County of Monterey
Carmel-by-the-Sea
Del Rey Oaks
Gonzales
Greenfield
King City
Marina
Monterey
Pacific Grove
Salinas
Sand City
Soledad

MULTI-JURISDICTIONAL HAZARD MITIGATION PLAN

Monterey County, California

September 2007

source cover photos: USGS, USFS, City of Anaheim

Prepared by the
URS Corporation on behalf of the
Monterey County Office of
Emergency Services

URS

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T	Special Districts

CFR	Code of Federal Regulations
cfs	cubic feet per second
County	Monterey County
DMA 2000	Disaster Mitigation Act of 2000
DOT	U.S. Department of Transportation
DSOD	California Division of Safety of Dams
EHS	Extremely Hazardous Substance
EPA	U.S. Environmental Protection Agency
EPCRA	Emergency Planning and Community Right to Know Act
FEMA	Federal Emergency Management Agency
FIRM	Flood Insurance Rate Map
FRAP	California Fire and Resource Assessment Program
GIS	Geographic Information System
Highway 1	(California) State Route 1
MJHMP	Multi-Jurisdictional Hazard Mitigation Plan
MM	Modified Mercalli
NFIP	National Flood Insurance Program
OES	Monterey County Office of Emergency Services
PGA	peak ground acceleration
Planning Team	Multi-Jurisdictional Hazard Planning Team
SFHA	Special Flood Hazard Area
Stafford Act	Robert T. Stafford Disaster Relief and Emergency Assistance Act
STAPLEE	Social, Technical, Administrative, Political, Legal, Economic, and Environmental
U.S. Census	U.S. Census Bureau
URS	URS Corporation
US 101	U.S. Highway 101
USC	United States Code
USGS	U.S. Geological Survey

This section provides an overview of the Disaster Mitigation Act of 2000 (DMA 2000) (Public Law 106-390), the adoption of this Multi-Jurisdictional Hazard Mitigation Plan (MJHMP) by the local governing bodies, and supporting documentation for the adoption.

1.1 DISASTER MITIGATION ACT OF 2000

Congress passed DMA 2000 to emphasize the need for mitigation planning to reduce vulnerability to natural and human-caused hazards. DMA 2000 amended the Robert T. Stafford Disaster Relief and Emergency Assistance Act (Stafford Act) (Title 42 of the United States Code [USC] 5121 et seq.) by repealing the act's previous mitigation planning section (409) and replacing it with a new mitigation planning section (322).

To implement the DMA 2000 planning requirements, the Federal Emergency Management Agency (FEMA) published an Interim Final Rule in the *Federal Register* on February 26, 2002 (FEMA 2002a). This rule (Title 44 of the Code of Federal Regulations [CFR] Part 201) established the mitigation-planning requirements for states, tribes, and local communities. The planning requirements are described in detail in Section 2 and are identified in their appropriate sections throughout the Plan. The FEMA crosswalk, which documents compliance with 44 CFR, is provided in Appendix A.

1.2 ADOPTION BY LOCAL GOVERNING BODIES AND SUPPORTING DOCUMENTATION

The requirements for the adoption of an MJHMP by the participating local governing bodies, as stipulated in the DMA 2000 and its implementing regulations, are described below.

DMA 2000 REQUIREMENTS: PREREQUISITES

Multi-Jurisdictional Plan Adoption

Requirement §201.6(c)(5): For multi-jurisdictional plans, each jurisdiction requesting approval of the plan **must** document that it has been formally adopted.

Element

- Does the plan indicate the specific jurisdictions represented in the plan?
- For each jurisdiction, has the local governing body adopted the plan?
- Is supporting documentation, such as a resolution, included for each participating jurisdiction?

Source: FEMA, March 2004.

The County of Monterey and the cities of Carmel-by-the-Sea, Del Rey Oaks, Gonzales, Greenfield, King City, Marina, Monterey, Pacific Grove, Salinas, Sand City, and Soledad (hereafter referred to as the participating jurisdictions) meet the requirements of Section 409 of the Stafford Act and Section 322 of the DMA 2000. For this version of the MJHMP, Special Districts are not considered participating jurisdictions.

The local governing body of the County and each participating jurisdiction has adopted the plan by resolution. The resolutions are included in Appendix B.

The remainder of this MJHMP consists of the following sections:

Community Description

Section 3 provides a general history and background of Monterey County and each participating community, including historical trends for population and the demographic and economic conditions that have shaped the area. Trends in land use and development are also discussed.

Planning Process

Section 4 describes the planning process and identifies the Planning Team members, the meetings held as part of the planning process (Appendix C), the URS Corporation (URS) consultants, and the key stakeholders within the county and surrounding region. In addition, this section documents public outreach activities (attached as Appendix D) and the review and incorporation of relevant plans, reports, and other appropriate information.

Hazard Analysis

Section 5 describes the process through which the Planning Team identified and compiled relevant data on all potential hazards that threaten the county. Information collected includes historical data on hazard events that have occurred in and around the county and how these events impacted the area and people.

The descriptions of hazards that could affect the county are based on historical occurrences and best available data from agencies such as FEMA, the U.S. Geological Survey (USGS), the California Geologic Survey (CGS), and the National Weather Service (NWS). Detailed hazard profiles include information on the frequency, magnitude, location, and impact of each hazard as well as probabilities for future hazard events. Figures (attached as Appendix E) are included to identify known hazard areas and locations of previous hazard occurrences.

Vulnerability Analysis

Section 6 identifies potentially vulnerable assets - people, residential dwelling units, critical facilities, infrastructure and lifelines, hazardous materials facilities, and nonresidential facilities – within the entire county. These data were compiled by assessing the potential impacts from each hazard using Geographic Information System (GIS) information. The resulting information identifies the full range of hazards that the county could face and potential social impacts, damages, and economic losses.

Mitigation Strategy

The mitigation strategy (Section 7) provides a blueprint for reducing the potential losses identified in the vulnerability analysis. For the countywide mitigation strategy, the Planning Team developed a list of mitigation goals and actions based upon the findings of the vulnerability analysis. Based upon these goals and other criteria (Appendix F), the Planning Team reviewed and prioritized a comprehensive range of appropriate mitigation actions to address the risks facing the county. Such measures include preventive actions, property

protection techniques, natural resource protection strategies, structural projects, emergency services, and public information and awareness activities.

Community-specific mitigation strategies, including capability assessments, are provided in Appendices H through S. For this version of the MJHMP, Special Districts (Appendix T) did not prepare mitigation strategies.

Plan Maintenance

Section 8 describes the Planning Team's formal plan maintenance process to ensure that the MJHMP remains an active and applicable document. The process includes monitoring, evaluating, and updating the MJHMP (Appendix G); implementation through existing planning mechanisms; and continued public involvement.

References

Section 9 lists the reference materials used to prepare this MJHMP

Appendix A

Appendix A provides the FEMA crosswalk, which documents compliance with 44 CFR.

Appendix B

Appendix B provides the adoption resolutions for Monterey County and each participating community.

Appendix C

Appendix C contains the Planning Team meeting agendas.

Appendix D

Appendix D provides public outreach information, including press releases and information posted on the County's website.

Appendix E

Appendix E includes the figures that identify known hazard areas and the locations of previous hazard occurrences.

Appendix F

Appendix F contains the Benefit-Cost Analysis Fact Sheet used to select and prioritize mitigation actions.

Appendix G

Appendix G provides the plan maintenance documents, such as an annual review sheet and the progress report form.

Appendices H through T

Appendices H through T provide the vulnerability analyses and mitigation strategies, including the capability assessments, for the County of Monterey and the participating communities. Special Districts did not prepare mitigation strategies for this version of the MJHMP.

This section describes the location, geography, and history; demographics; and land use development trends of Monterey County (the County) and the participating communities.

3.1 LOCATION, GEOGRAPHY, AND HISTORY

Monterey County is located on the north-central coast of California. The adjacent counties are Santa Cruz to the north; San Benito, Fresno, and King to the east; and San Luis Obispo to the south. The Pacific Ocean borders the County to the west. At its northernmost boundary, the County lies 92 miles from San Francisco, and at its southernmost boundary, the County lies 222 miles from Los Angeles on U.S. Highway 101 (US 101). The County occupies an area of 3,324 square miles and has 100 miles of coastline, two coastal ranges (the Santa Lucia and Gabilan Mountain Ranges), and two valleys (the Salinas and Carmel Valleys). Areas along the coast experience a Mediterranean-like climate that is characterized by moderate temperatures, a winter rainy season, and cool dry summers. Further inland, temperatures are more extreme and rainfall is considerably less.

The Presidio of Monterey was founded on June 3, 1770, by Spanish soldiers. Spain established a formal pueblo government in 1791, and by the turn of the century, approximately 400 settlers lived both in and outside the presidio walls. By 1814, a number of non-Spanish immigrants had begun to settle in Monterey. By the early 1840s, the pattern of the town was laid out and the presidio ceased to be the center of activity. After the Hispanic Period ended, public domains within the newly established county were settled quickly, first within areas established by the Hispanic settlers, then along the watered canyons and high valleys of the coastal ranges. By the 1860s, range lands used for ranching were subdivided into suitable lands for dry-farming of grains and shifted into large-scale seasonal row-crop farming made possible by rail access to markets and irrigation in the 1880s.

Today, the agriculturally rich County includes 12 incorporated cities Figure E-1 (Appendix E) and several small unincorporated towns and communities. Unincorporated communities include Big Sur, Blanco, Bolsa Knolls, Camphora, Carmel Valley, Chualar, Coburn, Cooper, Del Monte, Denvir, East Garrison, Elsa, Fort Romie, Gabilan Acres, Gorda, Harlem, Jamesburg, Jolon, Lockwood, Lucia, Martinez Corner, Mascorino Place, Metz, Moss Landing, Nashua, Posts, Prunedale, Robles Del Rio, San Ardo, San Lucas, Santa Rita, Spence, Spreckels, Spreckels Junction, Sycamore Flat, and Welby. The cities are often grouped into two classifications: the valley cities consist of King City, Gonzales, Greenfield, Salinas, and Soledad; the peninsula cities consist of Carmel-by-the-Sea, Del Ray Oaks, Marina, Monterey, Pacific Grove, Sand City, and Seaside.

3.2 DEMOGRAPHICS

According to the U.S. Census Bureau (U.S. Census), the County's population, including the incorporated cities, was 401,762 in 2000. Approximately 75 percent (301,510) of the County's population resides in the 12 incorporated communities. Approximately 8 percent of the population is under the age of five, 72 percent are ages 18 years and older, and 10 percent are over 65 years. The U.S. Census estimated the 2005 population to be 412,104.

The County's current labor force includes 184,789 persons, which is approximately 61.6 percent of the County's total population (16 years or older). The economic base of the County has been

oriented toward tourism, accounting for 13 percent of the regional working population, and agriculture, accounting for 33 percent of the regional working population. In 2000, the per capita income was $20,165, and the median family income was $48,305.

3.3 LAND USE AND DEVELOPMENT TRENDS

Monterey County began land use planning in 1930 with the creation of a Planning Commission followed by the establishment of a Planning Department 20 years later. The Planning Department completed its first general plan in 1968 and by the mid-1970s had adopted the State of California's mandated Safety Element as part of the plan. The draft 2006 General Plan includes land use, circulation, conservation and open space, safety, public services, agricultural, and economic elements. The policies of the General Plan underlie most land use development decisions, and the County's zoning ordinances, specific plans, development projects, and capital improvement programs must be consistent with the General Plan.

Approximately 1 percent of the County has been developed with residential, commercial, and industrial uses. Most of this development has been concentrated in the northern one-third of the County. Public and quasi-public uses, such as educational, transportation, military, recreational, cultural, and religious facilities, account for an additional 28 percent of the County's total land area. Agriculture accounts for the largest land use, representing almost 60 percent of the County's total land area.

North-central and inland County development trends over the past twenty years show that industrial development has nearly doubled while residential development has tripled in size. In addition, commercial development in some areas is five times larger compared to the early 1980s. In some areas, this development has occurred on reclaimed agriculture acreage. However, future development may become constrained due to limited water sources, poor water quality, and geologic (landslide), flood, and seismic hazards.

3.4 INCORPORATED COMMUNITIES

Approximately 75 percent of the countywide population resides in the 12 incorporated communities, which consists of only 15 percent of the total land area. The cities can be grouped into two geographical areas – those along the coast and those inland. From north-to-south the coastal incorporated communities include Marina (pop. 25,101), Sand City (pop. 216), Seaside (pop. 31,696), Del Rey Oaks (pop. 1,650), Monterey (pop. 29,791), Pacific Grove (pop. 15,522), and Carmel-by-the-Sea (pop. 4,070). Also from north-to-south, the inland communities include Salinas (182,759), Gonzales (7,539), Soledad (11,534), Greenfield (12,842), and King City (11,098).

This section provides an overview of the planning process; identifies the Planning Team members and key stakeholders; documents public outreach efforts; and summarizes the review and incorporation of existing plans, studies, and reports used to develop this MJHMP. Additional information regarding the Planning Team and public outreach efforts is provided in Appendices C and D.

The requirements for the planning process, as stipulated in DMA 2000 and its implementing regulations, are described below.

DMA 2000 Requirements: Planning Process

Planning Process

§201.6(b): An open public involvement process is essential to the development of an effective plan.

Documentation of the Planning Process

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

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

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

Element

- Does the plan provide a narrative description of the process followed to prepare the plan?
- Does the plan indicate who was involved in the planning process? (For example, who led the development at the staff level and were there any external contributors such as contractors? Who participated on the plan committee, provided information, reviewed drafts, etc.?)
- Does the plan indicate how the public was involved? (Was the public provided an opportunity to comment on the plan during the drafting stage and prior to the plan approval?)
- Was there an opportunity for neighboring communities, agencies, businesses, academia, nonprofits, and other interested parties to be involved in the planning process?
- Does the planning process describe the review and incorporation, if appropriate, of existing plans, studies, reports, and technical information?

Source: FEMA, March 2004.

4.1 OVERVIEW OF PLANNING PROCESS

The Monterey County Office of Emergency Services (OES) hired URS to assist with the development of this MJHMP. The first step in the planning process was to establish a Planning Team, which consisted of the County, the incorporated communities, and other interested local agencies. Kyle Oden of the Monterey County OES served as the primary point of contact for the County, the participating communities, and the public.

Once the Planning Team was formed, the following six-step planning process took place during the 10-month period from May 2006 to February 2007.

- **Organize resources:** The Planning Team identified resources, including County staff, agencies, and local community members, which could provide the technical expertise and historical information needed to develop the MJHMP.

- **Profile Hazards:** The Planning Team identified the hazards specific to Monterey County, and URS developed a hazard analysis for the nine identified hazards.
- **Assess Risks:** URS developed a vulnerability analysis for the County and each of the participating communities. The County and participating communities reviewed the vulnerability analysis results before and during the development of the mitigation strategy.
- **Assess capabilities:** Each member of the Planning Team reviewed the current administrative and technical, legal and regulatory, and fiscal capabilities to determine whether existing provisions and requirements adequately address relevant hazards in his/her respective community.
- **Develop a mitigation strategy:** The Planning Team developed a comprehensive range of potential mitigation goals and actions. Subsequently, each member of the Planning Team identified, evaluated, and prioritized the actions to be implemented in his/her respective community.
- **Monitor progress:** The Planning Team developed an implementation process to ensure the success of an ongoing program to minimize hazard impacts to Monterey County.

4.2 HAZARD MITIGATION PLANNING TEAM

4.2.1 Formation of the Planning Team

As previously noted, the planning process began in May 2006. Kyle Oden formed the advisory body, known as the Planning Team, using staff from relevant County agencies and each participating community. The Planning Team members are listed in Table 4-1. The Planning Team meetings are described below. The meeting agendas are provided in Appendix C.

Table 4-1
Monterey County MJHMP Planning Team Members

Name	Community	Agency/Department
Kyle Oden	County of Monterey	Office of Emergency Services
Rob Johnson	County of Monterey	Water Resources Agency
Jim McNulty	County of Monterey	Public Works Department
Bruce Meyer	City of Carmel-by-the-Sea	Fire Department
Ron Langford	City of Del Rey Oaks	Police Department
Harold Wolgamott	City of Gonzales	Fire Department
John Alves	City of Greenfield	Public Works/Deputy City Mgr.
Michael Powers	King City	City Manager
Harald Kelley	City Marina	Fire Department
Sam Mazza	City of Monterey	Fire Department
David Brown	City of Pacific Grove	Fire Department
Phil Vanderhorst	City of Salinas	Fire Department
Michael Klein	Sand City	Police Department
Steve Negro	City of Soledad	Fire Department

4.2.2 Planning Team Meetings and Tasks

May 10, 2006

During the kickoff meeting, URS discussed the objectives of DMA 2000, the hazard mitigation planning process, the public outreach process, and the steps involved in developing the MJHMP and achieving the goals of the County and the participating communities. The presentation included a review of GIS technology as a tool for identifying and mapping known hazards in Monterey County. Also discussed was the need for the Planning Team to network with other people in Monterey County, other agencies, and other professionals who might have specialized knowledge about the hazards that can affect Monterey County.

A hazard risk identification exercise was conducted to familiarize the Planning Team with the approach and concepts that would be used in the risk identification phase of the MJHMP development. The exercise identified the specific hazards that the Planning Team wanted to address in the MJHMP. Among the 21 potential hazards initially discussed (as shown in Section 5.2), nine hazards were determined to pose the greatest potential risk to Monterey County: coastal erosion, dam failure, earthquake, flood (including coastal storm), hazardous materials event, landslide, tsunami, wildland fire, and windstorm.

September 21, 2006

During the second meeting, URS presented the Planning Team with the draft hazard analysis and hazard maps. Also, each Planning Team member reviewed the asset information (critical facilities and infrastructure, population, and residential and nonresidential structures) that had been collected for his/her respective community.

December 7, 2006

During the third Planning Team meeting, each member reviewed the vulnerability analysis, including community-specific vulnerability analyses information. Next, the Planning Team reviewed and revised the mitigation goals and potential action items. After the Planning Team members reviewed the simplified Social, Technical, Administrative, Political, Legal, Economic, and Environmental (STAPLEE) evaluation criteria, the team members identified and prioritized the mitigation action items to be included in the Countywide Mitigation Action Plan. Each member of the Planning Team took mitigation strategy handouts back to his/her community to review and develop a prioritized list of mitigation actions to be included in his/her community-specific Mitigation Action Plan.

4.3 PUBLIC INVOLVEMENT

4.3.1 Press Release Inviting Participation

In early July 2006, shortly after the first Planning Team meeting, the County issued a press release regarding the preparation of the MJHMP. The press release was sent out in a mass email inviting local, state, and federal districts and agencies to participate in the planning process. The press release was emailed to over two dozen entities, including the North County Fire Protection

District, Carmel Valley Fire District, Big Sur Volunteer Fire Brigade, Mid Coast Fire Brigade, Cachagua Fire Protection District, Salinas Rural Fire District, San Ardo Volunteer Fire District, Spreckels Volunteer Fire Company, California Department of Forestry Monterey office, Marina Coast Water District, Moss Landing Harbor District, Monterey Airport Fire District, Monterey Red Cross, Carmel Red Cross, Carmel Area Waste Water District, Monterey Regional Water Pollution Control Agency, Monterey Peninsula Water Management District, Pajaro/Sunny Mesa Community Services District, Pebble Beach Community Services District, San Lucas Water District, Santa Cruz County Office of Emergency Services, and San Benito County Office of Emergency Services.

The press release is included in Appendix D.

4.3.2 Downloadable Information on County OES Website

In January, the County OES placed nine hazard area maps created for the MJHMP on its website. Website users were able to download maps and provide feedback via email or phone.

A snapshot of the website is included in Appendix D.

4.3.3 Public Comment Draft Period

The County OES posted the Public Comment Draft MJHMP on its website from April 15 – July 15. During this two-month period, website users could review the plan and provide feedback via email or phone.

4.4 INCORPORATION OF EXISTING PLANS AND OTHER RELEVANT INFORMATION

During the planning process, URS reviewed and incorporated information from existing plans, studies, reports, and technical reports into the MJHMP. A synopsis of the sources follows.

- *Monterey County General Plan, Draft October 2006*: The Land Use Element provides information on existing land use and future development trends. The Safety Element provides information for the initial hazard identification process and development of the mitigation strategy.
- *County of Monterey Municipal Codes:* These codes regulate development and land use; they were used to develop the capability assessment and the mitigation strategy.
- *California Coastal Commission's California Coastal Bluffs:* This study helps characterize the geotechnical and coastal processes that influence bluff erosion.
- *Monterey County Flood Management Plan*: This plan identifies Special Flood Hazard Areas as well as areas subject to flooding but not identified within the 100-year flood zone.
- *State of California Multi-Hazard Mitigation Plan:* This plan, prepared by the California Governor's Office of Emergency Services, was consulted to ensure that the MJHMP is consistent with the State hazard mitigation plan.

The following FEMA guides were also consulted for general information on the MJHMP process:

- *How-To Guide #1: Getting Started: Building Support for Mitigation Planning* (FEMA 2002c)
- *How-To Guide #2: Understanding Your Risks – Identifying Hazards and Estimating Loss Potential* (FEMA 2001)
- *How-To Guide #3: Developing the Mitigation Plan: Identifying Mitigation Actions and Implementing Strategies* (FEMA 2003a)
- *How-To Guide #4: Bringing the Plan to Life: Implementing the Hazard Mitigation Plan* (FEMA 2003b)

A complete list of the sources consulted is provided in Section 9.

This section identifies and profiles the hazards that could affect Monterey County.

5.1 OVERVIEW OF A HAZARD ANALYSIS

A hazard analysis includes the identification and screening of each hazard and subsequently the profiling of each hazard. Hazard identification is the process of recognizing the natural and human-caused events that threaten an area. Natural hazards result from unexpected or uncontrollable natural events of sufficient magnitude. Human-caused hazards result from human activity and include technological hazards and terrorism. Technological hazards are generally accidental or result from events with unintended consequences (for example, an accidental hazardous materials release). Terrorism is defined as the calculated use of violence (or threat of violence) to attain goals that are political, religious, or ideological in nature. Even though a particular hazard may not have occurred in recent history in the study area, all hazards that may potentially affect the study area are considered; the hazards that are unlikely to occur or for which the risk of damage is accepted as being very low, are eliminated from consideration.

Hazard profiling is accomplished by describing hazards in terms of their nature, history, magnitude, frequency, location, and probability. Hazards are identified through the collection of historical and anecdotal information, review of existing plans and studies, and preparation of hazard maps of the study area. Hazard maps are used to determine the geographic extent of the hazards and define the approximate boundaries of the areas at risk.

5.2 HAZARD IDENTIFICATION AND SCREENING

The requirements for hazard identification, as stipulated in DMA 2000 and its implementing regulations, are described below.

DMA 2000 Requirements: Risk Assessment: Identifying Hazards

Identifying Hazards

Requirement §201.6(c)(2)(i): [The risk assessment **shall** include a] description of the type of all natural hazards that can affect the jurisdiction.

Element

Does the plan include a description of the types of all natural hazards that affect the jurisdiction? If the hazard identification omits (without explanation) any hazards commonly recognized as threats to the jurisdiction, this part of the plan cannot receive a Satisfactory score. Consult with the State Hazard Mitigation Officer to identify applicable hazards that may occur in the planning area.

Source: FEMA, March 2004.

For the first step of the hazard analysis, the Planning Team identified 20 possible hazards that could affect Monterey County and the participating communities. The Planning Team evaluated and screened the comprehensive list of potential hazards based on a range of factors, including prior knowledge or perception of the relative risk presented by each hazard, the ability to mitigate the hazard, and the known or expected availability of information on the hazard (see Table 5-1). The Planning Team determined that nine hazards pose the greatest threat to Monterey County: coastal erosion, dam failure, earthquake, flood (including coastal storm), a hazardous materials event, landslide, tsunami, wildland fire, and windstorm The remaining 11 hazards

excluded through the screening process were considered to pose a lower threat to life and property in Monterey County due to the low likelihood of occurrence or the low probability that life and property would be significantly affected. Should the risk from these hazards increase in the future, the MJHMP can be updated to incorporate vulnerability analyses for these hazards.

Table 5-1
Identification and Screening of Hazards

Hazard Type	Should It Be Profiled?	Explanation
Avalanche	No	Monterey County is not located in area prone to frequent or significant snowfall.
Coastal Erosion	Yes	Several participating jurisdictions and areas of the unincorporated county are located along the Pacific Coast.
Coastal Storm	No (See Flood)	Several participating jurisdictions and areas of the unincorporated county are located along the Pacific Coast. This hazard will be addressed in the flood hazard profile.
Dam Failure	Yes	Several State-sized dams are located within Monterey County.
Drought	No	Existing local plans and policies, including water conservation activities of the Monterey Peninsula Water Management District Law, landscaping plans, and existing development and new construction water conservation requirements, help diminish the effects of this hazard.
Earthquake	Yes	Several active faults, including the San Andreas Fault, run through Monterey County.
Expansive Soils	No	No historic events have occurred in Monterey County.
Extreme Heat	No	While extreme temperatures are known to occur, prolonged heat waves are rare.
Flood	Yes	History of flooding is associated with coastal storms and heavy rainfall.
Hailstorm	No	No significant historic events have occurred in Monterey County.
Hurricane	No	No significant historic events have occurred in Monterey County.
Land Subsidence	No	No historic events have occurred in Monterey County.
Landslide	Yes	Monterey County is vulnerable to slope instability in the Santa Lucia Mountain Range and fault zones, especially after prolonged rainfalls.
Severe Winter Storm	No	No significant historic events have occurred in Monterey County.
Tornado	No	No significant historic events have occurred in Monterey County.
Tsunami	Yes	Several participating jurisdictions and areas of the unincorporated county are located along the Pacific Coast.
Volcano	No	No significant historic events have occurred in Monterey County.
Wildland Fires	Yes	The terrain, vegetation, and weather conditions in the region are favorable for the ignition and rapid spread of wildland fires.
Windstorm	Yes	Sustained inland sea breezes occur annually from March to October.
Other: Hazardous Materials	Yes	Hazardous materials facilities and major transportation routes are located throughout Monterey County.

5.3 HAZARD PROFILE

The requirements for hazard profile, as stipulated in DMA 2000 and its implementing regulations, are described below.

DMA 2000 Requirements: Risk Assessment – Profiling Hazards
Profiling Hazards
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 hazard events.
Element
Does the risk assessment identify the **location** (i.e., geographic area affected) of each natural hazard addressed in the plan?
Does the risk assessment identify the **extent** (i.e., magnitude or severity) of each hazard addressed in the plan?
Does the plan provide information on **previous occurrences** of each hazard addressed in the plan?
Does the plan include the **probability of future events** (i.e., chance of occurrence) for each hazard addressed in the plan?
Source: FEMA, March 2004.

The specific hazards selected by the Planning Team for profiling have been examined in a methodical manner based on the following factors:

- Nature
- History
- Location
- Extent
- Probability of future events

The hazards profiled for Monterey County (including the participating jurisdictions) are presented in the rest of Section 5.3 in alphabetical order. The order of presentation does not signify the level of importance or risk.

5.3.1 Coastal Erosion

5.3.1.1 Nature

Erosion is a process that involves the wearing away, transportation, and movement of land. Erosion rates can vary significantly, occurring rather quickly after a flash flood, coastal storm, or other event or slowly as the result of long-term environmental changes. Erosion is a natural process, but its effects can be exacerbated by human activity.

Coastal erosion is sometimes referred to as cliff, bluff, or beach erosion. However, other times these erosion types encompass different categories of erosion altogether. For this profile, tidal, bluff, and beach erosion will be nested within the term coastal erosion.

Coastal erosion is the attrition of land resulting in loss of beach, shoreline, dune, or cliff material from natural activity or human influences. Coastal erosion occurs over the area roughly from the edge of a cliff and the top of the bluff out into the near-shore region to about a depth of 30 feet. It is measured as the rate of change in the position or horizontal displacement of a shoreline over a period of time. Bluff recession is the most visible aspect of coastal erosion because of the dramatic change it causes to the landscape. As a result, this aspect of coastal erosion usually receives the most attention.

The forces of erosion are embodied in waves, currents, and winds on the coast. However, surface-water and groundwater flow and freeze-thaw cycles may also play a role. Not all of these forces may be present at any particular location. Coastal erosion can occur from rapid, short-term daily, seasonal, or annual natural events such as waves, storm surge, wind, coastal storms, and flooding, but it can also occur from human activities, including boat wakes and dredging. The most dramatic erosion often occurs during storms, particularly because the highest energy waves are generated under storm conditions.

Coastal erosion may also be due to multiyear impacts and long-term climatic change such as sea-level rise, lack of sediment supply, subsidence, or long-term human factors such as aquifer depletion or the construction of shore protection structures and dams.

Ironically, attempts to control erosion though shoreline protective measures, such as groins, jetties, seawalls, or revetments, can actually lead to increased erosion activity. This development occurs because shoreline structures eliminate the natural wave run-up and sand deposition processes and can increase reflected wave action and currents at the waterline. The increased wave action can cause localized scour both in front of and behind structures and prevent the settlement of suspended sediment.

5.3.1.2 History

Rain, wind, and waves along the coast of Monterey County induce large amounts of erosion, especially during winter storms. In particular, El Niño events have produced large waves that have stripped volumes of sand from Monterey Bay, leaving the beaches, dunes, and cliffs exposed to high tides and wave attack. As a result of the 1982–1983 El Niño events, approximately 20 to 40 feet of the marine terraces by Scenic Drive in Carmel fell into the sea. In the 1997–1998 El Niño winter storm event, a Light Detection and Ranging survey revealed that maximum dune erosion occurred in the vicinity of Fort Ord (43-foot retreat) and the city of Marina (50-foot retreat). During both El Niño events, several extremely steep cliffs (100 percent slope) near Big Sur failed as a result of increased wave attack.

In addition to winter storms, earthquakes have caused the Monterey cliffs to erode. The October 17, 1989, Loma Prieta Earthquake produced several isolated cliff failures throughout the coastal county.

5.3.1.3 Location, Extent, and Probability of Future Events

The largest concentrations of coastal dunes within California are the Monterey Bay dunes, which cover about 40 square miles from Moss Landing to Pacific Grove. Studies conducted over the past several years suggest that the average dune erosion rate for southern Monterey Bay (from Moss Landing to Pacific Grove) is approximately 2.6 feet a year. Historically, the highest dune

erosion rates have occurred in the Fort Ord area (7 feet annually) and Marina (4.5 feet annually) because of wave refraction patterns that produce larger waves.

Rocky cliffs and marine terraces are located along Monterey Peninsula from Pacific Grove to Carmel. Although the granite cliffs have shown very little erosion over the past several years, areas with overlying marine terraces are subject to higher erosion rates, especially during strong storm years. Coastal erosion analysis indicates that average retreat rates for marine terraces are between 2 to 4 inches a year.

Steep cliffs within Monterey County are located along the Big Sur coast, where the rugged Santa Lucia Mountains descend abruptly into the Pacific Ocean. U.S. Geological Survey (USGS) studies suggest cliff retreats within this area average about 7 inches per year; however, failure can be much greater in weakened, fractured, or faulted areas.

For coastal management purposes, average coastal erosion retreats have been projected over a 100-year period (as shown in Figure E-3 [Appendix E]). However, even though coastal erosion can occur with any annual winter storm, damage is more likely to occur during El Niño events. Ocean storms that have some amount of coastal impact can be expected every year. El Niño events occur about every 5 to 7 years and typically last 16 to 18 months. Historically, strong El Niño conditions have only occurred every 20 to 40 years.

5.3.2 Dam Failure

5.3.2.1 Nature

A dam failure is the structural collapse of a dam that releases the water stored in the reservoir behind the dam. A dam failure is usually the result of the age of the structure, inadequate spillway capacity, or structural damage caused by an earthquake or flood. The sudden release of water has the potential to cause human casualties, economic loss, and environmental damage. This type of disaster is dangerous because it can occur rapidly, providing little warning and evacuation time for people living downstream. The flows resulting from dam failure generally are much larger than the capacity of downstream channels and can therefore lead to extensive flooding. Flood damage occurs as a result of the momentum of the flood caused by the sediment-laden water, flooding over the channel banks, and impact of debris carried by the flow.

5.3.2.2 History

Four major dams and reservoirs, as well as several small dams, are located in and within the vicinity of Monterey County. The four largest dams, the Nacimiento Dam, San Antonio Dam, San Clemente Dam, and Los Padres Dam, have never failed or been subject to significant damage. However, Lake Nacimiento (Nacimiento Dam) has spilled over three times (1958, 1969, and 1983) over the last 50 years, and Lake San Antonio (San Antonio Dam) has spilled twice (1982 and 1983) over the past 40 years.

5.3.2.3 Location, Extent, and Probability of Future Events

As shown in Figure E-4 (Appendix E), four state-size dams and reservoirs in and near Monterey County pose the risk of inundation within the County. State-size dams, which are regulated by

the California Division of Safety of Dams (DSOD), are more than 25 feet in height and hold back more than 15 acre-feet of water or are more than 6 feet in height and hold more than 50 acre-feet of water. The four state-size dams are as follows:

- The earth-filled Nacimiento Dam was completed in 1957. It provides water conservation capacity of 377,900 acre-feet in Lake Nacimiento. When full, the lake is 18 miles long and has a shoreline of 165 miles. The Nacimiento Dam and its reservoir are located in northern San Luis Obispo County, 15 miles northwest of Paso Robles, along the Nacimiento River. However, it was constructed and is owned by Monterey County Water Resources Agency. It serves as a flood control, water conservation, and recreation facility.
- San Antonio Dam and its reservoir, Lake San Antonio, were completed in 1965, with 335,000 acre-feet of water conservation capacity. When full, it is 16 miles long and has approximately 100 miles of shoreline. San Antonio Dam and Lake San Antonio are located southwest of Bradley along the San Antonio River. Like Nacimiento Dam, San Antonio Dam is owned by Monterey County Water Resources Agency and serves as a flood control, water conservation, and recreation facility.
- The concrete-arched San Clemente Dam was built in 1921 in the Cachagua area along the upper reaches of the Carmel River. It originally was constructed to hold 2,000 acre-feet of water; however, today it holds back mostly mud. The dam, which is owned and operated by California-American Water Company, serves as a flood control and water conservation facility.
- Los Padres Dam was constructed in 1949, 6 miles upstream from San Clemente Dam. It is a rock-and-earth-filled dam that had an original storage capacity of 3,000 acre-feet that has now dwindled to 1,500 acre-feet. The dam, which is also owned and operated by California-American Water Company, serves as a flood control and water conservation facility.

Dam inundation maps show that the greatest risk from dam failure is in Carmel Valley, where failure of either Los Padres or San Clemente Dam would cause inundation of urbanized areas and alter the riparian corridor. A 1997 analysis conducted by the DSOD indicates that a dam failure of San Clemente Dam would send 100 to 150 acre-feet of water and mudflow downstream as far as Camp Stefani on the Carmel River, resulting in 1 to 6 feet of flooding. Dam failure in Salinas Valley would also be significant, whether caused by the failure of San Antonio or Nacimiento Reservoir. Studies reveal that either failure would overflow the 100-year floodplain in Salinas Valley. However, the risk would predominately be to agricultural land.

Although all four dams and reservoirs are inspected annually by the DSOD to ensure that they are in good operating condition, the dams are susceptible to floods and seismic events. During the winter, temporary flood storage is provided in flood pools along Nacimiento and Lake San Antonio Dams. Along Los Padres and San Clemente Dams, excess water can be released through transmission pipes, values, and spillway systems. However, dam overspills would most likely occur during severe winter storms, when the dams and reservoirs are inundated with flooding. Based on previous occurrences, an overspill due to flooding would likely occur every 10 years.

In addition to flood hazards, all four dams are susceptible to seismic hazards. Engineering studies conducted by the DSOD in 1992, indicate that San Clemente Dam could give way in a magnitude 5.5 earthquake along the Tularcitos Fault or a magnitude 7.0 earthquake along the San

Andreas Fault. As noted in Section 5.3.3, recent research by the USGS shows that the San Andreas Fault has a 21 percent probability of a magnitude 6.7 or greater earthquake by 2032.

5.3.3 Earthquake

5.3.3.1 Nature

An earthquake is a sudden motion or trembling caused by a release of strain accumulated within or along the edge of the earth's tectonic plates. The effects of an earthquake can be felt far beyond the site of its occurrence. Earthquakes usually occur without warning and, after just a few seconds, can cause massive damage and extensive casualties. The most common effect of earthquakes is ground motion, or the vibration or shaking of the ground during an earthquake.

Ground motion generally increases with the amount of energy released and decreases with distance from the fault or epicenter of the earthquake. It causes waves in the earth's interior, also known as seismic waves, and along the earth's surface, known as surface waves. Two kinds of seismic waves occur: P (primary) waves are longitudinal or compressional waves similar in character to sound waves that cause back-and-forth oscillation along the direction of travel (vertical motion), and S (secondary) waves, also known as shear waves, are slower than P waves and cause structures to vibrate from side to side (horizontal motion). Also two kinds of surface waves occur: Raleigh waves and Love waves. These waves travel more slowly and typically are significantly less damaging than seismic waves.

In addition to ground motion, several secondary natural hazards can occur from earthquakes, such as the following:

- **Surface Faulting** is the differential movement of two sides of a fault at the earth's surface. Displacement along faults, both in terms of length and width, varies but can be significant (e.g., up to 20 feet), as can the length of the surface rupture (e.g., up to 200 miles). Surface faulting can cause severe damage to linear structures, including railways, highways, pipelines, and tunnels.
- **Liquefaction** occurs when seismic waves pass through saturated granular soil, distorting its granular structure, and causing some of the empty spaces between granules to collapse. Pore water pressure may also increase sufficiently to cause the soil to behave like a fluid for a brief period and cause deformations. Liquefaction causes lateral spreads (horizontal movements of commonly 10 to 15 feet, but up to 100 feet), flow failures (massive flows of soil, typically hundreds of feet, but up to 12 miles), and loss of bearing strength (soil deformations causing structures to settle or tip). Liquefaction can cause severe damage to property.
- **Landslides/Debris Flows** occur as a result of horizontal seismic inertia forces induced in the slopes by the ground shaking. The most common earthquake-induced landslides include shallow, disrupted landslides such as rock falls, rockslides, and soil slides. Debris flows are created when surface soil on steep slopes becomes totally saturated with water. Once the soil liquefies, it loses the ability to hold together and can flow downhill at very high speeds, taking vegetation and/or structures with it. Slide risks increase after an earthquake during a wet winter.

- **Tsunamis:** As an Oceanic Plate is subducted beneath a Continental Plate, it sometimes brings down the lip of the Continental Plate with it. Eventually, too much stress is put on the lip and it snaps back, sending shockwaves through the earth's crust, causing a tremor under the sea, known as an Undersea Earthquake. Factors that affect tsunami generation from an earthquake event include magnitude (generally, a 7.5 magnitude and above), depth of event (a shallow marine event that displaces seafloor), and type of earthquake (thrust as opposed to strike-slip).

The severity of an earthquake can be expressed in terms of intensity and magnitude. Intensity is based on the damage and observed effects on people and the natural and built environment. It varies from place to place depending on the location with respect to the earthquake epicenter, which is the point on the Earth's surface that is directly above where the earthquake occurred. The severity of intensity generally increases with the amount of energy released and decreases with distance from the fault or epicenter of the earthquake. The scale most often used in the United States to measure intensity is the Modified Mercalli (MM) Intensity Scale. As shown in Table 5-2, the MM Intensity Scale consists of 12 increasing levels of intensity that range from imperceptible to catastrophic destruction. Peak ground acceleration (PGA) is also used to measure earthquake intensity by quantifying how hard the earth shakes in a given location. PGA can be measured in *g*, which is acceleration due to gravity (see Table 5-2).

Magnitude is the measure of the earthquake strength. It is related to the amount of seismic energy released at the earthquake's hypocenter, the actual location of the energy released inside the earth. It is based on the amplitude of the earthquake waves recorded on instruments, known as the Richter magnitude test scales, which have a common calibration (see Table 5-2).

Table 5-2
Magnitude/Intensity/Ground-Shaking Comparisons

Magnitude	Intensity	PGA (% *g*)	Perceived Shaking
0 – 4.3	I	<0.17	Not Felt
	II-III	0.17 – 1.4	Weak
4.3 – 4.8	IV	1.4- – 3.9	Light
	V	3.9 – 9.2	Moderate
4.8 – 6.2	VI	9.2 – 18	Strong
	VII	18 – 34	Very Strong
6.2 – 7.3	VIII	34 – 65	Severe
	IX	65 – 124	Violent
	X	124 +	Extreme
7.3 – 8.9	XI		
	XII		

5.3.3.2 History

Historically, most of the earthquakes that have occurred in Monterey County have originated from movement along the San Andreas Fault system, which runs through the southeastern

portion of the county for approximately 30 miles (Figure E-5 [Appendix E]). It is the source of the area's earliest recorded great earthquake event, which occurred in June 1838. It is believed that this earthquake was a magnitude 7.0 to 7.4. Monterey County's next large earthquake occurred almost 20 years later on January 9, 1857. This estimated 8.3 earthquake, dubbed the Fort Tejon earthquake, occurred on the southern segment of the San Andreas Fault, northwest of the unincorporated community of Parkfield. The next large earthquake, known as the Great San Francisco earthquake, occurred on April 18, 1906. This event lasted 45 to 60 seconds and was in the range of magnitude 7.7–7.9. In Monterey, Hotel Del Monte was nearly destroyed, and four or five people were killed.

Available data suggest that between five to ten small earthquakes have been felt each year in Monterey County and one moderate earthquake has been felt along the San Andreas Fault near Parkfield every 22 years (1857, 1881, 1901, 1922, 1934, 1966, and 2004) over the past 150 years. However, the next large earthquake did not occur for over 80 years, from 1906 until 1989. On October 17, 1989, the Loma Prieta earthquake occurred near Mt. Loma Prieta in neighboring Santa Cruz County. The earthquake lasted only 10 to 15 seconds, but had a magnitude 6.9 to 7.1. In Moss Landing, liquefaction destroyed the marine laboratory and seriously damaged a power plant.

5.3.3.3 Location, Extent, and Probability of Future Events

As noted above, the San Andreas Fault system is the most active fault system in California. In its entirety, it runs 800 miles down the California coastline, including 30 miles in the southeastern portion of Monterey County. To the north and south of the County, the fault appears to be currently locked with no detectable movement. Between these locked sections, within the County, the San Andreas Fault creeps (slips aseismically). From San Juan Bautista to Parkfield, the creeping section produces numerous small to moderate (mostly magnitude 6.0 and smaller) earthquakes but no large ones. The stretch of the fault between Parkfield and Gold Hill defines a transition zone between the creeping and locked behavior of the fault.

In addition to the San Andreas Fault, two other active faults are located in Monterey County: the Palo Colorado–San Gregorio Fault zone and the Monterey Bay–Tularcitos Fault zone. The Palo Colorado–San Gregorio Fault zone connects the Palo Colorado Fault near Point Sur south of Monterey with the San Gregorio Fault near Point Año Nuevo in Santa Cruz County. It is a right-lateral strike-slip fault zone oriented generally north-south consisting of two or more parallel and fairly continuous fault segments that extend at least 60 miles. The Monterey Bay–Tularcitos Fault zone lies seaward of the city of Seaside, extending northwesterly to the Pacific Ocean. It is composed of short, discontinuous parallel fault segments ranging from 3 to 9 miles in length. The Monterey Bay Fault–Tularcitos zone is either truncated or merges with the San Gregorio fault segment of the Palo Colorado–San Gregorio Fault zone.

In addition to these active faults, several less active faults are located in Monterey County, as shown in Figure E-6 (Appendix E).

As noted earlier, the severity or extent of an earthquake can be expressed in terms of intensity, and the PGA measures the earthquake's intensity by quantifying how hard the earth shakes in a given location. PGA can be measured in *g*, which is acceleration due to gravity. The seismic shaking hazard map, as shown in Figure E-6 (Appendix E), shows the level of ground motion that has an annual probability of 1 in 475 of being exceeded each year, which is equal to a 10

percent probability of being exceeded in 50 years. As such, this map shows that the northern and southeastern portions of Monterey County are most susceptible to severe to extreme shaking (MMI VIII-X) and the central and western portion of the County is least susceptible to shaking (MMI V-VI).

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 segment of the San Andreas Fault (south of Parkfield). As the last large earthquake on the southern San Andreas Fault segment occurred in 1857, that section of the fault is considered a likely location for an earthquake within the next few decades. The northern segment of the fault (north of San Juan Baustista) has a slightly lower potential for a great earthquake, as only about 100 years have passed since the 1906 earthquake. However, as noted above, Monterey County experiences several small detectable earthquakes every year. Also, moderate-sized, potentially damaging earthquakes could occur in this area at any time.

