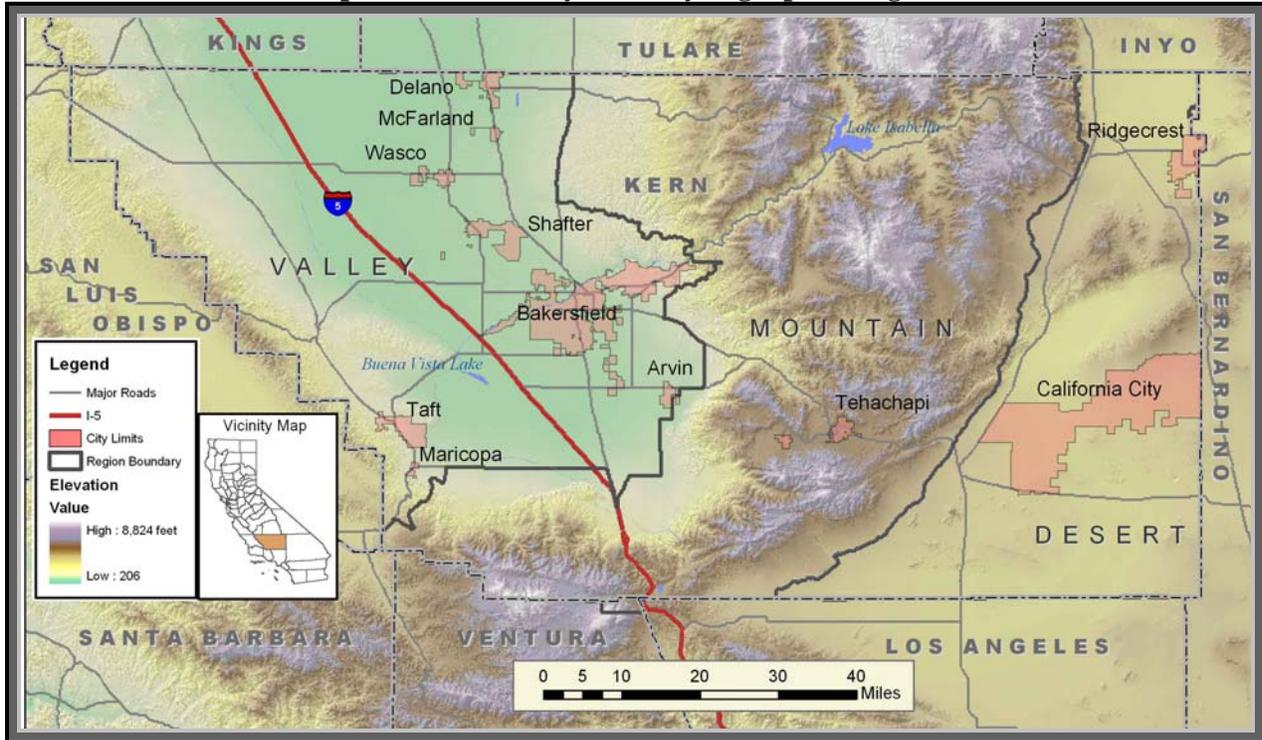
GEOGRAPHY

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. Elevations are at a low of 206' above sea level along the northern border of the county to a high of 8824' 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. Because of this diversity the county has a wide 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.

For the purposes of the plan the County has been divided into three regions that have similar geography and issues. These regions are called the Valley, Mountain, and Desert. The Valley includes the communities that occupy the San Joaquin Valley floor. The valley portion is the western one-third of the County and is the population and agricultural center. The Mountain region includes the Sierra Nevada Range, the Tehachapi Range, Temblor Range, El Tejon Mountains, and Tecuya Ridge communities. The Desert covers the roughly one-quarter of the county in the eastern portion and includes the Mojave Desert communities. The physiographic regions, major roads, and municipalities of Kern County are displayed in the map that follows.

Map of Kern County and Physiographic Regions



Map compilation AMEC

The vegetation and climate vary among the three zones. 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 a year, but is extremely variable. Snowfall is rare in the desert and valley regions but may range from 1 to 4 inches (Source: Kern County Flood Insurance Study).

Early settlement in Kern County began in the mountains with the discovery of gold in 1851. Kern County was first incorporated in 1866 and the first county seat was located in Havilah, approximately 70 miles northeast of Bakersfield. The government center was transferred to Bakersfield in 1873 when population shifted to the fertile valley lowlands.

The following table depicts the population and size of the County and its 11 incorporated communities, as of 2001:

Land area (acres):	5,210,240	Cities	Population 1-1-01	Cities	Population 1-1-01
Population, 7-1-00	678,500	Bakersfield	254,400	Tehachapi	11,450
Percent of California	2.0	Delano	40,300	Mcfarland	9,925
Population, 1-1-01	685,800	Ridgecrest	25,550	California City	9,350
		Wasco	21,950	Taft	8,900
		Arvin	13,550	Maricopa	1,140
		Shafter	13,200	Unincorporated	276,200

Source: California Department of Finance

Several of the state's main highway routes also pass through Kern County, including Interstate 5 and State Highway 99. The two highways branch off in the southern end of the County, where I-5 becomes the State's principal north-south route. Highway 99 follows the eastern side of the San Joaquin Valley and serves Bakersfield and other rapidly growing cities along its route through the county. US Highway 395 and State Highway 14 are the major thoroughfares on the eastern side of the Sierras. In addition there are 10 county airports and 2 railroad lines.

Water is the lifeblood of Kern County agriculture. Kern's main water sources include snowmelt from the Sierras that feed into the Kern River and other creeks, and the 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 California Aqueduct, which carries up to 2 million gallons of water per minute south from the Sacramento River Delta, across Kern County, and into metropolitan Los Angeles. 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.

Kern County's varied physical geography is the result of a multitude of geological, meteorological and hydrological forces at work. Disasters have occurred in the County when these natural forces have collided with the built environment and the County's residents. The disaster history of the County is profiled in detail in Section 4 of this plan, along with the numerous hazards that can impact the County.

ECONOMY

Agriculture has been Kern County's number one industry for many years. Approximately one out of every four jobs in Kern County is related to agriculture. Statewide the number is one out of every ten jobs. Kern County ranks in the top four California counties in agricultural production, behind Fresno, Tulare and Monterey Counties. Kern County exports approximately \$350 Million worth of agricultural commodities annually. 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 Asian rim receives the majority of the exported commodities.

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 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 (*Source: AAA map of Kern County*).

The county seat, which is in Bakersfield, is home to over one-third of the County's residents and struggles with continued growth and economic issues. Other large concentrations of the populace have grown as a result of their local community's unique needs: Ridgecrest and Mojave in the east are aligned with military installations that provide employment; Rosamond to the southeast

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; and Lamont and Arvin to the south, and Delano and Shafter to the north provide services and homes to the workers who labor in the fields of the large farms and ranches in the county. (Source: <http://www.co.kern.ca.us/courts/commoutreach.asp>).

The Kern economy continues to lag behind that of other counties because of the cyclical nature of the agricultural, military support, and petroleum industries that comprise the largest segments of the Kern economy. Despite these economic problems, portions of the Kern County area realize significant growth in population resulting from the reasonable cost of living and close proximity to the large metropolitan areas of Southern California. These trends, which are predicted to continue for the next five years according to the Kern County Board of Trade, have resulted in the difficult challenge of providing services to a growing constituency with a declining or stagnant allocation of local resources.

Multi-Hazard Mitigation Plan

3.0 Planning Process

44 CFR Requirement 201.6(c)(1): [*The plan shall document*] the planning process used to develop the plan, including how it was prepared, who was involved in the process, and how the public was involved.

The Kern County Fire Department Office of Emergency Services (Kern OES) recognized the need and importance of this plan and was responsible for its initiation. Funding for the planning assistance contract was a joint effort between Kern County and the eleven incorporated cities and numerous special districts. Kern County Emergency Services campaigned to raise the necessary funds for this important endeavor. In addition, planning team members donated to this effort by attending meetings, collecting data, managing administrative details, and providing facilities for meetings.

Kern OES contracted with Robert Olson Associates (ROA) and subcontractor AMEC Earth & Environmental (AMEC) in December 2004 to facilitate and develop this countywide, multi-jurisdictional, multi-hazard Mitigation Plan. The ROA/AMEC role was to:

- Assist in establishing a Hazard Mitigation Planning Committee (HMPC) for Kern County, all incorporated communities, and all other “local governments” as defined by the DMA regulations,
- Meet all of the DMA requirements as established by federal regulations, following FEMA’s planning guidance,
- Meet the Community Rating System (CRS) of the National Flood Insurance Program’s (NFIP) planning requirements (for Kern County only),
- Facilitate the entire planning process,
- Identify the data requirements that the HMPC participants could provide, and conduct the research and documentation necessary to augment that data;
- Develop and facilitate the public input process,
- Produce the draft and final plan documents, and
- Coordinate the State OES and FEMA Region IX reviews of this plan, and formal adoption of the plan by the governing board of each participating ‘local government’.

ROA/AMEC established the process for this planning effort utilizing the DMA planning requirements and FEMA’s associated guidance. This guidance is structured around a generalized four-phase process:

- 1) Organize resources,
- 2) Assess hazards and risks,
- 3) Develop a mitigation plan, and
- 4) Evaluate the work.

This Plan also utilizes the process set forth in FEMA Region IX’s Crosswalk Reference Document for Review and Submission of Local Mitigation Plans, and the California Office of Emergency Services (CA-OES) guidance for Local Hazard Mitigation Plans (LHMP).

ROA/AMEC also integrated an older, more detailed 10-step planning process that was still required at the time this effort was initiated for other FEMA mitigation plans, such as for the NFIP’s CRS and Flood Mitigation Assistance (FMA) programs. Thus, ROA/AMEC formulated a single planning process that melds these two sets of planning requirements together and meets the requirements of six major programs: DMA, CRS, FMA, Hazard Mitigation Grant Program (HMGP), FEMA’s Pre-Disaster Mitigation Program (PDM), and new flood control projects authorized by the U.S. Army Corps of Engineers (USACE). The table below shows how the 10-step process fits within the four-phase process.

DMA AND CRS PLANNING CROSS REFERENCE

Disaster Mitigation Act Planning Regulations (44 CFR 201.6)	CRS Planning Steps
Organize Resources	
201.6(c)(1)	1. Organize
201.6(b)(1)	2. Involve the public
201.6(b)(2) & (3)	3. Coordinate
Assess Hazards and Risks	
201.6(c)(2)(i)	4. Assess the hazard
201.6(c)(2)(ii) & (iii)	5. Assess the problem
Develop a Mitigation Plan	
201.6(c)(3)(i)	6. Set goals
201.6(c)(3)(ii)	7. Review possible activities
201.6(c)(3)(iii)	8. Draft an action plan
Evaluate the Work	
201.6(c)(5)	9. Adopt the plan
201.6(c)(4)	10. Implement, evaluate, revise

Source: Modified from CRS Coordinator’s Manual, Floodplain Management Planning, Commentary

LOCAL GOVERNMENT/JURISDICTION PARTICIPATION

44 CFR Requirement 201.6(a)(3): Multi-jurisdictional plans may be accepted, as appropriate, as long as each jurisdiction has participated in the process.

The DMA planning regulations and guidance stress that each local government seeking the required FEMA approval of their mitigation plan must:

- Participate in the process,
- Detail areas within the planning area where the risk differs from that facing the entire area,
- Identify specific projects to be eligible for funding, and
- Have the governing board formally adopt the plan.

For Kern County HMPC members, ‘participation’ meant that the local government representatives:

- Attended and participated in the HMPC meetings,
- Provided available data requested of the HMPC,
- Reviewed and provided comments on the plan drafts,
- Advertised, coordinated and participated in the public input process, and
- Coordinated the formal adoption of the plan by the governing boards.

THE TEN STEP PLANNING PROCESS

Step 1: Get Organized – Building the Planning Team

ROA/AMEC worked with Kern County’s Fire Department to establish the framework and organization for the development of this Plan. The Plan was developed by the HMPC led by ROA/AMEC, and was comprised of key county, city, and other local government and stakeholder representatives. The list of HMPC representatives is included in Appendix B.

The planning process officially began on February 15, 2005 with a kick-off meeting in Bakersfield. The meeting covered the scope of work and an introduction to the DMA 2000 regulations. The meeting was facilitated by the County Emergency Services Coordinator (HMPC Chair) and professional planning contractors ROA/AMEC. During this meeting the scope of work, the role of the HMPC, and data collection needs were explained. The County Fire Chief endorsed and emphasized the importance of this planning process. The meeting also covered an introduction to a preliminary hazard identification developed for the County by ROA/AMEC.

Participants were provided a planning workbook that included worksheets to facilitate the collection of the information needed to support the plan. Worksheets were designed by ROA/AMEC to capture information on historic hazard events, identify hazards of concern by jurisdiction, values at risk by jurisdiction, and capabilities by jurisdiction. Participants were also

provided a mitigation project worksheet to record ideas for possible projects that were identified during the planning process.

The HMPC communicated during the planning process with a combination of face to face meetings and email. The size of Kern County and the distance required to travel to attend meetings necessitated combining meetings on the various topics into half or full day workshops. The HMPC held 6 meetings during the 9-month period. Additional communication and coordination with the HMPC was done through the use of an email list and an FTP (file transfer protocol) site where draft documents were uploaded for download and review by team members.

HMPC Meeting	Meeting Topic	2005 Meeting Date
1	Introduction to DMA/Kick Off meeting	February 15
2	Hazard Identification introduction	February 15
3	Risk and Capability Assessment overview/ Developing Mitigation Goals and Objectives	June 22
4a	Review of Possible Mitigation Activities	June 22
4b	Developing Mitigation Recommendations	June 22
5	Review draft of plan	August 19
6	Public meetings (11)	September 19-30

Attendees and agendas for each of the HMPC meetings are on file with the County Fire Department OES.

Step 2: Plan for Public Involvement – Engaging the Public

44 CFR Requirement 201.6(b): “An open public involvement process is essential to the development of an effective plan”.

In order to develop a more comprehensive approach to reducing the effects of natural disasters, the planning process shall include:

(1) An opportunity for the public to comment on the plan during the drafting stage and prior to plan approval;

The HMPC undertook myriad strategies to engage the public in the planning process. At the kick-off meeting the team discussed a plan and options for soliciting public input. The team’s approach used the established Public Information mechanisms within the County and the resources of the HMPC member communities. A press release announcing that the planning process had begun was distributed following the kick-off meeting. County OES provided a mechanism for coordinating with other potentially interested public agencies, private companies, and appropriate citizens groups as part of Step 3 of this planning process.

Public input during the planning process was solicited by making the document available for public review and comment and hosting public meetings to explain the plan and planning process and gather feedback. A series of formal public meetings were conducted in September and October of 2005 following the development of the 3rd draft of the plan. The draft plan was posted to the County website (www.co.kern.ca.us) providing the general public several weeks to review and comment on the document during the September-October public meetings. A press

release announced the draft plan's existence, the public comment period, and ways that public input could be provided. The press release was developed and distributed by the Kern County Fire Department's Public Information Officer (PIO) to all the local media outlets and posted to the Kern County website. The press release and other sample outreach materials were provided to all the participating jurisdictions. Hard copies of the draft plan were also made available for review at all Kern County library branch locations.

During the public meetings the various community representatives on the HMPC handled the presentations in their respective communities, after contacting the appropriate special districts serving their communities. Assistance during the public meetings was provided by the Kern County Office of Emergency Services. In addition to the formal meetings the plan was promoted by the Kern County Office of Emergency Services at the Kern River Valley Revitalization Steering Committee meeting (October 5th), Kern River Valley Chamber of Commerce meeting (October 5th), Kern River Valley Town Hall meeting (October 11th) and the Kern River Valley Collaborative meeting (October 27th). A total of at least 178 persons attended the public meetings, including citizens, HMPC members, and jurisdictional representatives. The public meeting locations and dates are provided in the table that follows.

Public Meeting #	Public Meeting Location	2005 Meeting Date
1	Arvin City Hall	September 26th
2	Delano City Hall	September 29th
3	Golden Hills Community Services District, Golden Hills	October 4th
4	Rosamond Community Services District Office	October 5th
5	Taft City Hall	October 6th
6	Ridgecrest City Hall	October 12th
7	Shafter Veterans Memorial Hall	October 13th
8	Bakersfield City Hall	October 18th
9	McFarland City Hall	October 26th
10	Wasco City Hall	October 27th
11	California City City Hall	November 1st

Stakeholder and public comments were compiled and distributed to the planning team via email for discussion and consideration among the planning team. Appropriate responses were integrated into the final draft of the plan. Record of public input and HMPC response are on file with the Kern County Office of Emergency Services, in addition to sign-in sheets from the public meetings.

Step 3: Coordinate with Other Departments and Agencies

44 CFR Requirement 201.6(b): *In order to develop a more comprehensive approach to reducing the effects of natural disasters, the planning process shall include:*

(2) An opportunity for neighboring communities, local and regional agencies involved in hazard mitigation activities, and agencies that have the authority to regulate development, as well as

businesses, academia and other private and non-profit interests to be involved in the planning process;

Early on in the planning process, the HMPC determined that data collection, mitigation strategy development, and plan approval would be greatly enhanced by inviting other state and federal agencies to participate in the planning process. Based on their involvement in hazard mitigation planning, representatives from the following key agencies were offered the opportunity to provide comments and/or participate in the process as members of the HMPC:

State Government Agencies

- Governor's Office of Emergency Services Regional Coordinator and Hazard Mitigation Program
- Department of Transportation (Caltrans)
- Fish and Game
- Parks and Recreation (Red Rock Canyon State Park)
- Department of Water Resources
- Seismic Safety Commission
- California Geological Survey
- California Department of Forestry and Fire Protection
- California Highway Patrol
- Department of Health Services
- Department of Food and Agriculture
- Division of Oil, Gas, and Geothermal Resources
- Department of Toxic Substances Control

Federal Government Agencies

- Bureau of Land Management (Bakersfield Field Office)
- Bureau of Reclamation (Bakersfield Field Office)
- U.S. Army Corps of Engineers District Office
- U.S. Navy (China Lake)
- U.S. Air Force (Edwards AFB)
- Dept. of Homeland Security/Federal Emergency Management Agency, Region IX
- U.S. Geological Survey
- U.S. Department of Energy (regarding nuclear waste shipments)
- Natural Resource Conservation Service
- National Park Service
- Department of Transportation - Office of Pipeline Safety
- U.S. Forest Service (Sequoia National Forest)
- U.S. Fish and Wildlife Service district office
- National Weather Service (Hanford)
- National Oceanic and Atmospheric Administration, National Climatic Data Center
- U.S. Environmental Protection Agency

Other Regional and Local Agencies, including Special Districts

- Regional Water Quality Control Board
- Regional Air Pollution Control District
- Kern County Council of Governments
- Fire protection districts
- Kern County Water Agency
- Water districts
- Kern Water Bank Authority
- Indian Wells Valley Groundwater Management Group
- East Kern County Resource Conservation District
- Community services districts (single and multiple purpose)
- Reclamation and levee maintenance districts
- Flood control districts
- Historic preservation organizations
- Mosquito control districts
- Hospital districts/organizations
- School districts
- Water Association of Kern County

Other Potentially Interested Organizations

- Kern River Valley Fire Safe Council
- Kern River Valley Historical Society
- Greater Tehachapi Fire Safe Council
- Mount Pinos Communities Fire Safe Council
- Pine Mountain Club Property Owners Association
- Agricultural industry organizations
- Kern County Department of Agriculture
- County Agricultural Extension Agents
- Insurance Services Office
- Utilities (gas, electricity, water)
- Union Pacific Railroad
- BNSF Railroad Company
- Pipeline companies
- Petroleum producers and refiners
- Smart Growth Coalition of Kern County
- Catholic Healthcare West Hospitals (Bakersfield Memorial, Mercy, Mercy Southwest)
- Kaiser Permanente
- Other appropriate public and citizens groups, conservation groups

Each of the above agencies was issued invitations either in writing or by e-mail notification. The HMPC provided each agency a link to an online copy of the draft plan for their review and written comment. Those comments were incorporated into this document. Additionally,

technical data, reports and studies were obtained from these agencies either through web-based resources or directly from the agencies.

The CRS program requires that the neighboring communities also be invited to participate in the planning process, and to review the draft documents. Therefore, the floodplain administrators and emergency managers in the following neighboring counties were invited to participate, review and comment on our planning activities:

- Kings County
- Inyo County
- Los Angeles County
- San Bernardino County
- San Luis Obispo County
- Santa Barbara County
- Tulare County
- Ventura County

Copies of the letters seeking coordination with state, federal, and neighboring agencies are on file with the Kern County Fire Department OES.

44 CFR Requirement 201.6(b): *In order to develop a more comprehensive approach to reducing the effects of natural disasters, the planning process shall include:*
(3) *Review and incorporation, if appropriate, of existing plans, studies, reports, and technical information.*

This requirement was addressed in Steps 4 and 5 during the collection of data to support the Hazard Identification, Vulnerability Assessment, and Capability Assessment.

Step 4: Hazard Identification and Step 5: Risk Assessment

44 CFR Requirement 201.6(c)(2)(ii): *“The risk assessment shall include...a description of the jurisdiction’s vulnerability to the hazards described in paragraph (c)(2)(i) of this section. This description shall include an overall summary of each hazard and its impact on the community.*

ROA/AMEC led the HMPC in an exhaustive research effort to identify and document all the natural hazards that have, or could, impact Kern County. Data collection worksheets were developed and utilized in this effort to aid in determining hazards and vulnerabilities, and where the risk varies across the planning area. GIS was also used to display, analyze, and quantify hazards and vulnerabilities. Step 5 included a Capability Assessment which documents the participating jurisdiction’s current capabilities to mitigate natural hazards. A more detailed description of the risk assessment process and the results are included in this plan as Section 4 – Risk Assessment (Section 4-1 – Hazard Identification, Section 4-2 – Vulnerability Assessment, and Section 4-3 – Jurisdictional Elements and Capabilities).

Step 6: Identifying Goals and Step 7: Review Possible Measures

44 CFR Requirement 201.6(c)(3): *The plan shall include a mitigation strategy that provides the jurisdiction’s blueprint for reducing the potential losses identified in the risk assessment, based*

on existing authorities, policies, programs and resources, and its ability to expand on and improve these existing tools.

44 CFR Requirement §201.6(c)(3)(i): *[The hazard mitigation strategy shall include a] description of mitigation goals to reduce or avoid long-term vulnerabilities to the identified hazards*

44 CFR Requirement §201.6(c)(3)(ii): *[The mitigation strategy shall include a] section that identifies and analyzes a comprehensive range of specific mitigation actions and projects being considered to reduce the effects of each hazard, with particular emphasis on new and existing buildings and infrastructure.*

ROA/AMEC facilitated brainstorming and discussion sessions with the HMPC that described the purpose and the process of developing planning goals and objectives, a comprehensive range of mitigation alternatives, and a method of selecting and defending recommended mitigation actions utilizing a series of selection criteria. This information is included in this plan as Section 5 – Mitigation Goals and Strategy. Additional planning process documentation of the goals and strategy development is provided in Appendix D.

Step 8: Draft the Mitigation Action Plan

ROA/AMEC developed four drafts of this plan for the HMPC. The first draft consisted of the Hazard Analysis and Risk Assessment only and was reviewed by members of the HMPC in advance of the mitigation planning goals and strategy meetings. ROA/AMEC received these comments, made appropriate revisions at the direction of the HMPC, and developed a second draft of this plan, which included the HMPC’s mitigation strategy and other required plan elements. This complete draft was posted for HMPC review and comment on an internal website. Other agencies were invited to comment on this draft as well. Team and agency comments were integrated into the 3rd draft, which was extensively advertised and distributed for the purpose of collecting public input and comments through a series of formal Public Meetings. The comments and issues from the Public Meetings and the additional reviews were then discussed with the HMPC, appropriate revisions were made, and a 4th draft of the plan was produced reflecting the public and technical input.

Step 9: Adopt the Plan

44 CFR requirement 201.6(c)(5): *“{The local hazard mitigation plan shall include} documentation that the plan has been formally adopted by the governing body of the jurisdiction requesting approval of the plan (e.g., City Council, County Commissioner, Tribal Council).”*

In order to secure buy-in and officially implement the plan, the plan was adopted by each jurisdiction that participated in the planning effort. Scanned versions of the adoption resolutions are on the CD included as part of Appendix F with this plan.

Planning Step 10: Implement the Plan

44 CFR Requirement 201.6(c)(4): *“{The plan maintenance process shall include a} section describing the method and schedule of monitoring, evaluating, and updating the mitigation plan within a five-year cycle.”*

The true worth of this, and any mitigation plan, is its final step – implementation. To this point, all of the HMPC efforts have been directed at researching data, coordinating input from participating entities, and developing appropriate mitigation actions. Each recommended action includes key descriptors, such as a lead manager and possible funding sources, to help initiate implementation of the specific action. Beyond that, however, an overall implementation strategy is described in Section 7 – Implementation and Plan Maintenance.

Finally, there are numerous organizations within Kern County whose goals and interests interface with hazard mitigation. Coordination with these other community planning efforts is paramount to the success of this plan. Kern County and the incorporated communities and other eligible ‘local governments’ utilize a variety of comprehensive planning mechanisms, such as land use and general plans, emergency response and mitigation plans, and municipal ordinances and building codes to manage community growth and development. Additionally, the development of this plan utilized information included in existing community plans, studies, reports, and initiatives. These sources are referenced throughout the document and also mentioned in Section 7. A plan update and maintenance schedule and a strategy for continued public involvement is documented in Section 7.

Kern County Multi-Hazard Mitigation Plan

4.0 Risk Assessment

44 CFR Requirement 201.6(c)(2): “The plan shall include a risk assessment that provides the factual basis for activities proposed in the strategy to reduce the losses from identified hazards. Local risk assessments must provide sufficient information to enable the jurisdiction to identify and prioritize appropriate mitigation actions to reduce losses from identified hazards.”

Risk from natural hazards is a combination of hazard and exposure. The risk assessment process identifies relevant hazards and the exposure of lives, property, and infrastructure to the hazards. The goal of the risk assessment is to measure the potential loss to a community, including loss of life, personal injury, property damage, and economic injury from a hazard event.

The risk assessment process allows a community to better understand their potential risk and associated vulnerability to natural hazards. This information provides the framework for a community to develop and prioritize mitigation strategies and plans to help reduce both the risk and vulnerability from future hazard events. The risk assessment for this countywide Multi-Hazard Mitigation Plan followed the methodology described in the FEMA publication 386-2 “*Understanding Your Risks – Identifying Hazards and Estimating Losses*” (FEMA, 2002) and was based on a four-step process:

- (1) Identify hazards,
- (2) Profile hazard events,
- (3) Inventory assets, and
- (4) Estimate losses.

This risk assessment covers CRS Planning Step 4 – Assess the Hazard and CRS Planning Step 5 – Assess the Problem. It also includes a third component, Existing Mitigation Capabilities, where the risk and vulnerability are analyzed in light of what existing mitigation measures are in place, for example, the adoption and use of building codes, warning systems and floodplain development regulations.

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Kern County Multi-Hazard Mitigation Plan

4.1 Hazard Identification/Profiles

44 CFR Requirement 201.6(c)(2)(i): “The risk assessment shall include a description of the .. location and extent of all natural hazards that can affect the jurisdiction. The plan shall include information on previous occurrences of hazard events and on the probability of future events.”

The HMPC conducted a review of what hazards threaten the planning area. This section of the plan documents and profiles the possible natural hazards in Kern County.

Methodology

The HMPC used a variety of sources to identify and profile the natural hazards in Kern County. Where available, GIS data on hazards was obtained from CA-OES and other State Agencies, the USGS, and the Kern County COG. Previous efforts to identify hazards in the County, such as in the Safety Element of the County’s General Plan and the County’s Emergency Operations Plan, were incorporated into the Hazard Identification. Additional data from the National Oceanic and Atmospheric Administration (NOAA), National Climatic Data Center (NCDC), CA-OES, and FEMA Region IX, were used to develop a list of those natural hazards of significance to the participating communities within the planning area. Members of the HMPC used a hazards worksheet to identify and rate the significance of possible hazards. Significance was measured in general terms, focusing on key criteria such as the likelihood of the event, past occurrences, spatial extent, and damage and casualty potential. Only the more significant hazards have a more detailed hazard profile and are analyzed further in section 4.2, Risk Assessment. The natural hazards identified and investigated in Kern County are listed in alphabetical order below:

- Dam failure
- Drought
- Earthquakes
- Floods
- Insect hazards
 - Africanized Honey Bee
 - Glassy Winged Sharpshooter
 - Mosquitoes
 - Pine Bark Beetle
 - Red Imported Fire Ant
- Landslides
- Natural health hazards
 - West Nile Virus
 - Valley Fever
 - Plague
 - Hanta Virus
- Severe weather
 - Dust storms
 - Extreme temperatures
 - Fog
 - Severe thunderstorms/hail
 - Lightning
 - Tornadoes
 - Windstorm
 - Winter Storms
- Soil Hazards
 - Land subsidence
 - Expansive soils
 - Erosion
 - Soil liquefaction
 - Radon
- Volcanoes
- Wildfire

All of these hazards are identified in the California State Hazard Mitigation Plan with the exception of the Natural Health Hazards. The HMPC also considered avalanches, but the group felt that due to a lack of significant impacts it was not a concern within the County.

Summary Hazard Identification Worksheet. The following table is based on a hazard identification worksheet that was provided to each participating jurisdiction to assist in summarizing the significance of each hazard to the jurisdiction. The table below represents the County’s perspective based on input from the Kern County Engineering and Survey Services Department. The high and medium significance hazards identified by the other jurisdictions are discussed in Section 4.3 – Jurisdictional Elements and Capabilities.

Hazard	Likelihood of Event/Frequency	Hazard Extent	Potential Magnitude	Significance
Dam Failure	<i>Unlikely</i>	<i>Significant</i>	<i>Catastrophic</i>	<i>High</i>
Drought	<i>Likely</i>	<i>Extensive</i>	<i>Catastrophic</i>	<i>High</i>
Earthquakes	<i>Occasional</i>	<i>Extensive</i>	<i>Catastrophic</i>	<i>High</i>
Floods	<i>Likely</i>	<i>Significant</i>	<i>Critical</i>	<i>High</i>
Insect Hazards	<i>Likely</i>	<i>Limited</i>	<i>Limited</i>	<i>Low</i>
Landslides	<i>Occasional</i>	<i>Limited</i>	<i>Limited</i>	<i>Low</i>
Natural Health Hazards	<i>Highly Likely</i>	<i>Extensive</i>	<i>Limited</i>	<i>Medium</i>
Severe Weather*	<i>Highly Likely</i>	<i>Extensive</i>	<i>Critical</i>	<i>Medium</i>
Soil Hazards	<i>Highly Likely</i>	<i>Limited</i>	<i>Limited</i>	<i>Medium</i>
Volcanoes	<i>Unlikely</i>	<i>Limited</i>	<i>Limited</i>	<i>Low</i>
Wildfires	<i>Likely</i>	<i>Significant</i>	<i>Critical</i>	<i>High</i>

*Severe Weather Includes Dust Storms, Extreme Temperatures, Fog, Hail, Heavy rains, lightning, tornadoes, windstorms, and winter storms

Guidelines

Frequency of Occurrence:

Highly Likely: Near 100% chance of occurrence in the next year.
Likely: Between 10 and 100% chance of occurrence in the next year.
Occasional: Between 1 and 10% chance of occurrence in the next year.
Unlikely: Less than 1% chance of occurrence in the next year.

Potential Magnitude

Catastrophic: More than 50% of area affected
Critical: 25 to 50%
Limited: 10 to 25%
Negligible: Less than 10%

Hazard Extent

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

Significance

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

Introduction to the Hazard Profiles

This section begins with an overview of the declared disasters in Kern County and leads to a detailed hazard profile for the identified hazards. The purpose of this section is to profile all the natural hazards that affect, or could affect, Kern County and its jurisdictions. This sets the stage for the following section (Section 4.2), where the risk to Kern County is quantified for each of the significant hazards. Where the hazards and risk vary from jurisdiction to jurisdiction is

addressed in Section 4.2 and 4.3 of this plan. The following format is used to profile the hazards:

Hazard/Problem Description. This section gives a generic description of the hazard and associated problems, followed by details on the hazard specific to Kern County.

Hazard Extent. The extent, or location of the hazard within or near the County is discussed here. Due to the large expanse and varied geography of Kern County, the County has been divided into three regions that have similar geography and issues. These regions are the called the Valley, Mountain, and Desert. Classifying what region is affected by the hazard is the first step in defining how the hazard varies across the planning area. Where possible or practical, maps of the hazard are provided. The extent is then categorized into one of the following classifications:

Limited: Less than 10% of planning area

Significant: 10-50% of planning area

Extensive: 50-100% of planning area

Past Occurrences. This section contains information on historic incidents, including impacts where known. A historic incident worksheet was used to capture information from participating jurisdictions on past occurrences. Information provided by planning team members are integrated here with information from other data sources, such as National Weather Service databases. This is the next step in defining where hazard impacts vary across the planning area.

Frequency/Likelihood of Occurrence. The frequency of past events is used in this section to gauge the likelihood of future occurrences. Where studies exist for a particular hazard the probabilities are given. The frequency of occurrence can be categorized into one of the following classifications:

Highly Likely: Near 100% chance of occurrence in next year, or happens every year.

Likely: Between 10 and 100% chance of occurrence in next year, or has a recurrence interval of 10 years or less.

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

Unlikely: Less than 1% chance of occurrence in next 100 years, or has a recurrence interval of greater than every 100 years.

The frequency, or chance of occurrence, was calculated where possible based on existing data. Frequency was determined by dividing the number of events observed by the number of years and multiplying by 100. This gives the percent chance of the event happening in any given year. An example would be 3 droughts occurring over a 30 year period which equates to 10% chance of that hazard occurring any given year. Where possible the recurrence interval was calculated by dividing the number of years by the number of events that occurred over a period of time. This gives an indication of the return period for the hazard. Using the drought example of 3 occurring over a 30 year period the recurrence interval equals once every 10 years.

Seasonal Patterns. Some hazards, such as winter storms, occur during certain times of year, and are noted in this section.

Speed of Onset/Duration. How quickly the hazard can impact and how long it lasts helps during the formulation of mitigation options. This also relates to the probable amount of warning time:

None to minimal

3 to 6 hours

6 to 12 hours

More than 12 Hours

Magnitude/Secondary Affects. The potential magnitude of disaster that this hazard can cause is discussed here. If the hazard triggers secondary events, such as wildfires contributing to erosion and flooding problems, they are listed here.

Catastrophic: *More than 50% of area affected*

Critical: *25 to 50%*

Limited: *10 to 25%*

Negligible: *Less than 10%*

Significance. Significance is measured in general, qualitative terms, and is a summary of the potential impact based on the likelihood of the event, past occurrences, spatial extent, and damage and casualty potential.

Low: *Minimal potential impact. The occurrence and potential cost of damage to life and property is minimal.*

Medium: *Moderate potential impact. This ranking carries a moderate threat level to the general population and/or built environment. The potential of occurrence may be the same as the “high” ranking but the potential damage is more isolated and less costly than a more widespread disaster.*

High: *Widespread potential impact. This ranking carries the highest threat to the general population and/or built environment. The potential of this hazard occurring in the assessment area is considered a matter of “when” it will occur, as opposed to “if” it will occur. The potential for damage is widespread. Hazards in this category may have already occurred in the past.*

Medium and High significance hazards are analyzed further in the risk assessment.

Mitigation Options/Feasibility. This is a first look at the identification and analysis of mitigation measures. The intent is to profile how feasible it is to mitigate the hazard or the effects of the hazard. Details on existing mitigation efforts are given in Section 4.3 – Jurisdictional Elements and Capabilities.

Limited: *Few options exist to reduce the impacts of this hazard*

Partia: *Some options exist to reduce impacts*

Extensive: *Several options exist that may reduce most of the hazard’s impacts*

DISASTER DECLARATION HISTORY

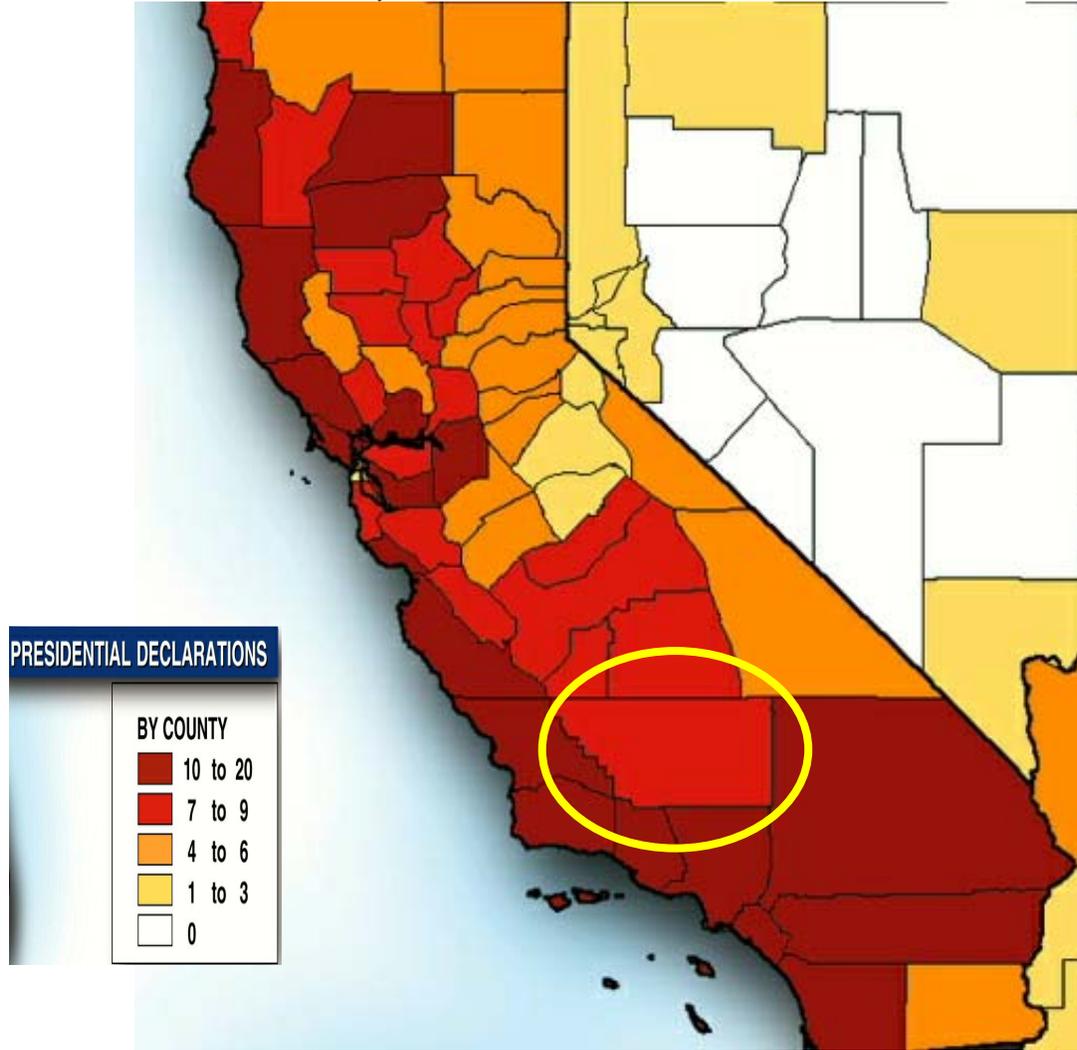
One method used to identify hazards in Kern County was to look at what events triggered federal and/or state disaster declarations within the planning area. Disaster declarations are granted when the severity and magnitude of the event's impact surpass the ability of the local government to respond and recover. Disaster assistance is supplemental and sequential. When the local government's capacity has been surpassed, a state disaster declaration may be issued, allowing for the provision of state assistance. Should the disaster be so severe that both the local and state governments' capacity is exceeded, a federal disaster declaration may be issued allowing for the provision of federal disaster assistance.

The federal government may issue a disaster declaration through the U.S. Department of Agriculture (USDA) and/or the Small Business Administration (SBA), as well as through FEMA. The quantity and types of damage are the determining factors. A USDA declaration will result in the implementation of the Emergency Loan Program through the Farm Services Agency (FSA). This program enables eligible farmers and ranchers in the affected county as well as contiguous counties to apply for low interest loans. A USDA declaration will automatically follow a Presidential declaration for counties designated major disaster areas and those counties that are contiguous to a declared county - including counties that are across state lines. As part of an agreement with the USDA, the Small Business Administration (SBA) offers low interest loans for eligible businesses that suffered economic losses in declared and contiguous counties that have been declared by the Secretary of Agriculture. These loans are referred to as Economic Injury Disaster Loans (EIDL). Kern County has received seven USDA and SBA designations since 2001 as either the primary county or as a county contiguous to another county with a primary declaration.

The following map displays the number of Presidential (FEMA) Disaster Declarations within the planning area between 1965 and 2002. Clearly, Kern County is among the many counties in California that are susceptible to disaster.

PRESIDENTIAL DISASTER DECLARATIONS MAP

January 1, 1965 to November 1, 2002 Source: www.fema.gov



Declared Disaster History Analysis. Details on Federal and State disaster declarations were obtained by the HMPC and compiled, in chronological order, in the table below. A review of state and federal declared disasters that have included Kern County indicate 38 major events have occurred since 1950. This equates to a major event worthy of a disaster declaration every 1.5 years for Kern County, or a 67% chance of a disaster declaration any given year. The declared events include 14 floods, 11 wildfires, 5 droughts, 2 freezes, 2 excessive heat events, 1 windstorm, 1 energy emergency, 1 earthquake, and 1 severe weather related event. 13 of these events resulted in Presidential disaster declarations. Most historical declared disaster event resulted directly or indirectly from extreme weather conditions. The declared disaster data demonstrates that injuries to people and damages to property and crops are often a result of severe weather conditions in Kern County.

Recent Event Profile. Just before the Kern mitigation planning process began, Southern California and Kern County was barraged by a series of severe rainstorms in late December 2004 and January 2005. On January 15, 2005 Governor Schwarzenegger issued a Governor's Proclamation of a State of Emergency for the Counties of Riverside, Santa Barbara, Los Angeles, Kern, San Bernardino, Orange and San Diego. On February 4, 2005, President Bush declared the region a disaster area for Los Angeles, Orange, Riverside, San Bernardino, San Diego, Santa Barbara, and Ventura Counties. Due to flooding in the Rosamond area, Kern County was declared for Individual Assistance and was eligible to apply for grants under the Hazard Mitigation Grant Program.

Another series of storms affected Kern, Los Angeles, Orange, Riverside, San Bernardino, San Diego and Ventura Counties between February 16-23, 2005. Impacts to Kern County were mainly flood related from drainage off the mountain foothills into the Valley. Kern County was declared eligible for Public Assistance and Hazard Mitigation Grant Program assistance.

Year	Event	Location	Declaration Type	Damages	Source of Data	Notes
11/21/1950	Flood	Kern County (statewide)	State	\$2 million	CA OES	CA OCD 50-01
07/21/1952	Earthquake	Kern County	unknown	12 deaths \$60 million	USGS report	
12/23/1955	Flood	Kern County (statewide)	Federal		CA OES	CD 47-DR-CA
04/04/1958	Flood	Kern County (statewide)	Federal	13 deaths and \$24,000,000 statewide	CA OES	CD 82-DR-CA
09/29/1970	Fire: Statewide Fires	Kern County and others	Federal	2 deaths, 125 injuries \$29 million	CA OES SHELDUS	OEP 295-DR-CA
10/25/1975	Flood: Heavy Rains/Storms	Kern County	State		CA OES	DC 75-04
01/12/1977	Drought	Kern County and others	State		CA OES	GP -1977
12/21/1977	Severe Windstorm, dust and rain, flood	Kern County	State	\$25 million (\$10 million in Arvin/Lamont)	CA OES Newspaper articles	GP -1977
02/15/1978	Flood: Heavy Rains	Kern County and others	Federal	\$5 million	CA OES SHELDUS	FDA 547-DR
10/28/1982	Agricultural losses due to Unseasonable Rains	Kern County	State - Economic		CA OES	DC-82-03
2/9/1983	Flood: winter storms	Kern County and others	Federal		CA mitigation plan	DR-677
07/31/1984	Fires/Thunderstorms/Mudslides	Kern County	State	\$875,000	CA OES SHELDUS	GP-84-01 GP-84-02
9/10/1987	Fires	Kern and 23 other counties	State	3 deaths, 76 injuries, \$18 million total	CA mitigation plan	
08/13/1990	Finley/Yosemite Fires		State		CA OES	GP- 90-01, 90-02
02/11/1991	Freeze	Kern County and others	Federal	\$8.6 Million	CA OES SHELDUS	FEMA 894-DR-CA
02/10/1992	Flood: 1992 Winter Storms	Kern County and 4 others	Federal	\$70,717	CA OES SHELDUS	FEMA 935-DR-CA
01/10/1995	Flood: 1995 Severe Winter Storms	Kern County (statewide)	Federal	\$6 Million	CA OES SHELDUS	FEMA 1044-DR
03/12/1995	Flood and Wind: 1995 Late Winter Storms	Kern County and others	Federal	\$57.3 Million	CA OES SHELDUS	FEMA 1046-DR
1996	Flood: Late Winter Storms	Kern County	Federal	\$18.6 Million	CA OES SHELDUS	OEP 223-DR-CA

Year	Event	Location	Declaration Type	Damages	Source of Data	Notes
02/06/1998	Flood: El Nino '98	Kern County (statewide)	Federal	\$35.5 Million	CA OES SHELDUS	FEMA 1203-DR-CA
12/29/1998	Freeze: Late 98/99 Freeze	Kern County and 7 others	Federal		CA OES	GP-98-02 2/9/99 Presidential Dec
01/17/2001	Other: 2001 Energy Emergency	Kern County (Statewide)	State		CA OES	GP-2001
03/22/2001	Ventura Drought	Kern County and others	Federal-USDA and SBA		CA OES	10/1/99
07/21/2002	Fire: Deer Fire	Kern County	Federal	\$3.8 Million	CA OES SHELDUS	FMAG-2450
07/21/2002	Fire: McNally: Contiguous County	Tulare County - Primary	Federal- SBA		CA OES	
09/1/2002	Fire: Curve Contiguous County	Ventura County	Federal- SBA		CA OES	
09/22/2002	Fire: Williams Secondary County	Los Angeles County	Federal- SBA Kern Contiguous		CA OES	Dec on 10/22/02
11/18/2002	Drought Primary County	Kern County	Federal-USDA and SBA		CA OES	Ongoing from 2000
06/27/2003	Fire: Sawmill Fire	Kern County	Federal	\$800,000	CA OES SHELDUS	FMAG-2473
06/29/2003	Fire: Tejon Fire	Kern County	Federal	\$1.6 Million	CA OES SHELDUS	FMAG-2474
10/23/2003	Severe Weather: Excessive Rain & Wheat Stripe Rust	Kern County	Federal -USDA and SBA		CA OES	4/1-5/31/03
10/21/2003	Fire: Contiguous to DR-1498 counties	Kern County and others	Federal-USDA/SBA		CA- OES	DR 1498
10/12/2004	Drought: Contiguous county	Kern County and others	Federal-USDA/SBA		USDA website	S1970 7/1/03- 6/30/04
11/22/2004	Excessive heat: Contiguous county	Kern and others	Federal-USDA/SBA		USDA website	S1984 3/1/04- 8/31/04
1/19/2005	Drought: Contiguous county	Kern and others	Federal-USDA/SBA			S2020 1/19/2005 and continuing
2/4/2005	Floods and mudslides 12/27/2004 through 1/11/2005	Kern County And others	State and Federal – IA and HMGP only		CA- OES	GP S-1-05 FEMA DR 1577
4/14/2005	Floods 2/16-23/2005	Kern County And others	State and Federal – PA and HMGP		FEMA website	FEMA DR 1585
02/24/2005	Extreme prolonged heat: subsequent fruit drop; contiguous	KernCounty And others	Federal-USDA/SBA		USDA website	S2063 4/23/04- 8/25/04

SEVERE WEATHER

Hazard/Problem Summary. Severe weather is generally any destructive weather event, but usually occurs in Kern County as localized storms such as thunderstorms, winter storms, and strong wind and hail events. Severe weather occurs in many forms and varies significantly in size, strength, intensity, duration, and impact. As evident in the review of historical disaster declarations, severe weather in Kern County has led to considerable losses. For this plan, severe weather is discussed in the following subsections:

- Winds
- Extreme Temperatures
- Severe Thunderstorms/Hail
- Tornadoes
- Winter Storms
- Fog
- Dust Storms

The NOAA National Climatic Data Center (NCDC) has been tracking severe weather events since 1950. Their database tracks wildfire, flood, thunderstorms, wind, heavy snow, tornadoes and funnel clouds, dense fog, extreme temperatures, hail, lightning, and microbursts. This database has many events recorded for Kern County, but mostly for the 1990-2004 timeframe. The NCDC database was supplemented with data from another source of disaster events called the SHELDUS database, produced by the Hazard Research Lab at the University of South Carolina. SHELDUS is a county-level data set for the U.S. on 18 different natural hazard event types along with property and crop losses, injuries, and fatalities for the period 1960-2000. This database is a combination of information from several sources and can be searched by county. From 1960 to 1995 only those events that generated more than \$50,000 in damages were included in the database. For events that covered multiple counties, the dollar losses, deaths, and injuries were equally divided among the counties (e.g. if 4 counties were affected, then each was given 1/4 of the dollar loss, injuries and deaths). Where dollar loss estimates were provided in ranges (e.g. \$50,000 - 100,000) the lowest value in the range of the category was used. This results in the most conservative estimate of losses during the time period of 1960-1995. From 1995 to 2000 all events that were reported by the National Climatic Data Center (NCDC) with a specific dollar amount are included in the database.

The two databases were downloaded from the Internet, merged into one, and had any duplicate events removed. Based on the combined NCDC/SHELDUS databases, there have been 417 documented severe weather events resulting in \$110,210,626 in property damages and \$343,763,201 in crop damages within Kern County. These events have directly or indirectly caused 38 deaths and 380 injuries since 1960 within the County. These sums do not likely represent the entire costs, as it is difficult to capture all the costs associated with an event. These events are discussed in further in the following hazard profiles.

**Summary of NCDC/SHELDUS Severe Weather Events affecting Kern County
since 1960- November 2004**

Type*	Count	Property Loss	Crop Loss	Deaths	Injuries
Blizzard	1	\$20,000	\$0	0	0
Drought	1	\$0	\$0	0	0
Dry Microburst	2	\$2,000	\$0	0	0
Dust Storm	5	\$673,809	\$0	7	150
Excessive Heat	9	\$0	\$0	6	1
Extreme Cold	6	\$86,206	\$192,038,514	0	0
Flood	92	\$31,604,259	\$101,120,000	3	10
Fog	11	\$1,109,583	\$0	4	72
Freeze	2	\$0	\$511,627	0	0
Funnel Cloud	12	\$0	\$5,900,000	0	0
Hail	16	\$15,000	\$506,250	0	0
Landslide	1	\$5,000	\$0	0	0
Lightning	21	\$415,000	\$0	0	2
Strong Wind	141	\$11,855,670	\$41,769,484	10	12
Thunderstorm	6	\$5,948	\$9,482	1	0
Tornado	10	\$71,000	\$0	0	0
Unseasonal/ Heavy Rain**	13	\$6,191,669	\$1,897,842	3	1
Wildfire	31	\$52,274,166	\$0	2	129
Winter Storm	36	\$5,881,312	\$10,000	1	0
Totals:	417	\$110,210,626	\$343,763,201	38	380

** Some of these types represent combinations of types found in the NCDC data, i.e. flash flood, flood, and heavy rain were combined into one flood category. ** Some of these events include areas outside of Kern County.*

The following section profiles specific severe weather hazards that have been identified in Kern County.

WINDS

Hazard/Problem Description. Wind is the movement of air from areas of high pressure to areas of low pressure. The greater the difference in pressure the stronger the wind. Wind can result in property damage and injury. Secondary hazards often associated with wind include utility outages, arcing power lines, downing of trees, debris blocking streets and an occasional structure fire. The following description of California wind patterns is derived from a summary of California climatology published by the Western Regional Climate Center:

California lies within the zone of prevailing westerlies and on the east side of the semi-permanent high pressure area of the northeast Pacific Ocean. The basic flow in the free air above the State, therefore, is from the west or northwest during most of the year. The several mountain chains within the State, however, are responsible for deflecting these winds and, except for the immediate coast, wind direction is likely to be more a product of local terrain than it is of prevailing circulation.

During the winter, storm tracks move further south. Wind direction and speed are modified by migratory pressure centers. With a strong high pressure area over the Great Basin and an intense low pressure area approaching the coast from the west, strong and sometimes damaging winds occur, usually from an easterly or southeasterly direction, especially along the coast and in the coastal mountains. As the storms move inland the winds veer to southerly and southwesterly directions, and high wind speeds may occur anywhere within the State with the greatest velocities at high elevations.

Southern California's "Santa Anas" are dry, north-easterly winds that tend to flow out of the Great Basin into the Central Valley, the Southeastern Desert Basin, and the South Coast. These winds usually occur in late fall and winter when a high pressure system forms in the Great Basin between the Sierra Nevada's and the Rocky Mountains. The winds are strong, gusty, and sometimes exceed 100 MPH, particularly near the mouth of canyons oriented along the direction of airflow. It is a situation that occasionally leads to serious fire suppression problems and often results in the temporary closing of sections of main highways to campers, trucks, and light cars.

A similar circulation pattern creates the "northers" of the Sacramento and San Joaquin Valleys. As a result of compressional heating of air flowing out of the Great Basin this situation results in pronounced heat waves in summer. In winter the result is usually a rather mild temperature accompanied by a dry, persistent wind that many persons find unpleasant.

<http://www.wrcc.dri.edu/narratives/CALIFORNIA.htm>

Past Occurrences. The NCDC/Sheldus databases lists 141 Strong Wind events reported in Kern County between 1/01/1960 and 09/30/2004. Of these, 87 events had reported damages that totaled \$11,855,670 in property damage, \$41,769,484 in crop damage, 10 fatalities, and 12 injuries. The 1977 event resulted in a State Disaster Declaration. The 1977 wind and dust storm filled canals in the Kern Delta Water District with approximately 70,000 cubic yards of dirt that cost the district \$87,000 to dig out.

2002 On December 16 a windstorm hit the Valley region's west side that snapped power poles, downed power lines, and toppling trees. More than 10,000 customers were without power for more than eight hours, including residents, schools and businesses in Taft and Maricopa. The Mercy West Side hospital continued to operate on a backup generator and served as a shelter for residents left without light or heat (Sources: Taft Fire Department, Midway Driller newspaper article).

Severe Wind Historic Incident

March 4, 2001 – "Strong southeast wind flow ripped through Interior California with various degrees of damage reported on the San Joaquin Valley floor to small structures and agriculture in addition to the damage in the Kern Mountains from strong wind around Frazier Park, Lebec, and Fort Tejon. Local utility companies reported more than 53 power poles downed and a dozen 70,000-volt power lines on the Southern San Joaquin Valley floor and in the Kern Mountains causing a power loss to at least 15,000 customers. Wind speed to 83 MPH was reported 5 miles east of Tehachapi with 55 MPH wind in Tehachapi Valley itself. Numerous trees and fences were downed with dirt piled up to 10 inches from blowing dust in the South Valley communities of Arvin, Wasco, and Shafter." \$600k property and \$100k crop in damages

Source: NCDC

1996 A wind storm struck Ridgecrest and vicinity on 12/22/1996, causing power outages and damaging property for an estimated \$325,000 in damage. Businesses were closed due to the lack of power.

1994 Strong winds in western Kern County near Taft snapped 14 telephone poles, toppled fences and awnings and caused power outages to local businesses and the petroleum industry on February 17 (Source: *Daily Midway Driller* article).

1979 Strong winds in and around Bakersfield on January 2 knocked over power poles and sparked 30 fires from arcing power lines. One horse was killed in a stable fire that caused \$12,500 in damage (Source: *Daily Midway Driller* article).

1977 A Severe wind and dust storm struck the southern valley (Dec. 20-21) (Source: *Kern Historical Society*). This storm is discussed in greater detail in the Dust Storm hazard profile.

1959 In June of 1959 a windstorm with winds in excess of 100mph hit Inyokern. The Inyokern airport beacon tower was toppled and destroyed. Two aircraft were totally destroyed and others severely damaged (Source: *Indian Wells Valley Airport District*).

1927 On December 26, 1927 a severe windstorm littered Bakersfield's streets with trash, branches and other debris. 17 oil derricks toppled over near Bakersfield (Source: *Kern Historical Society and Kern Library disaster files newspaper article*).

1921 Fierce windstorm in December (Source: *Kern Historical Society*).

1916 A Severe wind storm hits Valley West Side, including Taft and Maricopa on Jan. 17. According to Taft pioneers, this was one of the worst calamities to affect the City. Roofs were blown off buildings and nearly 2,000 oil derricks were toppled by the high winds. 700 of those derricks were destroyed. Some buildings collapsed and more than 100 were made homeless by the disaster. Power and telephone lines were knocked down, halting these services for days (Source: *Kern Historical Society and Kern Library disaster files newspaper article*).

1909 Severe wind storm swept the county's west side (Dec. 5) (Source: *Kern Historical Society*).

Hazard Extent. *Extensive.* Based on the NCDC data and wind behavior, windstorms can affect the entire county. Communities located along the foothills or valley floor at base of the mountains are more likely to experience high, downsloping winds. Numerous power-generating wind turbines just southeast of Tehachapi is evidence that the area experiences frequent steady winds.

Frequency/Likelihood of Occurrence. *Highly Likely-* Based on the 141 events experienced within the past 44 years, there is an average of 3.2 strong wind events per year. According to data on www.hazardmaps.gov, the 100 year wind exposure (or 1% chance of occurrence in any given year) for the entire county is 85 miles per hour.

Seasonal Patterns. High winds are generally experienced during the winter months, but several of the high wind events in the NCDC/Sheldus database were associated with thunderstorms in the summer months. Strong Santa Ana Winds generally occur between October-March.

Speed of Onset/Duration. Damaging winds are often predictable and usually last hours, sometimes for days.

Magnitude/Secondary Affects. Within Kern County winds tend to initiate a cascading series of damaging events. One example of this scenario is that wind topples power lines that block

highways or impact vehicles and people, then leads to wildfires that become severe and leads to property and crop losses. Power outage and transportation disruptions lead to additional economic impacts. Depending on the time of year and where they occur, winds can develop dust storms and cause damage to developing crops. Santa Ana winds cause a great deal of damage. These fast, hot winds cause vegetation to dry out, increasing the danger of wildfire. Once the fires start, the winds fan the flames and hasten their spread. The winds create turbulence and establish vertical wind shear (in which winds exhibit substantial change in speed and/or direction with height), both posing aviation hazards.

Significance. *Medium* – Based on the frequency, secondary affects, and historic losses.

Mitigation Options. *Partial* – Building codes and construction practices, strengthening or burying utility lines can help reduce wind impacts.

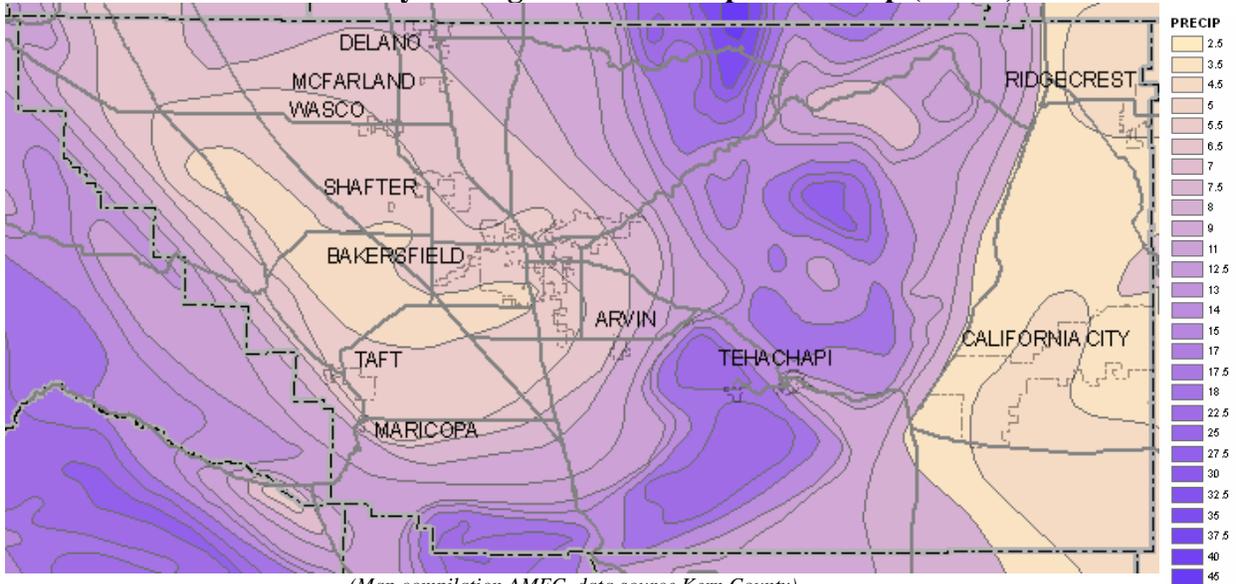
SEVERE THUNDERSTORMS/LIGHTNING/HAIL

Hazard/Problem Description. Meteorologists define a severe thunderstorm as having one or more of these characteristics: a tornado; wind gusts equal to or greater than 58 mph; or hail that is $\frac{3}{4}$ of an inch or larger. Severe thunderstorms in the planning area can include heavy rains that can lead to flash flooding. Thunderstorms can produce a strong rush of wind known as a downburst, or straight-line winds which may exceed 120 miles per hour. They usually occur when cool, moist air moves in to break a prolonged hot spell. The storms are usually short-lived and infrequent. Over the interior mountain areas storms are more intense, and they may become unusually severe on occasion at intermediate and high elevations of the Sierra Nevada.

Lightning is defined as any and all of the various forms of visible electrical discharge caused by thunderstorms. Cloud-to-ground lightning can kill or injure people by direct or indirect means. Objects directly struck may explode and burn, or the damage may be indirect when the current passes through or near it.

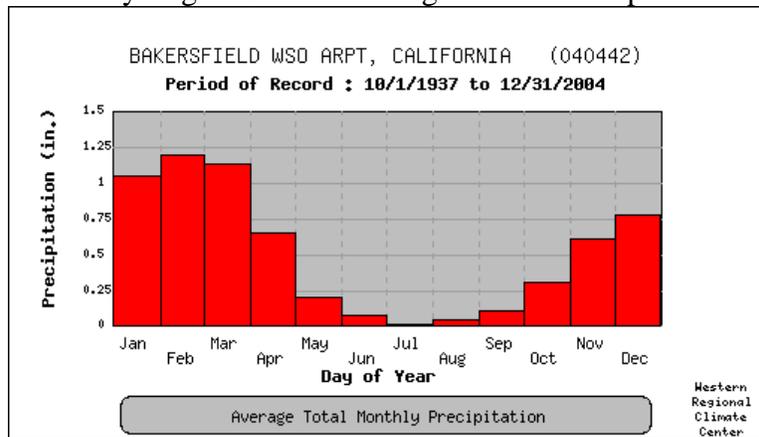
Heavy rain often accompanies severe thunderstorms and can lead to high flood peaks that pass rapidly, but can have devastating effects depending on where the storm occurs. Heavy rains in the Mountain region can cause violent flash flooding and erosion in the mountain watersheds, threatening valley roads and travelers and those recreating in the valleys. In the Valley and Desert regions overflow from poorly defined channels and inadequate culverts and drains can lead to shallow flooding, even from low intensity rainfall. The bulk of the rain occurs during the months of November through April but can be quite variable depending on different regions of the County. Due to the dramatic change in elevation from the western portion of Kern County to the eastern limit, precipitation and temperature can vary greatly throughout the County. The Mountain Region receives between 11 and to as much as 45 inches of precipitation a year, while the Valley receives between 4.5-7.5 inches. The Desert, due to its location in the rain shadow of the Sierra Nevada range, receives as little as 3.5 to 4.5 inches of precipitation on average each year.

Kern County Average Annual Precipitation Map (inches)

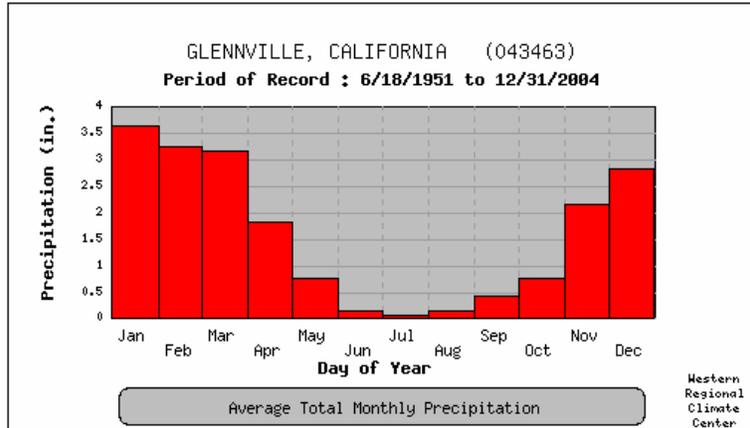


The following climate summaries depict how precipitation varies by month by representative locations in the Valley, Mountain, and Desert regions.

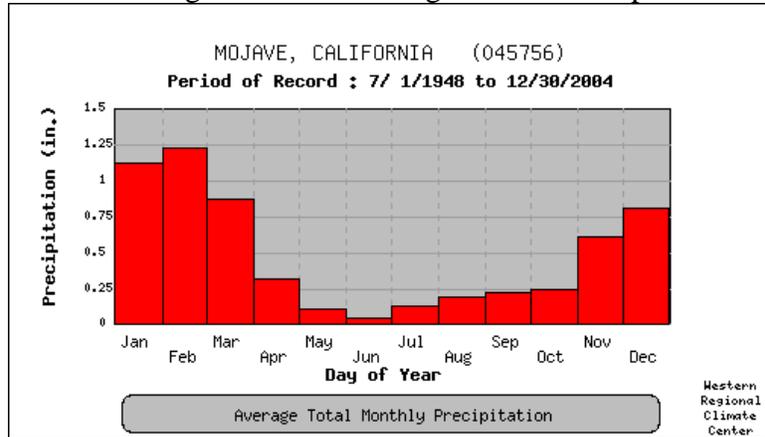
Valley Region Station Average Annual Precipitation



Mountain Region Station Average Annual Precipitation



Desert Region Station Average Annual Precipitation



Hail is a round ball of ice that falls from a cumulonimbus (thunderstorm) cloud. Hail can range in diameter from pea sized to baseball or even grapefruit sized. The greater the diameter the more destructive and dangerous the hail can be.

Hail, thunderstorms, and heavy rains can result in property damage and injury. Hail and wind often accompanies thunderstorms and can break windows, dent automobiles, damage rooftops, and injure persons. Unseasonable intense rain showers can contribute to crop damage and can overwhelm local drainages mechanisms and contribute to flooding. Thunderstorms can overturn poorly secured mobile homes, tear roofs off houses and topple trees. Often, downed trees fall across power lines or winds topple the power poles, causing power outages.

Hazard Extent. *Extensive.* Heavy rains, thunderstorms and hail can happen anywhere in the County, even in areas that typically have little average annual precipitation such as the Valley and Desert regions.

Past Occurrences. Based on the combined NCDC/SHELDUS databases, there have been 16 significant hail events in Kern County since 1973, resulting in at least \$506,250 in crop damages and \$15, 000 in property damages. Lightning has caused \$415,000 in property damage since 1996. Details on these events are provided in the table below.

HAIL EVENTS IN KERN COUNTY					
DATE	LOCATION	DTH	INJ	PRD	CROP
02/14/1973	SAN JOQUIN VALLEY	0	0	0	6,250
06/19/1982	KERN	0	0	0	0
03/16/1990	BAKERSFIELD	0	0	0	500,000
09/05/1991	KERN	0	0	0	0
12/13/1995	Weedpatch	0	0	0	0
12/13/1995	Bakersfield	0	0	0	0
10/30/1996	Bakersfield	0	0	0	0
02/17/1997	Bakersfield	0	0	0	0
03/22/1997	Bakersfield	0	0	0	0
09/02/1997	Rosamond	0	0	0	0
09/02/1997	Lake Isabella	0	0	0	0
09/02/1997	Kernville	0	0	0	0
03/13/1998	Bakersfield	0	0	0	0
02/16/2000	Lamont	0	0	0	0
08/01/2000	Tehachapi	0	0	0	0
09/03/2003	Lake Isabella	0	0	15,000	0

LIGHTNING EVENTS IN KERN COUNTY					
DATE	LOCATION	DTH	INJ	PRD	CRD
08/21/1995	Ridgecrest	0	1	0	0
03/22/1997	Bakersfield	0	0	50000	0
03/22/1997	Wasco	0	0	0	0
09/02/1997	Tehachapi	0	0	5000	0
05/05/1998	Bakersfield	0	1	100000	0
05/05/1998	Old River	0	0	20000	0
09/02/1998	Bakersfield	0	0	0	0
07/11/1999	Tehachapi	0	0	0	0
07/12/1999	Mettler	0	0	110000	0
07/13/1999	Inyokern	0	0	5000	0
09/22/1999	(bfl)meadow	0	0	0	0
09/23/1999	Wasco	0	0	0	0
08/28/2000	Lake Isabella	0	0	0	0
03/06/2001	Oildale	0	0	0	0
03/06/2001	Bakersfield	0	0	0	0
07/30/2003	(bfl)meadow	0	0	0	0
07/30/2003	Taft	0	0	50000	0
07/30/2003	(bfl)meadow	0	0	75000	0
07/30/2003	Delano	0	0	0	0
08/26/2003	Countywide	0	0	0	0
09/03/2003	Democrat Sp	0	0	0	0

The combined NCDC/SHELDUS databases list at least 13 Unseasonal/Heavy Rain events and 6 damaging thunderstorm events between 1960-2004 that have included Kern County. Some of these events include areas outside of Kern County, but the total damages for these events is at least \$6,197,653 in property losses and \$1,907,684 in crop losses. The local National Weather Service office in Hanford posts monthly storm data summaries on its webpage, dating back to 1996. The website has very detailed information of severe or unusual weather events. The storm summaries can be viewed at <http://www.wrh.noaa.gov/hnx/svdata.php>.

Frequency/Likelihood of Occurrence. *Highly Likely.* In the mountain areas of California, thunderstorms that can be observed by radar average 50 to 60 days per year (*source: <http://www.wrcc.dri.edu/narratives/CALIFORNIA.htm>*). Given the history of severe weather events in Kern County, severe weather, including thunderstorms, heavy rain, wind and lightning are very likely to continue to occur annually in the Kern County planning area.

Seasonal Patterns. As shown in the previous climate summaries, heavy rains and severe storms occur in the planning area primarily during the late fall, winter and spring seasons, but thunderstorms may occur in California at any time of the year. Hail events generally occur in the summer months.

Speed of Onset/Duration. Severe thunderstorms generally build and dissipate rapidly, but can last for several hours. The National Weather Service (NWS) can usually predict when a storm will occur, and Doppler radar can monitor the movement of these storms. The NWS will issue a Severe Thunderstorm Watch when conditions are favorable for producing a severe thunderstorm within the next 6 hours. A Severe Thunderstorm Warning is issued when the severe weather is occurring or is imminent.

Magnitude/Secondary Affects. Severe thunderstorms can spawn flash floods, tornadoes, hail, strong winds, and lightning. Associated hazards include utility outages, arcing power lines, downing of trees, debris blocking streets and an occasional structure fire.

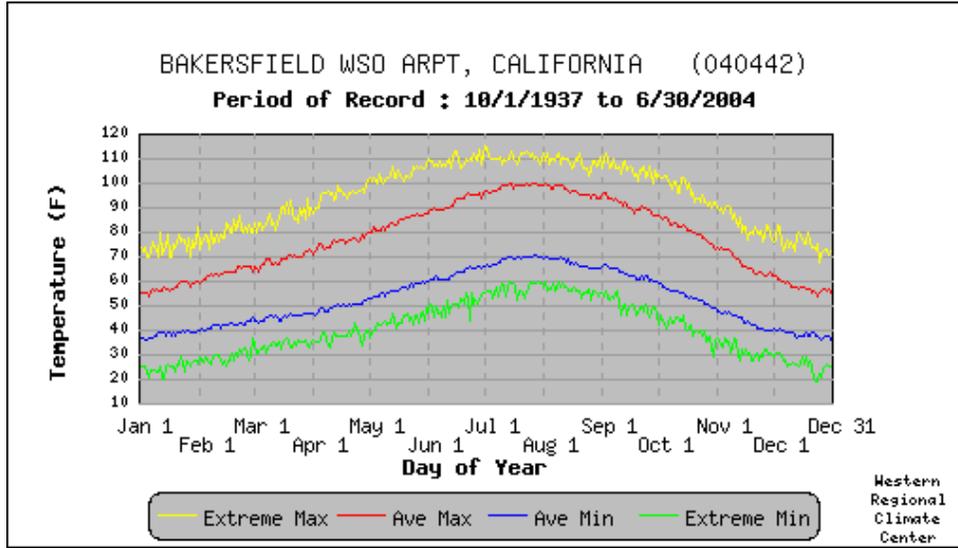
Significance. *Medium*

Mitigation Options/Feasibility. *Limited.* Warning systems and public awareness and education campaigns can help reduce impacts to life safety. Insurance can help reimburse property losses.

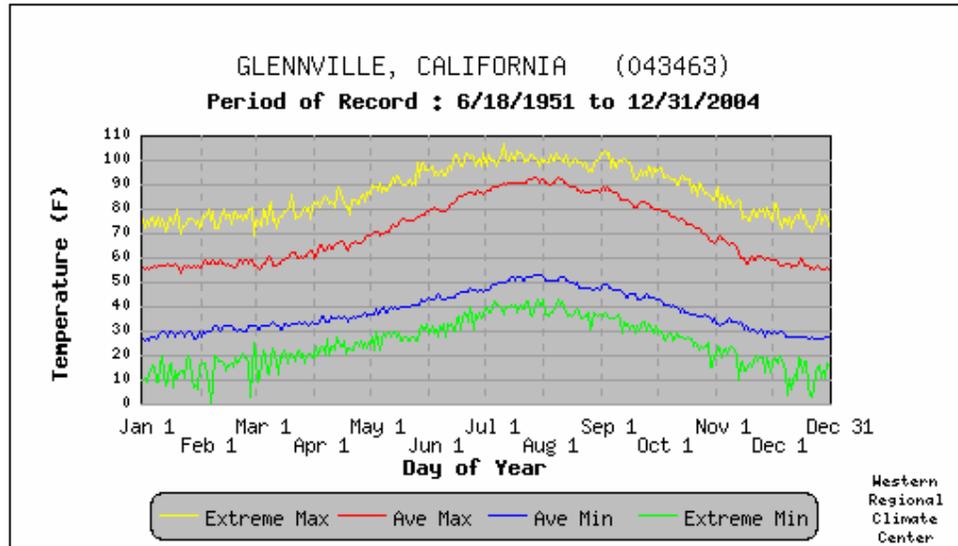
EXTREME TEMPERATURES

Hazard/Problem Description. Temperature hazards result from significant drops or rises in temperature or from extended periods of high/low temperatures. Extreme temperature events, both hot and cold, can have severe impacts on natural ecosystems, agriculture and other economic sectors, and human health and mortality. The average and extreme monthly temperatures for Valley, Mountain, and Desert locations are presented in the figures below.

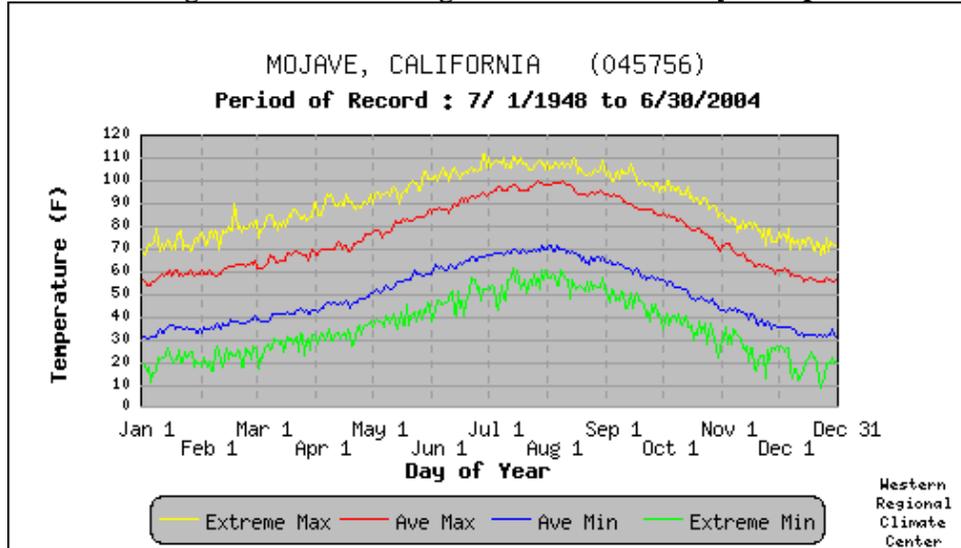
Valley Region Station Average and Extreme Daily Temperature



Mountain Region Station Average and Extreme Daily Temperature



Desert Region Station Average and Extreme Daily Temperature



- - Extreme Max is the maximum of all daily maximum temperatures recorded for the day of the year.
- - Ave Max is the average of all daily maximum temperatures recorded for the day of the year.
- - Ave Min is the average of all daily minimum temperatures recorded for the day of the year.
- - Extreme Min is the minimum of all daily minimum temperatures recorded for the day of the year.

High temperatures. Temperatures that hover 10 degrees or more above the average high temperature for the region and last for several weeks are defined as extreme heat by FEMA. In a normal year, approximately 175 Americans die from extreme heat. Young children, elderly people, and those who are sick or overweight are more likely to become victims. Farm workers are also more at risk. High temperatures are also a danger to developing crops.

Cold temperatures and freezes. Unseasonably cold temperatures can have tremendous impact on crops in Kern County. The growing season in Kern County is approximately 277 days per year. The frost-free period usually extends from mid-February to mid November. According to the Western Daily Climate Center data, crops are most vulnerable to below freezing temperatures during the months of November through February in the Bakersfield area.

Hazard Extent. *Extensive.* The entire county is susceptible to extreme temperatures. The

Extreme Temperature Historic Incident

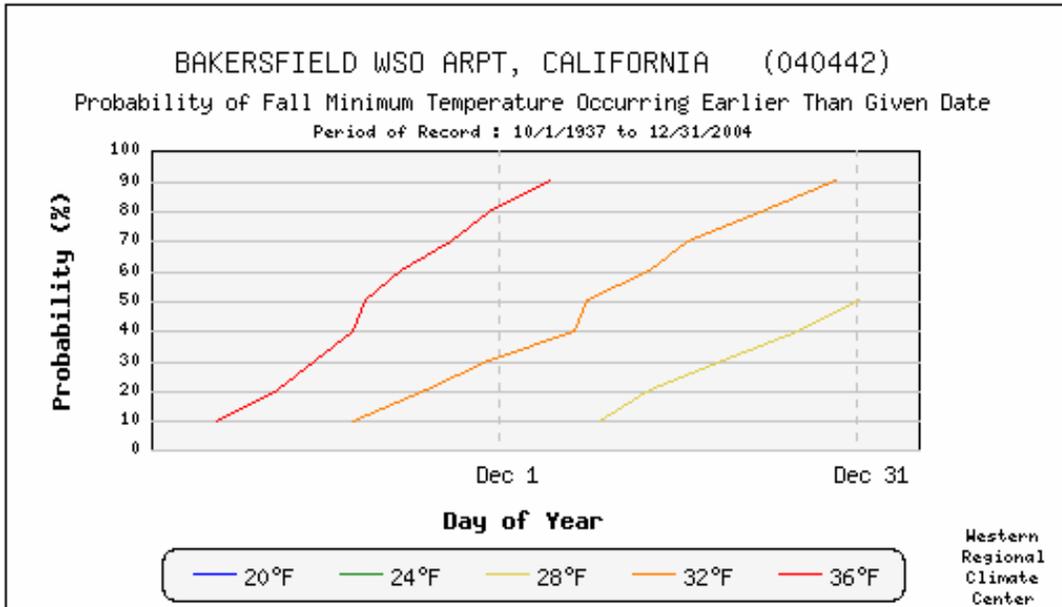
June 30-July 5th 2001 - *From the last day of June through the first 5 days in July, temperatures soared above 100 degrees F. in the Central and Southern San Joaquin Valley as well as the Kern Mountain area around Lake Isabella. The warmest day was the 3rd when Fresno and Bakersfield both climbed to 110°F with 108°F at Lake Isabella. This peak day occurred with the day before and after around 105°F on the S.J. Valley floor. With accompanying high humidity due to an early season monsoon flow, the Bakersfield Heat Index climbed to 112°F. While not meeting criteria for Heat Advisories, it was also quite warm in the Kern Deserts during this period with 112°F at Inyokern. In the Southern Sierra Nevada, Yosemite Valley reached 100°F!*

agricultural dominated Valley region of the county is likely to experience the greatest impacts from large or unseasonable temperature variations.

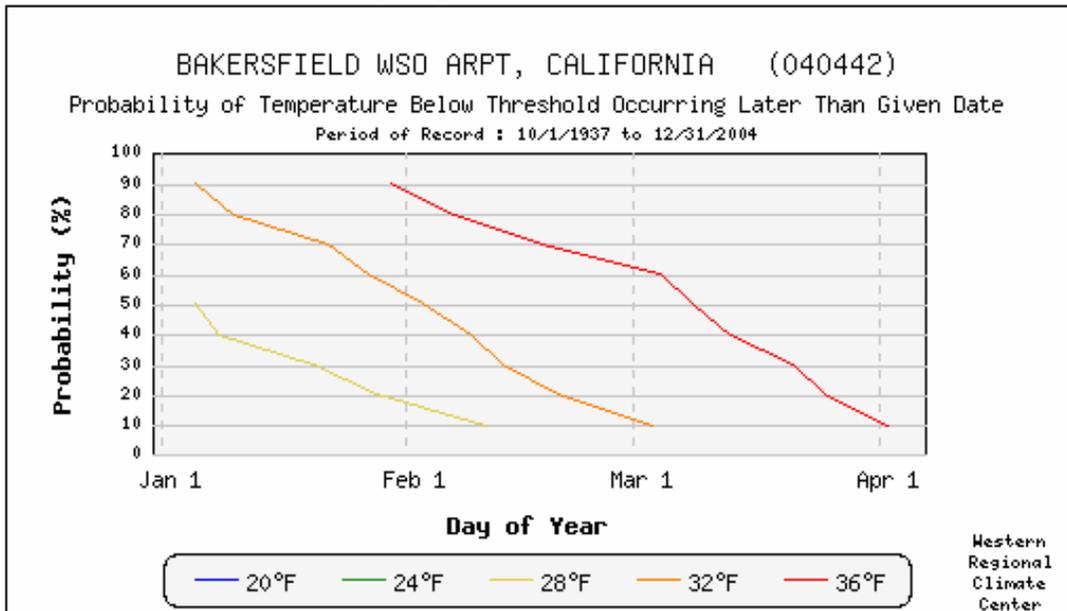
Past Occurrences. The NCDC/SHELDUS database shows 9 periods of excessive heat that were experienced between 1960-2004. A grape picker recently died from exposure to extreme heat after 10 hours of working in 100-plus degree heat on July 18, 2004. Kern County's agriculture industry has suffered from several freeze events. The database lists 6 extreme cold and 2 freeze events. Between December 20 and 28, 1998, California's San Joaquin Valley farming communities were hit with freezing temperatures that severely impacted the region's crops and resulted in a Presidential Disaster Declaration. The disaster declaration issued February 9, 1999 made federal funds available specifically to supplement unemployment compensation for farm laborers and other farm industry workers put out of work as a direct result of lost citrus and seasonal crops in Fresno, Kern, Kings, Madera, Monterey, and Tulare counties. FEMA provided \$6.9 million for mortgage and rental assistance to over 6,000 individuals across the six county disaster area (Source: http://www.fema.gov/regions/ix/disasters_region9.fema#CA). Severe prolonged freezing temperatures caused freezing of water tanks and pipes in 250 residences in the Golden Hills area during December 1990 and February 1991. A 5,000 gallon tank and .5 million gallon tank of water froze after several days of low temperatures. Hot temperatures in the Golden Hills area contributed to prolonged power outages and electrical power rationing during the summer of 1995. Some 7,000 residences were without domestic water due to the power outage, and the sudden loss of power damaged on of the Golden Hill's Community Service District's pumps (Source: Golden Hills Community Service District).

Frequency/ Likelihood of Future Occurrences. *Highly Likely* - Temperature extremes are likely to continue to occur annually in the Kern County planning area. The following graphs indicate the likelihood of freezing temperatures for the Bakersfield area (Source: <http://www.wrcc.dri.edu/summary/climsmsca.html>).

Fall Freeze Probabilities



Spring Freeze Probabilities



Seasonal Patterns. Extreme hot temperatures occur between May-August. Freezing temperatures in the Valley can occur during November to February in the Valley.

Speed of Onset/Duration. Temperature events can last hours to several days.

Magnitude/Secondary Affects. Temperature events can have a devastating effect to the agricultural economy in Kern County. The County’s numerous farm workers are at risk every year to heat exposure.

Significance. *Medium*

Mitigation Options/Feasibility. *Partial*

TORNADOES

Hazard/Problem Description. Tornadoes are another weather-related event that affects the planning area. Tornadoes are rotating columns of air marked by a funnel-shaped downward extension of a cumulonimbus cloud whirling at destructive speeds of up to 300 miles per hour. They usually accompany a thunderstorm. Tornadoes are the most powerful storms that exist. They can be comprised of the same pressure differential that fuels 300-mile wide hurricanes across a path only 300 yards wide or less. Tornado magnitude is ranked according to the Fujita scale listed below:

<u>FUJITA TORNADO SCALE</u>	
F0:	40-72 mph (35-62 knots)
F1:	73-112 mph (63-97 knots)
F2:	113-157 mph (137-179 knots)
F3:	158-206 mph (137-179 knots)
F4:	207-260 mph (180-226 knots)
F5:	261-318 mph (227-276 knots)

Past Occurrences. Based on the NCDC Storm Event Database Kern County has experienced at least ten tornadoes within the past 16 years:

Location or County	Date	Time	Type	Mag	Dth	Inj	PrD	CrD	
1 <u>KERN</u>	04/20/1988	1340	Tornado	F0	0	0	3K	0	
2 <u>KERN</u>	03/17/1991	2130	Tornado	F1	0	0	250K	0	
3 <u>KERN</u>	03/25/1991	1620	Tornado	F0	0	0	0K	0	
4 <u>KERN</u>	03/26/1991	1607	Tornado	F0	0	0	0K	0	
5 <u>Mcfarland</u>	02/23/1993	1405	Tornado	F0	0	0	5K	0	
6 <u>Edwards Air</u>	06/26/1995	1650	Tornado	F0	0	0	0	0	
7 <u>Bakersfield</u>	11/22/1996	03:43 PM	Tornado	F0	0	0	0K	0K	
8 <u>Bakersfield</u>	02/17/1997	02:15 PM	Tornado	F0	0	0	10K	0K	
9 <u>Mcfarland</u>	03/22/1997	04:37 PM	Tornado	F0	0	0	0	0	
10 <u>Bakersfield</u>	04/03/1999	04:30 PM	Tornado	F0	0	0	3K	0	
<i>Source: http://www4.ncdc.noaa.gov/cgi-win/wwcgi.dll?wwEvent~storms</i>					TOTALS:	0	0	271K	0

Hazard Extent. *Significant.* Based on the NCDC data and tornado behavior, tornadoes are more likely to hit the flatter, lower elevations of the county. However, a tornado was observed on July 7, 2004 by a hiker at 12,000 feet in Sequoia National Park, in the Sierras just north of Kern County, indicating that the higher elevations are not totally immune (*Source: <http://www.spc.noaa.gov/faq/tornado/>*).

Seasonal Patterns. Based on the NCDC data, tornadoes can occur almost any time of year, but appear more prevalent in March and April.

Speed of Onset/Duration. Tornadoes develop rapidly and can occur without warning. The NWS can predict the weather patterns that produce tornadoes and issue tornado warnings or watches when warranted. Most tornadoes last less than 10 minutes, though some have been observed to last an hour (Source: <http://www.spc.noaa.gov/faq/tornado/>).

Frequency/Likelihood of Occurrence. Based on data from 1950 to 1995, California ranks 32nd (compared to other states) for frequency of tornadoes, 36th for injuries and 31st for cost of damages. When compared to other states by the frequency per square mile, California ranks number 44th for the frequency of tornadoes, number 44th for injuries per area and number 40th for costs per area. (Source: www.disastercenter.com)

There have been ten recorded tornadoes in Kern County during the 52-year period of record, or one tornado every 5.2 years on average. This equates to an annual chance of occurrence at 19.2 percent. There are no official recurrence intervals calculated for tornadoes. However, if one assumes a tornado affects only one square mile and there are 8,073 square miles in Kern County, the annual probability of a tornado hitting any particular square mile in the planning area is .192 in 8,073, or a 0.002 percent (.000002) chance.

Magnitude/Secondary Affects. Tornadoes in California are rarely severe, and there is no record of tornadoes in Kern County greater than F1. Even small tornadoes can be damaging if they hit a populated area. However since the likelihood is small and the duration typically short, the expected average damages from a tornado in Kern County is considered to be slight.

Significance. *Low*

Mitigation Options/Feasibility. *Partial*

WINTER STORMS

Hazard/Problem Description. Winter storms occur when precipitation and freezing temperatures mix to produce a significant accumulation of snow or ice. Winter storms are often worsened by wind that produces blowing and drifting snow and reduced visibility. Winter storms can be quite disruptive. Road closures can occur causing people to become stranded; traffic occur; power, water, transportation and sewer services can be temporarily interrupted. These events can cause great impact to a community depending on the severity and duration of a storm.

Hazard Extent. *Significant.* The entire mountain region is susceptible to winter storms. The Valley and High Desert regions rarely experience snow, but occasionally have had snowstorms resulting in school closures.

Past Occurrences. The NCDC/SHELDUS database contains record of 37 major winter storm events between 1962 and 2004, associated with 2 deaths and 3 injuries and 5.9 million in property damage. Damaging storms occurred in 1962, 1989, 1992, 1993, 1994, 2000, 2001,

2002, 2003, and 2004. According to the Kern Historical Society a notable severe winter storm occurred on January 29-30, 1922.

Frequency/Likelihood of Occurrence. Based on the NCDC/SHELDUS data major winter storms have recurrence interval of 1.13, or an 88% chance of occurring any given year.

Seasonal Patterns. Winter storms occur during the months of October through May in the higher elevations.

Speed of Onset/Duration. Winter Storms can begin suddenly, but significant storms are typically predicted and allow several days warning. Winter storms can last for several days.

Magnitude/Secondary Affects. *Limited*

Significance. *Low*

Mitigation Options/Feasibility. *Partial.* Mitigation related to winter storms include a plowing and winter maintenance program.

FOG

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

The interior California valleys have their own unique fog problem called the tule fogs. Tule fogs are “radiated” out of the ground and can develop into several layers of fog that can be thousands of feet thick. The fog develops in the San Joaquin Valley during calm, stable air conditions combined with moisture in the ground and a chilling factor. The tule fogs get their name from the tule reeds. These cattail reeds grow around the swamps and deltas of the great Tulare Lake that once covered the southern end of the San Joaquin Valley.

The problem with fog is that it can have devastating effects on transportation corridors in the County. Nighttime driving in the fog can be incredibly dangerous. Multi-car pileups have resulted from drivers using excessive speed for the conditions and overdriving the visibility. These wrecks can cause multiple injuries and deaths and can have serious implications for health, safety, and environment if a hazardous or nuclear waste shipment is involved. Other disruptions from fog include delayed air traffic into the Bakersfield airport and delayed emergency response vehicle travel, Flight For Life groundings, and school closures.

Hazard Extent. *Significant.* Fog affects the Valley and Mountain Regions. Fog typically settles into the low lying areas of the San Joaquin Valley and the Tehachapi Valley.

Past Occurrences. The NCDC data shows four severe fog incidents in 2000, 2002 (2), and 2003. In these four events there has been one death, 55 injuries, and \$1,030,000 in property damage. Primarily, these incidents have been multi-vehicle collisions on the Highway 58 approximately 14-20 miles east-southeast of Bakersfield. This highway was affected in 1986 and in 2002 four separate accidents related to fog and black ice closed this road between Bakersfield and Tehachapi for up to five hours (Source: Tehachapi Area sub-planning group).

Frequency/Likelihood of Occurrence. Highly Likely: Near 100% chance in next year. Bakersfield averages 22 days of fog a year.

Seasonal Patterns. The tule fog season is typically December through February.

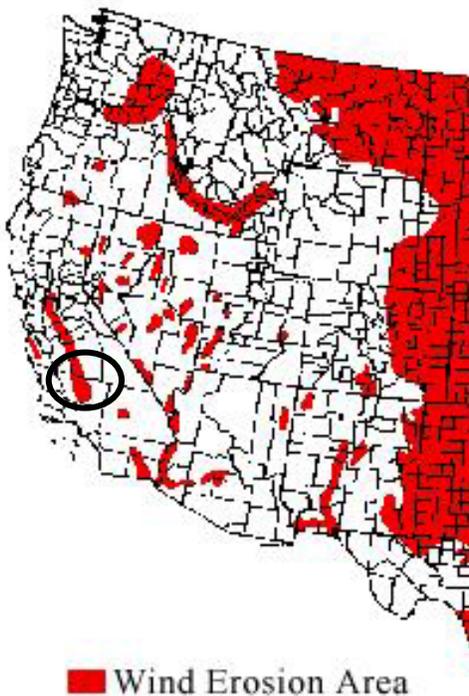
Speed of Onset/Duration. Fog typically forms rapidly in the early morning hours. Tule fogs can last for days, sometimes weeks.

Magnitude/Secondary Affects. *Critical*, more than 25-50% of the planning area affected. See several secondary affects previously discussed under the hazard/problem description

Significance. *Medium*

Mitigation Options/Feasibility. *Partial.* Fog mitigation is primarily a life safety issue related to safe transportation.

DUST STORMS



Hazard/Problem Description. A dust storm occurs when fine particles of soil are driven by strong winds into the air. Dust storms are often a result of wind, severe drought and poor soil conservation practices. A dust storm usually arrives suddenly in the form of an advancing wall of dust and debris that can be several miles long and thousands of feet high. Blinding, choking dust can quickly reduce visibility on highways and lead to chain collisions and massive pileups, similar to the fog hazard. Besides contributing to transportation problems dust storms are a health and safety hazard to persons and animals, and can foul machinery, HVAC systems, and electronic equipment. Water ditches filled with soil can impact water quality and water carrying capacity. Dust storms can be economically damaging to the agricultural industry, since the most fertile part of the soil is removed during events, reducing productivity and threatening the long term stability of the land.

Hazard Extent. *Extensive.* The map of areas susceptible to wind erosion in the United States indicates that the Valley region of Kern County is at risk to dust storms, but the Mountain and Desert can be affected as well *Source* http://www.weru.ksu.edu/new_weru/problem/problem.shtml.

Past Occurrences. Kern County has a history of damaging dust and wind storms, most notably in 1893, 1977, 1927, and 1916. On December 20-21, 1977 a severe wind and dust storm struck the southern valley, causing \$34 million in damage (see Wind hazard section and historic incident profile in this section). Hardest hit was the Arvin-Lamont area, with at least \$10 million in damage to agriculture, businesses, homes and local schools (*Source: Newspaper articles, Kern Library Local History Section*). The Arvin Edison Water Storage District sustained \$720,365 in damages and received \$50,725 from insurance and \$140,400 in disaster relief funds (*source: district*). In 1893 the opening of the East Side Canal had to be delayed due to a dust storm that filled the irrigation canal. The Tehachapi Cummings County Water District lost several pumps due to dust and dirt damage during dust storms in the Cummings Valley area in 1977 and 1988. Severe dust storms affected the Mojave Airport in 2002 and 2003 that damaged power lines, pitted windows, damaged building siding and roofs, reduced aircraft traffic and affected fuel sales and restaurant patronage (*source: Mojave Spaceport Airport District*).

Dust Storm Historic Incident

December 20-21, 1977 – Winds approaching 200 miles per hour roared down Bear Mountain near Arvin, tearing an estimated 25 million tons of soil from grazing lands alone and sending up a plume of dust that rose 5,000 feet and drifted up the valley. Five people were killed as a result of injuries sustained in automobile accidents caused by poor visibility. Many people were trapped in cars while all major arteries, including Interstate 5, were closed. Highways 58 and 223 were closed for weeks. Many small buildings had doors and roofs blown out. Many downed power lines fell near Highway 166 and Shallock Road. Many exposed electrical panels were filled with sand. Damage was estimated at \$34 million countywide. *Source: Bakersfield Californian article 12/20/87 and Wheeler Ridge-Maricopa Water Storage District.*

According to NCDC/SHELDUS data a dust storm on August 27, 1972 resulted in 7 deaths and 90 injuries in Kern County. Three separate dust storms in 1991 resulted in 57 injuries and \$557,142 in property damage. A dust storm on October 24, 1998, caused over \$66,000 in damage.

Frequency/Likelihood of Occurrence. Based on at least nine damaging dust storms in the past 110 years (1893-2003) the recurrence interval for dust storms equals about every 12 years, or an 8% chance of one occurring in any given year.

Seasonal Patterns. A review of the dust storm history shows that the most destructive events have happened in December, but storms have occurred in February, March, August, and October.

Speed of Onset/Duration. Dust storms usually arrive and leave quickly, though some of the more serious windstorms have lasted 36 hours or more.

Magnitude/Secondary Affects. *Critical*, as more than 25-50% of the planning area is affected. Secondary affects include soil erosion and deposition problems, and spreading of valley fever

spores and other airborne health hazards that may aggravate respiratory conditions. Outdoor activities are halted, resulting in many indirect economic impacts.

Significance. *High*

Mitigation Options/Feasibility. *Partial.* Modern farming and irrigation practices will help reduce the severity of future dust storms.

FLOODS

Hazard/Problem Description. Floods are among the most costly natural disasters in terms of human hardship and economic loss nationwide. There are four different types of flood events in the Kern County area: flash, riverine, canal breach and urban stormwater. Regardless of the type of flood, the cause is often the result of severe weather and excessive rainfall, either in the flood area or upstream reach.

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 on a relatively small drainage area. Precipitation of this sort usually occurs in the spring and summer. Dam failures also often result in flash flooding. However, dam failures are discussed separately later in this plan. Floods that are induced by seismic activity may be of significance in areas where earth movement causes failure of dams, canal banks, or where landslides block drainage channels, streams, and/or rivers.

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. 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.

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 assure that any increases are accommodated.

The area adjacent to a channel is the floodplain. A floodplain is the area that is inundated during a flood event. It is often physically discernible as a broad, flat area created by prior floods. The larger the floodplain, the greater the area that is at risk to flooding. Floodplains are illustrated on inundation maps, which show areas of potential flooding and water depths. In its common

usage, the floodplain most often refers to that area that is inundated by the 100-year flood, the flood that has a one percent chance in any given year of being equaled or exceeded. The 100-year flood is the national minimum standard to which communities regulate development in the floodplains through the National Flood Insurance Program (NFIP).

Floods have resulted in lives lost, direct damages, and indirect damages by disrupting area schools, temporary road and railroad closures, evacuations of homes and dislocated residents. Agriculture and public facilities are often impacted. These impacts include direct crop losses, planting delay, irrigation system damages, and erosion and deposition damages to agricultural lands and improvements. Often the damages from erosion and deposition are typically a greater problem to farm production than is the direct inundation. Flooding problems throughout Kern County are aggravated by undersized or insufficient drainage facilities.

Hazard Extent. *Major Sources of Flooding in Kern County*

Kern County, due to its large extent and varied geography, has several hundred potential flood sources and approximately one-half million acres of FEMA identified Special Flood Hazard Areas (SFHA's). The types of floodplains within the County are very diverse and include riverine floodplains (fast moving channelized flow), distributary flow floodplains (very 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 nine lake basins in the County. These basins include 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. 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 Interite built in 1977.

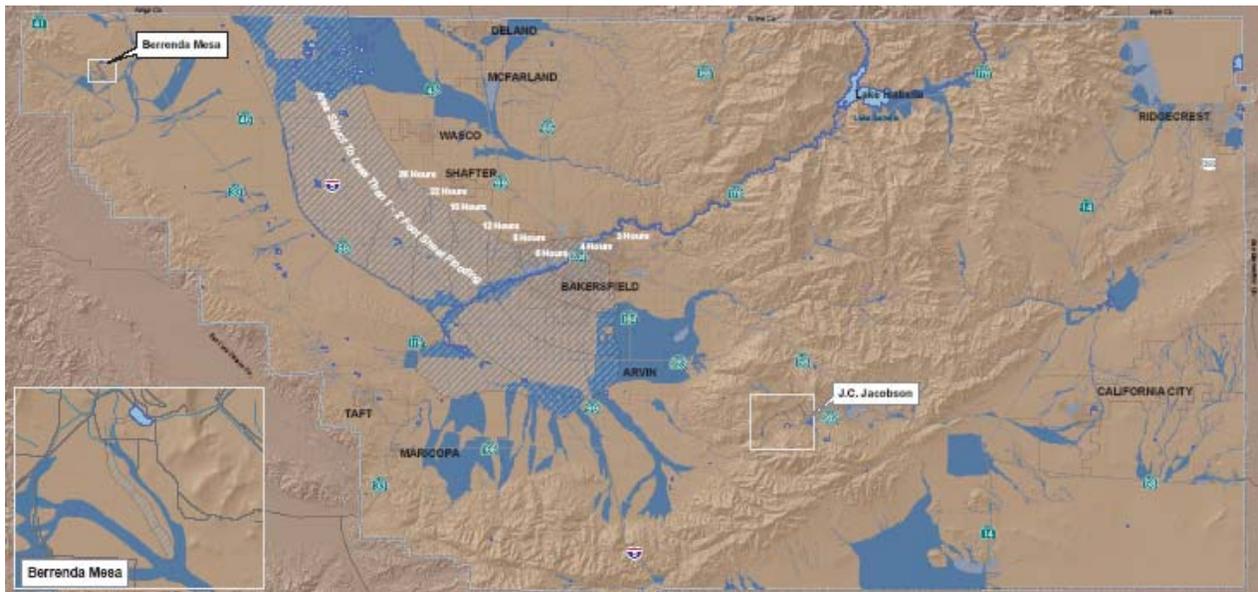
Valley Flood Sources. The Kern River is the source of flood problems for Bakersfield. Many small streams also cause flooding problems in the Valley where they discharge from steep canyons. While confined in the upland areas the streams tend to spread onto alluvial fans with poorly defined drainages on the valley floor. Flow is further disrupted by cultivation and urbanization. This type of flooding occurs at the Little Poso River, Caliente Creek, and Walker Basin 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. Flood problems in the Kern Lake Basin (a sub basin of the Tulare Lake Bed) are further detailed in the "Kern Lake Coordinated Resource Management and Planning (CRMP) Group Preliminary Status Report: Flood Control and Mitigation for the Kern Lake Basin 2000". 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 1050 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.

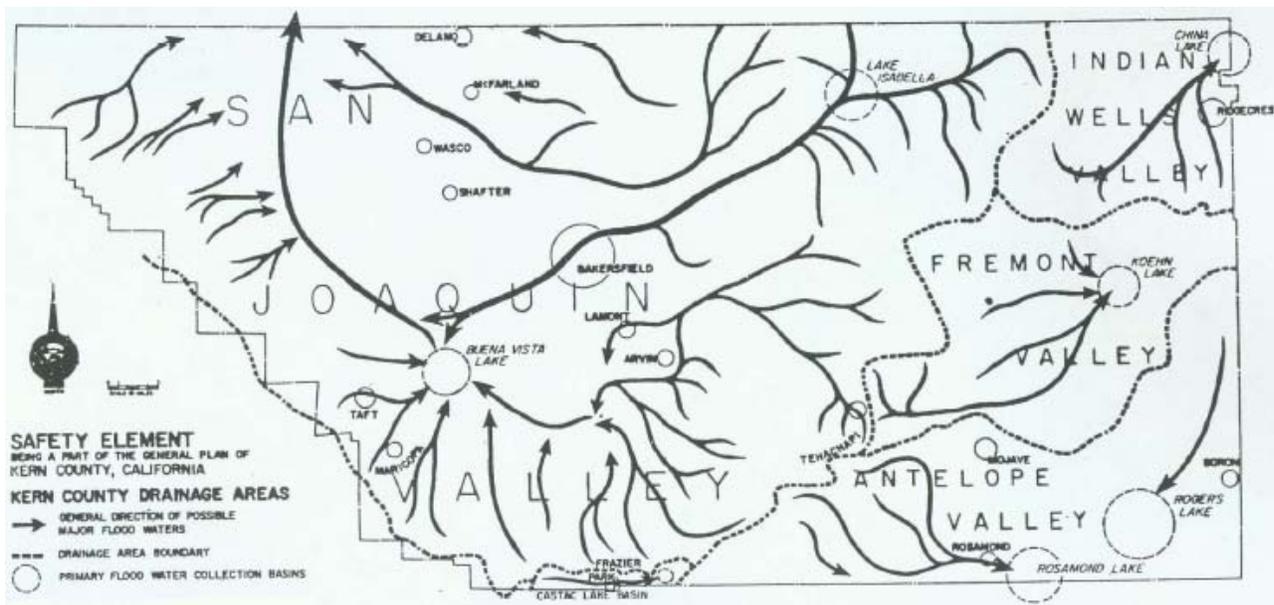
Desert Flood Sources. The desert has flood problems similar to the Valley where intermittent streams shift across alluvial fans. Streets, roads, and railroads often divert flows and may increase flood problems. Most flood sources that affect the Boron and Ridgecrest areas originate in local drainages; only Jawbone Canyon Wash originates in the Sierra Nevada range.

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.



Kern County Flood Plains and Dam Inundation Areas

Source: Kern COG Master Environmental Assessment Resource Atlas 2004. Dark blue represents the 100 year floodplain. Light blue is the 500 year flood plain, and hatched areas represent dam inundation zones.



Kern County Drainage Areas Map
 Source: Kern County General Plan Safety Element

Past Occurrences. Past flood events have been compiled by researching the Kern Historical Society webpage, the Kern County Flood Insurance Study (FIS), the Kern Lake Coordinated Resource Management and Planning Group (CRMP) 2000 report, and from input by HMPC members. Specific impacts and damages are listed, where available. The following table is based on the NCDC and SHELDUS Storm Event Database for Kern County and details the more recent flood events since 1972. This is followed by a discussion of the major events in more detail and includes a history of other floods that date back to 1862. Floods have resulted in at least 13 state and federal disaster declarations since 1950.

