# Yolo County, California

## July 2012

Yolo County Operational Area Multi-Jurisdictional Hazard Mitigation Plan

625 Court Street, Room 202, Woodland, CA 95695

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# Acknowledgements

Yolo County would like to thank those Yolo County Operational Area collaborators and partners who participated in the planning and development of this document.

The official Yolo County Operational Area Hazard Mitigation Steering Committee provided the oversight and dedication to this project that was required and without their commitment; this project would not be possible.

As with any working plan, this document represents planning strategies and guidance as understood as of the date of this plan's release. This plan identifies natural hazards and risks and identifies the hazard mitigation strategy to reduce vulnerability and make the communities of Yolo County more disaster resistant and sustainable.

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# Introduction

This Local Hazard Mitigation Planning document has been prepared with the intent of establishing an inter-jurisdictional process for the development and implementation of effective hazard mitigation strategies in association with identified hazards that pose real or potential threats to the Yolo Operational Area (YOA).

This document is, in concept, a revision of the previous Local Hazard Mitigation Plan, composed and approved in 2005, although this update represents a major refinement of the hazard mitigation planning process for Yolo County.

The revision of the Yolo OA Multi Hazard Mitigation Plan (MHMP) has been a collaborative effort, involving various local and tribal government jurisdictions, public authorities, special districts, and selected community-based organizations that represent a broad composite of the operational area. Additionally, selected state agencies and organizations have also contributed to this planning effort, and are represented within the document by direct participation or supplemental reference.

The bulk of the revision was conducted as a collaborative partnership between several local and tribal government organizations, organized as the Hazard Mitigation Steering Committee, and coordinated and facilitated by the Yolo County Office of Emergency Services (OES). This was a major inter-organizational undertaking, requiring a commitment of staff time, organizational resources, ongoing communication, and data collection in an effort to achieve the desired hazard mitigation planning goals. The specific jurisdictions represented in the plan that will formally approve this document are as follows: Cities of Davis, Winters, West Sacramento and Woodland, Yolo County Housing, the Yocha Dehe Wintun Nation and Yolo County.

In addition to the governmental efforts, community involvement was a major objective of the planning process, with significant online and participative outreach conducted at various stages within the planning process. Although not every aspect of the broader community was directly involved in the planning process, significant effort was made to ensure that the public and non-governmental entities had a voice in the plan's development.

Finally, the extent to which this revised plan will or will not be a success locally is dependent upon the commitment at all levels of the designated operational area, whether it be governmental or community-based, to monitor the progress of the identified mitigation strategies, and to ensure that appropriate projects are implemented in accordance with identified need, overriding policy, and funding availability.

## Plan Purpose

The purpose of this plan is to integrate hazard mitigation strategies into the activities and programs of the local jurisdictions and special districts and to the extent practical, into the activities of private sector organizations.

## Plan Scope

The plan identifies and evaluates specific local hazard mitigation strategies to be considered by the Yolo Operational Area and associated planning support for those strategies developed by its political subdivisions, agencies, special districts and organizations. The

Plan describes strategies that government and private sector organizations may utilize as acceptable and effective mechanisms for mitigating those hazards, within the realistic constraints of capability and priority.

## HAZARD MITIGATION PRINCIPLES

- *Hazard Mitigation* is any sustained action taken to eliminate or reduce long-term risk to human life, property, and the environment posed by a hazard.

- *Hazard Mitigation Planning* is the process of making any sustained plan or course of action taken to reduce or eliminate long-term risk to people and property from both natural and technological hazards and their effects. The planning process includes establishing goals and recommendations for mitigation strategies.

- Hazard Mitigation may occur during any phase of a threat, emergency or disaster. Mitigation can and should take place during the preparedness (before), response (during), and recovery (after) phases.

- The process of hazard mitigation involves evaluating the hazard's impact and identification and implementation of actions to minimize the impact.

## PLAN ORGANIZATION & STRUCTURE

The Plan has been developed using a structure similar to, but modified from its previous format. The Plan is divided into five primary sections, each covering a component of the document as required under state and federal planning guidance. The primary sections are further supported by front documents, sectional attachments, and appendices that support specific issues attached to the plan.