Recent research by the USGS shows that the San Andreas Fault has a 21 percent probability and the San Gregorio–Palo Colorado Fault zone has a 10 percent probability of a magnitude 6.7 or greater earthquake by 2032.

5.3.4 Flood

5.3.4.1 Nature

Flooding is the accumulation of water where usually none occurs or the overflow of excess water from a stream, river, lake, reservoir, or coastal body of water onto adjacent floodplains. Floodplains are lowlands adjacent to water bodies that are subject to recurring floods. Floods are natural events that are considered hazards only when people and property are affected.

Nationwide, floods result in more deaths than any other natural hazard. Physical damage from floods includes the following:

- Inundation of structures, causing water damage to structural elements and contents.
- Erosion or scouring of stream banks, roadway embankments, foundations, footings for bridge piers, and other features.
- Impact damage to structures, roads, bridges, culverts, and other features from high-velocity flow and from debris carried by floodwaters. Such debris may also accumulate on bridge piers and in culverts, increasing loads on these features or causing overtopping or backwater effects.
- Destruction of crops, erosion of topsoil, and deposition of debris and sediment on croplands.
- Release of sewage and hazardous or toxic materials as wastewater treatment plants are inundated, storage tanks are damaged, and pipelines are severed.

Floods also result in economic losses through closure of businesses and government facilities, disrupt communications, disrupt the provision of utilities such as water and sewer service, result in excessive expenditures for emergency response, and generally disrupt the normal function of a community.

In Monterey County two types of flooding occur: riverine flooding, also known as overbank flooding, due to excessive rainfall, and coastal flooding due to wave run-up. Riverine floodplains

range from narrow, confined channels in the steep valleys of mountainous and hilly regions to wide, flat areas in plains and coastal regions. The amount of water in the floodplain is a function of the size and topography of the contributing watershed, the regional and local climate, and land use characteristics. Flooding in steep, mountainous areas is usually confined, strikes with less warning time, and has a short duration. Larger rivers typically have longer, more predictable flooding sequences and broad floodplains.

Localized flooding may occur outside of recognized drainage channels or delineated floodplains due to a combination of locally heavy precipitation, increased surface runoff, and inadequate facilities for drainage and stormwater conveyance. Such events frequently occur in flat areas and in urbanized areas with large impermeable surfaces. Local drainage may result in "nuisance flooding," in which streets or parking lots are temporarily closed and minor property damage occurs.

Coastal flooding in Monterey County is generally caused by wave run-up. Pacific Ocean storms in the months of November through February in conjunction with high tides and strong winds can cause significant wave run-up. In addition to intense offshore storms, coastal flooding from the Pacific Ocean can also be attributed to seismic sea-waves or tsunamis that can occur at any time of the year. As such, coastal flooding can be exacerbated by the physical characteristics of the continental shelf and shoreline.

5.3.4.2 History

Historical records from 1911 through 2005 indicate that flood conditions and flood damage were experienced in portions of Monterey County during the following periods: March 1911, January 1914, February 1922, November 1926, December 1931, February 1937, February 1938, March 1941, January 1943, February 1945, January 1952, December 1955, January 1956, April 1958, February 1962, December 1966, January and February 1969, February 1973, February 1978, March 1983, January and March 1995, and February 1998.

In the past 15 years, Monterey County has received two federal disaster declarations for winter storms and floods. During the January flood event of 1995, sustained precipitation fell throughout the region and over 125 residential properties in the Carmel Valley sustained damage. Two months later, Monterey County experienced a second significant winter storm, which resulted in further sustained precipitation falling on already saturated watersheds. Devastating flooding occurred throughout Monterey County, particularly in the unincorporated communities of Castroville, Mission Fields, Carmel Valley, Cachagua, Carmel Highlands, Spreckels, and Big Sur. Over 1,500 residences and 100 businesses were damaged. Five years later, in 1998 a series of El Niño winter storms contributed to intense flooding in which over 15 inches of rain fell during the month of February. Several small streams flooded and several coastal communities experienced flooding from wave run-up. In addition, Pajaro's entire population of 3,500 was ordered to evacuate after the levee along the Pajaro River was breached in several places.

5.3.4.3 Location, Extent, and Probability of Future Events

Floods are described in terms of their extent (including the horizontal area affected and the vertical depth of floodwaters) and the related probability of occurrence. Flood studies often use historical records, such as stream-flow gages, to determine the probability of occurrence for

floods of different magnitudes. The probability of occurrence is expressed in percentages as the chance of a flood of a specific extent occurring in a given year.

The following factors contribute to the frequency and severity of riverine flooding:

- Rainfall intensity and duration
- Antecedent moisture conditions
- Watershed conditions, including steepness of terrain, soil types, amount, and type of vegetation, and density of development
- The existence of attenuating features in the watershed, including natural features such as swamps and lakes and human-built features such as dams
- The existence of flood control features, such as levees and flood control channels
- Velocity of flow
- Availability of sediment for transport, and the erodibility of the bed and banks of the watercourse

The following factors contribute to the frequency and severity of coastal flooding:

- Astronomical tides
- Storm surge, which is the rise in water from wind stress and low atmospheric pressure
- Waves
- Peak still-water elevation

The magnitude of flood used as the standard for floodplain management in the United States is a flood having a probability of occurrence of 1 percent in any given year, also known as the 100-year flood or base flood. The most readily available source of information regarding the 100-year flood is the system of Flood Insurance Rate Maps (FIRMs) prepared by FEMA. These maps are used to support the National Flood Insurance Program (NFIP). The FIRMs show 100-year floodplain boundaries for identified flood hazards. These areas are also referred to as Special Flood Hazard Areas (SFHAs) and are the basis for flood insurance and floodplain management requirements. The FIRMs also show floodplain boundaries for the 500-year flood, which is the flood having a 0.2 percent chance of occurrence in any given year. FEMA has prepared a FIRM for Monterey County, dated January 1984. FEMA is currently in the process of preparing a countywide digital FIRM for Monterey County, which will incorporate the flood hazard information for both the incorporated and unincorporated areas of the County.

The rivers and streams for which FEMA has prepared detailed engineering studies may also have designated floodways. The floodway is the channel of a watercourse and portion of the adjacent floodplain that is needed to convey the base or 100-year flood event without increasing flood levels by more than 1 foot and without significantly increasing flood velocities. The floodway must be kept free of development or other encroachments. FEMA has designated floodways within the Salinas River.

The FIRMs and Flood Insurance Studies for Monterey County and incorporated communities show identified SFHAs for the following flooding sources:

- Arroyo Del Rey, with a drainage area of 13.1 square miles and a 100-year peak discharge of 720 cubic feet per second (cfs)
- Arroyo Seco, with a drainage area of 244.0 square miles and a 100-year peak discharge of 40,100 cfs
- Calera Creek, with a drainage area of 12.8 square miles and a 100-year peak discharge of 850 cfs
- Canyon Del Rey, with a drainage area of 5.3 square miles and a 100-year peak discharge of 295 cfs
- Calera Creek, with a drainage area of 12.8 square miles and a 100-year peak discharge of 850 cfs
- Carmel River, with a drainage area of 246.0 square miles and a 100-year peak discharge of 29,100 cfs
- Castroville Boulevard Wash, with a drainage area of 3.5 square miles and a 100-year peak discharge of 125 cfs
- Corncob Canyon Creek, with a drainage area of 3.0 square miles and a 100-year peak discharge of 970 cfs
- El Toro Creek, with a drainage area of 41.4 square miles and a 100-year peak discharge of 2,000 cfs
- Elkhorn Slough, with a drainage area of 48.7 square miles and a 100-year peak discharge of 1,200 cfs
- Galiban Creek, with a drainage area of 36.7 square miles and a 100-year peak discharge of 2,000 cfs
- Gonzales Slough, with a drainage area of 17.0 square miles and a 100-year peak discharge of 400 cfs
- Gonzales Slough East Branch, with a drainage area of 2.3 square miles and a 100-year peak discharge of 195 cfs
- Natividad Creek, with a drainage area of 10.0 square miles and a 100-year peak discharge of 700 cfs
- Pacific Ocean, with a 5.0-foot still-water elevation
- Pajaro River, with a drainage area of 1,275.0 square miles and a 100-year peak discharge of 43,600 cfs
- Pine Canyon Creek, with a drainage area of 15.6 square miles and a 100-year peak discharge of 1,500 cfs
- Reclamation Ditch, with a drainage area of 124.0 square miles and a 100-year peak discharge of 1,300 cfs
- Salinas River, with a drainage area of 4,156.0 square miles and a 100-year peak discharge of 81,000 cfs

- San Lorenzo Creek, with a drainage area of 260.0 square miles and a 100-year peak discharge of 18,700 cfs
- San Miguel Canyon Creek, with a drainage area of 12.8 square miles and a 100-year peak discharge of 690 cfs
- Santa Rita Creek, with a drainage area of 4.2 square miles and a 100-year peak discharge of 465 cfs
- Tembladero Slough, with a drainage area of 135 square miles and a 100-year peak discharge of 4,000 cfs
- Thomasello Creek, with a drainage area of square miles and a 100-year peak discharge of 850 cfs

Figure E-7 (Appendix E) shows the extent of the 100-year and 500-year floodplains as well as the known localized flooding within the entire County. An area totaling 232.942 square miles within the County is within the 100-year floodplain and 57.367 square miles is within the 500-year floodplain. As such, shallow (1- to 3-foot) and sheet flooding conditions generally occur in the Salinas, Carmel, Pajaro, and Big and Little Sur Valleys. In addition, flooding can occur along the beach, where it is not uncommon to see winter storms produce 15-foot breakers. Flooding in these areas generally occurs during the rainy season, from October to April.

Based on previous occurrences, Monterey County can expect a serious flood event to occur every 4 years.

5.3.5 Hazardous Materials Event

5.3.5.1 Nature

Hazardous materials include hundreds of substances that pose a significant risk to humans. These substances may be highly toxic, reactive, corrosive, flammable, radioactive, or infectious. Numerous federal, state, and local agencies, including the U.S. Environmental Protection Agency (EPA), U.S. Department of Transportation (DOT), National Fire Protection Association, FEMA, the U.S. Army, and the International Maritime Organization regulate hazardous materials.

Hazardous material releases can occur from any of the following:

- Fixed site facilities (such as refineries, chemical plants, storage facilities, manufacturing facilities, warehouses, wastewater treatment plants, swimming pools, dry cleaners, automotive sales/repair, gas stations, etc.)
- Highway and rail transportation (such as tanker trucks, chemical trucks, and railroad tankers)
- Air transportation (such as cargo packages)
- Pipeline transportation (liquid petroleum, natural gas, and other chemicals)

Unless exempted, facilities that use, manufacture, or store hazardous materials in the United States fall under the regulatory requirements of the Emergency Planning and Community Right to Know Act (EPCRA) of 1986, enacted as Title III of the Federal Superfund Amendments and

Reauthorization Act (42 USC 11001–11050 [1988]). Under EPCRA regulations, hazardous materials that pose the greatest risk for causing catastrophic emergencies are identified as Extremely Hazardous Substances (EHSs). These chemicals are identified by the EPA in the *List of Lists – Consolidated List of Chemicals Subject to the Emergency Planning and Community Right-to-Know Act (EPCRA) and Section 112 of the Clean Air Act*. Releases of EHSs can occur during transport and from fixed facilities. Transportation-related releases are generally more troublesome because they can occur anywhere, including close to human populations, critical facilities, or sensitive environmental areas. Transportation-related EHS releases are also more difficult to mitigate due to the variability of locations and distance from response resources.

In addition to accidental human-caused hazardous material events, natural hazards may cause the release of hazardous materials and complicate response activities. The impact of earthquakes on fixed facilities may be particularly serious due to the impairment or failure of the physical integrity of containment facilities. The threat of any hazardous material event may be magnified due to restricted access, reduced fire suppression and spill containment, and even complete cut-off of response personnel and equipment. In addition, the risk of terrorism involving hazardous materials is considered a major threat due to the location of hazardous material facilities and transport routes throughout communities and the frequently limited antiterrorism security at these facilities.

5.3.5.2 History

The National Response Center, which serves as the federal point of contact for reporting oil, chemical, radiological, biological, and etiological discharges into the environment, Web-based query system shows that since October 1991, 571 oil and chemical spills have occurred throughout Monterey County. Of the total 571 incidents, 151 incidents (26 percent) occurred in the city of Monterey, 96 incidents (17 percent) occurred in Moss Landing, and 76 incidents (13 percent) occurred in Salinas. The number of total incidents, types of incidents, and sources are presented in Table 5-3.

Table 5-3
Oil and Chemical Spills, 1991–2006

Incidents		Sources	
Type	**Number**	**Sources**	**Number**
Aircraft	2	Oil, Misc.	75
Fixed	159	Oil, Diesel	67
Mobile	51	Oil, Fuel	45
Pipeline	27	Ammonia	20
Railroad	24	Oil, Crude	17
Release Non-Railroad	32	Unleaded Gas	17
Storage Tank	10	Sewage	15
Unknown	127	Natural Gas	13
Vessel	139	Other	302
Total	**571**		**571**

In addition to the National Response Center, the EPA's Environmental Facts Multisystem Query contains information about facilities that are required to report activity (Superfund, water, waste, radiation, air, chemical, and toxic releases) to a state or federal system. 13 facilities have produced and released air pollutants, 18 facilities have reported toxic releases, 453 facilities have reported hazardous waste activities, and 11 Superfund sites exist according to the query.

5.3.5.3 Location, Extent, and Probability of Future Events

In Monterey County, a hazardous materials event is most likely to occur along transportation corridors, oil fields, or in agricultural production areas. The trucks and trains that use these transportation corridors commonly carry a variety of hazardous materials, including gasoline, other crude oil derivatives, and other chemicals known to cause human health problems. The County's active oil fields are subject to fire or explosion. Monterey's agricultural industry is a heavy user of pesticides and fertilizers and the incorrect production and storage of these chemicals can not only contaminate the soil, air, and water, but can cause a fire or generate an explosion.

As such, as shown in Figure E-8 (Appendix E), a 1-mile buffer (½-mile on each side of the corridor) has been developed around the major transportation corridors: US 101, State Route 1 (Highway 1), State Route 156, State Route 183, State Route 68, State Route 148, and State Route 198. This buffer encompasses the majority of oil fields in Bradley and San Ardo and the majority of the agricultural pesticide and fertilizer storage facilities within Salinas Valley.

Comprehensive information on the probability and magnitude of a hazardous material event along the transportation corridor is not available. Wide variations among the characteristics of hazardous material sources and among the materials themselves make such an evaluation difficult. However, based on previous occurrences, Monterey County can expect a hazardous material event due to a railroad or mobile sources to occur five times a year. The probability of future hazardous material events due to oil fields and agricultural pesticides and fertilizers will be incorporated into future versions of the MJHMP as it becomes available.

5.3.6 Landslide

5.3.6.1 Nature

Landslide is a general term for the dislodgment and fall of a mass of soil or rocks along a sloped surface or for the dislodged mass itself. The term is used for varying phenomena, including mudflows, mudslides, debris flows, rock falls, rockslides, debris avalanches, debris slides, and slump-earth flows. Landslides may result from a wide range of combinations of natural rock, soil, or artificial fill. The susceptibility of hillside and mountainous areas to landslides depends on variations in geology, topography, vegetation, and weather. Landslides may also occur due to indiscriminate development of sloping ground or the creation of cut-and-fill slopes in areas of unstable or inadequately stable geologic conditions.

Landslides often occur together with other natural hazards, thereby exacerbating conditions, as described below.

- Shaking due to earthquakes can trigger events ranging from rock falls and topples to massive slides.
- Intense or prolonged precipitation that causes flooding can also saturate slopes and cause failures leading to landslides.
- Landslides into a reservoir can indirectly compromise dam safety, and a landslide can even affect the dam itself.
- Wildfires can remove vegetation from hillsides, significantly increasing runoff and landslide potential.

5.3.6.2 History

As shown in Figure E-9 (Appendix E), the USGS has mapped over 1,500 large landslides along the Big Sur coast. Some of these notable landslides include the Willow Creek, Wild Cattle Creek, Gray Slip, Duck Ponds, Tree Bones, Hurricane Point, and Straight Down landslides. Historically, landslide activity has increased during severe El Niño years. During the 1972–1973 El Niño season, a landslide along the Big Sur coast resulted in one death. Throughout the 1997–1998 El Niño season, a series of debris slides failed along the northern flank of Saddle Mountain in Carmel Valley and impacted Saddle Mountain Recreation Area. A landslide in Las Lomas in rural north Monterey County caused several homes to be destroyed and resulted in a Hazard Mitigation Grant Program (HMGP) project that involved buying out the affected homes and preserving the land where the slide occurred as perpetual open space. Failures were typically 50 to 100 feet in length, 30 to 50 feet in width, and 3 to 6 feet deep. Also, several landslides blocked Highway 1 at Hurricane Point.

5.3.6.3 Location, Extent, and Probability of Future Events

Several types of landslides occur in Monterey County, including shallow rock falls, debris flows, and steep slope failures. However, the most common type of landslide in this area is a large slow-moving or creeping landslide. Typically, these deep-seated landslides, which are hundreds to thousands of feet in length or width, only move fractions of an inch per year. However, during heavy rainfall or seismic events, a landslide can move several yards a minute or faster.

As shown in Figure E-10 (Appendix E), the areas of highest susceptibility to earthquake-induced large landslides include Carmel Valley, the southern Big Sur coast, the Arroyo Seco district, and the foothills of southern Salinas Valley. In this area, rocks have been weakened through faulting and fracturing, uplift, and saturated soils due to heavy or prolonged rainfall. Shallow landslides such as debris flows and rock falls are strongly dependent on local site conditions and therefore are not included on this figure. However, these geologic hazards are most common in the northern part, along the steep slopes of the northern Big Sur coast.

Monterey County can expect to experience significant landsliding events during strong El Niño years (every 5 to 7 years) or during a large earthquake event.

5.3.7 Tsunami

5.3.7.1 Nature

A tsunami is a series of waves generated in a body of water by an impulsive disturbance along the seafloor that vertically displaces the water. Subduction earthquakes at plate boundaries most frequently cause a tsunami. However, tsunamis can be generated by submarine landslides as well as by the collapses of volcanic edifices and violent submarine volcanic eruptions.

A single tsunami event may involve a series of waves, known as a train, of varying heights. In open water, tsunamis have extremely long periods of time (from minutes to hours) for the next wave top to pass a point after the previous one. Additionally, a tsunami wavelength can extend up to several hundred miles, very different from typical wind-generated swells on the ocean, which might have a period of about 10 seconds and a wavelength of 300 feet.

The actual height of a tsunami wave in open water is generally only 1 to 3 feet and is often practically unnoticeable to people on ships. The energy of a tsunami passes through the entire water column to the seabed, unlike surface waves, which typically reach only down to a depth of 30 feet or so. The tsunami wave travels across the ocean at speeds up to 700 miles per hour (mph). As the wave approaches land, the sea shallows and the wave no longer travels as quickly, so the wave begins to “pile up” as the wave-front becomes steeper and taller, and less distance occurs between crests. Therefore, the wave can increase to a height of 90 feet or more as it approaches the coastline and compresses. This steepening process is often compared to the sound of a cracking whip.

A tsunami not only affects beaches that are open to the ocean, but also bay mouths, tidal flats, and the shores of large coastal rivers. Tsunami waves can also diffract around land masses. And since tsunamis are not symmetrical, the waves may be much stronger in one direction than another, depending on the nature of the source and the surrounding geography. However, tsunamis do propagate outward from their source, so coasts in the shadow of affected land masses are usually fairly safe.

5.3.7.2 History

As shown in Table 5-4, eight observed tsunamis generated waves in Monterey County over the last 200 years. Almost all of the tsunamis were produced by earthquakes and resulted in wave run-ups of 1 meter or less. A tsunami in 1960 produced severe currents in Monterey, Moss Landing, and Pacific Grove and is blamed for one death.

Table 5-4
Historic Monterey County Tsunami Events, 1806–2006

Date	Origin	Cause	Location of Effects	Wave Run-Up (Meters)
03/03/1901	N. California	Landslide	Monterey	Observed
04/01/1946	E. Aleutian Islands	Earthquake, Landslide	Monterey, Pacific Grove	Observed – 2.6 M
03/09/1957	Central Aleutian Islands	Earthquake	Monterey	0.6 M
05/22/1960	S. Central Chile	Earthquake	Monterey, Moss Landing, Pacific Grove	0.8 – 1.1 M
03/28/1964	Gulf of Alaska	Earthquake	Monterey, Moss Landing, Pacific Grove	Observed – 1.4 M
10/18/1989	N. California	Earthquake	Monterey, Moss Landing	0.4 – 1.0 M
04/25/1992	N. California	Earthquake	Monterey	<0.1 M
06/22/2001	Southern Peru	Earthquake	Monterey	0.15 M

Source: Humboldt State University

5.3.7.3 Location, Extent, and Probability of Future Events

As shown in Figure 10 (Appendix E), the entire coastal area of Monterey County is susceptible to a tsunami. The Big Sur coast is less susceptible to significant tsunami run-up due to the rugged and steep cliffs of the coastal mountains. However, the coastal low-lying areas and riverine valleys to the north are highly susceptible to tsunamis. For example, areas as far inland as Castroville are susceptible to a moderate tsunami run-up (less than 21 feet), and areas as far inland as downtown Salinas and Castroville are susceptible to extreme tsunami run-ups (21 feet to 50 feet).

As noted above, Monterey County has experienced 8 tsunamis over the past 100 years and has been impacted significantly by one. Although these numbers could be averaged to generate an expected occurrence rate, there have been as few as 3 and as many as 45 years in between events, and an averaged recurrence interval would not be meaningful. For the purposes of this plan, the probability that Monterey County will experience a tsunami has been estimated to be high (1 event in every 3 to 45 years, averaging a 1-foot to 11-foot run-up for all coastal and low-lying areas within the County.

5.3.8 Wildland Fire

5.3.8.1 Nature

A wildland fire is a type of wildfire that spreads through consumption of vegetation. It often begins unnoticed, spreads quickly, and is usually signaled by dense smoke that may be visible from miles around. Wildland fires can be caused by human activities (such as arson or

campfires) or by natural events such as lightning. Wildland fires often occur in forests or other areas with ample vegetation. In addition to wildland fires, wildfires can be classified as urban fires, interface or intermix fires, and prescribed fires.

The following three factors contribute significantly to wildland fire behavior and can be used to identify wildland fire hazard areas.

- **Topography:** As slope increases, the rate of wildland fire spread increases. South-facing slopes are also subject to more solar radiation, making them drier and thereby intensifying wildland fire behavior. However, ridgetops may mark the end of wildland fire spread, since fire spreads more slowly or may even be unable to spread downhill.
- **Fuel:** The type and condition of vegetation plays a significant role in the occurrence and spread of wildland fires. Certain types of plants are more susceptible to burning or will burn with greater intensity. Dense or overgrown vegetation increases the amount of combustible material available to fuel the fire (referred to as the "fuel load"). The ratio of living to dead plant matter is also important. The risk of fire is increased significantly during periods of prolonged drought as the moisture content of both living and dead plant matter decreases. The fuel's continuity, both horizontally and vertically, is also an important factor.
- **Weather:** The most variable factor affecting wildland fire behavior is weather. Temperature, humidity, wind, and lightning can affect chances for ignition and spread of fire. Extreme weather, such as high temperatures and low humidity, can lead to extreme wildland fire activity. By contrast, cooling and higher humidity often signal reduced wildland fire occurrence and easier containment.

The frequency and severity of wildland fires is also dependent on other hazards, such as lightning, drought, and infestations (such as the recent damage to Southern California alpine forests by the pine bark beetle). If not promptly controlled, wildland fires may grow into an emergency or disaster. Even small fires can threaten lives and resources and destroy improved properties. In addition to affecting people, wildland fires may severely affect livestock and pets. Such events may require emergency watering/feeding, evacuation, and shelter.

The indirect effects of wildland fires can be catastrophic. In addition to stripping the land of vegetation and destroying forest resources, large, intense fires can harm the soil, waterways, and the land itself. Soil exposed to intense heat may lose its capability to absorb moisture and support life. Exposed soils erode quickly and enhance siltation of rivers and streams, thereby enhancing flood potential, harming aquatic life, and degrading water quality. Lands stripped of vegetation are also subject to increased debris flow hazards.

5.3.8.2 History

The third largest wildland fire recorded in California since 1932 occurred in Monterey County. In July 1977 the Marble Cone fire burned almost 178,000 acres of land. Fortunately, no structures were lost and no deaths occurred. Lightning was determined to be the cause of this fire.

As shown in Table 5-5, since 1999 Monterey County has experienced six large (300-acre or greater) wildland fires. These fires do not include the 25,000 acres burned annually from

wildland fires in Los Padres National Forest. Figure E-11 (Appendix E) shows total number of wildland fires from 1986 through 1996.

Table 5-5
Large Monterey County Wildland Fires, 1999-2006

Year	Fire Name	Dates	Acres Burned	Cause
2006	Ricco	7/22 – 7/27	14,506	Lightning
2006	Stoney	7/26 – 7/26	500	Under Investigation
2005	Johnson	9/4 – 9/5	1,393	Vehicle
2004	Chular	6/30 – 7/1	300	Powerline
2002	Ft. Hunter Liggett	8/10 – 8/11	1,400	Under Investigation
1999	Metz Rd. #3	6/19 – 6/19	300	Undetermined

5.3.8.3 Location, Extent, and Probability of Future Events

Figure E-12 (Appendix E) displays both the location and extent of wildland fire hazard areas for Monterey County. This map is based on the California Fire and Resource Assessment Program (FRAP) fuel rank model. This model ranks the fuel type, slope, and ladder and/or crown fuel present from 1911–2005 to determine potential exposure to wildfire hazard areas. As such, mountainous, highly combustible areas in and around the Los Padres National Forest have a FRAP fuel ranking of "very high" and therefore are most susceptible to wildland fires. The communities along the Big Sur coast, including Big Sur, Post, Lucia, Gorda, and Plaskett, are also at great risk to wildland fires. Sudden Oak Death is present and expanding in this area and its effects present a serious and growing wildland fire danger.

Generally, fire susceptibility throughout California dramatically increases in the late summer and early autumn as vegetation dries out, decreasing plant moisture content and increasing the ratio of dead fuel to living fuel. However, various other factors, including humidity, wind speed and direction, fuel load and fuel type, and topography, can contribute to the intensity and spread of wildland fires. The common causes of wildland fires in California include arson and negligence. Based on previous occurrences, Monterey County can expect a large wildland fire to occur about every 1 to 2 years.

5.3.9 Windstorm

5.3.9.1 Nature

Winds are horizontal flows of air that blow from areas of high pressure to areas of low pressure. Wind strength depends on the difference between the high- and low-pressure systems and the distance between them. A steep pressure gradient results from a large pressure difference or short distance between these systems and causes strong winds. Windstorms associated with cyclonic systems and their cold fronts occur in the winter. These storms can damage trees and temporarily disrupt power and communication facilities, but usually cause only minor damage to structures.

Windstorms can also be created by thermally forced circulations during the spring to summer months. Known as sea breezes, these winds are strongest when the land becomes warmer than

the adjacent ocean. Driven by the differential heating of land versus water, sea breeze formation is conducive under synoptic conditions that allow strong heating of land areas. The wind direction associated with the sea breeze is directed inland along the surface pressure gradient. Therefore, sea breeze fronts generally push inland for approximately 25 miles as the day progresses. The sea breeze circulation will intensify as the daytime solar heating reaches its maximum before diminishing and reversing to a land breeze circulation as the land cools.

5.3.9.2 History

According to the National Climatic Data Center, Monterey County has been affected by high windstorm events in February 1993 and March 1995. Monterey County has also recorded four tornadoes associated with cold-core upper-level lows centered off the Northern California coast. All four tornadoes occurred in the northeastern portion of Monterey County, with the largest tornado reaching a Category 1 (maximum wind speeds of 73–112 mph) in Watsonville, just across the Pajaro River in Santa Cruz County, in December 2001.

In addition to winter windstorms, every year, between the months of March and October, when the Pacific High attains its greatest strength, prevailing northwest sustained surface winds in Salinas Valley reach average speeds of 10 to 15 mph with accompanying wind gusts up to 45 mph.

5.3.9.3 Location, Extent, and Probability of Future Events

All of Monterey County is subject to strong southeasterly winds associated with powerful cold fronts. These winds, which are usually part of a strong Pacific storm, generally occur during the winter months, from November through February. On the other hand, sea breezes generally occur in the central and southern Salinas Valley. As shown in Figure E-13 (Appendix E), the central and southern Salinas Valley is susceptible to both types of wind hazards. This area contains roughly all lands between the communities of Chualar in the north and San Lucas in the south. The San Benito County line forms the eastern boundary, and the boundary to the southwest is formed by the Hunter-Liggett Military Reservation and the Los Padres National Forest. As the wind passes through the narrowing valley, the wind velocity increases and moisture-holding capacity decreases. As such, this wind is relatively hot and dry in southern portions of the valley, such as Soledad. Sea breeze winds, with average winds speeds of 10–15 mph, can be expected annually from March through October.

This section provides an overview of the vulnerability analysis and describes the five specific steps: asset inventory, methodology, data limitations and exposure analysis for current assets, and areas of future development. Community-specific asset inventory and exposure analysis tables are listed in Appendices H through T for Monterey County and the participating communities.

6.1 OVERVIEW OF VULNERABILITY ANALYSIS

A vulnerability analysis predicts the extent of exposure that may result from a hazard event of a given intensity in a given area. The analysis provides quantitative data that may be used to identify and prioritize potential mitigation measures by allowing communities to focus attention on areas with the greatest risk of damage. A vulnerability analysis is divided into five steps: including asset inventory, methodology, data limitations and exposure analysis for current assets, and areas of future development.

The requirements for a vulnerability analysis as stipulated in DMA 2000 and its implementing regulations, are described below.

- A summary of the community's vulnerability to each hazard that addresses the impact of each hazard on the community.

DMA 2000 Requirements: Risk Assessment, Assessing Vulnerability, Overview

Assessing Vulnerability: Overview

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.

Element

Does the plan include an **overall summary** description of the jurisdiction's **vulnerability** to each hazard?

Does the plan address the **impact** of each hazard on the jurisdiction?

Source: FEMA, March 2004.

- An identification of the types and numbers of existing vulnerable buildings, infrastructure, and critical facilities and, *if possible*, the types and numbers of vulnerable future development.

DMA 2000 Recommendations: Risk Assessment, Assessing Vulnerability, Identifying Structures

Assessing Vulnerability: Identifying Structures

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.

Element

Does the plan describe vulnerability in terms of the **types and numbers** of **existing** buildings, infrastructure, and critical facilities located in the identified hazard areas?

Does the plan describe vulnerability in terms of the **types and numbers** of **future** buildings, infrastructure, and critical facilities located in the identified hazard areas?

Source: FEMA, March 2004.

- Estimate of potential dollar losses to vulnerable structures and the methodology used to prepare the estimate.

DMA 2000 Recommendations: Risk Assessment, Assessing Vulnerability, Estimating Potential Losses

Assessing Vulnerability: Estimating Potential Losses

Requirement §201.6(c)(2)(ii)(B): [The plan **should** describe vulnerability in terms of an] estimate of the potential dollar losses to vulnerable structures identified in paragraph (c)(2)(i)(A) of this section and a description of the methodology used to prepare the estimate.

Element

Does the plan estimate **potential dollar losses** to vulnerable structures?

Does the plan describe the **methodology** used to prepare the estimate?

Source: FEMA, March 2004.

6.2 VULNERABILITY ANALYSIS: SPECIFIC STEPS

6.2.1 Asset Inventory

Asset inventory is the first step of a vulnerability analysis. Assets within each community that may be affected by hazard events include population, residential and nonresidential buildings, and critical facilities and infrastructure. The assets and insured values throughout all of Monterey County are identified and discussed in detail below. As noted above, community-specific asset inventory lists are located in Tables H-1 through T-1 in Appendices H through T, respectively.

6.2.1.1 Population and Building Stock

Population data for all of Monterey County was obtained from the 2000 U.S. Census, which was collected census block level. Monterey County's total population for 2000 was 401,762 (Table 6-1). Population density throughout Monterey County is shown on Figure E-14 (Appendix E).

Table 6-1
Countywide Estimated Population and Building Inventory

Population	Residential Buildings		Nonresidential Buildings	
2000 Census Population Count*	**Total Building Count**	**Total Value of Buildings ** (x$1000)**	**Total Building Count**	**Total Value of Buildings *** (x$1000)**
401,762	106,900	22,739,635	3,082	7,986,838

Source: FEMA HAZUS-MH, Version 2006 and U.S. Census 2000.
* Population count using census blocks within the countywide limits.

** Average insured structural value of all residential buildings (including single-family dwellings, mobile homes, etc., is $214,000 per structure).

*** Averaged insured structural value of all nonresidential buildings (including industry, trade, professional and technical services, etc., is $3,012,000).

Estimated numbers of residential and nonresidential buildings and replacement values for those structures, as shown in Table 6-1, were obtained from HAZUS, FEMA's hazard identification software program, the1997 Economic Census, and the 2000 U.S. Census. A total of 106,900 residential buildings were considered in this analysis, including single-family dwellings, mobile homes, multi-family dwellings, temporary lodgings, and institutional dormitory facilities. A total of 6,164 nonresidential buildings were also analyzed, including industry, retail trade, wholesale trade, personal and repair services, professional and technical services, banks, medical offices, religious centers, entertainment and recreational facilities, theaters, and parking facilities. The total number of nonresidential buildings captured by HAZUS appeared to be approximately 50 percent of the total number of nonresidential buildings throughout the County. Therefore, URS doubled the HAZUS numbers in order to more accurately reflect the actual nonresidential building count.

6.2.1.2 Critical Facilities and Infrastructure

A critical facility is defined as a facility in either the public or private sector that provides essential products and services to the general public, such as preserving the quality of life in Monterey County and fulfilling important public safety, emergency response, and disaster recovery functions. The total number of critical facilities within Monterey County is listed in Table 6-2 and shown on Figure E-15 (Appendix E). Community-specific critical facilities are listed in Tables H-2 through T-2 in Appendices H through T, respectively.

Similar to critical facilities, critical infrastructure includes infrastructure that is essential to preserving the quality of life and safety in Monterey County. Critical infrastructure identified within Monterey County is shown in Table 6-2 and Figure E-15 (Appendix E).

Table 6-2
Countywide Critical Facilities and Infrastructure

Category		Total Structures/Total Miles	Total Costs (x$1000)
Government		27	92,129
Emergency Response		33	37,524
Lifeline Utilities		19	842,364
		42	92,282
Care		113	66,670
Educational		14	591,633
Marine, Environmental, and Community		27	92,129
Special Districts		43	206,255
Infrastructure	Bridges	336	495,057
	Federal and State highways	505.1513 (miles)	3,136,297
	Railroad Tracks	115.9033 (miles)	160,017
	Airports	3	19,293

Source: FEMA HAZUS-MH (estimated values)

6.2.2 Methodology

A conservative exposure-level analysis was conducted to assess the risks of the identified hazards. This analysis is a simplified assessment of the potential effects of the hazards on values at risk without consideration of probability or level of damage.

Using GIS, the building footprints of critical facilities were compared to locations where hazards are likely to occur. If any portion of the critical facility fell within a hazard area, it was counted as impacted. Using census block level information, a spatial proportion was used to determine the percentage of the population and residential and nonresidential structures located where hazards are likely to occur. Census blocks that are completely within the boundary of a hazard area were determined to be vulnerable and were totaled. A spatial proportion was also used to determine the amount of linear assets, such as highways and pipelines, within a hazard area. The exposure analysis for linear assets was measured in miles.

Replacement values or insurance coverage were developed for physical assets. These values were obtained from HAZUS-MH or from Monterey County. For facilities that didn't have specific values per building in a multi-building scenario (e.g., schools), the buildings were grouped together and assigned one value. For each physical asset located within a hazard area, exposure was calculated by assuming the worst-case scenario (that is, the asset would be completely destroyed and would have to be replaced). Finally, the aggregate exposure, in terms of replacement value or insurance coverage, for each category of structure or facility was calculated. A similar analysis was used to evaluate the proportion of the population at risk. However, the analysis simply represents the number of people at risk; no estimate of the number of potential injuries or deaths was prepared.

6.2.3 Data Limitations

The vulnerability estimates provided herein use the best data currently available, and the methodologies applied result in an approximation of risk. These estimates may be used to understand relative risk from hazards and potential losses. However, uncertainties are inherent in any loss estimation methodology, arising in part from incomplete scientific knowledge concerning hazards and their effects on the built environment as well as the use of approximations and simplifications that are necessary for a comprehensive analysis.

It is also important to note that the quantitative vulnerability assessment results are limited to the exposure of people, buildings, and critical facilities and infrastructure to the identified hazards. It was beyond the scope of this MJHMP to develop a more detailed or comprehensive assessment of risk (including annualized losses, people injured or killed, shelter requirements, loss of facility/system function, and economic losses). Such impacts may be addressed with future updates of the MJHMP.

6.2.4 Exposure Analysis

The results of the exposure analysis for loss estimations in Monterey County are summarized in Tables 6-3, 6-4, and 6-5 and in the following discussion. The results of the exposure analysis for the participating communities (including the Special Districts) are located in Tables H-3, H-4, and H-5 through Tables T-3, T-4, and T-5 in Appendices H through T, respectively.

Table 6-3
Countywide Potential Hazard Vulnerability Analysis: Population and Buildings

		Population	Buildings			
			Residential		Nonresidential	
Hazard Type	**Methodology**	**Number**	**Number**	**Value ($)[1]**	**Number**	**Value ($)[1]**
Coastal Erosion	100-year erosion zone	752	445	112,766	100	144,715
Dam Failure	Inundation area	72,926	15,304	3,411,892	1,114	2,169,999
Earthquake	Extreme	12,251	3,357	590,989	129	260,579
	High	295,032	73,116	15,519,401	2,826	5,330,438
	Moderate	93,431	29,736	6,472,890	1,255	2,335,072
Flood	100-year flood zone	18,819	4,886	948,519	607	875,611
Hazardous Materials Event	1-mile buffer transport corridor	185,170	47,669	10,197,276	2,439	4,899,420
Landslide	High	5,165	2,495	522,411	31	72,273
	Moderate	19,473	7,973	1,634,502	132	296,608
Tsunami	Maximum average run-up	10,066	2,915	641,454	329	528,033
Wildland Fire	Very high	3,692	1,577	386,211	36	86,692
	High	17,134	7,201	1,425,731	158	323,664
	Moderate	348,973	89,728	19,308,157	3,642	6,701,906
Windstorm	Prevailing wind zone	112,466	19,949	3,691,210	643	1,299,328

[1] Value = Estimated average structural value (x1000)

Table 6-4
Countywide Potential Hazard Vulnerability Analysis – Critical Facilities

		Government		Emergency Response		Lifeline Utilities		Care		Educational		Marine / Environmental		Total	
Hazard	**Methodology**	**No.**	**Value ($)[1]**	**No.**	**Value ($)[1]**	**No.**	**Value ($)[1]**	**No.**	**Value ($)[1]**	**No.**	**Value ($)[1]**	**No.**	**Value ($)[1]**	**No.**	**Value ($)[1]**
Coastal Erosion	100-year erosion zone	1	1,180	0	0	0	0	0	0	0	0	1	181,022	2	182,202
Dam Failure	Inundation area	10	22,758	5	5,428	10	398,370	12	27,736	22	12,980	5	237,167	76	794,751
Earthquake	Extreme	0	0	0	0	0	0	0	0	2	1,180	2	2,360	7	7,160
	High	20	56,474	21	23,364	7	467,250	26	68,804	78	46,020	6	315,436	186	1,164,820
	Moderate	7	35,655	12	14,160	12	375,114	16	23,478	33	19,470	6	273,837	97	755,697
Flood	100-year flood zone	0	0	0	0	5	392,940	0	0	3	1,770	6	418,189	19	896,011
Hazardous Materials Event	1-mile buffer transport corridor	17	63,892	21	24,780	10	315,124	29	46,294	60	35,400	8	317,796	173	915,333
Landslide	High	0	0			0	0	0	0	2	1,180	0	0	3	1,888
	Moderate	0	0	1	1,652	0	0	1	802	2	1,180	0	0	6	5,050
Tsunami	Maximum average run-up	3	9,019	0	0	0	0	1	4,130	2	1,180	5	494,098	15	590,083
Wildland Fire	Very high	0	0	0	0	0	0	2	1,604	1	590	0	0	3	2,194
	High	0	0	0	0	0	0	0	0	4	2,360	0	0	7	4,484
	Moderate	25	89,769	33	37,524	7	274,030	38	87,478	97	57,230	14	591,633	248	1,256,479
Windstorm	Prevailing wind zone	5	27,816	9	11,092	14	463,702	9	15,334	24	14,160	0	0	64	534,976

[1] Value = Estimated insured structural value (x1000)

Table 6-5
Countywide Potential Hazard Vulnerability Analysis – Critical Infrastructure

		Highways		Railroads		Bridges		Airport	
Hazard	**Methodology**	**Miles**	**Value ($)[1]**	**Miles**	**Value ($)[1]**	**No.**	**Value ($)[1]**	**No.**	**Value ($)[1]**
Coastal Erosion	100-year erosion zone	10.0	51,750	0.0	0	0	0	0	0
Dam Failure	Inundation area	82.0	552,745	67.0	92,510	108	265,383	0	0
Earthquake	Extreme	16.1	96,008	9.3	12,833	22	10,503	0	0
	High	174.3	1,129,465	54.7	75,524	167	272,059	2	12,862
	Moderate	292.9	1,797,304	51.9	71,660	129	197,353	1	6,431
Flood	100-year flood zone	43.6	270,332	15.6	21,552	92	223,124	0	0
Hazardous Materials Event	1-mile buffer transport corridors	336.6	2,262,957	115.9	160,017	224	408,347	1	6,431
Landslide	High	55.0	287,390	2.0	2,748	25	30,269	0	0
	Moderate	43.1	235,944	2.1	2,889	15	8,616	0	0
Tsunami	Maximum average run-up	13.3	68,852	7.6	10,546	29	68,531	0	0
Wildland Fire	Very high	10.8	56,038	0.0	0	13	7,993	0	0
	High	141.6	758,489	11.6	16,034	84	75,712	0	0
	Moderate	205.1	1,249,652	38.5	53,164	174	299,285	2	12,862
Windstorm	Prevailing wind zone	141.7	1,053,539	77.3	106,724	55	152,534	1	6,431

[1] Value = Estimated value (x1000)

6.2.4.1 Coastal Erosion

Coastal erosion is present along the entire coast of Monterey County. On average, the northern County coastline erodes 2.6 feet annually while the steep cliffs along the southern coastline erode 7 inches annually. Therefore, using a 100-year projection to determine areas at risk to coastal erosion, approximately 752 people (less than 1 percent of the total population), 445 residential buildings (worth $112.7 million), 100 nonresidential buildings (worth $144.7 million), and 2 critical facilities (worth $182 million) reside in the coastal erosion hazard area. Approximately 10.0 miles of highway are also located in this hazard area.

6.2.4.2 Dam Failure

Exposed within the inundation zones of the Nacimiento, San Antonio, San Clemente, Los Padres, Black Rock Creek, Forest Lake, Pacific Grove, and Salinas dams are 72,926 people (18 percent of the total population), 15,304 residential buildings (worth $3.4 billion), 1,114 nonresidential buildings (worth $2.2 billion), and 76 critical facilities (worth $794.7 million). 82.0 miles of highway and 67.0 miles of railroad tracks are also located in this hazard area.

6.2.4.3 Earthquake

The strongest earthquake shaking is in the northern and southeastern portions of Monterey County. As such, exposed within the extreme shaking area are 12,251 people (3 percent of the total population), 3,357 residential buildings (worth $590.9 million), 129 nonresidential buildings (worth $260.6 million), and 7 critical facilities (worth $7.1 million). 16.1 miles of highway and 9.3 miles of railroad tracks are also located in this hazard area. Exposed within the high shaking hazard area is nearly 75 percent of the total population. This includes 295,032 people, 73,116 residential buildings (worth $15.5 billion), 2,826 nonresidential buildings (worth $5.3 billion), and 186 critical facilities (worth $1.2 billion). Additionally, 174.3 miles of highway, 54.7 miles of railroad tracks, and 2 airports are located in this hazard area. Moderate shaking can be found in the central and western portion of the County. Exposed within the moderate shaking area is the remaining 23 percent of the total population. This includes 93,431 people, 29,736 residential buildings (worth $6.5 billion), 1,255 nonresidential buildings (worth $2.3 billion), and 19 critical facilities (worth $896 million). 292.9 miles of highway, 51.9 miles of railroad tracks, and 1 airport are also located in this hazard area.