Summary of NCDC/SHELDUS Flood Events affecting Kern County since 1972- 2004

Location	Date	Event type	Death	Injuries	Property Loss	Crop Loss
BAKERSFIELD	06/07/1972	FLOODING	1	0	\$50,000.00	\$0.00
ENTIRE STATE - CA	01/16/1973	FLOODING, SEVERE	0	0	\$86,206.90	\$0.00
KERN CO.	03/01/1983	FLOODING	0	0	\$50,000.00	\$50,000.00
LARSEN TRACT	07/15/1984	FLOODING	0	0	\$50,000.00	\$5,000.00
LARSEN TRACT	07/16/1984	FLOODING	0	0	\$50,000.00	\$0.00
	07/18/1984	FLOODING	0	0	\$50,000.00	\$0.00
	07/27/1984	FLOODING	0	0	\$50,000.00	\$5,000.00
LAKE ISABELLA	07/30/1984	FLOODING	0	0	\$50,000.00	\$0.00
ONYX	07/30/1984	FLOODING, LIGHT	1	6	\$500,000.00	\$5,000.00
ONYX	08/20/1984	FLOODING	0	0	\$50,000.00	\$0.00
LAKE ISABELLA	09/19/1984	FLOODING	0	0	\$50,000.00	\$5,000.00
	03/01/1991	FLOODING, SEVERE	0	0	\$50,000.00	\$0.00

Location	Date	Event type	Death	Injuries	Property Loss	Crop Loss
	03/17/1991	FLOODING, SEVERE	0	0	\$50,000.00	\$0.00
	02/11/1992	FLOODING, WINTER W	0	0	\$11,627.91	\$0.00
ROSAMOND	02/12/1992	FLOODING	0	0	\$50,000.00	\$0.00
	02/14/1992	FLOODING, WINTER W	0	0	\$9,090.91	\$0.00
Mojave	01/25/1995	Flash Flood	0	0	\$5,000,000.00	\$500,000.00
	01/25/1995	FLOODING	0	0	\$500,000.00	\$50,000.00
Monthly Ag L	03/01/1995	Flood/rain/wind	0	0	\$0.00	\$22,000,000.00
COUNTYWIDE	01/04/1997	FLOODING	0	0	\$50,000.00	\$18,566,667.00
BAKERSFIELD	03/22/1997	FLOODING	0	0	\$150,000.00	\$0.00
Bakersfield	03/22/1997	Urban/sml Strea	0	0	\$150,000.00	\$0.00
Ridgecrest	09/02/1997	Flood	0	0	\$50,000.00	\$0.00
Cantil	09/03/1997	Flash Flood	0	4	\$5,000,000.00	\$0.00
Onyx	09/03/1997	Flash Flood	0	0	\$5,000.00	\$0.00
Mojave	09/03/1997	Flash Flood	0	0	\$10,000.00	\$0.00
Lebec	12/05/1997	Heavy Rain	1	0	\$0.00	\$0.00
Bakersfield	02/01/1998	Heavy Rain	0	0	\$12,500,000.00	\$5,400,000.00
Bakersfield	02/02/1998	Flash Flood	0	0	\$0.00	\$0.00
Lamont	02/02/1998	Urban/sml Strea	0	0	\$0.00	\$0.00
Cantil	02/03/1998	Flash Flood	0	0	\$0.00	\$0.00
Lost Hills	02/03/1998	Flash Flood	0	0	\$0.00	\$0.00
Lamont	02/22/1998	Urban/sml Strea	0	0	\$0.00	\$0.00
Mojave	02/23/1998	Flash Flood	0	0	\$10,000.00	\$0.00
	02/23/1998	FLOODING	0	0	\$10,000.00	\$0.00
	02/23/1998	FLOODING	0	0	\$6,000,000.00	\$0.00
Weed Patch	02/23/1998	Urban/sml Strea	0	0	\$0.00	\$0.00
	02/24/1998	FLOODING	0	0	\$50,000.00	\$0.00
Maricopa	03/25/1998	Urban/sml Strea	0	0	\$0.00	\$0.00
Lamont	03/28/1998	Urban/sml Strea	0	0	\$0.00	\$0.00
Bakersfield	03/31/1998	Urban/sml Strea	0	0	\$0.00	\$5,700,000.00
Bakersfield	04/26/1998	Urban/sml Strea	0	0	\$0.00	\$0.00
Bakersfield	05/01/1998	Heavy Rain	0	0	\$0.00	\$5,900,000.00
Bakersfield	05/02/1998	Flash Flood	0	0	\$0.00	\$0.00
Lamont	05/02/1998	Urban/sml Strea	0	0	\$0.00	\$0.00
	05/05/1998	FLOODING	0	0	\$120,000.00	\$0.00
Bakersfield	05/05/1998	Urban/sml Strea	0	0	\$250,000.00	\$0.00
Taft	05/05/1998	Urban/sml Strea	0	0	\$0.00	\$0.00
	06/01/1998	FLOODING	0	0	\$133,333.33	\$33,333,333.33
Glennville	06/03/1998	Heavy Rain	0	0	\$0.00	\$0.00
Rosamond	08/11/1998	Flood	0	0	\$0.00	\$0.00

Location	Date	Event type	Death	Injuries	Property Loss	Crop Loss
Inyokern Airport	08/30/1998	Flash Flood	0	0	\$10,000.00	\$0.00
Lake Isabella	05/26/1999	Urban/sml Strea	0	0	\$0.00	\$0.00
Cantil	07/11/1999	Flash Flood	0	0	\$10,000.00	\$0.00
Tehachapi	07/11/1999	Urban/sml Strea	0	0	\$0.00	\$0.00
Rosamond	07/11/1999	Urban/sml Strea	0	0	\$0.00	\$0.00
Tehachapi	02/21/2000	Urban/sml Strea	0	0	\$0.00	\$0.00
Maricopa	02/23/2000	Rain	0	0	\$100,000.00	\$0.00
Mettler	01/11/2001	Urban/sml Strea	0	0	\$0.00	\$0.00
Cantil	02/26/2001	Urban/sml Strea	0	0	\$0.00	\$0.00
Inyokern	02/26/2001	Urban/sml Strea	0	0	\$0.00	\$0.00
Cantil	02/28/2001	Urban/sml Strea	0	0	\$0.00	\$0.00
Lebec	03/05/2001	Urban/sml Strea	0	0	\$0.00	\$0.00
Bakersfield	03/06/2001	Urban/sml Strea	0	0	\$0.00	\$0.00
Frazier Par	07/05/2001	Flash Flood	0	0	\$0.00	\$0.00
Bakersfield	07/06/2001	Flash Flood	0	0	\$0.00	\$0.00
Inyokern	07/06/2001	Flash Flood	0	0	\$0.00	\$0.00
Cantil	07/07/2001	Flash Flood	0	0	\$0.00	\$0.00
CAZ090>091	09/03/2001	Rain	0	0	\$0.00	\$0.00
Bakersfield	11/12/2001	Urban/sml Strea	0	0	\$0.00	\$0.00
Bakersfield	11/08/2002	Urban/sml Strea	0	0	\$23,000.00	\$0.00
CAZ093>097	11/08/2002	Flood	0	0	\$200,000.00	\$0.00
Grape Vine	02/11/2003	Heavy Rain	0	0	\$0.00	\$0.00
Lamont	02/11/2003	Heavy Rain	0	0	\$0.00	\$0.00
CAZ095	02/12/2003	Flood	0	0	\$50,000.00	\$0.00
China Lake	02/13/2003	Heavy Rain	0	0	\$0.00	\$0.00
Maricopa	03/15/2003	Heavy Rain	0	0	\$0.00	\$0.00
Tehachapi	04/21/2003	Heavy Rain	0	0	\$1,000.00	\$0.00
Countywide	05/01/2003	Heavy Rain	0	0	\$0.00	\$9,600,000.00
Tehachapi	07/31/2003	Flash Flood	0	0	\$5,000.00	\$0.00
Tehachapi	08/01/2003	Flash Flood	0	0	\$0.00	\$0.00
Loraine	08/01/2003	Flash Flood	0	0	\$0.00	\$0.00
Tehachapi	08/01/2003	Flash Flood	0	0	\$0.00	\$0.00
Lake Isabel	08/20/2003	Flash Flood	0	0	\$0.00	\$0.00
Kernvale	08/20/2003	Flash Flood	0	0	\$0.00	\$0.00
Lake Isabel	08/20/2003	Flash Flood	0	0	\$0.00	\$0.00
Lake Isabel	08/24/2003	Heavy Rain	0	0	\$0.00	\$0.00
Lake Isabel	08/25/2003	Heavy Rain	0	0	\$0.00	\$0.00
Bodfish	09/03/2003	Heavy Rain	0	0	\$10,000.00	\$0.00
Bakersfield	12/24/2003	Heavy Rain	0	0	\$0.00	\$0.00

Location	Date	Event type	Death	Injuries	Property Loss	Crop Loss
Cantil	08/13/2004	Flash Flood	0	0	\$0.00	\$0.00
JohannesburG	08/14/2004	Heavy Rain	0	0	\$0.00	\$0.00

2005 Rosamond/Caliente Creek Flooding Heavy rains that began in late December 2004 and continued into February 2005 caused widespread flooding. Impacts sustained to the desert community of Rosamond resulted in a FEMA Federal Disaster Declaration for Individual Assistance (IA). Rosamond was impacted by flooding of residences, school and road closures (Source: Rosamond Community Services District). Several homes were flooded in Arvin and a road washed out on the Wheeler Ridge Road (Source: City of Arvin). The Rim Ditch near Herring Road and Hwy 99 suffered approximately \$22,000 in damage (Source: Kern Delta Water District). California City incurred approximately \$3 million in damage to a fire station, police facility, airport terminal and golf course, in addition to roads and culverts, and could receive an estimated \$1 million in FEMA disaster relief funds (Source: California City).

2005 Cuddy Creek Flooding Heavy snows followed by a tropical storm led to runoff which caused high flows and erosion to the banks of Cuddy Creek during January and February in the vicinity of Frazier Park. Kern County Roads Department worked to protect bridges (Source: Kern ESS/Roads Dept.)

2001 Kern Water Bank Canal A portion of this canal failed and resulted in local flooding (Source: California Department of Water Resources San Joaquin District).

1998 Flooding Flooding during this significant El Nino season resulted in a Federal Disaster Declaration, FEMA 1203-DR-CA, 02/06/1998, for Kern County (Source: CA OES). The Community of Lamont was impacted by Caliente Creek flooding. This flood inundated 5,500 acres and caused approximately \$30 million in damages (Source: CRMP 2000 report). Poso Creek flooded Highway 99 and 112 homes in McFarland, causing approximately \$2.5 million in damage (Source: ESS department records, www.wrh.noaa.gov/hnx/stormdat/1998feb.pdf). The City of Taft experienced flooding on May 5 that closed 2nd, 4th, and 6th streets. Approximately \$62,770 in disaster funding was received by the Kern Delta Water Agency. Arvin-Edison Water Storage District sustained approximately \$3 million in damages and received \$2 million in disaster assistance (Source: district). Heavy rains in September caused local flooding in the Antelope Run Channel near Tehachapi, resulting in \$100,000 in USDA-NRCS Emergency Work Project (EWP) (Source: Tehachapi-Cummings County Water District). Stallion Springs Community Services District sustained \$300,000 in damages to about 5 miles of roads owned by the district. Kelso Creek Levee at Weldon was damaged requiring \$21,000 in emergency repair and \$180,000 in restoration (Source: Kern Water Agency). Bear Valley Community Services District received \$500,000 from FEMA for damages within the District.

1997 Flooding Two floods within the Indian Wells Valley and Ridgecrest areas occurred on September 2 and 25 of 1997. Some roads and businesses were closed as a result, and \$100,000 worth of property damage was estimated (Source: City of Ridgecrest). A breach in the Poso Creek levees on January 4th flooded the Valley floor near Wasco, damaging agriculture and causing \$50,000 in damage to two homes (Source: www.wrh.noaa.gov/hnx/stormdat/1997jan.pdf).

1995 Flooding Federal Disaster Declaration, FEMA 1044-DR-CA, 1995 Severe Winter Storms, 01/10/1995. The Community of Lamont was impacted by Caliente Creek flooding. Two floods occurred on Caliente Creek, one in January and another in March. No urban damage occurred, but estimates of road and agricultural damage upstream of Lamont totaled \$3 million from both floods (Source: CRMP 2000 report).. At least \$48,000 in disaster relief funds was spent (source: Kern Delta Water Agency). In addition, Kelso Creek flooded the Weldon Area, causing \$32,000 in emergency repair work (Source: Kern Water Agency)..

1991/1992 Flooding near Rosamond. Above average rain in one storm caused erosion of the wastewater treatment plant pond dikes, created sink holes above water and sewer mains, and closed schools and roads. Damage was estimated to be \$15,000. (Source: Rosamond Community Services District).

1986 Flooding. Heavy rain during the spring caused flooding in the Caliente Creek, Tejon, Sycamore, and El Paso creeks in the southern Valley, flooding Lamont and the Hwy 99/Herring Rd area. Constant rain and runoff caused lower water sales and impeded delivery of water (source: Kern Delta Water District).

1984 Flooding from an intense thunderstorm inundated Lake of the Woods near Frazier Park in August. Three inches of rain fell in 30 minutes. Debris flows were also triggered. 5 people were injured and 27 homes and businesses sustained \$1.9 million in property damage. More than \$200,000 in damage was done to 20-30 county roads (Source: ESS department records, Bakersfield Californian article 8/26/1984).

1984 Ridgecrest and Inyokern flooding – Little Dixie Wash (August). On August 15 Ridgecrest and Inyokern were hit by the worst floods in 30 years. High flows in Little Dixie Wash were diverted into Inyokern by the Inyokern Road and SP Railroad crossings Source: Kern County FIS, 1986. The China Lake Mountain Rescue group was utilized to deliver medications to a stranded person in Randsburg and do wellness checks in Ridgecrest. Damage was estimated at \$4.1 million for Ridgecrest and Inyokern, where 412 residences and businesses were impacted. The homes affected were south of Ridgecrest Blvd and east of China Lake Blvd. Businesses affected were located on Balsam St. The Naval Weapons Center at China Lake was impacted as well, where a data lab sustained \$20 million in damages (Source: City of Ridgecrest, Bakersfield Californian article 8/26/1984).

1984 Flooding in Onyx, Weldon, Lake Isabella. A thunderstorm caused flooding in the Lake Isabella, Onyx, and Weldon area. Three homes were washed off their foundations in South Lake on July 15 by water and mud from a watershed that had been stripped of vegetation by a 26,000 acre wildfire the week before. On July 28 a dozen homes near Erskine and Bodfish creeks were flooded. On July 30, flooding in Scodie Canyon near Onyx washed 30 mobile homes away and injured seven people. Stranded residents had to be airlifted out. Lightning killed one man. Damage was estimated at \$3 million (Source: ESS department records, Bakersfield Californian article 8/26/1984).

1983 Caliente Creek floods Lamont and Arvin and Kelso Creek Floods in Weldon (March). Approximately \$40 million in damage occurred from flows that neared the 100 year event. Damage also occurred in the mountain community of Loraine (Sources: Kern Historical Society and Kern County

FIS, 1986). This flood inundated 12,000 acres and did an estimated \$18 million (\$30.15 million in year 2000 dollars) in damage.

Damages and flood-fighting costs totaled \$3,837,000 for the Arvin-Edison Water District (\$1,354,128 in disaster relief received) and \$132,000 for the Kern-Delta Water District (approximately \$87,000 in disaster relief received) (*Source: districts*). Damage to County roads and State Highways 18 and 223 totaled \$552,000. Southern Pacific Railroad sustained \$4.2 million in damage to tracks in the Caliente Creek canyon (*Source: CRMP 2000 report*). The Tehachapi-Cummings pipeline was exposed and a dirt access road was also damaged during this event. Emergency repairs of the Kelso Creek Levee were required at a cost of \$38,000.

1978 Kern River, Poso Creek, Kelso Creek, and Caliente Creek Flooding (February).

This was calculated to be a 70 year event on the Kern River based on a flow of 8,300 cfs near Bakersfield. The City of MacFarland experienced flooding from Poso Creek. Runoff ponded behind the Friant-Kern Canal and flowed southerly along the east canal bank (*Source: Kern County FIS, 1986*). 580 homes in the community of Lamont were affected by flooding on Caliente Creek. Public water facilities owned by the Arvin-Edison Water Storage District (\$3,928,799 in damage, \$2 million covered by insurance and \$834,600 disaster assistance received) and Kern-Delta Water District sustained damage (\$72,685, with \$70k reimbursed from Federal disaster funds). The Kern Sanitation Authority treatment plant was flooded, but did no permanent damage. This flood inundated 13,000 acres and caused approximately \$7.6 million (\$20.3 million in year 2000 dollars) in damage (*Source: CRMP 2000 report*). Repairs to the Kelso Creek Levee totaled \$155,000. Two people died in this flood (*Source: Bakersfield Californian article 8/26/1984*).

1976 Flash Flooding South Fork Kern River, Kelso Creek, and Erskine Creek (September).

Damage occurred at Uffert Park in the Lake Isabella area. Damage to Kern County Water Agency Improvement District No. 3 levees along Kelso Creek was severe, as the flow was estimated at 1.5 to 2 times the levee design flood. Repairs to the levee totaled \$50,000 (*Source: Kern County FIS, 1986, and Kern Water Agency*).

1975 Flooding in the Lake Isabella and Desert areas (September).

1972 Flash Flooding in East Bakersfield. A June cloudburst and flash flood in East Bakersfield resulted in major damage and two deaths (*Source: Kern Library disaster file newspaper article 12-28-1977*).

1969 San Joaquin Valley and Kelso Creek Flooding (January and February). A series of storms caused flooding on the Kern River, Poso Creek, and in the southern and western portions of the Valley. Flooding also occurred on Kelso Creek in the Mountains near Weldon. Extensive damage occurred to the distribution facilities of the Berrenda Mesa Water District, requiring \$350,000 for repairs. The community of Lamont was impacted as well. \$500,000 (\$2,330,000 in year 2000 dollars) in total damages were estimated and 13,000 acres were inundated. Many homes in the Weldon area were damaged from Kelso Creek including Kelso Creek Road (*Source: CRMP 2000 report and <http://www.bmwd.org/History.htm> and Kern Water Agency*).

1966 Upper Kern River, Caliente Creek, and Kelso Creek Flooding (December 2-7). Extensive damage occurred from an intense 48 hour storm in the Sierra Nevada range northeast of Bakersfield dumped 21 inches of rain. The road from Kernville upstream of Johnsondale was washed out in many places, washing out a bridge that isolated the community of Kernville. A

fish hatchery was destroyed and three people were killed by the flood. Damage was at least \$6 million from this event (Source: *Bakersfield Californian* article 8/26/1984). Isabella Dam mitigated flood affects in the Valley, but flooding on Caliente Creek resulted in \$625,800 in damage to urban and rural property in the Lamont Community. Source: *Kern County FIS, 1986*. \$1,100,000 (\$5,650,000 in year 2000 dollars) in damages were estimated and 4,800 acres were inundated (Source: *CRMP 2000 report*). Many homes in the Weldon area were damaged from flooding on Kelso Creek (Source: *Kern Water Agency*).

1963 Lake of the Woods Flooding. Flood waters overcame a small dam and washed away two homes (Source: *Bakersfield Californian* article 8/26/1984).

1963 Kernville Flooding (February 1-2). Kernville was evacuated after 14 inches of rain fell (Source: *Bakersfield Californian* article 8/26/1984).

1958 Flood. Federal Disaster Declaration, CD 82-DR-CA, 04/04/1958 (Source: CA OES).

1950 Kern River Flood Bakersfield (November). A recurrence interval of 670 years was calculated for this event that occurred 4 years before Isabella dam was constructed. Bakersfield was spared much damage by intensive flood fighting efforts. Approximately 37,000 acres were flooded, and included agricultural areas, the Fruitvale oilfield, Oildale and the Gordon's Ferry bridge that was completely washed out. Some flooding on Poso and Caliente Creeks occurred as well Source: *Kern County FIS, 1986*. Damages: \$2,000,000. An estimated 115 homes and businesses were damaged in Kernville (Source: *Bakersfield Californian* article 8/26/1984).

1945 Caliente Creek Flooding. The City of Arvin and the Community of Lamont were impacted. \$200,000 (\$1,870,000 in year 2000 dollars) in damages were estimated and 7,300 acres were inundated (Source: *CRMP 2000 report*).

1945 Tehachapi Flooding. Flooding occurred during a late summer thunderstorm.

1944 Caliente Creek Flooding. Community of Lamont impacted. \$200,000 (\$1,870,000 in year 2000 dollars) in damages were estimated and 7,600 acres were inundated (Source: *CRMP 2000 report*).

1943 Caliente Creek Flooding. Community of Lamont impacted. 11,700 acres were inundated and \$100,000 in damages (\$995,000 in 2000 dollars) were estimated (Source: *CRMP 2000 report*).

1938 Tehachapi Flooding. Flooding occurred as a result of heavy rains between February 28th and March 4th.

1937 Kern River Flood (February). Fruitvale and Fairhaven areas were affected.

1932 Caliente and Tehachapi Creek Flooding (September). The Santa Fe train washed off the track in a flash flood at the junction of Caliente and Tehachapi Creeks. 15 lives were lost in upstream canyon locations. The community of Lamont and the City of Arvin were impacted. 8,000 acres were inundated and damage was estimated to be \$1,000,000 (\$10,650,000 in 2000 dollars), largely due to the loss of the two locomotive engines (Source: *CRMP 2000 report*).

1916 Kern River Flood (January 17-19). (Source: Kern Historical Society)

1914 Kern River Flood (January 25-27). (Source: Kern Historical Society)

1913 Caliente Creek Flood wiped out the Community of Caliente (Source: Kern Historical Society).

1905 Buena Vista Lake levee broke damaging twelve miles of the Sunset Railroad and flooding over 25,000 acres (July 3)

1893 Kern River Flooded Bakersfield (February 10). (Source: Kern Historical Society)

1867 Great Kern River Flood destroyed many homes (Dec.-early 1868) (Source: Kern Historical Society)

1862 Kern River Flood destroyed many mining operations (Source: Kern Historical Society)

Frequency/Likelihood of Occurrence. Based on the historical data above, Kern County has experienced at least 32 damaging floods in 143 years (1862-2005). This equates to a 22.4% chance of occurrence in any given year, or a 4.5 year recurrence interval. According to Kern County ESS, the Caliente Creek watershed generates flows that reach the valley communities of Lamont and/or Arvin on average of every 7 years. Flooding in this area in the future is certain.

Seasonal Patterns. The majority of the floods in Kern County have occurred from winter-spring rainfall, but several have been the result of intensive cloudbursts in the months of July, August, and September. Flooding in Southern California is often associated with the El Nino weather phenomenon. An 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, which is where they got their name (El Niño means Christ child in Spanish). 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.

Speed of Onset/Duration. Slow rise floods associated with snowmelt and sustained precipitation usually are preceded with adequate warning, though the event can last several days. Flash floods, by their nature, occur very suddenly but usually dissipate within hours. Even flash floods are usually preceded with warning from the National Weather Service in terms of flash flood advisories, watches, and warnings.

Magnitude/Secondary Affects. *Significant.* There are approximately one-half million acres of FEMA identified Special Flood Hazard Areas (SFHA's) in the County. Thus, floods have potential to do widespread economic damage to agriculture in Kern County and impact homes, businesses, inundate or destroy roads and public facilities as well. Secondary affects for flooding

include dam failure flooding and health hazards associated with mold and mildew within flooded homes.

Significance. *High.* Flooding is a considerable problem in Kern County based on past events and the probability of future damaging events.

Mitigation Options/Feasibility. *Extensive.* Several mitigation options exist for flooding since it is a hazard with known boundaries.

DAM FAILURES

Hazard/Problem Description. Dams are man-made structures built for a variety of uses including flood control, power, agriculture, water supply and recreation. When dams are constructed for flood control, they usually are engineered to contain a flood with a computed risk of occurrence. For example, a dam may be designed to contain a flood at a location on a stream that has a certain probability of occurring in any one year. If a larger flood occurs, then that structure will either release water through its spillway or be overtopped. Overtopping is the primary cause of earthen dam failure. Failed dams can create flash floods that have catastrophic impacts on life and property.

Dams typically are constructed of earth, rock, concrete, or mine tailings. Two factors which influence the potential severity of a full or partial dam failure include:

- The amount of water impounded and
- The density, type, and value of development and infrastructure located downstream.

Dam failures can result from any one or a combination of the following causes:

- Prolonged periods of rainfall and flooding
- Earthquake
- Inadequate spillway capacity, resulting in excess overtopping flows
- Internal erosion caused by embankment or foundation leakage or piping
- Improper design
- Improper maintenance
- Negligent operation and/or
- Failure of upstream dams on the same waterway.

Dams and reservoirs have been built throughout California for water supply, flood control, hydroelectric power and recreational facilities. The storage capacities of these reservoirs range from a few thousand acre-feet to five million acre-feet.

Hazard Extent. According to a state dams GIS database, 20 dams lie within the Kern County, and three lie outside that could affect the County if they were to fail. The following dams and dikes are included in the Kern County inundation mapping program: Isabella Lake Dam, Brite Valley Dam, and Haiwee Reservoir, Antelope, Berrenda Mesa, Blackburn, and Fairmont.

Antelope and Blackburn dams are flood control structures that are normally dry. Inundation maps can be found in the Kern County Flood Evacuation Plan for the County and Greater Bakersfield Area. Most of these dams are located in the Mountain region, but would have the greatest impact on the Valley region if failure occurred. Lake Isabella is the largest reservoir in the County and has the potential to impact the majority of Bakersfield if it were to fail.

Kern County Dams

DAMNAME	YEAR COMPLETE	Inundation Map	COUNTY	STREAM	DAMTYPE
AERATED LAGOON	1980	No	Kern	OFFSTREAM	ERTH
ANTELOPE	1987	Yes	Kern	ANTELOPE CREEK	ERTH
BAP PONDS 1, 2,3	PROPOSED	No	Kern	OFFSTREAM	ERTH
BERRENDA MESA	1967	Yes	Kern	UNNAMED	ERTH
BIG FOUR RANCH	1970	No	Kern	UNNAMED	ERTH
BLACKBURN	1991	Yes	Kern	BLACKBURN CREEK	ERTH
BORAX SOLAR EVAP	1984	No	Kern	TR ROGERS DRY LK	ERTH
BORON TAILS PD	1975	No	Kern	TR ROGERS DRY LK	ERTH
BORON TAILS PD 5	1976	No	Kern	TR ROGERS DRY LK	ERTH
BORON TAILS PD 6	1980	No	Kern	TR ROGERS DRY LK	ERTH
BUENA VISTA	1890	No	Kern	OFFSTREAM	ERTH
BUENA VISTA	1973	No	Kern	KERN RIVER	ERTH
DIVERSION NO 1 (Kern River No. 1 Conduit)	1906	No	Kern	KERN RIVER	GRAV
FAIRMONT	1912	Yes	Los Angeles	ANTELOPE VALLEY	HYDF
FAIRMONT NO 2	1982	No	Los Angeles	TR ANTELOPE VY CR	ERTH
HAIWEE	1913	Yes	Inyo	ROSE VALLEY	HYDF
IRRIGATION RES	1980	No	Kern	OFFSTREAM	ERTH
ISABELLA	1953	Yes	Kern	KERN RIVER	ERTH
J C JACOBSEN (AKA Brite Valley)	1973	Yes	Kern	TR CHANAC CREEK	ERTH
KERN R CO PARK	1959	No	Kern	TRIB KERN RIVER	ERTH
REC DAM EDWARDS AB	1960	No	Los Angeles	REC DAM EDWARDS AB	ERTH
TEJON STORAGE 1	1946	No	Kern	TR EL PASO CREEK	ERTH
TEJON STORAGE 2	1956	No	Kern	TR TEJON CREEK	ERTH
<i>Source: California Division of Water Resources Dams GIS database, provided by CA OES</i>					

Past Occurrences. There are 1,483 dams in California. There have been 44 dam failures in California that killed at least 460 people since 1858. No occurrence in Kern County (*Source: cee.engr.ucdavis.edu*). The failures occurred for a variety of reasons, the most common being overtopping, and one due to an earthquake. Other reasons include specific shortcomings in the dams themselves or an inadequate assessment of surrounding geologic characteristics. According to a CHP officer quoted in a Bakersfield Californian article on 8/26/1984 in 1963 flood waters

overcame a small dam and washed away two homes in Lake of the Woods (Source: *Bakersfield Californian* article 8/26/1984). According to the Tehachapi Cummings County Water District a small agricultural dam breached in 1970, flooding the Cummings Valley area and causing damage to crops.

Frequency/Likelihood of Occurrence. There are no official recurrence intervals calculated for dam failures. The possibility for future dam failure remains, but the likelihood as a result of natural hazards is extremely low.

Seasonal Patterns. Dams can fail at any time of year, but the results are most catastrophic when the dams fill or overtop during winter or spring rain/snowmelt events.

Speed of Onset/Duration. The onset of Dam failure depends on the type of failure. If the dam is inspected regularly then small leaks allow for adequate warning time. Once a dam is breached, however, failure and resulting flooding occurs rapidly.

Magnitude/Secondary Affects. *Limited for most of planning area, Extensive for Bakersfield if Lake Isabella dam failed.* Secondary losses would include loss of the multi-use functions of the Dam, and associated revenues that accompany those functions.

Significance. *High*

Mitigation Options/Feasibility. *Extensive.* Several mitigation options exist for Dam failure since it is a hazard that can be controlled with regular inspection and maintenance programs and emergency preparedness planning.

EARTHQUAKES

Hazard/Problem Description. An earthquake is ground shaking caused by a sudden slip on a fault. Earthquakes occur when elastic strains that accumulate deep within the earth become so great that they can no longer be contained. When this happens, movement along a fault occurs, releasing enormous amounts of energy in the form of an earthquake. The amount of energy released is related to the length and area of the fault rupture. At any given location, the amount of the resulting shaking motion caused by the sudden movement depends to a large extent on local ground conditions – e. g., the stiffness of the rock type and the degree of water saturation. In some instances, the shock wave may actually increase in amplitude as it travels away from the source. It may cause greater damage as a location some distance from the actual rupture than at the point of surface displacement. Shallow earthquakes generally cause more damage than those that occur at greater depth.

Earthquake hazards include strong ground shaking, surface rupture due to faulting, soil deformation and lateral spreading due to soil liquefaction and differential settlement of soils. Large earthquakes often spawn secondary hazards such as landslides, and fires from ruptured utility lines. Strong earthquakes can wreak havoc on the built environment, causing internal damage to building contents, structural and non structural damage to buildings, collapsed buildings and bridges, and ruptured roads and lifelines.

Kern County is located in one of the more seismically active areas of California and may, at any time, be subject to moderate-to-severe ground shaking. The reason for this is the presence of major active faults in portions of the County. The infamous San Andreas Fault runs just outside of and parallel to the western border of Kern County, and eventually enters the south western portion of the county near Frazier Park, where it is intersected by the northeasterly trending Garlock Fault. The San Andreas Fault is the plate boundary between the Pacific Plate to the west and the North American Plate to the east. These two plates are grinding in a side by side motion relative to each other, with the Pacific Plate traveling north relative to the North American Plate.

The Garlock fault zone is one of the most obvious geologic features in southern California, clearly marking the northern boundary of the area known as the Mojave Block, as well as the southern end of the Sierra Nevada and the valleys of the westernmost Basin and Range province. The Garlock intersects the San Andreas at Lebec and follows a northeast trend through the Tehachapi Mountains to the east and south of Tehachapi, eventually traversing the Desert region between California City and Tehachapi. While no earthquake has produced surface rupture on the Garlock fault in historic times (although cracks opened along a short segment of the fault in 1952, due to the shaking of the Kern County earthquake, and groundwater removal has also triggered slip in the Fremont Valley area), there have been a few sizable quakes recorded along the Garlock fault zone. The most recent was a magnitude 5.7 near the town of Mojave on July 11, 1992. At least one section of the fault has shown movement by creep in recent years. These facts, along with the freshness of scarps left behind from previous ruptures and the on-going seismicity associated with the fault zone, leave little doubt that the Garlock fault zone will rupture again in the future.

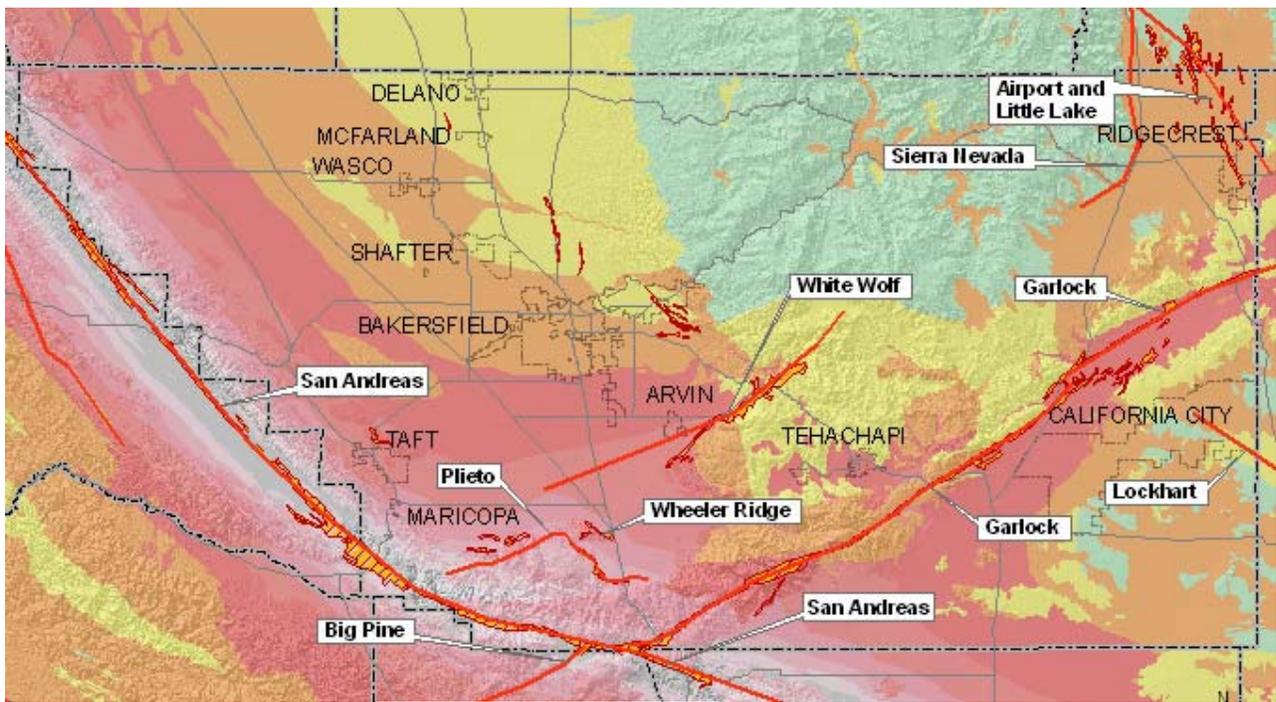
The White Wolf Fault in is another fault near Arvin and Bakersfield that produced a severe 7.7 earthquake in 1952. Before the earthquake this fault was not considered a major threat by geologists and seismologists. Other notable faults in the County include the Wheeler Ridge and Pleito Thrust faults in southern Kern County, and the Big Pine fault just to the south in Ventura County. Other faults of interest include the Premier, New Hope, and Kern Front faults to the north of Bakersfield. These faults were pre-existing Quaternary faults that have been actively creeping since the late 1940's due to subsurface withdrawal of oil and water by humans (Source: SCEC).

In the Desert region the Eastern California Shear Zone (ECSZ) is an area of increased seismic activity which stretches from the San Andreas fault near Indio, north-northeast across the Mojave and northward into Owens Valley. The numerous faults in this region may accommodate as much as 10 to 20 percent of the relative motion between the North American and Pacific plates. The Little Lake fault zone near China Lake and Airport Lake Fault Zone near Ridgecrest are part of the ECSZ. Other notable faults in the Desert region are the South Sierra Nevada Fault zone, and the Lockhart Fault (near California City). *Source: SCEC Faults of Southern California, Mojave Region*
<http://www.data.scec.org/faults/mojfault.html#MAP>

Hazard Extent.

Based on the following map and earthquake history, the entire County is at risk to earthquakes, but the probability of the strong shaking increases dramatically in the western, southern, and

portions of southeastern Kern County. The earthquake shaking data presented on the map was developed by the California Geological Survey (CGS). The map shows the earthquake hazard in terms of probability of exceeding a certain ground motion. This map shows the 10% probability of exceedance in 50 years and depicts an annual probability of 1 in 475 of being exceeded each year. This level of ground shaking has been used for designing buildings in high seismic areas. The maps for 10% probability of exceedance in 50 years show ground motions that the CGS does not think will be exceeded in the next 50 years. In fact, there is a 90% chance that these ground motions will NOT be exceeded. This probability level allows engineers to design buildings for larger ground motions than what CGS thinks 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. Potentially active faults are displayed, based on HAZUS data. This map also displays Alquist-Priolo Fault Zones. These are zones where surface fault rupturing has previously occurred, or where local topographical, geological, or geotechnical conditions indicate a potential for permanent ground displacements. They also have special building regulations/limitations associated with them.



Legend

Probability of Shaking 10% in 50 Years
Spectral Acceleration @ 1 Sec Freq.

- Water
- 0-10% g
- 10-20% g
- 20-30% g
- 30-40% g
- 40-50% g
- 50-60% g
- 60-70% g
- 70-80% g
- 80-176% g

- Faults
- Alquist Priolo Fault zones

Earthquake Hazards in Kern County

Map compilation AMEC,
Data sources:
 Earthquake Shaking - California Geological Survey
 Faults - HAZUS MH-MR 1 January 2005
 Alquist Priolo Fault zones - Kern COG

Major potentially active faults in Kern County

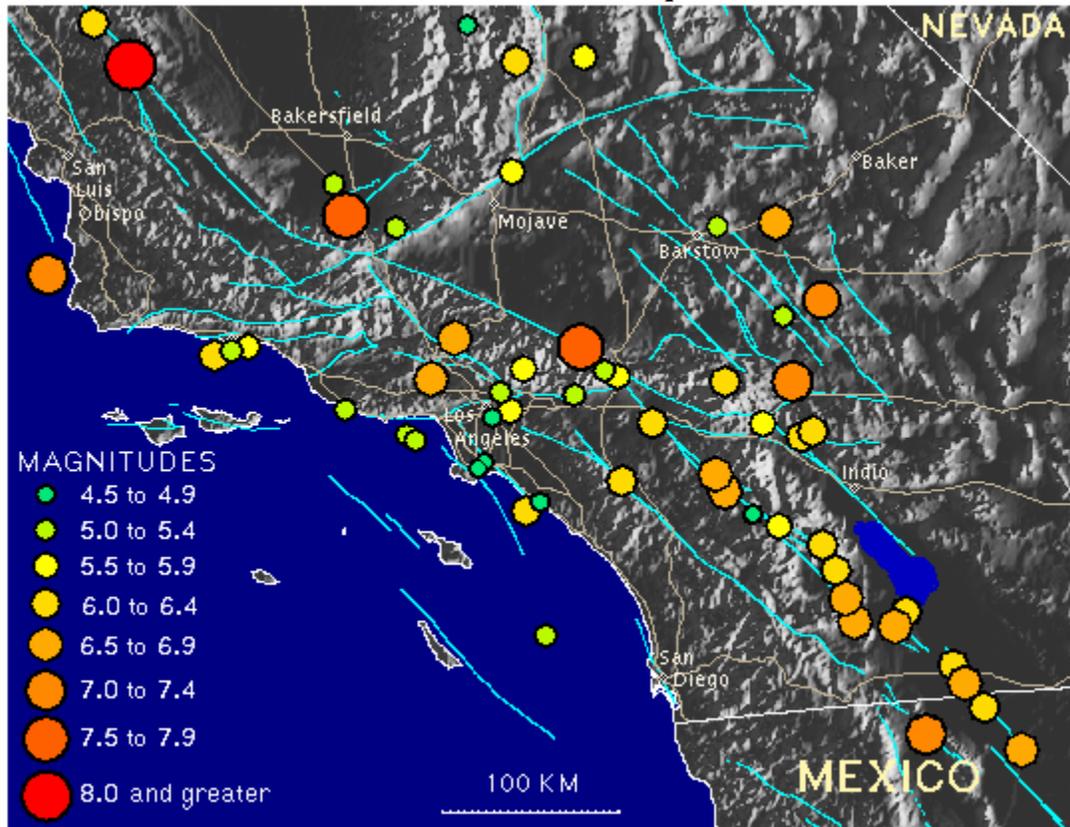
Fault Zone	Type /Dip direction	Recent faulting/ Recurrence	Slip Rate (mm/yr)	Maximum Moment Magnitude
San Andreas	Right lateral strike slip	Historic (1857)/ Varies: 20-300 years	20-35	6.8 to 8.0
Garlock	Left lateral strike slip	Historic, Holocene/ 200-3,000 years	6	6.5 to 7.1
White Wolf	Left lateral reverse/Southeast	Historic/Unknown	2	7.2
Wheeler Ridge	Thrust/South	Historic(2005)/Unknown	unknown	6.0 to 7.1
Plieto Thrust	Thrust/South	Holocene/Uncertain	1.4	6.3 to 7.3
South Sierra Nevada	Normal	Holocene/Unknown	> 1	6.0 to 7.1
Lockhart	Right lateral strike slip	Late Quaternary (Kern County segment)/ 3,000-5,000 years(?)	0.8	6.5 to 7.4
Airport Lake Fault Zone	Normal, some right lateral strike slip	Historic (1995)/ Unknown	~1	5.5 to 6.5
Little Lake Fault Zone	Right Lateral	Holocene/Unknown	~1	5.5 to 7.0
Big Pine Fault	Left lateral Strike slip/South	Late/pre Quaternary/ Unknown	1 to 4 (?)	Uncertain

Source: Final Environmental Impact Report for Lancaster Water Reclamation Plant 2020 Facilities Plan May 2004 – original source Hart 1997, Jennings, 1994, Peterson, 1996 and SCEC www.data.scec.org/faults/faultmap.html.

Past Occurrences.

Kern County has a history of significant earthquakes, illustrated on the map of historic earthquakes (from 1812) in Southern California below. The map does not show all the epicenters greater than magnitude 4.5, but only those that SCEC has determined to be large and destructive, fairly recent, or unusual earthquakes. The following section discusses the more significant events.

Notable Southern California Earthquakes Since 1812



Source: SCEC <http://www.data.scec.org/clickmap.html>

Kern County Earthquake of July 21, 1952

On July 21, 1952, a Magnitude 7.7 earthquake rocked Kern County at 4:52 am, the largest earthquake in California and the United States since the 1906 San Francisco earthquake. Twelve people were killed, nine of these killed by the collapse of a brick wall in Tehachapi. Eighteen persons were hospitalized and several hundred were given first-aid treatment. Property damage was estimated at \$60 million. Intensity XI effects were observed in a very small area on the Southern Pacific Railroad near Bealville. Reinforced concrete tunnels with walls 18 inches thick were cracked, twisted, and caved in, shortening the tunnel length by 8 feet in 300 feet. Intensities of VIII were felt in urbanized areas.



Photo: World Wide Photo

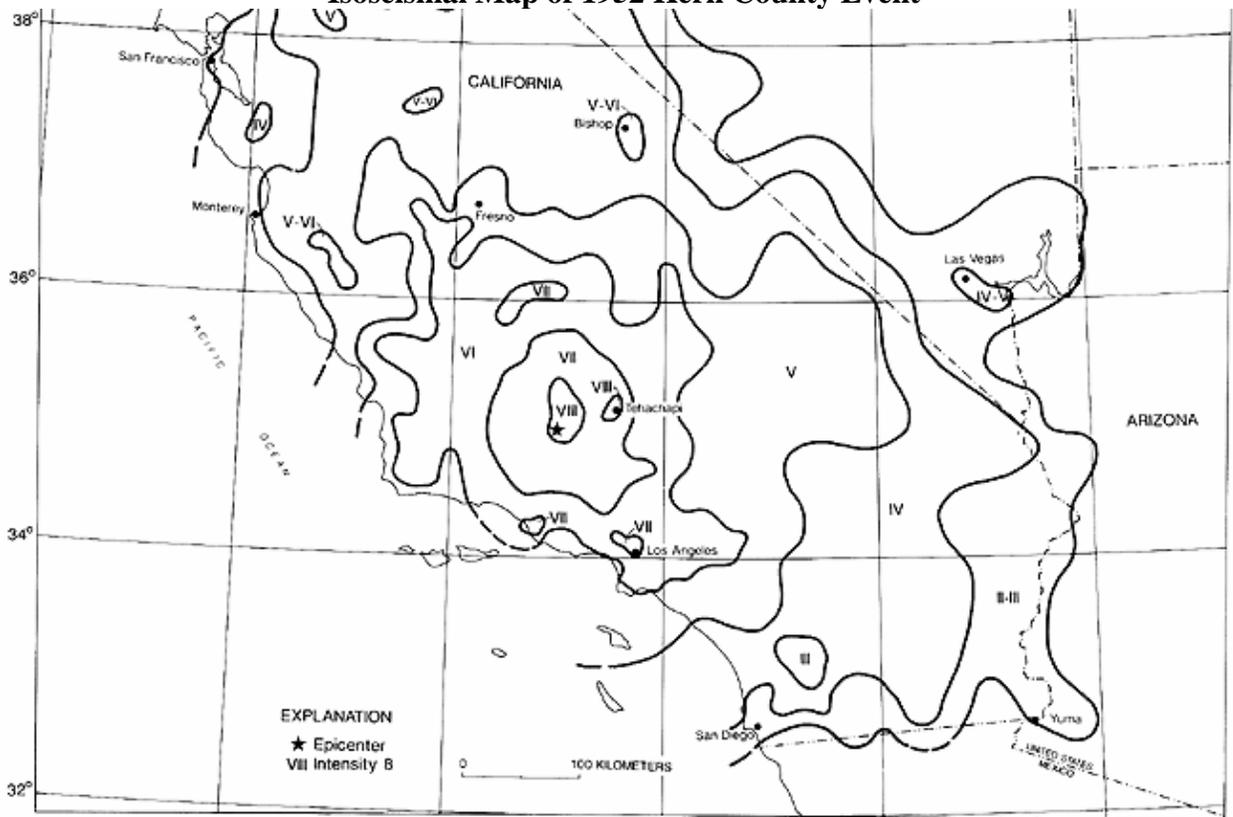


Photo: Southern Pacific Railroad

Damage in downtown Tehachapi and Southern Pacific Railroad Tunnel 3 from 1952 earthquake (Source: SCEC)

The earthquake occurred on the White Wolf Fault and caused many surface ruptures in the vicinity of the fault along the lower slopes of Bear Mountain. Before the earthquake this fault was not considered a major threat by geologists and seismologists. Reinforced concrete railroad tunnels near Caliente were demolished. South of Arvin, concrete irrigation pipe systems shattered, many fields required releveling, and hundreds of power transformers fell from elevated platforms. A broken gasline caused a fire at the Paloma Cycling Plant, causing millions of dollars of damage. There was widespread damage to underground utility and petroleum pipelines and oil storage tanks in the County. Building damage, including cracking and some collapses, was observed at Arvin, Bakersfield, and Tehachapi in old and poorly built masonry and adobe buildings. At least 100 buildings were torn down after the event.

Isoseismal Map of 1952 Kern County Event



Source: http://neic.usgs.gov/neis/eq_depot/usa/1952_07_21_iso.html

1952 Aftershocks and Bakersfield Earthquake - August 22nd

The area experienced over one hundred and eighty Magnitude 4 - 6.4 aftershocks between July 21 and September 26 of 1952. These aftershocks caused weakened buildings in Arvin and Tehachapi to collapse and injure several persons. Additional building damage was observed in Bakersfield and Taft, and a pipeline was damaged in Fairfax. These aftershocks also triggered landslides in several areas east and northeast of Bakersfield, and near Bena, Fresno, and Piedra. The 5.8 aftershock that struck near Bakersfield on August 22nd killed two people and caused an additional \$10 million in damage. Most of the damage was confined to brick structures within a 64 block area of downtown Bakersfield. Even though this was the fifth strongest of the aftershocks, it was the closest to Bakersfield and occurred after at least 18 other aftershocks of magnitude 5.0 or greater had shaken the area. (Sources: *Earthquake History of the United States*, Pub 41-1 US Dept of Commerce, 1973, *Kern ESS*, *Kern Historical Society*, SCEC http://www.data.scec.org/chrono_index/kerncoun.html)

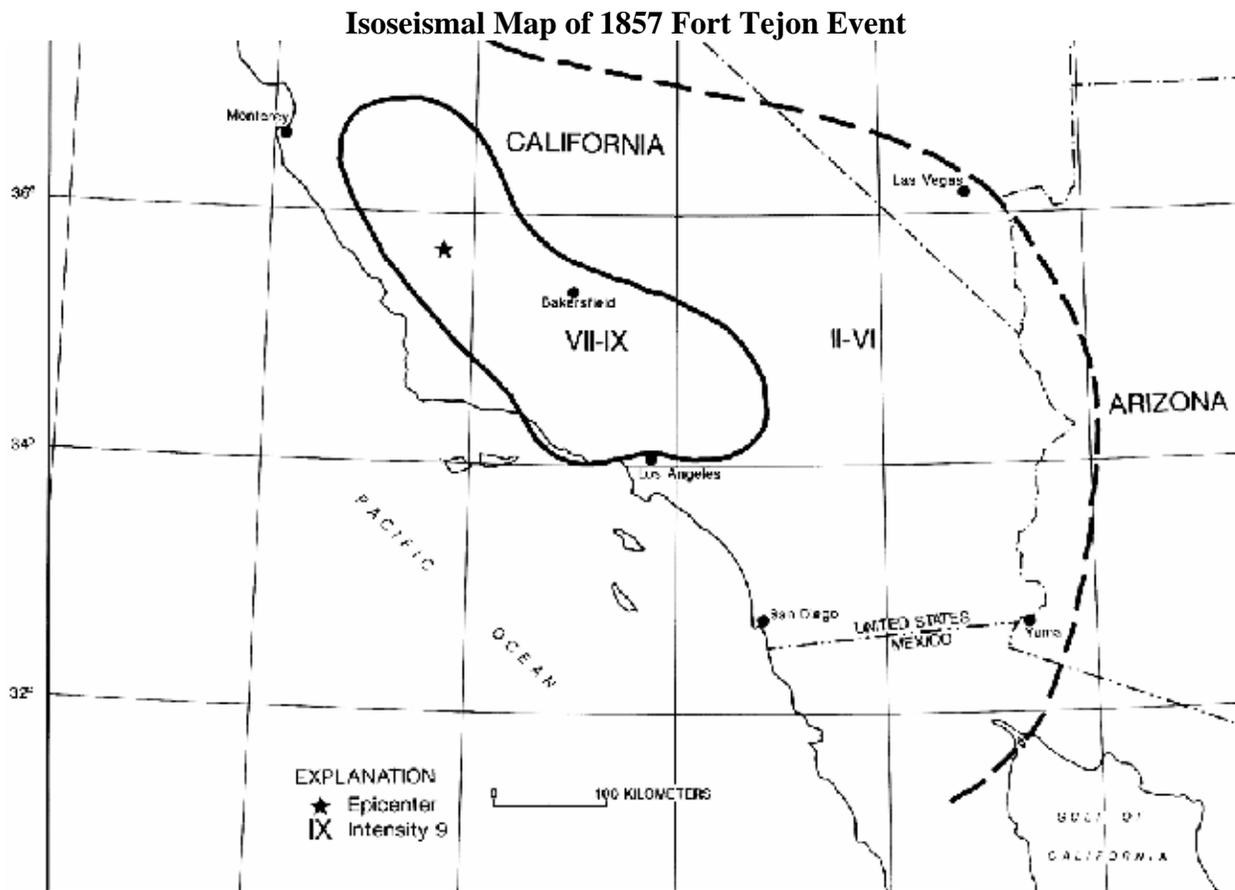
1857 Fort Tejon Magnitude 7.9 Event - The Largest Earthquake in California

The Fort Tejon earthquake of 1857 was one of the greatest earthquakes ever recorded in the U.S., and left an amazing surface rupture scar over 350 kilometers in length along the San Andreas fault. Property loss was heavy at Fort Tejon, an Army post in South Central Kern County about 7 kilometers from the San Andreas Fault. Two buildings were declared unsafe, three others were damaged extensively but were habitable, and still others sustained moderate damage. One person was killed in the collapse of an adobe house at Gorman. Strong shaking lasted from 1 to 3 minutes. As a result of the shaking, the current of the Kern River was turned upstream, and water ran four feet deep over its banks. The waters of Tulare Lake were thrown upon its shores,

stranding fish miles from the original lake bed. California in 1857 was sparsely populated, especially in the regions of strongest shaking, and this helped to keep the loss of life and damage to a minimum.

The earthquake was named Fort Tejon since it was the area of strongest reported shaking. However, because there is evidence that foreshocks to the 1857 earthquake may have occurred in the Parkfield area, the actual epicenter is thought to have been just southeast of Parkfield, just outside of Kern County's northwestern-most boundary

(Sources: USGS http://neic.usgs.gov/neis/eq_depot/usa/1857_01_09.html and SCEC http://www.data.scec.org/chrono_index/forttejo.html).



Source: http://neic.usgs.gov/neis/eq_depot/usa/1857_01_09_iso.html

Other events



2005 April 16 - A 5.1 earthquake struck approximately 25 miles south southwest of Bakersfield on April 16. No damage was reported.

2004 September 30 - A Magnitude 5.0 earthquake struck 17 miles northeast of Arvin. A rock slide triggered by the earthquake impacted a state highway, but the road was quickly cleared and there were no reports of damage or injury (Source: Associated Press newspaper article 9/30/04).

Map with location of the April 16, 2005 5.1 earthquake (Source: USGS National Earthquake Information Center).

1995 August 17 (5.4) and September 20 (5.8) near Ridgecrest. The 1995 Ridgecrest earthquake sequence started on August 17, when a magnitude 5.4 quake, centered 18 kilometers north of the town of Ridgecrest, shook the area and spawned over 2,500 aftershocks over the course of the following five weeks. Then, on September 20, 1995, the second large quake struck the area. This one, centered 2 kilometers southeast of the August 17 shock -- probably on the same fault segment -- measured magnitude 5.8 and was at that time the largest earthquake to hit southern California since the January 17, 1994, Northridge earthquake, and still is the largest earthquake ever recorded in the immediate area, though larger quakes are possible along some of the nearby fault zones. This area experienced earthquake swarms in 1980-1981 and in 1992-1994 as well (Source: SCEC http://www.data.scec.org/chrono_index/ridgecrq.html).

1993 5.0 earthquake recorded 20 miles southwest of Bakersfield (May 28). No damage was reported.

1992 July 11. A 5.7 earthquake occurred on the Garlock Fault approximately 13 miles north northeast of community of Mojave. It is theorized that this earthquake was actually triggered by the Landers earthquake of June 28, 1992, the epicenter of which was some 200 km to the southeast (Source http://www.data.scec.org/chrono_index/mojave92.html).

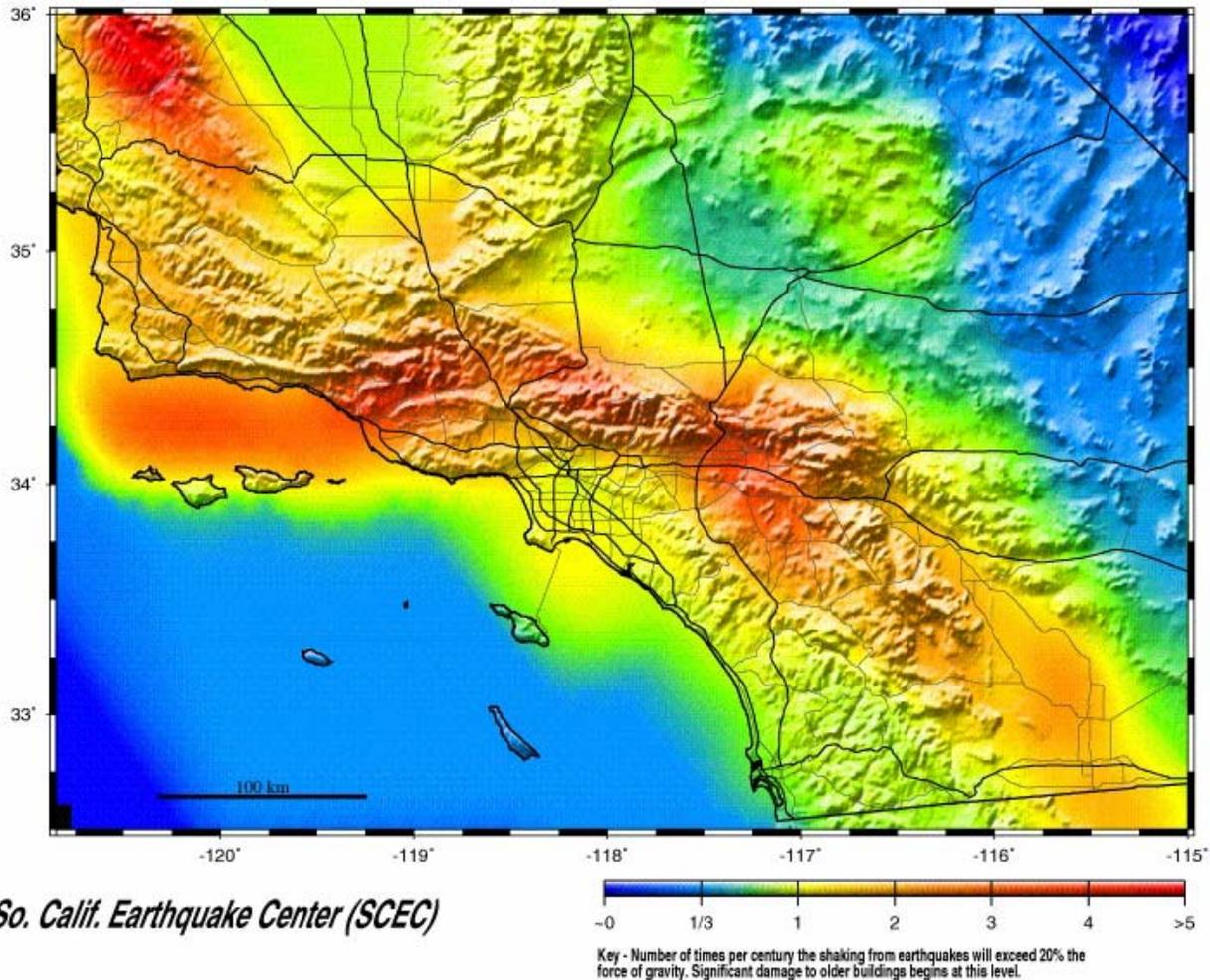
1905 A local shock damaged a number of buildings and caused considerable alarm in Bakersfield on December 23 (Intensity and Magnitude unknown) (Sources: *Earthquake History of the United States*, Pub 41-1 US Dept of Commerce, 1973).

Frequency/Likelihood of Occurrence.

The Southern California Earthquake Center (SCEC) has created a map displaying how often damaging earthquakes are likely to occur in Southern California for a period of time between 1994-2024. The following map presents hazard analysis in terms of average rates of earthquake shaking. This same information could have been expressed in terms of probabilities of earthquake shaking. For instance, a place that averages one time of severe shaking each century has a probability of shaking in any one year of 1%, and in any 30 years of 26%. This analysis predicts that somewhere in southern California (not everywhere-many residents would not be affected) should experience a magnitude 7.0 or greater earthquake about seven times each century. About half of these will be on the San Andreas "system" (the San Andreas, San Jacinto, Imperial, and Elsinore Faults) and half will be on other faults. The equivalent probability in the next 30 years is 85%.

This map shows the rate of shaking, as if everywhere were on solid rock. This map does not include site effects. The tabulation of soil conditions for all of southern California is not yet completed, as of May 2001. SCEC has another project in progress will update this map by showing a higher level of shaking for soft-soil sites. This will lead to a higher rate of damaging shaking because the more common smaller earthquakes will produce greater shaking in soft soil. The result will be to increase slightly the rates for the sedimentary basins such as the Los Angeles basin and the San Gabriel, Ventura and San Bernardino Valleys.

Probable Damaging Earthquakes 1994-2024



(Source <http://www.data.scec.org/general/PhaseII.html>)

Major Faults and Associated Recurrence Intervals

San Andreas Fault: Earthquakes on the Southern San Andreas Fault zone vary greatly, from under 20 years (at Parkfield only) to more than 300 years. The average recurrence interval for the Mojave segment is 140 years (Source: SCEC, http://www.data.scec.org/fault_index/sanandre.html).

Along the Earth's plate boundaries, such as the San Andreas Fault, segments exist where no large earthquakes have occurred for long intervals of time. These areas accumulate potential energy and provide clues as to where the next earthquake may occur, and when. Scientists term these

segments "seismic gaps" and, in general, have been successful in forecasting the time when some of the seismic gaps will produce large earthquakes. Geologic studies show that over the past 1,400 to 1,500 years large earthquakes have occurred at about 150-year intervals on the southern San Andreas Fault. As the last large earthquake on the southern San Andreas occurred in 1857, that section of the fault is considered a likely location for an earthquake within the next few decades (Source USGS:<http://pubs.usgs.gov/gip/earthq3/when.html>).

Garlock Fault: It is suspected that there are 200 to 3000 year intervals between major ruptures depending on the segment of this fault (Source: SCEC, http://www.data.scec.org/fault_index/garlock.html).

White Wolf and Pleito Faults: The interval between major ruptures on these faults is unknown.

Seasonal Patterns. *None* – Earthquakes can occur at any time of the day or night and at any time of year.

Speed of Onset/Duration. *Rapid* – Part of what makes earthquakes so destructive is that they generally occur without warning. The main shock of an earthquake can usually be measured in seconds, and rarely lasts for more than a minute. Aftershocks can occur within the days, weeks, and even months following a major earthquake.

Magnitude/Secondary Affects. *Catastrophic.* Due to the large area in Kern County that could be affected by damaging earthquakes, the impact could be catastrophic. Earthquake hazards include strong ground shaking, surface rupture due to faulting, soil deformation and lateral spreading due to soil liquefaction and differential settlement of soils (see Soil Hazards). Large earthquakes often spawn secondary hazards such as landslides, and urban and wildland fires from ruptured utility lines. Floods that are induced by seismic activity may be of significance in areas where earth movement causes failure of dams, canal banks, or where landslides block drainage channels, streams, and/or rivers. Aftershocks, though typically smaller than the main event, can cause damage to structures weakened by the main shock, posing safety hazards to rescue and recovery personnel.

Seiche. A seiche is a standing wave in an enclosed or partly enclosed body of water. Seiches are normally caused by earthquake activity, and can affect harbors, bays, lakes, rivers and canals. In the majority of instances, earthquake-induced seiches do not occur close to the epicenter of an earthquake, but hundreds of miles away. This is due to the fact that earthquake shock waves close to the epicenter consist of high-frequency vibrations, while those at much greater distances are of lower frequency, which can enhance the rhythmic movement in a body of water. The biggest seiches develop when the period of the ground shaking matches the frequency of oscillation of the water body, seiches create a "sloshing" effect on bodies of water. This effect can cause damage to anchored boats, piers and facilities close to the water. Secondary problems, including landslides and floods, are related to accelerated water movements and elevated water levels (Source: *Kern General Plan 2004*).

Significance. *High*

Mitigation Options/Feasibility. *Partial.* Earthquake effects can be mitigated through a combination of building codes, seismic resistant construction, land use planning and public education.

WILDFIRES

Hazard/Problem Description. Wildfire and Urban Wildfire are an ongoing concern for Kern County. 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 urban/rural interface 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.

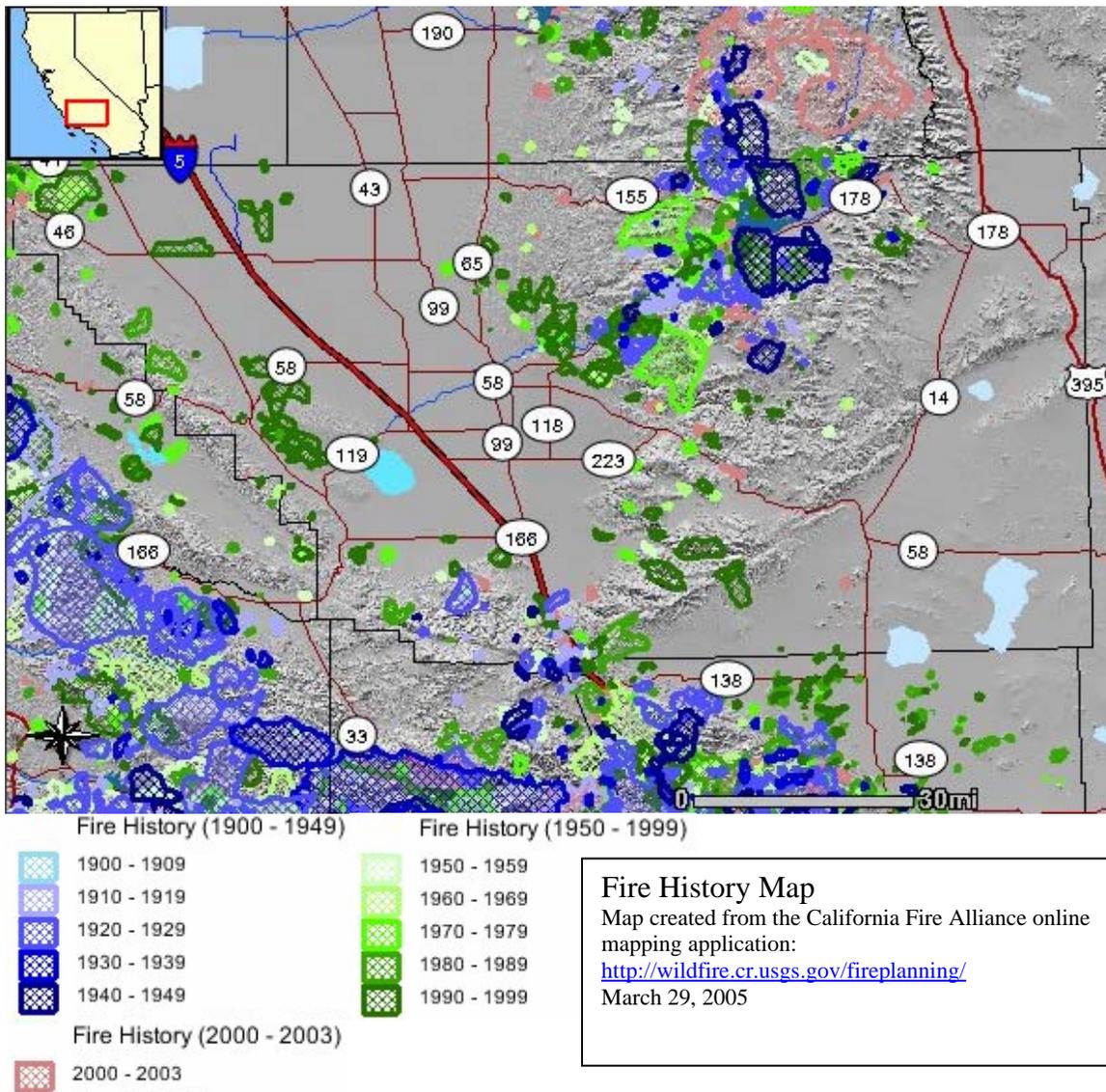
Fuel is the material that feeds a fire and is a key factor in wildfire behavior. Fuel is generally classified by type and by volume. Fuel sources are diverse and include everything from dead tree needles and leaves, twigs, and branches to dead standing trees, live trees, brush, and cured grasses. Also to be considered as a fuel source, are man-made structures and other associated combustibles. 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 rural lands.

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 at times 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. Related to weather is the issue of recent drought conditions contributing to concerns about wildfire vulnerability. During periods of drought, the threat of wildfire increases.

Hazard Extent. Based on the fire threat map below, much of Kern County has a moderate to very high fire rating. The hazard varies by physiographic region: the Mountains are rated mostly very high, the Desert is mostly moderate, and the Valley has little fuel and some areas of moderate fire hazard.

Wildfires outside of Kern County can indirectly have negative impacts on the county through air and water quality and watershed degradation. One example of this was the massive McNalley Wildfire. This fire occurred just north of the Kern County border in Tulare County during June 2002 and burned 150,000 acres of the Kern River watershed, north of Kernville in the Sequoia National Forest. 52% of the watershed suffered moderate to severe burns. Heavy rains fell in the fall washed sediment into the river, affecting raw water quality. Rehabilitation costs were in excess of \$59 million (Source: Kern County Water Agency).



Kern County Fires 1910-2003 Summarized by Year

YEAR	Number	Total ACRES	YEAR	Number	Total ACRES
1910	4	3,148	1963	1	568
1912	1	1,112	1964	7	2,045
1914	2	872	1965	5	2,265
1915	6	1,438	1966	10	26,261
1916	7	6,271	1967	4	1,139
1917	4	931	1968	5	2,087
1918	1	748	1969	10	2,905
1919	3	1,866	1970	13	69,801
1920	3	2,900	1971	6	2,192
1921	5	13,680	1972	2	1,439
1922	1	5,100	1973	4	4,153
1923	1	333	1974	23	13,363
1924	12	22,375	1975	7	1,996
1925	4	450	1976	1	302
1926	8	1,466	1977	5	5,672
1927	4	10,148	1978	2	167
1928	4	9,217	1979	3	2,367
1929	4	2,106	1980	4	3,227
1930	3	1,651	1981	4	4,445
1931	3	2,596	1982	2	2,566
1933	2	1,020	1983	4	307
1934	3	578	1984	13	41,672
1935	2	1,434	1985	5	9,655
1936	2	39	1986	7	13,273
1937	2	27	1987	15	16,041
1938	1	108	1988	9	10,384
1939	6	365	1989	6	850
1940	3	2,370	1990	8	31,543
1941	5	5,158	1992	6	9,993
1942	6	104,308	1993	27	40,360
1946	3	1,702	1994	21	19,822
1948	2	326	1995	27	36,030
1950	2	833	1996	28	29,769
1951	5	2,933	1997	24	41,463
1952	1	105	1998	23	14,408
1953	2	2,464	1999	18	7,971
1954	4	2,674	2000	7	7,352
1957	2	421	2001	3	1,725
1958	2	189	2002	3	3,880
1960	1	132	2003	23	10,246
1961	4	1,453			

Frequency/Likelihood of Future Fire Occurrences. Based on the fire history data, Kern County has a record of at least 535 fires between 1910 and 2003. This is an average of 5.7 fires per year, and a very likely chance of a fire any given year.

Seasonal Patterns. Generally, the fire season extends from early spring to late fall.

Speed of Onset/Duration. Wildfires can start suddenly due to lightning or human causes. Small fires can grow rapidly when adequate fuels coincide with weather and topography favorable to fire. Wildfires can last from several hours to several months.

Magnitude/Secondary Affects. *Catastrophic: More than 50% of area can be affected.* Secondary affects of wildfires include increased erosion and flash flood potential and economic impacts from burns in scenic viewsheds, subdivisions, or recreational areas.

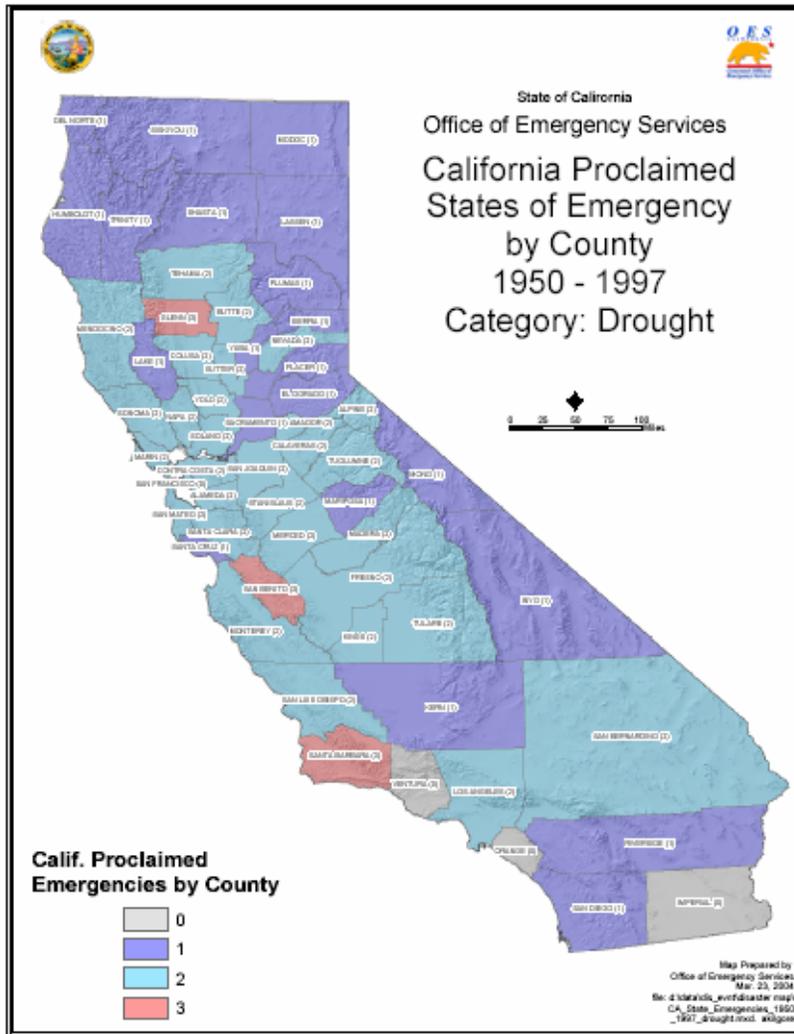
Significance. *High*

Mitigation Options/Feasibility. *Partial* - Some options exist to reduce wildfire impacts including property protection measures (defensible space), building codes, subdivision regulations, land use planning and life safety measures such as evacuation and warning. Though fires are a natural process and will continue to occur, the severity of fires on the environment and property can be reduced through forest and fuels management, fire breaks, etc.

DROUGHT

Hazard/Problem Description. Drought is a complex issue involving many factors, with differing conditions and drivers throughout the state making this more of a regional focus. Drought can be defined regionally based on its effects:

- **Meteorological** – this type of drought is usually defined by a period of below average water supply,
- **Agricultural** – this type of drought occurs when there is an inadequate water supply to meet the needs of the state’s crops and other agricultural operations such as livestock,
- **Hydrological** – a hydrological drought is defined as deficiencies in surface and subsurface water supplies. It is generally measured as stream flow, snowpack, and as lake, reservoir and groundwater levels,
- **Socioeconomic** – occurs when the results of drought impacts the health, well being, and quality of life, or when a drought starts to have an adverse economic impact on a region, and (*Source: National Drought Mitigation Center, University of Nebraska, Lincoln*)
- **Regulatory** – occurs when mandatory compliance with environmental protection laws (especially those pertaining to protection of endangered species) combined with low precipitation and runoff, produce deficiencies in agricultural and/or urban water supplies.



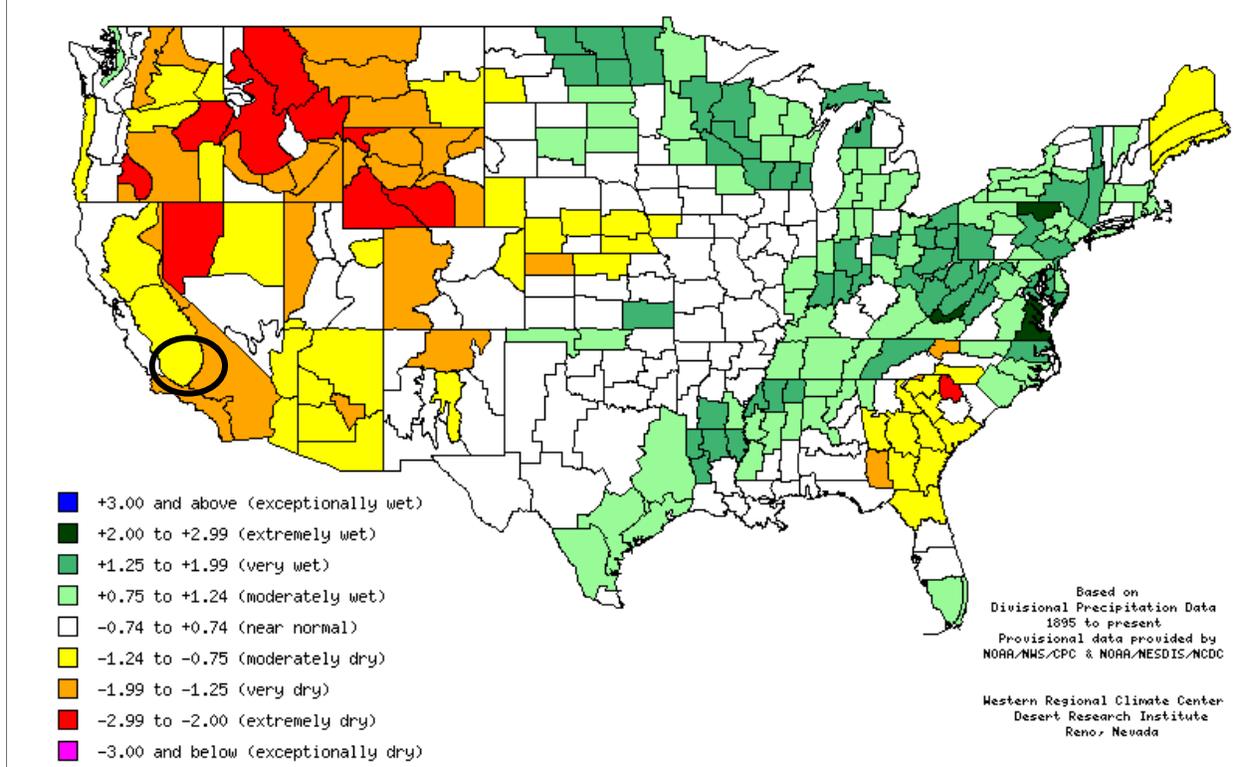
The drought issue is further compounded by water-rights specific to any state or region. Water is a commodity possessed under a variety of legal doctrines. In addition, the prioritization of water rights between farming and federally protected fish habitats in the state is also at issue.

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.

Hazard Extent. Droughts are generally widespread events that could easily affect the entire county and surrounding counties as well.

Past Occurrences. Historically, California has experienced severe drought conditions. Kern County has not been spared from the impacts of drought. The Standardized Precipitation Index is used to quantify dry or wet conditions over varying time scales. The following map indicates that the Kern County region has been experiencing long term moderately dry to very dry conditions based on the measured precipitation over the previous 72 month period (6 years).

72-month Standardized Precipitation Index through the end of November 2004



Source: <http://www.wrcc.dri.edu/cgi-bin/spiFmap.pl?spi72>

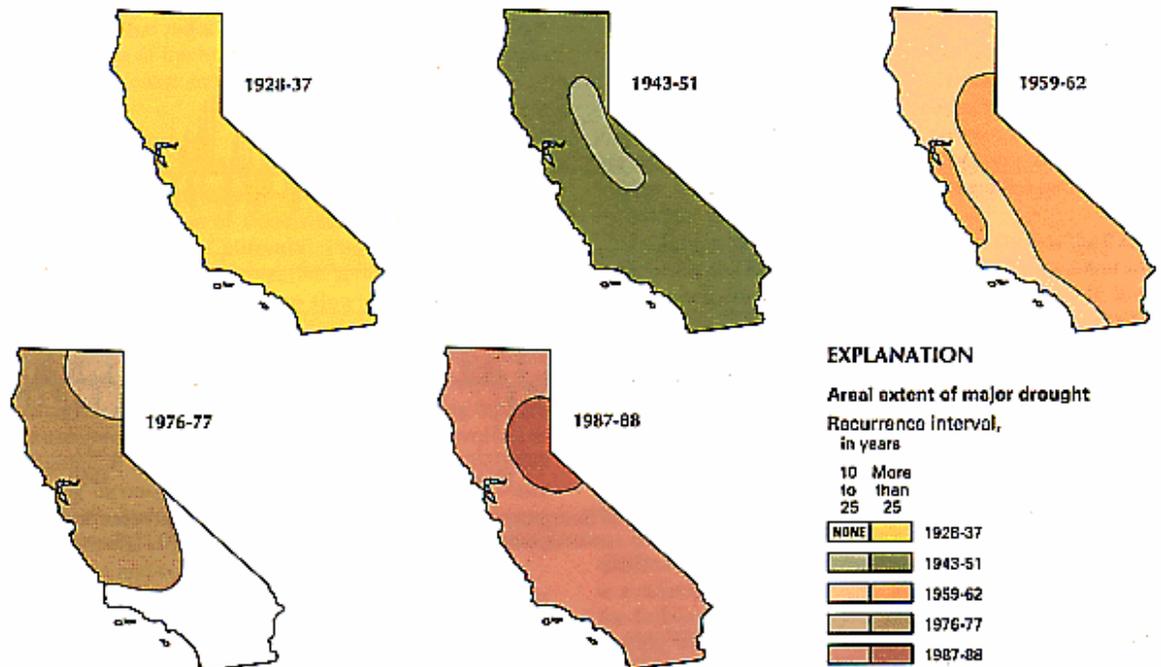
The following is a listing of years when drought has impacted California. The impacts specific to Kern county have been noted, where information is available. Kern has had at least 5 drought USDA Secretarial declarations between 1950-2005.

- **2005** - Contiguous county in USDA declaration
- **2004** - Contiguous county in USDA declaration
- **2002** - Primary county in USDA declaration
- **2001** - Lake Isabella was at 31% of capacity during 2001. Bakersfield's rainfall was 3.6", which was 2.9" below normal.
- **1987-1992** - During this multi-year, multi-county drought the runoff from the San Joaquin Valley was 47% of average. Millions of dollars were spent by local water districts to develop alternative water supplies (*Source: Kern Water Agency*).
- **1977** - The worst drought of record for California caused the Berrenda Mesa Water District to idle 10,000 acres of land in the service area. The District purchased Metropolitan Water District exchange water and along with a reduced State Water Project allocation, had about a 60% supply for the year (87,800 acre feet). The District obtained financial relief during the 1977 drought from a \$1,000,000 US Bureau of Reclamation loan; \$1,567,000 Economic Development Administration loan; and \$3,000,000 warrant sale (*Source: <http://www.bmwd.org/History.htm>*) . Bakersfield considered water rationing and mountain wells began to go dry. Irrigation districts experienced significant reductions in irrigated acreage and increased pumping

costs, resulting in lowered ground water levels. Kern Water Agency experienced a net water deficit of 664,000 acre feet. (Source: *The California Drought 1977, An Update February 15, 1977*).

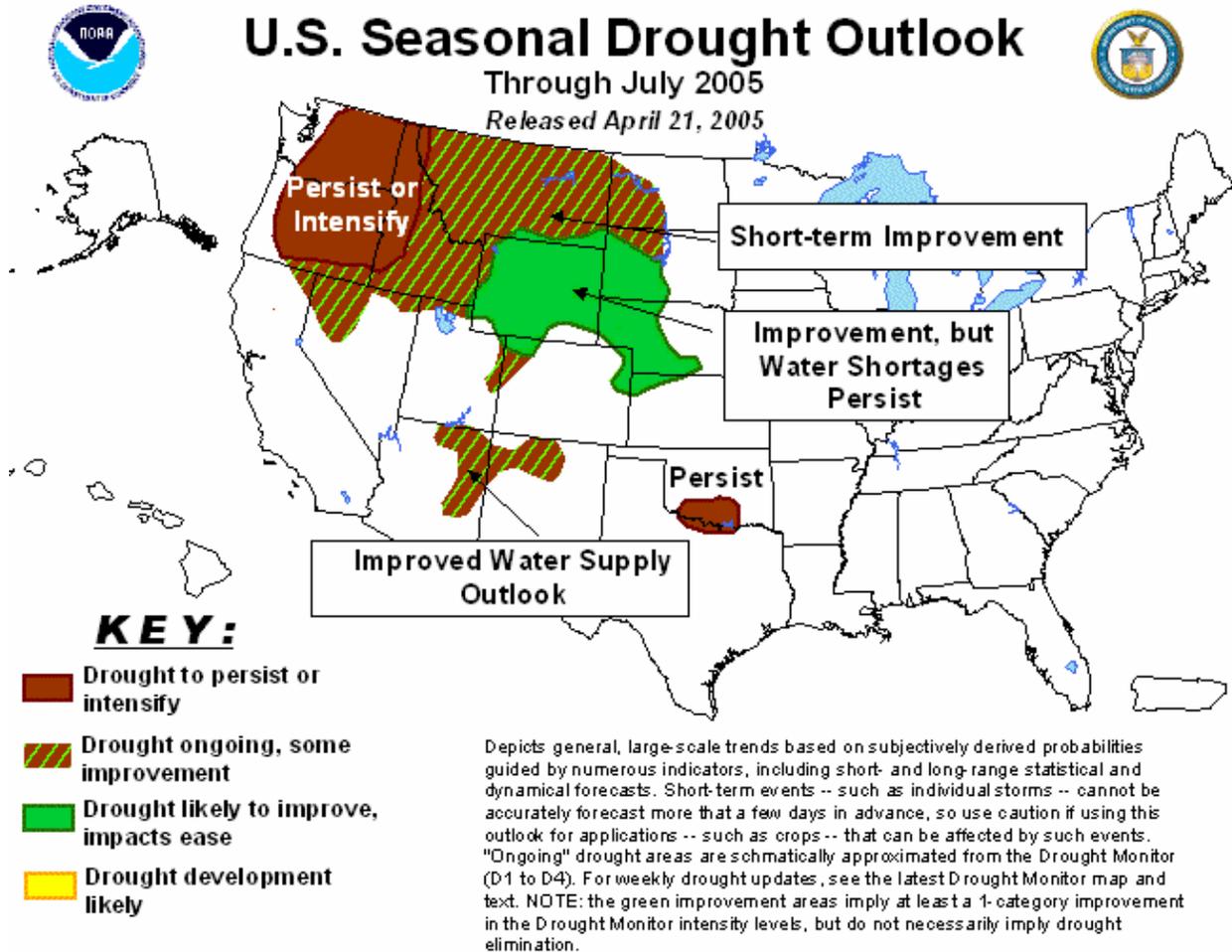
- **1959**- Driest year on record--1.87" of rain fell in the Bakersfield area (Source: *Kern Historical Society*). This drought was most extreme in the Sierra Nevada and central coast.
- **1947-1950** This drought affected the entire state but was most extreme in Southern California
- **1929-34**
- **1922-24**
- **1918-20**
- **1912-13**
- **1898** – It was noted that the drought of 1898 was "the means of crippling the cattle business greatly in California." Source: <http://www.sandiegohistory.org/journal/65january/cattle.htm>
- **1876-1877** San Joaquin Valley and south central costal area- It was reported that cattle died in droves on the ranges of Fresno, Tulare, and Kern counties, and that hundreds of cattle were slaughtered to save the hides.
- **1872**
- **1868-1871**
- **1862-1865** (particularly extreme)
- **1856-57**
- **1843**
- **1827-29**

Areal Extent of Droughts



Source: USGS http://geochange.er.usgs.gov/sw/impacts/hydrology/state_fd/cawater1.html

Frequency/Likelihood of Occurrence. *Likely.* Based on the historical record, 14 droughts (multi-year events counted as one) have occurred in California since 1862 (143 years). Based on this record, California experiences drought on average every 10 years, or almost a 10% chance of occurring any given year. The abundant precipitation of the 2004-2005 winter has helped bring California out of drought. The latest U.S. Seasonal Drought Outlook does not indicate drought returning to Southern California in the short term.



Seasonal Patterns. The onset of drought in western mountainous counties like Kern is usually signaled by a lack of significant winter snowfall. Kern County receives the majority of its precipitation as snow in the higher elevations during the months of November-April. Hot and dry conditions that persist into spring, summer and fall can aggravate drought conditions, making the effects of drought more pronounced as water demands increase during the growing season and summer months.

Speed of Onset/Duration. The onset of drought is typically very slow and can take years before the consequences are realized. Droughts can be a short term event over several months or a long term event that lasts for years or even decades.

Magnitude/Secondary Affects. Drought is one of the few hazards that has the potential to directly or indirectly impact each and every person within Kern County, as well as adversely affect the local economy. The impacts would be water restrictions associated with domestic supplies, agricultural losses and economic impacts associated with those losses, economic impacts to tourism and recreation industries, hydroelectric power reductions, increased wildland firefighting costs, and increased costs for water. History has shown that droughts in Southern California have resulted in disastrous losses to the livestock industry. The magnitude of the drought's impact will be directly related to the severity and length of the drought. Secondary affects include increased susceptibility to wildfires and pine beetle infestations. Increased groundwater pumping during times of drought can contribute to land subsidence problems.

Significance. *High*

Mitigation Options. *Partial.* The impacts of drought can be reduced through a combination of municipal and agricultural water conservation practices, drought resistant agricultural practices, and water storage efforts.

NATURAL HEALTH HAZARDS

WEST NILE VIRUS

Hazard/Problem Description. A recent natural hazard to affect California is the West Nile Virus (WNV). WNV is a type of organism called a flavivirus, first identified in 1937 in the West Nile region of Uganda in eastern Africa. The disease is spread when a mosquito bites an infected bird and then bites a person or animal. Illness ranges from mild, flu-like symptoms often called West Nile fever, to more severe forms of West Nile encephalitis or West Nile meningitis, depending on where it spreads. WNV first struck the northern hemisphere in Queens, NY, in 1999 and killed four people. In 2003, all 50 states warned of an outbreak from any of the 30 mosquito species known to carry it. From 62 severe cases in 1999, confirmed human cases of the virus spread to 39 states in 2002, and it killed 284 people. Less than one percent of those infected develop severe illness. People over 50 years of age are at higher risk for the severe aspects of the disease.

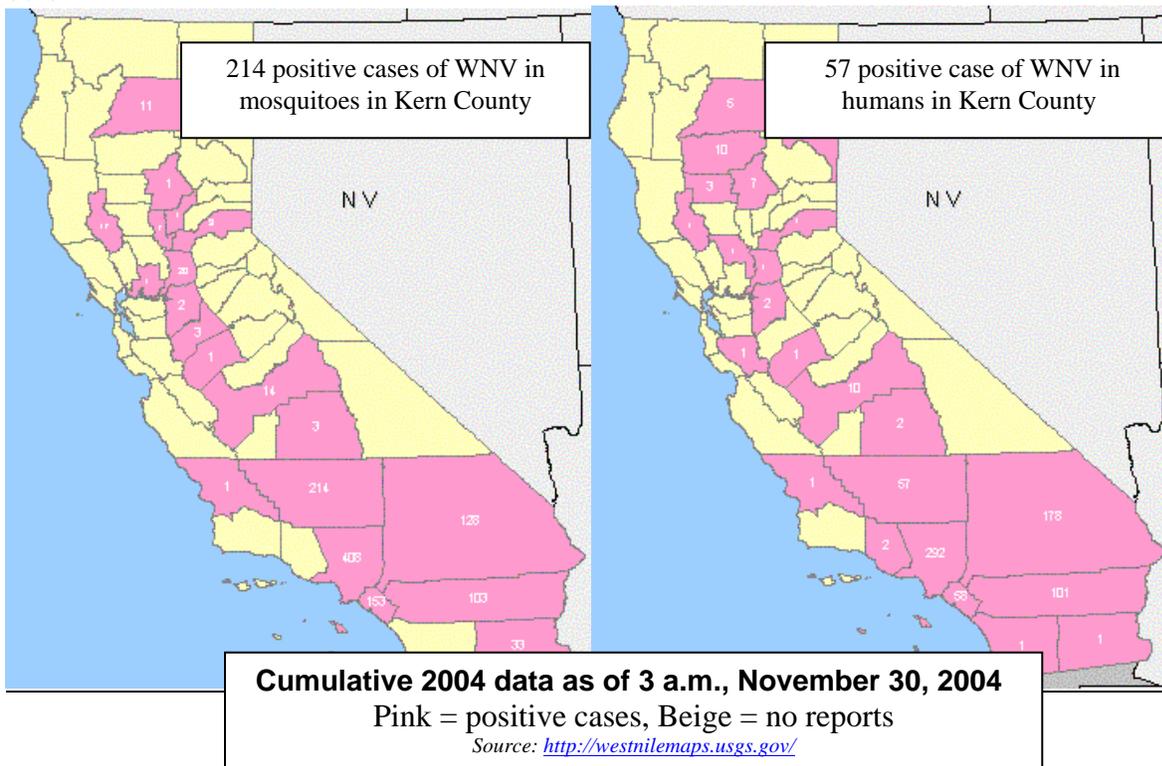
Hazard Extent. Based on the California West Nile Virus maps on the following page, the problem is widespread across much of California. The hazard is likely to be concentrated, however, in areas of favorable mosquito habitat. This includes areas of standing water such as ponds, lakes, and wetlands where mosquitoes are likely to breed.

Past Occurrences. WNV was detected on a very limited basis in horses and humans in California in 2003. In 2004, Kern County reported a total of 60 human West Nile Virus infections, with one death. Thus far California has had 25 West Nile Virus-related fatalities, in Los Angeles, Kern, Orange, Riverside, San Bernardino, and Tehama counties. *(Source: California Department of Health Services, as reported by AP and www.westnile.ca.gov)*

Likelihood of Future Occurrences. Across the United States, the incidence rate for WNV has been the worst in its second year with impacts tapering off after that. In California, 2004 was the

second year of exposure, and California was hard hit, as described above. If the national pattern holds true, the likelihood of future occurrences will continue to decrease, beginning in 2005. However, Dr. B.A. Jinadu, Health Officer for Kern County, announced that “that late on March 16, 2005, Kern County Department of Public Health received confirmation that a dead bird found in Bakersfield had tested positive for West Nile Virus.” This is the first confirmed positive test of West Nile Virus to be found in Kern County in 2005. “There have been no human cases of the virus reported in Kern County this year,” emphasized Dr. Jinadu.. Detection of this WNV positive bird 3 months earlier than last year is a worrisome indicator
 (Source: <http://www.co.kern.ca.us/health/wnv317.asp>).

The WNV maps for California showing number of mosquito and human cases by county are below:



Seasonal Patterns. Mosquitoes carry the highest amounts of virus in the early fall, thus there is a peak of disease in late August-early September. The risk of disease then decreases as the weather becomes colder and mosquitoes die off. Mosquito abundance in the summer is directly related to winter and spring precipitation.

Speed of Onset/Duration. (discussed in *Likelihood of Future Occurrences and Seasonal Patterns*)

Magnitude/Secondary Affects. Although mosquitoes that carry West Nile virus bite many people, most do not know they've been exposed. Few people develop severe disease or even notice any symptoms at all. The most at-risk populations for developing a worse form of the disease include the elderly, pregnant women, and those whose immune systems have been compromised from chemotherapy, organ transplants, or HIV.

Significance. *Low*

Mitigation Options/Feasibility. *Partial*. Strict prevention of exposure to mosquitoes and elimination of their breeding conditions could help reduce the number of anticipated cases. Kern County has mosquito control districts already in place. Public information activities can explain how to reduce exposure to WNV and what to do if an infection is suspected.

CALIFORNIA ENCEPHALITIS

Hazard/Problem Description. Another mosquito borne disease is California Encephalitis. California Encephalitis is a disease that causes swelling of the brain. The arbovirus California encephalitis virus was first isolated in 1943 from mosquitoes collected in Kern County. This virus primarily affects children between 5-10 years of age. Clinical manifestations include fever, vomiting, headache, and abdominal pain followed by seizures, altered mentation, and focal neurologic deficits. Most patients recover completely and the mortality rate is low (<1%) (Source: <http://www.emedicine.com/med/topic3161.htm>).

Hazard Extent. All of the County wherever mosquitoes are present could potentially harbor this disease, but the Valley region, based on past occurrences, is the only area where it has been detected to date.

Past Occurrences. Three cases of encephalitis were confirmed in 1945, all in Kern County residents. The best-documented case occurred in a 2-month-old Hispanic boy who had encephalitis and resultant developmental delay.

Frequency/Likelihood of Occurrence. *Occasional*. Since 1945 there has been only one (the fourth ever reported) case of mosquito borne Encephalitis in California, contracted by a person in Marin County (Source: <http://www.cdc.gov/ncidod/eid/vol7no3/eldridge.htm>).

Seasonal Patterns. (See *West Nile Virus*)

Speed of Onset/Duration. Once infected, the incubation period is usually 3-7 days before symptoms begin to show.

Magnitude/Secondary Affects. Twenty percent of patients develop behavioral problems or recurrent seizures.

Significance. *Low*

Mitigation Options. Kern County has largely mitigated the encephalitis problem through the establishment of some of the earliest mosquito control districts in the state (1916).

VALLEY FEVER

Hazard/Problem Description. Valley Fever is primarily a disease of the lungs that is common in the southwestern United States and northwestern Mexico. Valley Fever derives its name from its discovery in the San Joaquin Valley of California. It is caused by the fungus *Coccidioides immitis*, which grows in soils in areas of low rainfall, high summer temperatures, and moderate winter temperatures. These fungal spores become airborne when the soil is disturbed by winds, construction, farming and other activities. In susceptible people and animals, infection occurs when a spore is inhaled. Within the lung, the spore changes into a larger, multicellular structure called a spherule. The spherule grows and bursts, releasing endospores which develop into spherules and eventually into pneumonia. The pneumonia will spread until the body develops immunity to the fungus and thereby contains and suppresses the infection, or until a medication effective in destroying the fungus or in retarding the growth of the fungus is given. Valley Fever is not a "contagious" disease, meaning it is not passed from person to person. Second infections are rare (Source: http://www.vfce.arizona.edu/ValleyFever/valley_fever.htm)

About two weeks after a susceptible person – one who is not immune to the disease - inhales the Valley Fever arthrospores, the symptoms of the disease begin. These symptoms typically include fever, aching, chills, sweats, fatigue, cough, and headache symptoms, which are commonly associated with the "flu". The severity of symptoms – and the severity of the lung infection - are probably related to the number of arthrospores inhaled. The more spores inhaled, the worse the disease.

Over half of those infected have no symptoms at all and in many others symptoms can be very mild. The person may develop what amounts to a slight cold, which quickly subsides, and they will never know that the "cold" was really a mild case of Valley Fever. Fever and cough are prominent. Skin rashes may occur. Joint aches - especially those involving the knees - are also common. It may take six months or more for these symptoms, particularly the tiredness and joint aches, to completely subside. Meningitis - the most lethal complication of disseminated Valley Fever - may cause a stiff neck, severe and persistent headache, nausea, vomiting, and various other central nervous system symptoms such as disorientation, loss of balance or equilibrium, inability to think clearly, and loss of consciousness. Three medicines taken orally and two medicines given intravenously are approved by the United States Food and Drug Administration (FDA) for use against Valley Fever. Most cases of valley fever need no treatment

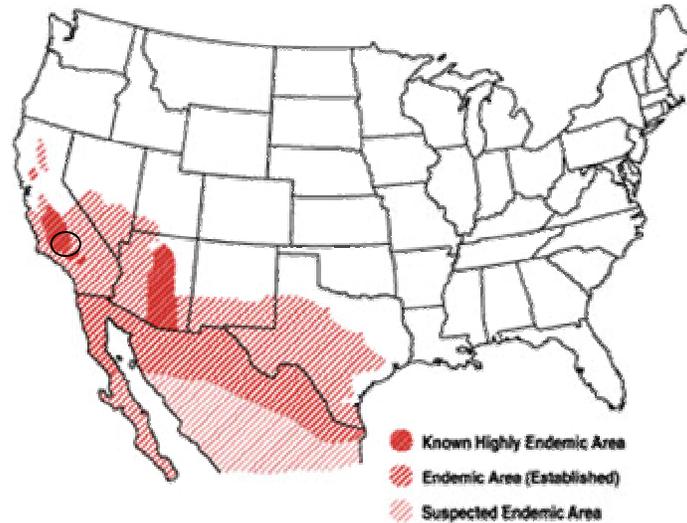
Individuals are quite likely to be affected by Valley Fever if they live in an area where the cocci fungus is prevalent. For instance, 30% or more of the residents of Bakersfield, Kern County, California have positive skin tests for Valley Fever. A person (or animal) with a positive skin test has had a Valley Fever infection and has developed immunity to the fungus and therefore will never contract Valley Fever again. Almost everyone who lives long in an area where the disease is prevalent has been infected themselves or knows someone who has had the disease. The social, medical, and economic impacts of the disease are considerable.

(Source: www.valleyfever.com).

Hazard Extent. The known endemic areas include: portions of the Sacramento Valley, all of the San Joaquin Valley, desert regions and southern portions of California, much of the southwestern United States, northern Mexico and some areas of Central and South America. The

area in California where Valley Fever occurs most frequently is Kern County. In Kern County this affects the Valley and Desert regions.

Valley Fever Extent Map (Source: <http://www.valleyfever.com/whatis.htm>)



Past Occurrences. Valley Fever was first described in cattle in 1929 and isolated from the soil in 1932. In the late '30's workers at the Kern County Health Department found the same organism in the sputum of people with what was then called San Joaquin Valley Fever that had been reported previously as being the cause of the fatal cases. In Kern County in 1992 (an epidemic year for Valley Fever) there were 3,500 new cases documented by blood tests. Most of those cases fell into the uncomplicated category.

Frequency/Likelihood of Occurrence. *Highly Likely.* An estimated 7,500 new cases of Valley Fever are anticipated annually within the United States, with an estimated treatment cost of \$60 million (Source: http://www.co.kern.ca.us/valley_fever.pdf).

Seasonal Patterns. In areas where cocci is common, Valley Fever infections usually occur in the hot, dry summer and fall months - particularly after a period of windy weather or after a dust storm.

Speed of Onset/Duration. Valley Fever symptoms generally occur within two to three weeks of exposure. Complications from the disease can last days to months, depending upon the severity of the infection.

Magnitude/Secondary Affects. *Catastrophic (more than 50% of population affected).* Exposure to Valley Fever in Kern County is widespread, but typically there are not serious complications. However, the disseminated form can lead to meningitis and death.

Significance. *High.*

Mitigation Options. *Partial.* Although it has been studied for the past 100 years, it is a disease that has remained difficult to control and treat. The Valley Fever Vaccine Project has been working on the development of a vaccine since the 1990's. As of February 1995, two candidate vaccines have been identified (Source: http://www.co.kern.ca.us/valley_fever.pdf).

PLAGUE

Hazard/Problem Description. Plague is a disease caused by *Yersinia pestis* (*Y. pestis*), a bacterium found in rodents and their fleas in many areas around the world. Human Plague is a rare disease. There are two ways that people get plague in California. The most common way is by the bite of a plague-infected flea. Fleas, which feed on plague-infected animals, get infected themselves. The second, less common way to contract plague is by handling sick or dead animals which are infected with plague. Plague bacteria in the animal's tissues and bodily fluids can get into cuts or scratches on the person's hands and result in disease. Some carnivores such as dogs, cats, coyotes and bobcats can become infected with plague, probably by eating plague-infected rodents or rabbits. In addition, dogs and cats may bring plague-infected fleas into the home. In about 25% of plague cases, a complication of plague called "plague pneumonia" or "pneumonic plague" occurs and this form of the disease can spread between people.

Plague is generally characterized by high fever; painful lump or swelling in the groin area, under the arms or in the neck; an overall feeling of sickness. If diagnosed and treated promptly, plague is quite curable.

Hazard Extent. The entire County has rodent and other animal populations that may harbor plague. Plague is a problem in the campgrounds north of Kernville according to the South Fork Mosquito Abatement District.

Past Occurrences. For the period January 1 through December 31, 1999, no human plague cases were identified in California. For the decade of the 1990's, a total of eight human plague cases have occurred in the state, one of which was fatal. There were three cases in Kern County, and one each in Madera, Inyo, Mono, Modoc, and El Dorado counties. Seven cases were in males, one female, ages ranging from 6 to 71 years. The fatal case was in a 23 year old male resident of Tehachapi in Kern County in 1995. It is believed that he contracted the disease from the recycling center where he worked, possibly from contact with infected animal carcasses in the refuse (Sources: <http://www.sove.org/newsletter/June/June%202000.html#Update%20on%20Plague> and <http://www.dhs.ca.gov/ps/dcdc/cm/951101cm.htm>).

In 1926-27 eradication of mouse predators such as coyotes led to an overabundance of mice in the vicinity of the Buena Vista Lake bed. As many as 100 million mice were present during the height of the infestation, which led to the "great Kern County mouse war" that lasted over three months and cost more than half a million of dollars in damaged crops, buildings and fences (Source: Kern Historical Society and Kern Library Disaster files).

Frequency/Likelihood of Occurrence. *Likely.* Plague is a bacterial disease of rodents. As long as rodents occupy areas in close proximity to humans, human plague will continue to be a

problem. Given the rainy winter of 2004-2005, the future occurrence of plague may be possible until such climatic conditions change.

Seasonal Patterns. Rodent populations tend to increase when food sources are high, generally during the wet weather season in winter and spring.

Speed of Onset/Duration. One to six days after becoming infected with the bacteria, people can develop symptoms.

Magnitude/Secondary Affects. *Limited.* Death can result in some cases.

Significance. *Low.*

Mitigation Options. *Partial.* Public education can help increase awareness and reduce impacts.

HANTA VIRUS

Hazard/Problem Description. Hantavirus Pulmonary Syndrome is an often deadly disease that usually begins with flu-like symptoms and may rapidly progress to a respiratory disease when the lungs fill with fluid. Patients usually develop breathing difficulty approximately two to six days after onset of symptoms. Hantavirus is spread by the deer mouse and other closely related species of wild mice, which excrete the virus in their urine, droppings and saliva. People can become infected by inhaling particles of the virus that may become airborne when rodent droppings or nests are disturbed. The virus is not spread from person to person.

Hazard Extent. The deer mouse is the most common mouse in Kern County and its habitat includes the entire County (Source: http://natureali.org/der_mouse.htm).

Past Occurrences. A twenty three year old male from Shafter died of Hanta Virus in 1999. Another male from Taft contracted the virus that same year but survived. Kern has had four cases between 1993 - 2001 (Source: <http://www.sove.org/newsletter/June/June%201999.html#hpsca> and <http://www.sove.org/newsletter/June/June%202000.html#Update%20on%20Plague>) No human cases were detected in California residents in 2001.

Frequency/Likelihood of Occurrence. Scientists think the emergence of the disease is caused by climactic changes, specifically the occurrence of El Nino in the southern hemisphere. El Nino brought more moisture into the area providing an increase food source for deer mice, which resulted in a rapid increase in the rodent population. Given the recent El Nino precipitation, it follows that the rodent population may increase as a result of an increase in food source for deer mice. Cases of Hantavirus might be expected to increase in the next year.

Seasonal Patterns. See Frequency/Likelihood of Occurrence above. Months of onset during 1999 were March, April, June, and July.

Speed of Onset/Duration. The Kern County resident death that resulted from Hanta Virus followed an incubation period of 2 days, which is considered abnormally short.

Magnitude/Secondary Affects. Hanta Virus kills around 40 percent of those who contract it, according to the Centers for Disease Control, which has issued a national warning about Hantavirus.

