Shasta County
and
City of
Anderson

Multi-Jurisdictional Hazard Mitigation Plan November 16, 2017

A Hazard Mitigation Plan is a pre-disaster strategic plan to guide how a community will lower its risk and exposure to disasters. Local agencies may receive Federal Emergency Management Agency (FEMA) funds for natural and technological hazards.

Prepared by: Shasta County Department of Public Works
1855 Placer Street
Redding, CA 96001
Phone: (530) 225-5661 Fax: (530)225-5667

This page intentionally left blank.

ACKNOWLEDGEMENTS

Shasta County Board of Supervisors

Mary Rickert

David A. Kehoe, Chair

Les Baugh

Leonard Moty

Steve Morgan

Anderson City Council

Susie Baugh, Mayor

Baron V. Browning

Norma Comnick

Melissa Hunt

James Yarbrough

Project Team Leaders

Sue Crowe, Shasta County Department of Public Works

Rachelle Russell, Shasta County Department of Public Works

Consultants

ENPLAN

Western Shasta Resource Conservation District

Shasta County Mission Statement

Shasta County meets the needs of our community through collaborative services provided with courteous, efficient professionalism while ensuring public trust.

City of Anderson Mission Statement

A community that cares about its residents… a community with pride!

This page intentionally left blank.

Contents

ACKNOWLEDGEMENTS

ACRONYMS

ESSENTIAL TERMINOLOGY

SECTION 1 INTRODUCTION 1-1

1.1 BACKGROUND 1-1

1.2 PURPOSE OF A LOCAL HAZARD MITIGATION PLAN 1-4

1.3 PLAN AUTHORITY 1-6

1.4 PLAN OUTLINE 1-6

1.5 SUMMARY OF 2015 PLAN UPDATES 1-7

SECTION 2 COMMUNITY PROFILE 2-1

2.1 LOCATION AND GEOGRAPHY 2-1

2.1.1 Physical Features 2-2

2.2 DEMOGRAPHICS 2-4

2.3 JURISDICTION PROFILE 2-5

2.3.1 Profile of Shasta County Government 2-5

2.3.2 Profile of the City of Anderson 2-6

SECTION 3 THE PLANNING PROCESS 3-1

3.1 OVERVIEW OF THE INITIAL PLAN DEVELOPMENT 3-2

3.1.1 Formation of the Steering Committee 3-2

3.1.2 Hazard Mitigation Meetings 3-4

3.2 THE PLANNING PROCESS 3-4

3.3 PUBLIC PARTICIPATION 3-5

3.4 INCORPORATION OF EXISTING PLANS OR STUDIES REVIEWED 3-8

3.5 2015 PLAN UPDATE PROCESS 3-9

3.5.1 Purpose of the Plan Update 3-9

3.5.2 Update Requirements 3-9

3.5.3 Documented Planning Process 3-10

SECTION 4 RISK AND VULNERABILITY ASSESSMENT 4-1

4.1 OVERVIEW OF THE RISK ASSESSMENT PROCESS 4-2

4.1.1 Identifying Hazards 4-3

4.1.2 Profiling Hazards 4-3
4.1.3 Identifying Assets 4-3
4.1.4 Assessing Vulnerability 4-4
4.1.5 Analyzing Development Trends 4-4
4.2 HAZARD IDENTIFICATION, SCREENING AND RANKING 4-4
4.2.1 List of Hazards 4-4
4.2.2 Hazard Identification Process 4-4
4.2.3 Hazard Identification Sources 4-6
4.2.4 Non-Profiled Hazards 4-6
4.2.5 Future Development and Critical Facilities 4-7
4.2.6 Critical Facilities Definition and Inventory 4-8
4.2.7 Hazard Ranking 4-9
4.3 HAZARD PROFILING, RISK AND VULNERABILITY ASSESSMENT 4-11
4.3.1 Flood 4-11
4.3.2 Wildfire 4-25
4.3.3 Extreme Weather 4-44
4.3.4 Earthquake 4-56
4.3.5 Hazardous Materials (Hazmat) 4-65
4.3.6 Volcano 4-73
4.3.7 Chemical, Biological, Radiological, Nuclear, & Explosive (CBRNE) 4-81
4.3.8 Pandemic/Epidemic 4-86
4.3.9 Multi-Casualty Incidents (MCI) 4-95
4.3.10 Dam Failure 4-103
4.4 ANALYSIS OF LAND USE 4-107
4.4.1 Shasta County 4-107
4.4.2 City of Anderson 4-122
4.5 ANALYSIS OF DEVELOPMENT TRENDS 4-122
4.5.1 Shasta County 4-122
4.5.2 City of Anderson 4-125
SECTION 5 GOALS, OBJECTIVES AND ACTIONS 5-1
5.1 OVERVIEW 5-2
5.1.1 Develop Mitigation Goals and Objectives 5-2

5.1.2 Mitigation Actions and Priorities 5-2
5.1.3 Evaluating Alternatives and Prioritizing Projects 5-4
5.1.4 Plan Implementation 5-4
5.1.5 Documentation of the Mitigation Planning Process 5-5
5.2 REGIONAL CONSIDERATIONS 5-5
5.3 COUNTY OF SHASTA 5-5
5.3.1 Capabilities Assessment 5-5
5.3.2 Goals, Objectives and Actions 5-22
5.4 CITY OF ANDERSON 5-43
5.4.1 Capabilities Assessment 5-43
5.4.2 Goals, Objectives and Actions 5-48
SECTION 6 PLAN MAINTENANCE PROCEDURES 6-1
6.0 INTRODUCTION 6-1
6.1 MONITORING, EVALUATING AND ENHANCEMENT 6-1
6.1.1 Plan Monitoring 6-1
6.1.2 Plan Evaluation 6-2
6.1.3 Plan Updates 6-2
6.1.4 Reporting Procedures 6-3
6.1.5 Implementation through Existing Programs 6-3
6.2 CONTINUED PUBLIC INVOLVEMENT 6-5

Listing of Tables

Section 2
Table 1. Industry Overview of Shasta County 2-4
Table 2. Population and Demographics of Shasta County 2-5
Section 3
Table 3. 2010 Initial Steering Committee Members 3-3
Table 4. 2010 Steering Committee Meetings 3-4
Table 5. Public Involvement in the Planning Process 3-6
Table 6. Public Participation in the Planning Process 3-6
Table 7. Plan Update Timeline 3-11
Table 8. 2015 Steering Committee Members 3-12
Table 9. SCHMP Mitigation Action Status 3-15
Section 4
Table 10. Summary of Hazard Identification Results 4-5
Table 11. Summary of Non-Profiled Hazards 4-7
Table 12. Historical Flood Peak Flows on Sacramento River 4-12
Table 13. Major Watersheds in Shasta County 4-16
Table 14. Average Replacement Values of Critical Facilities 4-19
Table 15. Potential Building Losses 4-20
Table 16. Damage to Essential Facilities Countywide 4-20
Table 17. History of Large Shasta County Fires 4-28
Table 18. Modified Mercalli Intensity and Peak Ground Acceleration (PGA) 4-58
Table 19. Expected Building Damage by Occupancy 4-60
Table 20. Total Agricultural Production Value - 2014 4-108
Section 5
Table 21. STAPLE Criteria Questions 5-4
Table 22. Shasta County Administrative and Technical Capacity 5-21
Table 23. Shasta County Legal and Regulatory Capability 5-21
Table 24. County of Shasta Fiscal Capability 5-22
Table 25. 2015 Proposed Mitigation Action Items - County of Shasta 5-38
Table 26. City of Anderson Administrative and Technical Capacity 5-47
Table 27. City of Anderson Legal and Regulatory Capability 5-48
Table 28. City of Anderson Fiscal Capability 5-48
Table 29. 2015 Proposed Mitigation Action Items – City of Anderson 5-57

Listing of Figures

Figure 4.3-1.A Shasta County Critical Facilities....4-20
Figure 4.3-1.B Floodplains and Critical Facilities....4-21
Figure 4.3-1.C South Central Urban Region Flood Hazard....4-22
Figure 4.3-1.D City of Anderson Flood Hazard....4-23
Figure 4.3-2.A Shasta County Fire History....4-28
Figure 4.3-2.B Direct Protection Areas....4-31
Figure 4.3-2.C Risk Levels for Shasta County Wildfires....4-32
Figure 4.3-2.E Fuel Reduction Planning Areas....4-41
Figure 4.3-2.F Fire Safe Council Fire Plan Base Map 2015....4-42
Figure 4.3-4.A Shasta County Earthquake Faults....4-57
Figure 4.3-4.B Historic Shasta County Earthquakes....4-58
Figure 4.3-4.C Earthquake Ground Shaking Potential....4-59
Figure 4.3-6.A Northern California Volcanic Hazards....4-74

Listing of Appendices

Appendix A Additional Federal and State Requirements
Appendix B References
Appendix 1 Shasta County Resolution Adopting the Multi-Jurisdictional Hazard Mitigation Plan
Appendix 2 City of Anderson Resolution Adopting the Multi-Jurisdictional Hazard Mitigation Plan
Appendix 3.A 2010 Steering Committee/Public Meeting Information
Appendix 3.B 2010 Survey and Summary of Responses
Appendix 3.C 2015 Steering Committee Meeting Notes
Appendix 3.D 2015 Public Meeting Information
Appendix 3.E 2016 Public Comment Period Information
Appendix 4.A 2010 Hazus MH Flood Reports
Appendix 4.B 2010 Hazus MH Earthquake Reports
Appendix 5.A 2010 Shasta County Mitigation Projects Implementation Matrix
Appendix 5.B 2010 Anderson Mitigation Projects Implementation Matrix
Appendix 5.C 2010 STAPLE/E Results

ACRONYMS

BFE	Base Flood Elevation
Cal EMA	California Governor's Office of Emergency Management Agency
Cal OES	California Governor's Office of Emergency Services
CAL FIRE	California Department of Forestry and Fire Protection
CBRNE	Chemical, Biological, Radiological, Nuclear, & Explosive
CDF	California Department of Forestry and Fire Protection
CFS	Cubic feet per second
CVP	Central Valley Project
DHS	Department of Homeland Security
DMA	Disaster Mitigation Act of 2000
DWR	California Department of Water Resources
FEMA	Federal Emergency Mitigation Assistance
FIRM	Flood Insurance Rate Map
FRAP	Fire Resource and Assessment Program
GIS	Geographic Information System
HAZMAT	Hazardous Materials
HMGP	Hazard Mitigation Grant Program
HMPC	Hazard Mitigation Plan Coordinator
LHMP	Local Hazard Mitigation Plan
MCI	Multi-Casualty Incident
NFIP	National Flood Insurance Program
NOAA	National Oceanic and Atmospheric Administration
SCHMP	Shasta County Hazard Mitigation Plan
SHMP	State Hazard Mitigation Plan
USBR	U.S. Bureau of Reclamation
USGS	U.S. Geological Survey
WUI	West Urban Interface

ESSENTIAL TERMINOLOGY

One of the difficulties in mitigation planning is confusion over the meaning of terms. The following discussion identifies key terms, their working definitions and their expanded meanings found in references consulted during exploration of this Plan.

For purposes of the Shasta County Hazard Mitigation Plan (SCHMP), the following working definitions are described briefly and, in some cases, accompanied by alternative definitions lending additional meaning from the law and natural hazards literature. One important source for these working definitions is a training handbook, *Planning for a Disaster-Resistant Community - September 2002*, prepared by the Federal Emergency Mitigation Assistance (FEMA) and the American Planning Association.

Catastrophe

In the Stafford Act, the definition of catastrophe implies an event of a magnitude exceeding available local and state response and recovery resources. In more recent history, the term catastrophic has been redefined by events such as the 9/11 World Trade Center disaster (September, 2001) and Hurricane Katrina (August, 2005) to mean disasters large enough to stretch national resources.

Disaster

Disaster refers to a major detrimental impact of a hazard upon the population and the economic, social and built environment of an affected area. Note that a variety of other definitions of disaster are found in the natural hazards literature and the law, including the following:

- An event concentrated in time and space, in which a society or one of its subdivisions undergoes physical harm and social disruption, such that all or some essential functions of the society or subdivision are impaired.
- The occurrence of a sudden or major misfortune which disrupts the basic fabric and normal functioning of a society or community.
- For declaring a disaster at the federal level, the Stafford Act provides the following definition of the term major disaster:
    - Any natural catastrophe (including any hurricane, tornado, storm, high water, wind-driven water, tidal wave, tsunami, earthquake, volcanic eruption, landslide, mudslide, snowstorm, or drought), or, regardless of cause, any fire, flood or explosion, in any part of the United States, which in the determination of the President causes damage of sufficient severity and magnitude to warrant major disaster assistance under this Act to supplement the efforts and available resources of states, local governments and disaster relief organizations in alleviating the damage, loss, hardship, or suffering caused thereby.

Hazard

An event or physical condition that has the potential to cause fatalities, injuries, property damage, infrastructure damage, agricultural losses, damage to the environment, interruption of business, or other types of harm or loss.

Mitigation

Sustained action taken to reduce or eliminate the long-term risk to human life and property from natural, human-caused and technological hazards and their effects. Note that this emphasis on long-term risk distinguishes mitigation from actions geared primarily to emergency preparedness and short-term recovery. Mitigation is predicated on the principles that many losses are preventable through better community design and that each event should teach us how to reduce losses in the next disaster. Mitigation generally means reducing long-term risk from hazards to acceptable levels through predetermined measures accompanying physical development, such as strengthening structures to withstand earthquakes, prohibiting or limiting development in flood-prone areas, clearing defensible space around residences in wildland-urban interface areas, or designing development away from areas of geological instability. Mitigation is different from emergency preparedness. The latter concentrates on activities that make a person, place or organization ready to respond to a disaster with emergency equipment, food, shelter, and medicine.

Natural vs. Human-Caused Disasters

Natural disaster refers to destructive events involving natural forces such as droughts, earthquakes, floods, hurricanes, landslides, mudslides, storms, tornados, tsunamis, high or wind-driven waters, wildfires, and volcanic eruptions. By contrast, human-caused disasters include acts of war and terrorism as well as disasters with a technological component such as dams and levee failures, nuclear accidents and radiological releases, major truck and rail transportation accidents, oil and other hazardous materials spills, and airplane crashes.

It is important to realize, however, that distinctions between natural, human-caused and technological disasters are often artificial when taking into account the human decisions underlying settlement patterns that conflict with natural hazards. For example, Hurricane Katrina on the Gulf Coast was both a natural and human-caused disaster involving the construction of urban areas over time in naturally hazardous areas below sea level only partially protected by construction of inadequate levees. To the extent that disaster losses could be made preventable through mitigation, natural disasters can also be considered human-caused.

Preparedness

Preparedness is making preparations before a disaster for what to do immediately after a disaster. Examples of preparedness include developing pre-disaster plans and information regarding who to contact and where to go after a disaster; what food, equipment and other emergency supplies to have ready and stored to enable quick action; what emergency communications measures should be available; how and where to evacuate people; and how to provide food, shelter, medical assistance, and basic services to disaster victims. It can also mean preparing for recovery, educating the public on personal and household preparedness and practicing disaster drills. Preparedness is sometimes confused with mitigation. However, it is distinguished from mitigation by its focus on immediate post-disaster action. Mitigation and preparedness go hand-in-hand. Where mitigation is insufficient to significantly reduce potential disaster losses, then preparedness becomes especially important. To the extent that time or financial resources preclude long-term mitigation of many hazards in the natural and social environment, then it becomes very important to undertake plans and actions to prepare for

emergencies, making it easier to respond to and recover. This interdependency is fundamental to the SCHMP.

Response
Actions taken to respond to the disaster, such as rescuing survivors, providing for mass evacuation, feeding and sheltering victims, and restoring communications.

Recovery
Restoring people's lives and creating new opportunities for the future. It includes such actions as restoration of essential transportation, utilities and other public services; repair of damaged facilities; provision of both temporary and replacement housing; restoration and improvement of the economy; and long-term reconstruction which improves the community.

Resilience
The term resilience is commonly defined as the ability of a system to absorb shock and maintain its structure and functions with a minimum of loss. Further, a resilient system is one that can resume pre-event functionality in a relatively short time. Thus, a community is resilient when it maintains continuity and recovers quickly despite disasters. This basic concept of resilience is expanded here to include two additional factors: (1) multiple geographic levels – cities, counties, regions, or states, and (2) the capacity of a city, county or state to adapt or transform itself during recovery to meet new challenges posed by changed conditions. The latter idea is captured in the commonly employed phrase —building back better.

For purposes of this Plan, resilience thus refers to the capacity of a community, region or state to: (1) survive a major disaster, (2) retain its essential structure and functions, and (3) adapt to post-disaster opportunities for transforming itself to meet new challenges. Resilience should be seen as an element of sustainability. Disasters destroy resources, making communities less sustainable or unsustainable, whereas resilience helps to protect resources. Resilience can be developed not only through mitigation, but also through its coordinated development and implementation with the other disaster management functions, including preparedness, response and recovery.

Risk
The potential losses associated with a hazard, defined in terms of expected probability and frequency, exposure and consequences. The International Standards Organization (ISO) defines risk as the combination of the probability of an event and its consequences, where:

- Probability is the extent to which an event is likely to occur.
- Event is the occurrence of a particular set of circumstances.
- Consequences are the outcome of an event.

Sustainability
Sustainability has come to be an over-arching concept within which disaster management takes place. A well-known definition of sustainability comes from the World Commission on Environment and Development which stated that sustainable development was that which meets the needs of the present

without compromising the ability of future generations to meet their own needs. This vision was articulated at a finer level by the National Commission on the Environment which suggested sustainability is a strategy for improving the quality of life while preserving the environmental potential for the future, of living off interest rather than consuming natural capital.

For purposes of this Plan, the term sustainability adds to these previous definitions the idea of preservation of resources – physical, social, economic, environmental, historical, and cultural – for the benefit of future generations. Thus, a community is inherently unsustainable if its resources are destroyed or dramatically altered by disasters. Sustainable cities are those that both consume and preserve resources in a way that allows them to exist for a long period of time. One of the paths to sustainability is through investment in strong disaster mitigation.

Vulnerability

Broadly means the level of exposure of human life and property to damage from natural and human-made hazards. This definition is expanded with a discussion of social vulnerability, which is described as partially the product of social inequalities—those social factors that influence or shape the susceptibility of various groups to harm, govern their ability to respond.

It is asserted that social vulnerability is also the product of place inequalities—those characteristics of communities and the built environment, such as the level of urbanization, growth rates and economic vitality, that contribute to the social vulnerability of places. Others expand on this vulnerability perspective, noting that disasters result not only from physical agents, but from a combination of three factors:

1. Disaster agent – whether a hurricane, earthquake, tornado, or some technological or human-induced event.
2. Physical setting affected by the disaster, including:
   a) Characteristics of the built environment (e.g., structures not built to survive the physical impact of the disaster agent).
   b) Environmental features that serve to either mitigate the effects of disasters or make them more severe (e.g., diminished wetlands that could have cushioned the impacts of Hurricane Katrina).
3. Population vulnerability, a complex construct that includes such factors as:
   a) Proximity to physical disaster impacts.
   b) Material resources (e.g., income and wealth).
   c) Race, ethnicity, gender, age.
   d) Knowledge concerning recommended safety measures.
   e) Factors associated with social and cultural capital, such as routine involvement in social networks that can serve as conduits for information and mutual aid, as well as knowledge that enables community residents to interact successfully with mainstream societal institutions.

SECTION 1
INTRODUCTION

This section provides a general introduction to the Shasta County and City of Anderson Multi-Jurisdictional Hazard Mitigation Plan and plan updates. It consists of the following subsections:

1.1 BACKGROUND
1.2 PURPOSE OF PLAN
1.3 PLAN AUTHORITY
1.4 PLAN OUTLINE
1.5 SUMMARY OF PLAN UPDATES

DMA 2000 PLANNING REQUIREMENTS: 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).

EXPLANATION. Adoption by the local governing body demonstrates the jurisdiction's commitment to fulfilling the mitigation goals and objectives outlined in the plan. Adoption legitimizes the plan and authorizes responsible agencies to execute their responsibilities. For final approval by FEMA, the Local Hazard Mitigation Plan must include a copy of the local governing body's resolution, adopting the plan.

ELEMENT A. Has the plan has been formally adopted by the local governing Body?

REQUIREMENT §201.6(d) (1). Plans must be submitted to the State Hazard Mitigation Officer for initial review and coordination. The State will then send the plan to the appropriate FEMA Regional Office for formal review and approval. (2) The Regional review will be completed within 45 days after receipt from the State, whenever possible.

1.1 BACKGROUND

Throughout northern California, people and property are at risk from a variety of hazards, in particular natural hazards such as wildland fires, floods, winter storms, drought, extreme heat, and earthquakes. The impact on families and individuals can be immense and damages to businesses can result in regional economic consequences. The time, money and effort to respond to and recover from these disasters divert public resources and attention from other important programs and problems.

Mitigation is commonly defined as sustained actions taken to reduce or eliminate long-term risk to people and property from hazards and their effects. Hazard mitigation focuses attention and resources on jurisdictional policies and actions that will produce successive benefits over time. The impact of expected yet often unpredictable natural and human-caused events can be reduced through planning. A mitigation plan states the aspirations and specific courses of action jurisdictions intend to follow to reduce vulnerability and exposure to future hazard events. This plan was formulated through a

systematic process centered on the participation of citizens, businesses, public officials, and other stakeholders, to the extent possible.

Disaster Mitigation Act 2000 (DMA 2000) Requirements

The DMA 2000, commonly known as the 2000 Stafford Act amendments, was approved by congress on October 10, 2000. On October 30, 2000, President Clinton signed the bill into law, creating Public Law 106-390. The DMA 2000 is the latest legislation to improve the hazard mitigation planning process. The new legislation reinforces the importance of mitigation planning and emphasizes planning for disasters before they occur. As such, the DMA 2000 establishes a pre-disaster hazard mitigation program and new requirements for the national post-disaster Hazard Mitigation Grant Program (HMGP). Section 322 of DMA 2000 specifically addresses mitigation planning at the state and local levels. It identifies new requirements that allow HMGP funds to be used for planning activities, and increases the amount of HMGP funds available to states that have developed a comprehensive, enhanced mitigation plan prior to a disaster. States and communities must have an approved mitigation plan in place prior to receiving post-disaster HMGP funds. Local and tribal mitigation plans must demonstrate that their proposed mitigation measures are based on a sound planning process that accounts for the risk to, and the capabilities of, the individual communities.

State governments have certain responsibilities for implementing Section 322, including:

- Preparing and submitting a standard or enhanced state mitigation plan.
- Reviewing and updating the state mitigation plan every three years.
- Providing technical assistance and training to local governments to assist them in applying for HMGP grants and in developing local mitigation plans.
- Reviewing and approving local plans if the state is designated a managing state and has an approved enhanced plan.

DMA 2000 is intended to facilitate cooperation between state and local authorities. It encourages and rewards local and state pre-disaster planning and promotes sustainability as a strategy for disaster resistance. This enhanced planning network is intended to enable local and state governments to articulate accurate needs for mitigation, resulting in faster allocation of funding and more effective risk reduction projects. FEMA prepared an Interim Final Rule, published in the Federal Register on February 26, 2002 (44 CFR Parts 201 and 206), which establishes planning and funding criteria for states and local communities. The Plan has been prepared to meet the FEMA and the Governor's Office of Emergency Services (Cal OES) requirements thus making the County of Shasta and the City of Anderson eligible for funding and technical assistance from state and federal hazard mitigation programs, such as HMGP, Pre-Disaster Mitigation-Competitive and Flood Mitigation Assistance programs.

Executive Order W-9-91 required the director of Cal EMA (renamed Cal OES in October 2013) to prepare the California State Emergency Plan and to coordinate activities of all state agencies during the

preparedness and response phases of emergencies. Subsequent standing administrative orders require hazard mitigation as part of emergency planning activities. The State Hazard Mitigation Plan of 2010 (SHMP) provides a common database and assessment concerning hazards, vulnerabilities and risk from natural and human caused hazards for the State's Emergency Plan, and a variety of related operational emergency plans.

The state has undertaken particularly significant mitigation planning efforts for California's three primary impact disaster sources: earthquakes, floods and wildfires. These hazard-specific mitigation plans are the California Earthquake Loss Reduction Plan, the California Fire Plan and the State Flood Hazard Mitigation Plan

Through Cal OES, the state has implemented a program to promote and support local hazard mitigation planning (LHMP) and local participation in state hazard mitigation planning. Cal OES assists and supports local governments in the development LHMPs and tracks the progress and effectiveness of plan updates and projects. The goal of the LHMP program is for all local governments in California to have a FEMA-approved LHMP.

The vision of the SHMP is a safe and resilient California and Shasta County through hazard mitigation. The mission of the SHMP is to integrate current laws and programs into a mitigation system that will guide the state in significantly reducing potential casualties and damage as well as the physical, social, economic, and environmental disruption from disasters.

The general purpose of the 2010 SHMP is to:

1. Significantly reduce life loss and injuries.
2. Minimize damage to structures and property, as well as disruption of essential services and human activities.
3. Protect the environment.
4. Promote hazard mitigation as an integrated public policy.

The SHMP includes vision, mission, goals, and objectives statements within a broader strategic framework which identifies the basis for setting mitigation priorities and using state and local capabilities to achieve outcomes which are consistent. The SHMP maintains and provides for continued progress on the following eight key strategies for action established by the 2010 SHMP:

1. Adopt legislation formalizing California's comprehensive mitigation program.
2. Strengthen inter-agency coordination actions, including state and local linkages.
3. Broaden public and private sector mitigation linkages.
4. Set targets for measuring future action progress.
5. Enhance data systems and geographical information system (GIS) modeling.
6. Establish a mitigation registry for communicating progress.
7. Expand mitigation project loss avoidance tracking through the State Mitigation Assessment Review Team (SMART) system.
8. Connect mitigation planning with regional planning.

The objectives of the SHMP program are to:

- Integrate hazard mitigation activities in all pertinent local government programs.
- Maximize the use of hazard mitigation resources, grants and funds to reduce the impact of future disasters at the local level.
- Maintain collaborative and cooperative relationships with local emergency managers, land use planners and the scientific and technical communities involved in hazard mitigation.
- Provide technical assistance and guidance to local governments to improve hazard risk assessments, mitigation project identification and analysis, and the development of local hazard mitigation plans.
- Improve communications with stakeholders, legislators and special interest groups involved in hazard mitigation.
- Continue to enhance Cal OES regional and operational area capability and coordination.
- Develop a statewide program of support for hazard identification and analysis and a risk-based approach to project identification, prioritization and support for local governments.

Within the state and county/city planning framework, key considerations in developing mitigation planning strategies include:

- Compatibility between state and community goals.
- Legal authority.
- Ability to implement and enforce mitigation actions.
- Technical feasibility.
- Financial capability.
- Priority level of the proposal project among the hazards addressed.
- Completeness of the solution.

1.2 PURPOSE OF A LOCAL HAZARD MITIGATION PLAN

The County of Shasta (County) and the City of Anderson (City), together the Jurisdictions, recognize the consequences of disasters and the need to reduce the impacts of natural hazards. The elected and appointed officials of the County and City also know that with careful selection, mitigation actions in the form of projects and programs can become long-term, cost effective means for reducing the impact of natural hazards. The purpose of hazard mitigation is to implement and sustain actions that reduce vulnerability and

risk from hazards, or reduce the severity of the effects of hazards on people and property. Mitigation actions are both short-term and long-term activities, which reduce the cause or occurrence of hazards; reduce exposure to hazards, or reduce effects of hazards through various means to include preparedness, response and recovery measures. Effective mitigation actions will also reduce the adverse impact and costs of future disasters. The Shasta County Multi-Jurisdictional Hazard Mitigation Plan (SCHMP) or (Plan) includes resources and information to assist in planning for hazards. The Plan provides a list of actions that may assist the Jurisdictions in reducing risk and preventing loss from future hazard events.

The emphasis of the SCHMP is on the assessment and avoidance of identified risks, implementing loss reduction measures for existing exposures, and insuring critical services and facilities survive a disaster. Hazard mitigation strategies and measures avoid losses by limiting new exposures in identified hazard areas, alter the hazard by eliminating or reducing the frequency of occurrence, avert the hazard by redirecting the impact by means of a structure or adapt to the hazard by modifying structures or standards.

This federal law and associated regulation establishes planning and funding criteria for states and local communities. The SCHMP is intended to serve many purposes, including:

Enhance Public Awareness and Understanding to help residents of Shasta County and the city of Anderson to better understand the natural hazards that threaten public health, safety and welfare; economic vitality; and the operational capability of important institutions.

Create a Decision Tool for Management to provide information that managers and leaders of local government, business and industry, community associations, and other key institutions and organizations need to take action to address vulnerabilities to future disasters.

Promote Compliance with State and Federal Program Requirements to insure that the County and City can take full advantage of state and federal grant programs, policies and regulations that encourage or mandate that local governments develop comprehensive hazard mitigation plans.

Enhance Local Policies for Hazard Mitigation Capability to provide the policy basis for mitigation actions that should be promulgated by participating jurisdictions to create a more disaster-resistant future.

Provide Inter-Jurisdictional Coordination of Mitigation-Related Programming to ensure that proposals for mitigation initiatives are reviewed and coordinated among the participating jurisdictions.

Achieve Regulatory Compliance to qualify for certain forms of federal aid for pre- and post-disaster funding; local jurisdictions must comply with the federal DMA 2000 and its implementing regulations (44 CFR Section 201.6).

DMA 2000 intends for hazard mitigation plans to remain relevant and current. It requires that SHMPs are updated every three years and local plans, including this SCHMP, every five years. This means that the SCHMP will use a five-year planning horizon. It is designed to carry the Jurisdictions through the next

five years, after which its assumptions, goals and objectives will be revisited and the Plan resubmitted for approval.

It is the intent of the Jurisdictions that the SCHMP will be used as a tool for all stakeholders to increase public awareness of local hazards and risks, while at the same time providing information about options and resources available to reduce those risks. Teaching the public about potential hazards will help the Jurisdictions protect against the effects of the hazards, and will enable informed decision making on where to live, play and locate homes and businesses.

The SCHMP was prepared with input from County and City departments, residents of Shasta County and the city of Anderson, responsible officials, and consultants (ENPLAN Environmental Scientists and Planners and Western Shasta Resource Conservation District) with the support of the State of California Emergency Management Agency (Cal OES). The process to develop the original Plan included nearly one year of coordination with representatives from various jurisdictions, agencies, organizations and the general public throughout Shasta County. The SCHMP will guide the Jurisdictions toward greater disaster resistance in harmony with the character and needs of its residents.

1.3 PLAN AUTHORITY

This Plan was prepared in accordance with current federal rules and regulations governing local hazard mitigation plans. The Plan shall be monitored and updated on a routine bases to maintain compliance with the following legislation: Section 409 of the Robert T. Stafford Disaster Relief and Emergency Assistance Act of 1988 (Stafford Act) and Section 322 of the DMA 2000. This includes complying with the requirement that the Plan be adopted by the Shasta County Board of Supervisors and the Anderson City Council within one year of FEMA's notification of approval pending adoption.

1.4 PLAN OUTLINE

The SCHMP is divided into six sections. Each section is described briefly below. The Plan also includes numerous appendices and supplemental items that are not included in the body of the Plan.

Section 1-Introduction provides an overview of hazard mitigation, the purpose of the Plan and the Plan's authority.

Section 2-Community Profile provides the background and general overview of Shasta County and the City of Anderson's planning area and community-specific descriptions for each Jurisdiction.

Section 3-Planning Process provides an overview of the planning processes used to develop and update the Plan, including how it was prepared and who was involved. It also describes how the public was involved and summarizes the review and incorporation of existing plans, studies, reports and technical information.

Section-4 Risk and Vulnerability Assessment describes the process for which potential hazards were identified. Information collected includes historical data on hazard events that have occurred in the county and city and how these events affected the area and its residents.

Section 5-Goals, Objectives and Actions defines and explains the development of mitigation goals and objectives and how the goals, objectives and projects were prioritized.

Section 6-Plan Maintenance Procedures describes the formal process that will ensure that the Plan remains active and a relevant document, including continued public participation.

1.5 SUMMARY OF 2015 PLAN UPDATES

The Plan update process involved a comprehensive review, update and modernization of each section and subsection of the 2010 Plan. The following Plan highlights were significant changes from the 2010 Plan:

Section 1

- ✓ Updates the Introduction section to include the Plan outline and summary of plan updates
- ✓ Moved community descriptions to Section 2 – Community Profile

Section 2

- ✓ Developed new Community Profile section (Section 2) formerly in Section 1
- ✓ Updated population and demographics tables with 2014 U.S. Census Bureau estimates
- ✓ Moved Jurisdiction infrastructure discussion to Section 5 to eliminate redundancy

Section 3

- ✓ Expanded section to include update process and update requirements
- ✓ Added past mitigation action table with discussion on previous plan mitigation action progress
- ✓ Added discussion on ShakeCast earthquake-shaking application

Section 4

- ✓ Revised discussion on Fire Safe Councils
- ✓ Expanded discussion on California's drought, water shortage and climate change
- ✓ Expanded discussion on seasonal flooding
- ✓ Added diseases under the pandemic/epidemic subsection
- ✓ GIS maps updated

Section 5

- ✓ Added discussion on bridge scour action plan
- ✓ Added bridge critical facilities maps
- ✓ Removed obsolete or completed mitigation action items
- ✓ Replaced action item format with action item matrix

Section 6

- ✓ Added plan update and reporting procedure subsections
- ✓ Discussion on Plan implementation in other planning documents

This page intentionally left blank.

SECTION 2
COMMUNITY PROFILE

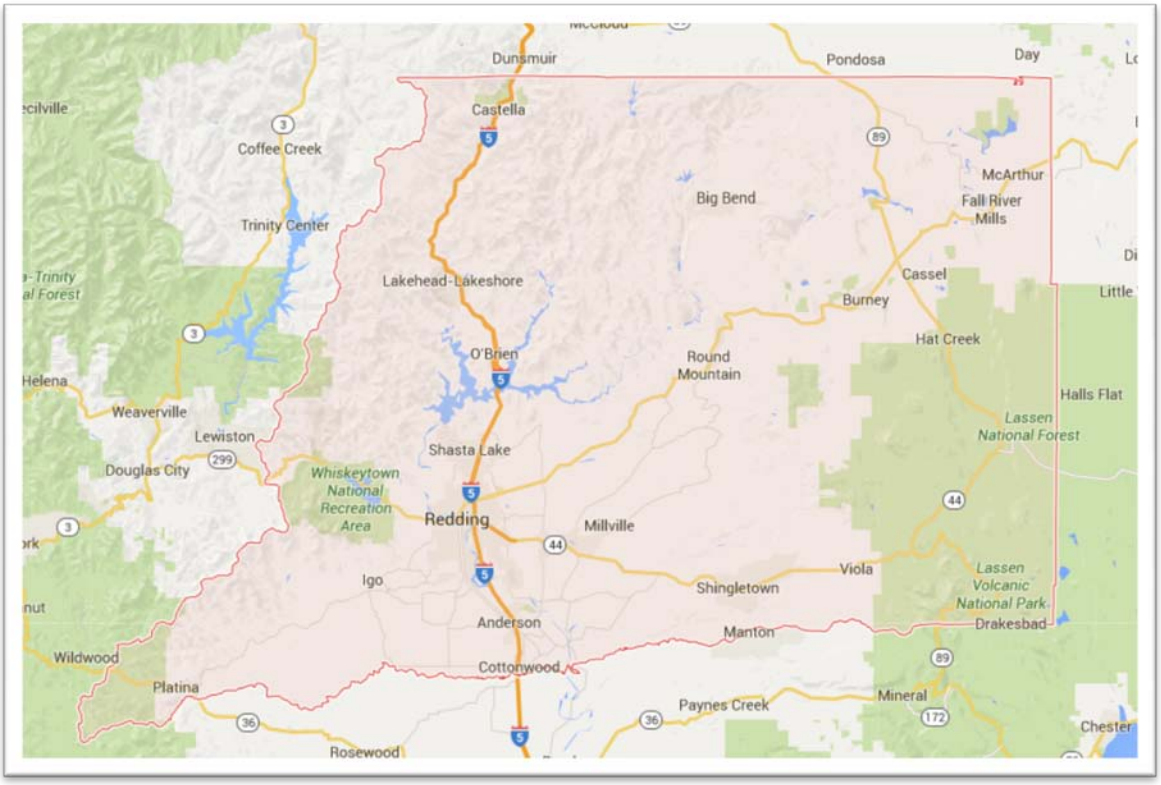
This section provides a background and general overview of the planning area, and community-specific descriptions for each jurisdiction. It consists of the following subsections:

2.1 LOCATION AND GEOGRAPHY
2.1.1 PHYSICAL FEATURES
2.2 DEMOGRAPHICS
2.3 JURISDICTION PROFILE
2.3.1 SHASTA COUNTY
2.3.2 CITY OF ANDERSON

2.1 LOCATION AND GEOGRAPHY

Shasta County is located at the northern end of the Sacramento Valley, equal distance between San Diego and Seattle on Interstate 5 (I-5), 160 miles north of Sacramento and 230 miles north of San Francisco. Shasta County was one of the original counties of California, created in 1850 at the time of statehood. Parts of Shasta County's territory were given to ty in 1852 and to Tehama County in 1856.

Shasta County includes three incorporated cities and many unincorporated communities. Shasta



County's metro area lies on both sides of the Sacramento River on I-5 and is supported by all major transportation systems. A thorough discussion on land use and development trends is included in subsection 4.4.

2.1.1 Physical Features

Shasta County was named after Mount Shasta, a stratovolcano located at the southern end of the Cascade Mountain Range. Originally Mount Shasta was within Shasta County, but it is now part of Siskiyou County, to the north. Its 14,179 foot peak is visible throughout most of Shasta County. The name Shasta is derived from the English equivalent for the name of a Native American tribe that once lived in the area. The name of the tribe was spelled in various ways until the present version was used when Shasta County was established.

According to the U.S. Census Bureau, Shasta County has a total area of 3,847 square miles of which 3,785 square miles are land and 62 square miles are water. Mountains line Shasta County on the east, north and west. The Sacramento River flows out of the mountains to the north, through the center of Shasta County, and toward the Sacramento Valley to the south.

Mountains

California's geography is largely defined by its central feature—the Central Valley, a huge, fertile valley between the Coastal and the Sierra Nevada Mountain Range. The northern part of the Central Valley is called the Sacramento Valley, after its main river. The Central Valley is watered by mountain fed rivers (notably the Kings and Sacramento) that drain to the San Francisco Bay system. Shasta County is situated where the Central Valley of California meets the convergence of the Klamath and Coastal Mountain Ranges to the northwest and west, with the Cascade Mountain range to the northeast and east. Shasta County lies at the northern end of the Central Valley and has the unique distinction of having three different mountain ranges flow into the county; the Sierra Nevada, the Cascade and the Coastal. Coniferous forest is the predominant vegetation in the mountainous regions of Shasta County. Other areas of Shasta County are characterized by cultivated and pasture lands, oak woodlands and grasslands. The major wildlife resources of Shasta County include deer, waterfowl and fish.

In Shasta County, the Central Valley area includes the cities of Anderson, Redding and Shasta Lake. The climate is described as Mediterranean, with hot, dry summers and cool, wet winters. In January, the average temperatures range from 36 to 55 degrees. In April, the average daily high is 70 degrees with an average daily low of 46 degrees. During July, the temperatures range from 65 to 99 degrees, with an average of

45 days in the summer that exceed 100 degrees. Annual rainfall averages 33 inches, most of which falls between November and March.

The Sierra Nevada Mountain Range in the eastern section of Shasta County is part of a mountain range that runs north–south for 400 miles. The topography of the Sierra Nevada is shaped by uplift and glacial action. The Sierra Nevada has 200–250 sunny days each year, warm summers, fierce winters, and varied terrain, a rare combination of rugged variety and pleasant weather. During the fall, winter and spring, precipitation in the Sierra Nevada ranges from 20 to 80 inches where it occurs mostly as snow above 6,000 feet (ft). Summers are dry with low humidity; however, afternoon thunderstorms are not uncommon, particularly during the North American monsoon. Summer high temperatures average 42 to 90 degrees. The growing season lasts 20 to 230 days, strongly dependent on elevation. The Sierra Nevada snowpack is the major source of water and a significant source of electric power generation in California.

The Cascade Mountain Range is a mountainous region stretching from British Columbia in Canada down to the northern part of California where it meets the Sierra Nevada Mountain Range at the Fall River Valley. The Cascades are part of the Pacific Ring of Fire, the ring of volcanoes around the Pacific Ocean. Lassen is the most southerly active volcano of the Cascade chain. This region is located in the northeastern section of the state bordering Oregon and Nevada, mostly north of the Central Valley and the Sierra Nevada mountain range.

The Coastal Mountain Range segment identified as the Trinity Mountains are located between Trinity Lake and Lake Shasta, also called Shasta Lake. The range lies in a southwest-northeasterly direction about 17 miles northwest of Redding and stretches over a distance of 30 to 35 miles. The Chappie-Shasta Off-Highway Vehicle Area lies between the Trinity Mountains and Shasta Lake. Peaks range from about 4,000 ft. at the southern end of the mountains, to more than 7,200 ft. The Trinity Mountains contain significant forested areas including stands of Black oak, Blue oak and Douglas-fir.

Large Lakes and Reservoirs

Lake Shasta lies fifteen miles north of Redding with 365 miles of shoreline consisting of many arms and inlets, which make it a paradise for explorers and boaters alike. The four major arms of the lake, the Sacramento, McCloud, Squaw Creek, and Pit, offer spectacular scenery as well as unusual geologic and historic areas of interest. Shasta Lake is an artificial lake created by the construction of Shasta Dam across the Shasta-Trinity National Forest between 1935 and 1945. With a capacity of 4,552,000 acre-ft at full pool, the lake has an elevation of 1,067 ft. and a surface area of 30,000 acres, making it California's largest reservoir and its third largest body of water. The lake has a mostly steep mountainous shoreline covered with tall evergreen trees and manzanita. The maximum depth is 517 ft. Known as the keystone of the Central Valley Project (CVP), outflow from Shasta Dam provides electricity and irrigation for widespread areas of California below the dam as well as flood control for the Sacramento River during the rainy season.

The Keswick Dam functions as an after-bay (regulating reservoir) for Shasta Dam and also generates power. The CVP is a complex operation of interrelated divisions. Shasta Dam acts as a flood control dam

for the Sacramento River. Shasta Lake stores water for controlled releases downstream. The Trinity River Division diverts surplus water from the Trinity River, in the Klamath River Basin, into the Sacramento River. Water from the Trinity River Division enters the Sacramento at Keswick Reservoir in the Shasta Division. Downstream from the Shasta Division, the Sacramento River Division supplies Sacramento River water for irrigation to Tehama, Glenn, Colusa, and Yolo Counties. Releases from the Shasta Division help control salinity in the Delta Division.

Whiskeytown Lake is located eight miles west of Redding in the Whiskeytown National Recreation Area, a portion of the larger Shasta-Trinity Recreation Area. It is formed by Whiskeytown Dam on Clear Creek as part of the Bureau of Reclamation's (USBR) CVP to provide water for agriculture. Additional water comes from Whiskey Creek and from the Lewiston Reservoir, which is supplied by the Trinity River via the Clear Creek Tunnel from the bottom of Trinity Lake. As the water enters and exits Whiskeytown Lake through a series of tunnels and penstocks, it generates hydroelectricity through the Judge Francis Carr and Keswick Powerhouses. Whiskeytown Lake, located at the junction of the Klamath Mountain range and the northern edge of the Sacramento Valley, is home to a unique collection of animal and plant life. Whiskeytown Lake provides 36 miles of shoreline and 3,200 surface acres for recreational use. Whiskeytown has relatively stable water levels and less water traffic than other area lakes, making it the perfect home for Largemouth, Smallmouth and Spotted bass. This lake is known for its Kokanee salmon and year-round Brook and Rainbow trout population for shore anglers. Other local fish include Sunfish, Catfish and Sacramento Pikeminnow.

2.2 DEMOGRAPHICS

The industry overview of Shasta County (September, 2015) in non-agricultural employment is shown in Table 1 below. Education and health services are the largest employment sector, followed by government.

Table 1. Industry Overview of Shasta

Industry	Total	Percent
Educational and health services	14,200	22.1%
Government	13,000	20.2%
Trade, transportation and utilities	12,100	18.8%
Leisure and hospitality	7,000	10.8%
Professional and business services	6,600	10.3%
Mining, logging and construction	3,200	5.0%
Financial activities	2,600	4.0%
Other services	2,500	3.9%
Manufacturing	2,400	3.8%
Information	700	1.1%
Total Non-Farming Industries	64,300	100.0%

Source: State of California Employment Development Department

The county's demographics based on the July 1, 2014 U.S. Census Bureau statistics are shown in Table 2 below:

Table 2. Population and Demographics of Shasta County		
People	**Shasta County**	**California**
2014 Population Estimate*		
City of Redding	91,593	
City of Anderson	10,209	
City of Shasta Lake	10,166	
Unincorporated area	67,836	
Total County population	179,804	38,802,500
Population increase from 2010	1.5%	4.2%
Percent of California's total population	4.6%	
Race and Origin*		
White alone	88.5%	73.2%
Black or African American	1.1%	6.5%
American Indian or Alaska Native	3.1%	1.7%
Asian	3.0%	14.4%
Native Hawaiian and Other Pacific Islander	0.2%	0.5%
Hispanic or Latino	9.4%	38.6%
Housing*		
Persons per household	2.54	2.94
Median household income	$44,651	$61,904
Persons below poverty level	17.5%	15.9%
Employment**		
Unemployment rate (September 2015)	6.4%	5.5%
Source: www.quickfacts.census.gov **U.S. Bureau of Labor Statistics*		

The county's median household income of $44,651, as reported by the U.S. Census Bureau, only slightly increased from the 2010 Plan. In 2014 the median income for residents of Shasta County was approximately 28 percent lower than California's median income.

2.3 JURISDICTION PROFILE

2.3.1 Profile of Shasta County Government

As required by state and federal mandate, the County is responsible at the local level for activities involving public welfare, health and justice (including jails) and for the maintenance of public records. The County also provides services such as law enforcement and public works to cities within the county on a cost-recovery contract basis. The County also operates recreational and cultural facilities serving both the incorporated and unincorporated areas of the county.

A five-member County Board of Supervisors (Board) is the legislative authority and governance for the County. Each supervisor is elected to a four year term in nonpartisan districts. The terms are staggered with two supervisors being elected then three supervisors being elected in alternating election years. The Board is responsible among other things, for establishing ordinances, adopting the budget, appointing committees, and hiring the County Executive Officer (CEO) and non-elected department heads. The CEO is responsible for carrying out the policies and ordinances of the

Board and for overseeing the day-to-day operations of the County. The County has six elected department heads responsible for the offices of the Auditor-Controller, Treasurer-Tax Collector-Public Administrator, Assessor-Recorder, Clerk/Registrar of Voters, District Attorney and Sheriff-Coroner.

The following is a summary of departments in the County and their responsibilities related to hazard mitigation planning and implementation, as well as existing planning documents and regulations related to mitigation efforts within the community. Specific resources reviewed include those involving technical personnel such as planners with knowledge of land development and land management practices, engineers trained in construction practices related to building and infrastructure, planners and engineers with an understanding of natural or manmade hazards, floodplain managers, surveyors, personnel with GIS skills and scientists familiar with hazards in the community. Only departments with a possible role in implementation of the Plan are listed. Many of the programs and plans of these departments, with applicability and links to loss reduction efforts, are detailed in subsection 5.3.

The departments within the County that will have a significant role in implementing the Plan are:

- Shasta County Department of Resource Management
  - Air Quality Management District
  - Building Division
  - Environmental Health and Community Education
  - Planning
- Health and Human Services Agency - Public Health
- Public Works
- Shasta County Fire
- Shasta County Sheriff's Office, Office of Emergency Services
  - Emergency Command Center
  - Shasta Cascade Hazard Materials Response Team

2.3.2 Profile of the City of Anderson

The city lies in the south county area, eight miles south of Redding. In 2014 the city had a population of 10,209 in an area of 6.37 square miles. The city is nestled at the northern end of the Great Central Valley along the Sacramento River.

The following is a summary of City departments and their responsibilities related to hazard mitigation planning and implementation, as well as existing planning documents and regulations related to mitigation efforts within the community. Only departments with a possible role in implementation of the Plan are listed. Many of the programs and plans of these departments, with applicability and links to loss reduction efforts, are detailed in subsection 5.4.

Public Works. The City's Public Works Department builds and maintains the infrastructure and provides a variety of services to the residents of Anderson. The department consists of three divisions, (1) the Engineering and Administration division, (2) the Streets division, which includes, storm drains, landscape and lighting, and water systems, and (3) the Wastewater Division. The various divisions of the

department perform construction and maintenance of streets, sidewalks, storm drains, traffic signs, landscaping, and a water system that delivers two million gallons of quality drinking water daily to city residents. The Wastewater Division treats both industrial and residential waste.

Development Services Division. The Planning and Building Divisions develop guiding policies in the City's General Plan, and regulate new construction through zoning, building permits, subdivision regulations, code enforcement and community design guidelines.

Police Department. The Police Department is organized into two divisions: Field Services and Support and Administrative Services. Each of these divisions plays an integral part in the operation of the Police Department. The department has 31 full-time, two part-time, and one extra help employees, which are focused on providing community-oriented policing principles.

Fire District. The city is served by the Anderson Fire Protection District, a combination paid and volunteer department. The Anderson Fire Protection District is an all-risk department serving a diverse and rapidly growing area in southern Shasta County responding to 2,089 calls in 2009. The fire district covers the city as well as some unincorporated areas outside the city limits. The district provides mutual and automatic aid to Cottonwood Fire District as well as CAL FIRE and works very close with the City on building projects.

This page intentionally left blank.

SECTION 3
THE PLANNING PROCESS

This section provides an overview of the planning processes used to develop and update the Plan, including how it was prepared and who was involved. It also describes how the public was involved, and summarizes the review and incorporation of existing plans, studies, reports, and technical information. It consists of the following subsections:

3.1 OVERVIEW OF THE INITIAL PLAN DEVELOPMENT
- **3.1.1 FORMATION OF STEERING COMMITTEE**
- **3.1.2 HAZARD MITIGATION MEETINGS**

3.2 THE PLANNING PROCESS

3.3 PUBLIC PARTICIPATION

3.4 INCORPORATION OF EXISTING PLANS OR STUDIES REVIEWED

3.5 PLAN UPDATE PROCESS
- **3.5.1 PURPOSE OF THE PLAN UPDATE**
- **3.5.2 UPDATE REQUIREMENTS**
- **3.5.3 DOCUMENTED PLANNING PROCESS**

DMA 2000 PLANNING REQUIREMENTS

REQUIREMENT §201.6(b) and §201.6(c)(1) Requires that there be an open public involvement process in the formation of the plan. This includes opportunities for the public to comment on the plan at all stages of its formation, and the involvement of any neighboring communities, interested agencies, or private and non-profit organization. This should also include a review of any existing plans or studies and incorporation of these if appropriate. Documentation of the planning process, including how the plan was prepared, who was involved in the process, and how the public was involved is essential.

EXPLANATION. A description of the planning process should include how the plan was prepared, who was involved in the planning process, and the timeframe for preparing the plan. The plan should document how the planning team was formed and the number and outcomes of the meetings the planning team held. Ideally, the local mitigation planning team is composed of local, state and federal agency representatives, as well as community representatives, local business leaders and educators. In addition to the core team preparing the plan, it is also important to indicate how the public (residents, businesses and other interested parties) participated, including what means (e.g., web pages, storefronts, toll free phone lines, etc.) were made available to those who could not attend public forums to voice concerns or provide input during the planning process.

ELEMENTS:

A. Does the plan provide a description of how the plan was prepared?
B. Does the plan indicate how the planning team was formed (including who was involved)?
C. Does the plan indicate how the public was involved in the process?
D. Does the planning process describe what means were made available to those who could not attend public meetings to provide input?

3.1 OVERVIEW OF THE INITIAL PLAN DEVELOPMENT

The jurisdictions involved in the initial development of the 2010 Plan are Shasta County (County) and the City of Anderson (City). The Cities of Redding and Shasta Lake and the Shasta Lake Fire Protection District currently have plans in place. Representatives from all areas of Shasta County as well as local business, various public and private non-profit agencies, media, and the general public, were invited to provide input during plan preparation. Representatives included, but were not limited to, fire chiefs/officials, police chiefs/officials, planners and other Jurisdictional officials and staff.

3.1.1 Formation of the Steering Committee

The County established an initial steering committee (Committee) to facilitate the development of the 2010 Plan. The County retained ENPLAN Environmental Scientists and Planners and Western Shasta Resource Conservation District (WSRCD) as consultants in the development of the 2010 Plan. The City participated in the County-established Committee to facilitate the development of the Plan. A representative from the County was designated as the Committee chair and Hazard Mitigation Plan Coordinator (HMPC).

The Committee identified the specific hazards/risks of concern and prioritized hazard mitigation measures. The Committee members brought information to meetings to provide input to the planning effort and to assure that all aspects of the County and City concerns were addressed.

The initial Committee was formed in April 2010. Table 3 on the following page, includes a list of all participants who served on the 2010 Committee.

Committee members were provided an overview of hazard mitigation planning elements at the meetings, which led the members through the process of defining the Jurisdiction's assets, vulnerabilities, capabilities, goals and objectives, and action items. The County, with support from its consultants, was responsible for facilitating the planning process and developing the hazard identification and risk assessment with input from the Committee. The Committee was responsible for setting goals and objectives, conducting a capabilities assessment and developing mitigation strategies or action plans as outlined in Section 5.

Table 3. 2010 Initial Steering Committee Members			
Entity	**Name**	**Position**	**Invited to Participate Via***
County			
Resource Management	Jim Whittle	Senior Environmental Health Specialist	Letter
Public Works Department	Jan Bulinski	Senior Planner	Email
	Al Cathey	Supervising Engineer, Development Services	
	Dan Little	Chief Public Works Planner	
	Troy Bartolomei	Deputy Director, Operations	
Public Health Department	Dave Maron	Program Manager	Letter
	Nicole Bonkrude	Community Education Specialist	
	Traci Niemela	Supervising Public Health Microbiologist	
Sheriff's Department	David Dean	Captain, Services Division	Letter
Cities			
City of Anderson	Jeff Kiser	Public Works Manager	Letter
	Dave Durette	Interim Deputy Public Works Director	
City of Redding	Lily Toy	Planner	Letter
	John Kaylor	Deputy Fire Chief	
	Kevin Kreitman	Fire Chief	
City of Shasta Lake	Jeff Tedder	City Engineer	Letter
	Fred Castagna	Public Works Director	
Federal Agencies			
USDA Forest Service	John Heibel	RAC Coordinator	Letter
Bureau of Land Management	Ron Kingsley	Area Manager	Letter
	Jeremy Strait	Fire Specialist	
Bureau of Reclamation	Brian Pearson	Area Manager	Letter
State Agencies			
Highway Patrol	Scott MacGregor	Chief State Security Division	Letter
	Jerry Flavin	Captain	
	Mark Mezzano	Sergeant	
Caltrans	Lance Brown	Maintenance Engineer	Letter
	Kurt Schneider	Engineer	
	Scott White	Senior Planner	
Department of Water Resources	Dwight Russell	Principal Engineer	Letter
	Curtis Anderson	Engineer	
CAL FIRE	Fred Tulley	Chief, Northern Region	Letter
	Jim Diehl	Battalion Chief	
CAL EMA	Jami Childress-Byers		Letter
Native American Tribal Government			
Pit River Tribe	Brian Babbini	Planner	Unknown
Redding Rancheria	Sandy Long		Unknown
Special Districts/Consultants			
Western Shasta Resource Conservation District (WSRCD)	Mary Mitchell	District Manager	Letter
	Dave DeMar	GIS Specialist	
	Rachel Aschbacher	Project Coordinator	
ENPLAN	Todd Burciaga	GIS Manager	Email
	Clay Guzi	Environmental Scientist	
***See Appendix 3.A for example of letter sent**			

The Committee members also participated in the public workshops held to present the risk assessment, preliminary goals, objectives and actions. In addition, several members met with consultants specifically to discuss hazard-related goals, objectives and actions. Preliminary goals, objectives and actions developed by Jurisdiction staff were then reviewed by the Committee.

Throughout the planning process the Committee members were given maps of the profiled hazards that illustrated the profiled hazards and critical facilities. In collaboration with the Jurisdictions departments, the Committee completed Section 4, the Risk and Vulnerability Assessment and Section 5, Goals, Objectives and Actions.

3.1.2 Hazard Mitigation Meetings

During the 2010 planning process, the Committee met four times between April 1, 2010 and January 11, 2011, and convened conference calls with members when needed. Topics and agendas covered the steps in the planning process, data collection, capabilities assessment, hazard identification, profiling and vulnerability assessment, goals and objectives, mitigation strategies and prioritization of strategies. The Committee coordinated and consulted with other entities and stakeholders throughout the process.

Table 4 identifies the dates the Committee and its subgroups met and the topics covered during the meetings. See Appendix 3.A for sign-in sheets, meeting agendas and meeting minutes. Other meetings included individual meeting with Jurisdictions, presentations to local planning teams/city councils, and public hearings for adoption of the Plan.

Table 4. 2010 Steering Committee Meetings

Dates	Topics of Discussion
4/1/10	Kick-off meeting; HMP requirements; process and schedule; role of members; goals; repetitive losses; primary hazards fire and flood; sources of information and data.
5/6/10	HAZUS-MH program outputs for various scenarios; maps on earthquake and flood vulnerabilities; FEMA flood maps; prioritizing hazards; fire planning.
8/12/10	Ranked hazards and vulnerabilities, reviewed HAZUS.
1/11/11	Overview of work done to date; comments made regarding HMP section changes to be made; hazards discussed and actions/suggestions made; participants agreed to send information regarding project ideas for inclusion in the HMP.

3.2 THE PLANNING PROCESS

The planning process generally followed the guidelines recommended by FEMA in the *FEMA State and Local Mitigation Planning How-to-Guide* (How-to-Guide).

Prior to adoption, the process followed ten general steps below and is self explanatory:

1. Conduct project kick-off meeting with newly formed Committee.
2. Develop goals.
3. Gather initial available data and conduct interviews.
4. Gather additional relevant data from external sources.
5. Perform hazard identification and risk assessment.
6. Conduct vulnerability assessment.
7. Conduct capabilities assessment.
8. Develop objectives and mitigation strategies.
9. Draft plan.
10. FEMA and Cal OES review.
11. Plan adoption.

The **Hazard Identification and Risk Assessment**, detailed in Section 4, involved the Committee in identifying the hazards perceived as threatening. Section 4 describes the analysis of hazards present throughout the County and City. It includes historical data from past occurrences and establishes a hazard ranking based upon frequency, probability, potential magnitude and impact. The hazard identification and ranking form the foundation for prioritizing mitigation actions.

The **Vulnerability Assessment** was conducted via investigative research and the use of GIS technology. Based on historical research, previous studies, community interviews and state and national datasets, the hazards identified and ranked for inclusion in the Plan were mapped or profiled. Once draft hazard maps were developed, extensive outreach was conducted with County and City departments, outside parties and through public meetings during which many of the preliminary hazard maps were red-lined and subsequently modified. Once confident that the maps accurately reflected hazard areas, focus switched to quantifying what is at risk in those areas, in terms of assets, infrastructure and population. Exposure analysis was conducted for all hazards and actual loss estimation for particular events for both earthquake and flooding.

The **Capability Assessment** included a comprehensive assessment of the County and City's capacity to implement meaningful mitigation actions based on past performance, current programs and political will. Staff and organizational capability, technical capability, policy and program capability, fiscal capability and legal authority were all considered. The purpose of the assessment was to find existing gaps and weaknesses or conflicting demands or interests of different programs that could hinder mitigation program development and project execution, as well as to build upon local programs, codes and existing plans to establish a significant and cohesive local loss reduction program.

Based on hazard identification, risk and vulnerability assessments, and the capability assessment, a meaningful **Hazard Mitigation Strategy** (action plan) was developed. The efforts involved in assessing risks and vulnerabilities and programmatic needs, which were centered on the County and City's goals, helped in creating meaningful objectives and mitigation actions that can be realistically implemented.

The initial Committee coordinated and consulted with other entities and stakeholders to identify and delineate natural and manmade hazards within the Jurisdictions to assess the risks and vulnerable property in identified hazard areas. From the start, every attempt was made to establish an open public process to provide an opportunity for all sectors of the overall community to be involved in the planning process. In some cases, direct public input was successful and in others the residents were represented in the process by the Jurisdictions staff, by necessity.

3.3 PUBLIC PARTICIPATION

There were opportunities during the planning process for the public to provide input and participate in the development of the LHMP. Table 5 summarizes opportunities for public input. Table 6 summarizes public participation in the planning process. As noted above, meeting agendas and minutes for the public meetings are provided in Appendix 3.A.

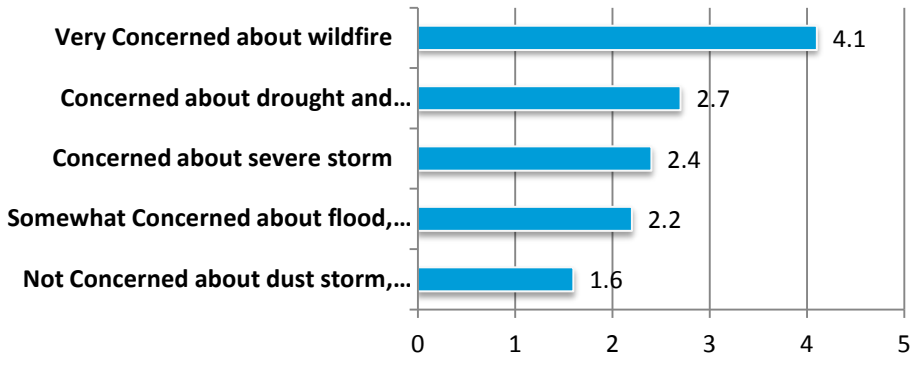
Table 5. Public Involvement in the Planning Process		
Date	**Target Audience**	**Time and Location**
11/15/10	Anderson residents and agencies	5:30 PM City of Anderson Community Room
12/14/10	Shasta County residents and agencies	5:30 PM City of Redding Community Room
02/04/11	All residents and agencies review draft	WSRCD website
	All residents and agencies review final	

Table 6. Public Participation in the Planning Process	
Date	**Item**
11/15/10	City of Anderson
	Press release for meetings
	Letters to targeted agencies, city council, city planning and public works
	PSA sent to local radio, TV and print media; press release sent to local print media
	Meeting sign in sheets, agenda and minutes
	Survey distributed at meeting
12/14/10	County
	Press release for meetings
	Invitation letters sent to targeted agencies, board of supervisors, planning and public works
	PSA sent to local radio, TV and print media; press release sent to local print media
	Meeting sign in sheets, agenda and minutes
	Survey distributed at meeting

This Plan was developed with input from meetings, telephone conversations and survey input received from residents in Shasta County. Copies of the surveys distributed to the public are provided in Appendix 3.B. Residents were asked to state whether they were: Not Concerned (1), Somewhat Concerned (2), Concerned (3), Very Concerned (4), or Extremely Concerned (5) about a variety of natural disasters.

The public participation chart below summarizes the hazard rank based on public participation.

Figure 1. Public Participation Hazard Ranking



A tally of the survey answers is shown in Appendix 3.B. Answers that emergency response agencies may find most interesting are:

- Two thirds of the respondents have received information on how to make their family and home safer from natural disasters as recently as two years ago.
- Government agencies, news and insurance agents were the primary source of information.
- The American Red Cross has the highest level of trust to supply accurate information, while newspaper stories, television and radio ads, internet, fact sheets, and workshops are very effective sources.
- Over half of the respondents feel communication on emergency preparedness is the easiest to understand.
- Almost all respondents have talked with members of their household about what to do in case of a natural disaster and half have prepared a disaster supply kit.
- Over half of all respondents are willing to spend 2-5 hours preparing for a natural disaster.
- The majority of respondents has on hand or stored: flashlights, batteries, medical supplies, first aid kit, fire extinguisher, smoke detectors, food, and water.
- Most households do not have flood insurance coverage since they do not live in a floodplain.
- Two-thirds of respondents do not have earthquake insurance coverage, primarily because it is too expensive.
- Most considered the possible occurrence of a natural hazard when they bought or moved into their home.
- Most are willing to spend $100-$999 to better protect their family and home from a natural disaster.
- Tax breaks and insurance discounts would motivate respondents to take additional steps to better protect their family.

Who were the respondents?

- Over half of the respondents were age 55 and older and predominantly male.
- Most had some college or college or postgraduate degrees.
- Respondent zip codes show the survey covered a majority of the zip codes in Shasta County.
- Most have lived in Shasta County over 10 years with half 20 years or more.
- All respondents had access to the internet and are buying or owned their home.

The public's input was incorporated into this Plan. A similar survey was distributed to local, state and federal agencies with the potential to address hazard mitigation or emergency response in Shasta County. Agency input was greatly appreciated and was considered and incorporated into this LHMP. Section 6 describes how the Jurisdictions will keep the public and other stakeholders involved in implementation and future updates of the Plan.

3.4 INCORPORATION OF EXISTING PLANS OR STUDIES REVIEWED

The Committee members reviewed several plans, studies and guides in addition to regulations, ordinances and policies for the 2010 Plan. These plans included FEMA documents, emergency services documents as well as County, City and other local general plans, community plans, local codes and ordinances, and other similar documents. These included:

- California Hazard Mitigation Plan
- HMP's from the City of Redding, City of Shasta Lake, Santa Barbara County, Butte County, Monterey County, Sutter County
- State and Local Mitigation Planning How-to-Guide, FEMA 386-2, August 2001
- Interim Hazard Mitigation Planning Guidance for California Local Governments
- FEMA CRS-DMA2K Mitigation planning requirements
- Crosswalk Reference Document for Review and Submission of Local Mitigation Plans to the State Hazard Mitigation Officer and FEMA Regional Office
- Shasta County/cities general plans
- Various local community plans
- Various local codes and ordinances
- Various emergency response plans
- Various precipitation reports
- FEMA RiskMap Discovery
- California Water Plan Update 2013
- ShakeCast V3

Each of the above documents was implemented in different ways for both Shasta County and City of Anderson. The various HMP & planning guides were used to get ideas as to what format and/or information was used and/or required for all the different sections of a HMP. The general/community plans, local codes and ordinances and emergency response plans were used to see what information is already established and available to local agencies and the public. Precipitation reports, FEMA RiskMap and California Water Plan documents provided information to aid in developing parts of the County's Flood, Extreme Weather and Dam Failure Sections. ShakeCast V3 provided information to implement into the County's Earthquake Section.

The FEMA Risk Mapping, Assessment and Planning (RiskMAP) program helps communities identify, assess and reduce their flood risk. Through RiskMAP, FEMA provides information to enhance local mitigation plans, improve community outreach and increase local resilience to floods. FEMA held a community meeting in Redding on January 11, 2016. Local response officials, floodplain management, public works, and planning officials (including Committee members) attended the meeting.

3.5 2015 PLAN UPDATE PROCESS

3.5.1 Purpose of the Plan Update

The SCHMP is subject to regular review and systematic, ongoing updates. The LHMP must be updated at least once every five years in order for the Jurisdictions to be eligible for FEMA hazard mitigation grant funding. The SCHMP reflects the Jurisdictions hazard mitigation commitment, planning and implementation actions.

This subsection generally describes how the updated SCHMP was prepared, who was involved in the planning process, how the steering Committee reviewed and analyzed the SCHMP, and how each chapter was revised.

Most important is the description of how the SCHMP has been implemented and revised using a multi-stakeholder approach in an effort to maximize the value added from the Plan revision process. Hazard mitigation planning is built on realistic assessments of hazards and effective strategies for investing in priority mitigation projects and actions. It involves multiple stakeholders and blends public and private sector goals, objectives and actions.

3.5.2 Update Requirements

Documented Planning Process. 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. Plan updates must include documentation of the current planning process undertaken to update the plan (subsection 3.5.3).

Current Hazard Events. Plan updates must include hazard events that have occurred since the last plan was developed (subsection 4.2.1).

Plan Integration. The updated plan must explain how the jurisdictions incorporated, and will continue to incorporate, the mitigation plan into other planning mechanisms as a demonstration in local hazard mitigation efforts (subsection 6.1.5).

Changes in Development. The plan update must describe changes in development that have occurred in hazard prone areas and increased or decreased the vulnerability of the jurisdiction(s) since the last plan was approved. If no changes in development impacted the jurisdiction's overall vulnerability, plan updates may validate the information in the previously approved plan (subsection 4.2.5).

Local Mitigation Efforts. The plan update must describe the status of hazard mitigation actions in the previous plan by identifying those that have been completed, or not completed. For actions that have not been completed, the plan must either describe whether the action is no longer relevant or be included as part of the updated action plan (subsection 3.5.3.3).

Changes in Priorities. The plan update must describe if and how any priorities changed since the plan was previously approved. If no changes in priorities are necessary, plan updates may validate the information in the previously approved plan.

Formal Plan Adoption. Prior to formal adoption, Cal OES and FEMA must approve the plan. At least one participating jurisdiction must formally adopt the plan within one calendar year of FEMA's designation of the plan as Approvable Pending Adoption. (Section 1, Appendices 1 & 2)

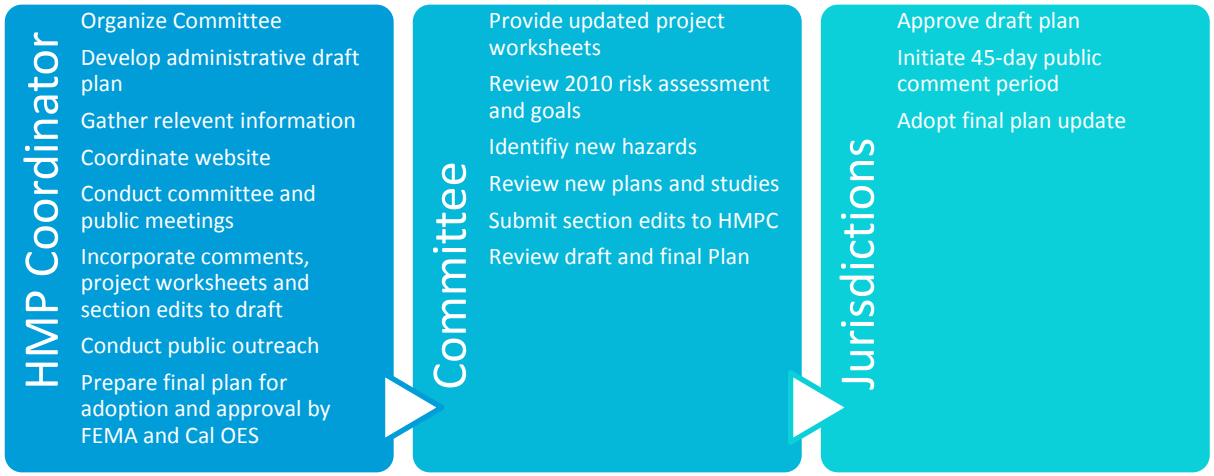
3.5.3 Documented Planning Process

The Shasta County Department of Public Works served as the coordinating agency for the Plan update with the HMPC serving as the point of contact. The update includes all previous participating Jurisdictions. The update process generally followed the guidelines recommended in the *FEMA Local Mitigation Plan Review Guide – October 2011,* the FEMA Bringing the Plan to Life: Implementing the Hazard Mitigation Plan *State and Local Mitigation Planning How to Guide – August 2003,* and Section 6 of the 2010 SCHMP. The Plan has been reorganized, updated and rewritten. Only information and data still valid from the 2010 Plan was carried forward as applicable in this update.

3.5.3.1 2010 Plan Review

The process involved a comprehensive review, update and modernization of each section and subsection of the 2010 Plan. Figure 2 shows key tasks of the Plan update and who is responsible for the delivery of each task.

Figure 2 Key Tasks



The HMPC established a one-year timeline for the Plan update. Table 7 on the following page shows the Plan update timeline, including target dates, responsible parties and task assignments.

Table 7. Plan Update Timeline		
Target Date	**Responsibility**	
October 2015 – February 2016	HMPC	a. Review 2010 LHMP for key requirements and new federal and state requirements b. Update contacts from initial steering Committee c. Gather relevant information d. Develop content for project webpage e. Attend FEMA Discovery Meeting (January) f. Prepare administrative draft 2015 LHMP for distribution
Steering Committee Meeting February 2, 2016	HMPC/Steering Committee	a. Determine if projects and goals are applicable, obsolete or irrelevant b. Identify new hazards c. Revisit the risk assessment d. Assignment of chapter edits
February – April 2016	Steering Committee	a. Update project worksheets and returns to HMPC b. Identify new plans that may impact the LHMP c. Submit chapter and section updates to the HMPC
April-May 2016	HMPC	a. Prepare draft 2015 LHMP b. Review new disaster plans c. Post draft 2015 LHMP on County website d. Presentation at Shasta County Public Works annual safety lunch e. Incorporate steering Committee comments, project worksheets and chapter/section edits to draft 2015 LHMP
Steering Committee Meeting June 1, 2016	Steering Committee	a. Plan comments b. Review and prioritize 2010 action items c. Prioritize 2015 action items
June 2016	HMPC	a. Start 45-day public comment and participation period b. Incorporate public comments into draft 2015 LHMP c. Circulate final draft 2015 LHMP to Committee members
July –August 2016	Steering Committee	a. Final review of draft 2015 LHMP
September 2016	HMPC	a. Cal OES and FEMA review and approval starts
Pending Cal OES and FEMA approval	HMPC	a. Incorporate FEMA revisions, if any
Prior to September 2017	HMPC	a. Anderson City Council adopts the 2015 LHMP b. Board of Supervisors adopts the 2015 LHMP

Re-Establishment of the Steering Committee

The HMPC updated the contact information from the 2010 Committee to include new contacts. **Error! Reference source not found.** below includes a list of all participants who served on the 2015 committee.

Table 8. 2015 Steering Committee Members

Entity	Name	Position	Invited to Participate Via
County			
Resource Management	Jim Whittle*	Senior Environmental Health Specialist	Email
	Lio Salazar	Associate Planner	
Public Works Department	Sue Crowe*	Staff Services (HMPC)	Email
	Pat Minturn*	Director	
	Troy Bartolomei*	Deputy Director-Operations	
	Neil McAuliffe	Supervising Engineer	
Public Health Department	Dave Maron*	Program Manager	Email
	Nicole Bonkrude*	Community Development Coordinator	
	Heidi Vert	Analyst	
Sheriff's Department	Tom Campbell	Lieutenant	Email
	Jason Barnhart	Sergeant	
	Rob Sandbloom	Sergeant	
County Fire	Bret Gouvea	Deputy Chief	Email
Cities			
City of Anderson	Dave Durette*	City Manager	Email
State Agencies			
Highway Patrol	Scott Frederick	Lieutenant	Email
Caltrans	Kurt Schneider*	Engineer	Email
	Susanne Rohner	District Hazmat Manager	
CAL FIRE	Nick Wallingford	Fire Captain	Email
Special Districts/Consultants			
Western Shasta Resource Conservation District (WSRCD)	Chester Anderson	District Manager	Email
	Analia Bertucci	Project Manager	
	Gary Lauben	Project Manager	
***Indicates initial Committee member**			

The first Plan update meeting was held on February 2, 2016 at the Shasta County Sheriff's Office of Emergency Services (OES). Appendix 3.C contains the agenda, sign in sheet and meeting notes. The HMPC, Sue Crowe, provided a brief overview of the current plan and facilitated an open discussion with the Committee noting any immediate issues, concerns or particular revisions necessary to reflect changes in hazard risks, community development, progress in local mitigation efforts, and/or any changes in local priorities. An administrative draft of the 2015 SCHMP was prepared by the HMPC and distributed to the Committee members for their review.

The second Plan update meeting was held on June 1, 2016 at the Shasta County Department of Public Works. Appendix 3.C contains the agenda, sign in sheet and meeting notes. Committee members reviewed and prioritized the 2015 SCHMP action items.

3.5.3.2 Public Participation

The 2010 Plan public participation is described in subsection 3.3. Key objectives of the outreach process was to 1) make effective use of networking and technology to broadly include the update process to relevant County and City departments, local agencies, citizens and local and state jurisdictions, 2) solicit informed comments and ideas on the draft Plan and mitigation activities, and 3) establish relationships with interested parties in both public and private sectors who have potential to influence ongoing hazard mitigation actions.

Preparation of the 2015 Plan has involved public participation at various times, venues and level of focus. The strategy to accomplish those objectives involved the following actions:

- Develop dedicated web portal containing up to date information on the Plan update process and primary documents.
- Disseminate information via Committee email distribution lists.
- Widely publicize the release of the Draft 2015 Plan through public notices and extending invitations to comment online.
- Perform public hearings in each Jurisdiction.

Project Website. A Hazard Mitigation Plan web portal was established on the County of Shasta website. The portal contained a link to the 2010 Plan along with information on what is a hazard mitigation plan, why the Plan is important, what goes into a hazard mitigation plan, and how the public can be involved in the planning process. The portal serves as a resource location for the Committee and general public.

Project Fact Sheet. As part of the early communication and outreach efforts, an informational flyer was developed for distribution at the Committee's kick-off meeting. The fact sheet was posted on the project webpage and distributed at public and Jurisdiction meetings.

Public Outreach and Presentations

The 45-day public comment period began on July 1, 2016. The Draft 2015 SCHMP was posted on the Jurisdictions websites for public review.

Shasta County Public Works Annual Safety Luncheon: Annually, the Department holds a safety luncheon which recognizes employees and retirees and presents safety awards. This event includes a presentation that is typically safety related. At the April 14, 2016 safety luncheon, the HMPC and Committee members from CAL FIRE (Nick Wallingford, Fire Captain), County Fire/CAL FIRE (Bret Gouvea, Deputy Chief) and OES (Rob Sandbloom, Sergeant) gave a combined presentation on disaster planning and prevention. 123 employees and 9 elected officials and County Administrative Staff attended the event.

Handouts were provided relating to Wildland Urban Interface Building Standards and personal Wildfire Action Plans (Appendix 3.D).

2016 Public Comment Period: The public had the opportunity to comment July 1, 2016 through August 15, 2016. The opportunity to comment information was published in three local newspapers; Record Searchlight based in Redding, CA, Ridge Rider News based in Shingletown, CA and The Intermountain News based in Burney, CA. In the publication, the public was provided with a point of contact if they had questions or wanted to provide comments and a link to the Draft 2015 HMP. During the public comment period, two public comments were received (Appendix 3.E). The first concern was fires caused by the homeless in undeveloped areas of Shasta County. This would fall under Section 4.3.2 which is wildfire information. Under Section 4.3.2.4, it specifically talks about current wildfire hazard mitigation efforts which includes managing the human/wildfire conflict. The second concern was lack of appropriate medical supplies for pediatrics and/or children. This type of situation would most likely occur if there was a pandemic/epidemic of some sort. This would fall under 4.3.8 which is pandemic/epidemic information. In Section 4.3.8.4, it talks about current pandemic/epidemic hazard mitigation efforts.

Individual Jurisdiction Meetings: The Draft 2016 SCHMP was presented to the Anderson City Council and the Shasta County Board of Supervisors for approval on November 7, 2017.

3.5.3.3 Mitigation Action Progress to Date

The 2010 mitigation strategy included 57 separate mitigation actions within the planning area. The 2010 LHMP mitigation action status is shown in Table 9.

The Committee and Jurisdictions reviewed the goals and projects from the 2010 Plan to determine if they were still applicable, obsolete or irrelevant. The Committee and Jurisdictions evaluated the project results and identified new plans, hazards or projects that would impact the Plan. Committee members submitted chapter and section updates for editorial integration by the HMPC into the Draft 2015 LHMP.

Table 9. SCHMP Mitigation Action Status					
Jurisdiction/Hazard/Action	**Complete**	**Ongoing/ In Progress**	**Not Yet Started**	**Obsolete**	**Project in 2015 Update**
City of Anderson Public Works					
(AFLD-1) Increase participation in floodplain re-mapping initiative		O			X
(AFLD-2) Floodplain management and flood mitigation education and outreach		O			X
(AFLD-3) Enhance floodplain management ordinance		O			X
(AFLD-4) Add community volunteers to creek cleanup activities		O			X
(AFLD-5) Tormey Drain		O			X
(AHM-1) Biohazard detection system drills					X
(AEW-1) Extreme weather operation drills					X
(AEQ-1) Retrofit any City buildings that do not meet seismic standards. Seismic upgrades would be expensive and disruptive to operations. Construction of new facilities meets current state and local building code requirements. State funding is only available for new projects. This project will not be carried forward in the 2015 plan.				X	
City of Anderson					
(AFLD-6) Build new police station					X
(AFLD-7) ACID aqueduct at South Street					X
(AWDF-2) Anderson River Park fuels reduction					X
(AWDF-3) Factory Outlets Drive/Deschutes Road Interchange. The first phase (Interim Phase) is complete and includes construction of the new off- ramp from northbound I-5 to Deschutes Road and the roundabout intersection at the I-5 northbound ramps intersection with both Deschutes Road and Locust Road. The balance of the improvements will be carried forward in the 2015 plan.		IP			
Shasta County Public Works					
(FLD-1) Increase participation in floodplain re-mapping initiative. Ongoing.		O			X
(FLD-2) Add community volunteers to creek cleanup committees. The County has no jurisdiction over creeks, streambeds or waterways and does not perform creek cleanup activities. This project requires a lead agency such as a conservation district.		O			X
(FLD-3) Burney Flood Wall. This project will be carried forward in the 2015 plan.			X		X
(FLD-4) Cottonwood Sewer Treatment Plant. The 2013 Sewer Master Plan is complete. Planning grant and improvement grants are secured. Estimated completion is scheduled for 2018. This project will be carried forward in the 2015 plan.		IP			X
(FLD-5) Culvert inventory with GPS coordinates and GIS maps. This project is obsolete and will not carry forward.				X	
(FLD-6) Replace low flow culvert on Silver Bridge Road. Shasta County Department of Public Works completed this project in 2011.	X				
(FLD-7) Repair Cottonwood's Fourth Street drainage. Developer-built systems have partially mitigated flooding upstream. Further improvements will be incorporated into future development. This project will be carried forward in the 2015 plan.		IP			X

(FLD-8) Reduce flooding of Burney Creek in Burney. The County has no jurisdiction over creeks, streambeds or waterways and does not perform streambed alterations. This project will not be carried forward.				X	
(FLD-9) Reduce flooding of Wilshire Ditch on Bechelli Lane. This ditch is in the City of Redding. This project will not be carried forward.				X	
(FLD-10) Reduce vegetation in all creeks where cleanout would help reduce flooding. The County has no jurisdiction over creeks, streambeds or waterways and does not perform creek cleanup activities. This project will need a lead agency such as a conservation district.		O			X
(FLD-11) Open up constricted creek channels along Platina and Trinity Mountain and French Gulch Roads and the Fountain Fire Area. Platina and Trinity Mountain Road were caused due to slides. Repairs are complete on Trinity Mountain Road. A large culvert is proposed for Platina Road and will carry forwards as FLD-5.	Trinity Mtn. and French Gulch X			Fountain Fire X	Platina X
(FLD-12) Restore adequate drainage on Dog Creek Road to prevent further erosion. Shasta County Department of Public Works completed this project in 2011.	X				
(EQ-1) Retrofit any County buildings that do not meet seismic standards. Seismic upgrades would be expensive and disruptive to operations. Construction of new facilities meets current state and local building code requirements. State funding is only available for new projects. This project will not be carried forward in the 2015 plan.				X	
(FLD-14) Bridge scour program. See discussion under subsection 5.3.1.1. Ongoing. This project will be carried forward in the 2015 plan.		O			X
Shasta County HHSA-Public Health					
(WDF-15) Reorganization of disaster healthcare volunteers (DHV) and training for Red Cross shelters. Complete. Shelter training is promoted with all DHV members.	X				
(EW-1) Develop Extreme Cold Plan. This plan was revised in July 2015. The plan is available on the County's Intranet site.	X				
(EW-2) Update Extreme Heat Plan each Spring. This plan was revised in July 2015. The plan is available on the County's Intranet site.	X				
(PE-1) Update Pan Flu Annex to ERP		IP			
(PE-2) Isolation and quarantine tabletop exercise				X	X
(PE-3) Mass vaccination exercises. Plans and procedures are tested annually with the drive through flu clinic. This is no longer an exercise but a live event.	X				
(MCI-3) EMS MCI Field Operations Guide. Complete. An MCI field operations guide is available for all of OES Region III.	X				
(MCI-4) Countywide fatality management plan. Completed in 2011. Plan is on file with HHSA-Public Health.	X				
(MCI-5) Government-authorized Alternate Care Site Plan Annex to ERP. Completed on July 25, 2012.	X				
(MCI-6) ACS Exercise 2011 Redding Air Show. Completed.	X				
(CB-1) Educate citizens for protection/prevention. Ongoing. This project will carry forward in the 2015 plan.		O			X
(HM-1) Biohazard detection system drill (Anthrax scenario). BDS drill conducted in May 2010. The exercise has been adopted as a mobile point of dispensing model.	X				
Sheriff OES					

(FLD-13) CAL EMA Guardian 2011 Tabletop Exercise (flood scenario)	X				
(MCI-1) Statewide medical and health exercises. Conducted in November 2010. This practiced an MCI event in which 25 healthcare agencies participated along with 25 Shasta Dam first responder and law enforcement agencies.	X				
(DF-1) Outreach and education about emergency services and plans for communication dam failure. Ongoing. This project will carry forward in the 2015 plan.		O			X
(V-1) Maintain integrated evacuation plan to address volcanic eruption. Ongoing. This project will carry forward in the 2015 plan.		O			X
Shasta County EMS					
(MCI-2) Attend Shasta County and Sierra-Sacramento Valley EMS meetings. Ongoing. This project will carry forward in the 2015 plan.		O			X
Western Shasta RCD					
Note: Projects WDF-1 through WDF-9 were consolidated in the 2010 CWPP update. Plan is in the process of updating and will be adopted prior to adoption of the 2015 SCHMP.	X				
(WDF-1) Update 2010 Cottonwood Creek Fuels Reduction Plan (CWPP)	X				
(WDF-2) Update 2010 Cow Creek Watershed Fuels Reduction Plan (CWPP)	X				
(WDF-3) Update 2010 French Gulch Area Fuels Reduction Plan (CWPP)	X				
(WDF-4) Update 2010 Lakehead Strategic Fuels Reduction Plan (CWPP)	X				
(WDF-5) Update 2010 Lower Clear Creek Watershed Fuels Plan (CWPP)	X				
(WDF-6) Update 2010 Shasta West Watershed Fuels Plan (CWPP)	X				
(WDF-7) Update 2010 Shingletown/Manton Fire Safe Plan (CWPP)	X				
(WDF-8) Update 2010 Stillwater/Churn-Creek Fuels Plan (CWPP)	X				
(WDF-9) Update 2009 Keswick Basin Wildfire Protection Plan (CWPP)	X				
Other Agencies/Organizations					
(WDF-10) Update 2008 CAL FIRE, Shasta-Trinity Unit Fire Plan. Note: Updated annually.		O			X
(WDF-11) Update 2002 Backbone Ridge Defensible Fuel Profile Zone					
(WDF-12) Update 2005 Day Lassen Bench Community Fire Safe Plan (CWPP)/ Day Lassen FSC, Lassen FSC, McArthur VFD	This project is in Lassen County				
(WDF-13) Update 1994 Middle Creek Watershed Strategic Wildfire Defense Plan (2010 Shasta West Strategic Fuels Management Plan)	X				
(WDF-14) Assistance to Burney water infrastructure for sustained fire fighting/Burney Water District, Fall River RCD.				X	
(AWDF-1) Complete a strategic fuels reduction plan for Anderson Creek Watershed					
(EW-3) Backup Electrical Power for Caltrans	X				
(EQ-2) Prevent Unplanned Bridge Closures/Seismic		O			X

This page intentionally left blank.

SECTION 4
RISK AND VULNERABILITY ASSESSMENT

This section identifies and profiles the hazards that could affect Shasta County. It consists of the following subsections:

4.1 OVERVIEW OF THE RISK ASSESSMENT PROCESS
California Overview
4.1.1 Identifying Hazards
4.1.2 Profiling Hazards
4.1.3 Identifying Assets
4.1.4 Assessing Vulnerability
4.1.5 Analyzing Development Trends
4.2 HAZARD IDENTIFICATION, SCREENING AND RANKING
4.2.1 List of Hazards
4.2.2 Hazard Identification Process
4.2.3 Hazard Identification Sources
4.2.4 Non-Profiled Hazards
4.2.5 Future Development and Critical Facilities
4.2.6 Critical Facilities Definition and Inventory
4.2.7 Hazard Ranking
4.3 HAZARD PROFILING, RISK AND VULNERABILITY ASSESSMENT
Background
4.3.1 Flood
4.3.2 Wildfire
4.3.3 Extreme Weather
4.3.4 Earthquake
4.3.5 Hazardous Materials
4.3.6 Volcanic
4.3.7 CBRNE (Chemical, Biological, Radiological, Nuclear, & Explosive)
4.3.8 Pandemic/epidemic
4.3.9 MCI – Multi-Casualty Incidents
4.3.10 Dam Failure
4.4 ANALYSIS OF LAND USE
4.4.1 Shasta County
4.4.2 City of Anderson
4.5 ANALYSIS OF DEVELOPMENT TRENDS
4.5.1 Shasta County
4.5.2 City of Anderson

DMA 2000 PLANNING REQUIREMENTS

REQUIREMENT §201.6(c)(2). Local risk assessment must provide sufficient information to enable the jurisdiction to identify and prioritize appropriate mitigation actions to reduce losses from identified hazards. This includes detailed descriptions of all the hazards that could affect the jurisdiction along with an analysis of the jurisdiction's vulnerability to those hazards. Specific information about numbers and types of structures, potential dollar losses and an overall description of land use trends in the jurisdiction must be included in this analysis. The local risk assessment should identify what hazards are likely to affect the area. The plan should describe the sources used to identify hazards, noting any data limitations and provide an explanation for eliminating any hazards from consideration. The process for identifying hazards could involve one or more of the following: Reviewing reports, plans, flood ordinances, and land use regulations among others; talking to experts from federal, state and local agencies and universities; searching the Internet and newspapers; and interviewing long-time residents.

4.1 OVERVIEW OF THE RISK ASSESSMENT PROCESS

Risk Assessment requires the collection and analysis of hazard-related data in order to enable local Jurisdictions to identify and prioritize appropriate mitigation actions that will reduce losses from potential hazards. *The FEMA State and Local Mitigation Planning How-to-Guide* (Guide) identifies five risk assessment steps as part of the hazard mitigation planning process, including:

1. Identifying hazards, which involves determining those hazards posing a threat to a study area.
2. Profiling hazards, which involves mapping identified hazards and their geographic extent.
3. Identifying assets, which assigns value to structures and landmarks in the identified hazard areas.
4. Assessing vulnerability, which involves predicting the extent of damage to assets.
5. Analyzing development trends, which assess future development and population growth to determine potential future threat from hazards.

In addition, the state plan supports climate scientists in recognition that in coming decades natural disasters are broadly expected to intensify due to climate change. Disasters affecting Shasta County that are expected to be more widely experienced in the future include flooding, wildfires and weather

(extreme heat, severe weather, drought, and storms). It is important that adaptive management be incorporated into the various strategies of the SCHMP, including local adaptive capacity and adjusting assessments to account for climate change. The steps and hazards exacerbated by climate change are described in detail in the following subsections.

4.1.1 Identifying Hazards

Natural hazards identification is the process of recognizing natural events that threaten a particular planning area. A natural event causes a hazard when it harms people or property or interferes with commerce and human activity. Such events would include floods, earthquakes, landslides, and wildfires that strike populated areas. Natural hazards that have harmed Shasta County in the past are likely to happen in the future; consequently, the process of identifying hazards includes determining whether or not the hazard has occurred previously. Approaches to collecting historical hazard data include researching newspapers and other records, conducting a planning document and report literature review in all relevant hazards subject areas, gathering hazard-related GIS data, and engaging in conversation with relevant experts from the community. In addition, a variety of sources were used to determine the full range of all potential hazards within Shasta County, including internet research. Even though a particular hazard may not have occurred in recent history in Shasta County, it is important during the hazard identification stage to consider all hazards that may potentially affect the planning area.

4.1.2 Profiling Hazards

An asset is vulnerable if it is susceptible to damage from a hazard.

Hazard profiling involves describing the physical characteristics of past hazards such as magnitude, duration, frequency, and probability. This stage of the hazard mitigation planning process involves creating base maps of the study area and collecting and mapping hazard event profile information obtained from various federal, state and local government agencies. The extent to which hazards are profiled is dependent on the availability of data. Some hazard profiles provide significantly more information than others based on the amount of prior research and data production identified. The Committee and consultant team obtained national maps available online from sources such as the United States Geological Survey (USGS), National Oceanographic and Atmospheric Administration (NOAA), FEMA and Cal OES. Data was also available from the County's own GIS Services. The hazard data was mapped to determine the geographic extent of the hazards in each participating Jurisdiction. The level of risk associated with each hazard in each Jurisdiction was also estimated and assigned a risk level of high, medium or low (or variations thereof) depending on several factors unique to that particular hazard.

4.1.3 Identifying Assets

The third step of the risk assessment process is to identify the assets in each Jurisdiction which will be affected by each hazard type. Assets include any type of structure or critical facility such as hospitals, schools and public infrastructure. An inventory of existing and proposed assets within the County was

generated. The assets were then mapped to show their locations and to determine their vulnerability to each hazard type. The Committee also considered potential future development, based upon a review of the Jurisdictions General Plans. As with profiling, identification of assets is limited to best available and usable data.

4.1.4 Assessing Vulnerability

Vulnerability depends on an asset's construction, contents and the economic value of its functions. A vulnerability analysis can also predict the extent of injury and damage that may result from a hazard event of a given intensity in a given area. The vulnerability assessment identifies the effects of hazards by estimating the relative exposure of population, land development and infrastructure to hazardous conditions. This includes consideration of indirect effects of hazards, which can be much more widespread and damaging than direct effects. For example, the loss of commerce due to road closures for an amount of time could significantly outweigh the cost of repairing the road. The assessment helps set mitigation priorities by allowing the Jurisdictions to focus attention on areas most likely to be damaged or most likely to require early emergency response during a hazard event.

4.1.5 Analyzing Development Trends

The final step of the risk assessment merges hazard information with proposed land uses and planned development within Shasta County. Due to the difficulty in predicting where future development will take place this subsection is not intended to provide a thorough analysis of future hazard areas. However, it does provide the groundwork for proposing mitigation strategies in the most likely locations and an opportunity to evaluate codes, regulations and standards within a hazard context to determine appropriate changes to protect from damage to future development.

4.2 HAZARD IDENTIFICATION, SCREENING AND RANKING

4.2.1 List of Hazards

The Committee reviewed hazards listed in the Guide and determined the prevalence of each hazard in Shasta County and whether each hazard should be included in the Plan. All hazards identified by FEMA in the Guide were reviewed. They include: avalanche, coastal storm, coastal erosion, dam failure, drought/water supply, earthquake, expansive soils, extreme heat, flooding, hailstorm, house/building fire, land subsidence, landslide, liquefaction, severe winter storm, tornado, tsunami, wildfire, windstorm, and volcano.

For the 2015 plan update, the Committee reaffirmed the initial hazard identification and screening process. No new hazard events were identified since the 2010 Plan, although extended emphasis has been placed on California's drought conditions (subsection 4.3.3.2).

4.2.2 Hazard Identification Process

The Committee worked with the consultant team to narrow the all-inclusive list of hazards to those most threatening to the Shasta County area. Consideration was also given to which hazards could

realistically be addressed in terms of mitigation during the screening process. The screening effort required input from a variety of Committee members, including representatives from County government and County departments. It also considered the results of the survey, addressed in subsection 3.3. Meetings with the general public were also held to confirm that the decision of the Committee were inclusive of public sentiment regarding which hazards pose the most significant threat and/or were realistic to address within the scope of this plan.

The final list of hazards to be profiled for Shasta County is shown in Table 10, including data sources and brief justifications for inclusion of each hazard.

Table 10. Summary of Hazard Identification Results

Hazard	Representative Data Collected for Hazard Identification	Justification for Inclusion
Flood	• FEMA FIRM Maps • Historical flood records	• Areas are located within the 100- year floodplain • History of events
Wildfire	• CDF-FRAP • USFS • County Fire/OES • Historical fire records	• Terrain and Mediterranean climate • Seasonal wind • History of events
Extreme Weather	• NOAA • USDA	• History of events
Earthquake	• USGS • CGS • CISN	• Several fault zones occur in the county • History of events
Hazmat	• USGS • Shasta County Hazardous Materials Business Plan • Shasta County Hazardous Materials Area Plan • EPA	• Location to major transportation arteries (rail and road) • History of events
Volcanic	• USGS • Cal OES	• History of events
CBRNE	• Shasta County HHSA -Public Health • CA Emergency Medical Services Authority • CA Department of Public Health	• Heightened sense of awareness since 9/11
Pandemic/ Epidemic	• Shasta County HHSA –Public Health • CA Emergency Medical Services Authority • CDC	• Cases of West Nile Virus in Shasta County • Cases of CA 2009 H1N1 in Shasta County
MCI	• Shasta County HHSA -Public Health • CA Emergency Medical Services Authority • CA Department of Public Health	• History of events
Dam Failure	• Dam Inundation Data (CAL OES) • BOR • ACOE 2009 Survey	• History of events • Presence of dams

4.2.3 Hazard Identification Sources

Hazard data was collected from the Internet, direct communication with various agencies, discussions with consultant team, in-house experts and historical records. Specific sources included:

- United States Geological Survey (USGS)
- California Geological Survey (CGS)
- Federal Emergency Management Agency (FEMA) HAZUS
- FEMA Flood Insurance Rate Maps (FIRM)
- FEMA RiskMap Discovery
- United States Forest Service (USFS)
- California Office of Emergency Management Agency (Cal EMA) (Cal OES)
- California Department of Forestry – Fire and Resource Assessment Program (CDF-FRAP)
- National Oceanographic and Atmospheric Administration (NOAA)
- National Climatologic Data Center (NCDC)
- Shasta County Flood Control District
- Southern California Earthquake Data Center (SCEDC)
- California Seismic Safety Commission (CSSC)
- California Integrated Seismic Network (CISN)
- California Department of Fish and Wildlife (CDFW)
- County General Plan Safety and Land Use Elements
- Input from local jurisdictions, districts and agencies
- Shasta County Public Works, GIS Services
- Shasta County Fire
- Shasta County OES
- Shasta County Hazardous Materials Area Plan 2013

4.2.4 Non-Profiled Hazards

During the initial evaluation the Committee determined that a number of hazards would not be included in the profiling step because they were not prevalent hazards within Shasta County, were found to pose only minor or very minor threats to Shasta County compared to the other hazards or were generally linked to or covered by other selected hazards. Table 11 on the next page gives a brief description of those hazards and the reason for their exclusion.

Table 11. Summary of Non-Profiled Hazards		
Hazard	**Description**	**Reason for Exclusion**
Avalanche	A mass of snow moving down a slope. There are two basic elements to a slide; a steep, snow- covered slope and a trigger.	Snowfall in the mountains poses a very minor threat compared to other hazards.
Coastal Storm	A storm that impacts the strip of land that extends from the coastline inland to the first major change in the terrain features, which are not influenced by the coastal processes.	Shasta County is not located on the coast.
Coastal Erosion	Erosion in the coastal profile takes place in the form of scouring in the foot of the cliffs or in the foot of the dunes. Coast erosion takes place mainly during strong winds, high waves and high tides and storm surge conditions.	Shasta County is not located on the coast.
Expansive Soils	Expansive soils shrink when dry and swell when wet. This movement can exert enough pressure to crack sidewalks, driveways, basement floors, pipelines and even foundations.	Most of Shasta County is characterized by moderately expansive soils with areas of low expansiveness in the South Central Region and southeastern corner of the County.
Land Subsidence	Land subsidence occurs when large amounts of ground water have been withdrawn from certain types of rocks, such as fine-grained sediments. The rock compacts because the water is partly responsible for holding the ground up. When the water is withdrawn, the rocks fall in on themselves.	Bay Delta map shows a small area in Shasta County at the northern end of the Great Central Valley; poses a very minor threat compared to other hazards.
Landslide	A landslide or landslip is a geological phenomenon which includes a wide range of ground movement, such as rock falls, deep failure of slopes and shallow debris flows, which can occur in offshore, coastal and onshore environments. Although the action of gravity is the primary driving force for a landslide to occur, there are other contributing factors affecting the original slope stability.	Landslides occur throughout Shasta County; however, landslides are more prevalent in the eastern and northern portions of Shasta County and are commonly related to the sedimentary and volcanic rocks in these vicinities.
Liquefaction	Liquefaction potential is determined from a variety of factors, including: soil type, soil density, depth to the groundwater table, and the duration and intensity of ground mobilization as a result of increased pore water pressure induced by significant ground shaking.	Areas in Shasta County with the highest potential for liquefaction are located along the Sacramento River and its tributaries.
Tornado	A tornado is a violent windstorm characterized by a twisting, funnel-shaped cloud. It is spawned by a thunderstorm (or sometimes as a result of a hurricane) and produced when cool air overrides a layer of warm air, forcing the warm air to rise rapidly. The damage from a tornado is a result of the high wind velocity and wind-blown debris.	Less than one tornado event occurs in California in any given year; poses a very minor threat compared to other hazards.
Tsunami	Large waves generated by earthquakes, landslides, volcanic eruptions, and impacts of cosmic bodies.	Shasta County is not located on the coast.

4.2.5 Future Development and Critical Facilities

Members of the Committee confirmed that there were no substantial changes or major future facilities planned within the 2015 five-year SCHMP review period that would represent significant changes to the current land use pattern or critical facilities inventory, thus affecting the potential estimated monetary loss due to urban/wildland fire. If development plans for future facilities are identified and initiated through the County Planning Department or County Fire, the structure and land use information should

be incorporated into the SCHMP to update the potential loss estimation for urban/wildland fires. Shasta County and City of Anderson had no changes in development.

According to the U.S. Census Bureau, Shasta County's population increased from 177,223 to 179,631 from 2010 to 2016. This equates to an annual growth rate of 0.2%. However, the unincorporated area experienced a net decline in population, due to demographic factors. The City of Redding grew from 89,861 to 91,808 during the same time period. The City of Anderson's population increased from by 300 persons, from 9,932 to 10,232 during the same time period for an annual growth rate of fifty people or 0.5%. These very low (or negative) growth rates have led to arrested development. A major shopping complex was proposed along Knighton Road but was rejected by voter referendum. These stable or declining population trends mitigate exposure to hazardous materials, CBRNE, Pandemic/Epidemic, Multi-Casualty and Dam Failure hazards.