6.2.4.4 Flood

The major SFHAs within the County include areas adjacent to the Salinas, Carmel, Pajaro, and Arroyo Seco rivers, the Moro Cojo and Elkhorn sloughs, and low-lying coastal areas that are inundated by wave attack. Exposed within this hazard area are 18,819 people (5 percent of the total population), 4,886 residential buildings (worth $949 million), 607 nonresidential buildings (worth $876 million), and 19 critical facilities (worth $896 million). Approximately 43.6 miles of highway and 15.6 miles of railroad tracks are located in the 100-year floodplain.

6.2.4.5 Hazardous Materials Event

Nearly half of the countywide total population resides in the 1-mile buffer of transportation corridors. This includes 185,170 people, 47,669 residential buildings (worth $10.1 billion), 2,439 nonresidential buildings (worth $4.9 billion), and 173 critical facilities (worth $915.3 million). These figures are for the entirety of the transportation corridors and, therefore, overstate the exposure since a hazardous material event along the corridors is unlikely to affect all of the buffer area.

6.2.4.6 Landslide

The areas of highest susceptibility to earthquake-induced large landslides include Carmel Valley, the southern Big Sur coast, the Arroyo Seco district, and the foothills of southern Salinas Valley Within the high landslide hazard area are 5,165 people (1 percent of the total population), 2,495 residential buildings (worth $522.4 billion), 31 nonresidential buildings (worth $72.2 million), and 3 critical facilities (worth $1.9 million). Approximately 55.0 miles of highway and 2.0 miles of railroad tracks are located in this high hazard area. Within the moderate landslide hazard area (lower foothills, Monterey coastal bluffs) are 19,473 people (5 percent of the total population), 7,973 residential buildings (worth $1.6 billion) and 132 nonresidential building (worth $296.6 million), and 6 critical facilities (worth $5.1 million). Approximately 43.1 miles of highway and 2.1 miles of railroad tracks are located in this moderate hazard area.

6.2.4.7 Tsunami

While the entire coastal area of Monterey County is susceptible to a tsunami, the coastal low-lying areas and riverine valleys, including western city limits of Salinas and the unincorporated communities of Boronda, Castroville, Moss Landing, and Pajaro, are the most susceptible to tsunamis. Using the maximum average scenario of 21-foot run-up, 3 percent of the total population is susceptible to a maximum average tsunami. This includes 10,066 people, 2,915 residential buildings (worth $641.5 million), and 329 nonresidential buildings (worth $528.0 million), and 15 critical facilities (worth $590.0 million) are located in this hazard area. Approximately 13.3 miles of highway and 7.6 miles of railroad tracks are located in this hazard area.

6.2.4.8 Wildland Fire

Using the California FRAP model, very high wildland fire hazard areas are located in and around Los Padres National Forest, Hunter Liggett Military Reservation, and Fresno and Kings counties borders. Within this hazard area are 3,692 people (1 percent of the total population),1,577 residential buildings (worth $368.2 million), 36 nonresidential buildings (worth $86.7 million), and 3 critical facilities (worth $2.2 million).

The high wildland fire risk areas, which mainly consist of the areas to the west and east of the Salinas Valley include 17,134 people (4 percent of the total population), 7,201 residential buildings (worth $1.4 billion), 158 nonresidential buildings (worth $323.7 million), and 7 critical facilities (worth $4.5 million).

Moderate wildland fire hazard areas are located from the southernmost area of the Salinas Valley all the way north to Moss Landing and Pajaro. This area include approximately 87 percent of the countywide total population, including 348,973 people, 89,728 residential buildings (worth $19.3 billion), 3,642 nonresidential buildings (worth $6.7 billion), and 248 critical facilities (worth $1.3 billion).

6.2.4.9 Windstorm

Windstorms created by prevailing northwest sustained surface winds are common throughout the central and southern Salinas Valley from March to October. As such, 112,466 people (28 percent of the total population), 19,949 residential buildings (worth $3.7 billion), 643 nonresidential buildings (worth $1.3 billion), and 64 critical facilities (worth $535.0 million) are located in the windstorm hazard area. It is important to note, however, that the region's average speeds generally reach only 10 to 15 mph with accompanying wind gusts up to 45 mph.

6.2.5 Future Development

The majority of the County's new development (mainly residential and commercial units) is expected to occur in the north-central and inland areas of the County. The northern region includes the communities of Aromas, Castroville, Elkhorn, Las Lomas, Moss Landing, Pajaro, and Prunedale. The inland area generally consists of the Toro region and the Greater Salinas planning area (including the City of Salinas). In addition, rapid development has occurred and is expected to continue to occur along the Highway 101 corridor to the City of Soledad.

Any new development in the north-central and inland area is susceptible to earthquake hazards. In addition, within the northern portion of the County, new development is susceptible to flooding adjacent to the Salinas and Pajaro Rivers. New development in the inland region will not only be susceptible to flooding along the canyon floors and flat floodplains of the Salinas River, but it will be also susceptible to landsliding along the steep ravines, hillsides, and ridgelines. Development down the Highway 101 corridor will be most susceptible to windstorms and hazardous materials events.

Although the Monterey Peninsula and Big Sur Coastal areas are expected to experience only minor changes in land use and development, any new development or redevelopment in this area (mainly visitor serving commercial inn units and employee housing) is susceptible to natural hazards. Along the Big Sur coast, new development is susceptible to landslides and erosion. Further inland, new development is susceptible to landsliding and wildland fires. Along the Monterey Peninsula, the biggest hazard concerns include flooding in the Carmel Valley and coastal erosion along the peninsula and dunes.

This section provides an overview of the four-step process for preparing a mitigation strategy: developing mitigation goals, identifying mitigation actions, evaluating mitigation actions, and implementing a Countywide Mitigation Action Plan. Community-specific Mitigation Action Plans are provided in Appendices H through S. No mitigation action plans were prepared for the Special Districts for this version of the MJHMP.

7.1 DEVELOPING MITIGATION GOALS

The requirements for the local hazard mitigation goals, as stipulated in DMA 2000 and its implementing regulations, are described below.

DMA 2000 Requirements: Mitigation Strategy – Local Hazard Mitigation Goals

Local Hazard Mitigation Goals

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.

Element

- Does the plan include a description of mitigation **goals** to reduce or avoid long-term vulnerabilities to the identified hazards? (**GOALS** are long-term; represent what the community wants to achieve, such as "eliminate flood damage," and are based on the risk assessment findings.)

Source: FEMA, March 2004.

During the third Planning Team meeting in December 2006, the Planning Team reviewed the Countywide and community-specific risk assessment results as a basis for developing the mitigation goals and actions. Mitigation goals are defined as general guidelines that explain what a community wants to achieve in terms of hazard and loss prevention. Goal statements are typically long-range, policy-oriented statements representing community-wide visions. As such, the Planning Team developed eleven goals to reduce or avoid long-term vulnerabilities to the identified hazards (Table 7-1).

Table 7-1
Mitigation Goals

Goal Number	Goal Description
1	Promote disaster-resistant development.
2	Build and support local capacity to enable the public to prepare for, respond to, and recover from disasters.
3	Reduce the possibility of damage and losses due to coastal erosion.
4	Reduce the possibility of damage and losses due to dam failure.
5	Reduce the possibility of damage and losses due to earthquake.
6	Reduce the possibility of damage and losses due to flood.
7	Reduce the possibility of damage and losses due to a hazardous materials event.
8	Reduce the possibility of damage and losses due to landslide.
9	Reduce the possibility of damage and losses due to tsunami.
10	Reduce the possibility of damage and losses due to wildand fire.
11	Reduce the possibility of damage and losses due to windstorm.

7.2 IDENTIFYING MITIGATION ACTIONS

The requirements for the identification and analysis of mitigation actions, as stipulated in DMA 2000 and its implementing regulations, are described below.

DMA 2000 Requirements: Mitigation Strategy - Identification and Analysis of Mitigation Actions

Identification and Analysis of Mitigation Actions

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.

Element

- Does the plan identify and analyze a **comprehensive range** of specific mitigation actions and projects for each hazard?
- Do the identified actions and projects address reducing the effects of hazards on **new** buildings and infrastructure?
- Do the identified actions and projects address reducing the effects of hazards on **existing** buildings and infrastructure?

Source: FEMA, March 2004.

After developing the mitigation goals, the Planning Team reviewed and revised list of potential mitigation actions for the County. Mitigation actions are activities, measures, or projects that help achieve the goals of a mitigation plan. Mitigation actions are usually grouped into six broad categories: prevention, property protection, public education and awareness, natural resource protection, emergency services, and structural projects. As listed in Table 7-2, the Planning Team developed 27 potential mitigation actions, with a particular emphasis placed on mitigation actions that reduce the effects of hazards on both new and existing buildings and infrastructure.

Table 7-2
Mitigation Goals and Potential Actions

Goals		Potential Actions	
Number	**Description**	**Number**	**Description**
1	Promote disaster-resistant development.	1.A	Create incentives (e.g., rebates) to promote homeowner/business owner disaster-resistant development (e.g., Class A roofing material).
		1.B	Identify hazard-prone critical facilities and infrastructure and carry out acquisition, relocation, and structural and nonstructural retrofitting measures as necessary.
		1.C	Do not permit development, including that of critical facilities, in high hazard coastal erosion, earthquake, landslide, and tsunami hazard areas unless measures recommended by a California certified engineering geologist or geotechnical engineer can be implemented to reduce the hazard to an acceptable level.
		1.D	Integrate elements from the MJHMP into other local planning documents, including the safety element section of general plans, hazard-specific zoning ordinances, and emergency operation plans.
		1.E	Update land acquisition / future development criteria to include a hazard analysis component.

Table 7-2
Mitigation Goals and Potential Actions

Goals		Potential Actions	
Number	**Description**	**Number**	**Description**
2	Build and support local capacity to enable community members to prepare for, respond to, and recover from disasters.	2.A	Develop a sustained public outreach program that encourages consistent hazard mitigation content. For example, consider publishing tsunami inundation maps in telephone books, wildland fire defensible space tips with summer water bills, and the safe handling and disposal of hazardous waste and chemicals with garbage bills.
		2.B	Develop audience-specific hazard mitigation outreach efforts. Audiences include the elderly, children, tourists, non-English speaking residents, and home and business owners.
		2.C	Develop community Citizen Corps programs that also include a mitigation component.
		2.D	Update hazard maps in the County's GIS mapping database to include all nine hazards and asset information identified in the MJHMP. Develop data-sharing agreements with other local agencies.
3	Reduce the possibility of damage and losses due to coastal erosion.	3.A	Regulate new development within 50 feet of the face of a cliff or bluff or within the area of a 20 degree angle from the toe of a cliff, whichever is greater. This setback may be greater if it is determined that the rate of erosion will place the structure in jeopardy within a 100-year structural life expectancy.
		3.B	Develop an online countywide plant selection guide that helps homeowners select the best plants for erosion control or slope stabilization project.
4	Reduce the possibility of damage and losses due to dam failure.	4.A	Review and update County inundation maps every five years and participate in DSOD mapping updates.
5	Reduce the possibility of damage and losses due to earthquakes.	5.A	Establish an ordinance to include permit requirements relative to the siting and design of new structures and grading in high seismic hazard areas.
		5.B	Develop an unreinforced masonry grant program that helps correct earthquake-risk nonmasonry building problems, including chimney bracing and anchoring water heaters.
6	Reduce the possibility of damage and losses due to floods.	6.A	Explore mitigation opportunities for repetitively flooded properties, and if necessary, carry-out acquisition, relocation, elevation, and flood-proofing measures to protect these properties.
		6.B	Require new development to install drainage facilities to mitigate post-development peak flow.
		6.C	Identify and carry-out minor flood and stormwater management projects that would reduce damage to infrastructure and damage due to local flooding/inadequate drainage. These include the modification of existing culverts and bridges, upgrading capacity of storm drains, stabilization of streambanks, and creation of debris or flood/stormwater retention basins in small watersheds.

Table 7-2
Mitigation Goals and Potential Actions

Goals		Potential Actions	
Number	**Description**	**Number**	**Description**
7	Reduce the possibility of damage and losses due to hazardous materials events.	7.A	Examine and mitigate critical infrastructure that has been identified as currently being too narrow to ensure the safe transportation of truck loads within Monterey County.
8	Reduce the possibility of damage and losses due to landslides.	8.A	Investigate and apply deep-seated landslide stability improvement measures including interceptor drains, in situ soil piles, drained earth buttresses, and subdrains, to site-specific landslide hazard areas.
		8.B	Develop a vegetation management plan. Proper vegetation can supply slope-stabilizing root strength, and facilitate in intercepting precipitation.
9	Reduce the possibility of damage and losses due to tsunamis.	9.A	Participate in the Tsunami Ready Program. This new program, sponsored by the National Weather Service, is designed to provide communities with incentives to reduce their tsunami risks.
10	Reduce the possibility of damage and losses due to wildland fire.	10.A	Continue to conduct current fuel management programs and investigate and apply new and emerging fuel management techniques.
		10.B	Create defensible space guidelines for both new and existing buildings that are in areas of very high and extreme fire hazard areas.
		10.C	Develop and provide funding and/or incentives for defensible space measures (e.g., free chipping day, free collection day for tree limbs).
11	Reduce the possibility of damage and losses due to windstorms.	11.A	Adopt more prescriptive rules relative to the construction and maintenance of overhead lines.
		11.B	Develop windstorm building requirements (e.g., fasteners for roof sheathing and singles) for new structures and critical facilities in high wind hazard areas.
		11.C	Include provisions for dust erosion control methods in building, grading, and land clearing permits.

7.3 EVALUATING MITIGATION ACTIONS

DMA 2000 requires that the potential mitigation actions be prioritized, that the way in which they would be implemented and administered be addressed, and that a cost-benefit review be conducted, as described below.

DMA 2000 Requirements: Mitigation Strategy - Implementation of Mitigation Actions

Implementation of Mitigation Actions

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.

Element

- Does the mitigation strategy include how the actions are **prioritized**? (For example, is there a discussion of the process and criteria used?)
- Does the mitigation strategy address how the actions will be **implemented and administered**? (For example, does it identify the responsible department, existing and potential resources, and timeframe?)
- Does the prioritization process include an emphasis on the use of a **cost-benefit review** (see page 3-36 of *Multi-Hazard Mitigation Planning Guidance*) to maximize benefits?

Source: FEMA, March 2004.

After the Planning Team members had identified the 27 potential mitigation actions, the members evaluated each of the mitigation actions to determine which actions would best help the County fulfill its mitigation goals, thereby reducing or avoiding long-term vulnerabilities to the identified hazards. To complete this task, the Planning Team reviewed the simplified STAPLEE evaluation criteria (shown in Table 7-3) and the Benefit-Cost Analysis Fact Sheet (Appendix F) to consider the opportunities and constraints of implementing each particular mitigation action.

Table 7-3
Evaluation Criteria for Mitigation Actions

Evaluation Category	Discussion "It is important to consider…"	Considerations
Social	The public support for the overall mitigation strategy and specific mitigation actions.	Community acceptance Adversely affects population
Technical	If the mitigation action is technically feasible and if it is the whole or partial solution.	Technical feasibility Long-term solutions Secondary impacts
Administrative	If the community has the personnel and administrative capabilities necessary to implement the action or whether outside help will be necessary.	Staffing Funding allocation Maintenance / operations
Political	What the community and its members feel about issues related to the environment, economic development, safety, and emergency management.	Political support Local champion Public support

Table 7-3
Evaluation Criteria for Mitigation Actions

Evaluation Category	Discussion "It is important to consider…"	Considerations
Legal	Whether the community has the legal authority to implement the action, or whether the community must pass new regulations.	Local, state, and Federal authority Potential legal challenge
Economic	If the action can be funded with current or future internal and external sources, if the costs seem reasonable for the size of the project, and if enough information is available to complete a FEMA BCA.	Benefit / cost of action Contributes to other economic goals Outside funding required FEMA BCA
Environmental	The impact on the environment because of public desire for a sustainable and environmentally healthy community.	Effect on local flora and fauna Consistent with community environmental goals Consistent with local, state, and Federal laws

Using the STAPLEE criteria and the Benefit-Cost Analysis Fact Sheet as guidance, the Planning Team assigned a mitigation action with a "positive" or "neutral" ranking. A positive ranking represents an action that best fulfills the goals of the MJHMP and is appropriate and feasible for the County and participating communities to implement. A neutral ranking represents an action that is useful, but may not be the best approach to reduce a hazard and may not be feasible for the County or its communities to implement. The Planning Team determined that the mitigation actions that received a positive ranking would be considered a "high" priority and be included in any mitigation action plan while a mitigation action that ranked neutral would be considered a "medium" priority and not included in any mitigation action plan.

7.4 IMPLEMENTING A MITIGATION ACTION PLAN

Table 7-5 shows a Countywide Mitigation Action Plan matrix that describes how the mitigation actions were ranked and prioritized, how the overall benefit-costs were taken into consideration, and how each mitigation action will be implemented and administered by the Planning Team, the County, and the participating communities.

Each participating community followed this same process and developed its own community-specific Mitigation Action Plan. The community-specific Mitigation Action Plans are provided in Appendices H through S. Special Districts did not prepare mitigation action plans for this version of the MJHMP.

Table 7-5
Countywide Mitigation Action Plan Matrix

Action Number	Description	Ranking / Prioritization	Administering Department	Potential Funding	Timeframe	Benefit-Costs
1.D	Integrate elements from the MJHMP into other local planning documents, including the safety element section of general plans, hazard-specific zoning ordinances, and emergency operation plans.	Priority / High	MJHMP Planning Team, County, participating communities	General Funds	Ongoing	The integration of the MJHMP elements into planning documents will help ensure consistency across all types and all phases of planning.
2.A	Develop a sustained public outreach program that encourages consistent hazard mitigation content. For example, consider publishing tsunami inundation maps in telephone books, wildland fire defensible space tips with summer water bills, and the safe handling and disposal of hazardous waste and chemicals with garbage bills.	Priority / High	MJHMP Planning Team, County, participating communities	HMGP and PDM Grants	Ongoing	A sustained mitigation outreach program will help build and support countywide capacity to enable the public to prepare for, respond to, and recover from disasters.
2.D	Update hazard maps in the County's GIS mapping database to include all nine hazards and asset information identified in the MJHMP. Develop data-sharing agreements with other local agencies.	Priority / High	MJHMP Planning Team, County, participating communities	General Funds	0-1 year, Ongoing	A multi-jurisdictional, multi-hazard GIS mapping program will help communities identify current hazard areas and critical assets. This information will help communities prioritize and implement relevant mitigation strategies.

This section describes a formal plan maintenance process to ensure that the MJHMP remains an active and applicable document. It includes an explanation of how Monterey County OES and the Planning Team intend to organize their efforts to ensure that improvements and revisions to the MJHMP occur in a well-managed, efficient, and coordinated manner.

The following three process steps are addressed in detail below:

- Monitoring, evaluating, and updating the MJHMP
- Implementation through existing planning mechanisms
- Continued public involvement

8.1 MONITORING, EVALUATING, AND UPDATING THE MJHMP

The requirements for monitoring, evaluating, and updating the MJHMP, as stipulated in the DMA 2000 and its implementing regulations, are described below.

DMA 2000 Requirements: Plan Maintenance Process - Monitoring, Evaluating, and Updating the Plan

Monitoring, Evaluating and Updating the Plan

Requirement §201.6(c)(4)(i): [The plan maintenance process **shall** include a] section describing the method and schedule of monitoring, evaluating, and updating the mitigation plan within a five-year cycle.

Element

- Does the plan describe the method and schedule for **monitoring** the plan? (For example, does it identify the party responsible for monitoring and include a schedule for reports, site visits, phone calls, and meetings?)
- Does the plan describe the method and schedule for **evaluating** the plan? (For example, does it identify the party responsible for evaluating the plan and include the criteria used to evaluate the plan?)
- Does the plan describe the method and schedule for **updating** the plan within the five-year cycle?

Source: FEMA, March 2004.

The MJHMP was prepared as a collaborative effort between Monterey County OES, Planning Team, and URS. To maintain momentum and build upon previous hazard mitigation planning efforts and successes, Monterey County OES will use the Planning Team to monitor, evaluate, and update the MJHMP. Each participating jurisdiction will be responsible for implementing his/her community-specific Mitigation Action Plan. Kyle Oden, the Planning Team leader, will serve as the primary point of contact and will coordinate all local efforts to monitor, evaluate, and revise the MJHMP.

Each member of the Planning Team, or representative from each participating jurisdiction, will conduct an annual review to monitor the progress in implementing the MJHMP, particularly his/her community-specific Mitigation Action Plan. As shown in Appendix G, the Annual Review Worksheet will provide the basis for possible changes in the to the overall MJHMP Mitigation Action Plan and each community-specific Mitigation Action Plan by refocusing on new or more threatening hazards, adjusting to changes to or increases in resource allocations, and engaging additional support for the MJHMP implementation. The Planning Team leader will initiate the annual review 1 month prior to the date of adoption. The findings from these reviews will be presented at the annual Planning Team meeting. Each review, as shown on the Annual Review Worksheet, will include an evaluation of the following:

- Participation of each jurisdiction and others in the MJHMP implementation.
- Notable changes in the countywide risk of natural or human-caused hazards.
- Impacts of land development activities and related programs on hazard mitigation.
- Progress made with the Countywide Mitigation Action Plan as well as each community-specific Mitigation Action Plan (identify problems and suggest improvements as necessary).
- The adequacy of local and county resources for implementation of the MJHMP.

A system of reviewing the progress on achieving the mitigation goals and implementing the Mitigation Action Plan activities and projects will also be accomplished during the annual review process. During each annual review, each community currently administering a mitigation project will submit a Progress Report to the Planning Team. As shown in Appendix G, the report will include the current status of the mitigation project, including any changes made to the project, the identification of implementation problems and appropriate strategies to overcome them, and whether or not the project has helped achieved the appropriate goals identified in the plan.

In addition to the annual review, the Planning Team will update the MJHMP every five years. To ensure that this occurs, in the fourth year following adoption of the MJHMP, the Planning Team will undertake the following activities:

- Thoroughly analyze and update the risk of natural and human-made hazards countywide.
- Provide a new annual review (as noted above), plus a review of the three previous annual reviews.
- Provide a detailed review and revision of the mitigation strategy.
- Prepare a new Mitigation Action Plan for Monterey County and each participating community.
- Prepare a new draft MJHMP and submit it to the each appropriate governing body for adoption.
- Submit an updated MJHMP to the California OES and FEMA for approval.

8.2 IMPLEMENTATION THROUGH EXISTING PLANNING MECHANISMS

The requirements for implementation through existing planning mechanisms, as stipulated in the DMA 2000 and its implementing regulations, are described below.

DMA 2000 Requirements: Plan Maintenance Process - Incorporation into Existing Planning Mechanisms

Incorporation into Existing Planning Mechanisms

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.

Element

- Does the plan identify other local planning mechanisms available for incorporating the requirements of the mitigation plan?
- Does the plan include a process by which the local government will incorporate the requirements in other plans, when appropriate?

Source: FEMA, March 2004.

After the adoption of the MJHMP, each Planning Team member will ensure that the MJHMP, in particular each Mitigation Action Plan, is incorporated into existing planning mechanisms. Each member of the Planning Team will achieve this by undertaking the following activities.

- Conduct a review of the community-specific regulatory tools to assess the integration of the mitigation strategy. These regulatory tools are identified in each community-specific capability assessment presented in Appendices H through S.
- Work with pertinent community departments to increase awareness of the MJHMP and provide assistance in integrating the mitigation strategy (including the Mitigation Action Plan) into relevant planning mechanisms. Implementation of these requirements may require updating or amending specific planning mechanisms.

8.3 CONTINUED PUBLIC INVOLVEMENT

The requirements for continued public involvement, as stipulated in the DMA 2000 and its implementing regulations, are described below.

DMA 2000 Requirements: Plan Maintenance Process - Continued Public Involvement

Continued Public Involvement

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.

Element

- Does the plan explain how **continued public participation** will be obtained? (For example, will there be public notices, an ongoing mitigation plan committee, or annual review meetings with stakeholders?)

Source: FEMA, March 2004.

Monterey County OES and each participating community are dedicated to involving the public directly in the continual reshaping and updating of the MJHMP. Electronic and hard copies of the MJHMP will be provided to each participating community. In addition, a downloadable copy of the MJHMP and any proposed changes will be posted on the Monterey County OES Web site. This site will also contain an e-mail address and phone number to which people can direct their comments or concerns.

The Planning Team will also identify opportunities to raise community awareness about the MJHMP and the hazards that affect Monterey County. This could include attendance and provision of materials at both County and City-sponsored events and public mailings. Any public comments received regarding the MJHMP will be collected by the Planning Team leader, included in the annual report, and considered during future MJHMP updates.

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Appendix A

FEMA Crosswalk

LOCAL HAZARD MITIGATION PLAN REVIEW CROSSWALK **FEMA REGION IX**

Jurisdiction: Monterey County, CA (multi-jurisdictional)

Instructions for Using the Plan Review Crosswalk for Review of Local Mitigation Plans

Attached is a Plan Review Crosswalk based on the ***Multi-Hazard Mitigation Planning Guidance Under the Disaster Mitigation Act of 2000***, published by FEMA, dated March 2004. This Plan Review Crosswalk is consistent with the *Disaster Mitigation Act of 2000* (P.L. 106-390), enacted October 30, 2000 and *44 CFR Part 201 – Mitigation Planning, Interim Final Rule* (the Rule), published February 26, 2002.

SCORING SYSTEM

N – Needs Improvement: The plan does not meet the minimum for the requirement. Reviewer's comments must be provided.

S – Satisfactory: The plan meets the minimum for the requirement. Reviewer's comments are encouraged, but not required.

Each requirement includes separate elements. All elements of a requirement must be rated "Satisfactory" in order for the requirement to be fulfilled and receive a summary score of "Satisfactory." A "Needs Improvement" score on elements shaded in gray (recommended but not required) will not preclude the plan from passing.

When reviewing single jurisdiction plans, reviewers may want to put an N/A in the boxes for multi-jurisdictional plan requirements. When reviewing multi-jurisdictional plans, reviewers may want to put an N/A in the prerequisite box for single jurisdiction plans.

States that have additional requirements can add them in the appropriate sections of the *Multi-Hazard Mitigation Planning Guidance* or create a new section and modify this Plan Review Crosswalk to record the score for those requirements.

Optional matrices for assisting in the review of sections on profiling hazards, assessing vulnerability, and identifying and analyzing mitigation actions are found at the end of the Plan Review Crosswalk.

The example below illustrates how to fill in the Plan Review Crosswalk.

Example

Assessing Vulnerability: Overview

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.*

Element	Location in the Plan (section or annex and page #)	Reviewer's Comments	SCORE N	SCORE S
A. Does the plan include an **overall summary** description of the jurisdiction's **vulnerability** to each hazard?	Section II, pp. 4-10	The plan describes the types of assets that are located within geographically defined hazard areas as well as those that would be affected by winter storms.		✓
B. Does the plan address the **impact** of each hazard on the jurisdiction?	Section II, pp. 10-20	The plan does not address the impact of two of the five hazards addressed in the plan. **Required Revisions:** • Include a description of the impact of floods and earthquakes on the assets. **Recommended Revisions:** • This information can be presented in terms of dollar value or percentages of damage.	✓	
		SUMMARY SCORE	✓	

March 2004

LOCAL HAZARD MITIGATION PLAN REVIEW CROSSWALK **FEMA REGION IX**

Jurisdiction: Monterey County (multi-jurisdictional) Date: March 2007

Local Mitigation Plan Review and Approval Status

Jurisdiction: **Monterey County (and participating communities, see below)**	**Title of Plan:** **Multi-Jurisdictional Hazard Mitigation Plan for Monterey County**	**Date of Plan:** **March 2007**
Local Point of Contact: **Kyle Oden**	**Address:** **1322 Natividad Rd.** **Salinas, CA 93906**	
Title: **Emergency Services Planner**		
Agency: **Monterey County Office of Emergency Services**		
Phone Number: **831.796.1900**	**E-Mail:** **OdenK@co.monterey.ca.us**	

State Reviewer:	**Title:**	**Date:**
Contract Reviewer:	**Title:**	**Date:**
Contract QA/QC Reviewer:	**Title:**	**Date:**

FEMA Reviewer:	**Title:**	**Date:**
Date Received in FEMA Region IX		
Plan Not Approved		
Plan Approved		
Date Approved		

Jurisdiction:	**NFIP Status***			
	Y	**N**	**N/A**	**CRS Class**
1. County of Monterey	✓			
2. Carmel-by-the-Sea	✓			
3. Del Rey Oaks	✓			

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LOCAL HAZARD MITIGATION PLAN REVIEW CROSSWALK **FEMA REGION IX**

Jurisdiction: Monterey County (multi-jurisdictional) Date: March 2007

4. Gonzales	✓			
5. Greenfield	✓			
6. King City	✓			
7. Marina	✓			
8. Monterey	✓			
9. Pacific Grove	✓			
10. Salinas	✓			
11. Sand City	✓			
12. Soledad	✓			
	✓			
	✓			
	✓			
1.	✓			

*** Notes:** **Y = Participating** **N = Not Participating** **N/A = Not Mapped**

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LOCAL HAZARD MITIGATION PLAN REVIEW CROSSWALK **FEMA REGION IX**

Jurisdiction: Monterey County (multi-jurisdictional) Date: March 2007

LOCAL MITIGATION PLAN REVIEW SUMMARY

The plan cannot be approved if the plan has not been formally adopted.

Each requirement includes separate elements. All elements of the requirement must be rated "Satisfactory" in order for the requirement to be fulfilled and receive a score of "Satisfactory." Elements of each requirement are listed on the following pages of the Plan Review Crosswalk. A "Needs Improvement" score on elements shaded in gray (recommended but not required) will not preclude the plan from passing. Reviewer's comments must be provided for requirements receiving a **"Needs Improvement"** score.

SCORING SYSTEM

Please check one of the following for each requirement.

N – Needs Improvement: The plan does not meet the minimum for the requirement. Reviewer's comments must be provided.

S – Satisfactory: The plan meets the minimum for the requirement. Reviewer's comments are encouraged, but not required.

Prerequisite(s) (Check Applicable Box)	**NOT MET**	**MET**
Adoption by the Local Governing Body: §201.6(c)(5) **OR**		
Multi-Jurisdictional Plan Adoption: §201.6(c)(5) **AND**		
Multi-Jurisdictional Planning Participation: §201.6(a)(3)		

Planning Process	**N**	**S**
Documentation of the Planning Process: §201.6(b) and §201.6(c)(1)		

Risk Assessment	**N**	**S**
Identifying Hazards: §201.6(c)(2)(i)		
Profiling Hazards: §201.6(c)(2)(i)		
Assessing Vulnerability: Overview: §201.6(c)(2)(ii)		
Assessing Vulnerability: Identifying Structures: §201.6(c)(2)(ii)(A)		
Assessing Vulnerability: Estimating Potential Losses: §201.6(c)(2)(ii)(B)		
Assessing Vulnerability: Analyzing Development Trends: §201.6(c)(2)(ii)(C)		
Multi-Jurisdictional Risk Assessment: §201.6(c)(2)(iii)		

Mitigation Strategy	**N**	**S**
Local Hazard Mitigation Goals: §201.6(c)(3)(i)		
Identification and Analysis of Mitigation Actions: §201.6(c)(3)(ii)		
Implementation of Mitigation Actions: §201.6(c)(3)(iii)		
Multi-Jurisdictional Mitigation Actions: §201.6(c)(3)(iv)		

Plan Maintenance Process	**N**	**S**
Monitoring, Evaluating, and Updating the Plan: §201.6(c)(4)(i)		
Incorporation into Existing Planning Mechanisms: §201.6(c)(4)(ii)		
Continued Public Involvement: §201.6(c)(4)(iii)		

Additional State Requirements*	**N**	**S**
Insert State Requirement		
Insert State Requirement		
Insert State Requirement		

LOCAL MITIGATION PLAN APPROVAL STATUS

PLAN NOT APPROVED ☐

PLAN APPROVED ☐

*States that have additional requirements can add them in the appropriate sections of the *Multi-Hazard Mitigation Planning Guidance* or create a new section and modify this Plan Review Crosswalk to record the score for those requirements.

See Reviewer's Comments

3

LOCAL HAZARD MITIGATION PLAN REVIEW CROSSWALK **FEMA REGION IX**

Jurisdiction: Monterey County (multi-jurisdictional) Date: March 2007

PREREQUISITE(S)

Adoption by the Local Governing Body

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).*

Element	Location in the Plan (section or annex and page #)	Reviewer's Comments	SCORE NOT MET	SCORE MET
A. Has the local governing body adopted the plan?		No, this is a draft plan. Adoption will occur after pre-approval from FEMA.		
B. Is supporting documentation, such as a resolution, included?		No, this is a draft plan. Adoption will occur after pre-approval from FEMA.		
		SUMMARY SCORE		

Multi-Jurisdictional Plan Adoption

Requirement §201.6(c)(5): *For multi-jurisdictional plans, each jurisdiction requesting approval of the plan **must** document that it has been formally adopted.*

Element	Location in the Plan (section or annex and page #)	Reviewer's Comments	SCORE NOT MET	SCORE MET
A. Does the plan indicate the specific jurisdictions represented in the plan?	Pg. 1-1			
B. For each jurisdiction, has the local governing body adopted the plan?		No, this is a draft plan. Adoption will occur after pre-approval from FEMA.		
C. Is supporting documentation, such as a resolution, included for each participating jurisdiction?		No, this is a draft plan. Adoption will occur after pre-approval from FEMA.		
		SUMMARY SCORE		

Multi-Jurisdictional Planning Participation

Requirement §201.6(a)(3): *Multi-jurisdictional plans (e.g., watershed plans) may be accepted, as appropriate, as long as each jurisdiction has participated in the process ... Statewide plans will not be accepted as multi-jurisdictional plans.*

Element	Location in the Plan (section or annex and page #)	Reviewer's Comments	SCORE NOT MET	SCORE MET
A. Does the plan describe **how** each jurisdiction participated in the plan's development?	Pg. 4-3			
		SUMMARY SCORE		

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LOCAL HAZARD MITIGATION PLAN REVIEW CROSSWALK **FEMA REGION IX**

Jurisdiction: Monterey County (multi-jurisdictional) Date: March 2007

PLANNING PROCESS: *§201.6(b): An open public involvement process is essential to the development of an effective plan.*

Documentation of the Planning Process

Requirement §201.6(b): *In order to develop a more comprehensive approach to reducing the effects of natural disasters, the planning process* ***shall*** *include:*
(1) An opportunity for the public to comment on the plan during the drafting stage and prior to plan approval;
(2) An opportunity for neighboring communities, local and regional agencies involved in hazard mitigation activities, and agencies that have the authority to regulate development, as well as businesses, academia and other private and non-profit interests to be involved in the planning process; and
(3) Review and incorporation, if appropriate, of existing plans, studies, reports, and technical information.

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

Element	Location in the Plan (section or annex and page #)	Reviewer's Comments	SCORE N	SCORE S
A. Does the plan provide a narrative description of the process followed to prepare the plan?	Pgs. 4-1 to 4-4			
B. Does the plan indicate who was involved in the planning process? (For example, who led the development at the staff level and were there any external contributors such as contractors? Who participated on the plan committee, provided information, reviewed drafts, etc.?)	Pg. 4-1, 4-2			
C. Does the plan indicate how the public was involved? (Was the public provided an opportunity to comment on the plan during the drafting stage and prior to the plan approval?)	Pg. 4-3, 4-4			
D. Was there an opportunity for neighboring communities, agencies, businesses, academia, nonprofits, and other interested parties to be involved in the planning process?	Pg. 4-3, 4-4			
E. Does the planning process describe the review and incorporation, if appropriate, of existing plans, studies, reports, and technical information?	Pg. 4-4, 4-5			
		SUMMARY SCORE		

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LOCAL HAZARD MITIGATION PLAN REVIEW CROSSWALK **FEMA REGION IX**

Jurisdiction: Monterey County (multi-jurisdictional) Date: March 2007

Local Capabilities Assessment (Optional, Additional State OES Requested Information)

Requirement §201.4(c)(3)(ii): *– Of the Federal Register Interim Final Rule 44 CFR Parts 201 and 206 states, "[The State mitigation strategy shall include] a general description and analysis of the effectiveness of local mitigation policies, programs, and capabilities.*

… .

Element	Location in the Plan (section or annex and page #)	Reviewer's Comments	SCORE N	SCORE S
A. Does the plan provide a description of the human, technical and financial resources available within this jurisdiction to engage in a mitigation planning process and to develop a local hazard mitigation plan? (These resources are described in Section 2.2 of the OES LHMP Development Guide).	Appendices H to S (Table 7)	***Note: This section is optional. A "Needs Improvement" score on this requirement will not preclude the plan from being approved by FEMA.***		
B. Does the plan list local mitigation funding sources (taxes, fees, assessments or fines) which affect or promote mitigation within the reporting jurisdiction?	Appendices H to S (Table 8)	***Note: This section is optional. A "Needs Improvement" score on this requirement will not preclude the plan from being approved by FEMA.***		
C. Does the plan list local ordinances which affect or promote disaster mitigation, preparedness, response or recovery within the reporting jurisdiction?	Appendices H to S (Table 6)	***Note: This section is optional. A "Needs Improvement" score on this requirement will not preclude the plan from being approved by FEMA.***		
D. Does the plan describe the details of ongoing mitigation projects and programs within the reporting jurisdiction?	Appendices H to S (Table 7)	***Note: This section is optional. A "Needs Improvement" score on this requirement will not preclude the plan from being approved by FEMA.***		

LOCAL HAZARD MITIGATION PLAN REVIEW CROSSWALK **FEMA REGION IX**

Jurisdiction: Monterey County (multi-jurisdictional) Date: March 2007

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

Identifying Hazards

Requirement §201.6(c)(2)(i): *[The risk assessment **shall** include a] description of the type … of all natural hazards that can affect the jurisdiction.*

Element	Location in the Plan (section or annex and page #)	Reviewer's Comments	SCORE N	SCORE S
A. Does the plan include **a description** of the types of **all natural hazards** that affect the jurisdiction? If the hazard identification omits (without explanation) any hazards commonly recognized as threats to the jurisdiction, this part of the plan cannot receive a Satisfactory score. Consult with the State Hazard Mitigation Officer to identify applicable hazards that may occur in the planning area.	Pg. 5-1, 5-2			
		SUMMARY SCORE		

Profiling Hazards

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 hazard events.*

Element	Location in the Plan (section or annex and page #)	Reviewer's Comments	SCORE N	SCORE S
A. Does the risk assessment identify the **location** (i.e., geographic area affected) of each natural hazard addressed in the plan?	Coastal Erosion: Pgs. 5-4 and 5-5 Dam Failure: Pgs. 5-5 and 5-6 Earthquake: Pg. 5-9 Flood: Pgs. 5-13 and 5-14 Hazardous Material Event: Pg. 5-16 Landslide: Pg. 5-17 Tsunami: Pg. 5-			

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LOCAL HAZARD MITIGATION PLAN REVIEW CROSSWALK **FEMA REGION IX**

Jurisdiction: Monterey County (multi-jurisdictional) Date: March 2007

	19 Wildland Fire: Pg. 5-21 Windstorm: Pg. 5-22			
B. Does the risk assessment identify the **extent** (i.e., magnitude or severity) of each hazard addressed in the plan?	Coastal Erosion: Pg. 5-5 Dam Failure: Pg. 5-6 Earthquake: Pgs. 5-9 and 5-10 Flood: Pgs. 5-13 and 5-14 Hazardous Material Event: Pg. 5-16 Landslide: Pg. 5-17 Tsunami: Pg. 5-19 Wildland Fire: Pg. 5-21 Windstorm: Pg. 5-22			
C. Does the plan provide information on **previous occurrences** of each hazard addressed in the plan?	Coastal Erosion: Pg. 5-4 Dam Failure: Pg. 5-5 Earthquake: Pgs. 5-8 and 5-9 Flood: Pg. 5-11 Hazardous Material Event: Pg. 5-15 Landslide: Pg. 5-17 Tsunami: Pgs. 5-18 and 5-19 Wildland Fire: Pgs. 5-20 and 5-21 Windstorm: Pg.			

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Jurisdiction: Monterey County (multi-jurisdictional) Date: March 2007

	5-22			
D. Does the plan include the **probability of future events** (i.e., chance of occurrence) for each hazard addressed in the plan?	Coastal Erosion: Pg. 5-5 Dam Failure: Pgs. 5-6 and 5-7 Earthquake: Pgs. 5-9 and 5-10 Flood: Pg. 5-14 Hazardous Material Event: Pg. 5-16 Landslide: Pg. 5-17 Tsunami: Pg. 5-19 Wildland Fire: Pg. 5-21 Windstorm: Pg. 5-22			
		SUMMARY SCORE		

Assessing Vulnerability: Overview

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.*

Element	Location in the Plan (section or annex and page #)	Reviewer's Comments	SCORE N	SCORE S
A. Does the plan include an **overall summary** description of the jurisdiction's **vulnerability** to each hazard?	Entire planning area: Pgs. 6-5 through 6-10 Specific jurisdictions: Appendices H-S			
B. Does the plan address the **impact** of each hazard on the jurisdiction?	Entire planning area: Pgs. 6-5 through 6-10 Specific jurisdictions: Appendices H-S			
		SUMMARY SCORE		

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LOCAL HAZARD MITIGATION PLAN REVIEW CROSSWALK **FEMA REGION IX**

Jurisdiction: Monterey County (multi-jurisdictional) Date: March 2007

Assessing Vulnerability: Identifying Structures

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 … .*

Element	Location in the Plan (section or annex and page #)	Reviewer's Comments	SCORE N	SCORE S
A. Does the plan describe vulnerability in terms of the **types and numbers** of **existing** buildings, infrastructure, and critical facilities located in the identified hazard areas?	Entire planning area: Pgs. 6-5 through 6-10 Specific jurisdictions: Appendices H-S	***Note: A "Needs Improvement" score on this requirement will not preclude the plan from passing.***		
B. Does the plan describe vulnerability in terms of the **types and numbers** of **future** buildings, infrastructure, and critical facilities located in the identified hazard areas?	No.	***Note: A "Needs Improvement" score on this requirement will not preclude the plan from passing.***		
		SUMMARY SCORE		

Assessing Vulnerability: Estimating Potential Losses

Requirement §201.6(c)(2)(ii)(B): *[The plan* ***should*** *describe vulnerability in terms of an] estimate of the potential dollar losses to vulnerable structures identified in paragraph (c)(2)(i)(A) of this section and a description of the methodology used to prepare the estimate … .*

Element	Location in the Plan (section or annex and page #)	Reviewer's Comments	SCORE N	SCORE S
A. Does the plan estimate **potential dollar losses** to vulnerable structures?	Entire planning area: Pgs. 6-5 through 6-10 Specific jurisdictions: Appendices H-S	***Note: A "Needs Improvement" score on this requirement will not preclude the plan from passing.***		
B. Does the plan describe the **methodology** used to prepare the estimate?	Pg. 6-4	***Note: A "Needs Improvement" score on this requirement will not preclude the plan from passing.***		
		SUMMARY SCORE		

LOCAL HAZARD MITIGATION PLAN REVIEW CROSSWALK **FEMA REGION IX**

Jurisdiction: Monterey County (multi-jurisdictional) Date: March 2007

Assessing Vulnerability: Analyzing Development Trends

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.*

Element	Location in the Plan (section or annex and page #)	Reviewer's Comments	SCORE N	SCORE S
A. Does the plan describe land uses and development trends?	Pg. 6-10	***Note: A "Needs Improvement" score on this requirement will not preclude the plan from passing.***		
		SUMMARY SCORE		

Multi-Jurisdictional Risk Assessment

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

Element	Location in the Plan (section or annex and page #)	Reviewer's Comments	SCORE N	SCORE S
A. Does the plan include a risk assessment for each participating jurisdiction as needed to reflect unique or varied risks?	Appendices H to S (Tables 3,4, and 5 in each appendix)			
		SUMMARY SCORE		

MITIGATION STRATEGY: *§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.*

Local Hazard Mitigation Goals

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.*

Element	Location in the Plan (section or annex and page #)	Reviewer's Comments	SCORE N	SCORE S
A Does the plan include a description of mitigation **goals** to reduce or avoid long-term vulnerabilities to the identified hazards? (**GOALS** are long-term; represent what the community wants to achieve, such as "eliminate flood damage"; and are based on the risk assessment findings.)	Pg. 7-1			
		SUMMARY SCORE		

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LOCAL HAZARD MITIGATION PLAN REVIEW CROSSWALK **FEMA REGION IX**

Jurisdiction: Monterey County (multi-jurisdictional) Date: March 2007

Identification and Analysis of Mitigation Actions

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.*

Element	Location in the Plan (section or annex and page #)	Reviewer's Comments	SCORE N	SCORE S
A. Does the plan identify and analyze a **comprehensive range** of specific mitigation actions and projects for each hazard?	Pgs. 7-2 to 7-4			
B Do the identified actions and projects address reducing the effects of hazards on **new** buildings and infrastructure?	Pgs. 7-2 to 7-4			
C. Do the identified actions and projects address reducing the effects of hazards on **existing** buildings and infrastructure?	Pgs. 7-2 to 7-4			
		SUMMARY SCORE		

Implementation of Mitigation Actions

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.*

Element	Location in the Plan (section or annex and page #)	Reviewer's Comments	SCORE N	SCORE S
A. Does the mitigation strategy include how the actions are **prioritized**? (For example, is there a discussion of the process and criteria used?)	Overall explanation: Pgs. 7-5 to 7-7			
B. Does the mitigation strategy address how the actions will be **implemented and administered**? (For example, does it identify the responsible department, existing and potential resources, and timeframe?)	Pg. 7-7 and Appendices H to S (Table 9)			
C. Does the prioritization process include an emphasis on the use of a **cost-benefit review** (see page 3-36 of *Multi-Hazard Mitigation Planning Guidance*) to maximize benefits?	Pgs. 7-5 to 7-7 (Table 9)			
		SUMMARY SCORE		

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LOCAL HAZARD MITIGATION PLAN REVIEW CROSSWALK **FEMA REGION IX**

Jurisdiction: Monterey County (multi-jurisdictional) Date: March 2007

Multi-Jurisdictional Mitigation Actions

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.*

Element	Location in the Plan (section or annex and page #)	Reviewer's Comments	SCORE N	SCORE S
A Does the plan include at least one identifiable **action item** for each jurisdiction requesting FEMA approval of the plan?	Overall planning area: Pg. 7-7 Specific jurisdictions: Appendices H to S (Table 9)			
		SUMMARY SCORE		

PLAN MAINTENANCE PROCESS

Monitoring, Evaluating, and Updating the Plan

Requirement §201.6(c)(4)(i): *[The plan maintenance process* ***shall*** *include a] section describing the method and schedule of monitoring, evaluating, and updating the mitigation plan within a five-year cycle.*

Element	Location in the Plan (section or annex and page #)	Reviewer's Comments	SCORE N	SCORE S
A. Does the plan describe the method and schedule for **monitoring** the plan? (For example, does it identify the party responsible for monitoring and include a schedule for reports, site visits, phone calls, and meetings?)	Pg. 8-1, Appendix G			
B. Does the plan describe the method and schedule for **evaluating** the plan? (For example, does it identify the party responsible for evaluating the plan and include the criteria used to evaluate the plan?)	Pg. 8-2, Appendix G			
C. Does the plan describe the method and schedule for **updating** the plan within the five-year cycle?	Pg. 8-2			
		SUMMARY SCORE		

LOCAL HAZARD MITIGATION PLAN REVIEW CROSSWALK **FEMA REGION IX**

Jurisdiction: Monterey County (multi-jurisdictional) Date: March 2007

Incorporation into Existing Planning Mechanisms

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.*

Element	Location in the Plan (section or annex and page #)	Reviewer's Comments	SCORE N	SCORE S
A. Does the plan identify other local planning mechanisms available for incorporating the requirements of the mitigation plan?	Pg. 8-3			
B. Does the plan include a process by which the local government will incorporate the requirements in other plans, when appropriate?	Pg. 8-3			
		SUMMARY SCORE		

Continued Public Involvement

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.*

Element	Location in the Plan (section or annex and page #)	Reviewer's Comments	SCORE N	SCORE S
A. Does the plan explain how **continued public participation** will be obtained? (For example, will there be public notices, an on-going mitigation plan committee, or annual review meetings with stakeholders?)	Pg. 8-3, 8-4			
		SUMMARY SCORE		

LOCAL HAZARD MITIGATION PLAN REVIEW CROSSWALK **FEMA REGION IX**

Jurisdiction: Monterey County (multi-jurisdictional) Date: March 2007

Matrix A: Profiling Hazards

This matrix can assist FEMA and the State in scoring each hazard. Local jurisdictions may find the matrix useful to ensure that their plan addresses each natural hazard that can affect the jurisdiction. **Completing the matrix is not required**.