Significance. *Low.*

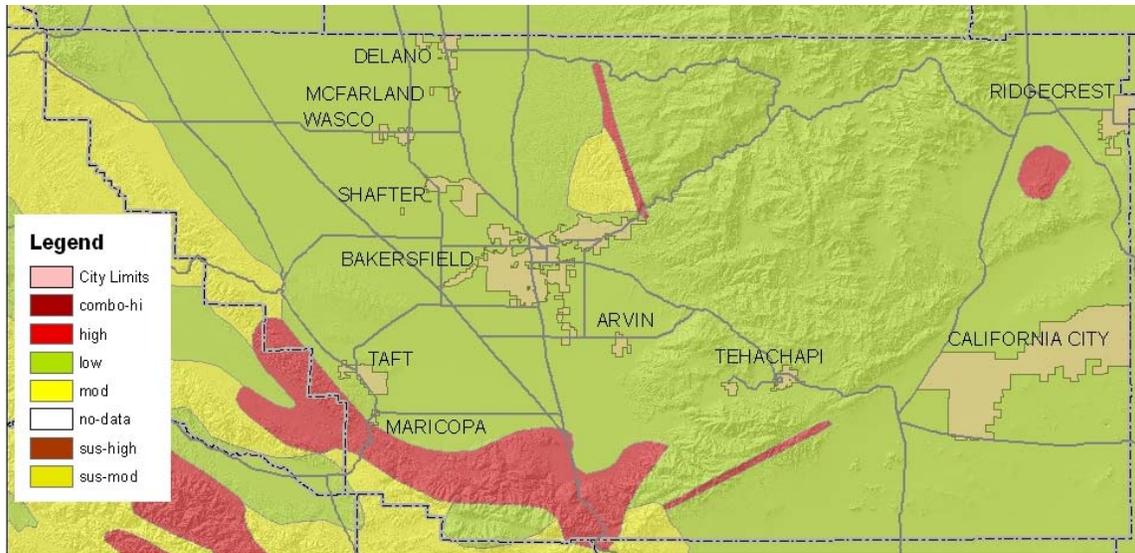
Mitigation Options. *Partial.* Public education and mouse control efforts can help minimize human exposure to mice feces.

LANDSLIDES

Hazard/Problem Description. Landslides, for the purposes of this plan, include slumps, debris flows, and rockfall. Rockfall is the falling of a detached mass of rock from a cliff or down a very steep slope. 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 (i.e. road cuts) or overloading slopes with artificial fill, by extensive irrigation, construction of impermeable surfaces, excessive groundwater withdrawal, and removal of stabilizing vegetation.

The California State Hazard Mitigation Plan identifies landslides as one of the hazards adversely impacting the state. Landslides are usually confined to areas of steep slopes that have an underlying geology that is susceptible to movement. Landslides are usually triggered by an event such as an earthquake, large rainfalls, human slope modification/loading activities, gravity, or a combination thereof.

Hazard Extent. *Limited.* The CGS has no landslide maps available yet for Kern County, thus USGS national-scale landslide maps were used as a baseline to identify possible landslide problem areas in the county. The map shows the southern California section of the USGS Landslide Overview Map of the Conterminous United States. The maps depicts where large numbers of landslides have occurred and areas which are susceptible to landsliding. This data is highly generalized and was developed at a scale that make it unsuitable for local planning or actual site selection. It does provide an overview of the possible areas of concern that may warrant further investigation.



Kern County Landslide Susceptibility Map (Map compilation AMEC, data source USGS)

The map shows that southwestern Kern County has a high susceptibility to landslides. Pockets of high and moderate exist in the Sierra foothills north east of Bakersfield, and along the West Garlock fault zone and a pocket of high southwest of Ridgecrest. Rockfall areas include Kern River Canyon along Highway 178 and along county roads in the vicinity of Caliente Creek. Debris flow areas along I-5 near the southern border of the County have frequently closed this major north-south transportation corridor.

The Kern COG has developed a map showing steep slopes within the County. These are areas with greater than 30% slope that may be a constraint to development, or have the potential for landslide, rockfall, or debris flows.

Past Occurrences.

September 30, 2004 rockslide

A Magnitude 5.0 earthquake struck 17 miles northeast of Arvin triggered a rock slide that impacted a state highway, but the road was quickly cleared and there were no reports of damage or injury.

December 7, 2003 rockslide

A rock slide occurred in the Kern River Canyon after 0.20" of rain had fallen in a 4-hour period close by in the Kern County Mountains causing approximately \$5,000 in damage (Source: NCDC).

August 1984, debris flows near Lake of the Woods

An intense thunderstorm that dropped 3 inches of rain in 30 minutes flooded Lake of the Woods near Frazier Park. Heavy debris flows were associated with this event that injured 5 people and caused 27 homes and businesses to sustain \$1.9 million in property damage (Source: Kern County ESS records).

July 1984 debris flows near Onyx, Weldon, and Lake Isabella were triggered by a thunderstorm.

Mid 1980's debris flow near Tehachapi

Heavy rains washed mud and debris onto State Highway 58 east of Tehachapi near Cameron Canyon Road. The highway was closed for two days as a result.

February 9, 1978 debris flows on I-5

Heavy rains triggered a debris flow that covered I-5 in a swath of mud and boulders more than a mile long, up to six feet deep and flowing hundreds of feet across all eight lanes of the Interstate.

The incident occurred in the mountains of south central Kern County where I-5 begins to climb up to El Tejon Pass and over to Los Angeles. 12 cars and 4 trucks were caught in the flow. A fifth truck jackknifed, was disabled and abandoned on the highway. The southbound lanes were closed for several days until rains stopped and allowed Caltrans crews to clean off the debris.

(Source: Newspaper article, Kern County Library disaster file).

July 21, 1952 Earthquake triggered rockslides

The Kern Canyon Plant Diversion Dam was heavily damaged by rockslides triggered during the earthquake in 1952 (Source SCEC slideshow photo at www.data.scec.org/chrono_index/kerncoun.html).



Photo: Gordon Coltrin, Pacific Gas & Electric

Rockslide damage to the Kern Canyon Plant Diversion Dam.

Frequency/Likelihood of Occurrence. *Occasional.* Although there is limited data on past events it is likely that the Mountain region of the planning area will experience landslides, rockfall, and debris flows in the future.

Seasonal Patterns. Winter and spring is typically the landslide/rockfall season in California as rain and snow melts and saturates soils and temperatures enter into freeze/thaw cycles. Debris and mud flows generally occur during summer cloudbursts.

Speed of Onset/Duration. Debris and mud slides and rockfall can occur rapidly with little warning during torrential rains. Landslides typically have a slower onset and can be predicted to some extent by monitoring soil moisture levels and ground cracking or slumping in areas of previous landslide activity.

Magnitude/Secondary Affects. *Limited, 10-25% of the planning area affected.* However a road closed due to landslide or rockfall activity can result in serious transportation disruptions.

Significance. *Low*

Mitigation Options. *Several.* Losses due to landslides can be almost totally eliminated by a combination of geologic investigations, engineering practice, use of hazard area zoning, and effective enforcement of the Zoning and Grading Ordinances.

SOIL HAZARDS

Hazards associated with soils include land subsidence, expansive clay soils, erosion, soil liquefaction, and radon. The following hazards are identified in the Kern County General Plan Safety Element, with the exception of radon.

LAND SUBSIDENCE

Hazard/Problem Description. Land subsidence is occurring within the San Joaquin Valley and desert regions of Kern County. It 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 (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.

According to the General Plan 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 practice has lowered the ground level over a large area south of Bakersfield and the desert Antelope Valley near Edwards Air Force Base.

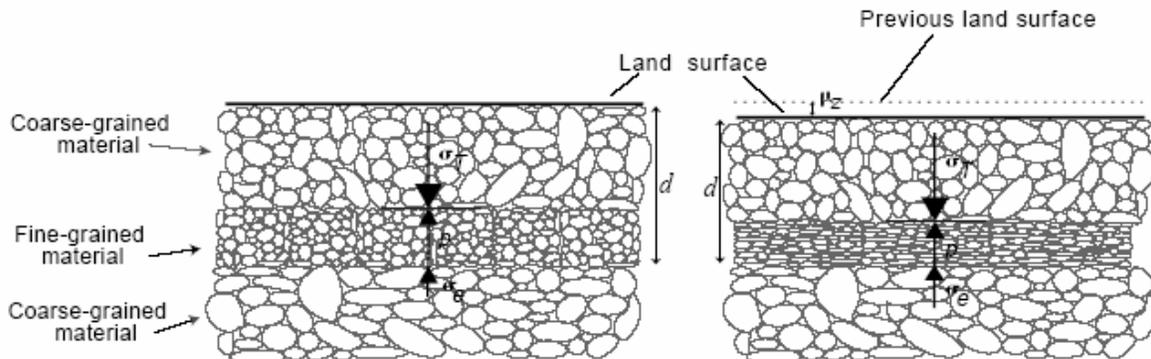
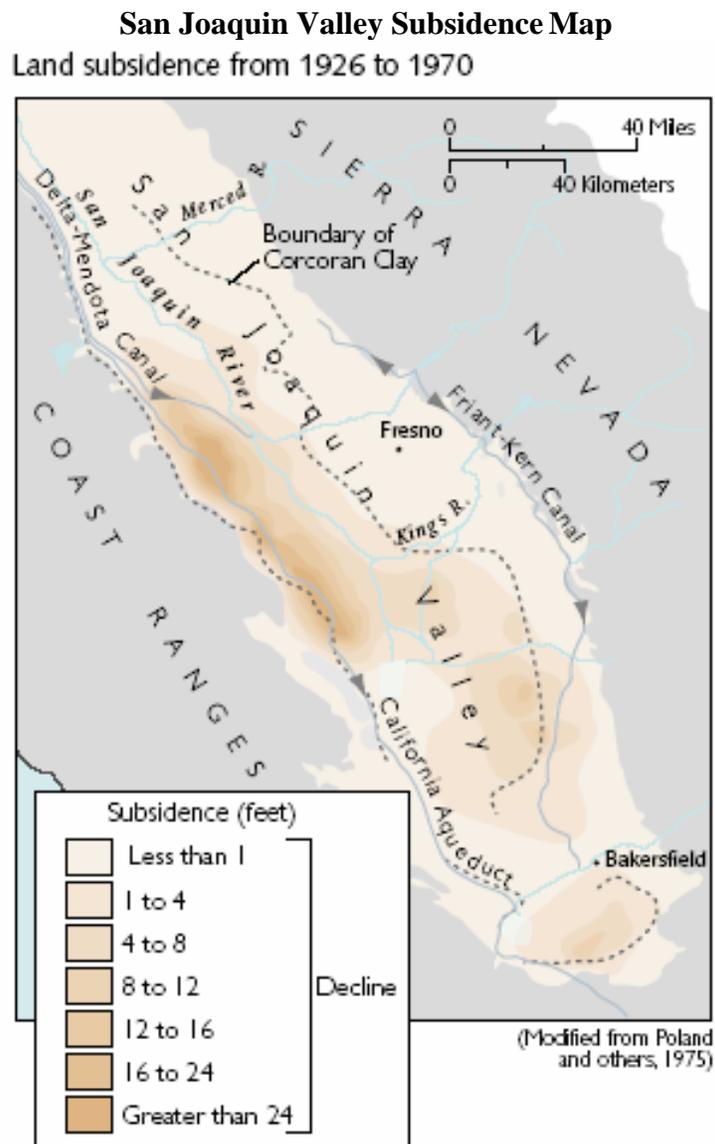


Illustration of subsidence due to de-watering of fine-grained soils

Source: USGS Water Resources Investigations Report 00-4015, 1997.

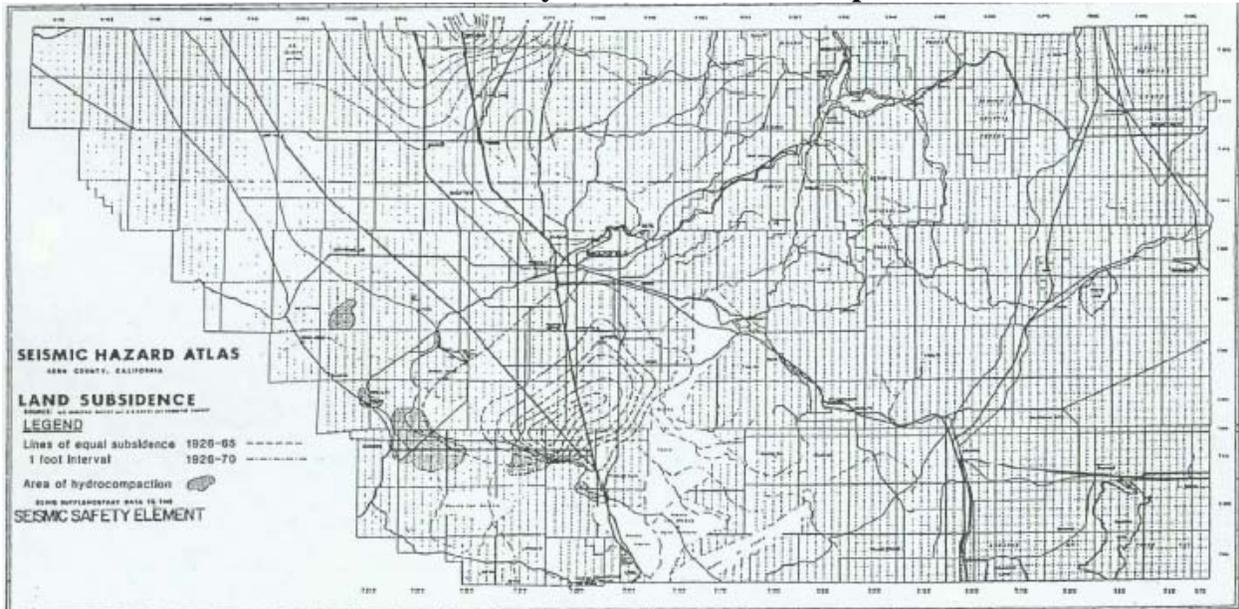
Subsidence caused by hydrocompaction of moisture – deficient alluvial deposits. This is a one time densification from collapse of the soil structure in near-surface strata where the rainfall or other moisture has not penetrated during a long period of time. Parts of the California Aqueduct were constructed through and over hydrocompactable deposit after compaction has occurred through ponding.

Hazard Extent. Significant. Subsidence is occurring in the Valley and Desert regions. Subsidence from groundwater withdrawal affects the San Joaquin Valley, particularly the southwest end of the Valley in the vicinity of the Buena Vista Lake Bed. Edwards Air Force Base in the Desert Region has also experienced subsidence problems in the vicinity of the Rogers Dry Lake Bed. A land subsidence map in the County General Plan details subsidence in the southern San Joaquin Valley. A second map developed by the USGS details historic subsidence near Edwards Air Force Base.



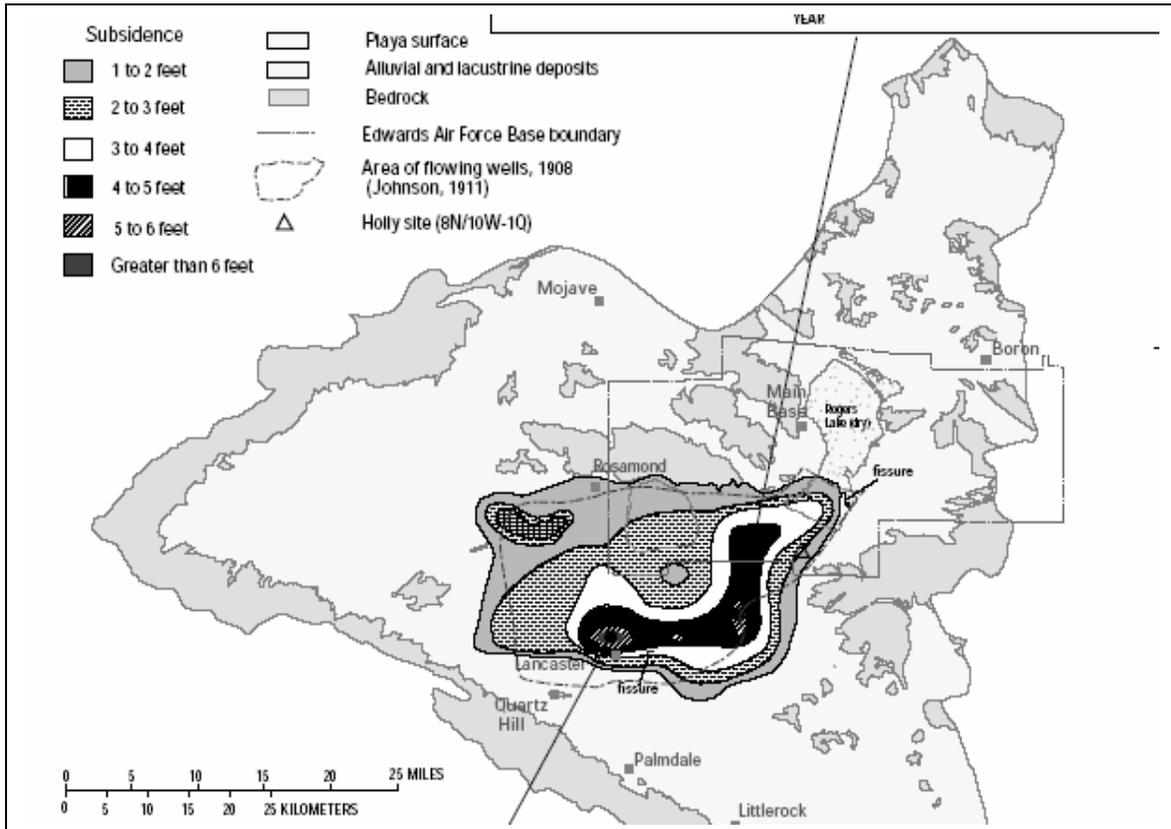
Source: USGS Circular 1182

Kern County Land Subsidence Map



Source: Kern County General Plan Safety Element

Subsidence Map in the vicinity of Edwards Air Force Base, Southeast Kern County. Source: USGS Water Resources Investigations Report 00-4015, 1997.



Past Occurrences.

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 1961-1989 has been about a tenth of a foot a year.

Several 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 sinklike depressions.

Land subsidence in the San Joaquin Valley was first noted in 1935 near Delano. Accelerated ground water pumpage 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. Costs associated with these damages to the San Joaquin Valley (including areas outside Kern County) have been estimated at \$25,000,000 (EDAW-ESA, 1978) (*Source: USGS Circular 1182, 1999*). Subsidence-related gradient changes are an ongoing problem for the California Aqueduct in Kern County.

Frequency/Likelihood of Occurrence.

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 slower rates 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.

Seasonal Patterns. Subsidence from ground water withdrawal can be associated with seasonal increases in ground water pumping, but often the effects are not manifested till months or years later.

Speed of Onset/Duration. Subsidence is a slow onset, long-term hazard. Subsidence from ground water withdrawal may continue for years, even after pumping has abated, due to time delays associated with aquifer compaction.

Magnitude/Secondary Affects. *Limited, 10-25% of the planning area affected.* Secondary affects include ground cracking that can impact roads, utilities, and other infrastructure. Subsidence can also contribute to flood and drainage problems. Ground failure from subsidence can be aggravated by earthquake ground shaking.

Significance. *Medium*

Mitigation Options/Feasibility. *Several.* The usual remedial action is that of raising the water table by injecting water or by reducing groundwater pumpage. This increases the fluid pressure in the aquifer and, in most instances, subsidence decreases or stops after a period of time.

EXPANSIVE SOILS

Hazard/Problem Description. Certain types of fine-grained clay soils expand when moisture is added. When water is added to these expansive clays, the water molecules are pulled into gaps between the clay plates. As more water is absorbed, the plates are forced further apart, leading to an increase in soil pressure or an expansion of the soil's volume.

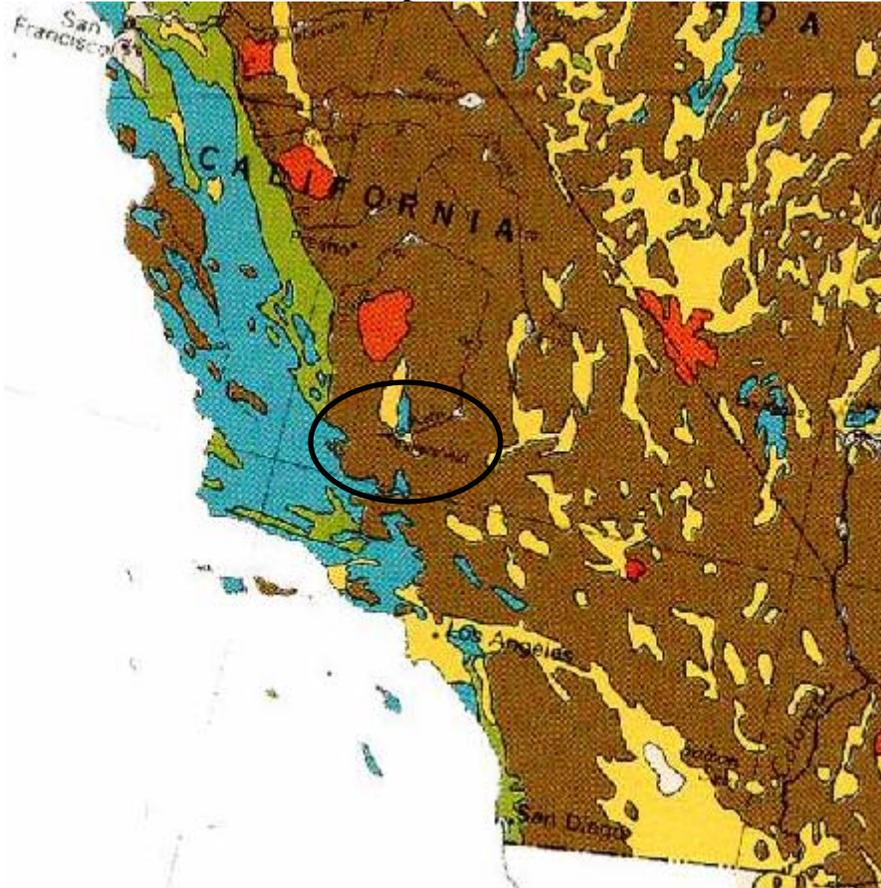
Soils containing expansive clays become very sticky when wet and are usually characterized by surface cracks or a “popcorn” like texture when dry. In many cases the expansive soils are buried under a layer of topsoil or dense vegetation and can't be identified without the use of subsurface core samples. Sometimes the expansive soils are contained within bedrock layers of the underlying geology.

Soils that expand when moisture is added tend to lose their ability to support foundations of structures. The weight of these structures squeezes the water-saturated clays laterally from under the foundations. Wavy, "roller-coaster" surfaces may indicate swelling at certain layers or an uneven distribution of swelling soils. Excessive patching or cracking of the asphalt is also a sign of swelling soils. Problems in residential areas include diagonal cracks in foundations, doors and windows that do not open properly, and cracked and uneven driveways. Heaving of roads and highway structures and disruption of pipelines and sewer lines can also result from the upward and/or horizontal destructive forces exerted by swelling soils.

(Source: www.surevoid.com/surevoid_web/soils/expansive_cons.html)

Hazard Extent. For general education purposes only, the USGS has mapped swelling soil potential, based on geologic formations that have abundant sources of clay.

**Excerpt from U.S. Geological Survey Swelling Clays Map of the Conterminous U.S.
Soil Map of California**



MAP LEGEND

- Unit contains abundant clay having high swelling potential
- Part of unit (generally less than 50%) consists of clay having high swelling potential
- Unit contains abundant clay having slight to moderate swelling potential
- Part of unit (generally less than 50%) consists of clay having slight to moderate swelling potential
- Unit contains little or no swelling clay
- Data insufficient to indicate clay content of unit and/or swelling potential of clay (Shown in westernmost states only)

Source: www.surevoid.com/surevoid_web/soil_maps/ca.html

Past Occurrences. Some swelling soil problems have occurred in Rosamond/Edwards Air Force Base area.

Source <http://www.lacsd.org/Final%20LRP%202020%20Facilities%20Plan%20DEIR/FinalFacEIRPlan.htm>

Frequency/Likelihood of Occurrence. *Likely.* Problems with swelling soils are likely to continue if they are not properly identified and mitigated prior to construction.

Seasonal Patterns. Expansive soil problems are likely to coincide with wet weather in the winter and spring.

Speed of Onset/Duration. Construction often exposes swelling soils to moisture and exacerbates the problem. Problems with heaving may not manifest until 6 months to years later.

Magnitude/Secondary Affects. *Limited, 10-25% of the planning area affected.*

Significance. *Medium*

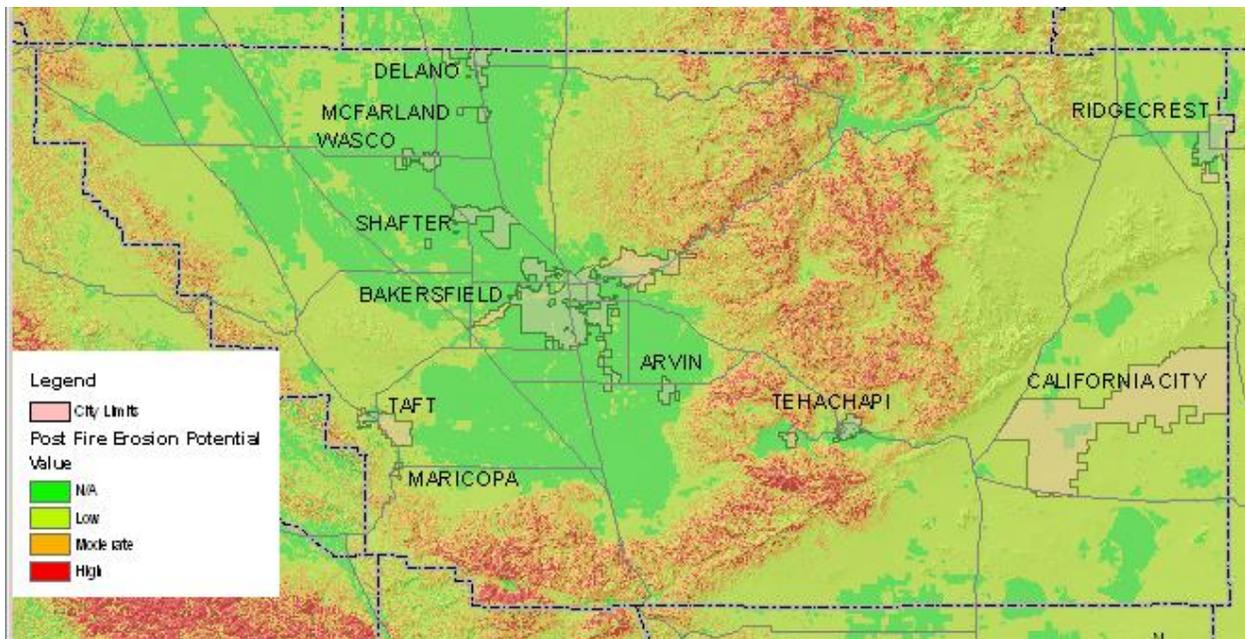
Mitigation Options/Feasibility. *Several.* Mitigation options include avoiding development on expansive soils or providing adequate drainage to reduce expansive soil saturation.

EROSION

Hazard/Problem Description. 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.

Erosion induced by seismic activity occurs on gentle-to-steep slopes covered by loose sediments. Fissures, steep slopes, and offsets along a fracture zone may enhance seismically induced erosion. With a large earthquake this could become a significant hazard in many areas of the County. The same could be said if a large wildfire were to occur, leading to erosion and sedimentation problems in mountain watersheds. Windstorms can strip vegetation on hillsides and exacerbate soil erosion problems (see dust storms).

Hazard Extent. Erosion problems in Kern County are prevalent on steep slopes, alluvial fans, earthquake fault zones, and urban drainage systems. Recent wildfire burn areas are also susceptible to erosion problems.



Post Fire Erosion Potential Map (Map compilation AMEC, data source CDF)

Past Occurrences. Erosion problems in the form of gully development have been associated with the Tehachapi Wind Turbine farm in the 1990's. Erosion problems have been observed at Jawbone Canyon near Cantil in the Desert region and at Cuddy Creek in the vicinity of the Frazier Park and Lake of the Woods in the Mountain region. Many of Kern County's erosion problems are in part due to human intervention (Source: *Frazier Park Area Adopt a Creek Project* <http://www.shopoutdoors.com/creekphotos.html>).

Frequency/Likelihood of Occurrence. *Highly Likely.* With the steep slopes, fire potential, and severe weather events it is likely that the County will have erosion problems every year.

Seasonal Patterns. Erosion problems are most prevalent during winter and spring rain and wind storms.

Speed of Onset/Duration. Erosion is typically an ongoing, gradual and long term process. Significant and rapid erosion can occur with flood and wind events.

Magnitude/Secondary Affects. *Medium.* Sedimentation in drainages and catchment basins can increase flood potential.

Significance. *Medium*

Mitigation Options/Feasibility. *Several.* Losses due to erosion can be greatly reduced by a properly engineered design, construction, and effective enforcement of the ordinance relative to grading, landscaping, and drainage.

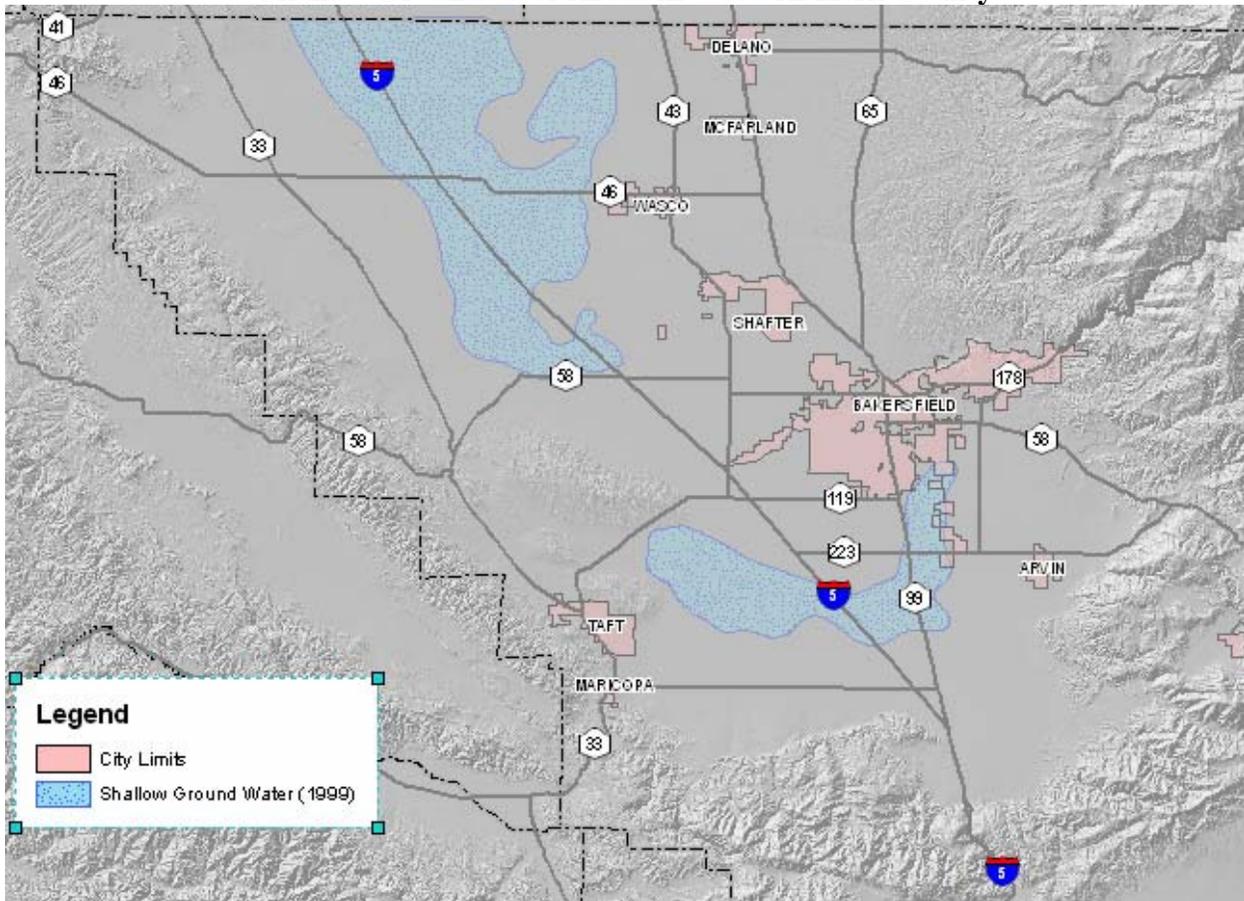
LIQUEFACTION

Hazard/Problem Description. Liquefaction is a temporary loss of soil bearing strength that is usually triggered by an earthquake. Liquefaction usually occurs in loosely consolidated sands and silts that have a shallow water table, or in poorly engineered, saturated fill. It typically affects saturated soils that are within 30 feet of the ground surface. Liquefiable soils are often associated with geologically recent river (alluvial) deposits. Evidence of liquefaction after an earthquake is usually in the form of surface sand boils and ground cracking and settling.

Liquefaction's temporary transition of soil into "quicksand" can have disastrous effects on the built environment. Earthquake-induced liquefaction observed in many areas of the world has caused buildings to fall over on their sides due to the lack of ground support. Some buildings designed to withstand earthquake shock waves, have been deemed inhabitable due to earthquake-triggered liquefaction. The building design was good except the foundation, which failed because liquefaction occurred during an earthquake. Differential settlement and shifting of liquefiable soils can wreak havoc to roads and runways and sever utility lines, leading to secondary hazards such as fires. Liquefaction can lead to lateral spreading in areas that are gently sloped. Anything built on these areas could suffer severe damage.

Hazard extent. The Department of Conservation has mapped liquefaction hazard areas in Los Angeles County. Near Rosamond, the liquefaction hazard is sited up to the Kern County border. When this plan was initially prepared detailed liquefaction mapping did not exist within Kern County. Mapping of shallow groundwater areas available in GIS format from Kern County GIS, however, provide a general sense of where potential problem areas may exist. The following map indicates areas of shallow groundwater based on 1999 data.

Shallow Groundwater Areas in Western Kern County



Map compilation AMEC; data source: Kern County

Past Occurrences. Research conducted during the planning process did not reveal evidence of previous liquefaction. Ground cracking was observed near Arvin and Caliente during the 1952 earthquake, some of which was associated with faulting, but it is possible but not clear if it was associated with liquefaction. Major field releveling had to be done in many places (Source: SCEC http://www.data.scec.org/chrono_index/kerncoun.html).

Frequency/Likelihood of Occurrence. *Occasional.* Based on historic events from earthquakes around the world an earthquake of Magnitude 6 or above is typically needed to trigger liquefaction. These earthquakes are generally less common, but given the fact that there are at least 5 faults in the western portion of Kern County capable of producing Magnitude 6 or above earthquakes, it is likely that liquefaction may occur in the future.

Seasonal Patterns. None, though liquefaction triggered by an earthquake that occurs during the rainy season is likely to be more widespread due to higher ground water levels.

Speed of Onset/Duration. Liquefaction occurs and dissipates rapidly with ground shaking from earthquakes.

Magnitude/Secondary Affects. *Limited.* It is unlikely that more than 10% of the planning area would be affected by liquefaction, but damage and liquefaction extent will be dependent on the

size of the earthquake, the amount of liquefiable soil and available shallow groundwater conditions. The greater the earthquake, the larger the potential for liquefaction. Lateral spreading and differential ground settlement will have the greatest impact on the built environment, which could lead to pipeline ruptures and environmental hazards or fires.

Significance. *Medium*

Mitigation Options/Feasibility. *Partial.* The most effective option to mitigate soil liquefaction involves avoiding development in hazardous areas. Foundation design methods and proper compaction of engineered fill will help reduce impacts to buildings.

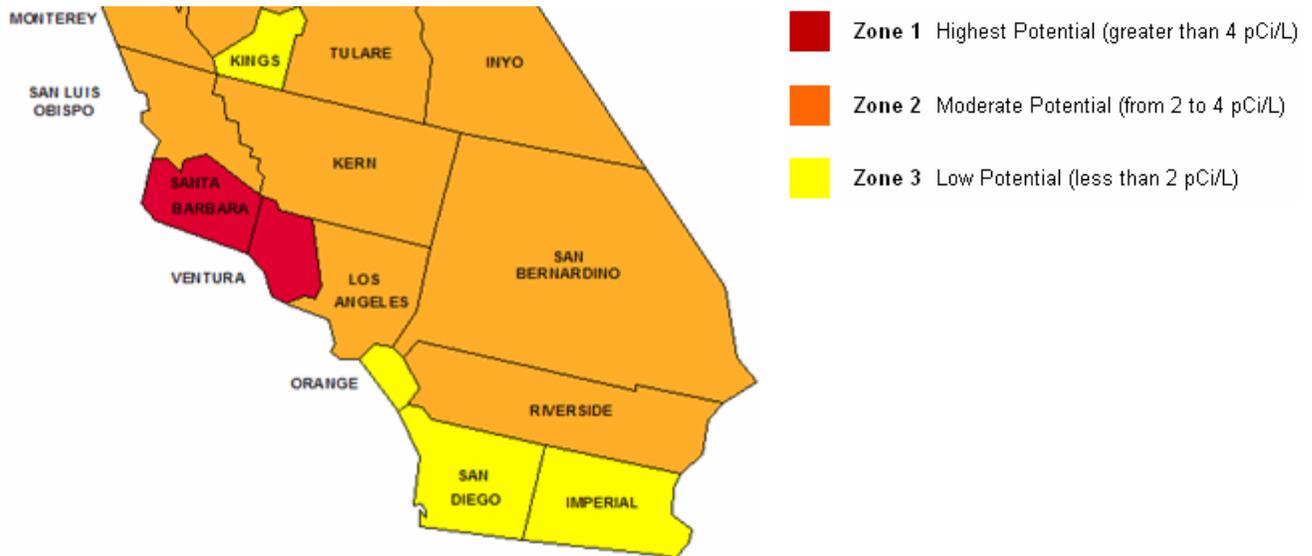
RADON

Hazard/Problem Description. Radon gas is a naturally occurring radioactive gas that is invisible and odorless. It forms from the radioactive decay of small amounts of uranium and thorium naturally present in rocks and soils so some radon exists in all rocks and soils. Certain rock types, such as black shales and certain igneous rocks, can have uranium and thorium in amounts higher than is typical for the earth's crust. Increased amounts of radon will be generated in the subsurface at these locations. Because radon is a gas, it can easily move through soil and cracks in building slabs or basement walls and concentrate in a building's indoor air. Areas with higher amounts of radon in the underlying rocks and soil are likely to have higher percentages of buildings with indoor radon levels in excess of U.S. Environmental Protection Agency guidelines, and incidences of very high indoor radon levels are more likely in these areas.

Breathing air with elevated levels of radon gas results in an increased risk of developing lung cancer. Not everyone exposed to radon will develop lung cancer, but U.S. EPA and the National Cancer Institute estimate the annual number of lung cancer deaths in the United States attributable to radon is between 7,000 and 30,000. The average concentration of radon in American homes is about 1.3 picocuries per liter and the average concentration in outdoor air is about 0.4 picocuries per liter. The U.S. EPA recommends that individuals avoid long-term exposures to radon concentrations above 4 picocuries per liter. The only way to know what the radon level is in a building or home is to test the air. Fortunately, radon testing is relatively simple and inexpensive. If indoor-air testing indicates radon levels exceeding 4 picocuries per liter, the U.S. EPA recommends remediation actions be considered (*Source: www.consrv.ca.gov/cgs/minerals/hazardous_minerals/radon/index.htm*).

Hazard Extent. The U.S. EPA and the U.S. Geological Survey have evaluated the radon potential in the U.S. and have developed a map to assist National, State, and local organizations to target their resources and to assist building code officials in deciding whether radon-resistant features are applicable in new construction. This map is not intended to be used to determine if a home in a given zone should be tested for radon. Homes with elevated levels of radon have been found in all three zones. The map assigns counties to one of three zones based on radon potential. Each zone designation reflects the average short-term radon measurement that can be expected to be measured in a building without the implementation of radon control methods. According to the EPA, all of Kern County is in Zone 2, which means there is a moderate potential for Radon contamination in the County. Detailed radon zone mapping, done by CGS for Santa Barbara and Ventura Counties, was not available for Kern County.

Excerpt from EPA Map of Radon Zones in California



Source: www.epa.gov/radon/zonemap/california.htm

Past Occurrences. It is difficult to link radon exposure directly with cancer occurrence. According to Kern County Department of Public Health Status Report, 2003, Kern County had 2,838 deaths from lung cancer during 1993-2002. The average age-adjusted death rate in the last ten years was 54.1 per 100,000, slightly higher than California's average of 48.7 per 100,000. It is likely that 90% of these deaths are attributable to smoking, and no link to radon exposure has been made (Source: <http://www.co.kern.ca.us/health/HSR-2003.pdf>).

Frequency/Likelihood of Occurrence. *Likely.* The California Department of Health Services (CDHS) conducted a statewide study of indoor radon concentrations in 1988-89. The survey was a statewide effort to determine the extent of indoor radon exposure in representative California homes and to identify areas of the State where residences may have elevated radon concentrations. Homes with long-term concentrations measured at or above the action level are recommended for radon reduction. The U.S. EPA action level is largely based on current mitigation technologies. It is recognized that radon exposures below 4 pCi/L still contribute to the risk of lung cancer. The statewide survey showed that about 0.8% (approximately 100,000) of California homes are expected to have annual average radon levels exceeding the U.S. EPA action level (Source: <http://www.dhs.ca.gov/ps/deodc/ehlb/iaq/Radon.htm>).

Seasonal Patterns. *None*

Speed of Onset/Duration. Radon is a product of the long term decay of radium, common in many soil and rock types. There are no immediate symptoms of exposure to Radon. Lung cancer usually develops years (5-25) after exposure (Source: www.epa.gov/radon/radonqa1.html#What%20are%20the%20Health%20Effects%20From%20Exposure%20to%20Radon).

Magnitude/Secondary Affects. The California Department of Health Services (CDHS) conducted a statewide study of indoor radon concentrations in 1988-89. The data show that California does not have a substantial statewide problem with indoor radon exposure. However,

elevated radon levels are found in certain selected areas (Source: <http://www.dhs.ca.gov/ps/deodc/ehlb/iaq/Radon.htm>). Lung cancer and death are possible complications of prolonged Radon exposure.

Significance. *Medium*

Mitigation Options. *Several.* Inexpensive Radon detectors can detect the presence of Radon inside of residences. Several options to ventilate residences exist.

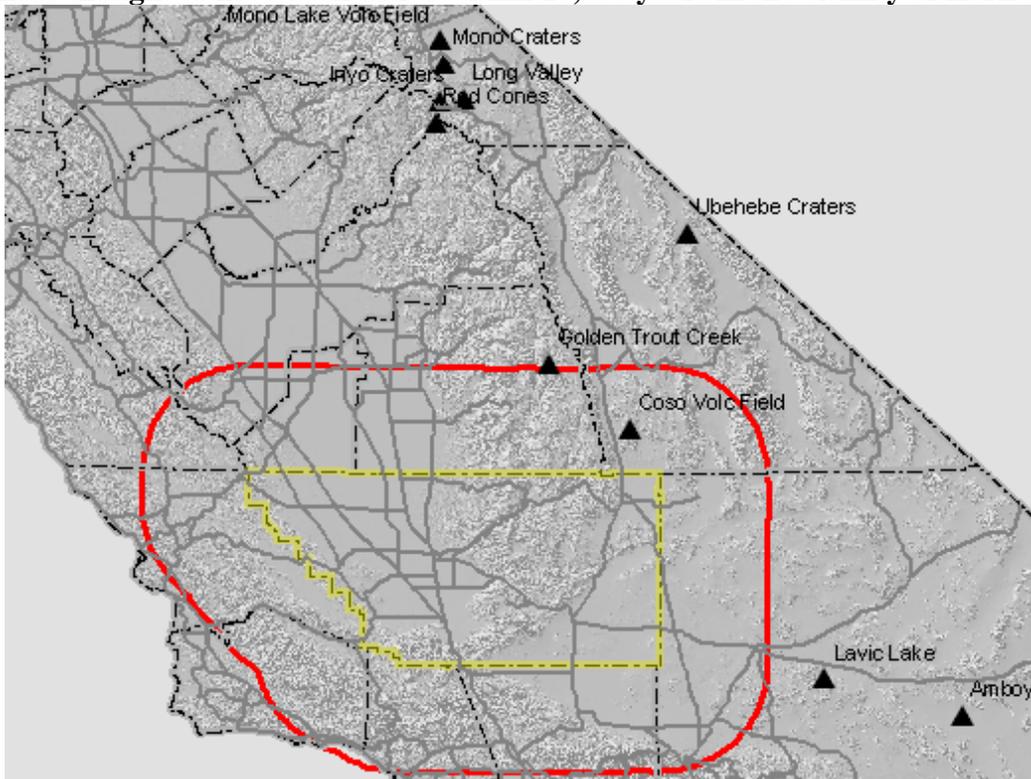
VOLCANOES

Hazard/Problem Description. A volcano is a mountain formed by the eruption of subsurface material including lava, rock fragments, ash, and gases, onto the earth's surface. Based on the evidence of past activity, volcanoes can be considered "active", "dormant", or "extinct". "Active" volcanoes usually have evidence of eruption during historic times. Volcanoes produce a wide variety of hazards that can damage and destroy property and cause injury and death to people caught in its path. Hazards include those related to volcanic activities such as: eruption columns and clouds, volcanic gases, lava/pyroclastic flows, volcanic landslides, mudflows or debris flows (called lahars) and widespread ejection of ash, known as tephra, into the atmosphere. This ash can be carried aloft by winds that deposit the ash far from the crater, with the finer grained materials traveling the furthest distances. Thus, depending on the type of eruption and wind direction, volcanoes can have far ranging effects.

The volcano hazard is related to the frequency of eruption, the type of volcano, and the proximity of development to the hazard. Volcanoes have the potential to be one of nature's most destructive natural hazards. The catastrophic effects of the Mount St. Helens eruption of 1980 demonstrated how powerful, deadly, and wide ranging the effects of a volcanic eruption can be.

Hazard Extent. The California State Hazard Mitigation Plan identifies volcanoes as one of the hazards adversely impacting the state. In general, they refer to population centers within 30-60 kilometers as being susceptible to significant volcanic impacts. GIS was used during this planning process to identify potential volcanic hazards. A map layer created by the USGS that contains Holocene volcanoes, or those which are thought to be active within the past 10,000 years, was overlaid with the Kern County boundary. No volcanoes lie within the county, but the Coso Volcanic Field lies within 60 km of the county boundary, the Golden Trout Creek volcanic fields lies 62 kilometers north of Kern County, and 8 other volcanoes lie within a 200 mile radius of the County. All of these volcanoes lie on east side of the Sierra and Tehachapi mountains. With the prevailing winds from the west, northwest and the mountains as a barrier, it is unlikely that ash from an eruption would affect western Kern County, unless it coincided with a Santa Ana Wind. Communities that lie in eastern Kern County may be more at risk to ash deposits from a volcanic eruption, being both closer to the existing hazard and east of the mountains.

Volcanoes thought to have been active within 10,000 years in the vicinity of Kern County



Yellow highlight is the Kern County Boundary, red line is a 60 km buffer of Kern County (Map compilation AMEC, data source USGS)

Volcanoes within 200 miles of Kern County

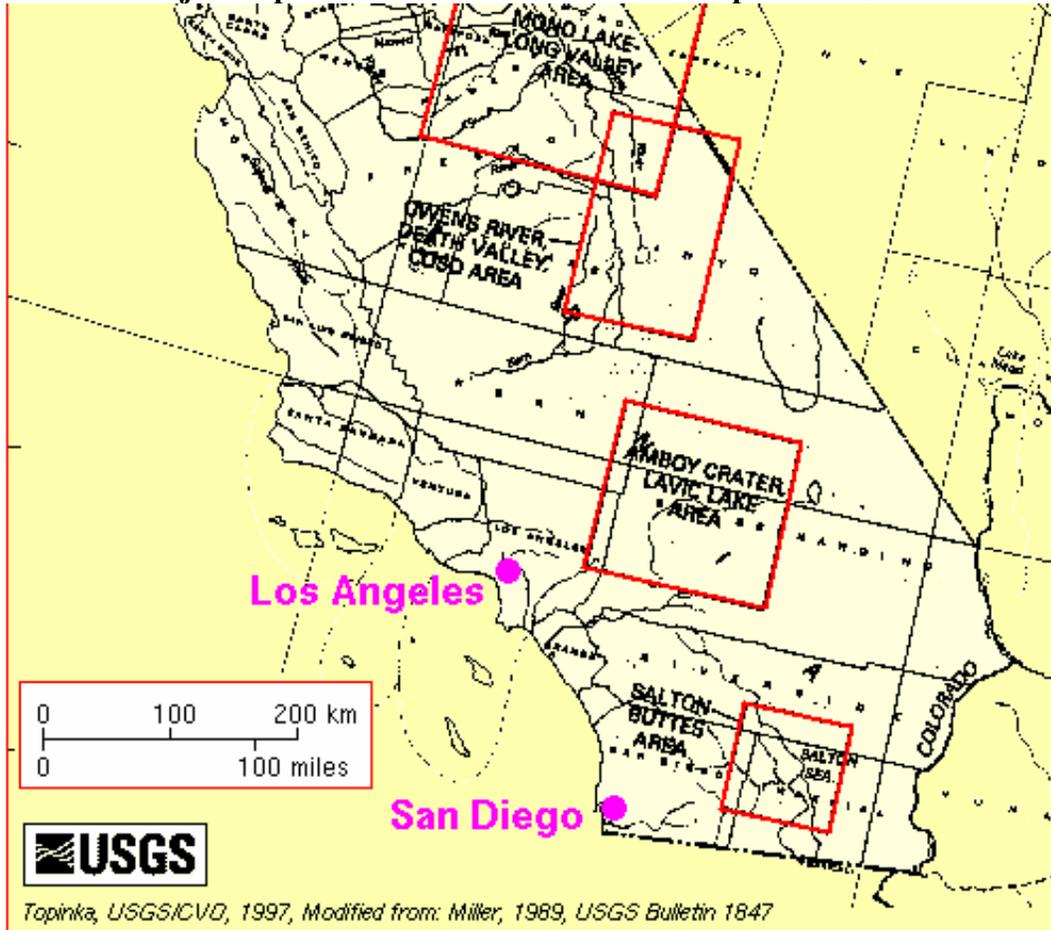
NAME	ELEV	TYPE	TIMEFRAME
Coso Volc Field	2,400	Lava domes	Uncertain Holocene eruption.
Golden Trout Creek	2,886	Volcanic field	Last known eruption B.C. (Holocene)
Lavic Lake	1,495	Volcanic field	Uncertain Holocene eruption.
Ubehebe Craters	752	Maars	Last known eruption B.C. (Holocene)
Mono Lake Volc Field	2,121	Cinder cones	Last known eruption from 1700-1799, inclusive.
Mono Craters	2,796	Lava domes	Last known eruption from A.D. 1-1499, inclusive.
Inyo Craters	2,629	Lava domes	Last known eruption from A.D. 1-1499, inclusive.
Long Valley	3,390	Caldera	Quaternary eruption(s) with the only known Holocene activity being hydrothermal.
Red Cones	2,748	Cinder cones	Undated, but probable Holocene eruption.
Amboy	288	Cinder cone	Undated, but probable Holocene eruption.

Source: USGS

Studies done by USGS indicate that there is some potential for volcanic hazards that may impact Kern County. The Coso valley, Amboy Crater\Lavic Lake area and Long Valley volcanic areas could generate ash and volcanic eruption hazards. The map below estimates the ashfall and volcanic hazards. These estimates of potential ash thickness are based on deposits of ash from

past eruptions at other volcanoes that involved volumes of as much as one kilometer³. Only a part of an ash-fall hazard zone would probably be affected by any single ash fall, the part affected would be determined by the wind speed and direction or directions during an eruption. (Source: <http://lvo.wr.usgs.gov/zones/TephraFall.html>) An eruption from Long Valley would not likely adversely impact Kern County with ash, even if it were downwind.

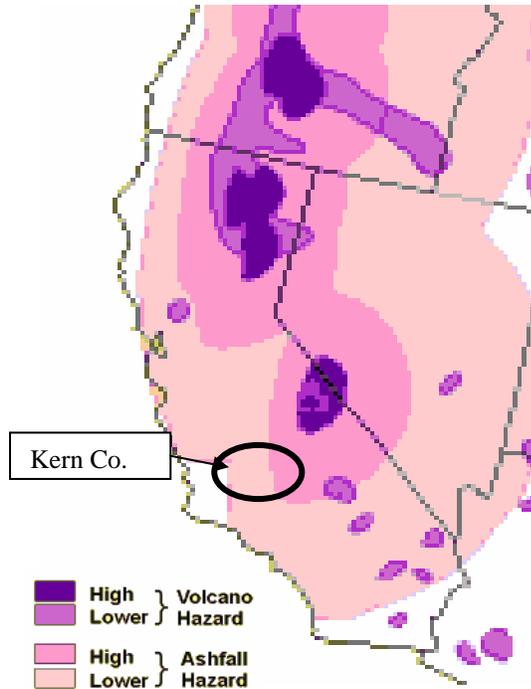
Areas subject to potential hazards from future eruptions in California



Volcanic Hazards in California

(based on activity within the past 15,000 years)

Source: USGS Website at <http://www.usgs.gov/themes/map2.html>



Past Occurrences. There is no evidence of volcanic eruption impacts on Kern County within historic time. The most recent eruptions in prehistoric times have been within the past 10,000 years for the mapped volcanoes previously discussed.

Frequency/Likelihood of Occurrence. *Unlikely: Less than 1% chance in next 100 years.* Although it is not possible to forecast when the next eruption may occur, based on geologic evidence volcanic activity in southern California recurs on the order of thousands of years

Seasonal Patterns. *None-* Volcanoes can erupt at any time of the year.

Speed of Onset/Duration. Volcanoes typically provide some indication that an eruption is imminent. Precursors to an eruption include increased seismic activity and venting of gases from the crater. Eruptions, depending on the type of volcano, can last days to even years.

Magnitude/Secondary Affects. *Limited.* The USGS has summarized the probable future types of eruptions and associated hazards at volcanic centers in California. The table below summarizes the possible impacts that would be associated with the closest volcanic centers to Kern County. This study does not consider the Coso Volcanic field. Based on this table it appears that eruptions would have mostly local impacts.

Summary of potential hazards associated with nearby volcanic areas.

Volcanic area	Most Recent Eruption	Most Probable future potential hazard
Amboy Crater – Lavic Lake basalt fields	Mafic cinder cones and lava flows of apparent early Holocene age	Formation of cinder cones, small volumes of tephra, and lava flows; phreatic explosions.
Golden Trout Creek volcanic field	Mafic cinder cone and lava flow about 10,000 to 5,000 years ago	Formation of cinder cones, small volumes of tephra and lava flows.
Ubehebe Crater area	Formation of maar craters and deposition of phreatomagmatic tephra and base-surge deposits in early Holocene time	Phreatomagmatic eruptions (interaction of subsurface magma and water) associated with base surges and small volumes of tephra.

Source: USGS http://vulcan.wr.usgs.gov/Volcanoes/California/Hazards/Bulletin1847/table_holocene_volcanoes.html

Significance. *Low* - Based on the low frequency of events, nature of the volcanic activity outside of Kern County, and the distance of the hazard from populated areas.

Mitigation options. *Limited*

INSECT HAZARDS

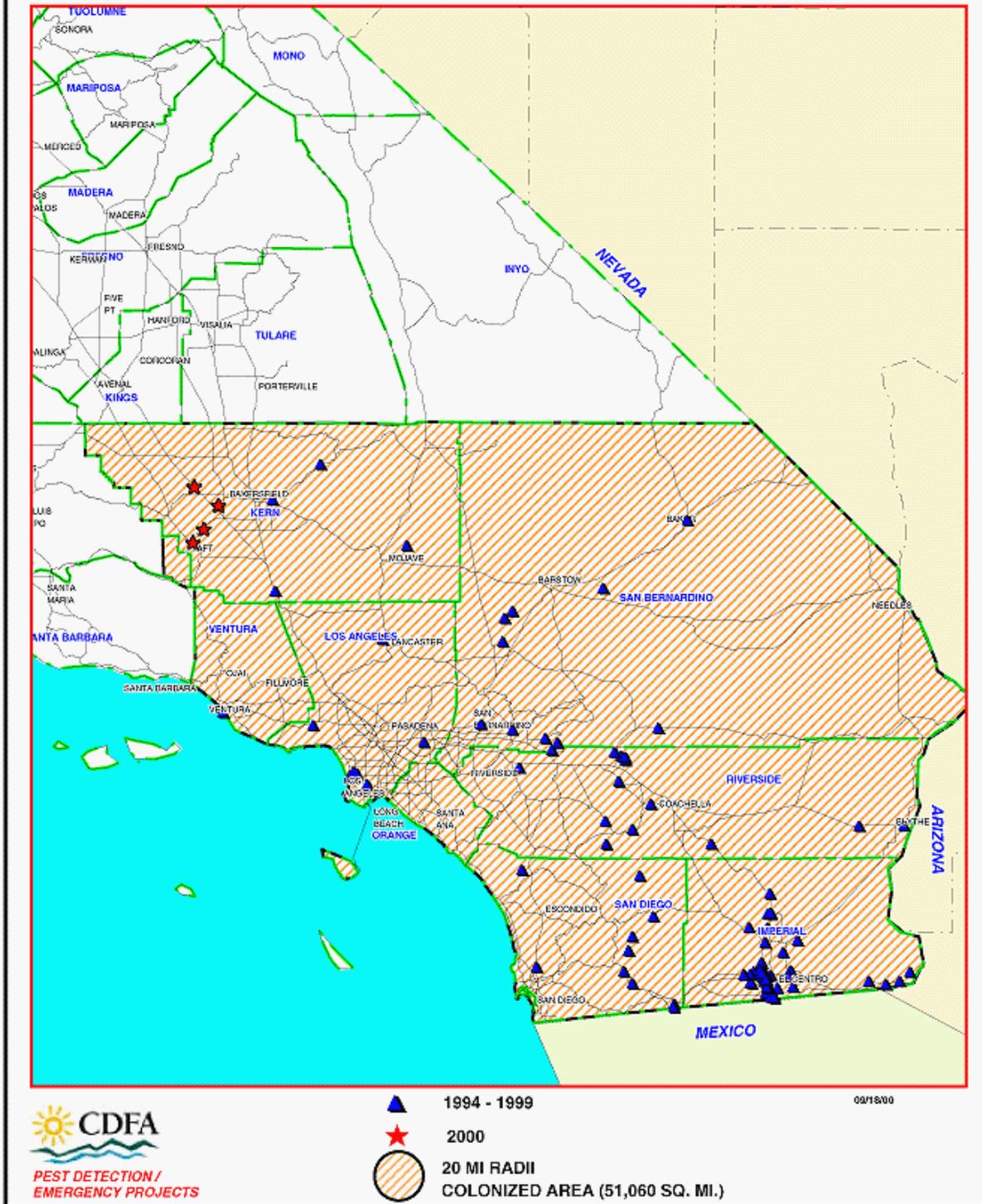
AFRICANIZED HONEY BEE

Hazard/problem description. Africanized honey bees (AHB)--also called "killer bees"--are established in parts of Texas, New Mexico, Arizona, Nevada and California. The bees have been migrating steadily northward since their accidental release from a breeding program in Sao Paulo, Brazil, in 1957. Although the killer reputation has been greatly exaggerated, the presence of AHB increases the chances of people being stung. Learning about the AHB and taking certain precautions can lower the risk of being injured by this new insect in Kern County's environment.

The Africanized honey bee is closely related to the European honey bee used in agriculture for crop pollination and honey production. The two types of bees look the same and their behavior is similar in many respects. Neither is likely to sting when gathering nectar and pollen from flowers, but both will sting in defense if provoked. A swarm of bees in flight or briefly at rest seldom bothers people. However, all bees become defensive when they settle, begin producing wax comb and raising young.

Hazard Extent. The entire County is considered colonized. The following map indicates infested areas and specific sightings within Kern County.

AFRICANIZED HONEY BEE 1994 - 2000



Source: http://www.corkyspest.com/ahb_map.html

Past Occurrences. While there have not been a lot of Africanized Honey Bee colonies found in Kern county, it is considered an infested county (*Source: Kern County website*). The bees migrated into Kern County in 1999, and the City of Taft has found AHB within its city limits. The City's incident reporting system has record of numerous events and emergency calls triggered by AHB swarms in the 1999-2004 time frame.

Frequency/Likelihood of Occurrence. *Likely.* A gradual increase in AHB sightings and incidents can be expected as the years progress. The City of Taft considers AHB problems likely to continue.

Seasonal Patterns. *Unknown*

Speed of Onset/Duration. Africanized honey bees are less predictable and more defensive than European honey bees. They are more likely to defend a greater area around their nest. They respond faster in greater numbers, although each bee can sting only once.

Magnitude/Secondary Affects. Individuals that are sensitive to bee venom, senior citizens, small children, outdoor workers, and pets or livestock in confined outdoor areas are especially at risk from multiple bee stings. Multiple bee stings have resulted in death to humans, animals, and livestock.

Significance. *low*

Mitigation Options/Feasibility. *Partial.* As a general rule, staying away from all honey bee swarms and colonies is the best mitigation, as well as reducing potential nesting sites. If bees are encountered, person should get away quickly, protecting face and eyes as much as possible. Taking shelter in a car or building can help. Do not stand and swat at bees; rapid motions will cause them to sting.

MOSQUITOS

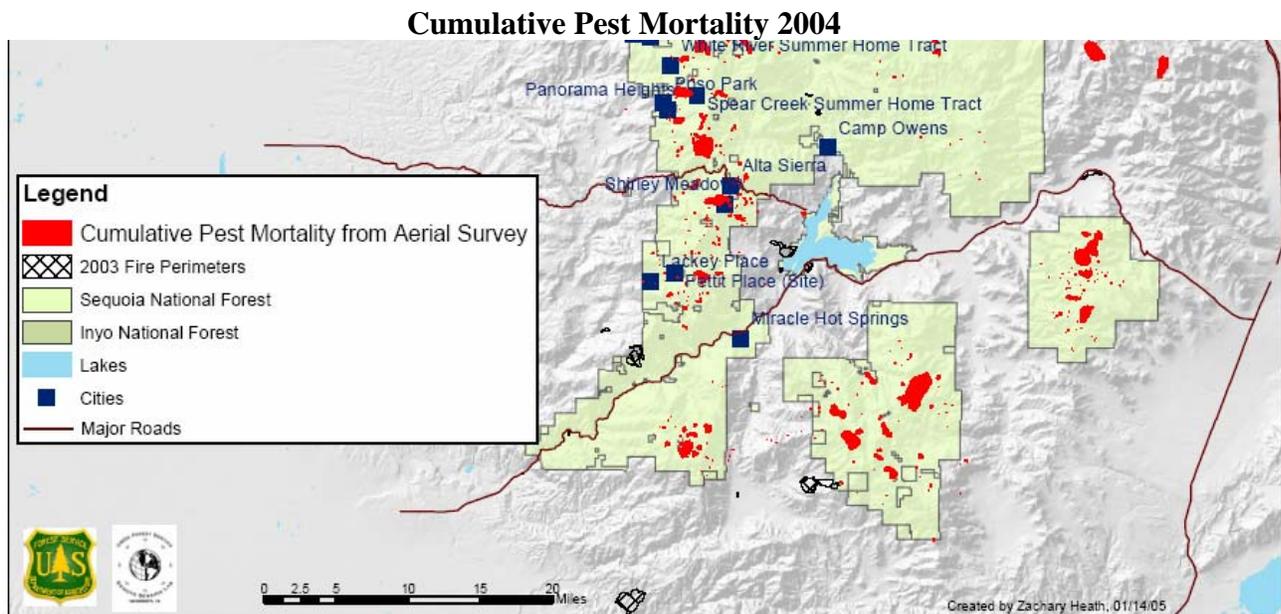
Hazard/problem description. Mosquito bites can cause severe skin irritation through an allergic reaction to the mosquito's saliva; this is what causes the familiar red bump and itching. A far more serious consequence of some mosquito bites can be the transmission of certain infectious diseases such as the West Nile Virus, malaria, yellow fever, filariasis, dengue fever, and several forms of encephalitis. See Encephalitis and West Nile Virus under the Natural Health Hazard section for additional profiles on these hazards.

PINE BARK BEETLE

Hazard/problem description.

The pine bark beetle is considered a hazard because it contributes to conifer mortality in the mountains of Kern County. Generally speaking these insects are always present in most forested areas. However when plants are healthy, thriving and plentiful the effects of their population are rarely noticed.

Hazard Extent. These insects are prevalent throughout the Mountain Region. The map below indicates areas of Pine Bark Beetle-associated conifer mortality, primarily within the Kern County mountains. This map was developed by the USFS.



Past Occurrences. Long-term wet winters in the 1960’s and 1970’s set the stage for above normal tree growth. Several long term periods of drought in the 1980’s and 90’s followed and stressed an over-populated forest. The various insect populations had abundant food and breeding areas in place.

Frequency/Likelihood of Occurrence. *Likely*

Seasonal Patterns. Conifers are most susceptible to Beetle Kill following periods of drought.

Speed of Onset/Duration. Beetle infestations can kill trees within a year of drought. As the drought and heat-stressed trees began to die, and the insects lose their food and breeding areas, they move on to the other “hosts”. This process can last for several years.

Magnitude/Secondary Affects. Pine Bark Beetles can lead to widespread dead trees in the Wildland Urban Interface and the forested areas surrounding those perimeters. This is developing into a fuels management crisis in Kern County. As witnessed in the Southland “Fire Siege” in the fall of 2003, conifer mortality can have a devastating effect on fire suppression tactics and strategy. Consequently the losses to private and commercial properties, the negative economics associated with loss of forested lands, loss of watersheds, loss of view sheds, wildlife habitats, air quality, water quality and most importantly human lives are dependent on active management of this developing problem.

Significance. *Medium*

Mitigation Options/Feasibility. *Partial.* There are several options for vegetation management but little that can be done to stop the insect itself. Possible solutions include defensible space education, fuel reduction and modification projects, and prescribed burns.

GLASSY WINGED SHARPSHOOTER

Hazard/problem description.

Glassy-winged sharpshooter (*Homalodisca coagulata*) is an insect that poses a serious threat to agriculture in California. When feeding, it can transmit Pierce's disease to grapevines, and other diseases to almond trees, alfalfa, citrus and oleanders. First sighted in the state in 1990, this insect has spread throughout Southern California and into the southern San Joaquin Valley. The glassy-winged sharpshooter and the diseases it carries pose a serious threat to the California viticulture industry, as well as to other crops throughout the state.

A large insect—almost 1/2 inch (12 mm) long—the glassy-winged sharpshooter is dark brown to black with a lighter underside. The upper parts of the head and back are stippled with ivory or yellowish spots; the wings are partly transparent with reddish veins. Watery excrement often collects on either side of the insect, appearing as large white spots.

The glassy-winged sharpshooter feeds on a wide variety ornamental and crop plants. On most plants, it feeds on stems rather than leaves. When feeding, it excretes copious amounts of watery excrement in a steady stream of small droplets. In urban areas, this "leafhopper rain" can be a messy nuisance. When dry, the excrement can give plants a whitewashed appearance. Pierce's disease is caused by the bacterium *Xylella fastidiosa*, which clogs the plant's water conductive tissue, choking off the movement of water and nutrients from the roots to grapevine canes and leaves. Insects that have the bacteria on their mouths transmit Pierce's disease to grapevines when they feed on fluid in the plant xylem (Source: <http://news.ucanr.org/mediakits/gwsskit/gwsbrochure.pdf>)

Hazard Extent. Glassy-winged sharpshooter-infested regions include an area that encompasses 35,000 acres of grapes in eastern and southern Kern County (Valley and Desert Regions) Source: <http://news.ucanr.org/newsstorymain.cfm?story=27>.

Past Occurrences. The insect was first detected in Kern County in the mid 1990's. Sixteen infected grapevines identified in summer 2000 in one Kern County vineyard were removed and destroyed.

Frequency/Likelihood of Occurrence. *Likely.*

Seasonal Patterns. May through August and November through March are when adult Glassy-winged sharpshooters are present.

Speed of Onset/Duration. Glassy-winged sharpshooters can transmit Pierce's disease effectively.

Magnitude/Secondary Affects. Serious economic impacts to agriculture industry.

Significance. *Medium*

Mitigation Options/Feasibility. *Partial.* Some bio-control efforts are underway with wasps that prey on the Glassy-winged Sharpshooters. Grower's removal of any vines that are diseased minimizes the sharpshooters' opportunities to acquire the bacterium and pass it on to more vines.

RED IMPORTED FIREANT (RIFA) Solenopsis invicta

Hazard/Problem Description. RIFA is an ant very similar in appearance to the Southwestern Fire Ant that is common in Kern County. The current infestations of RIFA occur in the southeastern states, southern Texas and areas of southern California. A distinguishing characteristic of RIFA is the large mound (3 feet in diameter and 18 inches tall) it makes to house the colony. The early stages of the mound resemble a gopher mound. When disturbed the ant is very aggressive. Ants differ from bees in that each ant stings multiple times. The RIFA uses its mouth to grab the skin as it stings. The venom contains an alkaloid that causes pustules by the second day. The occurrence of a secondary infection is common. In 1988, 32 deaths were attributed to RIFA.

Hazard Extent. The ant has a potential of colonizing most areas of Kern County. They prefer areas with moisture such as landscapes, agricultural fields and near streams.

Past Occurrences. In Kern County infestations of RIFA occurred in an almond orchard in Lost Hills and a backyard in Bakersfield. Both were eradicated.

Frequency/Likelihood of Occurrence. The ants are easily transported in nursery stock and bee colonies.

Seasonal Patterns. Unknown

Speed of Onset/Duration. When they are disturbed they attack in large numbers and are very aggressive.

Magnitude/Secondary Affects. Individuals that are sensitive to ant venom, small children, pets, livestock and wildlife are susceptible to the ant.

Significance. Low

Mitigation Options/Feasibility. Avoidance is the best method.

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Kern County Multi-Hazard Mitigation Plan

4.2 Vulnerability Assessment

44 CFR Requirement 201.6(c)(2)(ii): “The risk assessment shall include...a description of the jurisdiction’s vulnerability to the hazards described in paragraph (c)(2)(i) of this section. This description shall include an overall summary of each hazard and its impact on the community.

METHODOLOGY

A vulnerability assessment was conducted, based on the best available data and significance of the hazard. The vulnerability assessment is an attempt to quantify assets at risk, by jurisdiction where possible, to further define populations, buildings, and infrastructure at risk to natural hazards. The vulnerability assessment for this Countywide Multi-Hazard Mitigation Plan followed the methodology described in the FEMA publication 386-2 “*Understanding Your Risks – Identifying Hazards and Estimating Losses*” (FEMA, 2002) and addressed steps 3 and 4, where data permits, of the following four-step process:

- (1) Identify hazards
- (2) Profile hazard events
- (3) **Inventory assets and**
- (4) **Estimate losses.**

Data to support the vulnerability assessment was collected and compiled from the following sources:

- (1) County GIS data (hazards, base layers, and assessor’s data);
- (2) Statewide GIS datasets compiled by the CAL OES to support mitigation planning,
- (3) FEMA’s HAZUS-MH MR 1 GIS-based inventory data (January 2005)
- (4) Written descriptions of inventory and risks provided by participating jurisdictions,
- (5) Existing plans and vulnerability studies, and
- (6) Personal interviews with planning team members and County staff.

The initial scope of the vulnerability assessment was to describe the risks to the county as a whole. Countywide GIS datasets enabled the analysis of mapped hazards such as floods, wildfire, and earthquake shaking across the entire planning area. With city boundaries in the GIS further analysis by jurisdiction was possible for some hazards. Boundaries for special districts were not available. A third worksheet was provided to the jurisdictions participating on the planning team designed to capture risks specific to each jurisdiction. The Risk Assessment worksheet captured building inventory information, critical facilities, infrastructure, populations, historic/cultural/natural resources, and development trends within each jurisdiction. The information provided by the planning team is integrated here, and noted where the risk differs for a particular jurisdiction across the planning area.

HOW RISK VARIES BY LOCATION WITHIN THE COUNTY

44 CFR Requirement 201.6(c)(2)(iii): “For multi-jurisdictional plans, the risk assessment must assess each jurisdiction’s risk where they vary from the risks facing the entire planning area.

The DMA regulations require that the HMPC evaluate the risks associated with each of the hazards identified through the planning process. For multi-jurisdictional plans, the regulations also require that the risks be further evaluated where a jurisdiction’s risks vary from the risks facing the entire planning area. This section of the plan presents an evaluation of the vulnerability to all hazards that are identified in Section 4.1 as presenting a risk to Kern County. This chapter summarizes the possible impacts of each identified hazard, and attempts to quantify, where data permits, the specific impacts by region and jurisdiction. Additional detailed evaluation will be presented in Section 4.3, Jurisdictional Elements and Capabilities.

Hazard and Vulnerability Summary

The following table lists the Valley, Mountain, and Desert Regions and the jurisdictions within the Regions in further detail. The unincorporated community names are taken from the U.S. Census Bureau’s list of Census Designated Places.

The next table summarizes the extent and impact of the hazards as they vary across the planning area, based on the Hazard Identification. This table illustrates how the hazards vary across Kern County’s large and diverse geography. The overall significance by region is based on a summary of input from jurisdictions within each region. Earthquakes and Severe Weather were highly significant hazards for each region.

Included in this table is a summary of development trends by region, which provides an overview of how the regions are growing. These trends are discussed in further detail in this chapter and in the Jurisdictional Elements and Capabilities section.

Jurisdictions by Regions		
Incorporated	Unincorporated	Districts
Valley Region communities		
Arvin Bakersfield Delano Maricopa McFarland Shafter Taft Wasco	Buttonwillow Derby Acres Dustin Acres Fellows Ford City Lamont Lost Hills Mckittrick Mettler Oildale Rosedale South Taft Taft Heights Tupman Valley Acres Weedpatch	Arvin Edison Water Storage District North of the River Municipal Water District Wheeler Ridge-Maricopa Water Storage District West Kern Water District North of the River Sanitary District Greenfield County Water District Kern Sanitation Authority Ford City Taft Heights Sanitation District North of the River Recreation and Park Dist Various school districts
Mountain Region communities		
Tehachapi	Bear Valley Springs Bodfish Frazier Park Golden Hills Keene Kernville Lake Isabella Lake of the Woods Lebec Mountain Mesa Onyx Pine Mountain Club Squirrel Mountain Valley Stallion Springs Weldon Wofford Heights	Bear Valley CSD Stallion Springs CSD Golden Hills CSD Tehachapi Cummings County Water Dist. Tehachapi Valley Recreation and Parks Tehachapi Valley Hospital District South Fork Mosquito Abatement District Various school districts
Desert Region communities		
California City Ridgecrest	Boron China Lake Acres Edwards AFB Inyokern Johannesburg Mojave North Edwards Randsburg Rosamond	Rosamond CSD Indian Wells Valley Airport District Mojave Spaceport Airport district Sierra Sands Unified School District and other various school districts

	Hazard Extent Summary by Region*		
Hazard	Valley	Mountain	Desert
Dam Failure	X	X	X
Drought	X	X	X
Earthquakes	X	X	X
Floods	X	X	X
Insect Hazards	X	X	
Landslides		X	X
Natural Health Hazards	X	X	X
Severe Weather	X	X	X
Soil Hazards	X	X	X
Volcanoes	x	x	x
Wildfire	X	X	
	Overall Significance Summary by Region		
Dam Failure	high	med	low
Drought	high	high	low
Earthquakes	high	high	high
Floods	high	medium	medium
Insect Hazards	medium	low	low
Landslides	n/a	low	low
Natural Health Hazards	high	high	medium
Severe Weather	high	high	high
Soil Hazards	medium	low	low
Volcanoes	low	low	low
Wildfire	medium	high	low
Development type	Growth Potential Summary by Region		
Population	high	medium	medium
Residential	high	medium	high
Commercial	high	low	low
Industrial	medium	low	low
Agricultural	medium	low	low
*An 'X' indicates the presence of the hazard within the region. A lowercase 'x' indicates that the hazard exists outside the region, but could potentially have impacts.			

VULNERABILITY OF THE COUNTY TO CATASTROPHIC DISASTER

Once the hazard identification step was complete, the HMPC conducted a vulnerability assessment to describe the impact that each hazard identified in the preceding section would have upon Kern County. As a starting point, the HMPC utilized County Assessor data to define a baseline inventory value against which all other disaster impacts could be compared. The value of taxable property for the County as a whole, as of July 1, 2004, was \$50.8 Billion (*Source: County of Kern Assessor-Recorder Annual Report, 2004*). Oil and Gas represents about 25% of this total, or \$12.6 billion. Agriculture represents about \$3 billion.

The value is deceptively low in that state, federal and other exempt facilities are not included in the county's assessment. Residential and Commercial values are also low due to California's Proposition 13. This legislation limits property taxes by freezing a property's assessed value to the value on the date of the most recent sale. The figures below represent the value of buildings only. Land values have been purposely excluded because most often land remains following disasters, and subsequent market devaluations are frequently short-term and difficult to quantify. Additionally, state and federal disaster assistance programs generally do not address loss of land or its associated value.

TOTAL ASSESSED VALUE OF IMPROVEMENTS BY PROPERTY TYPE

Property Type	Improved Value
agricultural	\$1,505,535,280
commercial	\$3,395,472,008
industrial	\$1,352,153,689
other	\$161,226,478
residential	\$15,920,609,713
TOTAL	\$22,334,997,168
<i>Source: Kern County Assessor's database 2004</i>	

This table includes the entire County, including incorporated areas. The data is discussed by jurisdiction in the Jurisdictional Elements section.

County Inventory

Additional Inventory information is included in FEMA's HAZUS-MH MR1 data (released January 2005). Summary information from that inventory is included here. This inventory information formed the basis for the earthquake, flood, and wildfire risk analysis. These data sources are a continuous work in progress and the limitations include possible errors and omissions. In some cases it is the best available data, and also provides a standard baseline to gauge the risk from different hazards.

Building Inventory. The County has an estimated 189 thousand buildings in the region which have an aggregate total replacement value of \$34,046 (millions of dollars). Approximately 99% of the buildings (and 88% of the building value) are associated with residential housing. There are over 208 thousand households in the County based on 2000 Census Bureau data.

Critical Facilities Inventory. According to the Safety Element of the Kern County General Plan, Critical Facilities are defined as 'buildings and other structures indispensable to emergency services, including hospitals, law enforcement stations, fire stations, communication control stations, and other facilities of disaster control and refuge (e.g. schools). These facilities, according to the plan, must remain operational during any major disaster and be designed, located, and constructed accordingly.

Critical Facilities based on the definitions utilized within FEMA's HAZUS-MH loss estimation program were also analyzed. There are three categories:

Essential Facilities:

The loss to these facilities would be devastating when responding to or recovering from a hazard event and includes:

- Hospitals
- Other medical facilities
- Police stations
- Fire station
- Emergency Operations Centers

High Potential Loss Facilities (HPL)

These types of facilities would have a high loss or impact on the community and includes:

- Power plants
- Dams
- Levees
- Military Installations
- Hazardous Material sites

Transportation and Lifeline Facilities:

- Highways, Bridges, and tunnels
- Railroads and facilities
- Bus facilities
- Water treatment facilities
- Natural gas facilities and pipelines
- Oil facilities and pipelines
- Communications facilities

According to the HAZUS inventory, for essential facilities, there are 12 hospitals in the region with a total bed capacity of 1,628 beds. There are 277 schools, 18 fire stations, and 22 police stations. With respect to HPL facilities, there are 29 dams identified within the region. Of these,

11 of the dams are classified as ‘high hazard’. The inventory also includes 158 hazardous material sites. HAZUS databases returned values of 0 for military installations and emergency operation facilities, which indicate the omission of Edwards Air Force Base and the China Lake Naval Weapons Center, and the County EOC.

Inventory based on County GIS data. The county has the location of the following facilities as point locations in a GIS format (the total count is in parentheses):

- Fire stations (69)
- Sheriff stations (21)
- CHP stations (4)
- Hospitals (13)
- Schools (109)

The counts differ from those in the HAZUS inventory, which could be due to a number of factors including different data sources and a difference in the definitions of certain facilities, such as a “school.” In general the local GIS data is considered the more accurate and complete data source. A model of the vulnerability of these facilities to earthquakes, wildfire, and floods is presented in the Multi Hazard Risk Analysis section. The differences in the data sources

Transportation and Utility Lifeline Inventory. The replacement value of the transportation and utility lifeline systems is estimated to be \$10,182,000,000 and \$1,990,000,000, respectively. The total value of the lifeline inventory is over \$12,172,000,000. This inventory includes over 1,924 kilometers of highways, 546 bridges, and 77,995 kilometers of pipes.

System	Components and count	Total Replacement Value (millions of dollars)
Highway	Roads and Bridges (546)	\$7,647,600,000
Railways	Facilities (7), Bridges (15) and segments (360)	\$650,100,000
Bus	Facilities (6)	\$7,700,000
Airport	Facilities (41) Runways (44)	\$1,877,300,000
Potable Water	Facilities (4) and distribution lines	\$937,100,000
Waste Water	Facilities (10) and distribution lines	\$1,253,900,000
Natural Gas	Distribution lines	\$312,000,000
Oil Systems	Facilities (13)	*\$1,500,000
Electrical Power	Facilities (8)	\$1,038,400,000
Communications	Facilities (61)	\$7,200,000
<i>*Note: This value is most likely too low, see Assessor’s data discussion</i>		

Cultural, Historic and Natural Resource Inventory

In evaluating the vulnerability of a given area to disaster, it is important to inventory the cultural and natural resources specific to that area. Cultural and Natural Resources are important to identify pre-disaster for four reasons:

- First, the community may decide that these sites are worthy of a greater degree of protection than currently exists, due to their unique and irreplaceable nature and contribution to the overall economy;
- Second, should these resources be impacted by a disaster, knowing so ahead of time allows for more prudent care in the immediate aftermath, when the potential for additional impacts are higher;
- Third, the rules for repair, reconstruction, restoration, rehabilitation and/or replacement usually differ from the norm; and
- Fourth, Natural Resources, such as wetlands and riparian habitat, can have beneficial functions that contribute to the reduction of flood levels and damage.

Historic and Cultural Resources

To inventory the County's cultural resources, the HMPC referenced information on state and federal Historic Preservation District Registers. California Historical Landmarks are buildings, structures, sites, or places that have been determined to have statewide historical significance by meeting at least one of the criteria below. The resource also must be approved for designation by the County Board of Supervisors or the City/Town Council in whose jurisdiction it is located. To be eligible for designation as a Landmark, a resource must meet at least one of the following criteria:

- Be the first, last, only, or most significant of its type in the state or within a large geographic region (Northern, Central, or Southern California).
- Be associated with an individual or group having a profound influence on the history of California.
- Be a prototype of, or an outstanding example of, a period, style, architectural movement or construction or is one of the more notable works or the best surviving work in a region of a pioneer architect, designer or master builder.

The California State Historical Landmarks in Kern County includes 42 designated sites. The Landmarks range from the Tulamni Indian Site to locations of famous oil wells such as the site of the Lakeview Gusher 1. The locations of these sites are shown on the Historic Sites map of the 2004 Kern Regional Atlas. The Kern Regional Atlas is a product of the Master Environmental Assessment Resource (MEAR) prepared by the Kern COG. The map and atlas can be referenced online at http://www.kerncog.org/eatlas_maps.php. Descriptions of the sites can be referenced online at: http://ceres.ca.gov/geo_area/counties/Kern/landmarks.html.

The National Park Service maintains an online database of places listed in or determined eligible for the National Register of Historic Places. Places include sites, buildings, structures, and objects that are significant in American history, architecture, archeology, engineering, and culture. The National Register Information System database includes 21 sites within Kern County, based on the online database accessible at <http://www.cr.nps.gov/nr/research/nris.htm>. These sites are listed in the table below.

Listing of Kern County National Register of Historic Places			
Resource Name	Address	City	Listed
Bakersfield California Building	1707 Eye St.	Bakersfield	03/10/1983
Bandit Rock	SW of Inyokern near jct. of CA 14 and 178	Inyokern	10/31/1975
Burro Schmidt's Tunnel	Address Restricted	Ridgecrest	03/20/2003
Errea House	311 S. Green St.	Tehachapi	07/29/1997
First Baptist Church	1200 Truxtun Ave.	Bakersfield	01/02/1979
Fort Tejon	3 mi. NW of Lebec	Lebec	05/06/1971
Fort, The	Ash and Lincoln Sts.	Taft	07/22/1981
Green Hotel	530 James St.	Shafter	03/16/1989
Gross, Courtlandt, House	18600 Courtlandt Ct.	Tehachapi	03/22/1987
Jastro Building	1800 19th St.	Bakersfield	09/22/1983
Kern Branch, Beale Memorial Library	1400 Baker St.	Bakersfield	04/01/1981
Last Chance Canyon	Address Restricted	Johannesburg	12/05/1972
Long Canyon Village Site	Address Restricted	South Lake	04/14/1980
Rogers Dry Lake	Edwards Air Force Base	Mojave Desert	10/03/1985
Santa Fe Passenger and Freight Depot	150 Central Valley Hwy.	Shafter	01/19/1982
Shafter Research Station	17053 Shafter Ave.	Shafter	10/17/1997
Tehachapi Railroad Depot	101 W. Tehachapi Blvd.	Tehachapi	10/20/1999
Tevis Block	1712 19th St.	Bakersfield	03/29/1984
Walker Pass	60 mi. NE of Bakersfield on CA 178	Bakersfield	10/15/1966
Wasco Union High School Auditorium	1900 Seventh St.	Wasco	09/30/1997
Weedpatch Camp	8305 Sunset Blvd.	Bakersfield	01/22/1996
<i>Source: National Register Information System database http://www.cr.nps.gov/nr/research/nris.htm.</i>			

Natural Resources

The Kern Regional Atlas contains a map of Habitat Conservation areas within the County. This map includes Habitat Conservation Plan locations, U.S. Fish and Wildlife Service (USFWS) Critical Habitat Areas, and Endangered Species Recovery Program area for the San Joaquin Valley. The map also details the location of Proposed Specialty Preserves, Proposed Wildlife Linkages, Species Recovery Areas, Conserved Areas, Planned Habitat Acquisition, and Wildlife

Compatible Farmland. The map can be referenced online at http://www.kerncog.org/eatlas_maps.php.

The locations of the areas respective to the County planning regions are shown in parentheses in the list below.

Existing Preserves and Natural Areas

Kern National Wildlife Refuge (Valley)
Tule Elk State Reserve (Valley)
Desert Tortoise Natural Area (Desert)
Red Rock Canyon Preserve (Desert)
Red Rock Canyon State Park (Desert)

BLM areas of Critical Concern

Last Chance Canyon (Desert)
Western Rand Mountains (Desert)
Piute Cypress (Mountain)
Horse Canyon (Mountain)
Chico Martines (Valley)

USFWS Critical Habitat Areas

California Condor (Mountain)
Southwestern Willow Flycatcher in South Fork Wildlife Area (Mountain)

Other Natural Resources

Sequoia National Forest (Mountain)
Los Padres National Forest (Mountain-southwestern County)

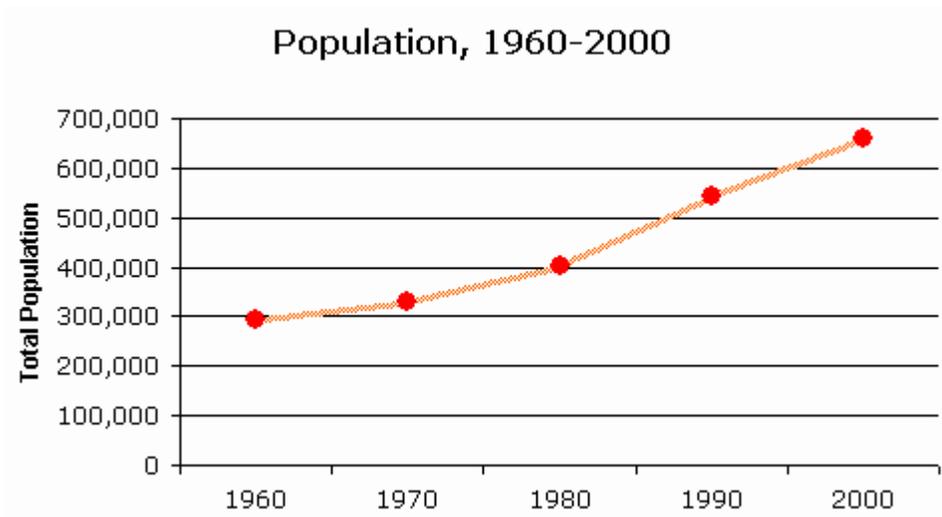
Kern County Population and Growth Trends

44 CFR Requirement 201.6(c)(2)(ii)(C): [The plan should describe vulnerability in terms of] providing a general description of land uses and development trends within the community so that mitigation options can be considered in future land use decisions.

Kern County is experiencing steady population growth. The Kern economy continues to lag behind that of other California counties because of the cyclical nature of the agricultural, military support, and petroleum industries that comprise the largest segments of the Kern economy. Despite these economic problems, portions of the Kern County area realize significant growth in population resulting from the reasonable cost of living and close proximity to the large metropolitan areas of Southern California. These trends are predicted to continue for the next five years according to the Kern County Board of Trade.

Source: <http://www.co.kern.ca.us/courts/commoutreach.asp>

Kern County Population Trends



Source: http://www.censusscope.org/us/s6/c29/chart_popl.html

Population, 1960-2000

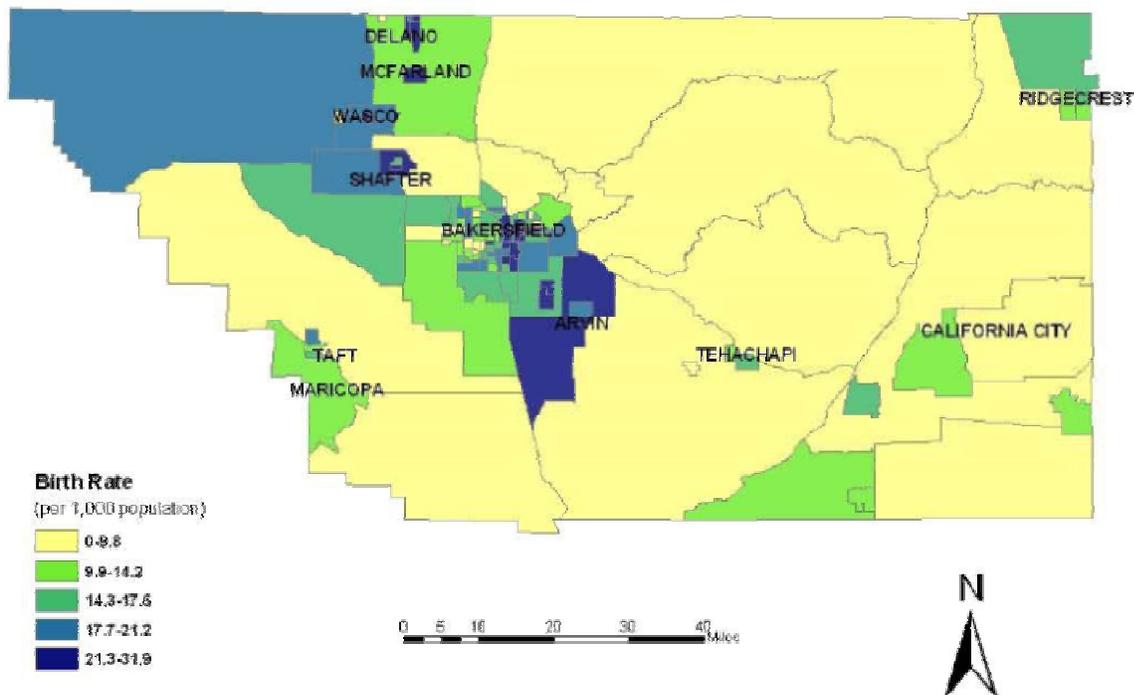
	1960	1970	1980	1990	2000
Total	291,984	330,234	403,089	543,477	661,645
Change		38,250	72,855	140,388	118,168
Percent Change		13.10%	22.06%	34.83%	21.74%

Source: Census 2000 analyzed by the [Social Science Data Analysis Network \(SSDAN\)](#).

Population Summary by Region			
Region	1990 Census	2000 Census	2003 estimate
Valley	426,425	541,004	575,851
Desert	68,969	69,614	73,710
Mountain	48,083	51,027	53,314
Population Summary by Incorporated Place			
Arvin	9,286	12,956	14,034
Bakersfield	174,820	247,057	266,784
California City	5,955	3,385	11,111
Delano	22,762	39,489	42,007
Maricopa	1,193	1,111	1,127
McFarland	7,005	9,618	10,638
Ridgecrest	22,725	24,927	25,587
Shafter	8,409	12,736	13,343
Taft	5,902	8,811	8,978
Tehachapi	5,791	10,957	11,381
Wasco	12,412	21,263	22,267
Incorporated	276,260	392,310	427,257
Unincorporated	267,217	269,335	275,616
Entire County	543,477	661,645	702,873

Source: Kern COG <http://www.kerncog.org/pdf/Estimates/RSA03web.pdf>

Birth Rate by Census Tract, Kern County Residents 1998-2002



Source: Kern County Department of Public Health Status Report -2003 (<http://www.co.kern.ca.us/health/HSR-2003.pdf>)

Kern COG has been studying the growth and development trends in Kern County to assist with their transportation planning efforts. Kern COG has compiled the County's and Municipalities General Plan information to develop a map of planned urban areas, as part of the Kern Regional Atlas. This map details where growth is expected to occur, as well as the location of two possible new cities: Pacificana (SW of Bakersfield) and San Emidio (near 1-5 and Hwy 99 and *also near source of the 1952 earthquake*). These locations of these new cities are also being considered for resource uses as an alternative. The Planned Urban Area Map can be referenced online at http://www.kerncog.org/eatlas_maps.php.

Kern County's population grew 25% as a whole during the 1990-2000 decade. The county seat, which is in Bakersfield, is home to over one-half of the County's residents and continues to struggle with growth and economic issues. Other large concentrations of the populace have grown as a result of their local community's unique needs: Ridgecrest and Mojave in the east are aligned with military institutions that provide employment; Rosamond to the southeast 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; and Lamont and Arvin to the south, and Delano and Shafter to the north provide services and homes to the workers who labor in the fields of the large farms and ranches in the county (Source: <http://www.co.kern.ca.us/courts/commoutreach.asp>).

Kern COG's Regional Housing Allocation Plan 2000 (<http://www.kerncog.org/data-overview.php#projects>) provides a more in-depth analysis of development trends by dividing the County into 9 regional planning areas. The population growth trends from this report are summarized by region in the following section.

Valley Region Growth Trends

Valley Population percent change 1990-2000 by sub-region			
<i>Westside</i>	<i>Northern San Joaquin Valley</i>	<i>Southern San Joaquin Valley</i>	<i>Belridge area (NW Valley)</i>
Maricopa 4.7%	Delano 56.2%	Arvin 27.6%	Unincorp. 2.5%
Taft 54.9%	MacFarland 34.7%	Bakersfield 35.6%	
Unincorp. 4.1%	Shafter 41.5%	Unincorp. 2.5%	
	Wasco 61.9%		
	Unincorp. 28.5%		

Desert Region Growth Trends

According to the Kern COG Regional Housing Allocation Plan 2000 the southern portion of this region in the Rosamond community is experiencing growth as a bedroom community to those who commute to Los Angeles County to the south for work. This is also the area that experienced flooding in the winter of 2004-2005 that warranted Kern County's Individual Assistance declaration. Growth in Ridgecrest has been relatively stagnant, but has increased 72% between 1990-2000 for the unincorporated area around Ridgecrest.

Mountain Region Growth Trends

Tehachapi grew from 6,182 in 1990 to 12,618 between 1990-2000, a 104.1% change. The Lake Isabella area had a modest 10 percent growth in population for the decade. The Frazier Park area grew 28.6% from 6,548 to 8,420 persons.

VULNERABILITY OF THE COUNTY TO SPECIFIC HAZARDS

44 CFR Requirement 201.6(c)(2)(ii)(A): “The plan should describe vulnerability in terms of the types and numbers of existing and future buildings, infrastructure, and critical facilities located in the identified hazard area...”

Identified Hazard Risk Areas: Flood, Earthquake, Wildfires

The HMPC identified three hazards within the Planning Area where specific geographical hazard areas have been defined: flood, earthquake, and wildfires. For these three hazard areas, the HMPC has inventoried the following for each community, to the extent feasible, as a means of quantifying the vulnerability within the identified hazard areas and meeting the requirement of identifying how risk varies across the planning area:

- General hazard-related impacts, including impacts to life, safety and health,
- Values at Risk (i.e., types, numbers, and value of land and improvements),
- Insurance coverage, Claims paid, and Repetitive losses,
- Identification of vulnerable Critical Facilities,
- Identification of vulnerable Cultural and Natural Resources,
- Overall Community Impact, and
- Development trends within the identified hazard area.

Vulnerability and potential impacts from hazards that do not have specific mapped areas, such as drought and severe weather, are discussed in more general terms, based on past events.

It is also important to be aware that hazard events that happen outside the County boundaries can have direct and indirect impacts to Kern County. For instance wildfires and dam failures in watersheds outside the County that drain into Kern County can result in floods and other impacts related to watershed health. An earthquake or flood as far away as the Sacramento Delta Region could disrupt water supply to the County from the California Aqueduct. Power supply could be interrupted as well by earthquake and wildfire hazards outside of the County.

EARTHQUAKES

The first step in determining the earthquake risk in Kern County was to research previous efforts to model the risk. CA-OES, using FEMA's HAZUS-MH loss estimation modeling tool, determined that approximately 22 million people live in the 40 percent gravity or higher seismic hazard zone statewide. Their analysis found 8.26 percent of Kern County's population within the high seismic hazard zone. Based on the previous seismic zone maps this population resides in the southern Valley Region and southern Mountain and Desert regions.

County	Total Population	Pop in EQ Prob > 40%	EQ Rank % of POP
KERN CO Total	661,645	54,665	8.26%

Source: The State of California Multi-Hazard Mitigation Plan 2004

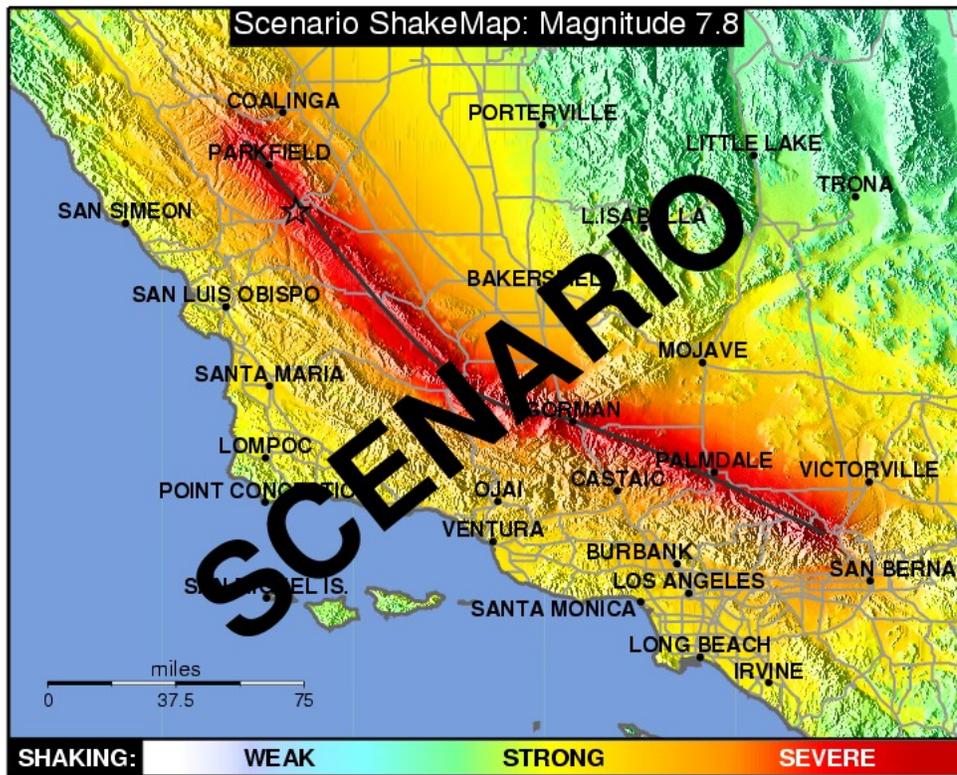
The entire County is in Seismic Zone IV, a designation previously used in the Uniform Building Code (UBC) to denote the areas of highest risk to earthquake ground motion. California has an Unreinforced Masonry (URM) program that details seismic safety requirements for Zone IV, which are discussed in more detail in Section 4.3 of this plan.

Calculating potential losses

Earthquake losses will vary in Kern County depending on the source and magnitude of the event. Past studies of the earthquake threat in the vicinity of Kern County were reviewed and information on potential risk and losses are summarized here. Additionally, HAZUS Level 1 earthquake scenarios were run for earthquakes on the White Wolf and Garlock faults to support this plan. These results are summarized and discussed in this section.

Repeat of the 7.9 Fort Tejon event. The Southern California Earthquake Center (SCEC) has developed a "shakemap" based on a repeat of the 1857 Fort Tejon earthquake. Their analysis includes Kern County and impacts to surrounding counties as well. According to SCEC were the Fort Tejon 7.9 earthquake to happen today, the damage would easily run into billions of dollars, and the loss of life would likely be substantial, as the present day communities of Wrightwood, Palmdale, **Frazier Park**, and **Taft** (among others) all lie upon or near the 1857 rupture area

(Source:



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http://earthquake.usgs.gov/shakemap/sc/shake/1857_se/products.html).

Pleito Thrust Fault. According to SCEC the potential for damage posed by the Pleito thrust is significant. Motion along this fault could make Interstate 5 impassable at "the Grapevine", where it comes down from Tejon Pass and into the southern end of the San Joaquin Valley, and this would block the primary northern transportation route to and from Los Angeles (Source: SCEC http://www.data.scec.org/fault_index/pleito.html).

HAZUS Earthquake Scenarios

For this plan the planning team's consultant used HAZUS-MH MR1 (Version 1.1, January 2005), FEMA's GIS-based earthquake loss estimation software to model the earthquake risk and potential losses. HAZUS produces loss estimates based on current scientific and engineering knowledge regarding the effects of earthquakes. HAZUS allows the user to define various earthquake scenarios based on existing faults, or "source events", arbitrary events, or probabilistic events. Three different scenarios were chosen to represent earthquake loss potential in the eastern and western county, and for the county as a whole. These are planning level analyses and since there are certain data limitations when using the default data, the results should be interpreted accordingly.

HAZUS allows for varied levels of customization. Level 1 analyses uses the default hazard and inventory data, Level 2 augments some of the default data with local data, and Level 3 involves

adjusting the built-in loss estimation models and using local data. For California there exists improved soils GIS data that is classified for earthquake characteristics that was imported for use in the Kern County HAZUS runs. Otherwise, the default data was used, which makes these analyses low-Level 2 HAZUS runs. A HAZUS study area was defined that included all of Kern County. Annualized and “source event” scenarios were defined. The “source event” allows the user to choose a fault source, and the magnitude is based on the probable earthquake associated with that particular fault. The “source events” were chosen to represent how damages would vary between an earthquake in the Valley Region and the Desert Region. The annualized loss scenario represents the estimated long-term average losses the County could endure from earthquakes any given year based on the aggregate of seismic sources in the area. This scenario is recommended in the FEMA How-To Guide 433, “Using HAZUS-MH for Risk Assessment.”

The event scenarios were defined as follows:

Magnitude 7.3 White Wolf Fault Source Event

*Epicenter location near Arvin, Western US Extensional attenuation function

Magnitude 7.5 East Garlock Fault Source Event

*Epicenter location near Red Rock Canyon State Park, Western US Extensional attenuation function

Annualized Loss Scenario

This scenario represents long term average losses based on overall local seismic hazard. The default M 7.0 assumption was used.

Economic Loss

HAZUS estimates losses to buildings, lifelines, populations and business interruptions. After a scenario is input and analyzed, the software generates reports that summarize the impacts of the scenario. The following is an excerpt from the Global Summary Report for the Annualized Loss Scenario. This is followed by a table that captures the estimated potential losses from the three scenarios.

“The total economic loss estimated for the earthquake is \$602.58 (millions of dollars), which includes building and lifeline related losses based on the region's available inventory. The building losses are broken into two categories: direct building losses and business interruption losses. The direct building losses are the estimated costs to repair or replace the damage caused to the building and its contents. The business interruption losses are the losses associated with inability to operate a business because of the damage sustained during the earthquake. Business interruption losses also include the temporary living expenses for those people displaced from their homes because of the earthquake. The total building-related losses were \$27.73 (millions of dollars); 7 % of the estimated losses were related to the business interruption of the region. By far, the largest loss was sustained by the residential occupancies which made up over 76 % of the total loss.”

HAZUS-MH EARTHQUAKE SCENARIO RESULTS

Earthquake Impacts	Western Kern County White Wolf Fault M 7.3	Eastern Kern County Garlock Fault M 7.5
Total buildings damaged	24,267 at least moderately damaged (13% of total in county)	7,685 at least moderately damaged (4% of total in county)
Residential Bldgs. Damaged	Slight: 5,989 Moderate: 6,495 Extensive: 3,285 Complete: 793	Slight: 2,480 Moderate: 2,281 Extensive: 1,601 Complete: 894
Injuries <i>(Based upon 2pm time of occurrence)</i>	Without requiring hospitalization: 626 Requiring hospitalization: 139 Life Threatening: 20 Fatalities: 36	Without requiring hospitalization: 191 Requiring hospitalization: 49 Life Threatening: 7 Fatalities: 14
Displaced Households	1,390	282
Economic Loss	Property and Lifeline Damage: \$1.9 billion	Property and Lifeline Damage: \$445.23 million
Damage to Schools	None with at least moderate damage	None with at least moderate damage
Damage to Hospital	None with at least moderate damage	None with at least moderate damage
Damage to Transportation Systems	11 highway bridges with at least moderate damage, 1 complete 1 railroad bridge moderate damage 8 airport facilities moderate damage	2 highway bridges with at least moderate damage
Households w/out Power & Water Service <i>(Based upon 208,652 households)</i>	loss of power at Day 1: 11,526 Water loss @ Day 1: 3,019 Water loss @ Day 3: 2,330 Water loss @ Day 7: 1,243 Water loss @ Day 30: 0	loss of power: 514 households at day 1 loss of water: 1,121 households at day 1

Earthquake Impacts	Annualized Loss Scenario (M 7)
Total buildings damaged	49,972 at least moderately damaged (26% of total in county)
Residential Bldgs. Damaged	Slight: 3,051 Moderate: 3,515 Extensive: 3,173 Complete: 3,667
Injuries <i>(Based upon 2pm time of occurrence)</i>	Without requiring hospitalization: 12 Requiring hospitalization: 3 Life Threatening: 0 Fatalities: 1
Displaced Households	7,385
Economic Loss	Property and Lifeline Damage: \$602.5 million
Damage to Schools <i>(Based upon 277 buildings)</i>	None with at least moderate damage
Damage to Hospital	None with at least moderate damage
Damage to Transportation Systems	100 highway bridges with at least moderate damage, 11 complete damage 1 railroad bridge and 2 railroad tunnels with at least moderate damage 7 airport facilities and 2 bus facilities with at least moderate damage
Households w/out Power & Water Service <i>(Based upon 208,652 households)</i>	power loss@ Day 1: 81,732 power loss@ Day 3: 49,707 power loss@ Day 7: 19,916 power loss@ Day 30: 3,759 power loss@ Day 90: 115 Water loss @ Day 1: 8,297 Water loss @ Day 3: 7,137 Water loss @ Day 7: 5,055 Water loss @ Day 30: 35

Overall Community Impact

According to the HAZUS model, Kern County is susceptible to serious earthquake losses from multiple sources that could total hundreds of millions of dollars or more. The overall impact of earthquakes to Kern County includes:

- Potential for injury and loss of life,
- Widespread commercial and residential structural damage, particularly in unreinforced masonry buildings,
- Loss of water, power, roads, phones, and transportation could impact ability to sustain life for those with certain medical conditions,
- Power loss following a large earthquake will complicate response and recovery efforts and add to the economic losses,
- Business interruption losses,
- Agricultural impacts including field disturbances and damages to equipment and irrigation systems, and
- Oil and Gas facility and pipeline impacts.