Virtually all exposure to risk associated with volcanic activity in Shasta County is within the unincorporated areas. Reduced population in the unincorporated areas has an incidental benefit in that it has stabilized or reduced exposure to volcanic activity.

The County and the City of Anderson participate in the National Flood Insurance Program which precludes development within floodways and restricts development in floodplains. Modern development standards require positive drainage for all newly created residential lots and other developments with attendant reductions in flood risk.

New buildings are constructed to modern building codes. These higher standards greatly reduce risk from extreme weather and earthquakes.

4.2.6 Critical Facilities Definition and Inventory

With the two major hazards of urban/wildland fire and flooding identified and profiled, it is necessary to evaluate how these hazards could affect the community's structural and nonstructural assets. Identifying these assets in relation to the geographic distribution of these major hazards is an integral part of the process of quantifying potential losses. Critical facilities are considered assets and are defined by FEMA as a facility in either the public or private sector that provides essential products and services to the general public, is otherwise necessary to preserve the welfare and quality of life in the region, or fulfills important public safety, emergency response and/or disaster recovery functions. Critical facilities located in the Jurisdictions boundaries and those that are susceptible to urban/wildland fire and flooding hazards are identified in this LHMP.

According to FEMA, critical facilities include:

- Essential Facilities – Medical care facilities, emergency response facilities, schools, shelters, and any facility vital to emergency response and recovery following a disaster.
- Transportation Lifeline Systems – Highways, railways, light rail, bus systems, ports, ferry systems, and airports.

- Utility Lifeline Systems – Potable water, electric power, wastewater, communications, and liquid fuels.
- Hazardous Materials Facilities – Facilities housing industrial/hazardous materials, such as corrosives, flammable materials, radioactive materials, and toxins.

Facilities that are considered high potential loss facilities such as dams, nuclear power plants, natural gas facilities, military installations, and large unique residential or commercial structures were not evaluated for potential loss estimation in the LHMP.

4.2.7 Hazard Ranking

Once the Committee identified the hazards for inclusion in the Plan, the hazards were ranked. Prioritization of the hazards that threaten Shasta County was based on two separate factors. For the rating of probability of occurrence, for each of the following hazards, the participants in the workshop for the SCHMP were asked to provide ratings of the likelihood that an event would occur in the future.

The ratings that were used were:

- High probability (highly likely to occur)
- Medium probability (likely to occur)
- Low probability (not very likely to occur)

These were subjective, order-of-magnitude ratings that participants could relate to whether they were highly skilled in a hazards area (e.g., members of a fire department) or not. This approach facilitated utilizing a consensus approach with the participating group.

For the rating of severity the participants in the workshop for the SCHMP were asked to provide ratings of the likely severity of an event, assuming one occurred in the future.

The ratings that were used were:

- High severity (extensive loss of life and/or property)
- Medium severity (moderate loss of life and/or property)
- Low severity (relatively modest loss of life and/or property)

These were subjective, order-of-magnitude ratings that participants could relate to whether they were highly skilled in a hazards area (e.g., members of a fire department) or not. This approach facilitated utilizing a consensus approach with the participating group.

- Probability that the hazard will affect the community
- Potential impacts on the community when it does

Each hazard's total impact is made up of three separate factors:

- Likely geographical extent of affected area
- Primary impacts of the hazard event

- Related secondary impacts

While primary impacts are a direct result of the hazard, secondary impacts can only arise subsequent to a primary impact. For example, a primary impact of a flood event may be road damage due to submerged pavement or eroded surface. A possible secondary impact in these circumstances would be restricted access of emergency vehicles to citizens in a portion of Shasta County due to the road closure.

The hazards were separated into three categories based on the relative risk level they pose to Shasta County: significant, moderate and limited. In order to focus on the most critical hazards, those assigned a level of significant or moderate were given the most extensive attention in the remainder of this analysis, while those with a limited, planning consideration were addressed in more general ways. The hazard ranking was based on the overall probability and impact on Shasta County as a whole.

Significant	Moderate	Limited
• Flood • Wildfire • Extreme Weather • Earthquake	• Hazardous Materials • Volcano • CBRNE • Panademic/Epidemic	• Multi-Casualty Incident • Dam Failure

The preceding categories (Significant, Moderate, Limited) are intended to characterize the relative threat or risk levels associated with the various hazards in the County and the City of Anderson. The hazards may also be characterized solely based upon their probability of significant occurrence in a given year. The following tables sort the various hazards based upon their recurrence interval in the County (25 yr = 4% probability of occurrence in a given year, etc).

5 yr	25 yr	100 yr
• Flood • Wildfire • Extreme Weather	• Hazardous Materials • Multi-Casualty Incident • Panademic/Epidemic • Earthquake	• Volcano • Dam Failure • CBRNE

4.3 HAZARD PROFILING, RISK AND VULNERABILITY ASSESSMENT

Background

A hazard profile is a description of the physical characteristics of a hazard and a determination of various hazard descriptors, including magnitude, duration, frequency, probability, and extent. The hazard data that were collected in the hazard identification process were mapped to determine the geographic extent of the hazards in each jurisdiction in Shasta County and the level of risk associated with each hazard. Most hazards were given a risk level of high, medium or low depending on several factors unique to the hazard. The hazards identified and profiled for Shasta County, as well as the data used to profile each hazard are presented in this subsection on a hazard-by-hazard basis in the order they were ranked.

The analysis presented here is based upon best available data. See Appendix B-References for a complete listing of sources and their unique data limitations, if any. Data used in updates to this plan should be reassessed upon each review period to incorporate new or more accurate data if/when possible. Significantly more data was available for some hazards than for others.

4.3.1 Flood

4.3.1.1 Hazard Definition

Floods and flooding are gauged by their size (width and depth of the affected area) and the probability of occurrence. The size and depth of the floodplain area is computed using mathematical models of precipitation, slope, runoff, soil type, and cross-section. Flood depths are calculated at intervals along a stream or channel corridor and then mapped and interpolated between sections. The result is a floodplain map. The probability of occurrence is expressed in a percentage of the chance of a flood of a specific extent occurring in any given year. The most widely adopted design and regulatory standard for floods in the U.S. is the 1-percent annual chance flood, and this is the standard formally adopted by FEMA, also commonly referred to as the '100-year flood.' It is the probability that smaller floods occur more often than larger floods that compels the percentage.

Flooding is an overflow of excess water from a stream, river, lake or reservoir, a piped or channeled conveyance, or coastal body of water, onto adjacent floodplains. Flooding can also occur by the accumulation of water in a natural or man-made depression where there normally is none. Floodplains are lowlands, adjacent to water bodies that are subject to recurring floods. Floods are natural events that become hazards when people or properties are affected. Floods occur in all 50 states and U.S. Territories, with an estimated four percent of the total area of the U.S. subject to a 1-percent annual

chance of flood. 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; while larger rivers in flatter valley and lowland areas typically have longer, more predictable flooding sequences and affect a broader floodplain.

4.3.1.2 History of Floods

Historical records indicate that at least nine major floods occurred in the Sacramento River Basin prior to 1900. Extensive flooding in northern California, which may well have extended to Anderson, took place in 1839-40, 1847, 1849-50, 1852, 1861-62, 1881, and 1890, and it is likely that high stages were reached on Anderson Creek, Sacramento Gulch and Tormey Drain during floods that occurred in 1904. Severe floods occurred on the Sacramento River in 1907, 1909, 1937, 1940, 1942, 1955, 1958, 1964-65, 1970, 1974. Among these, the floods of 1937, 1940, 1958, 1970, and 1974 were the most damaging of record.

In the past, floods have damaged homes and commercial structures, frequently interrupted utility services and delayed both railroad and highway travel. Two of the worst floods that occurred on the Sacramento River prior to construction of Shasta Dam were those of 1937 and 1940. During December 1937, a portion of Anderson was flooded. The river reached its highest level in 42 years and all highways and railroads in the study area were closed to through travel. Bridges and buildings were washed away and some power and communication facilities were destroyed.

The pre-Shasta Dam flood of 1940 on the Sacramento River was estimated to have had a peak flow of 186,000 cubic ft. per second (cfs), which is equal to a 180-year flood under present conditions. The estimated total flood damages for the 1940 flood in Shasta County were $278,000. The peak flows of historical floods on the Sacramento River are shown in Table 12. Floods that occurred after construction of Shasta Dam were affected by the flood control operation of that project.

Table 12. Historical Flood Peak Flows on Sacramento River

Date	Peak Flow (cfs)
At the Sacramento River Bridge at Kennett before the construction of Shasta Dam	
December 1937	132,000
February 1940	186,000
March 1941	98,200
February 1942	85,200
At the Sacramento River at Keswick above Redding, California	
December 1951	42,100
February 1955	51,000
February 1958	78,800
December 1964	54,000
January 1969	56,000
January 1970	78,900
April 1974	81,400

The operation of Shasta Dam, constructed in the early 1940s, resulted in regulating the 10-, 2-, and 1-percent annual chance floods to 79,000 cfs in the Redding area, from Keswick to Clear Creek. This gave the cities of Redding and Anderson a high degree of flood protection.

The two largest floods since the dam's construction occurred in 1970 and 1974. Peak discharges for the Sacramento River at Keswick for these years were estimated to have been 78,900 cfs and 81,400 cfs, respectively. Both floods were approximately 1-percent annual chance flood events in the city of Redding. Reported economic losses in Shasta County amounted to $3.79 million in 1970 and $10.65 million in 1974. It is believed that the actual losses were considerably greater.

Cottonwood Creek, which lies on the southern Shasta-Tehama County limits, is an area of frequent flooding. The drainage area of Cottonwood Creek is approximately 1,000 square miles. Most of the development, residential and agricultural, extends from the mouth to seven miles upstream. In 1970, a flood of 58,500 cfs caused damage estimated at $700,000, and in 1974, a flow of 70,000 cfs caused damage estimated at $1 million. Almost all the damage occurred within this seven-mile reach of the stream.

Natural obstructions to flood flows on Churn, Clover, Cow, Dry, and Little Cow Creeks include trees, brush and other vegetation growing in and along the floodplains. General rain floods in these drainage basins, as well as along Tormey Drain, can occur at any time between November and March. This type of flood results from prolonged heavy rainfall and is characterized by high peak flows of moderate duration. Flooding is more severe when antecedent rainfall has resulted in saturated ground conditions.

The largest recorded flood flow in Churn Creek was in 1964 at 3,160 cfs. The 1964 flood affected an estimated 730 acres of farmland and rural residential areas. Debris contributed to increased flood damage. Flood damages were estimated at $220,000. Seasonal flooding was reported annually from 2011 to 2015, damaging property and livestock. Much of the vegetative obstructions are invasive species that have thrived in the watershed and have been left untreated, allowing for dense growth.

Burney Creek, in northeastern Shasta County, is subject to flooding because of high flows. In 1970, a flood of 4,910 cfs caused an estimated $535,000 in flood damage, and in 1974, a flood of 2,890 cfs caused an estimated $160,000 in flood damage. Among the reasons for the flooding at Burney Creek is a narrow channel just above Burney and several sharp bends in the stream as it passes through Burney.

Snowfall rarely occurs along the tributary streams joining the Sacramento River between Shasta Dam and the city of Anderson. Consequently, snowmelt flooding originating downstream from Shasta Dam is not a hazard.

Floods that result from intense, widespread storms over the Sacramento River Basin, upstream from Shasta Dam, can occur anytime from September through April. Due to the regulating effect of Shasta Dam, peak flow at Anderson would be less than under natural conditions, but would continue for a much longer period. Winter rainfall runoff from the upper basin is intensified when the ground is frozen and infiltration is minimal, or when rain on snow in the higher elevations adds snowmelt to rainfall runoff.

Snowmelt runoff from the upper basin could be expected during the period from April through June and could result in flood control releases from Shasta Lake. Such releases, however, would be much smaller than those resulting from winter rainfall; therefore, snowmelt flooding is not considered to be a hazard in the study area. Cloudburst storms, sometimes lasting as long as three hours, can occur over the upper Sacramento River Basin anytime from late spring to early fall. They also may occur as extremely severe sequences within general winter rainstorms or during unseasonable rains. The intensity of cloudburst storms is very high, and the storms can produce enough precipitation to result in significant runoff. Cloudburst storm runoff originating above Shasta Lake would be entirely contained by Shasta Dam.

Repetitive Loss and Severe Repetitive Loss Properties

The City of Anderson: Under the Nation Flood Insurance Program (NFIP), the City of Anderson has had residential repetitive loss properties for a combined total of approximately $67,000. There have been no costs associated with severe repetitive loss properties.

Shasta County (Unincorporated Areas): Under the Nation Flood Insurance Program (NFIP), the unincorporated areas of Shasta County have had residential repetitive loss properties for a combined total of approximately $307,000 and commercial repetitive loss properties for a combined total of approximately $27,000. There have also been residential severe repetitive loss properties for a combined total of approximately $146,000.

Watersheds

The Sacramento River corridor occupies a relatively narrow and steep channel in the north, which begins to broaden somewhat in the central-Redding area, and becomes a fairly broad farmland floodplain at the southern city of Redding limits and beyond. The northern and western areas of the city are hilly with well-defined canyons and stream corridors. The eastern and southeastern sections of Redding sit atop a plateau above the Sacramento River, but are relatively flat with moderate to minor hills and broader, less defined stream channels. Flooding along the Sacramento River typically arises from increased flows from the Shasta and Keswick Dams. Shasta Dam regulates and controls mass storage of prolonged periods of rainfall from the rivers

and watersheds above the dam, including the Upper Sacramento River, the Pit River, Squaw Creek and numerous smaller creeks. Keswick Dam (immediately downstream from Shasta Dam) acts as an after-bay to more finely regulate the flows directly into the dam and river. These two dams act in concert to deliver precise and well-regulated flows to the Sacramento River directly north of Redding. Local drainage flooding occurs primarily due to infrequent, high-intensity rainfall events and to debris or obstructions.

Shasta County is divided into 18 major watersheds. The drainage areas for these watersheds are presented in**Error! Reference source not found.** Table 13 on the following page.

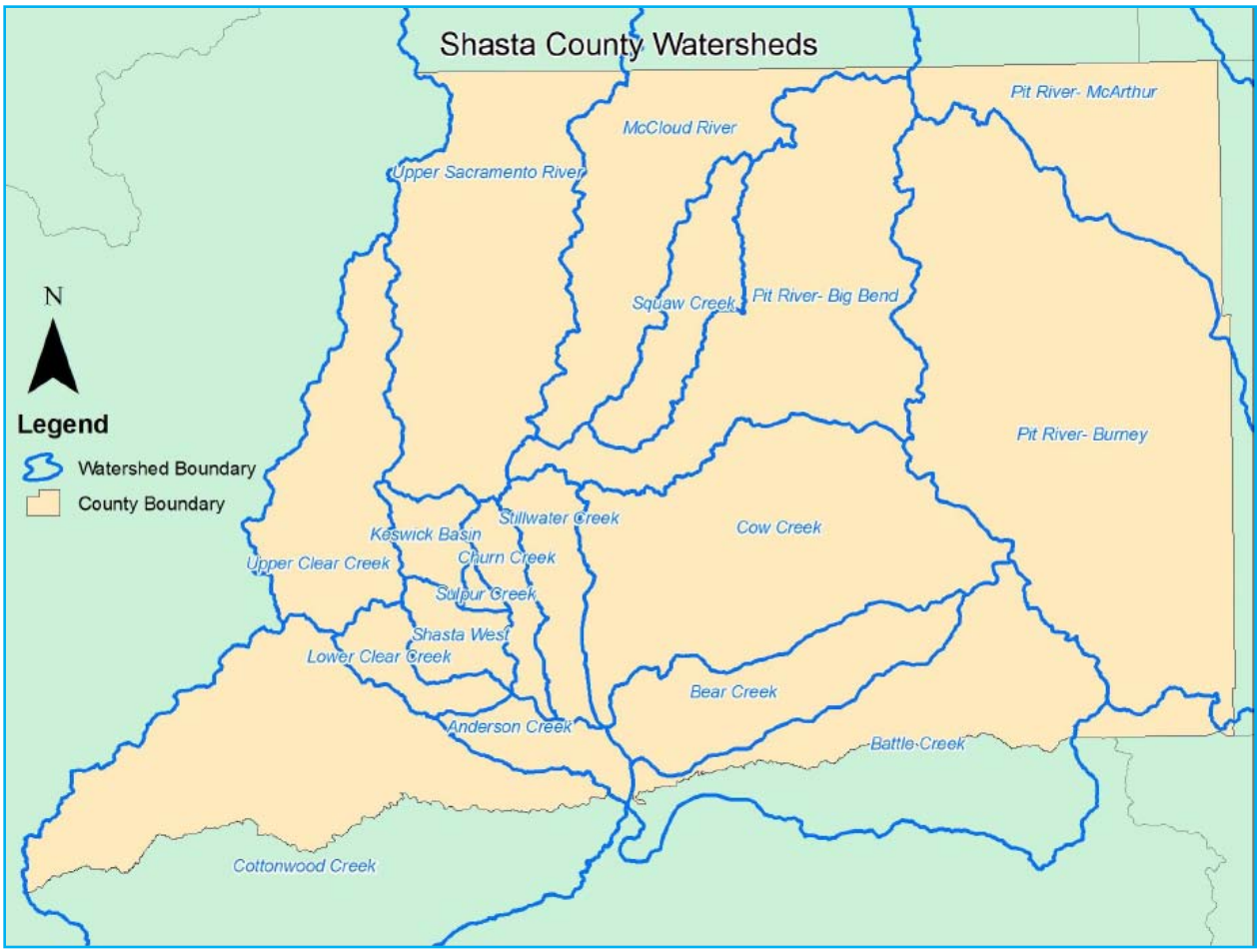


Table 13. Major Watersheds in Shasta County		
Watershed	**Square Miles**	**Within Shasta County**
Anderson Creek	55.12	55.12
Battle Creek	379.79	191.12
Bear Creek	156.57	156.57
Churn Creek	45.13	45.13
Cottonwood Creek	943.57	372.16
Cow Creek	429.21	429.21
Keswick Basin	40.09	40.09
Lower Clear Creek	48.75	48.75
McCloud River	682.11	252.64
Pit River – Big Bend	393.4	393.4
Pit River – Burney	993.96	769.91
Pit River – McArthur	1172.56	219.11
Shasta West	46.66	46.66
Squaw Creek	99.97	99.97
Stillwater Creek	76.44	76.44
Sulphur Creek	7.5	7.5
Upper Clear Creek	199.22	199.22
Upper Sacramento	595.28	387.41

4.3.1.3 Risk Assessment – Vulnerability and Potential Losses

The significant structures providing flood protection are Shasta Dam on the Sacramento River and Whiskeytown Dam on Clear Creek. Whiskeytown Dam, completed by the USBR in 1963, provides some flood protection in the southern end of the city of Redding. Although Whiskeytown Dam did not include flood control as a project purpose, the Water and Power Resources Service operates the top 10 ft. of the reservoir for flood control. This provides significant flood reduction on Clear Creek. Additional flood protection measures for each community within Shasta County are summarized below.

The City of Anderson: The County provides for floodplain districts, designated floodway districts and restricted flood zone districts along the Sacramento River. Anderson's General Plan and zoning ordinances recognize the designated floodway along the Sacramento River and establish a 100-foot corridor parallel to the main channel of Anderson Creek as flood plain open space. Land use in these flood plains is restricted to developments that will not endanger life or significantly restrict the carrying capacity of the floodway. The USBR places and maintains warning signs along the Sacramento River in an effort to indicate areas that might be subject to inundation from large releases from Shasta Lake. The Anderson area has been designated as a principal area requiring nonconventional flood damage reduction measures in the California Region Framework Study.

Shasta County (Unincorporated Areas): The County currently has a floodplain zoning ordinance in effect, as discussed previously.

A floodwall protects an area of the unincorporated town of Burney from flooding. However, this floodwall is not currently accredited by FEMA as providing protection from the 1-percent annual chance flood.

In addition the U.S. Army Corp of Engineers (USACE) is designing authorized flood-control dams on Cottonwood Creek, which joins the Sacramento River at the southern edge of Shasta County.

Construction of these dams would reduce the 1-percent annual chance floods flood peak along Cottonwood Creek near Cottonwood, from 108,000 cfs to 15,000 cfs.

Currently there is no flood-control structures constructed or planned on the studied reach of Cottonwood Creek. The Red Bank Project, a flood-control and water supply project under study by the California Department of Water Resources (DWR) is proposed for upstream locations on the south fork of Cottonwood Creek (about 20 miles west of Red Bluff) and Red Bank Creek, a tributary to the Sacramento River. If constructed as planned, this project would reduce the 1-percent annual chance floods peak flow on Cottonwood Creek by 15 percent. To date, a pre-feasibility study has been completed.

Seasonal Flooding

River flooding in Shasta County generally causes no loss of person or property. River flood levels are regulated and predictable. Advance notice of increased releases is sent to local agencies and the media, usually with 12 or more hours notice. In order to maintain a safe level of storage capacity behind the dam and prevent an overtopping event, regulators from the USBR routinely increase flows either during or following large, intense or prolonged rainfall periods in the watershed. These flows are increased to help draw down the lake to a safe level, and typically stay below 35,000 cfs. Approximately once a year, it is necessary for the USBR to increase releases to approximately 53,000 cfs. This also causes flooding below Redding, though it is mostly farmlands and a few road closures at this level.

Approximately every five to seven years, the USBR finds it necessary to increase flows to the maximum safe release of 80,000 cfs. During these flows, several blocks of riverside roadway are closed due to flooding, as are larger portions of the riverside parks and boat ramps. Flows greater than 80,000 cfs are possible, but are highly unlikely due to the widespread flooding in the valley areas below Redding. Several areas in Tehama and Colusa counties become inundated and several small communities in these areas become flooded or isolated due to the river flow at this level. Following the recession of flows greater than 53,000 cfs, streets are reopened and swept of silt and minor debris. Riverside parks and trails are checked for erosion, cleaned of minor debris and then reopened to the public. Localized flooding from high-intensity rainfall events, of which there are a few each year, typically manifests as flooded parking lots, and ponding (large puddles) along some surface streets. Road closures are rare and water levels recede quickly leaving only minor clean up of silt and debris. Many of the local drainage channels are concrete lined, but most are left natural per the CDFWs permitting and regulations.

Channels can become clogged or obstructed, especially at roadway under-crossings, due to the vegetation breaking away from the banks during periods of high flows. Typically during prolonged periods of rainfall with moderate to high intensity, these obstructions cause overflows in small channels and ditches.

Backyard flooding, including flooding the occasional swimming pool, as well as some street flooding can occur. Reports of minor flooding to garages and outbuildings, landscape erosion and flooded streets have occurred. Trash and other debris can also be found obstructing culvert and pipe openings during even moderate flows in smaller channels. Vandalism can also lead to clogging or obstruction of flows

from pipe systems. The increased use of plastic pipe in storm drain systems has lead to vandals building fires in the pipe openings, thus melting the pipe and causing it to sag into a closed or nearly closed opening, creating an obstruction. This forces the water to either back-up in the pipe until it reaches a surface street and creates localized flooding or ponding, or does not allow water into the pipe system which causes the upstream channel to overflow and flood adjoining properties.

In Shasta County, floods usually occur during the season of highest precipitations or during heavy rainfalls after long dry spells. Due to the Mediterranean climate and the variability of rainfall, stream flow throughout Shasta County is highly variable and directly impacted from rainfall with little snowmelt or base flow from headwaters. Many streams in Shasta County are dry during the summer months. Watercourses can experience a high amount of sedimentation during wet years and high amounts of vegetative growth during dry and moderate years. The increase of sedimentation and vegetation in the streams can hinder the flow and drainage of water, especially areas within the floodplain and near confluences to the Sacramento River.

The drainages in southern part of Shasta County are characterized by high intensity, short duration runoff events, due to the relatively short distance from the top of the mountains. In addition, many streams in Shasta County join the Sacramento River, creating a large floodplain in the area. The drainages in the northern part of Shasta County are contained in the upper mountain areas, but broaden out into level valley floors. The drainages in the northern part of Shasta County are generally characterized by longer duration and intense storms than the valley areas. Many streams in Shasta County only flow during winter months. In addition, there are numerous undersized culverts throughout Shasta County that cause flooding problems.

HAZUS Analysis

Flooding that occurs in Shasta County can impact critical facilities located in the unincorporated County and other jurisdictions. 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, is otherwise necessary to preserve the welfare and quality of life in Shasta County, or fulfills important public safety, emergency response and/or disaster recovery functions. Figures 4.3-1.A and 4.3-1.B show the location of critical facilities identified for Shasta County, in relation to flood hazard areas. A combination of census data from FEMA's HAZUS-MH, parcel data from the County and the County Assessor's Office database were combined to asset inventories of critical facilities and other structures in the Jurisdictions.

Table 14 shows the average replacement values of critical facilities as well as describes the abbreviations for them that are used throughout this analysis. The tables on the following pages provide inventories of population and buildings in high risk areas and describe the methodologies used in their identification.

Table 14. Average Replacement Values of Critical Facilities		
Abr.	**Name**	**Average Replacement Cost (millions)**
AIR	Airport facilities	94.5
BRDG	Bridges	333.3
BUS	Bus facilities	1.42
COM	Communication facilities and utilities	0.87
ELEC	Electric power facilities	424.7
INFR	Infrastructure includes:	
	Oil/Gas pipelines	20.6
	Railroad tracks	63.9
	Highways	2,537.0
POT	Portable and waste water facilities	596.9
RAIL	Rail facilities	2.94

Based on U.S. Inflation Calculator from 2010 to 2015 (8% inflation)

FEMA's Flood Insurance Rate Map (FIRM) data was used to determine hazard risk for floods in Shasta County. FEMA defines flood risk primarily by a 100-year flood zone, which is applied to those areas with a 1-percent chance, on average, of flooding in any given year. Any area that lies within the FEMA-designated 100-year floodplain is designated as high risk. Any area found in the 500-year floodplain is designated at low risk. Base Flood Elevations (BFE) were also used in the modeling process. A BFE is the elevation of the water surface resulting from a flood that has a one-percent chance of occurring in any given year (i.e., the height of the base flood).

Figures 4.3-1.C and 4.3-1.D display the location and extent of flood hazard areas for Shasta County. As shown in these figures, high hazard (100-year flood) zones in Shasta County are generally concentrated within the valley floor, where flash floods are more common.

Vulnerability describes how exposed or susceptible to damage an asset is, and depends on an asset's construction, contents and the economic value of its functions. Depth and velocity of flooding are also directly correlated with the amount of building and content damage for a given structure. This vulnerability analysis predicts the extent of damage to residential and commercial properties and critical facilities that may result from a flood event of a given intensity in a given area on the existing and future built environment. Like indirect damages, the vulnerability of one element of the community is often related to the vulnerability of another. Indirect effects can be much more widespread and damaging than direct effects. For example, damage to a major utility line or arterial roadway could result in significant inconveniences and business disruption that would far exceed the cost of repairing the utility line.

GIS modeling was used to estimate the potential hazard exposure of population, critical facilities, infrastructure and residential/commercial properties. The specific methods and results of all analyses are presented below. The results are shown as potential exposure in thousands of dollars, and as the worst case scenario.

Using data from HAZUS, potential impacts on residential and commercial structures in the event of a 100-year flood (considered high risk area for this plan) was estimated using the potential 100-year flood

depth from the FEMA flood maps and utilizing the Federal Insurance Administration's (FIA's) previously determined depth damage functions to anticipate damage to buildings and contents. The complete flood loss estimation tables are included as Appendix 4.A.

Table 15 and Table 16 on the next page provide a breakdown of potential losses to buildings by occupancy type and total exposure for critical facilities and infrastructure, respectively, by Jurisdiction. The total exposure to infrastructure and critical facilities in the 100-year floodplain is estimated at near $5 billion dollars, based on available data. It is important to note that the methods used for exposure analysis and loss estimation are based on limited data and several assumptions (e.g., population and buildings) being evenly distributed across census tracts. It should not be assumed that there are no risks in these areas for these types of facilities and infrastructure. Rather, the analysis shows that relative to the other Jurisdictions the risk is much lower. Detailed results of the 100-year flood hazard and 500-year flood hazard are located in Appendix 4.A.

Table 15. Potential Building Losses

Building Exposure by Occupancy Type County-Wide		
Occupancy	**Exposure ($1000)**	**Percent of Total**
Residential	3,966,636	80.5
Commercial	629,878	12.8
Industrial	109,655	2.2
Agricultural	29,467	0.6
Religion	79,470	1.6
Government	55,958	1.1
Education	54,219	1.1
Total	4,925,283	100
Based on U.S. Inflation Calculator from 2010 to 2015 (8% inflation)		

Table 16. Damage to Essential Facilities Countywide

Classification	Total	At Least Moderate	At Least Substantial	Loss of Use
Fire stations	38	4	0	1
Hospitals	3	0	0	0
Police stations	9	1	0	0
Schools	120	12	1	1

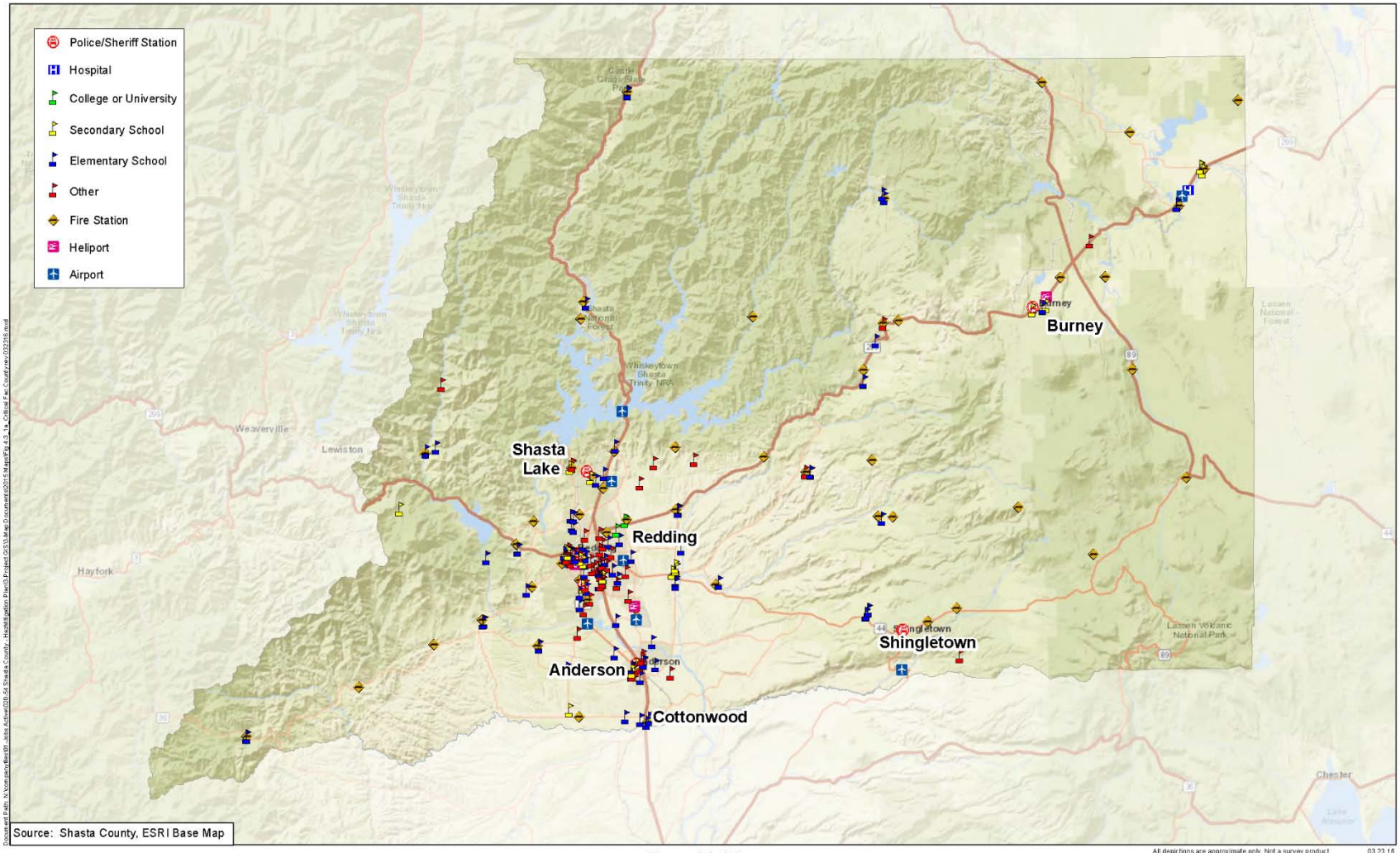


Figure 4.3-1.A
Shasta County Critical Facilities

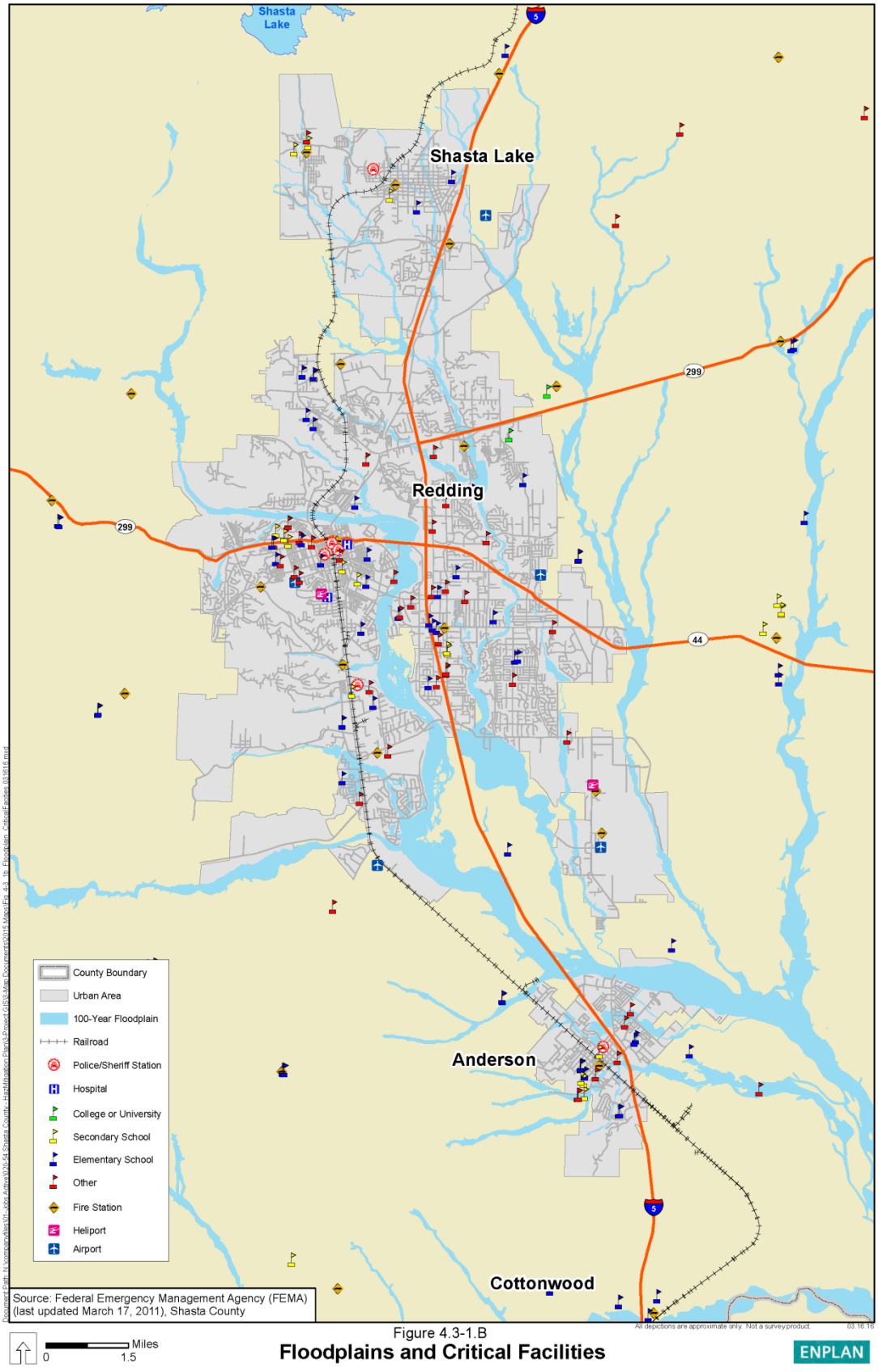


Figure 4.3-1.B
Floodplains and Critical Facilities

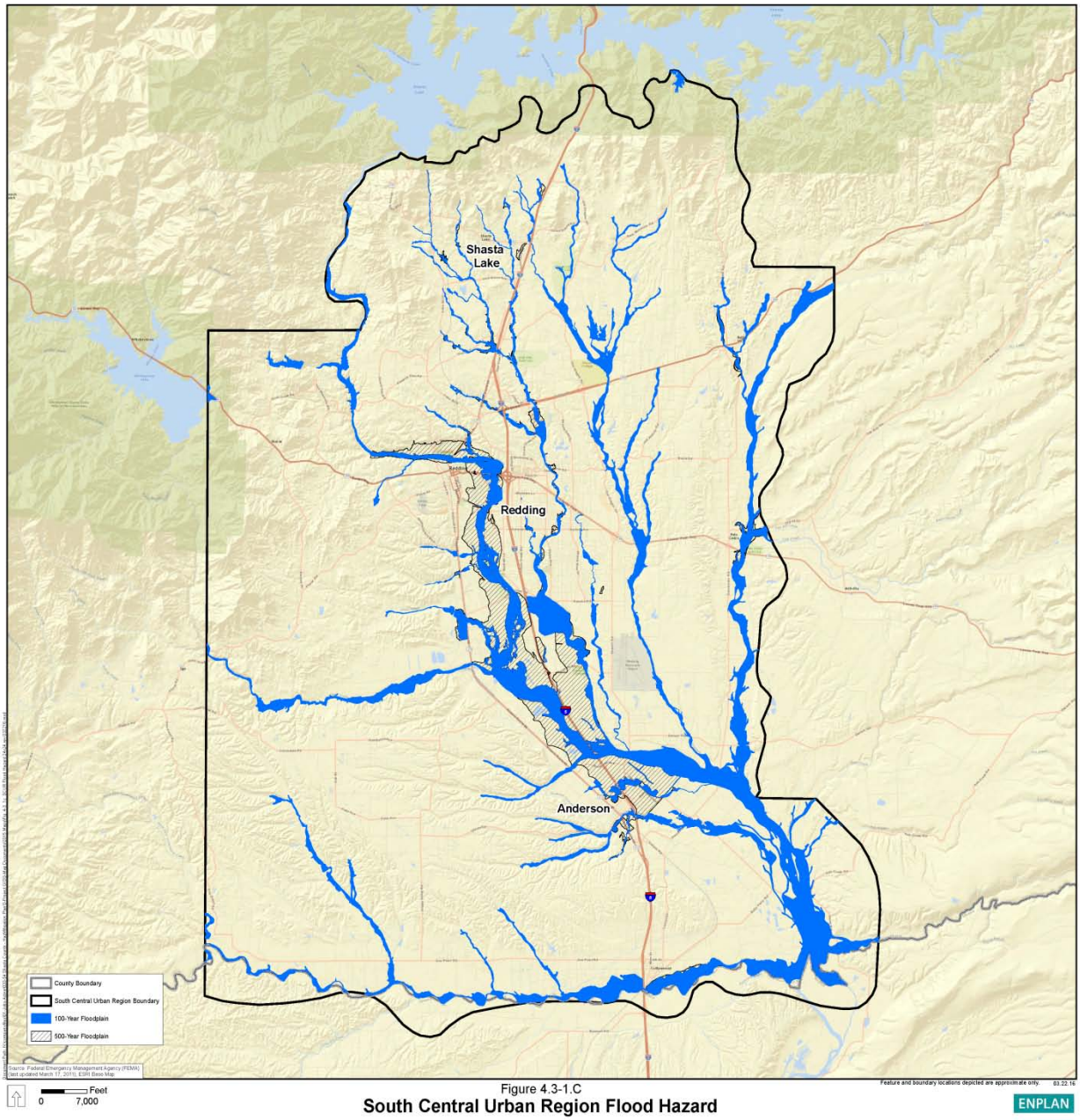


Figure 4.3-1.C
South Central Urban Region Flood Hazard

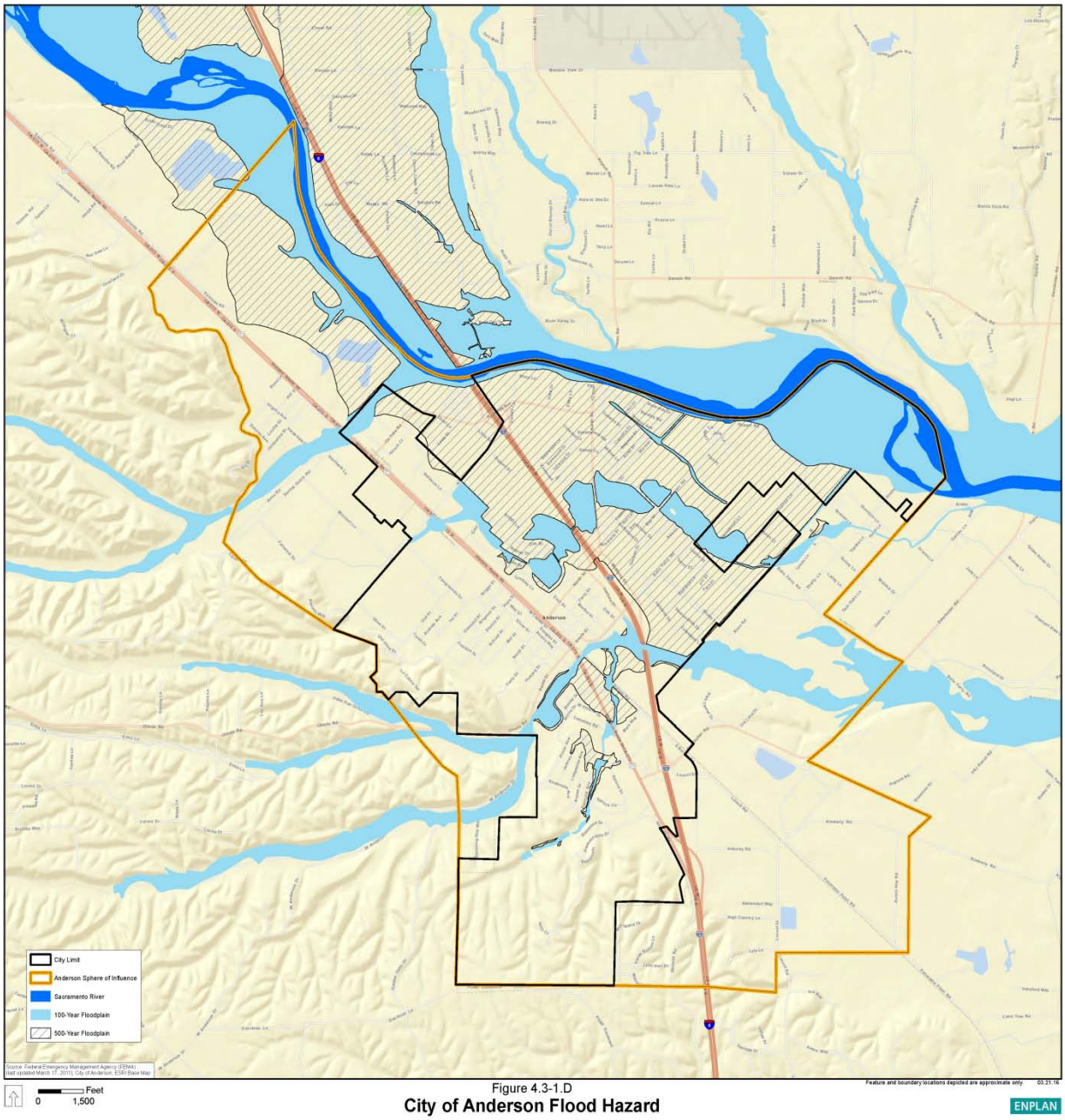


Figure 4.3-1.D
City of Anderson Flood Hazard

4.3.2 Wildfire

4.3.2.1 Hazard Definition

A wildfire is an uncontrolled fire spreading through vegetative fuels, exposing and possibly consuming structures (FEMA 386-2, 2001) and may originate from a variety of ignition sources. Three different types of wildfires exist. A surface fire is the most common type and burns along the floor of a forest, moving slowly and killing or damaging trees. A ground fire is usually started by lightning and burns on or below the forest floor in the organic layer down to the mineral soil. Crown fires spread rapidly by wind and move quickly by jumping along the tops of trees.

Wildland fire protection areas are administered by the following districts/agencies:

- CAL FIRE
- United States Forest Service – Shasta-Trinity National Forest
- National Park Service – Whiskeytown National Recreation Area and Lassen National Park
- Anderson Fire Protection District
- Burney Fire Protection District
- City of Redding
- City of Shasta Lake Fire Protection District
- Cottonwood Fire Protection District
- Fall River Fire Protection District
- Happy Valley Fire Protection District
- McArthur Fire Protection District
- Millville Fire Protection District
- Old Shasta Fire Department
- Shasta County Fire Department
- Shasta College Fire Protection District
- Shasta Fire Community Service District

Wildfires can be classified as either a wildland fire or a wildland-urban interface (WUI) fire. The former involves situations where wildfire occurs in an area that is relatively undeveloped except for the possible existence of basic infrastructure such as roads and power lines. An urban-wildland interface fire includes situations in which a wildfire enters an area that is developed with structures and other human developments. In WUI fires, the fire is fueled by both naturally occurring vegetation and the urban structural elements themselves. According to the National Fire Plan issued by the U.S. Departments of Agriculture and Interior, the wildland-urban interface is defined as —the line, area or zone where structures and other human development meet or intermingle with undeveloped wildland or vegetative fuels.

The WUI fire can be subdivided into three categories (NWUIFPP, 1998): The *classic wildland-urban interface* exists where well-defined urban and suburban development presses up against open expenses of wildland areas. The *mixed wildland-urban interface* is characterized by isolated homes, subdivisions and small communities situated predominantly in wildland settings. The *occluded wildland-urban interface* exists where islands of wildland vegetation occur inside a largely urbanized area. Generally, the areas at risk within Shasta County fall into the classic wildland-urban interface category.

Certain conditions must be present for a wildfire hazard to occur. A large source of fuel must be present, the weather must be conducive (generally hot, dry and windy) and fire suppression sources must not be

able to easily suppress and control the fire. Once a fire starts, topography, fuel and weather are the principal factors that influence wildfire behavior. People and lightning start most wildfires, but once burning, wildfire behavior is based on three primary factors - fuel, topography and weather. Fuel will affect the potential size and behavior of a wildfire depending on the amount present, its burning qualities (e.g. level of moisture), and its horizontal and vertical continuity.

Topography affects the movement of air, and thus the fire, over the ground surface. The terrain can also change the speed at which the fire travels, and the ability of firefighters to reach and extinguish the fire. Weather as manifested in temperature, humidity and wind (both short and long term) affect the probability, severity and duration of wildfires. The vegetation in Shasta County is an excellent fire fuel. Commonly called chaparral, it is dense and scrubby bush that has evolved to persist in a fire-prone habitat. Chaparral plants will eventually age and die, but won't be replaced by new growth until a fire rejuvenates the area. Chamise, manzanita and ceanothus are all examples of chaparral which are quite common in Shasta County.

Wildfires can cause short-term and long-term disruption to Shasta County. Fires can have devastating effects on watersheds through loss of vegetation and soil erosion, which may impact the county by changing runoff patterns, increasing sedimentation, reducing natural and reservoir water storage capacity, and degrading water quality. Fires may result in casualties and can destroy buildings and infrastructure.

Area Descriptions

Timber West is the Douglas-fir/Ponderosa Pine forest. The area is managed for timber production. Logging slash is a common fuel component. Sufficient undergrowth of ceanothus and manzanita is present to require consideration of a live fuel component. The terrain is steep with a large amount of heavy fuels and travel times are long in this area. Communities in this area include French Gulch, Platina, Lakehead, Lakeshore, La Moine, Shiloah, Sweetbriar, Castella, and Castle Crag.

Brush Area is the area down from the Timber Area. This mid elevation of 1,000 to 2,000 ft. surrounds the Sacramento Valley and merges with the brush area. The area is typically chaparral with chamise and manzanita. These elevations include oak woodland fuels with a high mixture of brush fuels. Communities include the city of Shasta Lake, Mountain Gate, Old Shasta, Keswick, and French Gulch.

Most of the lands northwest of Redding were void of vegetation by the early 1900's due to copper mining and smelter operations. This area now consists of mostly brush fields that are 50 years and older. The brush now has sufficient dead fuel and fine fuel to sustain large and damaging fires. The land to the west of Redding is at the base or lower levels of the mountains and is covered brush or oak woodland with a heavy brush understory.

Most of the land west of Redding is highly urbanized, which creates a high threat to life and property from wildfire. Subdivisions that were developed prior to 1982 often have narrow one-lane roads with no community water systems. Often the structures have a single access road. Some subdivisions were developed with fire emergency access roads. However, many of these roads are not maintained and are

overgrown to the point of being impassable. Communities in the Brush Area west of Redding, include Igo, Centerville, Old Shasta, Keswick, Shasta Lake and portions of Redding.

The Brush Area east of Redding is generally located in rangeland. However, urbanization in the brush area exists in the western edge of the communities of Shingletown, Whitmore, Oak Run, Round Mountain, and Montgomery Creek. This area has experienced significant fires in the past and with current urbanization can expect future fires to be more damaging.

Grass Area is the valley floor, the south-central part of Shasta County extending from the Sacramento River outwards to an approximate elevation of 1,000 ft. This is the most urbanized area of Shasta County and includes Anderson, Redding, Bella Vista, Happy Valley, Millville, and Palo Cedro. The area is typically grassy woodland with blue oak, valley oak, gray pine, and annual grasses. There are also large areas covered by brush types and some of the woodland areas have a dense brush understory. Significant fires have occurred on the valley floor, especially during north wind events, because the primary fuel is annual grasses. Each year the fire danger is recurring.

Timber East is a mixed species conifer forest that begins about the 2,000 ft. elevation and varies in topography, weather and includes some hardwood species. The majority of the area is managed for timber production; therefore, logging slash is a common fuel component. Sufficient undergrowth of ceanothus and manzanita is present to require consideration of a live fuel component. The terrain is very steep with a large amount of heavy fuels and travel times are long in this area. Communities include Shingletown, Viola, Latour, Big Bend, and Burney.

Northeast County area is high elevation sagebrush, juniper and ponderosa pine. Large tracks of agricultural lands are in the Fall River Valley. With the exception of the irrigated Fall River Valley, the area has experienced damaging fires. The most significant fires were located to the north of State Route 299E and east of State Route 89. Large and damaging fires have also occurred along State Route 89 south near the communities of Hat Creek and Old Station. Portions of this area are remote and travel times are long. The fuels are very sensitive to changes in the wind speed and direction. The larger communities include Cassel, Fall River Mills and McArthur with significant urbanization occurring outside of these communities.

4.3.2.2 History of Wildfires

Shasta County has a history of large and damaging fires. The continued urbanization of the wildland areas significantly increases both the damage and ignition potential. Significant amounts of the population and their properties are at risk. Residents must provide and maintain a defensible space around their properties. Fuels along existing roadways should also be maintained in order to ensure safe passage. Fuel breaks and post-fire fuel management are required to help alleviate the risk of fire and

help restore a healthy wildland environment. To achieve these, education, enforcement, fuels management and financial assistance should continue to be made available.

In Shasta County there have been 15 state and federally declared fire disasters between 1950 and 2014. The majority of large fires within Shasta County are shown in Figure 4.3-2.A, which have been documented since 1910. The majority of the most damaging fires have occurred since 2004.

Fire history shows a large and damaging fire can occur almost anywhere. Large fires in Shasta County within CAL FIRE's jurisdiction with structural damage are shown Table 17 below.

Table 17. History of Large Shasta County Fires

Month/Year	Fire Name	Cause	Acres	Structures
August 1992	Fountain	Arson	**63,960**	636
September 1999	Canyon	Vehicle	**2,580**	230
October 1999	Jones	Undetermined	**26,200**	954
August 2004	Bear	Human	**10,484**	114
August 2004	French	Under investigation	**13,005**	42
August 2005	Manton*	Human	**1,839**	30
June 2008	Lakehead	Lightning	**27,936**	12
September 2012	Ponderosa*	Lightning	**27,676**	133
September 2012	Bagley**	Lightning	**46,011**	0
September 2013	Clover	Arson	**8,073**	196
July 2014	Bully	Human caused	**12,661**	20
July 2014	Eiler	Lightning	**32,416**	21
Total			**272,841**	2,388

**Fires occurred in both Shasta and Tehama Counties*

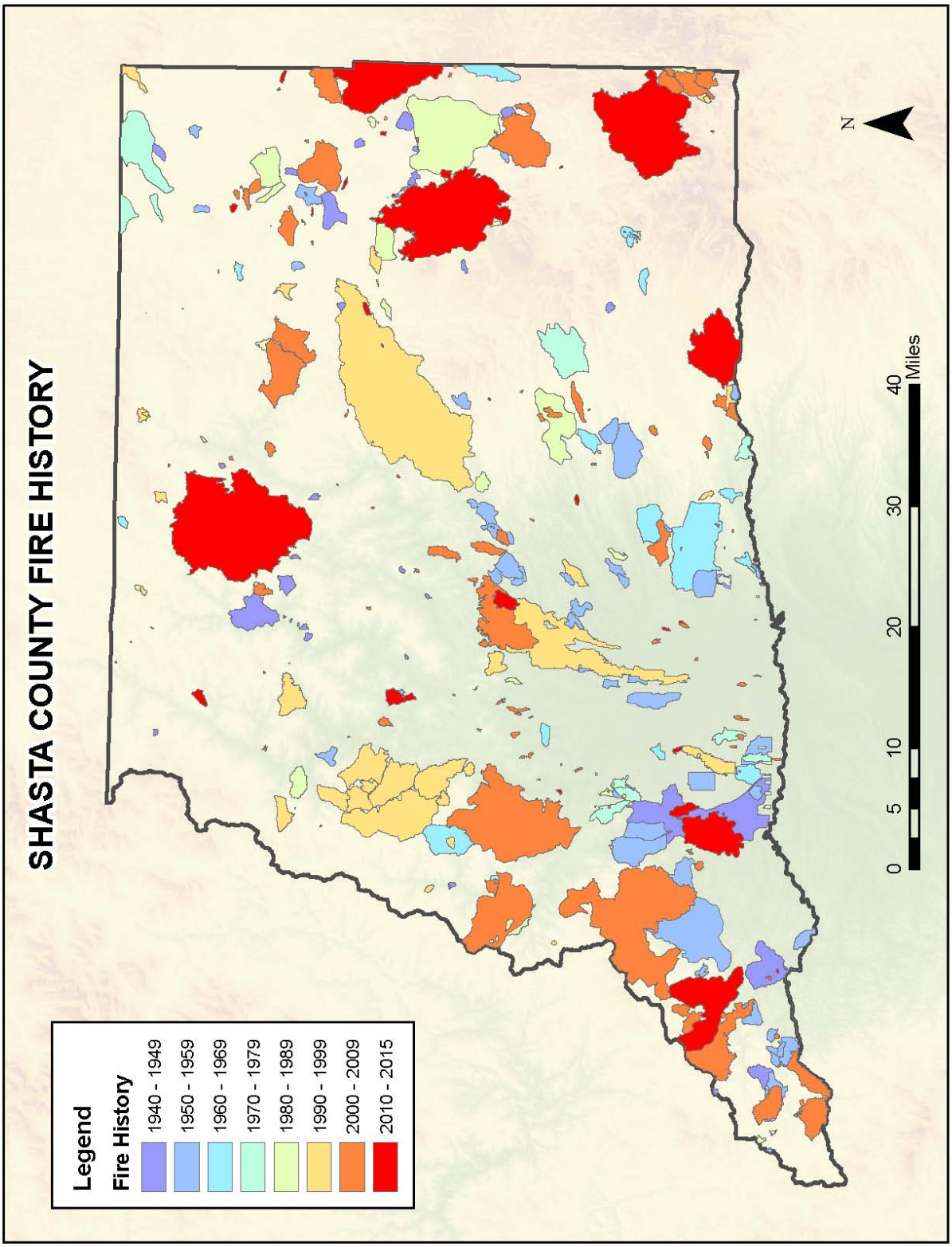
*** USFS fire – primarily on USFS and private land*

(Source: CAL FIRE Incident Information)

The 2013 Clover Fire occurred 10 miles southwest of Redding near the communities of Igo and Happy Valley, with a population density of 4.9 persons per square mile. The fire burned over 8,000 acres, destroying 196 structures and one fatality. The cause of this fire was ruled as arson.

On July 30, 2014, two fires occurred in eastern Shasta County causing significant damage. The Eiler Fire, a lightning-caused fire in the Lassen National Forest's Thousand Lakes Wilderness, forced evacuation of homes in the Shasta County communities of Johnson Park, Cassel and Big Eddy Estates. An evacuation advisory was in place for the community of Burney. Twenty-one structures were destroyed and 32,416 acres burned.

The Bald Fire, also on the Lassen National Forest eight miles southeast of Fall River Mills, grew to 39,736 acres and forced evacuation of homes in the Little Valley area of northwest Lassen County. No structures were damaged or destroyed. The fire burned heavy brush and scattered timber.


SHASTA COUNTY FIRE HISTORY
Legend
Fire History
1940 - 1949
1950 - 1959
1960 - 1969
1970 - 1979
1980 - 1989
1990 - 1999
2000 - 2009
2010 - 2015
N
0
5
10
20
30
40
Miles

4.3.2.3 Risk Assessment – Vulnerability and Potential Losses

Vulnerability describes how exposed or susceptible to damage an asset is, and depends on an asset's construction, contents and the economic value of its functions. This vulnerability analysis predicts the extent of damage that may result from a hazard event of a given intensity in a given area on the existing and future built environment. Unlike with flooding, where the amount of damage a building and its contents receives is directly related to flood depths, velocity and other factors, it is more difficult to estimate losses from wildfire, a peril that is less predictable and driven by such factors as wind direction and seasonal precipitation variations. With indirect damages, the vulnerability of one element of the community is often related to the vulnerability of another.

Indirect effects can be widespread and damaging. For example, with wildfire, the threat of future flooding, landslide and erosion increases dramatically. In addition to potential damage to homes and businesses, agricultural economies can be destroyed and having indirect effects on labor and associated industries (e.g., transportation). In some cases, the economic impact may be comparable to the economic impact of physical damages or, in some cases, even greater. Economic impacts of loss of transportation and utility services may include traffic delays/detours from road and bridge closures and loss of electric power, potable water and wastewater services. Fires can also cause major damage to power plants and power lines needed to distribute electricity to operate facilities.

Models

The California Department of Forestry and Fire Protection, Fire and Resource Assessment Program (CDF-FRAP) developed several models to assist in determining fire behavior and frequency. The FRAP WUI Fire Threat model was used to determine potential exposure to moderate, high, very high and extreme wildfire hazard areas. The WUI methodology assigns relative wildfire risk to areas of significant population density by intersecting residential housing unit density with proximate fire threat to give a relative measure of potential loss of structures and threats to public safety from wildfire. Initially developed at a 30-meter scale, a 100-meter representation of the data was used for analysis.

CDF-FRAP modeled wildland fire threat for the State of California in 2002. This model was used in GIS to profile the fire hazard throughout Shasta County. Figure 4.3-2.B displays the direct protection areas of responsibility for wildland fire and Figure 4.3-2.C shows the location and extent of the risk levels for wildfire fire throughout Shasta County, used for this discussion.

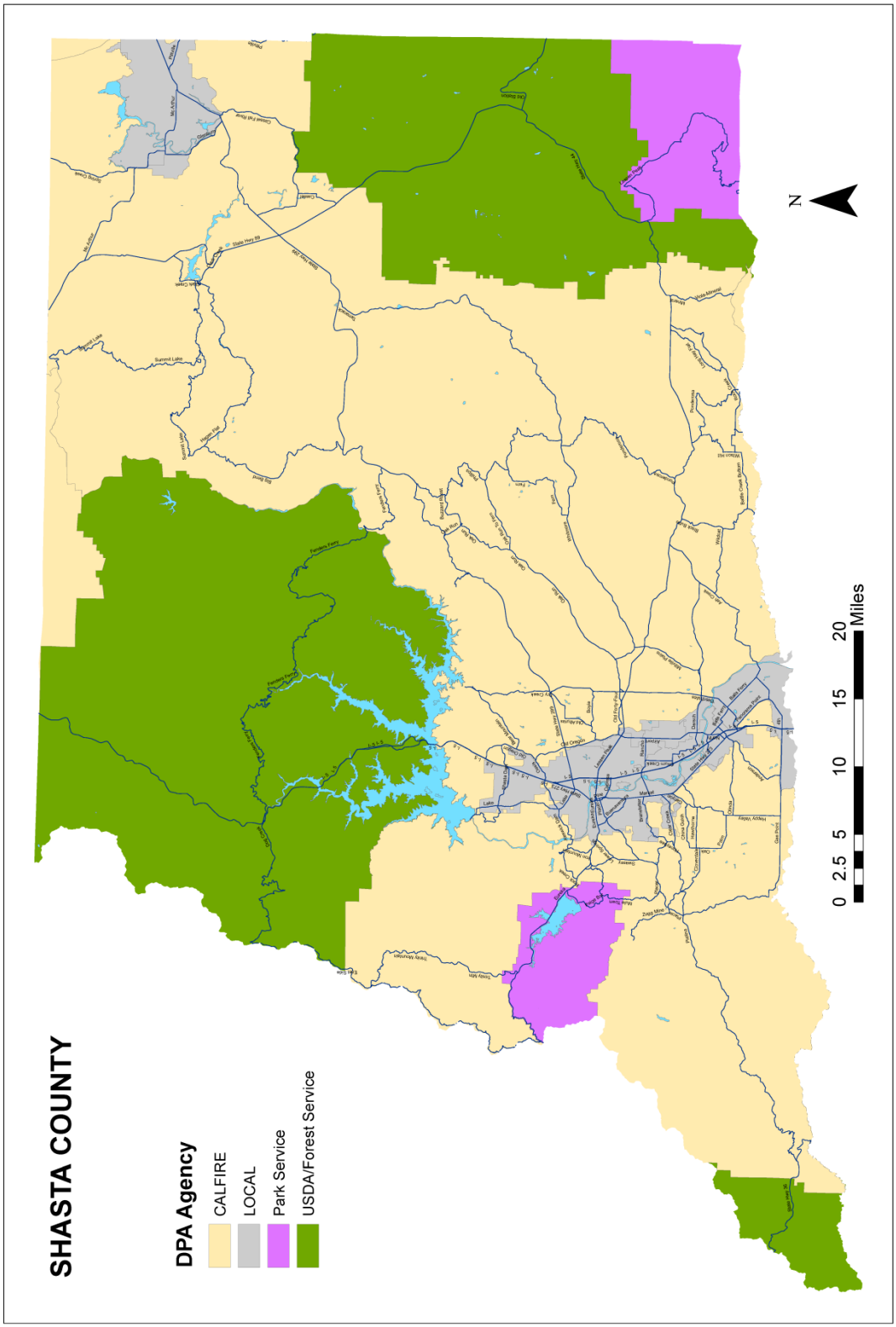
Wildfire in Shasta County can impact critical facilities as well as residential and commercial property shown in subsection 4.3.1.

Using GIS, the CDF FRAP threat data, provided by Cal OES was analyzed against an inventory of assets to identify exposure to the four levels of wildfire risks, resulting in three risk/exposure estimates for each level of risk: 1) the aggregated dollar exposure and building count at the census block level for residential and commercial occupancies, 2) the aggregated population at risk at the census block level, and 3) the critical infrastructure at risk (schools, hospitals, airports, bridges, and other facilities of critical nature).

Analysis at the census block level involved determining the proportion of total area for a census block to the area of hazard zone that intersects it. This spatial proportion was used to determine percentage of the population and buildings that would be affected within each block. Critical facilities and infrastructure that fell within the boundary of the hazard area were determined to be vulnerable and were totaled by count or number of kilometers affected. These numbers were aggregated and presented for each Jurisdiction and for the unincorporated areas of Shasta County. In general, dense urban areas offer greater resistance to the spread of wildfires, as they are not likely to contain continuous surface fuels despite the presence of mature trees.

Wildland fires have the greatest potential to cause widespread catastrophic loss and are the highest priority hazard in the SCHMP. As shown in Table 17, most years there are structures destroyed in Shasta County by wildland fires, which is not always the case in other counties in California. Figures 4.3.1-A, 4.3.1-B, 4.3.1-C, and 4.3.1-D in subsection 4.3.1 show the critical facilities and infrastructure which could be threatened by wildland fires.

Wildfire can create a multi-hazard effect, where areas that are burned by wildfire suddenly have greater landslide risks because the vegetation that prevented erosion is now gone. Watershed from streams and rivers will change and floodplain mapping may need to be updated. Also, air quality issues during a large-scale fire cause further economic losses than only the structural losses described below. Road closures and business closures due to large-scale fires would also increase the economic losses.


SHASTA COUNTY
DPA Agency
CALFIRE
LOCAL
Park Service
USDA/Forest Service
N
0 2.5 5 10 15 20
Miles

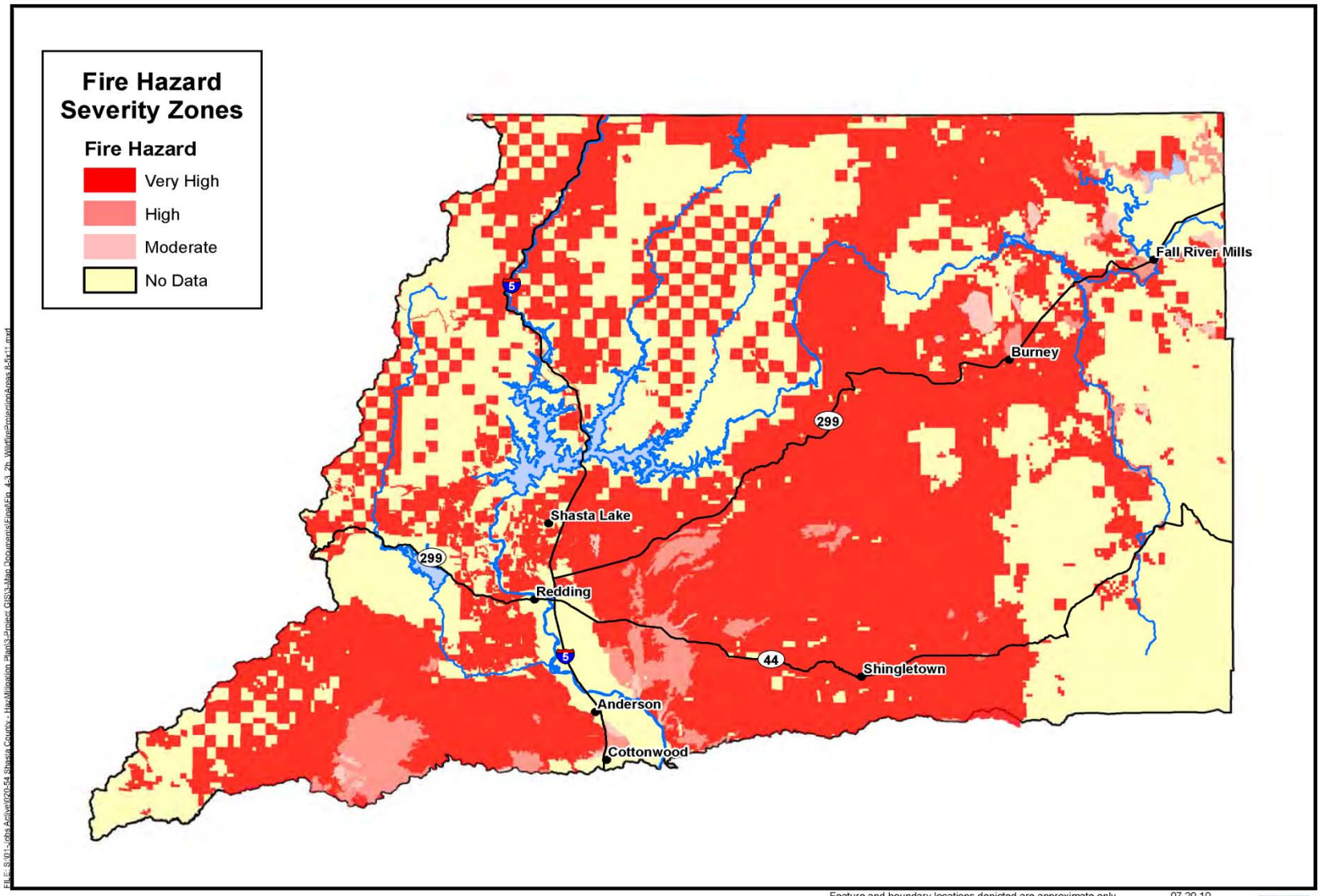


Figure 4.3-2.C
Location and Extent of Risk Levels for Shasta County Wildfires

Communities at Risk

The National Fire Plan (NFP) is a cooperative, long-term effort between various government agency partners with the intent of actively responding to severe wildland fires and their impacts to communities while ensuring sufficient firefighting capacity for the future. For purposes of the NFP, CAL FIRE generated a list of California communities at risk for wildfire. The intent of this assessment was to evaluate the risk to a given area from fire escaping off federal lands. Three main factors were used to determine the wildfire threat in the wildland-urban interface areas of California: fuel hazards, probability of fire and areas of suitable housing density that could create wildland urban interface fire protection strategy situations. The preliminary criteria and methodology for evaluating wildfire risk to communities is published in the Federal Register, January 4, 2001. Within Shasta County, the following 38 communities have been identified as at high risk of damage from wildfire: Anderson, Beegum, Bella Vista, Big Bend, Burney, Cassel, Castella, Centerville, Central Valley, Cottonwood, Dana, Fall River Mills, French Gulch, Gibson, Glenburn, Hat Creek, Igo, Keswick, Lakehead, Lamoine, McArthur, Millville, Montgomery Creek, Mountain Gate, O'Brien, Oak Run, Old Station, One, Palo Cedro, Pittville, Platina, Redding, Redding Rancheria, Roaring Creek Rancheria, Round Mountain, Shasta, Shingletown, Sims, and Whitmore.

Fire and the Natural Environment

Fire is a natural and critical ecosystem process in most of California's diverse terrestrial ecosystems, dictating in part the types, structure and spatial extent of native vegetation in the state. Many of California's ecosystems are adapted to a historic fire regime, which characterizes historic patterns of fire occurrence in a given area. Fire regimes include temporal attributes (e.g., frequency and seasonality), spatial attributes (e.g., size and spatial complexity), and magnitude attributes (e.g., intensity and severity), each of which have ranges of natural variability (Sugihara et al. 2006).

Ecosystem stability is threatened when any of the attributes for a given fire regime diverge from its range of natural variability, which currently is prevalent throughout California. In general, when compared to historic fire regimes, many mixed-conifer forests now experience fires that are more intense and severe, while chaparral shrublands experience fire at a greater frequency. Both trends have profound impacts on ecosystem stability throughout California.

A principal cause of intensifying wildfire severity in mixed-conifer forest types in the state is the mounting quantity and continuity of forest fuels that have been brought about by a century of fire exclusion. Fire exclusion in California and throughout the western U.S. has been attributed largely to fire suppression and introduction of grazing that removed fine fuels necessary for fire spread in and between forested stands. Conifer forests that historically experienced frequent but low-intensity surface fires, which are prevalent throughout California, are now predisposed to high-intensity, high-severity crown fires.

One measure of derivation from the range of natural variability is the fire regime condition class (FRCC; Hardy et al. 2008). FRCC classifies landscapes into three classes dependent on their degree of departure from natural fire regimes:

Low: Condition Class 1	Moderate: Condition Class 2	High: Condition Class 3
• Fire regimes are within the natural or historical range and risk of losing key ecosystem components is low. Vegetation attributes (composition and structure) are well intact and functioning.	• Fire frequencies may have departed by one or more return intervals (either increased or decreased). This departure may result in moderate changes in fire and vegetation activites.	• Fire frequencies may have departed by multiple return intervals. This may result in dramatic changes in fire size, fire intensity and severity, and landscape patterns. Vegetation attributes have been substantially altered.

Source - Hardy et al (2008)

Wildfire is a part of nature. It plays a key role in shaping ecosystems by serving as an agent of renewal and change. But fire can be deadly, destroying homes, wildlife habitat and timber, and polluting the air with emissions harmful to human health. Fire also releases carbon dioxide- a key greenhouse gas—into the atmosphere. Fire's effect on the landscape may be long-lasting. Fire effects are influenced by forest conditions before the fire, and management action taken or not taken after the fire.

Timberlands

Timberlands, defined as conifer-dominated habitat types that likely support 20 cubic ft. of volume growth per year and are not in reserved status, are a significant economic resource in California and are the primary economic base in some rural areas. Fire can pose significant risk to timber assets through direct loss from combustion, mortality of growing stock and fire-induced susceptibility to insect, pathogen and decay mechanisms. The actual loss of timber value associated with a given fire event is a function of tree structure, fire severity and post-fire salvage opportunity. Roughly three-quarters of California's timberland faces a high fire threat or greater and over half of these lands have very high or extreme fire threat conditions. Only about one-fifth of California's timberlands face a moderate fire threat, where expected losses to timber assets are likely to be low. While some of the standing timber value can be salvaged following a wildfire, much of California's timber assets are exposed to significant risk from wildland fire.

Woodlands

Woodland vegetation, especially hardwood woodlands, provide key habitat for many species. The risk of habitat loss associated with fire in woodland areas is highly variable, due both to varying habitat quality and the unique fuel and vegetation response characteristics of specific areas. Habitat characteristics

such as tree canopy height and closure, presence or absence of a developed shrub understory, and occurrence of special habitat elements, such as snags and downed logs, are important determinants of habitat quality for many species. Roughly two-thirds of California's hardwood woodlands are exposed to very high or extreme fire threat. While many areas may respond favorably to wildland fire, initial changes in the post-fire environment may cause temporary habitat loss and species dislocation.

Recreation and Open Space

After a wildfire, significant alteration of watershed lands and the associated stream systems is noticeable for periods varying from a few years to decades. In the short term, the presence of partially burnt vegetation reduces recreational and open space values. Increased amounts of downstream sedimentation may significantly affect streams and lakes, which tend to be the most heavily used spots within larger recreational areas. As the vegetation grows back and damaged recreational infrastructures are replaced, the recreational and open space values would increase. However, it may take decades before vegetation types such as mature forests return to their pre-burn character. Grasslands and shrublands, on the other hand, can return to their pre-burn character within a decade.

Water and Watersheds

Wildfires can have significant adverse effects on watershed lands, watercourses and water quality. Large, hot fires cause serious, immediate damage from which a watershed can take decades to recover. By burning off vegetation and exposing mineral soil, fire impairs the ability of a watershed to hold soil in place and to trap sediment before it enters stream systems. Loss of vegetation also means less water being absorbed by plants, causing a short-term increase in the quantity and the delivery rate of water entering streams. This can have significant effects downstream from the site of a fire. This increased runoff and its large sediment load can cause costly damage to downstream assets such as homes, roads, debris basins, and other infrastructure. It can also result in the loss of human life when at-risk residents are not evacuated.

Soils

Fire presents a significant risk to soil, especially in denuded watersheds, through accelerated erosion potential in the immediate post-fire environment, particularly when subjected to severe rainstorms prior to any vegetation recovery (Wells et al., 1979). FRAP has developed a statewide risk assessment based on the expected marginal increase in surface erosion from a potential fire.

Erosion is a natural process that occurs across a watershed at varying rates, depending on soils, geology, slope, vegetation and precipitation. The intensity of a fire and the subsequent removal of vegetative cover increase the potential rate of soil erosion and new sediment sources. Wildfires affect surface

erosion in a watershed by altering detachment, transport and deposition of soil particles. Most wildfires create a patchwork of burned areas that vary in severity. Severely burned areas suffer increased erosion due to loss of the protective forest floor layer and creation of water-repellent soil conditions that can cause flooding, downstream sedimentation and threats to human life and property.

Riparian Habitats

Wildfire can produce a wide range of water quality and aquatic habitat outcomes, from beneficial to catastrophic. Wildfire outcomes are determined by weather, fuels, terrain and, to a lesser extent, suppression efforts. Large wildfires pose the greatest risk to water quality and riparian habitat. If a wildfire encounters fuel levels that have been reduced through prescribed burning and/or mechanical means, there is a good chance the fire would produce conditions more favorable to maintaining good water quality and aquatic habitat. Highly destructive fires are thus minimized.

Aquatic Habitat

Fire can also dramatically affect aquatic habitat. Increased erosion and sediment deposition can result in channel aggradations (i.e., wider, shallower channels); filling of pools that provide important fish habitat, increased turbidity that makes it harder for fish to find food and can damage gills, and changes in water chemistry.

Water Quality

Wildfires can potentially affect water quality through increased sedimentation and increased turbidity and through increases in nutrient loadings. Concentration of nutrients (phosphorous and nitrogen) are increased from burned vegetation and delivered to streams through surface runoff. Stream temperatures often increase after fire occurs, typically through the removal of overhead protective vegetation. Elevated stream temperatures are detrimental to most cold-water fish species.

Water Infrastructure

Water delivery systems may be dramatically affected by fire. With the exception of the north Coast, most watersheds in California have extensive downstream water supply infrastructures serving rural residents, larger municipalities and agricultural users. Increased sediment can decrease storage capacity in dams and reservoirs.

Trade-Offs in Fire Hazards vs. Ecosystem Services Provided by Vegetation

To facilitate sustainable, disaster-resistant communities, there is a critical need to assess the tradeoffs in vegetation's potential to facilitate destructive wildfires versus the biological and economic benefits that it provides. Paradoxically, vegetation is both an asset and a liability to residents living in the WUI areas. The same vegetation that regularly burns with great intensity and destruction simultaneously provides both tangible and intangible benefits to local communities (Dicus and Zimmerman 2007, Dicus et al. 2009).

Minimizing fire hazard while maximizing the economic, biological, aesthetic, and social values that vegetation provides are seemingly conflicting objectives in the WUI, particularly to those living in high hazard areas with elevated population densities. Continued immigration to highly fire-prone areas in California will likely continue unabated in the near future.

Immigration to fire-prone areas in California has exponentially increased the costs and losses associated with WUI fires in the last two decades. In spite of increased fire agency staffing, equipment and training, nineteen of the top 20 most damaging California wildfires have occurred since 1990, resulting in the loss of 75 lives and almost 17,511 structures (CAL FIRE Top 20 Most Damaging California Wildfires 2015 fact sheet). Two of these fires occurred in September 2015 in Lake, Napa and Sonoma counties and Amador and Calaveras counties.

However, treatment- and development-induced losses in tree and shrub canopy cover cost society in many direct and indirect ways. Vegetation is more than fuel, providing various levels of tangible and intangible benefits to society, dependent on its composition and structure. For example, WUI vegetation not only enhances community attractiveness but also reduces home cooling costs and air pollution (Taha et al. 1997), lessens needed storm water runoff infrastructure (Sanders 1986), sequesters carbon (Nowak and Rowntree 1991), and provides wildlife habitat. Fuel treatments will only serve to further reduce vegetation and their subsequent social and economic benefits (Dicus et al. 2009).

The need to adequately understand how fuel treatments affect both fire hazard and societal benefits is especially critical in light of recent legislation which calls for a significant increase in mandatory fuel treatments around structures. California Senate Bill 1369 was signed into law as a direct result of the 2003 California fires, which amended Public Resources Code 4291 to increase mandatory vegetation clearance around homes in all designated areas where the state has primary suppression responsibilities. These new standards have the potential to significantly reduce the losses caused by wildfire but will also likely reduce the many tangible benefits to society that vegetation provides (Dicus et al. 2009). Thus, there is an acute need for California land managers to develop fuel management strategies in the WUI that minimizes fire risk while simultaneously reducing loss of native vegetation and the many societal benefits that it provides.

4.3.2.4 Current Wildfire Hazard Mitigation Efforts

Once thought of as a seasonal hazard, wildfires are an almost everyday occurrence in California. However, much of the state's approach to dealing with wildfire is still seasonal in nature. Flammable expanses of brush, diseased timberland, overstocked forests, hot and dry summers, extreme topography, and intense fire weather wind events, summer lightning storms and human acts all contribute to California's wildfire threat.

Wildfire and Human Development

Wildfire and human development have always been in conflict. Wildfire is a natural part of our environment and human development in wildland is an accepted practice. This inherent conflict requires careful management in order to reduce or eliminate losses to life, property and resources from wildfires. Some past management practices have failed to address the comprehensive nature of the human/wildfire conflict and have exacerbated conditions that can lead to more damaging fires. One example is wildfire suppression without aggressive management of hazardous fuels or defensible space. Another is development in historical WUI fire areas without performance-based fire-resistant

construction standards or fire-safe development requirements. Daily actions and decisions often fail to consider WUI fire risks and the potential for resulting losses.

Managing the Human/Wildfire Conflict

Managing the human/wildfire conflict requires a commitment of resources and a focused mitigation plan over the long term. The approach must be system-wide and include the following:

- An informed, educated public that takes responsibility for its own decisions relating to wildfire protection.
- An effective wildfire suppression program.
- An aggressive hazardous fuels management program.
- Land use policies and standards that protect life, property and natural resources.
- Building and fire codes that reduce structural ignitions from windblown embers and flame contact from WUI fires and impede or halt fire spread within the structure once ignited.
- Construction and property standards that provide defensible space.

2010 Strategic Fire Plan

CAL FIRE approved the 2010 Strategic Fire Plan in June, 2010. This plan forms the basis for assessing California's complex and dynamic natural and man-made environment and identifies a variety of actions to minimize the negative effects of wildland fire.

Vision: A natural environment that is more resilient and man-made assets which are more resistant to the occurrence and effects of wildland fire through local, state, federal and private partnerships.

Goals and Objectives: Through government and community collaboration, the following goals will enhance the protection of lives, property and natural resources from wildland fire, as well as improve environmental resilience to wildland fire. Community protection includes promoting the safety of the public and emergency responders, as well as protection of property and other improvements. Each goal listed here is meant to build upon the previous one (e.g., Goal 3 builds upon the accomplishments in Goals 1 and 2). Although full attainment of a goal is ultimately dependent upon the success of previous goals, any of the goals can be worked on at any given time based on available funding and other opportunities.

1. Identify and evaluate wildland fire hazards and recognize life, property and natural resource assets at risk, including watershed, habitat, social and other values of functioning ecosystems. Facilitate the sharing of all analyses and data collection across all ownerships for consistency in type and kind.
2. Articulate and promote the concept of land use planning as it relates to fire risk and individual landowner objectives and responsibilities.
3. Support and participate in the collaborative development and implementation of wildland fire protection plans and other local, county and regional plans that address fire protection and landowner objectives.
4. Increase awareness, knowledge and actions implemented by individuals and communities to reduce human loss and property damage from wildland fires, such

as defensible space and other fuels reduction activities, fire prevention and fire safe building standards.

5. Develop a method to integrate fire and fuels management practices with landowner priorities and multiple jurisdictional efforts within local, state and federal responsibility areas.
6. Determine the level of fire suppression resources necessary to protect the values and assets at risk identified during planning processes.
7. Address post-fire responsibilities for natural resource recovery, including watershed protection, reforestation and ecosystem restoration.

CAL FIRE has developed an estimate of fire risk in WUI areas that is consistent with National Fire Plan methods but is more refined in terms of both mapping extent and quantification of risk. CAL FIRE uses spatial data to distinguish fire-related characteristics from assets and applies spatial rules for determining relative risk of loss http://frap.fire.ca.gov/.

The 2010 Strategic Fire Plan is a strikingly different fire plan than those developed in the past. This Plan recognizes that fire will occur in California and works to answer the question of "How do we utilize and live with that risk of wildfire?" The approach taken in the revised plan is to focus on a vision and goals and objectives that will help reach that vision. The overall vision is to create a state that is more resistant and resilient to the damaging effects of catastrophic wildfire while recognizing fire's beneficial aspects. The 2010 Strategic Fire Plan is a living document. The entire fire plan can be viewed on the California Board of Forestry and Fire protection website at: http://bofdata.fire.ca.gov/board_Committees/resource_protection_Committee/current_projects/resources/strategicfireplan_june2010_06-04_photos.pdf

Shasta County Fire Safe Council (FSC)

The mission of the FSC is to be a framework for coordination, communication, education, and support to decrease catastrophic wildfire throughout Shasta County. The FSC was formed in 2002, to serve as a forum for agencies, business and community members for communication and collaboration. The council operates in conjunction with the Western Shasta Resource Conservation District and depends on grant funding to continue the program. The council encourages the formation of neighborhood or watershed-based fire safe councils to educate landowners in the importance of creating defensible space around homes and structures and periodically update the strategic fuels reduction plans to prioritize fuel reduction projects. The strategic fuels reduction plans were updated in 2009 for the areas shown on Figure 4.3-2.E.

A countywide fuels reduction mapping project has shows fuel reduction projects around Shasta County, along with other important information such as water sources, wildland interface zones, fire departments, powerlines, vegetation types and fuel ranking. This is an ongoing project that helps with strategic planning for the fuel reduction projects.

The FSC and Western Shasta Resource Conservation District work with councils and watershed groups in submitting grant applications to fund their highest priority fuel breaks. The proposed and completed fuel break projects are shown on Figure 4.3-2.F Fire Safe Council Fire Plan Base Map.

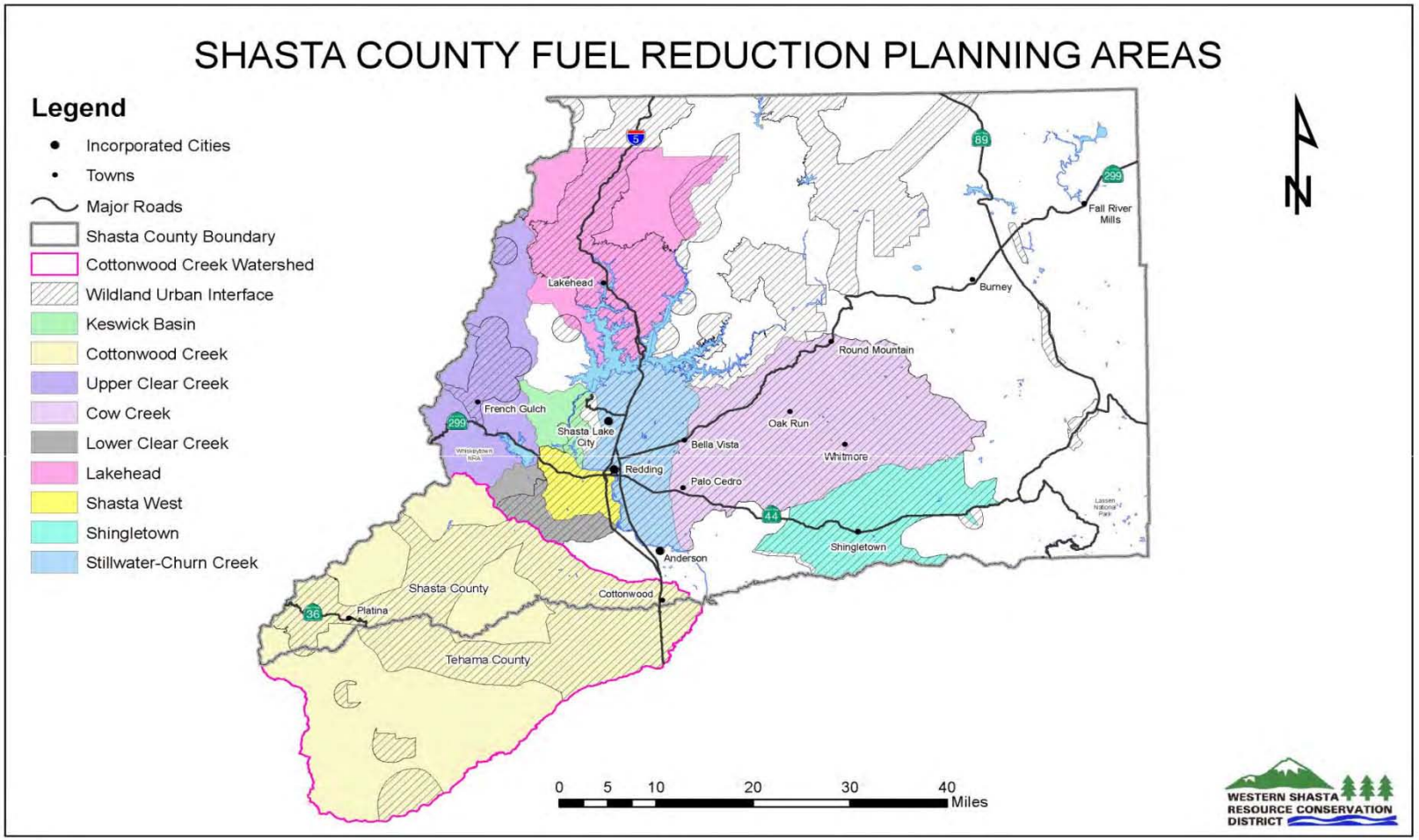
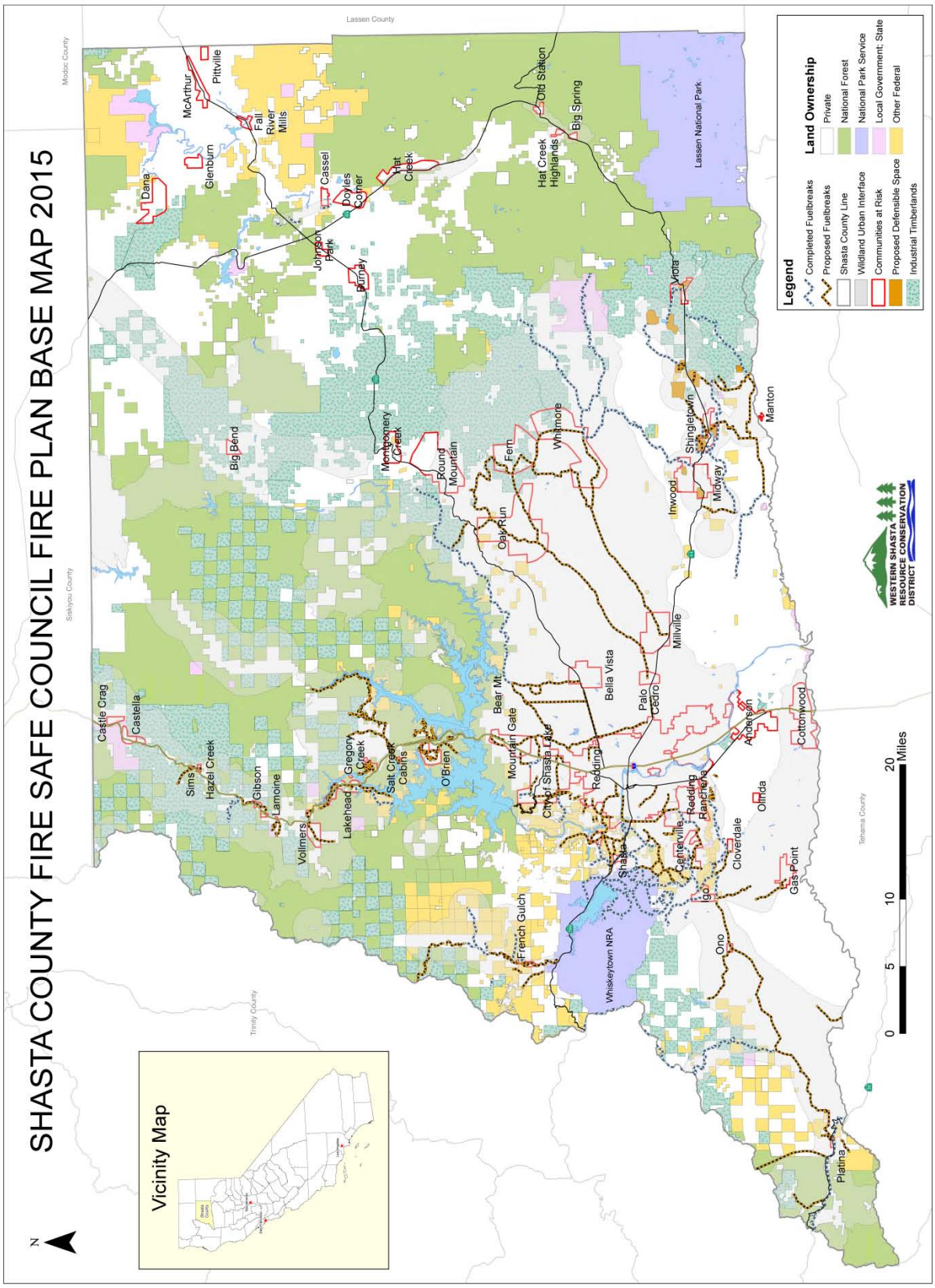


Figure 4.3-2.E
Fuel Reduction Planning Areas (Source: WSRCD)


SHASTA COUNTY FIRE SAFE COUNCIL FIRE PLAN BASE MAP 2015
N
Vicinity Map
Legend
Completed Fuelbreaks
Proposed Fuelbreaks
Shasta County Line
Wildland Urban Interface
Communities at Risk
Proposed Defensible Space
Industrial Timberlands
Land Ownership
Private
National Forest
National Park Service
Local Government: State
Other Federal
WESTERN SHASTA RESOURCE CONSERVATION DISTRICT
0
5
10
20
Miles
Lassen County
Modoc County
Siskiyou County
Trinity County
Tehama County
Lassen National Park
McArthur
Pittville
Fall River Mills
Glenburn
Dana
Cassel
Doyles Corner
Hat Creek
Johnson Park
Burney
Old Station
Hat Creek Highlands
Big Spring
Big Bend
Montgomery Creek
Round Mountain
Fern
Whitmore
Oak Run
Shingletown
Manton
Inwood
Midway
Viola
Millville
Bella Vista
Palo Cedro
Bear Mt.
Mountain Gate
City of Shasta Lake
Redding
Anderson
Cottonwood
Castle Crag
Castella
Sims
Hazel Creek
Gibson
Lamoine
Vollmers
Lakehead
Gregory Creek
Salt Creek Cabins
O'Brien
Shasta
Centerville
Redding Rancheria
Olinda
Cloverdale
Gas Point
Ono
Whiskeytown NRA
French Gulch
Platina

4.3.3 Extreme Weather

4.3.3.1 Hazard Definition

Extreme weather hazards in Shasta County are:

- Severe storm (heavy rain/hailstorm/snowstorm/windstorm)
- Drought
- Extreme heat

Severe storm in the context of Shasta County refers to heavy rain, hailstorms, snowstorms and windstorms. Extreme winter weather can adversely impact the availability of electricity and communication lines by disrupting power lines and distribution systems. At the end of December 2003, Shasta County experienced an unusual snowstorm with heavy snow and high winds that resulted in broken tree limbs, fallen telephone lines and a heavy accumulation of debris. The large amount of downed, suspended and standing vegetation created a fuel hazard and left the area subject to an extreme fire threat. The storm was not considered severe enough to be declared a state disaster, as there was relatively little structural or building damage.

Severe winter weather includes extreme cold, heavy snowfall, ice storms, winter storms, and/or strong winds. In addition, winter storms may result in other hazards such as flooding, severe thunderstorms, tornadoes or extreme winds. The hazard mitigation team identified snowstorms and strong winds as the most likely severe winter weather hazards based on history in the city of Redding. Flooding and subsequent fire hazards are most often a direct result of severe storms.

Drought must be defined not only in terms of below normal precipitation, but also in terms of duration. Occasional periods of below average precipitation will not seriously deplete moisture reserves. Droughts become severe if wet seasons pass without significant precipitation. Drought and extreme heat can cause shortages of water and food crops. Prolonged shortages of moisture can be enough of a drain on moisture reserves to seriously affect crops, livestock, forest and range lands, as well as hydroelectric, irrigation and urban water supplies. Parched lands are more susceptible to wildfires during periods of drought. Droughts can actually result in later flooding. The vegetation dies without water, and as a result, even average rain can cause flooding.

Extreme heat is defined as lengthy and locally severe temperatures potentially resulting in both utility disruption and health issues in vulnerable populations. Extreme heat emergencies are often slow to develop. It could take a number of days of oppressive heat for a heat wave to have a significant or quantifiable impact. Heat waves do not strike victims immediately, but rather their cumulative effects slowly take the lives of vulnerable populations.

4.3.3.2 History of Extreme Weather

Drought

Drought is characterized as meteorological, agricultural, hydrological, and socioeconomic. Meteorological drought is due to a period of low or below average water supply. Agricultural droughts

occur when there is an inadequate water supply to meet the needs of agricultural operations. Hydrological drought occurs when low water supply becomes evident, especially in streams, reservoirs, and groundwater levels, usually after many months of meteorological drought. Issues associated with water rights can also compound the water supply and availability issues. Drought is not a distinct event and occurs over an extended time frame. Agriculture, manufacturing, tourism, and commercial and domestic water use all require constant, reliable supplies of water. As the population in the area continues to grow, so does the demand for water. Water supply is affected by decreased storage in reservoirs and dry wells resulting from a declined water table. When reservoirs are low or dry, water users rely on wells to pump groundwater, which lowers the groundwater table.

California's Recent Chronological Drought History

1975 - 1977. From November 1975 through November 1977, California experienced one of its most severe droughts. Although people in many areas of the state are accustomed to very little precipitation during the growing season (April to October), they expect it in the winter. In 1976 and 1977, the winters brought only one-half and one-third of normal precipitation, respectively, leading to the state's fourth and first driest years on record. Most surface storage reservoirs were substantially drained in 1976, leading to widespread water shortages when 1977 turned out to be even drier.

1987 - 1992. California again experienced a serious drought due to low precipitation and run-off levels. The hardest hit region was the central coast, roughly from San Jose to Ventura. For the central coast and central Sierra Nevada, 1987 to 1990 was the driest period on record. In 1988, 45 California counties experienced water shortages that adversely affected about 30 percent of the state's population, much of the dry-farmed agriculture, and over 40 percent of the irrigated agriculture. Fish and wildlife resources suffered. Recreational use of lakes and rivers decreased. Forestry losses and fires increased and hydroelectric power production decreased.

Declared droughts in Shasta County since 1972 occurred in 1991 and 2001. The 1976-77 and 1987-92 droughts were among the worst in California history (Cal EMA Individual Assistance Section, 2001&2002 SBA Declarations/USDA Designations database; Cal EMA Origins and Development- A Chronology 1917-1999)

2007 - 2009. The 12th driest three-year period in California's measured hydrologic record, based on the California Department of Water Resources 8-station precipitation index. Water years 2007–2009 also marked a period of unprecedented restrictions in State Water Project (SWP) and federal CVP diversions from the Sacramento-San Joaquin River Delta (Delta) to protect listed fish species, a regulatory

circumstance that significantly exacerbated the impacts of hydrologic drought for customers of those water projects.

2012 - 2015. For the third winter in a row, California's precipitation has been below normal across the state. The last week of January is the midway point of the winter wet season, and accumulated precipitation since July is the lowest on record.

The current conditions are the product of several poor wet seasons in succession. The past 30 months—encompassing the past two winter wet seasons and the first half of the current one—are the driest since 1895 for comparable months.

On average, California will accumulate more than 53 inches of precipitation statewide over a typical 30-month span stretching from July to December, based on NOAA Climate Division Data. In the 30 months proceeding December 2013, the state has received closer to 33 inches, slightly less than the previous record low for a similar period, from July 1975-December 1977.

On April 1, 2015, California's Governor Brown issued Executive Order B-29-15 https://www.gov.ca.gov. Key provisions include ordering the State Water Resources Control Board to impose restrictions to achieve a 25 percent reduction in potable urban water usage through February 28, 2016; directing the California Department of Water Resources to lead a statewide initiative, in partnership with local agencies, to collectively replace 50 million square ft. of lawns and ornamental turf with drought tolerant landscapes; and directing the California Energy Commission to implement a statewide appliance rebate program to provide monetary incentives for the replacement of inefficient household devices, and:

- Asking all Californians to reduce water consumption by 20 percent and referring residents and water agencies to the Save Our Water campaign www.saveourwater.com for practical advice on how to do so.
- Directing local water suppliers to immediately implement local water shortage contingency plans.
- Ordering the State Water Resources Control Board to consider petitions for consolidation of places of use for the SWP and CVP, which could streamline water transfers and exchanges between water users.
- Directing the California Department of Water Resources and the state board to accelerate funding for projects that could break ground this year and enhance water supplies.
- Ordering the state water board to put water rights holders across the state on notice that they may be directed to cease or reduce water diversions based on water shortages.
- Asking the state water board to consider modifying requirements for releases of water from reservoirs or diversion limitations so that water may be conserved in reservoirs to protect cold water supplies for salmon, maintain water supplies and improve water quality.

County Drought Restrictions

Shasta County's Department of Public Works presently runs 11 active County Service Areas (CSAs). These are mostly small water and sewer systems. In April 2015, in response to drought conditions and the need to protect the public health, safety and welfare, the County declared a water shortage. The ordinance places limits on water for landscape irrigation and outside use, indoor water usage for eating or drinking establishments and hotels/motels. Additionally, the County sent notifications to all CSA customers encouraging citizens to take water-saving measures.

The County's CSA website http://www.co.shasta.ca.us/index/pw_index/operations/csas.aspx contains information on water conservation, rebate programs for replacing turf and installing low-flow toilets, and how to detect water leaks and reading household water meters.

Anderson Drought Restrictions

The City is following the Governor's drought reductions; limiting outdoor irrigation to three days a week, depending on street addresses.

Severe Storm

Shasta County experiences a range of severe storm conditions including wind, rain and snow. The New Years Day 1997 storm event caused widespread flooding and damage countywide with particular damage in the Cow Creek watershed. Shasta Dam nearly overtopped at the peak of the storm. The 2016/17 storm season was exceptionally wet but caused only moderate damage because individual storms were moderate in intensity though frequent and many in number.

The operation of Shasta Dam, constructed in the early 1940's, resulted in regulating floods to 79,000 cubic feet per second in Redding. The two largest floods since the construction of the dam occurred in 1970 and 1974. Peak discharges for the Sacramento River at Keswick were 78,900 cfs and 81,400 cfs, respectively. Both floods were approximately 100-year events at Redding. Reported economic losses in Shasta County amounted to $3,790,000 and $10,650,000, respectively.