Note: First, check which hazards are identified in requirement §201.6(c)(2)(i). Then, place a checkmark in either the N or S box for each ***applicable*** *hazard. An "N" for any element of any identified hazard will result in a "Needs Improvement" score for this requirement. List the hazard and its related shortcoming in the comments section of the Plan Review Crosswalk.*

Hazard Type	Hazards Identified Per Requirement §201.6(c)(2)(i)	A. Location		B. Extent		C. Previous Occurrences		D. Probability of Future Events	
	Yes	N	S	N	S	N	S	N	S
Avalanche	☐	☐	☐	☐	☐	☐	☐	☐	☐
Coastal Erosion	☐	☐	☐	☐	☐	☐	☐	☐	☐
Coastal Storm	☐	☐	☐	☐	☐	☐	☐	☐	☐
Dam Failure	☐	☐	☐	☐	☐	☐	☐	☐	☐
Drought	☐	☐	☐	☐	☐	☐	☐	☐	☐
Earthquake	☐	☐	☐	☐	☐	☐	☐	☐	☐
Expansive Soils	☐	☐	☐	☐	☐	☐	☐	☐	☐
Extreme Heat	☐	☐	☐	☐	☐	☐	☐	☐	☐
Flood	☐	☐	☐	☐	☐	☐	☐	☐	☐
Hailstorm	☐	☐	☐	☐	☐	☐	☐	☐	☐
Hurricane	☐	☐	☐	☐	☐	☐	☐	☐	☐
Land Subsidence	☐	☐	☐	☐	☐	☐	☐	☐	☐
Landslide	☐	☐	☐	☐	☐	☐	☐	☐	☐
Severe Winter Storm	☐	☐	☐	☐	☐	☐	☐	☐	☐
Tornado	☐	☐	☐	☐	☐	☐	☐	☐	☐
Tsunami	☐	☐	☐	☐	☐	☐	☐	☐	☐
Volcano	☐	☐	☐	☐	☐	☐	☐	☐	☐
Wildfire	☐	☐	☐	☐	☐	☐	☐	☐	☐
Windstorm	☐	☐	☐	☐	☐	☐	☐	☐	☐
Other _____	☐	☐	☐	☐	☐	☐	☐	☐	☐
Other _____	☐	☐	☐	☐	☐	☐	☐	☐	☐
Other _____	☐	☐	☐	☐	☐	☐	☐	☐	☐

Legend:
§201.6(c)(2)(i) Profiling Hazards
A. Does the risk assessment identify the location (i.e., geographic area affected) of each hazard addressed in the plan?
B. Does the risk assessment identify the extent (i.e., magnitude or severity) of each hazard addressed in the plan?
C. Does the plan provide information on previous occurrences of each natural hazard addressed in the plan?
D. Does the plan include the probability of future events (i.e., chance of occurrence) for each hazard addressed in the plan?

LOCAL HAZARD MITIGATION PLAN REVIEW CROSSWALK **FEMA REGION IX**

Jurisdiction: Monterey County (multi-jurisdictional) Date: March 2007

Matrix B: Assessing Vulnerability

This matrix can assist FEMA and the State in scoring each hazard. Local jurisdictions may find the matrix useful to ensure that their plan addresses each requirement. **Completing the matrix is not required**.

Note: First, check which hazards are identified in requirement §201.6(c)(2)(i). Then, place a checkmark in either the N or S box for each ***applicable*** *hazard. An "N" for any element of any identified hazard will result in a "Needs Improvement" score for this requirement. List the hazard and its related shortcoming in the comments section of the Plan Review Crosswalk.*

Note: Receiving an N in the shaded columns will not preclude the plan from passing.

Hazard Type	Hazards Identified Per Requirement §201.6(c)(2)(i)	§201.6(c)(2)(ii) Assessing Vulnerability: Overview					§201.6(c)(2)(ii) Assessing Vulnerability: Identifying Structures					§201.6(c)(2)(ii) Assessing Vulnerability: Estimating Potential Losses				
		A. Overall Summary Description of Vulnerability		B. Hazard Impact			A. Types and Number of Existing Structures in Hazard Area (Estimate)		B. Types and Number of Future Structures in Hazard Area (Estimate)			A. Loss Estimate		B. Methodology		
	Yes	N	S	N	S		N	S	N	S		N	S	N	S	
Avalanche	☐	☐	☐	☐	☐		☐	☐	☐	☐		☐	☐	☐	☐	
Coastal Erosion	☐	☐	☐	☐	☐		☐	☐	☐	☐		☐	☐	☐	☐	
Coastal Storm	☐	☐	☐	☐	☐		☐	☐	☐	☐		☐	☐	☐	☐	
Dam Failure	☐	☐	☐	☐	☐		☐	☐	☐	☐		☐	☐	☐	☐	
Drought	☐	☐	☐	☐	☐		☐	☐	☐	☐		☐	☐	☐	☐	
Earthquake	☐	☐	☐	☐	☐		☐	☐	☐	☐		☐	☐	☐	☐	
Expansive Soils	☐	☐	☐	☐	☐		☐	☐	☐	☐		☐	☐	☐	☐	
Extreme Heat	☐	☐	☐	☐	☐		☐	☐	☐	☐		☐	☐	☐	☐	
Flood	☐	☐	☐	☐	☐		☐	☐	☐	☐		☐	☐	☐	☐	
Hailstorm	☐	☐	☐	☐	☐		☐	☐	☐	☐		☐	☐	☐	☐	
Hurricane	☐	☐	☐	☐	☐		☐	☐	☐	☐		☐	☐	☐	☐	
Land Subsidence	☐	☐	☐	☐	☐		☐	☐	☐	☐		☐	☐	☐	☐	
Landslide	☐	☐	☐	☐	☐		☐	☐	☐	☐		☐	☐	☐	☐	
Severe Winter Storm	☐	☐	☐	☐	☐		☐	☐	☐	☐		☐	☐	☐	☐	
Tornado	☐	☐	☐	☐	☐		☐	☐	☐	☐		☐	☐	☐	☐	
Tsunami	☐	☐	☐	☐	☐		☐	☐	☐	☐		☐	☐	☐	☐	
Volcano	☐	☐	☐	☐	☐		☐	☐	☐	☐		☐	☐	☐	☐	
Wildfire	☐	☐	☐	☐	☐		☐	☐	☐	☐		☐	☐	☐	☐	
Windstorm	☐	☐	☐	☐	☐		☐	☐	☐	☐		☐	☐	☐	☐	
Other _____	☐	☐	☐	☐	☐		☐	☐	☐	☐		☐	☐	☐	☐	
Other _____	☐	☐	☐	☐	☐		☐	☐	☐	☐		☐	☐	☐	☐	
Other _____	☐	☐	☐	☐	☐		☐	☐	☐	☐		☐	☐	☐	☐	

Legend:

§201.6(c)(2)(ii) Assessing Vulnerability: Overview

A. Does the plan include an overall summary description of the jurisdiction's vulnerability to each hazard?

B. Does the plan address the impact of each hazard on the jurisdiction?

§201.6(c)(2)(ii)(A) Assessing Vulnerability: Identifying Structures

A. Does the plan describe vulnerability in terms of the types and numbers of existing buildings,

B. Does the plan describe vulnerability in terms of the types and numbers of future buildings, infrastructure, and critical facilities located in the identified hazard areas?

§201.6(c)(2)(ii)(B) Assessing Vulnerability: Estimating Potential Losses

A. Does the plan estimate potential dollar losses to vulnerable structures?

B. Does the plan describe the methodology used to prepare the estimate?

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infrastructure, and critical facilities located in the identified hazard areas?

Matrix C: Identification and Analysis of Mitigation Actions

This matrix can assist FEMA and the State in scoring each hazard. Local jurisdictions may find the matrix useful to ensure consideration of a range of actions for each hazard. **Completing the matrix is not required.**

Note: First, check which hazards are identified in requirement §201.6(c)(2)(i). Then, place a checkmark in either the N or S box for each ***applicable*** *hazard. An "N" for any identified hazard will result in a "Needs Improvement" score for this requirement. List the hazard and its related shortcoming in the comments section of the Plan Review Crosswalk.*

Hazard Type	Hazards Identified Per Requirement §201.6(c)(2)(i)	A. Comprehensive Range of Actions and Projects	
	Yes	N	S
Avalanche	☐	☐	☐
Coastal Erosion	☐	☐	☐
Coastal Storm	☐	☐	☐
Dam Failure	☐	☐	☐
Drought	☐	☐	☐
Earthquake	☐	☐	☐
Expansive Soils	☐	☐	☐
Extreme Heat	☐	☐	☐
Flood	☐	☐	☐
Hailstorm	☐	☐	☐
Hurricane	☐	☐	☐
Land Subsidence	☐	☐	☐
Landslide	☐	☐	☐
Severe Winter Storm	☐	☐	☐
Tornado	☐	☐	☐
Tsunami	☐	☐	☐
Volcano	☐	☐	☐
Wildfire	☐	☐	☐
Windstorm	☐	☐	☐
Other _____	☐	☐	☐
Other _____	☐	☐	☐
Other _____	☐	☐	☐

Legend:
§201.6(c)(3)(ii) Identification and Analysis of Mitigation Actions
A. Does the plan identify and analyze a comprehensive range of specific mitigation actions and projects for each hazard?

Appendix B
Adoption Resolutions

Appendix C

Planning Team Meeting Agendas

AGENDA – May 10, 2006

1:30-1:45 Introductions

- URS Consulting Team
- Multi-Jurisdictional Hazard Mitigation Planning Team

1:45-2:15 Pre-Disaster Mitigation Planning

- Why Mitigation Planning?
- Disaster Management Act of 2000
- Funding

2:15-2:45 Plan Development

- Four Phases
- Draft Plan Outline
- Draft Schedule

2:45-3:15 Exercise

- Hazard Identification

3:15-3:30 Questions & Answers

AGENDA – September 21, 2006

1:00-1:30 Progress Made-to-Date

- Public Outreach Efforts
- Documentation of Planning Process
- Community Profile
- Hazard Analysis

1:30-2:00 Hazard Figures

- Review Hazard GIS-Developed Figures

2:00-2:30 Asset Inventory

- Explain Vulnerability Analysis
- Review Draft Asset Inventory

2:30-3:00 Meeting Wrap-Up

AGENDA – December 7, 2006

1:00-1:15 Progress Made to Date

- Review of Planning Process
- Recap of Meeting No. 2

1:15-1:45 Vulnerability Analysis

- Assets Analyzed
- Vulnerability Analysis

1:45-2:45 Mitigation Strategy

- Overview of Mitigation Strategy
- Draft Goals and Actions
- Mitigation Action Plan

2:45-3:00 Next Steps

- Finalization of Vulnerability Analysis
- Completion of Community-Specific Mitigation Action Plans
- Review of Community-Specific Appendices
- Draft Plan

Appendix D

Public Outreach

For Immediate Release

July 7, 2006

This email is to announce the start of the process to develop a Local Hazard Mitigation Plan for the County of Monterey and 11 cities located therein. URS Corporation has been retained as the contractor to develop the plan along with input and assistance from the County, participating cities, other agencies, and the general public. An initial meeting was held in May, where the basics of the plan requirements and planning process were discussed. In attendance were representatives of the participating cities. This plan is required in order for the county to continue to be eligible for federal funding following a disaster such as an earthquake, flood, or wildland fire. The process will include hazard identification, along with risk, vulnerability, and capability assessments.

One of the major aspects of the plan is spatial variability of natural hazards in the county. For example, Soledad may have a larger flood risk than Pacific Grove, but no tsunami risk; the unincorporated county may have a higher wildland fire risk than the cities, etc. For these reasons, we invite input and participation from relevant agencies that have a large stake in emergency preparedness within the county. The intent of the plan is not to identify better ways of responding to a disaster, but ways to help mitigate the effects of a disaster before it occurs. Examples of mitigation activities include seismically retrofitting critical facilities, improving / increasing culvert capacities and other drainage improvements, establishing defensible space for fire, using fire-resistant roofing materials, establishing a backup power source, developing educational materials for the general public, etc.

Please inform me if you would like to participate in the planning process. Participation is not required, and would largely involve providing information from various other plans that may touch upon hazard mitigation, or providing a list of mitigation projects that your agency / district would like to see placed on a project "wish list" when we get to that point.

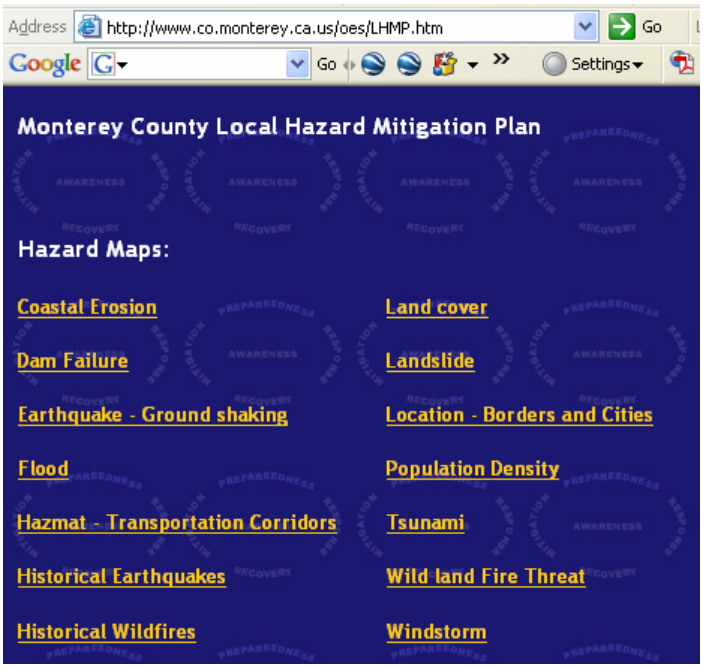
Special districts will be covered under the umbrella of the geographic entity in which it lies and will therefore be eligible for pre-and post-disaster mitigation funding once the plan is approved, whether they participated or not.

We appear to be on track in regard to the timeline for completion, and we anticipate having the plan completed by the first quarter of 2007.

Should you have any questions or comments, please contact me.

Kyle Oden
Emergency Services Planner
Monterey County Office of Emergency Services
1322 Natividad Road
Salinas, CA 93906
Phone: (831) 796-1904
Fax: (831) 796-1911
email: odenk@co.monterey.ca.us

Address http://www.co.monterey.ca.us/oes/
Monterey County Office of Emergency Services
1322 Natividad Rd,
Salinas, California 93906
(831) 796-1900
Protecting Your Family from Earthquakes - The Seven Steps to Earthquake Safety
English/Spanish
Vietnamese/Korean/Chinese
Are You Ready?
OES Home Page
Breaking News
Preparedness Planning
Select a topic
Go!
Standardized Emergency Management System (SEMS) Overview
National Incident Management System (NIMS) Training
Sign up for the Emergency Digital Information System (EDIS)
National Weather Service
Links
Emergency Managers' Page
Disaster Service Worker
NEW
Page Contents:
Mission/Vision/Responsibilities
Mission
Vision
Responsibilities
Organization
The Staff
Mission/Vision/Responsibilities
Mission
"THE MISSION OF THE OFFICE OF EMERGENCY SERVICES IS TO DEVELOP AND MAINTAIN A STATE OF READINESS IN PREPARATION FOR THE POTENTIAL OCCURRENCE OF ANY NATURAL, TECHNOLOGICAL, OR HUMAN CONFLICT RELATED EMERGENCY THAT COULD ADVERSELY IMPACT ANY SEGMENT OF MONTEREY COUNTY."
LOCAL HAZARD MITIGATION PLAN - HAZARD MAPS
Vision
"THE MONTEREY COUNTY OFFICE OF EMERGENCY SERVICES IS COMMITTED TO ESTABLISHING AND MAINTAINING A RESPONSIVE EMERGENCY MANAGEMENT ORGANIZATION THAT IS BASED ON THE PRINCIPLES OF TEAMWORK, COOPERATION, MUTUAL RESPECT, AND A KEEN AWARENESS OF THE NEEDS OF OUR COMMUNITY, ITS CITIZENS, AND ITS JURISDICTIONS."


Address http://www.co.monterey.ca.us/oes/LHMP.htm
Monterey County Local Hazard Mitigation Plan
Hazard Maps:
Coastal Erosion
Land cover
Dam Failure
Landslide
Earthquake - Ground shaking
Location - Borders and Cities
Flood
Population Density
Hazmat - Transportation Corridors
Tsunami
Historical Earthquakes
Wild land Fire Threat
Historical Wildfires
Windstorm

Appendix E

Figures Showing Known Hazard Areas and Locations of Previous Hazard Occurrences

Appendix F

Benefit-Cost Analysis Fact Sheet

Benefit-Cost Analysis Fact Sheet

Hazard mitigation projects are specifically aimed at reducing or eliminating future damages. Although hazard mitigation projects may sometimes be implemented in conjunction with the repair of damages from a declared disaster, the focus of hazard mitigation projects is on strengthening, elevating, relocating or otherwise improving buildings, infrastructure or other facilities to enhance their ability to withstand the damaging impacts of future disasters. In some cases, hazard mitigation projects may also include training or public-education programs if such programs can be demonstrated to reduce future expected damages.

A Benefit Cost-Analysis (BCA) provides an estimate of the "benefits" and "costs" of a proposed hazard mitigation project. The benefits considered are avoided future damages and losses which are expected to accrue as a result of the mitigation project. In other words, benefits are the reduction in expected future damages and losses (i.e., the difference in expected future damages before and after the mitigation project). The costs considered are those necessary to implement the specific mitigation project under evaluation. Costs are generally well determined for specific projects for which engineering design studies have been completed. Benefits, however, must be estimated probabilistically because they depend on the improved performance of the building or facility in future hazard events, the timing and severity of which must be estimated probabilistically.

All Benefit-Costs must be:

- Credible and well documented
- Prepared in accordance with accepted BCA practices
- Cost-effective (BCR $\geq$ 1.0)

General Data Requirements:

- All data entries (other than FEMA standard or default values) MUST be documented in the application
- Data MUST be from a credible source
- Provide complete copies of reports and engineering analyses
- Detailed cost estimate
- Identify the hazard (flood, wind, seismic, etc.)
- Discuss how the proposed measure will mitigate against future damages
- Document the Project Useful Life
- Document the proposed Level of Protection

- The Very Limited Data (VLD) BCA module cannot be used to support cost-effectiveness (screening purposes only)
- Alternative BCA software MUST be approved in writing by FEMA HQ and the Region prior to submittal of the application

Damage and Benefit Data

- Well documented for each damage event
- Include estimated frequency and method of determination per damage event
- Data used in place of FEMA standard or default values MUST be documented and justified
- The Level of Protection MUST be documented and readily apparent
- When using the Limited Data (LD) BCA module, users cannot extrapolate data for higher frequency events for unknown lower frequency events

Building Data

- Should include FEMA Elevation Certificates for elevation projects or projects using First Floor Elevations (FFEs)
- Include data for building type (tax records or photos)
- Contents claims that exceed 30% of building replacement value (BRV) MUST be fully documented
- Method for determining BRVs MUST be documented. BRVs based on tax records MUST include the multiplier from the County Tax Assessor
- Identify the amount of damage that will result in demolition of the structure (FEMA standard is 50% of pre-damage structure value)
- Include the site location (i.e., miles inland) for the Hurricane module

Use correct occupancy data:

- *Design occupancy* for Hurricane shelter portion of Tornado module
- *Average occupancy per hour* for the Tornado shelter portion of the Tornado module
- *Average occupancy* for Seismic modules

Questions to Be Answered

- Has the level of risk been identified?
- Are all hazards identified?
- Is the BCA fully documented and accompanied by technical support data?
- Will there be residual risk after the mitigation project is implemented?

Common Shortcomings

- Incomplete documentation
- Inconsistencies between data in the application, BCA module runs, and the technical support data
- Lack of technical support data
- Lack of a detailed cost estimate
- Use of discount rate other than FEMA required amount of 7%
- Overriding FEMA default values without providing documentation and justification
- Lack of information on building type, size, number of stories and value
- Lack of documentation and credibility for first floor elevations (FFEs)
- Use of incorrect Project Useful Life (not every mitigation measure = 100 years)

Appendix G

Plan Maintenance Documents

Annual Review Questionnaire

PLAN SECTION	QUESTIONS	YES	NO	COMMENTS
PLANNING PROCESS	Are there internal or external organizations and agencies that have been invaluable to the planning process or to mitigation action project implementation that should be represented on the Planning Team?			
	Are there procedures (e.g., meeting announcements, plan updates) that can be done more efficiently?			
	Has the Planning Team undertaken any public outreach activities regarding the HMP or implementation of mitigation actions?			
RISK ASSESSMENT	Has a natural and/or human-caused disaster occurred in this reporting period?			
	Are there natural and/or human-caused hazards that have not been addressed in this LHMP and should be?			
	Are additional maps or new hazard studies available? If so, what have they revealed?			
	Has the critical facilities list changed?			
	Have there been changes in development patterns that could influence the effects of hazards or create additional risks?			
MITIGATION STRATEGY	Are there different or additional resources (financial, technical, and human) that are now available for mitigation planning?			
	Are the goals still applicable?			
	Should new mitigation actions be added to the Mitigation Action Plan?			
	Do existing mitigation actions need to be reprioritized?			
	Are the mitigation actions appropriate for available resources?			

Mitigation Action Progress Report

Progress Report Period: _____ to _____
(date) (date)

Project Title: _____ Project ID# _____

Responsible Agency: _____

Address: _____

City: _____

Contact Person: _____ Title: _____

Phone #(s): _____ email address: _____

List Supporting Agencies and Contacts:

_____

Total Project Cost: _____

Anticipated Cost Overrun/Underrun: _____

Date of Project Approval: _____ Start date of the project: _____

Anticipated completion date: _____

Description of the Project (include a description of each phase, if applicable, and the time frame for completing each phase): _____

_____

_____

_____

Milestones	Complete	Projected Date of Completion

Plan Goal (s) Addressed:

Goal: _____

Indicator of Success: _____

_____

_____

_____

Project Status

☐ Project on schedule

☐ Project completed

☐ Project delayed*

*explain: _____

_____

☐ Project canceled

Project Cost Status

☐ Cost unchanged

☐ Cost overrun*

*explain: _____

_____

☐ Cost underrun*

*explain: _____

_____

Summary of progress on project for this report:

A. What was accomplished during thsi reporting period?

_____

_____

_____

_____

B. What obstacles, problems, or delays did you encounter, if any?

_____

_____

_____

_____

C. How was each problem resolved?

_____

_____

_____

_____

Next Steps: What is/are the next step(s) to be accomplished over the next reporting period?

Other Comments:

Appendix H

County of Monterey

Table H-1
County of Monterey Estimated Population and Building Inventory

Population	Residential Buildings		Nonresidential Buildings	
2000 Census Population Count*	**Total Building Count**	**Total Value of Buildings **- (x$1000)**	**Total Building Count**	**Total Value of Buildings *** (x$1000)**
99,635	37,696	7,566,934	930	2,355,194

Source: FEMA HAZUS-MH (residential and nonresidential buildings) and U.S. Census 2000 population data.
* Population count using census blocks within the county limits.

** Average insured structural value of all residential buildings (including single-family dwelling, mobile homes, etc., is $201,000 per structure).

*** Averaged insured structural value of all nonresidential buildings (including industry, trade, professional and technical services, etc., is $2,532,000).

Table H-2
County of Monterey Critical Facilities and Infrastructure

Category	Facility	Address	Estimated Insured Structural Value (x$1000)
Government	Government Center	168 West Alisal St., Salinas CA 93901	1,180
	Courthouse	240 Church St., Salinas, CA 93901	1,180
	Health Department	1270 Natividad Rd., Salinas, CA 93906	1,180
	Information Technology Department	1590 Moffett St., Salinas, CA 93905	1,180
	Office of Education	901 Blanco Circle, Salinas, CA 93901	1,180
	Water Resources Agency	893 Blanco Circle, Salinas, CA 93901	1,180
	Department of Social and Employment Services	730 La Guardia St., Salinas, CA 93905	1,180
	East Laurel Facilities	855 East Laurel Ave., Salinas, CA 93906	1,180
	Health Department – Animal Services Division	160 Hitchcock Rd., Salinas, CA 93908	1,180
	Agricultural Commission	1428 Abbot St., Salinas, CA 93901	1,180
	Emergency Services Center / 911	1322 Natividad Rd., Salinas, CA 93906	1,180
	Harbormaster's Office	Del Monte Ave. and Figueroa Ave., Monterey, CA 93940	1,180
	Moss Landing Harbor District Office	7881 Sandholdt Rd., Moss Landing, CA 95039	1,180
Emergency Response	Monterey County Sheriff's Office / Jail	1414 Natividad Rd., Salinas, CA 93906	1,652
	Courthouse / Sheriff's Office Substation	1200 Aguajito Rd., Monterey, CA 93940	1,652
	Sheriff's Office Substation	250 Franciscan Way, King, CA 93930	802
Lifeline Utilities	Duke Energy Moss Landing Power Plant	Highway 1 and Dolan Rd., Moss Landing, CA 95039	129,800
	Ogden Power Pacific Salinas	350 Crazy Horse Rd., Salinas, CA 93907	129,800

Table H-2
County of Monterey Critical Facilities and Infrastructure

Category	Facility	Address	Estimated Insured Structural Value (x$1000)
Care	Valley Rest Residential Care Facility	25017 Valley Place Circle, Carmel, CA 93923	802
	Carmel Terrace, Inc.	25193 Hatton Rd., Carmel, CA 93923	802
	Town & Country Residential Care for Seniors	27917 Berwick Dr., Carmel, CA 93923	802
	Carmel Valley Guest Home	200 West Carmel Valley Rd., Carmel Valley, CA 93924	802
	Carmel Valley Manor	8545 Carmel Valley Rd., Carmel, CA 93923	802
Educational	Carmel Middle School	4380 Carmel Valley Rd., Carmel, CA 93922	590
	Castroville Elementary School	11161 Merritt St., Castroville, CA 95012	590
	Echo Valley Elementary School	147 Echo Valley Rd., Salinas, CA 93907	590
	Prunedale Elementary School	17719 Pesante Rd., Salinas, CA 93907	590
	Elkhorn Elementary School	2235 Elkhorn Rd., Castroville, CA 95012	590
	Tularcitos Elementary School	35 Ford Rd., Carmel Valley, CA 93924	590
	Spreckels School	Fourth Street & Hatton Ave., Spreckels, CA 93962	590
	Captain Cooper Elementary School	Highway 1, Big Sur, CA 93920	590
	Bradley Union School	224 Dixie St., Bradley, CA 93246	590
	Chualar Union School	24285 Lincoln St., Chualar, CA 93925	590
	Pacific Unified School	69325 Highway 1, Pacific Valley #1, Big Sur, CA 93920	590
	San Antonio Union Elementary School	67550 Lockwood – Jolon Rd., Lockwood, CA 93932	590
	San Ardo Union Elementary School	62428 Center St., San Ardo, CA 93450	590
	San Lucas Union Elementary School	53675 San Benito St., San Lucas, CA 93954	590
	North Monterey County High School	13990 Castroville Blvd., Castroville, CA 95012	590

Table H-2
County of Monterey Critical Facilities and Infrastructure

Category	Facility	Address	Estimated Insured Structural Value (x$1000)
Educational (continued)	Carmel High School	3600 Ocean Ave., Carmel, CA 93923	590
	North Monterey County Center For Independent Study	13398 Castroville Blvd., Castroville, CA 95012	590
	Carmel Valley Continuation High School	27334 Schulte Rd., Carmel, CA 93922	590
	Central Bay Continuation High School	17500 Pesante Rd., Salinas, CA 93907	590
	Monterey County Special Education	132 W. Market St., Salinas, CA 93912	590
	Boronda Independent Study	1114 Fontes Ln., Salinas, CA 933907	590
	Toro Park Elementary School	22500 Portola Dr., Salinas, CA 93908	590
	Washington Union Elementary School	340 Corral de Tierra Rd., Salinas, CA 93908	590
	La Joya Elementary School	55 Rogge Rd., Salinas, CA 93906	590
	Gavilan View Middle School	18250 Van Buren Ave., Salinas, CA 93906	590
	Buena Vista Middle School	18250 Tara Dr., Salinas, CA 93908	590
	San Benancio Middle School	43 San Benancio Rd., Salinas, CA 93908	590
	Lagunita Elementary School	975 San Juan Grade Rd., Salinas, CA 93907	590
	Mission Elementary School	36825 Foothill Rd., Soledad, CA 93907	590
	Joseph Gambetta Middle School / North Monterey County Middle School	10301 Seymour St., Castroville, CA 95012	590
Marine, Environmental, and Community	Monterey Bay Aquarium Research Institute (MBARI)	7700 Sandholdt Rd., Moss Landing, CA 95039	78,269
	Moss Landing Marine Lab of California State University	8272 Moss Landing Rd., Moss Landing, CA 95039	78,269

Table H-2
County of Monterey Critical Facilities and Infrastructure

Category	Facility	Address	Estimated Insured Structural Value (x$1000)
Marine, Environmental, and Community (continued)	Marine Pollution Studies Lab, California Department of Fish & Game	7544 Sandholdt Rd., Moss Landing, CA 95039	78,269
	Pebble Beach Community Service District Office	3101 Forest Lake Rd., Pebble Beach, CA 93953	1,180
	Porter – Vallejo Mansion	29 Bishop St., Pajaro, CA 95076	1,180
	SPCA of Monterey County	1002 Monterey – Salinas Highway, Monterey, CA 93940	1,180
	Mazda Raceway Laguna Seca	1021 Monterey – Salinas Highway, Monterey, CA 93940	11,006
	Pajaro / Sunny Mesa Community Services District Office	Pajaro, CA 95076	1,180
	American Red Cross Monterey – San Benito Chapter Office	942 Lupin Dr., Salinas, CA 93906	1,180
	American Red Cross – Carmel Area Chapter Office	Delores and 8th Aves., Carmel, CA 93922	1,180

Source: FEMA HAZUS-MH (estimated values)

Table H-3
County of Monterey Potential Hazard Vulnerability Analysis – Population and Buildings

		Population	Buildings			
			Residential		Nonresidential	
Hazard Type	**Methodology**	**Number**	**Number**	**Value ($)[1]**	**Number**	**Value ($)[1]**
Coastal Erosion	100-year erosion zone	184	163	34,640	3	9,937
Dam Failure	Inundation area	17,638	4,782	921,167	342	592,097
Earthquake	Extreme	12,251	3,357	590,989	129	260,579
	High	60,207	21,237	4,237,729	892	1,531,295
	Moderate	26,302	12,445	2,604,390	275	537,687
Flood	100-year flood zone	10,802	3,341	630,188	440	624,427
Hazardous Materials Event	1-mile buffer transport corridor	39,437	12,788	2,516,789	550	1,042,504
Landslide	High	5,052	2,444	511,732	31	71,393
	Moderate	17,303	7,145	1,423,250	101	242,964
Tsunami	Maximum average run-up	6,213	1,515	274,763	53	70,405
Wildland Fire	Very high	2,674	1,334	283,847	22	45,402
	High	15,808	6,903	1,352,331	121	240,859
	Moderate	63,524	23,945	4,878,823	882	1,431,505
Windstorm	Prevailing wind zone	11,824	3,428	663,019	140	326,557

[1] Value = Estimated average structural value (x $1,000)

Table H-4
County of Monterey Potential Hazard Vulnerability Analysis – Critical Facilities

		Government		Emergency Response		Lifeline Utilities		Care		Educational		Marine, Environmental, and Community		Total	
Hazard	**Methodology**	**No.**	**Value ($)[1]**	**No.**	**Value ($)[1]**	**No.**	**Value ($)[1]**	**No.**	**Value ($)[1]**	**No.**	**Value ($)[1]**	**No.**	**Value ($)[1]**	**No.**	**Value ($)[1]**
Coastal Erosion	100-year erosion zone	1	1,180	0	0	0	0	0	0	0	0	0	0	1	1,180
Dam Failure	Inundation area	8	9,440	0	0	1	1,180	0	0	8	4,720	5	237,167	22	252,507
Earthquake	Extreme	0	0	0	0	0	0	0	0	2	1,180	2	2,360	4	3,540
	High	11	12,980	3	4,484	3	260,780	4	3,208	21	12,390	5	237,167	47	531,009
	Moderate	1	1,180	1	1,652	0	0	1	802	7	4,130	3	13,366	13	21,130
Flood	100-year flood zone	0	0	0	0	0	0	0	0	2	1,180	5	237,167	7	238,347
Hazardous Materials Event	1-mile buffer transport corridor	5	5,900	1	1,652	2	130,980	2	1,604	16	9,440	7	239,527	33	389,103
Landslide	High	0	0	0	0	0	0	0	0	1	590	0	0	1	590
	Moderate	0	0	1	1,652	0	0	1	802	2	1,180	0	0	4	3,634
Tsunami	Maximum average run-up	2	2,360	0	0	0	0	0	0	1	590	3	234,807	6	237,757
Wildland Fire	Very high	0	0	0	0	0	0	1	802	1	590	0	0	2	1,392
	High	0	0	0	0	0	0	0	0	3	1,770	0	0	3	1,770
	Moderate	10	11,800	4	6,136	3	260,780	4	3,208	23	13,570	10	252,893	54	548,387
Windstorm	Prevailing wind zone	0	0	1	1,652	0	0	0	0	2	1,180	0	0	3	2,832

[1] Value = Estimated insured structural value (x1000)

Table H-5
County of Monterey Potential Hazard Vulnerability Analysis – Critical Infrastructure

		Highways		Railroads		Bridges	
Hazard	**Methodology**	**Miles**	**Value ($)[1]**	**Miles**	**Value ($)[1]**	**Number**	**Value ($)[1]**
Coastal Erosion	100-year erosion zone	10.0	51,633	0.0	0	0	0
Dam Failure	Inundation area	72.7	481,979	59.8	82,609	79	220,319
Earthquake	Extreme	16.1	96,008	9.3	12,833	22	10,503
	High	144.7	942,401	47.6	65,657	106	172,213
	Moderate	273.4	1,673,073	47.9	66,079	110	175,902
Flood	100-year flood zone	41.3	250,631	15.5	21,426	84	213,939
Hazardous Materials Event	1-mile buffer transport corridor	288.3	1,955,726	104.7	144,568	148	289,486
Landslide	High	55.0	287,390	2.0	2,748	25	30,269
	Moderate	41.3	226,792	2.1	2,889	11	5,599
Tsunami	Maximum average run-up	12.0	62,039	7.6	10,546	25	62,149
Wildland Fire	Very high	10.2	53,086	0.0	0	10	5,743
	High	140.5	752,564	11.6	15,972	84	75,712
	Moderate	164.6	994,612	29.1	40,128	103	189,216
Windstorm	Prevailing wind zone	127.8	947,058	68.6	94,717	40	133,152

[1] Value = Estimated value (x1000)

Coastal Erosion

Coastal erosion is present along the entire coast of Monterey County. However, less than .2 percent of the County's population resides in this hazard zone. On average, the dunes along the northern Monterey Bay erode 2.6 feet annually while the steep cliffs along the southern coastline erode 7 inches annually. Therefore, using a 100-year projection to determine areas at risk to coastal erosion, approximately 184 people, 163 residential buildings (worth $34.6 million), 3 nonresidential buildings (worth $9.9 million), and 1 critical facilities (worth $1.2 million) reside in the coastal erosion hazard area. Additionally, 10.0 miles of highway are located in this hazard area.

Dam Failure

Approximately 20 percent of the County's population is located in the inundation zones of the Nacimiento, San Antonio, San Clemente, Los Padres, and Black Rock Creek dams. This includes 17,638 people, 4,782 residential buildings (worth $921.2 million), 342 nonresidential buildings (worth $592.1 million), and 22 critical facilities (worth $252.5 million). In addition, 72.7 miles of highway, 59.8 miles of railroad tracks, and 79 bridges are located in this hazard area.

Earthquake

Approximately 10 percent of the County's population resides in an extreme shaking area, while an additional 60 percent live in a high shaking area, and the remaining 30 percent live in a moderate shaking area. The strongest shaking is located in the southern and northern portions of the County. As such, exposed within the extreme shaking hazard area are 12,251 people, 3,357 residential buildings (worth $591.0 million), 129 nonresidential buildings (worth $260.6 million), and 4 critical facilities (worth $3 million). 16.1 miles of highway and 9.3 miles of railroad tracks are located in this hazard area. Exposed within the high shaking hazard area are 60,207 people, 21,237 residential buildings (worth $4.24 billion), 892 nonresidential buildings (worth $1.5 billion), and 47 critical facilities (worth $531.0 million). 144.7 miles of highway and 47.6 miles of railroad tracks are also located in this hazard area. Exposed within the moderate shaking hazard area are 26,301 people, 12,445 residential buildings (worth $2.6 billion), 275 nonresidential buildings (worth $537.7 million), and 13 critical facilities (worth $21.1 million). 273.4 miles of highway and 47.9 miles of railroad tracks are located in this hazard area.

Flood

Over 10 percent of the County's population resides the SFHA, which includes areas adjacent to the Salinas, Carmel, Pajaro, and Arroyo Seco Rivers, the Moro Cojo and Elkhorn sloughs, and low-lying coastal areas that are inundated by wave attack. Exposed within this hazard area are 10,802 people, 3,341 residential buildings (worth $630.2 million), 440 nonresidential buildings (worth $624.4 million), and 7 critical facilities (worth $238.3 million). Approximately 41.3 miles of highway and 15.5 miles of railroad tracks are also located in the 100-year floodplain.

Hazardous Materials Event

Within the 1-mile buffer of the transportation facilities, are 39,437 people (approximately 40 percent of the County's population), 12,788 residential buildings (worth $2.5 billion), 550 nonresidential buildings (worth $1.0 billion), and 33 critical facilities (worth $389.1 million). These figures are for the entirety of the transportation corridors and, therefore, overstate the exposure since a hazmat event along the corridors is unlikely to affect all of the area within the 1-mile buffer.

Landslide

A little over 20 percent of the County's population lives in moderate and high landslide hazard areas. The landslide areas within the County area located along the Big Sur coast, the Santa Lucia and Gabilan Mountain Ranges, the Carmel Valley, and the northern County limits. The high landslide hazard area includes 5,052 people, 2,444 residential buildings (worth $511.7 million), 31 nonresidential buildings (worth $71.4 million), and 1 critical facilities (worth $590,000). Approximately 55.0 miles of highway and 2.0 miles of railroad tracks are located in this high hazard area. 17,303 people, 7,145 residential buildings (worth $1.4 billion), 101 nonresidential building (worth $242.9 million) and 4 critical facilities (worth $3.6 million) are located in the moderate landslide hazard area. Approximately 41.3 miles of highway and 2.1 miles of railroad tracks are located in this moderate hazard area.

Tsunami

Using the maximum average scenario of 21-foot run-up, approximately 6 percent of County's population, mainly residing in the unincorporated communities of the Carmel Valley, Boronda, Castroville, Moss Landing, and Pajaro, is vulnerable to a tsunami. This includes 6,213 people, 1,515 residential buildings (worth $274.8 million), 53 nonresidential buildings (worth $70.4 million), and 6 critical facilities (worth $238 million). Approximately 12.0 miles of highway and 7.6 miles of railroad tracks are located in this hazard area.

Wildland Fire

Using the California FRAP model, very high wildland fire risk areas are located in and around the Los Padres National Forest. Within the area of very high wildland fire exposure are 2,674 people and 1,334 residential buildings (worth $283.8 million), 22 nonresidential buildings (worth $45.4 million) and 2 critical facilities (worth $1.4 million). Approximately 10.2 miles of highway are located in this hazard area.

In the high wildland fire risk areas are 15,808 people, 6,903 residential buildings (worth $1.4 billion), 121 nonresidential buildings (worth $240.9 million), and 3 critical facilities (worth $1.8 million). Approximately 140.5 miles of highway and 11.6 miles of railroad tracks are located in this hazard area.

Areas of moderate wildland fire risk include 63,524 people, 23,945 residential buildings (worth $4.9 billion), 882 nonresidential buildings (worth $1.4 million), and 54 critical facilities (worth $548.4 million). Approximately 164.6 miles of highway and 29.1 miles of railroad tracks are located in this hazard area.

Windstorm

Windstorms created by prevailing northwest sustained surface winds are common throughout the central and southern Salinas Valley from March to October. Therefore, 11,824 people, 3,428 residential buildings (worth $663.0 million), 140 nonresidential buildings (worth $326.6 million), and 3 critical facilities (worth $2.8 million) are located in this hazard area.