- **Introduction**
- **Element A: Planning Process**
- **Element B: Hazard Identification & Risk Assessment**
- **Element C: Mitigation Strategy**
- **Element D: Plan Review, Evaluation and Implementation**
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- **References**
- **Legal Authorities**
- **Community Profiles**
    - **Yolo County**
    - **Yocha Dehe Wintun Nation**
    - **City of Davis**
    - **City of West Sacramento**
    - **City of Winters**
    - **City of Woodland**
    - **Yolo County Housing**
- **Planning Process Documentation**
- **Hazus Model**
- **Formal Plan Adoption Documentation**

# Element A: Planning Process

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

More often than not, communities are faced with having to deal with the aftermath of an unwanted hazard that can devastate areas of a community. While we cannot prevent disasters from happening, their effects can be reduced or eliminated through hazard mitigation planning, but only if a local government has the foresight to assess likely hazards and craft preventative measures before the next hazard event occurs. This Chapter describes the background of hazard planning and why citizens and governments are becoming better prepared.

## PARTICIPATION AND COLLABORATION

**General**
Revision of the Multi Hazard Mitigation Plan requires collaboration and partnering at a multitude of levels.

- Identifying the primary local stakeholders – Formation of inter-jurisdictional Hazard Mitigation Steering Committee
- Establishing project goals and objectives
- Organizing the project work plan based upon identified goals and objectives
- Establishment of jurisdiction-specific hazard mitigation work groups to facilitate internal planning activity
- Organizing jurisdiction/agency-specific Hazard Mitigation Working Groups
- Review of existing Local Hazard Mitigation Plan
- Identification and refined assessment of real or potential hazards and threat conditions
- Revision of jurisdictional demographic and organizational data, and reformatting of information presentation
- Development of prioritized hazard mitigation strategies and projects, keyed to identified hazards

## PARTICIPATING JURISDICTIONS & ORGANIZATIONS

**Lead Agency**
The Yolo County Office of Emergency Services (OES) assumed the role of lead agency for the coordination and facilitation of the joint hazard mitigation plan revision project. OES functioned as the central point of contact for all partnering jurisdictions and organizations, as well as the liaison between the Yolo Operational Area and the State regarding plan revision. Finally, OES performed the bulk of actual plan format and development, in conjunction with the Steering Committee members.

**Steering Committee Participants**
The following identifies individuals who participated directly in the development of the Yolo County Multi Hazard Mitigation Plan revision, either as members of the inter-jurisdictional Steering Committee, as participants working within member organizations, or

as supplemental contributors. (Note: Emboldened names represent lead representatives on The Hazard Mitigation Planning Steering Committee)

COUNTY OF YOLO

| | |
|---|---|
| Rick Martinez | Interim Emergency Services Manager - Yolo County OES |
| Brenna Howell | Interim Emergency Services Coordinator – Yolo County OES |
| Bill Martin | Emergency Services Manager - Yolo County OES |
| Dana Carey | Health Preparedness Supervisor - Yolo County Health |
| John Young | Director – Yolo County Agricultural Dept |
| Jeff Anderson | Yolo County Planning & Public Works Dept |
| Jeff Pinnow | Supervisor – Yolo County Environmental Health |
| Lonell Butler | Chief Building Official – Yolo Co Planning/Public Works |
| Marcus Neuvert | GIS Specialist – Yolo County Information Technology |

CITY OF DAVIS

| | |
|---|---|
| Bill Weisgerber | Interim Fire Chief -Davis Fire Dept |
| Kathy Willhoff | Business Manager – Davis Fire Dept |
| Joy Parker-Lee | Administrative Aide – Davis Fire Dept |
| Ryan Crow | Firefighter – Davis Fire Dept |
| Glenn Glasgow | Lieutenant – Davis Police Dept |
| Juli Hawthorne | Assistant to Director – Community Services Dept |
| Stacey Winton | Admin Analyst – Community Development Dept |
| Samantha Wallace | Assistant to the Director –Community Services Dept |
| Bruce Boyd | MIS Senior Systems Analyst/GIS Manager |

CITY OF WEST SACRAMENTO

| | |
|---|---|
| Bryan Jonson | Fire Captain – West Sacramento Fire Dept |
| Gary Fredericksen | Division Chief – West Sacramento Fire Dept |

CITY OF WINTERS

| | |
|---|---|
| Dan Maguire | Housing Programs Manager |
| John W. Donlevy Jr. | City Manager |
| Mary Jo Rodolfa | Executive Assistant to the City Manager |
| Dawn Van Dyke | Management Analyst |
| Scott Dozier | Winters Fire Department - Fire Chief |
| Brad Lopez | Winters Fire Department – Captain |
| Art Mendoza | Winters Fire Department – Captain |
| Bruce Muramoto | Police Chief – Winters Police Dept |
| Sergio Gutierrez | Lieutenant - Winters Police Dept |
| Nelia Dyer | Community Development Director |
| Eric Lucero | Operations and Maintenance Manager |
| Carol Scianna | Environmental Services Manager |
| Gene Ashdown | Building Official |