Tributaries below Shasta Dam are typically uncontrolled and vulnerable to storms of shorter duration. Tributaries typically drain remote watersheds in steep terrain at higher elevations with flooding occurring in the more populated valley areas below. Cottonwood Creek is on the west side of the Sacramento River and defines the southerly County boundary with a drainage area of approximately 1,000 square miles. In 1970 and 1974, floods of up to 70,000 cfs caused damage of up to $1,000,000. Churn Creek is on the east side of the Sacramento River and extends through Redding to the Churn Creek Bottom. Major flooding in 1964 resulted in widespread damage. Debris and other natural obstructions may have contributed to these events.

Extreme Heat

Shasta County summers are hot and dry, particularly at lower elevations including Redding, Anderson and the rest of the Sacramento Valley floor. The average daily maximum temperature in July stays near 100 °F (38 °C) on the valley floor. The highest official recorded temperature in Redding was 118 °F (48 °C) on July 20, 1988. That was recorded at the nearby Redding airport. In 1967, Redding reached a temperature of at least 100 degrees on 69 days. In 2017, that record was broken with temperatures of at least 100 degrees on 72 days. These high temperatures are limited to the valley floor but nearly 90 percent of the County population resides below 1000' elevation.

4.3.3.3 Risk Assessment – Vulnerability and Potential Losses

Drought

Identifying Drought Hazards

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

Secondary Impacts

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

Vulnerability

Ample water supplies originate and reside in Shasta County (snowpack, groundwater basins, natural runoff). Shasta Dam is one of the largest reservoirs in the state and the keystone of the Central Valley Project. The Redding and Fall River groundwater basins are ample and largely untapped. These sources generally provide adequate supplies to most Shasta County residents even in times of drought. However, adequate supplies are not readily available to all Shasta County residents during droughts due to geographical distribution, water rights, and other constraints. Redding and Anderson directly overlie the Redding Groundwater Basin and have significant well fields enabling them to endure even prolonged droughts with little impact. The Anderson Cottonwood Irrigation District and other Pre-1914 water rights holders are protected from drought cutbacks by California's "First in time, first in right" water right doctrine. The most exposed areas are generally in the foothills north of Redding where urban development extends beyond the Redding Groundwater Basin. These areas are served by the Mountain Gate CSD, City of Shasta Lake, Keswick CSA, Jones Valley CSA and the Bella Vista Water District. These water districts nominally rely upon the Central Valley Project for supplies out of Shasta Lake. During times of drought these supplies have been curtailed by as much as 75%. These districts have joined

together in the Redding Area Water Council to access groundwater, secure transfers and otherwise improve drought reliability.

Severe Storm

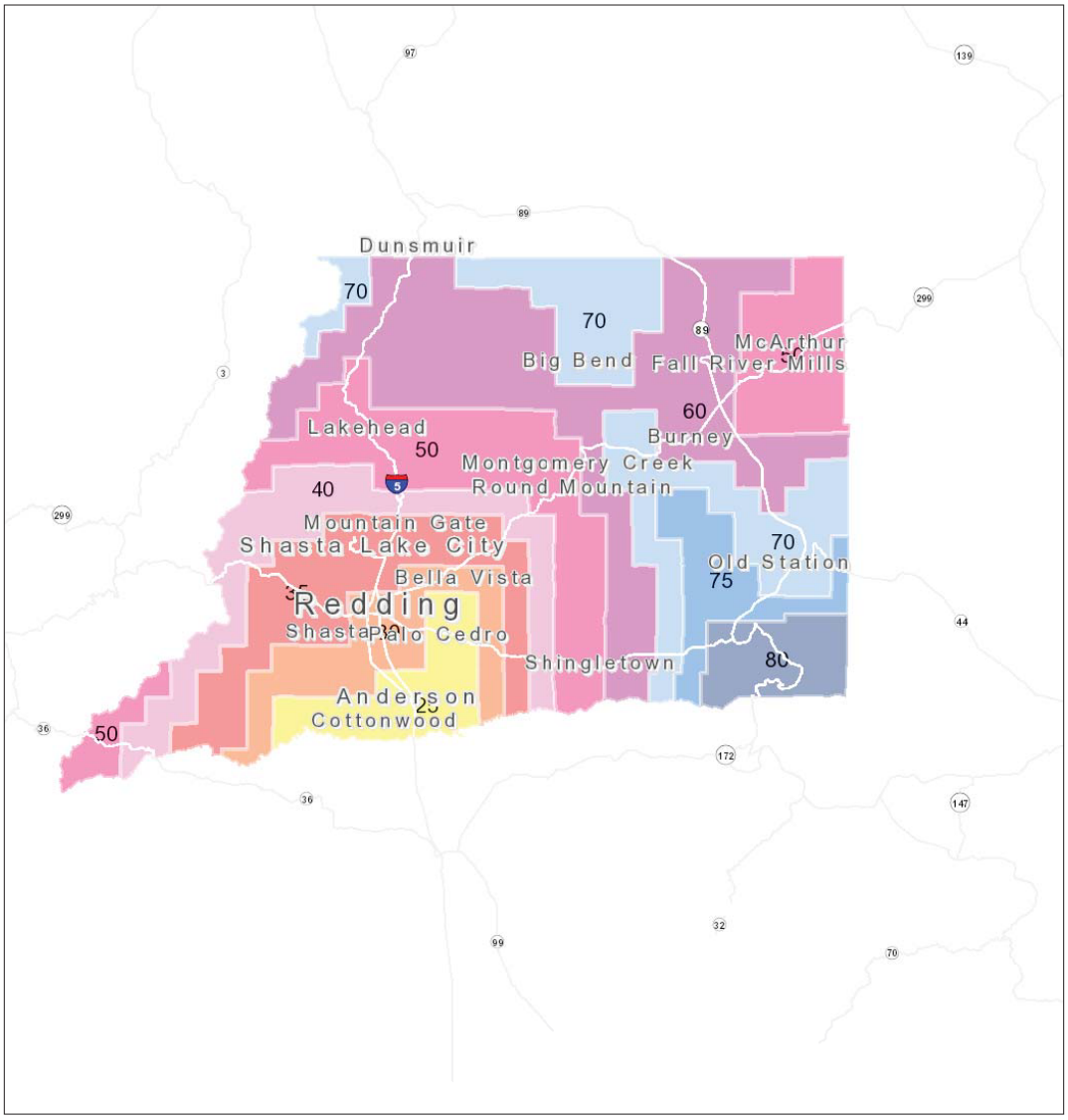
Shasta County experiences severe winter weather mainly during the months of January-March. Storms with strong southerly winds with or without heavy rain are relatively common during these months and typically occur several times per year. Wind speeds of 40 to 50 mph and peak gusts up to 60 mph occur with some regularity. On the other hand, it is not unusual for the most populated, lower-elevation areas of Shasta County (South Central Urban Region below 1000' elevation) to experience no measurable amounts of snow for several years in a row. Shasta County has not been affected by a single freeze disaster since 1950. Vulnerable locations include the entire County of Shasta.

Snow

According to newspaper reports, the largest one-day (unofficial) record for snowfall in the city of Redding occurred on New Year's Day in 1899 with more than 23 inches of snow. In late December 2003, the city of Redding experienced its most damaging snowfall since 1968. The City of Redding Electric Utility classified the December 2003 snowstorm as the one in twenty-five year event (i.e. occurs once every 25 years). Their storm event was logged between December 28, 2003 and January 2, 2004 and included the snowstorm and a windstorm that followed with wind speeds in excess of 60 miles per hour. The storm events affected 13,229 customers. The total direct cost was reported as $328,500.

Shasta County enforces the California Building Code (CBC) and the applicable sections of the code that relate to snow load and wind load design. The current design criterion for the County is a minimum 25 pounds per square foot (psf) non-reducible snow load and wind loading based on 75 miles per hour (mph) fastest-mile wind speed with the appropriate exposure category for the site (i.e. exposure B or exposure C for open and flat site conditions). In the summer of 1969, as a direct result of the damage from the December 1968 snowstorm, the City adopted a minimum design (roof) snow load of 30 pounds psf for all new structures. This design snow load was based on the recommendations from a committee of local engineers, architects and building inspectors who investigated and studied the roof failures. Prior to the 1968 storm, there was no snow load design requirement. The County does have a number of structures that were constructed prior to the 30 psf snow load. The current policy is that structures built prior to 1970 must undergo a snow load analysis by a qualified design professional (i.e. licensed engineer of architect) when that structures under goes a change in use or occupancy that results in structure being placed in higher hazard occupancy group, as required by CBC Chapter 34. Structures that are found to structurally deficient are required to upgrade to support a 30 psf snow load. County snow load design requirements are shown on the map below:

Shasta County Snow Loads Map



Wind

According to the National Weather Service (NWS), the highest recorded wind speeds in the city of Redding occurred in early December of 1995 when 60 mph (fastest-mile) and 85 mph peak gusts were measured. These wind speeds are equivalent to the highest rating on the Beaufort Scale (see table below). The hurricane force winds knocked down fences, toppled trees and power poles, tore roofing off houses, tipped a big rig in a parking lot while causing damage at the Redding Municipal Airport to four planes and 18 hangars. This storm appears to have produced the strongest winds since 1877 when peak gusts were estimated to be nearly 80 mph. Many long time Redding residents make comparisons between the December 1995 storm and what is referred to as the Columbus Day Storm. On October 12, 1962 this storm blew into California as a result of tropical typhoon Frieda with wind gusts slightly less than the December 1995 storm, causing damage to fences, roofs, trees, power poles, etc. These events were measured at lower elevations but similar or greater exposure exists at higher elevations, particularly in mountainous terrain near passes.

The Beaufort scale

No.	*Knots*	*Mph*	*Description*	*Effects at sea*	*Effects on land*
0	0	0	Calm	Sea like a mirror	Smoke rises vertically
1	1-3	1-3	Light air	Ripples but no foam crests	Smoke drifts in wind
2	4-6	4-7	Light breeze	Small wavelets	Leaves rustle; wind felt on face
3	7-10	8-12	Gentle breeze	Large wavelets; Crests not breaking	Small twigs in constant motion; Light flags extended
4	11-16	13-18	Moderate wind	Numerous whitecaps Waves 1-4ft high	Dust, leaves and loose paper raised. Small branches move.
5	17-21	19-24	Fresh wind	Many whitecaps, some spray; Waves 4-8 ft high	Small trees sway
6	22-27	25-31	Strong wind	Whitecaps everywhere; Larger waves 8-13 ft high	Large branches move; Difficult to use umbrellas
7	28-33	32-38	V. strong wind	White foam from waves is blown in streaks; waves 13-20ft high	Whole trees in motion
8	34-40	39-46	Gale	Edges of wave crests break into spindrift	Twigs break off trees; Difficult to walk
9	41-47	47-54	Severe gale	High waves; sea begins to roll Spray reduce visibility; 20ft waves	Chimney pots and slates removed
10	48-55	55-63	Storm	V. high waves 20-30 ft; blowing foam gives sea white appearance	Trees uprooted Structural damage
11	56-63	64-72	Severe storm	Exceptionally high waves; 30-45 ft high	Widespread damage
12	63	73	Hurricane	Air filled with foam; visibility reduced White sea; waves over 45ft high	Widespread damage; rare

Extreme Heat

Identifying Extreme Heat Hazards

The Heat Index (HI) as a function of heat and relative humidity. The HI describes how hot the heat-humidity combination makes it feel. As relative humidity increases, the air seems warmer than it

actually is because the body is less able to cool itself via evaporation of perspiration. As the HI rises, so do health risks. Vulnerable locations include the entire County of Shasta with particular risk in the Sacramento Valley below 1000' elevation.

The NWS will initiate its HI Program Alert procedures when the high is expected to exceed 105° - 110° (depending on local climate) for at least two consecutive days.

Classification	Heat Index	Effect on the body
Caution	80°F - 90°F	Fatigue possible with prolonged exposure and/or physical activity
Extreme Caution	90°F - 103° F	Heat stroke, heat cramps, or heat exhaustion possible with prolonged exposure and/or physical activity
Danger	103°F - 124°F	Heat cramps or heat exhaustion likely, and heat stroke possible with prolonged exposure and/or physical activity
Extreme Danger	125°F or higher	Heat stroke highly likely

Heat emergencies are often slow to develop. It could take a number of days of oppressive heat for a heat wave to have a significant or quantifiable impact. Heat waves do not strike victims immediately, but rather their cumulative effects slowly take the lives of vulnerable populations.

Profiling Extreme Heat Hazards

The California Climate Adaptation Strategy (CAS), citing a California Energy Commission study, states that *—over the past 15 years, heat waves have claimed more lives in California than all other declared disaster events combined*. B etween 1960 and 2008 not a single heat emergency was formally proclaimed at the state level or declared as a federal disaster. Though no formal explanation exists for this seeming contradiction, scholars have written about the exclusion of heat events as declared disasters. For example, Eric Klinenberg, author of an account of a heat wave which killed 739 people in the city of Chicago in July 1995, suggests that the hidden nature of social vulnerability combined with the inconspicuous nature of heat events (unlike earthquakes, floods, wildfires, tornados, etc.) prevent them from being declared as legitimate disasters. Further, although heat events can have a devastating effect on agriculture, heat-caused property damage over the last 48 years has been relatively small.

These facts raise several issues. First, since the primary goal of the SCHMP is to significantly reduce the loss of life and injuries in Shasta County, heat is considered a legitimate disaster type. Though heat does not cause much economic damage or damage to the built environment, the number of people it has killed underscores the importance of mitigating its impacts. Second, heat events highlight the importance of thoughtful social vulnerability analysis. While changes to the built environment can greatly alter vulnerability to different hazards, social vulnerability and resiliency are especially important during heat events. Socially isolated elderly persons are especially vulnerable. Any mitigation efforts aimed at reducing heat losses will focus on ways to reduce social isolation as well as changes to the built environment. Third, heat events illustrate how seemingly unrelated phenomena combine to create disaster. Increased use of air conditioners during heat waves can lead to power outages, which makes the events even more deadly. Upgrading water and power infrastructure, then, is a form of heat disaster mitigation.

Utility Disruption

The California Utilities Emergency Association (CUEA) cooperates with Cal EMA to coordinate public and private utility emergency-related issues in California. Largely supported by memberships from public and private utilities with jurisdiction or service territory in California, the CUEA operates and manages the utilities branch at Cal OES. Utilities membership in the CUEA includes gas, electric, telecommunications (including wireless), water, waste water, and petroleum pipeline industries. During emergencies, the utilities operations center is activated to enhance the utilities capability to respond to and recover from emergencies by providing a structure for cooperation and communication among utilities and government agencies.

Beyond involvement in emergency management, private utilities are continuously involved in ongoing investments increasing service capacities and replacing obsolete equipment and facilities. Many of these investments represent incremental improvements in the resilience against natural and human-caused hazards within their plants and facilities.

Pacific Gas and Electric (PG&E) owns, operates and maintains the transmission and distribution electric system in the unincorporated area of Shasta County. During an average year, PG&E delivers over 800 gigawatts of energy to its customers. The major hazards facing PG&E are natural disasters and energy supply shortage.

The California Energy Commission staff report entitled, *Summer 2010 Electricity Supply and Demand Outlook* reports that between the summer of 2009 and June 1, 2020, 1,234 megawatts of new electricity generation has been added or is expected to be added to the state's supply. The greatest uncertainty in the peak demand forecast is weather-related; air conditioning loads increase rapidly as temperatures rise. Statewide electricity reserve margins for 2010 range from 28 to 43 percent, fluctuating each summer month under normal summer temperature conditions. The margins under unusually hot summer weather conditions range from 17 to 31 percent. With these margins, there should be sufficient resources to cover most system contingencies, including high demand due to hotter-than-normal (1-in-10 year probability) weather conditions. Historically, wind and snow storms have had the greatest impact on the delivery of power to our customers. On December 31, 2003, the north valley area experienced an abnormally heavy snow storm, leaving many customers without power for a period of up to four days. Energy supply shortages in California also threaten the availability for customers. In 1996, the valley area was impacted by a west coast power outage that caused the automatic load shedding of about 30 percent of customers for over 30 minutes.

The ISO reports the number of notices issued, which include restricted maintenance operations, Alert, Warning, Emergency, and Flex Alert Notices. Notices issued from 1998 to 2010 total 1,663. The majority of notices, 1036 were issued in 2000-2001 (62 percent of the total period). The next largest number of notices was issued in 2006-2007, which total 80 or five percent of the twelve year period. In 2008-2009 no more than 15 were issued per year.

To mitigate the impact of natural disasters, PG&E participates in a local Emergency Response group, belongs to the CUEA and has entered into individual mutual aid agreements with many other California

utilities. PG&E also adheres to an aggressive system maintenance and tree trimming program. In regards to energy supply mitigation, PG&E belongs to the Western Electricity Coordinating Council (WECC). WECC is one of the coordination councils under the jurisdiction of the North American Reliability Council. WECC sets the reliability standards for all electrical utilities connected to the Western Grid. These WECC standards govern the majority of PG&E emergency procedures and protocols relating to system stability and reliability. In addition to meeting WECC standards, PG&E has taken additional measures to mitigate energy supply shortages such as installing local power generation and installing emergency off-system generators.

Vulnerability

Extreme heat in Shasta County is most likely to occur at low elevations (below 1000' elevation) in the Sacramento Valley (including the City of Anderson) during June, July and August. Seasonal weather patterns typically produce temperatures over 100 degrees on dozens of days each summer. Most residents and businesses are equipped to deal with these circumstances under normal conditions. Extreme heat arising early in the season or over prolonged periods may overwhelm existing infrastructure with associated impacts, particularly to sensitive populations.

Power outages are a particular vulnerability as noted above. Air conditioning is widely available and used during the summer, leading to heavy reliance upon PG&E supplies. Shasta County hosts a broad array of power generation and transmission facilities (hydro, biomass, renewable, natural gas). Electricity supplies in the Cottonwood area are particularly reliable owing to the many generation and transmission facilities nearby which provide redundancy. Local power supply problems usually arise when the larger power grid is strained to meet unusual demands elsewhere in the state. Weather conditions in the Bay Area are usually cool in the summer but occasionally turn hot, creating massive demand on PG&E's grid. In such times of excessive demand, rotating outages may impact Shasta County and Anderson. PG&E typically manages these incidents with rotating outages to minimize blackout durations and thus mitigate impacts to users.

4.3.3.4 Future Events

Climate Change and Drought

Climate change is having a profound impact on California water resources, as evidenced by changes in snowpack, sea level and river flows. These changes are expected to continue in the future and more of our precipitation will likely fall as rain instead of snow. This potential change in weather patterns will exacerbate flood risks and add additional challenges for water supply reliability. Climate scientists studying California find that drought conditions are likely to become more frequent and persistent over the 21st century due to climate change. The experiences of California during recent years underscores to the need to examine more closely the state's water storage, distribution, management, conservation and use policies.

The mountain snowpack provides as much as a third of California's water supply by accumulating snow during our wet winters and releasing it slowly during California's dry springs and summers. Warmer temperatures will cause snow to melt faster and earlier, making it more difficult to store and use. By the end of this century, the Sierra snowpack is projected to experience a 48-65 percent loss from the historical April 1st average. This loss of snowpack means less water will be available for Californians to use.

Climate change is also expected to result in more variable weather patterns throughout California. More variability can lead to longer and more severe droughts. In addition, the sea level will continue to rise threatening the sustainability of the Sacramento-San Joaquin Delta, the heart of the California water supply system and the source of water for 25 million Californians and millions of acres of prime farmland.

The DWR is addressing these impacts through mitigation and adaptation measures to ensure that Californians have an adequate water supply, reliable flood control and healthy ecosystems now and in the future. There is no way of predicting the future with absolute certainty, but scenarios of possible future conditions can be constructed. The California Water Plan Update 2013 considers many alternative, plausible, yet very different future scenarios as a way of considering uncertainty and risk and improving resource sustainability. For example, three alternative population growth rates and three alternative assumptions about future land-use development density are considered, thus yielding nine alternative growth scenarios. Many alternative scenarios of future climate are considered in order to represent extended droughts and climate change. The concept is not to plan for any one given future, but to identify strategies that are robust across many scenarios. Certain combinations of management strategies may prove to be robust regardless of future conditions. This is especially true if the strategies have a degree of adaptability to differing conditions that may develop. A general description of the scenarios can be found in the next section.

During preparation of the 2010 Plan, California was in a drought formally recognized by the Governor's in 2008. Low rainfall led to substantially reduced reservoir storage throughout the state, prompting state action encouraging a 20 percent statewide reduction in per capita water use through voluntary conservation. Although the 2009-2010 water year experienced increased rainfall, reservoir storage were still well below normal statewide.

During this Plan update, California is in a severe drought. Water supplies continue to be severely depleted. The severe drought conditions continue to present urgent challenges including; drinking water shortages in communities across the state, diminished water for agricultural production, degraded habitat for fish and wildlife species, increased wildfire risk, and the threat of saltwater contamination to fresh water supplies in the Sacramento-San Joaquin Bay Delta.

It is possible that the current drought will continue into a fifth straight year in 2016. Expedited actions are needed to reduce the harmful impact from water shortages and other impacts of the drought.

4.3.4 Earthquake

4.3.4.1 Hazard Definition

Earthquakes represent the most destructive source of hazards, risk and vulnerability, both in terms of recent state history and the probability of future destruction of greater magnitudes than previously recorded.

California has thousands of recognized faults. Only some are known to be active and pose significant hazards. The motion between the Pacific and North American plates occurs primarily on the faults of the San Andreas system and the eastern California shear zone. Faults are more likely to have future earthquakes on them if they have more rapid rates of movement, have had recent earthquakes along them, experience greater total displacements, and are aligned so that movement can relieve the accumulating tectonic stresses. Geologists classify faults by their relative hazards. Shasta County's earthquake fault zones are shown in Figure 4.3-4.A.

Active faults represent the highest hazards which have ruptured to the ground surface during the Holocene period (about the last 11,000 years). Potentially active faults are those that displaced layers of rock from the Quaternary period (the last 1.8 million years). Nearly all movement between the two plates is on active faults.

There are fault lines located in southern and eastern Shasta County that could produce low to moderate ground shaking (Figure 4.3-4.C). Ground shaking is the principal cause of damage in a seismic event and could catalyze dam failures, landslides and fires. According to the USGS, factors that affect the potential damage of structures and systems as a result of severe ground shaking include epicenter location and depth, the proximity to a fault, the direction of the rupture, the magnitude, the existing soil and geologic conditions and the structure-type. Newer structures are more resistant to ground shaking than older structures because of improved building codes. Manufactured housing is very susceptible to damage because the foundation systems are rarely braced for seismic activity. Lifeline systems such as highways, bridges, water and gas pipelines, railroads, and utility services, can experience substantial damage from ground shaking. Structure damage is considered likely when ground motion average peak acceleration reaches 10 percent and 15 percent of gravity.

According to the California Geological Survey's (CGS) Probabilistic Seismic Hazards Assessment, the area is subject to low and moderate ground shaking and lies within the 10 percent to 30 percent gravity zone (CGS 2003). The region within the boundaries of the County and has not sustained damages attributed to earthquakes, dam failures or landslides as far as records have been maintained and the County has not proclaimed a state of emergency due to earthquakes events.

4.3.4.2 History of Earthquakes

Shasta County has a low level of historic seismic activity. In the past 120 years there has been no significant property damage or loss of life due to earthquakes occurring within or near Shasta County. Maximum recorded intensities have reached MM VII, with possibly one instance of MM VIII. Most of the stronger intensity seismic activity in Shasta County has occurred in the eastern half of the county near Lassen Peak. Redding is located in the less seismically active western half of Shasta County, referred to as an area of moderate seismicity. Earthquake activity has not been a serious hazard in Shasta County's history, nor is it probable that it will become a serious hazard in the future. Research of historical earthquakes indicates that Redding has experienced several moderate sized earthquakes, magnitude 4.0 to 4.5 (estimated) in 1904, 1915, 1919, 1920 and 1930 (See Figure 4.3-4.B).

On November 26, 1998, Shasta County experienced a local magnitude ML 5.2 earthquake that was centered three miles north-northwest of the city of Redding near Keswick Dam. This was the largest recorded earthquake since the USGS began monitoring Shasta County in 1981 and believed to be the largest earthquake in the Redding area since 1878. No structural damage was reported in Redding. Nonstructural damage that was reported consisted of broken merchandise, loss of power due to a damaged electrical panel, a fire sprinkler break in a mechanical room and two operating rooms at Mercy Medical Center, and non-structural cracks at expansion joints in a highway overpass. Outside of the Redding city limits; a four million gallon water tank in Bella Vista lifted about an inch off its foundation, resulting in bent anchor bolt washers; and a PG&E transformer caught fire resulting in temporary power outage for 7,500 customers.

4.3.4.3 Risk Assessment – Vulnerability and Potential Losses

Earthquake vulnerability is primarily based upon population and the built environment. Urban areas in high hazard zones tend to be the most vulnerable, while uninhabited areas generally are less vulnerable.

Ground Shaking

The exposure to strong seismic shaking in Shasta County is considered to be relatively low. The maximum earthquake intensity is expected to be between MM VI & MM VII (see Table 18 below). These ground accelerations correspond to the earthquake that has a 10 percent probability of exceeding in 50 years, or the earthquake that has a return interval of 475 years.

Table 18. Modified Mercalli Intensity and Peak Ground Acceleration (PGA)

The National Earthquake Hazards Reduction Program rates soils from hard to soft, and give the soils ratings from Type A through Type E, with the hardest soils being Type A, and the softest soils rated at Type E. Liquefaction risk is considered high if there were soft soils (Types D or E) present within an active fault zone. The majority of the soils in the County are types A-C, with some areas having type D. No type E soils were identified, nor was consistent mapping of soil types. For these reasons, combined with a lack of liquefaction history, liquefaction was not addressed in a manner separate from earthquake. It should be considered in subsequent updates to the Plan as better data becomes available.

Damage in Shasta County resulting from earthquakes would most likely be from ground shaking, and less likely from related ground failure. The effects of ground shaking are best mitigated by adequate design for the maximum probable earthquake for Shasta County. The effects of ground failure are best mitigated by adequate geotechnical investigations of specific sites. The County enforces the California Building Code, which establishes building requirements for all new structures based on predicted earthquake intensities. The risk of loss of life and property damage due to seismic activity is assumed to be minimized if the California Building Code is enforced.

Instrumental Intensity	Acceleration (g)	Velocity (cm/s)	Perceived Shaking	Potential Damage
I	**< 0.0017**	< 0.1	Not felt	None
II-III	**0.0017 - 0.014**	0.1 - 1.1	Weak	None
IV	**0.014 - 0.039**	1.1 - 3.4	Light	None
V	**0.039 - 0.092**	3.4 - 8.1	Moderate	Very light
VI	**0.092 - 0.18**	**8.1 - 16**	Strong	Light
VII	0.18 - 0.34	**16 - 31**	Very strong	Moderate
VIII	0.34 - 0.65	**31 - 60**	Severe	Moderate to heavy
IX	0.65 - 1.24	**60 - 116**	Violent	Heavy
X+	> 1.24	**> 116**	Extreme	Very heavy

The City of Redding has run earthquake scenarios based on expected PGA of 18 percent over the entire county. Building Damage Ratios were estimated at six percent for older structures located in the immediate downtown area of Redding, and three percent for all other areas within the Redding city limits. The Building Damage Ratio represents an estimate of the ratio, as a percentage, of the repair cost divided by the replacement cost. The higher damage ratio in the downtown area was chosen since these structures are typically older and less likely to have been constructed with any seismic code design provisions (i.e. pre seismic code buildings). The total damage was estimated at $198 million for Redding as a whole, which is less than one percent of the damage estimates from the 1994 Northridge earthquake.

Unlike other hazards discussed in this section, where census, building and critical facilities data were extracted from the HAZUS-MH model for spatial analysis for exposure and/or loss based on other GIS layers, for earthquake, the model was used to evaluate vulnerability for specific events in Shasta County. How the model was used is discussed in more detail in the subsections below.

Critical facilities and the amount of damage they would be expected to receive in the modeled events are addressed in the tables that follow. Residential and commercial buildings were not inventoried in terms of aggregate exposure as the unpredictable nature of this hazard would arguably put all structures in Shasta County at some risk. How vulnerable a particular building is to a particular event includes many variables, including construction type, date of construction, etc.

The **HAZUS software model**, which was developed for FEMA by the National Institute of Building Sciences as a tool to determine earthquake loss estimates, was used for this assessment. This software program integrates with GIS to facilitate the manipulation of data on building stock, population and the regional economy with hazard models. The scenarios used in the earthquake hazard assessment were a 500- and 2000- year return period USGS probabilistic hazards. The analysis was limited to damage caused by ground-shaking. In addition, a default soil map was used to simplify the modeling process, in absence of better soils data. Anticipated losses were modeled. Loss is that portion of the exposure that is expected to be lost to a hazard, and is estimated by referencing frequency and severity of previous hazards. Hazard risk assessment methodologies embedded in HAZUS, FEMA's loss estimation software, were applied to earthquake hazards in Shasta County.

The software contains economic and structural data on infrastructure and critical facilities, including replacement value costs with 2002 square footage and valuation parameters to use in loss estimation assumptions. This approach provides estimates for the potential impact by using a common, systematic framework for evaluation. The HAZUS risk assessment methodology is parametric, in that distinct hazard and inventory parameters (e.g. ground shaking and building types) were modeled to determine the impact (damages and losses) on the built environment. The model was used to estimate losses from earthquake hazards to critical facilities, infrastructure and residential and commercial properties, as well as economic losses on two return period events (500 year and 2000 year). Loss estimates used available data, and the methodologies applied resulted in an approximation of risk. These estimates should be used to understand relative risk from hazards and potential losses. Uncertainties are inherent in any loss estimation methodology, arising in part from incomplete scientific knowledge concerning natural hazards and their effects on the built environment. Uncertainties also result from approximations and simplifications that are necessary for a comprehensive analysis (such as incomplete inventories, demographics, or economic parameters).

Loss estimates are presented for (1) the residential and commercial occupancies, and (2) the critical infrastructure at risk (schools, hospitals, airports, bridges, and other facilities of critical nature). In addition, potential shelter needs and casualties were estimated. Table 19 provides breakdowns of potential losses due to a 100-year earthquake event for residential and commercial properties.

Detailed results of the 500-year and 100-year earthquake hazards are located in Appendix 4.B.

Table 19. Expected Building Damage by Occupancy										
	None		Slight		Moderate		Extensive		Complete	
	Count	(%)	Count	(%)	Count	(%)	Count	(%)	Count	(%)
Agriculture	237	0.40	33	0.44	19	0.75	4	1.31	0	2.17
Commercial	2,658	4.46	409	5.52	235	9.29	45	15.21	3	25.12
Education	106	0.18	12	0.16	7	0.27	1	0.41	0	0.75
Government	143	0.24	21	0.28	12	0.49	2	0.62	0	1.39
Industrial	771	1.29	129	1.74	82	3.25	17	5.83	1	8.45
Other Residential	13,015	21.82	2,392	32.25	1,390	54.89	170	57.83	6	59.96
Religion	205	0.34	28	0.38	15	0.61	2	0.78	0	1.72
Single Family	42,507	71.27	4,393	59.23	771	30.47	53	18.01	0	0.44
Total	**59,642**		**7,417**		**2,531**		**294**		**10**	

ShakeCast. In conjunction with the USGS, the State of California's Department of Transportation (Caltrans) recently announced its launch of ShakeCast V3, which will bolster its statewide response to an earthquake. Because the health of bridges and other infrastructure is critical to emergency response, ShakeCast V3 will allow Caltrans to identify and address earthquake damages with unprecedented speed and efficiency.

ShakeCast V3 is an application that uses earthquake-shaking data and analyzes that data against performance characteristics for bridges and other structures. It uses a suite of powerful tools to alert first responders to the location and probable severity of impacts during a seismic event, including email alerts, an interactive website and analysis results, all of which are delivered to first responders within minutes of a seismic event.

V3 nearly doubled the list of existing bridges in the analysis database, adding 13,082 local bridges to the existing 13,157 state-owned bridges in the system. This means that all 26,239 bridges in the state of California are now monitored by ShakeCast. Caltrans now has the capability to alert, or make the assessment data available, to local agencies of possible seismic impacts to those critical structures. V3 also added to the database nearly 400 Caltrans building sites, all of which have their unique characteristics modeled into it so ShakeCast can assess the likelihood of adverse seismic affects to Caltrans facilities.

Moving forward, Caltrans is taking the lead to bring together state departments of transportation nationwide with Shakecast through a transportation pooled fund study. This effort will enable departments of transportation to achieve an advanced level of earthquake response, while raising situational awareness and coordination for earthquakes that cross state borders.

4.3.4.4 Current Earthquake Hazard Mitigation Efforts

Fires Following Earthquake

While ground shaking may be the predominant agent of damage in most earthquakes, fires following earthquakes can also lead to catastrophic damage depending on the combination of building characteristics and density, meteorological conditions, and other factors. Fire department response is often impacted by impaired communications as well as water supply and transportation together with

other emergency demands such as structural collapses, hazardous materials releases and emergency medical aid.

Fires following earthquakes may result from multiple causes (e.g., overturned burning candles, electrical sparking from downed power lines and broken natural gas pipelines). Numerous instances of serious fires following earthquakes have occurred in major urban areas. Fires following earthquakes can occur immediately after an earthquake or may be delayed. Causes of fires occurring immediately after include: power lines are fused or broken and the resulting arcing comes into contact with combustible fuel; water heaters, stoves, and lighting fixtures/lamps are dislodged and come into contact with combustible fuel; natural gas mains, lines and service are severed and the released gas finds a source of ignition; combustible liquids can leak and find a source of ignition.

Mitigation of Fires Following Earthquakes

A general framework for fire mitigation includes the following components provided in advance of an earthquake disaster:

- Reduction in damage through advance planning and preparation.
- Presence of functioning automatic sprinklers or other suppression systems.
- Citizens able to extinguish the fire if water is available or to call the fire department.
- Functioning communications (telephone) required to contact fire departments.
- Available fire department personnel and their assets (apparatus).
- Functioning transportation networks (roads).
- Adequate water supply.
- Advance provision of firebreaks via the urban planning process.

In addition, mitigation for the prevention of natural gas system leakage has included localized upgrading of natural gas pipelines and automatic seismic shut-off switches which cut off natural gas to customers. It is critical that restoration of gas service following an earthquake be coordinated through the local gas utility and the fire department to ensure that service is not restored until leak detection and minimum safety requirements are met on the distribution side of the gas meter. Restoration of gas and electrical services for areas known or suspected to have sustained damage may not be restored until the utilities and the fire department are prepared to have service restored.

An additional mitigation technique is the use of seismic pressure wave-triggered automatic garage door openers and alarms at fire stations. These devices help ensure that firefighters and fire equipment are not trapped in damaged fire stations following earthquakes.

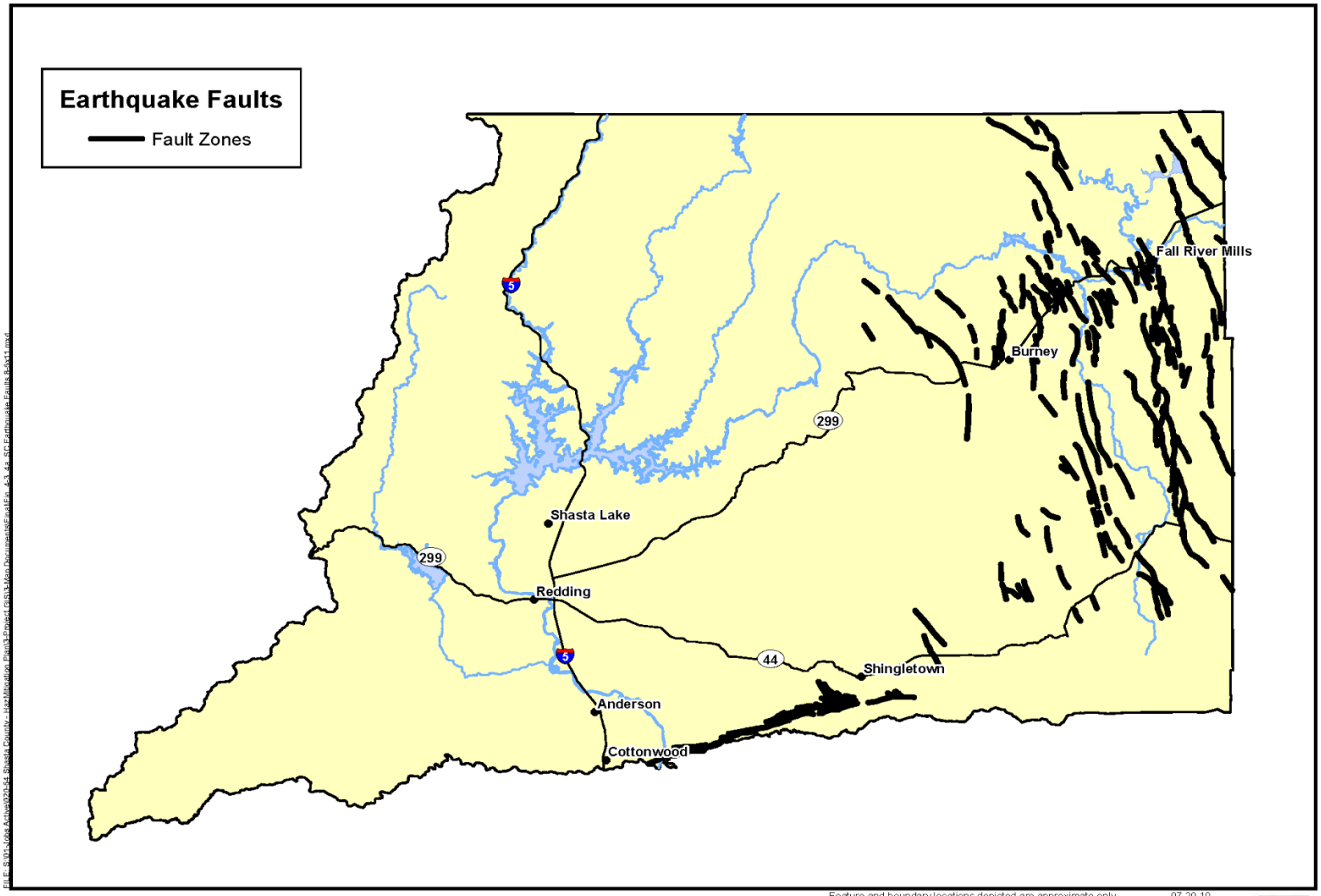


Figure 4.3-4.A
Shasta County Earthquake Faults

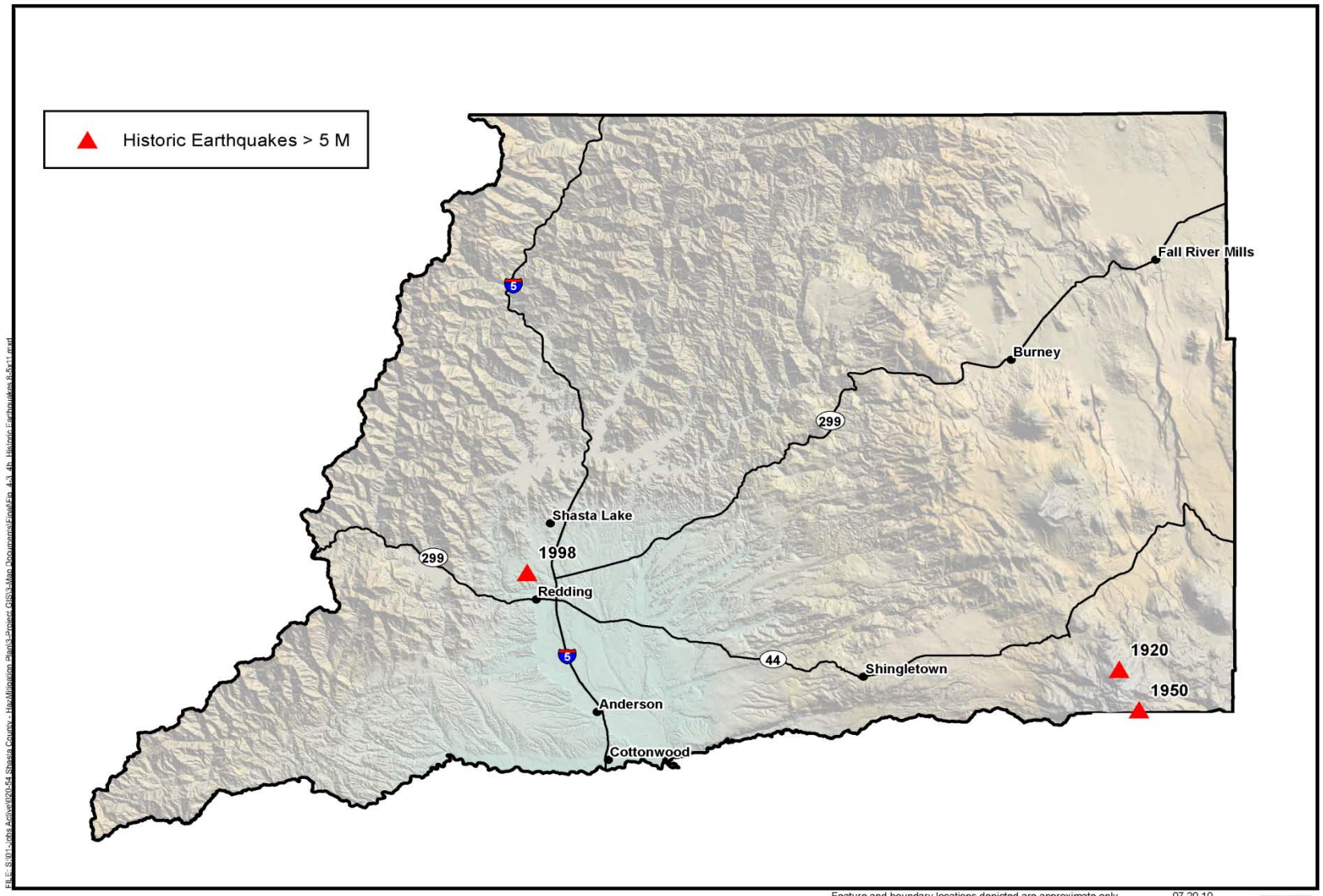


Figure 4.3-4.B
Historic Shasta County Earthquakes

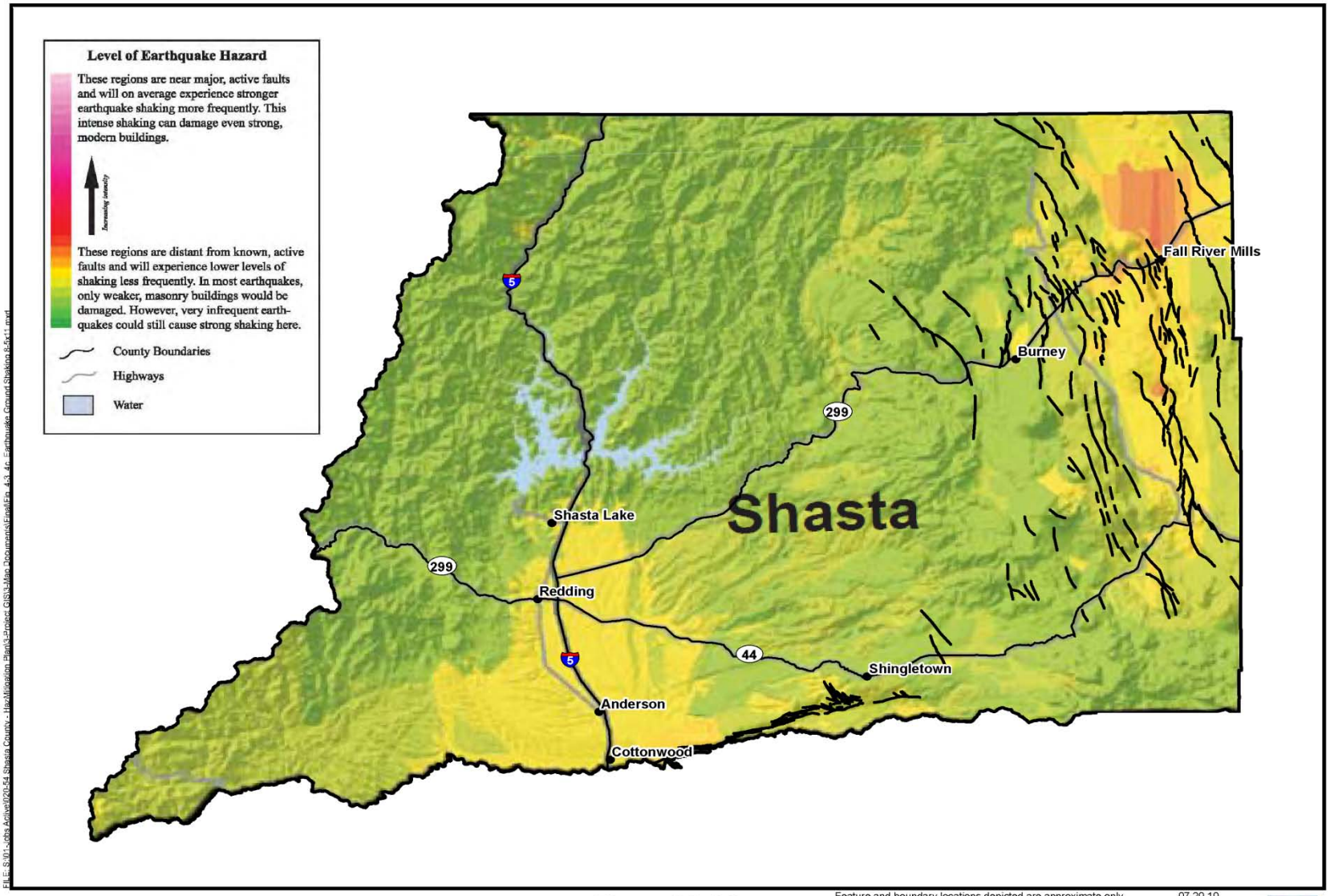


Figure 4.3-4.C
Earthquake Ground Shaking Potential

4.3.5 Hazardous Materials (Hazmat)

4.3.5.1 Hazard Definition

Identifying Hazardous Materials Release and Toxic Substance Hazards

Hazardous materials are substances that are flammable, combustible, explosive, toxic, noxious, and corrosive, an oxidizer, an irritant, or radioactive. A hazardous material spill or release can pose a risk to life, health or property. An incident can result in the evacuation of a few people, a section of a facility or an entire neighborhood.

There are a number of federal laws that regulate hazardous materials, including the Superfund Amendments and Reauthorization Act of 1986 (SARA), Resource Conservation and Recovery Act of 1976, Hazardous Materials Transportation Act, Occupational Safety and Health Act, Toxic Substances Control Act, and Clean Air Act.

Title III of SARA, also known as the Emergency Planning and Community Right-to- Know (EPCRA) Act, was established to encourage and support emergency planning efforts at the state and local levels and to provide the public and local governments with information concerning potential chemical hazards present in their communities. The law requires facilities to furnish information about the quantities and health effects of chemicals used at the facility and to promptly notify local and state officials whenever a significant amount of hazardous material is released.

California law established the Unified Program which consolidates, coordinates and makes consistent the administrative requirements, permits, inspections, and enforcement activities of six environmental and emergency response programs. The programs are the Hazardous Materials Business Plan/Emergency Response Plan, Hazardous Waste/Tiered Permitting, Underground Storage Tanks, Above-Ground Storage Tanks, California Accidental Release Prevention Program, and Uniform Fire Code Hazardous Materials Management Plan. The state agencies responsible for these programs set the standards for their program while local governments implement and enforce the standards. Cal EPA oversees the implement of the program as a whole (California Code of Regulations, Title 27, Division I, Subdivision 4, Chapter 1, Sections 15100-15620).

The Unified Program is implemented at the local level by government agencies certified by the Secretary of Cal EPA. These Certified Unified Program Agencies (CUPAs) have typically been established as a function of a local environmental health or fire department. Some CUPAs also have contractual agreements with one or more other local agencies, participating agencies (PAs), which implement one or more program elements under the oversight of the CUPA.

At the state level, the Hazardous Materials Business Plan/Emergency Response Plan's (California Health and Safety Code, Chapter 6.95) purpose is to prevent or minimize the damage to public health and safety

and the environment from a release or threatened release of hazardous materials and to satisfy community right-to-know laws. This is accomplished by requiring businesses that handle hazardous materials in quantities equal to or greater than 55 gallons, 500 pounds or 200 cubic ft. of gas or extremely hazardous substances above the threshold planning quantity (40 CFR, Part 355, Appendix A) to inventory their hazardous materials, develop an emergency plan and implement a training program for employees.

It should also be noted that a Hazardous Materials Business Plan regulates most hazardous materials facilities in the state. There are approximately 140,000 businesses, which range from the smallest gas station to the largest chemical facility.

Secondary Impacts

In addition to the immediate risk to life safety, public health, air quality, water source contamination and potential environmental impacts of accidental hazardous materials releases and toxic substances, there is concern for the long-term public health and environmental impacts that may result from the sustained use or exposure to certain substances. There is a growing recognition of the linkages between hazardous substances, environmental quality and global warming.

When MTBE was introduced in 1979 as a fuel additive to gasoline to increase its oxygen content and reduce carbon monoxide and ozone levels caused by auto emissions, it was considered to be an environmental breakthrough. However, over time it was discovered that MTBE was being introduced into drinking, ground and surface water supplies via leaking underground storage tanks and pipelines, spills, emissions from marine engines into lakes and reservoirs and, to some extent, from air deposition.

As part of implementing the Safe Drinking Water Act Amendments of 1996, the Office of Water placed MTBE on the drinking water Contaminant Candidate List for further evaluation to determine whether or not regulation with a National Primary Drinking Water Regulation is necessary.

Profiling Hazardous Materials Release and Toxic Substance Hazards

Hazardous materials are everywhere and are accidentally released or spilled many times during any given day. In 2008, The California State Warning Center received approximately 8,000 hazardous material spill reports on hazardous material incidents and potential hazardous material incidents. Of these incidents most are minor but some do cause significant impacts like injuries, evacuation and clean-up.

Hazmat may include hundreds of substances that pose a significant risk to humans. These substances may be highly toxic, reactive, corrosive, flammable, radioactive or infectious. They are present in nearly every community in the U.S., where they may be manufactured, used, stored, transported, or disposed. Because of their nearly ubiquitous presence, there are hundreds of hazmat release events annually in the U.S. that contaminate air, soil and groundwater resources, potentially triggering millions of dollars in clean-up costs, human and wildlife injuries and occasionally cause human deaths (FEMA, 1997).

Hazardous material releases may occur from any of the following:

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

In response to concerns over the environmental and safety hazards posed by the storage and handling of toxic chemicals in the U.S., Congress passed the Emergency Planning and Community Right to Know Act (EPCRA) in 1986. These concerns were triggered by the 1984 disaster in Bhopal, India, in which more than 2,000 people died or were seriously injured from the accidental release of methyl isocyanate from an American owned Union Carbide plant. To reduce the likelihood of such a disaster in the U.S., EPCRA established specific requirements on federal, state and local governments, Indian tribes, and industry to plan for hazardous materials emergencies. EPCRA's Community Right-to-Know provisions help increase the public's knowledge and access to information on chemicals at individual facilities, their uses and releases into the environment. States and communities working with facilities can use the information to improve chemical safety and protect public health and the environment (EPA, May 2003). Under EPCRA, hazardous materials must be reported to the Environmental Protection Agency (EPA), even if they do not result in human exposure. Such releases may include the following:

- Air emissions (e.g., pressure relief valves, smokestacks, broken pipes, water or ground emissions with vapors)
- Discharges into bodies of water (e.g., outflows to sewers, spills on land, water runoff, contaminated groundwater)
- Discharges onto land
- Solid waste disposals in onsite landfills
- Transfer of wastewater to public sewage plants
- Transfers of waste to offsite facilities for treatment or storage

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 bad due to the impairment of the physical integrity or even failure 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 anti-terrorism security at these facilities. Due to the high level of risk posed by hazardous materials, numerous federal, state and local agencies are involved in their

regulation, including the EPA, U.S. Department of Transportation, National Fire Protection Association, FEMA, U.S. Army, and the International Maritime Organization. Unless exempted, facilities that use, manufacture, or store hazardous materials in the U.S. fall under the regulatory requirements of EPCRA, enacted as Title III of the Federal Superfund Amendments and Reauthorization Act (SARA) (42 U.S.C. §§11001-11050 (1988)). EPCRA has four major provisions:

- Emergency Planning (Section 301-303) is designed to help communities prepare for and respond to emergencies involving hazardous substances. It requires every community in the U.S. to be part of a comprehensive emergency response plan.
- The Governor of California has designated a State Emergency Response Commission (SERC) responsible for implementing EPCRA provisions within California. The SERC oversees Local Emergency Planning Committee (LEPC) districts. Emergency Release Notification (Section 304) includes a list of chemicals that if spilled must be reported, including Extremely Hazardous Substances (EHS). The SERC supervises and coordinates activities of each LEPC, establishes procedures for receiving and processing public requests for information collected under EPCRA, and reviews LEPC developed local emergency response plans. Facilities with an EHS at quantities exceeding the Threshold Planning Quantities (TPQ) must notify the SERC and LEPC and provide a representative to participate in the County emergency planning process.
- Hazardous chemical storage reporting requirements (Sections 311-312) that requires facilities possessing a threshold reporting quantity of a hazardous material under EPCRA (Section 311/312, 40 CFR Part 370) to submit an annual chemical inventory report (Tier II Hazardous Chemical Inventory Form) to the SERC, LEPC and local fire department.
- Toxic chemical release inventory (Section 313). Of the hundreds of hazardous materials, under the EPCRA regulatory scheme, those hazardous materials that pose the greatest risk for causing catastrophic emergencies are identified as an EHS. As noted above, the presence of EHSs in quantities at or above TPQ require additional emergency planning and mitigation activities. These chemicals are identified by the U.S. EPA in the List of Lists – Consolidated List of Chemicals Subject to the EPCRA and Section 112 of the Clean Air Act (EPA, October 2001).

Releases of EHSs can occur during transport and from fixed facilities. Transportation related releases are generally more troublesome because they may 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. It should be noted that while comprehensive and readily accessible information is available on hazardous material release and facilities subject to EPCRA, there are numerous other sources of information on hazardous material facilities and incidents that are beyond the scope of this plan. A more in-depth analysis of potential hazardous material events would include the following:

- Risk Management Plan (RMP) facilities
- Tier II Hazardous Chemical Inventory Form facilities
- Toxic Release Inventory (TRI) facilities
- Pipelines and related facilities
- Railroad transportation facilities
- Explosive storage, sales, use, and manufacturing facilities
- Hazardous Materials Management Plan (HMMP) permit and Hazardous Materials Inventory Statement (HMIS) facilities
- Hazardous waste facilities (RCRA information and RMS databases)
- National Response Center Emergency Response Notification System (ERNS)
- U.S. Department of Transportation (DOT) Hazardous Materials Information Reporting System (HMIRS)
- California Hazardous Material Incident Reporting System (CHMIRS)
- California Department of Transportation (Caltrans)
- Trucking terminal facilities
- U.S. Office of Occupational Safety and Health Administration (OSHA) Injury, Illness and Fatality Database
- 911 regional dispatch centers
- EPA Envirofacts and Window to My Environment
- EPA Enforcement and Compliance History Online (ECHO)

4.3.5.2 History of Hazardous Materials

Some of the worst hazardous material events have occurred outside of the U.S., such the 1984 incident in Bhopal, India. Within the U.S., the National Response Center (NRC) reported an average of 280 hazardous material releases and spills occurred at fixed sites annually during the period 1987-1990. The U.S. Department of Transportation reported an average of 6,774 hazardous material events annually during the period 1982-1991, with highways accounting for 81.4 percent, railroads 14.7 percent, and other events 6.6 percent. Additionally, highway transportation hazardous material events have caused more than 100 deaths, 2,800 injuries, and $22.4 million in damages (FEMA, 1997).

4.3.5.3 Risk Assessment – Vulnerability and Potential Losses

The major sources of problems associated with hazardous materials are during production and use during manufacturing, a spill or a leak in a storage container, or a spill or leak during transporting. The major transportation routes for hazardous materials in Shasta County include the major highways such as I-5 from Oasis Road to Wonderland Exit and State Route 151 (Shasta Dam Boulevard) from I-5 to Shasta Dam as well as the railroads. Although Shasta County has experienced several hazardous spills, the City and fire district have not sustained damage attributed to hazardous materials as far as records have been maintained.

In California, the majority of hazardous materials incidents are handled prior to becoming a disaster. Nevertheless, the County's emergency organization needs to be flexible and evolutionary in its response to a developing incident in order to accommodate both the large number of relatively routine minor releases to truly disastrous hazardous materials releases is considered by most to be rural in nature and

therefore, does not include large industrial facilities which house or manufacture large quantities of hazardous materials that could potentially cause a devastating release.

Comprehensive information on the probability and magnitude of hazardous material events across all types of sources (e.g., fixed facility, transport vehicle) is not available. Wide variations in the characteristics of hazardous material sources and between the materials themselves make such an evaluation very difficult.

The U.S. Department of Transportation's Hazardous Materials Transportation Program is one of the most advanced probability and magnitude estimation programs. The program collects information on unintentional releases of hazardous materials, including the consequences, and analyzes them. The program is to identify low probability, high consequence events (which may not be apparent from incident data) and providing appropriate levels of protection (DOT, September 2003).

The Shasta County Environmental Health Division (SCHED) is the Administering Agency and Certified Unified Program Agency (CUPA) under California Health and Safety Code (H&SC) Title 20, Chapter 6.95, Article 1, § 25500. This statute mandates that the Administering Agency/CUPA develop and maintain an Area Plan which describes the agency's plan for preparing for and responding to a hazardous materials emergency. Participating agencies involved in hazardous materials incident planning or response are responsible for notifying the SCEHD of any changes in emergency response procedures or equipment that would substantially affect the Area Plan.

The Area Plan establishes the emergency response organization for hazardous materials incidents occurring within Shasta County including the cities of Redding, Anderson and Shasta Lake. This Plan documents the operational and general response procedures for the Shasta-Cascade Hazardous Materials Response Team (SCHMRT), which is the primary hazardous materials response group for Shasta County. SCHMRT is a multi-agency team based in Shasta County that serves the counties of Shasta, Tehama, Trinity, Siskiyou, Lassen, and Modoc. The SCHMRT administration group meets quarterly or on an as-needed basis.

SCHMRT is a Type II Hazardous Materials Team. A Type II Hazardous Materials Team is one that can respond to known and unknown chemicals and has specialized equipment and supplies to respond to these incidents. Members of the Shasta County Fire Department who are trained and certified to the level of technician and specialist are eligible to participate on the regional hazmat team. Members from participating agencies train together every month and can respond to emergencies involving hazardous materials such as poisons, radioactive materials, corrosives, compressed gases and oxidizer releases. SCHMRT has been able to acquire

additional equipment with grants from the Office of Domestic Preparedness and Homeland Security Administration. Such equipment has expanded the team's capability to handle incidents involving chemical, biological and radioactive weapons. One such grant purchased a new response vehicle with an on-board field laboratory. SCHMRT pursues cost recovery from individuals and agencies deemed responsible for causing a spill, leak or release of hazardous materials. In the event the responsible party cannot be located, the municipality in which the incident occurred is billed for the cost of mitigating the hazard. Because the Shasta County Fire Department is a part of the regional hazmat team, the County does not incur those costs, which can easily exceed $10,000 per incident. Continued involvement in SCHMRT is invaluable in our efforts to control and mitigate hazardous materials incidents. The costs of participating on the team are a small price considering the costs associated with hiring an outside firm to respond to each incident in Shasta County.

In January of every third year beginning in 2015, the County Agricultural Commissioner's Office will provide to the Environmental Health Division a list of pesticides used in Shasta County, which are known to drift, or volatize and are applied at high rates per acre (Shasta County Hazardous Materials Area Plan – May 2013 Part 1-10). The list is reviewed as part of the Area Plan update process.

Areas of concern in Shasta County are the Union Pacific Railroad and I-5, which are major interstate transportation routes that pass through our community. In addition, State Routes 44, 273 and 299 East and West support relatively high traffic volumes. Trains and trucks commonly carry a variety of hazardous materials, including gasoline and various crude oil derivatives, and other chemicals known to cause human health problems. Shasta County is exposed to the effects of a major catastrophic hazardous material emergency due to the proximity of these transportation routes to densely populated areas of the city of Redding. However, when properly contained, these materials present no hazard to the community.

In the event of an accident or derailment, such materials may be released, either in solid, liquid or gas form. In the case of some chemicals (such as chlorine), highly toxic fumes may be carried far from the accident site. Although standard accident and hazardous materials recovery procedures are enforced by the state and followed by private transportation companies, Shasta County is at relatively high risk because of its location along interstate, rail and highway corridors.

Informal surveys conducted by the Shasta County OES, Shasta County Environmental Health and the Redding Fire Department have indicated the presence of the following classifications of hazardous materials: explosives, poisons, corrosives, flammable liquids, combustible liquids, cryogenics, compressed gasses (flammable and non-flammable), radioactive materials, and oxidizers. Large pressurized natural gas pipelines traverse Shasta County. Three large propane facilities are located in Shasta County. Other small fixed facilities have varying uses of hazardous chemicals, but in general these do not pose a significant risk to Shasta County. Air transportation of hazardous materials involves the smallest quantity, but still poses a potential hazard. While it is beyond the scope of this plan to evaluate the probability and magnitude of hazardous material events in Shasta County in detail, it is possible to

determine the exposure of population, buildings and critical facilities should such an event occur. Of the facilities that were required to file an annual Tier II Material Inventory Report (under EPCRA) in Shasta County because of the presence of hazardous materials, six were identified as having EHS. The substances recorded at these facilities include common hazardous substances, such as chlorine, sulfur dioxide, anhydrous ammonia, hydrogen peroxide, ethylene oxide, etc. EHSs pose the greatest risk for causing catastrophic emergencies. Therefore, facilities with EHS's are considered a greater threat than situations where non-EHS's are involved. The list provided for this report does not include an additional forty-two facilities in Shasta County that have quantities of sulfuric acid (an EHS) in new and used batteries, nor the 16 County sites that have chlorine gas, ammonia and/or sulphuric acid.

The Shasta County Fire Department responds to spills, leaks and releases of hazardous materials in the entire county service area. The goal of hazmat response is to protect life, the environment and property from the damaging effects that can occur from the unplanned release of such materials. All Shasta County Fire Department personnel are trained, at minimum, to the level of Hazardous Materials First Responder which allows them to take defensive action at hazmat incidents. Some are trained to the higher levels of Hazardous Materials Technician and Hazardous Materials Specialist. Individuals trained to these levels are able to implement offensive control measures at hazmat incidents. Other Shasta County departments have undergone hazardous materials training and respond as needed to assist in incident mitigation.

Illegitimate businesses, such as clandestine drug laboratories, are a significant threat to human health, property, and the environment. Clandestine dumping is the criminal act of disposing of toxic materials and wastes from drug lab activities on public or private property. In many instances, drug lab wastes are dumped in remote areas of the county or along roadways, posing a serious health threat to the unsuspecting person who might stumble upon it and to the environment. Shasta County and the rest of the north state is experiencing an increase illegal growing of marijuana, which has the potential to result in unreported hazardous materials storage, such as diesel fuel, as well as improper or illegal application and/or disposal of fertilizers and pesticides.

Overall, Shasta County faces a moderate to high risk from exposure to hazardous materials incidents. The exposure was determined via two methods, the first of which is a one mile buffer around the six EHS sites and the second of which is a one mile buffer around selected sites on the major transportation corridors (I-5, State Routes 44, 273, and 299 and the Union Pacific Railroad Line). Within the one mile buffer around the six EHS sites, exposed are 29,820 people, 8,227 residential parcels (worth $828 million), 587 nonresidential parcels (worth $288 million), and 95 critical facilities (worth $411 million). These figures are for all of the EHS sites and, therefore, overstate the exposure since the probability of all EHS sites having an event simultaneously is very low. These facilities are predominately located within industrial and public zoned areas within Shasta County. However, all six EHS facilities are located within a mile of residential areas. Within a one mile buffer around one selected site on the major transportation corridors (I-5 and Cypress

Ave), exposed are 7,269 people, 1461 residential parcels (worth $130 million), 311 nonresidential parcels (worth $184 million), and 30 critical facilities (worth $67 million). These figures are calculated for one of the selected sites on the transportation corridors to give a representation of the potential risk in this specific area. The other sites would have similar risk and exposure if an incident were to occur. The incident magnitude is dependent on a number of factors including: time of day, day of week, location of incident, terrain, quantity of hazardous material involved and type of hazardous material involved.

4.3.5.4 Current Hazardous Materials Hazard Mitigation Efforts

The following mitigation efforts are required and implemented through state and federal regulation pertaining to the handling, storage and transport of hazardous substances:

Fixed (Stationary) Facilities	▪ Process Hazard Analysis (PHA) through Cal OSHA ▪ Policies and procedures, hazard communication and training ▪ Placarding and labeling of containers ▪ Hazard assessment ▪ Security ▪ Process and equipment maintenance ▪ Mitigating techniques—flares, showers, mists, containment vessels, fail-safe devices ▪ Use of inherently safer alternative products ▪ Emergency plans and coordination ▪ Response procedures
Transported	▪ Placards and labeling of containers ▪ Proper container established for material type ▪ Random inspections of transporters ▪ Safe-handling policies and procedures ▪ Hazard communications ▪ Training for handlers ▪ Permitting ▪ Transportation flow studies (e.g., restricting hazmat transportation over certain routes)

Additional programs are in place to combat the effects of existing hazardous materials releases and toxic substances.

4.3.6 Volcano

4.3.6.1 Hazard Definition

Volcanoes produce a wide variety of hazards that can kill people and destroy property. Large explosive eruptions can endanger people and property hundreds of miles away and even affect global climate. Some of the volcano hazards, such as landslides, can occur even when a volcano is not erupting.

Volcanic eruptions result in fires, toxic gas emissions, air pollution, and extensive ash deposits, and could catalyze earthquakes, landslides and floods. Ash deposits can create public health, telecommunications and structure damage hazards.

California volcanoes are generally well removed from urban areas. Regions at greater risk of experiencing volcanic activity such as lava flows, ash fall, lahars (volcanic mudflows), and debris avalanches are limited to sparsely populated resort areas (e.g., Shasta and Mammoth Lakes regions).

4.3.6.2 History of Volcanoes

According to an April 2005 report published by the USGS, Mount Shasta and Lassen Peak are considered to be very high threat volcanoes with limited monitoring (USGS, 2005). Mount Shasta erupted with pyroclastic flows in 1786, and Lassen Peak experienced a series of small explosions in 1914 that was followed by destructive lava flows in 1915 (USGS, 2004). Although Shasta County has experienced some volcanic activity, the South Central Urban Region has not sustained damages attributed to volcanic activity as far as records have been maintained. In their April 2005 report, the USGS proposed the highest level of monitoring, Level 4, for Mount Shasta and Lassen Peak, both of which are currently at the Level 2 monitoring stage. Monitoring includes tracking detailed changes in real-time of on-going activities such as seismic, land deformation and gas emissions.

Medicine Lake Volcano

Medicine Lake Volcano is a broad shield volcano capped by a 4- by 7-mile-wide caldera that erupted at least seven times in the past 4,000 years, most recently about 950 years ago. With a volume of more than 130 cubic miles, it is the largest volcano in the Cascade Mountain Range.

Mount Shasta

Mount Shasta has been the most active volcano in California during the past 4,000 years. During that time, Shasta has erupted on average about once every 300 years, producing many pyroclastic flows and lahars. Mount Shasta last erupted in 1786.

Lassen Volcanic Field

The Lassen Volcanic Field includes Lassen Peak and is the southernmost volcanic center in the Cascade Mountain Range. The most recent volcanic eruptions in California occurred at Lassen Peak from 1914 to 1917. An explosive eruption on May 22, 1915, produced a large pyroclastic flow, lahars and ash that fell as far away as Elko, Nevada, 300 miles to the east.

After the eruption of Mount St. Helens in 1980, the USGS intensified its monitoring of active and potentially active volcanoes in the Cascade Range. Monitoring of the Lassen area includes periodic measurements of ground deformation and volcanic gas emissions and continuous transmission of data from a local network of nine seismometers to USGS offices in Menlo Park, California. Should indications of a significant increase in volcanic activity be detected, the USGS will immediately deploy scientists and specially designed portable monitoring instruments to evaluate the threat. In addition, the National Park Service has developed an emergency response plan that would be activated to protect the public in the event of an impending eruption.

4.3.6.3 Risk Assessment – Vulnerability and Potential Losses

Populations living near volcanoes are most vulnerable to volcanic eruptions and lava flows, although volcanic ash can travel and affect populations many miles away. While there are about 20 volcanic locations in California, only a few are active and pose a threat.

Residents near volcanoes should learn about the community warning systems and emergency plans and be prepared for the hazards that can accompany volcanoes, which includes mudflows and flash floods, landslides and rock falls, earthquakes, ash fall and acid rain. Residents should make evacuation plans and if living in a known volcanic hazard area, plan a route out and have a backup route in mind. Residents should develop an emergency communication plan. In case family members are separated from one another during a volcanic eruption (a real possibility during the day when adults are at work and children are at school), have a plan for getting back together. Ask an out-of-state relative or friend to serve as the family contact, because after a disaster, it's often easier to call long distance. Make sure everyone knows the name, address and phone number of the contact person.

Mount Shasta is within Siskiyou County and poses the greatest volcanic risk to Shasta County residents and property. Areas subject to risk form future eruptions of Mount Shasta have been divided into zones that delineate the estimated degree of risk from each type of eruptive phenomenon. The zones of risk are to a great extent arbitrary and gradational.

Lava Flows

Potential hazard zones for future lava flows erupted at and in the vicinity of Mount Shasta are based on the vent locations of past lava flows, the areal extents of those lava flows, and their behavior.

It is likely that most future eruptions of lava will occur at the central vents rather than on the flanks of the volcano. However, some future lava flow could erupt at flank vents located five miles down slope from the present summit and individual flows may travel five miles down slope from their sources. The outer limit of potential hazard from lava flows is placed at a distance of eleven miles from the summit, excluding areas within eleven miles of the summit that are more than 350 ft. above the surrounding fan surface or any adjacent low areas. The eleven mile extent of this zone is based on the assumption that future lava flows will be of andesite or basaltic andesite and of similar viscosity and volume to those erupted in Holocene time.

The area of potential hazard from lava flows is divided into three concentric zones. In general, within the 22 mile diameter area, the risk is greatest near the present summit, where eruptions of lava have been most frequent in the past, and decreases with distance outward. Zone A extends from the summit outward 3.7 miles in all directions and includes the main vents that were active during Holocene time

(11,500 year ago) and their associated cones. Most future lava flows are likely to erupt within Zone A. Zone A has the greatest potential hazard form lava flows. Zone B consists of a ring-shaped area that extends from 3.7 to 7.4 miles from the summit. It is a zone into which lava flows from the Hotlum and Shastina central vents have flowed. In the northwest and west sectors, it is also a zone in which lava flows have been erupted from flank vents during Holocene time. Zone C is a ring extending from 7.4 to 11.1 miles from the summit. No known lava flows have erupted form vents in Zone C during Holocene time; however, this zone has been affected by flows that erupted from vents in Zone B and flowed into Zone C.

Pyroclastic Flows and Mudflows

Potential hazard zones for future pyroclastic flows and mudflows at and in the vicinity of Mount Shasta are based on the locations of past flows, the areal extents of those flows and their behavior.

Parts of Zone 1, centered on the volcano, have frequently been affected by pyroclastic flows and mudflows during the last 10,000 years. Future eruptions like those of the past will affect this zone more frequently than any other area around Mount Shasta. In general, the degree of hazard within this zone decreases outward in all direction from the summit. The greatest hazard from mudflows is in deep canyons. Mudflows tend to follow valleys and may not spread out until they reach fan surfaces.

Zone 2 is a zone or irregular shape between 6.2 and 12.4 miles from the summit of Mount Shasta that has been affected less frequently by pyroclastic flows and mudflows than Zone 1. The outer boundary is based on the maximum distance at which pyroclastic flow deposits younger than 10,000 years have been found.

Zone 3 includes areas between 12.4 and 18.6 miles from Mount Shasta that are known to have been affected only by mudflows, but that could be affected by very large and infrequent pyroclastic flows. No known pyroclastic flows have reached distances of more than 12.4 miles from Mount Shasta. Mudflows are likely to cover broad areas in Zone 3 as often as several times per century. The risk from mudflows is greatest on smooth fans and topographic depressions near major valleys which head on Mount Shasta.

Zone 4 consists of areas that have been affected only by mudflows and are beyond the limit of the largest predictable pyroclastic flows. This zone reaches from 18.6 to 43.4 miles south from Mount Shasta. Future mudflows may extend many tens of kilometers south along major drainages and may reach Shasta Lake. Future mudflows may also spread out in Shasta Valley northwest of Mount Shasta and could cover wide areas of the valley floor.

Broad areas within and beyond the limits of Zones 1-3 could be affected by clouds of hot ash and air blasts associated with pyroclastic flows. Ash clouds and associated air blasts would not be restricted to topographic depressions as pyroclastic flows and mudflows would be, but could affect all areas within several kilometers of pyroclastic flows.

Tephra

Eruptions of pumiceous tephra form Mount Shasta have been rare and of small volume in the past 10,000 years. Significant ash-fall thicknesses from a single eruption are likely to cover only a narrow

band downwind from the vent if winds are strong and unidirectional during the eruption. A review of wind records indicates that high-altitude winds in this region blow much more frequently and at higher speeds toward the east-northeast and east than toward the west. This data suggests that risk from tephra could be considerably less west of Mount Shasta than toward the east and that ash from about 90 percent of the future tephra eruptions could be expected to fall east of the mountain.

It is possible that an eruption of ash could be deposited on the communities that lie generally west, southwest, and south of Mount Shasta. This possibility means that a future eruption at Mount Shasta could deposit ash on communities like Weed and Mount Shasta.

Vulnerability

Figure 4.3-6.A shows local volcanic hazards. Specific volcanic threats are complex but may be simplified to include lava flows, mudflows and ash-fall. Prevailing winds are to the east-northeast.

Medicine Lake poses only a nominal threat due to its distance from populated areas of Shasta County.

Mount Shasta is beyond the eleven mile horizon for lava flows but mudflows may impact the Upper Sacramento and McCloud Rivers. The Upper Sacramento River Canyon contains several communities (Lakehead, Sweetbriar, Castella, Cragview), Interstate 5 and the Union Pacific Railroad which could be impacted by mudflows in the River. The River is steep and channelized with few obstructions. Community water systems draw from tributaries and springs instead of the River itself so they would not be impacted by mudflows. Water quality degradation may impact fisheries and recreation.

Lassen Peak is located within Lassen National Park in the sparsely inhabited southeast corner of the County. Park roads, lands and facilities would potentially be subject to lava flows and mudflows. State Route 44 traverses the northerly Park boundary and would potentially be impacted by lava flows. The Park is surrounded by National Forest lands and private timber holdings. There is little permanent habitation within the eleven mile horizon for lava flows. Hat Creek extends northerly from the Park and may be subject to lava flows and mudflows. The community of Hat Creek is within this area. The U.S. Geological Survey and the State of California monitor Lassen Peak and Mount Shasta. With this system established, there would be sufficient warning of renewed volcanic activity to evacuate the immediate vicinity. State Routes 44 and 89 may be impacted and could become impassable for extended periods.

All three volcanoes (Medicine Lake, Mount Shasta, Lassen Peak) may generate ash-fall over large areas of Shasta County. Prevailing winds are to the east-northeast, away from the City of Anderson and most other densely populated areas of Shasta County. Ash-fall is most likely to occur in the Intermountain communities of Burney, Hat Creek, Fall River Mills and MacArthur.

4.3.6.4 Current Volcano Hazard Mitigation Efforts

Future eruptions of Mount Shasta and Lassen Volcanic Field are virtually certain to occur and can neither be prevented nor stopped. Diversion or control of lava flows, pyroclastic flows, mudflows, and other products of eruptions from volcanoes like Mount Shasta and Lassen Volcanic Field is generally not feasible. Instead, reduction of loss of life and damage to property requires that the products of eruptions be avoided when possible and that plans be made to reduce the effects when and where they cannot be avoided.

After the eruption of Mount St. Helens in 1980, the USGS intensified its monitoring of active and potentially active volcanoes in the Cascade Range. Monitoring of the Lassen area includes periodic measurements of ground deformation and volcanic gas emissions and continuous transmission of data from a local network of nine seismometers to USGS offices in Menlo Park, California. Should indications of a significant increase in volcanic activity be detected, the USGS will immediately deploy scientists and specially designed portable monitoring instruments to evaluate the threat. In addition, the National Park Service has developed an emergency response plan that would be activated to protect the public in the event of an impending eruption.

Mitigation efforts to reduce life loss and injury from volcanoes include monitoring, warning, evacuation, and emergency public information:

- Identify hazardous areas. Scientists identify areas likely to be affected during future eruptions through detailed mapping of deposits from past eruptions. An understanding of volcanic processes and knowledge of a volcano's eruptive history provide the basis for preparing emergency-response plans before and during a volcano crisis, and for long-term community planning.
- Monitor unrest and issue timely warnings. Scientist issue warnings of future and ongoing eruptions by interpreting real-time data from networks of volcano-monitoring sensors. Volcanoes typically show signs of restlessness days to months to years before an eruption occurs. Since not all unrest leads to an eruption, monitoring data is essential in determining whether the activity poses an immediate hazard to people and property.
- If signs of an impending eruption appear its effects on people and property may be minimized if certain contingency plans are put into effect in time. It is suggested that the following actions be taken as soon as possible if an eruption begins or seems imminent.

What to do if an eruption begins or appears imminent:

- Notify local, state and federal authorities including County Sheriff Offices, California Highway Patrol, State Division of Emergency Services, and District Ranger, U.S. Forest Service.
- Inform the populace by suitable means about potential hazards that could be associated with an eruption, as well as areas of possible danger, and about official plans to deal with an eruption.
- Put into effect official contingency plans to limit access to and use of potentially hazardous areas as well as plans for possible evacuation of such areas.
- Put into effect an emergency communication system that could be used to warn people in potentially hazardous areas of the likelihood of an eruption and to direct them.
- Establish a volcano watch to observe the volcano from the ground and air on a regular basis and to monitor the volcano using various geophysical and perhaps geochemical, techniques.

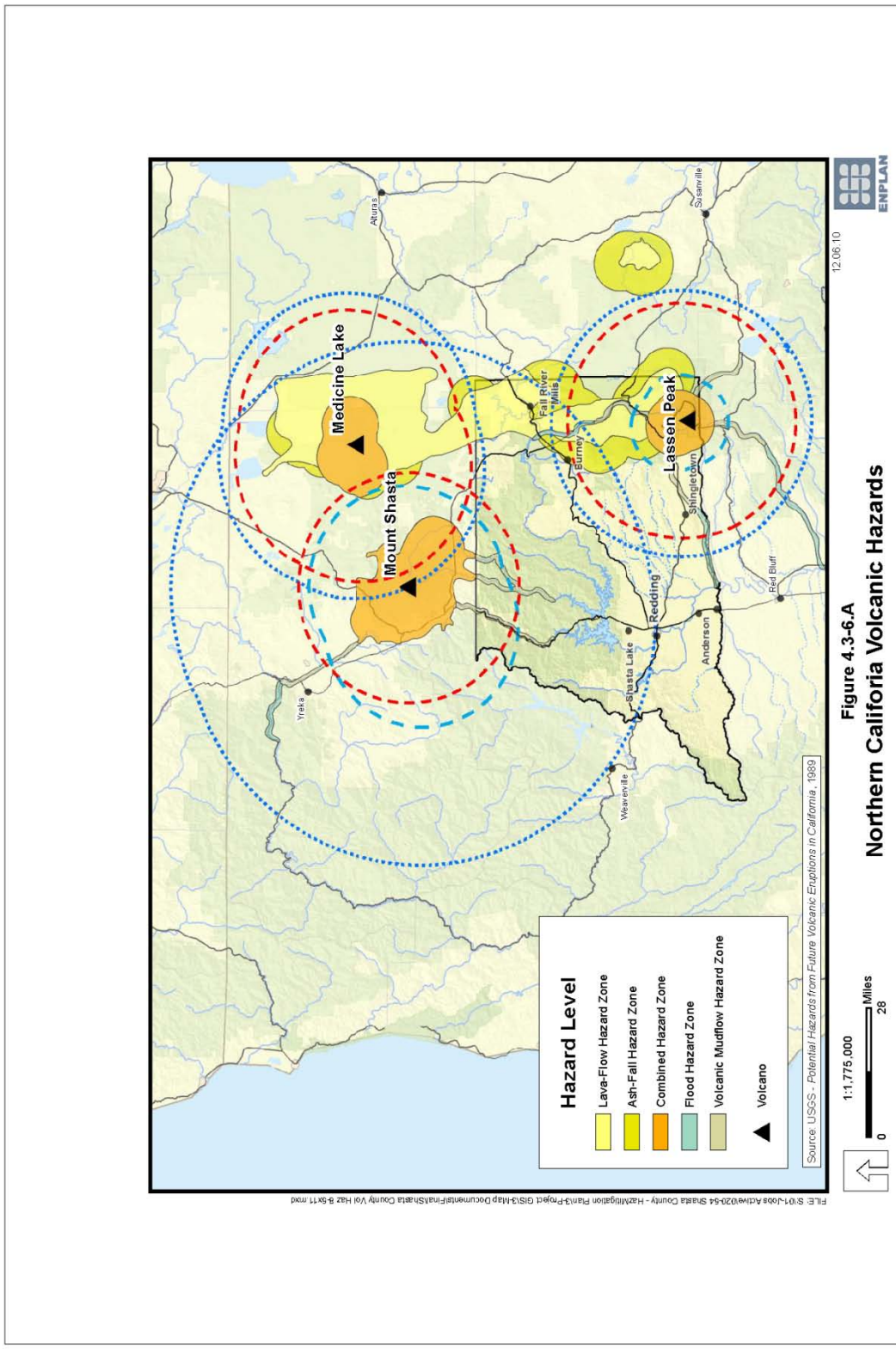


Figure 4.3-6.A
Northern California Volcanic Hazards

4.3.7 Chemical, Biological, Radiological, Nuclear & Explosive (CBRNE)

4.3.7.1 Hazard Definition

Hazardous materials include all toxic, flammable, combustible, corrosive, poisonous, and radioactive substances. An important subcategory of hazardous materials is hazardous wastes. Hazardous wastes should not be confused with solid wastes, which are discussed in the Community Development Element Group (Public Facilities Element). Hazardous waste is defined as a waste, or combination of wastes, which because of its quantity, concentration, or physical, chemical, or infectious characteristics may either:

- Cause, or significantly contribute to an increase in mortality or an increase in serious irreversible, or incapacitating reversible, illness, or;
- Pose a substantial present or potential hazard to human health or environment when improperly treated, stored, transported, disposed of, or otherwise managed (California Health and Safety Code Section 25117).

Records of hazardous materials handling at business facilities are maintained by the Shasta County Department of Resource Management Environmental Health Division.

Chemical substances if released or misused can pose a threat to people or the environment. These chemicals are used in industry, agriculture, medicine, research, and consumer goods. As many as 500,000 products pose physical or health hazards and can be defined as hazardous chemicals. Each year, over 1,000 new synthetic chemicals are introduced. Hazardous materials come in the form of explosives, flammable and combustible substances, poisons and radioactive materials. These substances are most often released as a result of transportation accidents or because of chemical accidents in manufacturing plants.

Chemicals are a natural and important part of the environment. People use chemicals every day that are found in kitchens, medicine cabinets, basements, and garages. Chemicals help keep our food fresh and bodies clean. They help plants grow and fuel cars. Chemicals make it possible for people to live longer, healthier lives.

A home chemical emergency arises when chemicals are used improperly. Some chemicals that are safe, and even helpful in small amounts, can be harmful in larger quantities or under certain conditions. In fact, most chemical accidents occur in our own homes, and they can be prevented. People may be exposed to a chemical even though they may not be able to see or smell anything unusual.

A person may be exposed in three ways:

1. Breathing the chemical.
2. Swallowing contaminated food, water or medication.
3. Touching the chemical, or coming into contact with clothing or things that have touched the chemical.

In Shasta County, the four major concerns regarding hazardous materials are their transportation, storage, operational uses, and unauthorized use/discharge.

Transportation accidents involving hazardous materials during transport pose threats to public health and safety, particularly when accidents occur along heavily traveled routes such as I-5 and the Union Pacific Railroad line in Shasta County. Transportation of hazardous materials presents perhaps the highest disaster potential in Shasta County. Regulations regarding the safe transport of hazardous materials and hazardous wastes should be contained in state and federal law.

The disposal of hazardous wastes and storage and use of hazardous materials have substantial implications for land use planning, as exposure to such materials may cause adverse health effects. The California Health and Safety Code authorize the Department of Toxic Substances Control (DTSC) to restrict certain land uses within 2,000 ft. (the border zone property) of hazardous waste property defined as land where a hazardous waste disposal site exists or has existed in the past.

If a permit is granted to any of these facilities, and there exists a significant disposal of hazardous waste on-site, the property is hazardous waste property by definition. No public hearing must be held prior to designation. The land surrounding these sites and extending up to 2,000 ft. from the location of disposal is potentially subject to designation as Border Zone Property BZP. DTSC has recommended that Shasta County inform all applicants for subdivision maps and building permits of the requirement that they must apply for a determination from DTSC whether the project should be designated as a hazardous waste property or border zone property, if the following conditions exist:

- They are an owner, lessor or lessee of property within 2,000 ft. of one of the facilities listed above; and
- They plan to construct within the next calendar year a structure to be used for one of the following purposes:
    - Residence, including any mobile home or factory built housing constructed or installed for use as a permanently occupied human habitation
    - Hospital for humans
    - School for persons under 21 years of age
    - Day care center for children
    - Permanently occupied human habitation other than those used for industrial purposes

DTSC regulations prohibit residential land uses including hospitals, day care centers and schools on hazardous waste properties, as well as any new land uses, except where variances are granted. State regulations further prohibit subdivision of such lands except where a subdivision would separate designated hazardous waste property from non-designated property. Land owners of these properties

are additionally required to create easements permitting state officials from DTSC to enter their lands in order to monitor hazardous waste storage.

State regulations regarding border zone properties are similar to those affecting designated waste properties with the exception that new land uses may occur on these lands without requiring a variance from the DTSC. State regulations also provide that if the County knows or has probable cause to believe that any land within the County is a hazardous waste property or a border zone property, then the County may apply to DTSC for determination whether the land should be designated under either classification. On-site handling of hazardous materials is also regulated by the Shasta County Department of Resource Management Environmental Health Division through submittal of chemical inventories by chemical handlers. In addition, the industry or hazardous substance user may be required to obtain a conditional use permit from the City and/or County government. Storage or disposal of materials with potentially hazardous impacts on nearby watercourses may also be subject to requirements established by the Central Valley Regional Water Quality Control Board or other local, state or federal agencies.

Hazardous materials are used in many forms and activities throughout Shasta County. The most heavily used substances are motor vehicle fuels, lubricants and propane. Regulations regarding the use of herbicides, pesticides and fertilizers which contain hazardous materials are administered by the State Department of Food and Agriculture in conjunction with the County Agricultural Commissioner. Any operation which discharges wastes onto land or into bodies of water must also meet discharge requirements established by the Central Valley Regional Water Quality Control Board.

4.3.7.2 History of CBRNE

Infectious or etiologic (disease causing) agents, potentially infectious materials, certain toxins and other hazardous biological materials are included in the definition of a biohazard: biological agents and materials which are potentially hazardous to humans, animals and/or plants. Biohazardous agents may include but are not limited to: Certain bacteria, fungi, viruses, rickettsiae, chlamydiae, parasites, recombinant products, allergens, cultured human or animal cells and the potentially infectious agents these cells may contain viroids, prions and other infectious agents as outlined in laws, regulations or guidelines. The definition of terrorism according to the Federal Bureau of Investigation (FBI) is the unlawful use of force against persons or property to intimidate or coerce a government, the civilian population, or any segment thereof, in furtherance of political or social objectives. Terrorist acts include the use of arson, hostile takeovers, shootings, bombings, hostage taking, and the deployment of chemical agents or biological agents. Weapons of mass destruction associated with terrorism are defined as CBRNE. Bioterrorism includes the use of biological agents (bacteria, viruses, parasites or toxins) to intentionally produce a disease in a group of people to meet terrorist goals. Attractive targets for bioterrorism include sporting events, political conventions and other special events, because they are highly visible, generate a large volume

of attendance, and attract celebrities and/or political leaders. Targets of opportunity include large public works facilities, water distribution systems, postal delivery or large venues where large groups of people congregate.

To date, Shasta County has yet to experience an act of bioterrorism. However, as with most rural counties in California, Shasta County has its vulnerabilities. In consideration of its mild climate, special events and attractiveness to tourists, Redding stands out for those who would commit such atrocities. Although, as mentioned, no significant acts of bioterrorism have occurred, Shasta County has in fact experienced incidents of naturally occurring or accidental exposure to biological agents.

4.3.7.3 Risk Assessment – Vulnerability and Potential Losses

Without a history of significant acts of terrorism or threats thereof having taken place in Shasta County, there is virtually no data available in which to predict a specific act that may occur. However, when considering the increase of terrorist attacks that have occurred worldwide and throughout the nation, it is only prudent to plan and prepare for when such an event occurs in Shasta County, and where Shasta County's vulnerabilities lie.

The SCHMRT personnel are trained to meet mandated requirements for the hazardous materials operational level. A small group of personnel have been trained to the higher levels of hazardous materials technician and specialist. Due to lengthy railway lines and state highways traversing Shasta County, there is an ongoing potential for a hazardous materials transportation incident. Personnel have limited abilities to respond to incidents of biological agent exposure. In an effort to combat the potential threat of bioterrorism, the Redding main postal facility of the U.S. Postal Service is being equipped with the Biohazard Detection System. The program aims to keep the public safe by detecting the presence of biological agents.

4.3.7.4 Current CBRNE Hazard Mitigation Efforts

The Shasta County Public Health (SCPH) Department has access to the California Health Alert Network (CAHAN). This network is designed to alert local health departments throughout California in the event of a public health emergency (bioterrorism). CAHAN provides a central point of access to local health departments and their partners for sending and receiving alerts as well as locating, creating and sharing critical information from a web-based interface. The SCPH Department recently upgraded their laboratory facility to process and test a variety of materials which may include suspected biological agents. The department added additional microbiologists who received specialized training in select-agent testing.

From Healthy Shasta Report 2008: Preparing for bioterrorism and other emergencies is another area of focus for the department. Strategies to achieve preparedness include collaborating with important community partners in planning, increasing frequency of training and practice, improving surveillance and investigation capacity for biological agents that may be used by terrorists, and developing effective health alert and crisis communication systems.

From Healthy Shasta 2008 Report: Bioterrorism/Emergency Preparedness Bioterrorism (BT) can be defined as the intentional, threatened or alleged use of viruses, bacteria, fungi, and toxins (biological agents) to produce death or disease in humans, animals or plants. Historically, an attack with a biological agent would have been considered almost unthinkable. Today, however, the threat of bioterrorism is real and growing. There are at least 17 nations that are believed to have the capacity to develop and use offensive bioterrorism weapons. Intelligence sources also suggest that terrorist groups continue to pursue the resources and technology required to manufacture and employ biological weapons. This potential threat places huge demands upon the public health and medical communities to be able to recognize and respond appropriately should such an event occur. In light of this threat, it is imperative that public health departments across the country be better prepared.

Public health preparedness can be defined as having the systems, plans and resources in place that enable local public health departments to address and handle community health emergencies. The nature of this preparedness is such that health departments will have enhanced systems in place that will allow them to respond not only to BT events, (for which they would have a significant role) but also to other community health emergencies including disease outbreaks and natural disasters.

SCPH in accordance with the federal mandate from the Centers for Disease Control and Prevention (CDC) will focus its efforts on the following BT and Emergency preparedness strategies.

Bioterrorism/Emergency Preparedness 2010 Goal

To partner with local, state and federal agencies to have the functional systems, flexible plans and sufficient resources in place to prepare and protect the residents of Shasta County in the event of a community health emergency.

Public Health's approach to Bioterrorism/Emergency Preparedness:

1. Establish an all-hazard threat matrix for different disaster scenarios that highlights probabilities of threat occurrence and impact.
2. Collaborate with partners to develop community health emergency response plans and systems.
3. Increase the level of training and testing capacity of the public health laboratory to respond to a bioterrorist event.
4. Enhance the surveillance, reporting, tracking and investigation capacity for suspicious diseases throughout the public health and medical community.
5. Develop effective risk information and communication systems for both the public and key partners. Sponsor emergency preparedness training and preparedness drills for public health staff and key partners.

4.3.8 Pandemic/Epidemic

4.3.8.1 Hazard Definition

Identifying Pandemic Flu Hazards

Influenza, also known as the flu, is a disease that attacks the respiratory system (nose, throat and lungs) in humans. Although mild cases may be similar to a viral cold, influenza is typically much more severe, usually comes on suddenly, and may include fever, headache, tiredness (which may be extreme), dry cough, sore throat, nasal congestion, and body aches and more often results in complications such as pneumonia. Seasonal influenza is a yearly occurrence that kills primarily persons aged 65 and older and those of any age with certain chronic health conditions, and causes significant economic impact.

Worldwide pandemics of influenza occur when a novel virus emerges to which the population has little immunity. The 20th century saw three such pandemics, the most notable of which was the 1918 Spanish influenza pandemic that was responsible for 20 million deaths throughout the world.

Of a total county population of 190,000 people in Shasta County 9,500 to 38,000 individuals will be infected with seasonal influenza each year. The average annual number of deaths in Shasta County reported in the population for all ages from influenza and pneumonia from 2006 to 2008 was 43 fatalities. However, most influenza cases are not reportable so this is likely an underestimate.

Secondary Impacts

Significant economic disruption can occur due to loss of employee work time and costs of treating or preventing spread of the flu.

From Healthy Shasta 2008 Report, general communicable disease prevention strategies focus on increasing immunization against vaccine-preventable diseases, tuberculosis control, preventing infection with blood-borne pathogens, decreasing transmission of sexually transmitted diseases, and improving laboratory capacity. Protecting people from the human and economic costs associated with disease is a core public health function. Infectious diseases remain major causes of illness, disability and death around the world. New infectious agents and diseases are being discovered regularly, and some diseases considered under control have re-emerged in recent years. Through communicable disease investigation and intervention (immunization services, STD services, HIV testing and counseling, community education, and laboratory services), SCPH works to prevent and control infectious diseases and epidemics. Keeping best practices in mind, the following strategic directions have been selected to prevent and control communicable diseases in our communities.

4.3.8.2 History of Pandemic/Epidemic

2009 saw the rise of the novel influenza A H1N1, popularly referred to as the Swine Flu. According to the California Center for Infectious Diseases, The H1N1 Flu (2009 H1N1 influenza virus) is a type of influenza virus that causes respiratory disease that can spread between people. While most people who have been sick have recovered without needing medical treatment, hospitalizations and deaths from infection with this virus have occurred. Spread of H1N1 flu occurs in the same way that seasonal flu spreads. Flu viruses are spread mainly from person to person through close range coughing or sneezing by people with influenza. As a result of preparation and mitigation strategies such as vaccinations and public education, the threat of a full blown H1N1 pandemic in the U.S. has receded. The possibility for a pandemic, though, still exists.

A previous pandemic flu threat that still looms is the avian flu. Birds can contract avian flu and pass it along to humans. Some strains of the avian flu are more virulent than others. Public health experts continue to be alert to the risk of a possible re-emergence of an epidemic of avian among people primarily in Asia in 2003. People who had been very close contact with infected birds (for example, people who lived with chickens in their houses) contracted a virulent form of avian flu and there was a high death rate from this disease. Thus far, the avian flu virus has not mutated and has not demonstrated easy transmission from person to person. However, were the virus to mutate in a highly virulent form and become easily transmissible from person to person, the public health community would be very concerned about the potential for a pandemic influenza outbreak. Such a pandemic could disrupt all aspects of society and severely affect the economy.

Influenza pandemics in the U.S. during the 20th century include the Spanish, Asian and Hong Kong pandemics. The Spanish pandemic was a Type A (H1N1) virus which occurred from 1918 to 1919 with a mortality rate of 550,000 individuals in the U.S. The Asian pandemic was a Type A (H2N2) virus which occurred from 1957 to 1958 with a mortality rate of 70,000 individuals in the U.S. The Hong Kong pandemic was a Type A (H3N2) virus which occurred from 1968 to 1969 with a mortality rate of 34,000 individuals in the U.S. (SCPH PowerPoint hardcopy).

4.3.8.3 Risk Assessment – Vulnerability and Potential Losses

Key hazards of concern to Shasta County are described below:

Anthrax is a serious disease caused by Bacillus anthracis, a bacterium that forms spores. A bacterium is a very small organism made up of one cell. Many bacteria can cause disease. A spore is a cell that is dormant (asleep) but may come to life with the right conditions. There are three types of anthrax: skin (cutaneous); lungs (inhalation); and digestive (gastrointestinal). Anthrax is not known to spread from one person to another.

Anthrax from animals: Humans can become infected with anthrax by handling products from infected animals or by breathing in anthrax spores from infected animal products (like wool, for example). People also can become infected with gastrointestinal anthrax by eating undercooked meat from infected animals.

Anthrax as a weapon: Anthrax also can be used as a weapon. This happened in the in 2001. Anthrax was deliberately spread through the postal system by sending letters with powder containing anthrax. This caused 22 cases of anthrax infection. Early treatment of cutaneous anthrax is usually curative, and early treatment of all forms is important for recovery. Patients with cutaneous anthrax have reported case fatality rates of 20 percent without antibiotic treatment and less than one percent with it. Although case-fatality estimates for inhalation anthrax are based on incomplete information, the rate is extremely high, approximately 75 percent, even with all possible supportive care including appropriate antibiotics. Estimates of the impact of the delay in post-exposure prophylaxis or treatment on survival are not known. For gastrointestinal anthrax, the case-fatality rate is estimated to be 25-60 percent and the effect of early antibiotic treatment on that case-fatality rate is not defined.

Botulism is a serious paralytic illness caused by a nerve toxin that is produced by the bacterium Clostridium botulinum. There are three main kinds of botulism. Food borne botulism is caused by eating foods that contain the botulism toxin. Wound botulism is caused by toxin produced from a wound infected with Clostridium botulinum. Infant botulism is caused by consuming the spores of the botulinum bacteria, which then grow in the intestines and release toxin. All forms of botulism can be fatal and are considered medical emergencies. Food borne botulism can be especially dangerous because many people can be poisoned by eating a contaminated food.

Brucellosis is an infectious disease caused by the bacteria of the genus *Brucella*. These bacteria are primarily passed among animals, and they cause disease in many different vertebrates. Various *Brucella* species affect sheep, goats, cattle, deer, elk, pigs, dogs, and several other animals. Humans become infected by coming in contact with animals or animal products that are contaminated with these bacteria. In humans brucellosis can cause a range of symptoms that are similar to the flu and may include fever, sweats, headaches, back pains, and physical weakness. Severe infections of the central nervous systems or lining of the heart may occur. Brucellosis can also cause long-lasting or chronic symptoms that include recurrent fevers, joint pain, and fatigue.

Campylobacter jejuni (Pronounced camp-e-low-back-ter j-june-eye) was not recognized as a cause of human food borne illness prior to 1975. Now, the bacterial organism is known to be the most common cause of food borne illness in the U.S. (Salmonella is the second most common cause). Food is the most common vehicle for the spread of Campylobacter and poultry is the most common food implicated. Some case-control studies indicate that up to 70 percent of sporadic cases of campylobacteriosis are associated with eating chicken. Surveys by the USDA demonstrated that up to 88 percent of the broiler chicken carcasses in the U.S. are contaminated with Campylobacter while a recent Consumer Reports study identified Campylobacter in 63 percent of more than 1,000 chickens obtained in grocery stores.

Other identified food vehicles include unpasteurized milk, undercooked meats, mushrooms, hamburger, cheese, pork, shellfish, and eggs.

Chikungunya (Pronounced chik-en-gun-ye) virus is transmitted to people by mosquitoes. The most common symptoms of Chikungunya virus infection are fever and joint pain. Other symptoms may include headache, muscle pain, joint swelling, or rash. Outbreaks have occurred in countries in Africa, Asia, Europe, and the Indian and Pacific Oceans. In late 2013, Chikungunya virus was found for the first time in the Americas on islands in the Caribbean. There is a risk that the virus will be imported to new areas by infected travelers. There is no vaccine to prevent or medicine to treat Chikungunya virus infection. Travelers can protect themselves by preventing mosquito bites. When traveling to countries with Chikungunya virus, use insect repellent, wear long sleeves and pants and stay in places with air conditioning or that use window and door screens.

Cholera is an acute, diarrheal illness caused by infection of the intestine with the bacterium *Vibrio cholerae*. An estimated 3-5 million cases and over 100,000 deaths occur each year around the world. The infection is often mild or without symptoms, but can sometimes be severe. Approximately one in 20 (five percent) infected persons will have severe disease characterized by profuse watery diarrhea, vomiting and leg cramps. In these people, rapid loss of body fluids leads to dehydration and shock. Without treatment, death can occur within hours.

The cholera bacterium is usually found in water or food sources that have been contaminated by feces from a person infected with cholera. Cholera is most likely to be found and spread in places with inadequate water treatment, poor sanitation and inadequate hygiene.

The cholera bacterium may also live in the environment in brackish rivers and coastal waters. Shellfish eaten raw have been a source of cholera, and a few persons in the U.S. have contracted cholera after eating raw or undercooked shellfish from the Gulf of Mexico.

Dengue virus is a leading cause of illness and death in the tropics and subtropics. As many as 400 million people are infected yearly. Dengue is caused by any one of four related viruses transmitted by mosquitoes. There are not yet any vaccines to prevent infection with dengue virus and the most effective protective measures are those that avoid mosquito bites. When infected, early recognition and prompt supportive treatment can substantially lower the risk of medical complications and death.

Dengue has emerged as a worldwide problem only since the 1950s. Although dengue rarely occurs in the continental United States, it is endemic in Puerto Rico and in many popular tourist destinations in Latin America, Southeast Asia and the Pacific islands.

Ebola previously known as Ebola hemorrhagic fever, is a rare and deadly disease caused by infection with one of the Ebola virus species. Ebola can cause disease in humans and nonhuman primates (monkeys, gorillas, and chimpanzees). Ebola is caused by infection with a virus of the family *Filoviridae,* genus *Ebolavirus*. There are five identified Ebola virus species, four of which are known to cause disease in humans: Ebola virus (*Zaire ebolavirus*); Sudan virus (*Sudan ebolavirus*); Taï Forest virus (*Taï Forest*

ebolavirus, formerly *Côte d'Ivoire ebolavirus*); and Bundibugyo virus (*Bundibugyo ebolavirus*). The fifth, Reston virus (*Reston ebolavirus*), has caused disease in nonhuman primates, but not in humans.