Table H-6
County of Monterey Legal and Regulatory Resources Available for Hazard Mitigation

Regulatory Tool	Name	Effect on Hazard Mitigation
Plans	October 2006 Draft General Plan Safety Element	Establishes policies that will minimize the potential of human injury and property damage to the following natural hazards: drainage; flood; seismic and other geologic hazards; and wild fires.
	Floodplain Management Plan 2003	Identifies flooding sources affecting Repetitive Loss Properties, establishes an implementation plan to reduce flooding, and ensures that the natural and beneficial of the floodplains are protected.
	Land Area Plans	Due to the diversity of Monterey County, smaller plans have been created to provide more specific policies unique to a particular geographical area. Area plans for the inland portion of the County include Cachagua, Central Salinas Valley, Greater Monterey Peninsula, Greater Salinas, North County, South County, and Toro).
	Land Use Plans and Coastal Implementation Plans	Land Use Plans and Coastal Implementation Plans have been developed for the four areas that make up the Coastal Zone, including Big Sur, Carmel Area, Del Monte Forest, and North County Coastal.
Programs	National Flood Insurance Program (NFIP)	Makes affordable flood insurance available to homeowners, business owners, and renters in participating communities. In exchange, those communities must adopt and enforce minimum floodplain management regulations to reduce the risk of damage from future floods.
	Capital Improvement Program	It is a five-year program that is updated annually. It consists of construction projects, such as storm drain improvements, that have a total cost of more than $100,000 and are planned to commence construction between July 1, 2006 and June 30, 2012.
	Monterey Regional Storm Water Program	Reduce pollution from storm water discharge and runoff with regard to the EPA's Phase II Storm Water National Pollutant Discharge Elimination System requirements. It is a collective effort and implementation of area-wide activities designed to benefit all participating entities.
	Local Coastal Program	Land Use Plans and Coastal Implementation Plans indicate the kinds, location, and intensity of land use and applicable resource protection and development policies within the Coastal Zone.

Table H-6
County of Monterey Legal and Regulatory Resources Available for Hazard Mitigation

Regulatory Tool	Name		Effect on Hazard Mitigation
Policies (County Code)	Title 10 Health and Safety	Title 10.46 Weed Control	Currently considered to be noxious weeds within the meaning of Section 5004 of the California Food and Agricultural Code which the Agricultural Commissioner finds and determines to be detrimental or destructive and difficult to control or eradicate. However, in future updates, policy could also include combustible weeds for fire hazard abatement.
		Title 10.65 Hazardous Materials Registration	Provides a continuing source of current information concerning hazardous substances and chemicals being utilized in the County of Monterey to protect the general health and safety of the public and to enable emergency personnel to respond safely and speedily to emergency situations which may arise and establish a continuing program for the purpose of preventing contamination from, and improper storage of, hazardous substances stored underground. This title also establishes orderly procedures that will ensure that newly constructed underground storage tanks meet appropriate standards and that existing tanks be properly maintained, inspected, and tested so that the health, property, and resources of the people of the County will be protected.
	Title 16 Environment	16.08 Grading	Sets forth rules and regulations to control all grading, including excavations, earthwork, road construction, fills and embankments, and establishes the administration procedure for issuance of permits; and provides for approval of plans and inspections of grading construction.
		16.12 Erosion Control	Requires control of all existing and potential conditions of accelerated (human-induced) erosion; sets forth required provisions for project planning, preparation of erosion control plans, runoff control, land clearing, and winter operations; and establishes procedures for administering those provisions.
		16.16 Regulations for Floodplains in Monterey County	Identifies areas where terrain characteristics would present new developments and their users with potential hazards to life and property from potential inundation by a 100-year frequency flood or other known flood hazards. These standards are also intended to minimize the effects of development on drainage ways and watercourses.
	Title 18 Building and Construction	18.08 Monterey County Building Code	Adopts and enforces the California Building Code, 2001 Edition, Volumes 1 and 2.

Table H-6
County of Monterey Legal and Regulatory Resources Available for Hazard Mitigation

Regulatory Tool	Name		Effect on Hazard Mitigation
		18.16 Monterey County Uniform Housing Code	Adopts and enforces the Uniform Housing Code, 1997 Edition.
		18.20 Monterey County Code for the Abatement of Dangerous Buildings	Adopts and enforces the Uniform Code for the Abatement of Dangerous Buildings, 1997 Edition.
		18.50 Residential, Commercial and Industrial Water Conservation Measures	Reduces the excessive use of water within the Greater Salinas, Toro, Greater Monterey Peninsula, and a portion of North County and Coast Planning areas by requiring the installation of low water use plumbing fixtures and low water use landscape material as part of new construction and prohibiting certain excessive use of water.
		18.56 Wildfire Protection Measures in State Responsibility Areas	Establishes wildfire protection standards in conjunction with building, construction, and development in State responsibility areas located within the boundaries of Monterey County and under the direct fire protection authority of the California Department of Forestry. These standards shall provide that future design and construction of structures, subdivisions and developments in State Responsibility Areas shall provide for emergency access and perimeter wildfire protection measures.
	Title 20 Coastal Implementation Plan Zoning	20.17 Watershed Scenic Corridor District	Provides a district to allow development in the more remote or mountainous areas in the Coastal Zone while protecting the significant and substantial resources of those areas. Of specific concern are the highly sensitive resources inherent in such areas such as viewshed, watershed, plant and wildlife habitat, streams and riparian corridors.
		20.64 Development on Slopes in Excess of 30 Percent	Establishes regulations, procedures, and standards to consider development on slopes in excess of 30 percent (25 percent in North County).
		20.66 Development Standards for Hazardous Areas	Same as 21.66, see below.

Table H-6
County of Monterey Legal and Regulatory Resources Available for Hazard Mitigation

Regulatory Tool	Name		Effect on Hazard Mitigation
	Title 21 Inland Zoning	21.66 Development Standards for Hazardous Areas	Provides development standards, including the requirement of a geologic report, which regulate land use and development, using the best available planning practices, in order to minimize risk to life and property and damage to the natural environment.

Table H-7
County of Monterey Administrative and Technical Resources for Hazard Mitigation

Staff/Personnel Resources	Department/Division Position
Planner(s) or engineer(s) with knowledge of land development and land management practices	Planning and Building Inspection
Engineer(s) or professional(s) trained in construction practices related to buildings and/or infrastructure	Planning and Building Inspection
Planner(s) or engineer(s) with an understanding of manmade or natural hazards	Planning and Building Inspection
Floodplain manager	Water Resources Agency
Personnel skilled in GIS and/or HAZUS-MH	Planning & Building Inspection / Information Technology
Director of Emergency Services	Office of Emergency Services
Finance (grant writers, purchasing)	Various County Departments
Public Information Officers	Various County Departments

Table H-8
County of Monterey Financial Resources for Hazard Mitigation

Financial Resources	Effect on Hazard Mitigation
General funds	If funding available, can be used for hazard mitigation activity.
Authority to levy taxes for specific purposes	Can be used for any hazard mitigation activity, but only eligible for use with voter approval.
Incur debt through general obligation bonds	Can be used for any hazard mitigation activity, but only eligible for use with voter approval.
Incur debt through special tax and revenue bonds	Revenue Bonds can be issued through the County voter approval, to raise funds for hazard mitigation activities.
Incur debt through private activity bonds	Can be used for any hazard mitigation activity but only eligible for use with voter approval.
FEMA HMPG and PDM grants	HMGP grant funding is available to local communities after a Presidentially-declared disaster. It can be used to fund both pre- and post-disaster mitigation plans and projects. PDM funding is available on an annual basis. This grant can only be used to fund pre-disaster mitigation plans and projects only.
United State Fire Administration (USFA) Grants	The purpose of these grants is to assist state, regional, national or local organizations to address fire prevention and safety. The primary goal is to reach high-risk target groups including children, seniors and firefighters.
Fire Mitigation Fees	Finance future fire protection facilities and fire capital expenditures required because of new development within Special Districts.

Table H-9
County of Monterey Mitigation Action Plan Matrix

Action Number	Description	Ranking / Prioritization	Administering Department	Potential Funding	Timeframe	Benefit-Costs
1.B	Identify hazard-prone critical facilities and infrastructure and carry out acquisition, relocation, and structural and nonstructural retrofitting measures as necessary.	Priority / High	OES	HMGP and PDM Grants	Ongoing	This action will help ensure that the community/critical facilities can operate in some capacity before, during, and after the disaster.
2.A	Develop a sustained public outreach program that encourages consistent hazard mitigation content. For example, consider publishing tsunami inundation maps in telephone books, wildland fire defensible space tips with summer water bills, and the safe handling and disposal of hazardous waste and chemicals with garbage bills.	Priority / High	OES	General Funds, HMGP, and PDM Grants	0-1 years	A mitigation outreach program will help build and support local capacity to enable the public to prepare for, respond to, and recover from disasters.
4.A	Review and update County inundation maps every five years and participate in DSOD mapping updates.	Priority / High	Water Resources	General Funds	Every 5 years	This action will not need additional funding and will help ensure current dam inundation areas are identified and corresponding mitigation activities are carried out.
7.A	Examine and mitigate critical infrastructure that has been identified as currently being too narrow to ensure the safe transportation of truck loads within Monterey County.	Priority / High	Public Works	General Funds	1-3 years	This effort will ensure that heavily used critical infrastructure will ensure the safe transportation of truck loads.

Table H-9
County of Monterey Mitigation Action Plan Matrix

Action Number	Description	Ranking / Prioritization	Administering Department	Potential Funding	Timeframe	Benefit-Costs
10.A	Continue to conduct current fuel management programs and investigate and apply new and emerging fuel management techniques.	Priority / High	County Fire	HMGP and PDM Grants	Ongoing	The probability of future damage from wildland fires could be high if this mitigation action is not implemented.
11.C	Include provisions for dust erosion control methods in building, grading, and land clearing permits.	Priority / High	Public Works	General Funds	0-2 years	Dust control erosion measures will reduce the effects of bad air quality and soil loss, thereby improving health and work conditions.
*	Implement the Carmel River (CSA-50) Lower Carmel River Flood Control Project structural and operational improvements, including adding pumping capacity, installing flood walls, and raising and extending levees.	Priority / High	Water Resources Agency	HMGP and PDM Grants	0-5 years	The mitigation of repetitively flooded properties is a priority for FEMA grant programs.
*	Work with Repetitive Loss property owners to implement property protection activities including constructing retaining walls, berms, and terrace drains, as well as installing debris fences and elevating structures to have the lowest floor a minimum of 1-foot above the base flood elevation.	Priority / High	Water Resources Agency	HMGP and PDM Grants	0-5 years	The mitigation of repetitively flooded properties is a priority for FEMA grant programs.

* Additional mitigation actions identified in the Monterey County Floodplain Management Plan 2003.

Appendix I

City of Carmel-by-the-Sea

Table I-1
City of Carmel-by-the-Sea Estimated Population and Building Inventory

Population	Residential Buildings		Nonresidential Buildings	
2000 Census Population Count*	Total Building Count	Total Value of Buildings ** (x$1000)	Total Building Count	Total Value of Buildings*** (x$1000)
4,070	3,152	649,048	114	214,772

Source: FEMA HAZUS-MH (residential and commercial buildings) and U.S. Census 2000 population data.
* Population count using census blocks within the city limits.

** Average insured structural value of all residential buildings (including single-family dwelling, mobile homes, etc., is $206,000 per structure).

*** Averaged insured structural value of all nonresidential buildings (including industry, trade, professional and technical services, etc., is $1,884,000).

Table I-2
City of Carmel-by-the-Sea Critical Facilities and Infrastructure

Category	Facility	Address	Estimated Insured Structural Value (x$1000)
Government	City Hall	Monte Verde Ave., between Ocean and 7th Ave.	6,659
Emergency Response	Police Department	Southeast corner of Junipero St. and 4th Aves.	1,652
	Fire Department	6th Ave. between Mission St. and San Carlos St.	708
Education	Carmel River Elementary	Monte Verde St. and 15 Ave.	509

Source: FEMA HAZUS-MH (estimated values)

Table I-3
City of Carmel-by-the-Sea Potential Hazard Vulnerability Analysis – Population and Buildings

		Population	Buildings			
			Residential		Nonresidential	
Hazard Type	**Methodology**	**Number**	**Number**	**Value ($)[1]**	**Number**	**Value ($)[1]**
Coastal Erosion	100-year erosion zone	1	1	197	2	466
Dam Failure	Inundation area	2	1	117	2	5
Earthquake	Extreme	0	0	0	0	0
	High	3,752	2,930	607,254	129	210,552
	Moderate	308	216	40,163	2	364
Flood	100-year flood zone	1	1	58	2	125
Hazardous Materials Event	1-mile buffer transport corridor	1,644	1,045	211,841	87	140,889
Landslide	High	0	0	0	0	0
	Moderate	51	38	8,893	16	27,379
Tsunami	Maximum average run-up	9	7	1,381	2	3,250
Wildland Fire	Very high	14	8	1,830	2	55
	High	1	1	15	2	36
	Moderate	4,038	3,132	644,361	129	208,575
Windstorm	Prevailing wind zone	NA	NA	NA	NA	NA

[1] Value = Estimated average structural value (x1000)

NA = Not Applicable

Table I-4
City of Carmel-by-the-Sea Potential Hazard Vulnerability Analysis – Critical Facilities

		Government		Emergency Response		Lifeline Utilities		Care		Educational		Marine, Environmental, and Community		Total	
Hazard	**Methodology**	**No.**	**Value ($)[1]**	**No.**	**Value ($)[1]**	**No.**	**Value ($)[1]**	**No.**	**Value ($)[1]**	**No.**	**Value ($)[1]**	**No.**	**Value ($)[1]**	**No.**	**Value ($)[1]**
Coastal Erosion	100-year erosion zone	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Dam Failure	Inundation area	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Earthquake	Extreme	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	High	1	6,659	2	2,360	0	0	0	0	1	590	0	0	4	9,609
	Moderate	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Flood	100-year flood zone	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Hazardous Materials Event	1-mile buffer transport corridor	0	0	1	1,652	0	0	0	0	0	0	0	0	1	1,652
Landslide	High	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Moderate	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Tsunami	Maximum average run-up	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Wildland Fire	Very high	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	High	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Moderate	1	6,659	2	2,360	0	0	0	0	1	590	0	0	4	9,609
Windstorm	Prevailing wind zone	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

[1] Value = Estimated insured structural value (x1000)

NA = Not Applicable

Table I-5
City of Carmel-by-the-Sea Potential Hazard Vulnerability Analysis – Critical Infrastructure

		Highways		Railroads		Bridges	
Hazard	**Methodology**	**Miles**	**Value ($)[1]**	**Miles**	**Value ($)[1]**	**Number**	**Value ($)[1]**
Coastal Erosion	100-year erosion zone	0	0	0	0	0	0
Dam Failure	Inundation area	0	0	0	0	0	0
Earthquake	Extreme	0	0	0	0	0	0
	High	0	0	0	0	0	0
	Moderate	0	0	0	0	0	0
Flood	100-year flood zone	0	0	0	0	0	0
Hazardous Materials Event	1-mile buffer transport corridor	0	0	0	0	0	0
Landslide	High	0	0	0	0	0	0
	Moderate	0	0	0	0	0	0
Tsunami	Maximum average run-up	0	0	0	0	0	0
Wildland Fire	Very high	0	0	0	0	0	0
	High	0	0	0	0	0	0
	Moderate	0	0	0	0	0	0
Windstorm	Prevailing wind zone	NA	NA	NA	NA	NA	NA

[1] Value = Estimated value (x1000)

NA = Not Applicable

Coastal Erosion

The rocky cliffs along the City's coastline erode at approximately 2-4 inches a year. Therefore, using a 100-year projection to determine areas at risk to coastal erosion, only 1 person, 1 residential building (worth $197,000), and 2 nonresidential buildings (worth $466,000 thousand), are located in this hazard area.

Dam Failure

Failure of the San Clemente and Los Padres dams is a risk to 2 people, 1 residential building (worth $117,000), and 2 nonresidential buildings (worth $5,000) located along the southern portion of the City limits.

Earthquake

There are non residents and/or buildings and facilities that reside in an extreme shaking hazard area. Approximately 3,752 residents (nearly 95 percent of the City's population), 2,930 residential buildings (worth $607.3 million), and 129 nonresidential buildings (worth $210.6 million) are located in a high shaking hazard area. Only 308 residents, 216 residential buildings (worth $40.2 million), 2 nonresidential buildings (worth $364,000) are located in a moderate hazard shaking area.

Flood

Only 1 person, 1 residential building (worth $58,000), and 2 nonresidential buildings (worth $125,000) are located in a SFHA.

Hazardous Materials Event

Approximately 40 percent of the City's population is located within the 1-mile buffer area of Highway 1 and therefore are exposed to a hazardous material transport event. This includes 1,644 people, 1,045 residential buildings (worth $211.8 million), 87 nonresidential buildings (worth $140.9 million), and 1 critical facility (worth $1.7 million). These figures are for the entirety of the transportation corridors and, therefore, overstate the exposure since a hazmat event along the corridors is unlikely to affect all of the area within the 1-mile buffer.

Landslide

There are no residents and/or buildings and facilities that reside in a high landslide hazard area. However, nearly 12 percent of the City's total population (along the western City limits) is exposed to moderate landslides. This includes 51 people, 38 residential buildings (worth $8.9 million) and 16 nonresidential building (worth $27.4 million).

Tsunami

Using the maximum average scenario of 21-foot run-up, only 9 people, 7 residential buildings (worth $1.4 million) and 2 nonresidential buildings (worth $3.3 million) are located in this hazard area along the southern portion of the City.

Wildland Fire

Using the California FRAP model, wildland fire risk areas, less than 4 percent of the City's population resides in very high and high wildland hazard areas. As such, the remaining 96 percent of the City's population reside in a moderate wildland fire hazard area. This area also includes 3,132 residential buildings (worth $644.4 million), 129 nonresidential buildings (worth $208.6 million), and 4 critical facilities (worth $9.6 million).

Table I-6
City of Carmel-by-the-Sea Legal and Regulatory Resources Available for Hazard Mitigation

Regulatory Tool	Name		Effect on Hazard Mitigation
Plans	General Plan, Environmental Safety Element		Establishes policies that will minimize the potential of human injury and property damage to the following natural hazards: floods; earthquakes, urban and wildfires; and tsunamis.
Programs	National Flood Insurance Program (NFIP)		Makes affordable flood insurance available to homeowners, business owners, and renters in participating communities. In exchange, those communities must adopt and enforce minimum floodplain management regulations to reduce the risk of damage from future floods.
Policies (Municipal Code)	Title 12 Streets, Sidewalks and Public Places	Chapter 12.20 Stormwater Utility	Creates a City enterprise to operate, maintain and fund the City's storm and surface drainage system.
	Title 14 Seismic Hazards	Chapter 14.04 Seismic Hazards Identification Program	Promotes public safety by identifying those buildings in the City of Carmel-by-the-Sea which exhibit structural deficiencies and by determining the severity and extent of those deficiencies in relation to their potential for causing loss of life or injury
	Title 15 Building and Construction	Chapter 15.08 Building Code	Adopts the 2001 California/Uniform Building Code.
		Chapter 15.12 Dangerous Buildings Code	Adopts the 2001 California/Uniform Code for the Abatement of Dangerous Buildings.

Table I-7
City of Carmel-by-the-Sea Administrative and Technical Resources for Hazard Mitigation

Staff/Personnel Resources	Department/Division Position
Planner(s) or engineer(s) with knowledge of land development and land management practices	Planning and Building
Engineer(s) or professional(s) trained in construction practices related to buildings and/or infrastructure	Planning and Building
Planner(s) or engineer(s) with an understanding of manmade or natural hazards	Planning and Building
Floodplain manager	Planning and Building
Personnel skilled in GIS and/or HAZUS-MH	Planning and Building
Director of Emergency Services	Police
Finance (grant writers, purchasing)	City Clerk
Public Information Officers	City Clerk

Table I-8
City of Carmel-by-the-Sea Financial Resources for Hazard Mitigation

Financial Resources	Effect on Hazard Mitigation
General funds	If funding available, can be used for hazard mitigation activity, including debt service for bonds.
Authority to levy taxes for specific purposes	Can be used for any hazard mitigation activity with voter approval.
Incur debt through general obligation bonds	Can be used for any hazard mitigation activity with voter approval.
Incur debt through special tax and revenue bonds	Revenue Bonds can be issued through the City with voter approval.
FEMA HMPG and PDM grants	HMGP grant funding is available to local communities after a Presidentially-declared disaster. It can be used to fund both pre- and post-disaster mitigation plans and projects. PDM funding is available on an annual basis. This grant can only be used to fund pre-disaster mitigation plans and projects only.
United State Fire Administration (USFA) Grants	The purpose of these grants is to assist state, regional, national or local organizations to address fire prevention and safety. The primary goal is to reach high-risk target groups including children, seniors and firefighters.

Table I-9
City of Carmel-by-the-Sea Mitigation Action Plan Matrix

Action Number	Description	Ranking / Prioritization	Administering Department	Potential Funding	Timeframe	Benefit-Costs
1.B	Identify hazard-prone critical facilities and infrastructure and carry out acquisition, relocation, and structural and nonstructural retrofitting measures as necessary.	Priority / High	Planning and Building	HMGP and PDM Grants	Ongoing	This action will help ensure that the community/critical facilities can operate in some capacity before, during, and after the disaster.
2.A	Develop a sustained public outreach program that encourages consistent hazard mitigation content. For example, consider publishing tsunami inundation maps in telephone books, wildland fire defensible space tips with summer water bills, and the safe handling and disposal of hazardous waste and chemicals with garbage bills.	Priority / High	City Clerk	General Funds, HMGP, and PDM Grants	0-1 years	A mitigation outreach program will help build and support local capacity to enable the public to prepare for, respond to, and recover from disasters.
5.B	Develop an unreinforced masonry grant program that helps correct earthquake-risk nonmasonry building problems, including chimney bracing and anchoring water heaters.	Priority / High	Planning and Building	General Funds, HMGP, and PDM Grants	0-3 years	This action will prevent future residential and nonresidential losses of unreinforced masonry buildings in the future. The retrofitting of unreinforced masonry buildings is a high priority for the State of California.
10.A	Continue to conduct current fuel management programs and investigate and apply new and emerging fuel management techniques.	Priority / High	Fire	General Funds and PDM Grant	Ongoing	The probability of future damage from wildland fires could be high if this mitigation action is not implemented.

10.C	Develop and provide funding and/or incentives for defensible space measures (e.g., free chipping day, free collection day for tree limbs).	Priority / High	Fire	General Funds, HMGP, and PDM Grants	Ongoing	The potential cost of this mitigation action seems reasonable for the size of the problem and its likely benefits.

Appendix J

City of Del Rey Oaks

Table J-1
City of Del Rey Oaks Estimated Population and Building Inventory

Population	Residential Buildings		Nonresidential Buildings	
2000 Census Population Count*	**Total Building Count**	**Total Value of Buildings **- (x$1000)**	**Total Building Count**	**Total Value of Buildings*** (x$1000)**
1,650	681	152,713	8	22,972

Source: FEMA HAZUS-MH (residential and commercial buildings) and U.S. Census 2000 population data.
* Population count using census blocks within the city limits.

** Average insured structural value of all residential buildings (including single-family dwelling, mobile homes, etc., is $224,000 per structure).

*** Averaged insured structural value of all nonresidential buildings (including industry, trade, professional and technical services, etc., is $2,872,000).

Table J-2
City of Del Rey Oaks Critical Facilities and Infrastructure

Category	Facility	Address	Estimated Insured Structural Value (x$1000)
Government	City Hall	650 Canyon del Rey Blvd.	6,659
Emergency Response	Police Department	650 Canyon del Rey Blvd.	1,652

Source: FEMA HAZUS-MH (estimated values)

Table J-3
City of Del Rey Oaks Potential Hazard Vulnerability Analysis – Population and Buildings

		Population	Buildings			
			Residential		Nonresidential	
Hazard Type	**Methodology**	**Number**	**Number**	**Value ($)[1]**	**Number**	**Value ($)[1]**
Coastal Erosion	100-year erosion zone	0	0	0	0	0
Dam Failure	Inundation area	0	0	0	0	0
Earthquake	Extreme	0	0	0	0	0
	High	698	261	59,344	9	5,142
	Moderate	952	420	93,369	11	17,830
Flood	100-year flood zone	78	35	7,756	2	2,777
Hazardous Materials Event	1-mile buffer transport corridor	1,650	681	152,713	20	22,972
Landslide	High	0	0	0	0	0
	Moderate	235	139	30,988	5	6,293
Tsunami	Maximum average run-up	12	5	1,151	2	435
Wildland Fire	Very high	0	0	0	0	0
	High	82	35	7,732	2	1,886
	Moderate	1,565	645	144,745	19	20,997
Windstorm	Prevailing wind zone	NA	NA	NA	NA	NA

[1] Value = Estimated average structural value (x1000)

NA = Not Applicable

Table J-4
City of Del Rey Oaks Potential Hazard Vulnerability Analysis – Critical Facilities

		Government		Emergency Response		Lifeline Utilities		Care		Educational		Marine, Environmental, and Community		Total	
Hazard	**Methodology**	**No.**	**Value ($)[1]**	**No.**	**Value ($)[1]**	**No.**	**Value ($)[1]**	**No.**	**Value ($)[1]**	**No.**	**Value ($)[1]**	**No.**	**Value ($)[1]**	**No.**	**Value ($)[1]**
Coastal Erosion	100-year erosion zone	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Dam Failure	Inundation area	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Earthquake	Extreme	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	High	1	6,659	1	1,652	0	0	0	0	0	0	0	0	2	8,311
	Moderate	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Flood	100-year flood zone	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Hazardous Materials Event	1-mile buffer transport corridor	1	6,659	1	1,652	0	0	0	0	0	0	0	0	2	8,311
Landslide	High	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Moderate	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Tsunami	Maximum average run-up	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Wildland Fire	Very high	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	High	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Moderate	1	6,659	1	1,652	0	0	0	0	0	0	0	0	2	8,311
Windstorm	Prevailing wind zone	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

[1] Value = Estimated insured structural value (x1000)

NA = Not Applicable

Table J-5
City of Del Rey Oaks Potential Hazard Vulnerability Analysis – Critical Infrastructure

		Highways		Railroads		Bridges	
Hazard	**Methodology**	**Miles**	**Value ($)[1]**	**Miles**	**Value ($)[1]**	**Number**	**Value ($)[1]**
Coastal Erosion	100-year erosion zone	0.0	0	0.0	0	0	0
Dam Failure	Inundation area	0.0	0	0.0	0	0	0
Earthquake	Extreme	0.0	0	0.0	0	0	0
	High	0.5	2,553	0.0	0	0	0
	Moderate	1.5	7,752	0.0	0	0	0
Flood	100-year flood zone	0.4	1,927	0.0	0	0	0
Hazardous Materials Event	1-mile buffer transport corridor	2.0	10,305	0.0	0	0	0
Landslide	High	0.0	0	0.0	0	0	0
	Moderate	0.4	1,857	0.0	0	0	0
Tsunami	Maximum average run-up	0.0	0	0.0	0	0	0
Wildland Fire	Very high	0.0	0	0.0	0	0	0
	High	0.2	985	0.0	0	0	0
	Moderate	1.8	9,143	0.0	0	0	0
Windstorm	Prevailing wind zone	NA	NA	NA	NA	NA	NA

[1] Value = Estimated value (x1000)

NA = Not Applicable

Earthquake

No residents and/or facilities are located in an extreme shaking hazard area. However, approximately 40 percent of the City's residents are located in a high shaking hazard area. As such, exposed within the high shaking hazard area are 698 people, 216 residential buildings (worth $59.3 million), 9 nonresidential buildings (worth $5.1 million), and 2 critical facilities (worth $8.3 million). Less than 2 miles of highways are located in this hazard area.

Within the moderate hazard shaking area are 952 people, 420 residential buildings (worth $93.4 million) and 11 nonresidential buildings (worth $17.8 million). There are no critical facilities located within this area. Only 1.5 miles of highway are vulnerable to this hazard.

Flood

The Arroyo Del Rey SFHA stretches from the northwest to the southeast of the City. Exposed within this hazard area are 78 people (5 percent of the City's population), 35 residential buildings (worth $7.8 million) and 2 nonresidential buildings (worth $2.8 million). In addition, 0.4 miles of highway are located in this hazard area.

Hazardous Materials Event

100 percent of the City's population resides within the 1-mile buffer of the transportation facilities and therefore is at risk to a hazardous materials transportation event. This includes 1,650 people, 681 residential buildings (worth $152.7 million), 20 nonresidential buildings (worth $23.0 million), and 2 critical facilities (worth $8.3 million). These figures are for the entirety of the transportation corridors and, therefore, overstate the exposure since a hazmat event along the corridors is unlikely to affect all of the area within the 1-mile buffer.

Landslide

No residents and/or buildings or facilities are located in a high landslide hazard area. Approximately 15 percent of City's total population is exposed to moderate landslides, however. The area includes 235 people, 139 residential buildings (worth $31.0 million) and 5 nonresidential buildings (worth $6.3 million). Less than 0.5 miles of highway is located in this hazard area.

Tsunami

Using the maximum average scenario of 21-foot run-up, approximately less than 1 percent of the City's population is vulnerable to a tsunami. This includes 12 people, 5 residential buildings (worth $1.2 million) and 2 nonresidential buildings (worth $435,000).

Wildland Fire

Using the California FRAP model, there are no very high wildland fire areas within the City. Less than 5 percent of the City's population resides in a high wildland fire area while the remaining 95 percent of the population is located in a moderate wildland fire area. Within the

area of high wildland fire exposure area are 82 people, 35 residential buildings (worth $7.7 million) and 2 nonresidential buildings (worth $1.9 million).

Areas of moderate wildland fire risk include 1,565 people, 645 residential buildings (worth $144.7 million), 19 nonresidential buildings (worth $21.0 million), and 2 critical facilities (worth $8.3 million).

Table J-6
City of Del Rey Oaks Legal and Regulatory Resources Available for Hazard Mitigation

Regulatory Tool	Name	Effect on Hazard Mitigation
Plans	City of Del Rey Oaks General Plan Safety Element	Establishes policies that will minimize the potential of human injury and property damage to natural hazards.
Programs	National Flood Insurance Program (NFIP)	Makes affordable flood insurance available to homeowners, business owners, and renters in participating communities. In exchange, those communities must adopt and enforce minimum floodplain management regulations to reduce the risk of damage from future floods.
	Monterey Regional Storm Water Management Program	Reduce pollution from storm water discharge and runoff with regard to the EPA's Phase II Storm Water National Pollutant Discharge Elimination System requirements. It is a collective effort and implementation of area-wide activities designed to benefit all participating entities.
Policies (Municipal Code)	Not Available	Not Available

Table J-7
City of Del Rey Oaks Administrative and Technical Resources for Hazard Mitigation

Staff/Personnel Resources	Department/Division Position
Planner(s) or engineer(s) with knowledge of land development and land management practices	Planning and Building
Engineer(s) or professional(s) trained in construction practices related to buildings and/or infrastructure	Maintenance
Planner(s) or engineer(s) with an understanding of manmade or natural hazards	Planning and Building
Floodplain manager	Planning and Building
Personnel skilled in GIS and/or HAZUS-MH	Planning and Building
Director of Emergency Services	Police
Finance (grant writers, purchasing)	City Clerk
Public Information Officers	City Clerk

Table J-8
City of Del Rey Oaks Financial Resources for Hazard Mitigation

Financial Resources	Effect on Hazard Mitigation
General funds	If funding available, can be used for hazard mitigation activity, including debt service for bonds.
Authority to levy taxes for specific purposes	Can be used for any hazard mitigation activity, but only eligible for use with voter approval.
Incur debt through general obligation bonds	Can be used for any hazard mitigation activity but only eligible for use with voter approval.
Incur debt through special tax and revenue bonds	Revenue Bonds can be issued through the City without voter approval, to raise funds for hazard mitigation activities.
Incur debt through private activity bonds	Can be used for any hazard mitigation activity but only eligible for use with voter approval.
FEMA HMPG and PDM grants	HMGP grant funding is available to local communities after a Presidentially-declared disaster. It can be used to fund both pre- and post-disaster mitigation plans and projects. PDM funding is available on an annual basis. This grant can only be used to fund pre-disaster mitigation plans and projects only.
United State Fire Administration (USFA) Grants	The purpose of these grants is to assist state, regional, national or local organizations to address fire prevention and safety. The primary goal is to reach high-risk target groups including children, seniors and firefighters.

Table J-9
City of Del Rey Oaks Mitigation Action Plan Matrix

Action Number	Description	Ranking / Prioritization	Administering Department	Potential Funding	Timeframe	Benefit-Costs
1.B	Identify hazard-prone critical facilities and infrastructure and carry out acquisition, relocation, and structural and nonstructural retrofitting measures as necessary.	Priority / High	Planning and Building	HMGP and PDM Grants	Ongoing	This action will help ensure that the community/critical facilities can operate in some capacity before, during, and after the disaster.
2.A	Develop a sustained public outreach program that encourages consistent hazard mitigation content. For example, consider publishing tsunami inundation maps in telephone books, wildland fire defensible space tips with summer water bills, and the safe handling and disposal of hazardous waste and chemicals with garbage bills.	Priority / High	City Clerk	General Funds, HMGP, and PDM Grants	0-1 years	A mitigation outreach program will help build and support local capacity to enable the public to prepare for, respond to, and recover from disasters.
5.B	Develop an unreinforced masonry grant program that helps correct earthquake-risk nonmasonry building problems, including chimney bracing and anchoring water heaters.	Priority / High	Planning and Building	General Funds, HMGP, and PDM Grants	0-3 years	This action will prevent future residential and nonresidential losses of unreinforced masonry buildings in the future. The retrofitting of unreinforced masonry buildings is a high priority for the State of California.

7.A	Examine and mitigate critical infrastructure that has been identified as currently being too narrow to ensure the safe transportation of truck loads within Monterey County.	Priority / High	Maintenance	General Funds	1-3 years	This effort will ensure that heavily used critical infrastructure will ensure the safe transportation of truck loads.
10.A	Continue to conduct current fuel management programs and investigate and apply new and emerging fuel management techniques.	Priority / High	City Clerk/ Seaside Fire	General Funds and PDM Grant	Ongoing	The probability of future damage from wildland fires could be high if this mitigation action is not implemented.
10.C	Develop and provide funding and/or incentives for defensible space measures (e.g., free chipping day, free collection day for tree limbs).	Priority / High	City Clerk/ Seaside Fire	General Funds, HMGP, and PDM Grants	Ongoing	The potential cost of this mitigation action seems reasonable for the size of the problem and its likely benefits.

Appendix K

City of Gonzales

Table K-1
City of Gonzales Estimated Population and Building Inventory

Population	Residential Buildings		Nonresidential Buildings	
2000 Census Population Count*	Total Building Count	Total Value of Buildings **- (x$1000)	Total Building Count	Total Value of Buildings*** (x$1000)
7,539	1,355	228,996	38	69,754

Source: FEMA HAZUS-MH (residential and nonresidential buildings) and U.S. Census 2000 population data.
* Population count using census blocks within the city limits.

** Average insured structural value of all residential buildings (including single-family dwelling, mobile homes, etc., is $169,000 per structure).

*** Averaged insured structural value of all nonresidential buildings (including industry, trade, professional and technical services, etc., is $2,683,000).

Table K-2
City of Gonzales Critical Facilities and Infrastructure

Category	Facility	Address	Estimated Insured Structural Value (x$1000)
Government	City Hall	147 Fourth St.	6,659
	Animal Control Facility	201 C St.	1,180
Emergency Response	Police Department	109 Fourth St.	1,652
	Fire Department	325 Center St.	708
Lifeline Utilities	Sewage Treatment Plant	Short Rd.	78,588
	Power Substation	10 Seventh St.	10,000
Care	Medical Center	133 Fourth St.	1,600
Educational	La Gloria School	220 Elko St.	590
	Fairview Middle School	401 Fourth St.	590
	Gonzales High School	501 Fifth St.	590
	Somavia Continuation School	650 Elko St.	590

Source: FEMA HAZUS-MH (estimated values)

Table K-3
City of Gonzales Potential Hazard Vulnerability Analysis – Population and Buildings

		Population	Buildings			
			Residential		Nonresidential	
Hazard Type	**Methodology**	**Number**	**Number**	**Value ($)[1]**	**Number**	**Value ($)[1]**
Coastal Erosion	100-year erosion zone	0	0	0	0	0
Dam Failure	Inundation area	13	1	235	0	0
Earthquake	Extreme	0	0	0	0	0
	High	7,539	1,355	228,996	38	69,754
	Moderate	0	0	0	0	0
Flood	100-year flood zone	528	99	15,867	2	2,714
Hazardous Materials Event	1-mile buffer transport corridor	7,538	1,355	228,980	38	69,754
Landslide	High	0	0	0	0	0
	Moderate	0	0	0	0	0
Tsunami	Maximum average run-up	0	0	0	0	0
Wildland Fire*	High	0	0	0	0	0
	Moderate	52	8	1,241	2	1,739
	Low	6,628	1,183	200,307	33	62,484
Windstorm	Prevailing wind zone	7,539	1,355	228,996	38	69,754

[1] Value = Estimated average structural value (x1000)

* Wildland Fire Rankings changed from Very High, High, and Moderate to High, Moderate, and Low respectively by the City of Gonzales Fire Services

Table K-4
City of Gonzales Potential Hazard Vulnerability Analysis – Critical Facilities

		Government		Emergency Response		Lifeline Utilities		Care		Educational		Marine, Environmental, and Community		Total	
Hazard	**Methodology**	**No.**	**Value ($)[1]**	**No.**	**Value ($)[1]**	**No.**	**Value ($)[1]**	**No.**	**Value ($)[1]**	**No.**	**Value ($)[1]**	**No.**	**Value ($)[1]**	**No.**	**Value ($)[1]**
Coastal Erosion	100-year erosion zone	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Dam Failure	Inundation area	0	0	0	0	1	78,588	0	0	0	0	0	0	1	78,588
Earthquake	Extreme	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	High	2	7,839	2	2,360	2	88,588	1	1,600	4	2,360	0	0	11	102,747
	Moderate	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Flood	100-year flood zone	0	0	0	0	1	78,588	0	0	0	0	0	0	1	78,588
Hazardous Materials Event	1-mile buffer transport corridor	2	7,839	2	2,360	1	10,000	1	1,600	4	2,360	0	0	10	24,159
Landslide	High	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Moderate	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Tsunami	Maximum average run-up	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Wildland Fire*	High	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Moderate	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Low	2	7,839	2	2,360	1	10,000	1	1,600	4	2,360	0	0	10	24,159
Windstorm	Prevailing wind zone	2	7,839	2	2,360	2	88,588	1	1,600	4	2,360	0	0	11	102,747

[1] Value = Estimated insured structural value (x1000)
* Wildland Fire Rankings changed from Very High, High, and Moderate to High, Moderate, and Low respectively by the City of Gonzales Fire Services

Table K-5
City of Gonzales Potential Hazard Vulnerability Analysis – Critical Infrastructure

		Highways		Railroads		Bridges	
Hazard	**Methodology**	**Miles**	**Value ($)[1]**	**Miles**	**Value ($)[1]**	**Number**	**Value ($)[1]**
Coastal Erosion	100-year erosion zone	0.0	0	0.0	0	0	0
Dam Failure	Inundation area	0.0	0	0.0	0	0	0
Earthquake	Extreme	0.0	0	0.0	0	0	0
	High	1.0	10,286	1.5	2,113	1	1,785
	Moderate	0.0	0	0.0	0	0	0
Flood	100-year flood zone	0.0	0	0.0	0	0	0
Hazardous Materials Event	1-mile buffer transport corridor	1.0	10,286	1.5	2,113	1	1,785
Landslide	High	0.0	0	0.0	0	0	0
	Moderate	0.0	0	0.0	0	0	0
Tsunami	Maximum average run-up	0.0	0	0.0	0	0	0
Wildland Fire*	High	0.0	0	0.0	0	0	0
	Moderate	0.0	0	0.0	0	0	0
	Low	1.0	9,854	1.2	1,616	1	1,785
Windstorm	Prevailing wind zone	1.0	10,286	1.5	2,113	1	1,785

* Wildland Fire Rankings changed from Very High, High, and Moderate to High, Moderate, and Low respectively by the City of Gonzales Fire Services

Dam Failure

Failure of the San Antonio and Nacimiento dams pose a risk to 2 percent of the City's population. Exposed within the inundation zone (on the far west side of the City) are 13 people, 1 residential building (worth $235,000) and 1 critical facility (worth $78.6 million).

Earthquake

No residents and/or buildings and facilities are located in an extreme shaking hazard area. However, 100 percent of the City's total population (7,539), including 1,355 residential buildings (worth $229.0 million), 38 nonresidential buildings (worth $69.8 million), and 11 critical facilities (worth $102.7 million) are located in a high shaking hazard area. Approximately 1 mile of highway, 1.5 miles of railroad tracks, and 1 bridge are located in the high shaking hazard area.

Flood

The SFHA includes the Gonzales Slough which bisects the City from the north to the southeast. Exposed within this hazard area are 528 people (7 percent of the City's population), 99 residential buildings (worth $15.9 million), 2 nonresidential buildings (worth $2.7 million), and 1 critical facility (worth $78.6 million).

Hazardous Materials Event

Within the 1-mile buffer around the transportation facilities, 100 percent of the City's population is exposed to a hazardous materials transport event. This includes 7,539 people, 1,355 residential buildings (wroth $229.0 million), 38 nonresidential buildings (worth $69.8 million), and 11 critical facilities (worth $102.7 million) are located in a high shaking hazard area. These figures are for the entirety of the transportation corridors and, therefore, overstate the exposure since a hazmat event along the corridors is unlikely to affect all of the area within the 1-mile buffer.

Wildland Fire

No residents and/or buildings and facilities are located in a high wildland fire hazard area. However, 7 percent of the population resides in a moderate wildland fire hazard area while the remaining 93 percent reside in a low wildland fire hazard. Therefore, using the California FRAP model, within the moderate wildland fire hazard area are 52 people, 8 residential buildings (worth $1.2 million) and 2 nonresidential buildings (worth $1.7 million).

Areas of low wildfire risk include 6,628 people, 1,355 residential buildings (worth $229.0 million), 33 nonresidential buildings (worth $62.5 million), and 10 critical facilities (worth $24.2 million).

Windstorm

Windstorms created by prevailing northwest sustained surface winds are common throughout the central and southern Salinas Valley. As such, the entire City, including its population, residential buildings, nonresidential buildings, and critical facilities and infrastructure are equally at risk to this hazard.

Table K-6
City of Gonzales Legal and Regulatory Resources Available for Hazard Mitigation

Regulatory Tool	Name		Effect on Hazard Mitigation
Plans	1996 Gonzales General Plan Safety Element		Establishes policies that will minimize the potential of human injury and property damage to natural hazards.
Programs	National Flood Insurance Program (NFIP)		Makes affordable flood insurance available to homeowners, business owners, and renters in participating communities. In exchange, those communities must adopt and enforce minimum floodplain management regulations to reduce the risk of damage from future floods.
Policies (Municipal Code)	Title 11 Building Regulations	Title 11.08 Adoption of California Building Code	Adopts and enforces the California Building Code, 1998 Edition.
		Title 11.32 Abatement of Dangerous Buildings	Adopts and enforces the Uniform Code for the Abatement of Dangerous Buildings, 1997 Edition.
		Title 11.40 Building Earthquake Safety	Promotes public safety and welfare by reducing the risk of death or injury that may result from the effects of earthquakes on buildings constructed prior to the adoption of local building codes requiring earthquake resistant design and construction, which have unreinforced masonry bearing walls and other characteristics specified in California Health and Safety Code section 19161 which make them potentially hazardous to life in the event of an earthquake. It establishes a program for the identification of all such buildings in the city, for the determination of the severity and extent of such hazards in relation to their potential for causing death or injury in the event of an earthquake, and for the carrying out of measures to mitigate such hazards.
	Title 14 Flood Control	Title 14.04 Flood Damage Prevention	Identifies areas where terrain characteristics would present new developments and their users with potential hazards to life and property from potential inundation by a 100-year frequency flood or other known flood hazards. These standards are also intended to minimize the effects of development on drainage ways and watercourses.