Specific Problems Areas

The HAZUS earthquake model applies to Census Tract level data for the County and does not allow for quantification of risk by jurisdiction. How the risk varies by jurisdiction can be quantified in relative terms based on the average expected ground motion, which has been mapped by the California Geological Survey. Based on the earthquake shaking map and fault locations in the Hazard Identification section, municipalities in southwestern Kern County could experience stronger ground shaking relative to the rest of the County. These municipalities include: Taft, Maricopa, Arvin, Tehachapi, and portions of southern Bakersfield. Wasco and Shafter could experience damaging shaking levels as well.

Older construction and particularly unreinforced masonry (URM) buildings within these communities will pose hazards during earthquakes. A summary of the unreinforced masonry buildings by jurisdiction, and the number that have been retrofitted for seismic shaking, are provided in the Jurisdictional Elements section. All five of the jurisdictions listed at risk have URM's, particularly Taft and Bakersfield. Shafter has at least 110 URM buildings within its downtown retail district.

Critical Facilities at Risk. Earthquake shaking potential to Critical Facilities, based on County GIS inventories, are discussed later in the Multi Hazard Risk Analysis section.

Cultural/Historic and Natural Resources at Risk. 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.

Other Assets at Risk

State of California Assets

- The California Aqueduct crosses the White Wolf Fault at Wheeler Ridge and parallels the San Andreas Fault within about 25 miles for most of its length in Kern County.
- Several pumping plants associated with the California Aqueduct are located near the White Wolf, Pleito, and San Andreas Faults including the John R. Teerink (Wheeler Ridge), Ira J. Chrisman (Wind Gap) and Edmonston pumping plants.
- Interstate 5 and Highway 99 also cross the White Wolf Fault roughly 1.5 miles north of the junction of those two highways.

Private Assets

- Numerous natural gas and oil pipelines, telephone lines, and fiber optic cables follow the Interstate 5 corridor through southern Kern County. These are vulnerable to damage from seismic offset. Water wells and oil wells could be damaged by subsurface slumping.
- Farm lands in the vicinity of the White Wolf Fault contain tens of miles of on-farm buried pipeline as well as above ground filters and pumps, some of which are vulnerable to seismic shaking and seismic offset.

Development Trends

Upward trends in population growth and development in Kern County will increase vulnerability to earthquakes. Modern, well-constructed buildings built to code should withstand earthquake shaking better. However even new buildings can be severely damaged if built upon areas that are susceptible to liquefaction. Shallow ground water near planned development areas in south Bakersfield should be evaluated for liquefaction potential. The planned urban area of San Emidio near the junction of I-5 and Highway 99 in the southern Valley Region is in a zone of high shaking potential with the presence of the San Andreas, Plieto, and White Wolf faults nearby. Rosamond is a growing desert community that is also subject to strong shaking from the San Andreas and Garlock faults. Row irrigation has largely ceased in the farmlands near the White Wolf Fault, so significant releveling of crop lands should not be required following seismic uplift as was required in 1952 (source: Wheeler Ridge-Maricopa Water Storage District).

FLOODS

According to the NFIP, all eleven municipalities within Kern County, with the exception of Wasco and Delano, have mapped flood hazard areas. GIS was used during this planning process to quantify how flood risk varies across the planning area. FEMA Q3 digital floodplains were overlaid on a city boundary layer to identify the municipalities with mapped floodplains. According to this analysis there is a flood hazard that exists in Delano. This may be due to annexation of previously unincorporated area that is designated floodplain.

The next step was to quantify the flood vulnerability by jurisdiction. HAZUS block level data was used for this analysis because it contains population as well as an estimate of building replacement values. Parcel level data was also available for the County, but due to the limitations with California's Proposition 13, the assessed valuations would not accurately reflect housing values. The floodplain and municipal boundary layer was overlaid on the HAZUS census blocks to create a new layer. A proportional division was performed to account for blocks that were split by city or flood boundaries, and to better model values in the floodplain. For example, a census block that was split in two by a floodplain (50% in, 50% out) had its population and building attributes multiplied by .50. From this layer information on the number of buildings, building replacement value, and population could be estimated by jurisdiction and by flood zone.

Limitations: HAZUS building data is based on average housing costs and 2000 census counts. There may be errors within the HAZUS data itself. In many cases the census block geography does not line up exactly with the city boundaries, which may lead to over or undercounts where blocks are split. The size and shape of the Census Block affects the accuracy of this model. The larger and more irregular the Census Block, typically found in rural areas, the less accurate this method becomes. There is also known spatial inaccuracies with FEMA Q3 data. It is beyond the scope of this planning process to resolve these data issues. This model may not reflect actual real world conditions, but it does serve as a basis to quantify the possible risk from floods, using the best available data.

Estimating Potential Losses

The result of the exposure analysis summarizes the values at risk in the floodplain. When a flood occurs seldom does the event cause total destruction of an area. Potential losses from flooding are related to a variety of factors including flood depth, flood velocity, building type and construction. Based on FIA flood Depth-Damage curves the percent of damage is directly related to the flood depth. FEMA's flood benefit/cost module uses this simplified approach to model flood damage based on building type and flood depth. A damage estimation of 20 percent of the total value was used based on FEMA FIA Depth-Damage curves based assumption of damage of at least 22 percent of the value of the structure and 20 percent of the contents value to a one-story structure with no basement flooded to two feet. While there are several limitations to this model, it does present a methodology to estimate potential damages. This model may include structures within the 100 year floodplain (A Zone) that may be elevated above the level of the base flood elevation, according to local floodplain development requirements.

Flood Risk Assessment Results by Incorporated Jurisdiction					
ZONE*	Acres	Building Count	Building Replacement value	Population	Potential Loss at %20
Arvin					
A (entirely)	3061.64	2,308	\$368,309,000	12,618	\$73,662,000
Bakersfield					
Out	64,634.20	64,205	\$13,229,653,000	235,558	
A	7,313.66	148	\$55,279,000	425	\$11,056,000
X500	2,921.64	2,818	\$566,816,000	8,444	\$113,363,000
Totals	74,869.50	67,171	\$13,851,748,000	244,427	
California City					
Out	113,523.49	2,354	\$378,959,000	6,503	
A	15,162.26	185	\$29,904,000	441	\$5,981,000
X500	1,525.42	543	\$87,422,000	1,435	\$17,484,000
Totals	130,211.16	3,083	\$496,285,000	8,378	
Delano					
Out	6302.20	6,504	\$1,188,949,000	34,058	
A	391.00	6	\$2,300,000	69	\$460,000
Totals	6693.20	6,510	\$1,191,249,000	34,127	\$238,250,000

ZONE*	Acres	Building Count	Building Replacement value	Population	Potential Loss at %20
Maricopa					
Out	950.61	434	\$44,501,000	1,107	
A	41.00	1	\$28,000	1	\$6,000
Totals	991.61	435	\$44,530,000	1,108	
McFarland					
Out	1210.55	887	\$165,741,000	5,767	
A	234.76	359	\$61,118,000	1,972	\$12,224,000
X500	163.93	328	\$48,203,000	1,833	\$9,641,000
Totals	1609.23	1,574	\$275,062,000	9,572	
Ridgecrest					
Out	10495.81	5,396	\$967,543,000	13,346	
A	799.43	86	\$16,271,000	227	\$3,254,000
X500	2421.95	4,396	\$756,434,000	11,350	\$151,287,000
Totals	13717.19	9,878	\$1,740,249,000	24,923	
Shafter					
Out	11764.0882	2,816	\$486,272,000	12,136	
A	276.9685	147	\$27,522,000	512	\$5,504,000
Totals	12041.0567	2,963	\$513,795,000	12,647	
Taft					
Out	9,078.88	1,754	\$345,848,000	5,818	
A	322.82	48	\$9,415,000	160	\$1,883,000
X500	244.34	179	\$35,654,000	460	\$7,131,000
Totals	9,646.04	1,981	\$390,917,000	6,437	
Tehachapi					
Out	3,810.10	333	\$126,549,000	5,324	
A	276.65	127	\$25,303,000	291	\$5,061,000
X500	2,210.63	1,824	\$320,380,000	5,241	\$64,076,000
Totals	6,297.38	2,284	\$472,232,000	10,855	
Wasco					
Out (entirely)	4,938.19	3,379	\$662,266,000	21,092	none
Unincorporated					
Out	4,425,729.56	71,598	\$11,601,428,000	222,171	
A	514,876.09	11,303	\$1,620,461,000	37,223	\$324,092,000
X500	25,347.07	5,967	\$879,505,000	17,123	\$175,901,000
Totals	4,965,952.72	88,868	\$14,101,394,000	276,517	
*A zone = 100 year floodplain, X500 = 500 year floodplain, Out = outside of designated floodplain					

Based on the results of this analysis, Arvin and McFarland have significant assets at risk to 100 year and greater floods, whereas some cities like Bakersfield, Tehachapi, Ridgecrest, and Taft are more vulnerable to the less likely 500 year or greater floods. The unincorporated County is more vulnerable to 100 year events.

Specific Problem Areas

Kern County has over 846 square miles of 100 year floodplain, and 54 square miles of 500 year floodplain, according to a GIS based summary of the FEMA Q3 digital floodplain data for the County. While the analysis above attempts to quantify the risk in various parts of the County, it does not capture the risk at some of the numerous problems areas in the unincorporated County. According to the Kern County Flood Hazard Mitigation Plan (1996, revised 1998) there are fifteen problem areas that are recommended to be evaluated for specific flood hazard mitigation plans. These areas are listed in the plan and repeated below:

- Sandy Creek (Taft/Ford City area) – This is an unconfined watercourse having the potential to cause significant residential and commercial property damage in Ford City (unincorporated) and the adjacent areas of the City of Taft.
- Cuddy Creek – This watercourse traverses the southern boundary of Kern County from Lake-of-the-Woods through Frazier Park and Lebec. The creek channel is highly unstable with significant degradation occurring in the Lake-of-the-Woods and Frazier Park areas as well as at the several bridge crossings along its flow path.
- The Southern Stream Group – These are a series of smaller watersheds which wrap around the southeastern edge of the San Joaquin Valley. Individually these creeks can create problems, cumulatively they have created millions of dollars of local infrastructure damages, primarily to local roadways, within the last 15 years.
- Poso Creek – This watercourse enters the San Joaquin Valley north of the City of Bakersfield. Under large flood events Poso Creek will likely break out of its current flow path and directly endanger the integrity of the Friant-Kern Canal resulting in devastating flooding in the City of McFarland.
- Caliente Creek – Caliente Creek discharges onto an approximately 400 square mile floodplain downstream of State Highway 58. The unincorporated town of Lamont has had significant flooding over the past 60 years. Large scale flood control projects have been found to be either low in benefit to cost ratio or too expensive for the local community to afford. The City of Arvin is entirely within the Caliente Creek 100 year floodplain and has been flooded numerous times. A flood control and mitigation plan has been developed in June 2000 to further identify the problems and mitigation options within the Kern Lake Basin, which includes Caliente Creek.
- Upper Caliente Creek – Within the town site of Caliente, at the confluence of Caliente and Tehachapi Creek, lie several residential, public, and commercial structures at direct risk of catastrophic damage related to large flooding from either of the contributing creeks.
- North Fork of the Kern River (Kernville) – Preliminary analysis of the Kern River in the Kernville area indicates that a levee, which is not maintained, would be subject to overtopping during large flood events. When this happens numerous conventionally framed

homes, a residential trailer park, and a large mobile home park will be at risk of incurring significant flood damages.

- Lower Kern River/Buena Vista Lake – This watercourse naturally flows north into the former Tulare Lake Basin. When this occurs thousands of acres of farmland and numerous roadways are inundated around Buena Vista Lake, the Semitropic region of Kern County and in adjacent counties. Development of surface retention facilities in the lower Kern River would enhance groundwater recharge and minimize flooding in the region.
- Onyx – The unincorporated community of Onyx, located adjacent to the South Fork of the Kern River, has been developed upon the active alluvial fans of Smith and Scodie Canyon Creeks.
- Kelso Creek – This watercourse has become a perched channel behind a sugar sand levee through much of the community of Weldon, located adjacent to the South Fork of the Kern River near Lake Isabella. The Kelso Creek watershed is capable of generating 100-year flows which exceed the capacity of the existing levee system. Several homes are constructed in close proximity to the levee. In case of levee failure these homes would be seriously inundated. There is potential for loss of life and impacts to 124 acres of farmland as well. There are approximately 75 homes, valued at \$1.5 million, that are not floodproofed to the County's standards. Flooding could affect 229 residents, more than 50% over 55 years old and below poverty level income. Portions of the Kelso Creek Road are at risk that average about \$80,000 to repair each time it floods. Many water wells and distribution systems, valued at about \$500,000, are at risk (*Source: Kern County Water Agency*).
- South Lake – The area along the southeast shore of Lake Isabella has several residential developments constructed on active alluvial fans.
- Lynch Canyon/Mountain Mesa – This residential and commercial area, along the south shore of Lake Isabella, is constructed on an active alluvial fan.
- Cache Creek – This watercourse currently follows a path which generates a flood hazard within California City. Under large events it is likely the flood waters will breach a narrow sand levee that currently separates Cache Creek from an adjacent abandoned gravel pit. If this were to happen Cache Creek would be redirected into the unincorporated community of Mojave, resulting in large residential, commercial, and infrastructure damages to this community.
- Little Dixie Wash – This watercourse passes to the south of the community of Inyokern, terminating in China Lake. The watercourse is an unstable, meandering channel. Little Dixie Wash currently poses a threat to the town of Inyokern as a result of probable breakout flows upstream of Brown Road, to the residential development between Brown Road and the China Lake Naval Weapons Center due to the unstable meandering nature of the channel, and to the China Lake Naval Weapons Center from potential significant volumes of sediment and flood waters which can be generated by the watershed.

- Ridgecrest Washes – The numerous desert washes have historically posed a threat to public infrastructure, private property, and the China Lake Naval Weapons Center during periods of heavy thunderstorm activity.

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
- Highway 166 at San Emigdio Creek and elsewhere
- Randsburg Red Rock Rd near Red Rock Canyon State Park
- Copus and Valpredo Rds near the junction of Highway 99 and Interstate 5
- Wheeler Rd and Rancho Dr near El Paso and Tejon Creek
- Frazier Mtn Park Rd and bridges along Cuddy Creek has erosion concerns

Tehachapi Area Flood Risk. Based on input from the Golden Hills Community Service District a minimum of 2,100 up to 7,500 persons could be impacted by floods in this area. Certain areas of the District's water system (worth up to \$30 million) and roads in three road maintenance districts (worth \$900,000) could be affected. Areas could be isolated from emergency services and experience loss of power service, power and natural gas. Stallion Springs C.S.D. would have similar losses during floods as during a dam failure (see discussion in Dam Failure section).

Insurance Claims and Repetitive losses. According to the NFIP a "repetitive loss structure" is "any building with 2 or more flood losses greater than \$1,000 in any ten-year period since 1978." The County does not have any structures that meet this definition. Although this is an encouraging statistic, this could reflect a lack of flood insurance policies in areas that have repetitive floods.

Community	# of Policies	# of Claims	Claims Amount	# of Repeti - tive Losses
Kern County	3,144	84	\$410,917	0
Arvin	1,105	7	\$546	0
Bakersfield	118	15	\$47,916	0
California City	65	0	\$0	0
Delano	No data	No data	No data	0
Maricopa	No data	No data	No data	0
McFarland	123	24	\$150,075	0
Ridgecrest	99	28	\$138,990	0
Shafter	44	0	\$0	0
Taft	No data	1	No data	0
Tehachapi	7	1	\$1,377	0
Wasco	27	0	\$0	0
Flood policies data as of November 30, 2004 <i>Source: CA dept of Water Resources</i>				

Critical Facilities at Risk. Critical Facilities at risk to floods are listed in the Multi Hazard Risk Analysis section that follows the Wildfire section of this chapter.

Cultural\Historic and Natural Resources at Risk. Risk analysis of these resources was not possible due to data limitations. Natural areas within the floodplain often benefit from periodic flooding as a naturally recurring phenomenon. These natural areas often reduce flood impacts by allowing absorption and infiltration of floodwaters.

Overall Community Impact

Floods and their impacts will vary by community, and will likely only affect certain areas of the County during specific timeframes. Based on the risk assessment it is evident that floods will continue to have potentially devastating economic impact to certain communities. While many of the floods are shallow, sheet flow events, they have resulted in property damage, road washouts, and transportation disruptions. Other impacts that are not quantified, but can be anticipated in future events include:

- Potential for injury and loss of life,
- Commercial and residential structural damage,
- Health hazards associated with mold and mildew,
- Loss of water, power, roads, phones, and transportation could impact ability to sustain life for those with certain medical conditions,
- Significant economic impact (jobs, sales, tax revenue) upon the community with the loss of commercial structures,
- Negative impact upon commercial and residential property values,

- The loss of schools would severely impact the entire school system, with significant disruption to families and teachers as temporary facilities and relocations would be likely, and
- Economic impacts due to washed out or flooded roads that necessitate detours.

Development trends

The risk of flooding in future developments should be minimized by floodplain management within the County and its jurisdictions that participate in the NFIP. Problems could still occur in areas that have no mapped floodplain or where floodplain maps are inaccurate.

WILDFIRES

Based on the hazard profile and County Fire Plan, Kern County has a significant wildfire hazard, particularly in the Mountain Region. The next step was to quantify what is exposed to the hazard, by jurisdiction. The analysis utilized three GIS layers: municipal boundaries, HAZUS supplied census block level exposure data, and a wildfire hazardous areas layer supplied by the County. The wildfire hazardous areas file was created to assign boundaries for the purpose of legislating requirements of construction materials and design for structures under new county permits. This shapefile was based upon very rough State of California-supplied data, but serves as a basis for comparison of levels of fire hazard in the County. HAZUS block level data was used for this analysis because it contains population as well as an estimate of building replacement values. Parcel level data was also available for the County, but due to the limitations with California's Proposition 13, the assessed valuations would not accurately reflect housing values. Using HAZUS data also allows an 'apples to apples' comparison of vulnerability between fire, flood, and earthquake hazards. Using GIS, the fire hazard layer and municipal boundary layer were merged with HAZUS census blocks to create a new layer. A proportional division was performed to account for blocks that were split by city or fire hazard boundaries, and to better model values in and out of fire hazard zones.

The resulting layer allows for summary of the population, number of buildings, and building replacement value by fire hazard level and by jurisdiction. According to this analysis wildfire is mostly a concern for the unincorporated County in the Mountain Region, but Maricopa, Taft, and Tehachapi are at risk as well. The exposure to the wildfire hazard is quantified in the table below.

Wildfire Risk Assessment Results by Jurisdiction				
Fire hazard level	Acres	Building Count	Building Replacement value	Population
Entire County (including jurisdictions)				
moderate hazard	1,980,398.90	17,744	\$2,614,426,000	43,315
high hazard	1,054,312.19	3,778	\$434,638,000	6,724
very high hazard	290,790.03	5,121	\$635,877,000	6,247
Total	3,325,501.12	26,643	\$3,684,942,000	56,286
Maricopa				
moderate hazard	951.81	421	\$43,162,000	1,085
Taft				
moderate hazard	1,392.78	56	\$9,003,000	154
Tehachapi				
moderate hazard	6,297.38	2,284	\$472,232,000	10,855
Unincorporated area				
moderate hazard	1,971,756.93	14,984	\$2,090,030,000	31,222
high hazard	1,054,312.19	3,778	\$434,638,000	6,724
Total	3026069.11	18,761	\$2,524,668,000	37,945

In addition, the CDF has generated a list of communities at risk for wildfire, as required under the National Fire Plan. Specifically, the intent was to evaluate the risk to a given area from fire escaping off federal lands. Three main factors were used to determine wildland fire threat in the WUI areas of California. These include, 1) Ranking fuel hazards, 2) Assessing the probability of fire, and 3) Defining areas of suitable housing density that could create wildland-urban interface fire protection strategy situations. The preliminary criteria and methodology for evaluating wildfire risk to communities is published in the Federal Register, January 4, 2001, Volume 66, Number 3. The communities in Kern County and the identified risk to these communities from fire escaping off federal lands are listed in the following table. The locations of these communities are shown on the map in the Hazard Identification section.

KERN COUNTY COMMUNITIES AT RISK OF WILDFIRE

ID	PLACE NAME	COUNTY NAME	FED THREAT	HAZARD LEVEL
49	Arvin	KERN		2
61	Bakersfield	KERN	F	2
74	Bear Valley Springs	KERN		3
122	Bodfish	KERN	F	3
164	California City	KERN	F	2
334	Edwards Air Force Base	KERN	F	3
395	Frazier Park	KERN	F	3
433	Golden Hills	KERN	F	2
438	Gorman	KERN	F	3
549	Keene	KERN		3
557	Kernville	KERN	F	3
597	Lake Isabella	KERN	F	3
618	Lebec	KERN	F	3
747	Mountain Mesa	KERN	F	3
761	Neenach	KERN	F	3
777	North Edwards	KERN	F	2
805	Onyx	KERN	F	2
950	Rosamond	KERN	F	3
933	Ridgecrest	KERN	F	2
917	Randsburg	KERN	F	2
1056	South Lake	KERN	F	3
1062	South Taft	KERN		2
1105	Tehachapi	KERN	F	3
1095	Taft	KERN		2
1096	Taft Heights	KERN	F	2
1187	Weldon	KERN	F	3
1220	Wofford Heights	KERN	F	3
<p>'F' indicates "in the vicinity of Federal Lands" 3 is the maximum hazard level rating <i>(Source: California Fire Alliance, www.cafirealliance.org)</i></p>				

In addition, Stallion Springs C.S.D has the potential to be severely impacted by wildfire based on information provided by the district.

Overall Community Impact

The overall impact to the community from a wildfire includes:

- Potential for injury and loss of life,
- Commercial and residential structural damage,
- Impact on the water quality of watersheds located within the county,
- Impact to natural resource habitats and other resources such as timber,
- Loss of water, power, roads, phones, and transportation could impact ability to sustain life for those with certain medical conditions,

- Significant economic impact (jobs, sales, tax revenue) upon the community with the loss of commercial structures,
- Negative impact upon commercial and residential property values,
- The loss of churches would severely impact the social fabric of the community;
- The loss of schools would severely impact the entire school system, with significant disruption to families and teachers as temporary facilities and relocations would be likely, and
- Major wildland fires within the community would have a significant impact on the overall mental health of the community.

Estimating Potential Losses

According to FEMA guidance, standard loss estimation tables do not currently exist for wildfires. Most wildfire related deaths are the result of fire suppression activities. However, if access is impaired and insufficient warning time, injuries and deaths to citizens can occur. Fire suppression and rehabilitation costs have totaled millions of dollars based on past events in Kern County, with the occasional loss of structures.

Critical Facilities at Risk. Critical Facilities at risk to wildfires are listed in the Multi Hazard Risk Analysis section that follows this section.

Natural Resources at Risk. Kern County has substantial natural resources located in the mountain region of the County as previously described. Natural resources at risk include the Sequoia and Los Padres National Forests, the Piute Cypress and Horse Canyon BLM areas of Critical Concern, and the California Condor and Southwestern Willow Flycatcher/South Fork Wildlife Area critical habitat areas.

There are several potential impacts to natural resources when wildland-urban interface fires occur. The first is the watershed and ecosystem losses that occur from wildland fires. The second is the timber and ground cover assets that make up the life style and some commercial aspects of living in the area. The last is the aesthetic value of the area. Major fires that result in visible damage detract from that value. Tourism is a major attraction in Kern County. Because many Kern County communities border Sequoia National Forest, the issues of watershed, forest products, wildlife, and recreation tourism are all critical elements to the County and surrounding areas and are all at risk from wildfire hazards.

Development Trends

Population growth and development in Kern County is on the rise. Much of this growth is occurring in previously undeveloped wildland interface areas. As long as the County continues to expand into these areas, the County's vulnerability to wildfires will increase proportionately.

MULTI HAZARD RISK ANALYSIS

GIS was used to model what areas of the County are at risk to multiple hazard occurrences. The analysis was limited to earthquake, flood, and wildfire due to the existence of available mapping for these hazards. Landslides were not included due to the coarse scale (nationwide dataset) of the data currently available. The layers were assigned a score based on the level of hazard as described below:

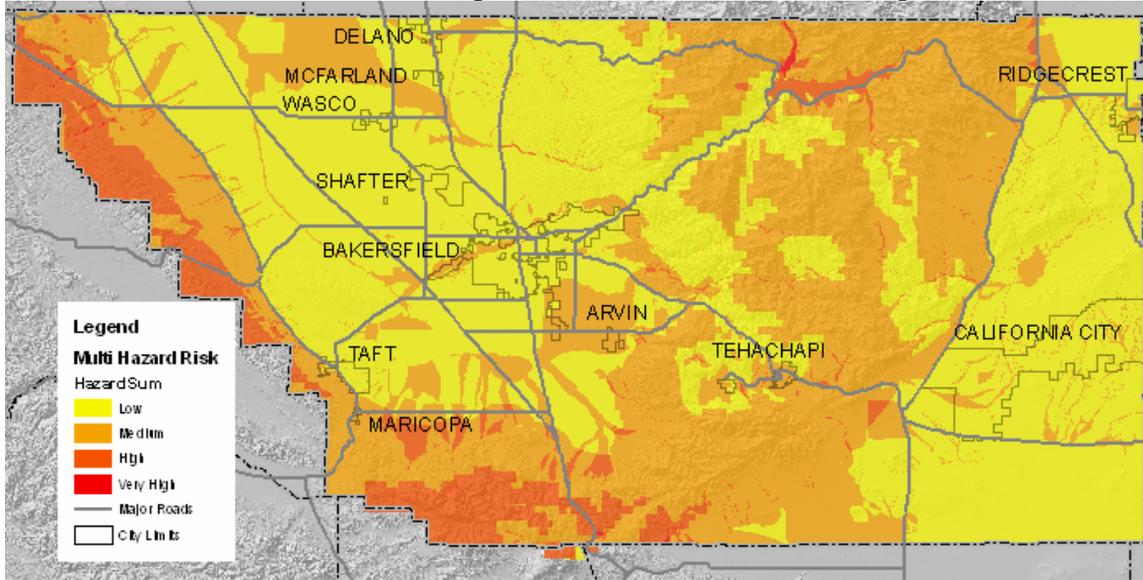
Hazard Zone	Hazard Score
Flood Zone	
X500 (500 year floodplain)	1
A zone (100 year floodplain)	2
Wildfire Hazard	
Moderate	1
High	2
Very High	3
Earthquake Shaking Spectral Acceleration @ 1 Second Frequency (10% chance of exceedence in 50 years)	
0-30% g	1
31-60% g	2
61-176% g	3

The GIS analysis combined the earthquake shaking potential map, wildfire hazard area map, and floodplain map into one composite layer. A new field was added to this composite layer to capture the sum of scores for each hazard. The results are displayed on the map below.

Multi Hazard Risk classification

Sum of scores	Classification
1-2	Low
3-4	Medium
5-6	High
7-8	Very High

Multi Hazard Risk Map based on Fire, Flood and Earthquake Hazard



Map compilation AMEC; data sources: Kern County, CAOES, FEMA

The map shows that the entire county has at least some earthquake risk, and some areas are prone to varying levels of earthquake and wildfire, earthquake and flood, floods and wildfire, or all three hazards. This map is intended to highlight areas that are prone to multiple hazards, and where multi-objective mitigation solutions should be considered.

Critical Facility Analysis

County critical facilities that were available in a GIS format were analyzed for vulnerability to earthquakes, floods, and wildfires. GIS was used to overlay the critical facility layers on top of the multi-hazard risk layer. A GIS function called a 'spatial join' was performed that joins the attributes of the multi-hazard risk layer to the facilities layers. The following tables display the results of this analysis. The tables are sorted by the multi hazard risk score, indicating the risk to multiple hazards. The highest risk facilities are at the top of each table. The particular hazard(s) to which the facilities are exposed can be reference in the tables also.

METRO AREA SCHOOLS

ID No.	Metro Area School Name	Place	Flood Zone	Fire Hazard	Earthquake Shaking (%G)	Multi-Hazard Rank
145	Alicante Avenue Elementary School	Lamont	A		45	4
146	Lamont Elementary School	Lamont	A		45	4
144	Mountain View Middle School	Lamont	A		45	4
147	Myrtle Avenue Elementary School	Lamont	A		45	4
148	Nueva Continuation High School	Lamont	A		45	4
143	Sunset Elementary School	Bakersfield	A		45	4
142	Vineland Elementary School	Bakersfield	A		45	4
139	Bakersfield Christian High School	Bakersfield	X500		35	3
140	Columbia Elementary School	Bakersfield	X500		35	3
138	Del Rio Elementary School	Bakersfield	X500		35	3
136	Franklin Elementary School	Bakersfield	X500		35	3
137	Highland Elementary School	Bakersfield	X500		35	3
141	Liberty High School	Bakersfield	X500		35	3
87	Able Center	Bakersfield			35	2
69	Actis (o J) Junior High School	Bakersfield			35	2
3	Almondale Elementary School	Bakersfield			35	2
88	Bakersfield Adult School	Bakersfield			35	2
7	Bakersfield High School	Bakersfield			35	2
53	Beardsley Intermediate School	Bakersfield			35	2
59	Beardsley Junior High School	Bakersfield			35	2
101	Berkshire Elementary School	Bakersfield			35	2
99	Bimat (william B) Elementary School	Bakersfield			35	2
70	Buena Vista Elementary School	Bakersfield			35	2
98	California State University Bakersfield (csub)	Bakersfield			35	2
43	Casa Loma Elementary School	Bakersfield			35	2
63	Castle (charles H) Elementary School	Bakersfield			35	2
4	Centennial Elementary School	Bakersfield			35	2
13	Centennial High School	Bakersfield			35	2
110	Community Learning Center	Bakersfield			35	2
95	Constellation Center	Bakersfield			35	2
108	County Community	Bakersfield			35	2
67	Curran Junior High School	Bakersfield			35	2
55	Discovery Elementary School	Bakersfield			35	2
91	Downtown Elementary School	Bakersfield			35	2
38	East Bakersfield High School	Bakersfield			35	2
42	Edison Middle School	Bakersfield			35	2
9	Emerson Junior High School	Bakersfield			35	2

ID No.	Metro Area School Name	Place	Flood Zone	Fire Hazard	Earthquake Shaking (%G)	Multi-Hazard Rank
77	Endeavour Elementary School	Bakersfield			35	2
89	Evergreen Elementary School	Bakersfield			35	2
47	Fairfax Elementary School	Bakersfield			35	2
49	Fairview Elementary School	Bakersfield			35	2
39	Foothill High School	Bakersfield			35	2
100	Freedom Middle School	Bakersfield			35	2
85	Fremont Elementary School	Bakersfield			35	2
81	Fruitvale Junior High School	Bakersfield			35	2
36	Garza (ramon) Elementary School	Bakersfield			35	2
133	General Shafter Elementary School	Bakersfield			45	2
134	Golden Valley High School	Bakersfield			45	2
52	Greenfield Junior High School	Bakersfield			35	2
61	Harris (caroline) Elementary School	Bakersfield			35	2
72	Hart (leo B) Elementary School	Bakersfield			35	2
14	Henrietta Weill Child Guidance Center	Bakersfield			35	2
96	Henrietta Weill Child Guidance Center	Bakersfield			35	2
16	Hills (stella I) Elementary School	Bakersfield			35	2
33	Horace Mann Elementary School	Bakersfield			35	2
92	Independence Elementary School	Bakersfield			35	2
29	Jefferson Elementary School	Bakersfield			35	2
28	Johnson (rafer) Elementary School	Bakersfield			35	2
109	Juvenile Court	Bakersfield			35	2
27	Kendrick (w A) Elementary School	Bakersfield			35	2
102	Kern Workforce 2000 Academy (charter)	Bakersfield			35	2
131	Lakeside Elementary School	Bakersfield			45	2
65	Laurelglen Elementary School	Bakersfield			35	2
30	Longfellow Elementary School	Bakersfield			35	2
84	Loudon (roy W) Elementary School	Bakersfield			35	2
73	Mcauliffe (christa) Elementary School	Bakersfield			35	2
135	Mckee Elementary	Bakersfield			45	2
129	Mckee Middle School	Bakersfield			45	2
130	Mckee Primary School	Bakersfield			45	2
21	Mckinley Elementary School	Bakersfield			35	2
44	Mount Vernon Elementary School	Bakersfield			35	2
86	Munsey Elementary School	Bakersfield			35	2
78	Norris Elementary School	Bakersfield			35	2
82	Norris Middle School	Bakersfield			35	2
54	North Beardsley Elementary School	Bakersfield			35	2
10	North High School	Bakersfield			35	2
56	Olive Drive Elementary School	Bakersfield			35	2
1	Ollivier (leon H) Junior High School	Bakersfield			35	2
37	Orangewood Elementary School	Bakersfield			35	2

ID No.	Metro Area School Name	Place	Flood Zone	Fire Hazard	Earthquake Shaking (%G)	Multi-Hazard Rank
32	Owens (bessie E) Intermediate School	Bakersfield			35	2
45	Owens (bessie E) Primary School	Bakersfield			35	2
50	Palla (raffaello) Elementary School	Bakersfield			35	2
132	Panama Elementary School	Bakersfield			45	2
103	Patriot Elementary	Bakersfield			35	2
20	Pauly (leo G) Elementary School	Bakersfield			35	2
23	Penn (william) Elementary School	Bakersfield			35	2
34	Pioneer Drive Elementary School	Bakersfield			35	2
25	Plantation Elementary School	Bakersfield			35	2
26	Planz Elementary School	Bakersfield			35	2
66	Quailwood Elementary School	Bakersfield			35	2
94	Reagan (ronald) Elementary School	Bakersfield			35	2
51	Regional Occupation Program	Bakersfield			35	2
15	Richardson Child Development Center	Bakersfield			35	2
128	Ridgeview High School	Bakersfield			45	2
104	Rio Bravo Elementary	Bakersfield			35	2
80	Rio Bravo-greeley Elementary School	Bakersfield			35	2
22	Roosevelt Elementary School	Bakersfield			35	2
83	Rosedale Middle School	Bakersfield			35	2
79	Rosedale North Elementary School	Bakersfield			35	2
40	Ruggenberg Career Center School	Bakersfield			35	2
97	Saint Francis Parrish School	Bakersfield			35	2
2	Sandrini (louise) Elementary School	Bakersfield			35	2
24	Seibert (amy B) Elementary School	Bakersfield			35	2
90	Sequoia Middle School	Bakersfield			35	2
41	Sierra Junior High School	Bakersfield			35	2
71	Sing Lum Elementary School	Bakersfield			35	2
8	South High School	Bakersfield			35	2
17	Special Education	Bakersfield			35	2
107	Special Services/constellation	Bakersfield			35	2
57	Standard Elementary School	Bakersfield			35	2
60	Standard Middle School	Bakersfield			35	2
62	Stine Elementary School	Bakersfield			35	2
64	Stockdale Elementary School	Bakersfield			35	2
12	Stockdale High School	Bakersfield			35	2
93	Suburu (donald E) Elementary School	Bakersfield			35	2
74	Tevis Junior High School	Bakersfield			35	2
68	Thompson (fred L) Junior High School	Bakersfield			35	2
105	Three Rs Achievement Academy	Bakersfield			35	2
106	Valle Verde	Bakersfield			35	2
6	Van Horn (wayne) Elementary School	Bakersfield			35	2
48	Virginia Avenue Elementary School	Bakersfield			35	2

ID No.	Metro Area School Name	Place	Flood Zone	Fire Hazard	Earthquake Shaking (%G)	Multi-Hazard Rank
18	Vista Continuation High School	Bakersfield			35	2
76	Vista West Continuation High School	Bakersfield			35	2
35	Voorhies Elementary School	Bakersfield			35	2
75	Warren (earl) Junior High School	Bakersfield			35	2
46	Wayside Elementary School	Bakersfield			35	2
19	West (frank) Elementary School	Bakersfield			35	2
11	West High School	Bakersfield			35	2
5	Williams (bill L) Elementary School	Bakersfield			35	2
31	Williams Elementary School	Bakersfield			35	2
58	Wingland Elementary School	Bakersfield			35	2
126	Bakersfield College (bc)	Bakersfield			25	1
111	Chavez (cesar E) Elementary School	Bakersfield			25	1
120	Chipman Junior High School	Bakersfield			25	1
113	College Heights Elementary School	Bakersfield			25	1
121	Compton Junior High School	Bakersfield			25	1
117	Eissler (henry) Elementary School	Bakersfield			25	1
124	Garces Memorial High School	Bakersfield			25	1
116	Harding Elementary School	Bakersfield			25	1
119	Highland High School	Bakersfield			25	1
118	Hort Elementary School	Bakersfield			25	1
127	Johnson (rafer) Community Day	Bakersfield			25	1
115	Nichols (colonel Howard) Elementary School	Bakersfield			25	1
114	Noble (myra A) Elementary School	Bakersfield			25	1
125	Our Lady Of Perpetual Help Elementary School	Bakersfield			25	1
122	Stiern (walter) Middle School	Bakersfield			25	1
123	Thorner (dr Juliet) Elementary School	Bakersfield			25	1
112	Washington Junior High School	Bakersfield			25	1

COUNTY SCHOOLS

ID No.	County School Name	Place	Flood Zone	Fire Hazard	Earthquake Shaking (%G)	Multi-Hazard Rank
102	South Fork Elem.		A	high hazard	35	6
85	Kernville Elem.			very high hazard	35	5
71	Douglas Adult		A		45	4
107	El Tejon Elem.			moderate hazard	95	4
104	Endevour Comm. Day		X500	moderate hazard	45	4
98	Frazier Park Elem			moderate hazard	115	4

ID No.	County School Name	Place	Flood Zone	Fire Hazard	Earthquake Shaking (%G)	Multi-Hazard Rank
101	Inyokern Elem.		A		35	4
103	Jacobsen Jr. High		X500	moderate hazard	45	4
73	Joshua Middle		A		45	4
74	Kern County ROP/C		A		45	4
92	Maricopa Elem.			moderate hazard	65	4
91	Maricopa High			moderate hazard	65	4
75	Mojave Elem.		A		45	4
76	Mojave High		A		45	4
72	Mtn. View Cont.		A		45	4
105	Tehachapi High		X500	moderate hazard	45	4
106	Wells Elem.		X500	moderate hazard	45	4
108	Belridge Elem.			moderate hazard	55	3
94	Caliente Elem.			moderate hazard	45	3
86	Conley Elem.			moderate hazard	55	3
97	Cummings Valley Elem.			moderate hazard	45	3
84	Gateway Elem.		X500		35	3
96	Golden Hills Elem.			moderate hazard	45	3
78	Hamilton Elem.		X500		45	3
89	Kern Valley High			moderate hazard	35	3
83	Las Flores Elem.		X500		35	3
109	Midway Elem.			moderate hazard	55	3
95	Monroe Cont.			moderate hazard	45	3
82	Pierce Elem.		X500		35	3
80	Rosamond Elem.		X500		45	3
79	Rosamond High		X500		45	3
90	Summit Cont.			moderate hazard	35	3
77	Tropico Middle		X500		45	3
87	Wallace Elem.			moderate hazard	35	3
88	Wallace Middle			moderate hazard	35	3
99	Blake Elem.			moderate hazard	15	2
47	Boron High				35	2
48	Boron Jr. High				35	2
50	Branch Elem.				35	2
81	Browning Road Elem.		X500		25	2
34	Buena Vista Cont.				55	2
25	Burroughs				35	2
69	Buttonwillow Elem.				45	2
44	California City Middle				35	2
15	Central Valley Cont.				35	2
28	Cerro Coso College				35	2
10	Clemens Elem.				35	2
70	Elk Hills Elem.				45	2

ID No.	County School Name	Place	Flood Zone	Fire Hazard	Earthquake Shaking (%G)	Multi-Hazard Rank
49	Forbes Av. Elem.				35	2
1	Frazier Mtn. High			moderate hazard	0	2
13	Independance Cont.				35	2
26	James Faller Elem.				35	2
27	James Monroe Jr. High				35	2
31	Jefferson Elem.				55	2
9	Jefferson Middle				35	2
32	Lincoln Elem.				55	2
100	Linns-Valley Poso Elem.			moderate hazard	15	2
3	Lost Hills Elem.				35	2
4	Lost Hills Middle				35	2
19	Maple Elem.				35	2
30	McKittrick Elem.				55	2
22	Murray Jr. High				35	2
45	North Edwards Cont.				35	2
6	North Kern Christian				35	2
8	Palm Av. Elem.				35	2
36	Parkview Elem.				55	2
93	Piute Mtn. Elem.			moderate hazard	25	2
7	Pruitt Elem.				35	2
40	Rand Elem.				45	2
41	Rare Earth Cont.				45	2
42	Red Rock School				45	2
43	Redrock Elem.				35	2
17	Richland Elem.				35	2
16	Richland Intermediate				35	2
18	Richland Sr. Elem.				35	2
21	Richmond Elem.				35	2
37	Roosevelt				55	2
20	Seven Day Adventist				35	2
14	Shafter High				35	2
24	Sierra Sands Elem.				35	2
29	St. Annes School				35	2
12	St. Josephs Catholic				35	2
38	Taft College				55	2
35	Taft Primary				55	2
33	Taft Union High				55	2
5	Thomas Middle				35	2
23	Vieweg Elem.				35	2
11	Wasco High				35	2
46	West Boron Elem.				35	2
57	Albany Park School				25	1

ID No.	County School Name	Place	Flood Zone	Fire Hazard	Earthquake Shaking (%G)	Multi-Hazard Rank
61	Del Vista School				25	1
55	Delano Adult School				25	1
56	Delano High				25	1
59	Delano Union				25	1
2	Desert Jr. Sr. High				15	1
58	Freemont School				25	1
67	Kern Av. Elem.				25	1
66	McFarland Elem.				25	1
68	McFarland High				25	1
51	Payne Av. Middle				25	1
64	Pond Elem.				25	1
54	Princeton St. Elem.				25	1
60	Saint Mary's				25	1
65	San Joaquin Elem.				25	1
39	Semitropic Elem.				25	1
53	Terrace Elem.				25	1
52	Valencia High Cont.				25	1
62	Valle Vista Elem.				25	1
63	Vista School				25	1

HOSPITALS

ID No.	Hospital Name	Place	Flood Zone	Fire Hazard	Earthquake Shaking (%G)	Multi-Hazard Rank
8	Kern Valley Hospital	Mountain Mesa	A	high hazard	35	6
6	Healthsouth Bakersfield Rehab	Bakersfield	A		35	4
12	Tehachapi Hospital	Tehachapi	X500	moderate hazard	45	4
1	Bakersfield Heart Hospital	Bakersfield	X500		35	3
4	Bakersfield Memorial Hospital	Bakersfield			35	2
5	Good Samaritan Hospital	Bakersfield			35	2
7	Kern Medical Center	Bakersfield			35	2
2	Mercy Hospital	Bakersfield			35	2
9	Mercy Southwest Hospital	Bakersfield			35	2
10	Mercy Westside Hospital	Taft			55	2
11	Ridgecrest Regional Hospital	Ridgecrest			35	2
3	San Joaquin Community Hospital	Bakersfield			35	2
13	Delano Regional Medical Center	Delano			25	1

FIRE STATIONS

STA No.	Fire Station Name	Place	Flood Zone	Fire Hazard	Earthquake Shaking (%G)	Multi-Hazard Rank
76	Kernville	Kernville	X500	very high hazard	35	6
58	Pine Mountain	Pine Mountain Club		very high hazard	115	6
71	Southlake	Weldon	A	moderate hazard	35	5
12	Tehachapi	Tehachapi	A	moderate hazard	45	5
	USFS Cannell Office			very high hazard	35	5
	USFS Work Center			very high hazard	35	5
54	Arvin	Arvin	A		45	4
23	Fellows	Fellows		moderate hazard	65	4
57	Frazier Park	Frazier Park		moderate hazard	75	4
73	Inyokern	Inyokern	A		35	4
51	Lamont	Lamont	A		45	4
56	Lebec	Lebec		moderate hazard	105	4
14	Mojave	Mojave	A		45	4
	USFS Summit Station			very high hazard	15	4
	BLM S. Fork Station			high hazard	35	4
16	Bear Valley	Tehachapi		moderate hazard	45	3
	Crew 7	Lake Isabella		moderate hazard	35	3
11	Keene	Keene		moderate hazard	45	3
	Keene Helibase	Keene		moderate hazard	45	3
72	Lake Isabella	Lake Isabella		moderate hazard	35	3
22	Maricopa	Maricopa		moderate hazard	55	3
62	Meadows Field	Bakersfield	X500		35	3
15	Rosamond	Rosamond	X500		45	3
04	Station 4	Bakersfield	X500		35	3
17	Boron	Boron			35	2
25	Buttonwillow	Buttonwillow			35	2
45	Edison	Bakersfield			35	2
	Fire Heavy Equipment Factory	Bakersfield			35	2
36	Glennville	Glennville		moderate hazard	15	2
65	Greenacres	Bakersfield			35	2
52	Greenfield	Bakersfield			45	2
63	Highland	Bakersfield			35	2
	Kern County Fire Department Headquarters	Bakersfield			35	2
66	Landco	Bakersfield			35	2
26	Lost Hills	Lost Hills			35	2
24	McKittrick	McKittrick			55	2
55	Mettler	Bakersfield			55	2
61	Norris	Bakersfield			35	2
53	Old River	Bakersfield			45	2

STA No.	Fire Station Name	Place	Flood Zone	Fire Hazard	Earthquake Shaking (%G)	Multi-Hazard Rank
78	Piute	Caliente		moderate hazard	25	2
74	Ridgecrest	Ridgecrest			35	2
77	Ridgecrest Heights	Ridgecrest			35	2
64	Riverview	Bakersfield			35	2
67	Rosedale	Bakersfield			35	2
32	Shafter	Shafter			35	2
18	Stallion Springs	Stallion Springs		moderate hazard	25	2
21	Taft	Taft			55	2
41	Virginia Colony	Bakersfield			35	2
31	Wasco	Wasco			35	2
35	Woody	Woody		moderate hazard	15	2
01	Station 1	Bakersfield			35	2
02	Station 2	Bakersfield			35	2
03	Station 3	Bakersfield			35	2
05	Station 5	Bakersfield			35	2
06	Station 6	Bakersfield			35	2
07	Station 7	Bakersfield			35	2
09	Station 9	Bakersfield			35	2
11	Station 11	Bakersfield			35	2
10	Station 10	Bakersfield			35	2
13	Station 13	Bakersfield			35	2
19	Station 19	California City			35	2
	USFS Lake Office			moderate hazard	15	2
	SQF Democrat Station			moderate hazard	15	2
34	Delano	Delano			25	1
37	Delano West	Delano			25	1
33	McFarland	McFarland			25	1
42	Niles	Bakersfield			25	1
75	Randsburg	Randsburg			25	1
08	Station 8	Bakersfield			25	1

SHERIFF STATIONS

ID No.	Sheriff Station Name	Place	Flood Zone	Fire Hazard	Earthquake Shaking (%G)	Multi-Hazard Rank
19		Frazier Park Sub	X500	moderate hazard	115	5
16		Lamont Sub	A		45	4
18		Maricopa Sub		moderate hazard	65	4
15		Mojave Sub	A		45	4
20		Tehachapi Sub	X500	moderate hazard	45	4
21		Walker Basin Sub	A	moderate hazard	25	4
17		Kern Valley Sub		moderate hazard	35	3
1		Administration			35	2
12		Boron Sub			35	2
6		Buttonwillow Sub			35	2
3		Central Receiving Faci			35	2
2		Coroner			35	2
4		East Bakersfield Sub			35	2
8		Ridgecrest Sub			35	2
10		Rosamond Sub			45	2
5		Rosedale Sub			35	2
9		Taft Sub			55	2
7		Wasco Sub			35	2
11		Communications			25	1
14		Lerdo Detentions Facil			25	1
13		McFarland Sub			25	1

CHP STATIONS

ID No.	CHP Station Name	Place	Flood Zone	Fire Hazard	Earthquake Shaking (%G)	Multi-Hazard Rank
4	Gorman			moderate hazard	75	4
2	Inyokern				35	2
3	Mojave				45	2
1	Stockdale				35	2

DROUGHT

The entirety of Kern County is vulnerable to drought. Drought is one of the few hazards that has the potential to impact all the citizens of the County in terms of water restrictions, loss of recreational opportunities, and increased produce and energy costs. The impacts of future droughts will vary depending on the region. The populated areas of the Valley and agricultural economy will experience hardships associated with a reduction in water supply, including agricultural losses. The Mountains will see an increase in dry fuels and beetle kill and associated wildfires. It is perhaps the Desert Region that will experience the least amount of impact, as this area is a naturally arid environment where water needs are typically lower and the inhabitants have learned to adapt to the climate.

The costs of drought are difficult to quantify because the impacts affect so many different sectors including tourism, agriculture, wildlife and natural resources, business and industry and individual households. Agriculture often suffers the most losses from drought and is a major part of the Kern County economy. According to the Kern County Crop Report produced by the Kern County Department of Agriculture, the total value of agriculture and related products was \$3.1 billion in 2004. Assuming a future drought causes a 20% loss of that total value, losses would be in the vicinity of \$680 million. Costs would be associated with 1) economic damage to grape vines, fruit trees, nut trees, 2) lost revenues from the fallowing of land, and 3) costs associated with increased groundwater pumping and lowering of the water table.

Agriculture in the San Joaquin Valley relies primarily on artificial irrigation using mostly imported water and/or groundwater. Local droughts are expected and accommodated using normal management practices. A prolonged statewide drought, however, could exceed the local ability to handle reductions of imported surface water supplies, perhaps leading to cutbacks in distribution from local water storage districts (*Source: Wheeler Ridge Maricopa Water Storage District*).

Development Trends. As the population grows so do the water needs for household, commercial, industrial, recreational, and agricultural uses. Vulnerability to drought is likely to increase with these increased water needs.

DAM FAILURES

General Impacts. Vulnerability to dam failures is confined to the areas subject to inundation downstream of the facility. Primary losses from dam failure due to what is essentially a large scale flash flood would be major loss of life and property. Secondary losses would include loss of the multi-use functions of the facility, and associated revenues that accompany those functions. Advanced warning and evacuation can help reduce life safety impacts, but property losses could be significant.

Specific Impacts. The majority of dams in Kern County are in the Mountain Region, but most of the risk is to the Valley Region, which is downstream of these dams. The Lake Isabella dam poses the greatest risk to Kern County should a dam failure occur. Flood water would reach

Bakersfield within 3 to 4 hours of failure, and a large portion of the City could be inundated with sheet flooding (1-2 foot deep) depending on the severity of the failure. Large, unincorporated areas of the Valley west and north of Bakersfield are subject to sheet flooding. The Lake Isabella dam lies on a geologic fault that is currently being studied by the Army Corp of Engineers to determine if it is a potential seismic hazard.

The J.C. Jacobsen (AKA Brite Valley) dam could potentially affect the Golden Hills Community Services District on the outskirts of Tehachapi. Based on information from the Golden Hills Community Services District a dam failure could impact 20 residences worth \$4,000,000, one non-residential building worth \$2,000,000, a wastewater treatment plant worth \$1.5 million, 2 road crossings (\$40,000), 1 well (\$20,000) and 2 water mains (\$100,000). Residents that live on the west side or north side of the Golden Hills area would be isolated and would likely experience loss of power, natural gas, and water supply.

Stallion Springs C.S.D would be split in two by a dam failure on Stallion Springs Lake. The east side of Stallion would be flooded while the west side would be isolated. Approximately 25% of the homes in Stallion would be affected, 250 homes valued at \$50-70 million dollars. 3 commercial buildings worth \$4-7 million dollars would be impacted and \$30-60 million dollars of police and administrative offices, water and wastewater infrastructure and roads would be affected.

The northeast corner of Kern County in the Desert near Ridgecrest is vulnerable to dam failure from the Haiwee dam, located in Inyo County to the north. The impact area would be in the Naval Weapons Center, China Lake. Two other dams, Fairmont and Fairmont No. 2, south of Kern County in Los Angeles County would drain into the Rosamond Dry Lake bed if they were to fail, but probably have minor impacts on the County.

VULNERABILITY TO SEVERE WEATHER

The severe weather evaluated as part of this risk assessment included wind, extreme temperatures, thunderstorms//Lightning/hail, tornadoes, winter storms, fog and dust storms. Based on the historical severe weather data for Kern County, severe weather is an annual occurrence in Kern County and past damages and disaster declarations related to severe weather events have occurred and will continue to occur in the future. Damages associated with the primary effects of severe weather have been significant, particularly with wind and dust storms, and extreme temperatures. It is often the secondary effects of severe weather such as flood, fire, and agricultural losses that have had even greater impact on the County.

Winds

The hazard profile for wind indicates that damaging winds occur every year in the County, with all of the County potentially at risk. Areas located at the base of mountains have the greatest risk to high, downsloping winds. These areas include Taft, Maricopa, Bakersfield, Arvin, and Ridgecrest. The series of cascading, damaging events associated with windstorms has had significant economic impacts on the County and poses a safety hazard to travelers. In the past

the oil industry has had many derricks toppled by high winds. Wind aggravates dust storms and valley fever outbreaks.

Risk summary for windstorms:

- All, old or poorly constructed buildings most at risk, personal property such as fences
- Telephone and power lines
- Agriculture and Oil and Gas Economies direct/ All other indirectly through power outages
- Wind storms average \$616,381 of damage per event (based on 87 events between 1960-2004)

Extreme Temperatures

The agricultural industry in the Valley region is the most at risk to extreme temperatures. Field workers have succumbed to heat exhaustion and heat stroke. Hot and cold temperature extremes pose a risk to crops in the Valley. The Community Services Districts in the Tehachapi area have experienced problems with power loss and water distribution during extreme hot and cold temperatures. Problems include line breaks, frozen gate valves, inability to keep up with demand, and loss of power for pumping. Limited water availability may affect fire protection as well.

Risk summary for Extreme Temperatures:

- Elderly and field workers most at risk
- Water infrastructure most at risk from freezing
- Power outages and rolling brownouts can result when high temperatures increase air conditioner use
- Economies: Agriculture-direct impact on crops, workers / All other indirectly through power outages. Could result in loss of farming jobs.

Severe Thunderstorms/Lightning/Hail

The entire County is at risk to this severe weather phenomena associated with thunderstorms. Impacts to Kern County include widespread crop losses and property damages. It is difficult to quantify where specific losses will occur due the random nature of this hazard. It is often the secondary affects, such as lightning caused wildfires, flooding from intense rainfall, or strong winds that will have the most impact. Hail losses are not anticipated to be large based on past events, and often the damages are insured.

Winter Storms

Impacts to Kern County as a result of winter snow storms include damage to infrastructure, frozen pipes, utility outages, road closures, traffic accidents, interruption in business and school activities. Also of concern is the impact to populations with special needs such as the elderly and those requiring the use of medical equipment. Delays in emergency response services can be of significant concern. Further, there are economic impacts associated with areas prone to heavy

snow. Depending on the nature of a given storm, the mountain region of Kern County is the most vulnerable to effects of snow. However, snowfall in the lower elevations can create significant issues, as they are usually not as prepared for heavy snows.

Like most weather events, periods of heavy snow occur on an annual basis. School and business closures occur annually, but are usually short-lived. Damages to infrastructure also occur annually; much of this is covered through private insurance policies. The economic impact for increased manpower and efforts for manning road closures, responding to traffic accidents, and for general snow-removal efforts is usually included in annual budgets. The Tehachapi area could be isolated for days during winter storms. The Community Services Districts in the area have experienced problems with power loss and water distribution during storms.

Tornadoes

Based on information provided by the HMPC, tornadoes do occur, but are of limited concern to the County. If a damaging tornado were to occur, the Valley Region is the most likely region to be impacted, based on past occurrences.

Fog

Fog is a concern for the Valley and Mountain Regions of the County based on the hazard analysis, and is a serious contributor to transportation accidents and a resulting life safety hazard. Four multiple vehicle pileups have occurred in the 2000-2004 timeframe. The major concern for the county related to fog is that serious health and environmental impacts could occur if a fog-related pileup involved a shipment of nuclear waste or other hazardous materials. Other communities such as Tehachapi may be isolated for hours or days at a time due to fog-related road closures.

Dust Storms

Damaging dust storms can occur in the Valley and Desert Regions of Kern County. Some very severe incidents occurred in 1977, 1972, 1927, and 1916. Dust storms have damaged agriculture, property, businesses and schools, and can cause hazardous driving conditions. Most vulnerable to dust storms and associated soil erosion is the agriculture industry and machinery that can be clogged with dust. Dust storms are a health hazard to residents that are forced to breathe particulates in the air, and can lead to increased Valley Fever incidents. Dust storms are also related to the wind hazard.

The 1977 severe dust storm was “born of colliding weather systems over Idaho and the Pacific, was exacerbated by combined factors: a two-year drought, overgrazing, and too few windbreaks.” Although the coincidence of these factors contributed to the severity of the event, there is little to preclude their combining again. There are more irrigated acres now in the Arvin area than in 1977, which would perhaps help mitigate soil erosion. Vines and citrus trees are more vulnerable to wind and dust storms and there were relatively few acres planted in trees and vines locally in 1977. The Wheeler Ridge-Maricopa Water Storage District estimated that approximately 5% of the 55,600 acres of permanent crops, or 2,780 acres, would suffer as a

result of a severe wind/dust storm. The district also calculated \$190,000 in potential loss to residential and farm buildings. This assumes that roof and window damage would result to 5% of the buildings and the damage would equal 10% of the structure value $((\$86,000,000) \times 5\% \times 10\%)$ for the district alone.

LANDSLIDES

Landslides are a documented hazard in the County. Impacts from landslides primarily involve damage to infrastructure, utility systems, and roads. Road closures can further impact emergency response efforts and interrupt business and school activities. Historically landslides resulting in significant losses have been limited within the County.

Rock slides are occasionally a problem in the Kern River Canyon and Sierra Way and along the Caliente Bodfish Rd, Burlando Rd, Beena Rd, Sierra Nureuste and Alta Sierra, according to the Kern County Road Department.



Mud and debris flows are problems associated with the Mountain Region in Kern County, particularly in the Lake Isabella region and in the mountains around Frazier Park, Lake of the Woods, and Pine Mountain in southern Kern County. The risk in Pine Mountain has been documented in a California State University, Long Beach, environmental geology online course. According to the webpage this mountain resort is built on the northern slope of Mt. Pinos, beneath an existing landslide scarp (the portion of a slope left behind when slide materials move downhill), seen as the unvegetated slope behind the cabin in the photo below. Many of the houses at Pine Mountain Club are built on debris from this slide. According to Cal State, If another mudflow were to occur in this same area, the house seen here, and many of its neighbors, would lie directly in the path of the moving wall of mud (Source: California State University, Long Beach <http://seis.natsci.csulb.edu/deptweb/webcourses/190/190slide.html>. Photo credit Paul Stoppelmann).

NATURAL HEALTH HAZARDS

WEST NILE VIRUS

The entire population of Kern County is exposed to this virus, though the likelihood of contracting the disease is low. Studies have shown that the second year is generally the worst for outbreaks of West Nile Virus. West Nile was detected in Kern County in 2003 and worsened in 2004. Time will tell if 2005 is a worse year for the virus in Kern County, or if the virus outbreaks begin to subside.

Although the potential for exposure does exist in Kern County in the 2005 season, the risk should be considered in terms of adverse effects due to exposure. The county already has an active vector control program in place for mosquitoes due to the past concern with equine encephalitis. And most important, protective measures to prevent exposure are relatively simple and cost effective. Given the nature of protective measures, such as wearing long sleeved clothing and using bug spray, the responsibility for protection can and should be an individual responsibility.

VALLEY FEVER

In areas where Valley Fever is prevalent, such as Kern County, it is estimated that as much as half of the population has been infected with Valley Fever, and some may have had Valley Fever without even knowing it. Persons whose activities put them in much contact with the soil appear to have a somewhat greater risk. Agricultural workers, construction workers, oil-field workers, telephone linemen, geologists - people who work outdoors and who are exposed to wind and dust - are somewhat more likely to contract valley fever. So are people whose hobbies or sports activities expose them to wind and dust: runners, joggers, bikers, off-road vehicle enthusiasts, tennis players, rock hounds, amateur (and professional) archeologists, etc. Once infected, persons of African, Filipino and some other Asian ancestries seem to be at a greater risk of contracting the more serious, or disseminated, form of the disease. The young, the old, and those with lowered immune systems are also in the high risk group. While men are at greater risk than women, pregnant women are especially vulnerable, particularly in the third trimester. Of all the people infected with Valley Fever, one or more out of 200 will develop the disseminated form, which is devastating, and can be fatal. These are the cases in which the disease spreads beyond the lungs through the bloodstream - typically to the skin, bones, and the membranes surrounding the brain, causing meningitis. People with disseminated disease need to be treated with medicines. The good news is that it appears that after one exposure, the body develops immunity.

Vulnerability to this disease increases when soil is disturbed during wind and dust storms. Even earthquakes have been known to increase the spread of the disease, which was witnessed after ground disturbance from the Northridge, California earthquake of 1994.

The cost of this disease in personal and economic terms is enormous. In its serious form, Valley Fever devastates its victims and their families. Employers feel the burden in lost work days, weeks and even months. Workers Compensation claims drain even more resources. Even the uncomplicated case of Valley Fever results in the loss, on average, of about two weeks of work. The average cost for an uncomplicated case, including doctor's office visits and testing, is about \$890. Based on this value the total cost of uncomplicated valley fever in Kern County in 1992, would have been $\$890 \times 3,500 \text{ cases} = \$3,115,000$. This does not include lost time and productivity due to illness. Using the average two weeks per case $\times 3,500 \text{ cases} = 7,000$ lost workweeks. Because many cases of the disease are unreported, the figures are skewed. However, it's estimated that there are 7,500 new cases of Valley Fever annually in the U.S.A. alone. This translates to a cost that may exceed \$60 million a year nationwide (*source* <http://www.valleyfever.com/primer.htm>).

"The medical and indirect costs for people with the most benign illness range from \$3,000 to \$5,000 per case. For those who experience a more severe illness, costs climb from \$30,000 to \$300,000 - especially for those who get meningitis or who are hospitalized for a long time. The average is \$8,000 per case overall."

John Caldwell Pharm.D. Director of Clinical Research, Kern Medical Center

(Source: www.valleyfever.com)

HANTA VIRUS and PLAGUE

Given the recent El Nino precipitation, it follows that the rodent population may increase as a result of an increase in food source for deer mice. Cases of Hantavirus and plague that are associated with rodents might be expected to increase in the next year, but the chances of contracting the virus are low.

CALIFORNIA ENCEPHALITIS

Impacts of encephalitis should remain low due to mosquito abatement districts and West Nile Virus public education efforts.

INSECT HAZARDS

AFRICANIZED HONEY BEE

Based on the trend of this hazard in other areas of the Americas, a gradual increase in AHB sightings and incidents can be expected as the years progress. The City of Taft considers AHB problems likely to continue. Similar to West Nile Virus, the risk to this hazard can be controlled through public education efforts and personal responsibility.

GLASSY WINGED SHARPSHOOTER

Certain crops will remain at risk to this insect, but biocontrol efforts are underway and should help to reduce the vulnerability to hazard. Biocontrol efforts are discussed in more detail in the Jurisdictional Elements and Capabilities.

SOIL HAZARDS

LAND SUBSIDENCE

Continued depletion of the aquifers in the Desert region Antelope Valley is likely due to a growing demand for water and uncertain alternate sources of water supply. The population of the valley is projected to grow from about 260,400 in 1990 to about 650,000 by 2010 (*Source: CA Dept of Finance, 1992; Los Angeles County Department of Regional Planning, 1994*). Studies by the USGS indicate that the Antelope Valley area will continue to subside unless groundwater resources are managed appropriately.

LIQUEFACTION

County risk. When this plan was initially prepared detailed liquefaction mapping did not exist within Kern County. Based on scientific studies and past earthquakes areas within shallow groundwater (within 30 feet of the ground surface) could potentially be prone to liquefaction. For the purpose of this risk assessment an assumption was made that shallow groundwater areas were possibly at risk, although detailed site and soil investigations are needed to verify that liquefiable soil conditions exist. Based on the shallow groundwater areas alone, two areas in the county are potentially at risk: the southern portion of the Valley between southeast Bakersfield (near Highway 99) towards the vicinity of Buena Vista Lake bed and a significant portion of the northwest valley floor in the I-5 corridor and beneath the California Aqueduct. Though these areas are sparsely developed, liquefaction damage to Highway 99 and or Interstate 5 could cause serious transportation problems. Damage to the California Aqueduct could impact water delivery to large urban counties to the south. Farmland impacts could include differential settling and cracking of fields and possible damage to irrigation ditches and access roads. The Lost Hills airport may be at risk to runway damage from liquefaction.

Bakersfield risk. According to the Safety Element of the Metropolitan Bakersfield General Plan portions of southeast Bakersfield may be susceptible to liquefaction during an earthquake. High groundwater is known to exist at depths of 5 to 15 below the ground surface on portions of the Lamont quadrangle, Township 30S, Range 28E. This area, roughly between Bundage Lane and DiGiorgio Road, could experience local areas of liquefaction during a strong earthquake. Liquefaction may cause ground rupture and potential sinking or tilting of large buildings.

RADON

The radon hazard will persist in Kern County due to the County's geology, but the risk to humans is difficult to quantify. Scientific studies have shown a strong link between radon and lung cancer incidences in miners, but the risk to radon exposure in homes harder to assess. The table below is an attempt by the EPA to quantify this risk. The following is an updated chart of the lifetime risk of lung cancer death per person from radon exposure in homes (excerpted from the updated radon risk assessment).

Radon Level ^a	Lifetime Risk of Lung Cancer Death (per person) from Radon Exposure in Homes ^b		
	pCi/L	Never Smokers	Current Smokers ^c
20	36 out of 1,000	26 out of 100	11 out of 100
10	18 out of 1,000	15 out of 100	56 out of 1,000
8	15 out of 1,000	12 out of 100	45 out of 1,000
4	73 out of 10,000	62 out of 1,000	23 out of 1,000
2	37 out of 10,000	32 out of 1,000	12 out of 1,000
1.25	23 out of 10,000	20 out of 1,000	73 out of 10,000
0.4	73 out of 100,000	64 out of 10,000	23 out of 10,000

a Assumes constant lifetime exposure in homes at these levels.
b Estimates are subject to uncertainties as discussed in Chapter VIII of the risk assessment.
c Note: BEIR VI did not specify excess relative risks for current smokers.

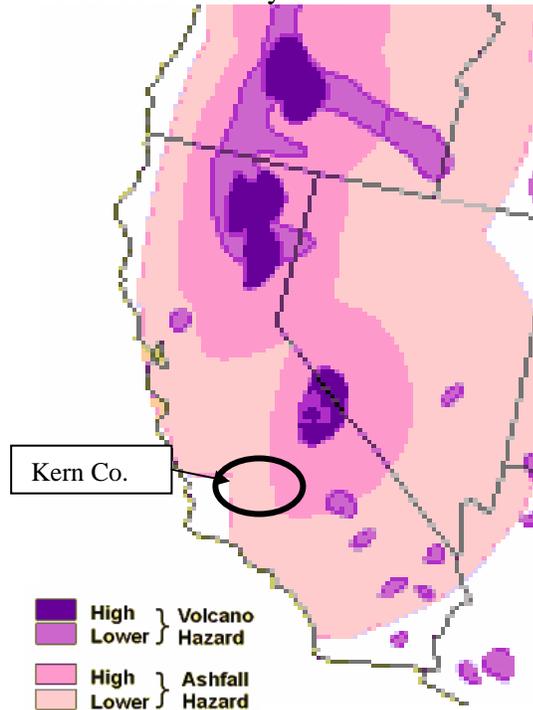
(Source: www.epa.gov/radon/risk_assessment.html)

California Department of Health Services Radon Program has posted a database of radon information by zipcode that can be searched online at:

http://www.consrv.ca.gov/cgs/minerals/hazardous_minerals/radon/DHS_Radon_Database.pdf

VOLCANOES

Based on the hazard identification all of the volcanoes within 200 miles of the County lie on east side of the Sierra and Tehachapi mountains. With the prevailing winds from the west, northwest and the mountains as a barrier, it is unlikely that ash from an eruption would affect western Kern County, unless it coincided with a Santa Ana Wind. Communities that lie in eastern Kern County may be more at risk to ash deposits from a volcanic eruption, being both closer to the existing hazard and east of the mountains. Thus Ridgecrest and California City and other districts and communities within the Desert Region are more likely to experience impacts from volcanic eruptions. The elements at risk from future eruptions in California include its population, power resources including nuclear reactors, water supplies, transportation, communications, agriculture, industry, and recreation. Based on the geologic history of the area, it could be hundreds to thousands of years before another eruption occurs, thus the risk from volcanic eruptions is considered to be very low.



RISK ASSESSMENT SUMMARY AND CONCLUSIONS

Valley Region

- Earthquake risk increases in the valley to the south, and along the west margins of the valley with the presence of the White Wolf, Pleito Thrust, and San Andreas faults. Delano and McFarland in the northwest valley are less earthquake prone than the rest of the valley cities.

- The Valley's agricultural economy is at risk to dust and wind storms, extreme temperatures, floods, drought, and insect hazards.
- Disasters in this region are likely to have the most impact since this region contains most of the County's population and infrastructure.
- Severe weather is likely to have frequent impacts to the Valley based on the historic accounts of severe wind and dust storms, the annual tule fogs, hail and rain events.
- Arvin is entirely in the floodplain of Caliente Creek and lies just over a mile from the White Wolf fault zone, and has experienced damaging wind and dust storms.
- Though rare, a dam failure would have the greatest impact on this region, particularly if the Lake Isabella dam was involved. The Lake Isabella dam lies on a geologic fault. This fault is currently being studied by the U.S. Army Corps of Engineers.
- Valley fever is a widespread health concern.

Desert Region

- Development in the Rosamond area of southeastern unincorporated Kern County is at risk to floods and earthquakes along the San Andreas and Garlock fault zones.
- Floods have impacted developed areas of the region and caused transportation disruptions to roadways and airports.
- Though unlikely, volcanic activity outside of the County may impact this area more than the rest of the County.
- Valley fever is a health concern.

Mountain Region

- Wildfires are likely to have the greatest impact to this region.
- Earthquakes are a risk to Tehachapi and the Pine Mountain Club, Frazier Park area of the unincorporated County. The northern mountain area of Lake Isabella is less earthquake prone.
- This region is susceptible to post-fire erosion problems.
- Winter storms are most likely to affect the Mountain Region.
- Debris flows are likely to impact this region in the Pine Mountain Club,/Lake of the Woods/Frazier Park and Lake Isabella areas of the unincorporated County.

- The multi-hazard risk analysis (earthquake, wildfire, and flood) revealed that the southwestern mountains of the County have the highest potential for multiple disaster occurrences. Fortunately, the rugged mountains near the San Andreas Fault are largely undeveloped, with the exception of the Pine Mountain Club/Lake of the Woods/Frazier Park area.

Countywide

- Earthquakes, Floods, and Wildfires and are likely to have the greatest impact on the built environment, the economy and citizens of the county.

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Multi-Hazard Mitigation Plan

4.3 Jurisdictional Elements and Capabilities

Thus far, the planning process has identified the natural hazards posing a threat to Kern County and described, in general, the vulnerability of the county and communities to these risks. The next step is to assess what loss prevention mechanisms are already in place. Doing so provides the county's 'net vulnerability' to natural disasters and more accurately focuses the goals, objectives and proposed actions of this plan. This part of the planning process is referred to as 'The Mitigation Capability Assessment'.

The HMPC took two approaches in conducting this assessment for the County and each of the incorporated communities. First, an inventory of common mitigation activities was made through the use of a matrix. The purpose for this effort was to identify activities and actions that were either in place, needed improvement, or could be undertaken, if deemed appropriate. Second, the HMPC conducted an inventory of existing policies, regulations and plans. These documents were collected and reviewed to determine if they contributed to reducing hazard related losses, or if they inadvertently contributed to increasing such losses.

The 'mitigation capabilities' of each community are individually identified and included as part of each 'jurisdictional element'. This section also presents those mitigation capabilities that are common to all communities within Kern County. Following the local capabilities is a discussion of State-level capabilities and mandates regarding hazard mitigation. State legislation has driven many of the local actions in areas such as seismic safety.

EXISTING MITIGATION CAPABILITIES BY JURISDICTION

KERN COUNTY

Similar to the HMPC's effort to describe hazards, risks and vulnerability where they differ across the planning area, this mitigation capability assessment describes the policies and procedures and plans that apply to Kern County. This is the next step prior to forming Goals and Objectives for improving the County's ability to reduce the impacts of these risks. This step coordinates this planning process with existing plans and procedures and inventories what is already "on the books" in terms of mitigation.

The following matrix summarizes the results of the mitigation capability assessment. Excerpts from applicable plans, rules and regulations follows that provide more detail on the existing policies related to hazard mitigation, and highlight where Kern County has made efforts above and beyond the standard floodplain management requirements of the NFIP.

Capability	Y/N other	Comments
Comp Plan/General Plan	Y	Planning Department
Special Plans	Y	Planning Department
Subdivision Ordinance	Y	Planning Department
Zoning Ordinance	Y	Planning Department
NFIP/FPM Ordinance	Y	Joined in 9/29/86 Map Date 9/6/95 FPM Ordinance
- Substantial Damage language?	Y	In FPMO
- Administrator/Certified Floodplain Mgr?	Y	
- # of Floodprone Buildings?	7633	
- # of flood insurance policies	4584	
- Maintain Elevation Certificates?	Y	Scanned
- # of Repetitive Losses?	0	
CRS Rating, if applicable	8	Joined in 10/1/1991
Stormwater Program?	Y	Local Storm Water Ordinance
Erosion or Sediment controls	Y	For Construction Sites > 1 acres
# of unreinforced masonry buildings	143	Includes URM's in Contract Cities Also
Hospitals built before 1973 (for HSSA)	Unknown	
Alquist-Priolo Special Studies Zones Act	Y	ESS Enforces the Act
Building Code Version	2001 CBSC	California Building Standards Code 97 UBC and others
Full-time Building Official	Y	
- Conduct "as-built" Inspections?	Y	In-Progress Inspections
BCEGS Rating	99/4	Evaluated in 1998-Being reevaluated in April 2005
Local Emergency Operations Plan	Y	Fire Dept.
Fire Department ISO rating	4/9/10 5/9/10	Depends on fire station region
Fire Safe Programs	Y	
Hazard Mitigation Plans	Y	
Warning Systems in Place?	Y	
- Storm Ready Certified?	N	
- Weather Radio reception?	Y	Improved in January 2005
- Outdoor Warning Sirens?	N	
- Emergency Notification (R-911)?	N	
- Other? (e.g., cable over-ride)	Y	Emergency Alert System
GIS System?	Y	
- Hazard Data?	Y	Floodplain and Alquist Priolo Zones
- Building footprints?	N	
- Tied to Assessor data?	Y	
- Land-Use designations?	Y	
Structural Protection Projects	Y	
Property Owner Protection Projects	Y	
Critical Facilities Protected?	Y	Per Building Codes
Natural Resources Inventory?	Y	Kern COG
Cultural Resources Inventory?	Y	Kern COG
Public Information Program/Outlet	Y	Web site
Environmental Education Program?	unknown	

HAZARD AND FLOODPLAIN MANAGEMENT RELATED POLICIES -PREVENTATIVE ACTIVITIES

Kern County has several documents and activities that describe how the County manages development of hazard prone areas. Below is a list of these documents and activities, along with a brief summarization of the document contents, and when the document was adopted.

NFIP and Community Rating System Participation

Kern County is a participant in the National Flood Insurance Program. The County entered the emergency phase in 1978 and the regular phase in September 29, 1986 with the adoption of a floodplain management ordinance. The ordinance regulates development in special flood hazard areas, and allows private property owners in participating communities to purchase affordable flood insurance through the NFIP, while the community retains its eligibility to receive certain federally backed monies, and disaster relief funds.

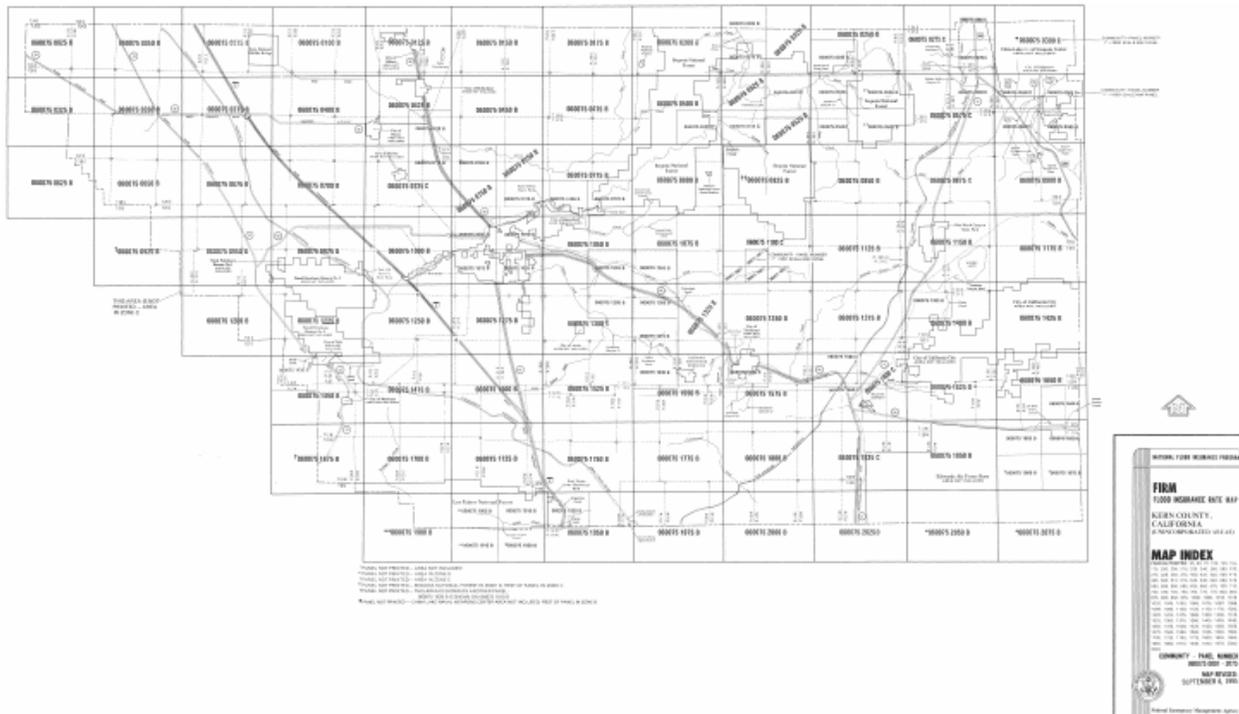
The county participates in the NFIP's Community Rating System (CRS). The CRS is a voluntary program for NFIP-participating communities that provides flood insurance discounts for policyholders in exchange for the community providing extra measures to provide protection from flooding, above the minimum NFIP requirements. Kern County entered the CRS in 10-1-1991, scoring a CRS rating of Class 8. This rating provides a 10% discount for policyholders within a Special Flood Hazard Area (SFHA) and a 5% discount for those outside of a SFHA.

Both the City of Bakersfield and the County of Kern participate in the state-mandated Kern River Designated Floodway program, which is administered by the California Department of Water Resources Reclamation Board. The Kern River Designated Floodway Program provides development criteria and issues permits for development within the limits of the Kern River Designated Floodway. FEMA has accepted the California Department of Water Resources (DWR) Reclamation Board Kern River designated floodway from Interstate 5 to the mouth of the Kern River canyon, because the DWR study is based upon the 100 year peak discharge of 15,000 cfs, which exceeds the Kern River Flood Insurance Study flow of 10,200 cfs.

In July 1985, both the City of Bakersfield and Kern County adopted the Kern River Plan Element (KRPE) as a part of their general plans. The KRPE establishes provisions for development along the Kern River, and specific policies for floodplain management. More detail on the KRPE is provided in the review of the Kern County General Plan that follows.

Floodplain Mapping

Kern County has FEMA Flood Insurance Rate Maps (FIRM's) that cover the entire county on a series of 116 map panels. The FIRM index is shown below. The County also has the floodplains in a digital, GIS- based format provided as FEMA Q3 data. This data was used for the risk analysis and mapping in this plan. Although not accurate enough for property floodplain determinations, it is appropriate for risk analysis. The County is included in the nationwide Flood Map Modernization effort, which will produce accurate, digital flood maps over the next several years that will enhance floodplain management efforts.



Kern County General Plan, June 2004

Kern County Planning Department General Plan – June 2004

The General Plan, Developed by the Kern County Planning Department, is considered a county "constitution" for rational decision-making concerning long-term physical development. The plan recognizes that environmental impacts of growth must be mitigated at the regional scale. The plan also recognizes natural hazards as a constraint to growth. The following is a summary of the elements of the plan that are related to mitigating natural hazard impacts.

Land Use, Conservation, and Open Space Element

Kern County's Land Use, Conservation, and Open Space Element provides for a variety of land uses for future economic growth while also assuring the conservation of Kern County's agricultural, natural, and resource attributes. It designates the type, intensity, and general distribution of uses of the land for housing, business, industry, open-space, education, public buildings, and grounds, waste disposal facilities, and other categories of public and private uses. This element recognizes physical and environmental constraints (natural hazards) that may affect future development. For example, it establishes that no structures will be placed within a minimum of 50 feet of an active fault. This element also promotes the preservation of cultural and historic resources as well as the protection of endangered species. It encourages groundwater recharge activities and supports the development of Urban Water and Groundwater Management Plans. This element also encourages the use of smart growth land use planning techniques.

Provided in this element is an Oak Tree Conservation Policy. It states that Oaks shall be protected where possible and incorporated into project development. Trees in developed areas are sometimes a substantial source of damage. The Oak Tree Conservation Policy does allow for the decision making body to grant specified tree removal in the case of hardship.

Safety Element

The safety element establishes policies and programs to reduce the County's risk associated with seismic, geologic, flood, and wildfire hazards.

The following Policies and Implementation measures are quite literally cut and paste from the Safety Element.

General Policies and Implementation Measures, Which Apply to More Than One Safety Constraint:

Policies

- 1) That the County's program of identification, mapping, and evaluating the geologic, fire, flood safety hazard areas, and significant concentrations of hydrogen sulfide in oilfield areas, presently under way by various County departments, be continued.
- 2) Those hazardous areas, identified as unsuitable for human occupancy, are guided toward open space uses, such as agriculture, wildlife habitat, and limited recreation.
- 3) That the County government encourage public support of local, State, and federal research programs on geologic, fire, flood hazards, valley fever, plague, and other studies so that acceptable risk may be continually reevaluated and kept current with contemporary values.
- 4) The County shall encourage extra precautions be taken for the design of significant lifeline installations, such as highways, utilities, and petrochemical pipelines.

Implementation Measures

- A) All hazards (geologic, fire, and flood) should be considered whenever a Planning Commission or Board of Supervisor's action could involve the establishment of a land use activity susceptible to such hazards.
- B) The Safety Element should be reviewed and comprehensively revised every five years, or whenever substantially new scientific evidence becomes available.
- C) Require detailed site studies for ground shaking characteristics, liquefaction potential, dam failure inundation, flooding potential, and fault rupture potential as background to the design process for critical facilities under County discretionary approval.
- D) Require seismic review prior to major addition, renovation, or increase in occupancy of buildings.
- E) Maintain adequate setbacks between oil/gas wells and development through the use of the zone districts DI (Drilling Island) or PE (Petroleum Extraction) and implementation of the uniform Fire Code 7904.32.3

Seismically Induced Surface Rupture, Ground Shaking, and Ground Failure

Policies

1) The County shall require development for human occupancy to be placed in a location away from an active earthquake fault in order to minimize safety concerns.

Implementation Measures

A) Known geologic hazards within the area of a proposed subdivision should be referenced on the final subdivision map.

B) Require geological and soils engineering investigations in identified significant geologic hazard areas in accordance with the Kern County Code of Building Regulations.

C) The fault zones designated in the Kern County Seismic Hazard Atlas should be considered significant geologic hazard areas. Proper precautions should be instituted to reduce seismic hazard, whenever possible in accordance with State and County regulations.

D) Detailed geologic investigations shall be conducted in conformance with guidelines of the California Geological Survey for all discretionary permits and construction designed for human occupancy in an Alquist-Priolo Earthquake Fault Zone.

E) Revise building codes and zoning ordinances to prohibit construction of buildings for human occupancy within 50 foot of the trace of an active fault. For critical facilities, the setback should be at least 300 feet.

F) Reflect the location of active faults in zoning and subdivision approvals, through low-density zoning designations, and through locations of lot lines and public ways to allow adequate flexibility in placement of buildings, such that active fault traces can be avoided.

G) Route major lifeline components such as highways, utilities, petroleum or chemical pipelines around areas of high groundwater whenever possible. Where they must cross an area of high groundwater, plans, and permits shall require design features to accommodate extensive ground rupture without prolonged disruption of an essential service or threat to health and safety.

H) Require that plans and permits for installation of major lifeline components such as highways, utilities, petroleum or chemical pipelines to incorporate design features to accommodate potential fault movement in areas of active faults without prolonged disruption of essential service or threat to health and safety.

I) Design significant lifeline installations, such as highways, utilities, and petrochemical pipelines which cross an active fault, to accommodate potential fault movement without prolonged disruption of essential service or creating threat to health and safety.

J) Update the County's Seismic Hazard Atlas as necessary.

K) Encourage and support local, State, and federal research programs for delineation of geologic and seismic hazards so that acceptable risk may be continually re-evaluated and kept current with state-of-the-art information and contemporary values.

L) Require seismic review prior to major addition, renovation, or increase in occupancy of buildings.

Dam Failure, Flooding and Inundation

Policies

1) Design discretionary critical facilities located within the potential inundation area for dam failure in order to mitigate the effects of inundation on the facility; promote orderly shutdown

and evacuation (as appropriate); and prevent on-site hazards from affecting building occupants and the surrounding communities in the event of dam failure.

2) Design discretionary critical facilities in the potential dam inundation area used for the storage, or use of hazardous materials to prevent on-site hazards from affecting surrounding communities in the event of inundation.

3) Require emergency response plans for the planning area to include specific procedures for the sequential and orderly evacuation of the potential dam inundation area.

4) Encourage critical and high occupancy facilities as well as facilities for the elderly, handicapped, and other special care occupants, located in the potential inundation area below the dam to develop and maintain plans for the orderly evacuation of their occupants.

Implementation Measures

A) Facilities used for the manufacture, storage, and use of hazardous materials shall comply with the Uniform Fire Code, with requirements for siting or design to prevent on-site hazards from affecting surrounding communities in the event of inundation.

B) Discretionary critical facilities within potential inundation areas shall be designed to mitigate or prevent effects of inundation.

Landslides, Subsidence, Seiche, and Liquefaction

According to the General Plan, all new installations in areas suspected of subsidence should be engineered to withstand such subsidence. The General Plan states that of subsidence due to groundwater withdrawal is of major concern and should be regulated and reduced, especially in urbanizing areas.

Policies

1) Determine the liquefaction potential at sites in areas of shallow groundwater (Map Code 2.3) prior to discretionary development and determine specific mitigation to be incorporated into the foundation design, as necessary, to prevent or reduce damage from liquefaction in an earthquake.

2) Route major lifeline installations around potential areas of liquefaction or otherwise protect them against significant damage from liquefaction in an earthquake.

3) Reduce potential for exposure of residential, commercial, and industrial development to hazards of landslide, land subsidence, liquefaction, and erosion.

Implementation Measures

A) The need for buffer zones to protect residential and recreational areas around Lake Isabella from possible seiches in the event of a major earthquake should be investigated.

B) Require liquefaction investigations in all areas of high groundwater potential and appropriate foundation design to mitigate potential damage to buildings on sites with liquefaction potential.

C) Develop and maintain maps, at an appropriate scale, showing the location of all geologic hazards, including active faults, Alquist-Priolo Earthquake Fault Zones, 100-year flood hazard boundary, the extent of projected dam failure inundation and time arcs, depth of inundation, land subsidence, slope failure and earthquake-induced landslides, high groundwater, and liquefaction potential.

D) Discretionary actions will be required to address and mitigate impacts from inundation, land subsidence, landslides, high groundwater areas, liquefaction and seismic events through the CEQA process.

Wildland and Urban Fire

Policies

- 1) Require discretionary projects to assess impacts on emergency services and facilities.
- 2) The County will encourage the promotion of public education about fire safety at home and in the work place.
- 3) The County will encourage the promotion of fire prevention methods to reduce service protection costs and costs to taxpayers.
- 4) Ensure that new development of properties have sufficient access for emergency vehicles and for the evacuation of residents.
- 5) Require that all roads in wildland fire areas are well marked, and that homes have addresses prominently displayed.
- 6) All discretionary projects shall comply with the adopted Fire Code and the requirements of the Fire Department.

Implementation Measures

- A) Require that all development comply with the requirements of the Kern County Fire Department or other appropriate agency regarding access, fire flows, and fire protection facilities.
- B) The provision of an adequate water supply for fire fighting purposes should be encouraged for all housing areas where an inadequate supply now exists.

Expansive Soils

According to the Kern County General Plan, a soils report, prepared by a soils engineer, should be required for every new building permit in suspect areas. This report should be based upon adequate test borings, excavations, soil and chemical tests, approved by the Building Official, and should include recommendations for corrective measures when necessary. The Building Official may waive the requirement for a soils report if he determines there is adequate information on the soil qualities of a particular lot available for review by the department.

Kern County Emergency Plan

Policies

- 1) Continue to maintain and update the Kern County Emergency Plan and continuously educate program participants of their responsibilities.
- 2) Monitor, enforce, and update, as appropriate, all emergency plans as needs and as conditions change.

Implementation Measures

- A) Incorporate specific plans and procedures for the sequential and orderly evacuation of the potential dam inundation area into Kern County emergency plans.

- B) Maintain an effective Joint Powers Agreement (JPA) for fire, police, medical response, emergency morgue, mass care, heavy rescue, or other functions as appropriate.
- C) Require emergency plans to include procedures for traffic control and security of damaged areas.
- D) Require public education and preparedness to be a major continuing component of the emergency program.

Critical Facilities and Hazardous Buildings

Policies

- 1) That buildings and other structures indispensable to emergency services, including hospitals, law enforcement stations, fire stations, communication control stations, and other facilities of disaster control and refuge (e.g. schools) remain operational during any major disaster and be designed, located, and constructed accordingly.
- 2) That there should be an awareness of the hazards that exist in many of the older structures in Kern County. To reduce the total risk to life and property, there should be encouragement to rehabilitate substandard structures to meet the requirements set forth in adopted codes.
- 3) Require that the siting and development of critical facilities under discretionary approval be supported by documentation thorough hazard investigations relating to site selections, preconstruction site investigations, and application of the most current professional standards for seismic design.
- 4) The location of all critical facilities should be cataloged and mapped.
- 5) Incorporate planning for incidents affecting critical facilities into contingency plans for disaster response and recovery.
- 6) The County shall ensure the inventory, periodic inspection, and adoption of high seismic standards for potentially hazardous buildings.

Implementation Measures

- A) A listing should be prepared and kept current, identifying all “critical facilities” and “critical structures” throughout the County. All “such facilities and structures” should then be reviewed for safety and, if necessary, be brought up to improved safety levels equal to that now required for schools and hospitals.
- B) A building strong-motion instrumentation program should be instituted for buildings over six stories in height with an aggregate floor area of 60,000 square feet or more and for every building over ten stories in height regardless of floor area.
- C) An inspection program of masonry structures that are not reinforced should be initiated to determine whether such buildings create an unacceptable hazardous situation. Consideration should then be given for initiating hazard abatement proceedings against masonry structures that are not reinforced and found to be unsafe.
- D) An inspection program identify hazardous buildings should be initiated. Once a hazardous building has been identified, enlargement thereof, except as necessary to make the structure safer, should not be permitted.
- E) Techniques by which dynamic analysis of structures can be performed by computers have been developed. In the future, use of such techniques should be studied to determine whether these techniques could be incorporated in those portions of the County code regulating construction.

- F) Amend County building and zoning ordinances to incorporate specific standards for siting and seismic design of critical facilities.
- G) Review existing critical facilities for any significant siting, design, or construction problems that would make them vulnerable in an earthquake. Findings shall be incorporated into emergency operations plans as well as addressed in longer-term programs of facilities upgrading or relocation.
- H) Concrete tilt up and concrete frame buildings built before enactment of the current seismic codes should be required to meet basic seismic standards before a change in use or occupancy level is approved or when significant alteration or repair is proposed.
- I) Detailed geologic investigations shall be conducted in conformance with guidelines of the California Geological Survey for all construction designed for human occupancy in an Alquist-Priolo Earthquake Fault Zone.
- J) Revise the building codes and the Zoning Ordinance to prohibit construction of buildings for human occupancy within 50 feet of the trace of an active fault. For critical facilities, the setback should be at least 300 feet.
- K) Reflect the location of active faults in zoning and subdivision approvals, through low- density zoning designations, and through locations of lot lines and public ways to allow adequate flexibility in placement of buildings such that active fault traces can be avoided.
- L) Require that plans and permits for installation of major lifeline components such as highways, utilities, and petroleum or chemical pipelines to incorporate design features to accommodate potential fault movement in areas of active faults without prolonged disruption of essential service or threat to health and safety.
- M) Require preparation and maintenance of a map showing all critical facilities within the planning area.
- N) Develop procedures for the discretionary review of critical facilities proposed in an area of potential dam inundation. Approvals shall include requirements that emergency shut down, facility evacuation plans be developed, maintained, and exercised for each facility, and the potential effects of inundation on critical facility functions, the safety of occupants, and the community in general are addressed.

Hazardous Materials

Policies

- 1) The proposed siting or expansion of hazardous waste facilities will be in conformance with the adopted Kern County and Incorporated Cities Hazardous Waste Management Plan.
- 2) Innovative technologies to manage hazardous waste streams generated in Kern County will be encouraged.

Implementation Measures

- A) Facilities used to manufacture, store, and use of hazardous materials shall comply with the Uniform Fire Code, with requirements for siting or design to prevent on-site hazards from affecting surrounding communities in the event of inundation.
- B) The proposed siting or expansion of hazardous waste facilities will be in conformance with the adopted Kern County and Incorporated Cities Hazardous Waste Management Plan.

Abandoned Open Shafts and Wells

Policy

- 1) The County should protect residents from the hazards of improperly abandoned mine shafts.
- 2) The County should protect residents from the hazards associated with development in areas where wells have been drilled and abandoned for exploration and/or production of oil and natural gas.

Implementation Measure

- A) Work with State and federal governments to assure that existing mine shafts are properly abandoned and designated.
- B) Support the construction site review program of the Department of Oil, Gas, and Geothermal Resources that assures wells are precisely located, properly plugged and abandoned, and tested for leakage prior to development of the area.

Housing Element

The development and preservation of adequate and affordable housing is important both to the well being of the residents and economic prosperity of Kern County. To plan for the development of adequate housing for all income segments, a housing element is prepared as a part of the General Plan. The Housing Element specifically addresses housing needs and resources in the county's unincorporated areas and summarizes and analyzes the most pertinent environmental constraints to housing in Kern County. The Land Use Element of Kern County's General Plan contains designations denoting physical constraints applied to the natural hazardous areas comprised of fault zones, landslides, shallow groundwater, steep slopes and flood hazard areas. The element states that in the areas identified with these constraints, development either needs to be mitigated to improve safety or be considered infeasible.

Kern River Plan Element – July 1995

This plan is focused on the portion of the Kern River between the mouth of the Kern River Canyon and Interstate 5. The focus of the Kern River Plan is the preservation and maintenance of the floodway channel of the Kern River. Planning also focuses on the area contained within the secondary floodway, which is the area most likely to experience pressures for development that might conflict with other, non-development-oriented River uses.

This element maps primary and secondary floodway designations. The primary floodway is the minimum channel area required to contain a 100-year flood flow of 15,000 cubic feet per second. The secondary floodway is where floods would occur if various flood control structures, such as dikes or levees, fail. The Kern River Plan allows for the development of urban uses - residences, businesses, and industry - to occur only in areas designated for such uses outside the primary floodway.

The Kern River Plan is the primary General Plan policy document for the River area. Map interpretations shall be based solely on the Kern River Plan Map. This is the official Kern River planning map for both the City of Bakersfield and the County of Kern.

The main goals of the plan are:

- To maintain the integrity of the River channel so as to facilitate a floodway for Kern River waters for the health and safety of the community.
- To maximize and fully utilize the groundwater recharge potential of the Kern River, its floodplains, and other potential recharge to aquifers.

It states that no new land uses may occur within the primary and secondary floodway that conflicts with the goals and objectives of the plan and that groundwater recharge is a principal allowable use of both primary and secondary floodways. It also states that a channel maintenance program should be developed by the City Water Resources Department and Kern County.

BUILDING AND FLOODPLAIN MANAGEMENT POLICIES

Code of Building Regulations – September 2003, County of Kern Engineering and Survey Services Department

The County's most current Code of Building Regulations was adopted in 2003 with the purpose of promoting public safety and welfare throughout the unincorporated territory of Kern County. Elements of the Code of Building Regulations particular to natural hazard mitigation include: Building Code, Seismic Strengthening Provisions for Unreinforced Masonry Bearing Wall Buildings, Fire Code, Grading Code, Urban Wildland Interface Code, and the Floodplain Management Ordinance. The following section provides more detail on the some of these regulations.

Building Code Title 17.08

Kern County has adopted the Uniform Building Code, 1997 Edition with some modifications and amendments. Seismic provisions associated with Seismic Zone 4 have been adopted. A new section, Section 1637, has been added regarding geological or flood hazards. This section enables the building official to deny a construction permit if a structure to be used for human habitation or occupancy is subject to a geological or flood hazard, unless corrective work is done. Section 1618 regarding the basic wind speed has been amended based on a map that shows the valley and mountain region to be in 70mph 50 year wind zone and the desert to be in a 80 mph zone.

The following appendix chapters have *not* been adopted:

- Appendix Chapter 21, Prescriptive Masonry Construction in High-Wind Areas
- Appendix Chapter 23, Conventional Light-Frame Construction in High-Wind Areas
- Appendix Chapter 34, Life Safety Requirements for Existing Buildings

Kern County Floodplain Management Ordinance Title 17.48

This ordinance establishes regulations for development within the floodplain. It applies to all flood prone areas within the county's jurisdiction, both FEMA SFHAs and other areas identified by the community. It includes methods and provisions for reducing flood loss and establishes regulations that go beyond the minimum NFIP standards. These include:

- Restricting or prohibiting dangerous uses and uses that result in damaging increases in erosion, flood heights, or flood velocities

- Requiring uses vulnerable to floods be protected against flood damage at the time of initial construction
- Controlling the alteration of natural floodplains, stream channels, and natural protective barriers
- Controlling filling, dredging, and other development which may increase flood damage
- Preventing or regulating the construction of flood barriers

The ordinance provides provisions for flood hazard reductions. Most of these requirements pertain to development within and SFHAs. These requirements include:

- All new construction, substantial improvements, and other proposed new development:
 - Be adequately anchored
 - Be constructed with materials and utility equipment resistant to flood damage
 - Be constructed using methods that minimize flood damage
 - Be constructed with service facilities that are designed or located to prevent water from entering or accumulating within components
 - Have adequate drainage paths to guide flood waters away from proposed structures
 - That the lowest floor be constructed one foot above the Base Flood Elevation (includes areas of shallow flooding)
- Nonresidential construction
 - Meet above requirements or
 - Be flood proofed one foot above base flood elevation
- Uninhabitable structures (garage, storage, etc.)
 - Meet requirements (except base flood elevation requirements) above
 - Be designed to automatically equalize hydrostatic flood forces on exterior walls by allowing for the entry and exit of flood water
- Utilities
 - New and replacement water supply and sanitary sewage systems be designed to minimize or eliminate infiltration of flood waters into system or discharge from systems into flood waters
 - On-site waste disposal systems be designed to withstand flood damage impairment and to prevent contamination from them during flooding
- Subdivisions
 - Identify all flood hazard areas and the elevation of base flood
 - Be consistent with measures to minimize flood damage
- Manufactured homes
 - Be adequately anchored
 - Be elevated one foot above the base level flood elevation
- Recreational Vehicles
 - Be on site for fewer than 180 consecutive days
 - Be fully licensed and ready for highway use
 - Meet elevation and anchoring requirements for manufactured homes

The ordinance also provides provisions for floodways, high hazard areas, mudslide hazard areas, and flood-related erosion hazard areas. Most of these provisions are to prevent encroachment into these areas and to ensure developments within the areas are relatively safe from hazards.

Fire Code - Title 17.32

The purpose of the fire code is to regulate the safeguarding of life, property, and public welfare from the hazards of fire, hazardous materials, and dangerous materials. The fire code establishes limits on districts that store flammable or explosive material. The fire code requires that a permit be obtained prior to any burning activities; installing or altering any fire alarm, fire safety system, or sprinkler system; selling or storing fireworks; discharging fireworks at a public gathering; and other activities related to flammable liquids. The code requires fire apparatus access roads for all buildings, facilities, and mobile homes. The code also requires a minimum flow of 500 gallons per minute (GPM) for a minimum duration of one hour for residential dwellings, 1,000 GPM for 2 hours for commercial structures, and 1,500 GPM for 4 hours for industrial facilities.

Grading Code - Title 17.28

Section G of the grading permit requirements states that the building official may require a geotechnical investigation that addresses the potential for liquefaction when shallow groundwater (less than 50 feet) and unconsolidated sandy alluvium are encountered during the course of investigation. Section D addresses engineered grading requirements, including soils reports and an engineering geology report, when a grading permit is submitted. Drainage and erosion control requirements are also addressed in this Code.

Housing Code – Title 17.16

The county has added provisions to the Uniform Housing Code to address earthquake and wind hazards where inadequate structural resistance to horizontal forces is encountered.

Stormwater Ordinance – Title 14.26

The Stormwater Ordinance regulates storm drain construction, the quantity and quality of stormwater discharge, the approval of plans for storm drain constructions, the issuance of required permits, and compliance with requirements set by governmental agencies.

Stormwater District – Title 14.28 of the Kern County Code

This ordinance established Stormwater District No. 1, in accordance with the provisions of Section 961 of the Streets and Highways Code of the State of California.

New Development Policies - The County has Development Standards for all new development.

OTHER PROGRAMS OR PLANS RELATED TO HAZARDS MANAGEMENT

Kern County Flood Hazard Mitigation Plan – March 1996, Revised April 1998.

The purpose of this plan is to set forth measures to reduce the magnitude, frequency, and severity of flooding within the county. The goals of the plan are to prevent/minimize loss of life, human health and safety hazards, and economic and social expenses; to conserve water through

enhancement and restoration of groundwater recharge functions; and to enhance and promote the natural beneficial functions of the floodplain. The plan reports that one-half million acres of the county are identified as Special Flood Hazard Areas (SFHAs) – areas that have a one percent chance in any year of experiencing flood depths in excess of one foot deep.

The plan identifies and describes areas that are to be evaluated for future Specific Flood Hazard Mitigation Plans. These include: Sandy Creek, Cuddy Creek, The Southern Stream Group, Poso Creek, Caliente Creek, Upper Caliente Creek, North Fork of the Kern River, Lower Kern River/Buena Vista Lake, Onyx, Kelso Creek, South Lake, Lynch Canyon/Mountain Mesa, Cache Creek, Little Dixie Wash, and Ridgecrest Washes.

The plan also identifies potential funding mechanisms for flood hazard mitigation areas. These include the Kern County Flood Control District (this agency does not exist, but the document assigns responsibilities for such an agency, should it be established), Resource Conservation District, General Obligation Bond, FEMA’s Hazard Mitigation Grant Program, United States Army Corp of Engineers, the Department of Water Resources, and the Department of Agriculture Following Program.

This plan also identifies specific hazard mitigation measures in areas where recurrent flood damages have occurred or are anticipated to occur. The measures identify potential projects, costs, funding sources, implementation schedules, and post implementation needs. The mitigation measures identified in the plan include:

- Several Lamont Flood Defense Projects associated with Caliente Creek
- Kelso Creek Retrofitting Project
- Poso Creek ALERT Flood Warning System
- Creation of a Poso Creek Levee Maintenance District
- Lower Kern River Flood Control Project and Slough Restoration
- Long Range Flood Hazard Mitigation Program for the Indian Wells Valley

Kern Lake Bed Flood Projects Task Force – August 2003

Building upon the Kern Lake Bed Coordinated Resource Management Planning effort, this task force was created to identify future flood control projects and related policy issues. This included providing the framework within which the preferred sequencing of flood mitigation projects are identified, designed, funded, constructed, and maintained. Products of this task force include a goals statement, identification of principles and values guiding floodplain management, a proposed document “Draft Kern County General Plan Floodplain Management Related Policies” for the Kern County General Plan update scheduled in 2003, and a project sequencing list. Flood problems and detailed mitigation project descriptions are provided in the “*Kern Lake Coordinated Resource Management and Planning (CRMP) Group Preliminary Status Report: Flood Control and Mitigation for the Kern Lake Basin 2000.*”

Kern County Fire Department Wildland Fire Management Plan – January 2004

This plan, developed by the Kern County Fire Department (KCFD), documents the assessment of the wildland fire situation throughout the State Responsibility Area (SRA) within the county. The goal of this plan is to reduce costs and losses from wildfire by focusing on pre-fire management prescriptions and increasing initial attack success. This plan considers wildland fire issues and county land use zoning and development. The plan identifies priorities by battalion: Battalion 1 – southeastern portion of the county, Battalion 2 – western portion of the county, Battalion 3 – north central portion of the county, Battalion 4 – south and east sides of Bakersfield, and Battalion 7 – northeastern portion of the county. The applications of the plan include:

- Identify areas of concentrated assets and high risk
- Allow KCFD to create a more efficient wildland fire protection system, focused on meaningful solutions for identified problem areas
- Give citizens an opportunity to identify public and private assets and to design projects to protect those assets
- Identify where the most cost-effective fire management investments can be implemented
- Encourage an intergovernmental public/private approach to reducing loss
- Enable policy makers and the public to focus on what can be done to reduce loss from wildfires

Drainage Impact Fee

There are five (5) Planned Drainage Areas (PDA) in the metro Bakersfield area where developers either pay a fee, or construct some of the PDA facilities, which can offset their fee.

Drainage Master Planning Program

The County is currently trying to fund a Master Drainage Plan for the Rosamond area..

PROPERTY PROTECTION ACTIVITIES

Through the implementation of the County's Floodplain Management Ordinance approximately 10,000 structures have been built that incorporate flood mitigation such as elevation or wet/dry floodproofing.

The county has a notification program for owners of Unreinforced Masonry buildings that could be susceptible to earthquakes. Compliance with California's Unreinforced Masonry Law is voluntary.