Ebola viruses are found in several African countries. Ebola was first discovered in 1976 near the Ebola River in what is now the Democratic Republic of the Congo. Since then, outbreaks have appeared sporadically in Africa.

The natural reservoir host of Ebola virus remains unknown. However, on the basis of evidence and the nature of similar viruses, researchers believe that the virus is animal-borne and that bats are the most likely reservoir. Four of the five virus strains occur in an animal host native to Africa.

People get Ebola through direct contact (through broken skin or mucous membranes in, for example, the eyes, nose, or mouth) with:

- Blood or body fluids (including but not limited to urine, saliva, sweat, feces, vomit, breast milk, and semen) of a person who is sick with or has died from Ebola.
- Objects (like needles and syringes) that have been contaminated with body fluids from a person who is sick with Ebola or the body of a person who has died from Ebola.
- Infected fruit bats or primates (apes and monkeys).
- Possibly from contact with semen from a man who has recovered from Ebola (for example, by having oral, vaginal or anal sex).

Escherichia coli (abbreviated as *E. coli*) are a large and diverse group of bacteria. Although most strains of *E. coli* are harmless, others can make you sick. Some kinds of *E. coli* can cause diarrhea, while others cause urinary tract infections, respiratory illness and pneumonia, and other illnesses. Still other kinds of *E. coli* are used as markers for water contamination—so you might hear about *E. coli* being found in drinking water, which are not themselves harmful, but indicate the water is contaminated.

Some kinds of *E. coli* cause disease by making a toxin called Shiga toxin. The bacteria that make these toxins are called Shiga toxin-producing *E. coli*, or STEC for short. You might hear them called verocytotoxic *E. coli* (VTEC) or enterohemorrhagic *E. coli* (EHEC); these all refer generally to the same group of bacteria. The most commonly identified STEC in North America is *E. coli* O157:H7 (often shortened to *E. coli* O157 or even just O157). When you hear news reports about outbreaks of *E. coli* infections, they are usually talking about *E. coli* O157.

In addition to *E. coli* O157, many other kinds (called serogroups) of STEC cause disease. These other kinds are sometimes called non-O157 STEC. *E. coli* serogroups O26, O111, and O103 are the non-O157 serogroups that most often cause illness in people in the U.S.

Giardiasis is a diarrheal disease caused by the microscopic parasite *Giardia*. A parasite is an organism that feeds off of another to survive. Once a person or animal (for example, cats, dogs, cattle, deer, and beavers) has been infected with *Giardia*, the parasite lives in the intestines and is passed in feces. Once

outside the body, *Giardia* can sometimes survive for weeks or months. *Giardia* can be found within every region of the U.S. and around the world.

Giardiasis can be spread by: Swallowing *Giardia* picked up from surfaces (such as bathroom handles, changing tables, diaper pails, or toys) that contain stool from an infected person or animal; drinking water or using ice made from water sources where *Giardia* may live (for example, untreated or improperly treated water from lakes, streams or wells); swallowing water while swimming or playing in water where *Giardia* may live, especially in lakes, rivers, springs, ponds, and streams; eating uncooked food that contains *Giardia* organisms; having contact with someone who is ill with giardiasis; and traveling to countries where giardiasis is common.

Hantavirus infection is caused by a group of viruses that can infect humans with two serious illnesses: hemorrhagic fever with renal syndrome (HFRS) and Hantavirus pulmonary syndrome (HPS). Hantaviruses are found without causing symptoms within various species of rodents and are passed to humans by exposure to the urine, feces, or saliva of those infected rodents. Ten different Hantaviruses have been identified as important in humans.

Hepatitis A is one of five human hepatitis viruses that primarily infect the human liver and cause human illness. The other known human hepatitis viruses are hepatitis B, C, D, and E. Hepatitis A is relatively unusual in nations with developed sanitation systems such as the U.S. Nevertheless, it continues to occur here. Each year, an estimated 100 persons die as a result of acute liver failure in the U.S. due to hepatitis A. Approximately 30 - 50,000 cases occur yearly in the U.S. and the direct and indirect costs of these cases exceed $300 million.

Influenza (the flu) is a contagious respiratory illness caused by influenza viruses. It can cause mild to severe illness, and at times can lead to death. Some people, such as older people, young children and people with certain health conditions, are at high risk for serious flu complications.

In 2009-2010, a new and very different flu virus (called 2009 H1N1) spread worldwide causing the first flu pandemic in more than 40 years. During the 2010-2011 flu season, CDC expects the 2009 H1N1 virus to cause illness again along with other influenza viruses.

Legionnaires' disease (LEE-juh-nares) is caused by a type of bacteria called *Legionella.* The bacteria got its name in 1976, when many people who went to a Philadelphia convention of the American Legion suffered from an outbreak of this disease, a type of pneumonia (lung infection).

People get Legionnaires' disease when they breathe in a mist or vapor (small droplets of water in the air) that has been contaminated with the bacteria. One example might be from breathing in the steam from a whirlpool spa that has not been properly cleaned and disinfected.

Legionnaires' disease can be very serious and can cause death in up to 5 percent to 30 percent of cases. Most cases can be treated successfully with antibiotics [drugs that kill bacteria in the body], and healthy people usually recover from infection.

Lyme disease (Borrelia burgdorferi) is a systemic, tick borne disease with protean manifestations, including dermatologic, rheumatologic, neurologic, and cardiac abnormalities. The best clinical marker for the disease is an initial skin lesion that occurs in 60-80 percent of patients.

Norwalk virus is a virus that attaches to the outside of cells lining the intestine. Once attached, it transfers its genetic material into that cell. There it reproduces, finally killing the human cell to release new copies of it that attach to more cells of the intestine's lining. Common names of the illness caused by the Norwalk and other small round structured or caliciviruses are viral gastroenteritis, acute nonbacterial gastroenteritis, food poisoning, and food borne infection. This illness occurs worldwide. Humans are the only known hosts. The viruses are passed in the stool of infected persons. Of viruses, only the common cold is reported more often than viral gastroenteritis. Norwalk and Norwalk like viruses are increasingly being recognized as leading causes of food-borne disease in the U.S. People most often get Norwalk virus infection by swallowing infected food or water. Outbreaks in the U.S. are often linked to eating raw shellfish, especially oysters and clams. Steaming does not kill the virus or prevent its transmission.

Plague is a disease caused by Yersinia pestis (Y. pestis), a bacterium found in rodents and their fleas in many areas around the world. Pneumonic plague is different from the bubonic plague. Both are caused by Yersinia pestis, but they are transmitted differently and their symptoms differ. Pneumonic plague can be transmitted from person to person; bubonic plague cannot. Pneumonic plague affects the lungs and is transmitted when a person breathes in Y. pestis particles in the air. Bubonic plague is transmitted through the bite of an infected flea or exposure to infected material through a break in the skin. Symptoms include swollen, tender lymph glands called buboes. Buboes are not present in pneumonic plague. If bubonic plague is not treated, however, the bacteria can spread through the bloodstream and infect the lungs, causing a secondary case of pneumonic plague. Patients usually have fever, weakness and rapidly developing pneumonia with shortness of breath, chest pain, cough, and sometimes bloody or watery sputum. Nausea, vomiting and abdominal pain may also occur. Without early treatment, pneumonic plague usually leads to respiratory failure, shock and rapid death.

Rabies is a preventable viral disease of mammals most often transmitted through the bite of a rabid animal. The vast majority of rabies cases reported to the Centers for Disease Control and Prevention (CDC) each year occur in wild animals like raccoons, skunks, bats, and foxes.

The rabies virus infects the central nervous system, ultimately causing disease in the brain and death.

The early symptoms of rabies in people are similar to that of many other illnesses, including fever, headache and general weakness or discomfort. As the disease progresses, more specific symptoms appear and may include insomnia, anxiety, confusion, slight or partial paralysis, excitation, hallucinations, agitation, hyper salivation (increase in saliva), difficulty swallowing, and hydrophobia (fear of water). Death usually occurs within days of the onset of these symptoms.

Salmonella is a type of bacteria that causes typhoid fever and many other infections of intestinal origin. Typhoid fever, rare in the U.S., is caused by a particular strain designated Salmonella typhi. But illness due to other Salmonella strains, just called *salmonellosis* is common in the U.S. today, the number of known strains of this bacterium total over 2,300.

Shigella is a bacterium that causes shigellosis. This disease is characterized by a sudden and severe diarrhea (gastroenteritis) in humans. Shigella lives in the human intestine and is commonly spread both through food and by person-to-person contact. The illness is also known as *bacillary dysentery*. About 25,000 or so laboratory confirmed cases of shigellosis are reported each year in the U.S. However, many cases go undiagnosed and/or unreported, and the best estimates are that 450,000 cases of Shigella infection actually occur annually in the U.S.

Tularemia is a potentially serious illness that occurs naturally in the U.S. It is caused by the bacterium Francisella tularensis found in animals (especially rodents, rabbits and hares). Tularemia is also known as rabbit fever. Tularemia is usually a rural disease and has been reported in all U.S. states except Hawaii. Tularemia is a widespread disease in animals. About 200 human cases of tularemia are reported each year in the U.S. Most cases occur in the south-central and western states.

West Nile Virus (WNV) is a mosquito-borne virus that has been found in parts of Asia, Eastern Europe, Africa, and the Middle East. The virus arrived in the Western Hemisphere in 1999 in New York City. The more severe forms of West Nile virus are West Nile encephalitis, West Nile meningitis, and West Nile meningoencephalitis. Encephalitis refers to an inflammation of the brain, meningitis is an inflammation of the membrane around the brain and the spinal cord, and meningoencephalitis refers to inflammation of the brain and the membrane surrounding it.

According to OES, there have been several reported cases of human West Nile Virus (WNV) infections in Shasta County. Since WNV was first isolated in 1937, it has been known to cause infection and fevers in humans in Africa, West Asia and the Middle East. Human and animal infections were not documented in the Western Hemisphere until the 1999 outbreak in New York City. Since then, the disease has spread across the U.S. In 2003, WNV activity occurred in 46 states and caused illness in over 9,800 people. According to the USGS, WNV is transmitted to humans through mosquito bites. Mosquitoes become infected when they feed on infected birds that have high levels of the WNV in their blood. Infected mosquitoes can transmit WNV when they feed on humans or other animals, however WNV is not considered contagious from person to person (Center for Disease Control, 2010).

A disease outbreak can cause illness and result in significant casualties. Since 1900, there have been three influenza pandemics that killed approximately 600,000 people in the U.S. In 2007, approximately 380 cases of West Nile Virus resulted in 21 deaths.

Zika virus disease (Zika) is a disease caused by Zika virus that is spread to people primarily through the bite of an infected *Aedes* species mosquito. The most common symptoms of Zika are fever, rash, joint pain, and conjunctivitis (red eyes). The illness is usually mild with symptoms lasting for several days to a week after being bitten by an infected mosquito. People usually do not get sick enough to go to the hospital, and they very rarely die of Zika. For this reason, many people might not realize they have been infected. Once a person has been infected, he or she is likely to be protected from future infections.

Zika virus was first discovered in 1947 and is named after the Zika forest in Uganda. In 1952, the first human cases of Zika were detected and since then outbreaks of Zika have been reported in tropical Africa, Southeast Asia and the Pacific Islands. Zika outbreaks have probably occurred in many locations. Before 2007, at least 14 cases of Zika had been documented, although other cases were likely to have occurred and were not reported. Because the symptoms of Zika are similar to those of many other diseases, many cases may not have been recognized.

In May 2015, the Pan American Health Organization (PAHO) issued an alert regarding the first confirmed Zika virus infection in Brazil and on February 1, 2016, the World Health Organization (WHO) declared Zika virus a public health emergency of international concern. Local transmission has been reported in many other countries and territories. Zika virus likely will continue to spread to new areas.

4.3.8.4 Current Pandemic/Epidemic Hazard Mitigation Efforts

California Department of Public Health (CDPH) is the lead pandemic planning agency in the state, which coordinates the public health response to a pandemic with local health departments, the healthcare community, the federal government, and other key partners. CDPH prepared a Pandemic Preparedness Plan, which will be implemented in collaboration with the Emergency Medical Services Authority (EMSA), California Health and Human Services Agency, Cal OES, local health departments, and tribal entities. While primarily a preparedness and response plan, the Plan also identifies potential mitigation actions that can be taken to reduce the impacts of the pandemic including:

- Ensure rapid and early detection of a novel virus.
- Confirm identity or type of a novel virus by laboratory identification.
- Identify the exposure source of the outbreak and the population at risk.
- Control and contain the spread of influenza through pharmaceutical and non-pharmaceutical community containment strategies, including isolation, quarantine, infection control, antiviral treatment and prophylaxis, and, if available, vaccination.

- Manage and disseminate accurate information for scientific, resource and policy decisions in public health and healthcare delivery settings.

The Communicable Disease Prevention Goal is to reduce the incidence of communicable diseases in Shasta County.

Public Health's approach to Communicable Disease:

1. Improve surveillance, laboratory testing, reporting, tracking, investigation, and intervention capacity for communicable diseases.
2. Develop and strengthen more partnerships with healthcare providers and other community agencies to screen and detect communicable diseases, to offer immunizations, to coordinate responses and to educate clients and the public.
3. Promote risk-reduction strategies to decrease transmission of sexually transmitted and blood-borne pathogens.
4. Provide or assure aggressive treatment and follow-up for persons with active TB disease and higher risk latent tuberculosis infections.
5. Establish a fully operational, population-based Immunization Registry for Shasta County.

4.3.9 Multi-Casualty Incidents (MCI)

4.3.9.1 Hazard Definition

Weapons of mass destruction involving CBNRE agents have become an increasing reality in the U.S. These agents will create their effect through a multi-casualty incident or person to person exposure, and, as with the biological agents, they will propagate their effect through exposure to individuals within the community. Prophylaxis of these agents can often occur during this incubation period from exposure to the agent until the onset of symptoms, thus reducing the spread of disease. Widespread public exposure to a terrorist agent, particularly a biological agent, would therefore require large scale mass prophylaxis of the public.

In the event of a terrorist release, mass prophylaxis of the public will be directed and coordinated by the public health system on a local, regional or statewide level. This would thus require logistical and operational assistance to mobilize, manage and demobilize a mass prophylaxis clinic site. No consensus exists on the population numbers that would define mass prophylaxis. For a multi-casualty incident (MCI), the numbers range between 500 to thousands of casualties that would exceed the normal capacity of the healthcare system. (Emerg Med Clin North Am 2002 May;20(2):409-36) Federal Bioterrorism Planning (under the CDC and HRSA funding guidance) defines mass as 500 patients, while prior exercises (such as TOPOFF) have 3,000-5,000 casualties with the simulated event. (CID 2001;32:436-45.) Mass Prophylaxis in New York City with the Anthrax attack constituted approximately 7,000 postal workers at one site (EID June 2003;9(6):615-22). As all local

healthcare systems and resources vary, the definition of a multi-casualty incident will vary depending on the local region. Therefore, mass prophylaxis is defined as a prophylaxis incident that exceeds the normal capacity of local public health and healthcare system.

4.3.9.2 History of Multi-Casualty Incidents

The Sierra-Sacramento Valley Emergency Medical Services (EMS) Agency serves a multi-county area in California State OES Regions III and IV. EMS personnel must be prepared to quickly shift from a one-on-one patient/provider relationship to a multiple patient incident operation. This may include the routine 2-5 patient incidents through the multiple/mass casualty incidents. EMS personnel must be prepared to implement and function within the Standardized Emergency Management System (SEMS), National Incident Management System (NIMS), and Multiple Casualty Incident (MCI)/Incident Command System (ICS).

The Sierra-Sacramento EMS Agency Program Policy Multi-Casualty Incident Field Operations Guide directs EMS responders regarding the response organization, personnel, equipment, resources, and procedures for field operations during a MCI. Procedures for activation of the MCI System consist of the mobilization of the necessary resources, notification of the Control Facility (CF), and initiation of Incident Command System (ICS).

As soon as it is determined that an emergency call may prove to be an MCI, additional appropriate resource requests and CF notifications should occur.

The procedures listed in the MCI – Response Procedures addendum, Reference No. 837-A shall be followed, and the CF shall be utilized when one or more of the following criteria are met:

1. Five or more immediate and/or delayed patients from a unifocal incident; or
2. Ten or more minor patients from a unifocal incident, at the discretion of the EMS provider(s) on scene or the base/modified base hospital.

4.3.9.3 Risk Assessment – Vulnerability and Potential Losses

Assessment of State Vulnerability and Potential Loss to Terrorism Hazards

The following state assets have been identified as potentially vulnerable to terrorism:

- Water
  - 34 lakes and reservoirs
  - 1,468 dams, 140 of which have a capacity greater than 10,000 acre-ft.
  - 701 miles of canals and pipelines
  - 1,595 miles of levees
- Transportation
  - 50,000 lane miles of highways
  - 257 public use airports, 42 of which are certified for air carrier operations
  - 186,076 miles of public roads
  - 12,000 bridges

- Agriculture
  - 74,000 farms, and $26 billion in farming related sales since 2002
- Finance
  - 6,619 commercial banks with deposits of $753 billion
  - 562 credit unions with $115 billion in assets
- Oil and natural gas
  - 6,000 miles of hazardous liquid pipelines
  - 21 refineries
  - 100 terminal facilities.
- Electrical power
  - 500 power plants
  - 25,000 circuit mile-electron highway
- Chemical
  - Approximately 2,500 high-risk facilities
- Ports
  - California handles nearly half of all the port traffic in the U.S. More than $4.5 billion in cargo moves through the Port of San Diego every year.

The threat level to various assets can change over time. Tracking the current vulnerability of different components is achieved by using various systems, including the National Asset Database inventory which can be used to determine which assets, systems, or networks are nationally critical, state critical, or locally critical based on the most current risk profile; Automated Critical Asset Management System which is a secure, web-based information management tool designed to capture, store and view critical asset data; and sector partnerships and communication networks which partner with asset owners to identify high priority sites in each sector.

The State Terrorism Threat Assessment Centers (STTAC) is a partnership of the California Highway Patrol and the Cal OES and includes participation of a number of state and federal agencies. The STTAC provides statewide analysis products, information tracking, pattern analysis, geographic report linkages and other statewide intelligence products to public safety agencies throughout California. The STTAC provides direct linkage to the State Warning Center, National Counter Terrorism Center and their National Watch List through the Homeland Security Operations Center.

Assessment of Local Vulnerability and Potential Loss to Terrorism Hazards

The state prevention strategy also created four Regional Terrorism Threat Assessment Centers (RTTACs). Their areas of responsibility mirror those of the four FBI field offices in California, minimizing reporting conflicts, providing statewide coverage and facilitating coordination with the FBI. The RTTACs and FBI field offices maintain daily contact and information exchanges. The RTTACs maintain a regional threat assessment, and directly connect to each other and the state to share information and produce reports and other products.

At the local level, law enforcement and public safety agencies designate terrorism liaison officers (TLO) who are trained in the review and assessment of local reporting and conducting outreach to other

public safety agencies, critical infrastructure operators and community groups. The TLO is the local agency point of contact for all terrorism- related alerts, requests for information, warnings and other notifications from regional, state or federal homeland security agencies. Through a single web-based state terrorism website, the TLO and his or her agency will have access to all available terrorism alerts, notices, information and documents through a searchable database and daily information exchange with key federal, state and local agencies.

4.3.9.4 Current Multi-Casualty Incidents Hazard Mitigation Efforts

Emergency Response Plans - National Response Framework (NPF) is a guide that details how the nation responds to all types of disasters and emergencies. It is a coordinated agency response that includes the community, state, federal government, non-governmental partners and the private sector. The NPF lays the groundwork for first responders, decision makers and supporting entities to provide a unified response.

Fifteen emergency support functions (ESF) annexes particular groups of federal resources and capabilities by function. These are:

ESF #1—Transportation / ESF Coordinator: Department of Transportation
Key Response Core Capability: Critical Transportation
Coordinates the support of management of transportation systems and infrastructure, the regulation of transportation, management of the nation's airspace, and ensuring the safety and security of the national transportation system. Functions include but are not limited to: ▪ Transportation modes management and control ▪ Transportation safety ▪ Stabilization and reestablishment of transportation infrastructure ▪ Movement restrictions ▪ Damage and impact assessment
ESF #2—Communications / ESF Coordinator: DHS/National Communications System
Key Response Core Capability: Operational Communications
Coordinates the reestablishment of the critical communications infrastructure, facilitates the stabilization of systems and applications from cyber attacks, and coordinates communications support to response efforts. Functions include but are not limited to: ▪ Coordination with telecommunications and information technology industries ▪ Reestablishment and repair of telecommunications infrastructure ▪ Protection, reestablishment and sustainment of national cyber and information technology resources ▪ Oversight of communications within the federal response structures
ESF #3—Public Works and Engineering / ESF Coordinator: DOD/U.S. Army Corps of Engineers
Key Response Core Capabilities: Infrastructure Systems, Critical Transportation, Public and Private Services and Resources, Environmental Response/Health and Safety, Fatality Management, Mass Care Services, Mass Search and Rescue Operations

Coordinates the capabilities and resources to facilitate the delivery of services, technical assistance, engineering expertise, construction management, and other support to prepare for, respond to, and/or recover from a disaster or an incident. Functions include but are not limited to:

- Infrastructure protection and emergency repair
- Critical infrastructure reestablishment
- Engineering services and construction management
- Emergency contracting support for lifesaving and life-sustaining services

ESF #4—Firefighting / ESF Coordinator: USDA/U.S. Forest Service and DHS/FEMA/U.S. Fire Administration

Key Response Core Capabilities: Critical Transportation, Operational Communications, Public and Private Services and Resources, Infrastructure Systems, Mass Care Services, Mass Search and Rescue Operations, On-scene Security and Protection, Public Health and Medical Services

Coordinates the support for the detection and suppression of fires. Functions include but are not limited to:

- Support to wildland, rural and urban firefighting operations

ESF #5—Information and Planning / ESF Coordinator: DHS/FEMA

Key Response Core Capabilities: Situational Assessment, Planning, Public Information and Warning

Supports and facilitates multiagency planning and coordination for operations involving incidents requiring federal coordination. Functions include but are not limited to:

- Incident action planning
- Information collection, analysis and dissemination

ESF #6—Mass Care, Emergency Assistance, Temporary Housing, and Human Services
ESF Coordinator: DHS/FEMA

Key Response Core Capabilities: Mass Care Services, Public and Private Services and Resources, Public Health and Medical Services, Critical Transportation, Fatality Management Services

Coordinates the delivery of mass care and emergency assistance, including:

- Mass care
- Emergency assistance
- Disaster housing
- Human services

ESF #7—Logistics / ESF Coordinator: General Services Administration and DHS/FEMA

Key Response Core Capabilities: Public and Private Services and Resources, Mass Care Services, Critical Transportation, Infrastructure Systems, Operational Communications

Coordinates comprehensive incident resource planning, management and sustainment capability to meet the needs of disaster survivors and responders. Functions include but are not limited to:

- Comprehensive, national incident logistics planning, management and sustainment capability
- Resource support (e.g., facility space, office equipment and supplies, contracting services)

ESF #8—Public Health and Medical Services / ESF Coordinator: Department of Health and Human Services

Key Response Core Capabilities: Public Health and Medical Services, Fatality Management Services, Mass Care Services, Critical Transportation, Public Information and Warning, Environmental Response/Health and Safety, Public and Private Services and Resources

Coordinates the mechanisms for assistance in response to an actual or potential public health and medical disaster or incident. Functions include but are not limited to:

- Public health
- Medical surge support including patient movement
- Behavioral health services
- Mass fatality management

ESF #9—Search and Rescue / ESF Coordinator: DHS/FEMA

Key Response Core Capability: Mass Search and Rescue Operations

Coordinates the rapid deployment of search and rescue resources to provide specialized lifesaving assistance. Functions include but are not limited to:

- Structural collapse (urban) search and rescue
- Maritime/Coastal/Waterborne search and rescue
- Land search and rescue

ESF #10—Oil and Hazardous Materials Response / ESF Coordinator: Environmental Protection Agency

Key Response Core Capabilities: Environmental Response/Health and Safety, Critical Transportation, Infrastructure Systems, Public Information and Warning

Coordinates support in response to an actual or potential discharge and/or release of oil or hazardous materials. Functions include but are not limited to:

- Environmental assessment of the nature and extent of oil and hazardous materials contamination
- Environmental decontamination and cleanup

ESF #11—Agriculture and Natural Resources / ESF Coordinator: Department of Agriculture

Key Response Core Capabilities: Environmental Response/Health and Safety, Mass Care Services, Public Health and Medical Services, Critical Transportation, Public and Private Services and Resources, Infrastructure Systems

Coordinates a variety of functions designed to protect the nation's food supply, respond to plant and animal pest and disease outbreaks and protect natural and cultural resources. Functions include but are not limited to:

- Nutrition assistance
- Animal and agricultural health issue response
- Technical expertise, coordination and support of animal and agricultural emergency management
- Meat, poultry, and processed egg products safety and defense
- Natural and cultural resources and historic properties protection

ESF #12—Energy / ESF Coordinator: Department of Energy

Key Response Core Capabilities: Infrastructure Systems, Public and Private Services and Resources, Situational Assessment

Facilitates the reestablishment of damaged energy systems and components and provides technical expertise during an incident involving radiological/nuclear materials. Functions include but are not limited to:

- Energy infrastructure assessment, repair and reestablishment
- Energy industry utilities coordination
- Energy forecast

ESF #13—Public Safety and Security / ESF Coordinator: Department of Justice/Bureau of Alcohol, Tobacco, Firearms, and Explosives

Key Response Core Capability: On-scene Security and Protection

Coordinates the integration of public safety and security capabilities and resources to support the full range of incident management activities. Functions include but are not limited to:

- Facility and resource security
- Security planning and technical resource assistance
- Public safety and security support
- Support to access, traffic and crowd control

ESF #14—Superseded by National Disaster Recovery Framework

ESF #15—External Affairs / ESF Coordinator: DHS
Key Response Core Capability: Public Information and Warning
Coordinates the release of accurate, coordinated, timely, and accessible public information to affected audiences, including the government, media, NGOs, and the private sector. Works closely with state and local officials to ensure outreach to the whole community. Functions include, but are not limited to: ▪ Public affairs and the Joint Information Center ▪ Intergovernmental (local, state, tribal, and territorial) affairs ▪ Congressional affairs ▪ Private sector outreach ▪ Community relations

Cost and damages to property due to biohazards can run into the thousands of dollars to clean up. During a disaster blood borne pathogens or sewage backing up could become a problem. During floods or catastrophic explosions biohazards could become a real threat to you and your family. Above all before touching anything put on non latex gloves if you absolutely have to remove any object that you think may be contaminated. If at all possible, leave it for your local hazmat team to handle.

Crime scenes may contain evidence gathering chemicals, tear gas or pepper spray residue that will need to be removed. The biohazard damages are usually not thought about in this situation.

Methamphetamine labs that produce illegal drugs are volatile. They are also high in biohazard damages. If you are buying a house there is currently no way to know if it was used as a drug laboratory. Contamination can seep into absorbent materials such as carpets and furniture and also remain in sinks, drains and ventilation systems. If you are exposed to the cooking process it can be harmful and cause health problems that include respiratory problems, skin and eye irritation, headaches, and nausea and dizziness.

Sewage back up can occur during severe rainstorms and floods. Sewage contains bacteria, viruses and may cause gastrointestinal distress, skin rashes and infections.

White powder incidents or anthrax hoaxes have cost law enforcement time and money. First responders, such as firefighters and local and state police have to respond as if it is real incident that threatens public safety. Hazmat teams are called out and the location where the incident occurs is treated as a crime scent. This means that the location and the people in it must be decontaminated before being released.

California's population, industrial infrastructure, economic importance, international reputation, media industry and numerous iconic features combine to make the state a potential target for both domestic and international terrorist attacks. Terrorists typically exploit vulnerabilities caused by technological hazards and may include hazardous materials, biological agents that result in epidemics, or attempts to damage the state's critical infrastructure including cyber attacks which pose potentially devastating disruptions to essential communications such as voice, email and Internet connectivity.

Current Terrorism Mitigation Efforts

The primary mechanism for past terrorist incidents has been bombings and because of the potential for mass casualties from weapons of mass destruction terrorist event, the primary focus of the state's hazard mitigation strategy for terrorism is on mitigation measures that reduce risk from bomb blast and nuclear, biological and chemical attacks to critical state facilities and population. Measures to be considered in Shasta County include the following:

Hardening (construction/retrofitting)	▪ Relocation/retrofitting of air intakes ▪ Ventilation system upgrade/retrofit ▪ Protect tower bases of bridges ▪ Seismic retrofitting ▪ Upgrade/retrofit water main system ▪ Blast guard window film/glazing, frames egress improvements
Barriers and Fencing	▪ Fencing around air intakes ▪ Fencing around fuel supply ▪ Vehicle barriers, bollards, popup gates, hydraulic barriers ▪ Waterfront security system ▪ Perimeter fencing
Redundant Systems	▪ Fire protection system ▪ Communications systems
Information Technology	▪ Utility (Gas/Heat/Water) ▪ Utility (Electric)
Security Measures	▪ Security systems/early warning systems ▪ Warning and alarms systems directly related to system protection/shut down ▪ Smart utility management systems on all critical services
Planning/Studies	▪ Telecommunications plans ▪ IT disaster recovery plans ▪ Business continuity/resumption plans ▪ Intelligence gathering and sharing ▪ Threat, vulnerability and risk assessments ▪ Evacuation plans ▪ Site security planning
HM Plan/Service Continuity Plan	▪ Seismic Study ▪ Retrofitting ▪ Interior lighting ▪ Exterior lighting ▪ Staging areas
Secure Access and Entry Points	▪ Card swipe system ▪ Magnetometer ▪ Metal detectors ▪ Surveillance cameras and closed circuit TVs ▪ Personnel detection equipment ▪ Vehicle detection equipment ▪ Radar systems ▪ Building access system ▪ Motion detectors

Information Technology Systems	▪ Replacing door locks and keys ▪ Building access system ▪ Security management system ▪ Employee identification system ▪ Coding protocol for sensitive records

4.3.10 Dam Failure

4.3.10.1 Hazard Definition

Dam failure is the uncontrolled release of impounded water from behind a dam. Flooding, earthquakes, blockages, landslides, lack of maintenance, improper operation, poor construction, vandalism, and terrorism can all cause a dam to fail. Dam failure causes downstream flooding that can affect life and property.

Based upon information provided by Cal OES, the area is not subject to major damage due to dam inundation from Shasta Dam or any other reservoirs. The Reclaimed Water Reservoir located in the city of Shasta Lake was inspected in February of 2002 and based upon the design and construction information and the visual inspection, the reservoir is considered satisfactory for continued use. The inspection included the embankment, spillway and outlet facilities (Department of Water Resources, Division of Safety of Dams, 2002).

4.3.10.2 Potential for Dam Failure Incidents

Shasta Dam, on the Sacramento River north of Redding, serves to control floodwaters and store winter runoff for irrigation in the Sacramento and San Joaquin Valleys, maintain navigable flows, provide flows for the conservation fisheries in the Sacramento River and its downstream tributaries, provide water for municipal and water district use, protect the Sacramento-San Joaquin Delta from saltwater intrusion, and generate hydroelectric power. In addition, Shasta Lake, behind Shasta Dam, provides boating and recreation opportunities that bring millions of dollars to the Redding area annually. Shasta Dam is the second largest dam in mass in the U.S. (behind Grand Coulee Dam on the Columbia River in Washington State). The dam is 602 ft. high, with a crest length of 3,460 ft. It is 883 ft. thick at the bottom and 30 ft. thick at the top. Shasta Dam is a curved concrete gravity-type dam with 6.5 million cubic yards of concrete weighing 15 million tons.

Construction of the dam started in 1938 and was completed in 1945. The spillway is 487 ft. long—the largest man-made waterfall in the world. The spillway is 375 ft. wide with three drum-gates, each 110 ft. wide and 28 ft. tall, and weighing 500 tons each. There are 18 outlets on the face of the dam, each 8.5 ft. in diameter with a maximum overall capacity of 186,000 cubic ft. per second. Prior to the construction of Shasta Dam, floods

frequently ravaged the Sacramento Valley, including the State Capital. It is estimated that Shasta Dam has prevented over five billion dollars in flood damages. The U.S. USBR uses flood control procedures and regulations prescribed by the Corps of Engineers for operations per agreements between the two entities. The city of Redding is the first incorporated city downstream of Shasta Dam through which the Sacramento River flows. As such, it would be affected by a dam overflow or failure. Although these are two different types of events, the results are the same – uncontrolled releases from Shasta Dam.

A dam overflow is more likely than a dam failure. However, it is unlikely that a true overtopping of the dam would take place. The design of the structure includes three spillway gates to minimize the possibility of a true overtopping of the dam. During an intense and prolonged storm period that might bring water levels near the top of the dam, these spillway gates would be lowered allowing water to be discharged down the spillway. Controlling, or funneling, the discharge down the spillway directly prevents structural erosion along the base and sides of the dam, protects the turbine power generation plant at the base of the dam, and allows a controlled release.

A dam failure is highly unlikely. A dam failure would be characterized by a structural breach of the dam. Flooding and overtopping, earthquakes, release blockages, landslides, lack of maintenance, improper operation, poor construction, vandalism, or terrorism are typical causes of dam failure. California has had approximately 45 failures of non-federal dams. These failures occurred for a variety of reasons, the most common being overtopping of earthen dams. Other reasons include specific shortcomings in the dams themselves or inadequate assessment of the surrounding geomorphologic characteristics. Of the concrete dams that failed, all were of the thin-arch design. Shasta Dam is a federally controlled and inspected dam, and is considered a thick arch design. Seismic activity is monitored and tunnels throughout the dam allow inspectors to monitor for cracks and seepage. The dam is built on bedrock and is geomorphologically sound. The probability of a dam failure is extremely low.

Uncontrolled releases from the dam, although very unlikely, would devastate the entire northern Central Valley. The Sacramento River and its tributaries would overtop banks and levees. Massive flooding in the lowlands along the river would occur and I-5, the main west coast transportation artery, would be affected by closure and possibly other structural damage. Other effects of large-scale flooding downstream include: loss of life; limited potable water supplies; potential for spread of disease from the release of untreated sewage; structural damage to buildings; probable loss of electricity and landline communications; crop damage and loss of agricultural lands; loss of livestock; emergency response efforts hampered by flooded transportation corridors; and the inevitable clean-up of silt, mud flows, erosion, and debris. In the event of a dam failure, large-scale flooding could occur repeatedly until the replacement of the dam is complete. As stated before, prior to the completion of Shasta Dam, devastating floods were a regular occurrence in the Sacramento River valley.

Shasta Dam has never overflowed in its 60-year history. In 1977 and again in 1998, prolonged warm spring rainfalls in the watershed above Shasta Dam raised the lake levels as much as 10 ft. per day for more than a week. This early snowmelt was followed by intense storms over several days that dropped record precipitation bringing lake levels to within 10 ft. of the top. In 1998, the flows were increased to 80,000 cfs out of the dam, but inflow to the lake was steady at more than 225,000 cfs. The storms

subsided as the lake neared four ft. from the top and the USBR assured everyone that the dam was never in danger of overtopping. The next day officials at the dam announced that for only the second time in the dams' history, the massive drum gates would all be lowered and water would come over the entire spillway in an effort to draw the lake back down to comfortable levels. The spillway gates remained open for several days, releasing 78,000 cfs.

4.3.10.3 Risk Assessment – Vulnerability and Potential Losses

There is an extremely low likelihood of either a dam overflow or a dam failure. Record rainfall events drew lake levels near the top twice in the last two decades, but both events were sidestepped using modern weather forecasting and safe release levels from the dam. Following the terrorist events of 9/11, Shasta Dam was closed to traffic across the dam for security reasons, thus minimizing a terrorist threat. The dam has since reopened to through traffic by permit but maintains a policy of no parking or stopping on the dam.

Although it is highly unlikely, the most probable scenario would be a dam overflow, not a dam failure. In the event that prolonged periods of high-intensity rain (typical in mid to late spring) in the watersheds above Shasta Dam, the inflows to the lake could exceed 225,000 cfs for extended periods of time. If the lake levels were near capacity and discharges from the dam at 80,000 cfs were unable to draw the lake down enough to prevent an overtopping, the USBR would likely be forced to open the spillway gates and allow higher flows. There is no precedence for this, but it is likely that the Bureau would give 12 or more hours notice of the impending rise in river flows. The City of Redding has run an EOC drill simulating an uncontrolled release at 100,000 cfs with 12 hours notice for evacuation of people and livestock from the inundation area. The affected area covers 3,000 ac and would displace some 1,987 people. Damages estimates are $131.2 million.

4.3.10.4 Current Dam Failure Hazard Mitigation Efforts

Since 1929, the state has supervised all non-federal dams in California to prevent failure for the purpose of safeguarding life and protecting property. Supervision is carried out through the state's Dam Safety Program under the jurisdiction of DWR. The legislation requiring state supervision was passed in response to the St. Francis Dam failure and concerns about the potential risks to the general populace from a number of water storage dams. The law requires:

- Examination and approval or repair of dams completed prior to August 14, 1929 (the effective date of the statute).
- Approval of plans and specifications for and supervision of construction of new dams and the enlargement, alteration, repair, or removal of existing dams.
- Supervision of maintenance and operation of all dams under the state's jurisdiction.

Dams and reservoirs subject to state supervision are defined in California Water Code §6002 through §6004, with exemptions defined in §6004 and §6025. In administering the Dam Safety Program, DWR must comply with the provisions of CEQA. As such, all formal dam approval and revocation actions must be preceded by appropriate environmental documentation.

In 1972, Congress moved to reduce the hazards from the 28,000 non-federal dams in the country by passing Public Law 92-367, the National Dam Inspection Act. With the passage of this law, Congress authorized the USACE to inventory dams located in the U.S. The action was spurred by two disastrous earthen dam failures during the year in West Virginia and South Dakota that caused a total of 300 deaths.

The Water Resources Development Act of 1986 (P.L 99-662) authorized USACE to maintain and periodically publish an updated National Inventory of Dams (NID). The Water Resources Development Act of 1996 (P.L. 104-303), Section 215, re-authorized periodic updates of the NID by USACE. Section 215 further established the National Dam Safety Program and named the Administrator of FEMA as its coordinator. The Dam Safety Act of 2006, Public Law 109-460, reauthorized the National Dam Safety Program through 2011.

FEMA has recently launched an effort under its Risk MAP program to communicate risk of dam failure and to coordinate state and private mitigation and preparedness efforts. Most people living downstream of a dam are unaware of the potential hazards associated with dam failure, have never seen the respective dam failure inundation map, are unaware of an evacuation plan or an Emergency Action Plan associated with the failure of that dam. There is a need, therefore, to include dam failure risk awareness as part of a comprehensive flood risk communication strategy and develop a communication strategy that reports on dam failure risk and promotes dam safety, including dam owners/operators, dam regulators, emergency managers, floodplain managers, planners, public and private decision makers, and the population at risk. Mitigation of dam failure is constantly occurring at both the federal and state level.

Division of Safety of Dams engineers and engineering geologists review and approve plans and specifications for the design of dams and oversee their construction to insure compliance with the approved plans and specifications. Reviews include site geology, seismic setting, site investigations, construction material evaluation, dam stability, hydrology, hydraulics, and structural review of appurtenant structures. In addition, division engineers inspect over 1,200 dams on a yearly schedule to insure they are performing and being maintained in a safe manner. More information can be found at: www.water.ca.gov/damsafety/index.cfm

4.4 ANALYSIS OF LAND USE

4.4.1 Shasta County

4.4.1.2 Resources Group

The Resources Group includes General Plan elements addressing the preservation, management and utilization of Shasta County's natural resources. The individual elements included in the Shasta County General Plan reflect both required and optional subject areas outlined in the General Plan guidelines, and are listed below.

I. Agricultural Lands
II. Timberlands
III. Minerals
IV. Energy
V. Air Quality
VI. Water Resources and Water Quality
VII. Fish and Wildlife Habitat
VIII. Scenic Highways
IX. Open Space and Recreation
X. Heritage Resources

As a group these elements address the range of opportunities presented by a diverse County resource base including opportunities for resource management, tourism, recreation, and aesthetic enjoyment. Together these opportunities contribute to Shasta County's attractiveness and desirability for residence.

These resources are all sensitive to human activities and may be destroyed or degraded if not addressed in the planning process. Thus, while it is important to maintain these resources for their direct and indirect benefits to people, protection and maintenance for their inherent ecological values must be recognized as well.

I. Agricultural Lands

Agricultural land uses are a major component of Shasta County's resource land base. They are also a major element in defining the quality of life available to the residents of Shasta County. Were agriculture to lose its land-based prominence in Shasta County, the rural character and country living so valued by its residents and so important to its economy would likely decline. This element encompasses portions of three mandatory elements, namely; land use, conservation and open space.

Ia. Contribution to Shasta County

Shasta County's total land area in farms was 376,306 acres in 2012, as reported in the 2012 Census of Agriculture. Agriculture is not a dominant industry in Shasta County, but it does account for an important segment of Shasta County's economic base. The total value of agricultural products increased from approximately $60 million in 2004 to$87.6 million in 2014 (Table 20) on the following page.

Table 20. Total Agricultural Production Value - 2014	
Shasta County Agriculture Production	**2014 Value (in millions)**
Livestock and livestock products	$28,965
Apiary products	$ 7,383
Field crops	$38,890
Nursery stock	$ 5,182
Orchard and vineyard crops	$ 7,217
Subtotal	$87,637
Timber	$39,861
Other forest products	$16,096

(Shasta County Crop and Livestock Report 2014)

Total employment in farming operations in 2014 approximated 900 persons or less than one percent of the total employment for Shasta County as reported in the 2014 report from the State of California Employment Development Department.

In addition to its economic contribution, the agriculture industry is in large part responsible for the rural character of Shasta County. Farming necessitates a close relationship between the farmer and the land, fosters close relationships with family and community, and encourages self-reliance and independence. These characteristics define a way of life which tends to be assumed by those living in agricultural areas, even though they are not directly engaged in agriculture.

Farmland retention can play an important role in the support of wildlife values through the effects it has on conservation of wildlife habitats. Potentially, the most fertile wildlife habitat is the forest edge or point where natural vegetation bounds meadows, pastures or croplands. Often such areas (called ecotones) contain greater variations of species and their numbers are much greater than in the communities to either side. As more farmland is developed for urban and suburban uses, the available habitat for most field and woodland edge species decreases, resulting in a subsequent decline or potential elimination of their populations.

Other indirect benefits from maintaining the agricultural landscape include sustaining the protection of watersheds and natural drainage courses. It is also important to recognize the aesthetic values of farmland. Agricultural lands provide productive, privately- maintained open space which contributes to the open, natural landscape of much of Shasta County. Cumulatively, these and other indirect benefits should be considered as important as direct benefits and should be evaluated whenever new development presents a potential to significantly impact agricultural lands. It is important to understand that agricultural land can be easily degraded and converted to nonagricultural uses; however, it is a resource that cannot be easily replaced. It is a non-renewable resource and once lost or degraded, may never be restored to its original quality. In most cases, the natural fertility of artificially-created agricultural land is low and therefore requires a high rate of input of fertilizers, energy and capital. In the long term, existing agricultural lands in Shasta County may become increasingly valuable as losses occur

elsewhere and as urban areas continue to expand. Shasta County, however, contains a pattern of agricultural geography which allows it to avoid significant losses of agricultural lands if appropriate policies are implemented.

Ib. General Characteristics of Farms

In Shasta County, the number of farms has been slowly increasing and the average farm size has been decreasing since 1987. This is the opposite of the California trend toward fewer but larger farms. According to the 2012 U.S. Census of Agriculture, the majority of farms in Shasta County are less than 50 acres in size.

II. Timberlands

The Timberlands Element is a combination of planning requirements from the mandated Land Use, Conservation and Open Space Elements.

One of Shasta County's most valuable resources is its timberland. Of Shasta County's 2.4 million total acres, 50.7 percent or 1.2 million acres are dedicated to commercial forest uses. In 2002, 613,495 acres of non-federally owned timberlands were designated in timber preserve zones pursuant to California's Forest Taxation Reform Act of 1976. These timber preserve lands represent nearly half of all County timberlands and approximately 87 percent of privately owned timberlands. Forest industry and miscellaneous private corporations control over 50 percent of the total commercial timberland in Shasta County.

The timber industry is important to the economy of California as well as Shasta County. In 2002, Shasta County was the third ranking timber county producing a harvest amounting to 152.1 million board ft. and valued at $39.2 million for timber cut from both private and public lands. The timber production value in 2014 was $39.8 million with 192,176 million board ft. harvested (Shasta County 2014 Crop and Livestock Report).

Shasta County's relative position as a timber producer has been consistent with overall statewide trends through the 1990's. Timber harvest volumes increased significantly during the first part of the decade while value declined. This trend was altered during the latter part of the 1990's, due, in part, to new timber management and environmental concerns affecting state and federal timber harvest policies. While the timber industry has historically constituted a large segment of Shasta County's employment base, its prominence in this regard has been reduced. The nature of Shasta County's economy has undergone significant structural changes, and the timber industry, although still important, does not command the share of Shasta County's economy that it once did.

The strength and importance of Shasta County's timber industry may likely maintain a generally stable trend in terms of annual harvesting quotas as experienced over the past five years. Over the long term, nationwide and worldwide demands for timber products may rise faster than available supplies, and higher prices for such products may rise as well. Higher prices can have positive implications for the

County as they tend to promote more intensive forest management practices and improved diversification and wider utilization of wood products.

III. Minerals

Mining has been an important industry in Shasta County since gold was discovered by P.B. Reading on Clear Creek in 1848. Shasta County was one of the two most important centers of mining in California during the 1849 Gold Rush and continuing through the late 19th century. The Washington Mine near French Gulch, established in 1852, is one of the oldest continuously-operated gold mines in the state. Since 1880, when California began keeping records of production, Shasta County has produced over two million ounces of gold.

At the present time there are six different mineral resources under production in Shasta County. These include the five mineral resources studied in the Mineral Land Classification report: alluvial sand and gravel, crushed stone, volcanic cinders, limestone, and diatomite. The other mineral resource currently being produced is gold, which was not included in the Mineral Land Classification study.

In 2002, the latest year for which production information is available, Shasta County produced the following minerals:

- 462,000 tons of sand and gravel
- 852,000 tons of crushed stone (including limestone used for construction)
- 51,000 tons of volcanic cinders

Note: The total production of other minerals including limestone used to manufacture Portland cement, diatomite and gold is not listed above. There are fewer than three major producers in each category, so to list total production could reveal proprietary information (Source: Estimates from the Shasta County SMARA Regulatory Program).

Other mineral resources are not currently being produced for a number of reasons, including the quality and quantity of the resource, the cost of extraction, processing and transportation, the potential environmental impacts, and current market conditions. Some mineral deposits are fairly limited and of relatively poor quality and, therefore, may never be developed again. However, other minerals, particularly metallic minerals such as copper, may again be produced when market conditions improve. In addition, gold mining is likely to significantly increase if and when the price of gold increases.

IV. Energy

The optional Energy Element is included in the Shasta County General Plan in recognition of these facts and to draw attention to its importance in the community planning process. A major goal of this element is to promote an awareness regarding the status of our long-term energy supplies and availability and that they are highly cyclical and subject to unforeseen global market forces. The Energy Element recommends implementation of guidelines for better management, use and conservation of all energy sources and discusses the potential development of local energy resources and alternative energy options.

Important renewable energy sources in Shasta County include solar, hydroelectricity, biomass, and cogeneration. There is also potential for development of wind, geothermal and waste-to-energy as alternative sources of energy production.

Technology improvements associated with renewable energy development will be a key to its rate of success. Renewable energy sources can be most effectively applied for space heating and cooling and for electrical generation. For the oil dependent transportation sector, renewable energy solutions involve developing marketable alternative fuel types as the cost of oil rises. Collectively, renewable energy offers a diverse and virtually inexhaustible resource, opportunities for developing new base industries, and all at substantially less 6.4.08 environmental cost.

IVa. Hydroelectricity

Existing USBR electrical generation facilities at Shasta Lake, Keswick and Whiskeytown Reservoirs provide the bulk of hydroelectricity produced in Shasta County. PG&E produces significant hydroelectric power from its facilities in the Pit River and Battle Creek watersheds. A number of small hydro facilities have been constructed on smaller Shasta County creeks during the late 1970's and early 1980's. The prospects for significant new large hydroelectric projects in Shasta County appear to be limited because the most efficient sites have already been utilized. However, a number of smaller retrofit projects could be implemented at existing dams that currently do not produce electricity. On the other hand, any continued development of new small hydro facilities will need to solve environmental concerns involving fish and wildlife habitat and water resource impacts.

IVb. Biomass

The uses of biomass for direct heating and electrical generation is important in Shasta County. Biomass primarily involves the use of wood for residential space heating and waste wood and other wood products for electrical generation. Potential air pollution problems from concentrated use of wood for residential space heating can be in part mitigated by installation of newer high efficiency wood stoves. Ongoing forestry efforts to implement thinning plans for fire protection and improving forest growth and health could lead to a more managed and reliable availability of wood as a biomass energy source during the planning period.

IVc. Cogeneration

Cogeneration involves the use of waste heat to produce heat or electricity. Cogeneration is currently utilized by several wood products firms located in Anderson, Burney and Redding. Although use of cogeneration technology and processes does not allow these firms to be energy self-sufficient, the

systems can generate enough energy to supply a major portion of plant needs during peak demand periods.

V. Air Quality

Clean air is one of the most precious resources fundamental to daily life. The development pattern represented by modern cities and their suburbs has fostered an increasing dependency on the automobile, thus creating one of the major threats to a healthy environment, particularly air quality. In order to meet the challenges of strict environmental laws designed to ensure the nation's cities have clean air, Shasta County must comply with new regulations and thresholds for meeting this objective. Furthermore, performance in meeting this target will be strictly monitored in accordance with specific timetables for implementing air quality programs and policies.

VI. Water Resources and Water Quality

There are two sources of water supplies: surface waters and groundwater, and two general methods of delivering water supplies - community systems and individual or on- site systems. Each type of delivery system may use either surface or groundwater as its supply source. The ground and surface water resources are not uniformly distributed throughout Shasta County, and in different areas of Shasta County, different delivery systems have developed over time.

The DWR has identified two significant groundwater basins in Shasta County. One is located in the Sacramento River Valley and is named the Redding Groundwater Basin. The other is located in the Fall River Valley and carries its name. Although the firm, or reliable, water yield from these two groundwater basins is unknown, the storage capacity of the 510-square-mile Redding Basin is estimated to contain approximately 5.5 million acre-ft. of groundwater and the 120-square-mile Fall River Valley Basin is estimated to contain approximately one million acre-ft. of storage. While recognizing that only a small fraction of this groundwater can be used under safe yield management, the total groundwater storage volume of these two basins is comparable to Shasta Lake's maximum storage of 4.5 million acre-ft.

The majority of the water supply in Shasta County comes from surface flows and is collected in the mountainous regions of Shasta County. Streams, creeks and rivers carry these surface waters to lower elevations, where a portion is eventually stored in lakes, reservoirs and groundwater basins. In contrast to groundwater, surface waters are subject to a complex state legal system establishing the rights of individuals and other entities to these flows. The primary surface water resources in Shasta County are impounded within or conveyed through Lake Shasta and Whiskeytown Reservoirs. Rights to these impounded waters are allocated under the jurisdictions of the federally owned and managed CVP, subject to preexisting water rights. Some recipients of this water in turn sell a portion of their allocation to other agencies, when possible. Rights to other major surface water resources of Shasta County have been similarly allocated to different individuals and entities. PG&E is a major controller of water rights, which it uses for power generation purposes. Several County Service Areas (CSAs) have water rights as well as the Anderson-Cottonwood Irrigation District (ACID), the City of Redding, and some private individuals and corporations. The CVP holds all other rights and the County has no interest in these rights other than its contracts.

For the most part, surface water quality in Shasta County is good, as is indicated by fish populations and recreational fishing activities. Potential hazards to surface water quality include the following nonpoint pollution problems: high turbidity from sediment resulting from erosion of improperly graded construction projects, concentration of nitrates and dissolved solids from agriculture or surfacing septic tank failures, contaminated street and lawn run-off from urban areas, and warm water drainage discharges into cold water streams. The most critical period for surface water quality is following a rainstorm which produces significant amounts of drainage runoff into streams at low flow, resulting in poor dilution of contaminates in the low flowing stream. Such conditions are most frequent during the fall at the beginning of the rainy season when stream flows are near their lowest annual levels. Besides the greases, oils, pesticides, litter, and organic matter associated with such runoff, heavy metals such as copper, zinc and cadmium can cause considerable harm to aquatic organisms when introduced to streams in low flow conditions.

Surface water pollution is also caused by erosion. Excessive and improperly managed grading, vegetation removal, quarrying, logging, and agricultural practices all lead to increased erosion of exposed earth and sedimentation of watercourses during rainy periods. In slower moving water bodies these same factors often cause a buildup of siltation, which ultimately reduces the capacity of the water system to percolate and recharge groundwater basins, as well as adversely affecting both aquatic resources and flood control efforts.

The quality of water in underground basins and water-bearing soils is considered generally good throughout most of Shasta County. The 1997 Shasta County Water Resources Master Plan concluded that the quality of both groundwater and surface water in the Redding Basin is generally excellent and suitable for all anticipated beneficial uses. As these basins or soils are the primary sources of water in the rural upland areas of Shasta County, it is very important to prevent contamination. Potential hazards to groundwater quality involve the concentration of nitrates and dissolved solids from agricultural practices and septic tank failures. Several small pockets are found in the eastern portions of Fall River Valley where groundwater testing shows elevated levels of nitrates. Also, several areas within the Eastern Upland planning area contain potential groundwater quality and quantity limitations.

VII. Fish and Wildlife Habitat

Viable and healthy fish and wildlife habitats and plant communities contribute significantly to aesthetic enjoyment, County-based recreation income, and scientific research. The degree to which this viability is maintained is one indicator of how well we are managing the impacts caused by our ever-growing human population. Natural habitat areas sufficient to maintain species diversity and which allow necessary corridors for seasonal species migration are also important to the preservation of ecological balances and environmental quality.

VIII. Scenic Highways

Because Shasta County contains two major river valleys, the Sacramento and the Fall River; and three major mountain ranges, the Coast, Klamath and Cascade; its scenic resources are both varied and remarkable. Scenic corridors make major contributions to the quality of life enjoyed by the residents of Shasta County. The development of community pride, the enhancement of property values and the protection of aesthetically-pleasing open spaces reflecting a preference for the rural lifestyle are all ways in which scenic corridors are valuable to County residents.

Scenic highways and their associated corridors also strengthen the tourist industry of Shasta County. For many visitors, highway corridors will provide their only experience of Shasta County. Enhancement and protection of these corridors ensures that the tourist experience continues to be a positive one and, consequently, provides support for the tourist-related activities of Shasta County's economy.

IX. Open Space and Recreation

Most of the open space resources of Shasta County are federally or state owned and their management is the responsibility of the appropriate government agency. Open space lands under the jurisdiction of the County are mostly privately-owned timber and agricultural lands. Their management for open space purposes will be indirectly accomplished by policies described in the Timber and Agricultural Elements and is primarily intended to maintain the economic value of these resources. Other major open space lands under County jurisdiction include floodplain areas which are subject to policies described in the Flood Protection Element and wildlife habitat areas which are subject to policies described in the Fish and Wildlife Element.

IXa. Trails

In recognition of their different right-of-way surface requirements, trails are divided into two parts: (a) bicycle and (b) hiking and equestrian. In certain sections, the two elements would share the same right-of-way. Trails offer one means of increasing accessibility to the open space and recreation resources of Shasta County, and trails are themselves a recreational facility. During the planning process, a considerable amount of interest in multi-purpose trails was expressed by the following organizations located in the SCR Planning Area: Palo Cedro Trails Council, Mountain Gate Trail Riders, Shasta Horseman's United Council, Centerville Community Planning Advisory Committee, and Shasta Wonderland Elite Athletic Team. Given this expression of citizen interest and the very limited resources which County government may devote to recreation development, a practical approach to developing a trail system would be to rely on citizen effort. The organizations listed above could be united under the leadership of the County Recreation Commission to begin the process of developing the trail system.

IXb. Tourist Related Recreation Resources

Undeveloped open space or natural areas contained within national recreation areas, national parks, wilderness areas, and state parks represent the major tourist recreation resources of Shasta County and are extremely important to Shasta County's tourist industry. Development of private and public lands within these resources could potentially visually impact the persons using these resources and, thus, their enjoyment.

X. Heritage Resource

Xa. Pre-European Contact

A primary concern expressed by Native Americans relevant to land use planning involves the preservation of ancient villages and burial grounds. This is particularly true for descendants of the Wintu tribes whose now abandoned villages were once located in the Sacramento River Valley. Today this area is experiencing substantial development pressure. In order to satisfy the desire for cultural preservation as well as the needs and demand of future development, representatives of Native American interests, historians and interested archaeologists should be allowed to monitor the preliminary development of sites which are known or suspected to contain significant cultural artifacts to determine their significance to cultural heritage. Provisions should also be made whereby valuable artifacts could be professionally excavated and preserved. In addition to villages and burial grounds, such artifacts include stone tool chipping sites, tools, baskets, and weapons. Several large petroglyph (rock art) sites have also been located in the SCR and Eastern Upland Planning Areas.

Xb. Post-European Contact

Post-contact artifacts consist primarily of settlement areas and structures, cemeteries and mining sites of the gold rush era. Many of these sites are located in the Sacramento River Valley and the Eastern and Western Upland Planning Areas of Shasta County and are usually accessible to the general public. Opportunities to preserve post-contact historic resources are available through Federal and State government protection. The National Register of Historic Places, the California Landmark Series, and State Points of Historic Interest are all means by which resources may be enhanced and maintained. Several historic sites in Shasta County have already been included in these programs.

4.4.1.3 Community Development Group

The Community Development Group is comprised of General Plan Elements that address the use of Shasta County's physical resources in order to provide communities in which its residents live, work and play. The individual elements contained in the Community Development Group are:

I. Community Organization and Development Pattern
II. Economic Development
III. Housing
IV. Circulation
V. Public Facilities
VI. Design Review

These elements are grouped together because they collectively address the development and maintenance of our communities.

The policy options available in this element group are closely influenced and in some areas constrained by elements in the Public Safety and Resources Groups. A major goal of the Plan is to balance and coordinate the sometimes competing objectives contained in the three element groups. Achieving this goal requires some understanding of their interrelationships. Elements contained in the Public Safety Group place limits on the use of the County's physical resources in order to reduce the risks of loss or damage to life and property. Elements contained in the Resources Group describe the opportunities presented by Shasta County's resource base and define the limits within which these resources may be used on a long-term, sustainable basis. Elements in the Community Development Group must respond to risks posed by natural and man-made hazards and to the opportunities presented by the resource base.

Responding to these risks and opportunities in a responsible manner will ensure that both present and future generations of Shasta County residents will be able to enjoy the quality of life which this County offers.

I. Community Organization and Development Pattern

Ia. Conversion of Residential Land Use Designations into Zoning Districts

The General Plan uses four residential land use designations - Urban (UR), Suburban (SR), Rural Residential A (RA), and Rural Residential B (RB). These designations relate to dwelling unit density and are more completely described in Table CO-4 of the General Plan. The maximum densities for these designations are:

- Urban - 16 dwellings/acre
- Rural Residential A - 1 dwelling/2 acres
- Suburban - 3 dwellings/acre
- Rural Residential B - 1 dwelling/5 acres

It is important to understand the role of the density assigned to the RB designation. This lower density is designed to focus growth in rural community centers by limiting population densities in surrounding rural areas. Decreasing population densities in these outlying rural areas can have the effect of reducing land use conflicts between residential and the agricultural/timber uses generally found in these areas. It may also reduce public service demands for fire protection, law enforcement, road construction and maintenance, school bus service, and retail commercial, by shifting them to rural community centers where they can be more efficiently provided. Lower densities may be required in certain RB designations due to factors such as the existence of severe fire hazards, proximity to resource lands and one or more environmental limitations.

Each residential land use designation will provide a relatively broad density range when converted into a more site-specific series of zoning districts, each with its own parcel size requirements. Apart from the existing land use/parcelization pattern, certain critical factors need to be evaluated in converting land use designations into zoning districts. They are:

- Water supply
- Wastewater treatment

- Slope and erosion potential
- Road access
- Fire hazard
- Environmental/Resource protection

Site-specific knowledge of these and other factors and their implications for density draw a major distinction between the application of the UR and SR designations and the RA and RB designations. Especially important in this regard are provisions for water supply and wastewater treatment. Use of the UR and SR designations is limited to those areas where public services by community systems including water and wastewater treatment exist, or can be, is assumed.

Ib. Land Capacity and Zoning

Lands classified as RA and RB should not be assigned specific parcel sizes or densities prior to review of detailed site-specific information. Instead, specific parcel size requirements should be applied to RA and RB lands only after collection and analysis of the site-specific data required to accurately make these determinations. Under this approach, commonly referred to as land capability analysis, site-specific information necessary to develop parcel size minimums for a specific zone district is provided by the property owner.

Ic. Conversion of Commercial and Industrial Land Use Designations into Zone Districts

The General Plan provides for single commercial and industrial land use designations which are normally applied only in urban and town centers. These designations are designed to establish broad commercial and industrial land use categories which will be converted into more specific zone districts. In addition, there is a mixed use (MU) designation that is applied to the commercial or light industrial areas in or near rural community centers.

Id. Planned Developments

Planned and/or mixed use developments can provide a more unified and potentially more desirable and attractive development in an area. Such developments involve a combination of comprehensive site planning and architectural design that can often provide a mix of uses that could otherwise create land use conflicts between neighboring uses. A unified site design for a residential planned development may offer a variety of housing types, including clustered housing, both attached and detached, with common open spaces. While planned developments are commonly used for urban and suburban residential projects, they may also be applied to other types of land uses such as commercial, industrial and office parks. Planned development proposals which contain a mix of any or all of these uses should be encouraged. A planned and/or mixed use development shall be at a scale where high design standards along with other quality of life amenities can be provided.

Ie. Relationship of Regulation to Privately Owned Land

Public regulation allows for the explicit expression of public community values and provides a mechanism for identifying and sharing the costs of development. In turn, the exercise of private property rights provides the motivation and resources without which no development would occur.

Both public regulation and the exercise of private property rights must work in concert if the development pattern provided by the General Plan is to be realized. Each has an important contribution to make to the planning process and the General Plan should allow these roles to be exercised.

II. Economic Development

IIa. County Economic Profile

In Shasta County, the Redding area is the primary trade and commerce center for the far north central and northeastern portion of California. Indicators of sustained growth in the cities and County as a whole include increases in education employment accompanied by expansion of the construction, services, retail trade, and manufacturing industries.

Outdoor recreation is also an important part of the Shasta County economy. The Sacramento River joins with a large network of rivers and streams to feed Shasta Lake in the Whiskeytown-Shasta-Trinity National Recreation Area. The area, along with Shasta-Trinity and Lassen National Forests and Lassen Volcanic National Park, are major economic resources. Visitors enjoy a variety of outdoor activities and a configuration of dams provides year-round hydroelectric power and water supply for agricultural and industrial production. The CVP is heavily dependent upon the water supply stored behind Shasta Dam.

Strawberries, a major crop in Shasta County, are exported internationally. Apiary products, exported to Canada, and orchard crops are just a few of the important sources of the County's agricultural income. Vast private and public timberlands provide jobs in the timber and wood products industry.

The Bureau of Labor Statistics database shows that the annual employment in Shasta County has not changed significantly in the last five years. The 2009 census of employment and wages show 61,351 persons employed compared to 61,657 in 2014.

IIb. Defining Target Industries

At the level of Shasta County's economic development, a precondition for the creation, attraction, retention, and expansion of quality jobs is development of a comparative advantage to other competing regions. The County is competing for quality jobs and economic opportunity in an environment which is made up of many factors. In the past, locational advantages have been due to local natural resources. However, in light of the economic realities found subsequent to the 1990's, local communities are able to create comparative advantages based on the targeting of industry clusters.

III. Housing

Population growth in Shasta County has been moderate over the past decade. When reviewing population data, it is important to distinguish between the populations changes that affect the entire County, the three incorporated cities, and the unincorporated portions of Shasta County. The

unincorporated portion of Shasta County experienced a sharp reduction in population totals is 1993 when the City of Shasta Lake was incorporated.

This reduced the unincorporated share of Shasta County's population to approximately 41 percent. At the present time, it is estimated that this share has dropped to approximately 39 percent. In 1990, the unincorporated areas of Shasta County contained 49 percent of the total County population.

Since 1990, the entire County grew at approximately 1.5 percent per year. However, population in the unincorporated area grew at an average annual rate of less than 1 percent. Based on this trend, it is estimated that nearly 60 percent of all Shasta County's growth during the next ten years will be distributed among the three incorporated Cities.

IV. Circulation

The most important features of the circulation system in Shasta County are: (1) its extensive provisions for automobile travel, and (2) the location of a major multimodal (auto, truck, bus, rail, air, and pipe and transmission line) transportation corridor through the SCR area. The circulation system of Shasta County comprises several physical components, some of which may be used by more than one mode of transportation.

V. Public Facilities

This Element addresses those public facilities not discussed elsewhere in the Plan but that have a bearing on land use matters. This includes wastewater treatment, solid waste disposal, community recreation, and schools.

Va. Wastewater Treatment

The simplest system is the individual on-site septic tank and leach field serving a single dwelling. The advantage of this on-site wastewater treatment system is its relatively low cost and its water recharge characteristics. Disadvantages relate to the narrow requirements of this system with respect to soil characteristics, topography and the absence of seasonal or year-round high groundwater levels. Failure of a septic tank system is its major disadvantage because it may result in contamination of groundwater or other health-related problems. Unless this failure is evidenced by odor, visual, or mechanical symptoms, it may go undetected indefinitely. With few exceptions these requirements severely limit their use in Shasta County in that it cannot be assumed that every lot in Shasta County of any size will be able to support an on-site septic tank and leach field system. Generally, those areas of Shasta County with the least constraints on the use of this system are located in the Sacramento Valley area and are most easily served by community sewer systems. Determining individual on-site sewage disposal suitability requires site-by-site investigation. In areas of seasonal high groundwater, the County's on-site sewage disposal rules may require that wet weather testing, mathematical modeling, or groundwater

determinations show that necessary suitability exists during normal rainy season conditions to allow safe operation of septic systems.

The remaining wastewater treatment systems are a form of community collection, treatment and disposal. The most common form of community system is the treatment plant which discharges treated effluent to a storage and irrigation system (land disposal) or diluted to a surface water course. Presently, the City of Shasta Lake is permitted to seasonally discharge treated effluent to surface water, namely Churn Creek. A major goal of the City's capital improvement plans has been to significantly reduce or cease the need for any Churn Creek discharge as soon as practically possible.

Both the Cities of Anderson and Redding discharge treated sewage year-round to the Sacramento River. The Central Valley Regional Water Quality Control Board's Sacramento Basin Plan discourages any new plans to dispose of treated wastewater to surface waters.

Vb. Solid Waste Disposal

The County and City adopted a Source Reduction and Recycling Element in 1991, which addresses the County's waste generation characteristics, source reduction, recycling, composting, education and public information, funding, and integration of solid waste management issues. The County also adopted a Household Hazardous Waste Element which acts to supplement and support the Source Reduction and Recycling Element. Further information is found in the County's IWMP.

There are currently three landfills operating in Shasta County. Anderson Solid Waste receives approximately 200 tons per day of solid waste from residential, commercial, industrial, and agricultural sources. It also receives asbestos waste, shredder waste and other special wastes that have received a permit from the California Environmental Protection Agency.

The West Central Landfill receives approximately 400 tons per day of non-hazardous waste from residential, commercial, industrial, and agricultural sources.

New solid waste facilities may be conditionally permitted according to the zoning plan, if the site is first found to be favorably based on environmental and social constraints.

This plan provides for new solid waste facilities to be conditionally permitted in all areas of Shasta County as the need occurs. This requires the site to be compatible with adjacent land uses. Once the solid waste facility is approved, new land uses in the surrounding area must be regulated to avoid incompatibility with the solid waste facility.

Vc. Community Recreation

The community recreation needs of Shasta County residents and the degree to which these needs are met by county government vary with the type of community in which they live. Needs in the

unincorporated urban areas of Cottonwood, Burney/Johnson Park, and Fall River Mills/McArthur differ from the needs in the rural community centers, such as Oak Run, Ono and Shingletown.

Needs in the urban areas, where most lands close at hand are developed and population densities are high, are for publicly-owned park lands, either developed as turf playfields or equipped with facilities such as ball fields, tennis courts, basketball courts, etc. To a certain degree, recreation needs in these urban communities are satisfied by school districts, but their ability to function as recreation providers is limited both financially and by their responsibilities in other areas. Recreation needs in these areas have also been met in part by special districts and service clubs. Discussions with recreation officials in the unincorporated urban areas of Shasta County indicate that a substantial portion of the recreation needs of the residents of these communities is not being met. These observations are based on the degree of use of available facilities and their inability to accommodate the total demand. Also, the growth of these urban areas over the 20-year planning period will cause a corresponding increase in recreational demand.

In the rural areas of Shasta County, the recreation demands of residents are no less than those of persons residing in urban areas, but they are of a different nature. Open lands are close at hand, population densities are low and opportunities for informal or passive recreation activities are more readily available. Schools and service organizations play a major role in meeting most, if not all, the needs of rural community residents for developed recreation facilities.

Vd. Schools

A key to the County's strategy will be to encourage the Shasta County Office of Education to work with all affected school districts to develop standards for preparation of school facilities master plans by individual school districts, including facility financing plans. Presently, there is no state or local standards which guide the preparation of school facility master plans. Because of the large number of school districts in Shasta County, it will be necessary to strive for uniformity in the content of school facilities master plans so that the General Plan's commitment to working with school districts is done on a County wide basis with reasonable consideration to school financing constraints and local economic and social factors.

School planning and sighting must meet certain state requirements, including being located at least 350 yards from any high voltage electrical transmission facility. This State requirement is in place to protect against any potential human health effects to susceptible youth populations by electromagnetic fields which are emitted from such electrical transmission and transformer facilities.

VI. Design Review

The development of the County's design review program involves following three related steps. First, the County should develop general guidelines for countywide application of a design review program. This first step would encompass revising the present zoning ordinance and/or related development

standards and conditions. Second, the County would begin developing design review programs specific to those areas slated for community planning efforts and which are consistent with the countywide design review standards. Third, the County could consider creating a special design review body with authority to review specific projects and design review policies.

4.4.2 City of Anderson

The Land Use Element describes various land use designations for the land uses throughout the City of Anderson with consideration for the comments from the residents of Anderson. These Land Use Designations have been designed to maintain Anderson's small-town characteristics as the community evolves.

By defining residential, commercial and industrial uses, along with the public and open- space lands, this Element of the General Plan provides clear direction for the various types of development that will occur in Anderson. The Land Use Diagram guides future development in Anderson in conjunction with plan goals and policies.

4.5 ANALYSIS OF DEVELOPMENT TRENDS

4.5.1 Shasta County

The *Current Trend* scenario is based on present-day plans, policies and practices projected into the future. Over time, the I-5 corridor and surrounding areas blend into one large metropolitan area. Much of what has traditionally been considered open space in the valley floor gradually disappears as undeveloped land becomes developed. Except for a few rural towns, the intensity of development fades as the distance from I-5 increases.

The places people live and the places people go are generally separated. Redding and a handful of commercial and industrial sites along I-5 continue to be the center of economic activity and employment. Retail development is grouped in large, regional centers near freeway on/off ramps and at major intersections. Residential development gradually expands outward at the urban fringe. Every so often, a large multi-thousand home tract changes the landscape more abruptly.

I-5 and regional highways are increasingly relied upon for routine trips. The vast majority of transportation investments focus on maintaining these roadways and fixing congested bottlenecks as resources permit. In the region, the general appearance and quality of life inches closer to other metropolitan areas throughout California.

Projected Impacts:

- Despite status quo policies and practices, the net effect on Shasta County's form, function and livability is anything but business-as-usual under the weight of future population projections.
- Nearly one-half of all land area in the valley floor and foothills is developed. The remaining half is those lands that are most problematic and/or expensive to develop

due to environmental impacts, lack of ground water or distance from existing infrastructure.

- Vehicle miles traveled per household jumps from 34 to 65 miles per day. A near doubling of automobile CO2 emissions is at odds with current environmental and climate change laws. Failure to comply with state laws will lead to litigation, eventually restricting Shasta County's freedom to grow and develop as a region.
- The *Current Trend* is the most predictable and politically expedient option in the short term, as only incremental changes in local policies and practices are required.

Scenario A focuses on the character and aesthetics associated with rural living. Growth and development is spread throughout the region rather than confined to cities and towns. Lot sizes grow substantially, but all new growth and development is accommodated within Shasta County's existing General Plan.

The implications are:

- An increase in large lot residential development achieves rural character and aesthetics over functionality. Nearly one-half of the region's prime agricultural lands are developed or subdivided into parcels not practical for commercial food production.
- Water consumption is higher on a per household basis due to larger lot sizes, but overall consumption is lowest as a result of water intensive agricultural land being converted to urban uses.
- Nearly four times as many acres of environmentally sensitive lands are impacted by new development compared to the *Current Trend* scenario. Large lot development helps reduce the severity of impacts, but the threat of wildfire in developed areas is high.
- Increased vehicle emissions affect air quality, leading to increased incidence of respiratory and other chronic diseases.
- Low density and far distances limit mobility options. Vehicle miles traveled per household balloons from 34 to 104 miles per day. Mobility and the cost of travel are highly susceptible to fluctuations in fuel prices.

Scenario B focuses on the benefits of urban living without sacrificing the closeness and accessibility of Shasta County's unique natural setting. Conceptually, this scenario resembles a hub and spoke development pattern. Employment, commerce and regional destinations are focused within an urban hub. Radiating outward along a select number of transportation corridors or spokes, are linear communities containing a mix of multifamily housing, townhouses, neighborhood commercial, and traditional neighborhoods.

The implications are:

- By locating large lot development outside and away from the valley floor, nearly 2,500 acres of prime agricultural lands are preserved and over 21,000 fewer acres of environmentally sensitive lands are impacted versus the *Current Trend* scenario.
- Development patterns in *Scenario B* are similar to the *Current Trend* scenario, but much more focused and condensed.
- More households have access to open space and nature. In addition, about one out of every four homes is within easy walking distance to neighborhood commercial and high-frequency public transportation. Opportunities for increased physical activity, such as walking to school, help reduce obesity and other chronic diseases.
- Low impact areas not feasible for development today due to lack of ground water now make economic sense through consolidation of infrastructure.
- Increased use of public transportation, carpooling, bicycling and walking helps *Scenario B* achieve the lowest vehicle miles traveled per household.

Scenario C focuses on maintaining individual community identity and a strong sense of place. Rather than have Shasta County's cities and towns grow together into one large metropolitan area, individual communities focus their energies inward. Each micropolitan area contains a well-defined, cohesive and compact city or town built around an appropriately-scaled downtown and community gathering places. Surrounding open spaces serve as buffers between cities and towns and help meet the functional needs of the natural environment and nearby agriculture production.

The implications are:

- Although major changes in development practices and policies are required, *Scenario C* represents a more traditional, small-town form of development.
- As cities and towns grow to their planned build-out size, new towns may eventually need to be created to accommodate growth and development.
- A large portion of growth and development occurs outside and away from the valley floor.
- Nearly 4,000 acres of prime agricultural lands are saved from conversion to other uses compared to the *Current Trend* scenario.
- Impacts to environmentally sensitive lands are reduced by nearly 43,000 acres.
- Children are able to walk or bike to schools located within each community.
- Residents will have greater opportunity to live, work and shop within their hometown.
- Vehicle miles traveled per household, fuel use and vehicle emissions are all substantially reduced over the *Current Trend* scenario.

Based on a combined analysis of survey responses and open-ended comments, a melding of *Scenario B* and *Scenario C* is recommended to inform future implementation efforts.

Based on local agency feedback solicited during the regional blueprint process, a regional plan that all agencies might uniformly agree upon must also meet the following criteria:

- Focuses on projects and policies directly tied to documented local values and priorities.
- Does not rely solely on public sector effort and investment for implementation.
- Focuses on minimally-scaled efforts and investments.
- Does not hinge upon another layer of rules and regulations to implement the Plan.
- Does not assume resources beyond the application of existing programs and funding.

4.5.2 City of Anderson

The population of Anderson and its Planning Area (estimated at 12,000), is projected to grow to 19,575 by the year 2025. There are 3,372 households out of which 39.3 percent have children under the age of 18 living with them, 42.6 percent are married couples living together, 20.2 percent have a female householder with no husband present, and 31.2 percent are non-families. Households made up of individuals are 26.5 percent of all households and 12.0 percent of all households have someone living alone who is 65 years of age or older. The average household size is 2.64 and the average family size is 3.14.

Infill development on undeveloped land within Anderson is an important facet of the 2007 General Plan. Infill and a compact development pattern will facilitate efficient use of land with a minimum of public service extensions. About one-quarter of the City remains undeveloped. Some of this land is constrained by natural features so that development may be limited without innovative building, lot and street designs and planning techniques.

The Old Town Core recognizes the 1892 town site as the area bounded by North Street from Interstate-5 to State Highway 273, north along State Highway 273 to Briggs Street, west along Briggs Street and First Street to the ACID Canal, South along the ACID Canal to South Street and east along South Street to Emily Street, South along Emily Street to Anderson Creek, along the Creek to a line extending from Balls Ferry Road, to Balls Ferry Road and along Balls Ferry Road to Interstate-5. The mixed use area within the Old Town Core will be bounded by Ventura, North, Douglas and South/Balls Ferry Streets.

The vision for the Old Town Core includes using the MU Land Use Designation, the preservation of the historical area with smaller lots and homes and the addition of compatible commercial and professional businesses.

Areas designated for residential uses within the current city limits will accommodate the short-term housing needs as outlined in the Housing Element. Long-term housing needs will depend on annexation of additional land. Depending on market factors, infill may be able to accommodate non-residential development. The City will meet the total commercial and industrial land demand through the annexation of additional lands.

Although the basic development patterns within the city limits are already established, much can and should be done over the 20-year life of the 2007 General Plan. Many outstanding, though subtle, land use concepts can enhance the City incrementally. The Old Town Core will in-fill and build-up rather than out, and will develop for mixed use. Renovation of individual homes and conservation of neighborhoods must keep up with further aging of an older housing stock. Existing commercial areas must renovate and intensify. Housing code enforcement and effective use of re-development programs are essential implementers of the 2007 General Plan.

City Expansion

Since its early days as an unincorporated settlement growing around a railroad station, Anderson has often expanded its boundaries to embrace and facilitate new development. From an original 12 square block town site in 1872; Anderson has grown to its current, irregularly shaped, 6.7 square miles.

The Sphere of Influence comprises about 12.9 square miles, nearly twice the current area of the incorporated city. A substantial portion of the region's commercial and industrial development is presently outside of the city but within the unincorporated planning area. The City proposes to add 2,000 acres southwest of the City to the Sphere of Influence which may then be annexed to the City. This area is proposed to be a special planning area which will develop according to an approved Specific Plan.

Areas to the northwest of the city will also be added to the Sphere of Influence and annexed for special uses, especially water storage, to serve future needs. The Rural Holding (RH) Land Use Designation will be used for this area. Commercial development along State Route 273 and the Verde Vale and Spring Gulch may eventually be annexed to the city.

One of the central themes of the Shasta County General Plan is to direct urban growth into community regions that can effectively and economically provide urban types of services. Anderson supports a centralized growth concept. The City is the logical service provider of the urban services required by future development within the Region. Urban densities require urban services, and Anderson requires annexation prior to service extension.

SECTION 5
GOALS, OBJECTIVES AND ACTIONS

This section of the Plan defines and explains the development of mitigation goals and objectives, mitigation actions and priorities, evaluating alternatives and prioritizing projects, plan implementation and documentation of the mitigation planning process. It contains the following subsections:

5.1 OVERVIEW
- **5.1.1 Develop Mitigation Goals and Objectives**
- **5.1.2 Mitigation Actions and Priorities**
- **5.1.3 Evaluating Alternatives and Prioritizing Projects**
- **5.1.4 Plan Implementation**
- **5.1.5 Documenting the Mitigation Planning Process**

5.2 REGIONAL CONSIDERATIONS

5.3 COUNTY OF SHASTA
- **5.3.1 Capabilities Assessment**
- **5.3.2 Goals, Objectives and Actions**

5.4 CITY OF ANDERSON
- **5.4.1 Capabilities Assessment**
- **5.4.2 Goals, Objectives and Actions**

DMA 2000 PLANNING REQUIREMENTS

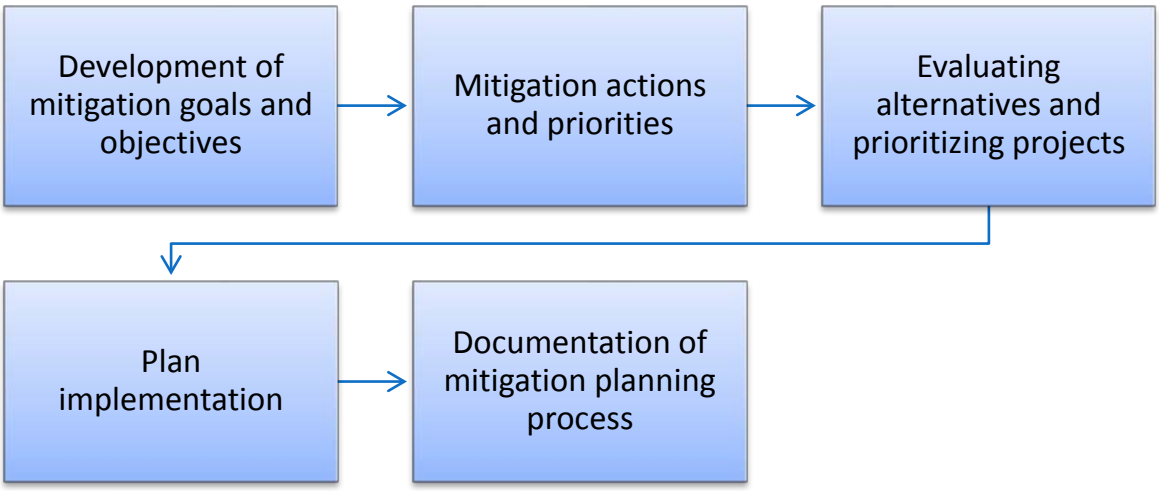
REQUIREMENT §201.6(c)(3). The plan shall include a mitigation strategy that provides the jurisdiction's blueprint for reducing the potential losses identified in the risk assessment, based on existing authorities, policies, programs and resources, and its ability to expand on and improve these existing tools.

EXPLANATION. The community's hazard reduction goals, as reflected in the plan, along with their corresponding objectives, guide the development and implementation of mitigation measures. This section should describe what these goals are and how they were developed. The goals could be developed early in the planning process and refined based on the risk assessment findings, or developed entirely after the risk assessment is completed. They should also be compatible with the goals of the community as expressed in other community plan documents (such as the General Plan).

Although the Interim Federal Regulations language does not require a description of objectives, communities are highly encouraged to include a description of the objectives developed to achieve the goals so that reviewers understand the connection between goals, objectives and activities. The goals and objectives should be based on the findings of the local and State risk assessments; and represent a long-term vision for hazard reduction or enhancement of mitigation capabilities.

5.1 OVERVIEW

This section of the Plan defines and explains:



5.1.1 Develop Mitigation Goals and Objectives

The Jurisdictions reviewed hazard profile and loss estimation information presented in Section 4 and used this as a basis for developing mitigation goals and objectives. Mitigation goals are general explanations of what hazards, and losses due to hazards, each Jurisdiction would like to prevent. They are typically long range visions and are oriented towards jurisdictional policy. The objectives define strategies to attain those goals. Both are based on consistent and complementary goals contained within existing local plans, policy documents, regulations, and public input.

5.1.2 Mitigation Actions and Priorities

Mitigation actions are a means of carrying out the objectives. They must be compatible with the plans, policies and regulations of the jurisdiction. The jurisdiction must also have the legal, administrative, fiscal, and technical capacities to perform each action. The process of analyzing the capacity of the jurisdiction is called the capabilities assessment (subsections 5.3 and 5.4), and it results in a list of acceptable and realistic mitigation actions. This list can then incorporate the social, technical, administrative, political, legal, economic and environmental opportunities and constraints of each action, and it can be trimmed accordingly.

After completion of the capabilities assessment, the Jurisdictions evaluated and prioritized their proposed mitigation actions in subsections 5.3 and 5.4. This step resulted in a list of acceptable and realistic actions that address the hazards identified in each jurisdiction. Each jurisdiction then identified and prioritized actions with the highest short to medium term priorities. An implementation schedule, funding source and coordinating individual or agency are identified for each prioritized action item. Each approach to reducing the impacts of disasters must be tailored to intertwine with the competing needs

and objectives of that community. The following categories of mitigation measures were chosen to work towards goals and objectives:

A. Prevention Measures

- Keep a hazard risk from getting worse.
- Ensure that future development does not increase hazard losses.
- Guide future development away from hazards, while maintaining other community goals such as economic development and quality of life and environment.

Communities can achieve significant progress toward hazard resistance through prevention measures, particularly in areas that have not been developed or where capital investment has not been substantial.

B. Property Protection Measures

- Modify existing buildings subject to hazard risk, or their surroundings.
- Directly protect people and property at risk.
- Inexpensive measures often are implemented or cost-shared with property owners.

Protecting a building does not have to affect the building's appearance and is therefore a popular measure for historic and cultural sites.

C. Public Education and Awareness Measures

- Inform and remind people about hazardous areas and the measures they can take to avoid potential damage and injury.

Education and awareness measures can be tailored to different audiences, including but not limited to: property owners, potential property owners, business owners, children and visitors.

D. Natural Resource Protection Measures

- Reduce the intensity of hazard effects and improve the quality of the environment and wildlife habitats.

Parks, recreation or environmental agencies or organizations usually implement these activities.

E. Emergency Services Measures

- Emergency services protect people before and after a hazard event.

Actions taken to ensure the continuity of emergency services are considered to be mitigation.

F. Structural Measures

- Directly protect people and property at risk.

These measures are termed structural mitigation because they involve construction of man-made structures to control hazards.

5.1.3 Evaluating Alternatives and Prioritizing Projects

The initial Committee used the STAPLE/E Criteria (Social, Technical, Administrative, Political, Legal, Economic, and Environmental) to select and prioritize the most appropriate mitigation alternatives. This methodology requires that the social, technical, administrative, political, legal, economic, and environmental aspects of a project be considered when reviewing potential actions. This process was used to help ensure that the most equitable and feasible actions would be undertaken based on capabilities. Table 21 provides information regarding the review and selection criteria for alternatives. The STAPLE/E Results are found in Appendix 5.C.

Table 21. STAPLE Criteria Questions

Criteria	Favorable	Less Favorable	Not Applicable
Social			
Community acceptance			
Effect on segment of population			
Technical			
Technically feasible			
Long-term solution			
Secondary impacts			
Administrative			
Staffing			
Funding allocation			
Maintenance/operations			
Political			
Political support			
Local champion			
Public support			
Legal			
State authority			
Existing local authority			
Potential legal challenge			
Economic			
Benefit of action			
Cost of action			
Contributes to economic goals			
Outside funding required			
Environmental			
Effect on land/water			
Effect on endangered species			
Effect on Hazmat/waste sites			
Consistent with community environmental goals			
Consistent with federal laws			

5.1.4 Plan Implementation

The Jurisdictions prepared a strategy for implementing the mitigation actions. The strategy identifies who is responsible for which action, what kind of funding mechanisms and other resources are available or will be pursued, and when the strategies will be completed. The goals, objectives, actions and implementation strategies form the body of the Plan.

5.1.5 Documentation of the Mitigation Planning Process

Agencies and organizations with plans in place were used in developing a list of actions for implementation by the Jurisdictions. These reports and lists of actions were reviewed by the Committee, which added additional actions to the planning process. The Committee prioritized the action items and the consultants held public meetings and listed the action items on the Western Shasta Resource Conservation District's website for review.

5.2 REGIONAL CONSIDERATIONS

The DMA 2000 requires that regions develop and maintain a document outlining measures that can be taken before a hazard event occurs that would help minimize the damage to life and property. The Plan meets this requirement by including specific goals, objectives and mitigation action items that the County and City developed. Some of the overall goals and objectives shared some commonalities (including promoting disaster-resistant future development; increasing public understanding, support and demand for effective hazard mitigation; building and supporting local capacity and commitment to continuously becoming less vulnerable to hazards; and improving coordination and communication with federal, state, local and tribal governments). However, the specific hazards and degree of risk vary greatly with the mix of other goals and objectives, and most action items are unique to each hazard.

5.3 COUNTY OF SHASTA

5.3.1 Capabilities Assessment

The County identified current capabilities available for implementing hazard mitigation activities. The Capability Assessment portion of the Jurisdictional mitigation plan identifies administrative, technical, legal and fiscal capabilities. This includes a summary of departments and their responsibilities associated with hazard mitigation planning as well as codes, ordinances and plans already in place associated with hazard mitigation planning.

5.3.1.1 Existing Institutions, Plans, Policies, and Ordinances

The following is a summary of existing departments in the County and their responsibilities related to hazard mitigation planning and implementation, as well as existing planning documents and regulations related to mitigation efforts within the community. Specific resources reviewed include those involving technical personnel such as planners/engineers with knowledge of land development and land management practices, engineers trained in construction practices related to building and infrastructure, planners and engineers with an understanding of natural or manmade hazards, floodplain managers, surveyors, personnel with GIS skills and scientists familiar with hazards in the community.

The agencies within the County that will have a significant role in implementing the Plan are:

- Resource Management
  - Air Quality Management District
  - Building Division
  - Community Education Section
  - Environmental Health
  - Planning Division
- Health and Human Services Agency
  - Public Health
- Public Works
- Shasta County Fire
  - Emergency Command Center
  - Shasta Cascade Hazard Materials Response Team
- Shasta County Sheriff's Department
  - OES

Only departments with a possible role in implementation of the Plan are listed. Many of the programs and plans of these departments, with applicability and links to loss reduction efforts, are detailed below.

Shasta County Department of Resource Management

Air Quality Management District (AQMD): AQMD endeavors to manage and enhance the air quality resources of Shasta County through a balanced program of environmental oversight and protection of public health. The AQMD functions as professional staff to the Air Pollution Control Board regarding rule development and potential industrial and commercial development. It also processes commercial and industrial applications to construct emission devices and issues permits to operate, which are renewed on an annual basis. The AQMD estimates releases of air contaminants and maintains an emission inventory to track emissions of all permitted devices. It also proposes mitigation strategies working cooperatively with affected emission sources, evaluates potential health risks and adopts air pollution control measures and regulations that seek to attain federal and state ambient air quality standards.

The AQMD operates monitoring devices to obtain information regarding concentrations of particulate matter (PM_{10}) and ozone air pollutants that may have an impact on the health of the general public or may damage vegetation and other materials. It issues open burning permits for agricultural, forest management, land clearing, and hazard reduction burning projects.

Building Division (BD): BD has the primary function to safeguard the life, health and property of Shasta County residents through the application of uniform building standards. These standards involve design, materials, construction, use, occupancy and location of all buildings and structures within the unincorporated area of Shasta County. The BD strives to implement these standards in a fair and consistent fashion while maintaining an open dialogue with the various building trades. Plan reviews, permits and inspections for structural, electrical, plumbing and mechanical as well as miscellaneous

items (signs, fences and mobile home or manufactured home setups) are provided through this division. The BD additionally serves as the code enforcement arm of the department providing follow-up on all complaints of zoning and building code violations registered with this division. The BD may provide an approximate cost of proposed structures based on the square footage, but it cannot give an exact cost until the plans have been checked. A filing fee (included as part of the plan check fee) is required at the time the plans are submitted for the plan check. The permit counter has booklets describing how to obtain permits for different types of construction and mobile home setups.

Community Education Section (CES): Provides a multitude of educational activities both in the schools and as part of community events. Programs are designed to impart lifestyle changes and prevent the imposition of regulatory control. CES focuses on the following four programs:

- Solid Waste Reduction (Reduce, Reuse, Recycle, & Buy Recycled)
- Household Hazardous Waste Disposal and Safer Alternatives
- Air Quality Awareness - Exhaust Emission Reduction
- Used Motor Oil Recycling

CES is responsible for providing information and community education to Shasta County residents about pollution prevention issues as they relate to our land, air, water, and human health and safety. CES provides written brochures and general information at community events; makes presentations in Shasta County classrooms (K-6) and in-service workshops to teachers; creates or assists in the creation of the recycling or disposal infrastructure; and works with other agencies in related programs.

Environmental Health Division (EHD): The EHD is charged with the responsibility of enforcement of pertinent California health laws, rules, regulations, and Shasta County ordinances. This responsibility covers Shasta County as well as the three incorporated cities within Shasta County. While the traditional objectives of the EHD have focused on the control of microbiological hazards, new areas of potential public health concern have arisen. These areas involve solid and liquid wastes, water pollution, food contaminants, storage and handling of hazardous materials, and other problems of a completely different nature and magnitude than epidemic diseases of the past. The EHD has subsequently responded with significant changes in both mandates and corresponding objectives.

Planning Division (PD): The PD serves as the land use information center for the County. The PD functions as a professional staff to the Board of Supervisors, the Planning Commission and the Airport Land Use Commission. The PD disseminates information to the public regarding potential development areas for residential, commercial, industrial, and resource development and management. The PD is responsible for the maintenance and implementation of the County General Plan, the County Zone Plan and implementation of the California Environmental Quality Act (CEQA). The PD processes development applications and permit requests for land divisions, use permits, General Plan amendments, zone changes, and variances.

The PD provides research and report services on land use related matters to the Planning Commission, the Resource Lands Committee, the Airport Land Use Commission, and the Board of Supervisors. Additionally, it works with the Shasta Regional Transportation Agency in implementing applicable portions of the Regional Transportation Plan. The PD also provides information to the general public and

to other public and private agencies regarding the growth and development of the County. The report data discusses the areas designated to accommodate residential, commercial or industrial uses and the development standards, policies and permits required for such activities. The PD also processes all requests for specific plans and Environmental Impact Reports (EIRs) for large developments. Staff planners work cooperatively with area residents through citizen advisory committees in the development of community plans for rural town centers and communities throughout Shasta County.

The PD functions as the County's Federal Census Data Center and disseminates information to the public regarding population, economic and housing characteristics and trends for Shasta County and its individual rural town centers and communities. The PD also implements the local Surface Mining and Reclamation Act Program (SMARA). This program includes the permitting requirements for new and existing mining operations which include gravel and cinder pits, limestone and diatomaceous earth quarries and underground gold mines. The PD processes mining permits and reclamation plans and ensures that money is set aside to guarantee mine cleanup and reclamation. The PD also inspects the mining operation and enforces compliance with state regulations and local ordinances. The PD administers the Integrated Land Use/Air Quality Program (ILU/AQP) which addresses the development of strategies and mitigation measures to address air quality impacts created by emissions from indirect and/or mobile sources.

The mapping unit provides mapping services to many sectors of County government and other public agencies. The unit also maintains and implements the County street naming and addressing system and provides address related information for the County's Emergency 911 response program.

The Planning Commission is composed of five members, each of whom is a resident of Shasta County. Each member of the Board of Supervisors nominates for appointment or proposes for reappointment to the commission one member of the public, who is a resident of the district represented by that supervisor. Each commissioner serves a term of four years, which is concurrent with the term of the member of the Board of Supervisors of the district in which the commissioner resides. The Planning Commission makes decisions on land use matters scheduled for public hearing regarding land divisions, use permits and variances. Action on some of the Planning Commission decisions can be appealed to the Board of Supervisors. The Commission also makes recommendations to the Board of Supervisors on public hearing items such as Zone Changes, General Plan Amendments, adoption of Community and Specific Plans, Williamson Act Contracts, and Timber Preserve Contracts.

In the PD, the Referral Agency review is a process whereby Resource Management, Public Works, County Fire, and other departments, as determined by the Director of the Department of Resource Management, receive referrals of development applications for review and comment as to project completeness, design, environmental determination and formation of recommended mitigation measures and conditions.

Resource Management's Hazard Mitigation Plan Role: Resource Management's reports, plans and fees play a role in this plan by helping to mitigate multiple hazards. Some examples of these are:

- When building in a flood plain, there are certain foundation height requirements that have to be met. These are in place to help minimize the probability of the structure flooding.
- When building at an elevation where snow is a factor, there are roof weight requirements that help mitigate extreme weather hazards.
- With any new structure, there are particular items that have to be strapped down to be help mitigate hazards that come with an earthquake.
- Exposure to hazardous wastes are reduced and/or prevented by the imposed steps one must take to remove and/or destroy them.

All of these items are used within this plan to help mitigate potential loss due to floods, extreme weather and hazardous wastes.

Shasta County Health and Human Services Agency (HHSA) - Public Health

The county health officer (HO), a physician appointed by the Shasta County Board of Supervisors, shall take measures as may be necessary to prevent the spread of disease (California Health and Safety Code 120175). Such measures include, but are not limited to, isolation, quarantine, examination, vaccination, evacuation, decontamination, restriction of public gatherings, and declaration of health emergency among others (Public Health Law Work Group, Health Officer Practice Guide for Communicable Disease Control in California, January 1, 2007, p. 5). Various functions within county public health assist the HO with discharge of his/her legal authorities, depending on the issues being addressed.

Public Health Laboratory Testing: The Public Health Laboratory System in California is a unique and diverse system of 35 autonomous county and city facilities, working in close cooperation with the California Department of Public Health state laboratories.

The SCPH Laboratory provides extensive communicable disease laboratory services to the Northern California region which includes Glenn, Lassen, Modoc, Shasta, Siskiyou, Tehama and Trinity counties for diagnostic and epidemiological investigations. The Health Department Laboratories are staffed by public health microbiologists. These professionals are certified by the State of California, hold baccalaureate or higher degrees and have been trained in approved Public Health Laboratories. Laboratories vary in size from one certified public health microbiologist to 50, depending on population and level of service provided. An approved laboratory director supervises each laboratory.

Immediate Disease Control Measures: Generally, HO actions may include obtaining information pertaining to the incident, assessing the health risk to the community, notifying appropriate people and agencies, and coordinating disease prevention and control with local, regional, state and federal agencies. In the event of a public health emergency, SCPH is the Shasta County agency responsible for prophylactic and responsive pharmaceutical distribution under the HO's medical direction.

Disease Surveillance and Investigation: Communicable disease surveillance is the process of systematic collection; consolidation and analysis of data including dissemination to those who need to know and provide information on relevant action. Appropriate surveillance systems provide the essential information to monitor, evaluate and model the impact of prevention and control activities for endemic communicable and zoonotic diseases; detect and track epidemics of emerging diseases and other public health threats; locate geographically the spread of diseases. An act of terrorism involving the release of a biological agent may be a major public health emergency and requires immediate response. Early detection and rapid investigation by public health nurses, epidemiologists and the HO is critical for determining the scope and magnitude of the exposure. Shasta County Public Health has the lead role in the early detection and identification of a bioterrorist event or excess disease outbreak. In the event of a confirmed outbreak, bioterrorist event or other large biologic disaster, SCPH will be responsible for initiating expanded epidemiological surveillance by implementing activities to educate clinicians and laboratorians such as disease reporting responsibilities, bioterrorist threat agents and diseases and how to contact the SCPH 24/7. The HO has a critical role in communication with the medical community as well as the general public in a public health emergency.

Crisis and Emergency Risk Communication for Medical and Health Information: The Public Health Information Officer is responsible for following the SCPH Crisis and Emergency Risk Communication Plan. This Plan is a comprehensive crisis communication plan applicable to Bioterrorism, infectious disease outbreaks and other public health threats and emergencies. The information officer will also ensure that the Department's website is used to provide health and safety information for targeted groups, including general public, ethnic populations, media and health care providers. Approved fact sheets, press releases and other pertinent health information will be posted on the website. In response to a bioterrorism or other public health emergency, the information officer will coordinate with other state and federal agencies to ensure that consistent messages are delivered, respond to media requests for health or medical information, maintain contact with and gather information from federal, state and voluntary organizations taking part in emergency response operations, and determine whether to schedule media briefings or news conferences. The information officer also identifies spokespeople to serve as needed.

Medical and Health Operational Area Coordination: The Medical and Health Operational Area Coordinator (MHOAC) is a function that may be established per Health and Safety Code §1797.153 within each Operational Area. The Health and Safety Code states the county Health Officer and Local Emergency Medical Services Agency (LEMSA) administrator may jointly act as the MHOAC or may appoint another individual to fulfill the responsibilities. The Health and Safety Code directs any appointed MHOAC to be responsible for ensuring the development of a comprehensive medical and health disaster plan for the provision of medical and health mutual aid within the Operational Area. SCPH and the HO would fulfill a coordinating function with the Shasta County Sheriff – Office of Emergency Services and the LEMSA administrator which is Sierra- Sacramento Valley Emergency Medical Services Agency. Public Health also may activate the Public Health Department Operations Center. The department would participate in the County Emergency Management Council if convened and would

send representation to the County Emergency Operations Center to support the medical and health branch and joint information center as needed.

Shasta County Health and Human Services Agency's Hazard Mitigation Plan Role: Shasta County Health and Human Services Agency's reports, tests and procedures play a role in this plan by helping to mitigate exposure to pandemic/epidemic hazards. The daily tests and public reports they provide help keep the public informed of any potential exposure. If there is an exposure, they have procedures in place to keep the exposure to a minimum. All of these items are used within this plan to help mitigate exposure and potential loss if exposure does occur.

Shasta County Fire Department (SCFD)

The mission of the SCFD is to serve and safeguard the community from the impacts of fires, medical emergencies, environmental emergencies, and natural disasters. This will be accomplished through education, code enforcement, planning and prevention, emergency response, and disaster recovery. SCFD is responsible for managing the following activities related to wildfire hazard reduction:

- The Weed Abatement Program (hazard reduction program), enforcing of defensible space
- Enforcing Development Standards
- Writing and Implementing the Wildfire Management Plan for the County (meeting National Fire Plan Standards)
- Assisting the Planning Division (and other Departments) with Development Standards for High Fire Hazard Areas
- Enforcing fuel breaks along highway corridors and public roadways
- Conducting outreach and education
- Implementing fire suppression
- Conducting prescribed burns
- Participating in the Healthy Forest Initiative
- Monitoring fire weather and completing annual action plans based on data from fire service agencies

Fire protection facilities include:

- 18 volunteer fire companies in the communities of Bella Vista, Big Bend, Cassel, Centerville, French Gulch, Hat Creek, Igo-Ono, Jones Valley, Keswick, Lakehead, Montgomery Creek, Oak Run, Old Station, Palo Cedro, Shingletown, Soldier Mountain, West Valley, and Whitmore
- 2 Schedule-A career staffed fire stations (Palo Cedro-32 and Redding 43)
- 3 Amador stations at Redding-43 Shasta-58 Shingletown-22

Fire Hazard Severity Zoning: The State of California is required to determine and map fire hazard severity zones. SCFD and the County hold the maps for the local responsibility area. The County is in the process of reevaluating the zones while meeting both the intent of the State law and also county ordinances.