Table K-7
City of Gonzales Administrative and Technical Resources for Hazard Mitigation

Staff/Personnel Resources	Department/Division Position
Planner(s) or engineer(s) with knowledge of land development and land management practices	Planning and Economic Development
Engineer(s) or professional(s) trained in construction practices related to buildings and/or infrastructure	Planning and Economic Development
Planner(s) or engineer(s) with an understanding of manmade or natural hazards	Planning and Economic Development
Floodplain manager	Public Works
Personnel skilled in GIS and/or HAZUS-MH	Management of Information Systems
Director of Emergency Services	Fire
Finance (grant writers, purchasing)	City Manager's Office
Public Information Officers	City Manager's Office

Table K-8
City of Gonzales Financial Resources for Hazard Mitigation

Financial Resources	Effect on Hazard Mitigation
General funds	If funding available, can be used for hazard mitigation activity, including debt service for bonds.
Authority to levy taxes for specific purposes	Can be used for any hazard mitigation activity, but only eligible for use with voter approval.
Incur debt through general obligation bonds	Can be used for any hazard mitigation activity but only eligible for use with voter approval.
Incur debt through special tax and revenue bonds	Revenue Bonds can be issued through the City without voter approval, to raise funds for hazard mitigation activities.
Incur debt through private activity bonds	Can be used for any hazard mitigation activity but only eligible for use with voter approval.
FEMA HMPG and PDM grants	HMGP grant funding is available to local communities after a Presidentially-declared disaster. It can be used to fund both pre- and post-disaster mitigation plans and projects. PDM funding is available on an annual basis. This grant can only be used to fund pre-disaster mitigation plans and projects only.
United State Fire Administration (USFA) Grants	The purpose of these grants is to assist state, regional, national or local organizations to address fire prevention and safety. The primary goal is to reach high-risk target groups including children, seniors and firefighters.

Table K-9
City of Gonzales Mitigation Action Plan Matrix

Action Number	Description	Ranking / Prioritization	Administering Department	Potential Funding	Timeframe	Benefit-Costs
1.B	Identify hazard-prone critical facilities and infrastructure and carry out acquisition, relocation, and structural and non structural retrofitting measures as necessary	Priority / High	City Management	Federal and State Grants (e.g, PDM grants)	In progress to be ongoing process	This action will help ensure that the community/critical facilities can operate in some capacity before, during, and after the disaster.
5.B	Develop an unreinforced masonry grant program that helps correct earthquake-risk nonmasonry building problems, including chimney bracing and anchoring water heaters.	Priority / High	Building Department	Federal and State Grants (e.g, PDM grants)	When funding is acquired	The identification and mitigation of unreinforced nonmasonry buildings will reduce potential losses due to earthquakes.
6.A	Explore mitigation opportunities for repetitively flooded properties, and if necessary, carry-out acquisition, relocation, elevation, and flood-proofing measures to protect these properties.	Priority / High	Planning Department	Federal and State Grants (e.g, FMA grants)	As funding is available	The mitigation of repetitively flooded properties is a priority for FEMA grant programs.
6.C	Identify and carry-out minor flood and stormwater management projects that would reduce damage to infrastructure and damage due to local flooding/inadequate drainage.	Priority / High	Public Works Department	Federal and State Grants (e.g, PDM grants)	As funding is available	The identification and implementation of minor flood and stormwater management projects will reduce multi-asset (critical facility, critical infrastructure, and residential and nonrersidential) losses due to flooding.

Table K-9
City of Gonzales Mitigation Action Plan Matrix

Action Number	Description	Ranking / Prioritization	Administering Department	Potential Funding	Timeframe	Benefit-Costs
7.A	Examine and mitigate critical infrastructure that has been identified as currently being too narrow to ensure the safe transportation of truckloads within Monterey County.	Priority / High	Planning Department	Federal and State Grants (e.g., PDM grants)	As funding is available	This effort will ensure that heavily used critical infrastructure will ensure the safe transportation of truck loads.

Appendix L

City of Greenfield

Table L-1
City of Greenfield Estimated Population and Building Inventory

Population	Residential Buildings		Nonresidential Buildings	
2000 Census Population Count*	**Total Building Count**	**Total Value of Buildings **- (x$1000)**	**Total Building Count**	**Total Value of Buildings (x$1000)**
12,842	2,243	352,242	10	34,416

Source: FEMA HAZUS-MH (residential and nonresidential buildings) and U.S. Census 2000 population data.
* Population count using census blocks within the city limits.

** Average insured structural value of all residential buildings (including single-family dwelling, mobile homes, etc., is $157,000 per structure).

*** Averaged insured structural value of all nonresidential buildings (including industry, trade, professional and technical services, etc., is $3,442,000).

Table L-2
City of Greenfield Critical Facilities and Infrastructure

Category	Facility	Address	Estimated Insured Structural Value (x$1000)
Government	City Hall	45 El Camino Real	6,659
Emergency Response	Police Department	215 El Camino Real	1,652
	Fire Department	380 Oak Ave.	708
Lifeline Utilities	Wastewater Treatment Plant	Located from aerial photography	78,588
Care	Touch of Grace	706 Elm St.	802
Educational	Oak Avenue School	1239 Oak Ave.	590
	Greenfield Elementary School	490 El Camino Real	590
	Vista Verde Middle School	1199 Elm Ave.	590
	Greenfield Primary School	801 Walnut Ave.	590
	Greenfield High School	2025 El Camino Real	590
	Ventana High Continuation School	2015 El Camino Real	590

Source: FEMA HAZUS-MH (estimated values)

Table L-3
City of Greenfield Potential Hazard Vulnerability Analysis – Population and Buildings

		Population	Buildings			
			Residential		Nonresidential	
Hazard Type	**Methodology**	**Number**	**Number**	**Value ($)[1]**	**Number**	**Value ($)[1]**
Coastal Erosion	100-year erosion zone	0	0	0	0	0
Dam Failure	Inundation area	0	0	0	0	0
Earthquake	Extreme	0	0	0	0	0
	High	0	0	0	0	0
	Moderate	12,842	2,243	352,242	26	34,416
Flood	100-year flood zone	0	0	0	0	0
Hazardous Materials Event	1-mile buffer transport corridor	7,271	1,350	224,611	25	34,131
Landslide	High	0	0	0	0	0
	Moderate	0	0	0	0	0
Tsunami	Maximum average run-up	0	0	0	0	0
Wildland Fire	Very high	0	0	0	0	0
	High	0	0	0	0	0
	Moderate	9,275	1,667	266,731	22	30,085
Windstorm	Prevailing wind zone	12,842	2,243	352,242	26	34,416

[1] Value = Estimated average structural value (x1000)

Table L-4
City of Greenfield Potential Hazard Vulnerability Analysis – Critical Facilities

		Government		Emergency Response		Lifeline Utilities		Care		Educational		Marine, Environmental, and Community		Total	
Hazard	**Methodology**	**No.**	**Value ($)[1]**	**No.**	**Value ($)[1]**	**No.**	**Value ($)[1]**	**No.**	**Value ($)[1]**	**No.**	**Value ($)[1]**	**No.**	**Value ($)[1]**	**No.**	**Value ($)[1]**
Coastal Erosion	100-year erosion zone	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Dam Failure	Inundation area	0	0	0	0	1	78,588	0	0	0	0	0	0	1	78,588
Earthquake	Extreme	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	High	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Moderate	1	6,659	2	2,360	1	78,588	1	802	5	2,950	0	0	10	91,359
Flood	100-year flood zone	0	0	0	0	1	78,588	0	0	0	0	0	0	1	78,588
Hazardous Materials Event	1-mile buffer transport corridor	1	6,659	2	2,360	0	0	1	802	3	1,770	0	0	7	11,591
Landslide	High	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Moderate	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Tsunami	Maximum average run-up	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Wildland Fire	Very high	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	High	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Moderate	1	6,659	2	2,360	0	0	1	802	2	1,180	0	0	6	11,001
Windstorm	Prevailing wind zone	1	6,659	2	2,360	1	78,588	1	802	5	2,950	0	0	10	91,359

[1] Value = Estimated insured structural value (x1000)

Table L-5
City of Greenfield Potential Hazard Vulnerability Analysis – Critical Infrastructure

		Highways		Railroads		Bridges	
Hazard	**Methodology**	**Miles**	**Value ($)[1]**	**Miles**	**Value ($)[1]**	**Number**	**Value ($)[1]**
Coastal Erosion	100-year erosion zone	0.0	0	0.0	0	0	0
Dam Failure	Inundation area	0.0	0	0.0	0	0	0
Earthquake	Extreme	0.0	0	0.0	0	0	0
	High	0.0	0	0.0	0	0	0
	Moderate	3.5	29,058	0.0	0	3	4,105
Flood	100-year flood zone	0.0	0	0.0	0	0	0
Hazardous Materials Event	1-mile buffer transport corridor	2.9	26,170	0.0	0	3	4,105
Landslide	High	0.0	0	0.0	0	0	0
	Moderate	0.0	0	0.0	0	0	0
Tsunami	Maximum average run-up	0.0	0	0.0	0	0	0
Wildland Fire	Very high	0.0	0	0.0	0	0	0
	High	0.0	0	0.0	0	0	0
	Moderate	1.6	13,715	0.0	0	3	4,105
Windstorm	Prevailing wind zone	3.5	29,058	0.0	0	3	4,105

[1] Value = Estimated value (x1000)

Dam Failure

Failure of the San Antonio, Nacimiento, and Salinas dams poses a risk to only one critical facility (wastewater treatment plant, worth $78.6 million) in the City of Greenfield.

Earthquake

No residents and/or facilities and buildings are located in extreme or high shaking areas. However, the entire City is at risk to moderate shaking. This includes 12,842 people, 2,243 residential buildings (worth $352.2 million), 26 nonresidential buildings (worth $34.4 million), 10 critical facilities (worth $91.4 million) and 3.5 miles of highway.

Flood

Flooding within the Salinas River SFHA poses a risk to only one critical facility (wastewater treatment plant, worth $78.6 million) in the most western portion of the City of Greenfield.

Hazardous Materials Event

Within the 1-mile buffer around the transportation facilities, almost 60 percent of the City's population is exposed to a hazardous material transport event. This includes 7,271 people, 1,350 residential buildings (worth $224.6 million), 25 nonresidential buildings (worth $34.1 million), and 7 critical facilities (worth $11.6 million). These figures are for the entirety of the transportation corridors and, therefore, overstate the exposure since a hazmat event along the corridors is unlikely to affect all of the area within the 1-mile buffer.

Wildland Fire

Using the California FRAP model, no person and/or facility and building are located in the high or very high wildland fire risk areas. As such, within the area of moderate wildland fire exposure is 9,275 people and 1,667 residential buildings (worth $266.7 million), 22 nonresidential buildings (worth $30.1 million) and 6 critical facilities (worth $11.0 million). In addition, 1.6 miles of highway are located in this hazard area.

Windstorm

Windstorms created by prevailing northwest sustained surface winds are common throughout the central and southern Salinas Valley. As such, the entire population, buildings, facilities, and infrastructure are vulnerable to windstorms from March to October.

Table L-6
City of Greenfield Legal and Regulatory Resources Available for Hazard Mitigation

Regulatory Tool	Name		Effect on Hazard Mitigation
Plans	City of Greenfield General Plan 2005-2006 Safety Element		Establishes policies that will minimize the potential of human injury and property damage to natural hazards. Hazards identified in the Safety Element include: geologic and seismic hazards, flooding, hazardous materials, and fire hazards.
Programs	National Flood Insurance Program (NFIP)		Makes affordable flood insurance available to homeowners, business owners, and renters in participating communities. In exchange, those communities must adopt and enforce minimum floodplain management regulations to reduce the risk of damage from future floods.
Policies (Municipal Code)	Zoning Code	Chapter 17.60 Hazardous Materials	Ensures that the use, handling, storage, and transportation of hazardous materials comply with all state laws and that appropriate information is reported to the Fire Department as the regulatory authority.
	Municipal Code	Adoption of California Building Code	Adopts and enforces the California Building Code, 1997 Edition.
	Municipal Code	Abatement of Dangerous Buildings	Adopts and enforces the Uniform Code for the Abatement of Dangerous Buildings, 1997 Edition.

Table L-7
City of Greenfield Administrative and Technical Resources for Hazard Mitigation

Staff/Personnel Resources	Department/Division Position
Planner(s) or engineer(s) with knowledge of land development and land management practices	Planning
Engineer(s) or professional(s) trained in construction practices related to buildings and/or infrastructure	Public Works
Planner(s) or engineer(s) with an understanding of manmade or natural hazards	Planning
Floodplain manager	Public Works
Personnel skilled in GIS and/or HAZUS-MH	Planning
Director of Emergency Services	Police
Finance (grant writers, purchasing)	Finance
Public Information Officers	Various Departments

Table L-8
City of Greenfield Financial Resources for Hazard Mitigation

Financial Resources	Effect on Hazard Mitigation
General funds	If funding available, can be used for hazard mitigation activity, including debt service for bonds.
Authority to levy taxes for specific purposes	Can be used for any hazard mitigation activity, but only eligible for use with voter approval.
Incur debt through general obligation bonds	Can be used for any hazard mitigation activity but only eligible for use with voter approval.
Incur debt through special tax and revenue bonds	Revenue Bonds can be issued through the City without voter approval, to raise funds for hazard mitigation activities.
Incur debt through private activity bonds	Can be used for any hazard mitigation activity but only eligible for use with voter approval.
FEMA HMPG and PDM grants	HMGP grant funding is available to local communities after a Presidentially-declared disaster. It can be used to fund both pre- and post-disaster mitigation plans and projects. PDM funding is available on an annual basis. This grant can only be used to fund pre-disaster mitigation plans and projects only.
United State Fire Administration (USFA) Grants	The purpose of these grants is to assist state, regional, national or local organizations to address fire prevention and safety. The primary goal is to reach high-risk target groups including children, seniors and firefighters.

Table L-9
City of Greenfield Mitigation Action Plan Matrix

Action Number	Description	Ranking / Prioritization	Administering Department	Potential Funding	Timeframe	Benefit-Costs
1.B	Identify hazard-prone critical facilities and infrastructure and carry out acquisition, relocation, and structural and nonstructural retrofitting measures as necessary.	Priority / High	Planning	HMGP and PDM Grants	Ongoing	This action will help ensure that the community/critical facilities can operate in some capacity before, during, and after the disaster.
2.A	Develop a sustained public outreach program that encourages consistent hazard mitigation content. For example, consider publishing tsunami inundation maps in telephone books, wildland fire defensible space tips with summer water bills, and the safe handling and disposal of hazardous waste and chemicals with garbage bills.	Priority / High	Various	General Funds, HMGP, and PDM Grants	0-1 years	A mitigation outreach program will help build and support local capacity to enable the public to prepare for, respond to, and recover from disasters.
5.B	Develop an unreinforced masonry grant program that helps correct earthquake-risk nonmasonry building problems, including chimney bracing and anchoring water heaters.	Priority / High	Planning	General Funds, HMGP, and PDM Grants	0-3 years	This action will prevent future residential and nonresidential losses of unreinforced masonry buildings in the future. The retrofitting of unreinforced masonry buildings is a high priority for the State of California.

7.A	Examine and mitigate critical infrastructure that has been identified as currently being too narrow to ensure the safe transportation of truck loads within Monterey County.	Priority / High	Planning	General Funds	1-3 years	This effort will ensure that heavily used critical infrastructure will ensure the safe transportation of truck loads.
10.A	Continue to conduct current fuel management programs and investigate and apply new and emerging fuel management techniques.	Priority / High	Fire District	General Funds and PDM Grant	Ongoing	The probability of future damage from wildland fires could be high if this mitigation action is not implemented.
10.C	Develop and provide funding and/or incentives for defensible space measures (e.g., free chipping day, free collection day for tree limbs).	Priority / High	Fire District	General Funds, HMGP, and PDM Grants	Ongoing	The potential cost of this mitigation action seems reasonable for the size of the problem and its likely benefits.
11.B	Develop windstorm building requirements (e.g., fasteners for roof sheathing and singles) in high wind hazard areas.	Priority / High	Planning	General Funds	0-1 year	This effort will ensure that future development is less vulnerable to this hazard.
11.C	Include provisions for dust erosion control methods in building, grading, and land clearing permits.	Priority / High	Planning	General Funds	0-1 year	Dust control erosion measures will reduce the effects of bad air quality and soil loss, thereby improving health and work conditions.

Appendix M

City of King City

Table M-1
City of King City Estimated Population and Building Inventory

Population	Residential Buildings		Nonresidential Buildings	
2000 Census Population Count*	**Total Building Count**	**Total Value of Buildings **- (x$1000)**	**Total Building Count**	**Total Value of Buildings (x$1000)**
11,098	2,123	370,213	56	153,042

Source: FEMA HAZUS-MH (residential and nonresidential buildings) and U.S. Census 2000 population data.
* Population count using census blocks within the city limits.

** Average insured structural value of all residential buildings (including single-family dwelling, mobile homes, etc., is $174,000 per structure).

*** Averaged insured structural value of all nonresidential buildings (including industry, trade, professional and technical services, etc., is $2,733,000).

Table M-2
City of King City Critical Facilities and Infrastructure

Category	Facility	Address	Estimated Insured Structural Value / Value Per Mile (x$1000)
Government	City Hall	212 South Vanderhurst Ave.	6,659
Emergency Response	Police Department	415 Bassett St.	1,652
	Fire Department	422 Bassett St.	708
Lifeline Utilities	Power Plant	750 Metz Rd.	129,800
	Wastewater Treatment Plant	Located from aerial photography	78,588
Care	George L. Mee Memorial Hospital	300 Canal St.	4,130
Educational	Santa Lucia Elementary School	502 Collins St.	590
	Del Rey Elementary School	502 King St.	590
	San Lorenzo Middle School	415 Pearl St.	590
	King City High School	720 Broadway St.	590
	Candy Butler Continuation High School	760 Broadway St.	590
Airport	Mesa Del Rey Airport	250 Airport Rd.	6,431

Source: FEMA HAZUS-MH (estimated values)

Table M-3
City of King City Potential Hazard Vulnerability Analysis – Population and Buildings

		Population	Buildings			
			Residential		Nonresidential	
Hazard Type	**Methodology**	**Number**	**Number**	**Value ($)[1]**	**Number**	**Value ($)[1]**
Coastal Erosion	100-year erosion zone	0	0	0	0	0
Dam Failure	Inundation area	3,067	638	92,464	9	10,251
Earthquake	Extreme	0	0	0	0	0
	High	0	0	0	0	0
	Moderate	11,098	2,128	370,213	84	153,042
Flood	100-year flood zone	721	139	20,361	4	3,462
Hazardous Materials Event	1-mile buffer transport corridor	9,607	1,822	312,794	78	145,903
Landslide	High	0	0	0	0	0
	Moderate	0	0	0	0	0
Tsunami	Maximum average run-up	0	0	0	0	0
Wildland Fire	Very high	0	0	0	0	0
	High	5	1	95	2	0
	Moderate	9,766	1,911	331,439	73	122,195
Windstorm	Prevailing wind zone	11,098	2,128	370,213	84	153,042

[1] Value = Estimated average structural value (x1000)

Table M-4
City of King City Potential Hazard Vulnerability Analysis – Critical Facilities

		Government		Emergency Response		Lifeline Utilities		Care		Educational		Marine, Environmental, and Community		Total	
Hazard	**Methodology**	**No.**	**Value ($)[1]**	**No.**	**Value ($)[1]**	**No.**	**Value ($)[1]**	**No.**	**Value ($)[1]**	**No.**	**Value ($)[1]**	**No.**	**Value ($)[1]**	**No.**	**Value ($)[1]**
Coastal Erosion	100-year erosion zone	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Dam Failure	Inundation area	0	0	0	0	1	78,588	0	0	0	0	0	0	1	78,588
Earthquake	Extreme	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	High	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Moderate	1	6,659	2	2,360	2	208,388	1	4,130	5	2,950	0	0	11	224,487
Flood	100-year flood zone	0	0	0	0	1	78,588	0	0	0	0	0	0	1	78,588
Hazardous Materials Event	1-mile buffer transport corridor	1	6,659	2	2,360	1	129,800	1	4,130	5	2,950	0	0	10	145,899
Landslide	High	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Moderate	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Tsunami	Maximum average run-up	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Wildland Fire	Very high	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	High	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Moderate	1	6,659	2	2,360	0	0	1	4,130	5	2,950	0	0	9	16,099
Windstorm	Prevailing wind zone	1	6,659	2	2,360	2	208,388	1	4,130	5	2,950	0	0	11	224,487

[1] Value = Estimated insured structural value (x1000)

Table M-5
City of King City Potential Hazard Vulnerability Analysis – Critical Infrastructure

		Highways		Railroads		Bridges		Airport	
Hazard	**Miles**	**Value ($)[1]**	**Miles**	**Miles**	**Value ($)[1]**	**Number**	**Value ($)[1]**	**Number**	**Value ($)[1]**
Coastal Erosion	100-year erosion zone	0.0	0	0.0	0	0	0	0	0
Dam Failure	Inundation area	1.2	10,876	0.1	75	6	7,181	0	0
Earthquake	Extreme	0.0	0	0.0	0	0	0	0	0
	High	0.0	0	0.0	0	0	0	0	0
	Moderate	6.3	42,902	2.3	3,176	7	8,214	1	6,431
Flood	100-year flood zone	0.3	2,612	0.1	126	4	4,864		
Hazardous Material Events	1-mile buffer transport corridor	6.1	41,727	2.3	3,176	7	8,214	1	6,431
Landslide	High	0.0	0	0.0	0	0	0	0	0
	Moderate	0.0	0	0.0	0	0	0	0	0
Tsunami	Maximum average run-up	0.0	0	0.0	0	0	0	0	0
Wildland Fire	Very high	0.0	0	0.0	0	0	0	0	0
	High	0.0	163	0.0	0	0	0	0	0
	Moderate	4.2	30,218	1.5	2,029	5	5,033	0	0
Windstorm	Prevailing wind zone	6.3	42,902	2.3	3,176	7	8,214	1	6,431

[1] Value = Estimated value (x1000)

Dam Failure

Failure of the San Antonio, Nacimiento, and Salinas dams poses a risk to over a quarter of the City's population. Exposed within the inundation zones are 3,067 people, 638 residential buildings (worth $92.5 million), 9 nonresidential buildings (worth $10.6 million), and 1 critical facility (worth $78.6 million). 1.2 miles of highways and 0.2 miles of railroad tracks are located in this hazard area.

Earthquake

No one in King City is at risk to extreme or high shaking. However, all of King City is exposed to moderate shaking. As such, exposed within exposed within this hazard area are 11,098 people, 2,128 residential buildings (worth $370.2 million), 84 nonresidential buildings (worth $153.0 million), and 11 critical facilities (worth $224.5 million). 6.3 miles of highway, 2.3 miles of railroad tracks, 7 bridges, and 1 airport are located in this hazard area.

Flood

The San Lorenzo Creek's SFHA is located on the west and southwestern portion of the City limits. Exposed within this hazard area are 721 people, 139 residential buildings (worth $20.4 million), 4 nonresidential buildings (worth $3.5 million), and 1 critical facility (worth $78.6 million). Approximately 0.3 miles of highway and 0.1 miles of railroad tracks are located in the 100-year floodplain.

Hazardous Materials Event

Within the 1-mile buffer around the transportation facilities, 86 percent of King City's population is exposed to a hazardous material transport event. This includes 9,607 people, 1,822 residential buildings (worth $312.8 million), 78 nonresidential buildings (worth $145.9 million), and 10 critical facilities (worth $145.9 million). These figures are for the entirety of the transportation corridors and, therefore, overstate the exposure since a hazmat event along the corridors is unlikely to affect all of the area within the 1-mile buffer.

Wildland Fire

There are no very high or high wildland fire hazard areas located in King City. Therefore, exposed within the moderate wildland fire area are 9,766 people and 1,911 residential buildings (worth $331.4 million), 73 nonresidential buildings (worth $122.2 million), and 9 critical facilities (worth $16.1 million).

Windstorm

Windstorms created by prevailing northwest sustained surface winds are common throughout the central and southern Salinas Valley from March to October. As such, exposed within exposed within this hazard area are 11,098 people, 2,128 residential buildings (worth $370.2 million), 84 nonresidential buildings (worth $153.0 million), and 11 critical facilities (worth $224.5 million).

6.3 miles of highway, 2.3 miles of railroad tracks, 7 bridges, and 1 airport are also located in this hazard area.

Table M-6
City of King City Legal and Regulatory Resources Available for Hazard Mitigation

Regulatory Tool	Name		Effect on Hazard Mitigation
Plans	General Plan Safety Element		Establishes policies that will minimize the potential of human injury and property damage to natural hazards.
Programs	National Flood Insurance Program (NFIP)		Makes affordable flood insurance available to homeowners, business owners, and renters in participating communities. In exchange, those communities must adopt and enforce minimum floodplain management regulations to reduce the risk of damage from future floods.
Policies (Municipal Code)	Title 7 Peace, Safety and Morals	Chapter 7.20 Weed Removal	Requires the owner, agent or person in control of any lot, piece or parcel of land in the city, to remove there from and from the sidewalks in front thereof, all noxious weeds or vegetation or dry grass and all dead trees, tin cans, rubbish, refuse and waste matter of all kinds which may endanger or injure neighboring property or the health or welfare of the residents of the vicinity.
	Title 8 Health and Sanitation	Chapter 8.34 Hazardous Materials Storage and Registration	Provides a continuing source of current information concerning hazardous substances and chemicals being utilized in the city to protect the general health and safety of the public and to enable emergency personnel to respond safely and speedily to emergency situations which may arise. It also establishes a continuing program for the purpose of preventing contamination from, and improper storage of, hazardous substances stored underground.
	Title 12 Buildings and Construction	Chapter 12.04 Construction Codes Adopted	Adopts and enforces the Uniform Building Code, 1997 Edition.
		Chapter 12.08 Fire Prevention Requirements	Prescribes regulations governing conditions hazardous to life and property from fire, hazardous materials or explosion.
		Chapter 12.16 Flood Damage Prevention	Identifies areas where terrain characteristics would present new developments and their users with potential hazards to life and property from potential inundation by a 100-year frequency flood or other known flood hazards. These standards are also intended to minimize the effects of development on drainage ways and watercourses.

Table M-6
City of King City Legal and Regulatory Resources Available for Hazard Mitigation

Regulatory Tool	Name		Effect on Hazard Mitigation
		Chapter 12.20 Building Earthquake Safety	Promotes public safety and welfare by reducing the risk of death or injury that may result from the effects of earthquakes on buildings constructed prior to the adoption of local building codes requiring earthquake-resistant design and construction, which have unreinforced masonry bearing walls and other characteristics specified in Section 19161 of the Health and Safety Code which make them potentially hazardous to life in the event of an earthquake. It establishes a program for the identification of all such buildings in the city, for the determination of the severity and extent of such hazards in relation to their potential for causing death or injury in the event of an earthquake, and for the carrying out of measures to mitigate such hazards.
	Chapter 17 Zoning	Chapter 17.36 Primary Floodplain District	The district is intended to be applied to properties which lie within a designated floodway, which for the purpose of this title shall be construed to be a stream, channel and such portions of the adjacent flood plain as are reasonably required to efficiently carry the flood of the stream; and on which properties special regulations are necessary for minimum protection of the public health, safety and of property and improvements from hazards and damage resulting from flood waters.
		Chapter 17.38 Secondary Floodplain District	This district is intended to be applied to properties which lie within that portion of the national floodway between the limits of the designated floodway and the limits of the flood plain, or where inundation may occur, but where depths and velocities will not cause appreciable damage and which properties require special regulations for the protection of such properties and their improvements from hazards and damage which may result from flood waters.

Table M-7
City of King City Administrative and Technical Resources for Hazard Mitigation

Staff/Personnel Resources	Department/Division Position
Planner(s) or engineer(s) with knowledge of land development and land management practices	Community Development
Engineer(s) or professional(s) trained in construction practices related to buildings and/or infrastructure	Community Development
Planner(s) or engineer(s) with an understanding of manmade or natural hazards	Community Development
Floodplain manager	Community Development
Personnel skilled in GIS and/or HAZUS-MH	Community Development
Director of Emergency Services	Police
Finance (grant writers, purchasing)	Community Development
Public Information Officers	Community Development

Table L-8
City of King City Financial Resources for Hazard Mitigation

Financial Resources	Effect on Hazard Mitigation
General funds	If funding available, can be used for hazard mitigation activity, including debt service for bonds.
Authority to levy taxes for specific purposes	Can be used for any hazard mitigation activity, but only eligible for use with voter approval.
Incur debt through general obligation bonds	Can be used for any hazard mitigation activity but only eligible for use with voter approval.
Incur debt through special tax and revenue bonds	Revenue Bonds can be issued through the City without voter approval, to raise funds for hazard mitigation activities.
Incur debt through private activity bonds	Can be used for any hazard mitigation activity but only eligible for use with voter approval.
FEMA HMPG and PDM grants	HMGP grant funding is available to local communities after a Presidentially-declared disaster. It can be used to fund both pre- and post-disaster mitigation plans and projects. PDM funding is available on an annual basis. This grant can only be used to fund pre-disaster mitigation plans and projects only.
United State Fire Administration (USFA) Grants	The purpose of these grants is to assist state, regional, national or local organizations to address fire prevention and safety. The primary goal is to reach high-risk target groups including children, seniors and firefighters.

Table L-9
City of King City Mitigation Action Plan Matrix

Action Number	Description	Ranking / Prioritization	Administering Department	Potential Funding	Timeframe	Benefit-Costs
1.B	Identify hazard-prone critical facilities and infrastructure and carry out acquisition, relocation, and structural and nonstructural retrofitting measures as necessary.	Priority / High	Community Development	HMGP and PDM Grants	Ongoing	This action will help ensure that the community/critical facilities can operate in some capacity before, during, and after the disaster.
2.A	Develop a sustained public outreach program that encourages consistent hazard mitigation content. For example, consider publishing tsunami inundation maps in telephone books, wildland fire defensible space tips with summer water bills, and the safe handling and disposal of hazardous waste and chemicals with garbage bills.	Priority / High	Community Development	General Funds, HMGP, and PDM Grants	0-1 years	A mitigation outreach program will help build and support local capacity to enable the public to prepare for, respond to, and recover from disasters.
5.B	Develop an unreinforced masonry grant program that helps correct earthquake-risk nonmasonry building problems, including chimney bracing and anchoring water heaters.	Priority / High	Community Development	General Funds, HMGP, and PDM Grants	0-3 years	This action will prevent future residential and nonresidential losses of unreinforced masonry buildings in the future. The retrofitting of unreinforced masonry buildings is a high priority for the State of California.

6.A	Explore mitigation opportunities for repetitively flooded properties, and if necessary, carry-out acquisition, relocation, elevation, and flood-proofing measures to protect these properties.	Priority / High	Water Resources	FMA Grants	Ongoing	The mitigation of repetitively flooded properties is a priority for FEMA grant programs.
7.A	Examine and mitigate critical infrastructure that has been identified as currently being too narrow to ensure the safe transportation of truck loads within Monterey County.	Priority / High	Community Development	General Funds	1-3 years	This effort will ensure that heavily used critical infrastructure will ensure the safe transportation of truck loads.
10.A	Continue to conduct current fuel management programs and investigate and apply new and emerging fuel management techniques.	Priority / High	Fire District	General Funds and PDM Grant	Ongoing	The probability of future damage from wildland fires could be high if this mitigation action is not implemented.
11.B	Develop windstorm building requirements (e.g., fasteners for roof sheathing and singles) in high wind hazard areas.	Priority / High	Community Development	General Funds	0-1 year	This effort will ensure that future development is less vulnerable to this hazard.
11.C	Include provisions for dust erosion control methods in building, grading, and land clearing permits.	Priority / High	Community Development	General Funds	0-1 year	Dust control erosion measures will reduce the effects of bad air quality and soil loss, thereby improving health and work conditions.

Appendix N

City of Marina

Table N-1
City of Marina Estimated Population and Building Inventory

Population	Residential Buildings		Nonresidential Buildings	
2000 Census Population Count*	**Total Building Count**	**Total Value of Buildings **- (x$1000)**	**Total Building Count**	**Total Value of Buildings*** (x$1000)**
25,101	6,126	1,467,026	76	220,906

Source: FEMA HAZUS-MH (residential and nonresidential buildings) and U.S. Census 2000 population data.
* Population count using census blocks within the city limits. This number was adjusted down in 2002 to 19,163.

** Average insured structural value of all residential buildings (including single-family dwelling, mobile homes, etc., is $239,000 per structure).

*** Averaged insured structural value of all nonresidential buildings (including industry, trade, professional and technical services, etc., is $2,907,000).

Table N-2
City of Marina Critical Facilities and Infrastructure

Category	Facility	Address	Estimated Insured Structural Value / Value Per Mile (x$1000)
Government	City Hall	211 Hillcrest Ave.	6,659
	City Hall Annex / Community Development Department	209 Cypress Ave.	1,180
	Development Services Department	3056 Del Monte Blvd., #201 & #205	1,180
Emergency Response	Department of Public Safety / Police Station / Fire Station #1	211 Hillcrest Ave.	1652/708/1180
	Department of Public Safety / Fire Station #2	3260 Imjin Rd.	708
Lifeline Utilities	Marina Coast Water District Seawater Desalination Plant	11 Reservation Rd.	39,294
Educational	Olson Elementary School	261 Beach Rd.	590
	Marina del Mar Elementary School	3066 Lake Dr.	590
	Marina Vista Elementary School	390 Carmel Ave.	590
	Crumpton Elementary School	460 Carmel Ave.	590
	Los Arboles Middle School	294 Hillcrest Ave.	590
	Learning for Life Charter School	330 Reservation Rd.	590
	Marina High School	2995 Rendova Rd.	590
Airport	Municipal Airport	781 Neeson Rd.	6,431

Source: FEMA HAZUS-MH (estimated values)

Table N-3
City of Marina Potential Hazard Vulnerability Analysis – Population and Buildings

		Population	Buildings			
			Residential		Nonresidential	
Hazard Type	**Methodology**	**Number**	**Number**	**Value ($)[1]**	**Number**	**Value ($)[1]**
Coastal Erosion	100-year erosion zone	7	4	721	0	0
Dam Failure	Inundation area	9	3	629	2	613
Earthquake	Extreme	0	0	0	0	0
	High	25,090	6,121	1,465,804	110	220,906
	Moderate	0	0	0	0	0
Flood	100-year flood zone	525	293	60,222	2	5,065
Hazardous Materials Event	1-mile buffer transport corridor	17,303	4,371	993,161	95	194,789
Landslide	High	0	0	0	0	0
	Moderate	0	0	0	0	0
Tsunami	Maximum average run-up	566	204	42,657	2	3,334
Wildland Fire	Very high	0	0	0	0	0
	High	87	34	7,072	2	1,637
	Moderate	24,771	5,994	1,439,166	109	217,816
Windstorm	Prevailing wind zone	NA	NA	NA	NA	NA

[1] Value = Estimated average structural value (x1000)

NA = Not Applicable

Table N-4
City of Marina Potential Hazard Vulnerability Analysis – Critical Facilities

		Government		Emergency Response		Lifeline Utilities		Care		Educational		Marine, Environmental, and Community		Total	
Hazard	**Methodology**	**No.**	**Value ($)[1]**	**No.**	**Value ($)[1]**	**No.**	**Value ($)[1]**	**No.**	**Value ($)[1]**	**No.**	**Value ($)[1]**	**No.**	**Value ($)[1]**	**No.**	**Value ($)[1]**
Coastal Erosion	100-year erosion zone	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Dam Failure	Inundation area	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Earthquake	Extreme	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	High	3	9,019	4	4,248	1	39,294	0	0	7	4,130	0	0	15	56,691
	Moderate	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Flood	100-year flood zone	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Hazardous Materials Event	1-mile buffer transport corridor	3	9,019	4	4,248	1	39,294	0	0	5	2,950	0	0	13	55,511
Landslide	High	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Moderate	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Tsunami	Maximum average run-up	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Wildland Fire	Very high	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	High	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Moderate	3	9,019	4	4,248	0	0	0	0	7	4,130	0	0	14	17,397
Windstorm	Prevailing wind zone	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

[1] Value = Estimated insured structural value (x1000)

NA = Not Applicable

Table N-5
City of Marina Potential Hazard Vulnerability Analysis – Critical Infrastructure

		Highways		Railroads		Bridges		Airport	
Hazard	**Value ($)[1]**	**Miles**	**Value ($)[1]**	**Miles**	**Value ($)[1]**	**Number**	**Value ($)[1]**	**Number**	**Value ($)[1]**
Coastal Erosion	100-year erosion zone	0.0	0	0.0	0	0	0	0	0
Dam Failure	Inundation area	0.0	0	0.0	0	0	0	0	0
Earthquake	Extreme	0.0	0	0.0	0	0	0	0	0
	High	7.2	37,488	0.0	0	11	25,873	1	6,431
	Moderate	0.0	0	0.0	0	0	0	0	0
Flood	100-year flood zone	0.1	698	0.0	0	0	0	0	0
Hazardous Materials Event	1-mile buffer transport corridor	7.2	37,488	0.0	0	11	25,873	0	0
Landslide	High	0.0	0	0.0	0	0	0	0	0
	Moderate	0.0	0	0.0	0	0	0	0	0
Tsunami	Maximum average run-up	0.3	1,744	0.0	0	0	0	0	0
Wildland Fire	Very high	0.0	0	0.0	0	0	0	0	0
	High	0.0	229	0.0	0	0	0	0	0
	Moderate	6.8	35,000	0.0	0	11	25,873	1	6,431
Windstorm	Prevailing wind zone	NA	NA	NA	NA	NA	NA	NA	NA

[1] Value = Estimated value (x1000)

NA = Not Applicable

Coastal Erosion

Historically, highest dune erosion rates in the region have occurred in the City of Marina (4.5 feet annually) because of wave refraction patterns produce larger waves. Therefore, using a 100-year projection to determine areas at risk to coastal erosion, approximately 7 people and 4 residential buildings (worth $721,000) are located in this hazard area.

Dam Failure

Failure of the San Antonio and Nacimiento dams pose a risk in the along eastern and northeastern City boundaries. Exposed within the inundation zone are 9 people, 3 residential buildings (worth $629,000) and 2 nonresidential buildings (worth $613,000).

Earthquake

Nearly 100 percent of the City's population is located in a high shaking hazard area. Exposed within this area are 25,090 people, 6,121 residential buildings (worth $1.5 billion), 110 nonresidential buildings (worth $220.9 million), and 15 critical facilities (worth $56.7 million). 7.2 miles of highway, 11 bridges, and 1 airport are also located in this hazard area.

Flood

The Salinas River (located along the northeastern and eastern City limits) and wave attack from the Pacific Ocean are the two main sources of flooding within Marina. Therefore, exposed within this hazard area are 525 people, 293 residential buildings (worth $60.2 million) and 2 nonresidential buildings (worth $5.1 million). Approximately 0.1 mile of highway is located in the 100-year floodplain.

Hazardous Materials Event

Within the 1-mile buffer around the transportation facilities, nearly 70 percent of Marina's population is exposed to a hazardous material transport event. This includes 17,303 people, 4,371 residential buildings (worth $993.1 million), 95 nonresidential buildings (worth $194.8 million), and 13 critical facilities (worth $55.5 million). These figures are for the entirety of the transportation corridors and, therefore, overstate the exposure since a hazmat event along the corridors is unlikely to affect all of the area within the 1-mile buffer.

Tsunami

Using the maximum average scenario of 21-foot run-up, approximately 2 percent of Marina's population is vulnerable to this hazard. This includes 566 people, 204 residential buildings (worth $42.7 million) and 2 nonresidential buildings (worth $3.3 million) located in the northwestern portion of the City. Approximately 0.3 mile of highway is located in this hazard area.

Wildland Fire

Using the California FRAP model, almost the entire City resides in a moderate wildland fire hazard area. Within this area of moderate wildland fire exposure are 24,771 people, 5,994 residential buildings (worth $1.4 billion), 109 nonresidential buildings (worth $217.8 million), 14 critical facilities (worth $17.4 million), and 1 airport (worth $6.4 million)

Only 87 people, 34 residential buildings (worth $7.1 million), and 2 nonresidential buildings (worth $1.6 million) are located in the high wildland fire hazard area.

Table N-6
City of Marina Legal and Regulatory Resources Available for Hazard Mitigation

Regulatory Tool	Name		Effect on Hazard Mitigation
Plans	General Plan Safety Element		Establishes policies that will minimize the potential of human injury and property damage to natural and human-made hazards.
	Local Coastal Implementation Plan & Local Coastal Land Use Plan		Indicates the kinds, location, and intensity of land use and applicable resource protection and development policies within the Coastal Conservation and Development District.
	Capital Improvement Plan		Evaluates the need for public works improvements, including drainage projects and the new construction of critical facilities.
Programs	Local Coastal Program		Uses the Local Coastal Implementation Plan and Local Coastal Land Use Plan to guide development and conservation efforts along the Coast.
	Monterey Regional Storm Water Management Program		Reduce pollution from storm water discharge and runoff with regard to the EPA's Phase II Storm Water National Pollutant Discharge Elimination System requirements. It is a collective effort and implementation of area-wide activities designed to benefit all participating entities.
	National Flood Insurance Program (NFIP)		Makes affordable flood insurance available to homeowners, business owners, and renters in participating communities. In exchange, those communities must adopt and enforce minimum floodplain management regulations to reduce the risk of damage from future floods.
Policies (Municipal Code)	Hazardous Materials	Chapter 8.12 Hazardous Materials Storage and Registration	Provides a continuing source of current information concerning hazardous substances and chemicals being utilized in the city to protect the general health and safety of the public and to enable emergency personnel to respond safely and speedily to emergency situations which may arise. It also establishes a continuing program for the purpose of preventing contamination from, and improper storage of, hazardous substances stored underground.
	Chapter 15 Building Security	Chapter 15.08 Building Code	Adopts and enforces the Uniform Building Code, 1997 Edition.

Table N-6
City of Marina Legal and Regulatory Resources Available for Hazard Mitigation

Regulatory Tool	Name		Effect on Hazard Mitigation
	Standards	Chapter 15.20 Abatement of Dangerous Buildings Code	Adopts and enforces the Uniform Code for the Abatement of Dangerous Buildings, 1997 Edition.
		Chapter 15.48 Flood Damage Prevention	Identifies areas where terrain characteristics would present new developments and their users with potential hazards to life and property from potential inundation by a 100-year frequency flood or other known flood hazards. These standards are also intended to minimize the effects of development on drainage ways and watercourses.

Table N-7
City of Marina Administrative and Technical Resources for Hazard Mitigation

Staff/Personnel Resources	Department/Division Position
Planner(s) or engineer(s) with knowledge of land development and land management practices	Planning
Engineer(s) or professional(s) trained in construction practices related to buildings and/or infrastructure	Public Works
Planner(s) or engineer(s) with an understanding of manmade or natural hazards	Planning
Floodplain manager	Public Works
Personnel skilled in GIS and/or HAZUS-MH	Planning
Director of Emergency Services	City Manager
Finance (grant writers, purchasing)	Finance
Public Information Officers	Various Departments

Table N-8
City of Marina Financial Resources for Hazard Mitigation

Financial Resources	Effect on Hazard Mitigation
General funds	If funding available, can be used for hazard mitigation activity, including debt service for bonds.
Authority to levy taxes for specific purposes	Can be used for any hazard mitigation activity, but only eligible for use with voter approval.
Incur debt through general obligation bonds	Can be used for any hazard mitigation activity but only eligible for use with voter approval.
Incur debt through special tax and revenue bonds	Revenue Bonds can be issued through the City with voter approval, to raise funds for hazard mitigation activities.
Incur debt through private activity bonds	Can be used for any hazard mitigation activity but only eligible for use with voter approval.
FEMA HMPG and PDM grants	HMGP grant funding is available to local communities after a Presidentially-declared disaster. It can be used to fund both pre- and post-disaster mitigation plans and projects. PDM funding is available on an annual basis. This grant can only be used to fund pre-disaster mitigation plans and projects only.
United State Fire Administration (USFA) Grants	The purpose of these grants is to assist state, regional, national or local organizations to address fire prevention and safety. The primary goal is to reach high-risk target groups including children, seniors and firefighters.

Table N-9
City of Marina Mitigation Action Plan Matrix

Action Number	Description	Ranking / Prioritization	Administering Department	Potential Funding	Timeframe	Benefit-Costs
1.B	Identify hazard-prone critical facilities and infrastructure and carry out acquisition, relocation, and structural and nonstructural retrofitting measures as necessary.	Priority / High	Planning, Public Works	HMGP and PDM Grants	0-5 years	This action will help ensure that the community/critical facilities can operate in some capacity before, during, and after the disaster.
2.A	Develop a sustained public outreach program that encourages consistent hazard mitigation content. For example, consider publishing tsunami inundation maps in telephone books, wildland fire defensible space tips with summer water bills, and the safe handling and disposal of hazardous waste and chemicals with garbage bills.	Priority / High	Planning, Various	General Funds, HMGP and PDM Grants	0-2 years, Ongoing	A mitigation outreach program will help build and support local capacity to enable the public to prepare for, respond to, and recover from disasters.
2.B	Develop audience-specific hazard mitigation outreach efforts. Audiences include the elderly, children, tourists, non-English speaking residents, and home and business owners.	Priority / High	Planning, Various	General Funds, HMGP and PDM Grants	0-2 years, Ongoing	A mitigation outreach program will help build and support local capacity to enable the public to prepare for, respond to, and recover from disasters.