The Kern County Fire Department (KCFD) has actively pursued fuels management projects on private lands adjoining WUI communities. In 2004, fuelbreaks were established or improved in the following communities:

- Alta Sierra
- Kernville
- Isabella Heights
- Squirrel Valley
- Tehachapi
- Bear Valley

- Frazier Park
- Pine Mtn Club
- Greenhorn Mtn Park
- Tehchapi Mtn Park
- Camp Condor

STRUCTURAL PROJECTS

Detention/Retention Ponds

The Lamont Drainfield was constructed after 1998, and consists of 3 desilting basins and a large detention pond, capable of accommodating sustained flow of 100 cfs, and the capacity to mitigate 325 cfs for 24 hours. The North Lamont Channel, constructed after 1998, intercepts flood waters, which historically flooded the streets within the Reynolds Tract, and now bypasses and releases them downstream of the Reynolds Tract.

NATURAL RESOURCE PROTECTION ACTIVITIES

Metropolitan Bakersfield Habitat Conservation Plan – August 1994

The goal of the MBHCP is to acquire, preserve and enhance native habitats which support the 18 endangered and sensitive species that may occur within the planning area, while allowing urban development to proceed as set forth in the Metropolitan Bakersfield 2010 General Plan. The study area covered by the MBHCP contains both City of Bakersfield and County of Kern jurisdictions.

Existing conflicts between species of concern and urban development have prompted the City and the County to pursue a Habitat Conservation Plan and incidental take permits. The Habitat Conservation Plan is designed to offset impacts resulting from loss of habitat incurred through the authorization of an otherwise lawful activity.

Drought

Kern County has several water storage districts among which drought mitigation is within the scope of normal activities.

The Eastern Kern County Resource Conservation District. This district is committed to conserving, improving, sustaining, and restoring the natural resources within Eastern Kern County through information, education and technical assistance programs.

COUNTYWIDE EMERGENCY SERVICES ACTIVITIES

Emergency preparedness is part of the County's strategy to protect life and property from floods and other disasters. The following is a listing of the emergency services activities that the County has undertaken.

Emergency Management Program

Kern County Office of Emergency Services Standardized Emergency Management System

Kern County OES offers electronic SEMS training curriculum developed by the State OES on its website.

Preparedness Checklists

The Kern County OES website also provides several preparedness checklists for the public as part of its Emergency Survival Program (ESP). The ESP is an awareness campaign designed to increase emergency preparedness at home, in the community, at work and at school. ESP was developed by the County of Los Angeles. Various cities and counties, including Kern, assist in the development and coordination of the campaign.

Earthquake Preparedness

The Kern County OES website also provides documents on earthquake preparedness.

Kern County Multi-Hazard Disaster Plan

This plan provides the planned response to extraordinary events associated with natural disasters and technological incidents. The plan outlines roles and responsibilities, and is designed to be part of the California Standardized Emergency Management System.

Kern County Flood Evacuation Plan for County and Greater Bakersfield Area Below Lake Isabella Dam – 1980's

This plan establishes the procedures for the evacuation and control of populated areas at risk below Lake Isabella Dam, provides for the emergency needs of the people, and for subsequent re-entry into the areas. This contingency plan is an integral part of an extension of the Kern County Emergency Management Plan and the City of Bakersfield Emergency Plan. The plan also has inundation maps and an evacuation plan for the Brite Valley Dam. This dam could inundate the Cummings Valley area near Tehachapi. Another map shows the inundation from the Haiwee Reservoir, located in Inyo County, that would drain into the China Lake dry lake bed in the extreme northeast corner of the Kern County. For homeland security reasons, the inundation maps are not included with this plan.

Warning systems

Kern County has NOAA weather radio coverage, which is an "all hazards" radio network for comprehensive weather and emergency information. Since early January 2005 a new broadcasting facility has been in test mode that will service Eastern Kern County including the Ridgecrest/Inyokern and Mojave/Rosamond areas of the the desert and the Tehachapi Valley. This will fill a substantial "hole" in weather radio coverage. The NOAA weather radio programming is handled by the NWS San Joaquin Valley Office located in Hanford, CA.

COUNTYWIDE PUBLIC INFORMATION ACTIVITIES

Map Determinations- Flood and Earthquake.

Kern County Engineering and Survey Services provides flood zone information, including FEMA mapped Flood Insurance Studies and County flood data to anyone who inquires.

Kern ESS has maps delineating the Alquist Priolo Earthquake Fault Zones

Outreach Projects

See Emergency Management Program above.

OTHER ONGOING MITIGATION ACTIVITIES

Existing or in progress mitigation projects

Kern County Seismic Hazard Atlas

This document was created by the Kern Council of Governments in 1974 using 1:24,000 base mapping for planning purposes. Seismic hazard such as faults, earthquake epicenters, and landslide areas are represented on USGS 7.5 minute topo quads. Kern COG is in the process of scanning and digitizing this information for use in GIS.

Kern County Water Agency

The Kern County Water Agency's mission is to secure adequate water supplies for Kern and participate in water management activities including water quality, flood control, and groundwater issues.

ARVIN

Hazard and Risk Summary

Arvin identified earthquakes and floods as the most significant hazards, and drought, severe weather, and natural health hazards as medium significance. Arvin and the nearby community of Lamont lie completely within the Caliente Creek 100 year floodplain. The community noted recent flooding from Caliente Creek and the Tejon Ranch foothills that affected several homes and caused a road to washout at the Wheeler Ridge Road that occurred during the winter of 2005 rains. The flood history section of this plan details the multiple floods that have occurred on Caliente Creek and affected Arvin. Arvin also noted that the 1952 earthquake on the nearby White Wolf Fault zone impacted the city. Magnitude 5.0 and above earthquakes occur frequently, but damage has been limited from these events.

Inventory

Building Inventory

2,500+ residential structures valued at \$200,000,000

200+ non-residential structures valued at \$25,000,000

Critical Facilities Inventory

Kern County Fire Station, City Hall/Police Station, 4 schools, Arvin/Edison Water Storage Facility, Waste Water Treatment Plant

Typical rural community infrastructure, unknown replacement cost

Affected population:

12,000+

Special needs include 90% Spanish speaking

Historic, cultural or natural resources affected:

Unknown

Development trends:

Unknown

Arvin Assessed Valuation of Improved Properties				
PROPERTY	COUNT	ACRES	IMPROVED VALUE	LAND VALUE
agricultural	48	1,237.24	\$ 1,564,634	\$ 2,502,158
commercial	142	29.86	\$ 13,008,569	\$ 3,978,376
industrial	44	102.12	\$ 16,573,795	\$ 2,115,068
other	101	533.66	\$ 218,181	\$ 115,252
residential	2,643	488.72	\$ 142,665,257	\$ 43,809,931
TOTALS	2,978	2,391.60	\$ 174,030,436	\$ 52,520,785

Source: Kern County Assessor's database 2004

Jurisdiction-Specific Existing Capabilities

Jurisdiction	Y/N other	Comments
Comp Plan/General Plan		
Special Plans		
Subdivision Ordinance		
Zoning Ordinance		
NFIP/FPM Ordinance	Y	Joined 1-13-1988, mapped in 5-4-1987
- Substantial Damage language?		
- Administrator/Certified Floodplain Manager?		
- # of Flood threatened Buildings?		
- # of flood insurance policies	1,105	
- # of Repetitive Losses?		
- Maintain Elevation Certificates?		
CRS Rating, if applicable		
Stormwater Program?		
Erosion or Sediment controls		
# of unreinforced masonry buildings		
Hospitals built before 1973 (for HSSA)		

Jurisdiction	Y/N other	Comments
Alquist-Priolo Special Studies Zones Act		
Building Code Version		
Full-time Building Official?		
Conduct "as-built" Inspections?		
BCEGS Rating		
Local Emergency Operations Plan		
Fire Department ISO Rating		
Fire Safe Programs		
Hazard Mitigation Plans		
Warning Systems/Services		
- Storm Ready Certified?		
- Weather Radio reception?		
- Outdoor Warning Sirens?		
- Emergency Notification (R-911)?		
- Other? (e.g., cable over-ride)		
GIS System?		
- Hazard Data?		
- Building footprints?		
- Links to Assessor data?		
- Land-Use designations?		
Structural Protection Projects		
Property Protection Projects		
Critical Facilities Protected?		
Natural and Cultural Resources Inventory?		
Public Information Program/Outlet		
Environmental Education Program?		

Existing or in progress mitigation projects

The county has constructed some flood control detention/retention ponds in the Arvin area that afford some relief, but more measures are needed.

Hazard and Risk Summary

Bakersfield identified dam failure and earthquakes as highly significant hazards, followed by drought, floods, severe weather, and wildfires. According to the Safety Element of the Metropolitan Bakersfield General Plan the hazards of concern include earthquake, dam failure, flooding, landslides, and subsidence. Bakersfield is situated on the Kern River fan, an alluvial fan that covers 300 square miles of the valley. The Kern River flood plain is incised into the upper part of the fan, north of downtown Bakersfield, but spreads out across the broad, flat lower fan. Bakersfield also lies within the inundation zone of a Lake Isabella dam failure.

Earthquake. The principal seismic hazard for Bakersfield is the potential for strong ground shaking from nearby major faults that were previously described in the Hazard Identification section of this plan. Other faults not previously discussed that are nearby are the Breckenridge, Kern Canyon, Pond, and Poso faults.

Unreinforced masonry buildings in the city are most vulnerable to earthquake shaking. These were built before seismic codes were first instituted in the city and county. Other buildings that may pose substantial hazards during earthquakes include precast concrete tilt-up buildings and multi story buildings of non-ductile concrete frame.

As noted before in the Hazard ID, the General Plan mentions that areas of high groundwater in southern portions of the city are areas of possible liquefaction risk. The Lamont Quadrangle at R 28 E, T 30 S has groundwater depths of 5 to 15 feet below the surface, near Brundage Lane and DiGiorgio Road.

Dam failure. Isabella Dam, located about 40 miles northeast of Bakersfield, is an earthen dam 195 feet high, 1,725 feet long and is designed to hold 570,000 acre feet of water. Failure of the dam would flood 60 square miles of Metropolitan Bakersfield and the surrounding areas of Oildale and Greenacres. The city would have two to six hours to evacuate the area. Studies have estimated the chances of the dam failing entirely with the lake at capacity to be 1 day in 10,000 years (Heart Hospital FEIR).

Earthquake Induced landslides. A strong earthquake could trigger landslides or slope failures on steeper slopes in the foothills and along the Kern River Canyon and floodplain near the city. Slope failures associated with earthquakes include bluff and stream bank failures, rock falls and soil slips on steep slopes.

Subsidence is occurring in the southern part of Bakersfield, with up to four feet of subsidence over a 40 year period. This is not considered a significant hazard, but damage to wells, foundations, and underground utilities may occur.

Inventory

Bakersfield Assessed Valuation of Improved Properties				
PROPERTY	COUNT	ACRES	IMPROVED VALUE	LAND VALUE
agricultural	144	9,577.06	\$ 4,425,499	\$ 26,811,903
commercial	4,141	4,001.59	\$ 2,165,101,394	\$ 831,482,540
industrial	1,426	3,091.22	\$ 337,313,597	\$ 162,037,045
other	2,766	18,316.05	\$ 7,765,588	\$ 22,723,486
residential	80,551	42,640.59	\$ 7,823,274,950	\$ 2,614,836,197
TOTALS	89,028	77,626.51	\$ 10,337,881,028	\$ 3,657,891,171

Source: Kern County Assessor's database 2004

Jurisdiction-Specific Existing Capabilities

Jurisdiction	Y/N other	Comments
Comp Plan/General Plan	Yes	
Special Plans	Yes	Disaster response plans
Subdivision Ordinance	Yes	
Zoning Ordinance	Yes	
NFIP/FPM Ordinance	Yes	Joined 5-1-1985, Map date 5-1-1985
- Substantial Damage language?	Yes	
- Administrator/Certified Floodplain Manager?	Yes	
- # of Flood threatened Buildings?	848	(845 residential, 3 comm.)
- # of flood insurance policies	118	
- # of Repetitive Losses?	0	
- Maintain Elevation Certificates?	Yes	
CRS Rating, if applicable	N/A	
Stormwater Program?	Yes	
Erosion or Sediment controls	Yes	
# of unreinforced masonry buildings	188	85% up to 1993 stds.
Hospitals built before 1973 (for HSSA)	5	
Alquist-Priolo Special Studies Zones Act	Yes	Planning
Building Code Version	Yes	2001
Full-time Building Official?	Yes	
Conduct "as-built" Inspections?	Yes	
BCEGS Rating		
Local Emergency Operations Plan	Yes	
Fire Department ISO Rating	3	
Fire Safe Programs	Yes	Schools, brush clearance
Hazard Mitigation Plans	Yes	
Warning Systems/Services	Yes	
- Storm Ready Certified?	No	
- Weather Radio reception?	Yes	

Jurisdiction	Y/N other	Comments
- Outdoor Warning Sirens?	No	
- Emergency Notification (R-911)?	Yes	
- Other? (e.g., cable over-ride)		
GIS System?	Yes	
- Hazard Data?	Yes	
- Building footprints?	Yes	
- Links to Assessor data?	Yes	
- Land-Use designations?	Yes	
Structural Protection Projects	Yes	
Property Protection Projects	Yes	Levees, catch basins, groundwater recharge
Critical Facilities Protected?	Yes	
Natural and Cultural Resources Inventory?	Yes	
Public Information Program/Outlet	Yes	Disaster preparedness on website
Environmental Education Program?	Yes	

Existing plans and procedures

Metropolitan Bakersfield General Plan - December 2002

The area covered by the Metropolitan Bakersfield General Plan coincides with the Bakersfield Metropolitan Priority Area of the Kern County General Plan. It encompasses an area of approximately 408 square miles.

Safety Element

Regarding Seismic Safety

The Safety Element recognizes that potential seismic hazards in the planning area include strong ground shaking, fault rupture, liquefaction, earthquake induced landslides and potential inundation from the failure of Lake Isabella dam. Other geologic hazards in the planning area include flooding, landslides, and subsidence.

The Uniform Building Code was revised in 1998 to:

- Upgrade the level of ground motion used in the seismic design of buildings;
- Add site amplification factors based on local soils conditions; and
- Improve the way ground motion is applied in detailed design.

The City program for unreinforced masonry buildings has been very successful. A complete inventory of unreinforced masonry buildings was completed and the City conducted a very aggressive seismic retrofit construction program after 1990. Of those buildings identified as “unreinforced masonry structures”, 85% are now up to 1993 seismic construction standards. The County has performed a similar inventory and notified owners of the status of their buildings.

Policies

Critical Facilities

1. Ensure that earthquake survival and efficient post-disaster functions are a primary objective in the siting, design and construction standards for discretionary essential facilities or for expansion of such existing facilities (I-1 through I-11).
2. Require that the siting and development of critical facilities under discretionary approval by the City Council and Board of Supervisors be supported by documentation of thorough hazard investigations relating to site selection, preconstruction site investigations and application of the most current professional standards for seismic design (I-1, I-2, I-10, I-13, I-26, I-29).
3. Encourage existing critical facilities with significant seismic vulnerabilities to be upgraded or relocated as appropriate (I-4).
4. Encourage critical facilities in dam inundation areas to develop and maintain plans for safe shut-down and efficient evacuation from their facilities, as appropriate to the degree of flood hazard for each facility (I-26, I-31).
5. Incorporate planning for incidents affecting critical facilities into contingency plans for disaster response and recovery (I-31).

Hazardous Buildings

1. Inventory all unreinforced masonry buildings in the planning area for conformance with state legislation and guidelines (i.e. SB 547, enacted in 1986 (I-5)).
2. Continue to address seismically hazardous buildings pursuant to Chapter 12.2 (§8875 et seq.), Division 1 of Title 2 of the Government Code (I-5 through I-8).
3. Require seismic review of other potentially hazardous buildings upon any change in their use or occupancy status (I-9).
4. Adopt and maintain high standards for seismic performance of buildings, through prompt adoption and careful enforcement of the most current seismic standards of the Uniform Building Code (I-1, I-2, I-3, I-5, I-7, I-10 through I-12).

Fault Rupture

1. Prohibit development designed for human occupancy within 50 feet of a known active fault and prohibit any building from being placed astride an active fault (I-14, I-15).
2. Require site-specific studies to locate and characterize specific fault traces within an Alquist-Priolo Earthquake Fault Zone for all construction designed for human occupancy (I-13).
3. Design significant lifeline installations such as highways, utilities and petrochemical pipelines which cross an active fault, to accommodate potential fault movement without prolonged disruption of an essential service or creating threat to health and safety (I-16).

Liquefaction

1. Determine the liquefaction potential at sites in areas of high groundwater prior to development and determine specific mitigation to be incorporated into the foundation design, as necessary to prevent or reduce damage from liquefaction in an earthquake (I-17 through I-19).
2. Route major lifeline installations around potential liquefaction areas or otherwise protect them against significant damage from liquefaction in an earthquake (I-20).

Information

1. Compile information on areas of potential hazards and field information developed as part of CEQA investigations and geo-logic reports and keep geologic reviews and policy development current and accessible for use in report preparation (I-21, I-22, I-23, I-25).
2. Encourage and support local, state and federal research program for delineation of geologic and seismic hazards so that acceptable risk may be continually reevaluated and kept current with state-of-the-art information and contemporary values (I-24).
3. Require known geologic and seismic hazards within the area of a proposed subdivision to be referenced on the final subdivision map (I-25).

Dam Failure Inundation Risk

1. Design discretionary critical facilities located within the potential inundation area for dam failure in order to: mitigate the effects of inundation on the facility; promote orderly shut-down and evacuation (as appropriate); and, prevent on-site hazards from affecting building occupants and the surrounding communities in the event of dam failure (I-26).
2. Design discretionary facilities in the potential dam inundation area used for the manufacture, storage or use of hazardous materials to prevent on-site hazards from affecting surrounding communities in the event of inundation (I-27).
3. Require emergency response plans for the planning area to include specific procedures for the sequential and orderly evacuation of the potential dam inundation area (I-28).
4. Encourage critical and high-occupancy facilities as well as facilities for elderly, handicapped and other special care occupants located in the potential inundation area below the dam to develop and maintain plans for the orderly evacuation of their occupants (I-35).

Emergency Management

1. Require local agencies to coordinate with the business community to reduce seismic hazards (I-29 through I-36).
2. Increase the public awareness of seismic hazards in residents of the city and county (I-35).
3. Require the city's and county's emergency preparedness programs to have a three-fold emphasis: hazard mitigation, disaster response and self-sufficiency of residents, business and industry (I-1 through I-36).
4. Require the emergency management program to include effective plans for disaster/earthquake response, training of responsible personnel, mutual aid agreements for all appropriate functions, and exercises conducted at least annually to test and evaluate plan capabilities (I-29 through I-33).

Implementation

The following are programs to be carried out by the City of Bakersfield and County of Kern to implement the goals and policies of the Safety Element affecting seismic safety. This listing is not to limit the scope of implementation of this plan. State law requires that planning agencies recommend various methods of implementation of the general plan as part of their on-going duties.

1. Amend city and county building and zoning ordinances to incorporate specific standards for siting and seismic design of critical facilities.

2. Require detailed site studies for ground shaking characteristics, liquefaction potential, dam failure inundation and flooding potential, and fault rupture potential, as background to the design process for critical facilities under city and county discretionary approval.
3. Require structures that are within the plan area and are subject to Building Department review to adhere to the most current seismic standards adopted as part of the Uniform Building Code.
4. Review existing critical facilities for any significant siting, design or construction problems that would make them vulnerable in an earthquake. The findings shall be incorporated into emergency operations plans as well as addressed in longer term programs of facilities upgrading or relocation.
5. Conduct (Department of Building Inspection) an inventory of all unreinforced masonry buildings in the planning area, including all information required by applicable state legislation and guidelines.
6. Require notification to owners of potentially hazardous buildings, pursuant to state legislation, and publication or availability of the list of such buildings for public information.
7. Continue the existing program for seismic upgrading of unreinforced masonry buildings.
8. Consider a special recognition program for buildings that have been reinforced under the hazardous buildings ordinance, such as a plaque or certificate that can be displayed on the building.
9. Maintain cognizance of other types of potentially hazardous buildings and programs developed for the reduction of seismic hazards. For example, concrete tilt up and concrete frame buildings built before enactment of the current seismic codes should be required to meet basic seismic standards before a change in use or occupancy level is approved, or when significant alteration or repair is proposed.
10. Develop appropriate criteria and procedures for third-party review of the seismic design of critical facilities.
11. Review the current code enforcement procedures for concrete tilt-up and composite pre-stressed concrete construction for consistency with effective principles of seismic design, and revised as appropriate to maintain seismic integrity of new construction.
12. Require seismic review prior to major addition, renovation or increase in occupancy of buildings.
13. Detailed geologic investigations shall be conducted, in conformance with guidelines of the California Division of Mines and Geology, for all construction designed for human occupancy in an Alquist-Priolo Earthquake Fault Study Zone.
14. Revise city and county zoning and building codes to prohibit construction of buildings for human occupancy within 50 feet of the trace of an active fault. For Critical Facilities the set-back shall be at least 300 feet.
15. Reflect the location of active faults in zoning and subdivision approvals, through low-density zoning designations and through locations of lot lines and public ways to allow adequate flexibility in placement of buildings such that active fault traces can be avoided.
16. Require plans and permits for installation of major lifeline components such as for highways, utilities and petroleum or chemical pipelines to incorporate design features to accommodate potential fault movement in areas of active faults without prolonged disruption of an essential service or threat to health and safety.

17. Require liquefaction investigations in all areas of high groundwater potential and appropriate foundation designs to mitigate potential damage to buildings on sites with liquefaction potential.
18. Develop specific guidelines for the collection of data for determination of liquefaction potential at a site.
19. Require the proper sealing of any abandoned wells and the removal of abandoned underground irrigation and drainage systems to be accomplished prior to subdivision approval in areas of high groundwater, to prevent the uncontrolled flow of water from adversely affecting long-term efforts for liquefaction and groundwater mitigation.
20. Route major lifeline components such as for highways, utilities and petroleum or chemical pipelines around areas of high groundwater wherever possible. Where they must cross an area of high groundwater, plans and permits shall require design features to accommodate extensive ground rupture without prolonged disruption of an essential service or threat to health and safety.
21. Compile maps showing the location of all geologic hazards, including: active faults, Alquist-Priolo Earthquake Fault Zones, 100-year flood hazard, extent of projected dam failure inundation and time arcs, depth of inundation, land subsidence, slope failure and earthquake-induced landslides, high groundwater and liquefaction potential.
22. Compile information on areas of potential hazard. Field information developed as part of CEQA investigations and geologic reports by the city/county geologists should be kept current and accessible for use in report preparation, geologic reviews and policy development.
23. Update the County's Seismic Hazards Atlas as necessary.
24. Encourage and support local, state and federal research programs for delineation of geologic and seismic hazards so that acceptable risks may be continually reevaluated and kept current with state-of-the-art information and contemporary values.
25. Require known geologic and seismic hazards within the area of a proposed subdivision to be referenced on the final subdivision map.
26. Develop procedures for the discretionary review of critical facilities proposed in an area of potential dam inundation. Approvals shall include requirements that emergency shut-down and facility evacuation plans be developed, maintained and exercised for each facility, and the potential effects of inundation on essential facility functions and the safety of occupants and the community in general are addressed.
27. Facilities used for the manufacture, storage or use of hazardous materials shall comply with the uniform fire code, with requirements for siting or design to prevent on-site hazards from affecting surrounding communities in the event of inundation.
28. Incorporate specific plans for the sequential and orderly evacuation of the potential dam inundation area into emergency response plans.
29. Maintain effective disaster response and earthquake response plans and update on a regular basis.
30. Require the city and county to maintain effective mutual aid agreements for fire, police, medical response, emergency morgue, mass care, heavy rescue, and other functions as appropriate.
31. Require emergency response plans and disaster exercise scenarios to include contingencies for the problems listed below; earth-quake response exercises shall be conducted at least once a year.

- Rupture of any active fault within 40 miles of Bakersfield.
 - Collapse of 50 buildings or more, including some mid-rise structures, some essential facilities and numerous unreinforced masonry buildings.
 - Ground rupture and attendant property damage due to pockets of liquefaction in areas of high groundwater.
 - Complete evacuation of the potential inundation area.
 - Many aftershocks, continuing for many weeks or months.
32. Require disaster response plans to include adequate capabilities for search and rescue, medical responses, interim morgue, emergency shelter, traffic and utility impacts, debris removal and disposal, as well as hazardous materials response.
 33. Require disaster response plans to include procedures for traffic control and security of damaged areas.
 34. Seek public participation in the development of hazard mitigation and disaster recovery programs.
 35. Require public education and preparedness to be a major, continuing component of the emergency preparedness program. It should include, at a minimum:
 - The existence and approximate locations of local faults.
 - Liquefaction susceptibility areas, and the dam evacuation area, and the procedures that have been developed to deal with them.
 - The potential for strong ground shaking in the area, and means of strengthening buildings and protecting furnishings, equipment and other building contents from damage.
 - The need for business and residents to be self-sufficient for several days following an earthquake, including food, water, sanitation, medical assistance, and limited fire fighting.
 - The provision for the orderly evacuation of elderly, handi-capped and other special-care persons.
 - What people and businesses should do to help themselves before, during and after earthquakes.
 36. Enlist the cooperation of the business community for public education, preparedness of business and industry, and mutual assistance.

Regarding Flood Hazard Mitigation

The City of Bakersfield entered the Regular Phase of the National Flood Insurance Program (NFIP) as administered by the Federal Emergency Management Agency (FEMA) on May 1, 1985. The County of Kern followed on September 29, 1986. By adopting flood damage prevention ordinances to regulate development in special flood hazard areas, private property owners in participating communities are allowed to purchase affordable flood insurance through the NFIP, while the community retains its eligibility to receive certain federally backed monies, and disaster relief funds.

Both the City of Bakersfield and the County of Kern participate in the state-mandated Kern River Designated Floodway program, which is administered by the California Department of Water Resources Reclamation Board. The Kern River Designated Floodway Program provides development criteria and issues permits for development within the limits of the Kern River Designated Floodway.

Floodplain mapping has been performed under the NFIP to delineate the special flood hazard areas. The City of Bakersfield Public Works Department and the Kern County Department of Engineering and Survey Services have the official Flood Insurance Rate Maps (FIRMS) and Flood Boundary Floodway Maps (FBFM) which show the extent of the floodplains. In addition, the communities are empowered to develop and use improved floodplain information. FEMA has accepted the California Department of Water Resources (DWR) Reclamation Board Kern River designated floodway from Interstate 5 to the mouth of the Kern River canyon, because the DWR study is based upon the 100 year peak discharge of 15,000 cfs, which exceeds the Kern River Flood Insurance Study flow of 10,200 cfs.

Both the city and county have adopted general plan designations which identify allowable uses in the floodplain. Local zoning ordinances more closely define known areas to have potential for flooding.

In July 1985, both the city and county adopted the Kern River Plan Element (KRPE) as a part of their general plans. The KRPE establishes provisions for development along the Kern River, and specific policies for floodplain management.

The Flood Damage Prevention Ordinance provides criteria for development within all floodplains, including prohibiting encroachments into a floodway, and requiring protection and/or elevation of construction within a floodway fringe.

With the construction of Isabella Dam, hazards from a 100-year flood have been substantially reduced for the Oildale/Bakersfield metropolitan area. New development within the 100 year floodplain will be required to be flood protected.

The Caliente Creek floodplain will continue to experience flooding until the localized programs and facilities can be implemented.

The City of Bakersfield has merged the Kern River Levee into its Water Resources Department operation. The established levee system will be maintained to USACE standards. The USACE provides an annual inspection and maintenance report in the evaluation of the Kern River Levee.

Policies Related to Flood Hazard Mitigation

1. Develop specific standards which apply to development located in flood hazard areas, as defined by Federal Flood Insurance maps and most recent information as adopted by the responsible agency (I-1, I-2).
2. Maintain adequate levees along the Kern River channel throughout the planning area (I-4).
3. Prevent urban development encroachment which would impede flood flows in the Kern River designated floodway (I-3, I-5).
4. Remove sand and excessive plant growth from the Kern River channel as required to maintain channel capacity through the planning area (I-6).

5. Develop a program or series of programs to control and reduce flooding in the Lamont area resulting from Caliente Creek (I-7).
6. The County's Flood Prevention Program shall be implemented for new development in areas of flooding potential.

Implementation

The following are programs to be carried out by the City of Bakersfield and County of Kern to implement the goals and policies of the Safety Element affecting flooding. This listing is not to limit the scope of implementation of this plan. State law requires that planning agencies recommend various methods of implementation of the general plan as part of their on-going duties.

1. Develop appropriate procedures for discretionary approval of all critical facilities in an area of identified flood hazard, with requirements for mitigation of the potential effects of flooding on essential facility functions and the safety of occupants and the community in general.
2. Develop procedures for the review of proposed facilities which use, manufacture or store hazardous materials proposed in areas of identified flood hazard.
3. Review current zoning designations, street width and traffic flow patterns in and adjacent to areas of identified flood hazard for compatibility with orderly evacuation, and identify and implement appropriate change in immediate and long-term policies and programs.
4. Consolidate and continue the activities of the Kern River Levee District in maintaining the Kern River levees.
5. Comply with the regulations and guidelines contained in the City/County adopted Kern River Plan Element of the City and County General Plans, and the zoning and floodplain management regulations which implement the Plan.
6. Implement the Kern River Channel Maintenance Program.
7. Develop a series of intercept and retention facilities to control floodwaters within the Caliente Creek drainage.

Regarding Public Safety

The Safety Element also includes a Public Safety discussion that reviews and sets forth measures to improve public safety including Bakersfield Police Department, Kern County Sheriff's Department, Bakersfield Fire Department, Kern County Fire Services, and hazardous materials and uses.

CALIFORNIA CITY

Hazard and Risk Summary

California City identified earthquakes, drought, severe weather, and wildfires as the most significant hazards, followed by floods, natural health hazards, and volcanoes. California City was recently impacted by floods during the December 18, 2004- January 5, 2005 rainstorms. Cache Creek flooded and deposited silt and debris in various parts of the City.

Repair estimates from 2004-2005 floods and severe weather:

Cache Creek channel and levees repair and debris removal \$ 2,037,422

89 th Street repairs	\$ 59,279
Yerba Blvd repairs	\$ 66,595
Police building roof repair	\$ 258,750
Airport Terminal roof repair	\$ 78,775
Golf Course pro shop roof repair	\$ 183,065
Total:	\$ 2,683,886

Inventory

California City Assessed Valuation of Improved Properties				
PROPERTY	COUNT	ACRES	IMPROVED VALUE	LAND VALUE
commercial	108	669.87	\$ 125,467,855	\$ 6,511,241
industrial	100	123.80	\$ 2,727,597	\$ 1,441,528
other	7,584	70,460.28	\$ 509,325	\$ 31,925,014
residential	43,219	41,065.56	\$ 235,280,352	\$ 148,962,074
TOTALS	51,011	112,319.51	\$ 363,985,129	\$ 188,839,857

Source: Kern County Assessor's database 2004

Jurisdiction-Specific Existing Capabilities

Capability	Y/N other	Comments
Comp Plan/General Plan	Y	
Special Plans	Y	
Subdivision Ordinance	Y	
Zoning Ordinance	Y	
NFIP/FPM Ordinance	Y	Joined 1-20-1982, Map 9-19-1984
- Substantial Damage language?	N	
- Administrator/Certified Floodplain Manager?	N	
- # of Floodprone Buildings?	1,500	
- # of flood insurance policies	65	
- Maintain Elevation Certificates?	N	
- # of Repetitive Losses?	0	
CRS Rating, if applicable	N/A	
Stormwater Program?	Y	
Erosion or Sediment controls	N	
# of unreinforced masonry buildings	5	
Hospitals built before 1973 (for HSSA)	N/A	
Alquist-Priolo Special Studies Zones Act	N	
Building Code Version	2004	
Full-time Building Official	Y	
- Conduct "as-built" Inspections?	Y	
BCEGS Rating	unkown	
Local Emergency Operations Plan	Y	
Fire Department ISO rating	4/8	
Fire Safe Programs	Y	Just starting in 2005

Capability	Y/N other	Comments
Hazard Mitigation Plans	N	
Warning Systems in Place?	N	
- Storm Ready Certified?	N	
- Weather Radio reception?	Y	
- Outdoor Warning Sirens?	N	
- Emergency Notification (R-911)?	N	
- Other? (e.g., cable over-ride)	Y	
GIS System?	N	
- Hazard Data?	N	
- Building footprints?	Y	
- Tied to Assessor data?	Y	
- Land-Use designations?	Y	
Structural Protection Projects	N	
Property Owner Protection Projects	N	
Critical Facilities Protected?	N	
Natural Resources Inventory?	N	
Cultural Resources Inventory?	N	
Public Information Program/Outlet	Y	
Environmental Education Program?	N	

DELANO

Hazard and Risk Summary

Delano identified earthquakes, dam failures, floods, and natural health hazards as the most significant hazards. Train derailment and associated hazardous materials spills was added as an additional concern (medium significance) on their hazard identification worksheet. Heavy rains over short periods of time have caused canal or creek overflow in the past.

Inventory

Delano Assessed Valuation of Improved Properties				
PROPERTY	COUNT	ACRES	IMPROVED VALUE	LAND VALUE
agricultural	14	226.48	\$ 692,177	\$ 1,559,884
commercial	464	188.45	\$ 91,014,237	\$ 27,724,282
industrial	74	241.90	\$ 63,782,260	\$ 7,579,451
other	282	2,584.74	\$ 399,149	\$ 2,953,512
residential	7,482	3,041.25	\$ 508,402,777	\$ 140,209,961
TOTALS	8,316	6,282.82	\$ 664,290,600	\$ 180,027,090

Source: Kern County Assessor's database 2004

Jurisdiction-Specific Existing Capabilities

Jurisdiction	Y/N other	Comments
Comp Plan/General Plan	Y	Redevelopment Plan
Special Plans		
Subdivision Ordinance		
Zoning Ordinance		
NFIP/FPM Ordinance	Y	Joined 8-23-1982, no SFHA
- Substantial Damage language?		
- Administrator/Certified Floodplain Manager?		
- # of Flood threatened Buildings?		
- # of flood insurance policies		
- # of Repetitive Losses?	0	
- Maintain Elevation Certificates?		
CRS Rating, if applicable	N/A	
Stormwater Program?		
Erosion or Sediment controls		
# of unreinforced masonry buildings		
Hospitals built before 1973 (for HSSA)	1	
Alquist-Priolo Special Studies Zones Act		
Building Code Version		
Full-time Building Official?		
Conduct "as-built" Inspections?		
BCEGS Rating		

Jurisdiction	Y/N other	Comments
Local Emergency Operations Plan		
Fire Department ISO Rating		
Fire Safe Programs		
Hazard Mitigation Plans		
Warning Systems/Services		
- Storm Ready Certified?		
- Weather Radio reception?		
- Outdoor Warning Sirens?		
- Emergency Notification (R-911)?		
- Other? (e.g., cable over-ride)		
GIS System?		
- Hazard Data?		
- Building footprints?		
- Links to Assessor data?		
- Land-Use designations?		
Structural Protection Projects		
Property Protection Projects		
Critical Facilities Protected?		
Natural and Cultural Resources Inventory?		
Public Information Program/Outlet	Y	City website
Environmental Education Program?		

Development trends. According to the City’s website, Delano is projected to grow another 16 percent by 2010. Local government, business, and residents have joined together in a visioning process to ensure Delano has a vibrant economy, jobs, affordable housing, reliable infrastructure, and public safety.

MARICOPA

Hazard and Risk Summary

Maricopa is a small town located in the Valley Region in southwestern Kern County. Earthquakes are a significant hazard for Maricopa, due to its proximity to the San Andreas Fault. Wildfires may also threaten the outskirts of the town. According to the NFIP Community Status Book Maricopa has been mapped for flood hazards but the area is minimally floodprone, and no flood elevations are shown on the map.

Inventory

Maricopa Assessed Valuation of Improved Properties				
PROPERTY	COUNT	ACRES	IMPROVED VALUE	LAND VALUE
agricultural	9	215.07	\$ -	\$ 115,369
commercial	23	1.75	\$ 1,268,055	\$ 601,758
industrial	2	10.45	\$ 166,100	\$ 114,848
other	43	228.57	\$ 123,180	\$ 251,280
residential	554	258.65	\$ 8,264,046	\$ 3,948,014
TOTALS	631	714.49	\$ 9,821,381	\$ 5,031,269

Source: Kern County Assessor's database 2004

Jurisdiction-Specific Existing Capabilities

The city has no permanent, full time staff, thus has no existing capabilities regarding mitigation.

Jurisdiction	Y/N other	Comments
Comp Plan/General Plan		
Special Plans		
Subdivision Ordinance		
Zoning Ordinance		
NFIP/FPM Ordinance	Y	Joined 9-24-1984, Map 9-24-1984
- Substantial Damage language?		
- Administrator/Certified Floodplain Manager?		
- # of Flood threatened Buildings?		
- # of flood insurance policies	No Data	
- # of Repetitive Losses?		
- Maintain Elevation Certificates?		
CRS Rating, if applicable		
Stormwater Program?		
Erosion or Sediment controls		
# of unreinforced masonry buildings		
Hospitals built before 1973 (for HSSA)		

Jurisdiction	Y/N other	Comments
Alquist-Priolo Special Studies Zones Act		
Building Code Version		
Full-time Building Official?		
Conduct "as-built" Inspections?		
BCEGS Rating		
Local Emergency Operations Plan		
Fire Department ISO Rating		
Fire Safe Programs		
Hazard Mitigation Plans		
Warning Systems/Services		
- Storm Ready Certified?		
- Weather Radio reception?		
- Outdoor Warning Sirens?		
- Emergency Notification (R-911)?		
- Other? (e.g., cable over-ride)		
GIS System?		
- Hazard Data?		
- Building footprints?		
- Links to Assessor data?		
- Land-Use designations?		
Structural Protection Projects		
Property Protection Projects		
Critical Facilities Protected?		
Natural and Cultural Resources Inventory?		
Public Information Program/Outlet		
Environmental Education Program?		

McFARLAND

Hazard and Risk Summary

Flooding along Poso Creek is a significant concern to McFarland, particularly on the east side of the City.

Inventory

McFarland Assessed Valuation of Improved Properties				
PROPERTY	COUNT	ACRES	IMPROVED VALUE	LAND VALUE
agricultural	11	226.47	\$ 456,153	\$ 645,365
commercial	86	75.24	\$ 55,885,113	\$ 3,827,816
industrial	17	18.59	\$ 985,052	\$ 422,551
other	71	429.90	\$ 26,160	\$ 93,295
residential	2,044	302.68	\$ 95,701,940	\$ 29,984,464
TOTALS	2,229	1,052.88	\$ 153,054,418	\$ 34,973,491

Source: Kern County Assessor's database 2004

Jurisdiction-Specific Existing Capabilities

Capability	Y/N other	Comments
Comp Plan/General Plan	Y	Currently being updated, est. 2006
Special Plans		
Subdivision Ordinance	Y	
Zoning Ordinance	Y	
NFIP/FPM Ordinance	Y	Joined 9-29-86, Map 9-29-86 Ordinance currently being updated
- Substantial Damage language?	Y	
- Administrator/Certified Floodplain Manager?	N	
- # of Floodprone Buildings?	123	As of 9/30/2004
- # of flood insurance policies	123	As of 9/30/2004
- Maintain Elevation Certificates?	Y	
- # of Repetitive Losses?	NA	
CRS Rating, if applicable	NA	Stormwater is collected in regional sumps. Stormwater is not treated.
Stormwater Program?	N	
Erosion or Sediment controls	N	
# of unreinforced masonry buildings	10	Estimated
Hospitals built before 1973 (for HSSA)	N	
Alquist-Priolo Special Studies Zones Act		
Building Code Version	Y	
Full-time Building Official	Y	
- Conduct "as-built" Inspections?	Y	
BCEGS Rating		

Capability	Y/N other	Comments
Local Emergency Operations Plan	Y	
Fire Department ISO rating	4	
Fire Safe Programs	Y	
Hazard Mitigation Plans	Y	
Warning Systems in Place?		
- Storm Ready Certified?		
- Weather Radio reception?		
- Outdoor Warning Sirens?		
- Emergency Notification (R-911)?		
- Other? (e.g., cable over-ride)		
GIS System?		
- Hazard Data?		
- Building footprints?		
- Tied to Assessor data?		
- Land-Use designations?		
Structural Protection Projects		
Property Owner Protection Projects		
Critical Facilities Protected?		
Natural Resources Inventory?		
Cultural Resources Inventory?		
Public Information Program/Outlet		
Environmental Education Program?		

According to the city approximately 500 residential properties worth approximately \$30 million and 25 commercial properties worth approximately \$25 million are flood-prone. Roads, houses, commercial centers, and a school are also at risk. The city is growing on the east side of town, which could exacerbate flood problems there. Improved drainage along the streets (curbs and gutters) and increased capacity of the storm drain collection system is needed.

RIDGECREST

Hazard and Risk Summary

Ridgecrest identified earthquakes and floods as the most significant hazards, followed by severe weather. Historic incidents indicate that floods and windstorms have impacted the city (see appropriate section in the Hazard Identification for more detail). The area just north of the town has been the source of several moderate sized earthquake swarms during 1980-1991, 1992-1994, and 1995. The largest of these was a magnitude 5.8 on 8/17/1995 (Source SCEC http://www.data.scec.org/chrono_index/ridgecrq.html).

Inventory

Ridgecrest Assessed Valuation of Improved Properties				
PROPERTY	COUNT	ACRES	IMPROVED VALUE	LAND VALUE
commercial	510	348.91	\$ 139,031,090	\$ 37,950,186
industrial	150	186.25	\$ 7,700,211	\$ 5,333,461
other	213	8,154.09	\$ 371,308	\$ 1,663,828
residential	11,595	1,890.78	\$ 610,632,879	\$ 134,654,906
TOTALS	12,468	10,580.03	\$ 757,735,488	\$ 179,602,381

Source: Kern County Assessor's database 2004

Jurisdiction-Specific Existing Capabilities

Jurisdiction	Y/N other	Comments
Comp Plan/General Plan	Y	
Special Plans	Y	
Subdivision Ordinance	Y	
Zoning Ordinance	Y	
NFIP/FPM Ordinance	Y	Joined 1-6-1982, Map 1-6-1982
- Substantial Damage language?	Y	
- Administrator/Certified Floodplain Manager?	Y	
- # of Flood threatened Buildings?	Unknown	
- # of flood insurance policies	99	
- # of Repetitive Losses?	Unknown	
- Maintain Elevation Certificates?	N	
CRS Rating, if applicable	Unknown	
Stormwater Program?	N	
Erosion or Sediment controls	Y	
# of unreinforced masonry buildings	None	
Hospitals built before 1973 (for HSSA)	Y	
Alquist-Priolo Special Studies Zones Act	N	
Building Code Version	2001	

Jurisdiction	Y/N other	Comments
Full-time Building Official?	Y	
Conduct "as-built" Inspections?	Y	
BCEGS Rating	Unknown	
Local Emergency Operations Plan	Y	
Fire Department ISO Rating	Unknown	
Fire Safe Programs	Y	
Hazard Mitigation Plans	Y	
Warning Systems/Services	Y	
- Storm Ready Certified?	Unknown	
- Weather Radio reception?	Good	
- Outdoor Warning Sirens?	N	
- Emergency Notification (R-911)?	Y	
- Other? (e.g., cable over-ride)	Y	
GIS System?	N	
- Hazard Data?	Y	
- Building footprints?	Y	
- Links to Assessor data?	Y	
- Land-Use designations?	Y	
Structural Protection Projects	N	
Property Protection Projects	N	
Critical Facilities Protected?	Y	
Natural and Cultural Resources Inventory?	N	
Public Information Program/Outlet	Y	
Environmental Education Program?	Y	

Preventative activities.

- Planning – Projects within the City of Ridgecrest are subject to review by the Department of Community Development. This review considers the impact of a given development on the environment and surrounding existing developments.
- Zoning – The City of Ridgecrest has a zoning plan which is enforced and is modified as needed to reflect the community needs.
- Open Space Preservation – Within the City of Ridgecrest, there are areas set aside for open space land uses. Outside the City of Ridgecrest there are thousands of square miles of government held lands which are considered as open space with restricted access.

Land development standards

- Subdivision Standards – The City of Ridgecrest has a subdivision ordinance and standards.
- Building Codes – The City of Ridgecrest enforces the California Building Code.
- Floodplain Development Regulations – The City of Ridgecrest has a floodplain ordinance and the City has been mapped by FEMA to define floodprone areas.

- Geologic Hazard Areas – The City of Ridgecrest has a seismic element in the general plan. There is little hazard due to landslides or slope failure due to the relatively flat topography.

Storm Water Management – Storm water management is one of the duties of the Street Department. New and existing developments are designed with this in mind.

Fuels Management – Given the nature of the natural vegetation in the area fuel management in the traditional sense is not a concern for the City of Ridgecrest. There are however concerns where debris and tumbleweeds accumulate in confined areas within the city.

Emergency services activities.

- Warning
 - NOAA Weather Radio – This service is available and cable TV also has a warning system.
 - Reverse 911 – This system is in the process of being installed.
- Emergency Response
 - Evacuation and Sheltering – Aside from the surrounding vacant desert areas for mass evacuation are limited. Areas for limited amounts of shelter are available at the local schools, the Fair Grounds, and the Civic Center.
 - Communications – The City of Ridgecrest is tied into Kern County and the state networks. A group of local HAM's are active in the local emergency response program.
 - Emergency Planning
 - Activation of the EOC is the responsibility of the Mayor, City Manager, or Police Chief.
 - Street closures are the responsibility of the Police Department and/or Street Department. When possible, fire and ambulance are given forewarning.
 - Control of the power is the responsibility of Southern California Edison.
 - The schools are responsible for the control of the children.
 - The Street Department is responsible for sandbags and a supply is kept on hand at all times.
 - The Mayor, City Manager, or Police would be responsible for ordering an evacuation.
 - Opening emergency shelters would be a joint effort by the Red Cross, governmental agencies (City, County, State, and NAWS) and local service groups.
 - Water levels are monitored by the Police, Street and Engineering Departments.
 - Security and other protection measures are the responsibility of the Police Department.

Property protection activities - Critical Facilities Protection

- Buildings and facilities that if damaged would create secondary disasters would for the most part be protected by local police agencies. There may have to be some assistance by utilities, private security agencies, and local institutions.
- Lifeline utility protection is the responsibility of the various utilities.
- Floods – Flooding can at times be a problem in the City of Ridgecrest. These events are infrequent and usually short in duration. Measures taken to protect structures by elevating the first floor above the adjacent ground. The City of Ridgecrest does have a master drainage plan, but the funding to implement the plan is not available.
- High Wind/Tornados – High winds are a frequent occurrence in the area, but tornados, while they have been sighted, are very infrequent. Newer structures are constructed in accordance with the building codes. Some problems may exist with the older structures however.
- Winter Storms – Snow is an infrequent event and usually melts quickly.
- Geologic Hazards – Earthquakes are common but present about the only geologic hazard in the area. Newer construction is built in compliance with modern building codes and should withstand seismic loads. Older structures may not fair as well.
- Drought – The Indian Wells Valley Water District provides water service in the Valley from ground water sources. It has been said that the supply is abundant. The City of Ridgecrest uses treated wastewater to water a golf course and to grow alfalfa. Low water consumption plants are encouraged. The Water District has a promotional plan to encourage this.
- Wildfires and Grassfires – Due to the sparse vegetation in the area, naturally occurring wildfires are rare. Fires are generally due to tumbleweeds and trash accumulation. Fire protection is provided by the Kern County Fire Department.
- Noxious Weeds and Insects – The tumbleweed is present and is a source of fire hazard if not controlled. Mosquitoes carrying the West Nile Virus also present a concern. The City of Ridgecrest has a spraying program in the summer.

Insurance

- Flood insurance is available within the City of Ridgecrest.
- Earthquake insurance, while expensive, is also available.

Natural Resource Protection.

- There are no wetland or riparian areas in the Ridgecrest Area.
- Erosion and sediment control are problems which cost the City of Ridgecrest a lot in the way of street maintenance.
- Pollution of surface water in the Ridgecrest area is not a problem since there is no surface water.

Post Disaster Mitigation

- Building inspections will be conducted by the Building Department and the Engineering Department.
- State and Federal relief sources will be sought.

Other Concerns

- Domestic and commercial solid waste facilities are operated and maintained by Kern County.
- Hazardous waste is collected periodically by the county and disposed of at a hazardous waste site.
- Building set backs are regulated by the Zoning Ordinance.
- The diesel and gas fuel tanks owned by the city are constructed above ground to avoid leaks that could pollute the groundwater. This also provides gravity flow in the event of a power failure.
- Consumption of water provided by the Indian Wells Valley Water District is restricted by the use of a metered system.

Structural Projects.

- The City of Ridgecrest has a master drainage plan but as previously noted, does not have the funding to implement the plan. Storm water runoff is conveyed on the city streets in a northerly and easterly direction until it enters the Navy Air Weapons Center property. There are several detention/retention basins that are maintained by the city. These are the sources that must be sprayed during the summer months to prevent mosquitoes.

SHAFTER

Hazard and Risk Summary

The City of Shafter did not list any hazards as highly significant, but noted drought, earthquakes, and severe weather have 'medium' significance concerns. The downtown area of Shafter has many unreinforced masonry buildings (at least 110) that could be severely damaged during an earthquake. A transportation accident is the most likely large-scale emergency facing the city. The city is divided by two major railroads that travel north-south. The city had a significant train derailment involving hazardous materials on October 25, 1995. 49 people were injured and 12 hospitalized as a result. State highway 43 was closed for 1 week and retail sales were reduced by 50%. The City is concerned about dust storms as well. Dust storms could impact the entire City, knocking over trees, interrupting power, and blocking access to some parts of the city and causing sheltering problems. The City provided historic incident information for the 1977 dust storm, 1990 freeze, and the 1952 earthquake.

Inventory

Shafter Assessed Valuation of Improved Properties				
PROPERTY	COUNT	ACRES	IMPROVED VALUE	LAND VALUE
agricultural	109	8,073	\$ 21,759,042	\$ 19,020,417
commercial	183	96	\$ 32,697,208	\$ 7,785,375
industrial	83	642	\$ 97,361,878	\$ 16,703,966
other	140	1,237	\$ 7,349,831	\$ 1,440,276
residential	3,014	438	\$ 176,459,061	\$ 53,029,662
TOTALS	3,529	10,486	\$ 335,627,020	\$ 97,979,696

Source: Kern County Assessor's database 2004

Inventory (provided by City)

Building Inventory

3,820 residential buildings worth \$300 billion

395 non-residential buildings worth \$325 billion

500 Bed Prison

City Hall

Critical Facilities Inventory

Police Building

Public Works Building (\$30 million)

2 Health Clinics

2 Nursing Homes (\$25 million)

Infrastructure

Water system valued at \$45 million

Roadways valued at \$35 million

Historical resources

Shafter Railroad museum, Green Railroad Hotel

Affected population:

13,200

50% below poverty line

Train derailment risk. Approximately 100 buildings near tracks could be damaged by a train derailment. A derailment could cause severe damage to City Hall, the Police Department, Courthouse, and other structures valued at an estimated \$52 million. Derailment will block rail and roads can cause localized damage to \$10 million. Depending on the type of spill and wind direction one half of the City's 13,800 residents could be affected with significant health issues.

Development trends. The City, residential and business community are growing at a rapid pace. By the year 2030, the population could nearly double to 24,721 persons in the core area and the number of households could increase to 5,701 units. New construction meets earthquake standards.

Jurisdiction-Specific Existing Capabilities

Capability	Y/N other	Comments
Comp Plan/General Plan	Y	
Special Plans	N	
Subdivision Ordinance	Y	
Zoning Ordinance	Y	
NFIP/FPM Ordinance	Y	Joined 9-29-1985, Map 6-16-1999
- Substantial Damage language?	Y	
- Administrator/Certified Floodplain Manager?	N	
- # of Floodprone Buildings?		
- # of flood insurance policies	44	
- Maintain Elevation Certificates?	Y	
- # of Repetitive Losses?	0	
CRS Rating, if applicable		
Stormwater Program?	N	
Erosion or Sediment controls	N	
# of unreinforced masonry buildings	26	Survey completed
Hospitals built before 1973 (for HSSA)	N	
Alquist-Priolo Special Studies Zones Act	N	
Building Code Version	2002	2001 California Building Code
Full-time Building Official	Y	
- Conduct "as-built" Inspections?	Y	
BCEGS Rating	3	ISO 3 Residential and Commercial
Local Emergency Operations Plan	Y	
Fire Department ISO rating		
Fire Safe Programs	N	
Hazard Mitigation Plans	N	
Warning Systems in Place?		
- Storm Ready Certified?	N	

Capability	Y/N other	Comments
- Weather Radio reception?	Y	
- Outdoor Warning Sirens?	N	
- Emergency Notification (R-911)?	N	
- Other? (e.g., cable over-ride)	N	
GIS System?	N	
- Hazard Data?		
- Building footprints?		
- Tied to Assessor data?		
- Land-Use designations?		
Structural Protection Projects		
Property Owner Protection Projects		
Critical Facilities Protected?		
Natural Resources Inventory?		
Cultural Resources Inventory?		
Public Information Program/Outlet		
Environmental Education Program?		

Existing plans and procedures

The City has a **Flood Ordinance Procedure** that contains all the tools the City needs for floodplain management, including permitting procedures, substantial improvement worksheets, elevation certificates, etc., as well as a copy of the City's floodplain management ordinance.

General Plan 1993.

The City is proposing a comprehensive update to its 1993 General Plan in 2005. The General Plan Safety Program is designed to protect the community from the risks associated with the effects of geologic hazards, flooding, airport accidents, hazardous materials transport, wildland and urban fires, and crime. The program also addresses the provision of services and facilities capable of responding to an emergency. Highlighted below are objectives related to natural hazards:

Geology and Seismicity

- Objective VI.A Minimize the potential for loss of life, physical injury, property damage, and social disruption resulting from seismic groundshaking and other geologic events. (five associated policies)
- Objective VI.B Minimize the potential for loss of life, physical injury, property damage, and social disruption resulting from a 100-year flood (4 associated policies).

Zoning Ordinance 1996, updated 2003.

The City of Shafter's Zoning Ordinance No. 472 is contained within Municipal Code Title 17.

Subdivision and Engineering Design Manual, 1998

The manual is contained within Section 1.030.B of Chapter 1 Municipal Code Title 16. It contains provisions for drainage and grading, hydraulic and hydrologic design, and design storm frequencies. Chapter II has the general policy on flood protection and flow on adjacent properties and design criteria for retention/detention basins.

Hazard and Risk Summary

Earthquakes are a significant hazard for Taft, due to its proximity to the San Andreas Fault. The city identified this as ‘high’ significance, with a potential ‘catastrophic’ magnitude, followed by drought, floods, and wildfires as ‘medium.’ The city notes that there is a significant amount of low lying residential area that is susceptible to flooding. In addition the City provided historic incident information for the following events that are integrated into the appropriate hazard profile in the County wide hazard identification:

- Africanized Honey Bee swarms (numerous events in 1999-2004);
- Citywide flooding on May 5th, 1998 that closed 2nd, 4th, and 6th streets. The City did receive FEMA funds as part of FEMA 1203-DR-CA declaration .
- Wildland urban interface fires in 1998 and 2004;
- High wind event in December, 2002 and in January of 1916 (one of the Town’s worst disasters)

The City completed risk assessment worksheets for : Natural Health Hazards, Earthquake, Drought, Floods, Wildfires, and Severe Weather. The city’s inventory, with footnotes of vulnerability to particular hazards, are presented below.

Inventory

Taft Assessed Valuation of Improved Properties				
PROPERTY	COUNT	ACRES	IMPROVED VALUE	LAND VALUE
agricultural	20	1,218.03	\$ 35,349	\$ 670,371
commercial	262	101.83	\$ 37,541,707	\$ 13,997,891
industrial	66	506.77	\$ 3,873,937	\$ 4,083,626
other	179	6,765.26	\$ 7,251,988	\$ 2,217,222
residential	2,152	209.11	\$ 118,968,208	\$ 43,512,326
TOTALS	2,679	8,801.00	\$ 167,671,189	\$ 64,481,436

Source: Kern County Assessor's database 2004

Building Inventory (2)

2,063 residential structures valued at \$167,172,655

616 non-residential structures valued at \$71,100,707

Critical Facilities Inventory

EMS Services (1)

Medical Facilities: Doctor’s office, Urgent Care, School Nursing (1)

Fire Station (4), (6)

Taft Primary School (4), (6)

Taft Union High School (4), (6)

City Hall (6)
 Police Station (6)
 Taft College (6)
 Prison (6)
 Junior High School (6)

Infrastructure (2)

Power lines/poles (5)
 Highways 33 and 119
 Bridges: 119, 4th, 6th, Emmons, N 10th, 33 Hillard (4)
 Gas –Electric – Water – Sewage (3)

Affected population (2)

800-1,000 (4)
 Special needs populations include seniors, preschoolers. (1)

Historic, cultural or natural resources affected (2)

Oilfield lands (5)
 Protected wildlife lands (Kit fox) (5)
 The Fort
 5th and Main St

Risk to hazards summary:

- (1) Natural health hazards
- (2) Earthquakes
- (3) Drought
- (4) Floods
- (5) Wildfire
- (6) Severe Weather

Development trends. "Typical to growing community" More single family homes are being built in urban wildland interface areas near the City.

Jurisdiction-Specific Existing Capabilities

Jurisdiction	Y/N other	Comments
Comp Plan/General Plan	Yes	
Special Plans	Yes	
Subdivision Ordinance	Yes	City Planner
Zoning Ordinance	Yes	City Planner
NFIP/FPM Ordinance	Yes	Joined 8-23-1982, Map 9-30-1992
- Substantial Damage language?	Yes	Included in FHMP
- Administrator/Certified Floodplain Manager?	Yes	City Building Inspector
- # of Flood threatened Buildings?	Unknown	
- # of flood insurance policies	No data	
- # of Repetitive Losses?	No	
- Maintain Elevation Certificates?	Unknown	

Jurisdiction	Y/N other	Comments
CRS Rating, if applicable	Unknown	
Stormwater Program?	Yes	
Erosion or Sediment controls	Unknown	
# of unreinforced masonry buildings	40	
Hospitals built before 1973 (for HSSA)	No	
Alquist-Priolo Special Studies Zones Act	No	
Building Code Version	2001	
Full-time Building Official?	Yes	City Building Inspector
Conduct "as-built" Inspections?	Yes	
BCEGS Rating	Unknown	
Local Emergency Operations Plan	Yes	
Fire Department ISO Rating	Yes	
Fire Safe Programs	No	
Hazard Mitigation Plans	Yes	
Warning Systems/Services	No	
- Storm Ready Certified?	No	
- Weather Radio reception?	No	
- Outdoor Warning Sirens?	No	
- Emergency Notification (R-911)?	No	
- Other? (e.g., cable over-ride)	No	
GIS System?	Yes	City GIS Coordinator
- Hazard Data?	Yes	
- Building footprints?	Yes	
- Links to Assessor data?	Yes	
- Land-Use designations?	Yes	
Structural Protection Projects		
Property Protection Projects	No	
Critical Facilities Protected?	Unknown	
Natural and Cultural Resources Inventory?	No	
Public Information Program/Outlet	No	
Environmental Education Program?	No	

Flood Hazard Mitigation Plan – March 1996

The Flood Hazard Mitigation Plan sets forth measures to reduce the magnitude, frequency, and severity of flooding within the City of Taft. The plan involves a four part strategy to reduce the city's vulnerability to flooding. These include measures for:

- **New Development:** The Floodplain Management Ordinance provides regulations for development in the floodplain.
- **Existing Development:** The city reviews existing developed areas where flooding may occur to lessen the threat of flooding with ongoing projects or reconstruction as funding allows.
- **Emergency Readiness:** Taft maintains Publics Works equipment and a stock of sandbags and sand to mitigate flood damage.

- **Specific Hazard Mitigation Project:** It is proposed to establish the Sand Creek channel capacity sufficient to carry the 100 year storm and stabilize the creek channel with concrete rip-rap from State Highway 33 to State Highway 119.

Floodplain Management Ordinance

Taft is a participant in the National Flood Insurance Program. Taft has adopted a Floodplain Management Ordinance. This ordinance establishes regulations for development in the floodplain. Taft requires that the lowest floor in areas of special flood hazards be elevated one foot above the base flood elevation on new or substantial improvements of residential construction. Similarly non-residential construction should either be elevated or floodproofed to one foot above one foot above base flood elevation. Facilities must also be properly anchored. The floodplain management ordinance also provides standards for utilities, subdivisions, manufactured homes and recreational vehicles. It also prohibits encroachment into floodways and requires a permit for any construction or development within a flood-related-erosion-prone area so that it is reasonably safe from flood-related erosion and will not cause flood-related erosion hazards.

Public Works Department

Unreinforced Masonry Buildings – February 1996

The Public Works department has a Unreinforced Masonry (URM) Buildings policy. It sets forth requirements for the inspection of the structural integrity of URM buildings at the time of a change in occupancy at a URM building or if URM building has been vacated for six months. The policy also requires that the URM buildings post a sign in a conspicuous place at the entrance of the building that states, “This is an unreinforced masonry building. Unreinforced masonry buildings may be unsafe in the event of a major earthquake.”

Fire Insurance Classification – December 1997

The Taft Fire District was evaluated by the insurance services office for public fire protection. The City of Taft was rated with an insurance classification of Class 5/9. This classification applies to buildings with a needed fire flow of 3,500 gallons per minute or less.

Wildfire Mitigation

The City has yearly weed abatement and hazard reduction programs that require the creation of defensible space.

Earthquake Mitigation

The City is concerned about seismic retrofit of unreinforced masonry buildings.

Public information activities.

Taft has set up a public education and notification process through its local Cable T.V. station.

TEHACHAPI

Hazard and Risk Summary

Tehachapi and six special districts in the Tehachapi area collaborated with their own planning team to develop input into this planning process. The team identified earthquakes, drought, wildfires, severe weather, and natural health hazards as the most significant hazards, followed by floods and dam failure. The team also added terrorism as a highly significant manmade hazards. Historic incidents indicate that floods, dam failure, earthquakes, landslides, dust storms, extreme temperatures both hot and cold, fog, wildfires, and windstorms have impacted the city and surrounding districts (see appropriate section in the Hazard Identification for more detail).

In addition the planning group provided historic incident information for the following events:

- The Tehachapi area experienced extensive property damage in the 1952 earthquake
- Significant floods have occurred in 1932, 1938, and 1945
- Landslide east of town in mid 1980's closed Highway 58 for two days
- Wind damage in 1985 and 1995 uprooted trees in city park and damaged homes.
- Wildfires are an annual threat to the area between May and October.
- Dam failures could impact the western City/Cummings Valley area.

Due to its Mountain location Tehachapi is susceptible to 2-10 days of isolation due to fog, winter storm, earthquake and landslide related road closures, and is susceptible to power, water, and natural gas outages.

Inventory

Tehachapi Assessed Valuation of Improved Properties				
PROPERTY	COUNT	ACRES	IMPROVED VALUE	LAND VALUE
agricultural	11	341.34	\$ 262,082	\$ 1,861,702
commercial	161	101.20	\$ 48,587,844	\$ 20,019,330
industrial	109	434.07	\$ 11,538,576	\$ 7,935,075
other	123	3,523.30	\$ 148,577	\$ 1,864,479
residential	2,288	949.12	\$ 137,946,540	\$ 50,735,562
TOTALS	2,692	5,349.03	\$ 198,483,619	\$ 82,416,148

Source: Kern County Assessor's database 2004

Jurisdiction-Specific Existing Capabilities

Jurisdiction :	Y/N other	Comments
Comp Plan/General Plan	Yes	City Planning Dept
Special Plans	Unknown	
Subdivision Ordinance	Yes	City Planning Dept
Zoning Ordinance	Yes	City Planning Dept
NFIP/FPM Ordinance	Yes	Joined 6-15-1982, Map

Jurisdiction :	Y/N other	Comments
		6-15-1982
- Substantial Damage language?	Yes	
- Administrator/Certified Floodplain Manager?	Yes	City Planning Dept
- # of Flood threatened Buildings?	Unknown	
- # of flood insurance policies	7	
- # of Repetitive Losses?	0	
- Maintain Elevation Certificates?	Yes	
CRS Rating, if applicable	N/A	
Stormwater Program?	Unknown	
Erosion or Sediment controls	Yes	
# of unreinforced masonry buildings		
Hospitals built before 1973 (for HSSA)	Yes	Tehachapi Hospital Distinct
Alquist-Priolo Special Studies Zones Act	Yes	
Building Code Version	Yes	City Planning Dept
Full-time Building Official?	Yes	City Planning Dept
Conduct "as-built" Inspections?	Yes	City Planning Dept
BCEGS Rating	Unknown	
Local Emergency Operations Plan	Yes	
Fire Department ISO Rating	Unknown	
Fire Safe Programs	Yes	
Hazard Mitigation Plans	No	
Warning Systems/Services	Yes	EBS
- Storm Ready Certified?	Unknown	
- Weather Radio reception?	Y	
- Outdoor Warning Sirens?	N	
- Emergency Notification (R-911)?	Y	
- Other? (e.g., cable over-ride)	Unknown	
GIS System?	Unknown	
- Hazard Data?	Unknown	
- Building footprints?	Unknown	
- Links to Assessor data?	Unknown	
- Land-Use designations?	Unknown	
Structural Protection Projects	N	
Property Protection Projects	Yes	Capital Improvement Plan
Critical Facilities Protected?	Yes	Hospital, Museum
Natural and Cultural Resources Inventory?	Unknown	
Public Information Program/Outlet	Yes	City websites, utility billing, Newspaper
Environmental Education Program?	Yes	Kern County Waste Management

Tehachapi General Plan Update

The Tehachapi General Plan covers the Tehachapi Sphere of Influence, an area of approximately 23 square miles, being primarily the Tehachapi Valley, from Golden Hills to the Calaveras Cement Plant. The General Plan is the foundational policy document of the city which effectively serves as the constitution for development within the city and as a blue-print for long-range physical planning.

Land Use Element – August 1996

Policies related to safety:

- No development shall be permitted in natural 100-year floodways. If approved, an environmental channel may be considered within the floodway. Adequate landscaping, revegetation, flood control measures, and usable open space beyond the embankments of the environmental channel shall be provided as determined by the city.
- Mobile home parks should be given particular attention to ensure that building and safety regulations are continually met and that mobile home parks are well maintained.
- Subdivisions should avoid the use of panhandle lots and unusual lot slopes except to preserve slopes, ridgelines, habitat areas, and other resources identified in the Open Space Conservation Element.
- In specific planning areas, appropriate protection against soil erosion, particularly where hillside development is involved shall be assured.
- Cluster developments shall not increase geotechnical and flooding hazards for adjoining properties.

Public Facilities Element

This element is a comprehensive collection of facility information including water, sewer, circulation, and drainage. Each facility discussion identifies the need for that facility, summarizes the overall plan for that facility, describes the existing condition of the facility, and describes requirements recommended for the approval of new development.

Drainage:

Historically, Tehachapi has been subjected to extensive flooding during periods of heavy precipitation or snowmelt due to runoff from the mountains in the south. A series of dams and diversion structures to the south of town has greatly reduced this hazard. As evidence of this fact, the FEMA has reclassified all of the area within the general plan boundaries below the dams as Flood Hazard Zone “B”. These dams and diversion structures were constructed and are maintained by the Tehachapi-Cummings County Water District. Construction of the dams and diversion structures has alleviated the City’s flooding problems greatly; however, storm water runoff concerns still exist. This element intends to implement a cohesive approach to storm water runoff control and provide an overall master plan for the installation of storm drainage facilities. The top two objectives and goals with regard to drainage are

- Provide protection from flooding for homes, businesses, and other structures
- Provide for safe circulation of vehicles and pedestrians

Several major drainage areas exist within the city. In some instances the specific drainage facility for an area has been studied and specific design parameters have been achieved. In other instances the problem has been ascertained along with a general solution, however, not to the degree that specific improvements are identified. Specific development applications will be reviewed on a case by case basis and their inclusion in a particular drainage area will be assessed at that time.

Financing for drainage facilities is through the collection of Storm Drain Basin Fees from new development. Improvements to existing storm drain deficiencies will be financed as part of the city's Capital Improvement Plan (CIP). Due to the lack of available resources, only those storm drain deficiencies which pose a significant threat to public health and safety will be given a high priority in the CIP.

Safety Element – October 1999

The Safety Element aims at reducing death, injuries, damage to property, and the economic and social dislocation resulting from fire, geologic hazards, earthquakes, geologic hazards, and other hazards. This element works as a vehicle for identifying hazards that must be considered in planning the location, type, and density of development.

Tehachapi has several existing conditions that provide the public with a safe living environment. Although the potential for damage resulting from future earthquakes cannot be ignored, Tehachapi is characterized by a number of factors, which tend to reduce earthquake hazards. Fore most among these are the relatively low-density character of the community and comparatively high level of seismic hazard awareness on the part of residents of the community and public officials.

Low density reduces the chances that any one fire would affect a large number of people. The relative newness and low-density form of the community are definite assets when perceived in terms of seismic susceptibility. Future intensification trends will benefit from modern seismic design and construction technology, creating a positive environment for the total community.

One other condition that relates to the character of the city includes its location on a generally level floodplain. For these reasons, the city is not susceptible to the dangers from brush fires, slope instability, general subsidence, differential settling, or erosion.

Two other advantages are the quality of local fire control agencies and the availability of many high quality disaster response agencies, which serve the city. The Fire Department is highly rated and is willing to take advantage of new methods and equipment. They are also tied into a countywide response program, which allows them to handle most emergencies. Mutual aid agreements combine the disaster response capabilities of many agencies and jurisdictions, including neighboring cities and counties, enabling adequate responses to most foreseeable emergencies. The Tehachapi area has a cooperative response agreement with the Kern County Fire Department. The county provides full-time staff to four of the five area stations. The rest of the staff consists of volunteers.

Tehachapi is fortunate in having a number of ordinances, programs, and requirements already in existence pertaining to seismic and fire hazards. Primary among these are the subdivision and building permit approval requirements for seismic strengthening, adequate access and minimum fire flow pressure. Upgrading of the water system is discussed in the CPI.

Public awareness of earthquake and fire hazards is another important consideration. The citizens are most cooperative in adhering to regulations and this awareness and cooperation contributes to understanding and cooperation during an actual emergency.

Construction of the Tehachapi Watershed Plan has alleviated a major portion of potential flooding problems. The Watershed Plan consists of a program for structural measures to alleviate flooding problems. The structural measures were installed by project sponsors with assistance from the Soil Conservation Service. The structural program includes dams with diversion inlets at the mouths of both Antelope and Blackburn Canyons, 0.2 miles of channel enlargement, and 20.5 acres of wildlife habitat development.

The Safety Element contains an environmental risk analysis for all types of environmental hazards that might be experienced in Tehachapi. The element provides several recommendations for improvement in reducing risk of damage by an environmental hazard and improving emergency response during a hazard.

Also, to protect the public from risks associated with pipelines used for the transmission of hydrocarbon related substances, the plan states a minimum setback of property lines, buildings, and structures of 25 feet from each side of the pipeline.

The element lists existing programs and activities that have a significant or potential capability for implementing the Safety Element goals and policies. They include:

City Programs

- Building regulation
- Disaster response coordination
- Fire protection
- Land division regulation
- Disaster preparedness
- Emergency medical aid
- Grading regulation
- Zoning regulation
- Tehachapi emergency operation plan

County Programs

- Building regulation
- Disaster response coordination
- Fire protection
- Land division
- Taxation
- Neighborhood development
- Disaster preparedness
- Emergency medical aid
- Geologic mapping
- Model neighborhoods
- Relocation services
- Hazardous waste programs

Regional Programs

- Intergovernmental coordination (LOCE, KCOG, AQMD)

State Programs

- Fire/Rescue Emergency Plan
- Water Supply Management
- Dam Safety
- Geologic Research and Mapping
- School Safety
- Taxation
- Dam Inundation Areas Evacuation
- Fault Hazard Zone Mapping

Federal Programs

- FIRESCOPE
- Relocation Services
- Taxation
- U.S. Geologic Survey

Other

- Community Relation
- Legislative Actions
- Long Range Planning
- Public Education
- Coordination and Review
- Mutual Assistance/Aide
- Research and Monitoring

Zoning Ordinance of the City of Tehachapi – January 05

This title is adopted to promote and protect the public health, safety, and welfare through the orderly regulation of land uses throughout the city. Further, the purposes of this title are to:

- Provide the economic and social advantages resulting from an orderly planned use of land resources;
- Encourage and guide development consistent with the city general plan;
- Divide the city into zoning districts of a number, size, and location deemed necessary to carry out the purposes of the city general plan and this title;
- Regulate the size and use of lots, yards, and other open spaces;
- Regulate the use, location, height, bulk, and size of buildings and structures;
- Regulate the intensity of land use;
- Regulate the density of population in residential areas;
- Establish requirements for off-street parking;
- Establish requirements for landscaping;
- Regulate signs and billboards;
- Provide for the enforcement of the regulations of this chapter.

Floodplain Management

It is the purpose of this chapter to promote the public health, safety and general welfare, and to minimize public and private losses due to flood conditions in specific areas by provisions designed:

- To protect human life and health;
- To minimize expenditure of public money for costly flood control projects;

- C. To minimize the need for rescue and relief efforts associated with flooding and generally undertaken at the expense of the general public;
- D. To minimize prolonged business interruptions;
- E. To minimize damage to public facilities and utilities such as water and gas mains, electric, telephone and sewer lines, streets and bridges located in areas of special flood hazard;
- F. To help maintain a stable tax base by providing for the second use and development of areas of special flood hazard so as to minimize future flood blight areas;
- G. To insure that potential buyers are notified that property is in an area of special flood hazard; and
- H. To insure that those who occupy the areas of special flood hazard assume responsibility for their actions.

In order to accomplish its purposes, this chapter includes methods and provisions for:

- A. Restricting or prohibiting uses which are dangerous to health, safety and property due to water or erosion hazards, or which result in damaging increases in erosion of flood heights or velocities;
- B. Requiring that uses vulnerable to floods, including facilities which serve such uses, be protected against flood damage at the time of initial construction;
- C. Controlling the alteration of natural floodplains, stream channel, and natural protective barriers, which help accommodate or channel floodwaters;
- D. Controlling filling, grading, dredging and other development which may increase flood damage; and
- E. Preventing or regulating the construction of flood barriers which will unnaturally divert floodwaters or which may increase flood hazards in other areas.

Protection measures include the requirement that new construction be elevated to or above base flood elevation.

In all areas of special flood hazards the following standards are required:

- To be anchored to prevent flotation, collapse or lateral movement of the structure resulting from hydrodynamic and hydrostatic loads.
- To be constructed with materials and utility equipment resistant to flood damage using methods and practices that minimize flood damage.
- To provide in flood prone zones, adequate drainage paths around structures on slopes to guide flood waters around and away from proposed structures.
- To elevate new construction and substantial improvements of any structure including basements to or above the base flood elevation and in flood prone areas above the highest adjacent grade at least as high as the depth number specified in feet on the FIRM, or at least two feet if no depth number is specified.
- To elevate nonresidential construction as stated above or together with attendant utility and sanitary facilities to be floodproofed so that below the base flood level the structure is watertight with walls substantially impermeable to the passage of water and have structural components capable of resisting hydrostatic and hydrodynamic loads and effects of buoyancy.

- To design fully enclosed areas below the lowest floor that are subject to flooding to automatically equalize hydrostatic flood forces on exterior walls by allowing for the entry and exit of floodwaters.

Capital Improvement Plan

The City has several flood mitigation projects outlined in its Capital Improvement Plan.

Structural Projects

Flood protection up to the 100 year event is provided to Tehachapi by the Antelope and Blackburn dams (see the Tehachapi Cummings County Water District section for more detail).

The City has been taking the lead on flood control through culvert removal and bridge construction. The City is working in conjunction with the Tehachapi Cummings County Water District on the Antelope Run restoration and flood control project.

Tehachapi Emergency Plan – November 1997

This Plan is composed of Volume One “Emergency Operations Center Standard Operating Procedures and Section Checklists” and Volume Two “SEMS Emergency Plan”. The two volumes provide a comprehensive emergency response document including detailed information covering Emergency Operations Center procedures, documentation, reference, and support information.

Volume One, Chapter One - EOC Activation Procedures

Provides general material on *Who, What, When, Where* and *How* to activate the Tehachapi Emergency Operations Center.

Volume One, Chapter Two – Section Checklists

This section provides Emergency Operations Center information and individual position checklists. The Section Chief is responsible to ensure each member within his Section reads and follows the Checklist for that position. The Operations Section has supplemental event specific checklists for law enforcement, fire/rescue, and public works.

Volume One, Chapter Three - EOC Documentation

Emergency Operations Center support documentation and essential information used in the completion of individual and section responsibilities and tasks is provided in this chapter.

Volume Two, Chapter One - Basic Plan

Supplemental information providing detailed information relating to the plan assumptions, goals, training and exercises, maintenance of the plan, preparedness elements, the Standardized Emergency Management System (SEMS), jurisdictional responsibilities under SEMS, and Alerting and Warning.

Volume Two, Chapter Two - Authorities and References

Federal, State, County and mutual aid authorities that provide legal basis for the Emergency Plan.

Volume Two, Chapter Three – Hazard Mitigation

Provides policies and procedures for implementing Section 409 (Minimum Standards for Public and Private Structures) of the Robert T. Stafford Disaster Relief and Emergency Services Act of 1988 (Public Law 93-288, as amended).

Volume Two, Chapter Four - Mutual Aid

This chapter provides information about California and local jurisdiction mutual aid systems and procedures.

Volume Two, Chapter Five - Utilization of Volunteers

This chapter provides information about the recruiting and management of volunteers.

Volume Two, Chapter Six - Threat Summary and Assessments

This chapter provides threat summaries and hazard analysis for City of Tehachapi.

Volume Two, Chapter Seven - Recovery

This chapter provides detailed information relating to federal, state, and local jurisdiction recovery categories and procedures.

Tehachapi Mountain Community Response Plan - 1996

The Tehachapi Mountain Community Response Plan is a plan designed to establish responsibilities and coordinate response to any major emergency or disaster that occurs or impacts the Tehachapi area. It is intended to provide general guidance. It covers Tehachapi, Bear Valley, Stallion Springs, Golden Hills, and Sand Canyon (generally the boundaries of the Tehachapi Unified School District. Due to potential isolation of the Tehachapi Mountain area, this plan is designed with the intent of augmenting the Kern County Emergency Plan. It provides a guideline of operations assuming that the out-of-area emergency personnel may not be able to reach sections of the Tehachapi Mountain area for during the first few hours or days following a disaster.

The plan describes the responsibilities of each agency involved in disaster response and provides contact information for all of these agencies. It also describes the Incident Command System, lists potential shelter locations and casualty staging areas, and provides frequency communication information for emergency response agencies.

Tehachapi Valley Recreation and Parks Department

The Tehachapi Valley Recreation and Parks Department is governed and adheres to Tehachapi City and Kern County codes, general plans, and regulations.

Unreinforced Masonry Building Inventory- January 2005

The City of Tehachapi has also identified an Unreinforced Masonry Building inventory. There are five identified unreinforced masonry buildings and seven buildings identified as poured-in-place concrete buildings.

Public Information

Tehachapi has several public information documents. These include:

- Tehachapi City Guide: A guide to the City of Tehachapi Services and Facilities
- Home Fire Safety
- Bicycling Rules of the Road
- Vial of Life Label: A label that states that a vial containing medical information is stored under top right shelf in refrigerator
- Protecting Your Records: A guide for protecting vital records

Hazard and Risk Summary

The City of Wasco listed earthquakes and severe weather as highly significant, followed by drought, floods, and soil hazards as ‘medium’ significance concerns.

Inventory

Wasco Assessed Valuation of Improved Properties				
PROPERTY	COUNT	ACRES	IMPROVED VALUE	LAND VALUE
agricultural	32	1,126.61	\$ 1,210,586	\$ 2,339,659
commercial	256	72.49	\$ 39,338,120	\$ 12,858,150
industrial	83	92.05	\$ 10,946,789	\$ 2,709,426
other	146	1,987.02	\$ 152,059	\$ 839,702
residential	3,746	679.18	\$ 212,187,467	\$ 63,353,989
TOTALS	4,263	3,957.35	\$ 263,835,021	\$ 82,100,926

Source: Kern County Assessor's database 2004

According to the City, there area 4,393 residential buildings and 303 non-residential worth a total of \$289,978,579.

Jurisdiction-Specific Existing Capabilities

Jurisdiction	Y/N other	Comments
Comp Plan/General Plan	Yes	
Special Plans	No	
Subdivision Ordinance	Yes	
Zoning Ordinance	Yes	
NFIP/FPM Ordinance	Yes	Joined 7-4-1989, Map 7-4-1989
- Substantial Damage language?	Yes	
- Administrator/Certified Floodplain Manager?		
- # of Flood threatened Buildings?		
- # of flood insurance policies	27	
- # of Repetitive Losses?		
- Maintain Elevation Certificates?		
CRS Rating, if applicable		
Stormwater Program?	No	Grants applied for to generate a plan
Erosion or Sediment controls		
# of unreinforced masonry buildings	9	11 identified in 2000, 2 have been demolished since
Hospitals built before 1973 (for HSSA)	None	
Alquist-Priolo Special Studies Zones Act	No	
Building Code Version	Yes	State UBC

Jurisdiction	Y/N other	Comments
Full-time Building Official?	Yes	2
Conduct "as-built" Inspections?	Yes	
BCEGS Rating	4	
Local Emergency Operations Plan	Yes	
Fire Department ISO Rating	?	
Fire Safe Programs	?	
Hazard Mitigation Plans	No	
Warning Systems/Services		
- Storm Ready Certified?	No	
- Weather Radio reception?	Yes	
- Outdoor Warning Sirens?	No	
- Emergency Notification (R-911)?	?	
- Other? (e.g., cable over-ride)		
GIS System?	Yes	Planning Department
- Hazard Data?	No	
- Building footprints?	No	
- Links to Assessor data?	Yes	
- Land-Use designations?	Yes	
Structural Protection Projects	No	
Property Protection Projects	No	
Critical Facilities Protected?	No	
Natural & Cultural Resources Inventory?	No	
Public Information Program/Outlet	No	
Environmental Education Program?	No	

THE DISTRICTS

The following section identifies special districts that participated in the planning process. The districts participated by attending HMPC meetings and providing inventory, hazard, and risk assessment data on provided worksheets (hazard identification, hazard history and risk worksheets, and project worksheets). This section summarizes the hazards that were identified as 'high' to 'medium' in significance on the Hazard Identification Worksheet, references specific incidents that have affected the district, and discusses assets within the district and any that may be vulnerable to hazards. Existing mitigation capabilities of the participating districts, where they vary from the County's, are discussed in the following section. Land use within special districts that cover unincorporated areas are governed by the County's General Plan and Building and Zoning Ordinances. If they cover municipal areas, the local ordinances apply.

INDIAN WELLS VALLEY AIRPORT DISTRICT

Hazard and Risk Summary

This district covers the Inyokern Airport and the significant hazards are earthquakes and severe weather, followed by floods. Details on past events and problems affecting the Airport were provided and incorporated into this plan. Floods have caused damage to buildings, runway/taxiway systems and navigational aids, roads and bridges. Floods occur when heavy rain falls in the Sierra Nevada Mountains to the West. The waters flow downward across alluvial plains and often form new channels during the event. Though the district has made efforts to mitigate flood hazards, it is possible that a large storm could impact the area. The district is at risk to earthquakes from the nearby Garlock and Sierra Nevada faults.

Inventory

Hangar buildings (12) \$1,461,000
Office buildings (4) \$525,000
Storage building \$8,000
Terminal \$600,000
Runways \$7,000,000
Runway lights and nav. Equipment \$500,000
Roads \$1,250,000
Airway beacon and tower \$80,000
Tetrahedron \$50,000
Fuel facilities \$400,000
Fire station \$1,500,000
Radar facility \$4,000,000

Jurisdiction-Specific Existing Capabilities

The Kern County Airport Master Plan and the Inyokern Specific Plan govern the Indian Wells Valley Airport District. The Seismic Safety and Safety Element of the Inyokern Specific Plan summarizes vulnerabilities to natural hazards and requires that construction comply with the Universal Building Code and the Universal Fire Code with regard to water supply, fire flow, construction standards. The district conforms to Kern County Building Code and Flood Plain regulations. The district also has adopted an airport emergency plan and has a fire station with equipment located on site. The district reaches the public via website, newsletter, and media releases.

Flood mitigation. Since damaging flooding of the airport in the mid-1980's the district has improved drainage channels, installed underground drainage pipes beneath runways, and has elevated all hangars and buildings above the floodplain.

Wind mitigation. All aircraft owners have their own insurance to cover severe weather damages. A “sand fence” constructed by the airport has reduced paint and window damage in aircraft during windstorms. Newly constructed hangars have also helped reduce aircraft damage. Recent construction complies with Kern County Building Code requirements, which should lessen damage to buildings during windstorms.

Indian Wells Valley Airport District

The Kern County Airport Master Plan and the Inyokern Specific Plan govern the Indian Wells Valley Airport District. The Seismic Safety and Safety Element of the Inyokern Specific Plan summarizes vulnerabilities to natural hazards and requires that construction comply with the Universal Building Code and the Universal Fire Code with regard to water supply, fire flow, construction standards. The district also has adopted an airport emergency plan and has a fire station with equipment located on site. The district reaches the public via website, newsletter, and media releases.

MOJAVE SPACEPORT AIRPORT DISTRICT

Hazard and Risk Summary

The district did not identify any natural hazards as highly significant. Floods were indicated as medium significance, followed by earthquake and severe weather (dust/wind storms). The district indicated that the highly significant hazards are manmade and include: Fuel Farm Fire; Fuel Truck Fire; Alpha Explosives. The district also noted Fuel Farm Release and Fuel Truck Release as moderate significance hazards. The proximity of the district to the Garlock, White Wolf, and San Andreas faults subjects the Spaceport to potential infrastructure damages from earthquakes. To date earthquakes have had minimal impact on the Spaceport.

The district was recently impacted by floods during the winter of 2005. This storm caused damage to the Spaceport storm water retention basin, runways, roadways, and culverts. The district has applied for federal disaster relief funding.

Inventory

- Office buildings
- Runway/taxiway
- Roads
- Fuel farm
- Pump house
- Fire Station
- Utilities/Water mains

Jurisdiction-Specific Existing Capabilities

Flood. The district has a storm water retention basin.

ARVIN COMMUNITY SERVICES DISTRICT

Hazard and Risk Summary

The district serves 13,000 to 16,000 residents in the Arvin area. The high concerns for the district are earthquakes and floods. Floods could contaminate drinking water, which all comes from wells. Earthquakes could damage wells and water tanks.

Inventory

The jurisdiction's inventory includes 1 office building worth \$400,000, 3 shop buildings worth \$150,000 total and water infrastructure including:

4 operating wells

1 standby well

1 well with no piping.

1 70,000 gallon elevated tank

1 480,000 gallon ground level tank

Booster station

Total replacement value of 5 wells and 2 tanks would be about \$1,400,000.

BEAR VALLEY COMMUNITY SERVICES DISTRICT

Hazard and Risk Summary

Bear Valley Springs is a rural residential equestrian community of approximately 25,000 acres in the foothills of the Tehachapi mountains. The Bear Valley Community Service District has composed their own Local Hazard Mitigation Plan and submitted it for approval in December 2004. The plan was approved by FEMA Region IX in June of 2005. The hazards of concern, listed by priority in the plan, are wildland fire, earthquake, and severe weather including flood. GIS-based hazard maps were prepared by the California Office of Emergency Services to support this planning effort.

Inventory

The jurisdiction's inventory is provided in their Local Hazard Mitigation Plan, with loss estimates calculated for each hazard.

Jurisdiction-Specific Existing Capabilities

Bear Valley Community Services District Local Hazard Mitigation Plan, December 2004.

Hazard and Risk Summary

This district participated as part one of the six special districts in the Tehachapi area that collaborated with the City of Tehachapi on a sub-planning team to identify hazards, vulnerabilities, and capabilities common to the region. Refer to the City of Tehachapi section for the hazards of concern to this district. Incidents of note that have affected this district in particular include:

- The district has been affected by floods in 1983, 1995, 1997-8, and 2005 and received OES/FEMA funds for these incidents. Golden Hills received funding to repair 3.5 miles of roads and a bank of a water recharge facility.
- Freezing temperatures have affected water tanks and pipes in 1990 and 1991. Special measures were taken to prevent damage to the tanks.
- Hot temperatures have led to power outages and domestic water supply interruption.

Inventory

Building Inventory: 2,500 residential estimated \$7,000,000

130 Non-residential estimated \$100-200 million

Infrastructure: 5,000 gallon water tank and .5 million gallon water tank, water system lines and wells worth \$125 million. Three separate road maintenance districts - \$900,000.

Critical Facilities:

Elementary School \$50 million, Surgery Center \$5 million,

Affected Population: 7,500+

Jurisdiction-Specific Existing Capabilities

Golden Hills Specific Plan – December 1986

Seismic Safety and Safety Element

Policies and Implementation

1. All new development should consider seismic risk and provide viable structural design solutions based upon the severe earthquake potential of the project region.
2. The policies of the County's adopted Seismic Safety and Safety Element are incorporated herein by reference.
3. No permanent structures and/or modular units will be allowed within drainage channels unless the structure is an approved transportation crossing or other similar type structure.
4. Areas with known geologic failures (i.e. subsidence, erosion) shall be zoned to the Geologic Hazard District. A geologic hazard report may be required by the environmental Analysis Division of the Kern County Department of Planning and Development Services during the environmental review of a development project.
5. In case of a natural catastrophe in the area, the adopted Kern County Emergency Plan shall be used to provide necessary procedures to safely evacuate residents.

6. Fire suppression systems shall be located and maintained in accordance with the standards of the Kern County Fire Department and/or the applicable Community Services District.
7. Approved building and development codes shall be strictly enforced to minimize the probability of geological and fire-related loss.
8. The circulation system shall be implemented in a manner sufficient to ensure minimal response time for safety services (i.e., police, fire, ambulance).
9. Safety oriented facilities shall be designed in the plan area according to County of Kern and/or Golden Hills Community Services District standards as new urban development occurs.
10. New development shall be served by a water supply adequate to meet the standards of the Kern County Fire Department.
11. Roofing materials should be encouraged for new single- and multiple-family residences and shall be required for commercial structures to be constructed of noncombustible material unless special exemption is granted by the Kern County Fire Department.

Golden Hills Community Services District Emergency Response Plan – Revised March 2005. This plan describes the emergency procedures that will be taken in the event of any major emergency or disaster that occurs or impacts the Golden Hills area. The purpose of this program is to provide guidelines for emergency action. This plan includes:

- Emergency Level Classifications
- Mobilization Guidelines
- Responsibilities of Golden Hills CSD
- Responsibility of Emergency Personnel
- Emergency Organization Responsibilities
- Emergency Staffing Chart
- Emergency Response Checklist
- Emergency Response Supplies and Equipment
- List of District Field Equipment
- Hazard Identification and
- Hazard Specific Information for:
 - Water Main Breaks
 - Structural Fires
 - Wildland Fires
 - Flooding
 - Power Failure
 - Earthquake
 - Hazardous Materials/Toxic Spills
 - Waterborne Disease
 - Terrorist Attack
 - Threats and Violence

Drought Mitigation. The district has a public education program, an Emergency Telephone Notification System, and Water Alert Resolution system for water rationing or inflicting penalties during times of drought.

Flood Preparedness. The district has designated drainage easements, CERT training, and sandbag stockpiles.

Fire mitigation. The district has removed vegetation around vulnerable areas.

Golden Hills CSD Water “Dip Site” – September 2004

This is a dip site for the Helicopter unit of the Kern County Fire Department to be used for the acquisition of water to combat fires in the Golden Hills area. It allows the Fire Department to more efficiently use the helicopter resources and it acts as an advance in wildfire mitigation. and has a dipping pond for fire helicopters.

Manmade hazards. The district has security measures in place at water facilities and a neighborhood watch group for terrorism concerns.

Structural projects.

- The district has a water recharge facility that contributes to drought mitigation.
- The district has culverts to allow for drainage during heavy rain.

Public information activities. The district has an existing notification sign near the entrance to Golden Hills and a PA system on field trucks.

Other. The district conducts CERT training, multi-agency disaster training and response participation, The district has back up generators and conducts extensive water monitoring

ROSAMOND COMMUNITY SERVICES DISTRICT

Hazard and Risk Summary

This district participated as part one of the six special districts in the Tehachapi area that collaborated with the City of Tehachapi on a sub-planning team to identify hazards, vulnerabilities, and capabilities common to the region. Rosamond lies in the Desert Region and identified earthquakes as highly significant, followed by floods, severe weather, natural health hazards as medium significance. Terrorism and train derailment were also noted as high and medium significance hazards, respectively.

The majority of Rosamond is in Flood Zones A or B. The very southeast corner is in Flood Zone C. Houses and mobile homes have sustained the majority of flood damage in the past. Flooding has caused erosion above water and sewer mains in areas of the district where there are no streets. Heavy equipment has been used to fill in the holes. Of particular concern to the district is that Rosamond Blvd. is the only access that emergency personnel have to the east side of Rosamond. If this road were destroyed by a flood there would be no way to get emergency help to residents on the east side of Rosamond. Train derailment is also a concern to the district. There is very little development along the train tracks at present.

Historic impacts during:

1995 flooding in February and March (triggered IA, HMGP declaration)

1991/1992 flooding

1952 Earthquake - Grammar School was damaged and had to be replaced.

Incidents of note that have affected this district in particular include:

- The district has been affected by floods in 1983, 1995, 1997-8, and 2005 and received OES/FEMA funds for these incidents.
- Train derailments occur every year in the area.

Inventory

Building Inventory: 5,705 residential buildings worth approximately \$570,500,000. Not all of these are exposed to flood but many of them are.

92 non-residential buildings worth approximately \$27,600,000

Critical facilities:

9 wellheads and water tanks valued at \$4,980,000

1 Wastewater treatment plan lift station: \$1,500,000

1 Sheriff's Office

1 County Fire Station

4 schools, \$6,000,000 each

District Main office & Operations building \$3,000,000

Infrastructure:

Population: Up to 20,000 are within the district, including 82 senior housing units with 164 residents.

Development trends. According to the district there is pressure to develop housing tracts in the flood plain and earthquake fault areas. Kern County Planning handles the special requirements for these areas.

Jurisdiction-Specific Existing Capabilities

Existing plans and procedures

Kern County Department of Planning and Development - November 1989

Rosamond Specific Plan

Safety Element

Flood Hazard:

Policies:

1. Proposed development within the 100-year floodplain shall be subject to County review so as to protect development and downstream properties from undue flood hazard.
2. New development where densities are limited to lot sizes of one acre or more facilitate sound floodplain management practices by allowing sheet flooding to occur over a mildly encroached floodplain. New developments where densities allow lot sizes smaller than

one acre significantly encroach upon the floodplain and tend to divert flow onto adjacent properties. For these denser developments, structural improvements and lot layouts need to take into account appropriate sections of the Kern County Subdivision standards, which indicate that it is necessary to receive and discharge floodwaters through the property without diverting flow onto adjacent property.

3. Encourage consideration of Rosamond Planned Drainage Areas to effectively manage drainage.

Implementation Measures

1. New development within the 100-year floodplain shall be regulated in accordance with the Flood Damage Prevention Ordinance and the Zoning Ordinance as they may be amended from time to time.
2. Permanent structures, including mobile homes, accessory structures, and water wells located in the 100-year floodplain, shall be elevated and/or flood protected to one foot above the base flood elevation as shown on the County floodplain maps or one foot above any backwater or depth of flow over backwater conditions, whichever is higher. The foundation shall be designed to protect against the potential scour velocities.
3. On-site waste disposal systems shall be designed and located to prevent impairment to them, or contamination by them, during flooding, as approved by the Kern County Environmental Health Services Department.
4. Areas within the 100-year floodplain shall be zoned with the appropriate FPP (Floodplain Primary), FP (Floodplain Combining), or FPS (Floodplain Secondary Combining) designation.
5. Prior to the issuance of any development permit where lot sizes are smaller than one acre, a drainage study must be provided that shows that development does not cumulatively increase the depth of flow more than 1 .0 foot within any individual lot, and that floodwaters are received and discharged at the locations that existed prior to development. Should diversion be required, sufficient work shall be done upstream and downstream to provide affected properties at least the same level of flood protection as existed prior to diversion.
6. Application of a constraints overlay Map Code 2.5 will be required for those areas within the 100-year floodplain.

Seismic Hazard

Policies:

1. The people of the plan area shall be made aware, through this document, of the relative earthquake hazards associated with living in the various portions of the plan area.
2. All new construction in the plan area shall comply with Chapter 23 of the Uniform Building Code (UBC), which includes building pad and foundation design standards for structures in UBC Seismic Zone IV.
3. No new 5. 1 or 5.2 designations will be permitted for property having a 2. 1 constraint overlay unless an approved, site-specific geologic report indicates that no fault hazard exists.

Implementation Measures

1. All areas designated with the physical constraint overlay Map Code 2. 1 shall permit development only in accordance with the Kern County Safety Element.
2. All final map subdivisions are required to prepare a geologic hazards analysis to determine what mitigation measures may be necessary to ensure the project is suitable for its intended use.
3. If new 5. 1 or 5.2 designations are proposed within the 2. 1 hazard constraint overlay, the County will advise the applicant prior to acceptance of any application, of the need for a site-specific geologic hazards report which contains a recommendation for clearance from fault hazard status.

Steep Slope

Policies

1. Construction of dwellings or other structures shall not be allowed on slopes of over 30 percent, except as provided by the Kern County Zoning Ordinance.

Implementation Measures

12. Development in areas designated with the physical constraint overlay Map Code 2.4 shall be permitted only in accordance with Chapter 19.88 of the Kern County Zoning Ordinance.

Rosamond CSD Emergency Management Plan – November 1994, Updated December 2004

This Emergency Management Plan is designed and prepared to serve the CSD in the first hours and days after a major disaster has damaged or destroyed water, sewer, or reclaimed water system. It ensures compliance with the concept of the Standardized Emergency Management System. This plan also contains guidelines from the California Department of Health Services Drinking Water Field Operation Branch (Disaster Response Plan) to ensure that Rosamond can deliver safe, pure, and wholesome water to customers during disasters. This plan contains forms, maps, directives, and required information, and required information needed to ensure all aspects of the plan are followed in an efficient and timely manner. Management shall ensure that all employees are trained on their duties and responsibilities during disasters and hold mock disaster drills to keep the district prepared for emergencies.

Existing or in progress mitigation projects

Natural resource protection activities. The district has an environmental education program.

Emergency services activities. See emergency management plan.

Public information activities. The district utilizes its web page and bill mailers to inform its constituents.

Manmade hazard mitigation. The district has increase security measures at well and tank sites and intends to add additional monitoring capabilities when SCADA system is installed in 2005/2006

STALLION SPRINGS COMMUNITY SERVICES DISTRICT

Hazard and Risk Summary

This district participated as part one of the six special districts in the Tehachapi area that collaborated with the City of Tehachapi on a sub-planning team to identify hazards, vulnerabilities, and capabilities common to the region. Refer to the City of Tehachapi section for the hazards of concern to this district. In addition the district provided historic incident information for the following events:

Incidents of note that have affected this district in particular include:

Road flood damage (\$300,000 in 1997/1998)

- The district has been affected by floods in 1983, 1995, 1997-8, and 2005 and received OES/FEMA funds for these incidents.
- An earthquake could isolate the community for 24-72 hours.
- Floods or dam failures would split the community in two. The east side of Stallion would be flooded while the west side would be isolated.

Inventory

Building Inventory: 1,100 residences worth \$300-500 million and 6-10 commercial structures worth \$20-30 million within the district.

Critical Facilities Inventory: District facilities are worth \$10 million.

Infrastructure Inventory: District infrastructure is valued at approximately \$100 million.

Affected population: The district serves approximately 4,000-5,000 persons.

Jurisdiction-Specific Existing Capabilities

Existing plans and procedures. The district has a full time fire station and regular brush clearance. Mandatory brush clearance is required in the more densely populated area of Stallion Springs.

Stallion Springs Community Response Plan – November 2002

This plan documents the command structure, response guidelines, resource utilization, facility utilization, standard operating procedures, and the areas of responsibility in the event of a major earthquake or other disaster in Stallion Springs CSD. It establishes the community's response organization, responsibilities, functions, and interactions necessary to mitigate the immediate effects of an emergency in Stallion Springs. The plan also serves as a reference and training guide for new and current employees.

Stallion Springs CSD Security Vulnerability Assessment April 2004

The Water Vulnerability Assessment plan is a planning document that serves as a means for water agencies to double check that their operations, infrastructure, etc. are protected from a terrorist attack.

The district also noted that it has a warning system/service, critical facility protection, a public information program/outlet, and an environmental education program.

TEHACHAPI-CUMMINGS COUNTY WATER DISTRICT

Hazard and Risk Summary

Tehachapi-Cummings County Water District (TCCWD) is located in the Tehachapi Mountains, east of the Southern San Joaquin Valley and encompasses approximately 266,000 acres. TCCWD provides an imported water supply, water resource management and flood protection to the public in a safe, reliable and environmentally sensitive way. This district participated as part one of the six special districts in the Tehachapi area that collaborated with the City of Tehachapi on a sub-planning team to identify hazards, vulnerabilities, and capabilities common to the region. Refer to the City of Tehachapi section for the hazards of concern to this district. In addition the district provided historic incident information for the following events:

- The district lost several pumps due to dust and dirt damage during dust storms in the Cummings Valley area in 1977 and 1988.
- Local flooding on the Antelope Run Channel in 1998 and in 1983.

Inventory

Infrastructure. Four Pump Plant buildings and storage tanks with four natural gas fired internal combustion engines each, turbine pumps, right angle gear drives, cooling systems and control telemetry in each plant. - \$25,000,000

J.C Jacobsen Dam and Storage Reservoir - 1800 af capacity - \$25,000,000

Antelope and Blackburn flood control dams and diversion channels - \$20,000,000

Plant 5 with 2 electric motors and 3 deep wells and turbine pumps - \$650,000

32 miles of 30 to 18 inch steel mortar lined and coated mainline distribution pipeline and approximately 22 miles of 21 to 8 inch PVC distribution laterals - \$36,000,000

11 miles 2 and 3 inch high pressure natural gas pipeline - \$1,500,000

Office-shop and Shop building with container storage - \$2,500,000

Jurisdiction-Specific Existing Capabilities

Flood Control Projects

The Tehachapi Cummings County Water District (TCCWD) in conjunction with the Eastern Kern County Resource Conservation District was instrumental in securing funding from Congress to build two \$8 million flood control projects.

The TCCWD Flood Control Projects include:

- A Diversion Channel from Highline Road north on Dennison Road to Tehachapi Airport, and into Tehachapi Creek. This was completed in 1988;
- Antelope Dam - A 721 acre foot runoff collection facility which was completed in 1986. It is also being used as a groundwater recharge site for the Tehachapi Basin;
- Blackburn Dam - A 710 acre foot runoff collection facility, completed in 1990.

The Antelope Canyon and Blackburn Canyon dams were constructed to control and detain runoff during flood events, protecting downtown Tehachapi. Both dams provide protection to Tehachapi up to the 100 year flood and are normally dry.

The district received a 1.3 million dollar grant in 2004 to support the antelope run restoration program. The project is for flood control and erosion mitigation. This project includes:

- Replacement of a concrete culvert
- Construction of several drop structures build from natural rock that will diffuse and slow water flow and reduce erosion
- Stream debris clearance and habitat restoration between drop structures
- Adjusting easement rights to include a multi-use trail bordering the stream
- Holding a series of meetings designed to raise awareness about problems and solutions along Antelope Run
- Involvement of community volunteers in design workshops, stream restoration events, and long term maintenance
- Development and execution of long-term management plan
- Creation of signage along Antelope Run and websites to build public awareness about flood control, erosion mitigation, and the use of innovative technologies that work with nature to solve these problems

This project will provide protection up to the 100 year flood to \$1.2 million in residential real estate.

Drought Management

Groundwater management is a goal of the district. From 1947 until 1965, the Tehachapi Soil Conservation District and the Tehachapi-Cummings Valley Water Conservation District developed basic groundwater and watershed studies. In 1966, lawsuits were filed in Superior Court in each of the three groundwater basins: Brite, Cummings and Tehachapi. In accordance with the settlements, recharge/recovery projects have been constructed and are in operation in the Tehachapi and Cummings Basins. Since the inception of the Groundwater Management Program, average groundwater elevations have increased approximately 70 feet. Another important project for the district is the Tehachapi Watershed Project. In 1983, initial congressional funding was obtained for a flood control project to protect the City of Tehachapi. This project was made possible through the efforts of TCCWD, Tehachapi Resource Conservation District, USDA Soil Conservation Service, City of Tehachapi and the KCWA.

Dam Safety

Emergency Action Plans and inundation maps for Jacobsen, Antelope and Blackburn Dams are on file with the county. Operation and maintenance of the dams are the responsibility of the TCCWD. Quarterly inspections are performed in accordance with the State Department of Water Resources requirements.

EAST NILES COMMUNITY SERVICE DISTRICT

Hazard and Risk Summary

The significant concerns for the district are earthquakes and drought, followed by dam failure, natural health hazards, soil hazards, volcanoes, wildfire and severe weather.

Inventory

Building Inventory: 6,500 residences within the district valued at \$967,000,000

227 non-residential buildings estimated value of \$200,000,000

Critical Facilities Inventory: 7 water wells, 13 water storage tanks, 7 pumping stations. Total estimated value of \$14,500,000

Infrastructure Inventory: 111 miles of water distribution main line and 71 miles of sewer line. Estimated value = \$48,393,600

Affected population: 24,900

Other potential impacts: Loss of drinking water and sanitary facilities due to earthquakes

Development trends: The area is encountering rapid residential growth.

Jurisdiction-Specific Existing Capabilities

Action Plans. East Niles CSD has action plans identified for earthquakes, water supply interruptions, and floods. These action plans include information and procedures regarding:

- A summary of the action plan
- Initiation and notification
- Identified equipment
- Specific activities
- Assessing the problem
- Isolating and fixing the problem
- Monitoring the problem
- Recovery and return to safety, and
- Reporting findings

East Niles Community Services District Emergency Response Plan. This document is intended to be implemented during a disaster or emergency situation. It supplies a framework for the control and coordination of activities and resources, establishes an understanding as to the lines of authority and communication during an emergency, and provides an informational tool for other government agencies to incorporate in an overall county-wide disaster plan. It includes procedures in the event of an earthquake. It also includes public health notices that may be used in times of emergency including a Boil Water Order, an Unsafe Water Alert, and a Consumer Alert during Water Outages.

East Niles CSD also has developed a notification plan for water quality emergencies.

Public Information Activities. The District produces an annual “Consumer Confidence Report” to keep the public informed about water quality.

Other. The district does routine scheduled cleaning of sewer lines to verify current conditions.

BUTTONWILLOW RECREATION AND PARK DISTRICT

Hazard and Risk Summary

The hazard of concern for the district are earthquakes. The district owns an aquatic facility that includes a swimming pool, deck, pump house and restroom facility worth approximately \$500,000. An earthquake could affect the facility and utility lines next to the facility.