Vegetative Management Plan Requirements: Prior to the erection of combustible materials, a vegetation management plan must be submitted and approved by the department. The vegetation management plan shall describe all actions that will be taken to prevent fire from being carried toward or away from structures. The plan must include a copy of a site plan indicating topographic features and a copy of a landscape plan. Each plan must also include methods and timetables for controlling, changing or modifying areas on the property. Elements of the plan must include removal of dead vegetation, litter, vegetation that may grow into overhead electrical lines, certain ground fuels and ladder fuels, as well as the thinning of live trees. Lastly the plan must include a maintenance schedule.

Stored Water Fire Protection Systems for One and Two Family Dwellings: As the name implies, this development standard prescribes standards for stored water at one and two family dwellings in high fire hazard areas.

Fire Hydrant Spacing and Flow Rates: This development standard addresses the placement and standard for fire hydrants in new developments.

Private Road and Driveway Standards for One and Two Family Dwellings: This development standard addresses easements, vegetative clearing, access (width, turnaround, etc.), paving and surface standards for private roads and driveways serving residential structures.

Fire Hazard Abatement Notices: Every year SCFD sends notices to abate fire hazards to the owners of all properties in county fire's jurisdiction that potentially pose a fire hazard, in conjunction with public education efforts through media outlets such as local television stations and newspapers. These notices indicate the start of yearly weed abatement requirements. Property owners have approximately three weeks to meet the requirements for clearing property outlined in the notice for their property. The various requirements include:

- Clearing entire parcels or lots (mow or disc)
- Maintaining a 100 foot perimeter break around buildings
- Maintaining a 10 foot roadside clearance break adjacent to the parcel
- Maintaining a 10 foot driveway clearance break
- Removal of all flammable vegetation around and adjacent to any structure for a distance of 30 ft. or to the property line
- Cutting vegetation to 18 inches or less around and adjacent to any structures beginning at 30 ft. up to 100 ft.

These requirements do not apply to single specimens of trees, ornamental shrubbery, or cultivated ground cover such as green grass, ivy succulents, or similar plants used as ground covers, provided that they do not form a means of readily transmitting fire from the native growth to any structure. When clearing property to abate fire hazards, consideration should be given to the potential environmental impact.

The Emergency Command Center (ECC) is staffed with a minimum of two personnel, 24 hours per day. The ECC handles all types of fires and medical emergencies in Shasta County, and also mobilizes resources statewide for all types of major incidents. The ECC is the incident commander from the time the report is received until the first resource arrives at scene. Unlike other dispatch centers, the ECC fire captains have the ability to modify responses based on prior field knowledge and information gathered from the reporting parties. The primary role of the ECC is to provide prompt and accurate support to the public and field resources, ensuring all incident needs are met as soon as possible. During the past year, the ECC has continued to improve street and address accuracy in the computer aided dispatch (CAD) map database. These updates have resulted in more accurate dispatches, and a better level of service for both the public and responders.

In addition to mapping updates, the ECC facilitated the conversion of Shasta County F-1 to a duplex command frequency, and completed installation of two repeaters. Within the next year, two additional repeaters will be installed. This will provide reliable backup for the SHU Local frequency as necessary. As well as establishing a secondary command frequency, the ECC also worked cooperatively with SHASCOM to establish a backup system for each agency at the others respective facility. This will enable either center to continue dispatching in the event of a major disaster at a facility, as well as providing an opportunity to cross-train personnel, further diversifying individuals' abilities.

SCFD Fire Weather Information is the same information used by CAL FIRE. All weather information is provided by Predictive Services staff at the Northern Region Operations Center.

SCFD does not have dedicated GIS staff for analyzing spatial date to improve planning; however, the Shasta-Trinity Unit of CAL FIRE has a pre-fire engineer that can perform these analyses for the State Responsibility Areas (SRA) within the County as part of their normal duties.

Education of citizens living in very high fire threat areas is being addressed through CAL FIRE's defensible space program in the SRA.

County hazard threats are identified through the efforts of the Fire and Resource Assessment Program (FRAP) in Sacramento.

Emergency Management Council (EMC) supports the Director of Emergency Services and consists of the following additional members:

- Chairman of the Board of Supervisors
- County Chief Executive Officer
- County Public Health Officer
- County Director of Environmental Health
- County Director of Social Services
- County Director of Public Works

Shasta County Fire Department's Hazard Mitigation Plan Role: Though the Shasta County Fire Department's programs, ordinances and fees play a role in multiple hazards, the biggest role they play in is helping to mitigate wildfire hazards. By providing multiple programs to various age groups, they are

able to educate the public. The ordinances they enforce, such as the Weed Abatement Program, helps to mitigate loss. There are fees associated with not complying with these ordinances which, in turn, help curb those individuals that may not want to comply right away. All of these items play a factor is preventing wildfires and preventing loss in case of a wildfire.

Shasta County Office of Emergency Services (OES)

OES is a division of the Shasta County Sheriff Department and is responsible for emergency planning and coordination for the Shasta Operational Area. On a day-to-day basis, OES is responsible for emergency planning and coordination among the Shasta Operational Area entities which include:

- Cities: Anderson, Redding and Shasta Lake
- Special Districts: Air Pollution Control District, Fire Districts, Sanitary Districts, School Districts, Vector Control Districts, Water Districts
- Volunteer Organizations: American Red Cross, Amateur Radio Emergency Services (ARES), Equine Evacuation
- Industry Groups: CAER-Community Awareness and Emergency Response, Petroleum Industry Mutual Aid Group, Shasta Industrial Association (SBIA)

OES also coordinates with adjoining offices of emergency services. The tri-county coordinators meet to discuss regional preparedness several times throughout the year. OES responsibilities include, but are not limited to:

- Maintain the Shasta County Operational Area Multi-Hazard Functional Plan.
- Maintain the County Emergency Operations Center (EOC) in a state of operational readiness.
- Maintain a trained cadre of EOC team members.
- Provide ongoing leadership and coordinate disaster plans and exercises with the three cities throughout Shasta County.
- Assist County departments in developing department emergency plans which address how they will perform during disasters.
- Assist County departments with development of facility emergency plans for every occupied County facility.
- Provide ongoing training for County department emergency coordinators.
- Participate in an ever-expanding public education campaign for all hazards through the Earthquake Survival Program (ESP), public venues and various media presentations.

The OES developed the SEMS Multi-Hazard Functional Plan (SEMS MHFP) in June 2003 to ensure the most effective and economical allocation of resources for the maximum benefit and protection of the civilian population in time of emergency. The MHFP was developed as part of the California Standardized SEMS.

The MHFP addresses emergency responses associated with natural disasters, technological incidents and national-security. The objective of the plan is to establish an effective organization capable of responding to potential large-scale emergency situations using all appropriate facilities and personnel in the County. The SEMS MHFP assigns tasks and specifies policies and procedures for coordination of emergency staff and service elements. The SEMS MHFP identifies emergency response actions associated with the large scale emergencies through standard operating procedures.

The plan states that hazard mitigation is a year round effort and encourages all communities to prepare hazard mitigation plans. The following activities were identified by the plan as potential mitigation activities: improving structures and facilities at risk, identifying hazard-prone areas and developing standards for prohibited or restricted use, recovery and relief from loss (i.e., insurance), and providing hazard warning and protecting the population.

The OES coordinated a local response plan, along with allied agencies and departments, in response to the nine terrorist attacks on the World Trade Center and Pentagon. A unified command structure was initiated with the Redding Police Department and the Shasta County Sheriff's Office to manage joint efforts. Objectives identified were security for dams and power plants in Shasta County. The security was staffed with local law enforcement agencies and was eventually turned over to the National Park Service. The second objective was identified as providing good public information to residents countywide. As a result of the terrorist attacks and the continued anthrax incidents, OES networked with Public Health and other emergency response agencies to develop and implement protocols for response to possible Anthrax tainted mail and packages.

Shasta County Office of Emergency Services' Hazard Mitigation Plan Role: The Shasta County Office of Emergency Services has involvement in all the hazard mitigations in this plan. Their plans and procedures are, by far, the most involved when it comes to hazard mitigation. They do continual training to prepare for any hazards that might arise. They also work side by side with all other County departments and state & local agencies to prepare for, mitigate and deal with potential hazards.

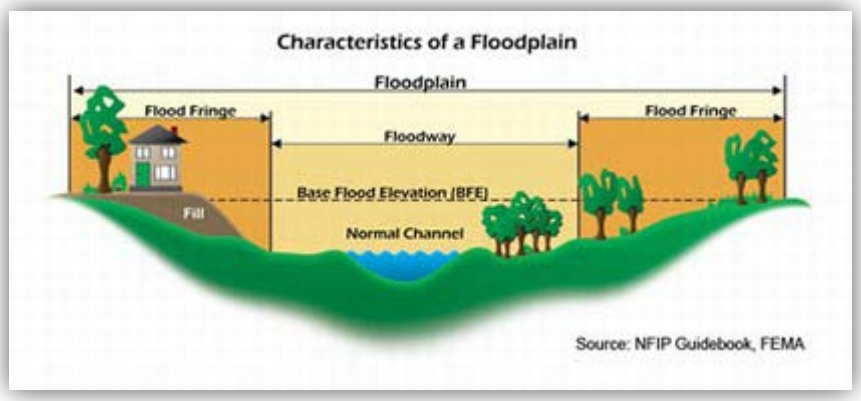
Shasta County Department of Public Works

The mission of Public Works is to provide safe, reliable and cost- effective facilities and services to the residents of Shasta County.

Bridge Design and Administration Division: The Bridge Design and Administration Division designs and administers the construction of bridge projects. Bridge projects include bridge replacement, bridge rehabilitation, seismic retrofit, and bridge railing upgrades.

Development Services Division: The Development Services Division is responsible for the administration of permanent road divisions (PRDs); assessment districts; County Surveyor functions; CSA Community Advisory Boards; CSA formations, annexations, and engineering; subdivision and encroachment field inspections; land use projects review, approval, and inspection; transportation permits; and flood plain administration.

The Floodplain Management Program through is identified in the County's General Plan under the Flood Protection Element. Activities associated with the Floodplain Management Program include reviewing new development permit applications for elevation above the 100-year flood level, proper setback from watercourses and adequate drainage plans. The Floodplain Management Program exceeds the minimum requirements for participation in the National Flood Insurance Program (NFIP).



For purposes of the NFIP, the area of the 100-year floodplain is divided into a floodway and a floodway fringe. The precise boundaries of those two areas are delineated on maps and described in reports produced by the FEMA for various creeks in Shasta County which have experienced or are expected to experience significant development.

The floodway is the channel of a stream, plus any adjacent floodplain areas, that must be kept free of development so that the 100-year flood can be carried away without increasing the flood height more than one foot.

The area between the floodway and the boundary of the 100-year floodplain is termed the floodway fringe and encompasses the portion of the floodplain that could be used for development without increasing the surface elevation of the 100-year flood more than one foot at any point.

Once the floodway and the floodway fringe have been distinguished within the 100-year floodplain, different development standards must be formulated for each area. These standards have two functions. First, they are designed to minimize loss of life and property damage by: (1) controlling the types of land uses which are permitted, and (2) prescribing certain construction methods. Second, they are intended to preserve the ability of the floodway to discharge the 100-year flood.

NFIP information should serve as the basis for land use and zoning designations in floodplain regions during the implementation phase of the planning process

Road Design and Administration Division: The Road Design and Administration Division designs and administers the construction of road projects and provides traffic engineering services. Road projects include realignment, reconstruction, overlays, and chip seals. Traffic engineering includes speed limits, stop signs and traffic signals. Additionally, the division includes the Right-of-Way office, which oversees public property acquisition and disposals.

Special Projects Division: The Special Projects Division is responsible for the design and contract administration of the County's capital improvements. Capital projects are all new County buildings and facilities, and remodels of existing buildings and facilities over $30,000. The County utilizes consultants for most architectural services. Contract administration is done with County staff.

The Special Projects division has one engineer certified under the Cal OES Post-Disaster Safety Assessment Program (SAP) as a safety assessment evaluator. Cal OES offers evaluator training every four years. The program provides professional resources to local governments to help with the safety and evaluation of buildings and infrastructure after a disaster.

Road Operations Division: The Road Operations Division maintenance crews maintain over 1,200 miles of paved roads and unpaved and gravel shoulders, drainage ditches, gutters, and culverts. Pavement maintenance includes surface treatments, crack sealing and pothole patching. Maintenance activities include snowplowing, mowing, weed spraying, brush removal, culvert and ditch maintenance, street sweeping, and litter clean up. Such activities are necessary to eliminate potential hazards, maintain adequate visibility, support the road structure, and allow storm water to readily exit the roadway. In addition special crews are responsible for bridge maintenance, traffic striping, and signal and sign maintenance.

Approximately 900 of the 1,200 miles of County-maintained roads are paved with asphalt concrete. All of the remaining mileage is essentially either dirt or gravel. Weathering and excessive traffic loads cause distress to the ac pavement. Excessive distress will lead to cracking, potholes and complete deterioration of the pavement. Maintenance activities to minimize these problems and extend the pavement service life include: crack sealing, pothole patching and surface treatments such as overlays, chip seals and slurry seals.

Public Works is responsible for maintaining over 300 bridges of various types and sizes. Caltrans inspects 222 of these bridges triennially. The remaining bridges are inspected annually by County crews and a bridge scour plan of action is documented and monitored (Figures 5.3-1 and 5.3-2). Based on the information provided in the inspection reports, the Road Maintenance Division performs the necessary maintenance such as repairing concrete and replacing old or damaged timbers and bridge railing. Major repairs are designed by the Engineering Division and constructed by contract. The infrastructure of the County supports the industries and the residents of Shasta County.

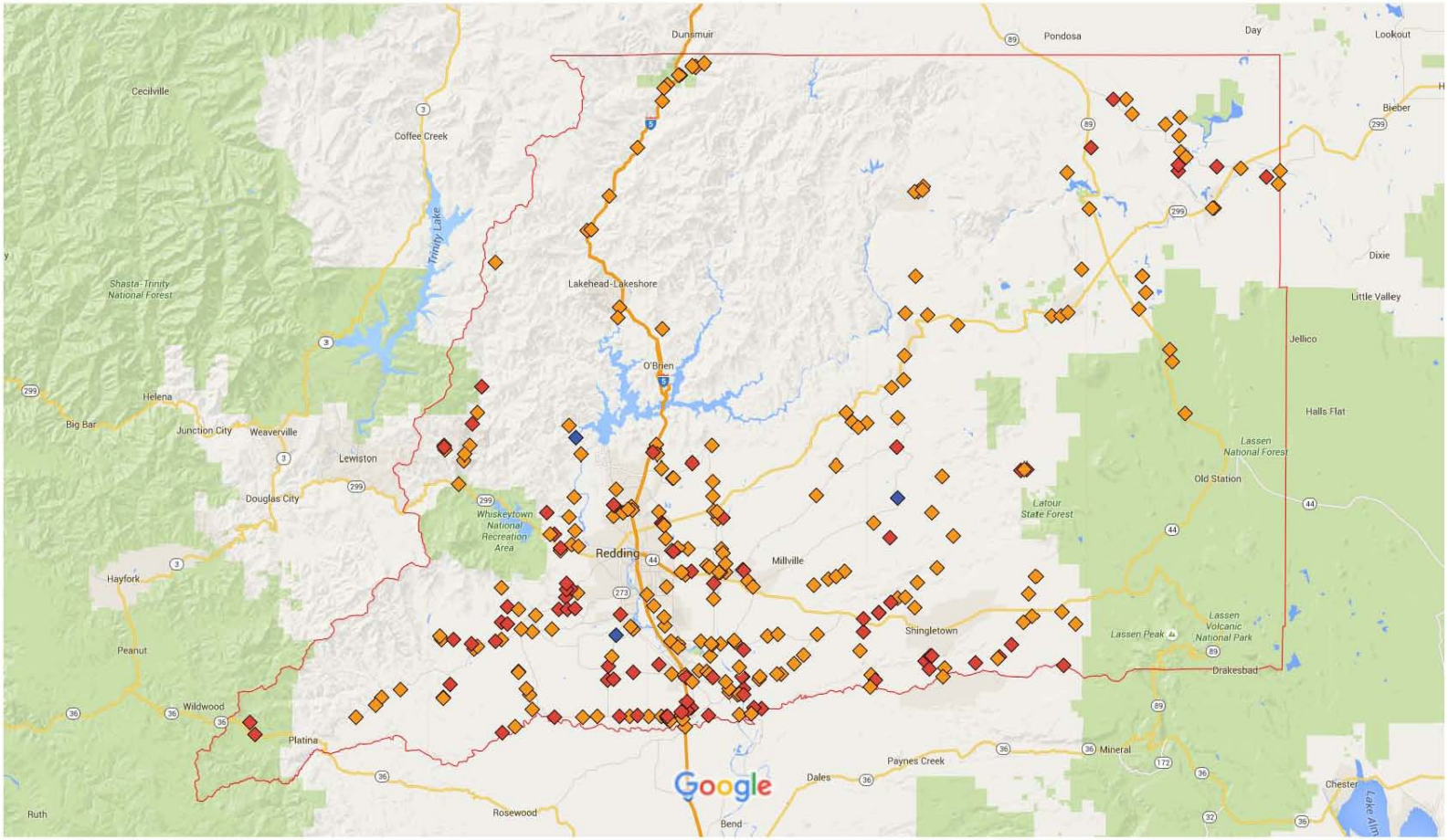
Solid Waste Division: The Solid Waste Division County administers it's program through franchise agreements with Waste Management, Inc., in the greater Redding area, and Burney Disposal, Inc., in the Intermountain area. The County is also responsible for managing the County's septage disposal program. The two series of ponds are located south of Anderson and in the Fall River Mills area. The County is responsible for operations at the West Central Landfill. Operations are currently performed by

City of Redding staff under contract with the County. The County maintains the solid waste permit for the landfill and has been responsible for landfill expansions.

Facilities Management Division: the Facilities Management Division is a division of Public Works and is responsible for maintaining the County's investment in buildings and grounds. Currently, Facilities Management maintains over one million square ft. of building space (County owned and leased) and 1.7 million square ft. of grounds. The division services include janitorial, general building maintenance, small scale renovations, remodel projects as well as Americans with Disabilities Act compliancy modifications and grounds maintenance. The division also manages and maintains the Hat Creek Park, French Gulch Park, Balls Ferry Boat Ramp, and the Redding Memorial Veterans Hall.

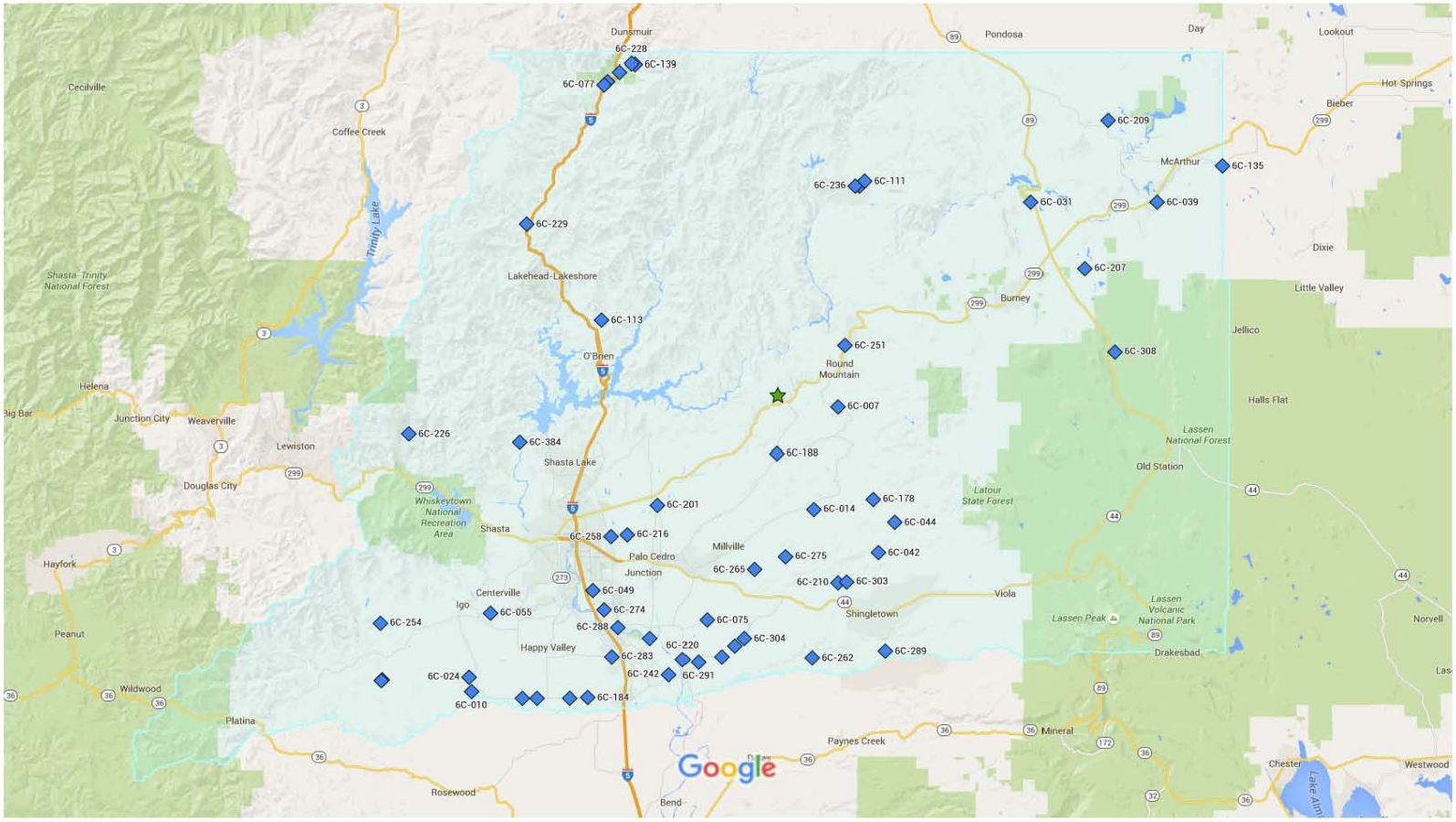
Public Works' Hazard Mitigation Plan Role: Public Works' has procedures, plans and policies in place to mitigate some potential hazards. They maintain roads and bridges to following state code and regulations. Debris in roadways is top priority for removal as to avoid potential casualty and/or multi-casualty incidents. They also design, contract and maintain the County's buildings. This hits a few different hazard mitigations because structures must be built to mitigate the loss due to potential earthquake, extreme weather and multi-casualty incidents due to multitude of hazards.

Google Maps **Shasta County Bridges**



Legend - Orange >20' Caltrans Inspected
Red <20'
Blue Large Culverts

Google Maps **Scour Critical Bridges**



The administrative and technical capabilities of the County, as shown in Table 22, provides an identification of the staff, personnel and department resources available to implement the actions identified in the mitigation section of the Plan. Specific resources reviewed include those involving technical personnel such as planners/engineers with knowledge of land development and land management practices, engineers trained in construction practices related to building and infrastructure, planners and engineers with an understanding of natural or manmade hazards, personnel with GIS skills and others familiar with hazards in the community.

Table 22. Shasta County Administrative and Technical Capacity

Technical Capacity Criteria	Yes	No
Planner(s) or engineer(s) with knowledge of land development and land management practices	Yes/Multiple	
Engineer(s) or professional(s) trained in construction practices related to buildings and/or infrastructure	Yes/Multiple	
Planner(s)or engineer(s) with an understanding of natural and/or manmade hazards	Yes/Multiple	
Floodplain manager	Yes/Public Works	
Surveyors	Yes/Public Works, County Surveyor's Office	
Staff with education or expertise to assess the community's vulnerability to hazards	Yes/Public Works, County Fire, OES	
Personnel skilled in GIS and/or HAZUS	Yes/Assessor's Office, Public Works – County Surveyor's Office, Planning & Development	
Scientists familiar with the hazards of the County	Yes/OES, Public Works, P&D	
Emergency manager	Yes/County Fire – OES, Public Works - Administration	
Grant writers	Yes/Departments determine their own level of service. The Disaster Recovery Manager with Public Works is lead for most disaster related grants.	

The legal and regulatory capabilities of the County are shown in Table 23, which presents the existing ordinances and codes that affect the physical or built environment of Shasta County.

Table 23. Shasta County Legal and Regulatory Capability

Legal and Regulatory Criteria	Yes	No
A. Building code	x	
B. Zoning ordinance	x	
C. Subdivision ordinance or regulations	x	
D. Special purpose ordinances (floodplain management, storm water management, hillside or steep slope ordinances, wildfire ordinances, hazard setback requirements)	x	
E. Growth management ordinances (also called smart growth or anti-sprawl programs)	x	
F. Site plan review requirements	x	
G. General plans	x	
H. A capital improvements plan	x	
I. An economic development plan	x	
J. Emergency response plan(s)	x	
K. A post-disaster recovery plan	x	
L. Real estate disclosure requirements	x	

5.3.1.2 Fiscal Resources

Table 24 shows specific financial and budgetary tools available to the County.

Table 24. County of Shasta Fiscal Capability		
Fiscal Capability	**Yes**	**No**
A. Community Development Block Grants (CDBG)	x	
B. Capital improvements project funding	x	
C. Authority to levy taxes for specific purposes (flood control districts)	x	
D. Fees for water, sewer, gas, or electric service	x	
E. Impact fees for homebuyers or developers for new developments/homes	x	
F. Incur debt through general obligation bonds	x	
G. Incur debt through special tax and revenue bonds	x	
H. Incur debt through private activity bonds	x	
I. Withhold spending in hazard-prone areas	x	

5.3.2 Goals, Objectives and Actions

Listed below are the County's specific hazard mitigation goals, objectives and related potential actions. For each goal, one or more objectives have been identified. In subsequent subsections, strategies to attain the goals are provided. Where appropriate, the County has identified a range of specific actions to achieve the objective and goal.

The goals and objectives were developed by considering the risk assessment findings, localized hazard identification and loss/exposure estimates (Section 4), and an analysis, of the County's current capabilities assessment. These preliminary goals, objectives and actions were developed to represent a vision of long term hazard reduction or enhancement of capabilities. County representatives met with consultant staff to specifically discuss these hazard-related goals, objectives and actions as they related to the overall Plan.

Representatives of numerous County departments involved in hazard mitigation planning, including Fire, Resource Management and Public Works, provided input to the Committee. The Committee members responsible for developing the goals, objectives and actions for the County were those listed in Section 3.

Meetings were held to present these preliminary goals, objectives and actions to citizens and to receive public input. The following subsections present the hazard related goals, objectives and actions as prepared by the Committee in conjunction with the locally elected officials and local citizens.

The 2015 Committee did not identify any new goals, or changes to existing goals.

5.3.2.1 Goals

Prioritized Hazards:

A. Floods (FLD)
B. Wildfire(WDF)
C. Extreme Weather (EW)
D. Earthquake (EQ)
E. Hazardous Materials (HM)
F. Volcano (V)
G. Chemical, Biological, Radiological, Nuclear, and Explosive (CBRNE)
H. Pandemic/epidemic (PE)
I. Multi-Casualty Incidents (MCI)
J. Dam Failure (DF)

The County has developed the following five goals for their Hazard Mitigation Plan.

Goal 1	Promote disaster resistant future development.
Goal 2	Increase public understanding and support for effective hazard mitigation.
Goal 3	Build and support capacity and commitment to become less vulnerable to hazards.
Goal 4	Enhance hazard mitigation coordination and communication with federal, state, local, and tribal governments.
Goal 5	Reduce the possibility of damage and losses to existing assets, particularly people, critical facilities/infrastructure, and County owned facilities, due to flood, wildfire, extreme weather, earthquake, hazardous materials, volcano, chemical/biological/radiological/nuclear/explosive, pandemic/epidemic, multi casualty, or dam failure.

5.3.2.2 Objectives

The County developed the following objectives to assist in the implementation of each of their five identified goals.

Shasta County Multi-Jurisdictional Hazard Mitigation Plan Goals and Objectives County of Shasta	
A. FLOOD (FLD)	
Goal FLD-1	**Promote disaster-resistant future development.**
Objective FLD-1.A	Facilitate the updating of general plans and zoning ordinances to limit (or ensure safe) development in flood hazard areas.
Objective FLD-1.B	Facilitate the adoption of building codes that protect existing assets and restrict new development in flood hazard areas.
Objective FLD-1.C	Facilitate consistent enforcement of general plans, zoning ordinances and building codes.

Objective FLD-1.D	Adopt zoning regulations which regulate land uses within the floodplain and prescribe construction design for floodplain development.
Goal FLD-2	**Build and support capacity and commitment to become less vulnerable to hazards.**
Objective FLD-2.A	Increase awareness and knowledge of flood hazard mitigation principles and practice among County department officials.
Objective FLD-2.B	Provide technical assistance to county jurisdictions to implement their flood hazard mitigation plans.
Objective FLD-2.C	Address identified data limitations regarding the lack of information about new development and build-out potential in flood hazard areas.
Objective FLD-2.D	Address data limitations identified in flood hazard profiling and risk assessment.
Objective FLD-2.E	Provide workshops to engineers and contractors on design and construction techniques to minimize flood damage.
Objective FLD-2.F	Develop a program to inspect repetitive loss properties to develop mitigations to minimize the impact from flooding.
Objective FLD-2.G	Conduct annual emergency operations center drills to ensure efficiency of County staff and coordination of resources and information.
Goal FLD-3	**Enhance hazard mitigation coordination and communication with federal, state, local and tribal governments.**
Objective FLD-3.A	Participate in initiatives that have mutual hazard mitigation benefits for the County, cities, state, tribal, and federal governments.
Objective FLD-3.B	Encourage other organizations to incorporate flood hazard mitigation activities into their existing programs and plans.
Objective FLD-3.C	Continue partnerships between the state, local and tribal governments to identify, prioritize and implement flood mitigation actions.
Objective FLD-3.D	Continuously improve the County's capability and efficiency at administering pre- and post-disaster flood mitigation.
Objective FLD-3.E	Support a coordinated permitting activities process.
Objective FLD-3.F	Provide technical support in administering pre- and post-disaster flood mitigation programs.
Objective FLD-3.G	Coordinate flood recovery activities while restoring and maintaining public services.
Goal FLD-4	**Reduce the possibility of damage and losses to existing assets, particularly people, critical facilities/infrastructure, and County- owned facilities.**
Objective FLD-4.A	Decrease the vulnerability of public infrastructure including facilities, roadways and utilities to floods.
Objective FLD-4.B	Record, collect and maintain comprehensive list of flood hazard related data.
Objective FLD-4.C	Minimize repetitive losses caused by flooding by implementation of hazard mitigation projects.
Objective FLD-4.D	Protect existing assets with the highest relative vulnerability to the effects of floods within the 100-year floodplain.
Objective FLD-4.E	Coordinate with and support existing efforts to mitigate floods (e.g., U.S. Army Corps of Engineers, U.S. Bureau of Reclamation and the California Department of Water Resources).
Objective FLD-4.F	Protect public health and safety, both on-site and downstream, from flooding

	through floodplain management and requires mitigation measures for development which would impact the floodplain by increasing runoff quantities.
Objective FLD-4.G	Protect existing bridge assets by conducting bridge inspections on structures owned by the County and generate work recommendations to correct identified bridge deficiencies.

B. WILDFIRE (WDF)

Goal WDF-1	**Promote disaster resistant future development.**
Objective WDF-1.A	Facilitate the updating of general plans and zoning ordinances to limit (or ensure safe) development in wildfire hazard areas.
Objective WDF-1.B	Facilitate the adoption of building codes that protect existing assets and restrict new development in wildfire hazard areas.
Objective WDF-1.C	Facilitate consistent enforcement of the general plans, zoning ordinances and building codes.
Goal WDF-2	**Increase public understanding and support for effective hazard mitigation.**
Objective WDF-2.A	Educate the public to increase awareness of wildfire hazards and opportunities for mitigation actions.
Objective WDF-2.B	Increase public understanding, support and demand for wildfire hazard mitigation for new developments.
Objective WDF-2.C	Monitor and publicize the effectiveness of wildfire mitigation actions implemented countywide.
Goal WDF-3	**Build and support capacity and commitment to become less vulnerable to hazards.**
Objective WDF-3.A	Increase awareness and knowledge of wildfire hazard mitigation principles and practice among County department officials.
Objective WDF-3.B	Provide technical assistance to county jurisdictions to implement their wildfire mitigation plans.
Objective WDF-3.C	Address identified data limitations regarding the lack of information about new development and build-out potential in wildfire hazard areas.
Objective WDF-3.D	Address data limitations identified in wildfire hazard profiling and risk assessment.
Objective WDF-3.E	Conduct annual wildfire emergency operations center drills to ensure efficiency of County staff and coordination of resources and information.
Goal WDF-4	**Enhance hazard mitigation coordination and communication with federal, state, local and tribal governments.**
Objective WDF-4.A	Participate in initiatives that have mutual wildfire hazard mitigation benefits for the County, cities, state, tribal, and federal governments.
Objective WDF-4.B	Encourage other organizations to incorporate wildfire hazard mitigation activities into their existing programs and plans.
Objective WDF-4.C	Continue partnerships between the state, local and tribal governments to identify, prioritize and implement wildfire mitigation actions.
Objective WDF-4.D	Continuously improve the County's capability and efficiency at administering pre- and post-disaster wildfire mitigation.
Objective WDF-4.E	Support a coordinated permitting activities process.

Objective WDF-4.F	Provide technical support in administering pre- and post-disaster wildfire mitigation programs.
Objective WDF-4.G	Coordinate wildfire recovery activities while restoring and maintaining public services.
Goal WDF-5	**Reduce the possibility of damage and losses to existing assets, particularly people, critical facilities/infrastructure, and County- owned facilities.**
Objective WDF-5.A	Enhance citizen and departmental understanding of wildfire threats and private property mitigation techniques through education and outreach.
Objective WDF-5.B	Address any deficiencies in fire weather forecasting.
Objective WDF-5.C	Strengthen existing development standards in high wildfire threat areas.
Objective WDF-5.D	Protect existing assets with the highest relative vulnerability to the effects of structural wildfire.
Objective WDF-5.E	Address identified data limitations regarding the lack of information about the relative vulnerability of assets from wildfire.

C. EXTREME WEATHER (EW)

Goal EW-1	**Increase public understanding and support for effective hazard mitigation.**
Objective EW-1.A	Educate the public to increase awareness of extreme weather hazards and opportunities for mitigation actions.
Objective EW-1.B	Increase public understanding, support and demand for extreme weather hazard mitigation for new developments.
Objective EW-1.C	Promote extreme weather hazard mitigation in the business community.
Objective EW-1.D	Promote water saving techniques during drought conditions.
Goal EW-2	**Build and support capacity and commitment to become less vulnerable to hazards.**
Objective EW-2.A	Increase awareness and knowledge of extreme weather hazard mitigation principles and practice among County department officials.
Objective EW-2.B	Provide technical assistance to county jurisdictions to implement their extreme weather mitigation plans.
Objective EW-2.C	Address data limitations identified in Extreme Weather Hazard Profiling and Risk Assessment.
Objective EW-2.D	Continue to enforce the snow and wind provisions of the latest edition of the California Building Code for new construction, alterations and additions.
Objective EW-2.E	Require a snow load analysis of existing structures (built prior to 1970) that undergo a change in use or occupancy that results in a higher hazard occupancy group.
Objective EW-2.F	Conduct annual extreme weather emergency operations center drills to ensure efficiency of County staff and coordination of resources and information.
Objective EW-2 G	All Caltrans maintenance stations have backup power electrical generators and high capacity generators.
Objective EW-2.H	Develop drought ordinances during drought emergencies.
Goal EW-3	**Enhance hazard mitigation coordination and communication with federal, state, local and tribal governments.**
Objective EW-3.A	Participate in initiatives that have mutual extreme weather hazard mitigation benefits for the County, cities, state, tribal, and federal governments.

Objective EW-3.B	Encourage other organizations to incorporate extreme weather hazard mitigation activities into their existing programs and plans.
Objective EW-3.C	Continue partnerships between the state, local and tribal governments to identify, prioritize and implement extreme weather mitigation actions.
Objective EW-3.D	Continuously improve the County's capability and efficiency at administering pre- and post-disaster extreme weather mitigation.
Objective EW-3.E	Support a coordinated permitting activities process.
Objective EW-3.F	Provide technical support in administering pre- and post-disaster extreme weather mitigation programs.
Objective EW-3.G	Coordinate extreme weather recovery activities while restoring and maintaining public services.
Goal EW-4	**Reduce the possibility of damage and losses to existing assets, particularly people, critical facilities/infrastructure, and County- owned facilities.**
Objective EW-4.A	Ensure that structures in the County are adequate to resist snow and wind loads.
Objective EW-4.B	Ensure County preparedness for emergency response actions due to severe winter weather.
Objective EW-4.C	Work with PG&E to ensure safe and reliable operation of the electric system through twenty-four-hour dispatching of the distribution system and real-time scheduling of PG&E's power plants.
Objective EW-4.D	Work with PG&E to ensure PG&E's power plants and providers are available to meet the needs of businesses and residents whenever required.
Objective EW-4.E	Work with PG&E to continue to mitigate potential hazards of trees in the proximity of overhead power lines.

D. EARTHQUAKE (EQ)

Goal EQ-1	**Promote disaster-resistant future development.**
Objective EQ-1.A	Facilitate the updating of general plans and zoning ordinances to limit (or ensure safe) development in earthquake hazard areas.
Objective EQ-1.B	Facilitate the adoption of building codes that protect existing assets and restrict new development in earthquake hazard areas.
Objective EQ-1.C	Facilitate consistent enforcement of general plans, zoning ordinances and building codes.
Goal EQ-2	**Increase public understanding and support for effective hazard mitigation.**
Objective EQ-2.A	Educate the public to increase awareness of earthquake hazards and opportunities for mitigation actions.
Objective EQ-2.B	Increase public understanding, support and demand for earthquake hazard mitigation for new developments.
Objective EQ-2.C	Promote earthquake hazard mitigation in the business community.
Objective EQ-2.D	Monitor and publicize the effectiveness of earthquake mitigation actions implemented countywide.
Goal EQ-3	**Build and support capacity and commitment to become less vulnerable to hazards.**
Objective EQ-3.A	Increase awareness and knowledge of earthquake hazard mitigation principles and practice among County department officials.

Objective EQ-3.B	Provide technical assistance to county jurisdictions to implement their earthquake mitigation plans.
Objective EQ-3.C	Address identified data limitations regarding information about new development and build-out potential in earthquake hazard areas.
Objective EQ-3.D	Address data limitations identified in earthquake hazard profiling and risk assessment.
Objective EQ-3.E	Enforce the seismic provisions of the latest edition of the California Building Code for new construction, alterations and additions.
Objective EQ-3.F	Require a seismic analysis of existing structures (built under earlier building codes) that undergo a change in use or occupancy that results in a higher hazard occupancy group.
Objective EQ-3.G	Conduct annual earthquake emergency operations center drills to ensure efficiency of County staff and coordination of resources and information.
Objective EQ-3.H	Actively participate and train County personnel in the State OES Safety Assessment Program (SAP).
Goal EQ-4	**Enhance hazard mitigation coordination and communication with federal, state, local and tribal governments.**
Objective EQ-4.A	Participate in initiatives that have mutual earthquake hazard mitigation benefits for the County, cities, state, tribal, and federal governments.
Objective EQ-4.B	Encourage other organizations to incorporate earthquake hazard mitigation activities into their existing programs and plans.
Objective EQ-4.C	Continue partnerships between the state, local and tribal governments to identify, prioritize and implement earthquake mitigation actions.
Objective EQ-4.D	Continuously improve the County's capability and efficiency administering pre- and post-disaster earthquake mitigation.
Objective EQ-4.E	Support a coordinated permitting activities process.
Objective EQ-4.F	Provide technical support in administering pre- and post-disaster earthquake mitigation programs.
Objective EQ-4.G	Coordinate earthquake recovery activities while restoring and maintaining public
Goal EQ-5	**Reduce the possibility of damage and losses to existing assets, particularly people, critical facilities/infrastructure, and County- owned facilities.**
Objective EQ-5.A	Ensure that structures in the County are adequately earthquake resistant.
Objective EQ-5.B	Ensure County preparedness for emergency response actions due to earthquakes.
Objective EQ-5.C	Protect existing assets with the highest relative vulnerability to the effects of earthquakes.
Objective EQ-5.D	Coordinate with and support existing efforts to mitigate earthquake hazards.
Objective EQ-5.E	Obtain better information on county-owned buildings at the highest risk of earthquake damage in the County.
Objective EQ-5.F	Educate building owners on earthquake safety and damage reduction techniques.
Objective EQ-5.G	Protect existing bridge assets by conducting bridge inspections on structures owned by the County and generate work recommendations to correct identified bridge deficiencies.

E. HAZARDOUS MATERIALS (HM)

Goal HM-1	**Promote disaster-resistant future development.**
Objective HM-1.A	Facilitate the updating of general plans and zoning ordinances to limit (or ensure safe) development in hazardous materials areas.
Objective HM-1.B	Facilitate the adoption of building codes that protect existing assets and restrict new development in hazardous materials areas.
Objective HM-1.C	Facilitate consistent enforcement of the general plans, zoning ordinances and building codes.
Goal HM-2	**Increase public understanding and support for effective hazard mitigation.**
Objective HM-2.A	Educate the public to increase awareness of hazardous materials and opportunities for mitigation actions.
Objective HM-2.B	Increase public understanding, support and demand for hazardous materials mitigation for new developments.
Objective HM-2.C	Promote hazard mitigation preparedness activity in the business community.
Objective HM-2.D	Monitor and publicize the effectiveness of hazardous materials mitigation actions implemented countywide.
Goal HM-3	**Build and support capacity and commitment to become less vulnerable to hazards.**
Objective HM-3.A	Increase awareness and knowledge of hazardous materials mitigation principles and practice among County department officials.
Objective HM-3.B	Provide technical assistance to county jurisdictions to implement their hazardous materials mitigation plans.
Objective HM-3.C	Address identified data limitations regarding the lack of information about new development and build-out potential in known hazardous materials areas.
Objective HM-3.D	Address data limitations identified in the Hazardous Materials Hazard Profiling and Risk Assessment.
Objective HM-3.E	Conduct annual hazardous materials emergency operations center drills to ensure efficiency of County staff and coordination of resources and information.
Goal HM-4	**Enhance hazard mitigation coordination and communication with federal, state, local and tribal governments.**
Objective HM-4.A	Participate in initiatives that have mutual hazardous materials mitigation benefits for the County, cities, state, tribal, and federal governments.
Objective HM-4.B	Encourage other organizations to incorporate hazardous materials mitigation activities into their existing programs and plans.
Objective HM-4.C	Continue partnerships between the state, local and tribal governments to identify, prioritize and implement hazardous materials mitigation actions.
Objective HM-4.D	Continuously improve the County's capability and efficiency at administering pre- and post-disaster hazardous materials mitigation.
Objective HM-4.E	Support a coordinated permitting activities process.
Objective HM-4.F	Provide technical support in administering pre- and post-disaster hazardous materials mitigation programs.
Objective HM-4.G	Coordinate hazardous materials recovery activities while restoring and maintaining public services.

Goal HM-5	**Reduce the possibility of damage and losses to existing assets, particularly people, critical facilities/infrastructure, and County- owned facilities.**
Objective HM-5.A	Develop a comprehensive approach to enhance the County's ability to respond to hazardous materials releases.
Objective HM-5.B	Train personnel to the technician and specialist level to be an integral part of the Regional Hazardous Materials Response Team (subsection 4.3.5.3).

F. VOLCANO (V)

Goal V-1	**Promote disaster-resistant future development.**
Objective V-1.A	Facilitate the updating of general plans and zoning ordinances to limit (or ensure safe) development in volcano hazard areas.
Objective V-1.B	Facilitate the adoption of building codes that protect existing assets and restrict new development in volcano hazard areas.
Objective V-1.C	Facilitate consistent enforcement of the general plans, zoning ordinances and building codes.
Goal V-2	**Increase public understanding and support for effective hazard mitigation.**
Objective V-2.A	Educate the public to increase awareness of volcano hazards and opportunities for mitigation actions.
Objective V-2.B	Increase public understanding, support and demand for volcano hazard mitigation for new developments.
Objective V-2.C	Promote volcano hazard mitigation in the business community.
Objective V-2.D	Monitor and publicize the effectiveness of volcano mitigation actions implemented countywide.
Goal V-3	**Build and support capacity and commitment to become less vulnerable to hazards.**
Objective V-3.A	Increase awareness and knowledge of volcano hazard mitigation principles and practice among County department officials.
Objective V-3.B	Provide technical assistance to county jurisdictions to implement their volcano mitigation plans.
Objective V-3.C	Address identified data limitations regarding the lack of information about new development and build-out potential in volcano hazard areas.
Objective V-3.D	Address data limitations identified in volcano hazard profiling and risk assessment.
Objective V-3.E	Conduct annual volcano emergency operations center drills to ensure efficiency of County staff and coordination of resources and information.
Goal V-4	**Enhance hazard mitigation coordination and communication with federal, state, local and tribal governments.**
Objective V-4.A	Participate in initiatives that have mutual hazard mitigation benefits for the County, cities, state, tribal, and federal governments.
Objective V-4.B	Encourage other organizations to incorporate volcano hazard mitigation activities into their existing programs and plans.
Objective V-4.C	Continue partnerships between the state, local and tribal governments to identify, prioritize and implement volcano mitigation actions.
Objective V-4.D	Continuously improve the County's capability and efficiency at administering pre- and post-disaster volcano mitigation.
Objective V-4.E	Support a coordinated permitting activities process.

Objective V-4.F	Provide technical support in administering pre- and post-disaster mitigation volcano programs.
Objective V-4.G	Coordinate volcano recovery activities while restoring and maintaining public services.
Goal V-5	**Reduce the possibility of damage and losses to existing assets, particularly people, critical facilities/infrastructure, and County- owned facilities.**
Objective V-5.A	Minimize future deaths, injuries, structural damage and losses due to volcanic activity.
Objective V-5.B	Monitor the situations and develop a plan when and if the probability of volcanic activity increases to a level of significance.

G. CHEMICAL/BIOLOGICAL/RADIOLOGICAL/NUCLEAR/EXPLOSIVE (CBRNE)

Goal CB-1	**Promote disaster-resistant future development.**
Objective CB-1.A	Facilitate the updating of general plans and zoning ordinances to limit (or ensure safe) development in chemical/biological hazard areas.
Objective CB-1.B	Facilitate the adoption of building codes that protect existing assets and restrict new development in chemical/biological hazard areas.
Objective CB-1.C	Facilitate consistent enforcement of general plans, zoning ordinances and building codes.
Goal CB-2	**Increase public understanding and support for effective hazard mitigation.**
Objective CB-2.A	Educate the public to increase awareness of chemical/biological hazards and opportunities for mitigation actions.
Objective CB-2.B	Increase public understanding, support and demand for chemical/biological hazard mitigation for new developments.
Objective CB-2.C	Promote chemical/biological hazard mitigation in the business community.
Objective CB-2.D	Monitor and publicize the effectiveness of chemical/biological mitigation actions implemented countywide.
Goal CB-3	**Build and support capacity and commitment to become less vulnerable to hazards.**
Objective CB-3.A	Increase awareness and knowledge of chemical/biological hazard mitigation principles and practice among County department officials.
Objective CB-3.B	Provide technical assistance to county jurisdictions to implement their chemical/biological mitigation plans.
Objective CB-3.C	Address identified data limitations regarding the lack of information about new development and build-out potential in chemical/biological hazard areas.
Objective CB-3.D	Address data limitations identified in chemical/biological hazard profiling and risk assessment.
Objective CB-3.E	When appropriate, conduct meetings with various County departments to share information and innovations in chemical/biological hazard mitigation.
Objective CB-3.F	Conduct annual chemical/biological emergency operations center drills to ensure efficiency of County staff and coordination of resources and information.
Goal CB-4	**Enhance hazard mitigation coordination and communication with federal, state, local and tribal governments.**
Objective CB-4.A	Participate in initiatives that have mutual hazard mitigation benefits for the County, cities, state, tribal, and federal governments.

Objective CB-4.B	Encourage other organizations to incorporate chemical/biological hazard mitigation activities into their existing programs and plans.
Objective CB-4.C	Continue partnerships between the state, local and tribal governments to identify, prioritize and implement chemical/biological mitigation actions.
Objective CB-4.D	Continuously improve the County's capability and efficiency at administering pre- and post-disaster chemical/biological mitigation.
Objective CB-4.E	Support a coordinated permitting activities process.
Objective CB-4.F	Provide technical support in administering pre- and post-disaster chemical/biological mitigation programs.
Objective CB-4.G	Coordinate chemical/biological recovery activities while restoring and maintaining public services.
Goal CB-5	**Reduce the possibility of damage and losses to existing assets, particularly people, critical facilities/infrastructure, and County- owned facilities.**
Objective CB-5.A:	Provide training to personnel in the latest tactics and personal protection in the event of bio-terrorism.
Objective CB-5.B:	Enhance communication between agencies to mitigate deaths, injuries, structural damage and losses from bio-terrorism.

H. PANDEMIC/EPIDEMIC (PE)

Goal PE-1	**Promote disaster-resistant future development.**
Objective PE-1.A	Facilitate the updating of general plans.
Objective PE-1.B	Facilitate consistent enforcement of the general plans.
Goal PE-2	**Increase public understanding and support for effective hazard mitigation.**
Objective PE-2.A	Educate the public to increase awareness of pandemic/epidemic hazards and opportunities for mitigation actions.
Objective PE-2.B	Increase public understanding, support and demand for pandemic/epidemic hazard mitigation for new developments.
Objective PE-2.C	Promote pandemic/epidemic hazard mitigation in the business community.
Objective PE-2.D	Monitor and publicize the effectiveness of pandemic/epidemic mitigation actions implemented countywide.
Objective PE-2.E	When appropriate, issue pandemic/epidemic hazard-related news releases.
Objective PE-2.F	Perform public outreach at local events.
Goal PE-3	**Build and support capacity and commitment to become less vulnerable to hazards.**
Objective PE-3.A	Increase awareness and knowledge of pandemic/epidemic hazard mitigation principles and practice among County department officials.
Objective PE-3.B	Provide technical assistance to county jurisdictions to implement their pandemic/epidemic mitigation plans.
Objective PE-3.C	Address data limitations identified in pandemic/epidemic hazard profiling and risk assessment.
Objective PE-3.D	Conduct annual pandemic/epidemic emergency operations center drills to ensure efficiency of County staff and coordination of resources and information.
Goal PE-4	**Enhance hazard mitigation coordination and communication with federal,**

	state, local and tribal governments.
Objective PE-4.A	Participate in initiatives that have mutual hazard mitigation benefits for the County, cities, state, tribal, and federal governments.
Objective PE-4.B	Encourage other organizations to incorporate pandemic/epidemic hazard mitigation activities into their existing programs and plans.
Objective PE-4.C	Continue partnerships between the state, local and tribal governments to identify, prioritize and implement pandemic/epidemic mitigation actions.
Objective PE-4.D	Continuously improve the County's capability and efficiency at administering pre- and post-disaster pandemic/epidemic mitigation.
Objective PE-4.E	Provide technical support in administering pre- and post-disaster pandemic/epidemic mitigation programs.
Objective PE-4.F	Coordinate pandemic/epidemic recovery activities while restoring and maintaining public services.
Goal PE- 5	**Reduce the possibility of damage and losses to existing assets, particularly people, critical facilities/infrastructure, and County-owned facilities.**
Objective PE-5.A	Ensure rapid reference laboratory testing services as appropriate within the Laboratory Response Network (LRN).
Objective PE-5.B:	Act as an LRN conduit to appropriate designated laboratory to identify or type a novel virus.
Objective PE-5.C	Work with appropriate agencies and individuals to identify the exposure source of the outbreak and the population at risk.
Objective PE-5.D	Control and contain the spread of influenza through pharmaceutical and non-pharmaceutical community containment strategies, including isolation, quarantine, infection control, antiviral treatment and prophylaxis, and, if available, vaccination.
Objective PE-5.E	Manage and disseminate accurate information for scientific, resource and policy decisions in public health and healthcare delivery settings.

I. MULTI-CASUALTY INCIDENT (MCI)

Goal MCI-1	**Promote disaster-resistant future development.**
Objective MCI-1.A	Facilitate the updating of general plans.
Goal MCI-2	**Increase public understanding and support for effective hazard mitigation.**
Objective MCI-2.A	Educate the public to increase awareness of multi-casualty hazards and opportunities for mitigation actions.
Objective MCI-2.B:	Monitor and publicize the effectiveness of multi-casualty mitigation actions implemented countywide.
Goal MCI-3	**Build and support capacity and commitment to become less vulnerable to hazards.**
Objective MCI-3.A	Increase awareness and knowledge of multi-casualty hazard mitigation principles and practice among County department officials.
Objective MCI-3.B	Provide technical assistance to county jurisdictions to implement their multi-casualty mitigation plans.
Objective MCI-3.C	Address data limitations identified in multi-casualty hazard profiling and risk assessment.
Objective MCI-3.D	Conduct annual multi-casualty, countywide disaster exercise to ensure coordination of resources and information.

Goal MCI-4	**Enhance hazard mitigation coordination and communication with federal, state, local and tribal governments.**
Objective MCI-4.A	Participate in initiatives that have mutual hazard mitigation benefits for the County, cities, state, tribal, and federal governments.
Objective MCI-4.B	Encourage other organizations to incorporate multi-casualty hazard mitigation activities into their existing programs and plans.
Objective MCI-4.C	Continue partnerships between the state, local and tribal governments to identify, prioritize and implement multi-casualty mitigation actions.
Objective MCI-4.D	Continuously improve the County's capability and efficiency at administering pre- and post-disaster, multi-casualty mitigation.
Objective MCI-4.E	Provide technical support in administering pre- and post-disaster, multi-casualty mitigation programs.
Objective MCI-4.F	Coordinate multi-casualty recovery activities while restoring and maintaining public services.
Goal MCI-5	**Reduce the possibility of damage and losses to existing assets, particularly people, critical facilities/infrastructure, and County- owned facilities.**
Objective MCI-5.A	Provide training to personnel in the latest tactics and personal protection in the event of a multi-casualty incident.
Objective MCI-5.B	Enhance communication between agencies to mitigate deaths, injuries, structural damage, and losses from a multi-casualty incident.

J. DAM FAILURE (DF)

Goal DF-1	**Promote disaster-resistant future development.**
Objective DF-1.A	Facilitate the updating of general plans and zoning ordinances to limit (or ensure safe) development in dam failure hazard areas.
Objective DF-1.B	Facilitate the adoption of building codes that protect existing assets and restrict new development in dam failure hazard areas.
Objective DF-1.C	Facilitate consistent enforcement of general plans, zoning ordinances and building codes.
Goal DF-2	**Increase public understanding and support for effective hazard mitigation.**
Objective DF-2.A	Educate the public to increase awareness of dam failure hazards and opportunities for mitigation actions.
Objective DF-2.B	Increase public understanding, support and demand for dam failure hazard mitigation for new developments.
Objective DF-2.C	Monitor and publicize the effectiveness of dam failure mitigation actions implemented countywide.
Objective DF-2.D	When appropriate, issue hazard-related news releases.
Goal DF-3	**Build and support capacity and commitment to become less vulnerable to hazards.**
Objective DF-3.A	Increase awareness and knowledge of dam failure hazard mitigation principles and practice among County department officials.
Objective DF-3.B	Provide technical assistance to county jurisdictions to implement their dam failure mitigation plans.
Objective DF-3.C	Address identified data limitations regarding the lack of information about new development and build-out potential in dam failure hazard areas.
Objective DF-3.D	Address data limitations identified in dam failure hazard profiling and risk

	assessment.
Objective DF-3.E	Conduct annual dam failure emergency operations center drills to ensure efficiency of County staff and coordination of resources and information.
Goal DF-4	**Enhance hazard mitigation coordination and communication with federal, state, local and tribal governments.**
Objective DF-4.A	Participate in initiatives that have mutual hazard mitigation benefits for the County, cities, state, tribal, and federal governments.
Objective DF-4.B	Encourage other organizations to incorporate dam failure hazard mitigation activities into their existing programs and plans.
Objective DF-4.C	Continue partnerships between the state, local and tribal governments to identify, prioritize and implement dam failure mitigation actions.
Objective DF-4.D	Continuously improve the County's capability and efficiency at administering pre- and post-disaster dam failure mitigation.
Objective DF-4.E	Support a coordinated permitting activities process.
Objective DF-4.F	Provide technical support in administering pre- and post-disaster dam failure mitigation programs.
Objective DF-4.G:	Coordinate dam failure recovery activities while restoring and maintaining public services.
Goal DF-5	**Reduce the possibility of damage and losses to existing assets, particularly people, critical facilities/infrastructure, and County- owned facilities.**
Objective DF-5.A	Maintain best possible coordination of information and emergency response.

5.3.2.3 Prioritization and Implementation of Action Items

Once the comprehensive list of Jurisdictional goals and objectives listed above was developed, the proposed mitigation actions were prioritized. This step resulted in a list of acceptable and realistic actions that address the hazards identified. This prioritized list of action items was formed by the SC weighing STAPLE/E criteria.

The DMA 2000 (at 44 CFR Parts 201 and 206) requires the development of an action plan that not only includes prioritized actions but one that includes information on how the prioritized actions will be implemented. For each of the strategies developed, the goal and objective(s) addressed are listed. In addition, the description of each measure also includes a priority level, coordinating individual or organization and department, implementation strategy, implementation timeline, cost effectiveness and potential funding sources. A description of each of these measures is included below:

For each mitigation measure a priority level of *Very High, High, Medium*, or *Low* has been assigned. These priority levels have been developed based on input from

Committee members, the overall planning consideration of the hazard as assigned in the hazard identification section of this document, the anticipated benefit-cost ratio and consideration of the STAPLE/E criteria.

The coordinating individual/organization listed for each alternative is tasked with the lead role in all aspects of the implementation of this measure. However, many of the measures identified will require effort and support from other departments. This department is expected to coordinate the efforts of all local departments as well as with additional regional, state and federal entities that may be involved.

The implementation strategy developed for each measure includes a general description of potential methods that could be utilized or actions that could be taken. Due to the complex nature of a number of these measures, not all of the listed methods will ultimately prove feasible. Before initiating the implementation of each measure, the responsible department should develop a detailed project plan with particular attention to technical feasibility and cost effectiveness.

The implementation timeline describes the length of time, beginning from the date of plan adoption, when the mitigation measure has been targeted for completion. Timelines listed are goals and can be influenced by many additional factors. Through the development of detailed project plans by the lead agencies, the timeline will be evaluated and revised when necessary.

For each measure a general discussion comparing potential benefits and costs is provided. For many of the projects, cost effectiveness is unknown. It should be noted that this discussion is not intended to replace a benefit cost analysis that should be completed prior to implementation.

For each mitigation measure, potential funding sources are listed. Whenever possible, non-local sources of funding have been identified, including state and federal grants. The sources listed are not intended to represent all possible options, as additional opportunities for funding may be identified during implementation.

All of the strategies identified in the remainder of this section are summarized in a Table 25. The prioritized mitigation actions as well as an implementation strategy for each are numbered by heading as follows:

FLD	Flood
WDF	Wildfire
EW	Extreme Weather
EQ	Earthquake
HM	Hazardous Materials
V	Volcano
CB	Chemical, Biological, Radiological, Nuclear, and Explosive
PE	Pandemic/epidemic
MCI	Multi-Casualty Incidents
DF	Dam Failure

5.3.2.4 Plan Update Requirement

The Plan mitigation action items have been updated to reflect the Jurisdiction's planning priorities and current conditions (subsection 3.5.3.3-Previous Mitigation Action Update). Projects that are complete or identified as obsolete were removed from the 2015 action items. New actions are prioritized in combination with the actions carried forward from the previous plan.

Our priority levels have stayed the same except as noted below. Action item # Adm. has been added. This item was added to keep everyone aware of the future timeline requirement. Action item # FLD-2 priority was changed from high to very high to reflect the ageing of the issues that are still incomplete. Action item # FLD-3 was in the 2010 plan but lacked a priority ranking; it has been ranked very high in light of a recent bridge closure. Action item # FLD-9 and FLD-10 have been added with a priority of high in light of the recent drought. The extreme weather item of emergency operation drill from the 2010 plan has been removed and replaced with EW-1. This new action item has been given the priority of medium and has been added to enhance conservation efforts. Action item # EQ-1 has been added and given the priority level of high due to potential safety issues associated. Action items # PE-1, MCI-1 and MCI-2 priorities have been changed from moderate to medium (nomenclature change only).

Table 25. 2015 Proposed Mitigation Action Items - County of Shasta

*Lead Agency (County) OES – Shasta County Sheriff Office of Emergency Services PH – Shasta County HHSA/Public Health PW – Shasta County Public Works RM – Shasta County Resource Management SCF – Shasta County Fire	*Lead Agency (State/Other) Caltrans – California Department of Transportation CAL FIRE COR – City of Redding DOT- U.S. Department of Transportation DWR- State Department of Water Resources FSC – Shasta County Fire Safe Councils WSRCD – Western Shasta Resource Conservation District

Action Item #	Description/Implementation/Cost Effectiveness	Goal/Objective	*Lead Agency	Timeline	Potential Funding Sources	Priority
Adm.	**MAINTAIN UPDATED MULTI-JURISDICTIONAL HAZARD MITIGATION PLAN**					
	DMA 2000 intends for hazard mitigation plans to remain relevant and current. Local hazard mitigation plans must be updated every five years. This means that the SCHMP will use a five-year planning horizon. It is designed to carry the Jurisdictions through the next five years, after which its assumptions, goals and objectives will be revisited and the Plan resubmitted for approval.	All	PW	2020	FEMA	High
FLOOD (FLD)						
FLD-1	**INCREASE PARTICIPATION IN FLOODPLAIN RE-MAPPING INITIATIVE**					
	Coordinate with the incorporated cities to identify mapping needs to promote flood mitigation on a watershed basis (after DFIRM production). Implementation Strategy: Use DWR Stream Prioritization Methodology to identify high priority streams for detailed analysis studies (after DFIRM production). Provide a detailed needs assessment to FEMA Region IX. Identify local cost share. Cost Effectiveness: FEMA research defends that the benefits of better flood mapping data at a national level exceed the costs. From the perspective of increased NFIP participation and awareness of flood hazard in the County, benefits would increase.	FLD-1.D FLD- 2.A/B/F/G FLD-3. A/C/E	PW RM	Ongoing	FEMA Map Modernization Program	Very High
FLD-2	**COTTONWOOD SEWER IMPROVEMENTS** (in progress)					
	The sewer treatment plant outfall is in Cottonwood Creek. The diffuser may be subject to damage by floating debris. Heavy rains could also inundate the sewage collection system potentially causing an overflow of partially treated sewage into Cottonwood Creek. Severe storms have the potential to interrupt electric service to the treatment plant and remote pump stations. Two of the four sewer lift stations do not have back-up power. Treatment plant may have difficulty meeting future discharge standards. A biological selector process is needed to improve treatment performance. Cost effectiveness: To be determined	FLD-4.A FLD-4.F	PW	2-4 yrs Complete in 2018	Planning & Const Grants Obtained	Very High
FLD-3	**PREVENT UNPLANNED BRIDGE CLOSURES**					
	Repair in-service bridge components deteriorated by scour, as listed on the Caltrans Office of Structure Maintenance and Investigations report. Cost Effectiveness: To be determined	FLD-4.A/B/D-G	Caltrans PW	Ongoing	Caltrans; FEMA; DOT	Very High

FLD-4	**REPLACE PLATINA ROAD CULVERT**					
	Replace a deteriorated 5' diameter culvert on Platina Road located 10.3 miles east of Hwy 36. The culvert has rusted to the point where it may collapse or washout in a storm event and could cause flooding. The culvert is tributary to Cottonwood Creek.	FLD-2.F FLD-4.A-F	PW	Completion in 2016	Road Fund; Shasta County Water Agency	High
FLD-5	**MODIFY OR REPLACE CULVERTS AND BRIDGES TO IMPROVE WATER AND TRAFFIC FLOW**					
	The construction of new bridges and culverts will improve water flow by allowing water to flow unimpeded through the structure. Implementation Strategy: Develop a plan for culvert construction and acquire permits. Monitor water flow of stream prior to and after construction to compare water flow. Maintain or restore stream bed, as needed and funding allows.	FLD-1.A-D FLD-2.A/B/E/F FLD-3.A-D/F/G FLD-4.A/C-G	Caltrans PW WSRCD	Ongoing	Benefit Assessment Fees; FEMA; California State Water Resources Control Board; California Dept. of Water Resources; U.S. Environmental Protection Agency	High
FLD-6	**VEGETATION MANAGEMENT IN CREEKS**					
	Reduce area flooding problems by removing excess vegetation where appropriate. This may also improve habitat for anadromous fish. Vegetation removed will include non-native and invasive species. Implementation Strategy: Coordinate with community members to organize a vegetation reduction and permitting. Hold public meetings to educate on importance of property maintenance and reducing flood risk.	FLD-2.A/B/E/F FLD-3.B/C FLD-4.A-F	WSRCD	Ongoing	Benefit Assessment Fees; FEMA; California State Water Resources Control Board; California Dept. of Water Resources; U.S. Environmental Protection Agency; U.S Fish and Wildlife Services; California Dept of Fish and Wildlife; National Fish and Wildlife Foundation.	High
FLD-7	**BURNEY FLOOD WALL**					
	Mitigate risk of flood damage to Burney Floodwall. Cost Effectiveness: To be determined	FLD-4.A FLD-4.F	PW	As funding is available	FEMA; CAL OES	High
FLD-8	**IMPROVE COTTONWOOD FOURTH STREET DRAINAGE**					
	Reduce flooding by correcting drainage issues on the north side of Fourth Street in Cottonwood. Developer-built systems have partially mitigated flooding upstream. Further improvements will be incorporated into future development. Cost Effectiveness: To be determined	FLD-2.F FLD-4.A-F	PW	Ongoing	FEMA	High
FLD-9	**CONSTRUCT RETENTION PONDS TO REDUCE FLOODING**					
	Flooding can be reduced through the construction of retention ponds to collect surface water. Retention ponds can be utilized as a secondary reservoir for surface water and to recharge groundwater. Implementation Strategy: Develop plans for construction and acquire permits. Monitor water flow of streams prior to and after construction to compare water flows. Maintain or restore water structure, as needed.	FLD-1.A-D FLD-2.A/B/E/F FLD-3.A-D/F/G FLD-4.A/C-G	WSRCD PW	Ongoing	Benefit Assessment Fees; FEMA; California State Water Resources Control Board; California Dept. of Water Resources; U.S. Environmental Protection Agency; U.S Fish and Wildlife Services; California Dept of Fish and Wildlife; National Fish and Wildlife Foundation	High
FLD-10	**CONDUCT FLOW MONITORING AND HYDROLOGICAL MODELING OF WATERWAYS**					
	Stream flow monitoring and hydrological modeling should be conducted to better understand the dynamics of watersheds. Install, operate and monitor stream gauge stations in waterways around Shasta County. Data collected can be used in flood risk mitigation planning. Implementation Strategy: Develop plan for construction and acquire permits for new facilities, if necessary. Install stream gauges and conduct on-going surveys along waterways. Analyze and present or publish findings of data collected.	FLD-1.A FLD-2.A-F FLD-3.C FLD-4.A/B/F	DWR WSRCD PW	Ongoing	Benefit Assessment Fees; FEMA; California State Water Resources Control Board; California Dept. of Water Resources; U.S. Environmental Protection Agency; U.S Fish and Wildlife Services; California Dept of Fish and Wildlife; National Fish and Wildlife Foundation	High

WILDFIRE (WDF)						
WDF-1	**MAINTAIN AN UPDATED SHASTA COUNTY COMMUNITIES WILDFIRE PROTECTION PLAN (CWPP)**					
	The CWPP addresses issues such as wildfire response, hazard mitigation, community preparedness, or structure protection-or all of the above. The process of developing a CWPP can help a community clarify and refine its priorities for the protection of life, property, and critical infrastructure in the wildland-urban interface. The CWPP should be updated every five years.	WDF-1.C WDF-2.A-C WDF-3.D WDF-4.C WDF-5.A	WSRCD SCF	Every 5 years	FEMA; Shasta County Title III funds	Very High
WDF-2	**IMPLEMENT STRATEGIC FUELS REDUCTION AND MANAGEMENT PLANS, AS IDENTIFIED IN THE CWPP**					
	Implementation Strategy: Locate shaded fuel breaks along key roadways. Increase publicity for the updated fires and community evacuation plan. Continue annual neighborhood-based fuel reduction work. Review existing projects, identify and map new fuel reduction projects that will provide for human safety, minimize private property loss and minimize the potential of a wildfire burning into communities. Conduct asset risk assessment and prioritization of the proposed projects. Cost Effectiveness: In order to obtain grant funding from state or federal agencies to construct a fuel break, a strategic plan must be completed with input from the community and fire agencies, approved by CAL FIRE and adopted for inclusion in the Shasta County Community Wildfire Protection Plan by the County Board of Supervisors.	WDF-1.A WDF-2.A-C WDF-3.A WDF-4.B/C WDF-5. A/D/E	WSRCD SCF CAL FIRE FSC	Every 5-7 years	NRCS Emergency Watershed Protection; NRCS/FCS Environmental Quality Incentives Program (EQIP); CAL FIRE Forest Stewardship Program; FEMA Hazard Mitigation Grant Program; CAL FIRE Vegetation Management Program; CAL FIRE California Forest Improvement Program; California Department of Conservation, RCD Assistance Program; USDA Forest Service State Fire Assistance; Bureau of Land Management Community Assistance; National Park Service Community Assistance; U.S. Fish and Wildlife Service Wildland-Urban Interface Grant Program; California State Fire Safe Council Clearinghouse, Fuel Reduction Project Grant Funding.	Very High
WDF-3	**RE-ESTABLISH FIRE SAFE COUNCILS (FSC)**					
	The FSC was established in 2002 to serve as a forum to address values at risk, landowner objectives, and types of fuel treatments, road systems, potential funding sources and fuel break locations for incorporation in the CWPP. The FSC is no longer active. The overall goal is to strengthen and consolidate the FSC'S. Implementation Strategy: Hire a fire safe coordinator to organize FSC's. Increase publicity for the updated fires and community evacuation plans. Post notices. Hold public meetings to discuss fire safety within Shasta County communities. Cost Effectiveness: FSC's develop and seek the information for strategic fuels plans needed to obtain grant funding from state or federal agencies to construct fuel breaks.	WDF-1.A WDF-2.A-C WDF-3.A-D WDF-4.B/C/G WDF-5.A/D/E	WSRCD SCF CAL FIRE	Ongoing	NRCS Emergency Watershed Protection; CAL FIRE Forest Stewardship Program; FEMA Hazard Mitigation Grant Program; CAL FIRE California Forest Improvement Program; California Department of Conservation, RCD Assistance Program; USDA Forest Service State Fire Assistance; Bureau of Land Management Community Assistance; National Park Service Community Assistance; U.S. Fish and Wildlife Service Wildland-Urban Interface Grant Program; California State Fire Safe Council Clearinghouse, Fuel Reduction Project Grant Funding.	Very High
WDF-5	**CAL FIRE, SHASTA-TRINITY UNIT FIRE MANAGEMENT PLAN**					
	The Shasta – Trinity Unit Fire Management Plan documents the assessment of the wildland fire potential within the unit. It includes stakeholder contributions, priorities and identifies strategic targets for pre-fire solutions. This plan is a living document to be amended as new information is collected. The goal of this plan is to reduce total cost and losses from wildfire by protecting assets at risk through focused pre-fire management prescriptions and increasing initial attack success.	WDF-1.A WDF-2.A-C WDF-3.A WDF-4.B/C WDF-5. A/D/E	SCF CAL FIRE	Annually	SRA Fees	Very High

WDF-5	**BURNEY COMMUNITY FUEL BREAK**					
	The second phase of the Burney fuel break travels south from Highway 299 along Jack Rabbit Flat Road, then east along the Z line road to an unnamed spur road and ends at the R line. It is approximately 2.2 miles long, 200' wide and 53 acres.	WDF-1.A WDF-2.A-C WDF-3.A WDF-4.B/C WDF-5. A/D/E	CAL FIRE	Completion in 2017	SRA Fire Prevention Fund	Very High
WDF-5	**BURNEY BASIN COMMUNITY WILDFIRE PROTECTION PLAN (CWPP)**					
	The CWPP addresses issues such as wildfire response, hazard mitigation, community preparedness, or structure protection-or all of the above. The process of developing a CWPP can help a community clarify and refine its priorities for the protection of life, property, and critical infrastructure in the wildland-urban interface. The CWPP should be updated every five years. The Burney CWPP is not affiliated with the Shasta County CWPP.	WDF-1.C WDF-2.A-C WDF-3.D WDF-4.C WDF-5.A	CAL FIRE Burney Fire Protection District	Every 5 years	SRA Fire Prevention Fund	Very High
EXTREME WEATHER (EW)						
EW-1	**REDUCE POTABLE WATER LOSSES**					
	Enhance water conservation in the Jones Valley water system through leak detection and meter replacement projects. Implementation strategy: Grant funding has been obtained for preliminary engineering related to leak detection and meter replacement. A subsequent project will be proposed to fix leaks and replace meters. Cost Effectiveness: To be determined. Additional grant and/or loan funding may be required depending upon the scope of proposed improvements.	EW-1.D	PW	Ongoing	DWR; State Water Resources Control Board	Medium
EARTHQUAKE (EQ)						
EQ-1	**PREVENT UNPLANNED BRIDGE CLOSURES**					
	Reduce the threat of unplanned bridge closures by strengthening and/or repairing components to withstand a creditable seismic event as listed on the Caltrans Office of Structure Maintenance and Investigations report. Cost Effectiveness: To be determined	EQ-5.A EQ-5.C EQ-5.G	Caltrans	Ongoing	FEMA; Caltrans; DOT	High
HAZARDOUS MATERIALS (HM)						
HM-1	**MAINTAIN AND UPDATE THE SHASTA COUNTY HAZARDOUS MATERIALS AREA PLAN**					
	The Area Plan establishes the policies, responsibilities and procedures required to protect the health and safety of citizens, the environment, and public and private property from the effects of hazardous materials emergency incidents. The plan is required to be reviewed and updated every three years. Cost Effectiveness: To be determined	HM-3.A-B HM-4.D HM-5.A	RM	Every 3 years	Ts	Medium
VOLCANO (V)						
V-1	**MAINTAIN INTEGRATED EVACUATION PLAN**					
	Maintain evacuation readiness for volcanic eruptions and similar emergencies. Include integrated evacuation plans into countywide evacuation planning for other hazards such as wildfire and flood. Cost Effectiveness: To be determined	V-1.A-C V-3.C V-4.G	OES	Ongoing	FEMA; CAL OES	Low
V-2	**MAINTAIN AND UPDATE THE COUNTY GENERAL PLAN AND ZONING PLAN**					
	Limit land uses near Mount Lassen through the County General Plan and Zoning Plan. All lands within six miles of the volcano are in public ownership or zoned for timber production. Permanent human occupation of these lands is severely restricted. Over 99% of all lands within ten miles of the volcano are similarly restricted with gradually reduced restrictions out to twenty miles and beyond. The General Plan and Zoning Plan are updated periodically. Cost Effectiveness: To be determined.	V-1.A	RM	Ongoing	RM	Medium

Promote water saving techniques during drought conditions.

CHEMICAL, BIOLOGICAL, RADIOLOGICAL, NUCLEAR AND EXPLOSIVE (CBRNE)						
CB-1	**EDUCATE CITIZENS FOR PROTECTION/PREVENTION**					
	Determine and purchase the best education and outreach program for rural residents regarding CBRNE. Cost Effectiveness: To be determined	CB-2.A-D	SCF PH	Ongoing	FEMA; CAL OES	Medium
PANADEMIC/EPIDEMIC (PE)						
PE-1	**UPDATE PAN FLU ANNEX TO ERP**					
	Include lessons learned from the 2009 Pandemic H1N1 Influenza response. Coordinate collection of information for use in updating Pan Flu Annex to ERP. Cost Effectiveness: Updating the Pan Flu Annex to ERP to include Lessons Learned from Pandemic H1N1 Influenza will help County Health officials better manage future pandemic incidents.	PE-1.A PE-2.E PE-3.A PE-4.A PE-4.D	PH	Within 3 years	TBD	Medium
MULTI-CASUALTY INCIDENTS (MCI)						
MCI-1	**SHASTA COUNTY AND SIERRA-SACRAMENTO VALLEY EMERGENCY MEDICAL SERVICES MEETINGS**					
	Participation of Shasta County Emergency Medical Services (EMS) stakeholders and Sierra–Sacramento Valley Emergency Medical Services Agency. Participation in these quarterly meetings helps ensure communication between agencies in case of a multi-casualty incident. Cost Effectiveness: Participation in these quarterly meetings helps ensure communication between agencies in case of a multi-casualty incident.	MCI-3.A/B MCI-4.A/C/D/G MCI-5.A /B	SCF PH	Ongoing	TBD	Medium
MCI-2	**AIRCRAFT FIRE DISASTER DRILL**					
	A joint disaster drill is scheduled at the Redding Municipal Airport in April 2017. The drill includes a large airliner prop complete with propane fire simulators. The drill will benefit emergency responders in the event of an aircraft disaster.	MCI-3.A MCI-3.D MCI-4.F MCI-5.A/B	SCF CAL FIRE COR Fire Districts	April 2017	TBD	Medium
DAM FAILURE (DF)						
DF-1	**EFFECTIVE OUTREACH AND EDUCATION ABOUT EMERGENCY SERVICES AND PLANS FOR COMMUNICATION ABOUT DAM FAILURE/OVERTOPPING**					
	Create an outreach and education program to notify residents about the emergency services and communication program in place in case of dam failure/overtopping. Cost Effectiveness: To be determined	DF-2.A-D	OES	Ongoing	FEMA; CAL OES	Low

5.4 CITY OF ANDERSON

5.4.1 Capabilities Assessment

The City identified current capabilities available for implementing hazard mitigation activities. The Capability Assessment portion of the Jurisdictional mitigation plan identifies administrative, technical, legal and fiscal capabilities. This includes a summary of departments and their responsibilities associated with hazard mitigation planning as well as codes, ordinances and plans already in place associated with hazard mitigation planning. The second part of the Assessment provides the City's fiscal capabilities that may be applicable to providing financial resources to implement identified mitigation action items.

5.4.1.1 Existing Institutions, Plans, Policies, and Ordinances

The following City Departments have a significant role in implementing the Plan.

City of Anderson Departments

- Planning
- Public Works
- Recreation
- Redevelopment

Only Departments with possible roles in implementation of the plan are listed. Many of the programs and plans of these departments, with applicability and links to loss reduction efforts, are detailed below.

Planning and Development

Planning and Development plans for and promotes reasonable, productive and safe long-term uses of the land which foster economic and environmental prosperity in the incorporated area of the city. It provides planning, permitting and inspection services through a public process under the policy direction of the City Council and the Planning Commission. It is responsible for the creation, update and implementation of the City's general plan, including the Safety Element. The divisions of the Planning and Development Department that have a role in natural disaster mitigation include:

Development Review - Reviews projects for permit decisions by staff, the zoning administrator, or the Planning Commission based on policies in the general plan, state law and local ordinances. It also ensures compliance with environmental impact mitigation measures and conditions of approval.

Zoning and Permits – Enforces the city zoning ordinances and provides information and services related to:

- Site specific zoning, meaning of zone districts, site specific land uses (e.g., required setbacks and allowable uses), general land uses.
- Historical Permit Information: information in microfiche (or original) address or permit files on issued permits.
- Discretionary Permits: status of applications in process, copies of materials (staff reports) related to pending case, procedures for filing new applications, assistance with filing, procedures for filing appeals.

- General Plan: site specific designations, meaning of designations, policies.
- Growth Management Ordinances: exemptions, points, allocations, effective dates, hardships.
- Maps: assistance with map selection, reading, interpretation.
- Assessor's Parcel System (APS); Assessor parcel numbers, copies of pages; landscape bonding procedures; sign ordinance; address assignment; zoning or permit compliance status, fees, etc.

Comprehensive Planning - The City of Anderson's General Plan is a plan for the city and for the adjacent Planning Area. The General Plan is designed to allow needed growth while protecting the "small town" characteristics of Anderson. The emphasis is on planning for the health and safety of all residents, now and in the future.

Building and Safety – The primary function is to provide reasonable controls and regulations that protect the citizenry and establish effective safeguards for the life, health and property equally throughout the incorporated area of the city. This is achieved through the application of uniform codes and standards that involve design, materials, construction, use, and occupancy of all buildings constructed within the jurisdiction. This department enforces the City building code, including the Geologic Hazards and High Fire Hazards Articles. It also enforces the grading code (landslide mitigation) and other sections of the zoning ordinances, dealing with public safety and hazard loss reduction techniques.

Public Works Department

The Public Works Department builds and maintains the infrastructure necessary in the city, and provides a variety of services to the residents of Anderson.

The department consists of three divisions: (1) the Engineering & Administration Division, (2) the Streets Division, which includes, Storm Drains, Landscape and Lighting and Water Systems, and (3) the Wastewater Division.

The various divisions of the department perform construction and maintenance of streets, sidewalks, storm drains, traffic signs, landscaping, and a water system that delivers 2 million gallons of quality drinking water daily to city residents. The department includes the Wastewater Collection and Treatment Division which treats both industrial and residential waste, and a Building Division to ensure public safety.

Flood Control - The city's retarding basins are used for flood control, debris control and water conservation. These require continual maintenance to assure the structural stability of the basins and the operational readiness of its mechanical equipment.

Floodplain Management Program - The objective of the Floodplain Management Program is to prevent future flood hazards, created in developing areas subject to flooding, and to reduce the necessity of constructing expensive flood control facilities in the future. Benefits derived from this program include the prevention of losses in flood- prone areas and reduced need for public emergency response during storm activity. Activities associated with the program include reviewing new development permit applications for elevation above the 100-year flood level, proper setback from watercourses, and adequate drainage plans. The City's Floodplain Management Ordinance exceeds the minimum requirements for participation in the NFIP.

Elevation Certificates - The City reviews development permit applications for structure elevation above the base flood elevation BFE. The City must certify that the lowest floor of any building in a special flood hazard area is elevated above the BFE before final approval for floodplain construction can be obtained. FEMA Elevation Certificates are required.

Routine Maintenance Program - As part of the City's Floodplain Management Program, it conducts routine creek maintenance. It has been doing so since 1992. The Routine Maintenance Program occurs annually and each year the City has to prepare an Annual Routine Maintenance Plan, as well as conduct public workshops and California Environmental Quality Act reviews of planned maintenance projects. The Annual Routine Maintenance Plan includes a description of the need for maintenance work, the work to be performed, the presence of sensitive biological resources, impacts of the activities on biological resources, standard maintenance practices to reduce impacts, and restoration measures. The Routine Maintenance Program focuses on urbanized areas or developed agricultural areas. The main objective of the program is to reduce flood hazard and damage to life, public property and infrastructure by maintaining the capacity of key channels in the city. All routine maintenance activities are conducted in a manner that minimizes environmental impacts. Maintenance activities are completed prior to the winter. The Routine Maintenance Program includes selective brushing, de-silting, channel shaping, bank stabilization, bank protection, herbicide spraying, and channel clearing activities in most creeks and streams throughout the city. These activities can be applied individually or in combination to address the specific requirements of the affected drainage. The Routine Maintenance Program also addresses the maintenance and repair of concrete lined channels. The individual flood zones fund the Routine Maintenance Program and the extent and frequency of channel maintenance is dependent upon the availability of funds.

Recreation Department

The department maintains more than 900 acres of parks and open space and 84 miles of trails. As pertains to natural hazard mitigation, the department's role includes facility and infrastructure protection and public safety on park lands.

Anderson Fire Protection District

The mission of the Anderson Fire Protection District is to serve and safeguard the

community from the impacts of fires, medical emergencies, environmental emergencies, and natural disasters. This is accomplished through education, code enforcement, planning and prevention, emergency response, and disaster recovery. The fire district is responsible for managing the following activities related to wildfire hazard reduction:

- Enforcement of Weed Abatement Program (hazard reduction program), for defensible space.
- Writing and implementing the *Wildfire Management Plan* for the district (meeting National Fire Plan Standards).
- Assisting Planning and Development (and other departments) with development.
- Standards for high fire hazard areas.
- Enforcing fuel loading along highway corridors and public roadways.
- Conducting outreach and education.
- Fire suppression.
- Monitoring fire weather and completing annual action plans based on data from fire service agencies.

Fire Hazard Severity Zoning - The state is required to determine and map fire hazard severity zones. The district holds the maps for the local responsibility area. The district is in the process of reevaluating the zones while meeting both the intent of the state law and City ordinances.

Vegetative Management Plan Requirements - Prior to the erection of combustible materials, a vegetation management plan must be submitted and approved. The vegetation management plan shall describe all actions that will be taken to prevent fire from being carried toward or away from structures. The plan includes a copy of a site plan indicating topographic features and a copy of a landscape plan.

Each plan also includes methods and timetables for controlling, changing or modifying areas on the property. Elements of the plan include removal of dead vegetation, litter, vegetation that may grow into overhead electrical lines, certain ground fuels and ladder fuels, as well as the thinning of live trees. Lastly, the plan includes a maintenance schedule.

Stored Water Fire Protection Systems for One and Two Family Dwellings – As the name implies, this development standard prescribes standards for stored water at one and two family dwellings in high fire hazard areas.

Fire Hydrant Spacing and Flow Rates – This development standard addresses the placement and standard for fire hydrants in new developments.

Private Road and Driveway Standards for One and Two Family Dwellings – This development standard addresses easements, vegetative clearing, access (width, turnaround, etc.), paving and surface standards for private roads and driveways serving residential structures.

Fire Hazard Abatement Notices - Every year the district sends notices to abate fire hazards to the owners of all properties in the jurisdiction that potentially pose a fire hazard, in conjunction with public

education efforts through media outlets such as local television stations and newspapers. These notices indicate the start of yearly weed abatement requirements. Property owners have approximately three weeks to meet the requirements for clearing property outlined in the notice for their property. The various requirements include:

- Clearing entire parcels or lots (mow or disc).
- Maintaining a 100 foot perimeter break is required around buildings.
- Maintaining a 10 foot roadside clearance break adjacent to the parcel.
- Maintaining a 10 foot driveway clearance break.
- Removal of all flammable vegetation around and adjacent to any structure for a distance of 30 ft. or to the property line.
- Cutting vegetation to 18 inches or less around and adjacent to any structures beginning at 30 ft. up to 100 ft.

These requirements do not apply to single specimens of trees, ornamental shrubbery, or cultivated ground cover such as green grass, ivy succulents, or similar plants used as ground covers, provided that they do not form a means of readily transmitting fire from the native growth to any structure. When clearing property to abate fire hazards, consideration should be given to the potential environmental impact. Table 26 provides an identification of the staff, personnel and department resources available to implement the actions identified in the mitigation section of the Plan. Specific resources reviewed include those involving technical personnel such as planners/engineers with knowledge of land development and land management practices, engineers trained in construction practices related to building and infrastructure, planners and engineers with an understanding of natural or manmade hazards, personnel with GIS skills and others familiar with hazards in the community.

Table 26. City of Anderson Administrative and Technical Capacity		
Administrative and Technical Criteria	**YES**	**NO**
A. Planner(s) or engineer(s) with knowledge of land development and land management practices	Yes	
B. Engineer(s) or professional(s) trained in construction practices related to buildings and/or infrastructure	Yes	
C. Planners or engineer(s) with an understanding of natural and/or manmade hazards	Yes	
D. Floodplain manager	Yes, consultant	
E. Surveyors	Yes, Public Works, consultant	
F. Staff with education or expertise to assess the community's vulnerability to hazards	Yes, Public Works, consultant	
G. Personnel skilled in GIS and/or HAZUS	Yes, consultant	
H. Scientists familiar with the hazards of the city	Yes, OES, DPW, P&D	
I. Emergency manager	Yes, Fire District – OES, Public Works Administration	
J. Grant writers	Yes	

The legal and regulatory capabilities of the City are shown in Table 27, which presents the existing ordinances and codes that affect the physical or built environment of the city.

Table 27. City of Anderson Legal and Regulatory Capability		
Legal and Regulatory Criteria	**Yes**	**No**
A. Building code	Yes	
B. Zoning ordinance	Yes	
C. Subdivision ordinance or regulations	Yes	
D. Special purpose ordinances (floodplain management, storm water management, hillside or steep slope ordinances, wildfire ordinances, hazard setback requirements)	Yes	
E. Growth management ordinances (also called smart growth or anti-sprawl programs)	Yes	
F. Site plan review requirements	Yes	
G. General Plan	Yes	
H. A capital improvements plan	Yes	
I. An economic development plan	Yes	
J. Emergency response plan(s)	Yes	
K. A post-disaster recovery plan	Yes	
L. Real estate disclosure requirements	Yes	

5.4.1.2 Fiscal Resources

Table 28 shows specific financial and budgetary tools available to the City such as community development block grants; capital improvements project funding; authority to levy taxes for specific purposes; fees for water, sewer, gas, or electric services; impact fees for homebuyers or developers for new development; ability to incur debt through general obligations bonds; and withholding spending in hazard-prone areas.

Table 28. City of Anderson Fiscal Capability		
Fiscal Resources	**Yes**	**No**
A. Community Development Block Grants (CDBG)	Yes	
B. Capital improvements project funding	Yes	
C. Authority to levy taxes for specific purposes (flood control districts)	Yes	
D. Fees for water, sewer, gas, or electric service	Yes	
E. Impact fees for homebuyers or developers for new developments/homes	Yes	
F. Incur debt through general obligation bonds	Yes	
G. Incur debt through special tax and revenue bonds	Yes	
H. Incur debt through private activity bonds	Yes	
I. Withhold spending in hazard-prone areas	Yes	

5.4.2 Goals, Objectives and Actions

Listed below are the City's specific hazard mitigation goals, objectives and related potential actions. For each goal, one or more objectives have been identified. In subsequent subsections, strategies to attain the goals are provided. Where appropriate, the City has identified a range of specific actions to achieve the objective and goal.

The goals and objectives were developed by considering the risk assessment findings, localized hazard identification and loss/exposure estimates, and an analysis of the City's current capabilities assessment.

These preliminary goals, objectives and actions were developed to represent a vision of long term hazard reduction or enhancement of capabilities. City representatives met with consultant staff to specifically discuss these hazard-related goals, objectives and actions as they related to the overall Plan.

Representatives of City departments involved in hazard mitigation planning provided input to the Committee. The Committee members were responsible for developing the Goals, Objectives and Actions for the City.

A public meeting was held in Anderson to present these preliminary goals, objectives and actions to citizens and to receive public input. The following subsections present the hazard related goals, objectives and actions as prepared by the Committee in conjunction with the locally elected officials and local citizens.

5.4.2.1 Goals

Hazards identified by the City of Anderson are:

Table29. Summary of Hazard Identification Results

Hazard	Representative Data Collected for Hazard Identification	Justification for Inclusion	Recurrence Interval of Event
Flood	• FEMA FIRM Maps • Historical flood records	• Areas are located within the 100-year floodplain	10 yr
Wildfire	• CDF-FRAP • USFS • County Fire/OES • Historical fire records • Anderson Fire Protection District	• Terrain and Mediterranean climate • Seasonal wind • History of events	10 yr
Extreme Weather	• NOAA • USDA	• History of events	10 yr
Earthquake	• USGS • CGS • CISN	• Several fault zones occur in the county • History of events	50 yr
HazMat	• USGS • Shasta County Hazardous Materials Business Plan • EPA	• Location to major transportation arteries (rail and road) • History of events	50 yr
CBRNE	• Shasta County HHSA -Public Health • CA Emergency Medical Services Authority • CA Department of Public Health	• Heightened sense of awareness since September 2001	200 yr
Pandemic/ Epidemic	• Shasta County HHSA –Public Health • CA Emergency Medical Services Authority	• Cases of West Nile Virus in Shasta County • Cases of CA 2009 H1N1 in Shasta	50 yr
MCI (Multi-Casualty Incident)	• Shasta County HHSA -Public Health • CA Emergency Medical Services Authority • CA Department of Public Health	• History of events	200 yr

Dam Failure	• Dam Inundation Data (CAL OES) • BOR • ACOE 2009 Survey	• History of events • Presence of dams	1000 yr

The City of Anderson has developed the following five Goals for inclusion in the SCHMP:

Goal 1	Promote disaster resistant future development.
Goal 2	Increase public understanding and support for effective hazard mitigation.
Goal 3	Build and support capacity and commitment to become less vulnerable to hazards.
Goal 4	Enhance hazard mitigation coordination and communication with federal, state, local, and tribal governments.
Goal 5	Reduce the possibility of damage and losses to existing assets, particularly people and critical facilities/infrastructure.

5.4.2.2 Objectives

The City developed the following objectives to assist in the implementation of each of their five identified goals. For each of these objectives, specific actions were developed that would assist in their implementation.

Shasta County Multi-Jurisdictional Hazard Mitigation Plan Goals and Objectives City of Anderson	
A. FLOOD (FLD)	
Anderson Goal FLD-1	**Promote disaster-resistant future development.**
Objective FLD-1.A	Facilitate the development or updating of the general plan and zoning ordinances to limit (or ensure safe) development in flood hazard areas.
Objective FLD-1.B	Facilitate the adoption of building codes that protect existing assets and restrict new development in flood hazard areas.
Objective FLD-1.C	Facilitate consistent enforcement of the general plan, zoning ordinances and building codes.
Anderson Goal FLD-2	**Increase public understanding and support for effective hazard mitigation.**
Objective FLD-2.A	Educate the public to increase awareness of flood hazards and opportunities for mitigation actions.
Objective FLD-2.B	Increase public understanding, support and demand for flood hazard mitigation for new developments.
Objective FLD-2.C	Promote flood hazard mitigation in the business community.
Objective FLD-2.D	Monitor and publicize the effectiveness of flood mitigation actions implemented citywide.
Anderson Goal FLD-3	**Build and support capacity and commitment to become less vulnerable to flood hazards.**
Objective FLD-3.A	Increase awareness and knowledge of flood hazard mitigation principles and practice among City department officials.
Objective FLD-3.B	Build and support capacity and commitment to become less vulnerable to hazards.

Objective FLD-3.C	Address identified data limitations regarding the lack of information about new development and build-out potential in flood hazard areas.
Objective FLD-3.D	Address data limitations identified in Flood Hazard Profiling and Risk Assessment.
Anderson Goal FLD-4	**Enhance flood hazard mitigation coordination and communication with federal, state, local and tribal governments.**
Objective FLD-4.A	Participate in initiatives that have mutual flood hazard mitigation benefits for the County, cities, state, tribal, and federal governments.
Objective FLD-4.B	Encourage other organizations to incorporate flood hazard mitigation activities into their existing programs and plans.
Objective FLD-4.C	Continue partnerships between the state, local and tribal governments to identify, prioritize and implement flood mitigation actions.
Objective FLD-4.D	Continuously improve the City's capability and efficiency at administering pre- and post-disaster flood mitigation.
Objective FLD-4.E	Support a coordinated permitting activities process.
Objective FLD-4.F	Provide technical support to departments in administering pre- and post-disaster flood mitigation programs.
Objective FLD-4.G	Coordinate flood recovery activities while restoring and maintaining public services.
Anderson Goal FLD-5	**Reduce the possibility of damage and losses to existing assets, particularly people, critical facilities/infrastructure, and City-owned facilities.**
Objective FLD-5.A	Educate local residents and businesses on the range of flooding that could affect the City and the potential impact.
Objective FLD-5.B	Participate in initiatives that result in better risk communication and the evaluation of flood threats.
Objective FLD-5.C	Decrease the vulnerability of public infrastructure including facilities, roadways and utilities to flooding.
Objective FLD-5.D	Educate the professional community on design and construction techniques that will minimize flood damage.
Objective FLD-5.E	Record, collect and maintain comprehensive list of flood hazard related data.
Objective FLD-5.F	Minimize repetitive losses caused by flooding.
Objective FLD-5.G	Protect existing assets with the highest relative vulnerability to the effects of floods within the 100-year floodplain.
Objective FLD-5.H	Coordinate with and support existing efforts to mitigate floods (e.g., U.S. Army Corps of Engineers, U.S. Bureau of Reclamation, California Department of Water Resources.
Objective FLD-5.I	Protect public health and safety, both on-site and downstream, from flooding through floodplain management which regulates the types of land uses which may locate in the floodplain, prescribes construction designs for floodplain development, and requires mitigation measures for development which would impact the floodplain by increasing runoff quantities.
B. HAZARDOUS MATERIALS (HM)	
Anderson Goal HM-1	**Promote disaster-resistant future development.**
Objective HM-1.A	Facilitate the updating of the General Plan and zoning ordinances to limit (or ensure safe) development in areas with potential hazardous materials.

Objective HM-1.B	Facilitate the adoption of building codes that protect existing assets and restrict new development in areas with potential hazardous materials.
Objective HM-1.C	Facilitate consistent enforcement of the General Plan, zoning ordinances and building codes.
Anderson Goal HM-2	**Increase public understanding and support for effective hazard mitigation.**
Objective HM-2.A	Educate the public to increase awareness of hazards and opportunities for mitigation actions.
Objective HM-2.B	Increase public understanding, support and demand for hazard mitigation for new developments.
Objective HM-2.C	Promote hazard mitigation in the business community.
Anderson Goal HM-3	**Build and support capacity and commitment to become less vulnerable to hazards.**
Objective HM-3.A	Increase awareness and knowledge of hazardous materials mitigation principles and practice among City department officials.
Objective HM-3.B	Address identified data limitations regarding the lack of information about new hazardous materials development potential in hazard areas.
Anderson Goal HM-4	**Enhance hazard mitigation coordination and communication with federal, state, local and tribal governments**
Objective HM-4.A	Participate in initiatives that have mutual hazard mitigation benefits for the City, county, state, tribal, and federal governments.
Objective HM-4.B	Encourage other organizations to incorporate hazardous materials mitigation activities into their existing programs and plans.
Objective HM-4.C	Continue partnerships between the state, local and tribal governments to identify, prioritize and implement hazardous materials mitigation actions.
Anderson Goal HM-5	**Reduce the possibility of damage and losses to existing assets, particularly people, critical facilities/infrastructure, and City-owned facilities.**
Objective HM-5.A	Develop a comprehensive approach to enhance the City's ability to respond to hazardous materials releases.
Objective HM-5.B	Train personnel at the technician and specialist level to be an integral part of the Regional Hazardous Materials Response Team.
Anderson Goal EW-1	**Promote disaster-resistant future development.**
Objective EW-1.A	Facilitate the updating of the General Plan and zoning ordinances to limit (or ensure safe) development in extreme weather hazard areas.
Objective EW-1.B	Facilitate the adoption of building codes that protect existing assets and restrict new development in extreme weather hazard areas.
Objective EW-1.C	Facilitate consistent enforcement of the General Plan, zoning ordinances and building codes to assist in protection against extreme weather hazards.
Anderson Goal EW-2	**Increase public understanding and support for effective hazard mitigation.**
Objective EW-2.A	Educate the public to increase awareness of extreme weather hazards and opportunities for mitigation actions.
Objective EW-2.B	Increase public understanding, support and demand for extreme weather hazard mitigation for new developments.
Objective EW-2.C	Promote extreme weather hazard mitigation in the business community.
Objective EW-2.D	When appropriate, issue extreme weather hazard-related news releases.
Anderson Goal EW-3	**Build and support capacity and commitment to become less vulnerable to hazards.**

Objective EW-3.A	Ensure City preparedness for emergency response actions due to severe winter or summer weather.
Objective EW-3.B	Coordinate with PG&E's power plants and providers are available to meet the needs of businesses and residents whenever required.
Objective EW-3.C	Coordinate with PG&E to mitigate potential hazards of trees in the proximity of overhead power lines.
Objective EW-3.D	Coordinate with PG&E to serve all customers in the event of a single contingency equipment failure or main feeder line failure.
Anderson Goal EW-4	**Enhance hazard mitigation coordination and communication with federal, state, local and tribal governments.**
Objective EW-4.A	Ensure City preparedness for emergency response actions due to severe summer or winter weather.
Objective EW-4-B	Participate in initiatives that have mutual hazard mitigation benefits for the City, county, state, tribal and federal governments.
Objective EW-4.C	Coordinate extreme weather recovery activities while restoring and maintaining public services.
Anderson Goal EW-5	**Reduce the possibility of damage and losses to existing assets, particularly people, critical facilities/infrastructure, and City-owned facilities.**
Objective EW-5.A	Ensure that structures in the City are adequate to resist extreme snow and wind loads.
Objective EW-5.B	Ensure City preparedness for emergency response actions due to severe winter weather.
Objective EW-5.C	Ensure City preparedness for emergency response actions to due to severe summer weather.
D. EARTHQUAKES (EQ)	
Anderson Goal EQ-1	**Promote disaster-resistant future development.**
Objective EQ-1.A	Facilitate the updating of General Plan and zoning ordinances to limit (or ensure safe) development in earthquake hazard areas.
Objective EW-1.B	Facilitate the adoption of building codes that protect existing assets and restrict new development in earthquake hazard areas.
Objective EW-1.C	Facilitate consistent enforcement of the General Plan, zoning ordinances and building codes in areas susceptible to earthquakes.
Anderson Goal EQ-2	**Increase public understanding and support for effective hazard mitigation.**
Objective EQ-2.A	Coordinate with and support existing efforts to mitigate earthquake hazards.
Objective EQ-2.B	Educate the public to increase awareness of hazards and opportunities for mitigation actions.
Anderson Goal EQ-3	**Build and support capacity and commitment to become less vulnerable to hazards.**
Objective EQ-3.A	Ensure that structures in the City are adequately earthquake resistant.
Objective EQ-3.B	Educate building owners on earthquake safety and damage reduction techniques.
Anderson Goal EQ-4	**Enhance hazard mitigation coordination and communication with federal, state, local and tribal governments.**
Objective EQ-4.A	Ensure City preparedness for emergency response actions due to

	earthquakes.
Objective EQ-4.B	Participate in initiatives that have mutual hazard mitigation benefits for the City, county, state, tribal and federal governments.
Anderson Goal EQ-5	**Reduce the possibility of damage and losses to existing assets, particularly people, critical facilities/infrastructure, and City-owned facilities.**
Objective EQ-5.A	Protect existing assets with the highest relative vulnerability to the effects of earthquakes.
Objective EQ-5.B	Obtain better information on the highest risk City-owned buildings in the City.
Objective EQ-5.C	Educate building owners on earthquake safety and damage reduction techniques.
E. WILDFIRE (WDF)	
Anderson Goal WDF-1	**Promote disaster-resistant future development.**
Objective WDF-1.A	Enhance citizen and departmental understanding of wildfire threats and private property mitigation techniques through education and outreach.
Objective WDF-1.B	Strengthen existing development standards in high threat areas.
Objective WDF-1.C	Protect existing assets with the highest relative vulnerability to the effects of structural wildfire.
Anderson Goal WDF-2	**Increase public understanding and support for effective hazard mitigation.**
Objective WDF-2.A	Educate the public to increase awareness of wildfire hazards and opportunities for mitigation actions.
Objective WDF-2.B	Monitor and publicize the effectiveness of wildfire mitigation actions implemented city-wide.
Objective WDF-2.C	Perform public outreach at local events.
Anderson Goal WDF-3	**Build and support capacity and commitment to become less vulnerable to hazards.**
Objective WDF-3.A	Increase awareness and knowledge of wildfire hazard mitigation principles and practice among City department officials.
Objective WDF-3.B	Address identified data limitations regarding the lack of information about new development and build-out potential in wildfire hazard areas.
Objective WDF-3.C	Conduct annual wildfire emergency operations center drills to ensure efficiency of City staff and coordination of resources and information.
Anderson Goal WDF-4	**Enhance wildfire hazard mitigation coordination and communication with federal, state, local and tribal governments.**
Objective WDF-4.A	Participate in initiatives that have mutual hazard mitigation benefits for the City, county, state, tribal and federal governments.
Objective WDF-4.B	Continuously improve the City's capability and efficiency at administering pre- and post-disaster wildfire mitigation.
Anderson Goal WDF-5	**Reduce the possibility of damage and losses to existing assets, particularly people, critical facilities/infrastructure, and City-owned facilities.**
Objective WDF-5.A	Enhance citizen and City department understanding of wildfire threats and private property mitigation techniques through education and outreach.
Objective WDF-5.B	Protect existing assets with the highest relative vulnerability to the effects of structural wildfire.