Table N-9
City of Marina Mitigation Action Plan Matrix

Action Number	Description	Ranking / Prioritization	Administering Department	Potential Funding	Timeframe	Benefit-Costs
6.A	Explore mitigation opportunities for repetitively flooded properties, and if necessary, carry-out acquisition, relocation, elevation, and flood-proofing measures to protect these properties.	Priority / High	Planning, Public Works	HMGP and PDM Grants	0-3 years	The mitigation of repetitively flooded properties is a priority for FEMA grant programs.
6.C	Identify and carry-out minor flood and stormwater management projects that would reduce damage to infrastructure and damage due to local flooding/inadequate drainage. These include the modification of existing culverts and bridges, upgrading capacity of storm drains, stabilization of streambanks, and creation of debris or flood/stormwater retention basins in small watersheds.	Priority / High	Public Works	HMGP and PDM Grants	Ongoing	The identification and implementation of minor flood and stormwater management projects will reduce multi-asset (critical facility, critical infrastructure, and residential and nonrersidential) losses due to flooding.
11.A	Adopt more prescriptive rules relative to the construction and maintenance of overhead lines.	Priority / High	Planning	General Funds	0-1 year	This effort will reduce future losses due to windstorm events.

Appendix O

City of Monterey

Table O-1
City of Monterey Estimated Population and Building Inventory

Population	Residential Buildings		Nonresidential Buildings	
2000 Census Population Count*	Total Building Count	Total Value of Buildings **- (x$1000)	Total Building Count	Total Value of Buildings (x$1000)
29,751	8,181	2,436,686	694	1,674,370

Source: FEMA HAZUS-MH (residential and nonresidential buildings) and U.S. Census 2000 population data.
* Population count using census blocks within the city limits.

** Average insured structural value of all residential buildings (including single-family dwelling, mobile homes, etc., is $298,000 per structure).

*** Averaged insured structural value of all nonresidential buildings (including industry, trade, professional and technical services, etc., is 2,413,000).

Table O-2
City of Monterey Critical Facilities and Infrastructure

Category	Facility	Address	Estimated Insured Structural Value (x$1000)
Government	City Hall	City Hall	6,659
Emergency Response	Police Department	351 Madison St.	1,652
	Fire Station #1	Pacific St. & Madison St.	708
	Fire Station #2	582 Hawthorne St.	708
	Fire Station #3	401 Dela Vina Ave.	708
Care	Monterey Bay Urgent Care Medical Center	245 Washington St.	802
	Community Hospital of the Monterey Peninsula	23625 Holman Hwy.	802
	Monterey Pines Skilled Nursing Facility	1501 Skyline Dr.	802
	Carmel Hills Care Center	23795 Holman Hwy.	802
	Bay View Gardens	399 Drake Ave.	802
	Ave Maria Convalescent Hospital	1249 Josselyn Canyon Rd.	802
	The Park Lane	200 Glenwood Circle	802
	Monterey Convalescent Hospital	735 Pacific St.	802
	Monterey Care Center	1575 Skyline Dr.	802
	Carmelo Park	966 Carmelo St.	802
	Hospice House	100 Barnet Segal Ln.	802
Educational	La Mesa Elementary School	1 La Mesa Wy.	590
	Foothill Elementary School	1700 Via Casoli Ext.	590
	Bay View Elementary School	680 Belden St.	590
	Monterey Adult / ROP	222 Case Verde Wy.	590
	Monterey High School	101 Herrmann Dr.	590
	Monterey Peninsula College	980 Fremont St.	5 90
	Walter Colton Middle School	100 Toda Vista Dr.	590
Marine, Environmental, and Community	Monterey Bay Aquarium	886 Cannery Row	181,022
	Monterey Bay National Marine Sanctuary of NOAA	299 Foam St.	1,180

Source: FEMA HAZUS-MH (estimated values)

Table O-3
City of Monterey Potential Hazard Vulnerability Analysis – Population and Buildings

		Population	Buildings			
			Residential		Nonresidential	
Hazard Type	**Methodology**	**Number**	**Number**	**Value ($)[1]**	**Number**	**Value ($)[1]**
Coastal Erosion	100-year erosion zone	120	40	22,184	82	108,709
Dam Failure	Inundation area	0	0	0	0	0
Earthquake	Extreme	0	0	0	0	0
	High	12,408	3,315	949,599	215	441,983
	Moderate	17,239	4,849	1,473,523	615	1,212,464
Flood	100-year flood zone	192	59	26,720	84	113,591
Hazardous Materials Event	1-mile buffer transport corridor	18,113	4,446	1,428,715	402	930,245
Landslide	High	113	52	10,679	2	881
	Moderate	1,883	651	171,370	10	19,973
Tsunami	Maximum average run-up	1,759	427	161,556	229	377,115
Wildland Fire	Very high	866	184	84,387	12	38,422
	High	357	84	28,824	31	68,212
	Moderate	28,081	7,809	2,274,004	750	1,482,983
Windstorm	Prevailing wind zone	NA	NA	NA	NA	NA

[1] Value = Estimated average structural value (x1000)

NA = Not Applicable

Table O-4
City of Monterey Potential Hazard Vulnerability Analysis – Critical Facilities

		Government		Emergency Response		Lifeline Utilities		Care		Educational		Marine, Environmental, and Community		Total	
Hazard	**Methodology**	**No.**	**Value ($)[1]**	**No.**	**Value ($)[1]**	**No.**	**Value ($)[1]**	**No.**	**Value ($)[1]**	**No.**	**Value ($)[1]**	**No.**	**Value ($)[1]**	**No.**	**Value ($)[1]**
Coastal Erosion	100-year erosion zone	0	0	0	0	0	0	0	0	0	0	1	181,022	1	181,022
Dam Failure	Inundation area	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Earthquake	Extreme	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	High	0	0	1	708	0	0	6	20,530	2	1,180	0	0	9	22,418
	Moderate	2	7,839	3	3,068	0	0	5	7,338	5	2,950	2	182,202	17	203,397
Flood	100-year flood zone	0	0	0	0	0	0	0	0	0	0	1	181,022	1	181,022
Hazardous Materials Event	1-mile buffer transport corridor	1	1,180	1	708	0	0	7	21,332	4	2,360	0	0	13	25,580
Landslide	High	0	0	0	0	0	0	0	0	1	590	0	0	1	590
	Moderate	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Tsunami	Maximum average run-up	1	6,659	0	0	0	0	1	4,130	0	0	1	181,022	3	191,811
Wildland Fire	Very high	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	High	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Moderate	2	7,839	4	3,776	0	0	11	27,868	7	4,130	2	182,202	26	225,815
Windstorm	Prevailing wind zone	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

[1] Value = Estimated insured structural value (x1000)

NA = Not Applicable

Table O-5
City of Monterey Potential Hazard Vulnerability Analysis – Critical Infrastructure

		Highways		Railroads		Bridges	
Hazard	**Methodology**	**Miles**	**Value ($)[1]**	**Miles**	**Value ($)[1]**	**Number**	**Value ($)[1]**
Coastal Erosion	100-year erosion zone	0.0	0	0.0	0	0	0
Dam Failure	Inundation area	0.0	0	0.0	0	0	0
Earthquake	Extreme	0.0	0	0.0	0	0	0
	High	6.6	34,033	0.0	0	22	30,863
	Moderate	2.8	14,539	0.0	0	5	3,854
Flood	100-year flood zone	0.1	661	0.0	0	0	0
Hazardous Materials Event	1-mile buffer transport corridor	9.4	48,572	0.0	0	25	33,113
Landslide	High	0.0	0	0.0	0	0	0
	Moderate	1.4	7,295	0.0	0	4	3,017
Tsunami	Maximum average run-up	0.2	1,134	0.0	0	4	6,382
Wildland Fire	Very high	0.4	1,818	0.0	0	3	2,251
	High	0.9	4,548	0.0	0	0	0
	Moderate	8.0	41,393	0.0	0	24	32,466
Windstorm	Prevailing wind zone	NA	NA	NA	NA	NA	NA

[1] Value = Estimated value (x1000)

NA = Not Applicable

Coastal Erosion

On average the dunes along Monterey's coast erode at approximately 2.6 feet per year. Therefore, using a 100-year projection to determine areas at risk to coastal erosion, approximately 120 people, 40 residential buildings (worth $22.2 million), 82 nonresidential buildings (worth $108.7 million), and 1 critical facility (worth $181.0 million) reside in the coastal erosion hazard area.

Earthquake

The City of Monterey is susceptible to high and moderate shaking. As such, exposed within the high shaking area are 12,408 people (42 percent of the City's population), 3,315 residential buildings (worth $949.6 million), 215 nonresidential buildings (worth $442.0 million), and 9 critical facilities (worth $22.4 million). 6.6 miles of highway and 22 bridges are also located in this hazard area.

Within the moderate shaking area are 17,239 people (58 percent of the City's population), 4,849 residential buildings (worth $1.5 billion), 615 nonresidential buildings (worth $1.2 billion), and at 17 critical facilities (worth $203.4 million). 2.8 miles of highway and 5 bridges are also located in this hazard area.

Flood

The SFHA mainly consists of wave attack from the Pacific Ocean. Additionally, a small portion of the eastern City limits is subject to flooding from the Arroyo Del Rey. Exposed within this hazard area are 192 people, 59 residential buildings (worth $26.7 million), 84 nonresidential buildings (worth $113.6 million), and 1 critical facility (worth $181.0 million). Approximately 0.1 mile of highway is located in the 100-year floodplain.

Hazardous Materials Event

Within the 1-mile buffer around the transportation facilities, 60 percent of Monterey's population is exposed to a hazardous material transport event. This includes 18,113 people, 4,446 nonresidential buildings (worth $1.4 billion), 402 nonresidential buildings (worth $930,2 million), and 13 critical facilities (worth $25.6 million). These figures are for the entirety of the transportation corridors and, therefore, overstate the exposure since a hazmat event along the corridors is unlikely to affect all of the area within the 1-mile buffer.

Landslide

Approximately 7 percent of Monterey's total population resides within high and moderate landslide hazard areas. The high landslide hazard area includes 113 people, 52 residential buildings (worth $10.7 million), 2 nonresidential buildings (worth $8.8 million), and 1 critical facility (worth $590,000). No critical infrastructure is located in this hazard area.

1,883 people, 651 residential buildings (worth $171.4 million), 10 nonresidential building (worth $20.0 million) are located in moderate landslide hazard areas. No critical facilities or infrastructure is located in this hazard area.

Tsunami

Using the maximum average scenario of 21-foot run-up, approximately 6 percent of Monterey's population is vulnerable to a tsunami. This includes 1,759 people, 427 residential buildings (worth $161.6 million), 229 nonresidential buildings (worth $377.1 million), and 3 critical facilities (worth $191.8 million). Approximately 0.2 mile of highway and 4 bridges are located in this hazard area.

Wildland Fire

Using the California FRAP model, nearly all of the City's population resides in a moderate wildland fire hazard area. Within this area are 28,081 people and 7,809 residential buildings (worth $2.3 billion), 750 nonresidential buildings (worth $1.5 billion) and 26 critical facilities (worth $225.8 million).

Of the remaining population, 357 people, 84 residential buildings (worth $28.8 million) and 31 nonresidential buildings (worth $68.2 million) are located in a high wildland hazard area. 866 people, 184 residential buildings (worth $84.4 million) and 12 nonresidential buildings (worth $38.4 million) are located in a very high wildland fire hazard area.

Table O-6
City of Monterey Legal and Regulatory Resources Available for Hazard Mitigation

Regulatory Tool	Name		Effect on Hazard Mitigation
Plans	City of Monterey General Plan, January 2005 Safety Element		Establishes policies that will minimize the potential of human injury and property damage to the following natural hazards: seismic and geologic hazards; fires; floods; and hazardous materials.
	Draft Storm Water Plan, June 2006		Describes the storm water problem and identifies Best Management Practices to reduce storm water.
Programs	Monterey Regional Storm Water Management Program		Reduce pollution from storm water discharge and runoff with regard to the EPA's Phase II Storm Water National Pollutant Discharge Elimination System requirements. It is a collective effort and implementation of area-wide activities designed to benefit all participating entities.
	National Flood Insurance Program (NFIP)		Makes affordable flood insurance available to homeowners, business owners, and renters in participating communities. In exchange, those communities must adopt and enforce minimum floodplain management regulations to reduce the risk of damage from future floods.
Policies (Municipal Code)	Chapter 9 Building Regulations	Article 1 Uniform Codes	Adopts and enforces the California Building Code.
		Article 5 Earthquake Hazard Reduction for URM's	Applies to all buildings constructed or under construction prior to 1941. The owner of each building within the scope of this article shall cause a structural analysis of the building to be made by a civil or structural engineer or architect licensed by the State of California. If the building does not meet the minimum earthquake standards specified by resolution of the City Council an engineer or architect shall make recommendations as to the corrections that would bring the building into compliance with these standards.
		Article 7 Flood Damage Prevention	Identifies areas where terrain characteristics would present new developments and their users with potential hazards to life and property from potential inundation by a 100-year frequency flood or other known flood hazards. These standards are also intended to minimize the effects of development on drainage ways and watercourses.
	Chapter 13 Fire Prevention	Article 1 Fire Protection	Regulates fire apparatus access, signage for critical infrastructure, safe combustible materials storage and handling.

Table O-6
City of Monterey Legal and Regulatory Resources Available for Hazard Mitigation

Regulatory Tool	Name		Effect on Hazard Mitigation
	Chapter 31.5 Storm Water Management	Article 1 Storm Water Management Utility	The purpose of this utility includes, but is not limited to, permitting, maintenance, planning, design, construction, regulation, surveying, water quality testing, and inspection relating to storm and surface water management facilities.
	Chapter 38 Zoning Ordinance	Article 19 Hazardous Materials Storage	Ensures that the use, handling, storage and transport of hazardous substances comply with all applicable requirements of the California Health and Safety Code and that the City is notified of emergency response plans, unauthorized releases of hazardous substances, and any substantial changes in facilities or operations that could affect the public health, safety or welfare. It is not the intent of these regulations to impose additional restrictions on the management of hazardous wastes, which would be contrary to state law, but only to require reporting of information to the City that must be provided to other public agencies.

Table O-7
City of Monterey Administrative and Technical Resources for Hazard Mitigation

Staff/Personnel Resources	Department/Division Position
Planner(s) or engineer(s) with knowledge of land development and land management practices	Planning
Engineer(s) or professional(s) trained in construction practices related to buildings and/or infrastructure	Building Safety and Inspection
Planner(s) or engineer(s) with an understanding of manmade or natural hazards	Planning
Floodplain manager	Public Works
Personnel skilled in GIS and/or HAZUS-MH	Planning
Director of Emergency Services	City Manager's
Emergency Management Coordinator	Fire
Finance (grant writers, purchasing)	Finance
Public Information Officers	City Manager's
Disaster Council	City Manager, Assistant City Manager, Fire Chief, Public Facilities Director, Police Chief, Public Works Director, Community Development Director, Library Director, and Recreation and Community Services Director.

Table O-8
City of Monterey Financial Resources for Hazard Mitigation

Financial Resources	Effect on Hazard Mitigation
General funds	If funding available, can be used for hazard mitigation activity, including debt service for bonds.
Authority to levy taxes for specific purposes	Can be used for any hazard mitigation activity, but only eligible for use with voter approval.
Incur debt through general obligation bonds	Can be used for any hazard mitigation activity but only eligible for use with voter approval.
Incur debt through special tax and revenue bonds	Revenue Bonds can be issued through the City with voter approval, to raise funds for hazard mitigation activities.
Incur debt through private activity bonds	Can be used for any hazard mitigation activity.
FEMA HMPG and PDM grants	HMGP grant funding is available to local communities after a Presidentially-declared disaster. It can be used to fund both pre- and post-disaster mitigation plans and projects. PDM funding is available on an annual basis. This grant can only be used to fund pre-disaster mitigation plans and projects only.
United State Fire Administration (USFA) Grants	The purpose of these grants is to assist state, regional, national or local organizations to address fire prevention and safety. The primary goal is to reach high-risk target groups including children, seniors and firefighters.

Table O-9
City of Monterey Mitigation Action Plan Matrix

Action Number	Description	Ranking / Prioritization	Administering Department	Potential Funding	Timeframe	Benefit-Costs
2.C	Develop community Citizen Corps programs that also include a mitigation component.	Priority / High	Fire	General	Ongoing	A community-focused mitigation/hazard preparedness program will help build and support local capacity to enable the public to prepare for, respond to, and recover from disasters.
10.A	Continue to conduct current fuel management programs and investigate and apply new and emerging fuel management techniques.	Priority / High	Public Works	USFA, PDM, and HGMP Grants	Ongoing	The probability of future damage from wildland fires could be high if this mitigation action is not implemented.
10.C	Develop and provide funding and/or incentives for defensible space measures (e.g., free chipping day, free collection day for tree limbs).	Priority / High	Public Works	USFA, PDM, and HMGP grants	1-2 years	The potential cost of this mitigation action seems reasonable for the size of the problem and its likely benefits.

Appendix P

City of Pacific Grove

Table P-1
City of Pacific Grove Estimated Population and Building Inventory

Population	Residential Buildings		Nonresidential Buildings	
2000 Census Population Count*	**Total Building Count**	**Total Value of Buildings **- (x$1000)**	**Total Building Count**	**Total Value of Buildings*** (x$1000)**
15,522	6,220	1,368,201	168	389,452

Source: FEMA HAZUS-MH (residential and nonresidential buildings) and U.S. Census 2000 population data.
* Population count using census blocks within the city limits.

** Average insured structural value of all residential buildings (including single-family dwelling, mobile homes, etc., is $220,000 per structure).

*** Averaged insured structural value of all nonresidential buildings (including industry, trade, professional and technical services, etc., is $2,318,000).

Table P-2
City of Pacific Grove Critical Facilities and Infrastructure

Category	Facility	Address	Estimated Insured Structural Value (x$1000)
Government	City Hall	300 Forest Ave.	6,659
Emergency Response	Police Department	580 Pine St.	1,652
	Fire Department	600 Pine Ave.	708
Care	Convalescent Hospital	200 Lighthouse Ave.	802
	Del Monte Assisted Residential Care	1229 David Ave.	802
	Forest Hill Manor	551 Gibson St.	802
	Canterbury Woods	651 Sinex Ave.	802
Educational	Forest Grove Elementary School	1065 Congress Ave.	590
	Robert H. Down Elementary School	485 Pine St.	590
	Pacific Grove Middle School	835 Forest Ave.	590
	Pacific Grove High School	615 Sunset Dr.	590
	Monterey Bay Charter School	1004-B David Ave.	590
	Pacific Grove Community School	435 Hillcrest Ave.	590
	Educational Pacific Grove Adult School*	1025 Lighthouse Rd.	590
Marine, Environmental, and Community	Community Shelter Pacific Grove Youth Center*	302 16th St.	590
	Community Shelter Pacific Grove Community Center*	515 Junipero Ave.	590
	Hopkins Marine Station of Stanford University	Ocean View Blvd.	78,269
	Pacific Fisheries Environmental Laboratory of NOAA	1352 Lighthouse Ave.	78,269

Source: FEMA HAZUS-MH (estimated values)

* Facilities not included in vulnerability analysis (as of March 1, 2007).

Table P-3
City of Pacific Grove Potential Hazard Vulnerability Analysis – Population and Buildings

		Population	Buildings			
			Residential		Nonresidential	
Hazard Type	**Methodology**	**Number**	**Number**	**Value ($)[1]**	**Number**	**Value ($)[1]**
Coastal Erosion	100-year erosion zone	440	238	55,023	14	25,514
Dam Failure	Inundation area	377	174	36,598	11	12,181
Earthquake	Extreme	0	0	0	0	0
	High	2,431	953	210,327	36	57,184
	Moderate	13,044	5,243	1,151,762	198	321,130
Flood	100-year flood zone	5	3	2,282	4	9,061
Hazardous Materials Event	1-mile buffer transport corridor	10,149	3,705	859,242	104	173,502
Landslide	High	0	0	0	0	0
	Moderate	0	0	0	0	0
Tsunami	Maximum average run-up	1,433	734	156,678	40	66,920
Wildland Fire	Very high	139	51	16,147	2	2,814
	High	26	10	2,970	2	4,661
	Moderate	15,174	6,087	1,329,028	224	362,627
Windstorm	Prevailing wind zone	NA	NA	NA	NA	NA

[1] Value = Estimated average structural value (x1000)

NA = Not Applicable

Table P-4
City of Pacific Grove Potential Hazard Vulnerability Analysis – Critical Facilities

		Government		Emergency Response		Lifeline Utilities		Care		Educational		Marine, Environmental, and Community		Total	
Hazard	**Methodology**	**No.**	**Value ($)[1]**	**No.**	**Value ($)[1]**	**No.**	**Value ($)[1]**	**No.**	**Value ($)[1]**	**No.**	**Value ($)[1]**	**No.**	**Value ($)[1]**	**No.**	**Value ($)[1]**
Coastal Erosion	100-year erosion zone	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Dam Failure	Inundation area	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Earthquake	Extreme	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	High	0	0	0	0	0	0	2	1,604	3	1,770	1	78,269	6	81,643
	Moderate	1	6,659	2	2,360	0	0	2	1,604	3	1,770	1	78,269	9	90,662
Flood	100-year flood zone	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Hazardous Materials Event	1-mile buffer transport corridor	0	0	0	0	0	0	3	2,406	5	2,950	1	78,269	9	83,625
Landslide	High	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Moderate	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Tsunami	Maximum average run-up	0	0	0	0	0	0	0	0	1	590	1	78,269	2	78,859
Wildland Fire	Very high	0	0	0	0	0	0	1	802	0	0	0	0	1	802
	High	0	0	0	0	0	0	0	0	1	590	0	0	1	590
	Moderate	1	6,659	2	2,360	0	0	3	2,406	5	2,950	2	156,538	13	170,913
Windstorm	Prevailing wind zone	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

[1] Value = Estimated insured structural value (x1000)

NA = Not Applicable

Table P-5
City of Pacific Grove Potential Hazard Vulnerability Analysis – Critical Infrastructure

		Highways		Railroads		Bridges	
Hazard	**Methodology**	**Miles**	**Value ($)[1]**	**Miles**	**Value ($)[1]**	**Number**	**Value ($)[1]**
Coastal Erosion	100-year erosion zone	>0.1	116	0.0	0	0	0
Dam Failure	Inundation area	0.0	0	0.0	0	0	0
Earthquake	Extreme	0.0	0	0.0	0	0	0
	High	0.2	942	0.0	0	0	0
	Moderate	3.1	16,163	0.0	0	0	0
Flood	100-year flood zone	0.0	0	0.0	0	0	0
Hazardous Materials Event	1-mile buffer transport corridor	3.3	17,105	0.0	0	0	0
Landslide	High	0.0	0	0.0	0	0	0
	Moderate	0.0	0	0.0	0	0	0
Tsunami	Maximum average run-up	0.2	897	0.0	0	0	0
Wildland Fire	Very high	0.2	1,133	0.0	0	0	0
	High	0.0	0	0.0	0	0	0
	Moderate	2.9	15,032	0.0	0	0	0
Windstorm	Prevailing wind zone	NA	NA	NA	NA	NA	NA

[1] Value = Estimated value (x1000)

NA = Not Applicable

Coastal Erosion

Pacific Grove is susceptible to both dune and cliff erosion. While the average dune erosion rate is approximately 2.6 feet per year, the rocky cliffs only erode at 2-4 inches annually. Therefore, using a 100-year projection to determine areas at risk to coastal erosion, approximately 440 people, 238 residential buildings (worth $55.0 million) and 14 nonresidential buildings (worth $25.5 million) are located in this hazard area. Less than 0.1 mile of highway is located in this area.

Dam Failure

Failure of the Pacific Grove Dam poses a risk to southern portion of the City. Exposed within the inundation zone are 377 people, 174 residential buildings (worth $36.6 million) and 11 nonresidential buildings (worth $12.2 million).

Earthquake

There are no people, buildings, or facilities located in an extreme shaking hazard area. Approximately 15 percent of the population is exposed to a high shaking hazard area. Within this area are 2,431 people, 953 residential buildings (worth $210.3 million), 36 nonresidential buildings (worth $57.2 million), and 6 critical facilities (worth $81.6 million). There is 0.2 mile of highway exposed to high shaking.

The remaining 85 percent of the City's population is located in a moderate shaking hazard area. As such, exposed within this hazard area are 13,044 people, 5,234 residential buildings (worth $1.2 billion), 198 nonresidential buildings (worth $321.1 million), and 9 critical facilities (worth $90.7 million). There are 3.1 miles of highway exposed to moderate shaking.

Flood

Wave attack from the Pacific Ocean makes up the SFHA in Pacific Grove. Exposed within this hazard area are 5 people, 3 residential buildings (worth $2.3 million), and 4 nonresidential buildings (worth $9.1 million).

Hazardous Materials Event

Within the 1-mile buffer around the transportation facilities, approximately two-thirds of the City's population is exposed to a hazardous material transport event. This includes 10,149 people, 3,705 residential buildings (worth $859.2 million), 104 nonresidential buildings (worth $173.5 million), and 9 critical facilities (worth $83.6 million). These figures are for the entirety of the transportation corridors and, therefore, overstate the exposure since a hazmat event along the corridors is unlikely to affect all of the area within the 1-mile buffer.

Tsunami

Using the maximum average scenario of 21-foot run-up, approximately 10 percent of Pacific Grove's population is vulnerable to this hazard. This includes 1,433 people, 734 residential

buildings (worth $156.7 million), 40 nonresidential buildings (worth $66.9 million), and 9 critical facilities (worth $83.6 million).

Wildland Fire

Using the California FRAP model, almost 100 percent of the City's population is located in a moderate wildland fire hazard area. Within the area of moderate exposure are 15,174 people, 6,087 residential buildings (worth $1.3 billion), 224 nonresidential buildings (worth $362.6 million) and 13 critical facilities (worth $170.9 million).

The remaining two percent of the population, which includes 165 residents, 61 residential structures, 4 nonresidential buildings, and 2 critical facilities, are located in the high and very high wildland fire hazard areas.

Table P-6
City of Pacific Grove Legal and Regulatory Resources Available for Hazard Mitigation

Regulatory Tool	Chapter or Section		Effect on Hazard Mitigation
Plans	1994 Pacific Grove General Plan Health and Safety Chapter		Establishes policies that will minimize the potential of human injury and property damage to the following natural hazards: seismic and geologic hazards, erosion, wildland and urban fires, and flooding.
	1989 Local Coastal Program Land Use Plan		A separate document, but element of the General Plan. Describes the kinds, location, and intensity of land use and applicable resource protection and development policies within the Coastal Zone
Programs	National Flood Insurance Program (NFIP)		Makes affordable flood insurance available to homeowners, business owners, and renters in participating communities. In exchange, those communities must adopt and enforce minimum floodplain management regulations to reduce the risk of damage from future floods.
	Monterey Regional Storm Water Management Program		Reduce pollution from storm water discharge and runoff with regard to the EPA's Phase II Storm Water National Pollutant Discharge Elimination System requirements. It is a collective effort and implementation of area-wide activities designed to benefit all participating entities.
	Seismic Hazards Identification Program		Promotes public safety by identifying those buildings in Pacific Grove which exhibit structural deficiencies and by accurately determining the severity and extent of those deficiencies in relation to their potential for causing loss of life or injury.
	Local Coastal Program		Establishes the kinds, location, and intensity of land use and applicable resource protection and development policies within the Coastal Zone.
Policies (Municipal Code)	Title 11 Health, Safety and Environment	Chapter 11.97 Community Floodplain	Specifies areas of special flood hazard as delineated by FEMA, properties within such areas shall be subject to the development permit requirements.
	Title 12 Trees and Vegetation	Chapter 12.12 Weed and Rubbish Abatement	Permits the City to regulate weeds on private property which may attain such large growth as to become, when dry, a fire menace to adjacent improved property.
	Title 18 Buildings and Construction	Chapter 18.04 Building Codes	Adopts the Uniform Building Code, 1997 Edition, including requirements in Seismic Zones 3 and 4.
		Chapter 18.32 Fire Prevention	Adopts the Uniform Fire Code, 1997 Edition.
		Chapter 18.40 Seismic Hazards Identification Program	Promotes public safety by identifying those buildings in Pacific Grove which exhibit structural deficiencies and by accurately determining the severity and extent of those deficiencies in relation to their potential for causing loss of life or injury.

Table P-7
City of Pacific Grove Administrative and Technical Resources for Hazard Mitigation

Staff/Personnel Resources	Department/Division Position
Planner(s) or engineer(s) with knowledge of land development and land management practices	Community Development
Engineer(s) or professional(s) trained in construction practices related to buildings and/or infrastructure	Public Works
Planner(s) or engineer(s) with an understanding of manmade or natural hazards	Community Development, Public Works
Floodplain manager	Public Works
Personnel skilled in GIS and/or HAZUS-MH	Community Development
Director of Emergency Services	Not Available
Finance (grant writers, purchasing)	City Manager
Public Information Officers	Various Departments

Table P-8
City of Pacific Grove Financial Resources for Hazard Mitigation

Financial Resources	Effect on Hazard Mitigation
General funds	If funding available, can be used for hazard mitigation activity.
Authority to levy taxes for specific purposes	Can be used for any hazard mitigation activity with voter approval.
Incur debt through general obligation bonds	Revenue Bonds can be issued through the City with voter approval.
Incur debt through special tax and revenue bonds	Can be used for any hazard mitigation activity without voter approval.
Incur debt through private activity bonds	Can not be used for any hazard mitigation activity.
FEMA HMPG and PDM grants	HMGP grant funding is available to local communities after a Presidentially-declared disaster. It can be used to fund both pre- and post-disaster mitigation plans and projects. PDM funding is available on an annual basis. This grant can only be used to fund pre-disaster mitigation plans and projects only.
United State Fire Administration (USFA) Grants	The purpose of these grants is to assist state, regional, national or local organizations to address fire prevention and safety. The primary goal is to reach high-risk target groups including children, seniors and firefighters.

Table P-9
City of Pacific Grove Mitigation Action Plan Matrix

Action Number	Description	Ranking / Prioritization	Administering Department	Potential Funding	Timeframe	Benefit-Costs
2.A	Develop a sustained public outreach program that encourages consistent hazard mitigation content. For example, consider publishing tsunami inundation maps in telephone books, wildland fire defensible space tips with summer water bills, and the safe handling and disposal of hazardous waste and chemicals with garbage bills.	Priority / High	Disaster Planning	General Funds, HMGP, and PDM Grants	1-2 years	A mitigation outreach program will help build and support local capacity to enable the public to prepare for, respond to, and recover from disasters.
2.C	Develop audience-specific hazard mitigation outreach efforts. Audiences include the elderly, children, tourists, non-English speaking residents, and home and business owners.	Priority / High	Fire / CERT	HMPG and PDM Grants	Ongoing	A mitigation outreach program will help build and support local capacity to enable the public to prepare for, respond to, and recover from disasters.
5.B	Develop an unreinforced masonry grant program that helps correct earthquake-risk nonmasonry building problems, including chimney bracing and anchoring water heaters.	Priority / High	Community Development	General Funds, HMGP, and PDM Grants	5 years	The identification and mitigation of unreinforced nonmasonry buildings will reduce potential losses due to earthquakes.

Table P-9
City of Pacific Grove Mitigation Action Plan Matrix

Action Number	Description	Ranking / Prioritization	Administering Department	Potential Funding	Timeframe	Benefit-Costs
9.A	Participate in the Tsunami Ready Program. This new program, sponsored by the National Weather Service, is designed to provide communities with incentives to reduce their tsunami risks.	Priority / High	Disaster Planning	General Funds	1-2 years	This effort is both a mitigation outreach effort and an emergency preparedness effort. This action will help reduce the possibility of future damage and losses by educating the public about local tsunami inundation areas. In addition, it will also educate the public on where and how to evacuate, if necessary.
10.A	Continue to conduct current fuel management programs and investigate and apply new and emerging fuel management techniques.	Priority / High	Fire Prevention	General Funds	Ongoing	The probability of future damage from wildland fires could be high if this mitigation action is not implemented.
10.C	Develop and provide funding and/or incentives for defensible space measures (e.g., free chipping day, free collection day for tree limbs).	Priority / High	Fire Prevention / Public Works	General Funds, HMGP, and PDM Grants	Ongoing	The potential cost of this mitigation action seems reasonable for the size of the problem and its likely benefits.

Appendix Q

City of Salinas

Table Q-1
City of Salinas Estimated Population and Building Inventory

Population	Residential Buildings		Nonresidential Buildings	
2000 Census Population Count*	Total Building Count	Total Value of Buildings **- (x$1000)	Total Building Count	Total Value of Buildings*** (x$1000)
151,060	30,635	6,431,826	798	2,222,275
182,759	36,910	7,749,188	962	2,710,092

Source: FEMA HAZUS-MH (residential and nonresidential buildings) and U.S. Census 2000 population data.
* First row includes census blocks within the city limits. Second row includes census blocks within the Salinas Planning Area.

** Average insured structural value of all residential buildings (including single-family dwelling, mobile homes, etc., is $210,000 per structure).

*** Averaged insured structural value of all nonresidential buildings (including industry, trade, professional and technical services, etc., is $2,817,000).

Table Q-2
City of Salinas Critical Facilities and Infrastructure

Category	Facility	Address	Estimated Insured Structural Value / Value Per Mile (x$1000)
Government	City Hall	222 Lincoln Ave.	6,659
Emergency Response	Police Department	222 Lincoln Ave.	1,652
	Fire Department Station # 1	216 West Alisal St.	708
	Fire Department Station # 2	10 West Laurel	708
	Fire Department Station # 3	827 Abbott St.	708
	Fire Department Station # 4	308 Williams Rd.	708
	Fire Department Station # 5	1400 Rider Ave.	708
	Fire Department Station # 6	45 East Bolivar Ave.	708
Lifeline Utilities	Treatment Plant	Davis Rd. at River Crossing	78,588
Care	Salinas Valley Memorial Hospital	450 East Romie Ln.	16,520
	Natividad Medical Center	1441 Constitution Blvd.	16,520
	Pacific Coast Care Center	720 East Romie Ln.	802
	Salinas Rehabilitation & Care Center	637 East Romie Ln.	802
	Madonna Manor	1335 Byron Dr.	802
	Summerville at Harden Ranch	209 Regency Cl.	802
	Almost Home	818 Riker Ave.	802
	A Home Away from Home	941 Los Palos Dr.	802
	Katherine Healthcare Center	315 Alameda Ave.	802
	Skyline Care Center	348 Iris Dr.	802
	The Ridge	350 Iris Dr.	802
	Colonial Manor	645 Williams Rd.	802
	Villa Serra	1320 Padre Dr.	802
Educational	Sherwood Elementary School	110 South Wood St.	590
	Los Padres Elementary School	1130 John St.	590
	Roosevelt Elementary School	120 Capitol St.	590
	Cesar E. Chavez Elementary School	1225 Towt St.	590
	Fremont Elementary School	1225 East Market St.	590
	El Gabilan Elementary School	1256 Linwood Dr.	590
	Frank Paul Elementary School	1300 Rider Ave.	590
	Alisal Community School	1437 Del Monte Ave.	590
	Natividad Elementary School	1465 Modoc Ave.	590
	Dr. Oscar Loya School	1465 Modoc Ave.	590
	John E. Steinbeck School	1714 Burlington Dr.	590
	Creekside School	1770 Kittery St.	590
	Santa Rita Elementary School	2014 Santa Rita St.	590

Table Q-2
City of Salinas Critical Facilities and Infrastructure

Category	Facility	Address	Estimated Insured Structural Value / Value Per Mile (x$1000)
Educational (continued)	McKinnon Elementary School	2100 McKinnon St.	590
	Mission Park Elementary School	403 West Acacia St.	590
	Monterey Park Elementary School	410 San Miguel Ave.	590
	Bardin Elementary School	425 Bardin Rd.	590
	Henry F. Kammann Elementary School	521 Rochex St.	590
	Laurel Wood Elementary School	645 Larkin St.	590
	Virginia Rocca Barton School	680 Las Casitas Dr.	590
	Loma Vista Elementary School	757 Sausal Dr.	590
	Boronda Meadows Elementary School	915 Larkin St.	590
	New Republic Elementary School	636 Arcadia Wy.	590
	University Park Elementary School	833 West Acacia St.	590
	Graves Elementary School	15 McFadden Rd.	590
	Jesse G. Sanchez School	901 North Sanborn Rd.	590
	Dr. Martin Luther Kind, Jr. Academy	925 North Sanborn Rd.	590
	El Sausal Middle School	1155 East Alisal St.	590
	Harden Middle School	1561 McKinnon St.	590
	La Paz Middle School	1300 North Sanborn Rd.	590
	Washington Middle School	560 Iverson St.	590
	Alisa High School	777 Williams Rd.	590
	Everett Alvarez High School	1900 Independence Blvd.	590
	North Salinas High School	55 Kip Dr.	590
	Salinas High School	726 South Main St.	590
	Monterey County Home Charter School	901 Blanco Cl.	590
	Oasis Charter School	404 Lincoln Ave.	590
	Hartnell College	156 Homestead Ave.	590
	Salinas Community School / Wellington M. Smith Jr.	1420 Natividad Rd.	590
	Mount Toro Continuation High School	10 Sherwood Place	590

Table Q-2
City of Salinas Critical Facilities and Infrastructure

Category	Facility	Address	Estimated Insured Structural Value / Value Per Mile (x$1000)
Airport	Municipal Airport	30 Morternsen Ave.	6,432

Source: FEMA HAZUS-MH (estimated values)

Table Q-3A
City of Salinas Potential Hazard Vulnerability Analysis – Population and Buildings (Planning Area)

		Population	Buildings			
			Residential		Nonresidential	
Hazard Type	**Methodology**	**Number**	**Number**	**Value ($)[1]**	**Number**	**Value ($)[1]**
Coastal Erosion	100-year erosion zone	0	0	0	0	0
Dam Failure	Inundation area	48,487	9,093	2,245,614	722	1,506,407
Earthquake	Extreme	0	0	0	0	0
	High	182,647	36,887	7,743,819	1,357	2,704,158
	Moderate	112	35	5,370	5	5,934
Flood	100-year flood zone	5,937	908	183,689	70	114,313
Hazardous Materials Event	1-mile buffer transport corridor	63,245	14,442	2,966,002	961	2,004,207
Landslide	High	0	0	0	0	0
	Moderate	0	0	0	0	0
Tsunami	Maximum average run-up	73	22	3,268	4	6,445
Wildland Fire	Very high	0	0	0	0	0
	High	717	127	25,429	3	4,634
	Moderate	176,671	35,584	7,473,691	1,322	2,625,295
Windstorm	Prevailing wind zone	NA	NA	NA	NA	NA

[1] Value = Estimated average structural value (x1000)

NA = Not Applicable

Table Q-3B
City of Salinas Potential Hazard Vulnerability Analysis – Population and Buildings (City Limits)

		Population	Buildings			
			Residential		Nonresidential	
Hazard Type	**Methodology**	**Number**	**Number**	**Value ($)[1]**	**Number**	**Value ($)[1]**
Coastal Erosion	100-year erosion zone	0.0000	0.0000	0.0000	0	0
Dam Failure	Inundation area	48487.2732	9093.1849	2245614.3937	722.1956	1506407.38
Earthquake	Extreme	0	0	0	0	0
	High	151063.0144	27662.0007	6056536.4782	1170	2397500.043
	Moderate	0.0000	0.0000	0.0000	0	0
Flood	100-year flood zone	5936.7422	908.4635	183689.4727	70.4168	114313.4054
Hazardous Materials Event	1-mile buffer transport corridor	53169.6936	10929.1471	2341996.2584	828.2188	1762512.59
Landslide	High	0	0	0	0	0
	Moderate	0	0	0	0	0
Tsunami	Maximum average run-up	0.0000	0.0000	0.0000	0	0
Wildland Fire	Very high	0	0	0	0	0
	High	442.2455	42.7259	10653.1709	1.1784	2463.5392
	Moderate	145779.2707	26717.6940	5849790.4720	1133.3984	2317550.696
Windstorm	Prevailing wind zone	NA	NA	NA	NA	NA

[1] Value = Estimated average structural value (x1000)

NA = Not Applicable

Table Q-4A
City of Salinas Potential Hazard Vulnerability Analysis – Critical Facilities (City Limits)

		Government		Emergency Response		Lifeline Utilities		Care		Educational		Marine, Environmental, and Community		Total	
Hazard	**Methodology**	**No.**	**Value ($)[1]**	**No.**	**Value ($)[1]**	**No.**	**Value ($)[1]**	**No.**	**Value ($)[1]**	**No.**	**Value ($)[1]**	**No.**	**Value ($)[1]**	**No.**	**Value ($)[1]**
Coastal Erosion	100-year erosion zone	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Dam Failure	Inundation area	1	6,659	3	3,068	1	78,588	9	22,936	13	7,670	0	0	27	118,921
Earthquake	Extreme	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	High	1	6,659	7	5,900	1	78,588	13	41,862	40	23,600	0	0	62	156,609
	Moderate	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Flood	100-year flood zone	0	0	0	0	1	78,588	0	0	1	590	0	0	2	79,178
Hazardous Materials Event	1-mile buffer transport corridor	1	6,659	4	3,776	0	0	9	7,218	15	8,850	0	0	29	26,503
Landslide	High	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Moderate	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Tsunami	Maximum average run-up	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Wildland Fire	Very high	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	High	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Moderate	1	6,659	7	5,900	0	0	13	41,862	37	21,830	0	0	58	76,251
Windstorm	Prevailing wind zone	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

[1] Value = Estimated insured structural value (x1000)

NA = Not Applicable

Table Q-5
City of Salinas Potential Hazard Vulnerability Analysis – Critical Infrastructure

		Highways		Railroads		Bridges		Airport	
Hazard	**Miles**	**Value ($)[1]**	**Miles**	**Miles**	**Value ($)[1]**	**Number**	**Value ($)[1]**	**Number**	**Value ($)[1]**
Coastal Erosion	100-year erosion zone	0.0	0	0.0	0	0	0	0	0
Dam Failure	Inundation area	6.9	51,612	5.6	7,755	19	32,606	0	0
Earthquake	Extreme	0.0	0	0.0	0	0	0	0	0
	High	9.5	77,806	5.6	7,755	24	38,812	1	6,431
	Moderate	0.0	0	0.0	0	0	0	0	0
Flood	100-year flood zone	1.3	13,803	0.0	0	4	4,321	0	0
Hazardous Materials Event	1-mile buffer transport corridor	9.5	77,806	5.6	7,755	22	37,979	0	0
Landslide	High	0.0	0	0.0	0	0	0	0	0
	Moderate	0.0	0	0.0	0	0	0	0	0
Tsunami	Maximum average run-up	0.0	0	0.0	0	0	0	0	0
Wildland Fire	Very high	0.0	0	0.0	0	0	0	0	0
	High	0.0	0	0.0	63	0	0	0	0
	Moderate	8.7	71,204	5.5	7,549	23	38,182	1	6,431
Windstorm	Prevailing wind zone	NA	NA	NA	NA	NA	NA	NA	NA

[1] Value = Estimated value (x1000)

NA = Not Applicable

Dam Failure

Failure of the San Antonio and Nacimiento dams poses a risk to over a quarter of the Salinas Planning Area's population. Exposed within the inundation zones along the central, western, and southwestern portions of the City are 48,487 people, 9,093 residential buildings (worth $2.2 billion), 722 nonresidential buildings (worth $1.5 billion), and 27 critical facilities (worth $118.9 million). 6.9 miles of highway, 5.6 miles of railroad tracks, and 19 bridges are located in this hazard area.

Earthquake

Over 99 percent of the Salinas Planning Area's population is located in a high shaking hazard. As such, exposed within the high shaking hazard area are 182,647 people, 36,887 residential buildings (worth $7.7 billion), 1,357 nonresidential buildings (worth $2.7 million), and 62 critical facilities (worth $156.6 million). 9.5 miles of highway, 5.6 miles of railroad tracks, 24 bridges, and 1 airport are also located in this hazard area. The remaining population (112 persons) is located in a moderate shaking hazard area.

Flood

The SFHA within the Salinas Planning Area include the Santa Rita Creek, Carr Lake, and the Salinas River. Exposed within this hazard area are 5,937 people, 908 residential buildings (worth $183.7 million), 70 nonresidential buildings (worth $114.3 million), and 2 critical facilities (worth $79.2 million). Approximately 1.3 miles of highway are located in the 100-year floodplain.