TEHACHAPI VALLEY RECREATION AND PARKS DISTRICT

Hazard and Risk Summary

This district participated as part one of the six special districts in the Tehachapi area that collaborated with the City of Tehachapi on a sub-planning team to identify hazards, vulnerabilities, and capabilities common to the region. Refer to the City of Tehachapi section for the hazards of concern to this district.

Inventory

Building Inventory: The district’s West Park Activity Center has an estimated value of \$1,250,000 and functions as a community shelter during winter storms, earthquakes, and floods.

Critical Facilities Inventory: The Activity Center is considered critical to the district.

Affected population: The district serves approximately 5,000 persons.

NORTH OF THE RIVER RECREATION AND PARK DISTRICT

Hazard and Risk Summary

This district is 125 square miles in size, covering the North Bakersfield area. For this planning process the district provided a summary of insured property and contents value for the facilities owned by the district. The high significance hazards for the district are earthquakes and natural health hazards, followed by drought and severe weather. Earthquakes could significantly affect the sewer lines of the district.

Inventory

Building Inventory: The district owns 27 buildings with a total estimated value of \$17,200,465.

Critical Facilities Inventory: Four district-owned daycare facilities and extended daycare programs at ten school sites within the district boundaries are worth \$1,267,580 in structure and content value.

Affected population: 91,500 residents within district boundaries.

Jurisdiction-Specific Existing Capabilities

The North of the River Recreation and Parks Department is in the process of revising their emergency operations plan. They are governed by the City of Bakersfield and County of Kern ordinances. They participate in CAPRI, which is self-insurance for earthquake and flood through joint powers authority.

WEST SIDE RECREATION AND PARK DISTRICT

Hazard and Risk Summary

The hazards of concern for the district are earthquake, severe weather, and wildfire. The district owns an aquatic facility, a community center, a skating rink, and a fitness center. An earthquake could affect these facilities, some of which could serve as community shelters.

ARVIN-EDISON WATER STORAGE DISTRICT

Hazard and Risk Summary

The high concerns for the district are earthquakes, floods, and severe weather. This area has been hard hit by floods from Caliente Creek and the district provided many detailed costs for past floods that are integrated into the Hazard Identification Section.

Jurisdiction-Specific Existing Capabilities

The district provides water storage for the Arvin area, thus drought mitigation is an integrated function of this district.

BERRENDA MESA WATER DISTRICT

Hazard and Risk Summary

This district is located in the northwest corner of Kern County. The hazard of high concern for the district is drought, followed by earthquakes and floods. The District was forced to idle 10,000 acres of agricultural land in the service area during the drought. The District obtained financial relief during the 1977 drought from a \$1,000,000 US Bureau of Reclamation loan; \$1,567,000 Economic Development Administration loan; and \$3,000,000 warrant sale. Heavy rain in January of 1969 produced high flows on Packwood and Franciscan Creeks. These high flows drained into the Berrenda Mesa Water District and deposited extensive quantities of

sediment on the District's 14 mile long canal. The Berrenda Mesa Canal was filled with sediment, and cleanup costs were \$350,000 to the District. Highway 46 was temporarily closed during the event.

Jurisdiction-Specific Existing Capabilities

Critical Facility Protection. Overshoots have been constructed to divert floodwaters over top of the Berrenda Mesa Canal.

BUTTONWILLOW COUNTY WATER DISTRICT

Hazard and Risk Summary

The high concerns for the district are earthquakes and severe weather. Power outages from storms have affected well, lift station, and wastewater facility operation. The district is north and east of the San Andreas fault. Wells, lift stations, and distribution lines which are located underground are subject to damage from earthquakes. Pumps, tanks and ponds could be damaged or destroyed by earthquakes as well. Disruption in service affects every residence and business in the community. Without sufficient water supply all homes and businesses would be at risk of fire protection in an emergency. If the wastewater facility fails to function, immediate personal health would be at risk.

Inventory

The district services 393 residential and 49 non-residential buildings within its boundaries. The district has the following facilities that are necessary to pump and distribute drinking water and to collect, distribute, and dispose of waste from residences and businesses.

Facilities. Liftstations (2) estimated value \$40k each

Water wells including pumps (3) estimated replacement value \$450k each

Storage tanks (2-40,000 gal) estimated \$75k each

Imhof Tank (1) \$150k

Wastewater pond

Infrastructure.

Approximately 8 miles of water distribution lines.

Approximately 8 miles of sewer lines.

Most lines are in public roadways and replacement value is estimated at \$3,000k.

Affected population.

Service area includes a population of 1,200 and is the only water source available. In addition it serves the only school in the community with a current enrollment of 392, the only health facility and fire department.

Development trends.

Little or no growth in the past 20 years. The community has been targeted by developers in the last 3 months. There is a proposal to build 170 homes and the land is currently in escrow.

Jurisdiction-Specific Existing Capabilities

The District has recently completed a \$350,000 mainline extension project, funded by a Block Grant. The project opened up several dead-end lines to increase pressure and water flow as well as reduce bacteria found in dead-end lines. Pumps and lift stations are currently being wired to allow for immediate connection to portable generators in the event of power loss. All sites are kept clear of debris, serviced regularly and inspected daily.

NORTH OF THE RIVER MUNICIPAL WATER DISTRICT

Hazard and Risk Summary

The high concerns for the district are drought and earthquakes, followed by severe weather. Earthquake impacts could rupture district pipes or storage facilities. Residents could have floods from ruptured pipes and be without water, fire protection, and at risk from disease from untreated water as a result.

Inventory

Building Inventory: 2 (district office and maintenance building)

Infrastructure Inventory: 6 water storage tanks at 3 elevations, 100+ miles of water pipeline, pumping facilities, estimated value of \$6,000,000.

Affected population: 30,000 residents served within district

Jurisdiction-Specific Existing Capabilities

North of the River Municipal Water District has built infrastructure that will keep it running in the event of the disaster. This includes

- 2,000 gallon/minute well that runs off of gas and propane (will run up to 3 days)
- Jointly purchased (with East Niles CSD, Kern County Water Agency, and California Water Service Company) giant generator that will supply baseline power in the event of emergency
- All pumping stations are independently powered
- To prevent earthquake damage, concrete reinforcing wings were added to support structures that hold up a 33,000 gallon liquid propane tank

Potential Mitigation Actions. A project is proposed for flexible couplings between tanks and underground pipes to minimize earthquake damage.

WHEELER RIDGE-MARICOPA WATER STORAGE DISTRICT

Hazard and Risk Summary

This district supplies water to approximately 90,000 acres of farm land at the extreme southern end of the San Joaquin Valley. High significance hazards for the district are drought, earthquakes, floods, and severe weather (dust storms/windstorms and extreme temperatures), followed by soil hazards. The district experienced flood events in 1978, 1983, 1989, 1995, 2000, and 2005 as well as a severe dust storm in 1977.

Inventory

The District owns and operates a distribution system of nearly 300 miles of pipelines, 137 booster pumps, 17 water wells, and 7 miles of concrete-lined canal. Depending on land leasing patterns in a given year, the District serves between 100 and 150 customers. The WRM10 Pumping Plant is a critical point of diversion serving 14,460 acres of farm land.

Jurisdiction-Specific Existing Capabilities

Floods, earthquakes, and severe weather:

- Emergency response plans
- Radio network with 100-foot tower and repeater
- 10,000-gallon above ground fuel tank with emergency power
- Large inventory of piping and replacement parts
- Agreements formed with neighboring water districts to pool equipment in event of emergency
- Pumping plants and pipelines located in flood prone areas built on raised pads
- Plants and pipelines protected against stream erosion by gabions
- Berm raised on uphill side of 850 Canal to divert flood flows
- Double siphon (overshoot) installed on Pastoria Creek crossing of 850 Canal

Drought: *Small annual fluctuations in water supply are generally managed by normal water district activities.* For example, this district has secured dry year water supplies for its landowners from water banking projects (Kern Water Bank, Pioneer Project, Berrenda Mesa Project) and backup water wells.

GREENFIELD COUNTY WATER DISTRICT

Hazard and Risk Summary

Significant hazards for the district are earthquakes, soil hazards, and natural health hazards, followed by severe weather and drought. The district stated that no significant hazards have

affected the district in the past, but that one office building was located within the floodplain. The district contains no unreinforced masonry buildings.

Inventory

Infrastructure: 5 water wells (including storage tanks, pumps, treatment facilities) valued at approximately \$3,100,000

Approximately 20 miles of water main estimated at \$6,336,000 (@\$60 per foot)

Office building and contents: \$450,000

Storage unit: \$20,000

Customers: estimated at 7,000

Development trends. Development within the district continues to be heavy and the trend appears that it will continue into the future.

Jurisdiction-Specific Existing Capabilities

The district has yearly inspections by the Fire Department and has an ISO rating of 4 as of 4/2/2004). Two of the district's wells have backup generators in the event of a power outage.

Greenfield County Water District

The Greenfield County Water District has back-up generators on their Panama and Berkshire wells. They perform regular maintenance at all well sites and inspect the mains and related water appurtenances to insure adequate and safe delivery of water to customers. They have and fire department ISO rating of 4 as of April 2004 and are inspected annually by the fire department.

WEST KERN WATER DISTRICT

Hazard and Risk Summary

This water district provides service to approximately 16,800 residents, one federal prison (2,000 residents), 3 of California's 5 largest oil fields, 3 electrical power plants, and multiple electrical co-generation plants. The highly significant hazards for the district are drought, earthquakes, and severe weather, followed by dam failure and soil hazards. The district helped provided detailed descriptions of past events that are integrated into the Hazard Identification. Hazard impacts specific to the district include ruptured water tanks, transmission, and distribution lines, damaged water production and pumping facilities, damaged office buildings, and associated economic losses.

Inventory

Water production facilities, pumping facilities, tanks \$61,470,000

Raw water station \$1,000,000

Transmission Pipeline system \$150,000,000

Distribution Pipeline system \$85,000,000
Office building \$900,000
Warehouse \$700,000
Machine shop \$250,000
Welding shop \$200,000
Paper supplies storage building \$35,000

Development trends. Areas within the district are having an increase in residential development and closing down of small local businesses.

Jurisdiction-Specific Existing Capabilities

The West Kern Water District has a Local Operations Plan Summary that includes a vulnerability assessment and emergency response incident action plans for several disasters including flood, earthquake, and several terrorist-type scenarios. The West Kern Water District also ensures that all employees who are expected to respond to emergency situations are trained in SEMS. Employees participate in a number of training activities including emergency response drills and full scale exercises with Kern Office of Emergency Services. West Kern Water District maintains a website and produces an annual Consumer Confidence Report to keep the public informed about operations.

Other capabilities for Severe Weather (Wind and Winter Storms) and Earthquakes:

- Two mobile 500 KW generators
- Uninterruptible power supplies at most facilities to transmit data
- Gas engines and pumping equipment with alternate fuel sources
- Water tanks placed in elevations higher than service areas
- Compliance with all State/County Building/Electrical codes
- Large inventory of replacement piping and parts
- Sufficient mechanical equipment to respond rapidly to a disaster

The following plans address drought problems:

- WKWD Urban Water Management Plan, 2000
- WKWD Groundwater Management Plan, 1997
- WKWD Rules and Regulations for Water Service, 2002
- Rule No. 14, Shortage of Supply and Interruption of Delivery

CAWELO WATER DISTRICT

Hazard and Risk Summary

Drought is the highest hazard of concern for the district. Earthquakes and severe weather are medium-high concerns for the district followed by floods and natural health hazards. Drought could impact an estimated \$700,000,000 of permanent crops within the district. Flooding on Poso Creek could washout bridges and permanent crops near the waterways. Erosion from

heavy rains, which would occur prior to flooding, could damage canals, pipelines, roads and commercial facilities in the area. Earthquakes in the region could have great impact in the area. Water pumping stations would be damaged beyond ability to operate. Pipelines would be damaged in multiple locations. Distribution canals would be damaged enough to be inoperable.

Inventory

The district serves an agricultural area limited population, but includes about 100 residential and 300 non-residential buildings. Non residential buildings include cold storage, packing facilities and equipment storage structures.

Critical facilities

Distribution canals, 6-miles, \$17,000,000

Pumping stations, 3 stations, 6 to 8 pumps per station, \$35,000,000

Pipelines, 40 miles, \$40,000,000

Operation Center, 1 building, \$2,500,000

Permanent Crops, \$20,000 per acre

Infrastructure replacement cost:

Roads \$1,000,000 per mile; Power lines \$500,000 per mile

Jurisdiction-Specific Existing Capabilities

Riprap has been placed along the Poso Creek to reduce erosion near critical facilities. Seismic design criteria have been incorporated in retrofit and new designs of facilities.

KERN COUNTY WATER AGENCY

Hazard and Risk Summary

The Kern County Water Agency's mission is to secure adequate water supplies for Kern and participate in water management activities including water quality, flood control, and groundwater issues. The high significance hazards for the district are earthquake and dam failure. According to the Agency about 20% of the water supply to Bakersfield could be affected by an earthquake. An earthquake could result in the loss of water purification drinking water production and infrastructure loss to buildings, pipes, and storage facilities.

The Agency is also concerned that wildfires could result in the temporary loss of water source, water quality degradation, and increased costs for water treatment. They profiled the McNalley Wildfire of June 2002, which did not have direct impacts on Agency facilities but resulted in \$100,000 in increased treatment chemical costs and reduction in finished water quality.

Inventory

Building Inventory

5 non-residential structures valued at \$20,000,000.

These include a Control Building, storage building, administration building, chemical storage building, and pump building at Oswell and Auburn.

Critical Facilities Inventory

Purification plant, Storage tanks, chemical systems valued at \$50,000,000

Infrastructure Inventory

Pipelines to East and North portions of Bakersfield, valued at \$30,000,000

Affected population:

100,000 serviced by Kern County Water Agency supply

Historic, cultural or natural resources affected:

The Kern River Watershed could be affected by wildfire

Development trends:

Unknown

Jurisdiction-Specific Existing Capabilities

Kern County Water Agency Urban Water Management Plan – December 1995

The plan discusses that declining water levels and ground water quality degradation prompted the Kern County Water Agency Board of Directors to make provisions for delivery of a treated surface water supply to part of the urban Bakersfield area. The Agency established Improvement District No. 4 with the objective of replacing ground water use with imported, treated surface water in these areas. The District's fundamental concept of operation is one in which substantial amounts of imported water are introduced annually into the underground aquifers for ground water replenishment. A treated surface supply is provided to the urban area in lieu of pumping ground water. The District has been taking full advantage of such conjunctive use operational schemes since initiation of operations in 1972. Improvement District No. 4 continues to optimize the use of ground water in conjunction with surface water imported by the State Water Project (SWP) to achieve water conservation through effective management. The plan goes on to discuss projected water demands, adopted and proposed water conservation measures, and the frequency and magnitude of water supply deficiencies.

Kern County Water Agency Emergency Response Plan – Updated February 2005

This document is intended to be implemented during a disaster or emergency situation. It supplies a framework for the control and coordination of activities and resources, establishes an understanding as to the lines of authority and communication during an emergency, and provides an informational tool for other government agencies to incorporate in an overall county-wide disaster plan. It includes procedures in the event of an earthquake. It also includes public health notices that may be used in times of emergency including a Boil Water Order, an Unsafe Water Alert, and a Consumer Alert During Water Outages.

Kern County Water Agency Kern County Water Education Coordinator Working with Schools

This is a public information/program outlet provided by Kern County Water Agency.

KERN DELTA WATER DISTRICT

Hazard and Risk Summary

The district identified dam failure and floods as ‘high’ significance, followed by earthquakes, severe weather, and soil hazards as ‘medium.’ Floods from Caliente Creek affect the district’s jurisdiction.

Inventory

Building Inventory

The district services the entire community of Lamont (approximately 3,300 residences and 13,000 people) and surrounding areas including 4 houses in the Highway 99/Herring Rd area.

Critical Facilities Inventory.

5 weirs estimated at \$25-30k each.

Affected population: 13,000

Development trends: Population is growing in the Lamont area, with housing developments.

Jurisdiction-Specific Existing Capabilities

Lamont Flood control basins within district and a flood bypass on Eastside Canal. 36” pipeline under Eastside Canal allows Caliente Creek floodwaters to pass under the canal, with destroying banks.

BUENA VISTA WATER STORAGE DISTRICT

Hazard and Risk Summary

The high significance hazards for the district floods and dam failures, followed by earthquakes, drought, severe weather, and wildfires. The district provided FEMA Damage Survey Report (DSR) from flooding in 1998 that caused excessive sedimentation in the Kern River channel near the junction with the California Aqueduct. To maintain capacity \$650,000 in sediment removal occurred in the Channel near Highway 119 and \$208,000 worth of removal near Highway 43 and Interstate 5.

Inventory

The district has facilities, floodway channels, canals, diversion structures, the Kern River/California Aqueduct Intertie, and pumping equipment. Equipment is vulnerable to dust storms and channels are prone to sedimentation during high flows.

Jurisdiction-Specific Existing Capabilities

The district recommends groundwater storage and recovery programs to mitigate drought impacts on the agricultural industry.

SEMITROPIC WATER STORAGE DISTRICT

The district identified dam failure, drought, earthquakes, and floods as ‘high’ significance, followed by severe weather, and soil hazards as ‘medium.’ Floods from Poso Creek have affected the district’s jurisdiction, including the City of McFarland

Inventory

The district has a detailed inventory spreadsheet that lists buildings, mobile equipment, and vehicles and their insured values. Values and assets are summarized below:

Office building

Main Shop

Meter Shop and Warehouse

Substations

Aqueduct turnout

Motor control buildings

The total value of property insured is \$10,234,479

Mobile equipment \$449,300 insured value

In addition the district has power lines, canals, pipelines, and miscellaneous buildings that are not captured in this inventory.

Jurisdiction-Specific Existing Capabilities

The district noted that it has a GIS system, a local emergency operations plan, and a public information outlet at www.semitropic.com. The district has also implemented critical facility protection.

The District’s canal systems were utilized in 1998 for excess water distribution, which helped minimize flooding in the area.

KERN SANITATION AUTHORITY

Hazard and Risk Summary

The high significance hazard for the district is earthquake. Floods and dam failure were the only other hazard that could impact the Authority, and they were described as low significance hazards. To date earthquakes have had no effect on the infrastructure or performance of the KSA. Rains in 1978 flooded the plant, but there was no permanent damage. Many changes were implemented to reduce damages in future events (discussed below).

Inventory

Kern Medical Center and Kern Sanitation Authority Plant

Sewer lines main estimated at \$25,000,000.

15,000 residential and 1,000 non residential buildings are within the district.

Customers: estimated at 40,000

Development trends: None

Jurisdiction-Specific Existing Capabilities

- Storm reservoir system improved after 1978
- Berms added to divert water from plant
- Grading around plant completed to improve drainage.
- Wastewater Treatment Plant Digester built in 1992 to seismic 8.0 standards.
- Periodic cleaning and televising of the lines done to verify the current condition of the sewer lines.

Kern Sanitation Authority

The Kern Sanitation Authority has a sewer overflow response plan.

FORD CITY TAFT HEIGHTS SANITATION DISTRICT

Hazard and Risk Summary

The high significance hazard for the district is earthquake. Earthquakes could significantly affect the sewer lines of the district.

Inventory

Building Inventory. There are approximately 2,000 residential and 500 non-residential structures within the district.

Infrastructure: Sewer lines worth approximately \$20 million

Affected Population: 5,000

Jurisdiction-Specific Existing Capabilities

The district does periodic cleaning and televising of sewer lines to verify current conditions.

The Ford City Taft Height Sanitation District has a sewer overflow response plan.

NORTH OF THE RIVER SANITARY DISTRICT

Hazard and Risk Summary

The significant concern for the district is earthquakes, followed by floods and severe weather. The district was not aware of any past impacts from hazards.

Inventory

1 wastewater treatment plant and 4 sewage lift stations valued at approximately \$11,000,000
Approximately 98 miles of sewer lines main estimated at \$52,000,000.
2 buildings and contents: \$11,000,000
Customers: estimated at 50,000

SOUTH FORK MOSQUITO ABATEMENT DISTRICT

Hazard and Risk Summary

This district covers a small section of the Kern River Valley in the mountains east of Bakersfield, along Highway 178 in the Onyx and Weldon areas. Significant hazards for the district are insect hazards (Mosquitoes, Africanized Honey Bees), and natural health hazards (West Nile Virus). Other concerns within the Kern River Valley include flooding, earthquakes, dam failure, landslides (rockfall), and wildfires.

Inventory

Jurisdiction-Specific Existing Capabilities

The manager/operator of the district attends safety meetings and continuing education programs with Kern Mosquito Abatement and is a member of the Kern County West Nile Virus Task Force. The district monitors standing water for mosquito breeding and controls them with fish or pesticide. They also test the Sentinal Chicken Flock.

The manager/operator of the district attends safety meetings and continuing education programs with Kern Mosquito Abatement and is a member of the Kern County West Nile Virus Task Force.

TEHACHAPI VALLEY HEALTHCARE DISTRICT

Hazard and Risk Summary

This district participated as part one of the six special districts in the Tehachapi area that collaborated with the City of Tehachapi on a sub-planning team to identify hazards, vulnerabilities, and capabilities common to the region. Refer to the City of Tehachapi section for the hazards of concern to this district.

THE SCHOOL DISTRICTS

Hazard and Risk Summary

Kern County has 49 school districts. During this planning process each district was provided a data collection worksheet that surveyed the district's impacts from past hazard events, assets at risk, existing or proposed safety plans and programs, and existing and proposed hazard mitigation projects. 18 of the districts provided feedback.

Summary of hazard impacts to schools. Many of these past events are integrated into the hazard identification section of this plan. The following is a summary of the impacts that are common to many of the school districts in Kern County:

- Windstorms have led to roof damage tree damage leading to property damage during windstorm.
- Snowstorms, fog, power outages, floods, water main breaks, gas leaks, and hazardous material incidents have resulted in school closures.
- The 1952 Earthquake damaged many schools in the County.
- Dust storms have damaged HVAC systems, particularly in 1977.
- Localized site flooding has caused sump overflow and other damages.

Specific impacts to schools:

- Vineland School District was closed for 3 days during the 1998 El Nino floods. High winds destroyed the roofs on 6 buildings in 2005.
- Pond Union School District experienced one major flood in the 1950's and minor roof shingle damage during windstorms.
- Tehachapi Unified School District's Wells School was damaged from flooding coming from land that had recently been cleared of an orchard in 1985. Partial roof blown off on two school buildings at one site during a windstorm.
- Panama-Buena Vista Union School District experienced major HVAC system damage from the December 1976 dust storm, and had to shelter students in place during the event. Particularly at risk are Panama, Buena Vista, and Berkshire schools and Warren Jr. High due to their locations near large dirt fields or agricultural sites. A windstorm in 2001-02 caused roof damage that led to secondary water damage from rain leaking into several portable classrooms.
- Delano Joint Union High School District's administration was torn down following the 1952 earthquake. In 2005 rainstorms the Cesar E. Chavez High School experienced sump overflow.
- Kern Community College District experienced impacts from a dust storm in 1999 at Bakersfield College, closures during 1999-2000 snow storms, and water main break and gas leak related closures.
- Bakersfield City School District has three areas at risk to flooding: Noble, Franklin, and College Heights.
- Lost Hills Union School District is at risk to seasonal dust storms and dense fog. Lost Hills Elementary and A.M. Thomas Middle School is at risk to earthquake due to the

nearby San Andreas Fault. The California Aqueduct is another source of potential flooding.

- Edison Elementary School District has experienced roof damage during excessive rains and county road flooding during El Nino years has interrupted bus service from 2 days to 6 weeks. Proximity of the site to freeway and railroad tracks make it vulnerable to transportation accidents and hazardous materials spills. One train derailed by the school in the 1990's.
- Mojave School District has experienced damage to roofs at the Joshua Middle School in Mojave during high wind events. Trees pose a hazard during wind storms.
- McKittrick School is at risk to damage from trees during storms.
- Sierra Sands Unified School District experienced school closures during flooding in 1984.
- Kernville Union School District provided lawn space for firefighter camps. The fires did not affect the school but the lawns were severely damaged by the activity.
- The 1977 dust storm damaged electronic equipment, alarms, and telephone equipment in Buttonwillow Union School District and required massive cleanup.

Jurisdiction-Specific Existing Capabilities

Many of the school districts have implemented seismic safety measures such as anchored cabinets and bookshelves, safety film or safety glass on windows, and earthquake resistant retrofitting or construction measures to buildings. In addition there are many existing student safety programs, plans, and drills related to earthquakes and other emergencies. The following table summarizes the school districts' capabilities.

School District	Evacuation Plans	Shelter – in place plans	Earthquake safety program/ drills	Other Emergency Plans	Hazard Mitigation Efforts
Pond Union School District	X		X	Fire Drills	Anchored bookshelves Anchored cabinets Safety film on windows/Safety glass
McKittrick School	X	X	X	Gas evacuation drills Chemical accident policy Fallen aircraft	Safety film on single-pane windows (where staff and students have closest contact or high potential for injury) New roof New bracing and supports for AC/Heater units Tree trimming
Richland Elementary School District	X		X	Gun on campus	Safety film on exterior glass windows that are not new

School District	Evacuation Plans	Shelter – in place plans	Earthquake safety program/ drills	Other Emergency Plans	Hazard Mitigation Efforts
Mojave Unified School District	X		X	Hazardous chemical spills from railroad or freeway	Seeking funding for new roofs Earthquake retrofitting Shatterproof glass in classrooms Tree trimming
Vineland School District	X		X	District evacuation drills emergency plan	Elevated structures for newer classrooms Anchored bookshelves Some earthquake retrofitting of equipment
Edison Elementary School District	X		X	Fire drills Lock-down drills	Will anchor bookshelves and file cabinets
Lost Hills Union School District	X		X	X	Anchored bookshelves Regular pruning of trees Modernization of A.M. Thomas Middle School Planting of a windbreak Some existing evacuation plans
Bakersfield City School District	X		X	X	Anchored bookshelves (non-systematic) Safety film on windows (limited) Installed “monolithic” roofing system – prevent wind-related damage Altered drainage to minimize localized floods
Buttonwillow Union School District	X	X	X	X Chemical hazard Procedures	Some roofing upgrades, dual paned windows on primary campus, upgraded plumbing and electrical systems (03) Junior High campus upgraded in 1987-89, included replacing windows, doors, flooring, lighting, and lowered ceilings. Asbestos removed to prevent health hazards from earthquakes.
Kern Community College District	X		X		At Bakersfield College: Earthquake retrofitting at Stadium and Student Services Building New building – library and child day care facility

School District	Evacuation Plans	Shelter – in place plans	Earthquake safety program/ drills	Other Emergency Plans	Hazard Mitigation Efforts
Kernville Union School District	X	X	X	X	Earthquake retrofitting Installed a large new draining system in the front of school for flood mitigation
Delano joint Union High School District					New school (Cesar E. Chavez High School) reviewed and approved by DSA Delano High School: Retrofit bookshelves Shear wall bracing ADA compliant
Panama-Buena Vista Union School District	X	X	X	Intruder response; Centrally managed plan shut-off of HVAC systems	Anchored bookshelves, file cabinets, and trophy cases Overhead shelves and trophy displays secured by heavy Velcro Training program for staff members (various emergency response and drills)
Tehachapi Unified School District	X	X	X	Response Plans for: Fire Bomb threat Severe weather Bio/chemical accident Terrorism Fallen aircraft Emergency lockdown Crisis Response Plan	Meet Field Act requirements Earthquake retrofitting Graded to prevent localized flooding
Sierra Sands Unified School District					None Inventory includes 11 School sites, 2 middle schools, 8 elementary, 1 high school. Total value estimated at \$330,000,000
Fairfax School District	X		X	Safe School Plan	Safety film for most windows Anchored bookshelves Tension wires on ceiling lights Sealants checked on windows

School District	Evacuation Plans	Shelter – in place plans	Earthquake safety program/ drills	Other Emergency Plans	Hazard Mitigation Efforts
Taft City School District	X		X	Injury and illness prevention program Safety of students Use of schools during disaster or other emergencies Fire Drills Bomb Threats Emergency school schedules Transportation safety Universal precautions Exposure control for bloodborne pathogens	Anchored bookshelves Safety film on some windows
Kern High School District	X	X Earthquake, enemy attack, flooding	X	Each Kern High School District site has a Comprehensive School Safety Plan that includes a Civil Defense and Disaster Preparedness Plan and an Emergency Organization Plan. Incident Command System and Standardized Emergency Management System plans for each District site	

KERN COUNCIL OF GOVERNMENTS

As the federally-designated Metropolitan Planning Organization and the state-designated Regional Transportation Planning Agency for Kern County, Kern COG is responsible for developing and updating a variety of transportation plans and for allocating the federal and state funds to implement them. Although regional transportation planning is its primary role, Kern COG also functions as the state-designated Census Data Center Affiliate for the Kern Region and the Kern Motorist Aid Authority , which operates emergency call boxes on county highways; and provides leadership in the development of geographic information systems in local government.

Since the mid-1990s, Kern COG has assisted local agencies in developing their GIS infrastructure. These systems are vital to the decision making that local governments carry out in their programs every day. Eighty percent of all local government data could be maintained more accurately and displayed more meaningfully through GIS. Local governments using GIS benefit from better decisions provided by the information available on these maps. The Kern Geographic Information Network (Kern GEONET) is a consortium of local governments administered by Kern COG. GEONET coordinates GIS development locally, saving cities more than \$2 million from the joint purchase digital aerial imagery and creation of other data layers.

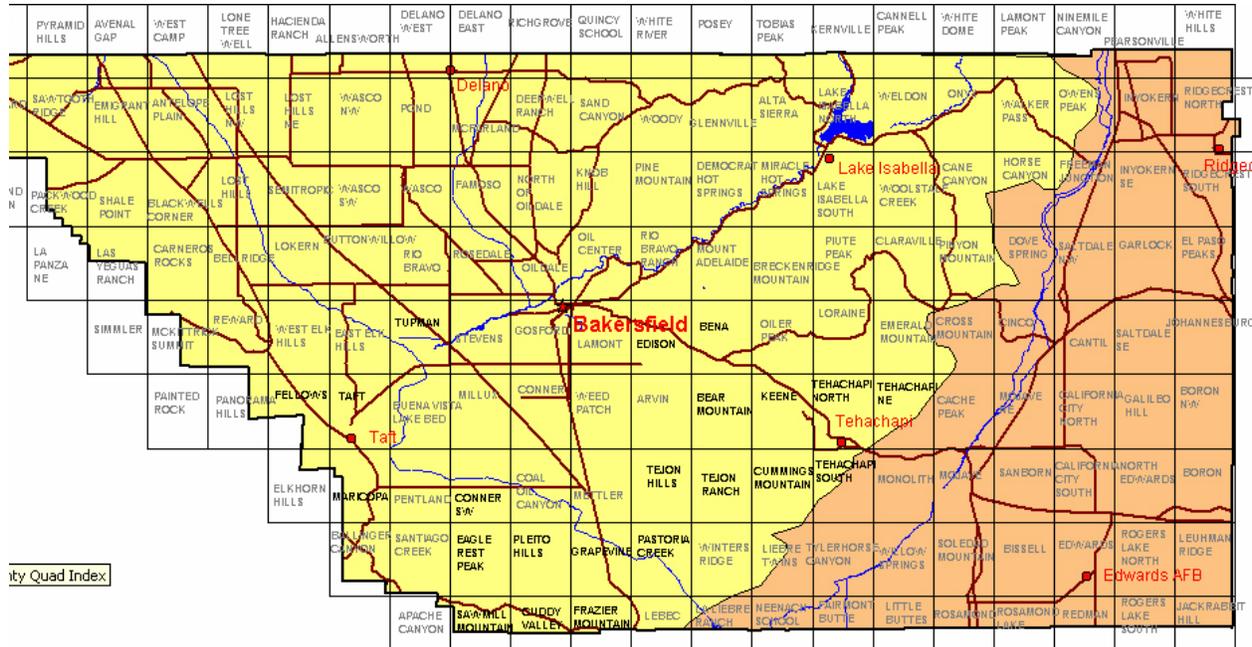
Kern COG has signed long-term agreements with some local government agencies to assist them in developing and maintaining their GIS. These custom agreements provide expertise and stability for smaller agencies more vulnerable to staff turnover. The GIS Incubator program assumes that as local agencies grow, they will be weaned off the need for Kern COG's assistance. Maricopa, Wasco, Shafter, Kern County Community Development Department, Bakersfield Economic Development Department, Kern County Community Development Department and the Eastern Kern County Resource Conservation District are a few of the agencies that Kern COG has assisted with developing GIS. Kern COG also helps develop standards to increase data sharing benefits and publish data on the Internet to reduce public inquiries for data.

FEDERAL AND STATE CONSIDERATIONS

CALIFORNIA STATE FLOODPLAIN MAPPING AWARENESS PROGRAM

The California Floodplain Mapping Awareness Program is currently limited to available floodplain mapping data; but by 2012, all areas expected to develop over the next 25 years will have their floodplains mapped. Initial Floodplain Mapping will be for "Awareness Floodplains" identifying flood hazard areas using approximate assessment procedures. These floodplains will be shown simply as flood prone areas without specific depth and other flood hazard data.

The community maps labeled in **black** on the map below are those with completed Awareness Floodplain Maps. The existing maps include FEMA/NFIP Q3 data, plus the additional approximate assessments. As of April 2005 over 455 square miles of the County have been mapped (Source http://www.fpm.water.ca.gov/mapping/awareness_mapping.html)



CALIFORNIA STATE DAM SAFETY PROGRAM

The California Water Code entrusts the regulatory Dam Safety Program to the Department of Water Resources through the Division of Safety of Dams. The principal goal of this program is to avoid dam failure and thus prevent loss of life and destruction of property. Dams under State jurisdiction are an essential element of the California infrastructure that provides constant water supply integrity.

On March 12, 1928, the sudden failure of St. Francis Dam in Southern California resulted in a major disaster. Because of this failure and because of the exposure to potential risk to the general populace from a number of water storage dams in California, the Legislature in 1929 enacted legislation providing for supervision over non-federal dams in the State. Before the enactment of this legislation, State supervision over dams was exercised by either the State Engineer or the State Railroad Commission. This supervision was limited in scope and extended to less than half of the dams in the State. The statute enacted in 1929 provided for:

1. Examination and approval or repair of dams completed prior to the effective date of the statute, August 14, 1929
2. Approval of plans and specifications, and supervision of construction of new dams, and of the enlargement, alteration, repair, or removal of existing dams and
3. Supervision over maintenance and operation of all dams of jurisdictional size.

In 1963, the failure of the Baldwin Hills Dam, in Southern California, caused the Legislature to amend the Water Code to include within State jurisdiction, both new and existing off-stream storage facilities.

In 1972, the Legislature mandated that all state-regulated dams develop inundation maps and provide copies of them to the state and local jurisdictions. Federal agencies complied with this requirement. (Federal Dam Safety regulations require inundation maps for all High-Hazard federal dams).

Dams under State jurisdiction are artificial barriers, together with appurtenant works, which are 25 feet or more in height or have an impounding capacity of 50 acre-feet or more. Any artificial barrier not in excess of six feet in height, regardless of storage capacity, or that has a storage capacity not in excess of 15 acre-feet, regardless of height, is not considered jurisdictional.

The statutes governing dam safety in California (Division 3 of the Water Code), place the supervision of the safety of non-federal dams and reservoirs under the jurisdiction of the Department of Water Resources' Division of Safety of Dams. The Division reviews plans and specifications for the construction of new dams or for the enlargement, alteration, repair, or removal of existing dams, under application, and must grant written approval before the owner can proceed with construction. Professional engineers and geologists from the Division evaluate each project, investigate proposed sites, and check available construction materials. During construction, they identify conditions disclosed during site development that may require design changes; they check for compliance with approved plans and specifications; and they approve foundations before material is placed.

The Department of Water Resources must have issued a certificate of approval before water can be impounded behind a new dam or behind an existing dam that has been enlarged, altered, or repaired. These certificates may contain restrictive conditions and may be amended or revoked by the Department of Water Resources. Operating dams are periodically inspected to assure that they are adequately maintained and to direct the owner to correct any deficiencies found.

Inasmuch as the approval of an application to construct a dam does not grant the right to appropriate water, the applicant must apply for a water right permit through the State Water Resources Control Board prior to filing an application to construct a dam. An application filed with the Division will initiate action for conformance with the requirements of the California Environmental Quality Act of 1970. (Source: damsafety.water.ca.gov)

CALIFORNIA STATE BUILDING CODE

The California Code of Regulations (CCR), Title 24, also known as the California Building Standards Code (CBSC), is based on the UBC 1997 Building Code, as amended, and has 11 parts. The California Building Standards Code is a compilation of three types of building standards from three different origins:

- Building standards that have been adopted by state agencies without change from building standards contained in national model codes
- Building standards that have been adopted and adapted from the national model code standards to meet California conditions and
- Building standards, authorized by the California legislature, that constitute extensive additions not covered by the model codes that have been adopted to address particular California concerns.

The national model code standards adopted into Title 24 apply to all occupancies in California except for modifications adopted by state agencies and local governing bodies. Included in the code are provisions for:

- Flood Resistant Construction
- Life-Safety Requirements for Existing Buildings Other than High-rise Buildings
- Life-Safety Requirements for Existing High-rise Buildings and
- Repair to Building and Structures Damaged by the Occurrence of a Natural Disaster.

Standard building codes provide new construction with protection against known or expected forces and include wind, seismic, fire and snow-load/ice considerations. As a practice, standard building codes include a factor of safety of up to 1.3, meaning that structures constructed in a professional manner should be able to withstand forces up to 30 percent greater than what is suggested. (Source: www.bsc.ca.gov)

CALIFORNIA HOSPITAL FACILITIES SEISMIC SAFETY ACT

Seismic-safety legislation SB 1953 – Hospital Facilities Seismic Safety Act- (Chapter 740, Statutes of 1994) was passed by the California Legislature in 1994 following the Northridge earthquake (which occurred on Jan.17, 1994.) The Northridge earthquake caused 23 hospitals to suspend some or all of their services and resulted in more than \$3 billion in hospital-related damages. SB 1953 requires hospitals to comply with three seismic safety deadlines – 1) by 2002, major non-structural systems such as backup generators, exit lighting, etc. must be braced; 2) by 2008, all general acute-care inpatient buildings at risk of collapsing during a strong earthquake must be rebuilt, retrofitted or closed; and 3) by 2030, all hospital buildings in the state must be operational following a major earthquake. A 5-year extension on the 2008 deadline to 2013 is available for both structural and non-structural requirements for hospital buildings that meet certain criteria and if they can meet the 2030 requirements by 2013 (Source: California Healthcare Association).

The ultimate public safety benefit of the Act is to have general acute care hospital buildings that not only are capable of remaining intact after a seismic event, but also capable of continued operation and provision of acute care medical services. This legislation has prompted some protection measures within these critical facilities in Kern County. As an example, in 2002 Bakersfield Memorial Hospital braced four critical utility systems for seismic shaking. Most hospitals in the state are having difficulty raising needed funds to meet the deadlines. Bakersfield Memorial Hospital, Kern Valley Hospital , Mercy Hospital, and Ridgecrest Regional

Hospital have all applied for and received the five year extension to the 2008 deadline requirements, which means they have until 2013 to comply.

The table that follows is an excerpt from the Office of Statewide Health Planning and Development’s Summary of Hospital Seismic Performance Ratings report (April 2001) and lists the Hospitals in Kern County (Source: <http://www.oshpd.ca.gov/SB1953/sb1953rating.pdf>). Each general acute-care inpatient building is placed into one of 5 structural (SPC) and 5 nonstructural (NPC) categories. For both categories Category 1 represents “worst” and Category 5 represents “best.” Any hospital with a value for SPC 2 must comply with the HFSSA. By 2030 these buildings must be in the SPC-3, 4 or 5 category and NPC-5.

**Hospital Building Ratings:
Structural Performance Category (SPC) and
Non-Structural Performance Category (NPC)
by County and by Hospital**

Total Number of Facilities = 474
Total Number of Non-Reporters = 38

HOSPITAL	TOTAL REPORTED BUILDINGS	SPC RATINGS					NPC RATINGS					TOTAL LICENSED BEDS	GAC-LICENSED BEDS		
		0	1	2	3	4	5	0	1	2	3			4	5
INYO COUNTY															
Northern Inyo Hospital	5	0	2	0	0	0	3	0	3	0	0	0	2	34	34
Southern Inyo Hospital	12	0	7	0	0	1	4	0	11	0	1	0	0	37	4
INYO COUNTY Totals	17	0	9	0	0	1	7	0	14	0	1	0	2	71	38
KERN COUNTY															
Bakersfield Memorial Hospital - White Lane	-	-	-	-	-	-	-	-	-	-	-	-	-	60	-
Bakersfield Memorial Hospital-34th Street	12	0	5	1	0	6	0	0	5	5	1	1	0	295	271
Delano Regional Medical Center	5	0	1	0	0	4	0	0	5	0	0	0	0	156	111
Good Samaritan Hospital	4	0	1	2	0	1	0	0	4	0	0	0	0	64	43
Healthsouth Bakersfield Rehab Hospital	2	0	0	0	0	2	0	0	2	0	0	0	0	60	60
Heart Hospital Of Bk. L.L.C.	1	0	0	0	0	0	1	0	0	0	0	0	1	47	47
Kern Medical Center	7	1	3	0	0	0	3	1	0	3	0	3	0	222	197
Kern Valley Hospital	1	0	1	0	0	0	0	0	1	0	0	0	0	101	27
Mercy Hospital - Bakersfield	12	0	3	0	0	9	0	0	7	0	0	5	0	261	211
Mercy Westside Hospital	5	0	2	1	0	2	0	0	3	1	1	0	0	84	21
Ridgecrest Community Hospital	7	0	0	4	0	3	0	0	5	2	0	0	0	80	80
San Joaquin Community Hospital	6	0	2	0	0	1	3	0	0	2	0	4	0	178	157
Tehachapi Hospital	1	0	1	0	0	0	0	0	1	0	0	0	0	28	28
KERN COUNTY Totals	63	1	19	8	0	28	7	1	33	13	2	13	1	1,636	1,253

(Source: <http://www.oshpd.ca.gov/SB1953/sb1953rating.pdf> April 2001) Note: Mercy Westside Hospital actually Mercy Southwest Hospital, other changes to this table may have occurred since 2001

CALIFORNIA UNREINFORCED MASONRY PROGRAM

Unreinforced masonry buildings (URMs), are generally brick buildings constructed prior to 1933, predating modern earthquake-resistant design. The brick is not strengthened with embedded steel bars and is therefore called unreinforced. The “URM Law” is SB 547, passed in 1986 and is section 8875 of the California Code. The State Building Code includes a map that identifies areas subject to seismic risk through Zones of increasing risk, from Zone I to Zone IV, with IV having the highest risk. URM buildings in UBC Seismic Zone IV must be inventoried and retrofitted in every jurisdiction. The communities are to adopt a loss reduction program, and to report progress to the Seismic Safety Commission (SSC). The 2003 SSC report discusses the relative effectiveness of mandatory, voluntary, and ‘notification only’ programs. (Source: www.quake06.org/quake06/best_practices)

Summary of Kern County's Compliance with State's Unreinforced Masonry Building Law

	Arvin ¹	Bakersfield ²	Calif. City	Delano	Kern Co. ³	Mari-copa	McFar-land ⁴	Ridge-crest	Shafter	Taft	Tehach-api	Wasco
Inventory Completed	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
No. of Historic URMs	0	0	0		0	0	0		0	0	0	0
No. of Non-Historic URMs	16	191	38		143	16	16		26	42	9	11
UCBC Compliance		6		1	1				1			
Other Compliance ⁵	7	145		1	29					2		2
Warnings Posted									25	2		
No Progress	12	30	37		113	16	16			40		9
Owners Notified	19	191	38		143		16		25			

¹ Mandatory strengthening required to meet 1985 Edition of Chapter 96 the Los Angeles County Code.

² Partial (wall & parapet anchors only) to meet 1991 Edition of the Uniform Code for Building Conservation (UCBC) Appendix 1

³ Unincorporated area.

⁴ Contracts with Kern County for code enforcement; County notifies owners.

⁵ Compliance with local program could include non-UCBC regulations, plans and permits issued, construction in process, occupancy reduced, or demolition planned or completed.

Source: State of California, Seismic Safety Commission, June 12, 2003, *Status of the Unreinforced Masonry Building Law: 2003 Report to the Legislature* (SSC 2003-03).

CALIFORNIA FIRE ALLIANCE

The California Fire Alliance is a cooperative membership dedicated to the support of pre-fire principles and activities ensuring that pre-fire management provides for public and community safety, minimizes costs and losses, and maintains and improves the quality of the environment. The Alliance constitutes an interagency forum for coordinating member agencies' efforts in an integrated fashion.

Fire Alliance members are involved in a number of fuel reduction projects, throughout California. These projects are designed to reduce the likelihood of large and damaging wildfires, while maintaining a healthy ecological system. Suppression forces are regularly used to accomplish such projects during non-emergency response time.

During the 2000 fire season, wildfires burned millions of acres throughout the United States. These fires dramatically illustrated the threat to human lives and development. Under Executive Order, the National Fire Plan was created as a cooperative, long-term effort of the US Department of Agriculture's Forest Service, the Department of the Interior, and the National Association of State Foresters to protect communities and restore ecological health on Federal lands.

A major component of the National Fire Plan was funding for projects designed to reduce fire risks to people and their property. A fundamental step in realizing this goal was the identification of areas that are at high risk of damage from wildfire. Federal fire managers authorized State Foresters to determine which communities were under significant risk from wildland fire on Federal lands.

The California Department of Forestry and Fire Protection undertook the task of generating the state's list of communities at risk. With California's extensive urban Wildland-Urban Interface situation, the list of communities extends beyond just those on Federal lands.

Three main factors were used to determine wildland fire threat to Wildland-Urban Interface areas of California.

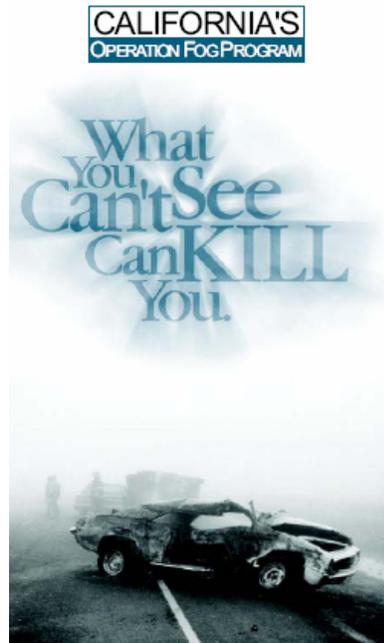
1. **Ranking Fuel Hazards:** ranking vegetation types by their potential fire behavior during a wildfire
2. **Assessing the Probability of Fire:** the annual likelihood that a large damaging wildfire would occur in a particular vegetation type and
3. **Defining Areas of Suitable Housing Density that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

In addition, the California State Hazard Mitigation Plan identifies two dozen pieces of state legislation that have been adopted over the past quarter century establishing requirements ranging from roofing materials to disclosure legislation. (Appendix 5.1.A in state Hazard Mitigation Plan).

CALIFORNIA HIGHWAY PATROL

California's Operation Fog Program.

CHP and Caltrans has a public information brochure on fog hazards located online at http://www.dot.ca.gov/dist6/docs/fog/fogbrochure_english.pdf



When visibility is reduced to less than 500 ft., the California Highway Patrol implements their “PACE CAR” program. The CHP escorts traffic through dense fog when needed. Officers utilize their flashing lights to lead vehicles at a safe pace through areas of heavy traffic. Keeping traffic speeds at a reduced and consistent pace during these conditions will minimize accidents and maximize safe travel.

CALIFORNIA DEPARTMENT OF TRANSPORTATION CALTRANS

Caltrans is working in conjunction with CHP on the California Operation Fog Program. Caltrans is utilizing current technology such as changeable message signs, visibility sensors, and visibility signs.

CALTRANS information network: 1-800-427-ROAD.

CALIFORNIA DEPARTMENT OF FOOD AND AGRICULTURE

Grassy Winged Sharpshooter Biocontrol Facility. As part of CDFA's Pierce's Disease Program, which is engaged in the fight against the sharpshooter and the diseases it spreads in grapevines and other crops and plants, a recent facility in Arvin produces and releases tiny wasps that are natural enemies of the glassy-winged sharpshooter. The Arvin Field Station is operated jointly by CDFA and the United States Department of Agriculture (USDA). The biocontrol crew includes two full-time staff from each agency as well as five seasonal staff. The station also houses a survey crew that monitors sharpshooter populations in the region.

Biological control of the glassy-winged sharpshooter is achieved by releasing thousands of tiny, stingerless wasps that lay their eggs inside the egg masses of the sharpshooter. As the new wasps emerge, they eat the sharpshooter eggs and significantly reduce the number of sharpshooters that hatch. Source: <http://www.cdfa.ca.gov/phpps/pdcp/BioCtrlRep/Doc/Spring2005.pdf>

CALIFORNIA OFFICE OF EMERGENCY SERVICES

Hazard Mitigation Section. The Hazard Mitigation Section is responsible for administering the Hazard Mitigation Grant Program (HMGP) and Pre-Disaster Mitigation Grant Program (PDM). The PDM program is a federally funded competitive grant program established to mitigate risks to facilities and infrastructure from future disasters. The Hazard Mitigation Section is also responsible for the development and implementation of the program which integrates both pre- and post-disaster risk management. It includes disaster prevention, hazard mitigation, hazards assessment, and vulnerability studies. The section also manages the disaster preparedness improvement grant.

Regional support. The State of California is partitioned into three administrative regions and six mutual aid regions. Kern County lies in the Inland administrative region and region V mutual aid region. The Inland region south office is located in Fresno. Each of the three OES regions is modeled after the larger organization and includes the full complement of support programs. A primary goal of this organization is to place more emphasis on regional support of local government. The regional branches are responsible for providing planning and technical assistance to state and local agencies within their respective areas. The programs provide support to local government, schools, businesses, and the public through outreach, education, earthquake hazard mitigation, and preparedness activities. The regions are also responsible for assisting in the coordination of mutual aid, delivery of disaster assistance and training programs, and the overall management of regional emergency response activities. The regional branches oversee the Mutual Aid Regional Advisory Committees (MARACs), which propagate SEMS throughout the regions.

SOUTHERN CALIFORNIA EDISON

Southern California Edison (SCE) has all-hazards emergency preparedness program in place to address pre and post disaster planning needs. They have also assessed the vulnerability of their electric power system and taken steps to mitigate that vulnerability. Some of these activities related to seismic upgrades include:

- Reinforcement of existing equipment/structures;
- Changes in equipment layouts to reduce interactions among substation equipment;
- Adoption of seismic safe models and new material

The company incorporates continuous upgrades to engineering design criteria based on the latest industrial progress, geotechnical findings, and Code revisions.

Multi-Hazard Mitigation Plan

5.0 Mitigation Strategy

This Section describes the mitigation strategy process and mitigation action plan for Kern County's Multi-Hazard Mitigation Plan. This Section describes how Kern County accomplished Phase 3 of FEMA's 4 Phase guidance: "Developing the Mitigation Plan." This includes the following CRS steps from the older 10-step guidance:

- Step 6 Set Planning Goals
- Step 7 Review Possible Activities
- Step 8 Draft an Action Plan

Up to this point in the planning process, the HMPC has organized resources, assessed natural hazards and risks, and documented mitigation capabilities within the County. A profile of Kern County's vulnerability to natural hazards resulted from this effort, which is documented in the preceding chapters of this plan. The following goals, objectives, and mitigation actions were developed based on this profile. The HMPC developed this section of the plan with a series of meetings and exercises designed to achieve a collaborative, multi-jurisdictional mitigation planning effort. Additional detail as to how the goals, objectives and mitigation actions were developed can be referenced in Appendix D - *Additional Planning Process Documentation*.

5.1 GOALS AND OBJECTIVES

44 CFR Requirement §201.6(c)(3)(i): *[The hazard mitigation strategy shall include a] description of mitigation goals to reduce or avoid long-term vulnerabilities to the identified hazards.*

Based upon the risk assessment review, and the process described in Appendix D, the HMPC developed one Master Goal/Mission Statement and three goals with several objectives. These goals and objectives provide the direction for reducing future hazard-related losses within Kern County.

Master Goal/Mission Statement of the Kern County Multi Hazard Mitigation Plan:

"To develop sustainable communities to preserve life, protect property, the environment, and the economy from natural hazards."

The following goals were developed that support the master goal:

- **Reduce hazard impacts to the citizens of the county.**
- **Reduce hazard impacts to existing and future development and the natural environment.**
- **Reduce hazard impacts to existing and future critical facilities and infrastructure.**

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5. 2 IDENTIFIED MITIGATION MEASURES AND ALTERNATIVES

44 CFR Requirement §201.6(c)(3)(ii): *[The mitigation strategy shall include a] section that identifies and analyzes a comprehensive range of specific mitigation actions and projects being considered to reduce the effects of each hazard, with particular emphasis on new and existing buildings and infrastructure.*

Following the development of goals, the HMPC analyzed a set of viable mitigation alternatives that would support the goals. The following Objectives were developed, based on the team's input, that summarize strategies to achieve each goal. The Objectives are ranked in priority order, with the highest priority at the top of the list, based on the team's consensus. Specific recommendations that were developed by the HMPC are listed under the appropriate Goal and Objective. The HMPC agreed not to prioritize the recommendations listed here. A relative prioritization is achieved through the prioritized objectives. The identification and prioritization process used is discussed in more detail in Appendix D.

Goal 1 Reduce hazard impacts to the citizens of the county.

Objectives

1.1 Improve public readiness and awareness

- Promote disaster/public education
- Develop community awareness, training, and preparedness for self reliance using programs such as CERT
- Hold area meetings to acquire information from homeowners on their specific needs, explain what resources are available, and what procedures to take if a quake happens
- Send literature to homeowners addressing earthquake problems and what homeowners can do to reduce vulnerability

1.2 Improve disaster response and recovery capabilities

- Maintain eligibility for grant funds
- Identify/establish funding sources
- Provide emergency transportation for students and citizens
- Have school district communication with emergency services
- Determine evacuation routes

1.3 Develop and exercise emergency response plans

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

Objectives

2.1 Provide and maintain flood mitigation

- Update floodplain management regulations and mapping
- Identify economic impacts to existing and proposed facilities within designated floodplains
- Establish a County Flood Control District

- Minimize county liability/legal exposure
 - Improve flow conveyance
 - Prevent construction of unauthorized levees in floodplain
 - Regulate developmental construction of structures within the floodplain
 - Enforce floodplain regulations
 - Build distribution systems to use flood waters to increase water supply
- 2.2 Promote seismic safety
- Promote seismic retrofit of unreinforced masonry buildings
 - Support seismic code enforcement for retrofit and new construction
- 2.3 Reduce wildfire hazard impacts
- Reduce combustible fuel load in foothills and mountain ridge areas to provide defensible areas and fire breaks
 - Educate residents as to various fire safe measures
 - Improve County Firefighter program by establishing “on call” reserve program.
- 2.4 Reduce exposure to weather related losses
- 2.4 Develop and utilize effective local ordinances

Goal 3 Reduce hazard impacts to existing and future critical facilities and infrastructure.
Objectives

- 3.1 Protect water supply, storage, and distribution facilities
- Develop additional groundwater and surface water storage
 - Improve the Bay-Delta Levee and water conveyance system
 - Promote use of reclaimed water on golf courses
 - Improve water storage tanks and update distribution system to seismic standards
- 3.2 Protect power and energy infrastructure
- 3.3 Protect transportation corridors
- Improve transportation/traffic during emergencies
- 3.4 Protect and develop critical facilities
- Identify critical facilities most at risk to seismic, wildfire, and flood events.
 - Community-wide EOC for the Tehachapi region
 - Provide adequate infrastructure
 - Promote modernization of Federal Endangered Species Act and other laws and regulations to allow water infrastructure projects to proceed
- 3.5 Protect communication and technology network
- 3.6 Protect waste management and sanitation infrastructure
- Strengthen water treatment and conveyance facilities against seismic damage

5.3 THE MITIGATION STRATEGY

44 CFR Requirement 201.6(c)(3): The plan shall include a mitigation strategy that provides the jurisdiction's blueprint for reducing the potential losses identified in the risk assessment, based on existing authorities, policies, programs and resources, and its ability to expand on and improve these existing tools.

The results of the planning process, the Risk Assessment, the Goal Setting, the Identification of Mitigation Measures, and the hard work of the HMPC led to the Action Plan that follows. The process also helped the HMPC clearly comprehend and identify the overall mitigation strategy that will lead to the implementation of the Action Plan. Taking all of the above into consideration the HMPC has developed this **overall mitigation strategy**:

- **COMMUNICATE** the hazard information collected and analyzed through this planning process so that the community better understands what can happen where, and what they can do themselves to be better prepared. Also, publicize the “success stories” that are achieved through the HMPC’s ongoing efforts,
- **IMPLEMENT** the Action Plan recommendations of this plan;
- **UTILIZE** existing rules, regulations, policies and procedures already in existence. Communities can reduce future losses not only by pursuing new programs and projects, but also by more stringent attention to what’s already “on the books”, and
- **MOM** - ardently monitor “Multi-Objective Management” opportunities, so that funding opportunities may be shared and “packaged” and broader constituent support may be garnered.

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5.4 KERN COUNTY MITIGATION ACTION PLAN

*44 CFR Requirement §201.6(c)(3)(iv): For multi-jurisdictional plans, there **must** be identifiable action items specific to the jurisdiction requesting FEMA approval or credit of the plan.*

This Action Plan presents the recommendations developed by the planning team for how Kern County can lessen the vulnerability of people, property, infrastructure, and natural and cultural resources to future disaster losses. The Recommended Mitigation Actions are organized by community in Appendix A. Each recommendation also includes a discussion of the benefit-cost to meet the regulatory requirements of DMA.

The Action Plan summarizes who is responsible for implementing each of the prioritized strategies determined in the previous step, as well as when and how the actions will be implemented. The table on the following page is the summary Action Plan. In addition to the mitigation projects, it includes the responsible party, how the project will be supported, and what the time frame is for implementation of the project. More detail on the specific projects is provided in Appendix A.

It is important to note that Kern County has numerous existing, detailed project descriptions, including cost estimates and benefits, in the County Flood Hazard Mitigation Plan, the CRMP Status Report, and Capital Improvement Plans. These projects are considered to be part of this plan and the details, to avoid duplication, should be referenced in the original plans. Kern County also realizes that new project needs and priorities may arise as a result of a disaster or other circumstances, and reserves the right to support these projects, as necessary, as long as they conform to the goals of this plan.

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KERN COUNTY MITIGATION ACTION PLAN SUMMARY

- Goal 1 Reduce hazard impacts to the citizens of the county.
 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 and infrastructure.

Jurisdiction	Proposed Mitigation Project	Local Priority	Link to Goals	Responsible Agency for Implementation	Estimated Timeframe	Hazards Addressed
Kern County	Bridge on Redrock Randsburg Road at Redrock Canyon Wash	High	3,1	Kern County Roads Department	None given	Flood
Kern County	Lebec Landfill and Transfer Station Drainage Improvements and Erosion Control	High	2,3	County of Kern Waste Management Department	2005-2006	Flood, Soil Hazards - erosion
Kern County	Kern Valley Landfill and Transfer Station Drainage Improvements and Erosion Control	High	2,3	County of Kern Waste Management Department	2005-2006	Flood, Soil Hazards - erosion
Kern County	Bena Landfill Drainage Improvements and Erosion Control	High	2,3	County of Kern Waste Management Department	2005-2006	Flood, Soil Hazards - erosion
Kern County	Mosquito Vector Control in Kern County for Communities without Mosquito Control Districts	High	1	Kern County Department of Public Health	2005	Natural Health Hazards – West Nile Virus
Kern County	Roadside Disc Breaks	High	3	KCFD	Annually, early spring through early summer	Wildfire
Kern County	Hazard Tree Removal, County Park Lands	High	1,2	KCFD, KC Parks	Immediate need, on going	Tree falling accident, Wildfire
Kern County	Hazardous Wildland Fuels Mitigation, Greater Tehachapi Area	High	2	KCFD	Continuous	Wildfire
Kern County	Hazardous Wildland Fuels Mitigation, Frazier Mtn Area	High	2	KCFD	Continuous	Wildfire
Kern County	Hazardous Wildland Fuels Mitigation, Kern River Valley	High	2	KCFD	Continuous	Wildfire
Kern County	Defensible Space, Public Education	High	1,2,3	KCFD	Continuous	Wildfire
Kern County	Fire Safe Council Development	Medium	1,2	KCFD	Continuous	Wildfire

KERN COUNTY MITIGATION ACTION PLAN SUMMARY

- Goal 1 Reduce hazard impacts to the citizens of the county.
 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 and infrastructure.

Jurisdiction	Proposed Mitigation Project	Local Priority	Link to Goals	Responsible Agency for Implementation	Estimated Timeframe	Hazards Addressed
Kern County	Education, Fire Department Personnel	Medium	1,2,3	KCFD	Ongoing, emphasis would be in the early spring and summer months.	Wildfire
Kern County	Caliente Creek Habitat Mitigation Project	High	2,3	Kern County Engineering and Survey Services	4 years	Flood, Soil Hazards - erosion
Kern County	Cuddy Creek Restoration Project	High	1,2,3	Kern County Engineering and Survey Services	2 years	Soil Hazards -erosion
Kern County	Pesticide Accident Response Gap Alleviation	Medium	1	Kern County Office of Emergency Services	Once approved and funded	Manmade – Hazardous materials
Kern County	Mobile Home Foundation Earthquake Retrofitting	Medium	1,2	Kern County Office of Emergency Services	Once approved and funded	Earthquake, Wind
Kern County	Hazard Public Education	Medium	1	Kern County Office of Emergency Services	Once approved and funded	Earthquakes, floods, severe weather, and wildfire
Kern County	Remote Automated Weather Station System	Medium	1,2	Kern FD	Immediate	Wildland fire, Hazardous materials release, Terrorist attack, Earthquake
Kern County	Kern County Flood Mitigation Plan Projects		1,2,3	As detailed in Flood Mitigation Plan		Flood
Kern County	Kern Lake Bed Flood Control and Mitigation Projects		1,2,3	As detailed in CRMP Status report, June 2000		Flood
Kern County, Arvin, Bakersfield, California City, Maricopa, McFarland, Shafter, Taft, Tehachapi, Wasco	Formation of Kern County Unreinforced Masonry Task Force	High	1,2	A committee representing all of the candidate jurisdictions, County OES, or the Kern County Council of Governments.	2005 – 2006 to develop task force and goals, long term implementation	Earthquake

KERN COUNTY MITIGATION ACTION PLAN SUMMARY

- Goal 1 Reduce hazard impacts to the citizens of the county.
- 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 and infrastructure.

Jurisdiction	Proposed Mitigation Project	Local Priority	Link to Goals	Responsible Agency for Implementation	Estimated Timeframe	Hazards Addressed
Kern County, Kern County Water Agency & Poso Creek Joint Powers Authority (Cawelo WD, North Kern WSD & Semitropic WSD) Cities of Wasco and McFarland	Poso Creek Flood Control Project	High	1,2	Cawelo Water District Army Corp of Engineers	Initiate in 2005	Flood
City of Arvin	Support County Caliente Creek Habitat Mitigation Project	High	1,2	See County project		Flood
City of Bakersfield	Repair or replace irrigation canal culverts under city streets	Medium	3	City of Bakersfield, Public Works Dept.		Earthquake, Flood
City of Bakersfield	Flood and storm damage mitigation	Medium	2,3	City of Bakersfield, Public Works Dept.	2006	Flood
City of Bakersfield	Jewetta north of Stockdale Hwy drainage project		3	City of Bakersfield		Flood
City of Bakersfield	Talisman Sump		3	City of Bakersfield		Flood
City of Bakersfield	Pump Stations at Beach Park and Pistol Range		3	City of Bakersfield		Flood
City of Bakersfield	Landfair Sump		2,3	City of Bakersfield		Flood
City of Bakersfield	Elcia and Real drainage project		2,3	City of Bakersfield		Flood
City of Bakersfield	Greenbelt Sump (Monitor Area)		2,3	City of Bakersfield		Flood
City of Bakersfield	Panamam Ln @ Golden Gate sump		2,3	City of Bakersfield		Flood
City of California City	Culvert Replacement California City Blvd, North and South end for Cache Creek drainage.		3	California City Public Works Dept.		Flood
City of California City	Culvert Replacement Randsberg-Mojave Road, North end for Cache Creek drainage.		3	California City Public Works Dept.		Flood

KERN COUNTY MITIGATION ACTION PLAN SUMMARY

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Jurisdiction	Proposed Mitigation Project	Local Priority	Link to Goals	Responsible Agency for Implementation	Estimated Timeframe	Hazards Addressed
City of California City	Culvert Replacement California City Blvd, West end for Cache Creek drainage from Highway 14.		3	California City Public Works Dept.		Flood
City of California City	Replace or retrofit un-reinforced masonry Fire Station at 20890 Hacienda	High	3,1	California City Public Works Dept.		Earthquake
City of California City	Replace or retrofit un-reinforced masonry City Hall at 21000 Hacienda	High	3,1	California City Public Works Dept.		Earthquake
City of California City	Replacement of water pumping systems		3	California City Public Works Dept.		Earthquake, Drought
City of California City	Levee re-enforcement @ Cache Creek		1,3	California City Public Works Dept.		Flood
City of California City	Deepening Cache Creek drainage		2,3	California City Public Works Dept.		Flood
City of Delano	Stormwater relief project for downtown area	Medium	1,2	City of Delano, Public Works Dept.	Completed by end of 2010	Flood
City of Delano	Earthquake education program		1	City of Delano		Earthquake
City of McFarland and Kern County	Flood Abatement	Medium	1,2	City of McFarland	As soon as funding becomes available	Flood
City of McFarland and Kern County	Remediation of Underground Storage Tanks	Medium	1,2	Kern County Environmental Health	3 years	Manmade – Hazardous materials
City of Ridgecrest	Construct 8' high x 10.5' wide x 90' long pre-cast concrete box culvert under Norma Street at the intersection of Norma Street and Bowman Road.	High	1,2,3	City of Ridgecrest, Department of Public Works	As soon as funding becomes available	Flood

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City of Ridgecrest	Construct 8' high x 10.5' wide x 250' long pre-cast concrete box culvert under China Lake Boulevard at the intersection of China Lake Boulevard and Bowman Road.	High	1,2,3	City of Ridgecrest, Department of Public Works	As soon as funding becomes available	Flood
City of Ridgecrest	Construct a 110' long by 80' wide bridge on East Ridgecrest Boulevard (SH 178) with outfall channel. Lowering and/or replacement of a large water main will also be required.	High	1,2,3	City of Ridgecrest, Department of Public Works	As soon as funding becomes available	Flood
City of Ridgecrest	Bowman Wash drainage improvements	High	1,2,3	City of Ridgecrest, Department of Public Works	As soon as funding becomes available	Flood
City of Ridgecrest	Mahan Street drainage improvements to Springer Avenue.	High	1,2,3	City of Ridgecrest, Department of Public Works	As soon as funding becomes available	Flood
City of Ridgecrest	Place Main Transmission Utility Lines Under Ground	Medium	1,3	City of Ridgecrest, Department of Public Works, Utility Services	As soon as funding becomes available	Severe weather- windstorm
City of Shafter	Shafter Downtown Retrofit for Earthquake	High	1,2	City Manager	ASAP	Earthquake
City of Shafter	Shafter Emergency Operations Center	Medium	1,3	City Manager	WOT	Earthquake, All
City of Shafter	Southeast Flood Control Project	Low	1,3	City Manager	Not scheduled	Flood
City of Taft	Unrienced masonry building (URMS) Task Force participation	High	1,2	Taft Building Department and Taft City Fire Department	Undetermined	Earthquake
City of Taft	Flood control and storm drainage	Low	1,2	Taft City Public Works	Within five years	Flood

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City of Tehachapi	Curry Tank Emergency Generator	High	1,3	City of Tehachapi	05-06	All
City of Tehachapi	Fire Station Engine House	High	1,2,3	City of Tehachapi	05-06	Wildfire
City of Tehachapi	Elm Street Drainage and Water Improvement	Medium	1,2	City of Tehachapi	06-07	Flood
City of Tehachapi	Borrow Pit Pump Station & Piping	Medium	1,2	City of Tehachapi	05-06	Flood
City of Tehachapi	Culverts @ Enterprise Way @ WWTP	Medium	1,2	City of Tehachapi	00-01	Flood
City of Tehachapi	Community Center (Multi-Purpose)	Medium	1,3	City of Tehachapi	05-06	All
City of Tehachapi	Cross Gutter (Curry @ C Street)	Medium	1,2	City of Tehachapi	05-06	Flood
City of Tehachapi	Sump Pump @ Capital Hills	Low	1,2	City of Tehachapi	05-06	Flood
City of Wasco	Municipal Water Well Emergency Generator Package Installation	High	3	City of Wasco, Public Works Department	Fiscal Year 2006/07	Drought
City of Wasco	Emergency Power Generator for the Annex Building	High	3	Public Works Department	ASAP	All
City of Wasco	Emergency Power Generator for the City Hall/KCSO Substation Building	High	3	Public Works Department	ASAP	All
East Kern Airport District	Construct rain runoff drainage diversion and upgrade drainage system throughout Mojave Airport	Medium	3	East Kern Airport District, Cal Trans and Kern County		Flood
Indian Wells Valley Airport District	Construction of Drainage Pipes	Low	2,3	Indian Wells Valley Airport District	Within seven years	Flood, Soil Hazards- erosion
Indian Wells Valley Airport District	Bridge Construction	High	3	Indian Wells Valley Airport District	As soon as funding becomes available	Flood

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Arvin CSD	None proposed at present/ will participate in County public hazard education project					
Bear Valley CSD	Bark Beetle Infestation Project	High	1,2	BVCSD	12-06	Wildfire
Bear Valley CSD	Water Booster House Fire Resistance Project	High	1,2,3	BVCSD	12-07	Wildfire
Bear Valley CSD	Water Dip Tank Installation Project	Medium	1,3	BVCSD	6-08	Wildfire
Bear Valley CSD	Fire Hydrant Replacement Project	Medium	1,3	BVCSD	6-08	Wildfire
East Niles CSD	Storage Tank Seismic Retrofit	High	1,3	East Niles Community Services District	Five years	Earthquake
Golden Hills CSD	Area Emergency Operations Center	High	1	Golden Hills CSD and others/ Kern County	None given	All
Golden Hills CSD	Rehabilitate Critical Drainage Easements	High	1,2	Golden Hills CSD	None given	Flood
Golden Hills CSD	Additional Water Storage Tanks	Medium	1	Golden Hills CSD	None given	Earthquake, Drought
Golden Hills CSD	Earthquake retrofit Water Storage Tanks	Medium	1	Golden Hills CSD	None given	Earthquake,
Golden Hills CSD	Fire Safe Council	Medium	1,2	Golden Hills CSD	None given	Wildfire
Golden Hills CSD	Additional Backup Generators		1	Golden Hills CSD	None given	All
Rosamond CSD	Secondary access road over railroad tracks	High	1	Kern County Roads	None given	Earthquake
Rosamond CSD	Storm Water Runoff Study	High	1,2,3	Kern County Roads	None given	Flood
Rosamond CSD	Alternate SR Hwy 14 Access	High	3	Kern County Roads	None given	Flood
Stallion Springs CSD	Replacement of District Administrative Offices which includes the Police Department	High	1,3	Stallion Springs CSD	None given	Earthquake, wildfire
Stallion Springs CSD	Emergency Services	High	1	KCFD, Stallion Springs CSD	Immediately	All

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Stallion Springs CSD	Enlargement of Stallion Springs Lake	High	1,2	Stallion Springs CSD	20 working days in the fall	Flood, Dam failure
Stallion Springs CSD	Fire Prevention	High	1,2	Kern County Fire Department	None given	Wildfire
Tehachapi Valley Healthcare District	None proposed at present/ will participate in County public hazard education project					
Kern Valley Healthcare District	None proposed at present/ will participate in County public hazard education project					
Buttonwillow Recreation and Park District	Aquatic Facility	Medium	1,2	Buttonwillow Recreation and Park District	When funding becomes available	Earthquake, Wildfire
Shafter Recreation and Parks District	None proposed at present/ will participate in County public hazard education project					
Tehachapi Valley Recreation and Parks Dist	Backup Generators	High	1,2	Michael L. Kelley	A.S.A.P.	All
Tehachapi Valley Recreation and Parks Dist.	Mobile radio communications system	High	3	Tehachapi Valley Recreation & Parks District	A.S.A.P.	All
Tehachapi Valley Recreation and Parks Dist.	Evacuation and Sheltering supplies	High	1	Tehachapi Valley Recreation & Parks District	A.S.A.P.	All
Tehachapi Valley Recreation and Parks Dist.	Gym Shelter Improvements	High	1	Tehachapi Valley Recreation & Parks District	Not given	All, earthquake
Tehachapi Valley Recreation and Parks Dist.	Gymnasium Air Conditioning/Cooling/Heating	Medium	3	Tehachapi Valley Recreation & Parks District	As soon as funding becomes available	All
North of the River Recreation and Park District	None proposed at present/ will participate in County public hazard education project					

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Wasco Recreation and Park District	None proposed at present/ will participate in County public hazard education project					
West Side Recreation and Parks District	Skate Escape at Main Street and Third Earthquake Retrofit	medium	1	West Side Recreation and Parks District	None given	Earthquake, Severe Weather - windstorm
West Side Recreation and Parks District	Fitness Center at Main Street and Third Earthquake Retrofit	medium	1	West Side Recreation and Parks District	None given	Earthquake, Severe Weather - windstorm
West Side Recreation and Parks District	Community Center at Kern Street and Cascade Place Shelter improvement	low	1	West Side Recreation and Parks District	None given	All hazards
West Side Recreation and Parks District	Natatorium at Fourth and Calvin Fire Water Supply	low	1,2	West Side Recreation and Parks District	None given	wildfire
Arvin – Edison Water Storage District	David Road Siphon	High	1,2	None given	None given	Flood
Arvin – Edison Water Storage District	Drainage Discharge lines	None given	1,2	None given	None given	Flood
Arvin – Edison Water Storage District	El Paso Creek Flood Channel	Medium	1,2	None given	None given	Flood
Berrenda Mesa Water District/Kern County	California Aqueduct Failure Mitigation	High	3	CA Dept of Water Resources/ Kern County Water Agency	None given	Flood, Earthquake, Drought
Buena Vista Water Storage District	Groundwater Recharge and Recovery Program	High	1,2	None given	Three years	Flood, drought
Buttonwillow County Water District	New/Updated Wastewater Plant	High	1,2,3	Buttonwillow County Water District	As soon as funding becomes available	Earthquake
Buttonwillow County Water District	Purchase 3 Portable Generators on trailers	High	1,3	Buttonwillow County Water District	Unscheduled, however, depends on funding sources	Earthquake, Flood, severe weather

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Buttonwillow County Water District	Service Connection WSV Well, Well #2 and Well #3	High	1,2	Buttonwillow County Water District	As soon as funding becomes available	Earthquake
Buttonwillow County Water District	500,000 Gallon Storage Tank	High	1,3	Buttonwillow County Water District	As soon as funding becomes available	Earthquake, Flood, severe weather
Cawelo Water District	Poso Creek Flood Control Project	High	1,2,3	Cawelo Water District	In progress	Flood
Cawelo Water District	Retrofit Facilities for Seismic Event	Medium	1,3	Cawelo Water District	Within three years	Earthquake, flood
Greenfield County Water District	Retrofit discharge piping and gate valves at Dublin & Panama Well sites	High	1,2,3	Greenfield County Water District		Earthquake
Greenfield County Water District	Replace Panama Well Storage Tank (500,000 gal.)	High	1,2,3	Greenfield County Water District		Earthquake
Kern County Water Agency	Kern County Water Agency Administration Building	Medium	3	Kern County Water Agency	Depending upon funding	Fire, Earthquake
Kern County Water Agency – Improvement District #4	Seismic Retrofit of Water Storage Facilities	High	1,3	Kern County Water Agency – Improvement District #4	March 2006	Earthquake
Kern County Water Agency – Improvement District #4	Operation Center Seismic Upgrades	High	1,3	Kern County Water Agency – Improvement District #4	December 2007	Earthquake
Kern County Water Agency – Improvement District #4	Kelso Creek Relocation and Floodproofing	High	1,2	Kern County Water Agency – Improvement District #4	2 years once funding is available	Flood
Kern County Water Agency – Improvement District #4	Isolation Valves on Transmission Pipelines	Medium	1,3	Kern County Water Agency – Improvement District #4	December 2006	Earthquake
Kern County Water Agency – Improvement District #4	Chemical Storage Seismic Upgrades	Medium	1,3	Kern County Water Agency – Improvement District #4	December 2007	Earthquake
Kern County Water Agency – Improvement District #4	Conjunctive Use Raw Water Pipeline from Well Field	Medium	1,3	Kern County Water Agency – Improvement District #4	December 2008	Wildfire
Kern County Water Agency – Improvement District #4	Equipment Storage Seismic Upgrades	Low	1,3	Kern County Water Agency – Improvement District #4	December 2007	Earthquake

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Kern County Water Agency – Improvement District #4	Side-Stream Nano-Filtration Treatment Option	Low	1,3	Kern County Water Agency – Improvement District #4	December 2008	Wildfire
Kern Delta Water District In conjunction with Kern County, Arvin, and others	Caliente and Southern Stream Flood Prevention Plan	High	1,2,3	County of Kern	Five years	Flood
North of the River Municipal Water District	Water Storage Reservoir Flexible Connection Project	High	1,3	North of the River Municipal Water District	When funded	Earthquake
Semitropic Water Storage District	Groundwater Recharge (in-lieu or direct) and Recovery Projects	High	1,2	Semitropic Water Storage District	Over the next three to five years	Flood, Drought
Tehachapi-Cummings County Water District	Groundwater Protection Strategy for Cummings Valley Groundwater Basin	High	2	State of California Department of Corrections	ASAP	Drought
Tehachapi-Cummings County Water District and Countywide	Antelope Run	High	1,2	Tehachapi-Cummings County Water District	Construction is underway	Flood, soil hazards-erosion
Tehachapi-Cummings County Water District	Fire hazard reduction	High	3	Tehachapi-Cummings County Water District	Each year. Currently operating.	Wildfire
Tehachapi-Cummings County Water District and Countywide	Obtain complete new mobile radio communications system for all vehicles and a base station which is compatible with Kern County's new system	High	1	Tehachapi-Cummings County Water District	In place January 2005	All
Tehachapi-Cummings County Water District	Provide two sites for fire fighting helicopters to dip water	Medium	1,2,3	Tehachapi-Cummings County Water District	Each year. Currently operating.	Wildfire
West Kern Water District	Station C-10 Building Demolition/Retrofit	High	1,3	West Kern Water District	Depending on availability of funds	Earthquake

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West Kern Water District	Water Tank Earthquake Valve(s)	Low to Medium	1,3	West Kern Water District	2006-2007	Earthquake
Wheeler Ridge-Maricopa Water Storage District	Pastoria Creek Channel Hardening for Flood Mitigation	High	1,3	Wheeler Ridge-Maricopa Water Storage District	Within two years	Flood, Soil hazards - erosion
Wheeler Ridge-Maricopa Water Storage District	Grapevine Creek Channel Hardening for Flood Mitigation	High	1,3	Wheeler Ridge-Maricopa Water Storage District	Within five years	Flood Soil hazards - erosion
Wheeler Ridge-Maricopa Water Storage District	New Water Wells for Drought Relief	High	1,2	Wheeler Ridge-Maricopa Water Storage District	Five years	Drought
Wheeler Ridge-Maricopa Water Storage District	Pastoria Creek Detention Basins for Flood Mitigation	Medium	1,3	Wheeler Ridge-Maricopa Water Storage District and Kern County	Within five years	Flood
Wheeler Ridge-Maricopa Water Storage District	Grapevine Creek Detention Basins for Flood Mitigation	Medium	1,3	Wheeler Ridge-Maricopa Water Storage District	Within five years	Flood
Wheeler Ridge-Maricopa Water Storage District	Stream Gages for Early Warning of Flood Conditions	Medium	1,2,3	Wheeler Ridge-Maricopa Water Storage District	Within five years	Flood
Ford City-Taft Heights Sanitation District	Prepare for damage to the collection sewer lines due to earthquake	High	1,2,3	Kern Sanitary Authority	None given	Earthquake
Ford City-Taft Heights Sanitation District	Replace more vulnerable sections of wastewater collection system to withstand the maximum probable earthquake as described in the California building code	Medium	1,2,3	Ford City-Taft Heights Sanitation District	five to seven years	Earthquake
Kern Sanitation Authority	Wastewater plant and collection system seismic retrofit and digester construction	Medium	1,2,3	Kern Sanitation Authority	seven to ten years	Earthquake

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Kern Sanitation Authority	Prepare for damage to the collection sewer lines due to earthquake	High	1,2,3	Kern Sanitation Authority	None given	Earthquake
Kern Sanitation Authority	Prepare for damage to the treatment plant due to earthquake	High	1,2,3	Kern Sanitation Authority	None given	Earthquake
North of River Sanitary District	Force Main pipeline replacement	Medium	1,2,3	North of River Sanitary District	Depending upon funding, within one year	Earthquake
North of River Sanitary District	Sewer Lift Station Backup	Medium	1,2,3	North of River Sanitary District	Depending upon funding, within one year	Earthquake
North of River Sanitary District	Lining three 40 acre wastewater treatment plant ponds	Low	1,2,3	North of River Sanitary District	Depending upon funding, within one year	Earthquake, Flood, Soil Hazards - erosion
South Fork Mosquito Abatement District	Will participate in County hazard public education campaign					
Bakersfield City School District	Additional window film throughout district. Additional anchoring of bookshelves etc.		1,2	Bakersfield City School District		Earthquake, Severe weather- windstorm
Bakersfield City School District	Extensive regarding of selected sites to facilitate better drainage.		1,2	Bakersfield City School District		Flood
Buttonwillow Union School District	East Campus Roofing Project	Medium	1,3	Buttonwillow Union School District	As soon as funding becomes available	Earthquake, Severe Weather – Wind, Severe Thunderstorms, Hail
Buttonwillow Union School District	Gymnasium/shelter Air Conditioning/Cooling/Heating	Medium	1	Buttonwillow Union School District	As soon as funding becomes available	Earthquake, Severe Weather – Wind, Severe Thunderstorms, Hail, Dust storms

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Buttonwillow Union School District	Remodeling/Construction of Storage Facilities	Low	1,2	Buttonwillow Union School District	As soon as possible.	Earthquake
Buttonwillow Union School District	Basement Retrofitting	Low	1	Buttonwillow Union School District	When Funding becomes available	Severe Weather – Wind, Tornadoes
Buttonwillow Union School District	Tree Trimming/Removal	Low	1,3	Buttonwillow Union School District	As soon as funding becomes available	Severe Weather - Wind
Buttonwillow Union School District	Bus Upgrades	Low	1	Buttonwillow Union School District	When Funding becomes available	Severe Weather - Fog
Buttonwillow Union School District	Cool Box/Freezer Replacement	Medium	1	Buttonwillow Union School District	When funding becomes available	Earthquake, Severe Weather
Delano Joint Union High School District	Cesar E. Chavez High School – Install emergency generator for lighting	High	1,3	Delano Joint Union High School District	When funding becomes available	All
Delano Joint Union High School District	Delano High School – Retrofit T-Bar ceilings in classrooms, replace windows with tempered glass	High	1,3	Delano Joint Union High School District	When funding becomes available	Earthquake, Severe Weather- Wind
Edison Elementary School District	Anchor 4-drawer file cabinets and bookshelves over 2 feet high in case of earthquakes		1	Edison Elementary School District		Earthquake
Edison Elementary School District	Make Special emergency plans for medically fragile and Special Day students		1	Edison Elementary School District		All
Edison Elementary School District	Review and improve earthquake safety training program		1	Edison Elementary School District		Earthquake
Edison Elementary School District	Abandon Edison site due to proximity to freeway and railroad tracks!		1	Edison Elementary School District		Manmade – Hazardous Materials

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Fairfax School District	Connect to sewer system/ upgrade for earthquakes	High	1,2,3	Fairfax School District		Earthquake
Kern Community College District	Response – Evacuation and Sheltering	High	1	Kern Community College District Safety Office		Flood, Earthquake, Severe Weather
Kern Community College District	Emergency response supply storage and supplies to accommodate a community evacuation site for Cerro Coso Community College and Bakersfield College		1	Kern Community College District		Flood, Earthquake, Severe Weather
Kern Community College District	Anchoring of bookshelves, filing cabinets, etc. for Bakersfield College and Cerro Coso Community College		1,2	Kern Community College District		Earthquake
Kern Community College District	Electrical Power Source upgrade and alternate emergency power to computing systems for Bakersfield College, Cerro Coso Community College and Kern Community College District		1,2	Kern Community College District		Flood, Earthquake, Severe Weather
Kern High School District	Provide Emergency Supplies and Rescue Supplies to School Sites	High	3	Kern High School District Pupil Personnel	within three weeks of receiving funding	All
Kern High School District	Equip School Vans with First Aid Kits	Medium	1	Kern High School District Pupil Personnel	within three weeks of receiving funding	All

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Kern High School District	NIMS Staff development training for administrators and police officers	High	1	Kern High School District Pupil Personnel	by September 30, 2006 in order to comply with the Federal N.I.M.S. compliance deadline.	All
Kernville Union School District	Shelter Cold Box/Freezer Replacement	Medium	1	Kernville Union School District Office	As soon as funds are available	All
Kernville Union School District	Construction of Gymnasium/Community Center	High	3	Kernville Union School District Office	break ground in June 2008 complete the project by June 2010.	All
Kernville Union School District	Install Emergency Generators	High	3	Kernville Union School District Office	When funding becomes available	All
Kernville Union School District	Construction of Storage Facilities	Medium	3	KUSD	When funds become available	All
Lost Hills Union School District	Evacuation strategies in the event of a flood resulting from the California Aqueduct		1	Lost Hills Union School District		Flood
Lost Hills Union School District	Major catastrophic event evacuation planning		1	Lost Hills Union School District		All
McKittrick School District	Retrofit School Bldg.	High	1,2,3	McKittrick School District	dependent on available funding.	Earthquake, Severe Weather- windstorm
McKittrick and westside school districts	Emergency Backup Systems	Medium	1,3	McKittrick School District	When funding becomes available	Earthquake, Severe Weather
Mojave Unified School District	Remove trees that could pose a hazard during windstorms.		1,3	Mojave Unified School District		Severe Weather - Windstorm

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Mojave Unified School District	Replace more windows with shatterproof glass.		1,3	Mojave Unified School District		Earthquake, Severe Weather - Windstorm
Panama-Buena Vista Union School District	Safety film on certain identified windows/displays	Medium	1,3	Panama-Buena Vista Union School District		Earthquake, Severe Weather - Windstorm
Panama-Buena Vista Union School District	Staff training in disaster response roles	High	1	Panama-Buena Vista Union School District		All
Panama-Buena Vista Union School District	Purchase and implement web-based emergency plan software	Medium	1	Panama-Buena Vista Union School District	Immediately when funds are secured	All
Panama-Buena Vista Union School District	Purchase two-way radios capable of programming to the NEW mutual aid frequency replacing the "Red Channel".	High	1	Panama-Buena Vista Union School District	Immediately when funds are secured	All
Pond Union School District	None proposed at present/ will participate in County public hazard education project					
Richland Elementary School District	Relocation of Transportation Facilities	High	3	Richland Elementary School District	When funding becomes available	Manmade –hazardous materials
Richland Elementary School District	Fencing of campuses and video surveillance	Medium	1	Richland Elementary School District	When funding becomes available	Earthquake, Manmade
Richland Elementary School District	GPS for District vehicles	Medium	1	Richland Elementary School District	When funding becomes available	Severe weather - Fog
Richland Elementary School District	Purchase Radios	High	1	Richland Elementary School District	When funding becomes available	All
Richland Elementary School District	Shade Structures	Medium	1	Richland Elementary School District	When funding is available	Severe weather – extreme temperatures
Richland Elementary School District	Replace Windows	High	1,3	Richland Elementary School District	When funding becomes available	Earthquake

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Jurisdiction	Proposed Mitigation Project	Local Priority	Link to Goals	Responsible Agency for Implementation	Estimated Timeframe	Hazards Addressed
Sierra Sands Unified School District	Flood Abatement	High	1,3	Sierra Sands Unified School District Office of Facilities and Maintenance	Contingent upon funding	Flooding
Sierra Sands Unified School District	School non-structural earthquake retrofit	High	1,3	Office of Personnel Services	Contingent upon funding	Earthquake
Taft City School District	Replace current outdated two-way radios	High	1,3	Taft City School District	Depending on funding, within three years	All
Taft City School District	School window replacement	High	1,3	Taft City School District	Depending on funding, within three years	Earthquake, Severe Weather – Windstorm, Tornado
Tehachapi Unified School District	Develop wildfire plans for schools		1	The District, City of Tehachapi, and County Fire Department		Wildfire
Tehachapi Unified School District	Wildfire and weather resistant roofing		1,3	Tehachapi Unified School District		Wildfire, Earthquake, Severe Weather
Vineland School District	None proposed at present/ will participate in County public hazard education project					

Multi-Hazard Mitigation Plan

6.0 Plan Adoption

44 CFR requirement 201.6(c)(5): “{The local hazard mitigation plan shall include} documentation that the plan has been formally adopted by the governing body of the jurisdiction requesting approval of the plan (e.g., City Council, County Commissioner, Tribal Council).”

The purpose of formally adopting this plan is to secure buy-in from participating jurisdictions, raise awareness of the plan, and formalize the Plan’s implementation. The adoption of this plan completes Step 9 of the Plan Development Process: Formal Plan Adoption. The Kern County Board of Supervisors, the City Councils, and various Board of Directors for participating Districts have adopted the Multi-Hazard Mitigation Plan by passing a resolution. A copy of the generic resolution and the executed copies for each participating jurisdiction is included in Appendix F. Appendix F includes a CD ROM with scanned versions of the original adoption resolutions. This was done to keep the size of the hardcopy plan manageable.

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Multi-Hazard Mitigation Plan

7.0 Plan Implementation and Maintenance

44 CFR Requirement 201.6(c)(4): “{The plan maintenance process shall include a} section describing the method and schedule of monitoring, evaluating, and updating the mitigation plan within a five-year cycle.”

Implementation and Maintenance of the Plan is critical to the overall success of Hazard Mitigation Planning. This is Step 10 of the 10 step Plan Development Process. Upon adoption, the plan faces the truest test of its worth: implementation. Implementation implies two concepts: action and priority. These are closely related.

While this plan puts forth many worthwhile and high priority recommendations, the decision about which action to undertake first will be the first task facing the HMPC. Fortunately, there are two factors that help make that decision. First, there are high priority items and second, funding is always an issue. Thus, pursuing low or no-cost high-priority recommendations will have the greatest likelihood of success.

Another important implementation mechanism that is highly effective and low-cost, is to incorporate the Hazard Mitigation Plan recommendations and their underlying principles of this into other community plans and mechanisms, such as comprehensive planning, capital improvement budgeting, economic development goals and incentives, or regional plans such as those put forth by the State Department of Transportation. **Mitigation is most successful when it is incorporated within the day-to-day functions and priorities of government and development.** This integration is accomplished by constant, pervasive and energetic efforts to network, identify and highlight the multi-objective, win-win benefits to each program, the community, and the constituents. This effort is achieved through the routine actions of monitoring agendas, attending meetings, sending memos, and promoting safe, sustainable communities.

Simultaneous to these efforts, it is important to maintain a constant monitoring of funding opportunities that can be leveraged to implement some of the more costly recommended actions. This will include creating and maintaining a bank of ideas on how any required local match or participation requirement can be met. When funding does become available, the HMPC will be in a position to capitalize on the opportunity. Funding opportunities to be monitored include special pre- and post-disaster funds, special district budgeted funds, state or federal earmarked funds, and grant programs including those that can serve or support multi-objective applications.

Additional mitigation strategies could include consistent and ongoing enforcement for existing rules and regulations, and vigilant review of countywide programs for coordination and multi-objective opportunities.

Plan maintenance implies an ongoing effort to monitor and evaluate the Plan implementation, and to update the plan as progress, roadblocks or changing circumstances are recognized. In order to track progress and update the Mitigation Strategies identified in the Action Plan the County will revisit the Kern County Multi Hazard Mitigation plan annually, or after a hazard event. The Kern County Emergency Management Director/Emergency Manager is responsible for initiating this review and will consult with members of the HMPC. This monitoring and updating will take place through a semi-annual review by Kern OES, an annual review through the HMPC, and a 5-year written update to be submitted to the state and FEMA Region IX, unless disaster or other circumstances (e.g., changing regulations) lead to a different time frame. CRS requires an annual re-certification report.

Evaluation of progress can be achieved by monitoring changes in vulnerabilities identified in the Plan. Changes in vulnerability can be identified by noting:

- Lessened vulnerability as a result of implementing recommended actions,
- Increased vulnerability as a result of failed or ineffective mitigation actions, and/or
- Increased vulnerability as a result of new development (and/or annexation).

Updates to this plan will consider:

- Changes in vulnerability due to project implementation
- Document success stories where mitigation efforts have proven effective
- Document areas where mitigation actions were not effective
- Document any new hazards that may arise or were previously overlooked
- Incorporating new data or studies on hazards and risks
- Incorporate new capabilities or changes in capabilities (planning and zoning, floodplain regulation changes, etc.)
- Incorporate growth and development-related changes to the County's inventory
- Incorporate new project recommendations or changes in project prioritization

Changes should be made to the plan to accommodate for projects that have failed or are not considered feasible after a review for their consistency with established criteria, the time frame, the community's priorities, and funding resources. Priorities that were not ranked high, but identified as potential mitigation strategies, should be reviewed as well during the monitoring and update of this plan to determine feasibility of future implementation. Updating of the plan will be by written changes and submissions, as the Committee deems appropriate and necessary, and as approved by the County Board of Supervisors. In keeping with the process of adopting the Plan, a public hearing to receive public comment on plan maintenance and updating should be held during the annual review period, and the final product adopted by the Board of County Supervisors appropriately.

Incorporation into Existing Planning Mechanisms

44 CFR Requirement §201.6(c)(4)(ii): *[The plan shall include a] process by which local governments incorporate the requirements of the mitigation plan into other planning mechanisms such as comprehensive or capital improvement plans, when appropriate.*

The Mitigation Strategy listed in Section 5.2 of this plan recommends utilizing existing plans and/or programs to implement hazard mitigation in the County, where possible. This point is also emphasized previously in this Implementation and Maintenance section, and in Section 5.4. Based on this plan's capability assessment, the County has and continues to implement policies and programs to reduce losses to life and property from natural hazards. This plan builds upon the momentum developed through previous and related planning efforts and mitigation programs, and recommends implementing projects, where possible, through the following mechanisms:

- Utilization of the Kern County General Plan and Kern County Code of Building Regulations
- Integration with the County Strategic Plan development in 2005
- Local Fire Safe Plans
- County Capital Facilities Plan
- Other Capital Improvement and General plans within the jurisdictions
- County Strategic Plan (under development)
- Other plans, regulations, and practices outlined within the Capability Assessment section of this plan
- Kern Flood Hazard Mitigation Plan
- Kern Lake Plan
- Kern County Caliente Watershed Strategic Pollution and Sediment Reduction Plan

Continued Public Involvement

44 CFR Requirement §201.6(c)(4)(iii): *[The plan maintenance process shall include a] discussion on how the community will continue public participation in the plan maintenance process.*

The update process provides an opportunity to publicize success stories from the plan's implementation, and seek additional public comment. A public hearing(s) to receive public comment on plan maintenance and updating should be held during the update period. When the HMPC reconvenes for the update they will coordinate with all stakeholders participating in the planning process – or that have joined the Committee since inception of the planning process – to update and revise the plan. Public notice will be posted and public participation will be invited, at a minimum, through available web postings and press releases to the local media outlets, primarily newspapers and AM radio stations.

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APPENDIX A

**KERN COUNTY MULTI- HAZARD
MITIGATION PLAN**

MITIGATION PROJECT DESCRIPTIONS

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Mitigation Project Description Worksheet

Jurisdiction: Kern County

Mitigation Project Title: Bridge on Redrock Randsburg Road at Redrock Canyon Wash

Issue/Background: Construct a 400 foot long bridge on the road over the Redrock Canyon drainage channel. This project, it is anticipated, will eliminate the need to restore the road to serviceable condition after flash flood events.

Other Alternatives: Low water crossing already installed.

Responsible Office: Kern County Roads Department

Priority (High, Medium, Low): High

Cost Estimate: \$1.5 million to \$2.0 million

Benefits (avoided Losses): Savings to road fund up to \$200,000 per year. Air quality benefits if detours avoided-closure average of 25 days per year; 25,000 vehicles drive an additional aggregate of potentially 2 million miles per year.

Potential funding: Federal / Local match

Schedule: None given

Worksheet Completed by:
Name and Title: Andrew Richter, Maintenance Engineer
Phone: (661) 862-8837

Mitigation Project Description Worksheet

Jurisdiction: County of Kern Waste Management Department

Mitigation Project Title: Lebec Landfill and Transfer Station Drainage Improvements and Erosion Control

Issue/Background: Due to potential high precipitation, the site could see future damage; therefore, the following would require mitigation as the site is located at the bottom of a canyon. Adjacent property run-off affects this site's ability to control storm runoff on site and creates steep grades and potential landslides; high water velocity channels and large soil loss potential.

Other Alternatives: 1) Do nothing and leave property as is. 2) Purchase adjacent property. 3) Relocate landfill.

Responsible Office: County of Kern, Waste Management Department

Priority (High, Medium, Low): High

Cost Estimate: \$1,000,000

Benefits (avoided Losses): Groundwater contamination; potential lawsuits; adjacent property damage; environmental or habitat preservation.

Potential funding: FEMA; California State Office of Emergency Services, County of Kern Solid Waste Enterprise Fund.

Schedule: 2005 and 2006

Worksheet Completed by
Name and Title: Jeffrey Chavez, Administrative Coordinator
Phone: (661) 862-8943

Mitigation Project Description Worksheet

Jurisdiction: County of Kern Waste Management Department

Mitigation Project Title: Kern Valley Landfill and Transfer Station Drainage Improvements and Erosion Control

Issue/Background: Due to potential high precipitation, the site could see future damage, therefore, the following would require mitigation: 1) Steep grade South of sedimentation channel will be causing a huge erosion in the future. 2) Silt has to be removed South of the drop structure. 3) Grade change around the landfill will cause erosion in narrow channels due to high intensity of rain.

Other Alternatives: 1) Do nothing and leave property as is. 2) Purchase adjacent property. 3) Relocate landfill

Responsible Office: County of Kern Waste Management Department

Priority (High, Medium, Low): High

Cost Estimate: \$200,000

Benefits (avoided Losses): Ground water contamination; potential lawsuits; adjacent property damage; environmental or habitat preservation.

Potential funding: FEMA; California State Office of Emergency Services, County of Kern Solid Waste Enterprise Fund

Schedule: 2005 and 2006

Worksheet Completed by
Name and Title: Jeffrey Chavez, Administrative Coordinator
Phone: (661) 862-8943

Mitigation Project Description Worksheet

Jurisdiction: County of Kern Waste Management Department

Mitigation Project Title: Bena Landfill Drainage Improvements and Erosion Control

Issue/Background: Due to potential high precipitation, the site could see future damage, therefore, the following requires mitigation: high water velocity flows in earth ditches, steep grades and limited vegetation on surface slopes.

Other Alternatives: 1) Do nothing and leave property as is. 2) Purchase adjacent property. 3) Relocate landfill

Responsible Office: County of Kern Waste Management Department

Priority (High, Medium, Low): High

Cost Estimate: \$500,000

Benefits (avoided Losses): Ground water contamination; potential lawsuits; adjacent property damage; environmental or habitat preservation

Potential funding: FEMA; California State Office of Emergency Services, County of Kern Solid Waste Enterprise Fund

Schedule: 2005 and 2006

Worksheet Completed by
Name and Title: Jeffrey Chavez, Administrative Coordinator
Phone: (661) 862-8943

Mitigation Project Description Worksheet

Jurisdiction: Kern County

Mitigation Project Title: Mosquito Vector Control in Kern County for Communities without Mosquito Control Districts

Issue/Background: Approximately 50 percent of Kern County does not have any mosquito control district to provide abatement activities. West Nile Virus is now established in much of the county and will continue to be a health hazard for many years to come. Of particular concern is the entire southeast region of the county. The communities of Tehachapi, Mojave, California City, Rosamond, Boron, Bear Valley, Stallion Springs and North Edwards are currently without any mosquito abatement coverage. West Nile Virus is particularly prevalent in American Crows and Western Scrub Jays, which are a significant proportion of the wild bird population in these communities. Without mosquito abatement activities the virus will be particularly dangerous to birds and humans in this region. Another area of serious concern is the large senior citizen population living in and near the Lake Isabella area. The South Fork Mosquito Abatement District only covers a small portion of the southeast end of the area surrounding the lake, but does not include the communities of Lake Isabella, Bodfish, Kernville, Mount Mesa or Wafford Heights. A very high percentage of the residents there are retired elderly people, who are highly susceptible to West Nile Virus because of their advanced age and chronic diseases.

Other Alternatives: These areas could individually decide to form a mosquito abatement district but it would take several years to organize a ballot initiative, and an election that would place a special district tax proposal on every property owner. It has been estimated that an election would cost anywhere between \$60,000-\$80,000 to conduct, and there would be no guarantee that the measure would pass. The only other alternative would be for the incorporated communities to use existing taxpayer's property tax revenues to hire an existing mosquito abatement district or another "certified sprayer", i.e. pest control company, to conduct mosquito control activities in their area. Even this would require approval of the elected political leaders, such City Council. For those communities that are unincorporated, the County Board of Supervisors could declare a state of emergency and hire a "certified sprayer" to conduct abatement activities in those areas.

Responsible Office: Kern County Department of Public Health

Priority (High, Medium, Low): High for 2005, decreasing in the subsequent years. However, since Kern County is experiencing a very significant housing market boon, the accompanying population growth will provide an ample number of new residents every year, for many years, to contract the disease.

Cost Estimate: \$1,000,000.

Benefits (avoided Losses): The reduction of disease carrying mosquitoes clearly reduces the potential for a widespread serious outbreak of West Nile Virus, as well as other mosquito borne illnesses, such as: western equine encephalitis, St. Louis encephalitis, and California encephalitis. The potential loss of human life could be reduced significantly. Additional abatement activities would also lead to the reduced loss of horses and wild birds to West Nile Virus.

Potential funding: Federal, State & Local Government.

Schedule: Begin in 2005

Worksheet Completed by

Name and Title: Steve Chambers, MSA, Public Health Planner

Phone: (661) 868-0389

Mitigation Project Description Worksheet

Jurisdiction: Kern County FD

Mitigation Project Title: Roadside Disc Breaks

Issue/Background: On an annual average, there are nearly 200 fires started by roadside ignitions, burning an average of over 4200 acres each year.

Each year the KCFD puts in over 150 miles of 12' wide disc breaks along the sides of major rural roads and along state and interstate highways in Kern County.

Other Alternatives:

1. Organized migrant grazing of roadsides to reduce fuel accumulations.
2. Require legal landowners to provide this as a part of annual hazard reduction.

Responsible Office: KCFD

Priority (High, Medium, Low): High

Cost Estimate: \$750,000 (annual expenditure)

Benefits (avoided Losses): Simple wildland fire incident cost is \$1000 / acre and up. Complex incidents, with multiple structure losses and or injuries and fatalities can exceed several million.

Potential funding: Public (Federal and State) Grants

Schedule: Annually, early spring through early summer

Worksheet Completed by

Name and Title: John V. Smith, Captain, KCFD

Phone: 661-391-7170

Mitigation Project Description Worksheet

Jurisdiction: Kern County FD, Kern County Parks

Mitigation Project Title: Hazard Tree Removal, County Park Lands

Issue/Background: Due to overstocked forests, drought, numerous beetle and fungal infestations throughout Kern County, there is an abundance of dead and dying trees within the Mountain Parks of Kern County. Estimates of numbers and species per acre vary by location. The threat to park visitors is significant. The threat to the public and firefighters in the event of a wildfire within the boundaries of the park from falling snags is also significant.

Other Alternatives: No action.

Responsible Office: Kern County FD, KC Parks

Priority (High, Medium, Low): High

Cost Estimate: \$150,000 - \$5,000,000

Benefits (avoided Losses): Protection of county park lands, reduced threat to neighboring property owners (public and private), litigated settlements due to tree falling accident(s).

Potential funding: Federal and State wildfire/fuels treatment grants

Schedule: Immediate need, on going

Worksheet Completed by
Name and Title: John V. Smith, Captain, KCFD
Phone: 661-391-7170

Mitigation Project Description Worksheet

Jurisdiction: Kern County FD

Mitigation Project Title: Hazardous Wildland Fuels Mitigation, Greater Tehachapi Area

Issue/Background: The greater Tehachapi Area (City of Tehachapi, Bear Valley, Golden Hills, Old West Ranch, Stallion Springs, Alpine Forest, Sand Canyon, Keene, Hart Flat) is a major Wildland Urban Interface area. All the communities are at risk for devastating wildfire during the usual fire season of Kern County. Numerous hazardous wildland fuels mitigation projects have been initiated, are ongoing or are in the planning phase within the area.

Ongoing projects include:

1. Highway 58 roadside handline fuel break
2. El Rita Canyon handline fuel break
3. Old West Ranch, road brushing
4. Meadowcreek Ranch fuel break
5. Hart Flat road brushing
6. Bear Valley bug kill pine, tree removal and fuels reduction
7. Bear Valley, south fuel breaks
8. Skyline Rd, road brushing

Planned projects include:

1. Alpine Forest road brushing
2. Alpine Forest ridgetop fuel break
3. Golden Hills fuels reduction and fuel break
4. Tehachapi Mtn fuel break system
5. Woodford Tehachapi Rd, road brushing
6. Wildhorse Ridge fuel break
7. Tehachapi Mtn Park, fuels reduction prescribed burn
8. Cummings Ranch range improvement / fuels reduction burn

Other Alternatives: No action.

Responsible Office: KCFD

Priority (High, Medium, Low): High

Cost Estimate: \$25,000 to \$1,500,000 per project

Benefits (avoided Losses): Reduced threat of life loss, property loss, wildlife habitat loss, and negative economic impacts to grazing, recreation, small business and infrastructure due to catastrophic wildfire. The dollar value is unknown.

Potential funding: Federal and State wildfire/fuels treatment grants

Schedule: Continuous

Worksheet Completed by

Name and Title: John V. Smith, Captain, KCFD

Phone: 661-391-7170

Mitigation Project Description Worksheet

Jurisdiction: Kern County FD

Mitigation Project Title: Hazardous Wildland Fuels Mitigation, Frazier Mtn Area

Issue/Background: The greater Frazier Mtn Area (Lebec, Frazier Park, Lake of the Woods, Pinion Pines, Pine Mtn Club) is a major Wildland Urban Interface area. All the communities are at risk for devastating wildfire during the usual fire season of Kern County. Numerous hazardous wildland fuels mitigation projects have been initiated, are ongoing or are in the planning phase within the area.