5.4.2.3 Prioritization and Implementation of Action Items

Once the comprehensive list of Jurisdictional goals and objectives listed above was developed, the proposed mitigation actions were prioritized. This step resulted in a list of acceptable and realistic actions that address the hazards identified. This prioritized list of action items was formed by the SC weighing STAPLE/E criteria.

The DMA 2000 (at 44 CFR Parts 201 and 206) requires the development of an action plan that not only includes prioritized actions but one that includes information on how the prioritized actions will be implemented. For each of the strategies developed, the goal and objective(s) addressed are listed. In addition, the description of each measure also includes a priority level, coordinating individual or organization and department, implementation strategy, implementation timeline, cost effectiveness, and potential funding sources. A description of each of these measures is included below:

Priority: For each mitigation measure a priority level of *Very High, High, Medium*, or *Low* has been assigned. These priority levels have been developed based on input from Committee members, the overall planning consideration of the hazard as assigned in the hazard identification section of this document, the anticipated benefit-cost ratio and consideration of the STAPLE/E criteria.

Coordinating Individual/Organization: The coordinating individual/organization listed for each alternative is tasked with the lead role in all aspects of the implementation of this measure. However, many of the measures identified will require effort and support from other departments. This department is expected to coordinate the efforts of all local departments as well as with additional regional, state and federal entities that may be involved.

Implementation Strategy: The implementation strategy developed for each measure includes a general description of potential methods that could be utilized or actions that could be taken. Due to the complex nature of a number of these measures, not all of the listed methods will ultimately prove feasible. Before initiating the implementation of each measure, the responsible department should develop a detailed project plan with particular attention to technical feasibility and cost effectiveness.

Implementation Timeline: The implementation timeline describes the length of time, beginning from the date of plan adoption, when the mitigation measure has been targeted for completion. Timelines listed are goals and can be influenced by many additional factors. Through the development of detailed project plans by the lead agencies, the timeline will be evaluated and revised when necessary.

Cost Effectiveness: For each measure a general discussion comparing potential benefits and costs is provided. For many of the projects, cost effectiveness is unknown. It should be noted that this discussion is not intended to replace a benefit cost analysis that should be completed prior to implementation.

Potential Funding Sources: For each mitigation measure, potential funding sources are listed. Whenever possible, non-local sources of funding have been identified, including state and federal grants. The

sources listed are not intended to represent all possible options, as additional opportunities for funding may be identified during implementation.

All of the strategies identified in the remainder of this section are summarized in a table entitled Anderson Mitigation Implementation Strategy Tracking Table, which can be found in Appendix 5.B. The prioritized mitigation actions as well as an implementation strategy for each are numbered by heading as follows:

- Flood (FLD)
- Hazardous Materials (HM)
- Extreme Weather (EW)
- Earthquake (EQ)
- Wildfire (WDF)

Proposed mitigation actions or strategies are listed and prioritized as follows in Table.

Table 30. 2015 Proposed Mitigation Action Items – City of Anderson

Action Item #	Description/Cost Effectiveness	Goal/Objective	Lead Agency	Timeline	Potential Funding Sources	Priority
Adm.	**Maintain Updated Multi-Jurisdictional Hazard Mitigation Plan.** DMA 2000 intends for hazard mitigation plans to remain relevant and current. Local hazard mitigation plans must be updated every five years. This means that the SCHMP will use a five-year planning horizon. It is designed to carry the Jurisdictions through the next five years, after which its assumptions, goals and objectives will be revisited and the Plan resubmitted for approval.	All	Public Works	2020	FEMA	High
FLOOD (FLD)						
FLD-1	**Increase participation in floodplain re-mapping initiative**. Coordinate with neighboring cities and the county to identify mapping needs to promote flood mitigation on a watershed basis (after DFIRM production). Implementation Strategy: Use DWR Stream Prioritization Methodology to identify high priority streams for detailed analysis studies (after DFIRM production). Provide a detailed needs assessment to FEMA Region IX. Identify local cost share. Cost Effectiveness: FEMA Research defends that the benefits of better flood mapping data at a national level exceed the costs. From the perspective of increased NFIP participation and awareness of flood hazards, benefits would increase.	FLD-1.A-C FLD-2.A-D FLD-3.A-D FLD-4.A/C/F FLD-5.A-H	Public Works	TBD	DHS FEMA	Very High
FLD-2	**Floodplain Management and Flood Mitigation Education and Outreach.** Mitigating potential flood losses within the City of Anderson through property acquisition and demolition is not feasible, as these properties are some of the most expensive and most desirable properties in the city. Less extensive retrofits may be an alternative; however, the view-shed restrictions and the political implications of providing grant assistance to this type of property is unlikely. For these reasons, Anderson has developed multiple outreach and education strategies to encourage self- responsible actions in these areas and other flood prone areas in general. The education and outreach programs target a variety of audiences to not only encourage retrofit and flood loss reduction activities but to encourage flood resistant future development. Cost Effectiveness: Although it cannot be proven that this strategy will reduce the levels of damages due to flood events, it will likely reduce the significant economic impact to the community immediately following a flood.	FLD-1.A-C FLD-2.A-D FLD-3.A-D FLD-4.A/C-D/F FLD-5.A-H	Public Works	Ongoing	DHS FEMA	Very High
FLD-3	**Enhance Floodplain Management Ordinance.** Modify Floodplain Management Ordinance to include a cumulative substantial improvement provision and clarification of the use of replacement cost minus depreciation in making substantial improvement determinations. Cost Effectiveness: TBD	FLD-1.A-C FLD-2.A-D FLD-3.A-D FLD-4.A/C/F FLD-5.A-H	Flood Control and Water District	Ongoing	TBD	Very High

FLD-4	**Adding Community Volunteers to Creek Cleanup Committees.** Publish annual notice for volunteers in the local paper, Public Works website and Channel 11 Government Access television station. Recruit individuals from high risk areas, if necessary. Hold kick-off/educational meetings to organize cleanup. Cost Effectiveness: TBD	FLD-2.A-D FLD-4.A-C FLD-5.B	Public Works, Flood Control, WSRCD	Ongoing	TBD	Very High
FLD-5	**Tormey Drain**. Clean Tormey Drain of excess organic material to improve storm water flow. Cost Effectiveness: TBD	FLD-4.A FLD-4.F	Public Works	Ongoing	Drainage Impact Fees	Very High
FLD-6	**Build a new police station**. Build a new police station for the City of Anderson Police Department within the next 10-15 years with an improved ability to serve as a command center in the case of a flood or other hazard emergency. Within the next five (5) years: accomplish planning, hire architect for design work, obtain property, or begin process of obtaining property, for the new building. Years 6 through 15: Begin and finish construction of new police department building. Move police department from current building into new building. Cost Effectiveness: The costs associated with developing a new police station are justified by the benefits of increased security and space for emergency personnel manning a command center during a hazard event such as a flood.	FLD-4.A FLD-4.D FLD-4.G FLD-5.C	City	As funding is available	TBD	Medium
FLD-7	**ACID Aqueduct at South Street**. Develop mitigation plan for ACID Aqueduct at South Street. Cost Effectiveness: The ACID Aqueduct near South Street in the City of Anderson exhibits excessive expansion and contraction relative to temperature causing seepage which affects South Street. Also, due to the age and condition of the aqueduct this structure is likely to fail affecting the integrity of South Street and disrupting public use and safety while utilizing South Street. In order to decrease the vulnerability of the public and the integrity of South Street a mitigation plan must first be developed.	FLD-2.A FLD-2.B FLD-3.A FLD-4.D FLD-5.C	City ACID	As funding is available	Water use	High
FLD-8	**VEGETATION MANAGEMENT IN CREEKS.** Reduce area flooding problems by removing excess vegetation where appropriate. This may also improve habitat for anadromous fish. Vegetation removed will include non-native and invasive species. Implementation Strategy: Coordinate with community members to organize a vegetation reduction and permitting. Hold public meetings to educate on importance of property maintenance and reducing flood risk.	FLD-2.A/B/E/F FLD-3.B/C FLD-4.A-F	WSRCD	Ongoing	Benefit Assessment Fees; FEMA; California State Water Resources Control Board; California Dept. of Water Resources; U.S. Environmental Protection Agency; U.S Fish and Wildlife Services; California Dept of Fish and Wildlife; National Fish and	High

					Wildlife Foundation.	
FLD-9	**CONSTRUCT RETENTION PONDS TO REDUCE FLOODING.** Flooding can be reduced through the construction of retention ponds to collect surface water. Retention ponds can be utilized as a secondary reservoir for surface water and to recharge groundwater. Implementation Strategy: Develop plans for construction and acquire permits. Monitor water flow of streams prior to and after construction to compare water flows. Maintain or restore water structure, as needed.	FLD-1.A-D FLD-2.A/B/E/F FLD-3.A-D/F/G FLD-4.A/C-G	WSRCD PW	Ongoing	Benefit Assessment Fees; FEMA; California State Water Resources Control Board; California Dept. of Water Resources; U.S. Environmental Protection Agency; U.S Fish and Wildlife Services; California Dept of Fish and Wildlife; National Fish and Wildlife Foundation	High
FLD-10	**CONDUCT FLOW MONITORING AND HYDROLOGICAL MODELING OF WATERWAYS.** Stream flow monitoring and hydrological modeling should be conducted to better understand the dynamics of watersheds. Install, operate and monitor stream gauge stations in waterways around Anderson. Data collected can be used in flood risk mitigation planning. Implementation Strategy: Develop plan for construction and acquire permits for new facilities, if necessary. Install stream gauges and conduct on-going surveys along waterways. Analyze and present or publish findings of data collected.	FLD-1.A FLD-2.A-F FLD-3.C FLD-4.A/B/F	DWR WSRCD PW	Ongoing	Benefit Assessment Fees; FEMA; California State Water Resources Control Board; California Dept. of Water Resources; U.S. Environmental Protection Agency; U.S Fish and Wildlife Services; California Dept of Fish and Wildlife; National Fish and Wildlife Foundation	Medium

HAZARDOUS MATERIALS (HM)						
HM-1	**BIOHAZARD DETECTION SYSTEM DRILLS**. Participate in any Biohazard Detection System drills held by Shasta County that includes local, state and federal agencies. Cost Effectiveness: Biohazard detection system drills ensures that local, state and federal agencies are prepared in case of a biohazard emergency.	HM-3.A HM-3.B HM-4.A HM-4.C HM-5.B	Public Works	As funding is available	FEMA Cal OES	High
EXTREME WEATHER (EW)						
EW-2	**EXTREME HEAT COOLING CENTERS.** Coordinate with local emergency response and public safety entities to hold cooling centers for those affecting by extreme heat conditions. Cost Effectiveness: Updating plan will provide better safety for Anderson residents by ensuring the Shasta County HHSA-Public Health is prepared to provide residents extreme heat assistance when needed.	EW-1. A EW-2. A EW-3. A EW-3. D-G EW-4. B		As funding is available	Shasta County Public Health (HHSA)	High
EARTHQUAKE (EQ)						
EQ-1	**PREVENT UNPLANNED BRIDGE CLOSURES.** Reduce the threat of unplanned bridge closures by strengthening and/or repairing components to withstand a creditable seismic event as listed on the Caltrans Office of Structure Maintenance and Investigations report. Cost Effectiveness: To be determined	EQ-3. A EQ-5. A EQ-5.C	Caltrans	Ongoing	FEMA; Caltrans; DOT	Low
WILDFIRE (WDF)						
WDF-5	**ANDERSON COMMUNITY WILDFIRE PROTECTION PLAN (CWPP).** The CWPP addresses issues such as wildfire response, hazard mitigation, community preparedness, or structure protection-or all of the above. The process of developing a CWPP can help Anderson clarify and refine its priorities for the protection of life, property, and critical infrastructure in the wildland-urban interface. The CWPP should be updated every five years.	WDF-1.C WDF-2. A-C WDF-3. A-C WDF-4. A-B WDF-5. A	Anderson Fire Protection District	Every 5 years	SRA Fire Prevention Fund	High

SECTION 6
PLAN MAINTENANCE PROCEDURES

This section of the Plan describes the formal process that will ensure that the Plan remains an active and relevant document. It contains the following subsections:

6.0 INTRODUCTION
6.1 MONITORING, EVALUATING AND UPDATING THE PLAN
- **6.1.1 PLAN MONITORING**
- **6.1.2 PLAN EVALUATION**
- **6.1.3 PLAN UPDATES**
- **6.1.4 REPORTING PROCEDURES**
- **6.1.5 IMPLEMENTATION OF EXISTING PROGRAMS**

6.2 CONTINUED PUBLIC INVOLVEMENT

DMA 2000 PLANNING REQUIREMENTS
REQUIREMENT §201.6(c)(4) (i)(ii)(iii) A plan maintenance process that includes: (i) A section describing the method and schedule of monitoring, evaluating and updating the mitigation plan within a five-year cycle. (ii) 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. (iii) Discussion on how the community will continue public participation in the plan maintenance process.

6.0 INTRODUCTION

This section of the Plan describes the formal process that will ensure that the Plan remains an active and relevant document. This section includes a schedule for monitoring and evaluating the Plan and revising the Plan every five years. It describes how the Jurisdictions will receive public input throughout the process. Finally, this section explains how the Jurisdictions will transform the mitigation strategies outlined in this Plan into existing planning mechanisms such as the General Plans, Capital Improvement Plans, development regulations and other documents.

6.1 MONITORING, EVALUATING AND ENHANCEMENT

6.1.1 Plan Monitoring

Shasta County Public Works, City of Anderson Public Works and the Committee participants will periodically review the Jurisdictional goals, objectives and action items listed in the Plan. The mitigation strategies matrix, included in the appendices, will be used to evaluate project status and to update such items as time-line, funding source and responsible entity. The Shasta County Public Works, City of Anderson Public Works and the Committee participants will be responsible for updating the Plan accordingly, on a five-year cycle, described below. A memorandum describing needed changes, and progress on implementation, will be provided annually to CAL OES and FEMA Region IX.

6.1.2 Plan Evaluation

Shasta County Public Works, City of Anderson Public Works and the Committee participants will organize a more comprehensive review of the Plan approximately three years after Plan adoption by convening the initial steering Committee and inviting other agencies and the public to attend. The coordinating organizations responsible for the various action items will report on the status of their projects, the success of various implementation processes, difficulties encountered and success of coordination efforts. The Committee will review the content of the Plan using the following questions:

- Are these programs effective?
- Have there been any changes in land development that affect the mitigation priorities?
- Do the goals, objectives and action items meet STAPLE/E criteria?
- Are the goals, objectives and action items relevant, given any changes in our Jurisdictions?
- Are the goals, objectives and action items relevant given any changes to state or federal regulations and policy?
- Is there any new data that affects the risk assessment portion of the Plan?

Any resulting updates or changes will be amended into the Plan. The HMPC will be responsible for making the changes and will provide the updates via a memorandum as described above and will keep files of changes needed for the five-year re-submittal described below in subsection 6.1.3.

6.1.3 Plan Updates

Shasta County Public Works, City of Anderson Public Works and the Committee participants will be responsible for making updates to the Plan, but the Committee participants are responsible for the content of the updates. The Plan should be submitted for review to CAL OES and FEMA every five years.

The Plan update should include:

- Status of recommended mitigation actions.
- Identification of barriers or obstacles to successful implementation or completion of mitigation actions, along with possible solutions for overcoming risk.
- Documentation of annual reviews and Committee involvement.
- Identification of a lead person to take ownership of, or champion the Plan.
- Reducing risks from natural hazards and serving as a guide for decision makers as they commit resources to reducing the effects of natural hazards.
- An approach to evaluating future conditions (i.e. socio-economic, environmental, demographic, change in built environment, etc.).
- Discussion on how changing conditions and opportunities could impact community resilience in the long term.

- Discussion of how the mitigation goals and actions support the long-term community vision for increased resilience.

Following the five-year review, any revisions deemed necessary will be summarized and implemented according to the reporting procedures outlined below. Upon completion of the review and update process, the SCHMP will be submitted to the State Hazard Mitigation Officer at Cal OES for final review and approval in coordination with FEMA.

6.1.4 Reporting Procedures

The results of the five-year plan review will be summarized by the Committee in the relevant sections of the updated plan. This includes:

- Any updates to the planning area profile (Section 2).
- Comprehensive descriptions of the Plan update process, including an evaluation of plan effectiveness (Section 3).
- Status updates on previously adopted mitigation action plans (including the identification of reasons for delays or obstacles to their implementation) (Section 3).
- Any notable revisions or updates the risk assessment or capability assessment (Section 4).
- Updated mitigation goals and consideration of mitigation action alternatives (Section 5).
- Identification of newly proposed mitigation actions (Section 5).
- Any revisions or updates to plan maintenance procedures (Section 6).

Any necessary revisions or changes to the SCHMP elements must follow the monitoring, evaluation and enhancement procedures outlined herein.

6.1.5 Implementation through Existing Programs

The updated plan must be incorporated into other planning mechanisms as a demonstration in local hazard mitigation efforts.

The participants and local agencies can use the Plan as a baseline of information on the natural hazards that impact their jurisdictions. Section 5 of the Plan should provide a reference to each Jurisdiction's existing institutions, plans, policies and ordinances. This will make it easier for the Jurisdictions to implement their action items through existing programs and procedures. How this will be accomplished is addressed in Section 5.0 of the Plan.

Each jurisdiction participating in this Plan is responsible for implementing specific mitigation actions. Every proposed action is assigned to a specific local department or agency in order to assign responsibility and accountability and increase the likelihood of subsequent implementation. This approach enables individual jurisdictions to update their own unique mitigation action list as needed without altering the broader focus of the county level Plan. The separate adoption of locally specific actions also ensures that each jurisdiction is not held responsible for the monitoring and implementation of actions belonging to other jurisdictions involved in the planning process. In addition

to the assignment of a local lead department or agency, an implementation time period or a specific implementation date or window has been assigned to each mitigation action to help assess whether actions are being implemented in a timely fashion. The jurisdictions present within Shasta County will seek outside funding sources to implement mitigation projects in both the redisaster and post-disaster environments. It will be the responsibility of each participating jurisdiction to determine additional implementation procedures beyond those listed within the mitigation action items. This includes integrating the requirements of the SCHMP into other local planning documents, processes or mechanisms such as general plans or capital improvement plans, when appropriate.

The members of the Committee will remain charged with ensuring that the goals and strategies of new and updated local planning documents for their jurisdictions or agencies are consistent with the goals and actions of the SCHMP, and will not contribute to increased hazard vulnerability in Shasta County. Opportunities to integrate the requirements of this Plan into other local planning mechanisms shall continue to be identified through future meetings of the Committee and through the fiveyear review process described herein. Although it is recognized that there are many possible benefits to integrating components of this Plan into other local planning mechanisms, the development and maintenance of this stand-alone SCHMP is deemed by the Committee to be the most effective and appropriate method to implement local hazard mitigation actions at this time.

6.1.5.1 Existing Plans Referring to the SCHMP

The Shasta County Department of Resource Management – Planning Division is in the process of updating the Shasta County General Plan. A General Plan is an official document adopted by a county or city which sets forth the general, long-range policies regarding how the community's future development should occur. A General Plan primarily addresses the use of the privately and publicly owned land resources located within the government's jurisdiction. A General Plan is not a detailed, parcel-specific policy statement. Instead, it establishes a generalized pattern of future land use which provides the basis for more detailed plans.

The Public Safety Group encompasses General Plan elements concerned with aspects of Shasta County's natural and man-made environment which pose potential threats to human life or property. The individual elements contained in the Public Safety Group are listed below:

- Seismic and Geologic Hazards
- Flood Protection
- Dam Inundation
- Fire Safety and Sheriff Protection
- Noise
- Hazardous Materials

These elements are grouped together because collectively they define basic constraints on land use that will affect community development patterns. They are presented first because an understanding of their limitations is essential to formulating a development pattern which adequately provides for human safety. The SCHMP will be utilized in this update.

The **Shasta County Hazardous Materials Area Plan –** May 2013 , establishes the policies, responsibilities and procedures required to protect the health and safety of Shasta County's citizens, the environment and public and private property from the effects of hazardous materials emergency incidents. It establishes the emergency response organization for hazardous materials incidents occurring within Shasta County, including the cities of Redding, Anderson and Shasta Lake. This Plan documents the operational and general response procedures for the Shasta-Cascade Hazardous Materials Response Team (SCHMRT), which is the primary hazardous materials response group for Shasta County.

The **Forest and Water Climate Adaptation: A Plan for Shasta County California** – January 2013 (Western Shasta Resource Conservation District) was written to educate the community about the local issues involved in global climate change, discuss adaptation actions, elicit support for collaborative action from agencies and local organizations, and act as a guide for taking action. References from the SCHMP were used under flood issues (Page 51).

The California Department of Water Resources' report, **California's Flood Future: Recommendations for Managing the State's Flood Risk**, developed in partnership with the U.S. Army Corps of Engineers, is a comprehensive look at flooding throughout the State and makes recommendations for future actions to reduce flood risk.

The Upper Sacramento, McCloud and Lower Pit watersheds have collaborated on the development of an **Integrated Regional Water Management Plan (IRWMP).** The IRWMP is a comprehensive, non-regulatory planning document that identifies critical issues and needs and broadly-supported objectives pertaining to management of water resources. The IRWMP also includes projects brought forward by stakeholders to address regional issues including water supply, water quality, forest management, tribal water resource interests, ecological health, and education and outreach, among others.

6.2 CONTINUED PUBLIC INVOLVEMENT

The public should be directly involved in reviewing and updating the Plan. The HMPC will solicit feedback from the public during monitoring, evaluating and updating the Plan as described above.

A copy of the Plan will be publicized and available for review on the Jurisdictions websites, and additional copies of the plan will be catalogued and kept at appropriate agencies in the Jurisdictions. The existence and location of these copies will also be posted on the webpage. The site will contain contact information for the HMPC to which the public can direct their comments and concerns. All public feedback will be forwarded for review to the HMPC for documentation.

A maintained copy of the Plan will reside on the County of Shasta website, on a webpage dedicated to hazard mitigation. The annual and biennial status memorandums will also be posted on the site.

During the five-year update cycle, the HMPC will issue a press release requesting public comments either immediately after each evaluation, or prior to the evaluation, as appropriate. The press release will direct people to the updated version of the Plan, both on the website and in hardcopy. The HMPC will be responsible for using county resources to publicize the press releases and maintain public involvement through public access channels, web pages and newspapers. In addition to these activities, many of the education and outreach activities described in Section 5.0 will contribute to continued public involvement in the Plan implementation process. Approximately three years after Plan adoption, the HMPC will conduct a review of the Plan to determine changes in development, progress in local mitigation efforts and changes in priorities. The results of this review will be utilized to prepare an updated Plan.

APPENDIX A

ADDITIONAL FEDERAL AND STATE REQUIREMENTS

Environmental compliance and historic preservation are essential components of the mitigation project planning, approval and implementation process. The following is a listing of some federal laws, state laws and executive orders that may apply to the proposed or future mitigation actions in this HMP.

California Environmental Quality Act (CEQA)
Clean Water Act (Section 401)
Clean Water Act (Section 404)
Endangered Species Act
Executive Order 1190 Wetland Protection
Executive Order 11988 Floodplain Management
Executive Order 12898 Environmental Justice
National Environmental Policy Act (NEPA)
National Historic Preservation Act
Wild and Scenic Rivers Act

Federal and State Requirements Resources

Institution, Organization, or Agency Website	Website
Federal Emergency Management Agency	www.fema.gov
Environmental Protection Agency	www.epa.gov
U.S. Fire Administration	www.usfa.fema.gov
National Fire Protection Association	www.nfpa.org
U.S. Army Corps of Engineers	www.usace.army.mil
U.S. Geological Survey	www.usgs.gov
U.S. Department of Agriculture Natural Resources Conservation Service	www.nrcs.usda.gov
ESRI/FEMA Hazards Awareness Site	www.esri.com/hazards
California Department of Fish and Game	www.dfg.ca.gov
California Law	www.leginfo.ca.gov
California Governor's Office of Planning and Research	www.opr.ca.gov
California Governor's Office of Emergency Services	www.oes.ca.gov
California Department of Water Resources	www.dwr.ca.gov
California Department of Forestry-Fire and Resource Assessment Program	http://frap.cdf.ca.gov

This page intentionally left blank.

APPENDIX B - REFERENCES

1. American Red Cross, "Disaster Response Plan, Shasta, Trinity, Lassen, Tehama, and Modoc Counties, Shasta Area Chapter" June 2004
2. California Department of Forestry and Fire Protection, "Red Sheet Fire Safety Briefing for the Shasta-Trinity Unit" June 1, 2004
3. California Department of Forestry and Fire Protection, Shasta-Trinity Unit, "2004 Fire Plan"
4. California Department of Forestry and Fire Protection, Wildland Fire Threat Locations, 2003
5. California Geological Survey, "The Revised 2002 California Probabilistic Seismic Hazard Maps," June 2003. Maps and report located at: http://www.conservation.ca.gov/CGS/rghm/psha/Pages/Index.aspx
6. California State Governor's Office of Emergency Services, Historical Fire Locations, 1997
7. California State Governor's Office of Emergency Services, California Proclaimed State of Emergency by County, 2003
8. California State Governor's Office of Emergency Services, California Proclaimed Flooding State of Emergency by County, 2004
9. City of Shasta Lake, Areas of Repetitive Flooding Outlined on a Base Map, August 2004
10. City of Shasta Lake, "City of Shasta Lake Emergency Plan," 1999
11. City of Shasta Lake, "City of Shasta Lake General Plan and Final Environmental Impact Report," June 15, 1999
12. Department of Water Resources, Division of Safety of Dams, Inspection of Dam and Reservoir Certified Status, Reclaimed Water Reservoir, Dam No. 2039, March 1, 2002.
13. Federal Emergency Management Agency, Critical Facility and Road Base Information, HAZUS 99, 1999
14. Federal Emergency Management Agency, Hazards Web Page, http://www.fema.gov/hazards/, 2004
15. Federal Register Notices, Vol. 66, No. 3, Thursday, January 4, 2001
16. National Drought Mitigation Center, University of Nebraska, Lincoln, Nebraska, 2004
17. National Oceanic and Atmospheric Administration, Drought Conditions, 2004
18. National Oceanic and Atmospheric Administration, Precipitation Levels, Maximum Temperatures, and Average Temperatures, 2003
19. Shasta County Environmental Health Hazardous Materials Management, "Hazardous Materials Business Plan for City of Shasta Lake Water Treatment Plant," April 27, 2004
20. Shasta County Environmental Health Hazardous Materials Management, "Hazardous Materials Business Plan for City of Shasta Lake Corporate Yard and Central Valley Substation," April 27, 2004
21. Shasta County Environmental Health Hazardous Materials Management, "Hazardous Materials Business Plan for City of Shasta Lake Wastewater Treatment Plant," April 27, 2004
22. Shasta County Environmental Health Hazardous Materials Management, "Hazardous Materials Business Plan for City of Shasta Lake Knauf Substation," April 27, 2004
23. Shasta County Environmental Health Hazardous Materials Management, "Hazardous Materials Business Plan for City of Shasta Lake Flanagan Substation," April 27, 2004
24. Shasta County Environmental Health Hazardous Materials Management, "Hazardous Materials Business Plan for City of Shasta Lake Sewer Pump Station No. 4," April 27, 2004

25. Shasta County Environmental Health Hazardous Materials Management, “Hazardous Materials Business Plan for City of Shasta Lake Sewer Pump Station No. 3,” April 27, 2004
26. Shasta County Environmental Health Hazardous Materials Management, “Hazardous Materials Business Plan for City of Shasta Lake Relief Pump Station,” April 27, 2004
27. Shasta Lake Municipal Code, Floodplain Management Ordinance, Chapter 15, Article I-VI
28. State Emergency Management System Guidelines, OES website, 1994 http://www.oes.ca.gov
29. U.S. Census Bureau, Population Density Data, 2000
30. U.S. Census Bureau, Residential Density Data, 2000
31. U.S. Geological Survey, “An Assessment of Volcanic Threat and Monitoring Capabilities in the United States: Framework for a National Volcano Early Warning System,” April 2005
32. U.S. Geological Survey, “Historic Volcanic Eruptions in the United States, Volcano Hazards Program,” 2004 http://volcanoes.usgs.gov
33. U.S. Geological Survey, West Nile Virus Maps, 2004 http://westnilemaps.usgs.gov/index.html
34. PG&E presented before the Public Utilities Commission of the State of California, “Interim Opinion on Storm and Reliability Issues,” 2004
35. California ISO “Cumulative Totals of Restricted Maintenance Operations, Alert, Warning, Emergency, and Flex Alert Notices Issued from 1998 to 2010,” Revised 4-5-2010
36. California Emergency Medical Services Authority, “State of California Mass Prophylaxis Planning Guide,” 2003
37. Wood Rogers Engineering, “City of Shasta Lake & Shasta Lake Fire Protection District Local Hazard Mitigation Plan,” 2005
38. FEMA Local Mitigation Plan Review Guide – October 2011
39. FEMA State and Local Mitigation Planning How To Guide – August 2003
40. Shasta County and City of Anderson Multi-Jurisdictional Hazard Mitigation Plan – September 2011
41. CAL FIRE Top 20 Most Damaging California Wildfires – September 2015 retrieved from http://www.fire.ca.gov/communications/downloads/fact_sheets/Top20_Damaging.pdf
42. Retrieved from California.gov http://ca.gov/drought
43. The California Water Plan Update 2013 retrieved from http://www.waterplan.water.ca.gov/cwpu2013
44. Shasta County Hazardous Materials Area Plan – May 2013 retrieved from http://www.co.shasta.ca.us/docs/Resource_Management/ehd-docs/areaplan.pdf?sfvrsn=0
45. Shasta County Crop and Livestock Report 2014
46. California Department of Water Resources retrieved from http://www.water.ca.gov/waterconditions/declaration.cfm http://www.water.ca.gov/climatechange
47. Retrieved from U.S. Census Bureau - http://www.census.gov
48. Retrieved from FEMA https://www.fema.gov/hazard-mitigation-planning

Appendix 1

SHASTA COUNTY RESOLUTION ADOPTING THE MULTI-JURISDICTIONAL HAZARD MITIGATION PLAN

RESOLUTION NO. 2017-101

A RESOLUTION OF THE BOARD OF SUPERVISORS OF THE COUNTY OF SHASTA ADOPTING THE SHASTA COUNTY AND CITY OF ANDERSON MULTI-JURISDICTIONAL HAZARD MITIGATION PLAN

WHEREAS, the County of Shasta and City of Anderson have historically experienced severe damage, property loss, economic injury, personal injury, loss of life and threats to public safety from natural and man-made hazards;

WHEREAS, the County of Shasta and City of Anderson jointly developed a Multi-Jurisdictional Hazard Mitigation Plan which recommends actions to protect both people and property; and

WHEREAS, public meetings were held to develop and review the Multi-Jurisdictional Hazard Mitigation Plan as required by law.

NOW, THEREFORE, BE IT RESOLVED that the Board of Supervisors of the County of Shasta:

1. Adopts this Multi-Jurisdictional Hazard Mitigation Plan as an official plan of the County;
2. Directs the respective County Officials identified in the Hazard Mitigation Plan to implement the actions assigned to them; and
3. Directs periodic reporting of the status of Plan Implementation as required by law.

DULY PASSED AND ADOPTED this 7th day of November, 2017 by the Board of Supervisors of the County of Shasta by the following vote:

AYES:	Supervisors Moty, Rickert, Morgan, Baugh, and Kehoe
NOES:	None
ABSENT:	None
ABSTAIN:	None
RECUSE:	None

David A. Kehoe

DAVID A. KEHOE, CHAIRMAN
Board of Supervisors
County of Shasta
State of California

ATTEST:

LAWRENCE G. LEES
Clerk of the Board of Supervisors

By: Candace Mallar
Deputy

THIS INSTRUMENT IS A CORRECT COPY OF THE ORIGINAL ON FILE IN THIS OFFICE

ATTEST NOV 09 2017

CLERK OF THE BOARD
Supervisors of the County of Shasta, State of California
BY: Candace Mallar

Appendix 2

CITY OF ANDERSON RESOLUTION ADOPTING THE MULTI-JURISDICTIONAL HAZARD MITIGATION PLAN

RESOLUTION NO. 17-45

A RESOLUTION OF THE CITY COUNCIL OF THE CITY OF ANDERSON ADOPTING THE SHASTA COUNTY AND CITY OF ANDERSON MULTI-JURISDICTIONAL HAZARD MITIGATION PLAN

WHEREAS, the City of Anderson has historically experienced property damage, economic injury, personal injury, and threats to public safety from natural and manmade hazards; and

WHEREAS, in 2012 the County of Shasta and the City of Anderson jointly developed a Multi-Jurisdictional Hazard Mitigation Plan which recommends actions to protect both people and property; and

WHEREAS, the County of Shasta and the City of Anderson have both reviewed and updated the Multi-Jurisdictional Hazard Mitigation Plan; and

NOW, THEREFORE, BE IT RESOLVED that the City Council of the City of Anderson:

1. Adopts this revised Multi-Jurisdictional Hazard Mitigation Plan as an official plan for Anderson.

2. Directs the respective City Officials identified in the Plan to implement the actions assigned to them.

3. Directs periodic reporting of the status of Plan Implementation as required by law.

PASSED AND ADOPTED by the City Council of the City of Anderson this 7th day of November, 2017, by the following vote:

AYES: Councilmembers Hunt, Comnick, Baugh, Neutze, and Mayor Browning.
NOES: None.
ABSTAIN: None.
ABSENT: None.

Baron Browning, Mayor

ATTEST:

Juanita Barnett, City Clerk

Appendix 3.A

2010 STEERING COMMITTEE/ PUBLIC MEETING INFORMATION

Shasta County Hazard Mitigation Plan
Steering Committee Meeting Agenda
April 1, 2010
Redding Library community room A, 10am-12pm

Introductions (Shasta Co)

Authorities and references (CalEMA)

Benefits of developing the Hazard Mitigation Plan (CalEMA)

Role of the Steering Committee (Shasta co)

Planning elements (Shasta/Steinmetz Assoc)
Volcano, flood, fire, etc.

Hazard identification and risk assessment (Steinmetz Assoc)
Existing plans, HAZUZ-MH run

Goals and objectives of the plan (Shasta/Steinmetz Assoc)

Next Steps - Project work plan and schedule (Steinmetz Assoc)

Review process (Shasta Co/CalEMA)

- Board of Supervisors Public comment
- State (Cal EMA) review begins
- FEMA review begins
- Board of Supervisors public comment document adoption

Next steering committee meetings (Shasta Co)

- May 6
- June 3

Questions:

Public meetings?
Website?
How many meetings of steering committee?

HMP Steering Committee meeting notes — April 1, 2010

This first meeting of the steering committee began with introductions! We were fortunate to have Jami Childress-Byers from CalEMA in attendance to discuss FEMA requirements of a plan.

Jami went over the requirement to have a hazard mitigation plan (HMP) and the benefits of it. She said to put all your projects in the plan, but you can amend them into it at a later date. She said that with a HMP you can get 100% of the 25% FEMA normally pays for emergency and other projects.

Jan mentioned that the steering committee, made up of different disciplines in the county, has been assembled to assure that all the needs, concerns, and actions taken are heard, accurate, and included in the plan.

Pat went over the hazards considered in this analysis and the need to identify which are particular to this region and the need to assess the inherent risk of each. This can be accomplished by utilizing existing plans and the HAZUS-MH program. Pat also discussed the goals and objectives of the plan using a powerpoint he prepared.

Several tidbits of info came up: land use and development plans, questionnaire for business impact analysis in mid April, EAP's for small dam owners, DWR maps, building codes. Pat ended the session with a request for comments on the goals and objectives.

Pat and Jami talked about the review process, Jami emphasizing the need to allow time for review and to definitely get the Board of Supervisors resolution adopting the document when it is complete.

The next steps will be to prepare a current schedule and work plan. Next meeting dates are tentatively May 6 and June 3.

Hazard Mitigation Plan Steering Committee
April 1, 2010

NAME	INITIAL	AGENCY	PHONE NUMBER	EMAIL ADDRESS
David Dean		Shasta County Sheriff Department		ddean@co.shasta.ca.us
~~Pat Minturn~~ Troy Bartolomei		Shasta County Department of Public Works	~~225-5110~~, 245-6823	~~pminturn@co.shasta.ca.us~~
Jim Whittle		Shasta County Environmental Health	225-5787	jwhittle@co.shasta.ca.us
Dave Maron		Shasta County Public Health	225-5593	dmaron@co.shasta.ca.us
Brian Babbini		Pit River	335-1118	prttrans@frontiernet.net
		U.S. Forest Service	226-2524	@fs.fed.us
Jeremy Strait		Bureau of Land Management (BLM)	224-2100	jeremy_strait@blm.gov
Capt. Jerry Flavin		CHP-Commander Redding Area Patrol	~~225-2715~~/941-1741	jflavin@chp.ca.gov
Lance Brown		Caltrans		lance_brown@dot.ca.gov
Curtis Anderson		Department of Water Resources (DWR)	529-7348	curtisa@water.ca.gov
Fred Tulley		CalFire	225-2401	fred_tulley@fire.ca.gov
Jami Childress-Byers		CalEMA	916-845-8161	jami.childress-byers@calema.ca.g
Jeff Kiser		City of Anderson	378-6640	dshigley@ci.anderson.ca.us
Julie Hope		shasta co CAO office	225-5260	jhope@co.shasta.ca.us
Michelle Clark		Western Shasta Resource Conservation District	365-7332	michelle@westernshastarcd.org
Dave Demar		Western Shasta Resource Conservation District	365-7332	dave@westernshastarcd.org
Ron Kingsley		Bureau of Reclamation	275-1554	rkingsley@usbr.gov
Lily Toy		City of Redding	225-4020	ltoy@ci.redding.ca.us
John Kaylor		~~Redding Fire~~ ok	225-4573	jkaylor@ci.redding.ca.us
Kevin Kreitman		~~Redding Fire~~	225-4573	kkreitman@ci.redding.ca.us
Dan Little		County of Shasta		dlittle@co.shasta.ca.us
Fred Castagna		City of Shasta Lake		fred.castagna@ci.shasta-lake.ca.u
~~Jeff Tedder~~		~~City of Shasta Lake~~		jeff.tedder@ci.shasta-lake.ca.us
~~Lorna McLeod~~		Western Shasta Resource Conservation District	365-7332	lorna@westernshastarcd.org
Sandy Long		Redding Rancheria	242-4596	sandyl@redding-rancheria.com
Sheryl Harral		US Bureau of Reclamation		sharral@usbr.gov
Clay Guzi	CG			
Pat Steinmetz	JPS			
Todd Burciaga	TB			
KEVIN WESTLAKE				

Table 4: Eligible Activities by Program

Eligible Activities	HMGP	PDM	FMA	RFC	SRL
1. Mitigation Projects	√	√	√	√	√
Property Acquisition and Structure Demolition	√	√	√	√	√
Property Acquisition and Structure Relocation	√	√	√	√	√
Structure Elevation	√	√	√	√	√
Mitigation Reconstruction					√
Dry Floodproofing of Historic Residential Structures	√	√	√	√	√
Dry Floodproofing of Non-residential Structures	√	√	√	√	
Minor Localized Flood Reduction Projects	√	√	√	√	√
Structural Retrofitting of Existing Buildings	√	√			
Non-structural Retrofitting of Existing Buildings and Facilities	√	√			
Safe Room Construction	√	√			
Infrastructure Retrofit	√	√			
Soil Stabilization	√	√			
Wildfire Mitigation	√	√			
Post-Disaster Code Enforcement	√				
5% Initiative Projects	√				
2. Hazard Mitigation Planning	√	√	√		
3. Management Costs	√	√	√	√	√

Additional information regarding eligible projects for HMGP is included in Part VIII A.8 and A.9; for FMA, see Part VIII C.3; for RFC, see Part VIII D.1; and for SRL, see Part VIII E.1.

Costs for eligible activities must be necessary and reasonable as required by 2 CFR Part 225, Cost Principles for State, Local, and Indian Tribal Governments, 44 CFR Part 13.22, applicable program regulations, and this guidance.

The following activities are not eligible as stand-alone activities but are eligible only when included as a functional component of eligible mitigation activities:

- For **HMGP** and **PDM** generators and/or related equipment purchases (e.g., generator hook-ups) when the generator directly relates to the hazards being mitigated and is part of a project (the 5% initiative allows for the stand-alone purchase of generators);
- Real property or easements purchases required for the completion of an eligible mitigation project. For safe room projects, no real property or easement purchase is eligible; and
- Studies that are integral to the development and implementation of a mitigation project, including hydrologic and hydraulic, engineering, or drainage studies.

D.1.1 Mitigation Projects

This section briefly describes the mitigation projects eligible under one or more of the five HMA programs. Table 4 summarizes the eligibility of the following project types for each program:

Sample

RESOLUTION 2005-87

RESOLUTION ADOPTION OF
LOCAL HAZARD MITIGATION PLAN

WHEREAS, the City of Redding having developed a Local Hazard Mitigation Plan meeting the requirements of Section 409 of the Robert T. Stanford Disaster Relief and Emergency Assistance Act of 1988, and Section 322 of the Disaster Mitigation Act of 2000; and

WHEREAS, the City of Redding recognizes the consequences of disasters and the need to reduce impacts of natural and human caused hazards; and

WHEREAS, the toll on families, individuals and businesses can be immense after a disaster, both emotionally and economically; and

WHEREAS, time, money and the emotional effort to respond and recover from these disasters diverting public resources and attention from other important programs and problems;

NOW, THEREFORE, IT IS RESOLVED the City of Redding does hereby adopt the Local Hazard Mitigation Plan.

I HEREBY CERTIFY that the foregoing resolution was introduced, read and adopted at a regular meeting of the City Council on the 19th day of July, 2005, by the following vote:

AYES:	COUNCIL MEMBERS:	Dickerson, Murray, Pohlmeyer, Stegall, and Mathena
NOES:	COUNCIL MEMBERS:	None
ABSENT:	COUNCIL MEMBERS:	None
ABSTAIN:	COUNCIL MEMBERS:	None

JOHN R. MATHENA, Mayor

ATTEST:

Toni Sherman for
CONNIE STROHMAYER, City Clerk

APPROVED AS TO FORM:

RICHARD A. DUVERNAY, City Attorney

Draft Work Plan

Hazard Identification, Analysis and Risk Assessment (June '02 – October '02)

- Project Initiation Meeting
- Public Meeting #1
- Hazard Identification
- Hazard Events Profile
- Community Asset Inventory
- Risk Assessment/Loss Estimation
- Progress and Coordination Meetings

Capability Assessment (June '02 – October '02)

- Plans, Policies, and Programs Examination
- Assessment of Previous Mitigation Activities
- Identification of Resources
- Public Meeting #2
- Progress and Coordination Meetings

Assessment of Alternative Hazard Mitigation Measures and Needs (November '02 – January '03)

- Develop Goals and Objectives
- Research of Mitigation Alternatives
- Progress and Coordination Meeting
- Evaluate the Mitigation Measures
- Mitigation Recommendations
- Public Meeting #3

Development of Implementation Strategy (February '03 – May '03)

- Progress and Coordination Meetings
- Mitigation Action Plan
- Public Meeting #4
- Public Hearing: present the draft Hazard Mitigation Plan
- Final Presentation: elected and appointed officials or other designated forum

Production of Final Plan (March '03 – May '03)

- Draft Plan
- Final Plan
- Adoption of plan by Planning Committee and City Council

Ongoing Activities (ongoing from June '03)

- Plan Evaluation
- Plan Updates
- Incorporate changes into plan

Sample

2.0 ACKNOWLEDGMENTS

Mayor and City Council
John Mathena, Mayor
Dick Dickerson
Ken Murray
Michael Pohlmeyer
Mary Stegall

Hazard Mitigation Project Team
Bruce Becker, Deputy Fire Chief
Lily Toy, Senior Planner
Jim Coats, GIS Manager
Ben Reed, Police Lieutenant
John Duffy, County of Shasta Public Health
Disaster Response Coordinator
Ray Duryee, Public Works Manager
Steve Hiner, Plan Check Engineer
Ray Johnson, Battalion Fire Chief
John Ostrowski, Police Sergeant

City of Redding Staff
Mike Warren, City Manager
Airports
Rod Dinger, Airports Manager
Barry Bratton, Assistant Airports Manager
Development Services Department
Jim Hamilton, Director
Kevin Burke, GIS Analyst
Terri Thesken, Senior Planner
Municipal Utilities
Steve Craig, W/W Utility Manager
Mike Robertson, Water Utility Manager
Redding Electric Utility
Paul Cummings, Electric Program Supervisor
Brian King, Electric Program Manager
Steve Wood, System Analyst/Programmer

Other Contributors
American Red Cross - Shasta Area Chapter

Goals, Objectives and Actions

- ***Goals*** ID and define the hazards and consequences of those hazards that Shasta County will strive to prevent or lessen – Long range
- ***Objectives*** define the strategies that will be employed to achieve goals – Realistic, achievable and measurable.
- ***Actions*** define and specify the means and methods that will be employed in carrying out objectives.
- Capabilities Assessment.

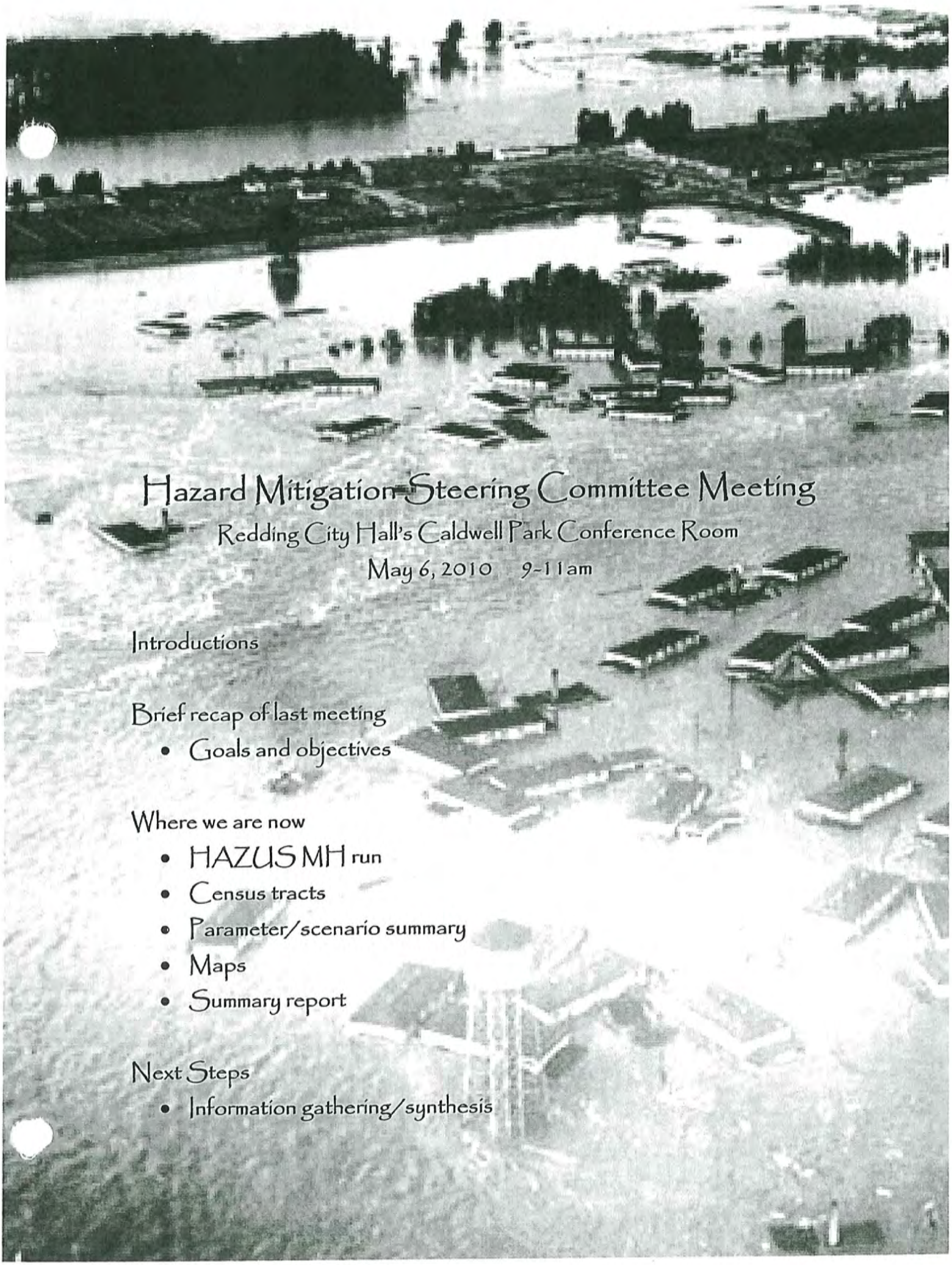
Goals & Objectives

- **GOAL #1 - PROMOTE DISASTER RESISTANT FUTURE DEVELOPMENT.**
- Obj - Facilitate the development or updating of the County General Plan & EOP and zoning ordinances to limit/ensure safe development in hazard areas.
- Obj - Facilitate the adoption of building codes that protect existing assets and restrict new development in hazard areas.

- **GOAL #2 - BUILD AND SUPPORT CAPACITY AND COMMITMENT TO BECOME LESS VULNERABLE TO HAZARDS.**
- Obj - Address identified data limitations regarding the lack of information about new development and build-out potential in hazard areas.
- Obj - Address data limitations identified in Hazard Profiling and Risk Assessment.

- GOAL #3 - REDUCE THE POTENTIAL FOR DAMAGE AND LOSS TO CITIZENRY , PROPERTY, CRITICAL FACILITIES AND ASSETS, ASSOCIATED WITH IDENTIFIED HAZARDS.
- Obj - Decrease the vulnerability of infrastructure.
- Obj - Minimize repetitive losses caused by flooding.
- Obj - Strengthen existing development standards in high fire threat areas.
- Obj - Coordinate with and support existing efforts to mitigate dam failure.

- Obj - Provide dam inundation mapping as information only layer on FEMA DFIRMs and advise developers of lands in inundation areas.
- Obj - Protect floodplains from inappropriate development.



Hazard Mitigation Steering Committee Meeting

Redding City Hall's Caldwell Park Conference Room

May 6, 2010 9-11am

Introductions

Brief recap of last meeting

- Goals and objectives

Where we are now

- HAZUS MH run
- Census tracts
- Parameter/scenario summary
- Maps
- Summary report

Next Steps

- Information gathering/synthesis

may 6 ?

HMP Steering Committee meeting notes **May 12, 2010**

The meeting began with introductions and a recap of our last meeting, which was the first and basically a discussion of member roles and introduction to hazard mitigation planning. Jami from CalEMA was also in attendance at the last meeting and discussed FEMA requirements of a plan.

ENPLAN went over the mapping an analysis of the HAZUS-MH program provided by FEMA. Clay and Todd introduced the concept of census tracts in the analysis of land use, flooding, and other hazards. They handed out a typical Event Report, this one for earthquakes.

Some detail on flooding was discussed, particularly regarding Shasta Dam. Apparently there is some dispute among experts and mapping as to the time period to flood certain areas in the county, ie. 12 minutes to Diestlhorst bridge according to Pat's information.

A good point was made that we should include hazards outside Shasta County, ie. Siskiyou. Also, Dave Demar mentioned a fuel breaks needs analysis, prevailing wind drift is also an issue. (I don't know if I got this right, but the issues are there).

Also, the FEMA flood maps are generated by new software. Ref. Julia Hayes FEMA rep in region 9, 510-627-7211.

Next steps to be taken include information gathering for the HAZUS run and synthesis of the information. This information will be relayed to the committee at the next meeting.

Pat's Presentation May 6 Steering Committee

I. Review ID'd hazards – Ask for additions and deletions, if none, consider these hazards finalized

- Flood
- Fire
- Earthquake
- HazMat
- Severe Storm
- Utility Disruption
- Drought
- CBRNE Chem bio rad nuclear explosion
- Volcanic
- MCI
- Dam Failure
- Pandemic/epidemic

II. Report on progress of hazard identification and data collection.

III. Review goals and objectives, request additional goals and objectives, if none offered, consider these finalized.

Goal #1 - Promote Disaster resistant future development.

- Obj - Facilitate the development or updating of the County General Plan & EOP and zoning ordinances to limit/ensure safe development in hazard areas.
- Obj - Facilitate the adoption of building codes that protect existing assets and restrict new development in hazard areas.

GOAL #2 - Build and support capacity and commitment to become less vulnerable to hazards.

- Obj - Address identified data limitations regarding the lack of information about new development and build-out potential in hazard areas.
- Obj - Address data limitations identified in Hazard Profiling and Risk Assessment.

GOAL #3 - Reduce the potential for damage and loss to citizenry , property, critical facilities and assets, associated with identified hazards.

- Obj - Decrease the vulnerability of infrastructure.
- Obj - Minimize repetitive losses caused by flooding.
- Obj - Strengthen existing development standards in high fire threat areas.

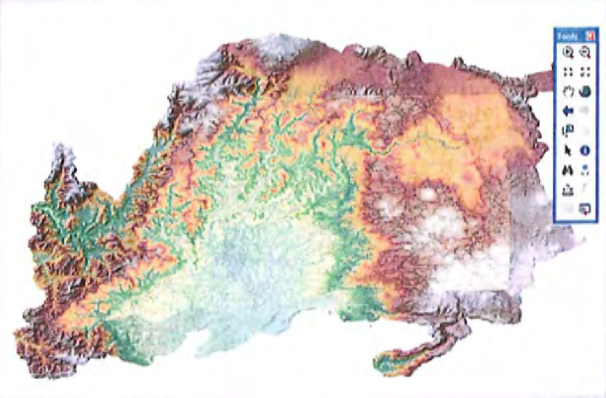
- Obj - Coordinate with and support existing efforts to mitigate dam failure.
- Obj - Protect floodplains from inappropriate development.

IV. Explain that the building and critical facilities inventory in HAZUS will be useful for planning purposes relative to hazards that HAZUS does not provide analyses for.

V. Turn it over to Clay and Todd who will explain progress and details of the HAZUS run thus far, discuss the HAZUS summary, and solicit input from the steering committee regarding earthquake, fire and flood events.

Shasta County Hazard Mitigation Plan

Mapping Analysis & Production



Clay Gu[illegible] Manager
Todd Hurchess, Municipal GIS Manager

HAZUS-MH Mapping

- **HAZUS-MH**
  - HAZUS-MH is a nationally applicable software program and standardized methodology for estimating potential losses from earthquake, flood, and hurricane hazards; the program was developed by FEMA and the National Institute of Building Sciences.
  - Various earthquake and flood hazard scenarios were run through HAZUS-MH for Shasta County (hurricane hazards do not apply).

HAZUS-MH Mapping (cont.)

- **How it Works**
  - Two distinct phases for HAZUS-MH
    1. Develop the hazard scenario (i.e., 100-year flood or 500-year flood, earthquake magnitude and epicenter, etc.). HAZUS-MH will then run the scenario, based upon the parameters entered.
    2. After the scenario has been run, there are literally hundreds of choices of what results HAZUS-MH can estimate based upon that specific hazard scenario (i.e., different categories of damage for medical facilities, functionality of those facilities, utility system damage, etc.). An extensive summary of the results of each event is also produced.
  - The team's role in developing the scenarios
    - ENPLAN is utilizing input provided from Pat to define the hazard scenarios. Pat is either providing scenario parameters he feels will be most beneficial to Plan development, or obtaining information from a specialist. For example, Pat is working with a USGS seismologist to obtain specific earthquake parameters representative of our area (i.e., fault type, rupture orientation, epicenter, magnitude, etc.).

HAZUS-MH Mapping (cont.)

- **Steering Committee Involvement**
  - The second phase of analysis in the HAZUS-MH process is where we feel input from the committee is instrumental.
  - We feel the best way to receive the committee's input is to review the results we've generated, the parameters utilized to generate the results, and then allow the committee to collectively present input.
  - We'd like to receive specific input on the parameters related to roads, utilities, and essential facilities.
    - HAZUS-MH generally defines Essential Facilities as police, fire, emergency operations facilities, schools, and medical facilities. roads & utilities

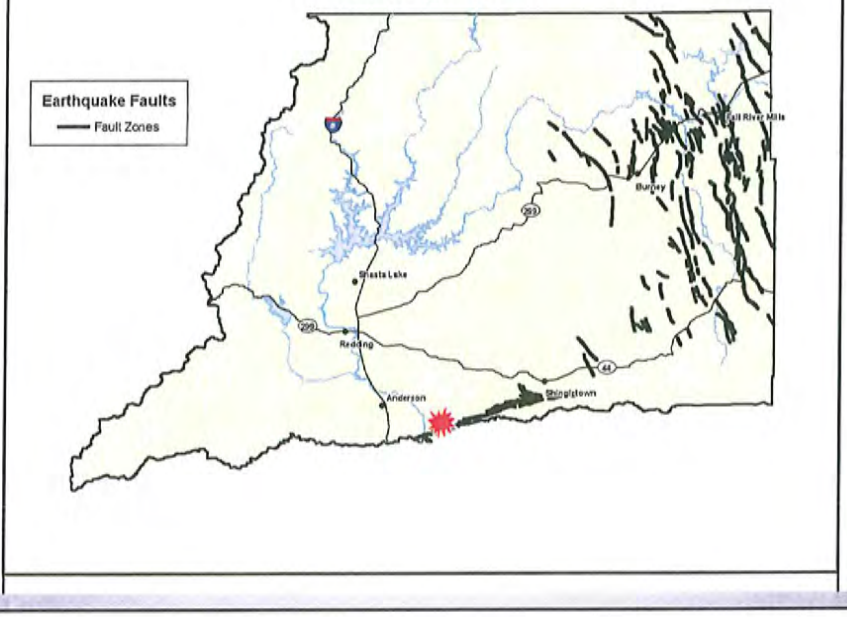
HAZUS-MH Mapping (cont.)

- **Earthquake Scenario Parameters:**

HAZUS uses the following set of information to define the earthquake parameters used for the earthquake loss estimate provided in this report.

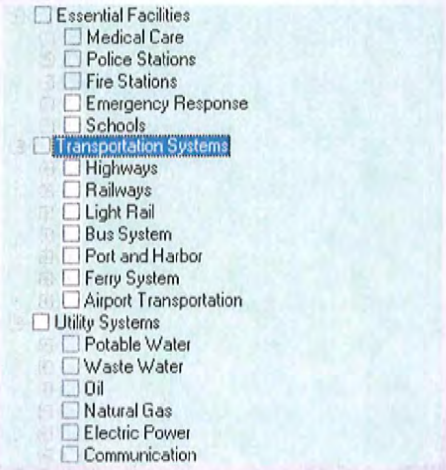
Scenario Name	M 6 5 Battle Creek Fault
Type of Earthquake	Arbitrary
Fault Name	NA
Historical Epicenter ID #	NA
Probabilistic Return Period	NA
Longitude of Epicenter	-122.06
Latitude of Epicenter	40.43
Earthquake Magnitude	6.50
Depth (Km)	10.00
Rupture Length (Km)	18.20
Rupture Orientation (degrees)	0.00
Attenuation Function	WUS Shallow Crustal Event - Extensional

Earthquake



Damage Analysis

- **Types of features that can be analyzed**

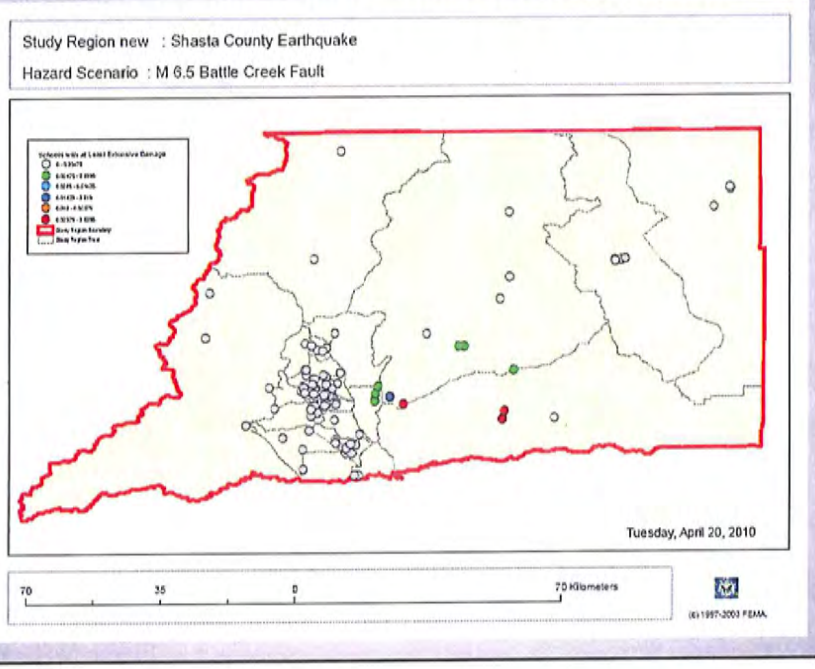


Damage Analysis

- **For each feature, we can visualize structural damage estimates and estimates of impaired functionality**

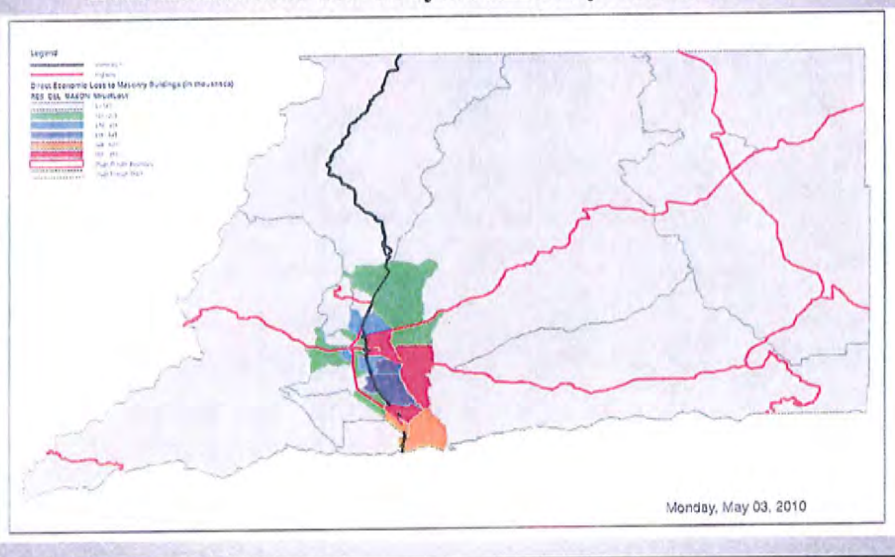
Struct dam
facility loss
economic loss

Sample Earthquake Result (Schools with Extensive Damage):



Census Tracts

- **Loss estimations can be symbolized by census tracts.**



Event Summaries

- HAZUS produces extensive summary reports of the effects of both flood and earthquake events.

Example global summary data from earthquake scenario

Building Damage

HAZUS estimates that about 2,637 buildings will be at least moderately damaged. This is over 4.00 % of the total number of buildings in the region. There are an estimated 10 buildings that will be damaged beyond repair. The definition of the 'damage states' is provided in Volume 1: Chapter 5 of the HAZUS technical manual. Table 3 below summaries the expected damage by general occupancy for the buildings in the region. Table 4 summaries the expected damage by general building type.

Table 3: Expected Building Damage by Occupancy

	None		Slight		Moderate		Extensive		Complete	
	Count	(%)	Count	(%)	Count	(%)	Count	(%)	Count	(%)
Agriculture	237	0.40	33	0.44	19	0.75	4	1.31	0	2.17
Commercial	2,658	4.46	409	5.52	235	9.29	45	15.21	3	25.12
Education	106	0.18	12	0.16	7	0.27	1	0.41	0	0.75
Government	143	0.24	21	0.28	12	0.49	2	0.62	0	1.39
Industrial	771	1.29	129	1.74	82	3.25	17	5.83	1	8.45
Other Residential	13,015	21.82	2,392	32.25	1,390	54.89	170	57.83	6	59.96
Religion	205	0.34	28	0.38	15	0.61	2	0.78	0	1.72
Single Family	42,507	71.27	4,393	59.23	771	30.47	53	18.01	0	0.44
Total	59,642		7,417		2,632		295		11	

Example global summary data from earthquake scenario

Table 4: Expected Building Damage by Building Type (All Design Levels)

	None		Slight		Moderate		Extensive		Complete	
	Count	(%)	Count	(%)	Count	(%)	Count	(%)	Count	(%)
Wood	47,865	80.25	5012	67.56	857	33.67	55	18.79	0	1.16
Steel	1,014	1.70	178	2.40	132	5.22	21	7.18	2	20.35
Concrete	1,030	1.73	174	2.35	93	3.67	12	4.14	1	4.98
Precast	744	1.25	114	1.54	106	4.20	30	10.28	1	7.52
RM	1,624	2.72	152	2.05	116	4.59	23	7.68	0	2.47
URM	359	0.60	74	0.99	42	1.65	10	3.35	2	14.41
MH	7,006	11.75	1712	23.08	1,185	46.80	143	48.57	5	49.11
Total	59,642		7,417		2,532		295		11	

*Note:
RM Reinforced Masonry
URM Unreinforced Masonry
MH Manufactured Housing

Earthquake Event Summary Report Page 8 of 20

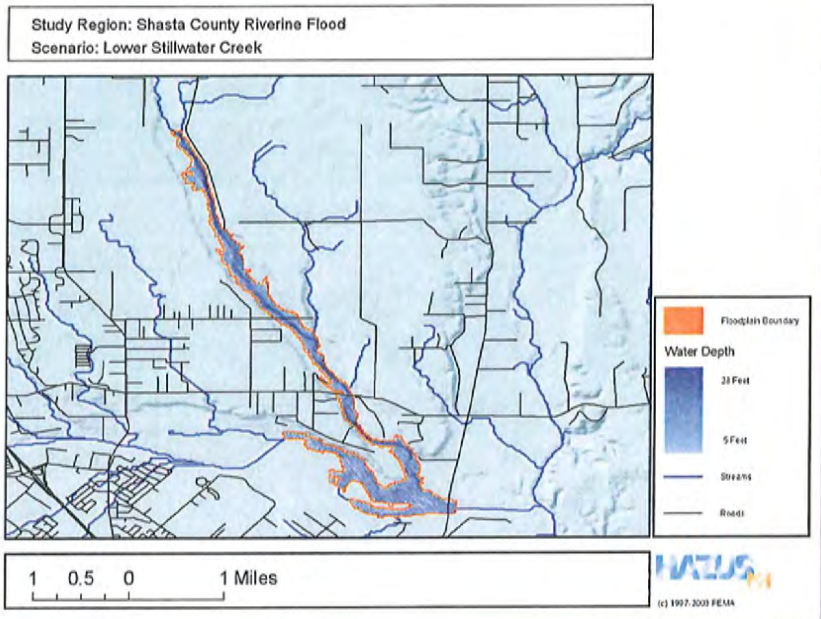
Flood Hazard

- **Flood Scenario Parameters:**

HAZUS used the following set of information to define the flood parameters for the flood loss estimate provided in this report.

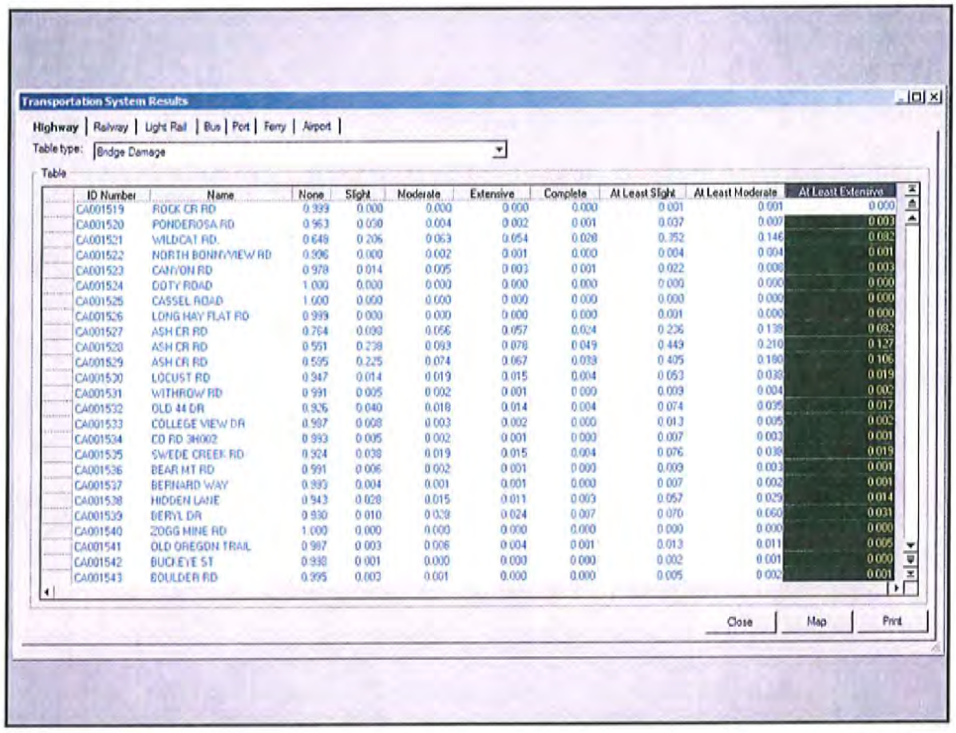
Study Region Name:	Shasta County Riverine Flood
Scenario Name:	Lwr Stillwater Cr
Return Period Analyzed:	100
Analysis Options Analyzed:	No What-Ifs

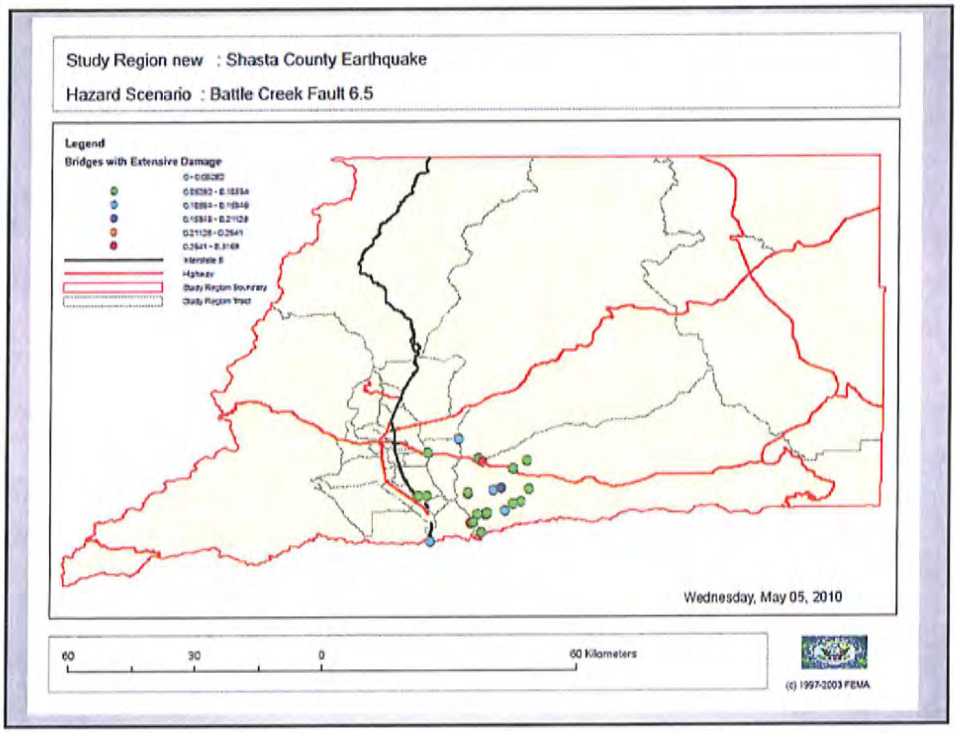
Example Flood Scenario: 100-year event along Stillwater Creek



Desired Results

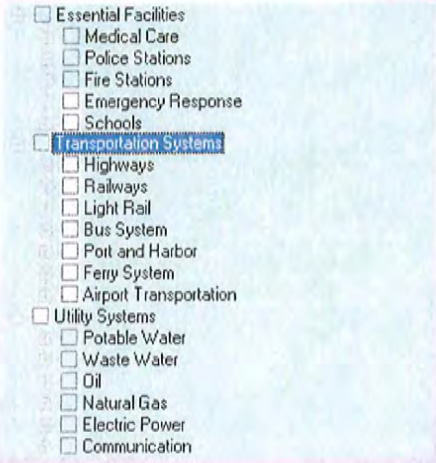
- **Input from the Committee is requested for the generation of Road, Essential Facility, and Utility outputs.**


Transportation System Results
Highway | Railway | Light Rail | Bus | Port | Ferry | Airport
Table type: Bridge Damage
Table
ID Number | Name | None | Slight | Moderate | Extensive | Complete | At Least Slight | At Least Moderate | At Least Extensive
CA001519 ROCK CR RD 0.999 0.000 0.000 0.000 0.000 0.001 0.001 0.000
CA001520 PONDEROSA RD 0.963 0.030 0.004 0.002 0.001 0.037 0.007 0.003
CA001521 WILDCAT RD 0.648 0.206 0.053 0.054 0.028 0.352 0.146 0.082
CA001522 NORTH BONNYVIEW RD 0.996 0.000 0.002 0.001 0.000 0.004 0.004 0.001
CA001523 CANYON RD 0.978 0.014 0.005 0.003 0.001 0.022 0.008 0.003
CA001524 DITY ROAD 1.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000
CA001525 CASSEL ROAD 1.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000
CA001526 LONG HAY FLAT RD 0.999 0.000 0.000 0.000 0.000 0.001 0.000 0.000
CA001527 ASH CR RD 0.764 0.090 0.056 0.057 0.024 0.236 0.139 0.083
CA001528 ASH CR RD 0.551 0.239 0.093 0.078 0.049 0.449 0.210 0.127
CA001529 ASH CR RD 0.595 0.225 0.074 0.067 0.039 0.405 0.180 0.106
CA001530 LOCUST RD 0.947 0.014 0.019 0.015 0.004 0.053 0.038 0.019
CA001531 WITHROW RD 0.991 0.005 0.002 0.001 0.000 0.009 0.004 0.002
CA001532 OLD 44 DR 0.926 0.040 0.018 0.014 0.004 0.074 0.035 0.017
CA001533 COLLEGE VIEW DR 0.987 0.008 0.003 0.002 0.000 0.013 0.005 0.002
CA001534 CO RD 3H002 0.993 0.005 0.002 0.001 0.000 0.007 0.003 0.001
CA001535 SWEDE CREEK RD 0.924 0.038 0.019 0.015 0.004 0.076 0.038 0.019
CA001536 BEAR MT RD 0.991 0.006 0.002 0.001 0.000 0.009 0.003 0.001
CA001537 BERNARD WAY 0.993 0.004 0.001 0.001 0.000 0.007 0.002 0.001
CA001538 HIDDEN LANE 0.943 0.028 0.015 0.011 0.003 0.057 0.029 0.014
CA001539 BERYL DR 0.930 0.010 0.039 0.024 0.007 0.070 0.060 0.031
CA001540 ZOGG MINE RD 1.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000
CA001541 OLD OREGON TRAIL 0.987 0.003 0.006 0.004 0.001 0.013 0.011 0.005
CA001542 BUCKEYE ST 0.998 0.001 0.000 0.000 0.000 0.002 0.001 0.000
CA001543 BOULDER RD 0.995 0.003 0.001 0.000 0.000 0.005 0.002 0.001
Close
Map
Print


Study Region new : Shasta County Earthquake
Hazard Scenario : Battle Creek Fault 6.5
Legend
Bridges with Extensive Damage
Wednesday, May 05, 2010
60
30
0
60 Kilometers
(c) 1997-2003 FEMA

Desired Results

- **Available outputs include structural damage and functionality loss data for the following features-**



Thank You

- **Thanks to all for attending and continuing to provide input as we proceed with Plan development.**
  - Jan Bulinski (Shasta County), 245-6821 jbulinski@co.shasta.ca.us
  - Patrick Steinmetz (Steinmetz Associates), 273-1065 steinmetzassoc@cebridge.net
  - Clay Guzi (ENPLAN), 221-0440 x 115 cguzi@enplan.com
  - Todd Burciaga (ENPLAN), 221-0440 x 118 tburciaga@enplan.com

Shasta County Hazard Mitigation Plan Steering Committee

August 12, 2010 9am-12pm
Caldwell Park Conference Room
Redding City Hall, 777 Cypress St

9 am Introductions

9:10 Recap of last meeting

9:20 Screen and Rank Hazards

*highest probability of occurrence (or repetitive occurrence)
*greatest impact on life and facilities
*probability of future occurrence

10:00 Vulnerabilities related to the Hazards

*critical facilities (types and numbers)
*repetitive loss
*potential loss (dollar)

10:45 Identify additional information needed and from whom

11:00 Progress on HAZUS scenarios/modeling

11:30 Discuss community meeting, survey, and crosswalk

11:45 Next Steps and agenda items

Shasta County Hazard Mitigation Plan
Steering Committee Meeting
Thursday, August 12, 2010
City of Redding Conference Room
9:00 AM to 10:30 AM

In attendance:

Chair, Jan Bulinski, Shasta County Public Works
Jan opened the meeting with introductions and a review of the previous meeting accomplishments.

Dave DeMar, WSRCD
Dave reviewed all hazards chosen for review and the initial decision that flood and fire are the top hazards. He reviewed the Risk Assessment requirements: identification, profile, identifying assets, value of structures and landmarks, assess vulnerabilities, analysis of development trends to determine future threats.

Dave presented a powerpoint presentation with various maps showing potential hazards for wildfire, volcano, and flood.

Todd Burciaga (Clay Guzi also present), Enplan
Todd handed out data about 100 year and 500 year flood scenarios.

Dave DeMar, WSRCD
Dave reviewed the tables that will be completed and why each hazard was included and the justification.

A map of earthquake faults showed hazards were predominantly in the eastern part of the county. There have been three earthquakes greater than a Level 5 magnitude, in 1920, 1950 and 1998. For ground shaking there is very lo potential in most of the county, but higher in the Fall River Mills area. For Drought, it also is very low except in the eastern hedge of the county.

Dave suggested grouping drought, utility failure, and storms into one category called Extreme Weather. Everyone agreed, since land use planning will not help much in extreme weather situations.

Questions raised:
(Jim Diehl from CalFire; Al Cathey from Public Works/Subdivision Engineer)
* Is Whiskeytown dam designed to meet severe earthquake potential?
* Under earthquake, should sewage treatment plants by included in the discussion?
* Under terrorism, should manually started wildfires be included?
* Is drought really a hazard? Check the frequency and severity levels.

Jami Byers, CAL EMA
Jami clarified that we can wait on getting the plan adopted until we receive a letter from CAL EMA that it meets the requirements. We have one year from meeting requirements to get the Shasta County Board of Supervisors adoption. When we submit the document for review, we should submit a note to show adoption is on the board's agenda at a point in the future.

Jami suggested getting the information out about the plan at as many community meetings as possible and contact the colleges, Boy Scouts, Red Cross, and all agencies in the area.

Next meeting in one month.

Agenda items: populate the tables.

Aug 12, 2010

Name	Agency
Todd Burciaga	ENPLAN
David DeMar	WSRCD
Jan Bulinski	Shasta Co.
Clay Guzi	ENPLAN
JAMI CHILDRESS-BYERS	CAL EMA
Ron Kingsley	Reclamation
Traci Niemela	Shasta Co. Public Health
JIM DIEHL	CAL FIRE | SCFD
AL CATHEY	SHASTA CO. DPW
Scan Tradgen Tiedgen	Shasta County
Lee Delaney	WSRCD
Leslie Bryan	WSRCD
Mary Mitchell	WSRCD

HMP Steering Committee meeting notes August 12, 2010

The meeting began with introductions and a recap of our last meeting, which went over the maps that ENPLAN is creating, HAZUS runs for the flooding hazard, and discussion regarding ETA for water from a potential Shasta Dam failure and conflicting information on different maps.

Dave presented a discussion on screening and ranking hazards through powerpoint presentation. He handed out hazard-related documents with tables 4.2-1 through 4.3-4. He emphasized that data and maps would be helpful from the different representatives in the group. He will be contacting them shortly.

FIRE – various maps in the powerpoint related to the fire hazard were discussed. Of particular interest are the fuel reduction areas. CalFire has fuel breaks proposed throughout the county.

FLOOD – According to the map, the Redding and Anderson areas, Hat Creek, Burney and Fall River Mills are the most vulnerable to flooding. The HAZUS analysis looked at the 100 and 500 year floods

An earthquake analysis is underway, it is anticipated that USGS will provide more definitive information for the analysis. Jim Diehl from CalFire asked how the hazards are defined. For instance, Mass Casualty, as defined by his colleagues, means more casualties than responders to the incident. Dave said that he was requesting that information of the members of the committee and appreciated the input. It was suggested that we define the hazards and then begin ranking their importance. Severity and frequency would determine the importance of a hazard in terms of its threat to the county.

Jim suggests that weather be placed in a higher rank than flood for our area. Weather, Dave said, really should be a compilation of all the weather-related hazards including: Severe storm, drought and extreme heat. Al Cathey brought up Whiskeytown dam, and whether its vulnerability had been assessed. Would it survive a quake? It is an earthen dam, and it is commonly known that they have a severe vulnerability to earthquake failure.

Hazardous spills are a significant threat in this area as interstate 5 runs through it, as well as the railroad. Past spills were considered and the group thought that hazardous spills should be ranked higher than earthquake as a risk. Finally it was decided that the ranking would be as follows: 1) Wildfire, (2) Extreme Weather, (3) Flood, (4) Haz Mat, (5) Earthquake, (6) Volcano, CBRNE, Pandemic/epidemic, Mass casualty, and Dam failure. It was agreed that hazards 5-10 are of less utility and much less time will be spent analyzing their impact.

Mary discussed community meetings as a requirement of the public participation element of the plan and the importance of public outreach. Jami said to take advantage of other venues for distribution of information regarding the plan such as the boy scouts and local college.

Mary handed out the "crosswalk" created by FEMA for use in grading the plans that are received. It must be accurate and include all components of the plan or FEMA will return the submittal.

Next steps to be taken include filling in tables 4.3-5 and 4.3-6 of the handouts, and running scenarios for the hazards.

Table 4.2-1
Summary of Hazard Identification Results

Hazard	Representative Data Collected for Hazard Identification	Justification for Inclusion
Flood	* FEMA FIRM Maps * FEMA Flood Hazard Layer * Topography * FEMA Base Flood Elevations * Historical flood records * FEMA Hazard website * OES	* Areas are located within the 100-year floodplain * Flash floods and other flood events occur during heavy rainstorms due to terrain * There have been several State of Emergency Proclamations between 1950-2004 as a result of flooding in Shasta County
Wildfire	* CDF-FRAP * USFS * CDFG * Topography * County Fire/OES * Historical fire records * FEMA Hazards website	* Shasta County experiences wildfires on a regular basis * Terrain and Mediterranean climate * Seasonal winds
Earthquake	* USGS * CGS * CISN * FEMA- HAZUS * FEMA Hazards website	* Several fault zones occur in the county * Historical records * The area is subject to low and moderate ground shaking
HazMat	* USGS * Shasta County Hazardous Materials Business Plan * EPA	* I-5 is a major transportation route for hazardous materials * Southern Pacific Railroad runs north south through the county * Several hazardous spills have occurred
Severe Storm	* OES * NOAA	* Periodic severe winter snow storms * Periodic severe summer storms with lightening

Hazard	Representative Data Collected for Hazard Identification	Justification for Inclusion
Utility Disruption	* PG&E * CA Public Utilities Commission * CA Energy Commission * WAPA	* Extreme heat of 120 degrees occasionally occurs * Heavy snow storms have occurred * High wind storms have occurred
Drought	* USDA * Shasta County Board of Supervisors records * NOAA * Redding Basin Water Management	* There have been State of Emergency Proclamations for drought * 2009 * 2008 Keswick Water Shortage Emergency * Concern about reliable water supplies * Concern about feed for livestock and water for agriculture
CBRNE (*chemical, biological, radiological, nuclear, explosive*)	* Shasta County Public Health General Plan * Healthy Shasta 2008 Report * CA Emergency Medical Services Authority * CA Dept. Health Services	Some probability, but low.
Volcanic	* USGS * Cal EMA	* Mt. Shasta and Mt. Lassen volcanoes are considered "very high threat volcanoes" by USGS.
MCI (*mass casualty incident*)	* Shasta County Public Health General Plan * Healthy Shasta 2008 Report * CA Emergency Medical Services Authority * CA Dept. Health Services	Some probability, but low.
Dam Failure	* FEMA-HAZUS * Dam Inundation Data (CA OES) * FEMA FIRM maps * FEMA Hazards website * ACOE 2005 Survey	* Potential for uncontrolled releases from Shasta and Whiskeytown Dams flooding inundation zone * Potential threat to fish and wildlife in the Sacramento River * Several dams exist throughout Shasta County * Many dams are over 30 years old * Downstream development
Pandemic/epidemic	* Shasta County Public Health General Plan * Healthy Shasta 2008 Report * CA Emergency Medical Services Authority * CA Dept. Health Services	* Cases of West Nile Virus in Shasta County * Cases of swine flu in Shasta County

Table 4.2-3
Hazard Ranking and Planning Consideration

Hazard Type and Ranking	Planning Consideration Based on Hazard Level
1. Wildfire (xx)	Significant
2. Flood (xx)	Significant
3. Severe Storm (xx)	Significant
4. Drought (xx)	Significant
5. Utility Disruption (xx)	Moderate
6. Earthquake (xx)	Moderate
7. Haz Mat (xx)	Moderate
8. Volcano (xx)	Moderate
9. CBRNE – Chemical, Biological, (xx)	Limited
10. Pandemic/epidemic (xx)	Limited
11. MCI – Mass casualty (xx)	Limited
12. Dam Failure (xx)	Limited
13. Extreme Heat (xx)	Limited

Table 4.2-3
Hazard Ranking and Planning Consideration

based severity & frequency

Hazard Type and Ranking		Planning Consideration Based on Hazard Level
1. Wildfire (xx)	Utility Disruption (xx)	Significant
2. Flood (xx)		Significant
3. Extreme Weather (xx)		Significant
3a. Severe Storm (xx)		
3b. Drought (xx)		
3c. Extreme Heat (xx)		
4. Earthquake (xx)		Moderate
5. Haz Mat (xx)		Moderate
6. Volcano (xx)		Moderate
7. CBRNE – Chemical, Biological, (xx)		Limited
8. Pandemic/epidemic (xx)		Limited
9. MCI – Mass casualty (xx)		Limited
10. Dam Failure (xx)		Limited

less utility 5-10

Table 4.3-4
Abbreviations and Costs Used for Critical Facilities and Infrastructure

Abbr.	Name	Building Type (where applicable)	Average Replacement Cost (x$1,000)
AIR	Airport facilities		
BRDG	Bridges		
BUS	Bus facilities		
COM	Communication Facilities and Utilities		
DAM	State-sized Dams		
ELEC	Electric Power Facility		
EMER	Emergency Centers, Fire Stations and Police Stations		
GOVT	Government Offices and Civic Center		
HOSP	Hospitals/Care Facilities		
INFR	Infrastructure includes: Oil/Gas Pipelines		
	Railroad Tracks		
	Highway		
POT	Portable and Waste Water Facilities		
RAIL	Rail Facilities		
SCH	Schools		

Table 4.3-5

Population Exposure and Potential Loss Estimates from 100-Year Flood Hazard by Jurisdiction

Jurisdiction	Exposed Population	Residential Building Count	Residential Est. Building and Content Loss (x$1000)	Commercial Building Count	Commercial Est. Building and Content Lost (x$1,000)
Shasta County, unincorporated					
City of Anderson					
City of Redding					
City of Shasta Lake					
Total					

Note: Commercial loss estimates include Industrial and Agricultural buildings and contents

Table 4.3-6

Potential Exposure to Critical Facilities and Infrastructure from 100-Year Flood Hazard by Jurisdiction

Jurisdiction	Data	AIR	BRDG	BUS	COM	EMER	HOSP	INFR	Rail Fac	Rail Length	SCH	Total
Shasta County, unincorporated	**Number Exposure (x$1000)**											
City of Anderson												
City of Redding												
City of Shasta Lake												
Total Number												
Total Exposure (x$1000)												

Note: Dollar amounts in this table are total exposure to 100 year flood (assumes worse case scenario) as opposed to loss estimation that was conducted for Residential and Commercial property above.

Shasta County Hazard Mitigation Plan

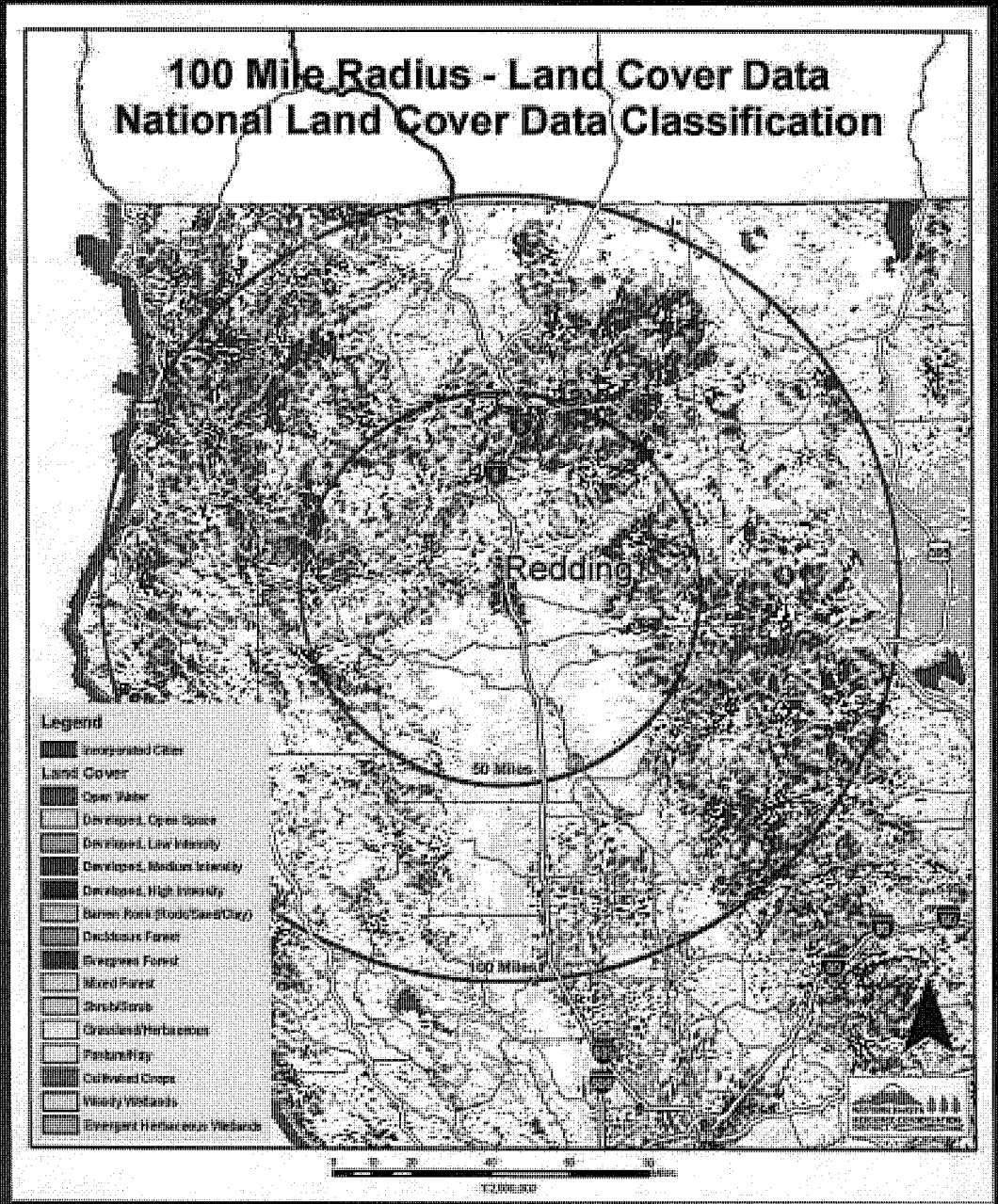
Steering Committee Meeting

Thursday, August 12, 2010

ENPLAN

WESTERN SHASTA RESOURCE CONSERVATION DISTRICT

COUNTY OF SHASTA CALIFORNIA


100 Mile Radius - Land Cover Data
National Land Cover Data Classification
Redding
50 Miles
100 Miles
Legend
Land Cover
Open Water
Developed, Open Space
Developed, Low Intensity
Developed, Medium Intensity
Developed, High Intensity
Deciduous Forest
Evergreen Forest
Mixed Forest
Shrub/Scrub
Grassland/Herbaceous
Pasture/Hay
Cultivated Crops
Woody Wetlands
Emergent Herbaceous Wetlands

Identified Hazards

Flood

Fire

Severe Storm

Earthquake

Hazardous Materials

Volcanic

Drought

Utility Disruption

Dam Failure

Pandemic / Epidemic

MCI – Mass Casualty Incidents

CBRNE – Chemical Biological

Risk Assessment

1) identifying hazards, which involves determining those hazards posing a threat to a study area,

2) profiling hazards, which involves mapping identified hazards and their geographic extent,

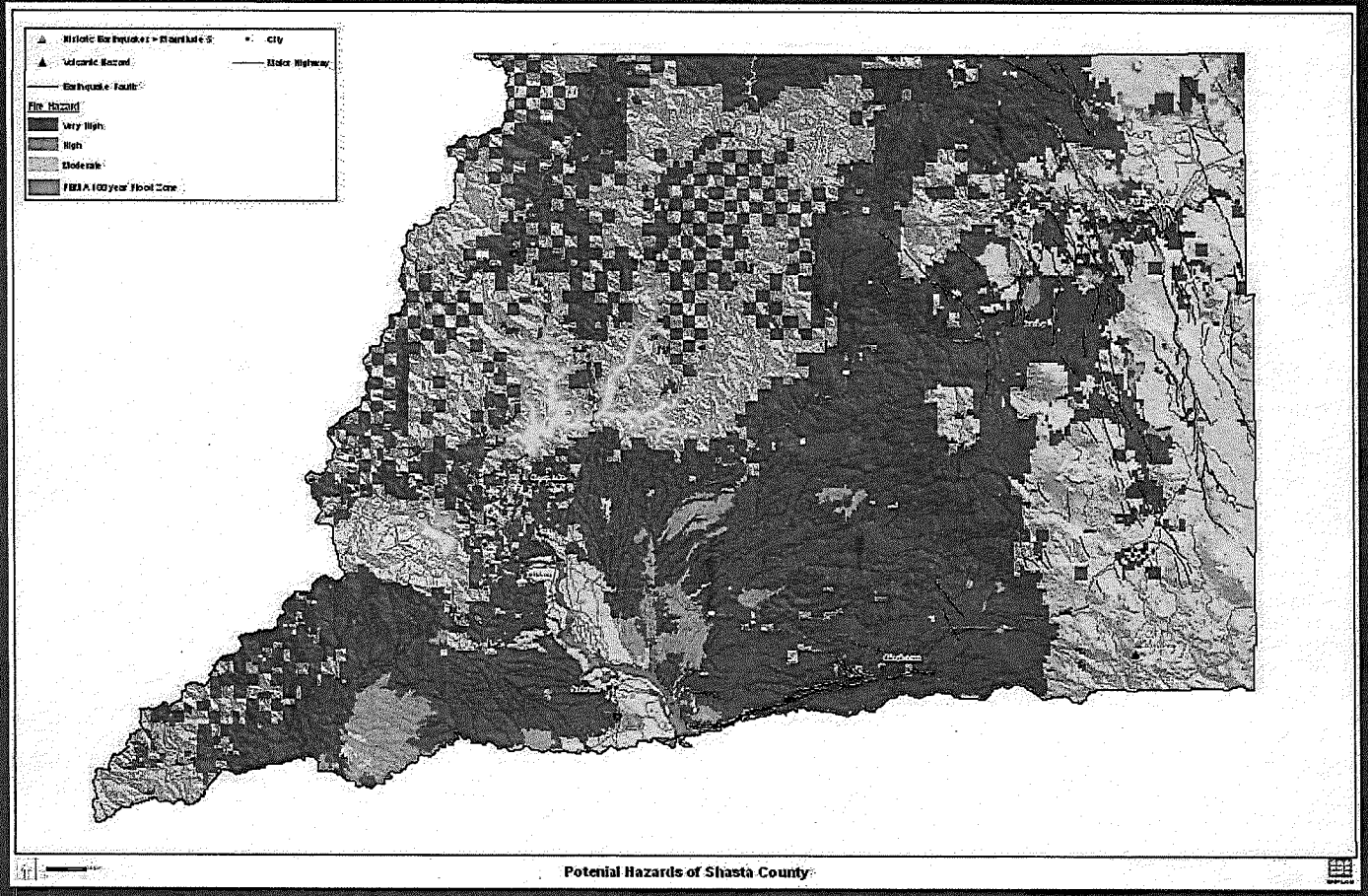
3) identifying assets, which assigns value to structures and landmarks in the identified hazard areas,

Risk Assessment

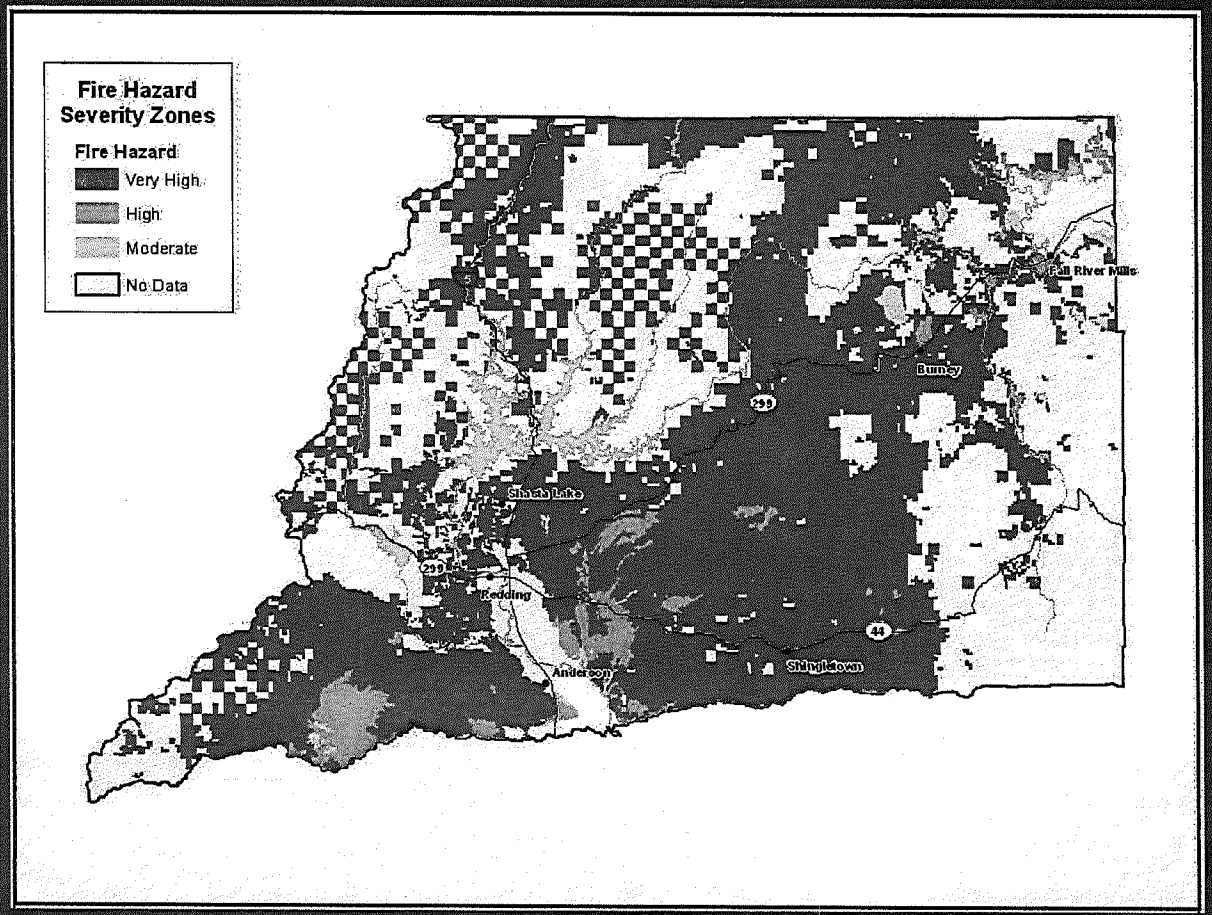
4) assessing vulnerability, which involves predicting the extent of damage to assets, and

5) analyzing development trends, which assesses future development and population growth to determine potential future threat from hazards.