CITY OF WOODLAND

| | |
|---|---|
| Mark Brooks | Fire Captain – Woodland Fire |
| Derrick Kaff | Lieutenant – Woodland Police |

| | |
|---|---|
| Mark Cocke | Woodland Public Works |
| Tod Reddish | Fire Chief (retired) – Woodland Fire |
| Rick Sander | Deputy Chief – Woodland Fire |

YOCHA DEHE WINTUN NATION

| | |
|---|---|
| Gary Fredericksen | Fire Chief – Yocha Dehe Fire |
| Crystal Smyth | Business Analyst – Yocha Dehe Fire |
| Mike Chandler | Retired Fire Chief – Yocha Dehe Fire |

YOLO COUNTY HOUSING

| | |
|---|---|
| Lisa Baker | Executive Director – Yolo County Housing |
| Janis Holt | Resource Manager – Yolo County Housing |

YOLO COUNTY OFFICE OF EDUCATION

| | |
|---|---|
| Linda Legnitto | Assistant Superintendent - Yolo County Office of Education |

UNIVERSITY OF CALIFORNIA - DAVIS

| | |
|---|---|
| Nick Crossley | Emergency Services Manager |

## ELEMENT A.1. PLANNING PROCESS

***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***.

**Hazard Mitigation Steering Committee**

Specific tasks were identified for the Steering Committee in order to ensure that project goals for the MHMP revision were undertaken and completed. The following represents those primary Steering Committee tasks:

- Coordinate tasks and activities with the Office of Emergency Services to develop all-hazards disaster mitigation plan and oversee the planning process.
- Prioritize hazards vs. resources.
- Select highest and best mitigation recommendations and develop those recommendations for further action by the Yolo Operational Area.
- Review planning drafts, recommendations and updates.
- Develop and implement long and short term goals.
- Integrate the plan with all phases of Comprehensive Emergency Management Planning.
- Provide for the implementation of committee decisions.

- Encourage, coordinate and provide a methodology for the implementation of public input.

- Provide for the implementation of committee decisions.

- Establish Hazard Mitigation Steering Committee Tasks to Include but not be limited to the following:

    - Determine implementation ability and constraints for proposed Hazard Mitigation planning steps and development of strategies
    - Bring forward community concerns through private and public input
    - Identify implementation resources
    - Provide for the update of Comprehensive Emergency Management Plans on a scheduled basis
    - Evaluate and carry out mitigation activities
    - Assist in implementation of funding identification and procurement

- Ensure that adjacent jurisdictions, pertinent private entities and citizens are informed of the Yolo Operational Area Hazard Mitigation Planning Process and offer each the opportunity for input into the plan.

**Steering Committee Hazard Mitigation Strategy Identification Activities**

1. Beginning in late 2010 members of the Steering Committee agreed to a bi-weekly meeting schedule to identify hazard priorities and review local hazard mitigation strategy recommendations.

2. The Hazard Mitigation Steering Committee agreed to make and pass plan-based general policy recommendations by a vote of a simple majority of those members present.

3. Following a public meeting the Steering Committee again examined and prioritized the Hazard Mitigation Strategies. These strategies were incorporated into the Plan with the intent of providing guidance in the development of local mitigation policy. The Steering Committee worked to identify estimated time frames and implementation costs associated with prioritized mitigation strategy projects for future implementation.

**Yolo Operational Area Hazard Mitigation Plan Steering Committee Future Tasks**

- Define the mitigation constraints that the Yolo Operational Area is required to follow in implementing recommendations from the Hazard Mitigation Steering Committee.

    - Protection of sensitive information
    - Apply budget constraints to recommended hazard mitigation strategies
    - Apply state policy and legal constraints to mitigation strategies brought forward by the Steering Committee.

- Meet on an annual basis to review the work of and contribute to the Yolo Operational Area Hazard Mitigation Steering Committee activities.

- Bring forth the concerns and views of the community to the Steering Committee for consideration in the ongoing Hazard Mitigation planning process.

- Assist in informing the public and community of the Hazard Mitigation strategies recommended by both the Steering Committee and individual jurisdictional planning teams.