Hazardous Materials Event

Roughly 30 percent of the Salinas Planning Area population is exposed to a hazardous material transport event. This includes 63,245 people, 14,442 residential buildings (worth $3.0 billion), 961 nonresidential buildings (worth $2.0 billion), and 29 critical facilities (worth $26.5 million). These figures are for the entirety of the transportation corridors and, therefore, overstate the exposure since a hazmat event along the corridors is unlikely to affect all of the area within the 1-mile buffer.

Tsunami

Using the maximum average scenario of 21-foot run-up, approximately less than 0.1 percent of Salinas's population is vulnerable to a tsunami. This includes 73 people, 22 residential buildings (worth $3.3 million) and 4 nonresidential buildings (worth $6.4 million) located in the central and western portions of the Salinas Planning Area.

Wildland Fire

According to the California FRAP model, over 96 percent of the City's population is located in the moderate wildland fire hazard area. This includes 176,671 people and 35,584 residential

buildings (worth $7.5 billion), 1,322 nonresidential buildings (worth $2.6 billion), 58 critical facilities (worth $76.3 million), and 1 airport (worth $6.4 million).

Less than 1 percent of the Salinas Planning Area population, including 717 people, 127 residential buildings (worth $25.4 million) and 3 nonresidential buildings (worth $4.6 million) are located in a high wildland fire hazard area. The remaining 3 percent of the population, including 4 critical facilities, is located in a low wildland fire hazard area and was not included in this analysis.

Windstorm

Windstorms created by prevailing northwest sustained surface winds are common throughout the central southern Salinas Valley, south of the Salinas Planning Area.

Table Q-6
City of Salinas Legal and Regulatory Resources Available for Hazard Mitigation

Regulatory Tool	Chapter or Section		Effect on Hazard Mitigation
Plans	2002 City of Salinas General Plan Safety Element		Establishes policies that will minimize the potential of human injury and property damage to the following hazards: seismically induced conditions including ground shaking, surface rupture, ground failure, tsunami, and seiche; slope instability leading to mudslides and landslides; subsidence and other geologic hazards; flooding; wildland and urban fires; and evacuation routes.
Programs	National Flood Insurance Program (NFIP)		Makes affordable flood insurance available to homeowners, business owners, and renters in participating communities. In exchange, those communities must adopt and enforce minimum floodplain management regulations to reduce the risk of damage from future floods.
Policies (Municipal Code)	Chapter 9 Buildings	Article 1 Building Code	Adopts the California Building Code, 2001 Edition.
		Article 2 Abatement of Dangerous Buildings	Amends the uniform code for the abatement of dangerous buildings.
	Chapter 13 Fire Prevention	Article 1 Fire Department	Describes the duty of the fire chief to exercise control and supervision over all matters relating to the prevention and suppression of fires, to mitigate hazardous or dangerous conditions, to provide emergency response and rescue to those in need and to take measures for the protection of lives and property imperiled thereby.
	Chapter 14 Garbage, Refuse, and Weeds	Article 2 Refuse and Weeds on Lots	Does not permit or allow any weeds or grass which bear seeds of a windborne or downy nature, or which attain such a large growth as to become a fire menace when dry, or which are otherwise noxious or dangerous, to grow, stand or remain upon such real property or upon any street or sidewalk in front of such real property.
	Chapter 29A Stormwater Management Utility		The purpose of this utility includes, but is not limited to, permitting, maintenance, planning, design, construction, regulation, surveying, water quality testing and inspection relating to storm and surface water management facilities.

Table Q-7
City of Salinas Administrative and Technical Resources for Hazard Mitigation

Staff/Personnel Resources	Department/Division Position
Planner(s) or engineer(s) with knowledge of land development and land management practices	Development and Engineering
Engineer(s) or professional(s) trained in construction practices related to buildings and/or infrastructure	Development and Engineering, Maintenance
Planner(s) or engineer(s) with an understanding of manmade or natural hazards	Development and Engineering
Floodplain manager	Maintenance
Personnel skilled in GIS and/or HAZUS-MH	Development and Engineering
Director of Emergency Services	Fire
Finance (grant writers, purchasing)	City Manager
Public Information Officers	Administration and Community Services

Table Q-8
City of Salinas Financial Resources for Hazard Mitigation

Financial Resources	Effect on Hazard Mitigation
General funds	If funding available, can be used for hazard mitigation activity.
Authority to levy taxes for specific purposes	Can be used for any hazard mitigation activity with 2/3rd voter approval for specific purpose or ½ voter approval for general tax.
Incur debt through general obligation bonds	Revenue Bonds can be issued through the City with 2/3rd voter approval.
Incur debt through special tax and revenue bonds	Can be used for any hazard mitigation activity with 2/3rd voter approval.
Incur debt through private activity bonds	Can be used for any hazard mitigation activity and it does not need voter approval (City Council can approve).
FEMA HMPG and PDM grants	HMGP grant funding is available to local communities after a Presidentially-declared disaster. It can be used to fund both pre- and post-disaster mitigation plans and projects. PDM funding is available on an annual basis. This grant can only be used to fund pre-disaster mitigation plans and projects only.
United State Fire Administration (USFA) Grants	The purpose of these grants is to assist state, regional, national or local organizations to address fire prevention and safety. The primary goal is to reach high-risk target groups including children, seniors and firefighters.

Table Q-9
City of Salinas Mitigation Action Plan Matrix

Action Number	Description	Ranking / Prioritization	Administering Department	Potential Funding	Timeframe	Benefit-Costs
1.B	Identify hazard-prone critical facilities and infrastructure and carry out acquisition, relocation, and structural and nonstructural retrofitting measures as necessary.	Priority / High	Development and Engineering	HMGP and PDM Grants	0-5 years	This action will help ensure that the community/critical facilities can operate in some capacity before, during, and after the disaster.
2.A	Develop a sustained public outreach program that encourages consistent hazard mitigation content. For example, consider publishing tsunami inundation maps in telephone books, wildland fire defensible space tips with summer water bills, and the safe handling and disposal of hazardous waste and chemicals with garbage bills.	Priority / High	Administration and Community Services, Various	HMGP and PDM Grants, General Funds	0-1 year, Ongoing	A mitigation outreach program will help build and support local capacity to enable the public to prepare for, respond to, and recover from disasters.
2.B	Develop audience-specific hazard mitigation outreach efforts. Audiences include the elderly, children, tourists, non-English speaking residents, and home and business owners.	Priority / High	Administration and Community Services	HMGP and PDM Grants, General Funds	0-1 year, Ongoing	A mitigation outreach program will help build and support local capacity to enable the public to prepare for, respond to, and recover from disasters.

Table Q-9
City of Salinas Mitigation Action Plan Matrix

Action Number	Description	Ranking / Prioritization	Administering Department	Potential Funding	Timeframe	Benefit-Costs
5.B	Develop an unreinforced masonry grant program that helps correct earthquake-risk nonmasonry building problems, including chimney bracing and anchoring water heaters.	Priority / High	Development and Engineering	HMGP and PDM Grants	2-5 years	The identification and mitigation of unreinforced nonmasonry buildings will reduce potential losses due to earthquakes.
6.A	Identify and carry-out minor flood and stormwater management projects that would reduce damage to infrastructure and damage due to local flooding/inadequate drainage. These include the modification of existing culverts and bridges, upgrading capacity of storm drains, stabilization of streambanks, and creation of debris or flood/stormwater retention basins in small watersheds.	Priority / High	Maintenance	HMGP and PDM Grants	Ongoing	The identification and implementation of minor flood and stormwater management projects will reduce multi-asset (critical facility, critical infrastructure, and residential and nonrersidential) losses due to flooding.
**	The police and fire department are looking to co-locate and enlarge their office space. The city is planning to build a new public safety building on city owned property. The new construction will replace the existing Armory building, Women's' Club	Priority / High	Fire	HMGP and PDM Grants	2008-2009	A new public safety building will ensure that the Fire and Police departments can respond to and recover from disasters, thereby aiding residents of Salinas.

Table Q-9
City of Salinas Mitigation Action Plan Matrix

Action Number	Description	Ranking / Prioritization	Administering Department	Potential Funding	Timeframe	Benefit-Costs
	and old Fire Station one.					

** Additional City-specific mitigation action.

Appendix R

City of Sand City

Table R-1
City of Sand City Estimated Population and Building Inventory

Population	Residential Buildings		Nonresidential Buildings	
2000 Census Population Count*	**Total Building Count**	**Total Value of Buildings **- (x$1000)**	**Total Building Count**	**Total Value of Buildings*** (x$1000)**
261	57	16,530	8	52,206

Source: FEMA HAZUS-MH (residential and nonresidential buildings) and U.S. Census 2000 population data.
* Population count using census blocks within the city limits.

** Average insured structural value of all residential buildings (including single-family dwelling, mobile homes, etc., is $290,000 per structure).

*** Averaged insured structural value of all nonresidential buildings (including industry, trade, professional and technical services, etc., is $6,526,000).

Table R-2
City of Sand City Critical Facilities and Infrastructure

Category	Facility	Address	Estimated Insured Structural Value (x$1000)
Government	City Hall	1 Sylvan Wy.	6,659
Emergency Response	Police Department	1 Sylvan Wy.	1,652

Source: FEMA HAZUS-MH (estimated values)

Table R-3
City of Sand City Potential Hazard Vulnerability Analysis – Population and Buildings

		Population	Buildings			
			Residential		Nonresidential	
Hazard Type	**Methodology**	**Number**	**Number**	**Value ($)[1]**	**Number**	**Value ($)[1]**
Coastal Erosion	100-year erosion zone	0	0	0	2	89
Dam Failure	Inundation area	0	0	0	0	0
Earthquake	Extreme	0	0	0	0	0
	High	261	57	16,530	41	89,464
	Moderate	0	0	0	0	0
Flood	100-year flood zone	0	0	0	2	76
Hazardous Materials Event	1-mile buffer transport corridor	261	57	16,530	42	89,654
Landslide	High	0	0	0	0	0
	Moderate	0	0	0	0	0
Tsunami	Maximum average run-up	0	0	0	2	130
Wildland Fire	Very high	0	0	0	0	0
	High	0	0	0	0	0
	Moderate	261	57	16,530	39	85,912
Windstorm	Prevailing wind zone	NA	NA	NA	NA	NA

[1] Value = Estimated average structural value (x1000)

NA = Not Applicable

Table R-4
City of Sand City Potential Hazard Vulnerability Analysis – Critical Facilities

		Government		Emergency Response		Lifeline Utilities		Care		Educational		Marine, Environmental, and Community		Total	
Hazard	**Methodology**	**No.**	**Value ($)[1]**	**No.**	**Value ($)[1]**	**No.**	**Value ($)[1]**	**No.**	**Value ($)[1]**	**No.**	**Value ($)[1]**	**No.**	**Value ($)[1]**	**No.**	**Value ($)[1]**
Coastal Erosion	100-year erosion zone	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Dam Failure	Inundation area	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Earthquake	Extreme	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	High	1	6,659	1	1,652	0	0	0	0	0	0	0	0	2	8,311
	Moderate	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Flood	100-year flood zone	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Hazardous Materials Event	1-mile buffer transport corridor	1	6,659	1	1,652	0	0	0	0	0	0	0	0	2	8,311
Landslide	High	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Moderate	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Tsunami	Maximum average run-up	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Wildland Fire	Very high	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	High	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Moderate	1	6,659	1	1,652	0	0	0	0	0	0	0	0	2	8,311
Windstorm	Prevailing wind zone	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

[1] Value = Estimated insured structural value (x1000)

NA = Not Applicable

Table R-5
City of Sand City Potential Hazard Vulnerability Analysis – Critical Infrastructure

		Highways		Railroads		Bridges	
Hazard	**Methodology**	**Miles**	**Value ($)[1]**	**Miles**	**Value ($)[1]**	**Number**	**Value ($)[1]**
Coastal Erosion	100-year erosion zone	0.0	0	0.0	0	0	0
Dam Failure	Inundation area	0.0	0	0.0	0	0	0
Earthquake	Extreme	0.0	0	0.0	0	0	0
	High	1.2	6,195	0.0	0	3	2,514
	Moderate	0.0	0	0.0	0	0	0
Flood	100-year flood zone	0.0	0	0.0	0	0	0
Hazardous Materials Event	1-mile buffer transport corridor	1.2	6,195	0.0	0	3	2,514
Landslide	High	0.0	0	0.0	0	0	0
	Moderate	0.0	0	0.0	0	0	0
Tsunami	Maximum average run-up	0.0	33	0.0	0	0	0
Wildland Fire	Very high	0.0	0	0.0	0	0	0
	High	0.0	0	0.0	0	0	0
	Moderate	1.0	5,279	0.0	0	3	2,514
Windstorm	Prevailing wind zone	NA	NA	NA	NA	NA	NA

[1] Value = Estimated value (x1000)

NA = Not Applicable

Coastal Erosion

The sandy dunes along the City's coastline erode at an average 2.6 feet a year. Therefore, using a 100-year projection to determine areas at risk to coastal erosion, only 2 nonresidential buildings (worth $89,000 thousand), are located in this hazard area.

Earthquake

Nearly all of Sand City is susceptible to high earthquake shaking. This includes 261 people (100 percent of the total population), 57 residential buildings (worth $16.5 million), 41 nonresidential buildings (worth $89.5 million), and 2 critical facilities (worth $8.3 million). 1.2 miles of highway and 3 bridges are located in this hazard area.

Flood

The SFHA in Sand City consists of wave attack from the Pacific Ocean. As such, only 2 nonresidential buildings (worth $76,000 thousand), are located in the 100-year floodplain.

Hazardous Materials Event

Within the 1-mile buffer around the transportation facilities, 100 percent of Sand City's population is exposed to a hazardous material transport event. This includes 261 people, 57 residential buildings (worth $16.5 million), 42 nonresidential buildings (worth $89.7 million), and 2 critical facilities (worth $8.3 million). 1.2 miles of highway and 3 bridges are located in this hazard area. These figures are for the entirety of the transportation corridors and, therefore, overstate the exposure since a hazmat event along the corridors is unlikely to affect all of the area within the 1-mile buffer.

Tsunami

Using the maximum average scenario of 21-foot run-up, approximately 2 nonresidential buildings (worth $130,000) are exposed to a tsunami hazard.

Wildland Fire

Using the California FRAP model, the nearly the entire City of Sand City is located within a moderate wildland fire hazard area. Within this area are 261 people, 57 residential buildings (worth $16.5 million), 39 nonresidential buildings (worth $85.9 million), and 2 critical facilities (worth $8.3 million). 1.0 mile of highway and 3 bridges are located in this hazard area.

Table R-6
City of Sand City Legal and Regulatory Resources Available for Hazard Mitigation

Regulatory Tool	Chapter or Section	Effect on Hazard Mitigation
Plans	General Plan Safety Element	Establishes policies that will minimize the potential of human injury and property damage to the natural hazards.
Programs	National Flood Insurance Program (NFIP)	Makes affordable flood insurance available to homeowners, business owners, and renters in participating communities. In exchange, those communities must adopt and enforce minimum floodplain management regulations to reduce the risk of damage from future floods.
	Monterey Regional Storm Water Management Program	Reduce pollution from storm water discharge and runoff with regard to the EPA's Phase II Storm Water National Pollutant Discharge Elimination System requirements. It is a collective effort and implementation of area-wide activities designed to benefit all participating entities.
Policies (Municipal Code)	Not Available	Not Available

Table R-7
City of Sand City Administrative and Technical Resources for Hazard Mitigation

Staff/Personnel Resources	Department/Division Position
Planner(s) or engineer(s) with knowledge of land development and land management practices	Planning, Engineering
Engineer(s) or professional(s) trained in construction practices related to buildings and/or infrastructure	Engineering, Building
Planner(s) or engineer(s) with an understanding of manmade or natural hazards	Engineering
Floodplain manager	Public Works
Personnel skilled in GIS and/or HAZUS-MH	Engineering
Director of Emergency Services	Police / Monterey County OES
Finance (grant writers, purchasing)	Administration
Public Information Officers	All

Table R-8
City of Sand City Financial Resources for Hazard Mitigation

Financial Resources	Effect on Hazard Mitigation
General funds	If funding available, can be used for hazard mitigation activity.
Authority to levy taxes for specific purposes	Can be used for any hazard mitigation activity.
Incur debt through general obligation bonds	Revenue Bonds can be issued through the City without voter approval.
Incur debt through special tax and revenue bonds	Can be used for any hazard mitigation activity, but only with voter approval.
Incur debt through private activity bonds	Can be used for any hazard mitigation activity.
FEMA HMPG and PDM grants	HMGP grant funding is available to local communities after a Presidentially-declared disaster. It can be used to fund both pre- and post-disaster mitigation plans and projects. PDM funding is available on an annual basis. This grant can only be used to fund pre-disaster mitigation plans and projects only.
United State Fire Administration (USFA) Grants	The purpose of these grants is to assist state, regional, national or local organizations to address fire prevention and safety. The primary goal is to reach high-risk target groups including children, seniors and firefighters.

Table R-9
City of Sand City Mitigation Action Plan Matrix

Action Number	Description	Ranking / Prioritization	Administering Department	Potential Funding	Timeframe	Benefit-Costs
1.B*	Identify hazard-prone critical facilities and infrastructure and carry out acquisition, relocation, and structural and nonstructural retrofitting measures as necessary.	Priority / High	Building and Engineering	General Funds, HMGP, and PDM Grants	0-5 Years	This action will help ensure that the community/critical facilities can operate in some capacity before, during, and after the disaster.
2.A	Develop a sustained public outreach program that encourages consistent hazard mitigation content.	Priority / High	Police, Fire, and Public Works	General Funds, HMGP, and PDM Grants	0-2 Years	A mitigation outreach program will help build and support local capacity to enable the public to prepare for, respond to, and recover from disasters.
2.B	Develop audience-specific hazard mitigation outreach efforts. Audiences include the elderly, children, tourists, non-English speaking residents, and home and business owners.	Priority / High	Police, Fire, and Public Works	General Funds, HMGP, and PDM Grants	0-2 Years	A mitigation outreach program will help build and support local capacity to enable the public to prepare for, respond to, and recover from disasters.
2.D*	Update hazard maps in a GIS mapping database to include all nine hazards and asset information identified in the MJHMP. Integrate information with existing City data.	Priority / High	Engineering	General Funds	Ongoing	This action will not need additional funding and will help ensure current hazard areas are identified and corresponding mitigation activities are carried out.
2.E**	Maintain records and data to accurately reflect existing utilities and critical facilities.	Priority / High	City Engineer	General Funds	0-2 Years	This action will not need additional funding and will help ensure that up-to-date critical assets are identified and corresponding mitigation activities are carried out.

Table R-9
City of Sand City Mitigation Action Plan Matrix

Action Number	Description	Ranking / Prioritization	Administering Department	Potential Funding	Timeframe	Benefit-Costs
2.F**	Explore opportunities to provide training to City personnel to use HAZUS and/or other applicable programs.	Priority / High	All	General Funds	0-2 Years	Training in HAZUS will help City staff better understand current and future risks due to hazards and therefore help City staff develop and implement appropriate mitigation measures.
2.G**	Continue to implement the most recent versions of the California State-adopted construction and building codes.	Priority / High	Building	General Funds	Ongoing	This action does not cost anything outside of current funding.
2.H**	Improve and expand the City's website to include the disbursement of hazard related information to the general public, inclusive of mitigation measures.	Priority / High	Administration	General Funds, HMGP, and PDM Grants	0-1 Year	A mitigation outreach program will help build and support local capacity to enable the public to prepare for, respond to, and recover from disasters.
2.I**	Promote information sharing among neighboring cities, utilities, Monterey County, and State and Federal agencies.	Priority / High	All	General Funds	Ongoing	Information-sharing will help build and support local capacity to enable the public to prepare for, respond to, and recover from disasters.
5.B	Develop an unreinforced masonry grant program that helps correct earthquake-risk nonmasonry building problems, including chimney bracing and anchoring water heaters.	Priority / High	Building and Engineering	HMGP and PDM Grants	0-5 Years	The identification and mitigation of unreinforced nonmasonry buildings will reduce potential losses due to earthquakes.

Table R-9
City of Sand City Mitigation Action Plan Matrix

Action Number	Description	Ranking / Prioritization	Administering Department	Potential Funding	Timeframe	Benefit-Costs
6.A*	Explore mitigation opportunities for repetitively flooded properties and, if necessary, encourage property owners to carry-out acquisition, relocation, elevation, and flood-proofing measures to protect these properties.	Priority / High	Building and Engineering	HMGP and PDM Grants	0-5 Years	The mitigation of repetitively flooded properties is a priority for FEMA grant programs.
	Ensure that new developments are designed to reduce or eliminate flood by requiring properties and right-of-ways to be designed for the approved sewer and drainage facilities, providing onsite detention facilities whenever possible.	Priority / High	Planning, Building, and Engineering	General Funds	Ongoing	This effort will reduce the risk of future flooding to new development and existing development downstream.
10.A	Continue to conduct current fuel management programs (weed abatement programs) and investigate and apply new and emerging fuel management techniques.	Priority / High	Fire and Public Works	HMGP and PDM Grants	Ongoing	The probability of future damage from wildland fires could be high if this mitigation action is not implemented.
10.D**	Explore and implement programs that will provide low-interest loans for business and homeowners to retrofit properties with fire resistant materials.	Priority / High	Redevelopment Agency	Unknown	0-3 Years	The potential cost of this mitigation action seems reasonable for the size of the problem and its likely benefits.

Table R-9
City of Sand City Mitigation Action Plan Matrix

Action Number	Description	Ranking / Prioritization	Administering Department	Potential Funding	Timeframe	Benefit-Costs
11.D**	Replace above-ground utility lines with underground utility lines. Ensure that utility lines are installed underground for new construction.	Priority / High	Building and Engineering	General Funds	0-5 Years	This effort will reduce future losses due to windstorm events.

* Actions slightly modified from Table 7-2.

** Sand City-specific mitigation actions.

Appendix S

City of Soledad

Table S-1
City of Soledad Estimated Population and Building Inventory

Population	Residential Buildings		Nonresidential Buildings	
2000 Census Population Count*	Total Building Count	Total Value of Buildings **- (x$1000)	Total Building Count	Total Value of Buildings (x$1000)
11,534	2,156	381,858	8	52,206

Source: FEMA HAZUS-MH (residential and nonresidential buildings) and U.S. Census 2000 population data.
* Population count using census blocks within the city limits.

** Average insured structural value of all residential buildings (including single-family dwelling, mobile homes, etc., is $177,000 per structure).

*** Averaged insured structural value of all nonresidential buildings (including industry, trade, professional and technical services, etc., is $6,526,000).

Table S-2
City of Soledad Critical Facilities and Infrastructure

Category	Facility	Address	Estimated Insured Structural Value (x$1000)
Government	City Hall	248 Main St.	6,659
Emergency Response	Police Department	236 Main St.	1,652
	Fire Department	525 Monterey St.	708
Lifeline Utilities	Wastewater Treatment Plant	Located from aerial photography (end of Morisolli Rd.)	78,588
	Well #9	End of Los Coches Dr.	1,000
	Well #7	1100 Monterey St.	1,500
	Well #11	58 San Vicente Rd.	800
	Well #10	433 Ortiz St.	800
	Well #6	725 North St.	950
	La Cuesta Booster Station	921 Vida St.	2,500
	Section 16 Water Storage Tank	End of Orchard Ln.	1,500
	Prison Wastewater Plant	End of Gloria Rd.	500
Care	Eden Valley Care Center	612 Main St.	802
	Mission Center Health Care	2524 H. De La Rosa Sr. St.	1,600
	Mee Memorial Clinic	359 Gabilan Dr.	1,600
	Soledad Dialysis Center	901 Los Coaches Dr.	1,600
	Soledad Medical Clinic	600 Main St.	1,600
	Clinica de Salud	799 Front St.	1,600
Educational	San Vicente Elementary School	1300 Metz Rd.	590
	Gabilan Elementary School	330 North Walker Dr.	590
	Rose Ferrero Elementary School	400 Entrada Dr.	590
	Main Street Middle School	441 Main St.	590
	Soledad High School	425 Galiban Dr.	590
	Chalone Alternative/Pinnacles Continuation High School	690 Main St.	590
	Frank Ledesma Elementary School	973 Vista de Soledad	590
	Jack Franscioni Elementary School	779 Orchard Ln.	590

Source: FEMA HAZUS-MH (estimated values)

Table S-3
City of Soledad Potential Hazard Vulnerability Analysis – Population and Buildings

		Population	Buildings			
			Residential		Nonresidential	
Hazard Type	**Methodology**	**Number**	**Number**	**Value ($)[1]**	**Number**	**Value ($)[1]**
Coastal Erosion	100-year erosion zone	0	0	0	0	0
Dam Failure	Inundation area	3,333	612	115,066	30	48,445
Earthquake	Extreme	0	0	0	0	0
	High	0	0	0	0	0
	Moderate	11,534	2,156	381,858	40	52,206
Flood	100-year flood zone	29	7	1,376	0	0
Hazardous Materials Event	1-mile buffer transport corridor	8,951	1,607	285,899	38	50,870
Landslide	High	0	0	0	0	0
	Moderate	0	0	0	0	0
Tsunami	Maximum average run-up	0	0	0	0	0
Wildland Fire	Very high	0	0	0	0	0
	High	1	1	21	0	0
	Moderate	9,218	1,715	309,332	39	51,432
Windstorm	Prevailing wind zone	11,534	2,156	381,858	40	52,206

[1] Value = Estimated average structural value (x1000)

Table S-4
City of Soledad Potential Hazard Vulnerability Analysis – Critical Facilities

		Government		Emergency Response		Lifeline Utilities		Care		Educational		Marine, Environmental, and Community		Total	
Hazard	**Methodology**	**No.**	**Value ($)[1]**	**No.**	**Value ($)[1]**	**No.**	**Value ($)[1]**	**No.**	**Value ($)[1]**	**No.**	**Value ($)[1]**	**No.**	**Value ($)[1]**	**No.**	**Value ($)[1]**
Coastal Erosion	100-year erosion zone	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Dam Failure	Inundation area	1	6,659	2	2,360	5	82,838	3	4,800	1	590	0	0	12	97,247
Earthquake	Extreme	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	High	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Moderate	1	6,659	2	2,360	9	88,138	6	8,802	8	4,720	0	0	26	110,679
Flood	100-year flood zone	0	0	0	0	1	78,588	0	0	0	0	0	0	1	78,588
Hazardous Materials Event	1-mile buffer transport corridor	1	6,659	2	2,360	5	5,050	5	7,202	3	1,770	0	0	16	23,041
Landslide	High	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Moderate	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Tsunami	Maximum average run-up	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Wildland Fire	Very high	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	High	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Moderate	1	6,659	2	2,360	3	3,250	4	5,602	6	3,540	0	0	16	21,411
Windstorm	Prevailing wind zone	1	6,659	2	2,360	9	88,138	6	8,802	8	4,720	0	0	26	110,679

[1] Value = Estimated insured structural value (x1000)

Table S-5
City of Soledad Potential Hazard Vulnerability Analysis – Critical Infrastructure

		Highways		Railroads		Bridges	
Hazard	**Methodology**	**Miles**	**Value ($)[1]**	**Miles**	**Value ($)[1]**	**Number**	**Value ($)[1]**
Coastal Erosion	100-year erosion zone	0.0	0	0.0	0	0	0
Dam Failure	Inundation area	1.2	8,278	1.5	2,070	4	5,278
Earthquake	Extreme	0.0	0	0.0	0	0	0
	High	0.0	0	0.0	0	0	0
	Moderate	2.0	12,508	1.7	2,405	4	5,278
Flood	100-year flood zone	0.0	0	0.0	0	0	0
Hazardous Materials Event	1-mile buffer transport corridor	2.0	12,508	1.7	2,405	4	5,278
Landslide	High	0.0	0	0.0	0	0	0
	Moderate	0.0	0	0.0	0	0	0
Tsunami	Maximum average run-up	0.0	0	0.0	0	0	0
Wildland Fire	Very high	0.0	0	0.0	0	0	0
	High	0.0	0	0.0	0	0	0
	Moderate	1.2	6,247	1.3	1,842	1	110
Windstorm	Prevailing wind zone	2.0	12,508	1.7	2,405	4	5,278

[1] Value = Estimated value (x1000)

Dam Failure

Failure of the San Antonio and Nacimiento dams pose a risk within the western portion of the City. Exposed within the inundation zones are 3,333 people, 612 residential buildings (worth $115.1 million), 30 nonresidential buildings (worth $48.4 million), and 12 critical facilities (worth $97.2 million). 1.2 miles of highway, 1.5 miles of railroad tracks, and 4 bridges are also located in this hazard area.

Earthquake

All of the City of Soledad is located in a moderate shaking hazard area. As such, 11,534 people, 2,156 residential buildings (worth $381.9 million), 40 nonresidential buildings (worth $52.2 million), and 26 critical facilities (worth $110.7 million) are vulnerable to a moderate shaking event. 2.0 miles of highway, 1.7 miles of railroad tracks, and 4 bridges are located in this hazard area.

Flood

The SFHA of Salinas River is located in the southern portion of the City. Exposed within this hazard area are 29 people, 7 residential buildings (worth $1.4 million), and 1 critical facility (worth $78.6 million).

Hazardous Materials Event

Within the 1-mile buffer around the transportation facilities, over 75 percent of Soledad's population is exposed to a hazardous materials transport event. This includes 8,951 people, 1,607 residential buildings (worth $285.9 million), 38 nonresidential buildings (worth $50.9 million), and 16 critical facilities (worth $23.0 million). These figures are for the entirety of the transportation corridors and, therefore, overstate the exposure since a hazmat event along the corridors is unlikely to affect all of the area within the 1-mile buffer.

Wildland Fire

Nearly 80 percent of the City resides in a moderate wildland hazard area. Within this area of exposure are 9,218 people, 1,715 residential buildings (worth $309.3 million), 39 nonresidential buildings (worth $51.4 million) and 16 critical facilities (worth $21.4 million).

Only 1 person and 1 residential building are located in the high wildland fire hazard area. The remaining 2,315 people reside in areas of low wildland fire hazard areas, which are not included in this analysis.

Windstorm

Windstorms created by prevailing northwest sustained surface winds are common throughout the central and southern Salinas Valley. As such, all of Soledad's residents, buildings, and facilities are susceptible to windstorms.

Table S-6
City of Soledad Legal and Regulatory Resources Available for Hazard Mitigation

Regulatory Tool	Chapter or Section		Effect on Hazard Mitigation
Plans	2005 General Plan Hazards Chapter, Safety Element		Establishes policies that will minimize the potential of human injury and property damage to the following seismic, flood, and fire hazards.
Programs	National Flood Insurance Program (NFIP)		Makes affordable flood insurance available to homeowners, business owners, and renters in participating communities. In exchange, those communities must adopt and enforce minimum floodplain management regulations to reduce the risk of damage from future floods.
Policies (Municipal Code)	Title 15 Building Construction	Chapter 15.08 Adoption of the California Building Code	Adopts the 1997 California Building Code, including the Uniform Code for the Abatement of Dangerous Buildings. Amendments have been made to the code for erosion control, runoff control, building site runoff, runoff retention, and dust.

Table S-7
City of Soledad Administrative and Technical Resources for Hazard Mitigation

Staff/Personnel Resources	Department/Division Position
Planner(s) or engineer(s) with knowledge of land development and land management practices	Community Development
Engineer(s) or professional(s) trained in construction practices related to buildings and/or infrastructure	Community Development, Public Works
Planner(s) or engineer(s) with an understanding of manmade or natural hazards	Community Development, Public Works
Floodplain manager	Public Works
Personnel skilled in GIS and/or HAZUS-MH	Community Development
Director of Emergency Services	Fire
Finance (grant writers, purchasing)	Finance
Public Information Officers	City Manager/City Clerk, Community Development

Table S-8
City of Soledad Financial Resources for Hazard Mitigation

Financial Resources	Effect on Hazard Mitigation
General funds	If funding available, can be used for hazard mitigation activity.
Authority to levy taxes for specific purposes	Can be used for any hazard mitigation activity, but only eligible for use with voter approval (Prop 218).
Incur debt through general obligation bonds	Can be used for any hazard mitigation activity but only eligible for use without voter approval.
Incur debt through special tax and revenue bonds	Revenue Bonds can be issued through the County without voter approval, to raise funds for hazard mitigation activities.
Incur debt through private activity bonds	Can be used for any hazard mitigation activity but it (private activity bond) must meet certain criteria.
FEMA HMPG and PDM grants	HMGP grant funding is available to local communities after a Presidentially-declared disaster. It can be used to fund both pre- and post-disaster mitigation plans and projects. PDM funding is available on an annual basis. This grant can only be used to fund pre-disaster mitigation plans and projects only.
United State Fire Administration (USFA) Grants	The purpose of these grants is to assist state, regional, national or local organizations to address fire prevention and safety. The primary goal is to reach high-risk target groups including children, seniors and firefighters.

Table S-9
City of Soledad Mitigation Action Plan Matrix

Action Number	Description	Ranking / Prioritization	Administering Department	Potential Funding	Timeframe	Benefit-Costs
1.A	Create incentives (e.g., rebates) to promote homeowner/business owner disaster-resistant development (e.g., Class A roofing material).	Priority / High	Fire	USFA, PDM, and HGMP Grants	1-2 years	An incentives program will help build and support local capacity to enable the public to prepare for disasters.
1.B	Identify hazard-prone critical facilities and infrastructure and carry out acquisition, relocation, and structural and nonstructural retrofitting measures as necessary.	Priority / High	Public Works	PDM and HGMP Grants	0-1 years, Ongoing	This action will help ensure that the community/critical facilities can operate in some capacity before, during, and after the disaster.
2.B	Develop audience-specific hazard mitigation outreach efforts. Audiences include the elderly, children, tourists, non-English speaking residents, and home and business owners.	Priority / High	Economic Development	PDM Grants and General Funds	0-1 years, Ongoing	A mitigation outreach program will help build and support local capacity to enable the public to prepare for, respond to, and recover from disasters.
5.B	Develop an unreinforced masonry grant program that helps correct earthquake-risk nonmasonry building problems, including chimney bracing and anchoring water heaters.	Priority / High	Community Development	PDM and HGMP Grants	0-2 years, Ongoing	The identification and mitigation of unreinforced nonmasonry buildings will reduce potential losses due to earthquakes.
6.C	Identify and carry-out minor flood and stormwater management projects that would reduce damage to infrastructure and damage due to local flooding/inadequate drainage. These include the modification of	Priority / High	Public Works	PDM and HGMP Grants	1-3 years, Ongoing	The identification and implementation of minor flood and stormwater management projects will reduce multi-asset

Table S-9
City of Soledad Mitigation Action Plan Matrix

Action Number	Description	Ranking / Prioritization	Administering Department	Potential Funding	Timeframe	Benefit-Costs
	existing culverts and bridges, upgrading capacity of storm drains, stabilization of streambanks, and creation of debris or flood/stormwater retention basins in small watersheds.					(critical facility, critical infrastructure, and residential and nonrersidential) losses due to flooding.
10.B	Create defensible space guidelines for both new and existing buildings that are in areas of very high and extreme fire hazard areas.	Priority / High	Fire	USFA, PDM, and HGMP Grants	0-1 years	The potential cost of this mitigation action seems reasonable for the size of the problem and its likely benefits.

Appendix T

Special Districts

Table T-1
Special District Facilities

Name	Category	Facility Type	Address	Insured Structural Value (x$1000)
Monterey Regional Water Pollution Control Agency	MRWPCA	District Office	5 Harris Court, Monterey, CA 93940	1,180
Monterey Regional Water Pollution Control Agency	MRWPCA	District Office	1951 Del Monte Blvd., Monterey, CA 93940	1,180
Monterey Regional Water Pollution Control Agency	MRWPCA	District Office	146 Hitchcock Rd., Salinas, CA 93955	1,180
Monterey Regional Water Pollution Control Agency	MRWPCA	District office	#1 Bay St., Sand City, CA 93955	1,180
Monterey Regional Water Pollution Control Agency	MRWPCA	Treatment Plant	Monterey Regional Environmental Park, Marina, CA, 93933	78,588
Monterey Regional Water Pollution Control Agency	MRWPCA	Pump Station	Coral St., Pacific Grove*	1,456
Monterey Regional Water Pollution Control Agency	MRWPCA	Pump Station	Fountain Ave., Pacific Grove*	1,456
Monterey Regional Water Pollution Control Agency	MRWPCA	Pump Station	(Reeside), Monterey*	1,456
Monterey Regional Water Pollution Control Agency	MRWPCA	Pump Station	Monterey*	1,456
Monterey Regional Water Pollution Control Agency	MRWPCA	Pump Station	Seaside*	1,456
Monterey Regional Water Pollution Control Agency	MRWPCA	Pump Station	Marina*	1,456
Monterey Regional Water Pollution Control Agency	MRWPCA	Pump Station	Ford Ord, Marina*	1,456
Monterey Regional Water Pollution Control Agency	MRWPCA	Pump Station	Salinas*	1,456
Monterey Regional Water Pollution Control Agency	MRWPCA	Pump Station	Moss Landing*	1,456

Table T-1
Special District Facilities

Name	Category	Facility Type	Address	Insured Structural Value (x$1000)
Monterey Regional Water Pollution Control Agency	MRWPCA	Pump Station	Castroville*	1,456
Carmel Area Wastewater District	CAWD	District Office	3945 Rio Rd., Carmel, CA 93923	1,180
Carmel Area Wastewater District	CAWD	Treatment Plant	Highway 1 and Carmel River, CA 93923	78,588
Carmel Area Wastewater District	CAWD	Pump Station #1	8th Ave. and Scenic Dr.	1,456
Carmel Area Wastewater District	CAWD	Pump Station #2	16th Ave. and Monte Verde St.	1,456
Carmel Area Wastewater District	CAWD	Pump Station #3	Bay Ct. and Scenic Dr.*	1,456
Carmel Area Wastewater District	CAWD	Pump Station	Hacienda Carmel*	1,456
Carmel Area Wastewater District	CAWD	Pump Station	Carmel Meadows*	1,456
Carmel Area Wastewater District	CAWD	Pump Station	Carmel Highlands*	1,456
North County Fire Protection District	Fire District	Station #1 / Headquarters	11200 Speegle St., Castroville, CA 95012	708
North County Fire Protection District	Fire District	Station #2	17639 Pesante Rd., Prunedale, CA 93907	708
North County Fire Protection District	Fire District	Station #3	301 Elkhorn Rd., Royal Oaks, CA 95076	708
Aromas / Tri-County Fire Protection District	Fire District	CDF Station #1	492 Carpenteria Rd., Aromas, CA 95004	708
Salinas Rural Fire Protection District	Fire District	Station #1	19900 Portola Dr., Salinas, CA 93908	708

Table T-1
Special District Facilities

Name	Category	Facility Type	Address	Insured Structural Value (x$1000)
Salinas Rural Fire Protection District	Fire District	Station #2	24281 Washington St., Chualar, CA 93925	708
Salinas Rural Fire Protection District	Fire District	Station #3	31 Laureles Gd., Salinas, CA 93908	708
Spreckels Volunteer Fire Company Station	Fire District	Station #1	38 Spreckels Blvd., Spreckels, CA 93962	708
Pebble Beach Community Service District Fire Department	Fire District	CDF Station	3101-B Forest Lake Road, Pebble Beach, CA 93953	708
Cypress Fire Protection District	Fire District	Station #1	3775 Rio Rd., Carmel CA 93923	708
Cypress Fire Protection District	Fire District	Station #2	4180 17 Mile Dr., Carmel, CA 93932	708
Carmel Valley Fire Protection District	Fire District	Station #1	8455 Carmel Valley Rd., Carmel Valley, CA 93924	708
Carmel Valley Fire Protection District	Fire District	Station #2	26 Via Contenta, Carmel Valley, CA 93924	708
Carmel Highlands Fire Protection District	Fire District	CDF Station #1	73 Fern Canyon Rd., Carmel, CA 93923	708
Mid Coast Fire Brigade	Fire District	Station #1	38000 Palo Colorado Rd., Carmel, CA 93923	708
Big Sur Volunteer Fire Brigade	Fire District	Station #1	Post Ranch Hwy. 1, Big Sur, CA 93920	708
Big Sur Volunteer Fire Brigade	Fire District	Station #2	South Coast Center Hwy. 1, Big Sur, CA 93920	708
Big Sur Volunteer Fire Brigade	Fire District	Station #3	Willow Springs Caltrans Yard, Big Sur	708
Cachagua Fire Protection District	Fire District	Station #1	37200 Nason Road, Carmel Valley, CA 93924	708

Table T-1
Special District Facilities

Name	Category	Facility Type	Address	Insured Structural Value (x$1000)
San Adro Volunteer Fire Department	Fire District	Station #1	62180 Railroad Rd., San Adro, CA 93450	708
Monterey Peninsula Airport District	MPAD	Airport	200 Fred Kane Dr., Monterey, CA 93940	6,431
Monterey Peninsula Airport District	MPAD	Fire Department Station	200 Fred Kane Dr., Monterey, CA 93940	708
Chualar Sanitation District	Sanitation District	Pump Station	Corner of Main St. and Grant St., Chualar	1456
Boronda Sanitation District	Sanitation District	Pump Station	Corner of El Rancho Rd. and Virginia Road.	1456
Boronda Sanitation District	Sanitation District	Pump Station	Corner of Virginia Rd. and Boronda Rd.	1456
Boronda Sanitation District	Sanitation District	Pump Station	328 Boronda Rd., Salinas, CA 93907	1456
Boronda Sanitation District	Sanitation District	Pump Station	Madison Ln., Salinas, CA 93907	1456
Boronda Sanitation District	Sanitation District	Pump Station	15099 Canario St., Salinas, CA 93907	1456
Moss Landing Sanitation District	Sanitation District	Pump Station	124 Struve Rd., Moss Landing, CA 95039	1456
Moss Landing Sanitation District	Sanitation District	Pump Station	*	1456
Moss Landing Sanitation District	Sanitation District	Pump Station	Sandholdt Rd., Moss Landing, CA 95039	1456
Moss Landing Sanitation District	Sanitation District	Pump Station	10933 Potrero Rd., Moss Landing, CA 95039	1456
Pajaro Sanitation District	Sanitation District	Pump Station	230 Hall Rd., Pajaro, CA 95076	1456
Pajaro Sanitation District	Sanitation District	Pump Station	87 Oak Rd. Pajaro, CA 95076	1456
Pajaro Sanitation District	Sanitation District	Pump Station	13234 Heritage Rd. Pajaro, CA 95076	1456
Pajaro Sanitation District	Sanitation District	Pump Station	End of Colonial Rd. Pajaro, CA 95076	1456

Table T-1
Special District Facilities

Name	Category	Facility Type	Address	Insured Structural Value (x$1000)
Pajaro Sanitation District	Sanitation District	Pump Station	Corner of Bay Hill Rd. and Bay Farms Rd. Pajaro, CA 95076	1456
Pajaro Sanitation District	Sanitation District	Pump Station	538 Salinas Rd. Pajaro, CA 95076	1456

* Unknown and/or incomplete facility address location. Not included in vulnerability analysis.

Table T-2
Special District Facilities - Potential Hazard Vulnerability Analysis

Hazard	Methodology	MRWPCA		CAWD		Sanitation Districts		Fire Districts		MPAD		Total	
		No.	Value ($)[1]	No.	Value ($)[1]	No.	Value ($)[1]	No.	Value ($)[1]	No.	Value ($)[1]	No.	Value ($)[1]
Coastal Erosion	100-year erosion zone	0	0	0	0	0	0	0	0	0	0	0	0
Dam Failure	Inundation area	1	1,180	3	81,224	3	4,368	5	3,540	0	0	12	85,944
Earthquake	Extreme	0	0	0	0	2	2,912	1	708	0	0	3	708
	High	3	80,948	4	82,680	12	17,472	9	6,372	0	0	28	170,000
	Moderate	1	1,180	0	0	0	0	8	5,664	2	7,139	11	13,983
Flood	100-year flood zone	1	1,180	2	79,768	1	1,456	1	708	0	0	5	81,656
Hazardous Materials Event	1-mile buffer transport corridor	3	3,540	2	79,768	9	13,104	12	8,496	2	7,139	28	98,943
Landslide	High	0	0	0	0	0	0	1	708	0	0	1	708
	Moderate	0	0	0	0	0	0	2	1,416	0	0	2	1,416
Tsunami	Maximum average run-up	2	2,360	1	78,588	0	0	1	708	0	0	4	81,656
Wildland Fire	Very high	0	0	0	0	0	0	0	0	0	0	0	0
	High	0	0	0	0	0	0	3	2,124	0	0	3	2,124
	Moderate	2	2,360	4	82,680	11	16,016	15	10,620	2	7,139	34	102,799
Windstorm	Prevailing wind zone	0	0	0	0	1	1,456	2	1,416	0	0	3	1,416