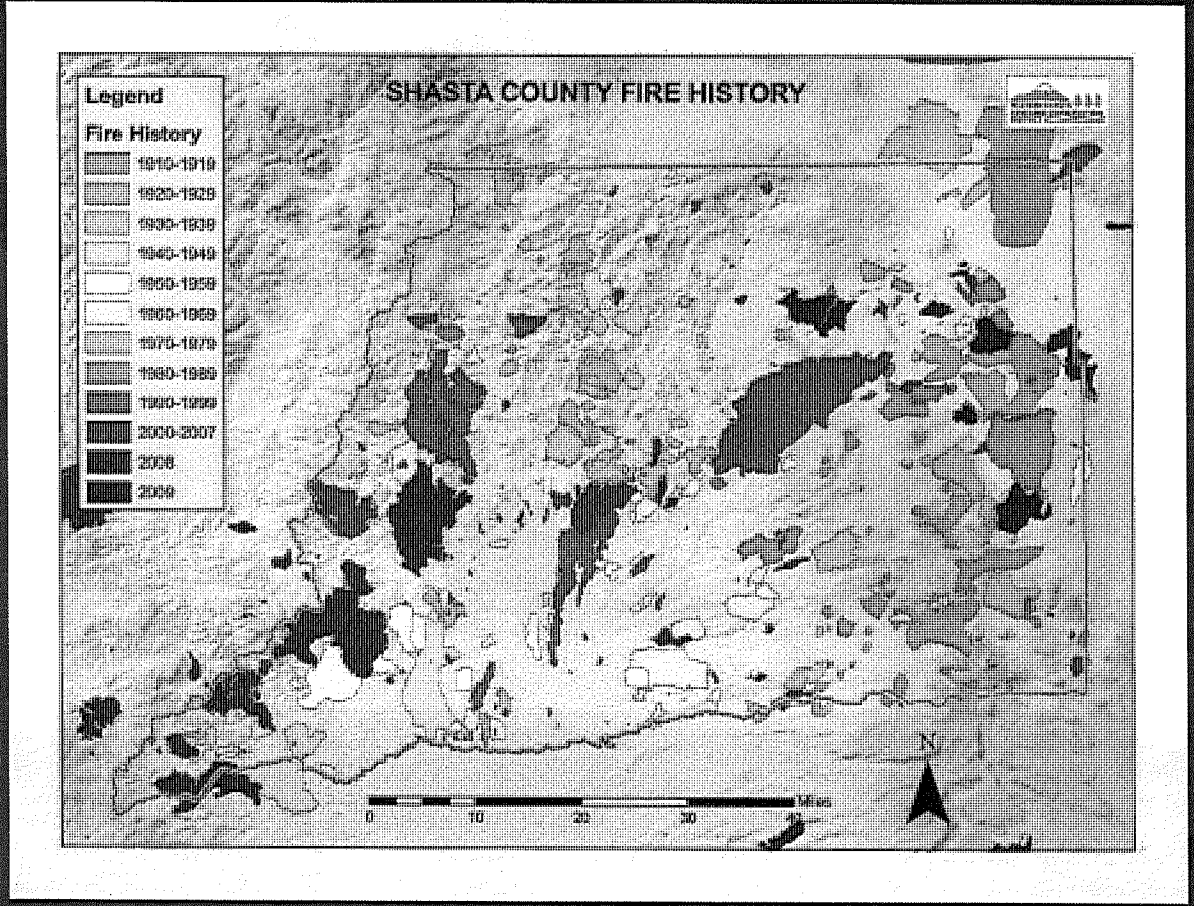
Potential Hazards



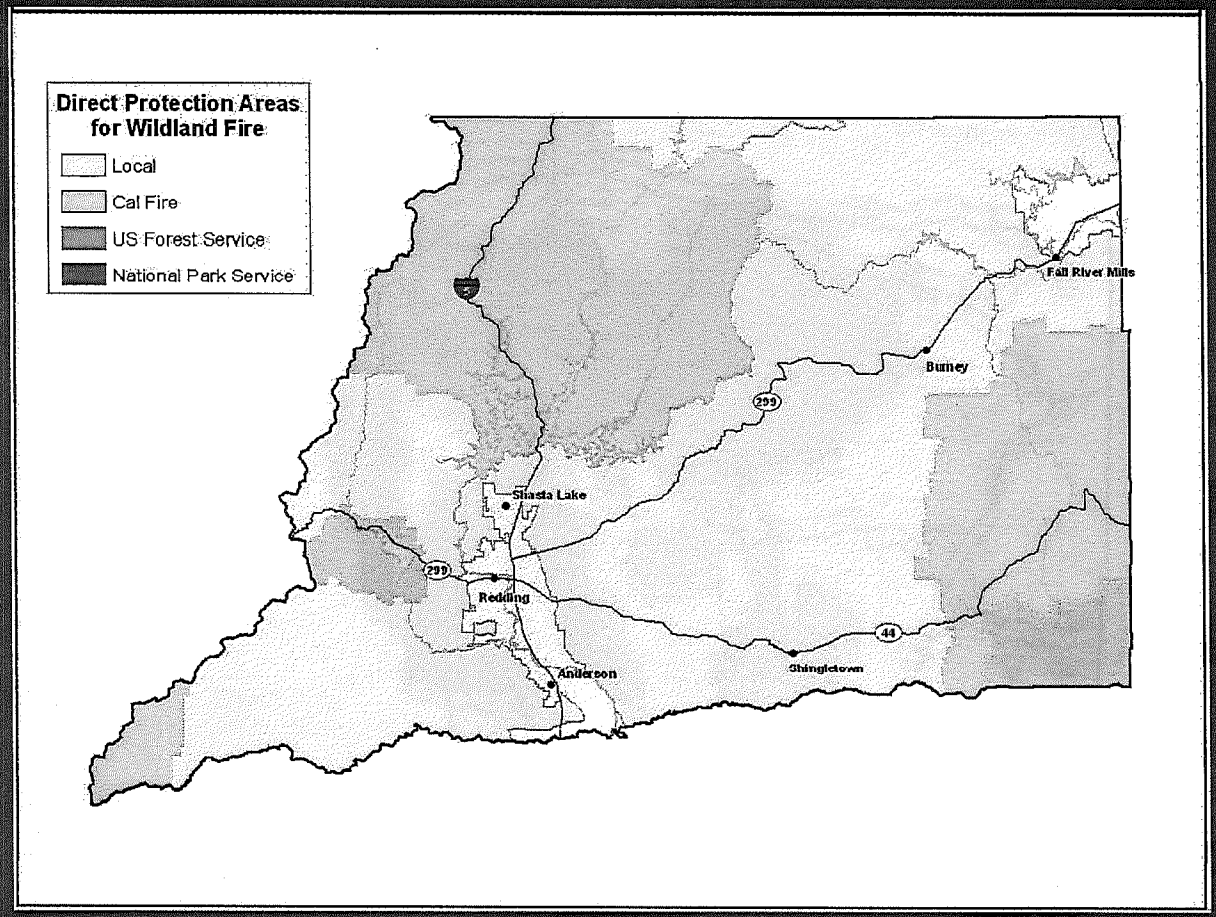
Fire Hazard


Fire Hazard Severity Zones
Fire Hazard
Very High
High
Moderate
No Data
Fall River Mills
Burney
299
Shasta Lake
299
Redding
44
Anderson
Shingletown

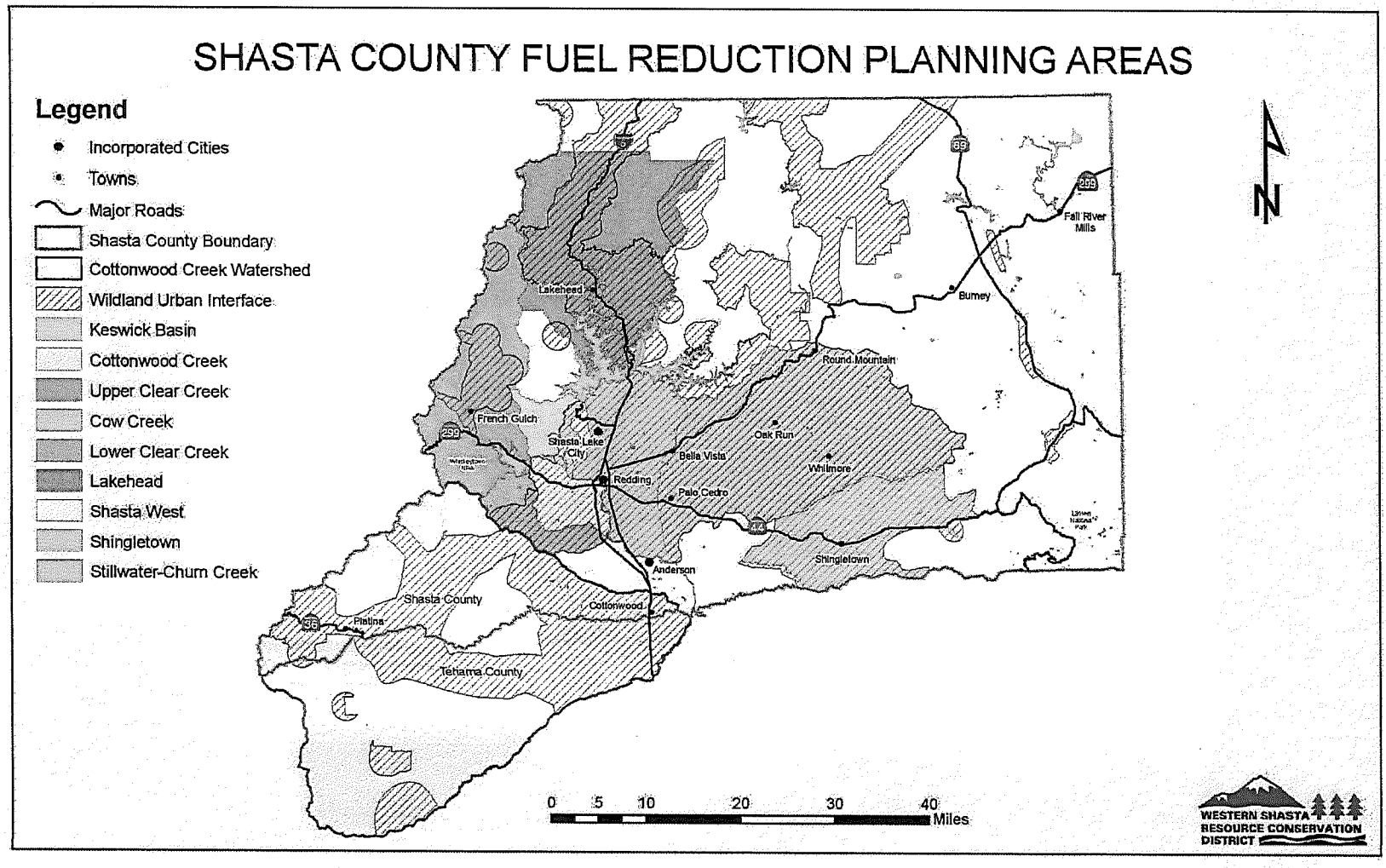
Fire History



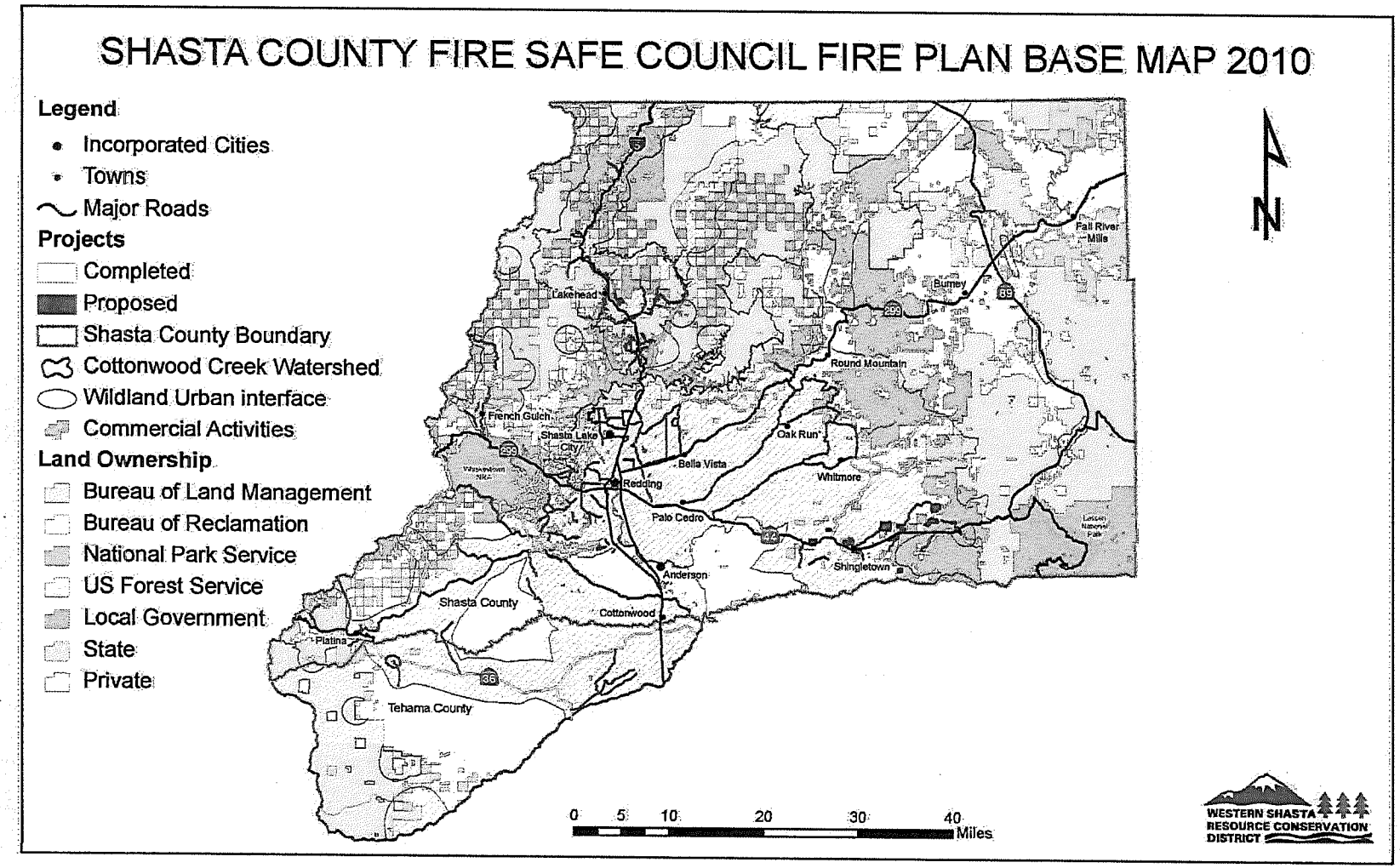
Fire Protection

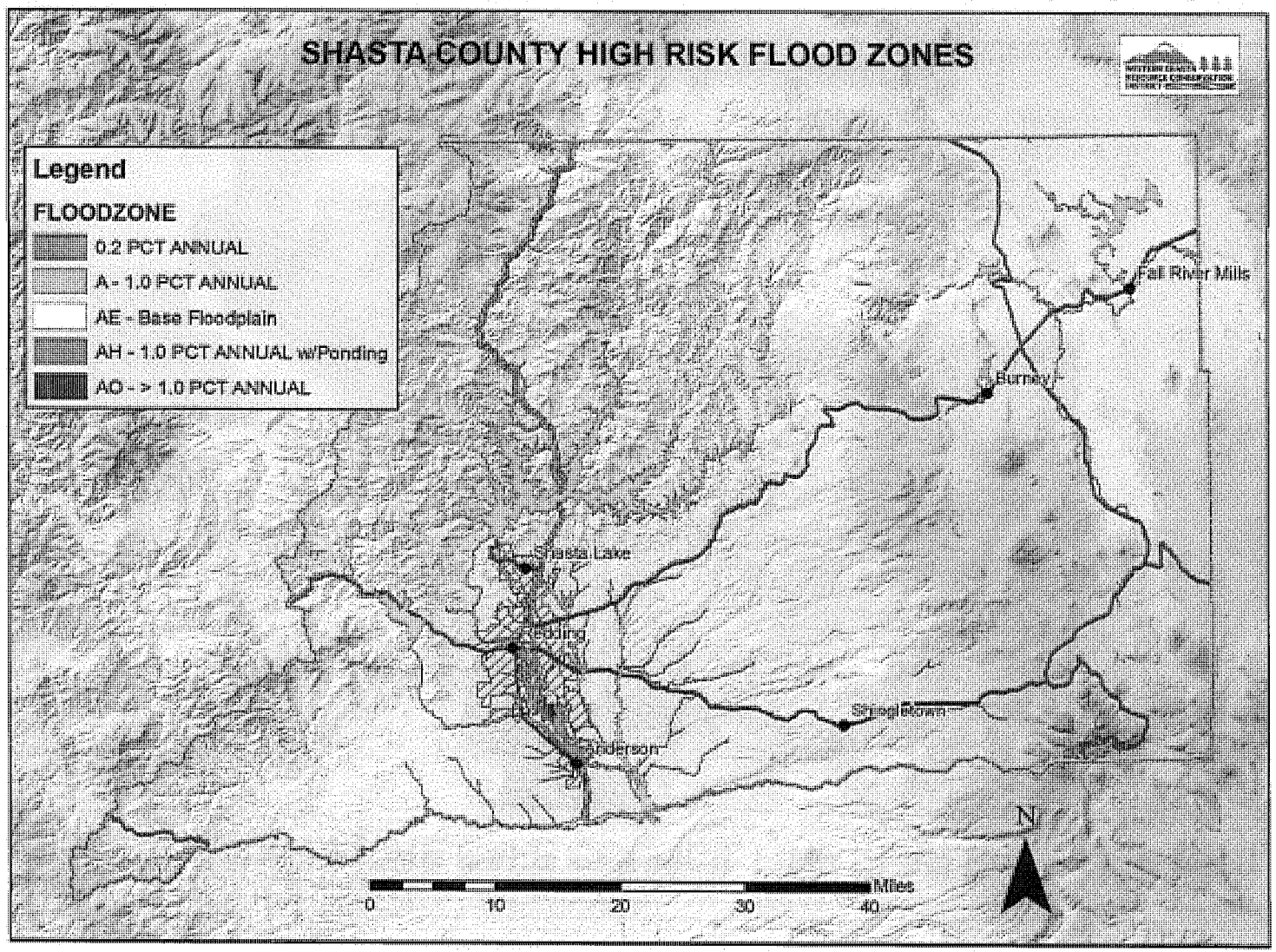


SHASTA COUNTY FUEL REDUCTION PLANNING AREAS

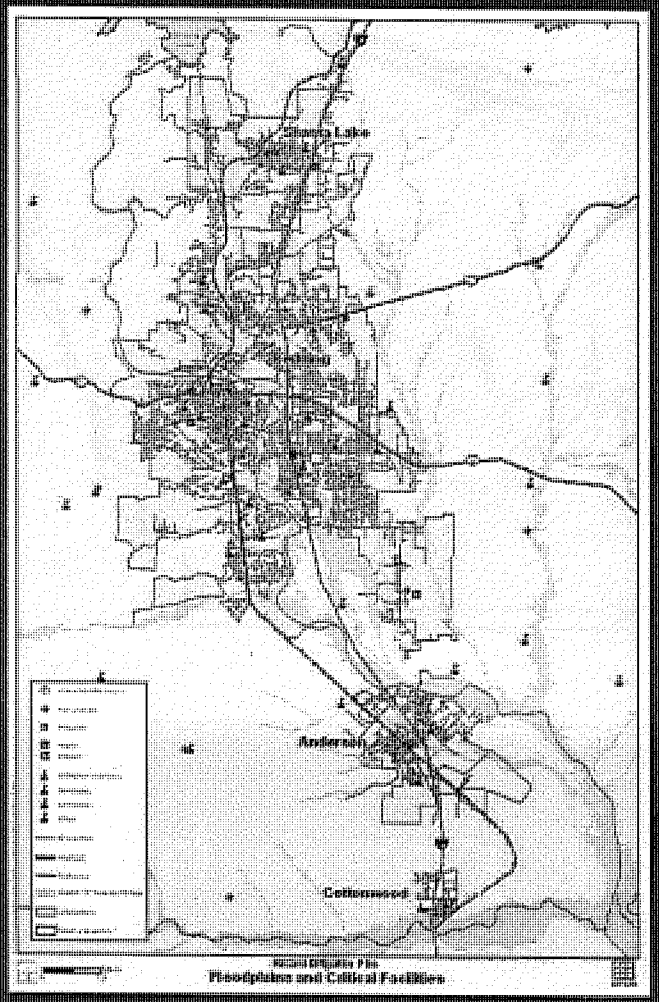


SHASTA COUNTY FIRE SAFE COUNCIL FIRE PLAN BASE MAP 2010

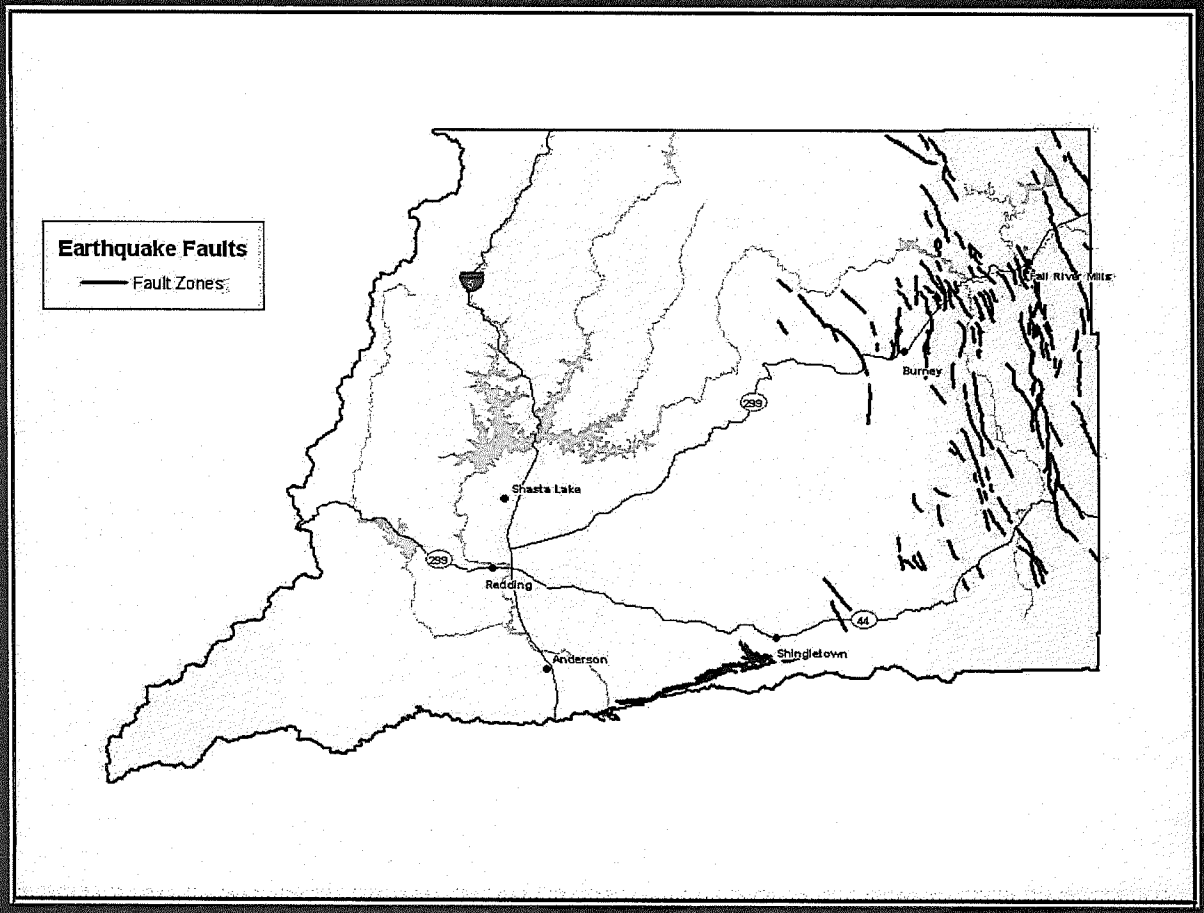



SHASTA COUNTY HIGH RISK FLOOD ZONES
Legend
FLOODZONE
0.2 PCT ANNUAL
A - 1.0 PCT ANNUAL
AE - Base Floodplain
AH - 1.0 PCT ANNUAL w/Ponding
AO - > 1.0 PCT ANNUAL
Fall River Mills
Burney
Shasta Lake
Redding
Anderson
Miles
0
10
20
30
40
N

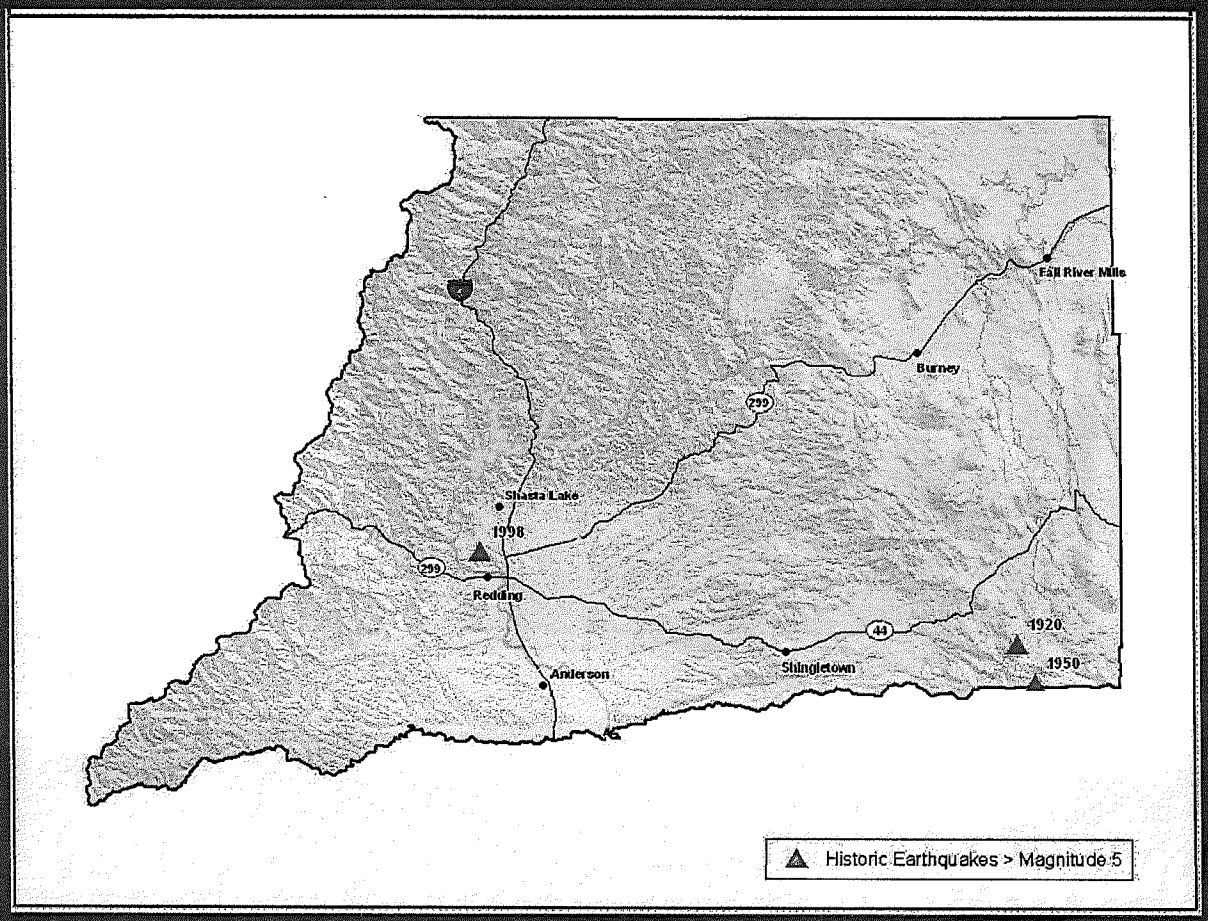
Urban Floodplain



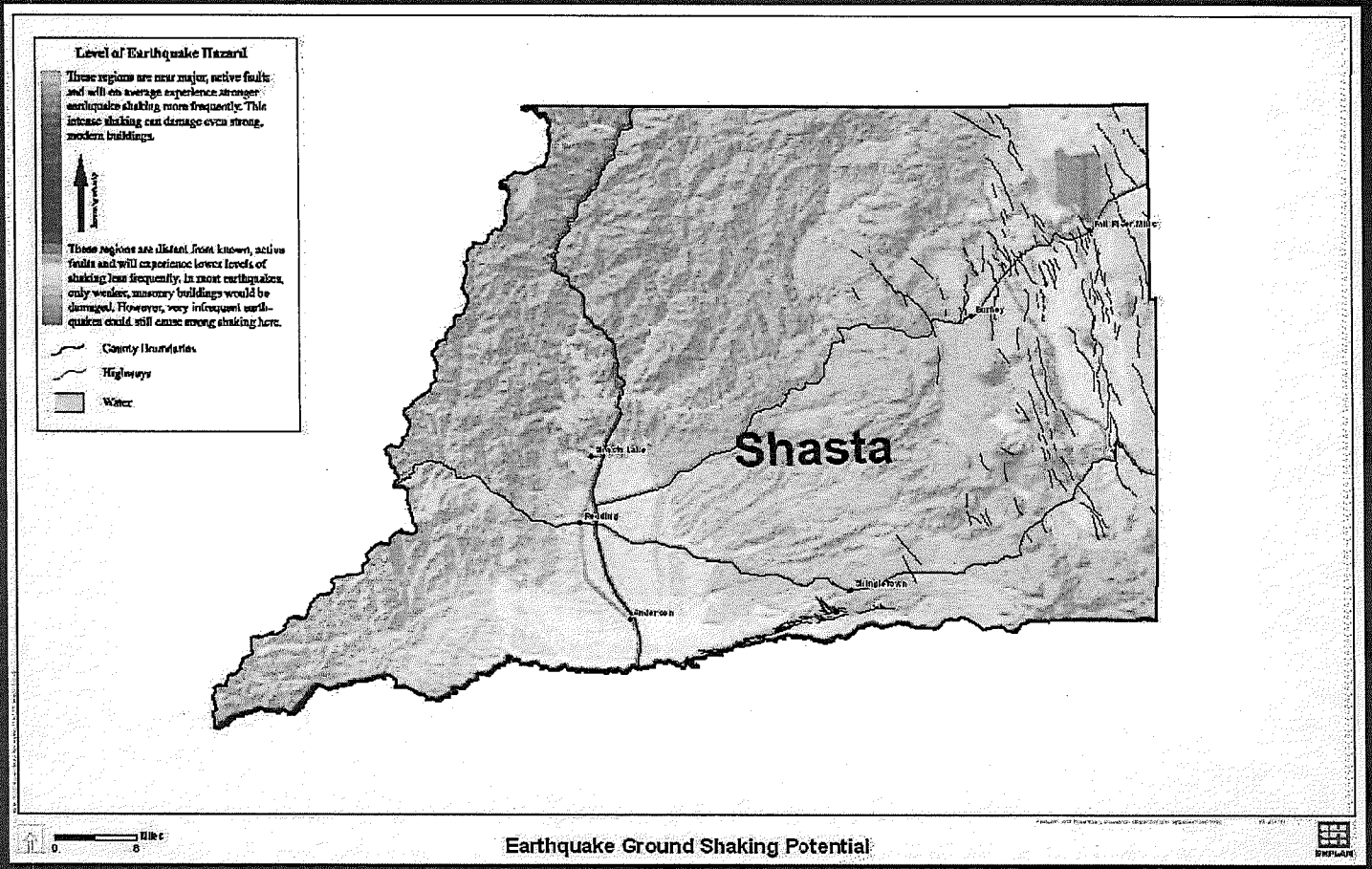
Earthquake Faults



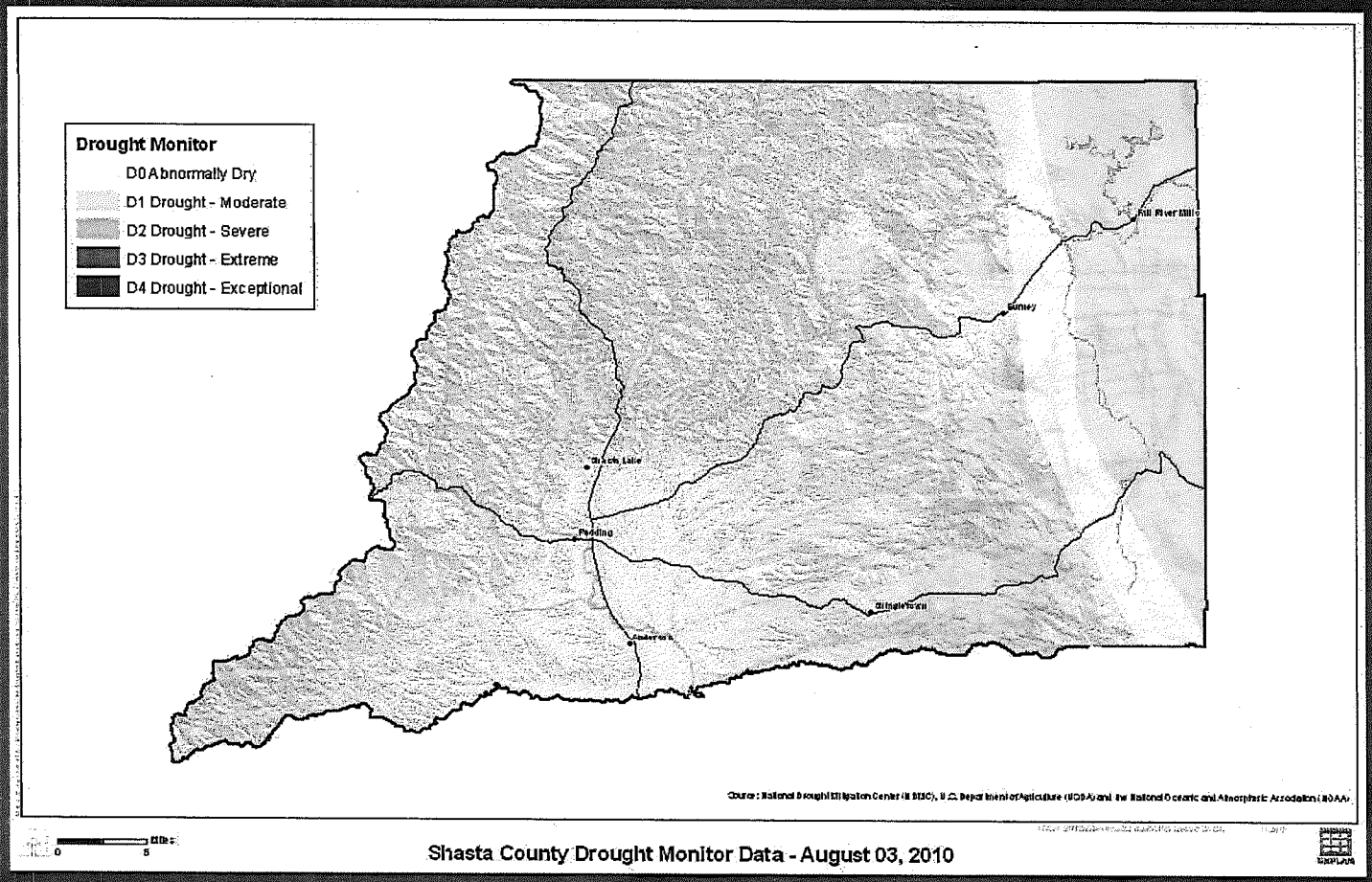
Historic Earthquakes



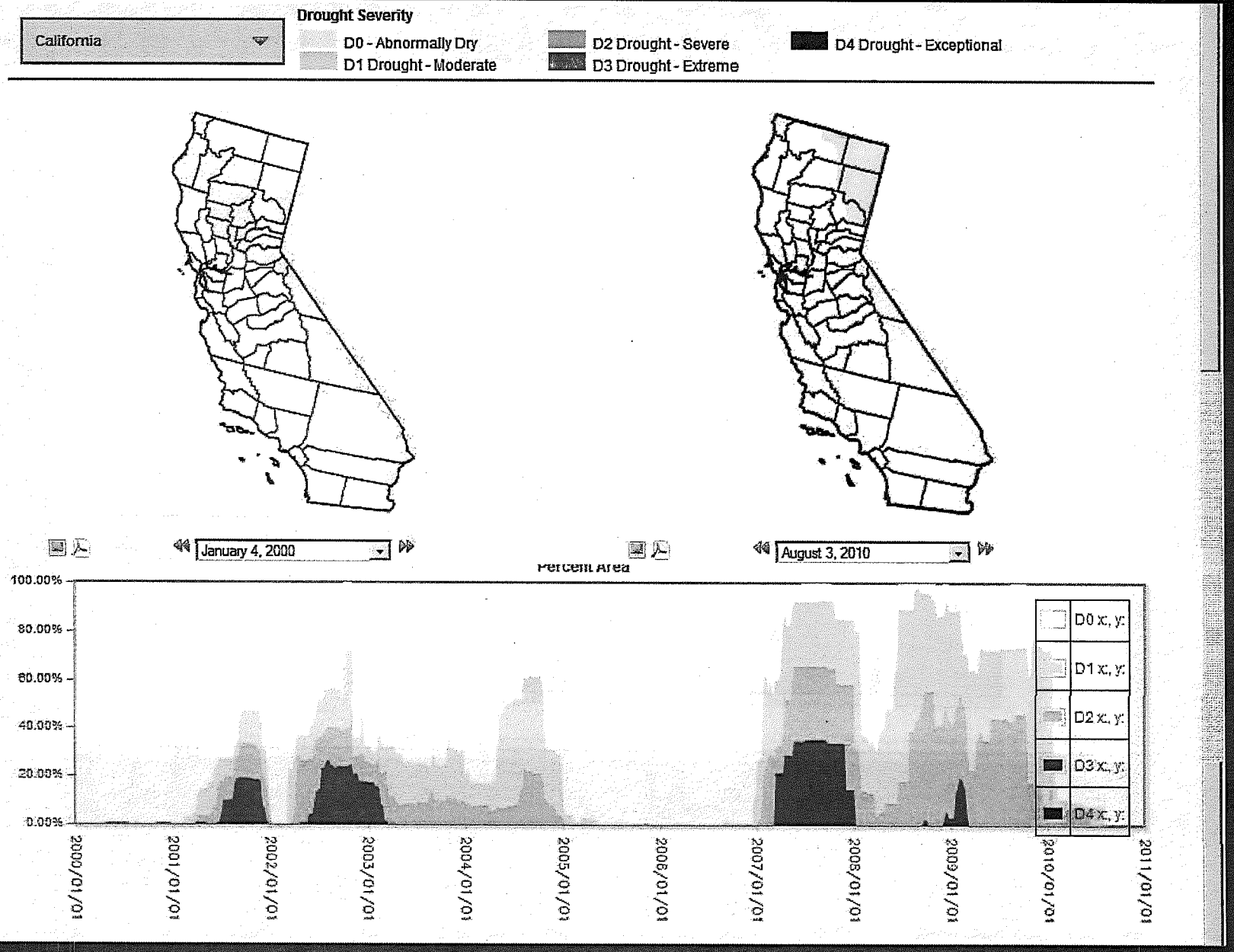
Ground Shaking Potential

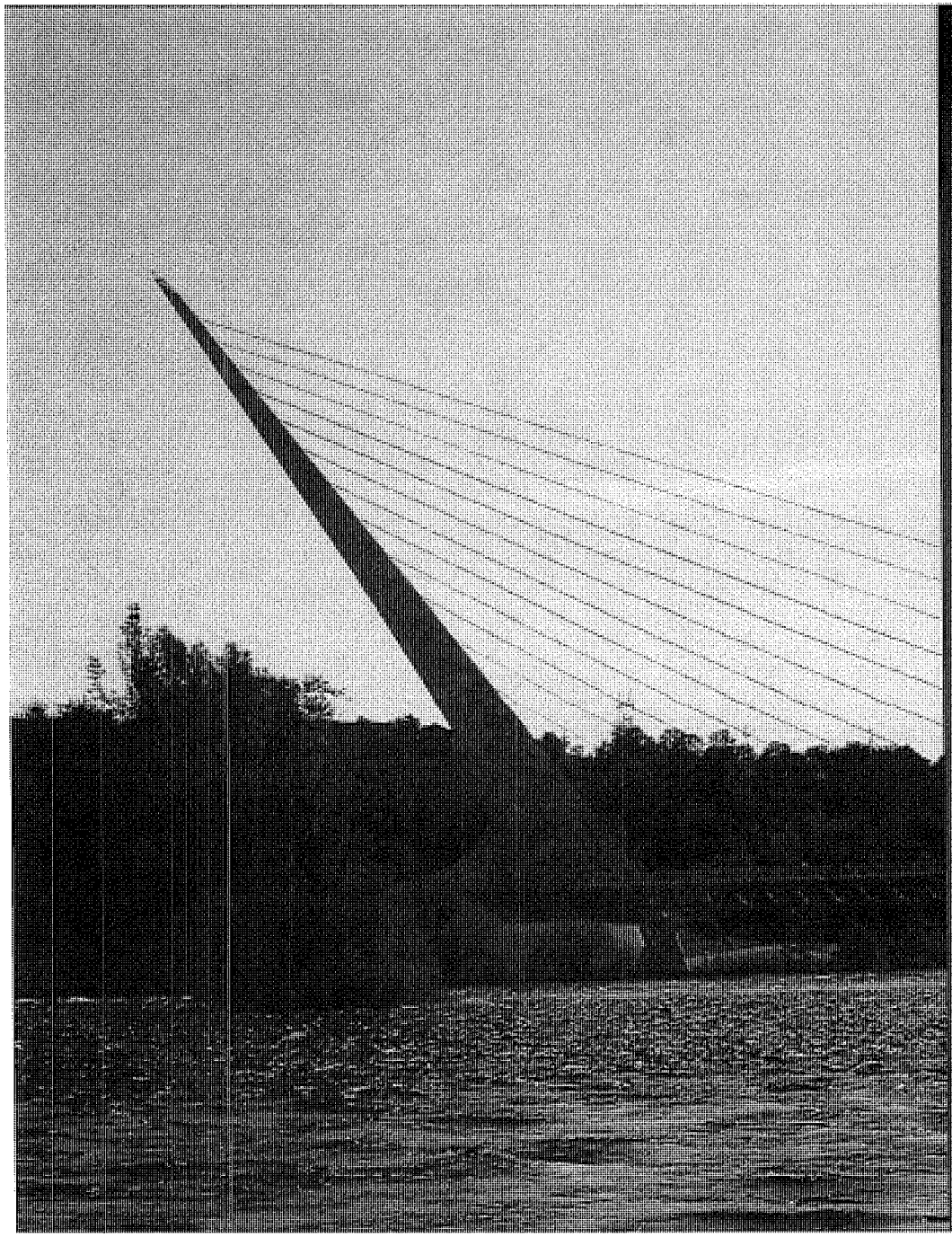


Drought Monitor Data



Shasta County Drought Monitor Data - August 03, 2010


California
Drought Severity
D0 - Abnormally Dry
D1 Drought - Moderate
D2 Drought - Severe
D3 Drought - Extreme
D4 Drought - Exceptional
January 4, 2000
August 3, 2010
Percent Area
100.00%
80.00%
60.00%
40.00%
20.00%
0.00%
2000/01/01
2001/01/01
2002/01/01
2003/01/01
2004/01/01
2005/01/01
2006/01/01
2007/01/01
2008/01/01
2009/01/01
2010/01/01
2011/01/01
D0 x, y:
D1 x, y:
D2 x, y:
D3 x, y:
D4 x, y:



Questions?

HAZUS-MH: Flood Event Report

Region Name: Shasta County

Flood Scenario: Shasta County Flood 7

Print Date: Wednesday, August 11, 2010

Disclaimer:

Totals only reflect data for those census tracts/blocks included in the user's study region.

The estimates of social and economic impacts contained in this report were produced using HAZUS loss estimation methodology software which is based on current scientific and engineering knowledge. There are uncertainties inherent in any loss estimation technique. Therefore, there may be significant differences between the modeled results contained in this report and the actual social and economic losses following a specific Flood. These results can be improved by using enhanced inventory data and flood hazard information.

Table of Contents

Section	Page #
General Description of the Region	3
Building Inventory	4
General Building Stock	
Essential Facility Inventory	
Flood Scenario Parameters	5
Building Damage	6
General Building Stock	
Essential Facilities Damage	
Induced Flood Damage	8
Debris Generation	
Social Impact	8
Shelter Requirements	
Economic Loss	9
Building-Related Losses	
Appendix A: County Listing for the Region	10
Appendix B: Regional Population and Building Value Data	11

General Description of the Region

HAZUS is a regional multi-hazard loss estimation model that was developed by the Federal Emergency Management Agency (FEMA) and the National Institute of Building Sciences (NIBS). The primary purpose of HAZUS is to provide a methodology and software application to develop multi-hazard losses at a regional scale. These loss estimates would be used primarily by local, state and regional officials to plan and stimulate efforts to reduce risks from multi-hazards and to prepare for emergency response and recovery.

The flood loss estimates provided in this report were based on a region that included 1 county(ies) from the following state(s):

- California

Note:
Appendix A contains a complete listing of the counties contained in the region.

The geographical size of the region is 3,785 square miles and contains 6,263 census blocks. There are over 63 thousand households in the region and has a total population of 163,256 people (2000 Census Bureau data). The distribution of population by State and County for the study region is provided in Appendix B.

There are an estimated 69,896 buildings in the region with a total building replacement value (excluding contents) of 12,183 million dollars (2006 dollars). Approximately 92.56% of the buildings (and 77.24% of the building value) are associated with residential housing.

General Building Stock

HAZUS estimates that there are 69,896 buildings in the region which have an aggregate total replacement value of 12,183 million (2006 dollars). Table 1 and Table 2 present the relative distribution of the value with respect to the general occupancies by Study Region and Scenario respectively. Appendix B provides a general distribution of the building value by State and County.

Table 1
Building Exposure by Occupancy Type for the Study Region

Occupancy	Exposure ($1000)	Percent of Total
Residential	9,410,456	77.2%
Commercial	1,907,456	15.7%
Industrial	328,910	2.7%
Agricultural	55,211	0.5%
Religion	191,410	1.6%
Government	164,514	1.4%
Education	125,418	1.0%
Total	**12,183,375**	**100.00%**

Table 2
Building Exposure by Occupancy Type for the Scenario

Occupancy	Exposure ($1000)	Percent of Total
Residential	3,078,020	79.2%
Commercial	532,243	13.7%
Industrial	95,620	2.5%
Agricultural	20,993	0.5%
Religion	62,665	1.6%
Government	45,475	1.2%
Education	51,045	1.3%
Total	**3,886,061**	**100.00%**

Essential Facility Inventory

For essential facilities, there are 3 hospitals in the region with a total bed capacity of 528 beds. There are 120 schools, 38 fire stations, 9 police stations and no emergency operation centers.

Flood Scenario Parameters

HAZUS used the following set of information to define the flood parameters for the flood loss estimate provided in this report.

Study Region Name:	Shasta County
Scenario Name:	Shasta County Flood 7
Return Period Analyzed:	500
Analysis Options Analyzed:	No What-Ifs

General Building Stock Damage

HAZUS estimates that about 5,851 buildings will be at least moderately damaged. This is over 14% of the total number of buildings in the scenario. There are an estimated 1,711 buildings that will be completely destroyed. The definition of the 'damage states' is provided in Volume 1: Chapter 5 of the HAZUS Flood technical manual. Table 3 below summarizes the expected damage by general occupancy for the buildings in the region. Table 4 summarizes the expected damage by general building type.

Table 3: Expected Building Damage by Occupancy

	1-10		11-20		21-30		31-40		41-50		Substantially	
Occupancy	Count	(%)	Count	(%)	Count	(%)	Count	(%)	Count	(%)	Count	(%)
Agriculture	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
Commercial	0	0.00	6	42.86	3	21.43	0	0.00	0	0.00	5	35.71
Education	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
Government	1	6.25	13	81.25	2	12.50	0	0.00	0	0.00	0	0.00
Industrial	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
Religion	0	0.00	1	100.00	0	0.00	0	0.00	0	0.00	0	0.00
Residential	0	0.00	95	1.63	788	13.54	529	9.09	2,703	46.44	1,706	29.31
Total	**1**		**115**		**793**		**529**		**2,703**		**1,711**	

Table 4: Expected Building Damage by Building Type

Building	1-10		11-20		21-30		31-40		41-50		Substantially	
Type	Count	(%)	Count	(%)	Count	(%)	Count	(%)	Count	(%)	Count	(%)
Concrete	0	0.00	5	71.43	1	14.29	0	0.00	0	0.00	1	14.29
ManufHousing	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	728	100.00
Masonry	0	0.00	4	30.77	1	7.69	0	0.00	4	30.77	4	30.77
Steel	0	0.00	4	80.00	1	20.00	0	0.00	0	0.00	0	0.00
Wood	0	0.00	97	1.91	788	15.50	529	10.40	2,697	53.04	974	19.15

Essential Facility Damage

Before the flood analyzed in this scenario, the region had hospital beds available for use. On the day of the scenario flood event, the model estimates that 0 hospital beds are available in the region.

Table 5: Expected Damage to Essential Facilities

		# Facilities		
Classification	Total	At Least Moderate	At Least Substantial	Loss of Use
Fire Stations	38	4	0	0
Hospitals	3	0	0	0
Police Stations	9	1	0	0
Schools	120	12	0	0

If this report displays all zeros or is blank, two possibilities can explain this.

(1) None of your facilities were flooded. This can be checked by mapping the inventory data on the depth grid.

(2) The analysis was not run. This can be tested by checking the run box on the Analysis Menu and seeing if a message box asks you to replace the existing results.

Debris Generation

HAZUS estimates the amount of debris that will be generated by the flood. The model breaks debris into three general categories: 1) Finishes (dry wall, insulation, etc.), 2) Structural (wood, brick, etc.) and 3) Foundations (concrete slab, concrete block, rebar, etc.). This distinction is made because of the different types of material handling equipment required to handle the debris.

The model estimates that a total of 212,297 tons of debris will be generated. Of the total amount, Finishes comprises 23% of the total, Structure comprises 38% of the total. If the debris tonnage is converted into an estimated number of truckloads, it will require 8,492 truckloads (@25 tons/truck) to remove the debris generated by the flood.

Shelter Requirements

HAZUS estimates the number of households that are expected to be displaced from their homes due to the flood and the associated potential evacuation. HAZUS also estimates those displaced people that will require accommodations in temporary public shelters. The model estimates 8,137 households will be displaced due to the flood. Displacement includes households evacuated from within or very near to the inundated area. Of these, 22,205 people (out of a total population of 163,256) will seek temporary shelter in public shelters.

The total economic loss estimated for the flood is 1,333.91 million dollars, which represents 34.33 % of the total replacement value of the scenario buildings.

Building-Related Losses

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

The total building-related losses were 1,313.97 million dollars. 1% of the estimated losses were related to the business interruption of the region. The residential occupancies made up 66.04% of the total loss. Table 6 below provides a summary of the losses associated with the building damage.

Table 6: Building-Related Economic Loss Estimates

(Millions of dollars)

Category	Area	Residential	Commercial	Industrial	Others	Total
Building Loss						
	Building	545.46	100.18	17.26	20.20	683.09
	Content	334.00	190.55	30.37	66.10	621.01
	Inventory	0.00	3.66	5.56	0.66	9.87
	Subtotal	**879.46**	**294.38**	**53.18**	**86.95**	**1,313.97**
Business Interruption						
	Income	0.02	1.13	0.00	0.17	1.31
	Relocation	1.09	0.25	0.00	0.06	1.40
	Rental Income	0.31	0.16	0.00	0.00	0.48
	Wage	0.06	1.16	0.00	8.62	9.84
	Subtotal	**1.47**	**2.70**	**0.00**	**8.85**	**13.02**
ALL	**Total**	**880.93**	**297.08**	**53.19**	**95.80**	**1,326.99**

Appendix A: County Listing for the Region

California

- Shasta

Appendix B: Regional Population and Building Value Data

	Population	Building Value (thousands of dollars)		
		Residential	Non-Residential	Total
California				
Shasta	163,256	9,410,456	2,772,919	12,183,375
Total	**163,256**	**9,410,456**	**2,772,919**	**12,183,375**
Total Study Region	**163,256**	**9,410,456**	**2,772,919**	**12,183,375**

INSTRUCTIONS FOR USING THE PLAN REVIEW CROSSWALK FOR REVIEW OF LOCAL MITIGATION PLANS

Attached is a Plan Review Crosswalk based on the ***Local Multi-Hazard Mitigation Planning Guidance***, published by FEMA in July, 2008. This Plan Review Crosswalk is consistent with the *Robert T. Stafford Disaster Relief and Emergency Assistance Act* (Stafford Act), as amended by Section 322 of the *Disaster Mitigation Act of 2000* (P.L. 106-390), the *National Flood Insurance Act of 1968,* as amended by the *National Flood Insurance Reform Act of 2004* (P.L. 108-264) and *44 Code of Federal Regulations (CFR) Part 201 – Mitigation Planning,* inclusive of all amendments through October 31, 2007.

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, however, all elements apply. States that have additional requirements can add them in the appropriate sections of the *Local 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.:

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 **new or updated** 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.		S
B. Does the **new or updated** 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.	N	
		SUMMARY SCORE	**N**	

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.

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

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

Risk Assessment	N	S
5. Identifying Hazards: §201.6(c)(2)(i)		
6. Profiling Hazards: §201.6(c)(2)(i)		
7. Assessing Vulnerability: Overview: §201.6(c)(2)(ii)		
8. Assessing Vulnerability: Addressing Repetitive Loss Properties. §201.6(c)(2)(ii)		
9. Assessing Vulnerability: Identifying Structures, Infrastructure, and Critical Facilities: §201.6(c)(2)(ii)(B)		
10. Assessing Vulnerability: Estimating Potential Losses: §201.6(c)(2)(ii)(B)		
11. Assessing Vulnerability: Analyzing Development Trends: §201.6(c)(2)(ii)(C)		
12. Multi-Jurisdictional Risk Assessment: §201.6(c)(2)(iii)		

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

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.

Mitigation Strategy	N	S
13. Local Hazard Mitigation Goals: §201.6(c)(3)(i)		
14. Identification and Analysis of Mitigation Actions: §201.6(c)(3)(ii)		
15. Identification and Analysis of Mitigation Actions: NFIP Compliance. §201.6(c)(3)(ii)		
16. Implementation of Mitigation Actions: §201.6(c)(3)(iii)		
17. Multi-Jurisdictional Mitigation Actions: §201.6(c)(3)(iv)		

Plan Maintenance Process	N	S
18. Monitoring, Evaluating, and Updating the Plan: §201.6(c)(4)(ii)		
19. Incorporation into Existing Planning Mechanisms: §201.6(c)(4)(ii)		
20. 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	
See Reviewer's Comments	
PLAN APPROVED	

LOCAL MITIGATION PLAN REVIEW CROSSWALK

Local Mitigation Plan Review and Approval Status

Jurisdiction:	Title of Plan:	Date of Plan:
Local Point of Contact:	Address:	
Title:		
Agency:		
Phone Number:	E-Mail:	

State Reviewer:	Title:	Date:

The following information must be completed by the State Reviewer prior to submission to the regional office:

Review Priority: __ **Routine** **or** __ **Immediate (If immediate, indicate reason)**

- __ **Pending Project Approval**
- __ **Pending Project Close-out**
- __ **Pending Declaration**
- __ **Other** _____

__ **When plans are submitted simultaneously for immediate review, write numerical prioritization (e.g. 1, 2, 3, etc.) on each plan submitted**

Funding Source: __ **HMGP (DR #** _____**)** __ **PDM-C (EMK #** _____**)**

__ **FMA (EMK #** _____**)** __ **CRS**

__ **PDM (EMK #** _____**)** __ **Other** _____

LOCAL MITIGATION PLAN REVIEW CROSSWALK

FEMA Reviewer:	Title:	Date:
Date Received in FEMA Region [Insert #]		
Plan Not Approved		
Plan Approved		
Date Approved		

Jurisdiction:	DFIRM		NFIP Status*			
	In Plan	NOT in Plan	Y	N	N/A	CRS Class
1)						
2)						
3)						
4)						
5)						
6)						
7)						
8)						
9)						
10)						
[ATTACH PAGE(S) WITH ADDITIONAL JURISDICTIONS]						

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

PREREQUISITE(S)

1. 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 **new or updated** plan?				
B. Is supporting documentation, such as a resolution, included?				
		SUMMARY SCORE		

2. 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 **new or updated** plan indicate the specific jurisdictions represented in the plan?				
B. For each jurisdiction, has the local governing body adopted the **new or updated** plan?				
C. Is supporting documentation, such as a resolution, included for each participating jurisdiction?				
		SUMMARY SCORE		

3. 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 **new or updated** plan describe **how** each jurisdiction participated in the plan's development?				
B. Does the updated plan identify all participating jurisdictions, including new, continuing, and the jurisdictions that no longer participate in the plan?				
		SUMMARY SCORE		

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

4. 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 **new or updated** plan?				
B. Does the **new or updated** plan indicate who was involved in the **current** 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.*?)				
C. Does the **new or updated** 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?)				
D. **Does the new or updated plan discuss the** opportunity for neighboring communities, agencies, businesses, academia, nonprofits, and other interested parties to be involved in the planning process?				
E. Does the planning process describe the review and incorporation, if appropriate, of existing plans, studies, reports, and technical information?				
F. Does the updated plan document how the planning team reviewed and analyzed each section of the plan and whether each section was revised as part of the update process?				
		SUMMARY SCORE		

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.*

5. 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 **new or updated** plan include **a description** of the types of **all natural hazards** that affect the jurisdiction?				
		SUMMARY SCORE		

6. 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 **new or updated** plan?				
B. Does the risk assessment identify the **extent** (*i.e.*, magnitude or severity) of each hazard addressed in the **new or updated** plan?				
C. Does the plan provide information on **previous occurrences** of each hazard addressed in the **new or updated** plan?				
D. Does the plan include the **probability of future events** (*i.e.*, chance of occurrence) for each hazard addressed in the **new or updated** plan?				
		SUMMARY SCORE		

7. 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 **new or updated** plan include an **overall summary** description of the jurisdiction's **vulnerability** to each hazard?				
B. Does the **new or updated** plan address the **impact** of each hazard on the jurisdiction?				
		SUMMARY SCORE		

8. Assessing Vulnerability: Addressing Repetitive Loss Properties

Requirement §201.6(c)(2)(ii): *[The risk assessment]* ***must*** *also address National Flood Insurance Program (NFIP) insured structures that have been repetitively damaged floods.*

Element	Location in the Plan (section or annex and page #)	Reviewer's Comments	SCORE N	SCORE S
A. Does the new or updated plan describe vulnerability in terms of the types and numbers of *repetitive loss properties* located in the identified hazard areas?				
		SUMMARY SCORE		

9. 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 **new or updated** plan describe vulnerability in terms of the **types and numbers** of **existing** buildings, infrastructure, and critical facilities located in the identified hazard areas?				
B. Does the **new or updated** plan describe vulnerability in terms of the **types and numbers** of **future** buildings, infrastructure, and critical facilities located in the identified hazard areas?		***Note: A "Needs Improvement" score on this requirement will not preclude the plan from passing.***		
		SUMMARY SCORE		

10. 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)(ii)(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 **new or updated** plan estimate **potential dollar losses** to vulnerable structures?		***Note: A "Needs Improvement" score on this requirement will not preclude the plan from passing.***		
B. Does the **new or updated** plan describe the **methodology** used to prepare the estimate?		***Note: A "Needs Improvement" score on this requirement will not preclude the plan from passing.***		
		SUMMARY SCORE		

11. 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 **new or updated** plan describe land uses and development trends?		***Note: A "Needs Improvement" score on this requirement will not preclude the plan from passing.***		
		SUMMARY SCORE		

12. 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 **new or updated** plan include a risk assessment for each participating jurisdiction as needed to reflect unique or varied risks?				
		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.*

13. 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 **new or updated** plan include a description of mitigation **goals** to reduce or avoid long-term vulnerabilities to the identified hazards?				
		SUMMARY SCORE		

14. 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 **new or updated** plan identify and analyze a **comprehensive range** of specific mitigation actions and projects for each hazard?				
B. Do the identified actions and projects address reducing the effects of hazards on **new** buildings and infrastructure?				
C. Do the identified actions and projects address reducing the effects of hazards on **existing** buildings and infrastructure?				
		SUMMARY SCORE		

15. Identification and Analysis of Mitigation Actions: National Flood Insurance Program (NFIP) Compliance

Requirement: §201.6(c)(3)(ii): *[The mitigation strategy] must also address the jurisdiction's participation in the National Flood Insurance Program (NFIP), and continued compliance with NFIP requirements, as appropriate.*

Element	Location in the Plan (section or annex and page #)	Reviewer's Comments	SCORE N	SCORE S
A. Does the new or updated plan describe the jurisdiction (s) participation in the NFIP?				
B. Does the mitigation strategy identify, analyze and prioritize actions related to continued compliance with the NFIP?				
		SUMMARY SCORE		

16. 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 **new or updated** mitigation strategy include how the actions are **prioritized**? (For example, is there a discussion of the process and criteria used?)				
B. Does the **new or updated** mitigation strategy address how the actions will be implemented and administered, including the responsible department , existing and potential resources and the timeframe to complete each action?				
C. Does the **new or updated** prioritization process include an emphasis on the use of a **cost-benefit review** to maximize benefits?				
D. Does the **updated** plan identify the completed, deleted or deferred mitigation actions as a benchmark for progress, and if activities are unchanged (*i.e.*, deferred), does the updated plan describe why no changes occurred?				
		SUMMARY SCORE		

17. 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 **new or updated** plan include identifiable **action items** for each jurisdiction requesting FEMA approval of the plan?				
B. Does the **updated** plan identify the completed, deleted or deferred mitigation actions as a benchmark for progress, and if activities are unchanged (*i.e.*, deferred), does the updated plan describe why no changes occurred?				
		SUMMARY SCORE		

PLAN MAINTENANCE PROCESS

18. 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 **new or updated** plan describe the method and schedule for **monitoring** the plan, including the responsible department?				
B. Does the **new or updated** plan describe the method and schedule for **evaluating** the plan, including how, when and by whom (*i.e.* the responsible department)?				
C. Does the **new or updated** plan describe the method and schedule for **updating** the plan within the five-year cycle?				
		SUMMARY SCORE		

19. 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 **new or updated** plan identify other local planning mechanisms available for incorporating the mitigation requirements of the mitigation plan?				
B. Does the **new or updated** plan include a process by which the local government will incorporate the mitigation strategy and other information contained in the plan (*e.g.*, risk assessment) into other planning mechanisms, when appropriate?				
C. Does the **updated** plan explain how the local government incorporated the mitigation strategy and other information contained in the plan (*e.g.*, risk assessment) into other planning mechanisms, when appropriate?				
		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 **new or updated** 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?)				
		SUMMARY SCORE		

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	☐	☐	☐	☐	☐	☐	☐	☐	☐
Levee Failure	☐	☐	☐	☐	☐	☐	☐	☐	☐
Flood	☐	☐	☐	☐	☐	☐	☐	☐	☐
Hailstorm	☐	☐	☐	☐	☐	☐	☐	☐	☐
Hurricane	☐	☐	☐	☐	☐	☐	☐	☐	☐
Land Subsidence	☐	☐	☐	☐	☐	☐	☐	☐	☐
Landslide	☐	☐	☐	☐	☐	☐	☐	☐	☐
Severe Winter Storm	☐	☐	☐	☐	☐	☐	☐	☐	☐
Tornado	☐	☐	☐	☐	☐	☐	☐	☐	☐
Tsunami	☐	☐	☐	☐	☐	☐	☐	☐	☐
Volcano	☐	☐	☐	☐	☐	☐	☐	☐	☐
Wildfire	☐	☐	☐	☐	☐	☐	☐	☐	☐
Windstorm	☐	☐	☐	☐	☐	☐	☐	☐	☐
Other _____	☐	☐	☐	☐	☐	☐	☐	☐	☐
Other _____	☐	☐	☐	☐	☐	☐	☐	☐	☐
Other _____	☐	☐	☐	☐	☐	☐	☐	☐	☐

To check boxes, double click on the box and change the default value to "checked."

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 **new or updated** plan?
B. Does the risk assessment identify the extent (*i.e.*, magnitude or severity) of each hazard addressed in the **new or updated** plan?
C. Does the plan provide information on previous occurrences of each natural hazard addressed in the **new or updated** plan?
D. Does the plan include the probability of future events (*i.e.*, chance of occurrence) for each hazard addressed in the plan?

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 the new or updated 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.*

To check boxes, double click on the box and change the default value to "checked."

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	N	S		
Avalanche	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐		
Coastal Erosion	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐		
Coastal Storm	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐		
Dam Failure	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐		
Drought	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐		
Earthquake	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐		
Expansive Soils	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐		
Levee Failure	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐		
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 **new or updated** plan include an overall summary description of the jurisdiction's vulnerability to each hazard?

B. Does the **new or updated** plan address the impact of each hazard on the jurisdiction?

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

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

B. Does the **new or updated** 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 **new or updated** plan estimate potential dollar losses to vulnerable structures?

B. Does the **new or updated** plan describe the methodology used to prepare the estimate?

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	☐	☐	☐
Levee Failure	☐	☐	☐
Flood	☐	☐	☐
Hailstorm	☐	☐	☐
Hurricane	☐	☐	☐
Land Subsidence	☐	☐	☐
Landslide	☐	☐	☐
Severe Winter Storm	☐	☐	☐
Tornado	☐	☐	☐
Tsunami	☐	☐	☐
Volcano	☐	☐	☐
Wildfire	☐	☐	☐
Windstorm	☐	☐	☐
Other _____	☐	☐	☐
Other _____	☐	☐	☐
Other _____	☐	☐	☐

To check boxes, double click on the box and change the default value to "checked."

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

Minutes from the Meeting with the City of Anderson
Monday, November 15, 2010

In attendance: **Jeff Kiser, Public Works Director, City of Anderson**
Mary Mitchell, WSRCD, District Manager
Dave DeMar, WSRCD, GIS Specialist, Project Manager
Rachel Aschbacher, WSRCD, Project Coordinator

The meeting began at 10:10 AM in the plan meeting room at the City of Anderson

The agenda was presented and reviewed.

Planning Overview: Dave reviewed the powerpoint presentation on Hazard Mitigation Planning, focusing on the several new pages focused on the Anderson area.

Identifying priority hazards for Anderson: There is no doubt that flooding is the #1 hazard. The groundwater level in the Anderson area is fairly high. The two main contributors to flooding problems are the Tormey Drain, which collects most of the surface water and directs it into the Sacramento River and ACID leaking ditches. Anderson Creek picks up a lot of the leaking water from ACID and it drains into the Sacramento River. When BOR raises the level of the river by increases the releases from Shasta Dam, it backs up the drainage flow into the river causing flooding. Tormey Drain is getting overgrown with vegetation, which is a big problem. Spraying overgrowth increases dead plant material in the drain, which catches sediment and eventually results in lost capacity. There is never a good time to clean out the ditch since in summer months the drain is never dry due to ACID leaking ditches during irrigation season and the occasional ditch blowout.

Jeff explained that Anderson is unique in that the City is cut in half by Interstate 5 and the north-south railroad, which moves a lot of freight through the city daily. Accidents and derailments could create significant hazardous materials issues and possibly mass casualty incidents. Jeff noted that the police department is located on the east side of the railroad and the fire district on the west side. Any blockage of east-west traffic can create a significant problem.

Wildfire is not much of a direct issue for the City, but the indirect issues are. For instance, when CAL FIRE sets up a wildfire command center at the District Fairgrounds, their water tenders fill up on City water. There is a huge draw on resources.

One area where fuels reduction would be very beneficial is Anderson River Park.

Although the top five hazards identified for Shasta County are the same top five for Anderson, the order is different for the City. Preferred order for Anderson is:

1. Flooding
2. Hazardous Materials
3. Extreme Weather
4. Earthquake
5. Wildfire

Identify plans that may lend information and data to the HMP: Jeff will look into publications and plans that may be helpful in development of the HMP.

Identifying projects:
* Ideally a communication system could be set up with BOR that when releases are increased at the dam, perhaps a reverse 911 system could notify landowners and the City.
* How to fund the extensive permitting needed to take care of the vegetation maintenance in Tormey Drain.
* How to modernize the fairgrounds so CAL FIRE doesn't have to bring in so much communications and equipment to set up the incident command center.
* Fuels reduction and maintenance in Anderson River Park.
* Culvert replacement to prevent flooding in Anderson River Park.

Review the public meeting focus: The plan for the upcoming meeting in the City of Anderson's community room on November 30 at 5:30 PM was discussed. Jeff will brief City Council tomorrow night on the upcoming meeting.

The meeting ended at 10:45 AM.

Meeting with the City of Anderson

Hazard Mitigation Planning

Sign in Sheet

November 15, 2010

Name	Representing	Phone	Email
Mary Mitchell	WSRCD	3657332	mary@westernshasta rcd.org
Rachel Aschbacher	WSRCD	365-7332	rachel@westernshastarcd.org
David Dellar	WSRCD	365-7332 x212	dave@westernshastarcd.org
Jeff Kiser	C of A	378-6636	jkiser@ci.anderson.ca.us

Minutes from the Meeting with Shasta County Public Health
Tuesday, November 23, 2010

In attendance: **Dave Moran, Program Manager, Shasta County Public Health**
Nicole Bonkrude, Shasta County Public Health
Dave DeMar, WSRCD, GIS Specialist, Project Manager
Rachel Aschbacher, WSRCD, Project Coordinator

The meeting began at 9:30 AM in the conference room at the Shasta County Public Health office on Breslauer Way in Redding California.

The agenda was presented and reviewed.

Planning Overview: Dave reviewed the powerpoint presentation on Hazard Mitigation Planning.

Identifying biological hazards for Shasta County: A review of the spreadsheet sent out to steering committee members requesting county information was reviewed with comments from Shasta County Public Health. It was felt that the questions on the spreadsheet were a great help to identifying information needed for the HMP. Dave Moran and Nicole … were able to give some information relating to Pandemics and MCI and will follow up with more information after identifying specific information requested by Dave DeMar.

Pandemic concerns are centered on Category A Select Agents in the area.

Identify plans that may lend information and data to the HMP: A list of Grant funded projects being performed by the Shasta County Public Health office will be sent to the WSRCD for inclusion in the SCHMP.

Review the public meeting focus: Briefly discussed the upcoming public meetings in the Cities of Anderson and Redding and what general information the Shasta County Public Health would like to have presented in relation to the SCHMP.

The meeting ended at 11:00 AM.

Shasta County Multi-jurisdiction Hazard Mitigation Plan
Public Meeting at the Anderson Community Center
Tuesday, November 30, 2010
5:30 PM

In attendance:
ENPLAN: Clay Guzi, Todd Burciaga
Shasta County: Jan Bulinski
WSRCD: Mary Mitchell, Dave DeMar

Guests:
Jeff Kiser
Juanita Barnett
Marty Mofield
Jeff Smith
Ron Barnett
Marcia Burchid

The meeting opened with a welcome and 30-minute PowerPoint presentation by Dave DeMar about hazard mitigation planning and a review of maps of Shasta County land ownership, Shasta County wildfire history, Shasta County wildfire hazard rating, fuels reduction plans, urban flood zones in south Shasta County, City of Anderson, Anderson flood zone.

The presentation was followed by a question and answer session on the following:

Q: Can the presentation be viewed on line?
A: Yes, we will put it on the WSRCD web site as soon as possible.

Q: When was the largest earthquake in this area?
A: The last sizeable earthquake was in 1998.

Q: Does the Anderson Fire Protection District have full time staff?
A: Yes, the chief, marshall and paid office staff. The staff is larger during summer months.

Q: Where can I see the location of my home in the Anderson floodplain?
A: We will show you the map, which is on display here tonight. Or we can put the plan online.

Q: Is there a similar flood map for dam failure?
A: Yes, but the public doesn't have access to that information. A total breach of Shasta or Keswick dams is unrealistic. What is of greater risk is what would cause unscheduled release of water from the dams.

Q: What about volcanic eruption and the area of devastation?
A: If it was Mt. Lassen, due to the typical wind, most of the ash would go east. Would expect there would be air quality issues, like the dense smoke issues with the 2008 wildfires.

Q: What about ash levels and how do we protect ourselves from it?
A: It depends on prevailing winds and we expect most of it would blow east. And for that type of hazard, there would be plenty of early warning like there was with Mt. St. Helens.

Q: As far as critical facilities are concerned, will those be addressed?
A: Yes, as well as roads, bridges, power lines, schools, fire protection facilities and how all of this could be impacted and how much it costs to replace the facilities. Computer models provide a good idea of this cost.

Q: Why is this plan being done?
A: It is a proactive approach to identifying risks and potential mitigation projects that can lessen the impact of a hazard occurring. It is a living document that will be updated every five years.

Q: Will the plan specify what actions to take in a disaster?
A: No, this is not an operational plan, but will include a list of what operational plans are out there.

Q: I live in the county but my kids go to school in Anderson. Will there be more information about the county?
A: Yes, there will be a public meeting for the county on December 14th at the Community Room at Redding City Hall.

Q: What radio station would be the best to tune into during a disaster?
A: That is in the operational plans and Shasta County Public Health has a great framework for emergency services. Here is a flyer from Public Health and the Sheriff's Department on disaster preparedness, called Ready Shasta. There are several websites listed that have additional informational.

Q: Has WSRCD been contracted by Anderson to do this plan?
A: The City of Anderson is tagging onto the Shasta County agreement with Enplan Consulting and the RCD is assisting in writing the plan.

The meeting ended at 6:30 PM.

City of Anderson – Hazard Mitigation Plan
November 30, 2010 – Community Meeting

WESTERN SHASTA RESOURCE CONSERVATION DISTRICT

SIGN IN SHEET

NAME	ADDRESS	PHONE NUMBER	E-MAIL ADDRESS
	If not on file		
Jeff Kiser			
Clay Guzi			cguzi@enplan.com
Mary Hutchison			wsrcd
David DeMar			wsrcd
Jan Bulinski			jbulinski@co.shasta.ca.us
Jeanette Barnett	2946 Sandstone Dr. And	365-7181	jbarnett@ci.anderson.ca.us
Toda Burciaga			tburciaga@enplan.com
MARTY MOFIELD			MMofield@ci.anderson.ca.us
JEFF SMITH	4730 PHEASANT		jeff-lindasmith@sbcglobal.net
RON BARNETT	2546 Sandstone DR	365-7181	rjbarnett@charter.net
Marcia Burchiel			marcia.burchiel@calema.ca.gov

Ready Shasta

SHASTA COUNTY • EMERGENCY PREPAREDNESS • PLAN TO BE SAFE

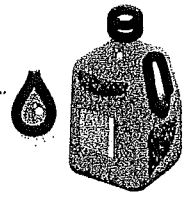
Plan 9

You can do this!

Collect these nine essential items to help you shelter-in-place in the event of an emergency.

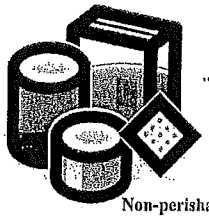
Start here

1 Water



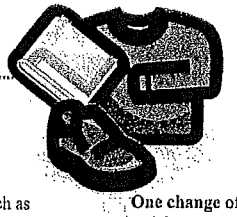
One gallon per person, per day for three days.

2 Food



Non-perishables, such as canned or packaged food.

3 Clothes

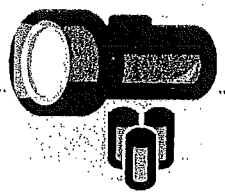


One change of clothes and footwear per person.

4 Medications

Three days' worth of prescription medications.

5 Flashlight

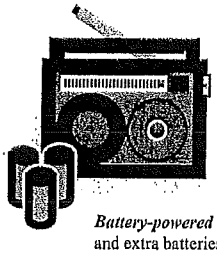


A bright flashlight and extra batteries.

6 Can Opener

***Manual* can opener** in case there's no electric power.

7 Radio

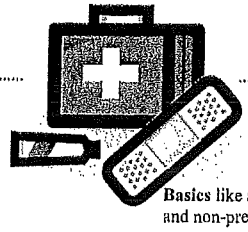


***Battery-powered* radio** and extra batteries.

8 Hygiene Items

Basics like soap, toilet paper and a toothbrush.

9 First Aid



Basics like antiseptic, bandages, and non-prescription medicines.

Done!

For more information about emergency preparedness, contact some of the following organizations or call 1-800-971-1999 or 530-225-5591.

Shasta County, CA	co.shasta.ca.us
Shasta County Sheriff	sheriff.co.shasta.ca.us
Shasta County Public Health	shastapublichealth.net
Be Prepared California	beperparedcalifornia.ca.gov
American Red Cross	redcross.org
Centers for Disease Control	cdc.gov
Disability Preparedness	disabilitypreparedness.gov
Federal Emergency Management Agency	fema.gov
U.S. Department of Homeland Security	ready.gov
Humane Society of the United States	hsus.org/disaster

(For help with pet preparation.)

building a healthier community
Shasta County Public Health
www.shastapublichealth.net

APC
Advanced Practice Centers

Shasta County Multi-Jurisdiction Hazard Mitigation Plan
Public Meeting at the City of Redding Community Room
Tuesday, December 14, 2010
5:30 PM

In attendance:
ENPLAN: Clay Guzi
Shasta County: Jan Bulinski
WSRCD: Mary Mitchell, Dave DeMar

Guests:
Jeff Smith
Rick Simon
Nicole Bonkrude
Bruce Ross

The meeting opened with a welcome and 30-minute powerpoint presentation by Dave DeMar about hazard mitigation planning and a review of maps of Shasta County land ownership, Shasta County wildfire history, Shasta County wildfire hazard rating, fuels reduction plans, urban flood zones in south Shasta County.

The presentation was followed by a question and answer session on the following:

Q: Are there any levies in Shasta County?
A: Yes, several including Olney Creek.

Q: In the Extreme Weather hazard category, is freezing included?
A: Yes. Thee has been one declared hazard for a cold freeze in 2002.

Q: Will the report have a 500 year floodplain map update?
A: Yes. That data will be available in March 2011.

Q: What happens next in this process:
A: A draft will e sent to the Steering Committee for review. The Committee may change the ranking a bit. A final draft will be compiled that includes any issues brought up at the community meetings. The consultants will run the final draft through the CAL EMA Crosswalk, which is a checklist that identifies all of the key parts of the project to be sure it passes the test. Then it will go to FEMA and be approved by the Shasta County Board of Supervisors and Anderson City Council.

Q: What is the FEMA turnaround time?
A: We have been told six to eight weeks.

Q: What is the plan horizon? How long is it effective?

A: The plan has a 5-year life. Once this is fully adopted, it will be possible to apply for a grant to complete the 5-year update. It will be important in the update to show what progress has been made to implement any of the mitigation measures identified in the initial plan. Staff members in both Shasta County and City of Anderson are locating projects to add to this initial plan.

Q: In ranking hazards, how do you assess risk?
A: Some risks are quantifiable, such as frequency and the amount of damage expected. Others are a bit more difficult to quantify, such as flooding. We know flooding will occur, but the frequency and extent are more challenging so it becomes an expectation made by the Steering Committee and staff.

Q: Does the ranking of the hazards have any significance?
A: It is more of a planning tool on where to use resources for mitigation.

Q: What legal standing will the plan have? Is it binding?
A: No, it is not binding, but with both the County and City of Anderson adopting it, the projects for the top five hazards have a higher ranking in importance than the others. If we show progress on implementing priority projects it could be helpful on flood insurance rates.

Q: Could this plan be used as a baseline for a County Safety Element for the General Plan?
A: Very possible. It could be a foundation for policy measures that could become legally binding in a Safety Element.

The meeting ended at 6:30 PM.

County of Shasta – Hazard Mitigation Plan
December 14, 2010 – Community Meeting

WESTERN SHASTA RESOURCE CONSERVATION DISTRICT

SIGN IN SHEET

NAME	ADDRESS	PHONE NUMBER	E-MAIL ADDRESS
	If not on file		
Mary Mitchell	6270 Parallel Ave	3657332	mary@westernshastarcd.org
Clay Gozi	3179 Bechelli Ln. Redding 96002	604-7657	cguzi@enplan.com
JEFF SMITH	4730 PHEASANT DR. ANDERSON	365-0336	jeff-linda smith@sbcglobal.net
Rick Simon	Shasta Co.	225 5114	rsimon@co.shasta.ca.us
Nicole Bonkrude	6940 Riverside Dr. Redding 96001	276-8844	nbonkrude@co.shasta.ca.us
Jan Bulinski	1855 Placer Rdg	2456821	jbulinski@co.shasta.ca.us
Bruce Ross	1101 Twin View Blvd	225-8298	BROSS@Redding.com

HMP Steering Committee Meeting
Tuesday, January 11, 2011
City of Redding – Caldwell Room
1:00 to 3:00 PM

In attendance: Lance Brown, DOT; Kurt Schneider, DOT; Rachel Aschbacher, WSRCD; David DeMar, WSRCD; Scott White, DOT; Dave Maron, Shasta County Public Health; Jan Bulinski, Shasta County Public Works; Sandy Long, Redding Rancheria; Ron Kingsley, USBR; Mark Mezzano, CHP; Jerry Flavin, CHP; Clay Guzi, ENPLAN; Mary Mitchell, WSRCD; John Kaylor, City of Redding; Kevin Kreitman, City of Redding; Fred Tulley, California Fire; Dave Dean, Shasta County; Lily Toy, City of Redding; David Durette, City of Anderson; Jim Whittle, Shasta County; Troy Bartolomei, Shasta County.

Clay Guzi opened the meeting and explained the work being done by ENPLAN and Western Shasta Resource Conservation District. Self-introductions followed.

David DeMar summarized what had been accomplished to date and reviewed each section of the draft HMP and requested comments. No comments were made on Sections 1, 2, and 3. In Section 4, it was noted that anywhere it mentions City/Fire Department should also include the County. In Section 5, page 9, Shasta County OES is not part of the Fire Department, but rather the Sheriff's Office and in Shasta County OES it mentions the Tri-County Coordinator, which may not exist at this time. In Section 5, it was noted that there were no action items listed for the Flood Objective regarding adopting zoning regulations (page 20).

Each hazard was discussed and the following action items or suggestions were made:

Flood

- Create electronic maps showing flood prone tributaries of the Sacramento River. Some gage data available to identify these flood events (e.g CDEC website - http://cdec.water.ca.gov/). Identifying flood areas and gages would be helpful to relay flooding potential to agencies.
- Work with the California Data Exchange Center to get the ability to send out county-wide alerts on tributary flooding.
- Cal EMA 2011 is planning the Golden Guardian Exercise statewide.
- Create a map of lifeline escape routes during floods.
- Identify repetitive flooding areas.
- Regional Transportation Planning Authority is working on a county-wide GIS system for the web site, which is 3-4 years until completion.

Wildfire

- Annual training for fire departments and CAL FIRE summer staff, including defensible space inspections.
- Install wells in areas with inadequate water supply for firefighting.
- More public education programs.

Extreme Weather

- Caltrans noted that they meet with their Oregon counterparts prior to winter to plan for highway incidents.
- Caltrans has been approved to install 100-125 KVA generators at their nine maintenance facilities so the facilities can be used as critical facilities when the power is out.
- Most critical infrastructure needs generators for power backup, including the fuel to run generators.
- California Highway Patrol said they have annual meetings prior to both the snow season and fire season to discuss mitigation of hazardous road conditions during extreme weather.
- Public outreach and education regarding extreme weather and how to stay safe, where to go incase of extreme heat or cold.
- Reference was made to power outages and power shortages in regard to water/wastewater treatment facilities and the possible need for backup power generators.

Earthquake

- There currently is a ten-year plan for addressing needs for bridges and roads. Caltrans suggested the need for advanced planning on the seismic retrofit of numerous bridges (e.g. the Pit River Bridge) – There is a need for planning dollars to make a determination between retrofit vs. replacement. This advanced planning would be used to identify the scope, cost, and prioritization of seismic retrofits of bridges.
- Need code enforcement of the County plan.

Hazardous Materials

- When funded vehicle inspection stations (e.g. Dunsmuir and Cottonwood) can identify hazardous materials along the I-5 corridor.
- The City Fire Department received a record from the Union Pacific Railroad on what hazardous materials move through the city by rail.
- SCHMIRT (Shasta County Hazardous Materials…….) has a lot of information on this issue.
- First responders would like a map of where hazardous materials are stored and the area of evacuation for the various materials. It was mentioned that each business with hazardous materials has to identify the evacuation area for their own hazard. In most hazardous materials cases, it is best to shelter people in place.
- Some population centers received evacuation shelter location maps in their utility bills, but not all areas were covered.
- General county preparedness and SIMS/NIMS training of personnel.

Volcano

- The committee felt the threat of volcanic explosion would be received very early and action plans put in place. Specific recommendations for mitigating this hazard include the continued monitoring of seismic and volcanic activity in the region to allow for early notification of potential threats.

]

Chemical/Biological

- The Bureau of Reclamation has an annual county-wide disaster drill, each year it covers a different aspect of the potential disasters. One is scheduled for 2011.
- A multi-agency mock drill would be helpful if it was activated by communications between agencies to determine who is ready and who is not.
- The Highway Patrol has a rig with communication systems to every agency. It has visited the north state recently. At that exercise, Verizon brought out a portable cell tower and could show live video feed from a helicopter. Cell phones did not work well in the drill.
- training mock disaster drill will be undertaken at the airport in the spring. The airport drills every three years.
- The Postal Service held a biological detection drill this past year and will do another in three years.
- Check into the distribution of Chem Packs through the hospitals.
- Many agencies need backup communication centers. Just switching locations when one system is out may not work in a big emergency.
- The 911 system needs an infrastructure upgrade.
- STAIRES (?) has identified all of the Ham operators if the phone system goes down.

Pandemic/Epidemic

- Conduct an Isolation and Quarantine Tabletop Exercise by Spring 2013
- Annual Mass Vaccination Exercises held

Mass Casualty

- Plans are at place at the hospitals.
- CAL FIRE has trailers to handle up to 20 patients each in various locations around the state.
- Highway Patrol drills all include mass casualty.
- Statewide Medical Health Exercise developed and conducted November 2010 practiced Mass Casualty Event-25 healthcare agencies participated along with 25 Shasta Dam first responder and law enforcement agencies
- Quarterly Shasta County Sierra-Sacramento Valley Emergency Medical Services meetings
- County wide EMS MCI field operations guide in process
- Consultant hired to develop a county wide fatality management plan 2010-2011
- Consultant hired to develop a Government-Authorized Alternate Care Site (ACS) Plan Annex to ERP 2011
- ACS Exercise planned in combination with Redding Air Show September 2011

Dam Failure

- The committee agreed to change the term dam failure to dam flooding . The last threat of overtopping Shasta Dam was in 1998 when inflow to the lake reached 225,000 cfs with a maximum outflow of 78,000 cfs. It did not overflow.

Overall
Caltrans suggested a single source directory of Emergency Operations Centers with points of contact would be beneficial.

Public Health received a Disaster Healthcare Volunteer grant to assist the Red Cross in shelters in response to all hazards.

Participants agreed to review projects they might be undertaking over the next five years and get the information to David DeMar within the next two weeks.

County of Shasta – Hazard Mitigation Plan
January 11, 2011 – Steering Commitee Meeting

WESTERN SHASTA RESOURCE CONSERVATION DISTRICT

SIGN IN SHEET

NAME	ADDRESS	PHONE NUMBER	E-MAIL ADDRESS
	If not on file		
Lance Brown	1657 Riverside Dr	225-3251	lance_brown@dot.ca.gov
Kurt Schneider	1657 River side DR.	225-3382	kurt_schneider@dot.ca.gov
Rachel Aschbacher	6270 Parallel Rd Anderson	365-7332	rachel@westernshastarcd.org
Scott White	1657 Riverside Dr	229-0518	Scott_White@dot.ca.gov
Dave Maron	2650 Breslauer	225 5593	DMARON@CO.SHASTA.CA.US
Sandy Long		242-4596	sandyl@redding-rancharia.com
Ron Kingsley	16349 Shasta Dam Blvd Shasta Lake 96019	276-2026	rkingsley@usbr.gov
Mark Mezzano	2503 Cascade Bl Redding	242-3200	M.MEZZANO@CHP.CA.GOV
Jerry Flavin	2503 Cascade Bl Redding	242-3200	JFLAVIN@CHP.CA.GOV
Clay Guzi	3179 Bechelli Lane, Redding	221-0440	cguzi@enplan.com
Mary Mitchell	6270 Parallel Rd 07	3657332x202	mary@westernshastarcd.org
John Kaylor	777 Cypress Ave., RDG. 96002	225-4572	jKaylor@ci.redding.ca.us
Kevin Kreitman	" "	225-4142	KKreitman@ci.redding.ca.us
Fred Tulley	875 Cypress Ave., Rdg 96001	225-2401	fred.tulley@fire.ca.gov
Dave Dean	1525 Court St. RDG. 96001	245-6148	ddean@co.shasta.ca.us

County of Shasta – Hazard Mitigation Plan
January 11, 2011 – Steering Commitee Meeting

WESTERN SHASTA RESOURCE CONSERVATION DISTRICT

SIGN IN SHEET

NAME	ADDRESS	PHONE NUMBER	E-MAIL ADDRESS
	If not on file		
Lily Toy	777 Cypress Avenue	245-7231	Ltoy@ci.redding.ca.us
DAVID DURETTE	City of Anderson	378-6641	ddurette@ci.anderson.ca.us
JIM WHITTLE	SHASTA COUNTY 1855 PLACER ST.	225-5406	jwhittle@co.shasta.ca.us
TROY BARTOLOMEI	SHASTA COUNTY D.P.W.	225-5667	tbartolomei@co.shasta.ca.us

Minutes from the Meeting with the City of Anderson
Thursday, February 03, 2010

In attendance: **Jeff Kiser, Public Works Director, City of Anderson**
Mary Mitchell, WSRCD, District Manager
Dave DeMar, WSRCD, GIS Specialist, Project Manager
Rachel Aschbacher, WSRCD, Project Coordinator

The meeting began at 9:00 AM in the plan meeting room at the City of Anderson

The agenda was presented and reviewed.

Identify hazards within future building and infrastructure in the City:
The General Plan speaks to the proposed residential development to the east of Rhonda Road and the Wal-Mart shopping center.

Discussion of information needed for projects identified in the Plan:
Presented template for identifying the projects. Jeff will identify projects, fill out tables and forward the in the information in the coming week.

Identify Projects planned by the City to mitigate hazards:
* Develop communication system could be set up with BOR to communicate increased releases at the dam.
* Vegetation maintenance in Tormey Drain.
*Modernize communications and equipment for an incident command center at the fairgrounds so CAL FIRE doesn't have to bring in so much communications and equipment
* Fuels reduction and maintenance in Anderson River Park.
* Culvert replacement to prevent flooding in Anderson River Park.

The meeting ended at 10:05 AM.

Appendix 3.B

2010 SURVEY AND SUMMARY OF RESPONSES

HOUSEHOLD NATURAL HAZARDS PREPAREDNESS SURVEY

Thank you for taking time to answer this survey and assist us in the preparation of a Shasta County Hazard Mitigation Plan. The survey will help us identify the level of understanding and preparedness in our county. The information you provide will help improve public/private coordination of preparedness and risk reduction activities within the county. Thank you!

NATURAL HAZARD INFORMATION

1. Have you or someone in your household been involved in a natural disaster within Shasta County, such as an earthquake, severe windstorm, wildfire, flood, or extreme heat?

___ Yes ___ No (If "NO" skip to question #2)

If "Yes" please check the natural disasters you or someone in your household experienced within Shasta County:

___ Drought
___ Dust Storm
___ Earthquake
___ Extreme Heat
___ Flood
___ Wildfire
___ Landslide/Debris flow
___ Household Fire
___ Volcanic Eruption
___ Windstorm
___ Winter Storm
___ Other_____

2. How concerned are you personally about the following potential for natural disasters to effect Shasta County? Circle the corresponding number for each hazard.

Natural Disaster	Not Concerned	Somewhat Concerned	Concerned	Very Concerned	Extremely Concerned
Drought	1	2	3	4	5
Dust Storm	1	2	3	4	5
Earthquake	1	2	3	4	5
Flood	1	2	3	4	5
Wildfire	1	2	3	4	5
Landslide/Debris flow	1	2	3	4	5
Household Fire	1	2	3	4	5
Volcanic Eruption	1	2	3	4	5
Windstorm	1	2	3	4	5
Severe Storm	1	2	3	4	5
Utility Disruption	1	2	3	4	5
Chemical/biological	1	2	3	4	5
Mass Casualty	1	2	3	4	5
Dam Failure	1	2	3	4	5
Pandemic/epidemic	1	2	3	4	5
Other: _____	1	2	3	4	5

3. Have you ever received information on how to make your family and home safer from natural disasters?
___ Yes ___ No (If "NO", skip to question 4)

If "Yes", on any particular subject? _____
How recently?
___ Within the last 6 months
___ Between 6 and 12 months ago
___ Between 1 and 2 years ago
___ Between 2 and 5 years ago
___ 5 years ago or more

From whom did you last receive information about how to make your family and home safer from natural disasters? (Check only one)
___ News media
___ Government agency
___ Insurance agent or company
___ Utility company
___ American Red Cross
___ Other non-profit organization
___ Not sure
___ Other: _____

4. Who would you most trust to provide you with information about how to make your family and home safer from natural disasters? (Please check all that apply)
___ News media
___ Government agency
___ Insurance agent or company
___ Utility company
___ Other: _____
___ University or research institution
___ American Red Cross
___ Other non-profit organization
___ Not sure

5. What is the most effective way for you to receive information about how to make your family7 and home safer from natural disasters? (Please check all that apply)
___ Newspaper stories
___ Newspaper ads
___ Television news
___ Television ads
___ Radio news
___ Radio Ads
___ Fact sheets or brochures
___ Public workshops/meetings
___ Academic institutions
___ Schools
___ Outdoor ads (billboards, etc)
___ Books
___ Mail
___ Fire Department/Rescue
___ Internet
___ Chamber of Commerce
___ Magazines
___ Other: _____

6. To assist in communicating information to Shasta County residents about how to better prepare for a natural disaster, which of the following phrases do you think is the easiest to understand? (Check only ONE)
___ Natural disaster readiness
___ Emergency preparedness
___ Other: _____
___ Disaster preparedness
___ Natural hazard risk reduction

NATURAL DISASTER PREPAREDNESS

7. Please check those activities that you **have done** in your household, **plan to do** in the near future, **have not done**, or are **unable to do**. (Please check one answer for each activity)

Have you or someone in your household:

Activity	**Yes**	**No, but would like to**	**Not Interested**
a. Attended meetings or received written information on natural disasters or emergency preparedness.	_____	_____	_____
b. Talked with members in our household about what to do in case of a natural disaster or emergency.	_____	_____	_____
c. Developed a "Household Emergency Plan" in order to decide what everyone would do in case of a household emergency.	_____	_____	_____
d. Prepared a "Disaster Supply kit" with extra food, water, batteries, or other emergency supplies?	_____	_____	_____

8. All of the above activities require a personal time commitment. How much time **each year** are you willing to spend on preparing yourself or your household for a natural disaster or emergency?

	Number of Hours will to spend				
Circle One:	0-1	2-5	6-10	11-15	16+

9. What steps have you taken in your household to prepare for a natural disaster? (Check all that apply)

Stored or stocked up on:
___ Food
___ Water
___ Flashlights
___ Batteries
___ Battery-powered radio
___ Medical supplies, first aid kit
___ Fire extinguisher
___ Smoke detectors

Other:
___ Prepared a Disaster Supply Kit
___ Received First Aid/CPR Training
___ Made a fire escape plan
___ Developed a reconnection plan, where to meet and who to call
___ Discussed utility shutoffs and locations
___ Other: _____

10. Does your household have insurance coverage for flood events?

___ Yes or ___ No

If "NO", what is the main reason? (Check only one)

___ Not located in a floodplain
___ Too expensive
___ Not necessary
___ Other: _____
___ Deductibles too high/not worth it
___ Don't know about it
___ Never considered it

11. Does your household have insurance coverage for earthquake events?

___ Yes or ___ No

If "NO", what is the main reason? (Check only one)

___ Too expensive
___ Not necessary
___ Never considered it
___ Deductibles too high/not worth it
___ Don't know about it
___ Other: _____

NATURAL HAZARD RISK REDUCTION

12. Did you consider the possible occurrence of a natural hazard when you bought or moved into your current home?

___ Yes or ___ No

13. Would you be willing to spend more money on a home that had features that made it more disaster resistant?

___ Yes or ___ No

14. How much more money are you willing to spend to better protect your family and home from natural disasters? (Check only one)

___ Less than $100
___ $100 to $499
___ $500 to $999
___ $1,000 to $2,499
___ $2,500 to $4,999
___ $5,000 and above
___ Nothing
___ Don't know
___ Other: _____

15. Which of the following incentives, if any, would motivate you to take additional steps to better protect your family and home from a natural disaster? (Check all that apply)

___ Insurance discount
___ Low interest rate loan
___ Lower new home construction cost
___ Mortgage discount
___ Tax break or incentive
___ None
___ Other: _____

GENERAL HOUSEHOLD INFORMATION

16. Please indicate your age: _____

17. Gender (check one): ___ Male ___ Female

18. Indicate your level of education:

___ Grade school/no schooling
___ Some high school
___ High school graduate (GED)
___ Some college or trade school
___ College degree
___ Postgraduate degree
___ Other: _____

19. Zip Code: _____

20. How long have you lived in Shasta County?

___ Less than one year
___ 1-4 years
___ 5-9 years
___ 10-19 years
___ 20 years or more

21. If you have lived in Shasta County for less than 20 years, where did you live before you moved to Shasta County?
City: _____ County: _____ State: _____

22. Do you have access to the Internet or World Wide Web?
___ Yes or ___ No

23. Do you own (or are buying) or renting your home?
___ Own or ___ Renting

Other Comments:

THANK YOU VERY MUCH FOR PROVIDING THIS INFORMATION!
Please return the survey by mail, email, or drop it off at either of the following:

Western Shasta RCD
Attention Mary Mitchell
6270 Parallel Road
Anderson, CA 96007
Email: mary@westernshastarcd.org

City of Anderson
Attention: Jeff Kiser
1887 Howard Street
Anderson, CA 96007

Appendix 3B

SURVEY ANSWERS

HOUSEHOLD NATURAL HAZARDS PREPAREDNESS SURVEY

Thank you for taking time to answer this survey and assist us in the preparation of a Shasta County Hazard Mitigation Plan. The survey will help us identify the level of understanding and preparedness in our county. The information you provide will help improve public/private coordination of preparedness and risk reduction activities within the county. Thank you!

NATURAL HAZARD INFORMATION

1. Have you or someone in your household been involved in a natural disaster within Shasta County, such as an earthquake, severe windstorm, wildfire, flood, or extreme heat?

___ Yes ___ No (If "NO" skip to question #2)

If "Yes" please check the natural disasters you or someone in your household experienced within Shasta County:

___ Drought
___ Dust Storm
___ Earthquake
___ Extreme Heat
___ Flood
___ Wildfire
___ Landslide/Debris flow
___ Household Fire
___ Volcanic Eruption
___ Windstorm
___ Winter Storm
___ Other_____

2. How concerned are you personally about the following potential for natural disasters to effect Shasta County? Circle the corresponding number for each hazard.

ANSWERS IN BOLD: Average of all responses

Natural Disaster	Not Concerned	Somewhat Concerned	Concerned	Very Concerned	Extremely Concerned
Drought	1	2	**2.7** 3	4	5
Dust Storm	**1.0**	2	3	4	5
Earthquake	1	2 **2.2**	3	4	5
Flood	1	**2.0**	3	4	5
Wildfire	1	2	3	**4.1**	5
Landslide/Debris flow	1	**1.6** 2	3	4	5
Household Fire	1	2	**2.7** 3	4	5
Volcanic Eruption	1	**2.1**	3	4	5
Windstorm	1	**2.1**	3	4	5
Severe Storm	1	2	**2.4** 3	4	5
Utility Disruption	1	2 **2.2**	3	4	5
Chemical/biological	1	**1.6** 2	3	4	5
Mass Casualty	1	**1.6** 2	3	4	5
Dam Failure	1	**2.0**	3	4	5
Pandemic/epidemic	1	**2.1**	3	4	5
Other: none listed	1	2	3	4	5

3. Have you ever received information on how to make your family and home safer from natural disasters?

22 Yes **11** No (If "NO", skip to question 4)

If "Yes", on any particular subject? _____

How recently?

9 Within the last 6 months
6 Between 6 and 12 months ago
3 Between 1 and 2 years ago
1 Between 2 and 5 years ago
2 5 years ago or more

From whom did you last receive information about how to make your family and home safer from natural disasters? (Check only one)

5 News media
10 Government agency
5 Insurance agent or company
2 Utility company
1 American Red Cross
1 Other non-profit organization
0 Not sure
0 Other: _____

4. Who would you most trust to provide you with information about how to make your family and home safer from natural disasters? (Please check all that apply)

6 News media
9 Government agency
5 Insurance agent or company
7 Utility company
0 Other: _____
11 University or research institution
13 American Red Cross
10 Other non-profit organization
4 Not sure

5. What is the most effective way for you to receive information about how to make your family7 and home safer from natural disasters? (Please check all that apply)

12 Newspaper stories
0 Newspaper ads
0 Television news
15 Television ads
10 Radio news
0 Radio Ads
18 Fact sheets or brochures
13 Public workshops/meetings
4 Academic institutions
2 Schools
1 Outdoor ads (billboards, etc)
1 Books
12 Mail
19 Fire Department/Rescue
15 Internet
2 Chamber of Commerce
2 Magazines
0 Other: _____

6. To assist in communicating information to Shasta County residents about how to better prepare for a natural disaster, which of the following phrases do you think is the easiest to understand? (Check only ONE)

8 Natural disaster readiness
17 Emergency preparedness
0 Other: _____
4 Disaster preparedness
1 Natural hazard risk reduction

NATURAL DISASTER PREPAREDNESS

7. Please check those activities that you **have done** in your household, **plan to do** in the near future, **have not done**, or are **unable to do**. (Please check one answer for each activity)

Have you or someone in your household:

Activity	Yes	No, but would like to	Not Interested
a. Attended meetings or received written information on natural disasters or emergency preparedness.	**19**	**0**	**0**
b. Talked with members in our household about what to do in case of a natural disaster or emergency.	**28**	**0**	**0**
c. Developed a "Household Emergency Plan" in order to decide what everyone would do in case of a household emergency.	**15**	**0**	**0**
d. Prepared a "Disaster Supply kit" with extra food, water, batteries, or other emergency supplies?	**16**	**0**	**0**

8. All of the above activities require a personal time commitment. How much time **each year** are you willing to spend on preparing yourself or your household for a natural disaster or emergency?