- Define the constraints for implementation of prioritized mitigation strategies within the authorities, laws, and regulations of the local and tribal government entities existing within the Yolo Operational Area.

- Carry out the goals and objectives of the Yolo Operational Area Multi Hazard Mitigation Plan.

- Support and review the input from meetings of the adjunct members with individuals, agencies and jurisdictions.

- Assure that the public is kept informed of changing strategies and implementation actions periodically.

## ELEMENT A.2. COORDINATION WITH OTHER COMMUNITIES

***Requirement §201.6(b)(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.***

Since the inception of this planning process there have been two major forums for sharing this planning with adjacent jurisdictions. The first is the Mutual Aid Regional Advisory Committee for California Mutual Aid Region IV. Region IV's members are comprised of 11 counties within the Cal EMA Inland Region, located near the Greater Sacramento area. The value to this collaboration is that these counties share many of the same characteristics as Yolo County such as similar threats, politics, geography and culture. The second form and somewhat more specialized forum is the Public Health Coordination in Region IV. This coordinated process has been made possible by the support of many federal grant programs. This has allowed a multi-county, multi-agency approach to both prevention and mitigation issues in public health. Since many of the counties in Region IV have already gone through the hazard mitigation planning process, their experience and advice has proven invaluable to Yolo County. Each of these meetings includes a local roundtable discussion where we have been able to freely and collaboratively share our local hazard mitigation planning process. Additionally, due to the location and proximity to the Bay Area, Yolo County collaborates with the counties flanking itself on many issues such as the Delta Emergency Planning, Terrorism Planning, Earthquake Preparedness and Mass Care coordination to name a few.

## ELEMENT A.3. PUBLIC INVOLVEMENT

***Requirement §201.6(b)(1) An opportunity for the public to comment on the plan during the drafting stage and prior to plan approval; 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.***

**Public Meetings**

The Steering Committee considered the options available regarding conducting public meetings for the purpose of revealing and gathering comment from the community relating to the Plan draft. After several discussions, three jurisdictions choose to participate in the open public outreach meetings: City of Winters, City of Woodland, and the County of Yolo. While all municipalities were involved in the decision process and encouraged to participate in individual local sessions, the result was two combined public presentations.

**City of Woodland**

A public meeting was held for the City of Woodland and unincorporated of Yolo County at the Yolo County Health Department.

Jurisdiction representatives attended and were prepared to answer questions and record comments and input. Only one member of the public, from Woodland, attended.

| | |
|---|---|
| Date/Time: | December 6, 2011 6:00 to 8:00 PM |
| Location: | Yolo County Health Department - Woodland |
| Facilitator: | Yolo County OES |
| Public Attendance: | (1) Member of the public (Woodland) |
| | (1) City of West Sacramento staff |

**City of Winters**

The City of Winters held a public meeting at the Winters City Council Chambers. The following announcement was published:

| | |
|---|---|
| Date/Time: | December 7, 2011 6:00 to 7:30 PM |
| Location: | City of Winters City Council Chambers |
| Facilitator: | Yolo County OES/City of Winters |
| Public Attendance: | (2) Members of the public (Davis) |
| | (4) City of Winters staff |
| | (1) City of West Sacramento staff |
| | (1) Local media |

Jurisdiction representatives attended and were prepared to answer questions and record comments and input. No members of the public attended.

**Public Participation Survey**

All jurisdictions conducted an aggressive drive to receive public input on the general perception of threats within their community, the importance of individual preparedness, and the level of hazard mitigation.

In order to facilitate the use of new outreach technologies, the bulk of the survey was conducted using the Internet, with access provided through existing governmental websites.

Yolo County, Cities of Davis and West Sacramento placed a letter to interested citizens introducing the attached questionnaire on their official web sites with an invitation to fill it out and return it. Davis had 32 responses, West Sacramento had 15 responses. The City of Woodland mailed a copy of the questionnaire with their utility bills and received 889 responses. The City of Winters received 102 responses to the same survey. Yolo County Housing supported the public outreach effort by distributing approximately two thousand of the public participation surveys to their clients. This includes over six hundred landlords, fourteen hundred low income and Section 8 households through out Yolo County.

**Integration of Public Input**

Information collected from questionnaires and through interaction with the community at the two public forums was analyzed by the Hazard Mitigation Steering Committee and County OES staff and used to help identify public concern and perceptions on identified threats.