Ongoing projects include:

1. Interstate 5 roadside handline fuel break
2. Frazier Park fuel break system
3. Pinion Pines fuel break
4. Pine Mountain Club fuel reduction project
5. Camp Condor fuels reduction project
6. Frazier Park School fuels reduction project
7. Charter School fuels reduction project
8. Bitter Creek Wildlife Refuge, disk breaks

Planned projects include:

1. Lake of the Woods, fuels reduction and fuel break
2. Cuddy Valley fuels reduction
3. Pine Mtn Club fuel break
4. Fort Tejon Fuel Break
5. Fuels reduction directly related to the Tejon Ranch development

Other Alternatives: No action.

Responsible Office: KCFD

Priority (High, Medium, Low): High

Cost Estimate: \$25,000 to \$1,500,000 per project

Benefits (avoided Losses): Reduced threat of life loss, property loss, wildlife habitat loss, and negative economic impacts to grazing, recreation, small business and infrastructure due to catastrophic wildfire. The dollar value is unknown.

Potential funding: Federal and State wildfire/fuels treatment grants

Schedule: Continuous

Worksheet Completed by
Name and Title: John V. Smith, Captain, KCFD
Phone: 661-391-7170

Mitigation Project Description Worksheet

Jurisdiction: Kern County FD

Mitigation Project Title: Hazardous Wildland Fuels Mitigation, Kern River Valley

Issue/Background: The greater Kern River Valley Area (Alta Sierra, Bodfish, Caliente Creek, Canebrake, Havilah, Hungry Gulch, Isabella Highlands, Kelso Valley, Kernville, Lake Isabella, Lorraine, Mt. Mesa, Onyx, Riverkern, Southlake, Squirrel Valley, Twin Oaks, Walker Basin, Walker Pass, Weldon, Wofford Heights) is a major Wildland Urban Interface area. The area has a long history of frequent multi-jurisdictional wildland urban interface fires. All the communities are at risk for devastating wildfire during the usual fire season of Kern County. Numerous hazardous wildland fuels mitigation projects have been initiated, are ongoing or are in the planning phase within the area.

Ongoing projects include:

1. Kernville Area Fuel Break System
 - a. Burma Rd
 - b. Grandview
 - c. Tollefson
 - d. Frontier Homes
 - e. Rodgers Rd
2. Pala Ranches fuel break
3. Alta Sierra fuel break and fuels reduction
4. Sawmill/Isabella Highlands fuel break
5. Rim Road fuel break
6. Myers Canyon fuel break and fuels reduction
7. Squirrel Valley fuel break

Planned projects include:

1. Riverkern fuel break
2. Plater Road fuel break and fuels reduction
3. Tillie Creek fuel break
4. Hungry Gulch fuel break and fuels reduction
5. Dutch Flat, fuels reduction
6. Bodifsh Canyon road brushing and fuel break
7. Erskine Creek, road brushing
8. Spring Gulch, road brushing and fuel break
9. Yankee Canyon road brushing and fuels reduction
10. Greenhorn Mtn Park, forest health and fuels reduction prescribed burn

Other Alternatives: No action.

Responsible Office: KCFD

Priority (High, Medium, Low): High

Cost Estimate: \$25,000 to \$1,000,000 per project

Benefits (avoided Losses): Reduced threat of life loss, property loss, wildlife habitat loss, negative economic impacts to grazing, recreation, small business and infrastructure due to catastrophic wildfire. The dollar value is unknown.

Potential funding: Public (Federal and State) Grants

Schedule: Continuous

Worksheet Completed by
Name and Title: John V. Smith, Captain, KCFD
Phone: 661-391-7170

Mitigation Project Description Worksheet

Jurisdiction: Kern County FD

Mitigation Project Title: Defensible Space, Public Education

Issue/Background: In the event of a wildfire in the wildland urban interface the key to homeowner preparedness is defensible space. This process must be understood, accepted, and the responsibility for, undertaken by the private homeowner. To that end, public education plays a key role in the prevention of catastrophic loss in the wildland urban interface.

Public education avenues, currently in use, include:

- Local newspaper inserts
- Brochures and Handouts
 - Available at public events and fire stations
- PowerPoint presentations, delivered by Fire Department, Federal Land Management personnel, and Fire Safe Council members

Other avenues, which primarily due to inadequate funds, have yet to be developed:

- Newspaper advertisements
- Freeway billboard displays
- Electronic media
 - Television
 - Radio
 - Internet

Other Alternatives: No action.

Responsible Office: Kern County FD

Priority (High, Medium, Low): High

Cost Estimate: \$2,000 to \$25,000 (depending on project specifics)

Benefits (avoided Losses): Reduced threat of life loss, property loss, and negative economic impacts to recreation, small business and infrastructure due to catastrophic wildfire. The dollar value is unknown.

Potential funding: Public Grants

Schedule: Continuous

Worksheet Completed by

Name and Title: John V. Smith, Captain, KCFD

Phone: 661-391-7170

Mitigation Project Description Worksheet

Jurisdiction: Kern County FD

Mitigation Project Title: Fire Safe Council Development

Issue/Background: A consistent public education message, coordination of multiple agency focus, programs and projects is the primary benefit of the local Fire Safe Councils. These community-based groups are non-profit, citizens trying to make their communities safer from catastrophic wildfire. They are often only limited by funds to: support their ongoing ideas and projects, maintain their financial records, provide the means to deliver their important message, or the "seed money" needed to develop effective community based Wildfire Protection Plans.

Other Alternatives: No action.

Responsible Office: Kern County FD

Priority (High, Medium, Low): Medium

Cost Estimate: \$1,000 to \$20,000 per Fire Safe Council

Benefits (avoided Losses): Improved community awareness and participation will yield reduced losses due to catastrophic wildfire. The dollar value is unknown.

Potential funding: Public Grants

Schedule: Continuous

Worksheet Completed by
Name and Title: John V. Smith, Captain, KCFD
Phone: 661-391-7170

Mitigation Project Description Worksheet

Jurisdiction: Kern County FD

Mitigation Project Title: Education, Fire Department Personnel

Issue/Background: Information and technologies available to the agencies with wildland firefighting responsibilities are developed daily. Laws and ordinances can become confusing to the average firefighter especially when these laws cross several jurisdictional boundaries.

Fire department personnel are the primary contact for the public regarding hazard reduction, defensible space and fire safety in the Wildland Urban Interface. These personnel span a broad area, with diverse agency priorities, experience levels and training.

Fire department and land management agency personnel need a consistent message and information source to help educate the public and enforce sometimes confusing laws and ordinances.

The ability to routinely train these employees with DVD and print based material will allow for a more consistent and enforceable message to the general public.

Other Alternatives: Continue the status quo, with minimal training information.

Responsible Office: KCFD

Priority (High, Medium, Low): Medium

Cost Estimate: \$5,000 to \$100,000

Benefits (avoided Losses): Improved public education and awareness could save countless dollars in reduced loss due to catastrophic wildfire. The exact dollar value is unknown.

Potential funding: Public Grants

Schedule: Ongoing, most training and emphasis would be in the early spring and summer months.

Worksheet Completed by

Name and Title: John V. Smith, Captain, KCFD

Phone: 661-391-7170

Mitigation Project Description Worksheet

Jurisdiction: Kern County

Mitigation Project Title: Caliente Creek Habitat Mitigation Project

Issue/Background: The Caliente watershed routinely floods the communities of Arvin and Lamont on the average of every 7 years. This project would acquire 1500 acres of land where it would intercept the water upstream of those communities (near Hwy 58) and would force the water to slow and dissipate energy, deposit sediment, and increase flood-flow volume losses. The area would also be reclaimed back to natural habitat and reintroduce native species to the site.

Other Alternatives: Do nothing

Responsible Office: Kern County Engineering and Survey Services

Priority (High, Medium, Low): Medium

Cost Estimate: \$17,000,000

Benefits (avoided Losses): Less than 50% of the flood events that currently pass downstream of Hwy 58 would pass after this project. Also, the project would reduce scour and sediment generation, force deposition and sediment removal, provide volumetric flood losses as well as provide groundwater recharge, and also promote habitat reclamation. This would also be an integral mitigation project of sediment and habitat for future downstream projects.

Potential funding: Unknown

Schedule: 4 years

Worksheet Completed by

Name and Title: Greg Fenton, Engineering Division Manager

Phone: 661-862-5061

Mitigation Project Description Worksheet

Jurisdiction: Kern County

Mitigation Project Title: Cuddy Creek Restoration Project

Issue/Background: This project would restore a portion of Cuddy Creek through the town of Frazier Park. This reach has experienced uncontrolled erosion for several years and several bridges, homes and businesses are or will soon be in danger. The project consists of constructing a series of rock groins and planted groins to force the stream into a meandering path to slow the flow, reduce energy, and thereby reduce the negative affects of erosion, degradation and aggregation.

Other Alternatives: Do nothing

Responsible Office: Kern County Engineering and Survey Services

Priority (High, Medium, Low): Medium

Cost Estimate: \$800,000

Benefits (avoided Losses): In addition to minimizing erosion and the threat to properties, the project would also provide natural habitat for aquatic and terrestrial species, enhance greenbelts and riparian and wetland habitats, support groundwater recharge capabilities, and create an education outreach center to promote public awareness on the local environmental benefits.

Potential funding: Unknown

Schedule: 2 years

Worksheet Completed by

Name and Title: Greg Fenton, Engineering Division Manager

Phone: 661-862-5061

Mitigation Project Description Worksheet

Jurisdiction: Kern County

Mitigation Project Title: Pesticide Accident Response Gap Alleviation

Issue/Background: Kern County has a thriving agricultural industry. In 2004, over \$3 billion in crops were harvested from almost 900,000 acres.

As part of the growth cycle, many of the crops require the application of pesticides. The California State government extensively regulates the application of pesticides to farmland. Such regulation mitigates the risk of pesticide accidents (e.g., pesticide drifts). However, such accidents occasionally occur. Kern County's most recent pesticide accident occurred in July 2005 when three construction workers were exposed to pesticides released by a crop duster spraying an adjacent field. Another pesticide accident in May 2005 affected almost two dozen field workers. Over the last dozen years, more than 1,300 people in Kern County have reported illness from pesticide exposure.

The California State government also extensively regulates preparedness for and response to pesticide accidents. However, after speaking with agencies involved with pesticide accident preparedness and response (Agricultural Commissioner, Fire Department, Environmental Health, and Public Health), we have identified gaps in preparedness and response that may be addressed through a mitigation project. These gaps, and potential remedies, are described below.

- Gap 1 – Immediate bilingual response. An improved bilingual response could help quell on-site panic in the first half hour after a pesticide accident.

Potential remedies. Bilingual response may be improved through options ranging from providing English/Spanish translator cards to first responders to offering some sort of "emergency response conversational Spanish" training to non-bilingual personnel.

- Gap 2 – Availability of after-business-hours contact information. Up-to-date, easily accessible contact information may improve communications among growers, pesticide applicators, and first responders after a pesticide accident. For example, imagine that first responders needed to quickly find out what type of pesticide was involved in an after-hours accident.

Potential remedy. A secure Website may improve communications. First responders could access the secure Website to determine whom to contact for this information at any time. Related costs would include appropriate Website development and maintenance.

- Gap 3 – Environmental Health Hazmat response time. At the present time, Environmental Health Hazmat is notified of pesticide accidents through department-issued pagers. The time it takes on-call personnel to receive and return a page may slow their response to a pesticide accident.

Potential remedy. Issuing cell phones to on-call Environmental Health Hazmat personnel may improve their response times. Related costs would include cell phone hardware and service.

- Gap 4 – Fire Department Hazmat setup. At the present time, Fire Department Hazmat first responders must set up a decontamination area at the accident site before they begin treating victims. The area must be configured to ensure the victims have as much privacy as possible during the decontamination process. This may include the use of portable shelters and tarps. The time it takes to set up the area may delay the beginning of treatment.

Potential remedy. A self-contained decontamination trailer with shower stalls may decrease the time it takes to set up a decontamination area and begin treatment while ensuring victim privacy.

Although we may identify other gaps during this planning process, we will limit this mitigation project proposal to the four described above.

Other Alternatives: No action.

Responsible Office: Kern County Office of Emergency Services

Priority (High, Medium, Low): Medium

Cost Estimate: _____

Benefits (avoided Losses): Improved emergency response

Potential funding: _____

Schedule: The projects described above could be implemented as soon as they are approved and funded.

Worksheet Completed by

Name and Title: Wendy J. Benson, Kern County Office of Emergency Services Planner

Phone: (661) 391-7099

Mitigation Project Description Worksheet

Jurisdiction: Kern County

Mitigation Project Title: Mobile Home Foundation Earthquake Retrofitting

Issue/Background: The Hazard Mitigation Plan Planning Team (Team) developed a Plan goal to reduce hazard impacts to existing and future development and the natural environment. In support of this goal, the Team developed an objective to promote seismic safety. Concurrently, while assessing the risks posed by earthquakes, a hazard with which Kern County has a lot of experience, we became aware of the vulnerability of mobile homes to foundation damage. This vulnerability is compounded by the inability of some mobile home residents, due to limited financial resources, to retrofit the foundation of their mobile homes to better equip them to withstand earthquakes.

To mitigate this vulnerability, we propose implementing a program to award funds to eligible mobile home homeowners to pay to retrofit the foundations of their mobile homes to better withstand earthquakes. Such a program may lessen the impact of a major earthquake on a population that may be particularly ill-equipped to withstand such an impact.

The California Department of Insurance's former Earthquake Retrofit Grants and Loans Program illustrates the potential effectiveness of this program. According to the Department's 2001 Annual Report, 18 homes retrofitted under the Program successfully withstood the September 3, 2000, Napa earthquake even though they were located near the epicenter. By comparison, many non-retrofitted homes nearby were damaged.

Other Alternatives: No action.

Responsible Office: Kern County Office of Emergency Services

Priority (High, Medium, Low): Medium

Cost Estimate: _____

Benefits (avoided Losses): Improved seismic safety for a potentially vulnerable population. Reduced damage to structures from earthquakes and windstorms.

Potential funding: California Department of Insurance, Local sources, FEMA

Schedule: The project described above could be implemented as soon as it is approved and funded.

Worksheet Completed by
Name and Title: Wendy J. Benson, Kern County Office of Emergency Services Planner
Phone: (661) 391-7099

Mitigation Project Description Worksheet

Jurisdiction: Kern County

Mitigation Project Title: Hazard Public Education

Issue/Background: In support of the Plan goal to reduce hazard impacts to the citizens of Kern County, the Hazard Mitigation Plan Planning Team (Team) developed an objective to improve public readiness and awareness. Specific recommendations to accomplish this objective include

- Promote disaster/public education,
- Develop community awareness, training, and preparedness for self-reliance using programs such as CERT,
- Hold area meetings to acquire information from homeowners on their specific needs, explain what resources are available, and what procedures to take, and
- Send literature to homeowners addressing what homeowners can do to reduce vulnerability.

Initially, we seek to increase public readiness and awareness of the four hazards most common to Kern County: Earthquakes, floods, severe weather, and wildfire. Potential actions to achieve the specific recommendations include, but are not limited to, the following:

- Producing public education announcements on television and radio, including Kern Government Television (KGOV),
- Publishing materials, including but not limited to brochures, pamphlets, posters, and leaflets,
- Executing direct mail campaigns targeting Kern County residents, and
- Participating in community forums (e.g., safety fairs, health fairs, and/or public resource fairs).

To accomplish the actions above, specific expenses may include the following:

- Public education announcement production and airtime costs,
- Publication design and printing costs,
- Direct mail permit fees, postage, and mailing lists,
- Portable components to set up booths at community forums, including but not limited to stand-alone panels, table skirting, and tabletop displays, and
- Promotional products (e.g., calendars, magnets, first aid kits).

Other Alternatives: No action.

Responsible Office: Kern County Office of Emergency Services

Priority (High, Medium, Low): Medium

Cost Estimate: _____

Benefits (avoided Losses): Improved public readiness and awareness.

Potential funding: County and local funds, CA OES

Schedule: The actions described above could be implemented as soon as they are approved and funded.

Worksheet Completed by

Name and Title: Wendy J. Benson, Kern County Office of Emergency Services Planner

Phone: (661) 391-7099

Mitigation Project Description Worksheet

Jurisdiction: Kern County FD

Mitigation Project Title: Remote Automated Weather Station System

Issue/Background: All large-scale emergency incidents, be they a wildland fire, hazardous materials release, terrorist attack, or earthquake, is a weather related catastrophe. Fire behavior, toxic plume direction and modeling, flood probabilities and locations, and pre-alerting of the severe conditions associated with these types of incidents can be mitigated by the use of a Remote Automated Weather Station (RAWS) system.

The current collection of RAWS, are loosely collated by several different agencies with differing missions. Since the Fire Department generally responds to all these scenarios, it would be in the department's best interest to have a dedicated RAWS system, which is accessible county-wide using current technologies, by Incident Command staff as needed with minimal or no setup delays.

Eight RAWS stations could provide invaluable and timely information for Incident Command staff and planners. These stations could be linked through the counties existing radio system for information access across the county 24 hours a day. The information could also be access through the Internet as all data can be sent via the GOES satellite system.

Other Alternatives: Continue the current system; rely on multiple agencies to relay weather data.

Responsible Office: Kern FD

Priority (High, Medium, Low): Medium

Cost Estimate: \$128,000 (8 X \$16K each)

Benefits (avoided Losses): Primary benefit is to Incident Planners and Command Staff, however that could yield numerous lives and or properties saved with proper situational awareness.

Potential funding: Public Grants, DHS funds

Schedule: Immediate

Worksheet Completed by
Name and Title: John V. Smith, Captain KCFD
Phone: 661-391-7170

Mitigation Project Description Worksheet

Jurisdiction: Kern County, Arvin, Bakersfield, California City, Maricopa, McFarland, Shafter, Taft, Tehachapi, Wasco

Mitigation Project Title: Formation of Kern County Unreinforced Masonry Task Force

Issue/Background: This project involves forming a task force that will jointly address the URM problems within the County and develop policy, financial, regulatory and other means to reduce the risk. Kern County is an area of high earthquake risk, and 10 of its communities collectively have over 500 hazardous unreinforced masonry buildings (URMs). As demonstrated repeatedly, URM buildings pose a significant risk because their construction predates the adoption of building codes requiring earthquake resistance. The well documented collapse or severe damage to URMs even in moderate events results in deaths, injuries, and business interruptions, losses, or closures. Many California communities have adopted URM abatement programs, many of which were triggered by a state law that required communities to inventory their URMs and to notify the buildings' owners of the hazard. Learning from a sample of other communities that have adopted and implemented local URM mitigation programs, will allow Kern County's communities to design cost-effective, politically acceptable, and practical hazard mitigation measures.

Other Alternatives: No action continues to perpetuate the risk posed by a class of buildings—URMs—that are a “disaster waiting to happen.”

Responsible Office: 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.

Priority (H, M, L): High

Cost Estimate: The cost for the evaluation and the preparation of a recommended customized strategy and supporting documentation for each community and the facilitation of meetings and hearings is \$240,000.

Cost Benefit: When earthquakes strike these communities, the physical losses alone will be in the millions of dollars. Potential fatalities and injuries will be avoided as will the loss of businesses and jobs. This evaluation will cost less than \$500 per building.

Potential Funding: The Federal Emergency Management Agency (FEMA) through its hazard mitigation programs and/or funds appropriated to FEMA to carry out its responsibilities under the National Earthquake Hazards Reduction Act.

Schedule: It would take about one year to complete the evaluation and to prepare URM mitigation plans for individual communities. The total program to strengthen, replace, or otherwise abate the risk may take ten years and be accomplished in phases.

Mitigation Project Description Worksheet

Jurisdiction: Kern County, Kern County Water Agency & Poso Creek Joint Powers Authority (Cawelo WD, North Kern WSD & Semitropic WSD), Cities of Wasco & McFarland

Mitigation Project Title: Poso Creek Flood Control Project

Issue/Background: The Poso Creek regularly breaches its banks and floods cities within Northern Kern County.

In February of 1998, the Poso Creek in northwest Kern County breached its banks late the night of the 23rd with a flow estimate of 7000CFS by 0100 PST on 2/24/98 and flooded the Kern County town of McFarland (112 homes) by 1300 PST on the 24th. The Poso Creek high water also threatened some rural homes downstream near Wasco later on the 24th.

The proposed solution would be to build a flood control structure that would protect cities within the Poso Creek watershed.

Other Alternatives: Allow flooding to occur

Responsible Office: Cawelo Water District 661.393.6072 ; District Engineer - Dick Shafer of Shafer & Associates; Army Corp of Engineers,

Priority (High, Medium, Low): High

Cost Estimate: as of 10/2002, \$47,082,000 (Total)

Benefits (avoided Losses): Flood damage to cities within Northern Kern County

Potential funding:

\$29,259,000 (potentially from Federal)

\$17,823,000 (needs to come from local sources)

Schedule: Initiate in 2005

Contact information

Name of jurisdiction: Semitropic Water Storage District

Filled out by: Drew Hamilton

Address: PO Box Z

Wasco, CA 93280

Mitigation Project Description Worksheet

Jurisdiction: City of Bakersfield

Mitigation Project Title: Repair or replace irrigation canal culverts under city streets.

Issue/Background: A number of corrugated metal pipe culverts and old concrete pipe culverts cross under various streets throughout the city. These culverts are for irrigation canal water and many are deteriorated from age and corrosion. An earthquake could cause structural failure if it occurs before repair or replacements. One location is a bridge.

Other Alternatives: Construct new culvert under roadway and relocate canal to new location. Cost of new construction and right-of-way needed would be prohibitive.

Responsible Office: City of Bakersfield, Public Works Dept.

Priority (High, Medium, Low): Medium

Cost Estimate: \$1,000,000 (approx. 4 – 5 locations)

Benefits (avoided Losses): Cost from failure due to earthquake and subsequent emergency could be three times the estimate plus potential loss of life or injuries.

Potential funding: Grants or bond issue

Schedule:

Worksheet Completed by: City of Bakersfield
Name and Title: Stuart Patterson, Construction Superintendent
Phone: (661) 326-3105

Mitigation Project Description Worksheet

Jurisdiction: City of Bakersfield

Mitigation Project Title: Flood and storm damage mitigation.

Issue/Background: Much of the downtown area and the Panorama Bluffs area are subject to flooding and storm damage. Flooding in downtown is due to inadequate and undersized storm drain and collection systems. Storm damage potential in the Bluffs consists of erosion of hillside and subsequent loss of infrastructure. This project would complete improvements recommended in the drainage study. An upgrade and installation of storm drain, collection, and pump stations would alleviate the problem.

Other Alternatives: Sandbags or other temporary flood control devices installed during storm events.

Responsible Office: City of Bakersfield, Public Works Dept.

Priority (High, Medium, Low): Medium

Cost Estimate: \$6,000,000

Benefits (avoided Losses): Would avoid projects to repair erosion, reconstruct roads, reconstruct utilities, or property damage.

Potential funding: Grants or bond issue

Schedule: 2006

Worksheet Completed by: City of Bakersfield
Name and Title: Stuart Patterson, Construction Superintendent
Phone: (661) 326-3105

Mitigation Project Description Worksheet

Jurisdiction: City of Bakersfield

Mitigation Project Title: Jewetta north of Stockdale Hwy drainage project.

Issue/Background: The street floods if adjacent lakes are full, this project would deepen the lakes to allow storm runoff from the street at all times.

Other Alternatives: No action

Responsible Office: City of Bakersfield

Priority (High, Medium, Low):

Cost Estimate: \$200,000

Benefits (avoided Losses): Reduced street flooding

Potential funding: City general fund

Schedule:

Worksheet Completed by:

Name and Title: Brad B. Underwood, Public Works Operations Manager

Phone: (661) 326-3781

Mitigation Project Description Worksheet

Jurisdiction: City of Bakersfield

Mitigation Project Title: Tallisman Sump

Issue/Background: Sump overflows in heavy rain. This project would connect the sump to the storm drain system to collect overflow capacity.

Other Alternatives: No action

Responsible Office: City of Bakersfield

Priority (High, Medium, Low):

Cost Estimate: \$200,000

Benefits (avoided Losses): Reduced street flooding

Potential funding: City general fund

Schedule:

Worksheet Completed by:

Name and Title: Brad B. Underwood, Public Works Operations Manager

Phone: (661) 326-3781

Mitigation Project Description Worksheet

Jurisdiction: City of Bakersfield

Mitigation Project Title: Pump Stations at Beach Park and Pistol Range

Issue/Background: Install permanent generators at these key pump stations to avert potential damage in storm situations.

Other Alternatives: No action

Responsible Office: City of Bakersfield

Priority (High, Medium, Low):

Cost Estimate: \$100,000

Benefits (avoided Losses): Reduced flood losses

Potential funding: City general fund

Schedule:

Worksheet Completed by:

Name and Title: Brad B. Underwood, Public Works Operations Manager

Phone: (661) 326-3781

Mitigation Project Description Worksheet

Jurisdiction: City of Bakersfield

Mitigation Project Title: Landfair Sump

Issue/Background: This area floods when the golf course lakes are full. This project would connect the storm system to other existing systems to divert the flow.

Other Alternatives: No action

Responsible Office: City of Bakersfield

Priority (High, Medium, Low):

Cost Estimate: \$200,000

Benefits (avoided Losses): Reduced flood losses

Potential funding: City general fund

Schedule:

Worksheet Completed by:

Name and Title: Brad B. Underwood, Public Works Operations Manager

Phone: (661) 326-3781

Mitigation Project Description Worksheet

Jurisdiction: City of Bakersfield

Mitigation Project Title: Elcia and Real drainage project

Issue/Background: Connect this area to the county storm drain system that flows into a county sump.

Other Alternatives: No action

Responsible Office: City of Bakersfield

Priority (High, Medium, Low):

Cost Estimate: \$100,000

Benefits (avoided Losses): Reduced flood damages

Potential funding: City general fund

Schedule:

Worksheet Completed by:

Name and Title: Brad B. Underwood, Public Works Operations Manager

Phone: (661) 326-3781

Mitigation Project Description Worksheet

Jurisdiction: City of Bakersfield

Mitigation Project Title: Greenbelt Sump (Monitor Area)

Issue/Background: Depress sump to handle additional water.

Other Alternatives: No action

Responsible Office: City of Bakersfield

Priority (High, Medium, Low):

Cost Estimate: \$200,000

Benefits (avoided Losses): Reduced flood losses

Potential funding: City general fund

Schedule:

Worksheet Completed by:

Name and Title: Brad B. Underwood, Public Works Operations Manager

Phone: (661) 326-3781

Mitigation Project Description Worksheet

Jurisdiction: City of Bakersfield

Mitigation Project Title: Panaman Ln @ Golden Gate sump

Issue/Background: Purchase property and install sump.

Other Alternatives: No action

Responsible Office: City of Bakersfield

Priority (High, Medium, Low):

Cost Estimate: \$200,000

Benefits (avoided Losses): Reduced flood losses

Potential funding: City general fund

Schedule:

Worksheet Completed by:

Name and Title: Brad B. Underwood, Public Works Operations Manager

Phone: (661) 326-3781

Mitigation Project Description Worksheet

Jurisdiction: California City

Mitigation Project Title; Culvert Replacement and over sizing at California City Blvd, North and South end for Cache Creek drainage.

Issue/Background: The city experiences flooding each rain due to several factors. One factor is the culvert sizes are too small which allows water to wash out the streets and creates a backup of water which floods property and buildings.

Other Alternatives: No action

Responsible Office: California City Public works

Priority (High, Medium, Low):

Cost Estimate:

Benefits (avoided Losses): Reduced flood losses

Potential funding: City general fund

Schedule:

Worksheet Completed by:
Name and Title: Michael Antonucci Jr.
Phone: 760-373-7003

Mitigation Project Description Worksheet

Jurisdiction: California City

Mitigation Project Title: Culvert Replacement and over sizing at Randsberg-Mojave Road, North end for Cache Creek drainage.

Issue/Background: The city experiences flooding each rain due to several factors. One factor is the culvert sizes are too small which allows water to wash out the streets and creates a backup of water which floods property and buildings.

Other Alternatives: No action

Responsible Office: California City/ Kern County Road and Bridge

Priority (High, Medium, Low):

Cost Estimate:

Benefits (avoided Losses): Reduced flood losses

Potential funding: City general fund

Schedule:

Worksheet Completed by:
Name and Title: Michael Antonucci Jr.
Phone: 760-373-7003

Mitigation Project Description Worksheet

Jurisdiction: California City

Mitigation Project Title: Culvert Replacement and over sizing at California City Blvd, West end for Cache Creek drainage from Highway 14.

Issue/Background: The city experiences flooding each rain due to several factors. One factor is the culvert sizes are too small which allows water to wash out the streets and creates a backup of water which floods property and buildings.

Other Alternatives: No action

Responsible Office: California City/ Kern County Road and Bridge

Priority (High, Medium, Low):

Cost Estimate:

Benefits (avoided Losses): Reduced flood losses

Potential funding: City general fund

Schedule:

Worksheet Completed by:
Name and Title: Michael Antonucci Jr.
Phone: 760-373-7003

Mitigation Project Description Worksheet

Jurisdiction: California City

Mitigation Project Title: Replace or retrofit un-reinforced masonry Fire Station at 20890 Hacienda

Issue/Background: The fire station, built in 1963, is the only station to service 204 square miles of areas plus mutual aid to the County of Kern. This essential facility has staffing and equipment which responds to approximately 2,100 alarms for service per year and is in need of a retro-fit or replacement. It could not with stand an earthquake of any significance. We have had soils and engineering done on the building to conclude this finding.

Other Alternatives: No action

Responsible Office: California City

Priority (High, Medium, Low): High

Cost Estimate:

Benefits (avoided Losses): Continuity of emergency services during a disaster; reduced impact to firefighters and firefighting equipment during an earthquake.

Potential funding: City general fund/ FEMA

Schedule:

Worksheet Completed by:
Name and Title: Michael Antonucci Jr.
Phone: 760-373-7003

Mitigation Project Description Worksheet

Jurisdiction: California City

Mitigation Project Title: Replace or retrofit un-reinforced masonry City Hall at 21000 Hacienda

Issue/Background: City Hall of the City of California City is an essential facility within the city government. This facility was built in the 1960's and is not to current standards. This facility needs to be retro-fitted or replaced. It could not with stand an earthquake of any significant. We have had soils and engineering done on the building to conclude this finding.

Other Alternatives: No action

Responsible Office: California City

Priority (High, Medium, Low): High

Cost Estimate:

Benefits (avoided Losses): Continuity of government services during a disaster; reduced impact to City employees and visitors during an earthquake.

Potential funding: City general fund/ FEMA

Schedule:

Worksheet Completed by:
Name and Title: Michael Antonucci Jr.
Phone: 760-373-7003

Mitigation Project Description Worksheet

Jurisdiction: California City

Mitigation Project Title: Replacement of water pumping systems

Issue/Background: The city gets the majority of water from wells owned by the city. These wells require pumping to the tanks which are the domestic water supply and fire water supplying the hydrants. The pumps need to have generator backup and one pump in natural gas and needs to be replaced with a system which allows backup operation.

Other Alternatives: No action

Responsible Office: California City Public Works

Priority (High, Medium, Low):

Cost Estimate:

Benefits (avoided Losses): continued water supply for domestic and emergency purposes

Potential funding: City general fund

Schedule:

Worksheet Completed by:
Name and Title: Michael Antonucci Jr.
Phone: 760-373-7003

Mitigation Project Description Worksheet

Jurisdiction: California City

Mitigation Project Title: Levee re-enforcement @ Cache Creek

Issue/Background: During heavy rains the levee that protects the City from high flows on Cache Creek breaks, flooding homes and business, causing street erosion and damage to the critical infrastructure. This project will allow for re-enforcement of the levee to prevent this occurrence in future rain storms.

Other Alternatives: No action

Responsible Office: California City Public Works

Priority (High, Medium, Low):

Cost Estimate:

Benefits (avoided Losses): Reduced flood losses

Potential funding: City general fund/ FEMA

Schedule:

Worksheet Completed by:
Name and Title: Michael Antonucci Jr.
Phone: 760-373-7003

Mitigation Project Description Worksheet

Jurisdiction: California City

Mitigation Project Title: Deepening Cache Creek drainage

Issue/Background: Cache Creek runs from the Tehachapi Mountains through the city from the West to East. It crosses Highway 14 with tremendous volume and as it run through the city the creek becomes shallower allowing the water to overflow the banks. This project would deepen Cache Creek to the depth at highway 14 and also provide cement to allow the flow to increase.

Other Alternatives: No action

Responsible Office: California City Public Works

Priority (High, Medium, Low):

Cost Estimate:

Benefits (avoided Losses): Reduced flood losses

Potential funding: City general fund/ FEMA

Schedule:

Worksheet Completed by:
Name and Title: Michael Antonucci Jr.
Phone: 760-373-7003

Mitigation Project Description Worksheet

Jurisdiction: City of Delano

Mitigation Project Title: Stormwater relief project for downtown area.

Issue/Background: Over the years, whenever there is heavy rain, the storm drains for our main business district occasionally backup and allow water to flood the sidewalks and go into some stores. The water has to abate on its own due to no other alternatives at this time. A second or new drain project would abate the problem.

Other Alternatives: If left as is, business areas will be flooded if not sandbagged.

Responsible Office: City of Delano, Public Works Dept.

Priority (High, Medium, Low): Medium

Cost Estimate: \$3.5 million to install approx. 5000 ft. of 30" drainpipe.

Benefits (avoided Losses): Downtown areas – water would not backup into stores and offices if not sandbagged.

Potential funding: Grants from State of California

Schedule: Completed by end of 2010

Worksheet Completed by: City of Delano
Name and Title: Craig Wilson, Utility & Water Production Supervisor
Phone: (661) 721-3350

Mitigation Project Description Worksheet

Jurisdiction: City of Delano

Mitigation Project Title: Earthquake Education Program.

Issue/Background: Hold area meetings to acquire information from homeowners on their specific needs, explain what resources are available, and what procedures to take if a quake happens. Send literature to homeowners addressing earthquake problems and what homeowners can do to reduce vulnerability. Coordinate with County hazard education efforts.

Other Alternatives: Do nothing

Responsible Office: City of Delano, Kern County

Priority (High, Medium, Low): Medium

Cost Estimate:

Benefits (avoided Losses): Reduced impacts to Delano residents and improved self-reliance during earthquakes

Potential funding:

Schedule:

Worksheet Completed by: City of Delano

Name and Title: Craig Wilson, Utility & Water Production Supervisor

Phone: (661) 721-3350

Mitigation Project Description Worksheet

Jurisdiction: City of McFarland and Kern County

Mitigation Project Title: Flood Abatement

Issue/Background: The east side of town is in an existing flood zone. This project would improve the drainage along the streets (curbs and gutters) and increase the capacity of the storm drain collection system. Construct flood canals to channel water.

Other Alternatives: No action

Responsible Office: City of McFarland

Priority (High, Medium, Low): Medium

Cost Estimate: \$5 million

Benefits (avoided Losses): Reducing flooding to existing residences

Potential funding: County and State Grants

Schedule: When funding becomes available

Worksheet Completed by
Name and Title: Brennan Ott, Assistant Engineer
Phone: (661) 325-7253

Mitigation Project Description Worksheet

Jurisdiction: City of McFarland and Kern County

Mitigation Project Title: Remediation of Underground Storage Tanks

Issue/Background: There are currently several leaking Underground Storage Tanks in the City of McFarland. These tanks pose environmental hazards by contaminating the soil and groundwater. These tanks need to be replaced, the soil excavated and removed and the groundwater cleaned, if contaminated, and monitored.

Other Alternatives: Remediation alternatives include soil washing, vapor extraction, bioremediation, and pump and treat of the contaminated groundwater.

Responsible Office: Kern County Environmental Health

Priority (High, Medium, Low): Medium

Cost Estimate: \$1,000,000.00

Benefits (avoided Losses): No contamination of groundwater and soil.

Potential funding: County and responsible party.

Schedule: 3 years per site to investigate extent of impairment and perform remediation.

Worksheet Completed by
Name and Title: Brennan Ott, Assistant Engineer
Phone: (661) 325-7253

Mitigation Project Description Worksheet

Jurisdiction: City of Ridgecrest

Mitigation Project Title: Action #1 Construct 8' high x 10.5' wide x 90' long pre-cast concrete box culvert under Norma Street at the intersection of Norma Street and Bowman Road

Issue/Background: This intersection floods frequently because the existing culverts under Norma Street are inadequate in size. Norma Street is a major arterial and when flooded traffic flow must be stopped at this location resulting in traffic congestion. The proposed culvert is consistent with the Master Drainage Plan for the City of Ridgecrest.

Other Alternatives: No action.

Responsible Office: City of Ridgecrest, Department of Public Works, Joe Pollock Assistant Director of Public Works, 100 West California, Ridgecrest, California, 93555.

Priority (High, Medium, Low): High

Cost Estimate: In 1989 the cost of construction was estimated at \$59,052. Inflation and increased cost of labor and materials are thought to have increased to about \$147,630 in 2005 dollars.

Benefits (avoided Losses): Increased traffic safety, decreased traffic congestion and decreased property damage.

Potential Funding: None

Schedule: As soon as funding becomes available.

Mitigation Project Description Worksheet

Jurisdiction: City of Ridgecrest

Mitigation Project Title: Action #2 Construct 8' high x 10.5' wide x 250' long pre-cast concrete box culvert under China Lake Boulevard at the intersection of China Lake Boulevard and Bowman Road

Issue/Background: This intersection floods frequently because the existing culverts under China Lake Boulevard are inadequate in size. This results in diversion of flood waters north along China Lake Boulevard resulting in flood damage to commercial areas to the north. China Lake Boulevard is a major arterial and when flooded traffic flow must be stopped at this location resulting in traffic congestion. The proposed culvert is consistent with the Master Drainage Plan for the City of Ridgecrest.

Other Alternatives: No action.

Responsible Office: City of Ridgecrest, Department of Public Works, Joe Pollock Assistant Director of Public Works, 100 West California, Ridgecrest, California, 93555.

Priority (High, Medium, Low): High

Cost Estimate: In 1989 the estimated cost of construction was \$277,500. Inflation and increased costs of labor and material are thought to have increased the cost of construction to \$693,750

Benefits (avoided Losses): Increased traffic safety, decreased traffic congestion and decreased property damage.

Potential Funding: None

Schedule: As soon as funding becomes available.

Mitigation Project Description Worksheet

Jurisdiction: City of Ridgecrest

Mitigation Project Title: Action #3 Construct a 110' long by 80' wide bridge on East Ridgecrest Boulevard (SH 178) with outfall channel. Lowering and/or replacement of a large water main will also be required.

Issue/Background: The proposed location is subject to flooding on a 5 – 10 recurrence interval. This section of Ridgecrest Boulevard is a State Highway (SH 178) and serves as the primary access route between Trona and Ridgecrest. When flooding occurs the highway must be closed to traffic which results in personnel working at the chemical plants in Trona not being able to get to and from work and also prevents shipment of the chemical products produced in the plants. Further a large potable water pipe main traverses the site which is the primary fresh water supply for Trona. Failure of this pipeline due to flooding would result in disruption of the water supply to Trona. These proposed improvements are consistent with the Master Drainage Plan for the City of Ridgecrest.

Other Alternatives: No action.

Responsible Office: City of Ridgecrest, Department of Public Works, Joe Pollock Assistant Director of Public Works, 100 West California, Ridgecrest, California, 93555.

Priority (High, Medium, Low): High

Cost Estimate: In 1989 the estimated cost of construction was \$778,500. Inflation and increases in material and labor costs are thought to have increased the cost of construction to approximately \$1,946,250 in 2005 dollars.

Benefits (avoided Losses): Providing a dependable transportation route between Ridgecrest and Trona.

Potential Funding: State Transportation Funds.

Schedule: As soon as funds become available.

Mitigation Project Description Worksheet

Jurisdiction: City of Ridgecrest

Mitigation Project Title: Bowman Wash drainage improvements

Issue/Background: A major source of flooding in the southern portions of the City of Ridgecrest due to the 43.49 square mile drainage area. This results in flooding in the southeast part of town on a frequent basis with damages to numerous structures in this densely developed residential area. As a result of public input received at a joint public hearing of the Sierra Sands Unified School District and the City of Ridgecrest held on 12 October 2005 two more projects were considered. The first would be the construction of a series of channels, culverts and bridges in accordance with the master drainage plan along the Bowman Road right of way from just west of Brady Street to Ridgecrest Boulevard. The project is known in the Master Drainage as the Bowman Wash and would have a total length of about 5 miles. Should this project be selected the facilities included in **Action #'s 1, 2 and 3** would be constructed. The second proposal will be defined in **Action #5** herein.

Other Alternatives: No action.

Responsible Office: City of Ridgecrest, Department of Public Works, Joe Pollock Assistant Director of Public Works, 100 West California, Ridgecrest, California, 93555.

Priority: High

Estimate of Cost: In 1989 the estimated cost of construction was \$12,330,544. Inflation and increases in material and labor costs are thought to have increased the cost of construction to approximately \$24,661,088 in 2005 dollars.

Potential Benefit: Decrease flood damages in the southern part of the City of Ridgecrest.

Potential Funding: Corp of Engineers

Schedule: As soon as funds become available.

Mitigation Project Description Worksheet

Jurisdiction: City of Ridgecrest

Action: Mahan Street drainage improvements to Springer Avenue.

Issue/Background: Action #5 As a result of public input received at a joint public hearing of the Sierra Sands Unified School District and the City of Ridgecrest held on 12 October 2005 flood protection for the Ridgecrest Heights was considered. The 1989 Master Drainage plan proposed a series of channels, culverts and other facilities along Mahan Street from Bowman Road to just south of Dolphin Avenue. This proposal would extend these facilities south to Springer Avenue. The total length of the project would be 1 mile. The drainage area for this project is in the County and includes approximately 3 square miles of developed residential areas. The runoff enters into the City, overtops Mahan Street and floods a downstream residential area known as Ridgecrest Heights. Ridgecrest Heights is a 320 acre area which is subdivided into 6100 +/- sf residential lots on which development is increasing. Extension of the project from that defined in the Master Drainage plan to insure that 100% of coverage would be provided for Ridgecrest Heights.

Other Alternatives: No action.

Responsible Office: City of Ridgecrest, Department of Public Works, Joe Pollock Assistant Director of Public Works, 100 West California, Ridgecrest, California, 93555.

Priority: High

Estimate of Cost: In 1989 the estimated cost of construction was \$378,900. Inflation and increases in material and labor costs are thought to have increased the cost of construction to approximately \$757,800 in 2005 dollars. Extension of the facility to Springer Avenue should increase the total construction cost to \$1,515,600.

Potential Benefit: Decrease flood damages in the Ridgecrest Heights area of the City of Ridgecrest.

Potential Funding: Corp of Engineers

Schedule: As soon as funds become available.

Mitigation Project Description Worksheet

Jurisdiction: City of Ridgecrest

Mitigation Project Title: Place Main Transmission Utility Lines Under Ground.

Issue/Background: Action # 6 Due to high wind storms in the valley, it is routine for main transmission utility lines to be blown from their supporting poles and even transmission poles braking. During these events, first responders have to safeguard the area until repairmen can arrive, which can take up to 60 minutes. This takes away from other emergency calls that first responders need to respond to. Additionally, this interrupts electric service to parts of the community and can affect those on life support devices at their residences. These individuals also require emergency response to help them relocate to where electric is active.

Other Alternatives: Adding weights to power lines to reduce the sway.

Responsible Office: City of Ridgecrest, Department of Public Works, Joe Pollock Assistant Director of Public Works, 100 West California, Ridgecrest, California, 93555. Utility Services.

Priority (High, Medium, Low): Medium

Cost Estimate: \$50 Million

Benefits (avoided Losses): First responders will no longer need to evacuate areas of downed power lines. No need to relocate individuals that require electricity to survive. Reduced costs to the utility companies to replace utility poles and related equipment.

Potential funding: Utility Companies

Schedule: As soon as funding becomes available.

Mitigation Project Description Worksheet

Jurisdiction: City of Shafter

Mitigation Project Title: Shafter Downtown Retrofit for Earthquake

Issue/Background: Shafter Downtown is constructed of unreinforced masonry buildings. The likelihood is great that most buildings downtown would be destroyed by a localized earthquake of any size.

Other Alternatives: Destruction of the buildings and rebuild business district

Responsible Office: City Manager

Priority (High, Medium, Low): High

Cost Estimate: \$310 M

Benefits (avoided Losses): Avoid economic loss from earthquake. Minimize loss of life.

Potential funding: None presently.

Schedule: ASAP

Worksheet Completed by:
Name and Title: J.A. Zrofsky, Chief of Police
Phone: (661) 746-6341

Mitigation Project Description Worksheet

Jurisdiction: City of Shafter

Mitigation Project Title: Shafter Emergency Operations Center

Issue/Background: A new city EOC is required because the current primary EOC and alternate are located within close proximity to the rails and are Unreinforced Masonry Buildings.

Other Alternatives: Continue to risk staff lives to operate the primary and alternate EOCs.

Responsible Office: City Manager

Priority (High, Medium, Low): Medium

Cost Estimate: \$3.5 M

Benefits (avoided Losses): Reduce pain and suffering by effective operation of EOC to control emergencies.

Potential funding: None

Schedule: WOT

Worksheet Completed by:
Name and Title: J.A. Zrofsky, Chief of Police
Phone: (661) 746-6341

Mitigation Project Description Worksheet

Jurisdiction: City of Shafter

Mitigation Project Title: Southeast Flood Control Project

Issue/Background: The BNSP Railway that traverses the City of Shafter is built up from grade, causing water to gather south of Lerdo Highway and east of the Railway. The flood is minor but does cause disruption. Build a flood drainage to carry floodwater southwest out of the city.

Other Alternatives: Construct new culvert under roadway and relocate canal to new location. Cost of new construction and right-of-way needed would be prohibitive.

Responsible Office: City Manager

Priority (High, Medium, Low): Low

Cost Estimate: \$2.6 M

Benefits (avoided Losses): No localized flooding within the city.

Potential funding: None identified.

Schedule: Not scheduled.

Worksheet Completed by:
Name and Title: J.A. Zrofsky, Chief of Police
Phone: (661) 746-6341

Mitigation Project Description Worksheet

Jurisdiction: City of Taft

Mitigation Project Title: Unreinforced masonry building (URMS) Task Force participation

Issue/Background: The Taft City Fire Department is committed to saving lives and protecting property. The City of Taft is approximately thirty miles north east of the San Andreas Fault. The city has approximately forty-three buildings currently identified as unreinforced masonry buildings. Occupancies of these buildings are small retail and service businesses, apartments, churches and residences. Many of these are located in the down town area which accomodates approximately seventy-five percent of the City's businesses. The cost to reinforce these buildings may exceed property value. Economically, property and business owners are unable to contribute financially toward building reinforcement or replacement. The City is challenged with how best to reduce the risk of roof and parapet collapse.

Other Alternatives: The City of Taft is very aware of the potential loss of life. The City of Taft is requiring that all unreinforced buildings be posted stating the building may be unsafe in an event of a major earthquake.

Responsible Office: Taft Building Department and Taft City Fire Department

Priority (High, Medium, Low): High

Cost Estimate: undetermined

Benefits (avoided Losses): To reduce the risk of loss of life

Potential funding: Grants, subsidies available for such projects

Schedule: Undetermined

Worksheet Completed by
Name and Title: Ken Scott, Acting Fire Chief
Phone: (661) 765-4136

Mitigation Project Description Worksheet

Jurisdiction: City of Taft

Mitigation Project Title: Flood control and storm drainage

Issue/Background: The flooding experienced annually on Sixth Street causes significant traffic and safety issues for the City of Taft and its residence. Sixth Street is a heavily traveled route utilized by three school districts, traffic from two highways, and local residents moving throughout the community. Taft City Schools has a middle school, elementary school, administration building, maintenance buildings, and bus transportation garage that are located on one block on Sixth Street. Taft High School and Taft College also utilize Sixth Street as a route to their campuses. The flooding causes potential unsafe traffic conditions, compromises the safety of young children and other general public pedestrians while utilizing the street and intersections.

Other Alternatives: No action.

Responsible Office: Taft City Public Works: Gary Dabbs, Director

Priority (High, Medium, Low): Low

Cost Estimate: To install a twenty-four inch storm drain from sixth and warren to Sandy Creek and from fourth and Warren to Sandy Creek is estimated at \$336,000.

Benefits (avoided Losses): To reduce the safety hazards to school children (life safety) and traffic.

Potential funding: 50/50 match with federal grants and City of Taft

Schedule: Within five years

Worksheet Completed by

Name and Title: Ken Scott, Acting Fire Chief

Phone: (661) 765-4136

Name and Title: Gary Dabbs, Public Works Director

Phone: (661) 783-1222 ext. 23

Mitigation Project Description Worksheet

Jurisdiction: City of Tehachapi

Mitigation Project Title: Curry Tank Emergency Generator

Issue/Background: Identified in the Capital Improvement Plan Year 2003/2004 Water Fund, RDA

Other Alternatives: No action

Responsible Office: City of Tehachapi

Priority (High, Medium, Low): High

Cost Estimate: \$60,000

Benefits (avoided Losses):

Potential funding: City funds

Schedule: 2005-2006

Worksheet Completed by
Name and Title: Tim McLaughlin, Fire Chief, 108 Pinon Street
Phone: (661) 822-2230
Email: tmclaughlin@tehachapifire.com

Mitigation Project Description Worksheet

Jurisdiction: City of Tehachapi

Mitigation Project Title: Fire Station Engine House

Issue/Background: Identified in the Capital Improvement Plan Year 2003/2004 Water Fund, RDA

Other Alternatives: No action

Responsible Office: City of Tehachapi

Priority (High, Medium, Low): High

Cost Estimate: \$1.5 M

Benefits (avoided Losses):

Potential funding: City funds

Schedule: 2005-2006

Worksheet Completed by
Name and Title: Tim McLaughlin, Fire Chief, 108 Pinon Street
Phone: (661) 822-2230
Email: tmclaughlin@tehachapifire.com

Mitigation Project Description Worksheet

Jurisdiction: City of Tehachapi

Mitigation Project Title: Elm Street Drainage and Water Improvement

Issue/Background: Identified in the Capital Improvement Plan Year 2003/2004 Water Fund, RDA

Other Alternatives: No action

Responsible Office: City of Tehachapi

Priority (High, Medium, Low): Medium

Cost Estimate: \$100,000

Benefits (avoided Losses):

Potential funding: City funds

Schedule: 2006-2007

Worksheet Completed by

Name and Title: Tim McLaughlin, Fire Chief, 108 Pinon Street

Phone: (661) 822-2230

Email: tmclaughlin@tehachapifire.com

Mitigation Project Description Worksheet

Jurisdiction: City of Tehachapi

Mitigation Project Title: Borrow Pit Pump Station & Piping

Issue/Background: Identified in the Capital Improvement Plan Year 2003/2004 Water Fund, RDA

Other Alternatives: No action

Responsible Office: City of Tehachapi

Priority (High, Medium, Low): Medium

Cost Estimate: \$50,000

Benefits (avoided Losses):

Potential funding: City funds

Schedule: 2005-2006

Worksheet Completed by
Name and Title: Tim McLaughlin, Fire Chief, 108 Pinon Street
Phone: (661) 822-2230
Email: tmclaughlin@tehachapifire.com

Mitigation Project Description Worksheet

Jurisdiction: City of Tehachapi

Mitigation Project Title: Culverts @ Enterprise Way @ WWTP

Issue/Background: Identified in the Capital Improvement Plan Year 2003/2004 Water Fund, RDA

Other Alternatives: No Action

Responsible Office: City of Tehachapi

Priority (High, Medium, Low): Medium

Cost Estimate: \$50,000

Benefits (avoided Losses):

Potential funding: City funds

Schedule: 2000-2001

Worksheet Completed by
Name and Title: Tim McLaughlin, Fire Chief, 108 Pinon Street
Phone: (661) 822-2230
Email: tmclaughlin@tehachapifire.com

Mitigation Project Description Worksheet

Jurisdiction: City of Tehachapi

Mitigation Project Title: Community Center (Multi-Purpose)

Issue/Background: Identified in the Capital Improvement Plan Year 2003/2004 Water Fund, RDA

Other Alternatives: No action

Responsible Office: City of Tehachapi

Priority (High, Medium, Low): Medium

Cost Estimate: \$500,000

Benefits (avoided Losses):

Potential funding: City funds

Schedule: 2005-2006

Worksheet Completed by
Name and Title: Tim McLaughlin, Fire Chief, 108 Pinon Street
Phone: (661) 822-2230
Email: tmclaughlin@tehachapifire.com

Mitigation Project Description Worksheet

Jurisdiction: City of Tehachapi

Mitigation Project Title: Cross Gutter (Curry @ C Street)

Issue/Background: Identified in the Capital Improvement Plan Year 2003/2004 Water Fund, RDA

Other Alternatives: No Action

Responsible Office: City of Tehachapi

Priority (High, Medium, Low): Medium

Cost Estimate: \$32,000

Benefits (avoided Losses):

Potential funding: City funds

Schedule: 2005-2006

Worksheet Completed by
Name and Title: Tim McLaughlin, Fire Chief, 108 Pinon Street
Phone: (661) 822-2230
Email: tmclaughlin@tehachapifire.com

Mitigation Project Description Worksheet

Jurisdiction: City of Tehachapi

Mitigation Project Title: Sump Pump @ Capital Hills

Issue/Background: Identified in the Capital Improvement Plan Year 2003/2004 Water Fund, RDA

Other Alternatives: No Action

Responsible Office: City of Tehachapi

Priority (High, Medium, Low): Low

Cost Estimate: \$95,000

Benefits (avoided Losses):

Potential funding: City funds

Schedule: 2005-2006

Worksheet Completed by
Name and Title: Tim McLaughlin, Fire Chief, 108 Pinon Street
Phone: (661) 822-2230
Email: tmclaughlin@tehachapifire.com

Mitigation Project Description Worksheet

Jurisdiction: City of Wasco

Mitigation Project Title: Municipal Water Well Emergency Generator Package Installation

Issue/Background: The City of Wasco has no above ground water sources. Neither do we have any above ground water storage. Therefore, every time we experience a power failure, we have only three of our seven wells with emergency generators that become our sole source of water.

Other Alternatives: We have applied for a grant to construct a 3 million gallon above ground tank. We have already received a \$100,000 grant to perform the feasibility study for this project.

Responsible Office: City of Wasco, Public Works Department

Priority (High, Medium, Low): High

Cost Estimate: 3 Well Sites @ \$86,000 each = \$258,000
 1 Well Site @\$141,000
 Total Project Estimate - \$ 399,000

Benefits (avoided Losses): Loss of municipal water supply during an event.

Potential funding: Grants, Water Division Reserves

Schedule: Fiscal Year 2006/07

Worksheet Completed by
Name and Title: R.M. Jones – Public Works Director
Phone: (661) 758-7271

Mitigation Project Description Worksheet

Jurisdiction: City of Wasco

Mitigation Project Title: Emergency Power Generator for the Annex Building

Issue/Background: Our Annex Building not only houses our Building and Planning Departments, it is also the location for our Communication System Matrix. The full functionality of this facility is crucial to our ability to deal with an emergency event of any type. We currently do not have a properly engineered emergency power generator to provide adequate back up emergency power to this crucial facility.

Other Alternatives: None feasible

Responsible Office: Public Works Department

Priority (High, Medium, Low): High

Cost Estimate: One (1) – 300 kilowatt Generator with auto transfer switch - \$90,000

Benefits (avoided Losses): Crucial services are kept up and operational during an event.

Potential funding: Grants

Schedule: Engineering and planning phases are complete.

Worksheet Completed by
Name and Title: R.M. Jones – Public Works Director
Phone: (661) 758-7271

Mitigation Project Description Worksheet

Jurisdiction: City of Wasco

Mitigation Project Title: Emergency Power Generator for the City Hall/KCSO Substation Building

Issue/Background: Our City Hall/KCSO Building not only houses these two operations, it is also the location for our INCIDENT COMMAND CENTER. This facility is extremely crucial to our ability to deal with an emergency event of any type. We currently do not have a properly engineered emergency power generator to provide adequate back up emergency power to this crucial facility.

Other Alternatives: None feasible

Responsible Office: Public Works Department

Priority (High, Medium, Low): High

Cost Estimate: One (1) – 300 kilowatt Generator with auto transfer switch - \$90,000

Benefits (avoided Losses): Crucial services are kept up and operational during an event.

Potential funding: Grants

Schedule: ASAP – Engineering and planning phases are complete

Worksheet Completed by
Name and Title: R.M. Jones – Public Works Director
Phone: (661) 758-7271

Mitigation Project Description Worksheet

Jurisdiction: East Kern Airport District

Mitigation Project Title: Construct rain runoff drainage diversion and upgrade drainage system throughout Mojave Airport.

Issue/Background: The Mojave Airport is located in an area that is susceptible to flooding. During the December 2004 and January 2005 winter storms the airport suffered approximately \$250,000 in rain and flood related damages. Flood and rain damage could render the airport inoperable and directly impact the employment of approximately 1200 people. The airport sits downstream from the runoff of the mountains to the north and east. Cache Creek is a major drainage channel and runs west to east, north of the airport. A failure in Cache Creek could create a situation that would undermine our runways and close the airfield. Water diversion barriers and upgraded drainage channels/pipes could prevent significant damage to our infrastructure by routing the flood waters around the airfield, through improved channels and increased piles to our retention pond.

Other Alternatives: No Action

Responsible Office: East Kern Airport District, Cal Trans and Kern County

Priority (High, Medium, Low): Medium

Cost Estimate: Utilizing a combination of in house and contract we can reduce the overall cost of the project. Obtain heavy equipment with the assistance of county resources would make this possible. Estimated cost \$500,000.

Benefits (avoided Losses): Reduce/prevent major potential hazard to the airfield infrastructure. If nothing lessens the effects that recently caused \$250,000 in damage this year. More significant events could take the airfield and airport out of business.

Potential funding:

Schedule:

Worksheet Completed by
Name and Title:
Phone:

Mitigation Project Description Worksheet

Jurisdiction: Indian Wells Valley Airport District

Mitigation Project Title: Construction of Drainage Pipes

Issue/Background: The large drainage channel traversing the airport retains silt and debris during periods of runoff. The silt/debris is removed following the rain, but during very wet years the channel becomes silted up and is not capable of carrying the flows. Concrete pipes beneath the bridges will alleviate the problem and provide protection from mud flows into hangars and on roadways.

Other Alternatives: No action, with periodic channel cleanout being done as is currently done.

Responsible Office: Indian Wells Valley Airport District

Priority (High, Medium, Low): Low

Cost Estimate: \$250,000

Benefits (avoided Losses): Will prevent damage to hangars and aircraft from water and mud.

Potential funding: E.A.A. grants and Airport matching funds

Schedule: Within 7 years

Worksheet Completed by
Name and Title: Nancy Bass, General Manager
Phone: (760) 377-5844

Mitigation Project Description Worksheet

Jurisdiction: Indian Wells Valley Airport District (Inyokern Airport)

Mitigation Project Title: Bridge Construction

Issue/Background: Inyokern Airport is the site of a joint-use fire station: (1) there is an Aircraft Fire Fighting & Rescue (ARFF) vehicle for use if there is an aircraft accident and (2) there is an engine used for structure fires in the community of Inyokern and the unincorporated area adjacent. The fire station was constructed with Federal Aviation Administration grant funds. The small town of Inyokern includes an elementary school as well as a senior citizen center. Therefore the airport fire station is essential for the safety of a large area which includes the airport.

The exit road from the airport includes a bridge which crosses a large drainage channel carrying flow not only from the immediate vicinity, but also the run-off from the Southern Sierra Nevada Mountains to the west. The load capacity for the bridge is 11 tons, while the ARFF vehicle weighs 28 tons and the regular fire trucks are also in excess of the bridge capacity. The U.S. Navy at China Lake and the airport also have agreed to provide mutual assistance to each other in the event of a large aircraft accident, meaning that the Navy's vehicle may also be entering/exiting the airport.

In fair weather, the fire trucks are able to actually drive through the drainage channel to reach the community or the airport. However, during periods of flow in the drainage channel, the only exit remaining from the airport is to the east, adding considerable time to arriving at the location of the emergency in the town.

The airport, which receives no tax revenues, has been unable to replace the old, timber bridge. A new bridge, with three concrete box culverts sized to carry the heavy drainage flow, would be constructed with sufficient load capacity to handle the heavy emergency equipment to the community. This will provide a shorter response time to the airport, the entire community and adjacent rural area, but especially to the elementary school.

Other Alternatives: The only other alternative is no project, which will continue to leave the community of Inyokern with a longer response time in the event of an emergency.

Responsible Office: Indian Wells Valley Airport District

Priority (High, Medium, Low): High

Cost Estimate: \$800,000.00. Estimate includes the cost of engineering plans and specifications, inspections, preparation of bid package, as well as construction and contingencies.

Benefits (avoided Losses): Potential losses include aircraft and structures, but of most importance is the potential loss of life. It is not possible to provide a dollar amount for these losses. The bridge construction will help minimize these losses.

Potential funding: The airport district receives no tax revenues, but must improve and maintain the facility with revenues from rents and charges. Grants may be obtained from the Federal Aviation Administration; however, a grant for the bridge might take several years to obtain. With projected growth in our area because of increased work force at the Navy Base at

China Lake, both the area population and the aircraft activity will increase. Therefore the District would like to minimize delay in the bridge construction with a timely grant.

Schedule: Completion of the project is anticipated within six months of release of grant funds.

Worksheet Completed by
Name and Title: Nancy Bass, General Manager
Phone: (760) 377-5844

Mitigation Project Description Worksheet

Jurisdiction: Bear Valley Community Services District

Mitigation Project Title: Bark Beetle Infestation Project

Issue/Background: Bear Valley Community Services District, a mountainous community of 7,500 people in Kern County, contains approximately 5,000 acres of pine forest (mixed conifers, but primarily Ponderosa and Jeffrey Pines). Due to extended droughts in the area, this forest has become infested with bark beetles, which have infested thousands of trees. Hundreds of dead and dying trees were removed in 2002 and 2003 under a program funded by private property owners and the Bear Valley Community Services District (BVCSD paid about two-thirds of the cost). The infestation continues, however, and more trees are dead and dying. In addition, a considerable amount of slash remains on the ground from the tree-removal project of two years ago, posing an acute fire hazard.

This project would remove dead and dying conifers infested with bark beetles and remove slash associated with their removal and the prior removal of infested trees.

Other Alternatives: None

Responsible Office: Bear Valley Community Services District

Priority (High, Medium, Low): High

Cost Estimate: \$300,000

Benefits (avoided Losses): Potentially losses of \$100 million or more to single family residences if a wildland fire occurs in the pine forest area of Bear Valley Springs.

Potential funding: FEMA PDM Grant, possible grant from Fire Safe Council and fees charged to private property owners.

Schedule: To be completed by December 31, 2006.

Worksheet Completed by

Name and Title: John Martin, Assistant General Manager

Phone: (661) 821-4428

Mitigation Project Description Worksheet

Jurisdiction: Bear Valley Community Services District

Mitigation Project Title: Water Booster House Fire Resistance Project

Issue/Background: Bear Valley CSD provides residential water service to a mountainous community of 7,500 people in Kern County. The water is lifted from a base elevation of 4000' to a maximum elevation of 6,000' through a series of boosters and storage tanks. The booster pumps are housed in wood-frame buildings that have wood siding and wood shake roofs. A wildland fire in Bear Valley Springs threatens to destroy the booster houses, damaging the pumps and electrical panels inside. If this happens, water can no longer be pumped up the hill where it is needed to fight the fire. Although the area around each booster house is cleared of vegetation several times each year so that a fire should not burn up to the building, the wood exterior of the buildings makes them vulnerable to hot embers that could catch them on fire.

This project will replace (1) the wood siding on each booster house with "Wonderboard"-type siding (cement-composite) and (2) the wood shake roof on each booster house with asphalt-composite shingles. Each booster house can be retrofitted for \$12,000. There are 35 booster houses that need to be retrofitted for a total project cost of \$420,000.

Other Alternatives: None.

Responsible Office: Bear Valley Community Services District

Priority (High, Medium, Low): High

Cost Estimate: \$420,000

Benefits (avoided Losses): \$1,750,000 in total loss to all 35 boosters, but more importantly, potential losses of \$100 million or more to single family residences if water is unavailable to fight a fire.

Potential funding: FEMA PDM Grant, local funds from water rates.

Schedule: To be completed by December 31, 2007.

Worksheet Completed by:

Name and Title: John Martin, Assistant General Manager

Phone: (661) 821-4428

Mitigation Project Description Worksheet

Jurisdiction: Bear Valley Community Services District

Mitigation Project Title: Water Dip Tank Installation Project

Issue/Background: Bear Valley Community Services District provides water service to a community of 7,500 people in a mountainous area of Kern County. The service territory is large, covering 25,000 acres, with an inhabited area of approximately 19,000 acres. There are two recreational lakes, a ten-acre lake and a thirty-acre lake, which are used by fire-fighting helicopters when needed. Because the community is so large, however, the time required to travel from the lakes to the farthest corners of the community is excessive.

This project will construct four dip tanks, one at each of the extreme corners of Bear Valley Springs that will be plumbed to the district's water system and will be operated by remote control by water system operators at the district office. Each tank will have a 6500 gallon capacity and a fill capacity of 1000 gallons per minute through an 8-inch line and will be fitted with a pump to discharge water remaining in the tank after the fire is extinguished. The total cost for each dip tank for site acquisition, site preparation, tank, pipe, pump, power, float switch and SCADA equipment is \$25,000 for a total project cost of \$100,000.

Other Alternatives: None

Responsible Office: Bear Valley Community Services District

Priority (High, Medium, Low): Medium

Cost Estimate: \$100,000

Benefits (avoided Losses): Potentially millions of dollars in losses to houses lost to fire due to excessive time required to transport water by helicopter from the lakes.

Potential funding: FEMA PDM Grant and local funds from water rates.

Schedule: One tank (near rifle range) to be completed by December 31, 2006 and the other three tanks (locations to be determined) to be completed by June 30, 2008.

Worksheet Completed by

Name and Title: John Martin, Assistant General Manager

Phone: (661) 821-4428

Mitigation Project Description Worksheet

Jurisdiction: Bear Valley Community Services District

Mitigation Project Title: Fire Hydrant Replacement Project

Issue/Background: Bear Valley Community Services District provides water service to a community of 7,500 people in a mountainous area of Kern County. The water system is extensive, with over 100 miles of water mains and 650 fire hydrants. Thirty of these fire hydrants are 4-inch, which was approved at the time they were installed in the early 1970's, but is considered deficient now. This project will replace the 4-inch hydrants with 6-inch hydrants, including the installation of a 6-inch line from the main to the hydrant at a cost of \$6,000 each for a total project cost of \$180,000.

Other Alternatives: None

Responsible Office: Bear Valley Community Services District

Priority (High, Medium, Low): Medium

Cost Estimate: \$180,000

Benefits (avoided Losses): Potentially millions of dollars in losses to houses lost to fire due to inadequate water flow through the fire hydrants.

Potential funding: FEMA PDM Grant and local funds from water rates.

Schedule: To be completed by June 30, 2008.

Worksheet Completed by

Name and Title: John Martin, Assistant General Manager

Phone: (661) 821-4428

Mitigation Project Description Worksheet

Jurisdiction: East Niles Community Services District

Mitigation Project Title: Storage Tank Seismic Retrofit

Issue/Background: ENCSD has thirteen (13) water storage tanks ranging from 210,000 gallons to four million gallons. In the event of an earthquake, it is possible to incur catastrophic damage to the tank and pipeline connections to the tank depending on the magnitude of the earthquake. To mitigate this problem we intend to retrofit all connections to storage tanks with flexible earthquake dampening connections at points where pipelines connect to storage tank. The estimated cost is based on number and size of connections and is currently \$226,032.00.

Other Alternatives: The use of automatic closing valves on all tank structure inlet/outlet piping is an alternative to be considered.

Responsible Office: East Niles Community Services District

Priority (High, Medium, Low): High

Cost Estimate: \$226,032.00

Benefits (avoided Losses): After an earthquake the possibility of fire is generally very high. Without access to water for firefighting the losses to the community could be catastrophic and widespread throughout the District. The possible losses to sanitary facilities may grow very quickly to the point of a Health Crisis.

Potential funding: Grants, California State Revolving Fund

Schedule: 5 years

Worksheet Completed by: East Niles Community Services District
Name and Title: Larry C. White
Phone: (661) 871-2011

Mitigation Project Description Worksheet

Jurisdiction: Golden Hills Community Services District

Mitigation Project Title: Area Emergency Operation Center

Issue/Background: There is a real need for EOC that serves the area due to the demographics of the Tehachapi Valley and the number of agencies involved in a time of emergency. There are several special districts that are within county jurisdiction but will be isolated from the rest of the county in an emergency. The designated lead agencies are the Kern County Fire Department and Sheriff Department. There is not a designated operation center with the necessary equipment and communication network to respond and coordinate emergency response.

Other Alternatives: No action

Responsible Office: Golden Hills CSD / Tehachapi Cummings County Water District/ Alpine Forest/ Stallion Spring Community Services District/ Sand Canyon/ Kern County Fire Department/ Kern County Sheriff

Priority (High, Medium, Low): High

Cost Estimate: \$500,000

Benefits (avoided Losses): Important Community Participation and coordination during emergencies

Potential funding: None

Schedule: None

Worksheet Completed by
Name and Title: William C. Fisher / General Manager
Phone: 661/822-3064

Mitigation Project Description Worksheet

Jurisdiction: Golden Hills Community Services District

Mitigation Project Title: Rehabilitate Critical Drainage Easements

Issue/Background: There are miles of drainage easements in the Golden Hills area that are maintained by the District and property owners. However there is a few that will require major excavation and rehabilitation due to erosion.

Other Alternatives: No action

Responsible Office: Golden Hills CSD

Priority (High, Medium, Low): High

Cost Estimate: \$35,000

Benefits (avoided Losses): When the area has another El Nino year, there will be flood protection for approximately 100 residences and commercial developments.

Potential funding: None as the State all funding from property taxes

Schedule: None

Worksheet Completed by
Name and Title: William C. Fisher / General Manager
Phone: 661/822-3064

Mitigation Project Description Worksheet

Jurisdiction: Golden Hills Community Services District

Mitigation Project Title: Additional Water Storage Tanks

Issue/Background: We only have 16-20 hours of water storage during peak demands. In the event of any disruption of power the district can not pump water. This was discovered when the whole West Coast power grid went down in the mid 1990's.

Other Alternatives: Back up generators to pump critical wells. Public notification to curtail unnecessary water use.

Responsible Office: Golden Hills CSD

Priority (High, Medium, Low): Medium

Cost Estimate: Water storage Tanks (5 million gallons) - \$3,500,000
Portable generators \$40,000 each,

Benefits (avoided Losses): Insure potable water supply for public health & safety; insure water supply for fire protection

Potential funding: None

Schedule: None

Worksheet Completed by
Name and Title: William C. Fisher / General Manager
Phone: 661/822-3064

Mitigation Project Description Worksheet

Jurisdiction: Golden Hills Community Services District

Mitigation Project Title: Earthquake Retrofit Water Storage Tanks

Issue/Background: All water storage tanks were built before current earthquakes standards were required. If the area suffered a major earthquake such as the one in 1952, the potential of losing water storage facilities is very possible. The ability to providing water for health and safety of the residents will be greatly affected. We only have 16-20 hours of water storage during peak demands.

Other Alternatives: Build new storage tanks that meet current earthquake standards

Responsible Office: Golden Hills CSD

Priority (High, Medium, Low): Medium

Cost Estimate: Retrofit existing water storage tanks - \$700,000
New water storage tanks (5 million gallons) - \$3,500,000

Benefits (avoided Losses): Insure potable water supply for public health & safety; insure water supply for fire protection

Potential funding: None

Schedule: None

Worksheet Completed by
Name and Title: William C. Fisher / General Manager
Phone: 661/822-3064

Mitigation Project Description Worksheet

Jurisdiction: Golden Hills Community Services District

Mitigation Project Title: Fire Safe Council

Issue/Background: Main goal is to educate the public in fire safety and mitigation. For every \$.10 spent on fire mitigation there is a savings of \$.90 for every dollar spent on fire fighting

Other Alternatives: No action

Responsible Office: Golden Hills CSD

Priority (High, Medium, Low): Medium

Cost Estimate:

Benefits (avoided Losses): Education for the public in fire mitigation preventing possible loss of life and property to due wildfires common to the area.

Potential funding: National wildfire grants

Schedule: None

Worksheet Completed by

Name and Title: William C. Fisher / General Manager

Phone: 661/822-3064

Mitigation Project Description Worksheet

Jurisdiction: Golden Hills Community Services District

Mitigation Project Title: Additional Backup Generators

Issue/Background:

Other Alternatives: No action

Responsible Office: Golden Hills CSD

Priority (High, Medium, Low): Medium

Cost Estimate:

Benefits (avoided Losses): Continuous power source during emergencies

Potential funding:

Schedule:

Worksheet Completed by
Name and Title: William C. Fisher, General Manager
Phone: (661) 822-3064

Mitigation Project Description Worksheet

Jurisdiction: Rosamond Community Services District

Mitigation Project Title: Secondary access road over railroad tracks

Issue/Background: Railroads splits Rosamond in two. A major earthquake would/could stop emergency vehicles from reaching the east side of town.

Other Alternatives: Construct new culvert under roadway and relocate canal to new location. Cost of new construction and right-of-way needed would be prohibitive.

Responsible Office: Kern County Roads

Priority (High, Medium, Low): High

Cost Estimate: None given

Benefits (avoided Losses): None given

Potential funding: None given

Schedule: None given

Worksheet Completed by:

Name and Title:

Phone:

Mitigation Project Description Worksheet

Jurisdiction: Rosamond Community Services District

Mitigation Project Title: Storm Water Runoff Study

Issue/Background: Over 500,000 acres northwest of Rosamond proper contribute storm runoff water that naturally flows into west and southwest Rosamond, west of the Highway 14 Freeway. Only one designated or planned flood control route exists allowing the passage of stormwater past the 14 Freeway structures. No designed route exists to direct stormwater from Rosamond Blvd. south to the freeway channel and bridge. An example of lack of stormwater runoff plan is the detention basin that serves the Tradewinds Mobil Home Park, located between the 14 Freeway and 20th Street West. There is no continuous drainage channel to drain the basin to Rosamond Lake. Basin overflow causes flooding to homes and businesses along 20th Street and Sierra Highway. A detailed engineering study and design needs to be conducted to mitigate the potentially life threatening conditions of existing natural and piece meal man-made flood control features.

Other Alternatives: Encourage Kern County to require developers to provide studies of the runoff areas they plan to construct housing developments in, and at some point of time in the future the County will correlate the studies into one composite report. The County would then recommend engineering solutions. The difficulty with this approach is that it may be 20 to 30 years before the area is completely built out and a composite study and plan could be developed. Cost of land acquisition for storm drain easements would be prohibitive. Annual winter storms, with every 5 to 6 years being "El Nino" storms with unusually heavy runoffs would have occurred in the intervening time.

Responsible Office: Kern County Roads

Priority (High, Medium, Low): High

Cost Estimate: \$500,000.

Benefits (Avoided Losses): Reduced flood impact to residents, homes and businesses

Potential Funding: Federal, State of California Grants, Storm Control District

Schedule: None given

Worksheet Completed by: Sherry DeLano, Claud Seal

Name and Title: General Manager, Assistant General Manager/District Engineer

Phone: 661-256-3411

Mitigation Project Description Worksheet

Jurisdiction: Rosamond Community Services District

Mitigation Project Title: Alternate SR Hwy 14 Access

Issue/Background: The Town of Rosamond is served by the north-south divided freeway of State Route Highway 14. There is one principle freeway interchange at Rosamond Blvd. Rosamond Blvd. is the only east-west street that connects both parts of the community, provides access to the west gate of Edwards Air Force Base to Rosamond's east, and access to the developing northern end of the Antelope Valley that is located within Kern County. Rosamond Blvd. is also the only improved access across the Union Pacific Rail Lines to the east of Fwy 14. The UPRR connects Lancaster to the south with Mojave to the north. The closest Fwy 14 interchange is 2 miles south of Rosamond Blvd., at Avenue A. Avenue A is the boundary between Kern and Los Angeles Counties. The closest interchange to the north of Rosamond Blvd. is Dawn Road, also 2 miles away. Neither Avenue A nor Dawn Road provide quick or easy access into the central Rosamond business or residential areas. An engineering study needs to be conducted to, 1) designate an alternate route over the rail road tracks accessing the Fwy 14 from the east and a new route to the same new interchange from the west, 2) provide improved high speed thoroughfares between the new interchange and Rosamond Blvd. to the north and Avenue A to the south on both sides of the freeway. Ultimately the detailed engineering study would be used as a basis for local road, street, and parkway improvements (by Kern County); freeway interchange construction (CalTRANS), and stormwater runoff routes and structures.

Other Alternatives: Request Kern County to establish a local improvement district to fund the engineering studies, designs, and construction.

Responsible Office: Kern County Roads

Priority (High, Medium, Low): High

Cost Estimate: Engineering Study = \$1,000,000.

Benefits (Avoided Losses): Provide safer, alternate, and more available Fwy 14 access and usage, provide alternate routing past the UPRR tracks, provide more opportunity for businesses to locate near the freeway at an interchange and take advantage of easier transit lane access, provide final resolution to stormwater runoff drainage routing past the 14 Fwy.

Potential Funding: Federal, State of California Grants, Highway and Road improvement assessment District.

Schedule: None given

Worksheet Completed by: Sherry DeLano, Claud Seal

Name and Title: General Manager, Assistant General Manager/District Engineer

Phone: 661-256-3411

Mitigation Project Description Worksheet

Jurisdiction: Stallion Springs Community Services District

Mitigation Project Title: Replacement of District Administrative Offices which includes the Police Department

Issue/Background: The current building does not meet current code, shake roof presents a high fire hazard and the building would be very susceptible to an earthquake

Other Alternatives: No action

Responsible Office: Stallion Springs, C.S.D.

Priority (High, Medium, Low): High

Cost Estimate: \$1,000,000

Benefits (avoided Losses): Protection of employees, ability to operate emergency personnel in a safe structure, property loss avoided.

Potential funding: None at this time.

Schedule: None given.

Worksheet Completed by:
Name and Title: David Aranda, General Manager
Phone: (661) 822-3268

Mitigation Project Description Worksheet

Jurisdiction: Stallion Springs Community Services District

Mitigation Project Title: Emergency Services

Issue/Background: Currently Stallion Springs has a police department and a CERT TEAM. Because any disaster has the potential to isolate the community from outsider resources it would be important to have the following:

- 1) A full time Kern County Fire Station in Stallion Spring
- 2) CERT TEAM that grows with volunteers and the ability to do their function
- 3) A reverse 911 system that allows the District to stay "in touch" with residents

Other Alternatives: No action

Responsible Office: For item one it would be KCFD. For items 2 and 3 it would be SSCSD.

Priority (High, Medium, Low): High

Cost Estimate: Kern County Fire Department would have to address their cost. 911 system \$15,000

Benefits (avoided Losses): Life safety and self sufficiency during 24-72 hours of isolation

Potential funding: None.

Schedule: Immediately

Worksheet Completed by:
Name and Title: David Aranda, General Manager
Phone: (661) 822-3268

Mitigation Project Description Worksheet

Jurisdiction: Stallion Springs Community Services District

Mitigation Project Title: Enlargement of Stallion Springs Lake

Issue/Background: A dam failure or heavy rain could cause the lake to overflow and then spill and flood golf courses, homes, roads, and infrastructure downstream. Annual dredging efforts and better weir control would allow a greater amount of water to be absorbed by the lake and sent downstream in a controlled manner.

Other Alternatives: No action

Responsible Office: Stallion Springs, C.S.D.

Priority (High, Medium, Low): High

Cost Estimate: \$50,000

Benefits (avoided Losses): Potential to save golf course, homes, roads, and infrastructure from flooding. Additional water storage is another benefit.

Potential funding: None at this time.

Schedule: The work could be done around fall of any year and would take 20 working days

Worksheet Completed by:
Name and Title: David Aranda, General Manager
Phone: (661) 882-3268

Mitigation Project Description Worksheet

Jurisdiction: Stallion Springs Community Services District

Mitigation Project Title: Fire Prevention

Issue/Background: Wildfires in Stallion Springs have the potential to harm life and create a potential for a large loss of property. This project would promote fire wise construction and defensible space within Stallion Springs Community Services District.

Other Alternatives: No action

Responsible Office: Kern County Fire Department

Priority (High, Medium, Low): High

Cost Estimate: Unknown

Benefits (avoided Losses): Property saved and possible lives

Potential funding: None given

Schedule: None given

Worksheet Completed by:

Name and Title: David Aranda, General Manager

Phone: (661) 822-3268

Mitigation Project Description Worksheet

Jurisdiction: Buttonwillow Recreation and Park District

Mitigation Project Title: Aquatic Facility

Issue/Background: Overhead wires and electrical/telephone poles that are in the alley adjacent to our facility could significantly affect our existing aquatic center if a strong earthquake should happen.

We have the only public swimming pool in our community. In an earthquake if poles were to fall, significant damage may occur to the pool, deck, pump house and restrooms. Relocating the district's aquatic center to a safer location would benefit the community.

We are governed by the County of Kern ordinances, which would ensure that the construction of a new facility would meet health and safety standards.

Other Alternatives:

Responsible Office: Buttonwillow Recreation and Park District

Priority (High, Medium, Low): Medium

Cost Estimate: \$500,000

Benefits (avoided Losses): Water from the pool would be available for fires.

Potential funding: Prop. 40, future Park Bond Acts

Schedule: Depending when funding becomes available

Worksheet Completed by
Name and Title: Marie Parsons
Phone: (661) 764-5205

Mitigation Project Description Worksheet

Jurisdiction: Tehachapi Valley Recreation & Parks District

Mitigation Project Title: Backup Generators for Tehachapi Valley Recreation & Parks District

Issue/Background: (American Red Cross Shelter) – Activity Center.

Other Alternatives: No action

Responsible Office: Michael L. Kelley

Priority (High, Medium, Low): High

Cost Estimate: \$75,000

Benefits (avoided Losses): Sheltering citizens, employees during a disaster.

Potential funding: Undetermined

Schedule: A.S.A.P.

Worksheet Completed by Michael L. Kelley
Name and Title: Michael L. Kelley District Manager
Phone: (661) 822-3228 ext.11

Mitigation Project Description Worksheet

Jurisdiction: Tehachapi Valley Recreation & Parks District

Mitigation Project Title: Obtain complete new mobile radio communications system for all vehicles and a base station which is compatible with Kern County's new system.

Issue/Background: Communications must be updated to be compatible with Kern County's new system. In a disaster, cellular phones will be overloaded. These new radios mounted in all vehicles to help citizens within the greater Tehachapi Valley.

Other Alternatives: None

Responsible Office: Tehachapi Valley Recreation & Parks District

Priority (High, Medium, Low): High

Cost Estimate: \$16,200

Benefits (avoided Losses): Some of these radios "scan" and interface with County Fire and Sheriff Depts.

Potential funding: Undetermined

Schedule: A.S.A.P

Worksheet Completed by Michael L. Kelley
Name and Title: Michael L. Kelley District Manager
Phone: (661) 822-3228 ext. 11

Mitigation Project Description Worksheet

Jurisdiction: Tehachapi Valley Recreation & Parks District

Mitigation Project Title: Emergency response supply storage and supplies to accommodate a community evacuation site for the greater Tehachapi Valley.

Issue/Background:

Other Alternatives:

Responsible Office: Tehachapi Valley Recreation & Parks District

Priority (High, Medium, Low): High

Cost Estimate:

Benefits (avoided Losses):

Potential funding: Undetermined

Schedule: A.S.A.P.

Worksheet Completed by Michael L. Kelley
Name and Title: Michael L. Kelley District Manager
Phone: (661) 822-3228 ext. 11

Mitigation Project Description Worksheet

Jurisdiction: Tehachapi Valley Recreation & Parks District

Mitigation Project Title: Gym Shelter Improvements

Issue/Background: Tehachapi has a significantly high elevation. Many years ago, Tehachapi Parks and Rec. Activity Center Gym was identified as an evacuation site for the community. Emergency supplies were not originally stored to present standards and were removed from the fallout shelters and discarded. The gym could provide an ideal location for community sheltering if the issues were addressed for emergency supplies; generated power for the gym, a water storage tank with an accessible water system placed near the gym, reinforced roads to the gym, and seismic strengthening and/or retrofitting of the gym.

Other Alternatives: None identified

Responsible Office: Tehachapi Valley Recreation & Parks District

Priority (High, Medium, Low): High (Flood)

Cost Estimate: \$1,000,000

Benefits (avoided Losses): Life Safety

Potential funding: None given

Schedule: None given

Worksheet Completed by Michael L. Kelley
Name and Title: Michael L. Kelley District Manager
Phone: (661) 822-3228 ext. 11

Mitigation Project Description Worksheet

Jurisdiction: Tehachapi Valley Recreation & Parks District

Mitigation Project Title: Gymnasium Air Conditioning/Cooling/Heating

Issue/Background: The gymnasium was built in 1788. There are two heating units, but no source of cooling. This building is considered an emergency shelter and the focal point in the event of any disaster that occurs in Tehachapi.

Other Alternatives: None

Responsible Office: Tehachapi Valley Recreation and Parks District

Priority (High, Medium, Low): Medium

Cost Estimate: Unknown – depends on the type of mitigation needed and building code requirements.

Benefits (avoided Losses): Emergency shelter during summer and winter months.

Potential funding: Undetermined

Schedule: As soon as funding becomes available, avoiding interruption of recreational activities while students are present.

Worksheet Completed by Michael L. Kelley
Name and Title: Michael L. Kelley District Manager
Phone: (661) 822-3228 ext. 11

Mitigation Project Description Worksheet

Jurisdiction: West Side Recreation and Parks District

Mitigation Project Title: Skate Escape at Main Street and Third Earthquake Retrofit

Issue/Background: Building is a pre 1950 structure of wood and stucco once used as a car dealership converted to a skating rink. Front windows are large and need to be replaced with Plexiglas to minimize damage to occupants in an earthquake.

Other Alternatives: No action

Responsible Office: West Side Recreation and Park District

Priority: Medium

Cost Estimate:

Benefits (Avoided Losses): Minimize casualties in an earthquake

Potential Funding: None Presently

Schedule: None given

Worksheet Completed by:
Name and Title: Norman Kaszycki, Superintendent of Parks
Phone: (661) 763-4246

Mitigation Project Description Worksheet

Jurisdiction: West Side Recreation and Parks District

Mitigation Project Title: Fitness Center at Main Street and Third Earthquake Retrofit

Issue/Background: Building is a pre 1950 structure of wood and stucco designed and used once as a USO Club which was redesigned into a basketball/racquetball/volleyball gymnasium with a weight room. If the building were to be retrofitted to better withstand an earthquake it could be used as an emergency shelter that would have showers. The structure integrity would gain from the retrofit and would stand up better to potential hazards. The building as it stands now may not be available for these services in the event of such disasters.

Other Alternatives: Do nothing

Responsible Office: West Side Recreation and Park District

Priority: Medium

Cost Estimate:

Benefits (Avoided Losses): Minimize casualties

Potential Funding: None Presently

Schedule: None given

Worksheet Completed by:

Name and Title: Norman Kaszycki, Superintendent of Parks

Phone: (661) 763-4246

Mitigation Project Description Worksheet

Jurisdiction: West Side Recreation and Parks District

Mitigation Project Title: Community Center at Kern Street and Cascade Place Shelter improvement

Issue/Background: Buildings (3) were built in 1982 and are of wood and stucco. There are large rooms that could be used as emergency shelters in a disaster. There also is a large kitchen that could be used to serve emergency meals to displaced individuals.

Other Alternatives: No action

Responsible Office: West Side Recreation and Park District

Priority: Low

Cost Estimate:

Benefits (Avoided Losses):

Potential Funding:

Schedule:

Worksheet Completed by:
Name and Title: Norman Kaszycki, Superintendent of Parks
Phone: (661) 763-4246

Mitigation Project Description Worksheet

Jurisdiction: West Side Recreation and Parks District

Mitigation Project Title: Natatorium at Fourth and Calvin Fire Water Supply

Issue/Background: The Natatorium is a swimming pool with change rooms and restrooms. The building dates back to 1937 and is constructed of wood and stucco. The pool is 104 feet by 40 feet and is a concrete in-ground type of pool.

Other Alternatives:

Responsible Office: West Side Recreation and Park District

Priority:

Cost Estimate:

Benefits/(Avoided Losses): The pool holds approximately 238,000 gallons of water that would be available for fires.

Potential Funding: None Presently

Schedule: None

Worksheet Completed by:
Name and Title: Norman Kaszycki, Superintendent of Parks
Phone: (661) 763-4246

Mitigation Project Description Worksheet

Jurisdiction: Arvin – Edison Water Storage District

Mitigation Project Title: David Road Siphon

Issue/Background: District's 300cfs South Canal siphons under David Road. David Road during periods of heavy rain is flooded from the El Paso Creek. The length of the District siphon is not long enough to allow for the flood water to cross. Flood water enters the District canal causing the canal to overflow. The District's South Canal ultimately terminates at Highway 99, 3.5 miles from the David Road siphon. Very likely potential that during heavy rains the District's South Canal could overflow onto Highway 99.

Other Alternatives: No action

Responsible Office: None given

Priority (High, Medium, Low): High

Cost Estimate: \$400,000

Benefits (avoided Losses): Avoid possible loss of life and property

Potential funding: None given

Schedule: None given

Worksheet Completed by:
Name and Title: David A. Nixon, Assistant Manager
Phone: (661) 854-5573

Mitigation Project Description Worksheet

Jurisdiction: Arvin – Edison Water Storage District

Mitigation Project Title: Drainage Discharge lines

Issue/Background: Along the District's South Canal there are approximately 100 drainage pipelines or structures that discharge water into the canal. During heavy rains these pipelines allow uncontrollable water and sediment to entire District facilities. These uncontrollable elements entering the canal can cause the canal to overflow onto adjacent farm land and potentially to overflow onto Highway 99.

Other Alternatives: No action

Responsible Office: None given

Priority (High, Medium, Low): None specified

Cost Estimate: \$750,000

Benefits (avoided Losses): None given

Potential funding: None given

Schedule: None given

Worksheet Completed by:
Name and Title: David A. Nixon, Assistant Manager
Phone: (661) 854-5573

Mitigation Project Description Worksheet

Jurisdiction: Arvin – Edison Water Storage District

Mitigation Project Title: El Paso Creek Flood Channel

Issue/Background: El Paso creek is not big enough to handle heavy rains. During periods of heavy rain water breaks out of the creek and floods the Districts 64 lateral and adjacent farm land. This has occurred in 1978, 1983, 1998, and most recently in 2005. A larger channel and a siphon under Sebastian Road should be constructed to control El Paso Creek.

Other Alternatives: No action

Responsible Office: None given

Priority (High, Medium, Low): Medium

Cost Estimate: \$1,000,000

Benefits (avoided Losses): Control El Paso Creek and avoid losses to District facilities and farm land

Potential funding: None given

Schedule: None given

Worksheet Completed by:
Name and Title: David A. Nixon, Assistant Manager
Phone: (661) 854-5573

Mitigation Project Description Worksheet

Jurisdiction: Berrenda Mesa Water District and Kern County

Mitigation Project Title: California Aqueduct Failure Mitigation

Issue/Background: Extensive agriculture has been developed on the West side of Kern County. A significant portion of this development is planted permanent crops. Although a portion of the demand can be met through groundwater banking projects, most of the irrigation demand is met through imported water from the State Water Project delivered via the California Aqueduct. A breach or failure to this conveyance system during the peak irrigation periods of May to October would result in significant crops lost and economic loss. The California Department of Water Resources should consider reinforcement of the aqueduct against hazard impacts such as earthquake, flood, and drought.

Other Alternatives:

A portion of the water can be made up from the pumping of groundwater. This pumping occurs near Bakersfield from District owned groundwater banking projects. The available pumping is insufficient to meet the peak irrigation demands. One alternative is to develop alternative water supplies for emergency purposes.

Responsible Office:

State of California, Department of Water Resources and the Kern County Water Agency

Priority (High, Medium, Low):

High

Cost Estimate:

Unknown

Benefits (avoided Losses):

Avoided loss of significant permanent crops

Potential funding:

Unknown

Schedule:

Unknown

Worksheet Completed by

Name and Title:

Phone:

Mitigation Project Description Worksheet

Jurisdiction: Buena Vista Water Storage District

Mitigation Project Title: Groundwater Recharge and Recovery Program

Issue/Background: Kern County water districts and their customers face drought and flood events in great frequency. In order to reduce flood impacts to agriculture and store water in the groundwater basin for drought protection additional R & R Programs could be developed.

Other Alternatives: Additional state water project and Isabella reservoir conservation storage.

Responsible Office: None given

Priority (High, Medium, Low): High

Cost Estimate: \$40 million

Benefits (avoided Losses): Reduced crop damage from flood and drought

Potential funding: None given

Schedule: 3 years

Worksheet Completed by:

Name and Title:

Phone:

Mitigation Project Description Worksheet

Jurisdiction: Buttonwillow County Water District

Mitigation Project Title: New/Updated Wastewater Plant

Issue/Background: The Community is currently served by an Imhof Tank and Pond System built in the early 50's. The Pond is unlined and relies on aeration as a means for treatment. Based on pumping calculations, the system meets the minimum 30-day storage capacity. Imhof Tanks are no longer considered an effective method of treatment. In the event of a severe earthquake, damage to the tank without the necessary backup storage, could result in potential ground water contamination and Public Health risks.

Other Alternatives: No action

Responsible Office: Buttonwillow County Water District

Priority (High, Medium, Low): High

Cost Estimate: Unknown – In the process of hiring an engineer to determine the most effective plant for our community and associated costs to construct.

Benefits (avoided Losses): Protection of groundwater, restrict waste backup in the system preventing potential health risks to residents. Allow for adequate storage in the event of a power outage.

Potential funding: The District has been compiling data in an effort to submit an application for grant funding. Working with State Water Resource Control Board.

Schedule: As soon as funding becomes available.

Worksheet Completed by

Name and Title: Regina K. Houchin, Secretary to the Board

Phone: (661) 764-5273 or District office 764-5405

Mitigation Project Description Worksheet

Jurisdiction: Buttonwillow County Water District

Mitigation Project Title: Purchase 3 Portable Generators on trailers

Issue/Background: Buttonwillow County Water District operates 3 domestic water wells, two small storage tanks with a total capacity of 80,000 gallons and a wastewater facility. Buttonwillow is isolated in that the nearest town is 17 miles away. In the event of flood, earthquake or severe weather the community could be isolated from any outside sources and emergency services. Installing a 500,000-gallon tank would supply enough water for approximately 4 days, allowing emergency services time to respond. The community had one health center, a fire department, a sheriff's substation, a grammar school (k-8) and a Senior Citizens Center all classified as critical facilities. The Buttonwillow County Water District supplies 100% of the water to these facilities.

Other Alternatives: No Action

Responsible Office: Buttonwillow County Water District

Priority (High, Medium, Low): High

Cost Estimate: Range between \$90,000 - \$120,000

Benefits (avoided Losses): Continuing a water supply to critical facilities during a disaster or extreme hazardous conditions. Avoiding sewer system failure mitigating potential health hazards.

Potential funding: Grants

Schedule: Unscheduled, however, depends on funding sources.

Worksheet Completed by

Name and Title: Regina K. Houchin, Secretary to the Board

Phone: (661) 764-5273 or District office 764-5405

Mitigation Project Description Worksheet

Jurisdiction: Buttonwillow County Water District

Mitigation Project Title: Service Connection WSV Well, Well #2 and Well #3

Issue/Background: The District currently owns and operates 3 domestic water wells. Two wells are located within 200 yards of each other and the third (WSV Well) is located 2 miles away. The wells within the town site are connected with 8" and 10" mainlines, while the WSV Well is connected to the town site system with only a 4" line, preventing adequate water distribution from that well to the main system that serves the majority of the community. By installing and connecting the system with a 10" mainline any one of the wells would be available to provide domestic water to its customers and have enough pressure to service fire hydrants in the event of a disaster or hazard that disable any one of them.

Other Alternatives: No Action

Responsible Office: Buttonwillow County Water District

Priority (High, Medium, Low): High

Cost Estimate: Based on recent construction, the cost is estimated at \$325,000.00.

Benefits (avoided Losses): As these wells are the only source of water for the Community, having access from any one of the three wells throughout the community would limit or prevent possible health hazards and provide necessary fire protection.

Potential funding: The District has applied for Prop 50 funding, but due to the number of applicants and availability, unlikely any money will be available for our district. Continuing to look for grants and sources of funding.

Schedule: As soon as funding becomes available.

Worksheet Completed by

Name and Title: Regina K. Houchin, Secretary to the Board

Phone: (661) 764-5273 or District office 764-5405

Mitigation Project Description Worksheet

Jurisdiction: Buttonwillow County Water District

Mitigation Project Title: 500,000 Gallon Storage Tank

Issue/Background: Buttonwillow County Water District operates 3 domestic water wells, two small storage tanks with a total capacity of 80,000 gallons. Buttonwillow is isolated in that the nearest town is 17 miles away. In the event of flood, earthquake or severe weather the community could be isolated from any outside source. Installing a 500,000-gallon tank would supply enough water for approximately 4 days, allowing emergency services time to respond. The community had one health center, a fire department, a sheriff's substation, a grammar school (k-8) and a Senior Citizens Center all classified as critical facilities. The Buttonwillow County Water District supplies 100% of the water to these facilities.

Other Alternatives: No Action

Responsible Office: Buttonwillow County Water District

Priority (High, Medium, Low): High

Cost Estimate: Approximately \$400,000.00

Benefits (avoided Losses): Continuing a water supply to critical facilities during a disaster.

Potential funding: The District has applied for Prop 50 funding, but due to the number of applicants and availability, unlikely any money will be available for our district. Continuing to look for grants and sources of funding.

Schedule: As soon as funding becomes available.

Worksheet Completed by

Name and Title: Regina K. Houchin, Secretary to the Board

Phone: (661) 764-5273 or District office 764-5405

Mitigation Project Description Worksheet

Jurisdiction: Cawelo Water District

Mitigation Project Title: Poso Creek Flood Control Project

Issue/Background:

1998 flood flows from Poso Creek accounted for Millions of dollars in damages and contributed to one death. The lands adjacent to Poso Creek were eroded and the town of McFarland was partially flooded. State Route 99 was closed for over 24 hours and the Burlington Northern Santa Fe railroad tracks were closed for several hours.

Feasibility study for the project is currently in progress. Funding from the State of California and the Federal Government has been budgeted for 2005. Additional funding is expected if feasibility study is successful.

Other Alternatives: Continue to pay damages from floodwaters

Responsible Office:

Cawelo Water District lead agency of a JPA consisting of Cawelo Water District, North Kern Water Storage District, Semi Tropic Water Storage District, Kern County Water Agency and the County of Kern

Priority (High, Medium, Low): High

Cost Estimate: \$50,000,000

Benefits (avoided Losses): Reduce loss of interstate commerce from the closure of State Route 99 and the railroad. Reduce losses from flooding McFarland, CA. and reduce losses from flooded agriculture lands.

Potential funding: JPA cost sharing, State and Federal Revenues

Schedule: In Progress

Worksheet Completed by: Cawelo Water District
Name and Title: David Ansolabehere, General Manager
Phone: (661) 393-6072

Mitigation Project Description Worksheet

Jurisdiction: Cawelo Water District

Mitigation Project Title: Retrofit Facilities for Seismic Event

Issue/Background:

Seismic events in the area of District facilities have the potential to breach levees of water storage reservoirs, damage Control Buildings and concrete forebay structures.

Provide Seismic analysis to strengthen levees and brace & anchor concrete structures.

Other Alternatives: Do nothing

Responsible Office: Cawelo Water District

Priority (High, Medium, Low): Medium

Cost Estimate: \$2,500,000

Benefits (avoided Losses): Reliability of facilities, reduce impacts to crops in Service Areas from loss of irrigation water.

Potential funding: Grants, Loans & cost sharing with District Funds

Schedule: Within Three Years

Worksheet Completed by: Cawelo Water District
Name and Title: David Ansolabehere, General Manager
Phone: (661) 393-6072

Mitigation Project Description Worksheet

Jurisdiction: Greenfield County Water District

Mitigation Project Title: Replace discharge piping and gate valves at Dublin & Panama Well sites with earthquake resistant fittings and valves.

Issue/Background: In the event of an earthquake, existing pipes and valve could break and all water in the tanks would be lost.

Would like to replace pipe with Flex-tend piping (pipe will move several inches rather than break loose) and install an automatic shutoff valve at tank discharge to prevent any loss of water.

Other Alternatives: Not aware of any

Responsible Office: Greenfield County Water District

Priority (High, Medium, Low): High

Cost Estimate: \$60,000 - \$70,000

Benefits (avoided Losses): Fire protection and drinking water in the event of a disaster.

Potential funding:

Schedule:

Worksheet Completed by
Name and Title: Mel C. Johnson, General Manager
Phone: (661) 831-0989

Mitigation Project Description Worksheet

Jurisdiction: Greenfield County Water District

Mitigation Project Title: Replace Panama Well Storage Tank (500,000 gal.)

Issue/Background: Tank is over 40 years old and not able to withstand an earthquake. Demolish old tank and install new 500,000 gallon tank that could better withstand an earthquake.

Other Alternatives: None

Responsible Office: Greenfield County Water District

Priority (High, Medium, Low): High

Cost Estimate: \$600,000 - \$700,000

Benefits (avoided Losses): Adequate fire protection and drinking water in the event of an earthquake or disaster.

Potential funding:

Schedule:

Worksheet Completed by
Name and Title: Mel C. Johnson, General Manager
Phone: (661) 831-0989

Mitigation Project Description Worksheet

Jurisdiction: Kern County Water Agency

Mitigation Project Title: Kern County Water Agency Administration Building

Issue/Background: The Kern County Water Agency Administration Building was constructed in two phases: the first phase (east wing) was constructed in the mid-1970s and the second phase (west wing and lobby) was constructed in the early 1990s. Both phases were constructed without automatic fire sprinklers, though fire detection devices and an alarm exist.

Additionally, it is unknown to what extent, if any, the Administration Building is susceptible to damage resulting from an earthquake. An investigation by a qualified professional would determine the extent to which remediation is necessary, if any.

Other Alternatives: No action.

Responsible Office: Kern County Water Agency.

Priority (High, Medium, Low): Medium

Cost Estimate: From fire damage: retrofitting the Administration Building with automatic fire sprinklers – unknown. From earthquake damage: Prepare through professional consultant a structural/seismic assessment of the Administration Building - \$20,000.

Benefits (Avoided Losses): Suppression of damages due to loss by cause of fire and/or earthquake, and loss of downtime for administrative and operations staff.

Potential funding: Future inclusion of budget, grant funds, loans, and/or other.

Schedule: Dependent upon funding.

Worksheet Completed by

Name and Title: Steven Ruettggers, Business Management

Phone: (661) 634-1400

Mitigation Project Description Worksheet

Jurisdiction: Kern County Water Agency – Improvement District #4 (ID4)

Mitigation Project Title: Seismic Retrofit of Water Storage Facilities.

Issue/Background: Currently all water storage tanks do not have seismic connections from the reservoir to the inlet and outlet piping. In the event of an earthquake, the steel reservoirs would potentially rupture releasing all of the stored water supply and rendering the distribution system inoperative.

Other Alternatives: Install new reservoirs with seismic considerations to be placed into service if the old reservoirs are destroyed.

Responsible Office: ID4

Priority (High, Medium, Low): High

Cost Estimate:	23 Corner Reservoir	\$150,000
	Oswell 0.5 MG Reservoir	\$300,000
	Oswell 6.8 MG Reservoir	<u>\$450,000</u>
	Total	<u>\$900,000</u>

Benefits (avoided Losses): Would avoid large water outages to customers in the event of damage to the tanks.

Potential funding: Water Rate Revenue/Low Interest Loans/Grant Funding

Schedule: March, 2006

Worksheet Completed by
Name and Title: Kelly Ulrich, Asst. Superintendent of Water Production Facilities
Phone: (661)634-1524

Mitigation Project Description Worksheet

Jurisdiction: Kern County Water Agency – Improvement District #4 (ID4)

Mitigation Project Title: Operation Center Seismic Upgrades

Issue/Background: The existing Henry C. Garnett Water Purification Plant Operation Center was constructed in 1977 in accordance with the 1976 Uniform Building Code. Most of the nonstructural elements which include chemical piping, feed pumps, testing equipment, electrical switchgear and control hardware have not been anchored or secured in accordance with the 2001 California Building Code. During a seismic event the above referenced items may be damaged rendering the Plan inoperative. Additionally, rapid movement of any of these items may cause injury to operation's personnel.

Other Alternatives: No action

Responsible Office: ID4

Priority (High, Medium, Low): High

Cost Estimate:	Operation's Center	\$850,000
	Treated Water Pump Station	<u>\$175,000</u>
	Total	\$1,025,000

Benefits (avoided Losses): Would avoid operational outages resulting in loss of water production from the Henry C. Garnett Water Purification Plant

Potential funding: Water Rate Revenue/Low Interest Loans/Grant Funding

Schedule: December 2007

Worksheet Completed by
Name and Title: Kelly Ulrich, Asst. Superintendent of Water Production Facilities
Phone: (661)634-1524

Mitigation Project Description Worksheet

Jurisdiction: Kern County Water Agency

Mitigation Project Title: Kelso Creek Relocation and Flood proofing

Issue/Background: A subdivision was developed in the floodplain of Kelso Creek in the Weldon area near Lake Isabella in 1960. Floods in 1966 and 1969 damaged many homes and portions of Kelso Creek Road. A levee was built to try to protect the area but historical flows and subsequent FEMA flood studies have determined the levee to be inadequate to handle the 100-year flood. Cost estimates to provide a levee to withstand the 100-year flood on Kelso Creek are higher than the value of the homes that would be protected. In addition floods from Short Canyon and Cholla Canyon would still inundate the area.

Those homeowners willing to be relocated should be bought out. Those wanting to stay should be flood proofed. Land should be acquired to enable flood flows to spread out and flow at shallower depths and lower velocities. Costs range from over \$5 million for a buy out program to around \$1 million for flood proofing and land acquisition.

Other Alternatives:

Fortifying the Kelso Creek Levee and acquiring additional lands would cost about \$3 million, however the area would still be susceptible to flooding from other streams.

Responsible Office: Kern County Water Agency

Priority (High, Medium, Low): High

Cost Estimate: \$1 million to \$5 million

Benefits (avoided Losses): \$3 million to \$6 million every major flood event

Potential funding: State or Federal Grants plus a \$200,000 in local funds

Schedule: 2-years once funding available

Worksheet Completed by

Name and Title: Rick Iger, Engineering and Operations Manager

Phone: (661) 634-1469

Mitigation Project Description Worksheet

Jurisdiction: Kern County Water Agency – Improvement District #4 (ID4)

Mitigation Project Title: Isolation Valves on Transmission Pipelines.

Issue/Background: Wholesale domestic water is currently distributed through two large diameter pipelines, one supplying North Bakersfield and the other servicing East Bakersfield. In the event of earthquake damage the entire line would have to be taken out of service, even if the damage were at the end of either line. Five valves would be installed on the East Line and three valves on the North line. This would allow for water service to continue to be delivered to portions of the retail customers while the remaining section of the pipeline was repaired. Without the valves the entire pipeline would be out of service until all of the pipeline could be repaired.