	Number of Hours will to spend				
Circle One:	0-1	2-5	6-10	11-15	16+
	6	**16**	**6**	**1**	**4**

9. What steps have you taken in your household to prepare for a natural disaster? (Check all that apply)

Stored or stocked up on:
- **18** Food
- **16** Water
- **26** Flashlights
- **24** Batteries
- **16** Battery-powered radio
- **23** Medical supplies, first aid kit
- **23** Fire extinguisher
- **26** Smoke detectors

Other:
- **0** Prepared a Disaster Supply Kit
- **0** Received First Aid/CPR Training
- **6** Made a fire escape plan
- **5** Developed a reconnection plan, where to meet and who to call
- **5** Discussed utility shutoffs and locations
- **0** Other: _____

10. Does your household have insurance coverage for flood events?

7 Yes or **25** No

If "NO", what is the main reason? (Check only one)

25 Not located in a floodplain
4 Too expensive
4 Not necessary
0 Other: _____
0 Deductibles too high/not worth it
0 Don't know about it
0 Never considered it

11. Does your household have insurance coverage for earthquake events?

12 Yes or **21** No

If "NO", what is the main reason? (Check only one)

10 Too expensive
4 Not necessary
3 Never considered it
4 Deductibles too high/not worth it
0 Don't know about it
0 Other: _____

NATURAL HAZARD RISK REDUCTION

12. Did you consider the possible occurrence of a natural hazard when you bought or moved into your current home?

24 Yes or **9** No

13. Would you be willing to spend more money on a home that had features that made it more disaster resistant?

22 Yes or **10** No

14. How much more money are you willing to spend to better protect your family and home from natural disasters? (Check only one)

0 Less than $100
10 $100 to $499
11 $500 to $999
0 $1,000 to $2,499
0 $2,500 to $4,999
0 $5,000 and above
2 Nothing
7 Don't know
0 Other: _____

15. Which of the following incentives, if any, would motivate you to take additional steps to better protect your family and home from a natural disaster? (Check all that apply)

26 Insurance discount
5 Low interest rate loan
2 Lower new home construction cost
9 Mortgage discount
24 Tax break or incentive
4 None
4 Other: _____

GENERAL HOUSEHOLD INFORMATION

16. Please indicate your age: **6** 31-45
6 46-55
16 55+

17. Gender (check one): **16** Male **12** Female

18. Indicate your level of education:
0 Grade school/no schooling
0 Some high school
2 High school graduate (GED)
9 Some college or trade school
14 College degree
4 Postgraduate degree
0 Other: _____

19. Zip Code:

5	96001	**4**	96069	**1**	96059
3	96003	**6**	96022	**6**	96088
2	96007	**1**	96096	**1**	96073

20. How long have you lived in Shasta County?
2 Less than one year
2 1-4 years
6 5-9 years
7 10-19 years
17 20 years or more

21. If you have lived in Shasta County for less than 20 years, where did you live before you moved to Shasta County? **No answers given.**
City: _____ County: _____ State: _____

22. Do you have access to the Internet or World Wide Web?
32 Yes or **0** No

23. Do you own (or are buying) or renting your home?
31 Own or **0** Renting

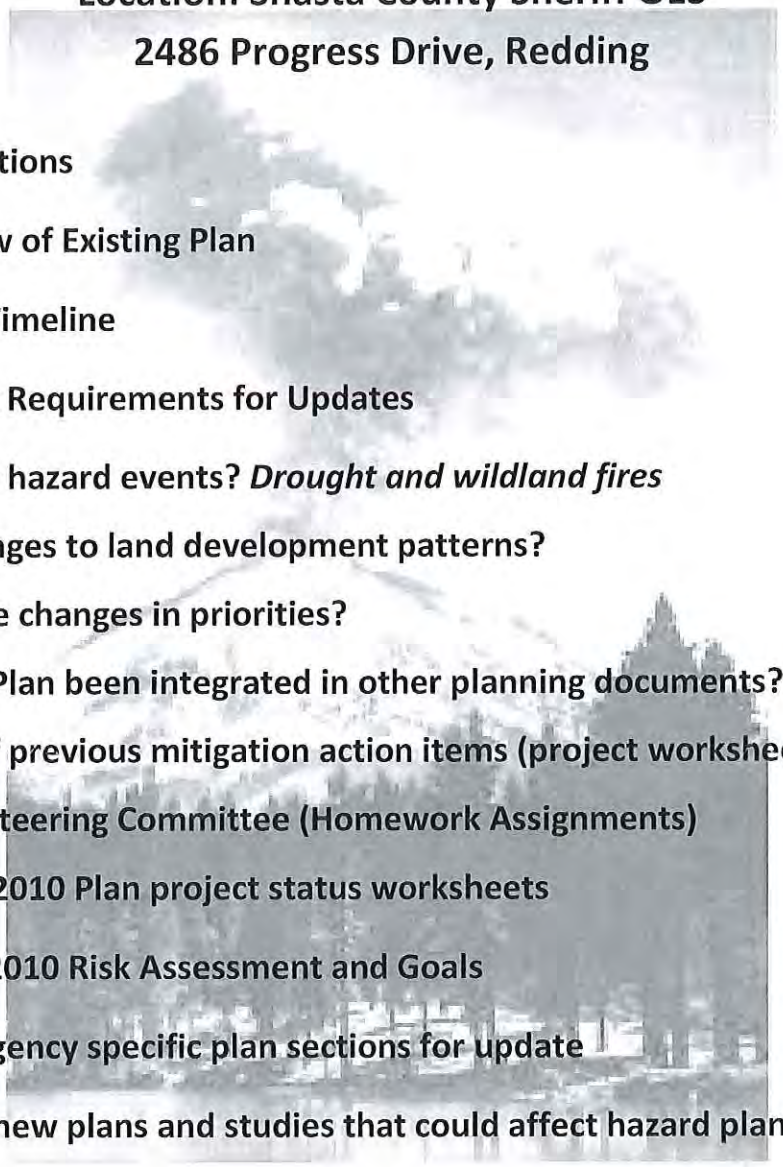
Other Comments:
None

This page intentionally left blank.

Appendix 3.C

2015 STEERING COMMITTEE

Shasta County and City of Anderson Hazard Mitigation Plan
Steering Committee Meeting
Date: February 2, 2016
Time: 1:00 – 3:00 p.m.
Location: Shasta County Sheriff OES
2486 Progress Drive, Redding



1:00 Introductions

1:15 Overview of Existing Plan

Project Timeline

1:30 Planning Requirements for Updates

Any new hazard events? *Drought and wildland fires*

Any changes to land development patterns?

Are there changes in priorities?

Has the Plan been integrated in other planning documents?

Status of previous mitigation action items (project worksheets)

2:30 Role of Steering Committee (Homework Assignments)

Provide 2010 Plan project status worksheets

Review 2010 Risk Assessment and Goals

Assign agency specific plan sections for update

Identify new plans and studies that could affect hazard planning

Reviews administrative and draft plan

2:45 Due dates, next steps and next meeting

Shasta County Hazard Mitigation Plan
Steering Committee Meeting Notes
February 2, 2016
1:00-3:00 p.m.
Shasta County OES, 2486 Progress Drive, Redding

Sue Crowe, Shasta County Department of Public Works (Hazard Mitigation Plan Coordinator/Chair) opened the meeting at 1:10 p.m. Introductions followed (attendance sheet attached).

Information packets were provided to committee members that included:

- Hazard Mitigation Plan fact sheet
- FEMA Mitigation Planning fact sheet
- Plan update evaluation worksheet
- List of 2010 prioritized hazards and goals
- List of 2010 mitigation action items
- Summary of 2010 goals/objectives/action items by hazard
- Mitigation action progress report form

Sue presented a brief overview of the 2010 Plan, the plan update process, timeline, and FEMA planning requirements for the update. The plan will be prepared in-house with consultants performing map revisions.

Discussion was held on if there were new hazard events or land development patterns in the Jurisdictions planning areas, or changes in plan priorities. The Committee validated that no new development patterns or hazard events have occurred since the 2010 plan adoption.

Sue explained the role of the Committee. Members of the committee who were determined as the coordinating individual/organization for the 2010 mitigation action item were assigned to update a progress report form for each project and to identify any new projects for inclusion in the 2015 plan. Discussion continued on existing projects and potential projects.

Members were asked to also review the 2010 goals and objectives. Members were asked to edit sections of the 2015 administrative draft specific to their agency, department or organization and to report on any new plans or studies that could affect the hazard plan update.

Completed progress report forms and section edits will be returned to Sue Crowe by April 1 for inclusion in the Plan draft.

The next committee meeting will be scheduled for May. A public comment period will be publicized shortly thereafter.

The meeting closed at 2:00 p.m.

Shasta County and City of Anderson Hazard Mitigation Plan
Steering Committee Meeting
Date: February 2, 2016
Time: 1:00 – 3:00 p.m.
Location: Shasta County Sheriff OES
2486 Progress Drive, Redding

SIGN IN SHEET

Name	Agency	Email Address
DAVE MARLOW	PUBLIC HEALTH	DMARLOW@CO.SHASTA.CA.US
HEIDI VERT	Public Health	hvert@co.shasta.ca.us
Chester Anderson	WSRCD	chester@westernshastarcd.org
Analia Bertucci	WSRCD	abertucci@westernshastarcd.org
LIO SALAZAR	DRM - PLANNING	lsalazar@co.shasta.ca.us
JIM WHITTLE	EHA	jwhittle@co.shasta.ca.us
David Duretta	COA	dduretta@ci.anderson.ca.us
PAT MINTURN	Shasta Co	
TROY BARTOLOMEI	SHA CO DPW	tbartolomei@co.shasta.ca.us
TOM CAMPBELL	SCSO	lt. sergeant
JASON BARNHART	SCSO	sergeant
ROB SANDGLOOM	SCSO	sarg
Gary Lauben	WSRCD	gary@westernrcd.org
Bret Gouvea	CALFIRE/SCFD	bret.gouvea@fire.ca.gov

Shasta County & City of Anderson Multi-Jurisdictional Hazard Mitigation Plan Update

FACT SHEET

What is a Hazard Mitigation Plan?

A Hazard Mitigation Plan is a pre-disaster strategic plan to guide how a community will lower its risk and exposure to disasters.

Why revise the Hazard Mitigation Plan?

Local agencies may receive Federal Emergency Management Agency (FEMA) funds for natural and technological hazards. Eligible agencies shall have an approved Hazard Mitigation Plan in place prior to any declared disaster. That plan shall be updated every 5 years. Hazard Mitigation Plans may also facilitate agency savings – every dollar spent on mitigation typically results in dollars saved in response and recovery related costs.

What is the purpose of this meeting?

Steering committee meetings will be held between February 2016 and April 2016. Regional hazards identified in the 2010 Plan will be revisited. Risk assessments and goals related to these hazards will be updated. Plans shall include open public involvement. Your input is important for implementation of the specific mitigation goals, objectives and action items for the Plan.

What elements are included in the Plan Process?

When will the Plan be complete?

The updated plan will be proposed for adoption by the Shasta County Board of Supervisors and the Anderson City Council in September 2016. The adopted Plan will be submitted to FEMA by October 2016.

Who is preparing the Plan?

The County of Shasta is designated as the lead agency. Committee members will assist in updating the Plan prior to public meetings. The Committee will utilize additional key staff at each agency for subject matter expertise and policy direction.

Contact Information: Sue Crowe, Staff Services Manager, Shasta County Department of Public Works
Ph (530)245-6826 Fax (530)225-5667 Email slcrowe@co.shasta.ca.us

Mitigation Plan Website:
http://www.co.shasta.ca.us/index/pw_index/news_events/2010-hazard-mitigation-plan-update

Shasta County and City of Anderson Hazard Mitigation Plan
Steering Committee Meeting
Date: June 1, 2016
Time: 10:00-11:00 a.m.
Location: Shasta County Public Works Conference Room
1855 Placer Street, Redding

10:00 Introductions

10:10 Status of Plan Update

- Plan Comments
- Action Items (Review)
  - 2010 Action Items Matrix
  - 2015 Prioritize Action Items Matrix
- Public Comment Period
  - Incorporate Public Comments
- Committee Final Draft Review

10:45 Next Steps

- Board/Council Adopts Draft
- FEMA Review
- Final Plan Adoption

Shasta County Hazard Mitigation Plan
Steering Committee Meeting Notes
June 1, 2016
10:00-11:00 a.m.
Shasta County Public Works, 1855 Placer Street, Redding, CA

Sue Crowe, Shasta County Department of Public Works (Hazard Mitigation Plan Coordinator/Chair) opened the meeting at 10:00 a.m. Introductions followed (attendance sheet attached).

Sue provided a plan status update to committee members.

2010 Projects:

- Take out CCPW – annual looked at under Cal Fire
- Day Lassen bench is w/ Lassen County
- No info on Middle Creek Project
- CalTrans generators are ongoing (maintenance stations)
- Unplanned bridge scour/closure – ongoing checking

MCI-1 EMS project – public health has a grant through them, & Cal Fire (Brett) attends meeting (advisory group meeting) John Lord – agent to contact.

Cal Fire (Brett) wants to connect dots with Burney Basin Safe Council on the Burney Community Wildfire Protection plan. The plan is included in the Cal Fire unit plan.

New/Ongoing Projects:

Committee members ranked 2015 mitigation action items.

- CalTrans unplanned bridge closure/scour – depends on 2 priorities:
    - 1 – Maintenance
    - 2 – Quality of the road (money related budget)
- No change in ranking for flood projects
- Wildfire (Brett) CWPP target to minimize fires. CWPP developed locally to help with funding. Has to identify as "shovel ready" plans to obtain funding
- Volcanoes (Jason) is ranked low because other plans can help make up for that
- Multi- Casualty Project for air jet, air prop will be placed in Redding airport to help train/learn for incidents next April (Brett)

Timeline:

The plan will be ready the first to mid July for public comments. The committee will review the draft document after public comments are added. Plan will then be presented to the Anderson City Council and Shasta County Board of Supervisors for draft plan adoption. Formal FEMA review follows with final plan adoption upon FEMA's approval.

Nicole (Public Health) suggests when placing the Hazard Mitigation Plan online to separate document into chapters to reduce file size.

Brett will be sending in updated maps.

Meeting concluded at 10:50 a.m.

Shasta County and City of Anderson Hazard Mitigation Plan
Steering Committee Meeting
Date: June 1, 2016
Time: 10:00 – 11:00 a.m.
Location: Shasta County Public Works
1855 Placer Street, Redding

SIGN IN SHEET

Name	Agency	Email Address
Nick Wallingford	CAL-FIRE	NICK.Wallingford@fire.ca.gov
Nicole Bonkrude	SC HHSA PH	nbonkrude@co.shasta.ca.us
JASON BARNHART	SHASTA S.O.-OES	Jbarnhart@co.shasta.ca.us
Bret Gouvea	CALFIRE / SCFD	bret.gouvea@sbcglobal.net
KURT SCHNEIDER	CAL TRANS	Schneider_kurt@DOT.CA.GOV
Neil McAuliffe	Shasta County DPW	NMCAULIFFE@CO.SHASTA.CA.US
JIM WHITTLE	SHASTA Co. EHS	jwhittle@co.shasta.ca.us
Analia K. Bertucci	WSRCD	abertucci@westernshastarcd.org
Chester Anderson	WSRCD	chester@westernshastarcd.org
Vue Crowe	Shasta DPW	
Amy Wahl	Shasta DPW	awahl@co.shasta.ca.us

This page intentionally left blank.

Appendix 3.D

2015 PUBLIC MEETING INFO

Annual Safety Luncheon
Shasta County Public Works

DISASTER PLANNING & PREVENTION

Special Guest Speakers:

Cal Fire, County Fire, Sheriff OES

Date: 04/14/2016

Time: 11:00am -1:00pm

COUNTY OF SHASTA 1850

DPW

Lunch Provided

Date: April 14, 2016

Time: 11:00am-1:00pm

Location: Veterans Hall

1605 Yuba Street

Contact person: Tammy Frye
tfrye@co.shasta.ca.us
530-245-6793
530-604-9374

DEPARTMENT OF PUBLIC WORKS

Annual Safety Luncheon

Thursday, April 14, 2016 commencing at 11:00 AM

Master of Ceremonies – **John Heath**

a. Welcome - **Pat Minturn**
   1. Introduction of Guests
      - Board of Supervisors
      - Larry Lees - CEO
      - Angela Davis – Support Services
      - Jim Johnson and Thomas Vandepol – Risk Management
      - Fire Captain Nick Wallingford-Cal Fire, Deputy Chief Bret Gouvea-County Fire, ~~Lieutenant Jason Barnhardt~~-OES Sgt Rob Sandbloom

b. Recognition of Employees – **Troy Bartolomei**
   1. Facilities Management – **Tom Forbish**
      i. Custodial Services - Bob Wilkinson
      ii. Grounds - Chris Swearingen
      iii. Administration – Tom Forbish
      iv. Mechanical Crafts – Nick Butrie
      v. Structural Crafts – Tom Fuller

   2. Operations Superintendent – **Troy Bartolomei**
      i. Roads District 1 – Rick Richards
      ii. Roads District 2 – Ron Jimenez
      iii. Roads District 3 – Jason Eilts
      iv. Roads District 4 – Cathy Myers
      v. Special Crews – Jack Ball
      vi. Shop - Day – Craig Isberg, Night – Troy Burns

   3. CSA – **Scott Sealander**

   4. Office – **Scott Wahl**
      i. Administration – Ken Cristobal
      ii. Development Services – Eric Wedemeyer
      iii. Road Design & Administration – Al Cathey
         1. Right of Way – Brandon Magby
      iv. Bridge Design & Administration – Shawn Ankeny
      v. Special Projects – Neil McAuliffe
      vi. Solid Waste/Storm Water/Safety – John Heath

c. Retirees - 2014 (alphabetical order) – **Troy Bartolomei**
   i. Jeanne August – *13 years of service*
   ii. David Beyelia -- *9 years of service*

d. Director's Comments – **Pat Minturn**
   i. Budget update

e. Awards – **Troy Bartolomei**
   a. Safety Contest – **John Heath**
   b. Employee of the Year – **Pat Minturn**

f. (11:35-12:00) Presentation: **Disaster Planning and Prevention, Cal Fire, County Fire and OES**

g. Lunch, catered by Juvenile Hall Catering Services – Mike Hefner

h. Clean Up

ANNUAL SAFETY MEETING SIGNUP SHEET

Subjects Covered: Hazard Mitigation

Work Location/Job Classes Included: DPW employees, Invited guests

Date: 4/14/16 Presenter: Rick Wallingford, Bret Gouvea, Jason Barnhart

Attendees: Please sign your name legibly.
If your name is not on the list please add it at the end.

Last Name	First		Signature
Abbey	Dennis	Roads	Dennis M. Abbey
Abbey	Kathy	Roads	Kathy Abbey
Adamec	Jeff	Fleet	
Allen	Jon	Shop	Jon T. Allen
Anderson	Matthew	Roads	
Ankeny	Shawn	Eng	
Ball	Jack	Roads	
Bartolomei	Devon	Eng	
Bartolomei	Troy	Admin	
Beard	Charleen	Eng	
Belflower	Buck	Fleet	
Berry	Dawnda	Cust	
Blankenship	Jake	Roads	
Book	Darrin	Eng	
Brubaker	Rick	Roads	
Burns	Troy	Shop	
Butrie	Nick	Fac Man	
Calvert	Jim	Roads	

16

ANNUAL SAFETY MEETING SIGNUP SHEET

Subjects Covered: Hazard Mitigation

Work Location/Job Classes Included: DPW employees, Invited guests

Date: 4/14/16 Presenter: Rick Wallingford, Bret Gouvea, Jason Barnhart

Attendees: Please sign your name legibly.
If your name is not on the list please add it at the end.

Last Name	First		Signature
Campbell	Andrea	Fac Man	
Campbell	Brian	Eng	
Cannafax	Johnny	Roads	
Cannan	Josh	Eng	
Cantrell	Kolyn	Roads	
Carlin	Tina	Admin	
Cathey	Al	Eng	
Ciancio	Mark	Eng	
Clark	Jamie	Fleet	
Collins	Kyle	Roads	
Cook	Dan	Shop	
Corley	Seth	CSA	
Correll	William	Shop	
Cottrell	Gary	Roads	
Covert	Joseph	Roads	
Cristobal	Ken	Admin	
Crowe	John	Eng	
Crowe	Sue	Admin	

ANNUAL SAFETY MEETING SIGNUP SHEET

Subjects Covered: Hazard Mitigation

Work Location/Job Classes Included: DPW employees, Invited guests

Date: 4/14/16 Presenter: Rick Wallingford, Bret Gouvea, Jason Barnhart

Attendees: Please sign your name legibly.
If your name is not on the list please add it at the end.

Last Name	First		Signature
Davis	Stuart	Eng	
DoMoe	Ben	Fac Man	
Dorroh	Travis	Fac Man	
Duffy	Michael	Shop	
Duncan	Levi	CSA	
DuPont	Robert	Roads	
Duzyk	Mark	Fac Man	
Eilts	Jason	Roads	
Fierro	Rose	Admin	
Forbish	Thomas	Fac Man	
Fox	Ron	Eng	
Frye	Tammy	Eng	
Fuller	Tom	Fac Man	
Gardner	Shawn	Fac Man	
Gehres	Linda	CSA	
Gonzalez	Amanda	Cust	
Gonzalez	Miguel	Cust	
Gordon	Robin	Fleet	

ANNUAL SAFETY MEETING SIGNUP SHEET

Subjects Covered: Hazard Mitigation

Work Location/Job Classes Included: DPW employees, Invited guests

Date: 4/14/16 Presenter: Rick Wallingford, Bret Gouvea, Jason Barnhart

Attendees: Please sign your name legibly.
If your name is not on the list please add it at the end.

Last Name	First		Signature
Grames	Darell	Roads	
Graves	Gary	CSA	
Graves	Jed	CSA	
Gross	Kevin	CSA	
Harris	Robin	Fac Man	
Heath	John	Eng	
Henriquez	Alex	Roads	
Hermann	William	Roads	
Hines	Ed	CSA	
Hines	Gary	Fleet	
Humphries	Cheryl	Cust	
Isberg	Craig	Shop	
Jenkins	Cody	Roads	
Jimenez	Ron	Roads	
Kenneally	James	Roads	
Lassa	David	Cust	
Layfield	Scott	Roads	
Lee	Carmen	CSA	

ANNUAL SAFETY MEETING SIGNUP SHEET

Subjects Covered: Hazard Mitigation

Work Location/Job Classes Included: DPW employees, Invited guests

Date: 4/14/16 Presenter: Rick Wallingford, Bret Gouvea, Jason Barnhart

Attendees: Please sign your name legibly.
If your name is not on the list please add it at the end.

Last Name	First		Signature
Lee	David	CSA	
Lemler	Donna	Fac Man	
Luken	Robert	Grounds	
Magby	Brandon	Eng	
Maple	Kevin	Eng	
Marquez	Klayton	Roads	
Matthews	Jim	Cust	
Maynes	Mike	Fac Man	
McAuliffe	Neil	Eng	
McClain	Casey	Roads	
McCullough	Michael	Roads	
McGarry	Matthew	Eng	
Meers	James	Fac Man	
Meyers	John	Roads	
Minturn	Pat	Admin	
Mitchell	Victoria	Roads	
Moon	Jerry	Roads	
Morgan	Dale	Fac Man	

13

ANNUAL SAFETY MEETING SIGNUP SHEET

Subjects Covered: Hazard Mitigation

Work Location/Job Classes Included: DPW employees, Invited guests

Date: 4/14/16 Presenter: Rick Wallingford, Bret Gouvea, Jason Barnhart

Attendees: Please sign your name legibly.
If your name is not on the list please add it at the end.

Last Name	First		Signature
Munro	Robert	Roads	
Myers	Cathy	Roads	
Nash	James	Roads	
Nicholas	Stanley	Roads	
Nicholas	Steven	Roads	
Nickens	Bart	Roads	
Nield	David	Roads	
Nunez	Senecca	Eng	
Olson	Norm	Roads	
Park	Ken	Roads	
Pendleton	Paul	Shop	
Pepin	James	Roads	
Plesa	Nikita	Cust	
Powell	Phillip	Fac Man	
Ratledge	Cathy	Cust	
Reilly	Glenn	Shop	
Rennels	COREY Cory	Roads	
Renz	Don	Eng	

ANNUAL SAFETY MEETING SIGNUP SHEET

Subjects Covered: Hazard Mitigation

Work Location/Job Classes Included: DPW employees, Invited guests

Date: 4/14/16 Presenter: Rick Wallingford, Bret Gouvea, Jason Barnhart

Attendees: Please sign your name legibly.
If your name is not on the list please add it at the end.

Last Name	First		Signature
Richards	Rick	Roads	
Riley	Henry	Cust	
Riley	T. Dan	Cust	
Robinson	Dan	CSA	
Rotter	Edward	Roads	
Rulon	Robert	Grounds	
Russell	Laura	Admin	
Russell	Rachelle	Admin	
Salay	Mandy	Cust	
Sealander	Scott	CSA	
Sease	Brad	Shop	
Seghetti	Jim	Roads	
Smith	Scott	Fac Man	
Stainbrook	Butch	Roads	
Starr	Randy	Roads	
Stevens	Jim	Cust	
Stone	Dennis	Shop	
Sturm	Brandon	Roads	

10

ANNUAL SAFETY MEETING SIGNUP SHEET

Subjects Covered: Hazard Mitigation

Work Location/Job Classes Included: DPW employees, Invited guests

Date: 4/14/16 Presenter: Rick Wallingford, Bret Gouvea, Jason Barnhart

Attendees: Please sign your name legibly.
If your name is not on the list please add it at the end.

Last Name	First		Signature
Williams	Rosella	Fleet	Rosella Williams
Wilson	John	Roads	
Winton	Shane	Eng	
Wolter	Debbie	Admin	
Wood	William	Fac Man	
Woolery	Matt	Roads	
Zeimet	Dennis	Eng	
Fields	Chris		
Whan	Don		

ANNUAL SAFETY MEETING SIGNUP SHEET

Subjects Covered: Hazard Mitigation

Work Location/Job Classes Included: DPW employees, Invited guests

Date: 4/14/16 Presenter: Rick Wallingford, Bret Gouvea, Jason Barnhart

Attendees: Please sign your name legibly.
If your name is not on the list please add it at the end.

Last Name	First		Signature
Swayne	Rusty	CSA	
Swearingen	Chris	Grounds	
Swingseth	Russell	Cust	
Thomas	Ranell	Cust	
Timmons	Keith	Roads	
Trotter	Venton	Eng	
Tyrolt	George	Roads	
Uzzardo	Tim	Roads	
Van Slyke	Susan	Grounds	
Vasquez	George	Roads	
Vellines	Russell	CSA	
Wahl	Amy	Admin	
Wahl	Scott	Admin	
Warren	Pete	Cust	
Watkins	Andy	Roads	
Wedemeyer	Eric	Eng	
Wilkinson	Robert	Cust	
Williams	Eric	Roads	

ANNUAL SAFETY MEETING SIGNUP SHEET

Subjects Covered: Hazard Mitigation

Work Location/Job Classes Included: DPW employees, Invited guests

Date: 4/14/16 Presenter: Rick Wallingford, Bret Gouvea, Jason Barnhart

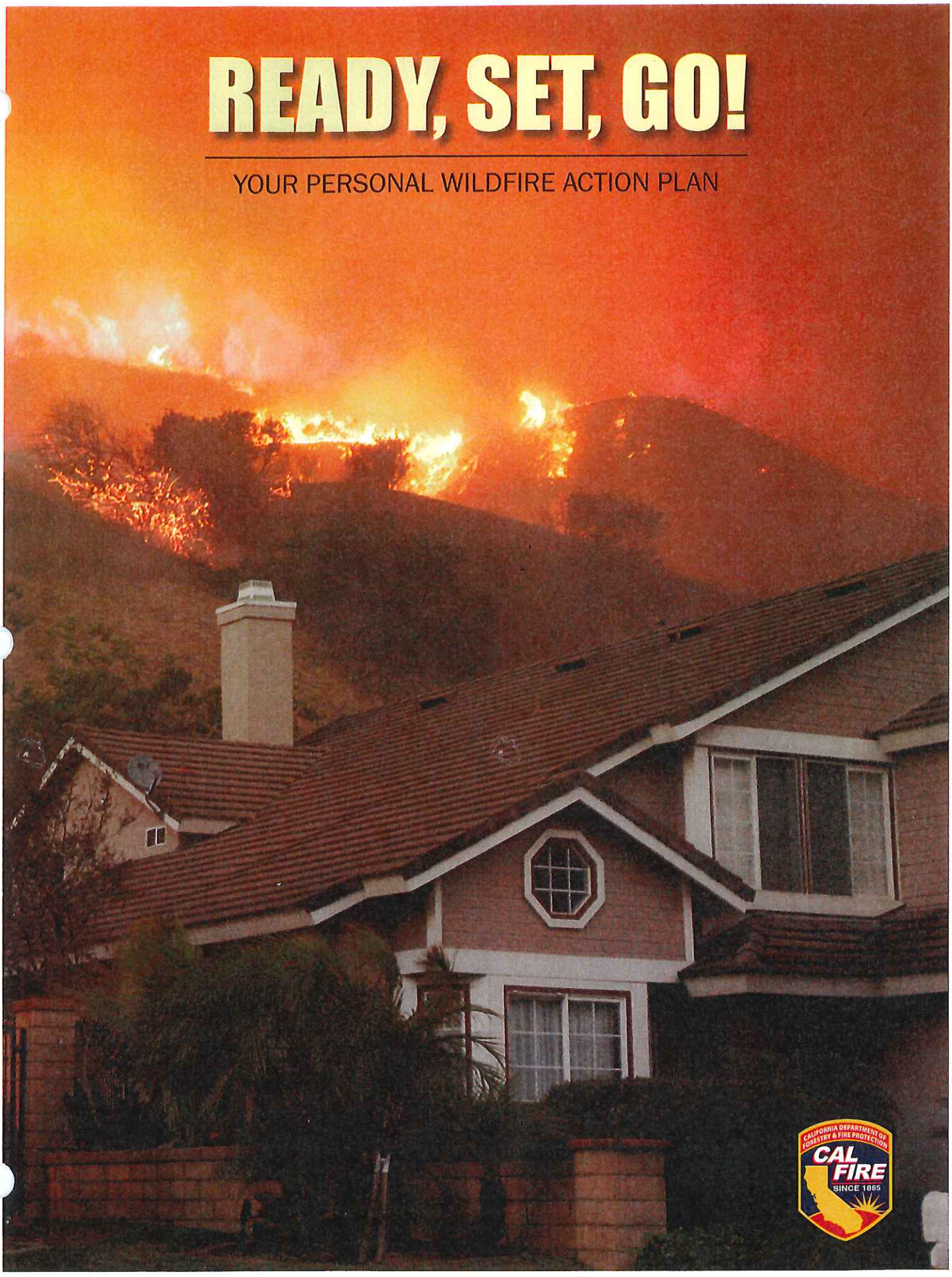
Attendees: Please sign your name legibly.
If your name is not on the list please add it at the end.

Last Name	First		Signature
	GUESTS		
Barnhart	Jason	OES	
Baugh	Les	Supervisor	
Davis	Angela	Supt Svcs	
Dorney	Megan	CAO's	
Giacomini	Pam	Supervisor	
Gouvea	Bret	County Fire	
Johnson	James	Risk Man	attended - did not sign
Kehoe	David	Supervisor	
Lees	Larry	CEO	
Moty	Leonard	Supervisor	
Schappell	Bill	Supervisor	
Vanderpol	Thomas	Risk Man	attended - did not sign
Wallingford	Nick	Cal Fire	

9

READY, SET, GO!

YOUR PERSONAL WILDFIRE ACTION PLAN



CAL FIRE Land Use Planning Program

Nick Wallingford, Fire Captain

Program Overview

- Driven by Senate Bill 1241, January 2014
- Goals:
  - Save lives
  - Save property
  - Ease the financial burden for fire suppression on both state and local government

History: Injuries and Deaths

- In the top ten most damaging fires since 2000, 29 deaths have resulted.
- The Tunnel Fire alone in Oakland Hills/Berkeley resulted in 25 deaths in 1991.
- More people living in the wildland means higher potential for injuries and deaths.

History: Damages

- 6/10 California's most damaging fires ever recorded have occurred since 2003.
  - These six fires alone destroyed nearly 9,000 structures
  - 2/10 most damaging fires have occurred in Shasta County (Jones 1999, Fountain 1992)
- 7/10 California's largest fires ever recorded have occurred since 2003.
  - High intensity
  - Fast moving

2015 Property Damages

- Last fire season alone, nearly 2,000 homes were destroyed, plus approximately 800 outbuildings (mostly from Butte and Valley Fires).

  *Outbuilding= Permanent structure, min. size of 120sf.
- Butte and Valley fires alone:
  - Over $2 Billion in damages
  - Over $100+ million in suppression costs
  - Six civilian deaths
  - Burn over of four CAL FIRE helitack firefighters resulting in serious injuries. The crew was engaged in structure defense

History: Financial Burden

- 2014-2015 Wildland fire Budget $762 million
  - Additional $200 million used from emergency fund
- Multiple fire seasons have surpassed $1 Billion in wildland fire suppression costs

History: Financial Burden

- Per CA Legislative Analysts Office:
  - CAL FIRE budget tripled from 1998-1999 to 2008-2009 period
  - Some main reasons for increased costs:
    - Larger fires
    - More housing/development in fire prone areas

Future Projections

- Houses and people in the SRA grew 16% between 2000 and 2010.
- Longer fire seasons
- Increased fuel loading

Shifting Mentality

Develop land and build structures with the expectation that a fire will burn

Senate Bill 1241

- Requires
  - Updating Safety Element within the General Plan to include planning for wildland fire hazards
  - Submission to the State Board of Forestry and Fire Protection for comment
  - Submission to agencies providing fire protection in jurisdiction
  - Specific findings before map approvals

Land Use Planning Program

- Twelve Person group to serve the entire state
- Provide technical expertise to local planners regarding wildland fire planning
- Bridge the gap between fire fighters on the ground, local planners and personnel in Sacramento

Thank you for your time!

PROTECTING THE HOMES & CITIZENS OF CALIFORNIA

Wildland Urban Interface Building Standards
California Building Code Chapter 7A

Can we live with wildland fire?

In the 1800s settlers started building homes in areas of California where wildfires naturally roam. Since then Californians have watched raging wildfires threaten or destroy their communities. Each year, as the cost in lost lives, burned homes, ruined businesses, and devastated communities increases, millions of dollars are being spent on firefighting. Unfortunately that number continues to escalate.

California always will experience wildland fires but residents don't have to accept the losses. Research into home loss in the wildland urban interface shows not only why structures burn but the best way to protect homes ***BEFORE*** a wildfire occurs.

This page intentionally left blank.

Appendix 3.E

2016 PUBLIC COMMENT PERIOD INFORMATION

Shasta County and City of Anderson
2010 Hazard Mitigation Plan Update
Opportunity to Comment
July 1, 2016 through August 15, 2016

A Hazard Mitigation Plan is a pre-disaster strategic plan to help guide a community on how to lower its risk and exposure to disaster. The objectives of the plan are to minimize the risk of wildfire, flood, and other natural and non-natural disasters, to provide for personal safety, minimize property loss, and to incorporate projects that could reduce risk.

FEMA regulations require that the plan must be updated every five years. The update includes input from the community on what hazards are most evident and critical to landowners and residents. Comments must be received by 5:00 p.m. on August 15, 2016.

The draft plan update may be viewed on the County of Shasta's website at:
http://www.co.shasta.ca.us/index/pw_index/news_events/2010-hazard-mitigation-plan-update

For more information, or to provide comments, please contact:

Sue Crowe
Shasta County Department of Public Works
1855 Placer Street
Redding, CA 96001
Phone: (530) 225-5661
Email: slcrowe@co.shasta.ca.us

Rachelle Russell

From: Ken Cristobal
Sent: Thursday, August 04, 2016 3:26 PM
To: Rachelle Russell
Cc: Pat Minturn; Scott Wahl; Troy C. Bartolomei
Subject: FW: Hazard Mitigation Plan Update

Follow Up Flag: Follow up
Flag Status: Completed

From: Maureen Robison [mailto:madaboutewe@gmail.com]
Sent: Thursday, August 04, 2016 3:22 PM
To: Sue Crowe
Subject: Hazard Mitigation Plan Update

Hi Sue,

I wanted to weigh in on the Hazard Mitigation Update

1. Concern over homeless causing / starting fires in undeveloped areas all over Shasta County

2. Lack of appropriate medical supplies for Pediatrics / Children

These are the two most important things I can think of. Thank you for your consideration,

--
Maureen Robison
530-949-2140

FAILURE IS NOT AN OPTION. It comes bundled with the software.

This page intentionally left blank.

Appendix 4.A

2010 HAZUS MH FLOOD EVENT REPORTS

HAZUS MH Flood Event Reports

Shasta County Flood 100-year

Table 1

Building Exposure by Occupancy Type for the Study Region		
Occupancy	**Exposure ($1000)**	**Percent of Total**
Residential	9,410,456	77.2%
Commercial	1,907,456	15.7%
Industrial	328,910	2.7%
Agricultural	55,211	0.5%
Religion	191,410	1.6%
Government	164,514	1.4%
Education	125,418	1.0%
Total	**12,183,375**	**100.00%**

Table 2

Building Exposure by Occupancy Type for the Scenario		
Occupancy	**Exposure ($1000)**	**Percent of Total**
Residential	3,672,812	80.5%
Commercial	583,221	12.8%
Industrial	101,532	2.2%
Agricultural	27,285	0.6%
Religion	73,584	1.6%
Government	51,813	1.1%
Education	50,203	1.1%
Total	**4,560,450**	**100.00%**

Table 3

Expected Building Damage by Occupancy												
	1-10		**11-20**		**21-30**		**31-40**		**41-50**		**Substantially**	
Occupancy	**Count**	**(%)**	**Count**	**(%)**	**Count**	**(%)**	**Count**	**(%)**	**Count**	**(%)**	**Count**	**(%)**
Agriculture	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
Commercial	0	0.00	4	44.44	0	0.00	0	0.00	2	22.22	3	33.33
Education	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
Government	3	21.43	11	78.57	0	0.00	0	0.00	0	0.00	0	0.00
Industrial	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
Religion	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
Residential	0	0.00	122	2.48	884	17.96	620	12.60	2,135	43.38	1,161	23.59
Total	**3**		**137**		**884**		**620**		**2,137**		**1,164**	

Table 4

Expected Building Damage by Building Type												
Building Type	**1-10**		**11-20**		**21-30**		**31-40**		**41-50**		**Substantially**	
	Count	**(%)**	**Count**	**(%)**	**Count**	**(%)**	**Count**	**(%)**	**Count**	**(%)**	**Count**	**(%)**
Concrete	1	20.00	4	80.00	0	0.00	0	0.00	0	0.00	0	0.00
ManufHousing	0	0.00	0	0.00	0	0.00	0	0.00	4	0.68	581	99.32
Masonry	1	10.00	3	30.00	0	0.00	0	0.00	3	30.00	3	30.00
Steel	1	25.00	3	75.00	0	0.00	0	0.00	0	0.00	0	0.00
Wood	0	0.00	122	2.82	884	20.42	620	14.32	2,126	49.10	578	13.35

Table 5

Expected Damage to Essential Facilities				
		# Facilities		
Classification	**Total**	**At Least Moderate**	**At Least Substantial**	**Loss of Use**
Fire Stations	38	4	0	1
Hospitals	3	0	0	0
Police Stations	9	1	0	0
Schools	120	12	1	1

Table 6

Building-Related Economic Loss Estimates						
(Millions of dollars)						
Category	**Area**	**Residential**	**Commercial**	**Industrial**	**Others**	**Total**
Building Loss						
	Building	460.34	80.75	12.37	15.95	569.41
	Content	286.31	154.25	21.87	54.08	516.50
	Inventory	0.00	2.71	3.99	0.59	7.29
	Subtotal	**746.65**	**237.71**	**38.23**	**70.61**	**1,093.20**
Business Interruption						
	Income	0.02	0.92	0.00	0.13	1.08
	Relocation	0.94	0.19	0.00	0.05	1.18
	Rental Income	0.27	0.13	0.00	0.00	0.39
	Wage	0.06	0.96	0.00	7.43	8.46
	Subtotal	**1.29**	**2.20**	**0.00**	**7.62**	**11.11**
ALL	**Total**	**747.93**	**239.91**	**38.23**	**78.23**	**1,104.31**

Building Value (thousands of dollars)				
	Population	**Residential**	**Non-Residential**	**Total**
California				
Shasta	163,256	9,410,456	2,772,919 1	2,183,375
Total	**163,256**	**9,410,456**	**2,772,919**	**12,183,375**
Total Study Region	**163,256**	**9,410,456**	**2,772,919**	**12,183,375**

Shasta County Flood 500-year

Table 1

Building Exposure by Occupancy Type for the Study Region		
Occupancy	**Exposure ($1000)**	**Percent of Total**
Residential	9,410,456	77.2%
Commercial	1,907,456	15.7%
Industrial	328,910	2.7%
Agricultural	55,211	0.5%
Religion	191,410	1.6%
Government	164,514	1.4%
Education	125,418	1.0%
Total	**12,183,375**	**100.00%**

Table 2

Building Exposure by Occupancy Type for the Scenario		
Occupancy	**Exposure ($1000)**	**Percent of Total**
Residential	3,078,020	79.2%
Commercial	532,243	13.7%
Industrial	95,620	2.5%
Agricultural	20,993	0.5%
Religion	62,665	1.6%
Government	45,475	1.2%
Education	51,045	1.3%
Total	**3,886,061**	**100.00%**

Table 3

Expected Building Damage by Occupancy												
	1-10		11-20		21-30		31-40		41-50		Substantially	
Occupancy	**Count**	**(%)**	**Count**	**(%)**	**Count**	**(%)**	**Count**	**(%)**	**Count**	**(%)**	**Count**	**(%)**
Agriculture	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
Commercial	0	0.00	6	42.86	3	21.43	0	0.00	0	0.00	5	35.71
Education	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
Government	1	6.25	13	81.25	2	12.50	0	0.00	0	0.00	0	0.00
Industrial	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
Religion	0	0.00	1	100.00	0	0.00	0	0.00	0	0.00	0	0.00
Residential	0	0.00	95	1.63	788	13.54	529	9.09	2,703	46.44	1,706	29.31
Total	**1**		**115**		**793**		**529**		**2,703**		**1,711**	

Table 4

Expected Building Damage by Building Type												
	1-10		11-20		21-30		31-40		41-50		Substantially	
Building Type	**Count**	**(%)**	**Count**	**(%)**	**Count**	**(%)**	**Count**	**(%)**	**Count**	**(%)**	**Count**	**(%)**
Concrete	0	0.00	5	71.43	1	14.29	0	0.00	0	0.00	1	14.29
ManufHousing	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	728	100.00
Masonry	0	0.00	4	30.77	1	7.69	0	0.00	4	30.77	4	30.77
Steel	0	0.00	4	80.00	1	20.00	0	0.00	0	0.00	0	0.00
Wood	0	0.00	97	1.91	788	15.50	529	10.40	2,697	53.04	974	19.15

Table 5

Expected Damage to Essential Facilities				
		# Facilities		
Classification	**Total**	**At Least Moderate**	**At Least Substantial**	**Loss of Use**
Fire Stations	38	4	0	0
Hospitals	3	0	0	0
Police Stations	9	1	0	0
Schools	120	12	0	0

Table 6

Building-Related Economic Loss Estimates						
(Millions of dollars)						
Category	**Area**	**Residential**	**Commercial**	**Industrial**	**Others**	**Total**
Building Loss						
	Building	545.46	100.18	17.26	20.20	683.09
	Content	334.00	190.55	30.37	66.10	621.01
	Inventory	0.00	3.66	5.56	0.66	9.87
	Subtotal	**879.46**	**294.38**	**53.18**	**86.95**	**1,313.97**
Business Interruption						
	Income	0.02	1.13	0.00	0.17	1.31
	Relocation	1.09	0.25	0.00	0.06	1.40
	Rental Income	0.31	0.16	0.00	0.00	0.48
	Wage	0.06	1.16	0.00	8.62	9.84
	Subtotal	**1.47**	**2.70**	**0.00**	**8.85**	**13.02**
ALL	**Total**	**880.93**	**297.08**	**53.19**	**95.80**	**1,326.99**

Building Value (thousands of dollars)				
	Population	**Residential**	**Non-Residential**	**Total**
California				
Shasta	163,256	9,410,456	2,772,919 1	2,183,375
Total	**163,256**	**9,410,456**	**2,772,919 1**	**2,183,375**
Total Study Region	**163,256**	**9,410,456**	**2,772,919**	**12,183,375**

This page intentionally left blank.

Appendix 4.B

2010 HAZUS MH EARTHQUAKE EVENT REPORTS

HAZUS MH Earthquake Events

Shasta County Earthquake 500 yr

Table 1

Transportation System Lifeline Inventory			
System	**Component**	**# locations/ # Segments**	**Replacement value (millions of dollars)**
Highway	Bridges	213	305.60
	Segments	130	2,021.00
	Tunnels	0	0.00
		Subtotal	**2,326.60**
Railways	Bridges	5	0.40
	Facilities	1	2.70
	Segments	33	58.30
	Tunnels	0	0.00
		Subtotal	**61.30**
Light Rail	Bridges	0	0.00
	Facilities	0	0.00
	Segments	0	0.00
	Tunnels	0	0.00
		Subtotal	**0.00**
Bus	Facilities	1	1.30
		Subtotal	**1.30**
Ferry	Facilities	0	0.00
		Subtotal	**0.00**
Port	Facilities	0	0.00
		Subtotal	**0.00**
Airport	Facilities	1	10.70
	Runways	2	75.90
		Subtotal	**86.60**
		Total	**2,475.80**

Table 2

Utility System Lifeline Inventory			
System	**Component**	**# Locations/ Segments**	**Replacement value (millions of dollars)**
Potable Water	Distribution Lines	NA	47.30
	Facilities	2	78.60
	Pipelines	0	0.00
		Subtotal	**125.90**
Waste Water	Distribution Lines	NA	28.40
	Facilities	5	392.90
	Pipelines	0	0.00
		Subtotal	**421.30**
Natural Gas	Distribution Lines	NA	18.90
	Facilities	0	0.00
	Pipelines	0	0.00
		Subtotal	**18.90**
Oil Systems	Facilities	0	0.00
	Pipelines	0	0.00
		Subtotal	**0.00**
Electrical Power	Facilities	3	389.40
		Subtotal	**389.40**
Communication	Facilities	7	0.80
		Subtotal	**0.80**
		Total	**956.40**

Table 3

Expected Building Damage by Occupancy										
	None		Slight		Moderate		Extensive		Complete	
	Count	(%)	Count	(%)	Count	(%)	Count	(%)	Count	(%)
Agriculture	88	0.30	47	0.31	49	0.56	25	0.95	6	1.49
Commercial	848	2.85	632	4.21	867	9.91	430	16.29	92	24.29
Education	44	0.15	19	0.13	22	0.25	11	0.42	2	0.60
Government	45	0.15	29	0.19	41	0.47	19	0.73	4	1.01
Industrial	224	0.75	175	1.17	2556	2.93	136	5.15	32	8.42
Other Residential	4,635	15.56	3,339	22.25	3,529	40.33	1,482	56.15	208	55.27
Religion	79	0.26	45	0.30	54	0.62	26	0.97	5	1.30
Single Family	23,820	79.98	10,719	71.44	3,932	44.94	511	19.36	29	7.62
Total	**29,783**		**15,004**		**8,750**		**2,639**		**377**	

Table 4

Expected Building Damage by Building Type (All Design Levels)										
	None		Slight		Moderate		Extensive		Complete	
	Count	(%)	Count	(%)	Count	(%)	Count	(%)	Count	(%)
Wood	26,712	89.69	12201	81.32	4,515	51.60	544	20.63	36	9.42
Steel	316	1.06	205	1.37	372	4.25	176	6.66	45	11.99
Concrete	303	1.02	240	1.60	353	4.04	166	6.30	61	8.20
Precast	189	0.63	121	0.81	264	3.01	216	8.18	53	14.46
RM	595	2.00	250	1.67	441	5.04	275	10.40	31	8.19
URM	142	0.48	101	0.67	102	1.16	45	1.72	15	4.01
MH	1,527	5.13	1887	12.57	2,703	30.90	1,217	46.11	166	44.03
Total	**29,783**		**15,004**		**8,750**		**2,639**		**377**	

*Note:
RM Reinforced Masonry
URM Unreinforced Masonry
MH Manufactured Housing

Table 5

Expected Damage to Essential Facilities				
Classification	**Total**	**# Facilities**		
		At Least Moderate Damage > 50%	**Complete Damage > 50%**	**With Functionality > 50% on day 1**
Hospitals	3	3	0	0
Schools	120	0	0	105
EOCs	0	0	0	0
Police Stations	9	0	0	8
Fire Stations	38	0	0	25

Table 6

Expected Damage to the Transportation Systems						
System	Component	Number of Locations				
		Locations/ Segments	With at Least Mod. Damage	With Complete Damage	With Functionality > 50 % After Day 1	With Functionality > 50 % After Day 7
Highway	Segments	162	0	0	162	162
	Bridges	430	0	0	430	430
	Tunnels	0	0	0	0	0
Railways	Segments	71	0	0	71	71
	Bridges	7	0	0	7	7
	Tunnels	0	0	0	0	0
	Facilities	1	0	0	1	1
Light Rail	Segments	0	0	0	0	0
	Bridges	0	0	0	0	0
	Tunnels	0	0	0	0	0
	Facilities	0	0	0	0	0
Bus	Facilities	1	0	0	1	1
Ferry	Facilities	0	0	0	0	0
Port	Facilities	0	0	0	0	0
Airport	Facilities	1	0	0	1	1
	Runways	2	0	0	2	2

Table 7

Expected Utility System Facility Damage					
System	# of Locations				
	Total #	With at Least Moderate Damage	With Complete Damage	with Functionality > 50 % After Day 1	with Functionality > 50 % After Day 7
Potable Water	2	0	0	2	2
Waste Water	5	0	0	0	5
Natural Gas	1	0	0	0	1
Oil Systems	0	0	0	0	0
Electrical Power	5	0	0	3	5
Communication	22	0	0	22	22

Table 8

Expected Utility System Pipeline Damage (Site Specific)			
System	Total Pipelines Length (kms)	Number of Leaks	Number of Breaks
Potable Water 1	1,872	2484	621
Waste Water	7,123	1965	491
Natural Gas	4,749	2100	525
Oil	0	0	0

Table 9

Expected Potable Water and Electric Power System Performance						
	Total # of Households	Number of Households without Service				
		At Day 1	At Day 3	At Day 7	At Day 30	At Day 90
Potable Water	63,426	13,249	11,451	7,918	0	0
Electric Power		0	0	0	0	0

Table 10

Casualty Estimates					
		Level 1	**Level 2**	**Level 3**	**Level 4**
2 AM	Commercial	3	1	0	0
	Commuting	0	0	0	0
	Educational	0	0	0	0
	Hotels	4	1	0	0
	Industrial	4	1	0	0
	Other-Residential	113	20	2	3
	Single Family	76	8	0	1
	Total	**200**	**31**	**2**	**4**
2 PM	Commercial	224	54	8	16
	Commuting	0	0	0	0
	Educational	70	17	2	5
	Hotels	1	0	0	0
	Industrial	29	7	1	2
	Other-Residential	26	5	0	1
	Single Family	18	2	0	0
	Total	**367**	**85**	**12**	**24**
5 PM	Commercial	179	43	7	13
	Commuting	2	2	4	1
	Educational	7	2	0	0
	Hotels	1	0	0	0
	Industrial	18	4	1	1
	Other-Residential	41	7	1	1
	Single Family	29	3	0	0
	Total	**277**	**62**	**12**	**16**

Table 11

Building-Related Economic Loss Estimates (Millions of dollars)							
Category	**Area**	**Single Family**	**Other Residential**	**Commercial**	**Industrial**	**Others**	**Total**
Income Losses	Wage	0.00	3.97	52.38	1.43	4.29	62.06
	Capital-Related	0.00	1.69	42.63	0.84	0.65	45.81
	Rental	7.68	10.94	24.57	0.41	2.32	45.92
	Relocation	29.14	16.01	39.27	2.55	12.40	99.37
	Subtotal	**36.82**	**32.61**	**158.84**	**5.22**	**19.66**	**253.16**
Capital Stock Losses	Structural	45.11	25.37	54.01	8.32	13.72	146.54
	Non-Structural	219.60	92.61	122.00	20.56	30.13	484.90
	Content	71.67	18.56	50.87	11.73	12.71	165.54
	Inventory	0.00	0.00	1.43	2.28	0.24	3.95
	Subtotal	**336.38**	**136.54**	**228.32**	**42.89**	**56.80**	**800.93**
	Total	**373.20**	**169.15**	**387.16**	**48.11**	**76.47**	**1,054.09**

Table 12

Transportation System Economic Losses (Millions of dollars)				
System	**Component**	**Inventory Value**	**Economic Loss**	**Loss Ratio (%)**
Highway	Segments	3,446.27	$0.00	0.00
	Bridges	514.99	$9.89	1.92
	Tunnels	0.00	$0.00	0.00
	Subtotal	**3961.30**	**9.90**	
Railways	Segments	128.00	$0.00	0.00
	Bridges	0.83	$0.01	0.64
	Tunnels	0.00	$0.00	0.00
	Facilities	2.66	$0.43	16.25
	Subtotal	**131.50**	**0.40**	
Light Rail	Segments	0.00	$0.00	0.00
	Bridges	0.00	$0.00	0.00
	Tunnels	0.00	$0.00	0.00
	Facilities	0.00	$0.00	0.00
	Subtotal	**0.00**	**0.00**	
Bus	Facilities	1.29	$0.21	16.25
	Subtotal	**1.30**	**0.20**	
Ferry	Facilities	0.00	$0.00	0.00
	Subtotal	**0.00**	**0.00**	
Port	Facilities	0.00	$0.00	0.00
	Subtotal	**0.00**	**0.00**	
Airport	Facilities	10.65	$1.76	16.49
	Runways	75.93	$0.00	0.00
	Subtotal	**86.60**	**1.80**	
	Total	**4180.60**	**12.30**	

Table 13

Utility System Economic Losses (Millions of dollars)				
System	**Component**	**Inventory Value**	**Economic Loss**	**Loss Ratio (%)**
Potable Water	Pipelines	0.00	$0.00	0.00
	Facilities	78.60	$6.80	8.65
	Distribution Lines	237.40	$11.18	4.71
	Subtotal	**316.03**	**$17.98**	
Waste Water	Pipelines	0.00	$0.00	0.00
	Facilities	392.90	$34.45	8.77
	Distribution Lines	142.50	$8.84	6.21
	Subtotal	**535.40**	**$43.29**	
Natural Gas	Pipelines	0.00	$0.00	0.00
	Facilities	1.30	$0.18	13.81
	Distribution Lines	95.00	$9.45	9.95
	Subtotal	**96.26**	**$9.63**	
Oil Systems	Pipelines	0.00	$0.00	0.00
	Facilities	0.00	$0.00	0.00
	Subtotal	**0.00**	**$0.00**	
Electrical Power	Facilities	649.00	$68.69	10.58
	Subtotal	**649.00**	**$68.69**	
Communication	Facilities	2.60	$0.25	9.70
	Subtotal	**2.60**	**$0.25**	
	Total	**1,599.28**	**$139.84**	

Shasta County Earthquake 100 yr

Table 1

Transportation System Lifeline Inventory			
System	**Component**	**# locations/# Segments**	**Replacement value (millions of dollars)**
Highway	Bridges	430	515.00
	Segments	162	3,446.30
	Tunnels	0	0.00
		Subtotal	**3,961.30**
Railways	Bridges	7	0.80
	Facilities	1	2.70
	Segments	71	128.00
	Tunnels	0	0.00
		Subtotal	**131.50**
Light Rail	Bridges	0	0.00
	Facilities	0	0.00
	Segments	0	0.00
	Tunnels	0	0.00
		Subtotal	**0.00**
Bus	Facilities	1	1.30
		Subtotal	**1.30**
Ferry	Facilities	0	0.00
		Subtotal	**0.00**
Port	Facilities	0	0.00
		Subtotal	**0.00**
Airport	Facilities	1	10.70
	Runways	2	75.90
		Subtotal	**86.60**
		Total	**4,180.60**

Table 2

Utility System Lifeline Inventory			
System	**Component**	**# Locations /Segments**	**Replacement value (millions of dollars)**
Potable Water	Distribution Lines	NA	237.40
	Facilities	2	78.60
	Pipelines	0	0.00
		Subtotal	**316.00**
Waste Water	Distribution Lines	NA 1	42.50
	Facilities	5	392.90
	Pipelines	0	0.00
		Subtotal	**535.40**
Natural Gas	Distribution Lines	NA	95.00
	Facilities	1	1.30
	Pipelines	0	0.00
		Subtotal	**96.30**
Oil Systems	Facilities	0	0.00
	Pipelines	0	0.00
		Subtotal	**0.00**
Electrical Power	Facilities	5	649.00
		Subtotal	**649.00**
Communication	Facilities	22	2.60
		Subtotal	**2.60**
	Total		**1,599.30**

Table 3

Expected Building Damage by Occupancy										
	None		Slight		Moderate		Extensive		Complete	
	Count	(%)	Count	(%)	Count	(%)	Count	(%)	Count	(%)
Agriculture	237	0.40	33	0.44	19	0.75	4	1.31	0	2.17
Commercial	2,658	4.46	409	5.52	235	9.29	45	15.21	3	25.12
Education	106	0.18	12	0.16	7	0.27	1	0.41	0	0.75
Government	143	0.24	21	0.28	12	0.49	2	0.62	0	1.39
Industrial	771	1.29	129	1.74	82	3.25	17	5.83	1	8.45
Other Residential	13,015	21.82	2,392	32.25	1,390	54.89	170	57.83	6	59.96
Religion	205	0.34	28	0.38	15	0.61	2	0.78	0	1.72
Single Family	42,507	71.27	4,393	59.23	771	30.47	53	18.01	0	0.44
Total	**59,642**		**7,417**		**2,532**		**265**		**11**	

Table 4

Expected Building Damage by Building Type (All Design Levels)										
	None		Slight		Moderate		Extensive		Complete	
	Count	(%)	Count	(%)	Count	(%)	Count	(%)	Count	(%)
Wood	47,865	80.25	5012	67.58	857	33.87	55 1	8.79	0	1.16
Steel	1,014	1.70	178	2.40	132	5.22	21	7.18	2	20.35
Concrete	1,030	1.73	174	2.35	93	3.67	12	4.14	1	4.98
Precast	744	1.25	114	1.54	106	4.20	30	10.28	1	7.52
RM	1,624	2.72	152	2.05	116	4.59	23	7.68	0	2.47
URM	359	0.60	74	0.99	42	1.65	10	3.35	2	14.41
MH	7,006	11.75	1712	23.08	1,185	46.80	143	48.57	5	49.11
Total	**59,642**		**7,417**		**2,532**		**295**		**11**	

*Note:
RM Reinforced Masonry
URM Unreinforced Masonry
MH Manufactured Housing

Table 5

Expected Damage to Essential Facilities				
Classification	**Total**	**# Facilities**		
		At Least Moderate Damage > 50%	**Complete Damage > 50%**	**With Functionality > 50% on day 1**
Hospitals	3	0	0	3
Schools	120	0	0	120
EOCs	0	0	0	0
Police Stations	9	0	0	9
Fire Stations	38	0	0	38

Table 6

Expected Damage to the Transportation Systems						
		Number of Locations				
System	Component	Locations/ Segments	With at Least Mod. Damage	With Complete Damage	With Functionality > 50 %	
					After Day 1	After Day 7
Highway	Segments	162	0	0	162	162
	Bridges	430	0	0	430	430
	Tunnels	0	0	0	0	0
Railways	Segments	71	0	0	71	71
	Bridges	7	0	0	7	7
	Tunnels	0	0	0	0	0
	Facilities	1	0	0	1	1
Light Rail	Segments	0	0	0	0	0
	Bridges	0	0	0	0	0
	Tunnels	0	0	0	0	0
	Facilities	0	0	0	0	0
Bus	Facilities	1	0	0	1	1
Ferry	Facilities	0	0	0	0	0
Port	Facilities	0	0	0	0	0
Airport	Facilities	1	0	0	1	1
	Runways	2	0	0	2	2

Table 7

Expected Utility System Facility Damage					
System	# of Locations				
	Total #	With at Least Moderate Damage	With Complete Damage	with Functionality > 50%	
				After Day 1	After Day 7
Potable Water	2	0	0	2	2
Waste Water	5	0	0	5	5
Natural Gas	1	0	0	1	1
Oil Systems	0	0	0	0	0
Electrical Power	5	0	0	5	5
Communication	22	0	0	22	22

Table 8

Expected Utility System Pipeline Damage (Site Specific)			
System	Total Pipelines Length (kms)	Number of Leaks	Number of Breaks
Potable Water	11,872	366	92
Waste Water	7,123	290	72
Natural Gas	4,749	310	77
Oil	0	0	0

Table 9

Expected Potable Water and Electric Power System Performance						
	Total # of Households	Number of Households without Service				
		At Day 1	At Day 3	At Day 7	At Day 30	At Day 90
Potable Water	63,426	29	0	0	0	0
Electric Power		0	0	0	0	0

Table 10

Casualty Estimates					
		Level 1	**Level 2**	**Level 3**	**Level 4**
2 AM	Commercial	0	0	0	0
	Commuting	0	0	0	0
	Educational	0	0	0	0
	Hotels	0	0	0	0
	Industrial	0	0	0	0
	Other-Residential	14	1	0	0
	Single Family	12	1	0	0
	Total	**26**	**2**	**0**	**0**
2 PM	Commercial	18	2	0	0
	Commuting	0	0	0	0
	Educational	6	1	0	0
	Hotels	0	0	0	0
	Industrial	2	0	0	0
	Other-Residential	3	0	0	0
	Single Family	3	0	0	0
	Total	**32**	**4**	**0**	**1**
5 PM	Commercial	14	2	0	0
	Commuting	0	0	0	0
	Educational	1	0	0	0
	Hotels	0	0	0	0
	Industrial	1	0	0	0
	Other-Residential	5	1	0	0
	Single Family	4	0	0	0
	Total	**26**	**3**	**0**	**0**

Table 11

Building-Related Economic Loss Estimates (Millions of dollars)							
Category	**Area**	**Single Family**	**Other Residential**	**Commercial**	**Industrial**	**Others**	**Total**
Income Loses	Wage	0.00	0.37	6.59	0.18	0.58	7.73
	Capital-Related	0.00	0.16	5.48	0.11	0.08	5.83
	Rental	1.03	1.41	3.45	0.06	0.28	6.22
	Relocation	3.61	2.59	5.14	0.43	1.47	13.24
	Subtotal	**4.63**	**4.53**	**20.66**	**0.79**	**2.41**	**33.02**
Capital Stock Loses	Structural	7.26	3.64	6.30	1.08	1.60	19.87
	Non-Structural	37.85	13.89	15.86	2.88	4.13	74.62
	Content	11.66	2.93	7.86	1.71	1.97	26.12
	Inventory	0.00	0.00	0.21	0.34	0.03	0.58
	Subtotal	**56.76**	**20.46**	**30.23**	**6.01**	**7.73**	**121.19**
	Total	**61.39**	**24.99**	**50.89**	**6.80**	**10.14**	**154.22**

Table 12

Transportation System Economic Losses (Millions of dollars)				
System	**Component**	**Inventory Value**	**Economic Loss**	**Loss Ratio (%)**
Highway	Segments	3,446.27	$0.00	0.00
	Bridges	514.99	$0.56	0.11
	Tunnels	0.00	$0.00	0.00
	Subtotal	**3961.30**	**0.60**	
Railways	Segments	128.00	$0.00	0.00
	Bridges	0.83	$0.00	0.01
	Tunnels	0.00	$0.00	0.00
	Facilities	2.66	$0.16	5.96
	Subtotal	**131.50**	**0.20**	
Light Rail	Segments	0.00	$0.00	0.00
	Bridges	0.00	$0.00	0.00
	Tunnels	0.00	$0.00	0.00
	Facilities	0.00	$0.00	0.00
	Subtotal	**0.00**	**0.00**	
Bus	Facilities	1.29	$0.08	5.96
	Subtotal	**1.30**	**0.10**	
Ferry	Facilities	0.00	$0.00	0.00
	Subtotal	**0.00**	**0.00**	
Port	Facilities	0.00	$0.00	0.00
	Subtotal	**0.00**	**0.00**	
Airport	Facilities	10.65	$0.63	5.90
	Runways	75.93	$0.00	
	Subtotal	**86.60**	**0.60**	
	Total	**4180.60**	**1.40**	

Table 13

Utility System Economic Losses (Millions of dollars)				
System	**Component**	**Inventory Value**	**Economic Loss**	**Loss Ratio (%)**
Potable Water	Pipelines	0.00	$0.00	0.00
	Facilities	78.60	$1.34	1.70
	Distribution Lines	237.40	$1.65	0.69
	Subtotal	**316.03**	**$2.99**	
Waste Water	Pipelines	0.00	$0.00	0.00
	Facilities	392.90	$6.65	1.69
	Distribution Lines	142.50	$1.30	0.92
	Subtotal	**535.40**	**$7.95**	
Natural Gas	Pipelines	0.00	$0.00	0.00
	Facilities	1.30	$0.03	2.28
	Distribution Lines	95.00	$1.39	1.47
	Subtotal	**96.26**	**$1.42**	
Oil Systems	Pipelines	0.00	$0.00	0.00
	Facilities	0.00	$0.00	0.00
	Subtotal	**0.00**	**$0.00**	
Electrical Power	Facilities	649.00	$12.63	1.95
	Subtotal	**649.00**	**$12.63**	
Communication	Facilities	2.60	$0.05	1.88
	Subtotal	**2.60**	**$0.05**	
	Total	**1,599.28**	**$25.05**	

Shasta County Historic Earthquake 11-26-1998

Table 1

Transportation System Lifeline Inventory			
System	**Component**	**# locations/ # Segments**	**Replacement value (millions of dollars)**
Highway	Bridges	213	305.60
	Segments	130	2,021.00
	Tunnels	0	0.00
		Subtotal	**2,326.60**
Railways	Bridges	5	0.40
	Facilities	1	2.70
	Segments	33	58.30
	Tunnels	0	0.00
		Subtotal	**61.30**
Light Rail	Bridges	0	0.00
	Facilities	0	0.00
	Segments	0	0.00
	Tunnels	0	0.00
		Subtotal	**0.00**
Bus	Facilities	1	1.30
		Subtotal	**1.30**
Ferry	Facilities	0	0.00
		Subtotal	**0.00**
Port	Facilities	0	0.00
		Subtotal	**0.00**
Airport	Facilities	1	10.70
	Runways	2	75.90
		Subtotal	**86.60**
		Total	**2,475.80**

Table 2

Utility System Lifeline Inventory			
System	**Component**	**# Locations/ Segments**	**Replacement value (millions of dollars)**
Potable Water	Distribution Lines	NA	47.30
	Facilities	2	78.60
	Pipelines	0	0.00
		Subtotal	**125.90**
Waste Water	Distribution Lines	NA	28.40
	Facilities	5	392.90
	Pipelines	0	0.00
		Subtotal	**421.30**
Natural Gas	Distribution Lines	NA	18.90
	Facilities	0	0.00
	Pipelines	0	0.00
		Subtotal	**18.90**
Oil Systems	Facilities	0	0.00
	Pipelines	0	0.00
		Subtotal	**0.00**
Electrical Power	Facilities	3	389.40
		Subtotal	**389.40**
Communication	Facilities	7	0.80
		Subtotal	**0.80**
		Total	**956.40**

Table 3

Expected Building Damage by Occupancy										
	None		Slight		Moderate		Extensive		Complete	
	Count	(%)	Count	(%)	Count	(%)	Count	(%)	Count	(%)
Agriculture	209	0.38	3	0.47	1	0.82	0	1.72	0	2.33
Commercial	2,787	5.01	57	7.92	21	13.90	3	30.58	0	47.62
Education	97	0.17	1	0.20	0	0.31	0	0.59	0	1.34
Government	135	0.24	3	0.35	1	0.49	0	0.70	0	2.11
Industrial	799	1.43	17	2.31	7	4.33	1	9.54	0	5.48
Other Residential	12,797	22.99	300	41.65	93	60.30	4	43.13	0	38.17
Religion	204	0.37	3	0.46	1	0.64	0	0.98	0	2.94
Single Family	38,645	69.42	336	46.63	30	19.22	1	12.75	0	0.00
Total	**55,672**		**719**		**154**		**9**		**0**	

Table 4

Expected Building Damage by Building Type (All Design Levels)										
	None		Slight		Moderate		Extensive		Complete	
	Count	(%)	Count	(%)	Count	(%)	Count	(%)	Count	(%)
Wood	43,592	78.30	383	53.30	32 20.61	1	12.97	0	0.00	
Steel	1,092	1.96	16	2.20	5	3.45	0	4.34	0	6.77
Concrete	1,066	1.91	22	3.02	5	3.09	0	3.00	0	0.00
Precast	801	1.44	25	3.47	14	9.30	2	25.91	0	0.81
RM	1,552	2.79	26	3.68	12	7.71	1	13.48	0	0.00
URM	381	0.68	17	2.32	6	4.05	1	9.75	0	92.42
MH	7,187	12.91	230	32.01	80	51.80	3	30.55	0	0.00
Total	**55,672**		**719**		**154**		**9**		**0**	

*Note:
RM Reinforced Masonry
URM Unreinforced Masonry
MH Manufactured Housing

Table 5

Expected Damage to Essential Facilities				
Classification	**Total**	**# Facilities**		
		At Least Moderate Damage > 50%	**Complete Damage > 50%**	**With Functionality > 50% on day 1**
Hospitals	2	0	0	2
Schools	87	0	0	87
EOCs	0	0	0	0
Police Stations	6	0	0	6
Fire Stations	15	0	0	15

Table 6

Expected Damage to the Transportation Systems						
System	Component	Number of Locations				
		Locations/ Segments	With at Least Mod. Damage	With Complete Damage	With Functionality > 50 %	
					After Day 1	After Day 7
Highway	Segments	130	0	0	130	130
	Bridges	213	0	0	213	213
	Tunnels	0	0	0	0	0
Railways	Segments	33	0	0	33	33
	Bridges	5	0	0	5	5
	Tunnels	0	0	0	0	0
	Facilities	1	0	0	1	1
Light Rail	Segments	0	0	0	0	0
	Bridges	0	0	0	0	0
	Tunnels	0	0	0	0	0
	Facilities	0	0	0	0	0
Bus	Facilities	1	0	0	1	1
Ferry	Facilities	0	0	0	0	0
Port	Facilities	0	0	0	0	0
Airport	Facilities	1	0	0	1	1
	Runways	2	0	0	2	2

Table 7

Expected Utility System Facility Damage					
System	# of Locations				
	Total #	With at Least Moderate Damage	With Complete Damage	with Functionality > 50 %	
				After Day 1	After Day 7
Potable Water	2	0	0	2	2
Waste Water	5	0	0	5	5
Natural Gas	0	0	0	0	0
Oil Systems	0	0	0	0	0
Electrical Power	3	0	0	3	3
Communication	7	0	0	7	7

Table 8

Expected Utility System Pipeline Damage (Site Specific)			
System	Total Pipelines Length (kms)	Number of Leaks	Number of Breaks
Potable Water	2,366	5	1
Waste Water	1,419	4	1
Natural Gas	946	4	1
Oil	0	0	0

Table 9

Expected Potable Water and Electric Power System Performance						
	Total # of Households	Number of Households without Service				
		At Day 1	At Day 3	At Day 7	At Day 30	At Day 90
Potable Water	53,742	0	0	0	0	0
Electric Power		0	0	0	0	0

Table 10

Casualty Estimates					
		Level 1	**Level 2**	**Level 3**	**Level 4**
2 AM	Commercial	0	0	0	0
	Commuting	0	0	0	0
	Educational	0	0	0	0
	Hotels	0	0	0	0
	Industrial	0	0	0	0
	Other-Residential	1	0	0	0
	Single Family	1	0	0	0
	Total	**2**	**0**	**0**	**0**
2 PM	Commercial	2	0	0	0
	Commuting	0	0	0	0
	Educational	0	0	0	0
	Hotels	0	0	0	0
	Industrial	0	0	0	0
	Other-Residential	0	0	0	0
	Single Family	0	0	0	0
	Total	**2**	**0**	**0**	**0**
5 PM	Commercial	1	0	0	0
	Commuting	0	0	0	0
	Educational	0	0	0	0
	Hotels	0	0	0	0
	Industrial	0	0	0	0
	Other-Residential	0	0	0	0
	Single Family	0	0	0	0
	Total	**2**	**0**	**0**	**0**

Table 11

Building-Related Economic Loss Estimates (Millions of dollars)							
Category	**Area**	**Single Family**	**Other Residential**	**Commercial**	**Industrial**	**Others**	**Total**
Income Loses	Wage	0.00	0.02	0.51	0.01	0.05	0.59
	Capital-Related	0.00	0.01	0.40	0.01	0.01	0.43
	Rental	0.04	0.10	0.33	0.01	0.02	0.50
	Relocation	0.13	0.16	0.46	0.04	0.09	0.87
	Subtotal	**0.17**	**0.29**	**1.70**	**0.06**	**0.16**	**2.38**
Capital Stock Loses	Structural	0.40	0.27	0.59	0.09	0.10	1.44
	Non-Structural	2.57	1.21	1.49	0.26	0.36	5.89
	Content	0.90	0.29	0.81	0.16	0.20	2.35
	Inventory	0.00	0.00	0.02	0.03	0.00	0.05
	Subtotal	**3.87**	**1.76**	**2.91**	**0.53**	**0.66**	**9.73**
	Total	**4.04**	**2.05**	**4.60**	**0.60**	**0.82**	**12.11**

Table 12

Transportation System Economic Losses (Millions of dollars)				
System	**Component**	**Inventory Value**	**Economic Loss**	**Loss Ratio (%)**
Highway	Segments	2,021.02	$0.00	0.00
	Bridges	305.61	$0.00	0.00
	Tunnels	0.00	$0.00	0.00
	Subtotal	**2326.60**	**0.00**	
Railways	Segments	58.25	$0.00	0.00
	Bridges	0.40	$0.00	0.00
	Tunnels	0.00	$0.00	0.00
	Facilities	2.66	$0.08	3.15
	Subtotal	**61.30**	**0.10**	
Light Rail	Segments	0.00	$0.00	0.00
	Bridges	0.00	$0.00	0.00
	Tunnels	0.00	$0.00	0.00
	Facilities	0.00	$0.00	0.00
	Subtotal	**0.00**	**0.00**	
Bus	Facilities	1.29	$0.04	3.15
	Subtotal	**1.30**	**0.00**	
Ferry	Facilities	0.00	$0.00	0.00
	Subtotal	**0.00**	**0.00**	
Port	Facilities	0.00	$0.00	0.00
	Subtotal	**0.00**	**0.00**	
Airport	Facilities	10.65	$0.20	1.89
	Runways	75.93	$0.00	0.00
	Subtotal	**86.60**	**0.20**	
	Total	**2475.80**	**0.30**	

Table 13

Utility System Economic Losses (Millions of dollars)				
System	**Component**	**Inventory Value**	**Economic Loss**	**Loss Ratio (%)**
Potable Water	Pipelines	0.00	$0.00	0.00
	Facilities	78.60	$0.38	0.48
	Distribution Lines	47.30	$0.02	0.04
	Subtotal	**125.90**	**$0.40**	
Waste Water	Pipelines	0.00	$0.00	0.00
	Facilities	392.90	$0.95	0.24
	Distribution Lines	28.40	$0.02	0.06
	Subtotal	**421.33**	**$0.96**	
Natural Gas	Pipelines	0.00	$0.00	0.00
	Facilities	0.00	$0.00	0.00
	Distribution Lines	18.90	$0.02	0.09
	Subtotal	**18.93**	**$0.02**	
Oil Systems	Pipelines	0.00	$0.00	0.00
	Facilities	0.00	$0.00	0.00
	Subtotal	**0.00**	**$0.00**	
Electrical Power	Facilities	389.40	$1.19	0.30
	Subtotal	**389.40**	**$1.19**	
Communication	Facilities	0.80	$0.00	0.45
	Subtotal	**0.83**	**$0.00**	
	Total	**956.38**	**$2.57**	

Appendix 5.A

2010 SHASTA COUNTY MITIGATION PROJECTS IMPLEMENTATION MATRIX

Shasta County Mitigation Implementation Strategy Tracking Table			
Area	**Actions and Strategies**	**Timeframe**	**Update**
FLD-1	Increase Participation in Floodplain Re-mapping Initiative		
FLD-2	Adding Community Volunteers to Creek Cleanup Committees		
FLD-3	Burney Flood Wall		
FLD-4	Cottonwood Sewer Treatment Plant		
FLD-5	Culvert inventory with GPS coordinates and GIS maps		
FLD-6	Replacement of a low flow culvert on Silver Bridge Road		
FLD-7	Repair Cottonwood's Fourth Street Drainage		
FLD-8	Reduce flooding of Burney Creek in Burney		
FLD-9	Reduce flooding of Wilshire Ditch on Bechelli		
FLD-10	Reduce vegetation in all creeks where cleanout would help reduce flooding.		
FLD-11	Open up the constricted creek channel along Platina Road, Trinity Mountain Road, Fountain Fire area and French Gulch Road.		
FLD-12	Restore adequate drainage on Dog Creek Road to prevent further erosion.		
FLD-13	CalEMA Golden Guardian 2011 Tabletop Exercise (flood scenario).		
FLD-14	Sub Scour Mitigation of County Bridges		
WDF-1	2010 Cottonwood Creek Watershed Strategic Fuels Reduction Plan		
WDF-2	2010 Cow Creek Watershed Strategic Fuels Reduction Plan		
WDF-3	2010 French Gulch Area Fuels Reduction and Management Plan		
WDF-4	2010 Lakehead Strategic Fuels Reduction and Management Plan		
WDF-5	2010 Lower Clear Creek Watershed Strategic Fuels Plan		
WDF-6	2010 Shasta West Watershed Strategic Fuels Reduction Plan		
WDF-7	2010 Shingletown/Manton Communities Fire Safe Plan		
WDF-8	2010 Stillwater-Churn Creek Community Wildfire Protection Plan		
WDF-9	2009 Keswick Basin Community Wildfire Protection Plan		
WDF-10	2008 CAL FIRE, Shasta – Trinity Unit Fire Plan		
WDF-11	2002 Backbone Ridge Defensible Fuel Profile Zone		
WDF-12	2005 Day Lassen Bench Community Fire Safe Plan		
WDF-13	1994 Middle Creek Watershed Strategic Wildfire Defense Plan		
WDF-14	Assistance to Burney water infrastructure for sustained fire fighting**.**		
WDF-15	Reorganization of Disaster Healthcare Volunteers and training for Red Cross emergency shelters**.**		
EW-1	Severe Storm		
EW-2	Extreme Heat		
EW-3	Critical Infrastructure Power Generation		
EQ-1	Retrofit any County buildings that do not meet seismic standards.		
EQ-2	Retrofit any County bridges that do not meet seismic standards.		
HM-1	Biohazard Detection System drill (suspected Anthrax scenario)		

Shasta County Mitigation Implementation Strategy Tracking Table			
Area	**Actions and Strategies**	**Timeframe**	**Update**
V-1	Maintain integrated evacuation plan to address the unique situation of volcanic eruption		
CB-1	Educate citizens for protection/prevention		
PE-1	Update Pan Flu Annex to ERP		
PE-2	Isolation and Quarantine Tabletop Exercise		
PE-3	Mass Vaccination		
MCI-1	Statewide Medical Health Exercise		
MCI-2	Shasta County Sierra-Sacramento Valley Emergency Medical Services meetings.		
MCI-3	EMS MCI Field Operations Guide		
MCI-4	County wide fatality management plan		
MCI-5	Government-Authorized Alternate Care Site (ACS) Plan Annex to ERP 2011.		
MCI-6	ACS Exercise		
DF-1	Effective outreach and education about emergency services and plans for communication about dam failure/overtopping		

This page intentionally left blank.

Appendix 5.B

2010 ANDERSON MITIGATION PROJECTS IMPLEMENTATION MATRIX

Anderson Mitigation Implementation Strategy Tracking Table			
Area	**Actions and Strategies**	**Timeframe**	**Update**
FLD-1	Increase Participation in Floodplain Re-mapping Initiative		
FLD-2	Floodplain Management and Flood Mitigation Education and Outreach Action		
FLD-3	Enhance Floodplain Management Ordinance		
FLD-4	Adding Community Volunteers to Creek Cleanup Committees		
FLD-5	Tormey Drain		
FLD-6	City of Anderson Police Department		
FLD-7	ACID Aqueduct at South Street		
HM-1	Biohazard Detection System Drills		
EW-1	Extreme weather emergency operation drills		
EQ-1	Retrofit any City buildings that do not meet seismic standards.		
WDF-1	Complete a Strategic Fuels Reduction Ploan for Anderson Creek Watershed		
WDF-2	Anderson River Park Fuels Reduction		
WDF-3	Factory Outlets Drive-Deschutes Road interchange with I-5		

Appendix 5.C

STAPLE/E

SHASTA COUNTY - FLOOD

Alternative Actions	STAPLE/E Criteria Considerations + Favorable - Less Favorable **N** Not Applicable																					
	(S)ocial		(T)echnical			(A)dministrative			(P)olitical			(L)egal			(E)conimic				(E)nvironmental				
	Community Acceptance	Effect on Segment of Population	Technically Feasible	Long-Term Solution	Secondary Impacts	Staffing	Funding Allocation	Maintenance/Operations	Political Support	Local Champion	Public Support	State Authority	Existing Local Authority	Potential Legal Challenge	Benefit of Action	Cost of Action	Contributes to Economic Goals	Outside Funding Required	Effect on Land/Water	Effect on Endangered Species	Effect on HAZMAT/Waste Sites	Consistent with Community Environmental Goals	Consistent with Federal Laws
FLD-1	+	+	+	+	N	+	+	+	+	+	-	N	+	N	+	+	+	N	+	+	+	+	+
FLD-2	+	+	+	N	+	+	N	+	+	+	+	N	+	N	+	+	+	N	+	+	+	+	N
FLD-3	+	+	+	+	N	-	-	-	+	+	+	N	+	N	+	-	+	-	+	+	+	+	N
FLD-4	+	+	+	N	-	-	+	+	+	+	N	+	N	+	+	+	+	-	+	+	+	+	+
FLD-5	+	+	+	N	N	+	-	+	+	+	+	N	+	N	+	-	+	+	+	+	+	+	N
FLD-6	+	+	+	+	N	+	-	+	+	+	+	N	+	N	+	-	N	-	+	N	N	N	N
FLD-7	+	+	+	+	N	-	-	+	+	+	+	N	+	N	+	-	+	-	+	N	+	+	N
FLD-8	+	+	+	+	+	-	-	+	+	+	+	N	+	N	+	-	+	-	+	+	+	+	N
FLD-9	+	+	+	+	+	-	-	+	+	+	+	N	+	N	+	-	+	-	+	+	+	+	N
FLD-10	+	+	+	-	+	+	+	+	+	+	+	N	+	N	+	+	+	N	+				
FLD-11	+	+	+	+	+	-	-	+	+	+	+	N	+	N	+	-	+	-	+	+	+	+	N
FLD-12	+	+	+	+	+	-	-	+	+	+	+	N	+	N	+	-	+	-	+	+	+	+	N
FLD-13	+	+	+	N	+	+	+	N	+	+	+	N	+	N	+	+	+	N	N	N	+	+	N

SHASTA COUNTY - WILDFIRE

Alternative Actions	STAPLE/E Criteria Considerations + Favorable - Less Favorable N Not Applicable																						
	(S)ocial		(T)echnical			(A)dministrative			(P)olitical			(L)egal			(E)conimic				(E)nvironmental				
	Community Acceptance	Effect on Segment of Population	Technically Feasible	Long-Term Solution	Secondary Impacts	Staffing	Funding Allocation	Maintenance/Operations	Political Support	Local Champion	Public Support	State Authority	Existing Local Authority	Potential Legal Challenge	Benefit of Action	Cost of Action	Contributes to Economic Goals	Outside Funding Required	Effect on Land/Water	Effect on Endangered Species	Effect on HAZMAT/Waste Sites	Consistent with Community Environmental Goals	Consistent with Federal Laws
WDF-1	+	+	+	+	-	+	+	-	+	+	+	+	+	N	+	+	+	-	+	+	+	+	+
WDF-2	+	+	+	+	-	+	+	-	+	+	+	+	+	N	+	+	+	-	+	+	+	+	+
WDF-3	+	+	+	+	-	+	+	-	+	+	+	+	+	N	+	+	+	-	+	+	+	+	+
WDF-4	+	+	+	+	-	+	+	-	+	+	+	+	+	N	+	+	+	-	+	+	+	+	+
WDF-5	+	+	+	+	-	+	+	-	+	+	+	+	+	N	+	+	+	-	+	+	+	+	+
WDF-6	+	+	+	+	-	+	+	-	+	+	+	+	+	N	+	+	+	-	+	+	+	+	+
WDF-7	+	+	+	+	-	+	+	-	+	+	+	+	+	N	+	+	+	-	+	+	+	+	+
WDF-8	+	+	+	+	-	+	+	-	+	+	+	+	+	N	+	+	+	-	+	+	+	+	+
WDF-9	+	+	+	+	-	+	+	-	+	+	+	+	+	N	+	+	+	-	+	+	+	+	+
WDF-10	+	+	+	+	-	+	+	-	+	+	+	+	+	N	+	+	+	-	+	+	+	+	+
WDF-11	+	+	+	+	-	+	+	-	+	+	+	+	+	N	+	+	+	-	+	+	+	+	+
WDF-12	+	+	+	+	-	+	+	-	+	+	+	+	+	N	+	+	+	-	+	+	+	+	+
WDF-13	+	+	+	+	-	+	+	-	+	+	+	+	+	N	+	+	+	-	+	+	+	+	+
WDF-14	+	+	+	+	-	-	-	-	+	+	+	N	+	N	+	-	+	-	+	-	+	+	+
WDF-15	+	+	+	+	-	+	-	+	+	+	+	N	+	N	+	+	-	+	N	N	+	N	+

SHASTA COUNTY – EXTREME WEATHER

Alternative Actions	STAPLE/E Criteria Considerations + Favorable - Less Favorable **N** Not Applicable																					
	(S)ocial		(T)echnical			(A)dministrative			(P)olitical			(L)egal			(E)conimic				(E)nvironmental				
	Community Acceptance	Effect on Segment of Population	Technically Feasible	Long-Term Solution	Secondary Impacts	Staffing	Funding Allocation	Maintenance/Operations	Political Support	Local Champion	Public Support	State Authority	Existing Local Authority	Potential Legal Challenge	Benefit of Action	Cost of Action	Contributes to Economic Goals	Outside Funding Required	Effect on Land/Water	Effect on Endangered Species	Effect on HAZMAT/Waste Sites	Consistent with Community Environmental Goals	Consistent with Federal Laws
EW-1	+	+	+	+	-	+	-	+	+	+	+	+	+	N	+	+	-	-	N	N	+	N	+
EW-2	+	+	+	+	-	+	+	+	+	+	+	+	+	N	+	+	-	+	N	N	+	N	+

SHASTA COUNTY - EARTHQUAKE

Alternative Actions	STAPLE/E Criteria Considerations + Favorable - Less Favorable N Not Applicable																						
	(S)ocial		(T)echnical			(A)dministrative			(P)olitical			(L)egal			(E)conimic				(E)nvironmental				
	Community Acceptance	Effect on Segment of Population	Technically Feasible	Long-Term Solution	Secondary Impacts	Staffing	Funding Allocation	Maintenance/Operations	Political Support	Local Champion	Public Support	State Authority	Existing Local Authority	Potential Legal Challenge	Benefit of Action	Cost of Action	Contributes to Economic Goals	Outside Funding Required	Effect on Land/Water	Effect on Endangered Species	Effect on HAZMAT/Waste Sites	Consistent with Community Environmental Goals	Consistent with Federal Laws
EQ-1	+	+	+	+	-	-	+	+	+	+	+	+	+	N	+	-	+	-	+	N	+	+	+

SHASTA COUNTY – HAZARDOUS MATERIALS

Alternative Actions	STAPLE/E Criteria Considerations + Favorable - Less Favorable **N** Not Applicable																				
	(S)ocial		(T)echnical			(A)dministrative			(P)olitical			(L)egal			(E)conimic				(E)nvironmental				
	Community Acceptance	Effect on Segment of Population	Technically Feasible	Long-Term Solution	Secondary Impacts	Staffing	Funding Allocation	Maintenance/Operations	Political Support	Local Champion	Public Support	State Authority	Existing Local Authority	Potential Legal Challenge	Benefit of Action	Cost of Action	Contributes to Economic Goals	Outside Funding Required	Effect on Land/Water	Effect on Endangered Species	Effect on HAZMAT/Waste Sites	Consistent with Community Environmental Goals	Consistent with Federal Laws
HM-1	+	+	+	+	-	+	+	+	+	+	+	+	+	N	+	+	-	-	-	-	+	+	+

SHASTA COUNTY - VOLCANO

Alternative Actions	STAPLE/E Criteria Considerations + Favorable - Less Favorable N Not Applicable																				
	(S)ocial		(T)echnical			(A)dministrative			(P)olitical			(L)egal			(E)conimic				(E)nvironmental				
	Community Acceptance	Effect on Segment of Population	Technically Feasible	Long-Term Solution	Secondary Impacts	Staffing	Funding Allocation	Maintenance/Operations	Political Support	Local Champion	Public Support	State Authority	Existing Local Authority	Potential Legal Challenge	Benefit of Action	Cost of Action	Contributes to Economic Goals	Outside Funding Required	Effect on Land/Water	Effect on Endangered Species	Effect on HAZMAT/Waste Sites	Consistent with Community Environmental Goals	Consistent with Federal Laws
V-1	+	+	+	+	-	+	-	+	+	+	+	-	+	N	+	+	-	-	N	N	+	+	+

SHASTA COUNTY – CHEMICAL/BIOLOGICAL

Alternative Actions	STAPLE/E Criteria Considerations + Favorable - Less Favorable **N** Not Applicable																				
	(S)ocial		(T)echnical			(A)dministrative			(P)olitical			(L)egal			(E)conimic				(E)nvironmental				
	Community Acceptance	Effect on Segment of Population	Technically Feasible	Long-Term Solution	Secondary Impacts	Staffing	Funding Allocation	Maintenance/Operations	Political Support	Local Champion	Public Support	State Authority	Existing Local Authority	Potential Legal Challenge	Benefit of Action	Cost of Action	Contributes to Economic Goals	Outside Funding Required	Effect on Land/Water	Effect on Endangered Species	Effect on HAZMAT/Waste Sites	Consistent with Community Environmental Goals	Consistent with Federal Laws
CB-1	+	+	+	+	-	+	-	+	+	+	+	+	+	N	+	+	+	-	N	N	+	N	+

SHASTA COUNTY – PANDEMIC/EPIDEMIC

Alternative Actions	STAPLE/E Criteria Considerations + Favorable - Less Favorable **N** Not Applicable																					
	(S)ocial		(T)echnical			(A)dministrative			(P)olitical			(L)egal			(E)conimic				(E)nvironmental				
	Community Acceptance	Effect on Segment of Population	Technically Feasible	Long-Term Solution	Secondary Impacts	Staffing	Funding Allocation	Maintenance/Operations	Political Support	Local Champion	Public Support	State Authority	Existing Local Authority	Potential Legal Challenge	Benefit of Action	Cost of Action	Contributes to Economic Goals	Outside Funding Required	Effect on Land/Water	Effect on Endangered Species	Effect on HAZMAT/Waste Sites	Consistent with Community Environmental Goals	Consistent with Federal Laws
PE-1	+	+	+	+	+	+	+	+	+	+	+	+	+	N	+	+	+	-	-	-	+	-	+
PE-2	+	+	+	+	-	+	+	+	+	+	+	+	+	N	+	-	-	+	N	N	+	-	+
PE-3	+	+	+	+	+	+	+	+	+	+	+	+	+	N	+	+	-	+	N	N	+	-	+

SHASTA COUNTY – MASS CASUALTY INCIDENTS

Alternative Actions	STAPLE/E Criteria Considerations + Favorable - Less Favorable **N** Not Applicable																				
	(S)ocial		(T)echnical			(A)dministrative			(P)olitical			(L)egal			(E)conimic				(E)nvironmental				
	Community Acceptance	Effect on Segment of Population	Technically Feasible	Long-Term Solution	Secondary Impacts	Staffing	Funding Allocation	Maintenance/Operations	Political Support	Local Champion	Public Support	State Authority	Existing Local Authority	Potential Legal Challenge	Benefit of Action	Cost of Action	Contributes to Economic Goals	Outside Funding Required	Effect on Land/Water	Effect on Endangered Species	Effect on HAZMAT/Waste Sites	Consistent with Community Environmental Goals	Consistent with Federal Laws
MCI-1	+	+	+	N	+	+	+	N	+	+	+	+	+	N	+	+	–	+	N	N	+	+	+
MCI-2	+	+	+	N	+	+	+	N	+	+	+	N	+	N	+	+	+	N	N	N	N	N	N
MCI-3	+	+	+	N	N	=	=	N	+	+	+	N	+	N	+	+	+	N	N	N	N	+	N
MCI-4	+	+	+	+	+	+	+	+	+	+	+	+	+	N	+	+	+	+	N	N	N	N	+
MCI-5	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	N	N	N	N	+
MCI-6	+	+	+	N	+	+	+	N	+	+	+	N	+	N	+	+	+	+	N	N	N	N	+

SHASTA COUNTY – DAM FAILURE

Alternative Actions	STAPLE/E Criteria Considerations + Favorable - Less Favorable N Not Applicable																				
	(S)ocial		(T)echnical			(A)dministrative			(P)olitical			(L)egal			(E)conimic				(E)nvironmental				
	Community Acceptance	Effect on Segment of Population	Technically Feasible	Long-Term Solution	Secondary Impacts	Staffing	Funding Allocation	Maintenance/Operations	Political Support	Local Champion	Public Support	State Authority	Existing Local Authority	Potential Legal Challenge	Benefit of Action	Cost of Action	Contributes to Economic Goals	Outside Funding Required	Effect on Land/Water	Effect on Endangered Species	Effect on HAZMAT/Waste Sites	Consistent with Community Environmental Goals	Consistent with Federal Laws
DF-1	+	+	+	+	-	+	+	+	+	+	+	+	+	N	+	-	+	-	+	+	+	+	+

CITY OF ANDERSON - FLOOD

Alternative Actions	STAPLE/E Criteria Considerations + Favorable - Less Favorable **N** Not Applicable																				
	(S)ocial		(T)echnical			(A)dministrative			(P)olitical			(L)egal			(E)conimic				(E)nvironmental				
	Community Acceptance	Effect on Segment of Population	Technically Feasible	Long-Term Solution	Secondary Impacts	Staffing	Funding Allocation	Maintenance/Operations	Political Support	Local Champion	Public Support	State Authority	Existing Local Authority	Potential Legal Challenge	Benefit of Action	Cost of Action	Contributes to Economic Goals	Outside Funding Required	Effect on Land/Water	Effect on Endangered Species	Effect on HAZMAT/Waste Sites	Consistent with Community Environmental Goals	Consistent with Federal Laws
FLD-1	+	+	+	N	N	+	+	+	+	+	-	N	+	N	+	+	+	N	+	+	+	+	+
FLD-2	+	+	+	N	+	+	N	+	+	+	+	N	+	N	+	+	+	N	+	+	+	+	N
FLD-3	+	+	+	+	N	-	-	-	+	+	+	N	+	N	+	-	+	-	+	+	+	+	N
FLD-4	+	+	+	N	-	-	+	+	+	+	+	N	+	+	+	+	+	-	+	+	+	+	+
FLD-5	+	+	+	N	N	+	-	+	+	+	+	N	+	N	+	-	+	+	+	+	+	+	N

CITY OF ANDERSON – HAZARDOUS MATERIALS

Alternative Actions	STAPLE/E Criteria Considerations + Favorable - Less Favorable **N** Not Applicable																					
	(S)ocial		(T)echnical			(A)dministrative			(P)olitical			(L)egal			(E)conimic				(E)nvironmental				
	Community Acceptance	Effect on Segment of Population	Technically Feasible	Long-Term Solution	Secondary Impacts	Staffing	Funding Allocation	Maintenance/Operations	Political Support	Local Champion	Public Support	State Authority	Existing Local Authority	Potential Legal Challenge	Benefit of Action	Cost of Action	Contributes to Economic Goals	Outside Funding Required	Effect on Land/Water	Effect on Endangered Species	Effect on HAZMAT/Waste Sites	Consistent with Community Environmental Goals	Consistent with Federal Laws
HM-1	+	+	+	+	-	+	+	+	+	+	+	+	+	N	+	+	-	-	-	-	+	+	+
HM-2	+	+	+	+	-	+	+	+	+	+	+	+	+	N	+	+	-	-	-	-	+	+	+
HM-3	+	+	+	+	-	+	+	+	+	+	+	+	+	N	+	+	-	-	-	-	+	+	+
HM-4	+	+	+	+	-	+	+	+	+	+	+	+	+	N	+	+	-	-	-	-	+	+	+
HM-5	+	+	+	N	+	+	-	N	+	+	+	N	+	N	+	-	+	-	+	+	N	+	+

CITY OF ANDERSON – EXTREME WEATHER

Alternative Actions	STAPLE/E Criteria Considerations + Favorable - Less Favorable N Not Applicable																				
	(S)ocial		(T)echnical			(A)dministrative			(P)olitical			(L)egal			(E)conimic				(E)nvironmental				
	Community Acceptance	Effect on Segment of Population	Technically Feasible	Long-Term Solution	Secondary Impacts	Staffing	Funding Allocation	Maintenance/Operations	Political Support	Local Champion	Public Support	State Authority	Existing Local Authority	Potential Legal Challenge	Benefit of Action	Cost of Action	Contributes to Economic Goals	Outside Funding Required	Effect on Land/Water	Effect on Endangered Species	Effect on HAZMAT/Waste Sites	Consistent with Community Environmental Goals	Consistent with Federal Laws
EW-1	+	+	+	-	-	+	-	+	+	+	+	+	+	+	+	+	-	-	N	N	N	N	+
EW-2	+	+	+	+	-	+	+	+	+	+	+	+	+	N	+	+	-	+	N	N	+	N	+
EW-3	+	+	+	-	-	+	-	+	+	+	+	+	+	+	+	+	-	-	N	N	N	N	+
EW-4	+	+	+	-	-	+	-	+	+	+	+	+	+	+	+	+	-	-	N	N	N	N	+
EW-5	+	+	+	+	+	-	-	-	+	+	+	N	+	N	+	-	+	-	+	+	+	+	+

CITY OF ANDERSON - EARTHQUAKE

Alternative Actions	STAPLE/E Criteria Considerations + Favorable - Less Favorable N Not Applicable																				
	(S)ocial		(T)echnical			(A)dministrative			(P)olitical			(L)egal			(E)conimic				(E)nvironmental				
	Community Acceptance	Effect on Segment of Population	Technically Feasible	Long-Term Solution	Secondary Impacts	Staffing	Funding Allocation	Maintenance/Operations	Political Support	Local Champion	Public Support	State Authority	Existing Local Authority	Potential Legal Challenge	Benefit of Action	Cost of Action	Contributes to Economic Goals	Outside Funding Required	Effect on Land/Water	Effect on Endangered Species	Effect on HAZMAT/Waste Sites	Consistent with Community Environmental Goals	Consistent with Federal Laws
EQ-1	+	+	+	+	-	-	+	+	+	+	+	+	+	N	+	-	+	-	+	N	+	+	+
EQ-2	+	+	+	+	-	-	+	+	+	+	+	+	+	N	+	-	+	-	+	N	+	+	+
EQ-3	+	+	+	+	-	-	-	+	+	+	+	+	+	N	+	-	+	-	+	N	+	+	+
EQ-4	+	+	+	+	-	-	+	+	+	+	+	+	+	N	+	-	+	-	+	N	+	+	+
EQ-5	+	+	+	+	-	-	+	+	+	+	+	+	+	N	+	-	+	-	+	N	+	+	+

CITY OF ANDERSON - WILDFIRE

Alternative Actions	STAPLE/E Criteria Considerations + Favorable - Less Favorable N Not Applicable																					
	(S)ocial		(T)echnical			(A)dministrative			(P)olitical			(L)egal			(E)conimic				(E)nvironmental				
	Community Acceptance	Effect on Segment of Population	Technically Feasible	Long-Term Solution	Secondary Impacts	Staffing	Funding Allocation	Maintenance/Operations	Political Support	Local Champion	Public Support	State Authority	Existing Local Authority	Potential Legal Challenge	Benefit of Action	Cost of Action	Contributes to Economic Goals	Outside Funding Required	Effect on Land/Water	Effect on Endangered Species	Effect on HAZMAT/Waste Sites	Consistent with Community Environmental Goals	Consistent with Federal Laws
WDF-1	+	+	+	+	-	-	-	-	+	+	+	+	+	-	+	+	+	-	+	+	+	+	+
WDF-2	+	+	+	+	-	-	-	-	+	+	+	+	+	N	+	+	+	-	+	+	+	+	+
WDF-3	+	+	+	+	-	-	-	-	+	+	+	+	+	N	+	+	+	-	+	+	+	+	+
WDF-4	+	+	+	+	-	-	-	-	+	+	+	+	+	N	+	+	+	-	+	+	+	+	+
WDF-5	+	+	+	+	-	-	-	-	+	+	+	+	+	N	+	+	+	-	+	+	+	+	+