As Plan stake holders developed their individual hazard prioritization matrices, the information from their respective communities was also considered in formulating the hazard list and subsequent analysis of each of those hazards. The result was a listing of High, Moderate and Low Risk Priority natural, technological, and human-conflict hazards that can or could impact the Yolo Operational Area. Out of that general assessment, prioritized mitigation strategies, with identified implementation projects, was developed by inter-jurisdictional consensus.

## ELEMENT A.4. REVIEW AND INCORPORATION OF EXITING PLANS

***Requirement §201.6(b)(3) Review and incorporation, if appropriate, of existing plans, studies, reports, and technical information.***

The Global view of hazards in California was provided by the California Hazard Mitigation Plan and the statewide mapping studies created by the California Earthquake Projects, California Geological Survey and Cal EMA, Geographic Information Section. This information is especially relevant to this plan's section on threat and hazard analysis.

The Yolo County Operational Area Multi-Jurisdictional Hazard Mitigation Plan will be used to focus project prioritization. Mitigation projects will be considered for funding through federal and state grant programs, and when other funds are made available through the County and or federal government. The Yolo County Operational Area Disaster Council will be the coordinating agency for project implementation. Individual jurisdictions have the capacity to organize resources, prepare grant applications, and oversee project implementation, monitoring, and evaluation. Coordinating organizations may include local, county, or regional agencies that are capable of, or responsible for, implementing activities and programs. The Yolo County OES Operational Area Coordinator (County OES Manager) will be responsible for mitigation project administration with Yolo County and will assist each submitting jurisdiction named in this plan with their mitigation project administration.

A number of federal, state and local regulations and policies form the legal framework to implement Yolo County's and it's participating jurisdictions hazard mitigation goals and projects. A list of these regulations and plans is presented in the references list at the end of this section.

## ELEMENT A.5. PLAN MAINTENANCE PROCESS

***Requirement §201.6(c)(4)(iii) [The plan maintenance process shall include a] discussion on how the community will continue public participation in the plan maintenance process.***

The process of hazard mitigation does not end with the completion, approval, and adoption of this plan. Within the lifespan of this document (5 years), participating local and tribal governments, in conjunction with community-based organizations, will ensure that the mitigation goals and strategies identified are monitored, that plan administration will continue under a collaborative and cooperative umbrella, and that the document itself will be properly maintained.

The Yolo County Office of Emergency Services, as lead coordination agency for hazard mitigation planning within the Yolo OA, and will assist and support the ongoing collaborative efforts of local and tribal governments, through the established Hazard Mitigation Steering Committee.

Specific plan maintenance activities may include:

- Distribution of the Plan to all interested parties, including both written and digital formats.
- Facilitation of regular Hazard Mitigation Steering Committee Meetings.
- Monitoring of OA mitigation project activities and dissemination of status reports.
- Generation of reports relative to plan status, project management, and revision updates to executive leadership.
- Preparations for plan eventual revision and updating.

## ELEMENT A.6. CONTINUED PUBLIC INVOLVEMENT

***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.***

The Yolo Operational Area Hazard Mitigation Steering Committee has made the commitment to periodically bring this plan before the public through public meetings and community posting so that citizens may make input as strategies and implementation actions change. Each jurisdiction is responsible for assuring that their citizenry are informed when deemed appropriate by the standing Steering Committee.

# Element B: Hazard Identification and Risk Assessment

***Requirement §201.6(c)(2)(i) [The risk assessment shall include a] description of the type, location and extent of all natural hazards that can affect the jurisdiction. The plan shall include information on previous occurrences of hazard events and on the probability of future hazard events.***

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

***§201.6(c)(2)(ii)(A) (A) The types and numbers of existing and future buildings, infrastructure, and critical facilities located in the identified hazard areas;***

***§201.6(c)(2)(ii)(B) (B) An estimate of the potential dollar losses to vulnerable structures identified in ... this section and a description of the methodology used to prepare the estimate.***

***§201.6(c)(2)(ii)(C) Providing a general description of land uses and development trends within the community so that mitigation options can be considered in future land use decisions.***

Yolo County is at risk from a variety of potential hazards: natural, technological and human conflict related. Many of these hazards, under the right circumstances, could result in a disastrous impact to the county.

Although an attempt has been made to identify all major hazards and their respective impacts, it must be remembered that we live in a time of emerging threats, and nature, coupled with humankind's ongoing development and tendencies toward violence ensures that the material contained within this document will surely require modification over time.