Other Alternatives: Install tankage at various locations on each of the transmission lines but it would still require valving.

Responsible Office: ID4

Priority (High, Medium, Low): Medium

Cost Estimate:	East Pipeline: 5 Valves @ \$55K	\$275,000
	North Pipeline: 3 Valves @ \$35K	<u>\$105,000</u>
	Total	<u>\$380,000</u>

Benefits (avoided Losses): Would avoid large water outages to customers in the event of damage to the large transmission main lines.

Potential funding: Water Rate Revenue/Low Interest Loans/Grant Funding

Schedule: December, 2006

Worksheet Completed by

Name and Title: Kelly Ulrich, Asst. Superintendent of Water Production Facilities

Phone: (661)634-1524

Mitigation Project Description Worksheet

Jurisdiction: Kern County Water Agency – Improvement District #4 (ID4)

Mitigation Project Title: Chemical Storage Seismic Upgrades

Issue/Background: The existing Henry C. Garnett Water Purification Plant chemical storage tanks were not constructed with seismic rated tanks and anchorage. During a seismic event, the tanks may move and damage the surrounding structure or rupture and displace the stored chemicals. Loss of chemicals at the Plant would render the plant inoperative.

Other Alternatives: No action

Responsible Office: ID4

Priority (High, Medium, Low): Medium

Cost Estimate:	Seismic Rated Tanks (Three)	\$120,000
	Tank anchor retrofit	<u>\$52,000</u>
	Total	\$172,000

Benefits (avoided Losses): Would avoid operational outages resulting in loss of water production from the Henry C. Garnett Water Purification Plant

Potential funding: Water Rate Revenue/Low Interest Loans/Grant Funding

Schedule: December 2007

Worksheet Completed by

Name and Title: Kelly Ulrich, Asst. Superintendent of Water Production Facilities

Phone: (661)634-1524

Mitigation Project Description Worksheet

Jurisdiction: Kern County Water Agency – Improvement District #4 (ID4)

Mitigation Project Title: Conjunctive Use Raw Water Pipeline from Well Field

Issue/Background: One of the Henry C. Garnett Water Purification Plant's raw water sources is the Kern River. A forest fire has potential impact on the watershed due to loss of vegetation and erosion. The amounts of Total Organic Carbon in the river can increase significantly and therefore make it difficult to meet water quality regulations regarding disinfection by-products.

Other Alternatives: Switch to another source if available.

Responsible Office: ID4

Priority (High, Medium, Low): Medium

Cost Estimate: \$15,000,000

Benefits (avoided Losses): Would allow conversion to treatment of groundwater from our well field, rather than potential plant shut-down.

Potential funding: Water Rate Revenue/Low Interest Loans/Grant Funding

Schedule: December 2008

Worksheet Completed by
Name and Title: Kelly Ulrich, Asst. Superintendent of Water Production Facilities
Phone: (661)634-1524

Mitigation Project Description Worksheet

Jurisdiction: Kern County Water Agency – Improvement District #4 (ID4)

Mitigation Project Title: Equipment Storage Seismic Upgrades

Issue/Background: The existing Henry C. Garnett Water Purification Plant storage facility was not constructed with seismic rated shelving, cabinetry and enclosure facilities. Most of this equipment requires extended order and delivery times. During a seismic event, spare equipment may be damaged or destroyed rendering the equipment useless for the repair of Plant and pumping facilities. Additionally, rapid movement of any of these items may cause injury to operation's personnel

Other Alternatives: Purchase new equipment

Responsible Office: ID4

Priority (High, Medium, Low): Low

Cost Estimate:	Shelves, cabinets and enclosures	<u>\$200,000</u>
	Total	<u>\$200,000</u>

Benefits (avoided Losses): Would reduce operational outages resulting in loss of water production from the Henry C. Garnett Water Purification Plant

Potential funding: Water Rate Revenue/Low Interest Loans/Grant Funding

Schedule: December 2007

Worksheet Completed by
Name and Title: Kelly Ulrich, Asst. Superintendent of Water Production Facilities
Phone: (661)634-1524

Mitigation Project Description Worksheet

Jurisdiction: Kern County Water Agency – Improvement District #4 (ID4)

Mitigation Project Title: Side-Stream Nano-Filtration Treatment Option

Issue/Background: One of the Henry C. Garnett Water Purification Plant's raw water sources is the Kern River. A forest fire has potential impact on the watershed due to loss of vegetation and erosion. In addition, the amounts of Total Organic Carbon in the river can increase significantly and therefore make it difficult to meet water quality regulations regarding disinfection by-products.

Other Alternatives: Switch to another source if available.

Responsible Office: ID4

Priority (High, Medium, Low): Low

Cost Estimate: \$10,000,000

Benefits (avoided Losses): Would provide partial treatment and blending to comply with regulations for disinfection byproducts. Avoid potential plant shut-down.

Potential funding: Water Rate Revenue/Low Interest Loans/Grant Funding

Schedule: December 2008

Worksheet Completed by
Name and Title: Kelly Ulrich, Asst. Superintendent of Water Production Facilities
Phone: (661)634-1524

Mitigation Project Description Worksheet

Jurisdiction: County of Kern, in possible conjunction with Lamont Public Utility District, the City of Arvin, and various water districts (possibly including Arvin-Edison Water Storage District, Wheeler-Ridge Maricopa Water Storage District, Henry Miller Water District, and Kern Delta Water District)

Mitigation Project Title: Caliente and Southern Stream Flood Prevention Plan

Issue/Background: Caliente Creek and various small streams south of Caliente Creek in the Sierra and Tehachapi mountain ranges flood causing damages to residences and public agencies as well. The scale and types of flooding make dam mitigation much too expensive. One action that has increased the damages caused by these floods is the construction of channels by the use of levees around properties that are within historic floodplains.

A mitigation alternative for this type of hazard would include passing stricter planning, zoning and development regulations in floodplains. It would also include enforcing existing regulations regarding construction of levees of agricultural fields and other properties.

Other Alternatives: No Action, or dam construction

Responsible Office: Kern County

Priority (High, Medium, Low): Medium

Cost Estimate: Unknown at this time

Benefits (avoided Losses): Reduction in property loss

Potential funding: Unknown at this time

Schedule: Within three years

Worksheet Completed by: Kern Delta Water District
Name and Title: Sheridan Nicholas, District Engineer
Phone: (661) 834-4656

Mitigation Project Description Worksheet

Jurisdiction: North of the River Municipal Water District

Mitigation Project Title: Water Storage Reservoir Flexible Connection Project

Issue/Background: If there were a major earthquake, the District's 6 reservoirs can be thrown about, severing the connections to the water pipes entering the ground, and possibly ripping out the sides of the tanks. There are flexible ball-joint type connections that can be inserted between the tanks and the ground piping. These can run approximately \$40,000 per tank to purchase and have installed.

Other Alternatives: None

Responsible Office: North of the River Municipal Water District

Priority (High, Medium, Low): High

Cost Estimate: \$240,000

Benefits (avoided Losses): Millions of dollars in damage to tanks, property

Potential funding: FEMA Grant

Schedule: When funded

Worksheet Completed by:
Name and Title: William R. Miller, GM
Phone: (661) 393-5411

Mitigation Project Description Worksheet

Jurisdiction: Semitropic Water Storage District

Mitigation Project Title: Recharge (in-lieu or direct) and Recovery Projects

Issue/Background:

Floods and drought have severely impacted Kern County over numerous decades. This has also drastically reduced Kern County's water table. This project would obtain excess water from local flood water, excess State and Federal water, and other water sources to achieve the following:

1. reduce Kern County's exposure to flooding
2. replenish the water table
3. add to Kern County's water supply

This project will use existing facilities in conjunction with new distribution systems to deliver excess water into the District. Land would be purchased for direct recharge.

Other Alternatives:

- Allow flooding to occur
- Build flood control facilities
- Tolerate existing water supply issues to negatively impact Kern County

Responsible Office: Semitropic Water Storage District

Priority (High, Medium, Low): High

Cost Estimate: \$6,000,000-\$14,000,000 (in addition to local funding below)

Benefits (avoided Losses):

- Flood protection to vast regions within Kern County
- Provide drought protection to Semitropic's service area
- Slow any future overdraft conditions to Kern County's water table

Potential funding:

\$50,000,000 in existing local funding from Semitropic Water Storage District

Schedule: over the next 3-5 years

Contact information

Name of jurisdiction: Semitropic Water Storage District

Filled out by: Drew Hamilton

Address: PO Box Z
Wasco, CA 93280

Phone: 661.758.5113

Mitigation Project Description Worksheet

Jurisdiction: Tehachapi-Cummings County Water District (TCCWD)

Mitigation Project Title: Groundwater Protection Strategy for Cummings Valley Groundwater Basin

Issue/Background: The Cummings Valley Groundwater Basin is an adjudicated basin. TCCWD is the watermaster. California correction institute (CCI) is a state prison which has not properly operated their sewage treatment plant. "State Corrections" has stated that "they" plan to build a new sewer treatment plant for over 15 years. They have illegally screened 100,000 cubic yards of untreated sewage and stored on their property over the groundwater basin.

Other Alternatives: Move the prison

Responsible Office: State of California Department of Corrections

Priority (High, Medium, Low): High

Cost Estimate: \$10 million

Benefits (avoided Losses): Sustain a groundwater basin which provides a water source for homes and agriculture.

Potential funding: Don't know

Schedule: ASAP

Worksheet Completed by: TCCWD
Name and Title: Glenn Mueller, Opp. Mgr.
Phone: (661) 822-5485

Mitigation Project Description Worksheet

Jurisdiction: Tehachapi-Cummings County Water District and Countywide

Mitigation Project Title: Antelope Run

Issue/Background: Drainage channel, 2 miles long through commercial and residential lands. Erosion control structures have been needed to reduce the run off velocity.

Other Alternatives: None.

Responsible Office: Tehachapi-Cummings County Water District
22901 Banducci Road
Tehachapi, CA 93561
661-822-5504

Priority (High, Medium, Low): High

Cost Estimate: \$1.3 million

Benefits (avoided Losses): Reduces soil erosion. Improves flow. Reduces flood hazard.

Potential funding: P13-109 California Department of Water Resources Grant, City of Tehachapi, Tehachapi-Cummings County Water District

Schedule: Construction is underway

Worksheet Completed by:
Name and Title: Glenn H. Mueller, Project Manager
Phone: (661) 822-5504

Mitigation Project Description Worksheet

Jurisdiction: Tehachapi-Cummings County Water District

Mitigation Project Title: Fire hazard reduction

Issue/Background: Annual weed growth in and around our 5 pump plant facilities. Tehachapi-Cummings County Water District hires 3 – 4 college students each summer to help control fire hazard by reducing weeds and other “fire fuel” at Pump Plants and at access road gates.

Other Alternatives: None.

Responsible Office: Tehachapi-Cummings County Water District
22901 Banducci Road
Tehachapi, CA 93561
661-822-5504

Priority (High, Medium, Low): High

Cost Estimate: \$15,000

Benefits (avoided Losses): Reduced impact to Pump Plants if a range land fire burns near the Pump Plants.

Potential funding: General Funds of Tehachapi-Cummings County Water District

Schedule: Each year. Currently operating.

Worksheet Completed by:
Name and Title: Glenn H. Mueller, Operations Manager
Phone: (661) 822-5504

Mitigation Project Description Worksheet

Jurisdiction: Tehachapi-Cummings County Water District and Countywide

Mitigation Project Title: Obtain complete new mobile radio communications system for all vehicles and a base station which is compatible with Kern County's new system.

Issue/Background: Communications must be updated to be compatible with Kern County's new system. In a disaster, cellular phones will be overloaded. These new radios mounted in all vehicles to help citizens within the Water District and beyond.

Other Alternatives: None.

Responsible Office: Tehachapi-Cummings County Water District
22901 Banducci Road
Tehachapi, CA 93561
661-822-5504

Priority (High, Medium, Low): High

Cost Estimate: \$16,200

Benefits (avoided Losses): Some of these radios "scan" and can interface with County Fire and the Sheriff.

Potential funding: General Funds of Tehachapi-Cummings County Water District

Schedule: In place January 2005

Worksheet Completed by:
Name and Title: Glenn H. Mueller, Project Manager
Phone: (661) 822-5504

Mitigation Project Description Worksheet

Jurisdiction: Tehachapi-Cummings County Water District

Mitigation Project Title: Provide two sites for fire fighting helicopters to dip water.

Issue/Background: The development in the foothills and the forest fringe demands fast fire department response. Tehachapi-Cummings County Water District has a large water main running through Tehachapi Valley. Tehachapi-Cummings County Water District has, with the expertise of the Kern County Fire Department, developed two medium-sized, open top tanks that fill fast, where a helicopter fighting a fire can fill its tank. This cuts response time in half.

Other Alternatives: None.

Responsible Office: Tehachapi-Cummings County Water District
22901 Banducci Road
Tehachapi, CA 93561
661-822-5504

Priority (High, Medium, Low): Medium

Cost Estimate: \$4,000

Benefits (avoided Losses): Reduced impact to Pump Plants if a range land fire burns near the Pump Plants.

Potential funding: General Funds of Tehachapi-Cummings County Water District

Schedule: Each year. Currently operating.

Worksheet Completed by:
Name and Title: Glenn H. Mueller, Operations Manager
Phone: (661) 822-5504

Mitigation Project Description Worksheet

Jurisdiction: West Kern Water District

Mitigation Project Title: Station C-10 Building Demolition\Retrofit

Issue/Background:

West Kern Water District's C-10 facility was built in the pre 1920's. The pump facility is located approximately 6 to 8 miles off the San Andreas Earthquake Fault. The District's C-10 facility is the sole source of water for the Greater Taft Area which includes a population of approximately 8,000 people.

The C-10 facility also feeds:

- * Schools (9 Total)
- * Skilled Nursing Facilities
- * City Fire Mains
- * County Fire Mains
- * County and City Fire Departments
- * Medical Offices
- * Return To Custody Facility

There are more than 2,063 residential and 616 non-residential structures valued at over \$238,273,362.

Our main concern is the ability to continue operations in event of a large earthquake. The entire structure was constructed prior to seismic building codes and due to the age of structure concrete pillars are degrading, concrete flooring is cracking and timber support pillars are showing longitudinal cracking as well. A large earthquake could potentially cause the building to collapse upon the pumping equipment, or be condemned and unsafe for District employees to enter.

Other Alternatives: No action

Responsible Office: West Kern Water District
800 Kern Street
Taft, CA. 93268

Priority (High, Medium, Low): High

Cost Estimate: \$2,000,000 to \$3,000,000

Benefits (avoided Losses): Continued water service to the Greater Taft Area following a large earthquake.

Potential funding: Grants, District Budgeting

Schedule: Depending on availability of funds

Worksheet Completed by: West Kern Water District
Name and Title: George Harmer, Safety Supervisor
Phone: 661-763-3151

Mitigation Project Description Worksheet

Jurisdiction: West Kern Water District

Mitigation Project Title: Water Tank Earthquake Valve(s)

Issue/Background:

Much of the West Kern Water District is located approximately 6 to 8 miles off the San Andreas Earthquake Fault.

The District is isolated from other water districts without a secondary supply of potable water. The population of approximately 16,800, is not great but the District also serves 3 of the State's 5 largest oil fields, multiple co-generation facilities, and 3 electrical power plants.

Most water tanks are strategically located on hill tops to provide water pressure for customer service and Fire Department connections. There are still many miles of transite and older steel pipelines in service, which can be damaged by earthquakes, causing localized flooding and severe erosion as elevated tanks are emptied.

Placing earthquake valves on strategic water tanks may preserve as much as 10 million gallons in multiple locations making possible continued availability of water for drinking, sanitary purposes, fire fighting, and the continued operation of critical facilities.

Other Alternatives: No action.

Replacing all transite lines with steel pipe would ameliorate the situation but would not be a complete fix because steel pipes can also fail in an earthquake.

Responsible Office: West Kern Water District

Priority (High, Medium, Low): Low to Medium

Cost Estimate: 5 tanks at \$50K each = \$250K

Benefits (avoided Losses):

Cost to import and distribute drinking water

Reduction in property loss to fire

Continued electrical production (generating plants do not require as much water to operate as oil production facilities)

Water supply for health and sanitation issues

Potential funding: Grants

Schedule: 2006 - 2007

Worksheet Completed by West Kern Water District
Name and Title: Jim Blanton, Safety Supervisor

Mitigation Project Description Worksheet

Jurisdiction: Wheeler Ridge-Maricopa Water Storage District (WRMWS D)

Mitigation Project Title: Pastoria Creek Channel Hardening for Flood Mitigation

Issue/Background: Pastoria Creek is an ephemeral stream originating in the Tehachapi Mountains (watershed area 31 square miles) and draining into Kern Lake Bed. The February 16-23, 2005 flooding of Grapevine and Pastoria Creeks (FEMA Disaster #1585), a less than 100-year event, resulted in damages to the WRMWS D of roughly \$43,000 at 15 sites. Damages to District facilities in the Pastoria Creek watershed resulted primarily from washout of buried valves, washout of gabion baskets and bank materials, silt deposition, and clogging of valves. In addition to WRMWS D losses, there has been repeated flooding of the roadway and washout of road surfaces and barrow ditches on Laval Road, Rancho Road, and LeGray Road (County owned) as well as damage to privately owned underground pipelines and farm fields.

This project proposes to harden the stream bank at one WRM pumping plant and up to six water pipeline crossings where damage has historically occurred. The preferred hardening method consists of placing stone and wire mesh gabions in the bank and reinforcing them with poured concrete. This has been demonstrated to be an effective mitigation measure where applied in this District.

Other Alternatives:

- 1) Move obstructions and flow restrictions out of the stream channel through code enforcement and right of way enforcement
- 2) Deepen and widen the existing creek channel to increase the cross section of flow and reduce flow velocities
- 3) Construct off stream detention basins to reduce peak flow volumes
- 4) Relocate Pastoria Creek to its pre-1970 channel west of Rancho Road through condemnation and land purchase by Kern County

Responsible Office: William A. Taube, Engineer-Manager, Wheeler Ridge-Maricopa Water Storage District

Priority (High, Medium, Low): High

Cost Estimate: \$6,000 per site or stream crossing. Estimate $\$6,000 \times 7 \text{ sites} = \$42,000$

Benefits (avoided Losses): Assume $\$25,000/\text{flood event} \times 10 \text{ events}/50 \text{ years} = \$250,000$ total. Because this option does not reduce flood volumes or velocities, benefits accrue only to WRMWS D where District facilities are protected.

Potential funding: WRMWS D reserve fund. Perhaps FEMA funds for flood mitigation. No other grants, subsidies or funding programs are known to apply.

Schedule: Within two years

Worksheet Completed by Tom Suggs, P.E., P.G.
Name and Title: Staff Engineer
Phone: (661) 858-2281 x15

Mitigation Project Description Worksheet

Jurisdiction: Wheeler Ridge-Maricopa Water Storage District (WRMWSO)

Mitigation Project Title: Grapevine Creek Channel Hardening for Flood Mitigation

Issue/Background: Grapevine Creek is an ephemeral stream originating in the Tehachapi Mountains (watershed area 27 square miles) and draining into Kern Lake Bed. The February 16-23, 2005 flooding of Grapevine and Pastoria Creeks (FEMA Disaster #1585), a less than 100-year event, resulted in damages to the WRMWSO of roughly \$43,000 at 15 sites. Damages to District facilities in the Grapevine Creek watershed consisted primarily of washout of buried valves, washout of gabion baskets and stream banks at two locations, deposition of several feet of silt at one canal siphon, and mass wasting of bank material, which undermined and eventually broke a buried water supply main at one location.

This project proposes to harden the stream bank at five pipeline crossings where severe erosion has historically occurred (e.g. WRMWSO laterals B-D, B-3, B-2, B-1, BG-A). The preferred hardening method consists of placing stone and wire mesh gabions in the bank near vulnerable facilities and reinforcing them with poured concrete. This has been demonstrated to be an effective mitigation measure where applied in this District.

Other Alternatives:

- 1) Move obstructions and flow restrictions out of the stream channel through code enforcement, right of way enforcement, condemnation and land purchase by Kern County
- 2) Deepen and widen the existing creek channel to increase the cross section of flow and reduce flow velocities
- 3) Construct off stream detention basins to reduce peak flow volumes

Responsible Office: William A. Taube, Engineer-Manager, Wheeler Ridge-Maricopa Water Storage District

Priority (High, Medium, Low): High

Cost Estimate: Assume \$6,000 per site or stream crossing for gabion construction. Estimate \$6,000 x 6 sites = \$36,000 total.

Benefits (avoided Losses): Assume avoided losses of \$20,000/flood event x 10 events/50 years = \$200,000 total. Because this option does not reduce flood volumes or velocities, benefits accrue only to WRMWSO where District facilities are protected.

Potential funding: WRMWSO reserve fund. Perhaps FEMA funds for flood mitigation. No other grants, subsidies or funding programs are known to apply.

Schedule: Within five years

Worksheet Completed by Tom Suggs, P.E., P.G.
Name and Title: Staff Engineer
Phone: (661) 858-2281 x15

Mitigation Project Description Worksheet

Jurisdiction: Wheeler Ridge-Maricopa Water Storage District (WRMWSO)

Mitigation Project Title: New Water Wells for Drought Relief

Issue/Background: Most of the District's water supply is obtained via the California Aqueduct from the State Water Project under contract with the Kern County Water Agency. The District has secured additional dry year water supplies for its landowners from the Kern Water Bank, Pioneer Project, the Berrenda Mesa Project, and the Blanca Rosa Improvement District. Moreover, the District owns and operates 17 backup wells capable of providing temporary water service to about 10,000 acres of developed lands. Although these measures improve dry year reliability, a prolonged statewide drought could exceed our local ability to compensate for the loss of imported surface water.

A prolonged drought would be regional event that would affect virtually all of the 90,000 agricultural acres located within this water district. Impacts would be in the form of 1) economic damage to grape vines, fruit trees, and nut trees, 2) lost revenues from the fallowing of land, 3) costs associated with increased groundwater pumping and lowering of the water table.

This project proposes to increase the local groundwater extraction capacity of the WRMWSO by constructing five high capacity water wells within District boundaries. Based on past experience, it is estimated that five wells would produce approximately 20 cubic feet per second (cfs), or enough water to supply roughly 4,300 irrigated acres of citrus, nuts, or vines.

Other Alternatives:

- 1) Develop additional groundwater and surface water storage throughout the State
- 2) Expand local agency participation in groundwater banks
- 3) Improve the Bay-Delta levee and water-conveyance system, especially seismic strengthening of Delta levees
- 4) Modernize the federal Endangered Species Act and other laws and regulations to allow the improvement of facilities on the State Water Project and reduce unnecessary diversions for in-stream uses.

Responsible Office: William A. Taube, Engineer-Manager, Wheeler Ridge-Maricopa Water Storage District

Priority (High, Medium, Low): High

Cost Estimate: \$500,000/well x 5 wells = \$2.5 M for construction and equipping. WRMWSO would be responsible Operation & Maintenance and for connecting wells to the distribution system.

Benefits (avoided Losses): This estimate focuses on permanent crops only (trees and vines) and does not include row and field crops (vegetables, grains, and cotton), because it is assumed that such crops would not be planted locally in the event of a prolonged drought. The value of lost produce is not included.

For planning purposes, it is assumed that 10-20% of permanent crops could suffer damage due to water stress in a prolonged drought. 55,600 acres x 20% = 11,200 acres damaged or lost.

Assume that additional groundwater production could supply 4,300 irrigated acres on an emergency basis that would otherwise be lost. The cost to replace citrus, almonds, and grapes ranges from approximately \$5,000 to 7,000 per acre. Thus, the avoided crop damage is estimated at:

$$4,300 \text{ acres} \times \$5,000/\text{ac damaged} = \$21.5 \text{ M.}$$

Potential funding: WRMWSD reserve fund.

Schedule: Five years

Worksheet Completed by	Tom Suggs, P.E., P.G.
Name and Title:	Staff Engineer
Phone:	(661) 858-2281 x15

Mitigation Project Description Worksheet

Jurisdiction: Wheeler Ridge-Maricopa Water Storage District (WRMWSO)

Mitigation Project Title: Pastoria Creek Detention Basins for Flood Mitigation

Issue/Background: Pastoria Creek is an ephemeral stream originating in the Tehachapi Mountains (watershed area 31 square miles) and draining into Kern Lake Bed. The February 16-23, 2005 flooding of Grapevine and Pastoria Creeks (FEMA Disaster #1585), a less than 100-year event, resulted in damages to the WRMWSO of roughly \$43,000 at 15 sites. In addition to WRMWSO losses, there has been repeated flooding of the roadway and washout of road surfaces and barrow ditches on Laval Road, Rancho Road, and LeGray Road (County owned) as well as damage to privately owned underground pipelines and farm fields.

This project proposes to construct an approximately 100-200 acre-foot capacity temporary detention basin or basins adjacent to Pastoria Creek between Edmonston Pumping Plant Road and Laval Road. The project, consisting of earthen berms and a simple diversion works, would temporarily divert a portion of peak stream flows to fallow lands, reducing flood volumes and flow velocities north of Laval Road. There would be no permanent dam structure required in the creek channel.

Other Alternatives:

- 1) Raise the roadway height above the 5-year flood elevation on approximately 3.5 miles of Rancho Road, 2 miles of Sebastian Road, and 2 miles of Legray Road
- 2) Harden underground pipelines and other permanent facilities at stream crossings
- 3) Move Pastoria Creek back to its pre-1970 channel west of Rancho Road through condemnation and land purchase by Kern County
- 4) Move obstructions and flow restrictions out of the stream channel along Rancho Road through code enforcement and right of way enforcement
- 5) Deepen and widen the current creek channel along Rancho Road
- 6) Culvertize stream crossings at Laval Road, Sebastian Road, and Legray Road

Responsible Office: William A. Taube, Engineer-Manager, Wheeler Ridge-Maricopa Water Storage District

Priority (High, Medium, Low): Medium

Cost Estimate:

Construction	\$300,000
Land leases and easements	<u>\$100,000</u>
Total	<u>\$400,000</u>

It is assumed that WRMWSO and Kern County would establish a joint agreement for Operation & Maintenance. It is assumed that project land would be secured through long term leases or easements. If land were purchased, project costs would increase accordingly.

Benefits (avoided Losses):

WRMWSD facilities only assume	
\$20,000/flood event x 10 events/50 years =	\$200,000
For private landowners assume	
\$20,000/flood event x 10 events/50 years =	\$200,000
For County roads assume	
\$50,000/flood event x 10 events/50 years =	<u>\$500,000</u>
Total benefit over 50 years =	<u>\$900,000</u>

Potential funding: WRMWSD reserve fund. Kern County funds. Perhaps State grants for flood control and artificial recharge.

Schedule: Within five years

Worksheet Completed by Tom Suggs, P.E., P.G.
Name and Title: Staff Engineer
Phone: (661) 858-2281 x15

Mitigation Project Description Worksheet

Jurisdiction: Wheeler Ridge-Maricopa Water Storage District (WRMWS D)

Mitigation Project Title: Grapevine Creek Detention Basins for Flood Mitigation

Issue/Background: Grapevine Creek is an ephemeral stream originating in the Tehachapi Mountains (watershed area 27 square miles) and draining into Kern Lake Bed. The February 16-23, 2005 flooding of Grapevine and Pastoria Creeks (FEMA Disaster #1585), a less than 100-year event, resulted in damages to the WRMWS D of roughly \$43,000 at 15 sites. In addition to WRMWS D losses, there has been repeated flooding of the roadway and washout of road surfaces and barrow ditches on Laval Road, Rancho Road, and Legray Road (County owned) as well as damage to privately owned underground pipelines and farm fields.

This project proposes to construct an approximately 100-200 acre-foot capacity temporary detention basin or basins adjacent to Grapevine Creek between Edmonston Pumping Plant Road and Laval Road. The project, consisting of earthen berms and a simple diversion works, would temporarily divert a portion of peak stream flows to fallow lands, reducing flood volumes and flow velocities north of Laval Road. There would be no permanent dam structure required in the creek channel.

Other Alternatives:

- 1) Raise the roadway height above the 5-year flood elevation on approximately 3.5 miles of Rancho Road, 2 miles of Sebastian Road, and 2 miles of Legray Road
- 2) Harden underground pipelines and other permanent facilities at stream crossings
- 3) Move obstructions and flow restrictions out of the stream channel through code enforcement and right of way enforcement
- 4) Deepen and widen the current creek channel along Rancho Road
- 5) Culvertize stream crossings at Laval Road, Sebastian Road, and Legray Road

Responsible Office: William A. Taube, Engineer-Manager, Wheeler Ridge-Maricopa Water Storage District

Priority (High, Medium, Low): Medium

Cost Estimate:

Construction	\$300,000
Land leases and easements	<u>\$100,000</u>
Total	<u>\$400,000</u>

It is assumed that WRMWS D and Kern County would establish a joint agreement for Operation & Maintenance. It is assumed that project land would be secured through long term leases or easements. If land were purchased, project costs would increase accordingly.

Benefits (avoided Losses):

WRMWSD facilities only assume	
\$20,000/flood event x 10 events/50 years =	\$200,000
For private landowners assume	
\$20,000/flood event x 10 events/50 years =	\$200,000
For County roads assume	
\$50,000/flood event x 10 events/50 years =	<u>\$500,000</u>
Total benefit over 50 years =	<u>\$900,000</u>

Potential funding: WRMWSD reserve fund. Kern County funds. Perhaps State grants for flood control and artificial recharge.

Schedule: Within five years

Worksheet Completed by Tom Suggs, P.E., P.G.
Name and Title: Staff Engineer
Phone: (661) 858-2281 x15

Mitigation Project Description Worksheet

Jurisdiction: Wheeler Ridge-Maricopa Water Storage District (WRMWSO)

Mitigation Project Title: Stream Gages for Early Warning of Flood Conditions

Issue/Background: Real time stream gage data can provide early warning of flood conditions in time to reroute traffic or to dispatch public works and Caltrans forces. This project proposes to install stream gages near the mouth of the canyon on eight local streams known to be prone to flooding. Gages would consist of simple H-weirs, stilling wells, pressure transducers, staff gages, and radio transmitters. Incoming data would be processed using the existing WRMWSO telemetry system. Candidate streams include Santiago, San Emigdio, Pleito, Pleitito, Tecuya Grapevine, Pastoria, and El Paso Creeks.

Other Alternatives:

- 1) Move obstructions and flow restrictions out of the stream channels through code enforcement and right of way enforcement by Kern County
- 2) Deepen and widen the existing creek channels to increase the cross section of flow and reduce flow velocities
- 3) Construct off stream detention basins to reduce peak flow volumes

Responsible Office: William A. Taube, Engineer-Manager, Wheeler Ridge-Maricopa Water Storage District

Priority (High, Medium, Low): Medium

Cost Estimate: Assume \$5,000 per stream gage. Estimate \$5,000 x 8 sites = \$40,000 total.

Benefits (avoided Losses): Unknown

Potential funding: WRMWSO reserve fund. Perhaps FEMA funds for flood mitigation. No other grants, subsidies or funding programs are known to apply.

Schedule: Within five years

Worksheet Completed by Tom Suggs, P.E., P.G.
Name and Title: Staff Engineer
Phone: (661) 858-2281 x15

Mitigation Project Description Worksheet

Jurisdiction: Ford City-Taft Heights Sanitation District

Mitigation Project Title: Prepare for damage to the collection sewer lines due to earthquake.

Issue/Background: Damage to sewer line could result in the backing up and overflow of sewage into the streets and eventually the storm water system. Prepare for overflows by identifying areas of access to rivers. Prepare plans to block that flow with sandbags, turn off fresh water sources, route to storm water retention basins, and disinfect sewage.

Other Alternatives: Allow overflow into rivers and disinfect there. (Backflow prevention??)

Responsible Office: Kern Sanitary Authority

Priority (High, Medium, Low): High

Cost Estimate: Mitigation preparation: \$5,000
Implementation during incident: \$100,000
Repair of damaged lines: \$20 million

Benefits (avoided Losses): None given

Potential funding: None given

Schedule: None given

Worksheet Completed by

Name and Title: Rob Ellery
Phone: (661) 862-8984

Mitigation Project Description Worksheet

Jurisdiction: Ford City-Taft Heights Sanitation District

Mitigation Project Title: Replace more vulnerable sections of wastewater collection system to withstand the maximum probable earthquake as described in the California building code.

Issue/Background: A major earthquake could result in damage to large portions of the wastewater collection lines. Depending on the extent of the damage, minor to severe property damage, environmental damage and disruption of sewer service could occur.

Other Alternatives: No real alternative exists to replacing segments of the sewer lines with more resilient sewer lines.

Responsible Office: Ford City-Taft Heights Sanitation District

Priority (High, Medium, Low): Medium

Cost Estimate: \$5,000,000.

Benefits (avoided Losses): Prevent potentially millions of dollars of property damage and environmental damage caused by raw sewage spilling on to streets, private and public property, and backing up into homes and businesses.

Potential funding: Grants

Schedule: Once funding is obtained, completion of the entire project could take five to seven years.

Worksheet Completed by

Name and Title: Thomas F. McCutcheon, Special Projects Manager

Phone: (661) 862-8998

Mitigation Project Description Worksheet

Jurisdiction: Kern Sanitation Authority

Mitigation Project Title: Wastewater plant and collection system seismic retrofit and digester construction.

Issue/Background: Most of the sewer lines and treatment facility components are 40 to 50 years old, with some concrete/VCP main lines approximately 90 years old. A major earthquake could damage portions of the wastewater collection lines and the treatment facilities. Property damage, environmental damage and disruption of sewer service could occur. To mitigate damage a project should be undertaken to retrofit the more vulnerable components of the treatment facility and replace sections of wastewater collection system to withstand the maximum probable earthquake as described in the California building code. A backup digester should also be constructed.

Other Alternatives: No real alternative exists to retrofitting plant components and replacing segments of the sewer lines to adequately reinforce the facilities and sewer lines. A backup digester is needed to assure continuation of service in a disaster.

Responsible Office: Kern Sanitation Authority

Priority (High, Medium, Low): Medium

Cost Estimate: \$15,000,000.

Benefits (avoided Losses): Prevent potentially millions of dollars in property damage and environmental damage caused by raw sewage spilling on to streets, private and public property, and backing up into homes and businesses.

Potential funding: Grants

Schedule: Once funding is obtained, completion of the entire project could take seven to ten years.

Worksheet Completed by

Name and Title: Thomas F. McCutcheon, Special Projects Manager

Phone: (661) 862-8998

Mitigation Project Description Worksheet

Jurisdiction: Kern Sanitation Authority

Mitigation Project Title: Prepare for damage to the collection sewer lines due to earthquake

Issue/Background: Damage to sewer line could result in the backing up and overflow of sewage into the streets and eventually the storm water system. Prepare for overflows by identifying areas of access to the Kern River. Prepare plans to block that flow with sandbags, turn off fresh water sources, route to storm water retention basins, and disinfect sewage.

Make special arrangement for Critical Facility KMC if necessary.

Other Alternatives: Allow overflow into the Kern river and disinfect there. (Backflow check valves?)

Responsible Office: Kern Sanitation Authority

Priority (High, Medium, Low): High

Cost Estimate: Mitigation preparation: Done
Implementation during incident: \$100,000
Repair of damaged lines: \$25 million (avoided?)

Benefits (avoided Losses): None given

Potential funding: None given

Schedule: None given

Worksheet Completed by

Name and Title: Rob Ellery

Phone: (661) 862-8984

Mitigation Project Description Worksheet

Jurisdiction: Kern Sanitation Authority

Mitigation Project Title: Prepare for damage to the treatment plant due to earthquake

Issue/Background: Damage to plant could affect the plants ability to treat the sewage. Plan would be to by pass the affected pieces of equipment, treat the best possible and discharge to the reservoirs where additional treatment could take place. Additional aeration in the reservoirs could be necessary.

Other Alternatives: None

Responsible Office: Kern Sanitation Authority

Priority (High, Medium, Low): High

Cost Estimate: Mitigation preparation:
Improving routing option within the plant: \$1million
Run electrical power to reservoirs for aerators, 20 aerators: \$2 M
Implementation during incident: \$10,000
Repair of damaged infrastructure: \$10 million (how to avoid?)

Benefits (avoided Losses): None given

Potential funding: None given

Schedule: None given

Worksheet Completed by
Name and Title: Rob Ellery
Phone:(661) 862-8984

Mitigation Project Description Worksheet

Jurisdiction: North of River Sanitary District

Mitigation Project Title: Force Main pipeline replacement (3800 feet of 10 inch cast iron force main pipeline replacement).

Issue/Background: The force main is over 50 years old and is made up of cast iron with leaded joints. An earthquake could damage all or portions of the force main pipeline. Any portion of the force main damaged would result in closing the entire pipeline for repairs. Property damage, environmental damage and disruption of sewer service could occur. Damage would be mitigated with the replacement of the force main with new plastic pipe able to withstand earth movement.

Other Alternatives: No action

Responsible Office: North of River Sanitary District

Priority (High, Medium, Low): Medium

Cost Estimate: \$760,000.00

Benefits (avoided Losses): Prevent potentially millions of dollars in property damage and environmental damage caused by raw sewage spilling on to streets, private and public property, waterways, and backing up into homes and businesses.

Potential funding: Grants

Schedule: Once funding is obtained, completion of the project could be completed within a year.

Worksheet Completed by
Name and Title: Donald O. Glover, Manager
Phone: (661) 399-6411

Mitigation Project Description Worksheet

Jurisdiction: North of River Sanitary District

Mitigation Project Title: Sewer lift station backup.

Issue/Background: A 50 year old sewer lift station serves over 7,000 people. An earthquake could damage portions of the lift station that operates from a dry well basement.. Property damage, environmental damage and disruption of sewer service could occur. To mitigate the damage, two additional submersible pumps with piping and valves should be installed.

Other Alternatives: No action

Responsible Office: North of River Sanitary District

Priority (High, Medium, Low): Medium

Cost Estimate: \$300,000.00

Benefits (avoided Losses): Prevent potentially millions of dollars in property damage and environmental damage caused by raw sewage spilling on to streets, private and public property, waterways, and backing up into homes and businesses.

Potential funding: Grants

Schedule: Once funding is obtained, completion of the project could be completed within a year.

Worksheet Completed by

Name and Title: Donald O. Glover, Manager

Phone: (661) 399-6411

Mitigation Project Description Worksheet

Jurisdiction: North of River Sanitary District

Mitigation Project Title: Lining three 40 acre wastewater treatment plant ponds.

Issue/Background: An earthquake, water erosion, or flooding could damage the embankments of three 40 acre ponds. The damage would result in a breach of the pond thereby flooding nearby properties and highway with wastewater effluent. Property damage, environmental damage and disruption of sewer service could occur. The damage could be mitigated by lining the embankments to prevent any breaches.

Other Alternatives: No action

Responsible Office: North of River Sanitary District

Priority (High, Medium, Low): Low

Cost Estimate: \$300,000.00

Benefits (avoided Losses): Prevent losses in property damage and environmental damage caused by effluent spilling on to streets, private and public property, and waterways.

Potential funding: Grants

Schedule: Once funding is obtained, completion of the project could be completed within a year.

Worksheet Completed by

Name and Title: Donald O. Glover, Manager

Phone: (661) 399-6411

Mitigation Project Description Worksheet

Jurisdiction: Bakersfield City School District

Mitigation Project Title: Additional window film throughout district. Additional anchoring of bookshelves etc.

Issue/Background:

Other Alternatives: No action

Responsible Office: Bakersfield City School District

Priority (High, Medium, Low):

Cost Estimate:

Benefits (avoided Losses): Avoided injuries to students and staff. Less damages to contents of building during windstorms.

Potential funding:

Schedule:

Worksheet Completed by
Name and Title: Michael Hamlin
Phone: (661) 207-7068

Mitigation Project Description Worksheet

Jurisdiction: Bakersfield City School District

Mitigation Project Title: Extensive regarding of selected sites. Removal/replacement of asphalt and landscaping to facilitate better drainage.

Issue/Background:

Other Alternatives:

Responsible Office: Bakersfield City School District

Priority (High, Medium, Low):

Cost Estimate:

Benefits (avoided Losses): Reduced flood damages

Potential funding:

Schedule:

Worksheet Completed by
Name and Title: Michael Hamlin
Phone: (661) 207-7068

Mitigation Project Description Worksheet

Jurisdiction: Buttonwillow Union School District

Mitigation Project Title: East Campus Roofing Project

Issue/Background: The classroom buildings were constructed between 1928 and 1939. They are roofed with mission clay tile. The clay tile lends to the architecture of the facility and is a superior roof. However, years of shifting, breaking and wear have created areas of leakage, resulting in potentially major structural damage. Most desirable resolution would be to contract with a roofer to inspect, replace clay tiles, install sealants, flashing, etc. to extend the lifetime of the existing roof.

Other Alternatives: Replace entire roof.

Responsible Office: Buttonwillow School District Office

Priority (High, Medium, Low): Medium

Cost Estimate: The exact cost is undetermined, however based on current projects underway, would expect the cost to range from \$30,000.00 to inspect, replace broken tiles, repair existing roof to \$250,000.00 to replace the entire roof.

Benefits (avoided Losses): Effectively reduce the cost of major structural damage due to heavy rains, and dislodging due to earthquakes and excessive winds. Minimize school closures as such. Minimize loss to electrical equipment as the result of leaking.

Potential funding: At this time no funding source is available. The District is currently in the process of completing projects outlined in a bond measure passed in 2002, which does not include any of the above.

Schedule: If funding became available, the District would begin the mitigation project as soon as possible without disrupting normal school operation. Probably would need to coincide with winter break or summer vacation.

Worksheet Completed by
Name and Title: Regina K. Houchin, Trustee
Phone: (661) 764-5273 or District office 764-5248

Mitigation Project Description Worksheet

Jurisdiction: Buttonwillow Union School District

Mitigation Project Title: Gymnasium Air Conditioning/Cooling/Heating

Issue/Background: The gymnasium was built in 1957. There are two heating units, but no source of cooling. This building is considered an emergency shelter and the focal point in the event of any disaster that occurs in Buttonwillow. The gymnasium was used in 1977 during the severe dust storm as shelter for stranded travelers on Interstate 5 and others unable to go home. While heating was available for this disaster, if anything were to happen during the months of May through September, when temperatures can reach 110, it would be too hot to house residents for any extended length of time. One heating unit is non-operable at this time and both could be updated.

Other Alternatives: No action

Responsible Office: Buttonwillow School District Office

Priority (High, Medium, Low): Medium

Cost Estimate: Unknown – depends on type of mitigation needed and building code requirements.

Benefits (avoided Losses): Emergency shelter during summer months.

Potential funding: Intent was to use Bond Measure funds, however with the rising cost of construction, the funds generated from the Bond may not cover this expense.

Schedule: As soon as funding becomes available, avoiding interruption of daily school activities while students are present.

Worksheet Completed by

Name and Title: Regina K. Houchin, Trustee

Phone: (661) 764-5273 or District office 764-5248

Mitigation Project Description Worksheet

Jurisdiction: Buttonwillow Union School District

Mitigation Project Title: Remodeling/Construction of Storage Facilities

Issue/Background: The original school facility was built in 1927, with additional construction in 1937, 1939, 1955, 1957 and the last in 1967. While there have been modernization projects throughout the schools history, nothing has been done to substantially increase the storage facilities and space to keep up with the needs of providing for the students education. Hence, items are stored around campus, where space allows, and not in secured areas that would prevent possible damage in the event of an earthquake. Items are not where they can be properly secured.

Other Alternatives: Utilize the minimal space available and construct shelving and cabinets to secure items.

Responsible Office: Buttonwillow School District Office

Priority (High, Medium, Low): Low

Cost Estimate: The exact cost is undetermined, but with the cost of construction and based on size, to build a storage facility with shelving, closets, etc. at both ends of campus would range between \$100,000 and \$200,000.00. Utilizing current space – cost unknown.

Benefits (avoided Losses): Obvious benefit would be to student safety, but having items secured would prevent physical loss of equipment, books and potentially desks and other furniture.

Potential funding: At this time no funding source is available. The District is currently in the process of completing projects outlined in a bond measure passed in 2002, which does not include any of the above.

Schedule: If funding became available, the District would begin the mitigation project as soon as possible. Depending on the location of the project and the ability to secure the construction site, disruption of school should not be necessary. If determined a disruption would be necessary, the project would need to be completed during school breaks.

Worksheet Completed by
Name and Title: Regina K. Houchin, Trustee
Phone: (661) 764-5273 or District office 764-5248

Mitigation Project Description Worksheet

Jurisdiction: Buttonwillow Union School District

Mitigation Project Title: Basement Retrofitting

Issue/Background: The basement is located beneath the auditorium, built in 1927. It is currently used as storage, due to the lack of additional space. The below ground level facility could be retrofitted to house students and community members in the event of excessive wind or tornados. Could be used as an emergency facility. Due to the size of our community, 1200+ and the potential isolation from a large city, these types of facilities are not readily available to our residents.

Other Alternatives: No action

Responsible Office: Buttonwillow School District Office

Priority (High, Medium, Low): Low

Cost Estimate: Unknown

Benefits (avoided Losses): Health & Safety, Emergency Services

Potential funding: At this time no funding source is available. The District is currently in the process of completing projects outlined in a bond measure passed in 2002, which does not include any of the above.

Schedule: When Funding becomes available.

Worksheet Completed by

Name and Title: Regina K. Houchin, Trustee

Phone: (661) 764-5273 or District office 764-5248

Mitigation Project Description Worksheet

Jurisdiction: Buttonwillow Union School District

Mitigation Project Title: Tree Trimming/Removal

Issue/Background: While the District does nominal annual trimming, there are several trees in the front of the school, on Buttonwillow Drive and on the north side of the Junior High wing that need major trimming and or removal to prevent physical damage to the facilities. With the current financial status of most schools, this type of cash outlay is not built into the budget.

Other Alternatives: No action

Responsible Office: Buttonwillow School District Office

Priority (High, Medium, Low): Low

Cost Estimate: Unknown – depends on type of mitigation needed.

Benefits (avoided Losses): Would protect roof, windows and in some cases damage to the walls in the event of limbs breaking or trees falling.

Potential funding: At this time no funding is available. Deferred maintenance monies are always used on high priority issues, but at some point may become available for this project.

Schedule: As soon as funding becomes available.

Worksheet Completed by
Name and Title: Regina K. Houchin, Trustee
Phone: (661) 764-5273 or District office 764-5248

Mitigation Project Description Worksheet

Jurisdiction: Buttonwillow Union School District

Mitigation Project Title: Bus Upgrades

Issue/Background: Some buses have not been updated with the newest safety features to provide safe transportation of students in heavy fog situations.

Other Alternatives: No action

Responsible Office: Buttonwillow School District Office

Priority (High, Medium, Low): Low

Cost Estimate: Unknown

Benefits (avoided Losses): Health and safety.

Potential funding: At this time no funding is available. The District is currently in the process of completing projects outlined in a bond measure passed in 2002, which does not include any of the above.

Schedule: When funding becomes available.

Worksheet Completed by

Name and Title: Regina K. Houchin, Trustee

Phone: (661) 764-5273 or District office 764-5248

Mitigation Project Description Worksheet

Jurisdiction: Buttonwillow Union School District

Mitigation Project Title: Cool Box/Freezer Replacement

Issue/Background: Due to the makeup of our community, the school is the central facility that is designed to house large numbers of people in an emergency situation. The school was the focal point of safety in the 1977 dust storms. While the school makes every effort to have food and water available in an emergency, current facilities prevent long-term storage. The walk-in cold box and freezer was constructed in 1939 of plaster and wood, which is now deemed unhealthful.

Other Alternatives: No action

Responsible Office: Buttonwillow School District Office

Priority (High, Medium, Low): Medium

Cost Estimate: Unknown

Benefits (avoided Losses): Health and safety, emergency services

Potential funding: At this time no funding source is available. The District is currently in the process of completing projects outlined in a bond measure passed in 2002, which does not include any of the above.

Schedule: When funding becomes available and when time allows, avoiding disruption of normal school hours and programs.

Worksheet Completed by

Name and Title: Regina K. Houchin, Trustee

Phone: (661) 764-5273 or District office 764-5248

Mitigation Project Description Worksheet

Jurisdiction: Delano Joint Union High School District

Mitigation Project Title: Cesar E. Chavez High School – Install emergency generator for lighting

Issue/Background: In the event of a disaster, the campus would be used as a shelter for the community. If power is lost during such an occurrence, lighting would be a necessity.

Other Alternatives: No action

Responsible Office: Delano Joint Union High School District

Priority (High, Medium, Low): high

Cost Estimate: unknown

Benefits (avoided Losses): injury prevention

Potential funding: none available at this time

Schedule: when funding becomes available

Worksheet Completed by

Name and Title: Jeff Foy, Maintenance/Operations/Transportation/Construction Manager

Phone: (661) 720-4102

Mitigation Project Description Worksheet

Jurisdiction: Delano Joint Union High School District

Mitigation Project Title: Delano High School – Retrofit T-Bar ceilings in classrooms, replace windows with tempered glass

Issue/Background: T-bar ceilings are not up to code and need to be brought up to DSA standards. Windows are not tempered glass and are held in with putty that contains asbestos.

Other Alternatives: none

Responsible Office: Delano Joint Union High School District Office

Priority (High, Medium, Low): high

Cost Estimate: ceilings: \$180,000 windows: \$250,000

Benefits (avoided Losses): injury prevention

Potential funding: none available at this time

Schedule: when funding becomes available

Worksheet Completed by

Name and Title: Jeff Foy, Maintenance/Operations/Transportation/Construction Manager

Phone: (661) 720-4102

Mitigation Project Description Worksheet

Jurisdiction: Edison Elementary School District

Mitigation Project Title: Anchor 4-drawer file cabinets and bookshelves over 2 feet high in case of earthquakes.

Issue/Background:

Other Alternatives: No action

Responsible Office: Edison Elementary School District

Priority (High, Medium, Low):

Cost Estimate:

Benefits (avoided Losses): injury prevention, reduce damage to contents

Potential funding:

Schedule:

Worksheet Completed by
Name and Title: Robert Lytle
Phone: (661) 363-7645

Mitigation Project Description Worksheet

Jurisdiction: Edison Elementary School District

Mitigation Project Title: Make Special emergency plans for medically fragile and Special Day students (for the first time, we are taking back 5 severely handicapped students from County classes and teaching them at Orangewood)

Issue/Background:

Other Alternatives:

Responsible Office: Edison Elementary School District

Priority (High, Medium, Low):

Cost Estimate:

Benefits (avoided Losses):

Potential funding:

Schedule:

Worksheet Completed by
Name and Title: Robert Lytle
Phone: (661) 363-7645

Mitigation Project Description Worksheet

Jurisdiction: Edison Elementary School District

Mitigation Project Title: Review and improve earthquake safety training program.

Issue/Background:

Other Alternatives: No action

Responsible Office: Edison Elementary School District

Priority (High, Medium, Low):

Cost Estimate:

Benefits (avoided Losses): Life safety

Potential funding:

Schedule:

Worksheet Completed by
Name and Title: Robert Lytle
Phone: (661) 363-7645

Mitigation Project Description Worksheet

Jurisdiction: Edison Elementary School District

Mitigation Project Title: Abandon Edison site due to proximity to freeway and railroad tracks!

Issue/Background:

Other Alternatives: No action

Responsible Office: Edison Elementary School District

Priority (High, Medium, Low):

Cost Estimate:

Benefits (avoided Losses):

Potential funding:

Schedule:

Worksheet Completed by
Name and Title: Robert Lytle
Phone: (661) 363-7645

Mitigation Project Description Worksheet

Jurisdiction: Fairfax School District

Mitigation Project Title: Connect to sewer system two (2) school sites in our FSD, Virginia Ave, and Fairfax Middle School, currently still in a septic tank system.

Issue/Background: In case of an earthquake, movement or shift could possibly displace our septic system which are both very old (± 50 years) and once damaged, is beyond repair. This issue can easily be mitigated by going to a sewer tie-in (avoid damaging sanitation hazard to students and community).

Other Alternatives: Do nothing. Just wait for the disaster to occur.

Responsible Office: Fairfax School District

Priority (High, Medium, Low): High

Cost Estimate: None given

Benefits (avoided Losses): Avoid several weeks or months of lost instructional time for students

Potential funding: None given

Schedule: None given

Worksheet Completed by:
Name and Title: Felix C. Garcera
Phone:

Mitigation Project Description Worksheet

Jurisdiction: Kern Community College District

Mitigation Project Title: Response – Evacuation and Sheltering

Issue/Background: Bakersfield College is located in northeast Bakersfield at 1801 Panorama Drive in Bakersfield, California, with an elevation significantly higher than the central area of the City of Bakersfield. Many years ago Bakersfield College was identified as an evacuation site for the community. Emergency supplies were stored in the campus fallout shelters that still exist today; however, the supplies were not originally stored to present standards and were removed from the fallout shelters and discarded. The College's stadium, grounds, and gym could provide an ideal location for community sheltering if the issues were addressed for emergency supplies; generated power for the stadium, gym, and library; a water storage tank with an accessible water system placed near the gym and stadium; reinforced roads to the stadium and gym, and seismic strengthening and/or retrofitting of the gym.

Other Alternatives: None identified.

Responsible Office: Kern Community College District Safety Office

Priority (High, Medium, Low): High (Flood)

Cost Estimate: Approximated \$1,000,000

Benefits (avoided Losses): Life Safety

Potential funding: None given

Schedule: None given

Worksheet Completed by: KCCD Human Resources
Name and Title:
Phone: (661) 395-4609

Mitigation Project Description Worksheet

Jurisdiction: Kern Community College District

Mitigation Project Title: Emergency response supply storage and supplies to accommodate a community evacuation site for Cerro Coso Community College and Bakersfield College

Issue/Background:

Other Alternatives: No action.

Responsible Office: Kern Community College District

Priority (High, Medium, Low):

Cost Estimate:

Benefits (avoided Losses):

Potential funding:

Schedule:

Worksheet Completed by
Name and Title: Tom Burke, Asst. Chancellor of Business Services
Phone: (661) 336-5117

Mitigation Project Description Worksheet

Jurisdiction: Kern Community College District

Mitigation Project Title: Anchoring of bookshelves, filing cabinets, etc. for Bakersfield College and Cerro Coso Community College

Issue/Background:

Other Alternatives:

Responsible Office: Kern Community College District

Priority (High, Medium, Low):

Cost Estimate:

Benefits (avoided Losses):

Potential funding:

Schedule:

Worksheet Completed by
Name and Title: Tom Burke, Asst. Chancellor of Business Services
Phone: (661) 336-5117

Mitigation Project Description Worksheet

Jurisdiction: Kern Community College District

Mitigation Project Title: Electrical Power Source upgrade and alternate emergency power to computing systems for Bakersfield College, Cerro Coso Community College and Kern Community College District

Issue/Background:

Other Alternatives:

Responsible Office: Kern Community College District

Priority (High, Medium, Low):

Cost Estimate:

Benefits (avoided Losses):

Potential funding:

Schedule:

Worksheet Completed by
Name and Title: Tom Burke, Asst. Chancellor of Business Services
Phone: (661) 336-5117

Mitigation Project Description Worksheet

Jurisdiction: Kern High School District

Mitigation Project Title: Provide Emergency Supplies and Rescue Supplies to School Sites

Issue/Background:

The Kern High School District is the largest non-unified high school district in the state of California. It is comprised of 24 school sites serving over 35,000 students. Each site completes and updates a Safe School Plan yearly. It has become apparent that not all sites are equally and/or fully equipped to deal with a natural disaster, were one to occur. Due to our location, the most likely natural disaster to occur would be an earthquake.

To adequately supply each site with emergency supplies, we would like to create *emergency barrels*. Golden Valley High School, the newest school in the district, did just this when it opened. The following items are contained in the *emergency barrels*:

FIRST AID RESPONDER KIT: (5) Emergency blankets; (2) multi-trauma blankets; (1) bag of mini-kit items; (1) bag of gauze (12 PK); (1) bag of gauze sponges; (1) bag of bandaids; (1) package of gauze sponges 4" X 4"; (1) bag of latex gloves; (1) bag of ointment packages; (1) box of dry back ADB pads 5" X 9"; (2) 16 oz. bottles of eye wash solution; (1) large bag of mixed items

EMERGENCY SEARCH & RESCUE KIT: (1) small shovel; (4) goggles; (12) leather/cloth gloves; (2) rolls danger red tape; (2) small rolls duct tape; (1) solar radio; (1) large bag (batteries, candle, water tablets, light sticks, ETC; (4) flashlights (yellow); (1) collapsible water container; (1) 50' orange rope; (10) dust masks

RED BACKPACK BAG: (1) 14" pipe wrench; (1) red hand axe (large); (1) 2 ½ lb. sledge hammer; (1) 16 oz. claw hammer; (1) pick handle; (1) pick; (1) 10" locking pliers; (1) 10" adjustable wrench; (1) 10" groove joint pliers; (1) 8" linesman pliers; (1) folding campers saw; (1) utility hacksaw; (1) 4 pack hacksaw blades 12"; (1) hacksaw frame; (1) long cold chisel; (1) #3 X 6" Phillips screwdriver; (1) #2 X 4" Phillips screwdriver; (1) ¼" X 4" slotted screwdriver; (1) 5/16 X 6" slotted screwdriver

EXTRA ITEMS IN BARREL: (1) hand shovel; (1) axe/pick; (2) 30" wrecking bars; (1) portable toilet; (4) yellow hard hats; (1) bolt cutters; (1) tarp – 16' X 20' blue; (1) 4 ton jack

Other Alternatives:

Continue to rely on the basic first aid supply kits located at each school site, and depend on emergency services to be dispatched to provide relief and aid in case of a natural disaster such as an earthquake.

Responsible Office: Kern High School District Pupil Personnel

Priority (High, Medium, Low): High

Cost Estimate: Cost is estimated to be \$2,000.00 per *emergency barrel*, for a total of \$48,000.00

Benefits (avoided losses):

Having such supplies in case of a large earthquake would equip first responders (school staff) to better address the needs of injured or trapped staff members and/or students. This could prevent loss of life.

Potential funding:

F.E.M.A.

Schedule:

The barrels would be provided to the school sites within three weeks of receiving funding.

Worksheet Completed by

Name and Title:

Phone:

Mitigation Project Description Worksheet

Jurisdiction: Kern High School District

Mitigation Project Title: Equip School Vans with First Aid Kits

Issue/Background: The Kern High School District is the largest non-unified high school district in the state of California. It is comprised of 24 school sites serving over 35,000 students. Each school site uses 9 passenger vans to transport students to and from home, on field trips, or to sporting events. There are approximately 100 vans operated by the district.

To adequately supply each van with a first aid kit, we propose the following items be included:

FIRST AID KIT FOR UP TO 15 PEOPLE: 22 first aid products, 119 pieces in a plastic case with weatherproof seal. Includes: first aid cream, antiseptic wipes, scissors, forceps, latex gloves, instant cold pack, adhesive bandages.

Other Alternatives: Continue to rely on emergency services to respond in case of an emergency caused by accident or natural disaster.

Responsible Office: Kern High School District Pupil Personnel

Priority (High, Medium, Low): Medium

Cost Estimate: The first aid kit is available at a cost of \$41.95 each. The total cost to equip 100 vans would be approximately \$4,195.00.

Benefits (avoided losses):

Having such supplies in case of an accident or disaster would help first responders deal with injuries until medical personnel could arrive.

Potential funding: F.E.M.A., district funds

Schedule: The kits would be installed in the vans within three weeks of receiving funding.

Mitigation Project Description Worksheet

Jurisdiction: Kern High School District

Mitigation Project Title: NIMS staff development training for administrators and police officers

Issue/Background: The Kern High School District is the largest non-unified high school district in the state of California. It is comprised of 24 school sites serving over 35,000 students. The District has previously partnered with the Kern County Sheriff's Department to provide training for administrators in the Standardized Emergency Management System (S.E.M.S.). S.E.M.S. training prepares staff to deal with a crisis on campus such as responding to a natural disaster or responding to a shooter on campus. In order to comply with Federal guidelines the District would like to transition from S.E.M.S. training to National Incident Management System training. Such training, provided by local law enforcement and/or outside contractors, would be given to administration and police officers at all District sites.

The following description of N.I.M.S. is taken from the F.E.M.A. website:

"The National Incident Management System (NIMS) was developed to provide a system that would help emergency managers and responders from different jurisdictions and disciplines work together more effectively to handle emergencies and disasters. Most incidents are handled on a daily basis by a single, local jurisdiction at the local level, often by fire personnel, EMS and law enforcement. But even for incidents that are relatively limited in scope, coordination and cooperation among the responding organizations makes for a more effective response.

When the NIMS is adopted and used nationwide it will form a standardized, unified framework for incident management within which government and private entities at all levels can work together effectively. The NIMS provides a set of standardized organizational structures such as the Incident Command System and standardized processes, procedures and systems. These processes and procedures are designed to improve interoperability among jurisdictions and disciplines in various areas -- command and management, resource management, training, communications."

Other Alternatives:

- A) Continue with S.E.M.S. training in conjunction with the Kern County Sheriff's Department
- B) Have administrators and staff complete on-line courses that will certify NIMS compliance

Responsible Office: Kern High School District Pupil Personnel

Priority (High, Medium, Low): High

Cost Estimate: Exact cost is unknown and dependent upon finding an outside agency to administer the training. Similar trainings in the past have run approximately \$5,000.00 per training, which pays for the training agency and their expenses, location rental and meals. In order to effectively train all administrators and police officers in the Kern High School District, four separate trainings would be necessary. The estimated cost of such training is \$20,000.00.

Benefits (avoided losses): Bringing site administrators together with local law enforcement for N.I.M.S. training, enhance emergency preparedness and response

Potential funding: F.E.M.A., district funds

Schedule: The schedule is dependent upon funding and the ability to find a qualified trainer. However, such training would need to be completed September 30, 2006 in order to comply with the Federal N.I.M.S. compliance deadline.

Worksheet Completed by
Name and Title:
Phone:

Mitigation Project Description Worksheet

Jurisdiction: Kernville Union School District

Mitigation Project Title: Cold Box/Freezer Replacement

Issue/Background: Due to the makeup of our community the school is the central facility designed to house large numbers of people in an emergency. One of our sites was utilized by the Red Cross during the summer of 2005 for the evacuation purposes during the Sierra Way Fire. While the school makes every effort to have food and water available in an emergency, current facilities prevent long- term storage.

Other Alternatives: None

Responsible Office: Kernville Union School District Office

Priority (High, Medium, Low): Medium

Cost Estimate: Unknown

Benefits (avoided Losses): Health and safety, emergency services

Potential funding: The district is currently completing projects outlined in a bond measure passed in 2004 which did not include the above.

Schedule: As soon as funds are available

Worksheet completed by: Dennis Voller director of Maintenance Operations and Transportation and Mary Barlow, Superintendent

Phone (760) 379-3651

Mitigation Project Description Worksheet

Jurisdiction: Kernville Union School District

Mitigation Project Title: Construction of Gymnasium/Community Center

The Kern River Valley is an isolated community with only two major access routes to Bakersfield and Ridgecrest. It is the largest unincorporated residential area in the county. Over 12,000 residents of the Kern River Valley are served by county and local emergency providers (Forestry Service, BLM, Fish and Game, and CHP). The Wallace Multipurpose room is one of two centrally located emergency shelters. The capacity is only 700 persons. During fire season, we have housed up to 300 fire fighters in the multi purpose room and over 1,000 on our campus in classrooms and in tents. The facility is used annually for fires and other emergency needs (Red Cross shelters). Isabella Dam is fifty year old man made dam located directly above the community of Lake Isabella. In the event of an earthquake or other man made or natural disaster, we will need a larger facility to house displaced residents and emergency personnel.

The Wallace campus is well known in the community as a Red Cross Shelter and central location for emergency services. It is easily accessible to surrounding communities and is somewhat elevated from Lake Isabella proper. The campus infrastructure can support emergency services. We are equipped with wireless services with a bandwidth 45-mega bit wireless to outside services and wireless inside the classroom inside is 54 bit. The newly renovated Wallace classrooms, cafeteria, and office can support and serve thousands of displaced residents. All electrical, water, heating and air conditioning services have been renovated. Wallace operates a full kitchen (with limited food storage) and feeds over 700 students two meals daily. The capacity is much higher than the current operation. The district has developed an ICS emergency plan that includes assigned staff. We have stored emergency kits located in each classroom. Our district has two sheriff deputies on staff to assist with students and school needs. We have seven busses on site. We currently have fifteen certified bus drivers who will be on hand to assist with transportation as needed to assist with evacuation if needed. Operations employees are certified to use heavy equipment (some of which is stored and available at Wallace). Wallace site is approximately 23 acres with an opportunity to establish temporary housing as needed in good weather. Our community experiences weather extremes such as temperatures over 100 in the summer and below freezing during the winter. Therefore temporary indoor shelter will be needed in an emergency. Wallace is located right off the main freeway and the closest emergency shelter to Bakersfield. It is only 2 miles from nearby county facilities and emergency services. It is within 8 miles of the Kern Valley Hospital. It is located in the middle of a large residential area. Displaced families could walk to the school if necessary.

Finally, the district is a McKinney Homeless Grant recipient. We have trained staff able to assist with homeless and displaced families. The district stores emergency clothing, blankets, and school supplies for children. We have access to food banks and direct funds for homeless families. The district also staffs a full time nurse, three health Liaisons, a certified counselor, school psychologist, and other support personnel who could provide direct service from the Wallace site.

Other Alternatives: Dispersed housing across small facilities valley wide with limited access to emergency services. Dispersing residents will result in a reducing the effectiveness of limited emergency medical and safety personnel.

Responsible Office: Kernville Union School District Office

Priority: High

Cost Estimate: \$4,000,000

Benefits (avoided Losses): Could prevent loss of life. Provide a central location where residents can be housed, feed, and medically treated until evacuation is possible.

Potential funding: District twill is applying for some state hardship funding to assist with the project. We are seeking a matching grant.

Schedule: The district is in the planning stages for the facility. Plans are scheduled to be forwarded to the Department of State Architecture within 12 months. We plan to break ground in June 2008 and complete the project by June 2010.

Worksheet completed by

Name and Title: Dennis Voller Director of Maintenance Operations and Transportation and Mary Barlow, Superintendent

Phone (760) 379-3651

Mitigation Project Description Worksheet

Jurisdiction: Kernville Union School District

Mitigation Project Title: Install Emergency Generators

Issue/Background: In the event of an emergency, the campus would be used as a shelter for our community. If power were lost in a disaster, power for lighting, and cold boxes would be a necessity. There is currently no back up power at all.

Other Alternatives: None

Responsible Office: Kernville Union School District Office

Priority (High, Medium, Low): High

Cost Estimate: Unknown

Benefits (avoided Losses): Safety, injury prevention, use of KUSD as an emergency shelter

Potential Funding: None at this time

Schedule: When funding becomes available

Worksheet Completed by: Dennis Voller Director of Maintenance Operations and Transportation
and Mary Barlow, Superintendent

Phone (760)379-3651

Mitigation Project Description Worksheet

Jurisdiction: Kernville union School District

Mitigation Project: Construction of Storage Facilities

Issue Background: The Wallace campus was recently modernized. The original facility built in 1959 had little storage and storage remains an issue. A secured storage area for storage of equipment, emergency kits, and emergency supplies.

Other Alternatives: Continue storing equipment and supplies across campus in temporary facilities.

Responsible Office: KUSD

Priority: Medium

Cost Estimate: \$50,000-\$100,000

Benefits (avoided Losses): Student safety, protection of equipment, furniture, supplies, and materials. Central location to seek materials and supplies when responding to an emergency situation.

Potential Funding: The district did not include storage in the bond measure passed in 2003. Storage facilities are not a high priority for state funding.

Schedule: When funds become available

Worksheet completed by: Dennis Voller Director of Maintenance Operations and Transportation and Mary Barlow, Superintendent

Phone (760)379-3651

Mitigation Project Description Worksheet

Jurisdiction: Lost Hills Union School District

Mitigation Project Title: Evacuation strategies in the event of a flood resulting from the California Aqueduct

Issue/Background:

Other Alternatives: No action

Responsible Office: Lost Hills Union School District

Priority (High, Medium, Low):

Cost Estimate:

Benefits (avoided Losses):

Potential funding:

Schedule:

Worksheet Completed by
Name and Title: Dr. David Day
Phone: (661) 797-3012

Mitigation Project Description Worksheet

Jurisdiction: Lost Hills Union School District

Mitigation Project Title: Major catastrophic event evacuation planning

Issue/Background:

Other Alternatives: No action

Responsible Office: Lost Hills Union School District

Priority (High, Medium, Low):

Cost Estimate:

Benefits (avoided Losses):

Potential funding:

Schedule:

Worksheet Completed by
Name and Title: Dr. David Day
Phone: (661) 797-3012

Mitigation Project Description Worksheet

Jurisdiction: McKittrick School District

Mitigation Project Title: Retrofit School Bldg.

Issue/Background: Remove old single pane window systems. Replace with double pane window system that would both reduce possible injury and building damage. Also replace old water line systems as well as add fire hydrants and communication lines. The structure is inadequate to house victims in the case of a disaster. This facility location would need to be used as both a emergency command post, as well as to be used as emergency shelter. The structures integrity would gain from the retrofit and would stand up better to potential hazards. The building as it stands now may not be available for these services in the event of such disasters

Other Alternatives: An alternative to a complete retrofit would be to split the project into phases,

Responsible Office:

Priority (High, Medium, Low): High

Cost Estimate: Window replacement approx \$700,000
Communication and fire prevention approx \$ 40,000
Water storage and line replacement approx \$ 95,000

Benefits (avoided Losses): The plant itself has had some modernization done to the facility with this new work done the loss of this facility would be greatly reduced. It would easily save 10 to 20 million in the rebuilding of the facility as well as lives it would affect.

Potential funding: pre disaster preparedness funding

Schedule: This would depend on available funding. Water lines and hydrants will start its initial process in about 1 ½ years

Worksheet Completed by

Name and Title: Jon Rubadeau M.O.T. Director Mckittrick School District
Phone: 661-762-7303 school
661-301-5407 cell

Mitigation Project Description Worksheet

Jurisdiction: Mckittrick and Kern County westside School Districts

Mitigation Project Title: Emergency Backup systems

Issue/Background: Provide a source of electrical backup systems to the school districts. These facilities will be used as EOC as well as emergency housing for those in need these facilities will need to have Electrical Backup Service of some type so they will be able to facilitate this role

Other Alternatives: N/A

Responsible Office: Mckittrick and Kern County westside School Districts

Priority (High, Medium, Low): Medium

Cost Estimate: \$ 25,000 for 10 generators as well as electrical hookup

Benefits (avoided Losses): EOC and victims will have an area to both work from and rest at.

Potential funding: pre-disaster Mitigation Funding

Schedule: When funds become available

Worksheet Completed by

Name and Title: Jon Rubadeau M.O.T. Director Mckittrick School District

Phone: 661-762-7303 school, 661-301-5407 cell

Mitigation Project Description Worksheet

Jurisdiction: Mojave Unified School District

Mitigation Project Title: Remove trees that could pose a hazard during windstorms

Issue/Background: The district would like to remove trees which could pose a hazard when there are wind storms. Regular tree trimming on older trees would be scheduled.

Other Alternatives: No action

Responsible Office: Mojave Unified School District

Priority (High, Medium, Low):

Cost Estimate:

Benefits (avoided Losses): Property damage and injuries avoided

Potential funding:

Schedule:

Worksheet Completed by
Name and Title: Susan C. Wiggins
Phone: (661) 824-4001 ext. 229

Mitigation Project Description Worksheet

Jurisdiction: Mojave Unified School District

Mitigation Project Title: Replace more windows with shatterproof glass.

Issue/Background:

Other Alternatives: No action.

Responsible Office: Mojave Unified School District

Priority (High, Medium, Low):

Cost Estimate:

Benefits (avoided Losses): Property damage and injuries avoided

Potential funding:

Schedule:

Worksheet Completed by
Name and Title: Susan C. Wiggins
Phone: (661) 824-4001 ext. 229

Mitigation Project Description Worksheet

Jurisdiction: Panama-Buena Vista Union School District

Mitigation Project Title: Safety film on certain identified windows/displays

Issue/Background: Trophy and display cases in school officer, hallways, cafeterias & gymnasiums are vulnerable to impeding egress during an earthquake or evacuation following an earthquake.

Other Alternatives: Remove all display cases not equipped with safety film, safety glass or Plexiglas (which is easily vandalized in a school setting). Identify alternate evacuation routes if possible.

Responsible Office: School District Safety Department (Brenda Lowe, Coordinator)

Priority (High, Medium, Low): Medium

Cost Estimate: Approximately \$500 per display case depending on size. Estimated number of such areas throughout a 21 campus school district is approximately 30. Total estimated cost: \$15,000

Benefits (avoided Losses): Decreased potential of occupant injury in the vicinity during an earthquake and all occupants during evacuation following such an event. (Life safety)

Potential funding: General fund of school district or school maintenance budget allocation.

Schedule: Summer, 2006, or possibly during winter and spring recesses.

Worksheet Completed by
Name and Title: Brenda Lowe
Phone: (661) 978-9099 cell

Mitigation Project Description Worksheet

Jurisdiction: Panama-Buena Vista Union School District

Mitigation Project Title: Staff training in disaster response roles or incident management roles including upgrading written plans from SEMS compliant terminology to that of NIMS compliant language and philosophy. Additionally, we need to secure emergency response supplies to care for students & staff for up to 72 hours following an emergency incident.

Issue/Background:

Rapid student population growth, new school administrators and staff who frequently change school sites or are newly hired are inadequately trained to their specific roles in an integrated command plan and system. Currently, staff number in excess of 1,700 people and students between the ages of 4 and 15 years number 15,238. Maintaining current plans and training with changing school classroom and staffing configurations necessitate more in depth drills than the routine "fire drill" or "duck and cover drill". Certainly, more appropriate emergency supplies are needed if the schools are expected to be self-contained for up to 72 hours following a wide-spread incident.

Other Alternatives: Continue with the routine fire drills and duck and cover or site evacuation drills.

Responsible Office: School District Safety Department (Brenda Lowe, Coordinator)

Priority (High, Medium, Low): High

Cost Estimate: Emergency supplies could cost upwards of \$5,000 per school and staff training costs could be minimized with a train the trainer approach. Total estimate: \$100,000

Benefits (avoided Losses): Inadequately trained staff may be incapable of functioning well in a complicated or significant event. Perhaps training could focus on the role of the school's incident commander and interfacing with city and county safety/emergency jurisdictions or in a "train-the-trainer" model. The ultimate benefit would be an improved response utilizing an integrated incident management system which minimizes life safety, emergency care and shelter of students and staff, and more efficiently providing independent self-care in a wide-spread emergency event.

Potential funding: Emergency planning grants via FEMA or California Office of Emergency Services.

Schedule: Fall of 2006

Worksheet Completed by
Name and Title: Brenda Lowe
Phone: (661) 978-9099 cell

Mitigation Project Description Worksheet

Jurisdiction: Panama-Buena Vista Union School District

Mitigation Project Title: Purchase and implement web-based emergency planning software to standardize emergency plans for 24 school/sites and the District's EOC.

Issue/Background: Currently, hard copies of plans and assignment rosters and tasks are kept in binders and are not readily available for reference in an emergency. Updates and changes are cumbersome and many plans are not current or useful. (Reference: www.bomac.com) REDI II for School Emergencies and Aftermath programs are examples of PC or web-based programs that will provide instant changes district-wide and also allow for easy access to plans and site maps to city and county jurisdictions serving each school campus.

Other Alternatives: Continue to use word-processing tools to update plans and attempt to keep all 24 locations current in planning and assignments.

Responsible Office: School District Safety Department (Brenda Lowe, Coordinator)

Priority (High, Medium, Low): Medium

Cost Estimate: \$15,000 initially for software, then approximately \$3,000 annually for software updates and maintenance.

Benefits (avoided Losses): Increased ability to provide current emergency plans and task assignments in an easy to read, readily updated manner which is accessible online to the school site, the District's EOC and to city/county emergency response personnel in the operational area. This tool would promote a more seamless transition for an integrated emergency/incident management system.

Potential funding: General fund of school district or safety department's budget allocation. Grant applications.

Schedule: Evaluation of software has begun and plans to be operational by late 2006.

Worksheet Completed by
Name and Title: Brenda Lowe
Phone: (661) 978-9099 cell

Mitigation Project Description Worksheet

Jurisdiction: Panama-Buena Vista Union School District

Mitigation Project Title: Purchase two-way radios capable of programming to the NEW mutual aid frequency replacing the former "Red Channel" utilized by the County EOC/Operational Area.

Issue/Background: The District has been granted and maintained access to the "Red Channel" for more than ten years. In April, 2005, the frequency of that channel was changed by the Kern County Communications manager and the format (UHF to VHF) is no longer compatible with radios utilized by our local, District EOC. Permission to access the new frequency for "mutual aid" has been again granted, however, the cost of new radios capable of this frequency range will need to be purchased and programmed to be able to communicate the emergency needs of our large, elementary school district. This capability would also allow the District's EOC to monitor the status of the incident's scope by listening to radio traffic and possibly to relay the availability of District-owned resources such as school buses and drivers for use under a mutual aid agreement.

Other Alternatives: Utilize the current plan to FAX our damage assessments to the communications office of the Kern County Superintendent of Schools. No provision currently exists to relay information in a timely way regarding emergency response needs that arise.

Responsible Office: School District Safety Department (Brenda Lowe, Coordinator)

Priority (High, Medium, Low): High

Cost Estimate: To equip the District's EOC and provide some provisional redundancy with handheld radio units, the cost would be approximately \$5,000.

Benefits (avoided Losses): Other than telephone landlines and cellular phones, and without a functioning 9-1-1 that may be overwhelmed with requests for emergency response, the District has no current viable way to communicate needs for emergency response or mutual aid without this tool. Communication is the most critical link and this project would allow the District EOC to monitor events within the Operational Area, request timely mutual aid as well as offer it.

Potential funding: None known except the District's general fund or possible grants.

Schedule: Immediately when funds are secured.

Worksheet Completed by
Name and Title: Brenda Lowe
Phone: (661) 978-9099 cell

Mitigation Project Description Worksheet

Jurisdiction: Richland Elementary School District

Mitigation Project Title: Relocation of Transportation Facilities

Issues/Background: Transportation facilities are located within two hundred feet of a railroad track. Fifty-six trains go by each day. Many of the train cars are filled with combustible chemicals or highly flammable gases. In the event of an earthquake or train derailment the danger of escaping gases would first endanger the employees that would be responsible for providing transportation to evacuate school sites. 1,800 students are housed 400 feet away from the facility. There has been at least one train derailment that occurred during non school hours. An intermodal is being constructed in the community that will increase the length of trains and the number of trains

Other Alternatives: No action

Responsible Office: Richland Elementary School District

Priority (High, Medium, Low): High

Cost Estimate: \$750,000

Benefits: (Avoided Losses): Injury Prevention, and saving of lives

Potential Funding: None available at this time

Schedule: When funding becomes available

Worksheet completed by
Lyle W. Mack, Superintendent
Richland School District
Shafter California
661-746-8600

Mitigation Project Description Worksheet

Jurisdiction: Richland Elementary School District

Mitigation Project Title: Fencing of campuses and video surveillance

Issues/Background: Fencing does not completely enclose campuses. Intruders can come onto campuses from many directions without being detected. Intruders can also escape law enforcement very easily. Also during an emergency like an earthquake, it is very difficult to account for and supervise students if people of the community are able to come on campus from all directions. Campuses would be secured with the installation of fencing. Also, high resolution cameras would be installed for monitoring of possible intruders on campus via an internet connection. In the past ten years there has been a murder within a block of a school, a car thief has driven on campus followed by law enforcement that had guns ready, and there has also been a case of a Border Patrol chasing a suspected illegal near a campus.

Other Alternatives: No action

Responsible Office: Richland Elementary School District

Priority (High, Medium, Low): Medium

Cost Estimate: \$400,000

Benefits: (Avoided Losses): Saved Lives and injuries

Potential Funding: None Available

Schedule: When funding is available

Worksheet completed by
Lyle W. Mack, Superintendent
Richland School District
Shafter California
661-746-8600

Mitigation Project Description Worksheet

Jurisdiction: Richland Elementary School District

Mitigation Project Title: GPS for District vehicles

Issues/Background: Richland School District has students living over an area of 121 square miles. Thirteen busses are out on a daily basis. Much of the District is criss-crossed with country roads. In the winter tule fog is common, cutting visibility significantly. Even though careful checks are made to determine safety conditions for transporting students, all areas of the District cannot be checked. The District has had at least one fog related incident where a car ran a stop sign and broadsided a bus. Luckily there were no serious injuries. Bus drivers are also required to leave the bus and walk young children across streets. School schedules are changed on foggy days, but the entire District cannot be checked for density of fog. During an emergency evacuation of the bus could be tracked by an individual in an unaffected area.

Other Alternatives: Bus Drivers are instructed to pull over if fog is too thick and makes driving unsafe. However, a bus pulled over to the side of the road could still be rammed.

Responsible Office: Richland Elementary School District

Priority (High, Medium, Low): medium

Cost Estimate: \$10,000

Benefits: (Avoided Losses): The District would have the ability to locate a bus quickly and dispatch help to a direct location.

Potential Funding: At this time no funding source is available

Schedule: When funding becomes available.

Worksheet completed by
Lyle W. Mack, Superintendent
Richland School District
Shafter California
661-746-8600

Mitigation Project Description Worksheet

Jurisdiction: Richland Elementary School District

Mitigation Project Title: Purchase Radios

Issues/Background: Richland School District has some radios available for communication during an emergency. All key personnel do not have the communication tool available. Additional radios would assist in implementing emergency procedures. Since all those with a radio can hear messages at the same time emergency communications will be expedited between schools and other District officials.

Other Alternatives: No action

Responsible Office: Richland School District

Priority (High, Medium, Low): High

Cost Estimate: \$2,500

Benefits: (Avoided Losses): Communication and avoid serious injury or possible death

Potential Funding: None available

Schedule: When funding becomes available

Worksheet completed by
Lyle W. Mack, Superintendent
Richland School District
Shafter California
661-746-8600

Mitigation Project Description Worksheet

Jurisdiction: Richland Elementary School District

Mitigation Project Title: Shade Structures

Issues/Background: Richland School District and its schools are located in the Southern San Joaquin Valley where temperatures may be over one hundred degrees when school is in session. During a building evacuation students must stand outside in the heat waiting for direction. In the case of an earthquake with major damage and injury during the time of extreme heat, rescued students would be placed in direct sun and heat until emergency help became available. A fabric shade structure on campuses would provide a shaded area for students and injured individuals from further exposure.

Other Alternatives: No action

Responsible Office: Richland School District

Priority (High, Medium, Low): Medium

Cost Estimate: \$200,000

Benefits: (Avoided Losses): Less injury and weather exposure

Potential Funding: None available

Schedule: When funding is available

Worksheet completed by
Lyle W. Mack, Superintendent
Richland School District
Shafter California
661-746-8600

Mitigation Project Description Worksheet

Jurisdiction: Richland Elementary School District

Mitigation Project Title: Replace Windows

Issues/Background: Pre 1970 schools in the Richland School District have glass that is not tempered that during an earthquake would be injurious to many students and staff. The District has replaced some glass but there still remains a significant amount of glass that is not tempered.

Other Alternatives: No action

Responsible Office: Richland School District

Priority (High, Medium, Low): High

Cost Estimate: \$300,000

Benefits: (Avoided Losses): Fewer injuries and saved lives during an earthquake

Potential Funding: State Modernization when eligible in the future

Schedule: When funding becomes available

Worksheet completed by
Lyle W. Mack, Superintendent
Richland School District
Shafter California
661-746-8600

Mitigation Project Description Worksheet

Jurisdiction: Sierra Sands Unified School District

Mitigation Project Title: Flood Abatement

Issue/Background: Whenever it rains heavily, flooding is a major problem at all district sites. In order to mitigate flooding the following actions should be initiated:

- 1) develop an extensive network of culverts and other drainage vehicles
- 2) install gutters on all site buildings
- 3) upgrade plans to include location of all underground utilities and devices
- 4) acquire a sump pump system
- 5) have a geological study done to discover location of water and runoff so that it can be diverted
- 6) barriers at strategic locations
- 7) sandbagging

Other Alternatives: No action

Responsible Office: Sierra Sands Unified School District Office of Facilities and Maintenance

Priority (High, Medium, Low): High

Cost Estimate: None given

Benefits (avoided Losses): Preservation of district structures, safety of students and staff, maintain district aesthetics.

Potential funding: FEMA, State of California, City of Ridgecrest, District Budget (general fund/other funds)

Schedule: Contingent upon funding

Worksheet Completed by: Sierra Sands Unified School District

Name and Title: Elaine Janson, CFO (ejanson@ssusd.org)

Phone: (760) 375-1582

Mitigation Project Description Worksheet

Jurisdiction: Sierra Sands Unified School District

Mitigation Project Title: School non-structural earthquake retrofit

Issue/Background: In order to minimize negative impact of earthquakes the following actions should be taken in accordance with the recent facilities needs assessment.

- 1) replace glass windows with plexiglass
- 2) bracing where needed in structures
- 3) bolt cabinets
- 4) upgrade electrical infrastructure
- 5) reinforce and stabilize communication towers
- 6) upgrade bell system to alarm system
- 7) upgrade wireless communications system

Other Alternatives: Continue to implement current disaster preparedness plan without upgrades

Responsible Office: Office of Personnel Services

Priority (High, Medium, Low): High

Cost Estimate:

Benefits (avoided Losses): Avoid loss of life and structures

Potential funding: FEMA, State of California Modernization and Renovation, District Budget, Deferred Maintenance

Schedule: Contingent upon funding

Worksheet Completed by: Sierra Sands USD

Name and Title: Joanna Rummer, Superintendent, SSUSD

Phone: (760) 375-3363

Mitigation Project Description Worksheet

Jurisdiction: Taft City School District

Mitigation Project Title: Replace current outdated two-way radios

Issue/Background:

The district currently has two-way radios that were purchased in the mid 1970's. The radios are no longer repairable due to their age. Some of the radios are not capable to "talk around", but only work through the repeater system. When a disaster comes and the repeater tower goes down, the existing radio system can't be counted on to provide adequate emergency communications.

Other Alternatives: No action

Responsible Office: Taft City School District

Priority (High, Medium, Low): High

Cost Estimate: Radio replacement in 10 buses, 8 district vehicles and two base stations. Approximately \$19,000.

Benefits (avoided Losses): Life safety; Ability to communicate in a emergency.

Potential funding: Equipment funding

Schedule: Depending on funding, within three years

Worksheet Completed by
Name and Title: Don Maxwell
Phone: (661) 765-4344

Mitigation Project Description Worksheet

Jurisdiction: Taft City School District

Mitigation Project Title: School window replacement

Issue/Background:

Remove old single pane windows. Replace with infill walls and single row of double pane windows to reduce possible injury and improve building stability and security. Our facility locations would be needed as emergency evacuation centers. The buildings as they stand may not be available as shelters due to the damaged window systems.

Other Alternatives: Install window film on all windows to help stabilize the glass in the window frames.

Responsible Office: Taft City School District

Priority (High, Medium, Low): High

Cost Estimate: Window replacement at three sites approximately \$780,000.

Benefits (avoided Losses): Life safety; Reduction in property Loss.

Potential funding: Modernization funding

Schedule: Depending on funding, within three years

Worksheet Completed by
Name and Title: Don Maxwell
Phone: (661) 765-4344

Mitigation Project Description Worksheet

Jurisdiction: Tehachapi Unified School District

Mitigation Project Title: The District intends to develop wildfire plans for schools

Issue/Background:

Three schools are in rural areas with open land on all sides that are heavily vegetated.

Other Alternatives: No action

Responsible Office: The District will work in conjunction with both City and County Fire Departments to develop these plans.

Priority (High, Medium, Low):

Cost Estimate:

Benefits (avoided Losses):

Potential funding:

Schedule:

Worksheet Completed by
Name and Title: Leroy R. Barker
Phone: (661) 822-2120

Mitigation Project Description Worksheet

Jurisdiction: Tehachapi Unified School District

Mitigation Project Title: Wildfire and weather resistant roofing

Issue/Background: The District plans to replace composition shingle and concrete tile roofs with metal roofs when replacement is planned

Other Alternatives: No action

Responsible Office: Tehachapi Unified School District

Priority (High, Medium, Low):

Cost Estimate:

Benefits (avoided Losses):

Potential funding:

Schedule:

Worksheet Completed by
Name and Title: Leroy R. Barker
Phone: (661) 822-2120

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Appendix B

Participating HMPC Representatives

Kern County

- Kern County Fire Department
 - Georgianna Armstrong, Office of Emergency Services Manager
 - Wendy Benson, Office of Emergency Services Planner
 - Phil Gray, Battalion Chief
 - Doug Johnston, Captain
 - Kevin Scott, Deputy Chief
 - Dennis Thompson, Chief
 - Phil Castle
- Kern County EMS Department
 - Ross Elliott
- Kern County Engineering and Survey Services Department
 - Greg Fenton, Engineering Division Manager
 - Clark Farr, Floodplain Administrator
- Kern County Resource Management Agency
 - Tina Burke, Special Projects Manager
 - David Price III, Director
- Kern County Waste Management Department
 - Jeffrey Chavez, Administrative Coordinator
 - Daphne Harley, Director
- Kern County Administrative Office
 - Brent Rush, Public Information Officer
- Kern County Roads Department
 - Andrew Richter, Maintenance Engineer

INCORPORATED COMMUNITIES

City of Arvin

- City Manager
 - Enrique Ochoa
- Assistant to City Manager
 - Cecilia Vela

City of Bakersfield

- John Stinson, Assistant City Manager
- Bakersfield Fire Department
 - Garth Milam, Captain

City of California City

- California City Fire Department
 - Michael Antonucci, Fire Chief

City of Delano

- Assistant City Manager

- Michele Carr
- Delano Police Department
 - Larry Jones, Lieutenant
 - Sam Pearson, Corporal

City of Maricopa

- City Administrator
 - Tommy Davis

City of McFarland

- Interim City Administrator
 - Anthony Lopez

City of Ridgecrest

- Ridgecrest Police Department
 - Mike Avery, Police Chief
- Public Works
 - Joe Pollock, Assistant Director

City of Shafter

- Shafter Police Department
 - Jeff Bell, Captain
 - John Zrofsky, Chief

City of Taft

- Isaac George, Principal Planner
- Taft Fire Department
 - Scott Hunter, Captain
 - Ken Scott, Captain
 - Bernie Heimos

City of Tehachapi

- Tehachapi Fire Department
 - Tim McLaughlin, Fire Chief
 - David Dimmett
- Assistant City Manager
 - Greg Garrett

City of Wasco

- Public Works Director
 - Marty Jones
- City Manager
 - Larry Pennell

SPECIAL DISTRICTS

Airport Districts

- East Kern Airport District
 - Robert Rice, Assistant Director of Airfield Operations
- Indian Wells Valley Airport District
 - Nancy Bass, Manager

Community Services Districts

- Arvin Community Services District
 - Raymond Kincy, Manager/Secretary-Treasurer
- Bear Valley Community Services District
 - John Anzulis, Member-Disaster Council
 - Eldon Kordes, Chairman-Disaster Council
 - John Martin, Assistant General Manager
- East Niles Community Services District
 - Larry White, Senior Treatment Operator
 - Tim Ruiz, General Manager
- Golden Hills Community Services District
 - William Fisher, General Manager
- Rosamond Community Services District
 - Sherry Delano, Manager
- Stallion Springs Community Services District
 - David Aranda, General Manager

Hospital Districts/Organizations

- Kern Valley Healthcare District
 - Wayne Watrous
- Tehachapi Valley Healthcare District
 - Joanne Kramer, Director of Patient Care Services

Mosquito Abatement Districts

- South Fork Mosquito Abatement District
 - Genel Hodges, Clerk of the Board

Recreation and Parks Districts

- Buttonwillow Recreation and Parks District
 - Marie Parsons, General Manager
- North of the River Recreation and Parks District
 - Ron Lundy, Business Director
- Shafter Recreation and Parks District
 - Antoinette Johnston, Board Chairman
- Tehachapi Valley Recreation and Parks District
- Wasco Recreation and Parks District
 - Danny Espitia, Director
- West Side Recreation and Parks District
 - Diane Rofkahr, Business Services Coordinator
 - Norman Kaszycki, Superintendent of Parks

Sanitation Districts

- Kern Sanitation Authority
 - Tom McCutcheon, Special Projects Manager
- North of the River Sanitary District No. 1
 - Donald Glover, Manager
- Ford City Taft Heights Sanitation District
 - Rob Ellery
 - Thomas F. McCutcheon, Special Projects Manager

School Districts

- Bakersfield City School District
 - Michael Hamlin, Assistant Director of Maintenance and Operations
- Buttonwillow Union School District
 - Regina Houchin, Board Chairman
- Delano Joint Union High School District
 - Jeff Foy, MOTC Manager
 - Sarah Thomas, Facilities Secretary
- Edison School District
 - Robert Lytle
- Elk Hills School District
 - Deborah Goble
- Fairfax School District
 - Desiree Von Flue, District Superintendent
 - Felix Garcera, Facilities Manager
- Kern Community College District
 - Tom Burke, Chief Financial Officer
 - Sheila Shearer, Safety Coordinator-Bakersfield College
- Kern High School District
- Kernville Union School District
 - Mary Barlow, Superintendent
 - Dennis Voller, Director of Maintenance and Operations
- Lost Hills Union School District
 - Dr. David Day, Assistant Superintendent
- McKittrick School District
 - Jon Rubadeau, Head of Maintenance, Operations and Transportation
- Mojave Unified School District
 - Susan Wiggins, Categorical Programs Director
- Panama-Buena Vista Union School District
 - Brenda Lowe, Director of Safety
- Pond Union School District
 - Horacio Cruz
- Richland School District
 - Gary Hayden, Psychologist
 - Lyle Mack, Superintendent
- Sierra Sands Unified School District
 - Jody Rummer, Superintendent
- Taft City School District
 - Don Maxwell, Director of Maintenance, Operations and Transportation
- Tehachapi Unified School District
 - Leroy Barker, Maintenance Director, Facilities and Operations
- Vineland School District
 - Stephen Greenfield

Water Districts

- Arvin-Edison Water Storage District

- David Nixon, Assistant Manager
 - Steve Collup, Engineer-Manager
- Berrenda Mesa Water District
 - Harry Starkey, General Manager-Secretary/Chief Engineer
- Buena Vista Water Storage District
 - Dan Bartel, Assistant Manager
 - Kristine Boyer, Receptionist
 - Martin Milobar, Engineer-Manager
- Buttonwillow County Water District
 - Regina K. Houchin, Secretary to the Board
- Cawelo Water District
 - David Ansolabehere, General Manager/Treasurer-Tax Collector
- Greenfield County Water District
 - Mel Johnson, General Manager
- Kern Delta Water District
 - Sam Farris
 - Sheridan Nicholas, District Engineer
- Kern County Water Agency
 - Phil Holderness, Water Treatment Plant Superintendent
 - Ms. Kelly Ulrich, Water Treatment Plant Assistant Superintendent
- Kern-Tulare Water District
 - Steven Dalke, General Manager
- Lost Hills Water District
 - Philip Nixon, Manager/Secretary
- North of the River Municipal Water District
 - William Miller, General Manager/Secretary-Treasurer
- Semitropic Water Storage District
 - Drew Hamilton, Controller
- Tehachapi-Cummings County Water District
 - Glenn Mueller, Operations Manager
 - John Otto, Assistant Manager
- West Kern Water District
 - George Harmer, Safety Supervisor
 - Jim Blanton
- Wheeler Ridge-Maricopa Water Storage District
 - Thomas Suggs, Staff Engineer
 - William Taube, Engineer-Manager
- Water Association of Kern County
 - William Taube, President

OTHER STAKEHOLDERS

- Catholic Healthcare West Hospitals - Bakersfield Memorial, Mercy, and Mercy Southwest (Private Non Profit)

- Robert Omens, Regional Director of Facilities Planning
 - Charlotte Hoshi, Consultant
- Kaiser Permanente
 - Paul Fuller
- Sierra Club, Kern-Kaweah Chapter
 - Lorraine Unger

TECHNICAL AGENCIES

FEDERAL

STATE

Governor's Office of Emergency Services

- Frank Hauck, Hazard Mitigation Section
- Roy Manning, Emergency Services Coordinator

California Division of Water Resources San Joaquin District

- Paula Landis, Chief

California Division of Oil, Gas, and Geothermal Resources

- Mark Gamache

REGIONAL

Kern County Council of Governments (Kern COG)

- Rob Ball, Senior Planner
- Michael Heimer, Regional Planner III
- Ronald Brummett, Executive Director

Professional Planning Assistance provided by:

Robert Olson, Robert Olson Associates, Folsom, California

AMEC Earth & Environmental, Inc.:

- Jeff Brislawn, Lakewood, Colorado
- Leanna Struzziery, Santa Barbara, California
- Clancy Philipsborn, Lakewood, Colorado

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Kern County and other General Plans

Appendix D Additional Planning Process Documentation

Goal and Objective Setting

44 CFR Requirement §201.6(c)(3)(i): *[The hazard mitigation strategy shall include a] description of mitigation goals to reduce or avoid long-term vulnerabilities to the identified hazards.*

The HMPC met as part of Team meeting #3 on June 22, 2005, to develop plan goals and objectives. The County's consultant reviewed the results of the hazard identification, vulnerability assessment and capability assessment with the team. This analysis of the Risk Assessment identified areas where improvements could be made, providing the framework for the HMPC to formulate planning goals, so that the improvements would be incorporated into the Mitigation Plan.

Goals were defined for the purpose of this mitigation plan as broad based public policy statements that:

Represent basic desires of the community;
Encompass all aspects of community, public and private;
Are nonspecific, in that they refer to the quality (not the quantity) of the outcome;
Are future-oriented, in that they are achievable in the future; and
Are time-independent, in that they are not scheduled events.

Goals are stated without regard for implementation, that is, implementation cost, schedule, and means are not considered. Goals are defined before considering how to accomplish them so that the goals are not dependent on the means of achievement. Goals statements form the basis for objectives and measures that will be used as means to achieve the goals. Objectives define strategies to attain the goals, and are more specific and measurable.

Team members were given a list of sample goals and objectives to consider. The HMPC members were instructed that they could use, combine or revise the statements they were provided or develop new ones on their own, keeping the risk assessment in mind. Team members were provided two index cards each and asked to write a goal statement and one or more objectives to attain each goal on each card. Goal statements were collected and grouped into similar themes and pasted onto the wall of the meeting room. The goal statements were then attached to the meeting-room wall, and grouped into similar topics. New goals that represented the team's input were written, with accompanying objectives, until consensus was formed amongst the team in HMPC meeting #4a. Some of the statements were determined to be better suited as objectives or actual mitigation projects, and were set aside for later use. Based upon the planning data review, and the process described above, the HMPC developed one Master Goal/Mission Statement and three goals with several objectives. These goals and objectives provide the direction for reducing future hazard-related losses within Kern County and are listed in Section 5.1.

Identification of Mitigation Measures and Alternatives

44 CFR Requirement §201.6(c)(3)(ii): *[The mitigation strategy shall include a] section that identifies and analyzes a comprehensive range of specific mitigation actions and projects being considered to reduce the effects of each hazard, with particular emphasis on new and existing buildings and infrastructure.*

Following the goal setting meeting, the HMPC undertook a brainstorming session to generate a set of viable alternatives that would support the proposed goals and objectives. Each HMPC member was provided with the following list of categories of mitigation measures that are based on the six CRS categories:

- Prevention,
- Property Protection,
- Structural Projects,
- Natural Resource Protection,
- Emergency Services, and
- Public Information.

The HMPC members were also provided with several lists of alternative multi-hazard mitigation actions for each of the above categories. A facilitated discussion then took place to examine and analyze the alternatives. With an understanding of the alternatives, a brainstorming session was conducted to generate a list of preferred mitigation actions to be recommended.

44 CFR Requirement: §201.6(c)(3)(iii): *[The mitigation strategy section shall include] an action plan describing how the actions identified in section (c)(3)(ii) will be prioritized, implemented, and administered by the local jurisdiction. Prioritization shall include a special emphasis on the extent to which benefits are maximized according to a cost benefit review of the proposed projects and their associated costs.*

With these tools, each participating jurisdiction was provided project worksheets to record possible projects identified during this planning process. The project worksheets included the following questions that were considered during the development of the mitigation projects. The completed worksheets are included in Appendix A:

Jurisdiction. What jurisdiction is involved or affected by the project?

Mitigation Project Title. What is the proposed project title?

Issue and Background Statement. What is the problem and the proposed solution?

Other Alternatives. What other alternatives should be considered, including no action?

Responsible Office. Who will lead the implementation efforts? Who will put together funding requests and applications?

Cost Estimate. What are the costs, rough or detailed (if available), for the project?

Benefits. What are the benefits to this project, or future damages avoided?

Potential Funding. What funding sources may be leveraged for the project?

Schedule. When will these actions be implemented?

Once the mitigation actions were identified, the HMPC members were provided with several sets of decision-making tools, including, FEMA’s recommended STAPLE/E set (Sustainable Disaster Recovery, Smart Growth principles) and “Others” to assist in deciding why one recommended action might be more important, more effective, or more likely to be implemented than another.

The team was presented with the FEMA recommended STAPLE/E criteria to help evaluate and prioritize mitigation recommendations.

1. STAPLE/E

- Social: Does the measure treat people fairly? (different groups, different generations)
- Technical: Will it work? (Does it solve the problem? Is it feasible?)
- Administrative: Do you have the capacity to implement & manage project?
- Political: Who are the stakeholders? Did they get to participate?
Is there public support? Is political leadership willing to support?
- Legal: Does your organization have the authority to implement? Is it legal? Are there liability implications?
- Economic: Is it cost-beneficial? Is there funding? Does it contribute to the local economy or economic development?
- Environmental: Does it comply with Environmental regulations?

In addition to STAPLE/E team members were asked to consider these criteria:

2. SUSTAINABLE DISASTER RECOVERY

- Quality of Life
- Social Equity
- Hazard Mitigation
- Economic Development
- Environmental Protection/Enhancement
- Community Participation

3. SMART GROWTH PRINCIPLES

- Infill versus Sprawl
- Efficient Use of Land Resources
- Full Use of Urban Resources
- Mixed Uses of Land
- Transportation Options
- Detailed, Human-Scale Design

4. OTHER

- Does measure address area with highest risk?

Does measure protect ...

The largest # of people exposed to risk?

The largest # of buildings?

The largest # of jobs?

The largest tax income?

The largest average annual loss potential?

The area impacted most frequently?

Critical Infrastructure (access, power, water, gas, telecommunications)

Timing of Available funding

Visibility of Project

Community Credibility

With these criteria in mind Team members were given a set of nine colored dots, 3 each of red, yellow, and blue. The dots were assigned red for High priority, yellow for Medium priority, and blue for Low priority, and a point score of 3, 2, and 1 respectively. The Team was asked to use the dots to prioritize projects with the above criteria in mind.

The Team felt that prioritizing all the projects as a group would not be effective since many of the projects were jurisdiction-specific. Alternatively the Team used the dots to prioritize the *objectives* as a group, and let each jurisdiction rank their own projects as high, medium, or low priority. This approach enabled the objectives to be ranked in order of importance, and helped steer the development of additional projects that meet the more important objectives. Recognizing the DMA regulatory requirement to prioritize by Benefit-Cost and the need for any publicly funded project to be cost-effective, the HMPC decided to pursue implementation according to when and where damages occur, available funding, individual community priority, and priorities identified in the State Mitigation Plan. This process drove the development of a prioritized action plan for Kern County. Cost effectiveness will be considered in additional detail when seeking FEMA mitigation grant funding for eligible projects associated with this Plan.

Appendix E
Acronyms and Abbreviations Used in this Plan

AKA	Also Known As (see CA-DOT, below)
BOR	Bureau of Reclamation
CA-DOT	California Department of Transportation (aka “Caltrans”)
CA-DWR	California Department of Water Resources
CA-OES	California Office of Emergency Services
CAL-FED	California-Federal Government Water Supply Plan and Project
CCR	California Code of Regulations
CDBG	Community Development Block Grants
CDF	California Department of Forestry
CERES	California Environmental Resources Evaluation System
CERT	Citizen Emergency Response Team
CGS	California Geological Survey
COG	Council of Governments
CRS	Community Rating System
CSD	Community Services District
DMA	Disaster Mitigation Act
FEMA	Federal Emergency Management Agency (technically the Emergency Preparedness and Response (EP&R) within the Department of Homeland Security [DHS])
FIRM	Flood Insurance Rate Map
FIS	Flood Insurance Study, the report providing the details to the local FIRM
FMA	Flood Mitigation Assistance

FTP	File Transfer Protocol
FWS	Fish and Wildlife Service
HMGP	Hazard Mitigation Grant Program
HMPC	Hazard Mitigation Planning Committee
HUD	Housing and Urban Development (Department of)
Km	Kilometer
LHMP	Local Hazard Mitigation Plan
LOMR	Letter of Map Revision (an administrative method of changing the mapped floodplain without having to actually re-map it)
LOS	Level of Service
MMI	Modified Mercalli Intensity scale (one way of measuring earthquakes)
NCDC	National Climatic Data Center, a statistical data base of NOAA/NWS
NFIP	National Flood Insurance Program
NIMS	National Incident Management System
NOAA	National Oceanic and Atmospheric Administration
NWS	National Weather Service
OES	Office of Emergency Services
PDM	Pre-Disaster Mitigation (Grant Program)
PIO	Public Information Officer
SEMS	State Emergency Management System
SSC	(California) Seismic Safety Commission
UBC	Uniform Building Code
URM	Unreinforced Masonry (e.g., brick buildings, most prone to earthquake damage)
USACE	United States Army Corps of Engineers

USC-HRL	University of South Carolina – Hazards Research Lab
USGS	United States Geological Survey
WUI	Wildland Urban Interface (That area where development and forest overlap).
WNV	West Nile Virus

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APPENDIX F
Community Adoptions

Note to Reviewers: When this plan has been reviewed and approved pending adoption by FEMA Region IX, all adoption resolutions will be scanned and put on a CD which will contain the adoptions, as Appendix F. A Model resolution is provided below:

Resolution # _____

**Adopting the Kern County
Multi-Hazard Mitigation Plan**

Whereas, (Name of Government/District/Organization seeking FEMA approval of Hazard Mitigation Plan) recognizes the threat that natural hazards pose to people and property within our community; and

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

Whereas, an adopted Multi-Hazard Mitigation Plan is required as a condition of future funding for mitigation projects under multiple FEMA pre- and post-disaster mitigation grant programs; and

Whereas, (Name of Government/District/Organization) fully participated in the FEMA-prescribed mitigation planning process to prepare this Multi-Hazard Mitigation Plan; and

Whereas, the California Office of Emergency Services and Federal Emergency Management Agency, Region IX officials have reviewed the “Kern County, California Multi-Hazard Mitigation Plan” () and approved it () contingent upon this official adoption of the participating governments and entities;

Now, therefore, be it resolved, that the (Name of Government/District/Organization) adopts the “Kern County, California Multi-Hazard Mitigation Plan” as an official plan; and

Be it further resolved, (Name of Government/District/Organization) will submit this Adoption Resolution to the California Office of Emergency Services and Federal Emergency Management Agency, Region IX officials to enable the Plan’s final approval.

Passed: _____ (date)

Certifying Official

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