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

## HAZARD ANALYSIS PROCESS

### Hazard Identification

The process of identifying hazards that do, or could potentially affect Yolo County at various levels was the first step in assessing overall risk. Recognizing potentiality required an analysis of known, suspected, and emerging hazards existing within or directly affecting the Yolo OA. Some of the following questions were used to during the analysis:

- What are the known hazards?

-Historical experience and evidence based data

- What are the suspected hazards?
  -Suspected hazards lacking reliable historical or physical evidence
- What are the potentially emerging hazards?
  -Projected or developing hazards consistent with
- What are the elements of the hazard?
  -The criteria inherent within each hazard that defines its characteristics and behavior
- What are the conditions associated with the occurrence of a hazardous event?
- What factors are required for an event to turn hazardous?

In the early meetings with Yolo County and the Steering Committee, data was reviewed from the following sources on hazards affecting the county, those sources were: the Federal and State Disaster Declaration History, the State of California Hazard Mitigation Plan (2010), the Safety Element of the participating jurisdictions, and many more documents as noted in the references section of this plan.

The Planning Team came to agreement on significant hazards to Yolo County. The Planning Team agreed not to address technological (other than Dam and Levee Failure) or human-caused hazards, which are addressed in emergency operations plans for the participating jurisdictions. The following natural hazards and their effects are: Earthquake, Fire, Flood, Severe Weather and Volcanic Activity.

The planning process used the available FEMA tools to evaluate all the possible threats faced. Through the threat analysis process the most probable threats, the most devastating threats and the most significant threats to Yolo County were identified.

Mitigation of the significant hazards facing Yolo County has the side benefit of appreciably enhancing the overall disaster resistance in the community from related threats. For example, the clearing of roads of intrusive vegetation and eliminating a wildfire hazard will also speed the restoration of the road after an earthquake. The effect of mitigation actions carried out is recognized as a synergistic effect.

**Geographic Extent and Potential Magnitude**
This section describes the potential severity of a disaster and any secondary events caused by the hazard and the extent or location of the hazard in the operational area. Magnitude is classified by the following:

- **Catastrophic:** More than 50 percent of the operational area affected
- **Critical:** Between 35-50 percent of the operational area affected
- **Limited:** 10-25 percent of the operational area affected
- **Negligible:** Less than 10 percent of the operational area affected

**Previous Occurrences**
This section includes information on historic incidents, including impacts, if known. A brainstorming session as the early Planning Team meetings was used to capture

information from participating jurisdictions on past occurrences.

**Probability of Future Occurrences**
The frequency of past events is used to gauge the likelihood of future occurrences. Based on historical data, the probability of future occurrences is categorized into one of the following classifications:

- **Highly Likely:** Near 100 percent chance of occurrence next year or happens every year
- **Likely:** Between 10 percent and 100 percent chance of occurrence in next year or has a recurrence interval of 10 years or less
- **Occasional:** Between 1 percent and 10 percent chance of occurrence in the next year or has a recurrence interval of 11 to 100 years
- **Unlikely**: Less than 1 percent chance of occurrence in next 100 years or has a recurrence interval of greater than every 100 years

The probability, or chance of occurrence, was calculated where possible based on existing data. Probability was determined by dividing the number of events observed by the number of years and multiplying by 100. This gives the percent chance of the event happening in any given year. An example would be three droughts occurring over a 30-year period, which suggests a 10 percent chance of that hazard occurring in any given year.

## COMMUNITY THREAT RATINGS

**Community Risk Assessments**
In the process of rating risks based upon the vulnerability and impact to local jurisdictions, the Yolo Operational Area was divided into two distinct categories: 1) Municipal and tribal government jurisdictions; and 2) County government and unincorporated communities. There are distinct differences in scale, organization, policy, and threat potential associated with both groups, and those variables are represented in the risk rating system used for this plan.

In addition to the community-based risk assessments, local government entities that are not designated jurisdictional, but may operate within either of the two primary groups are represented as stand-alone organizations. Public authorities and special districts, as defined and structured under state law and established within Yolo County, tend to be extra-territorial in their function, and thereby not necessarily limited to location-specific threats.

**Local & Tribal Government Jurisdictions**
For the purpose of this plan, the following municipal and tribal government jurisdictions have been identified and rated separately as to localized risk:

- City of Woodland (WLD)
- City of Davis (DAV)
- City of West Sacramento (WSC)
- City of Winters (WIN)
- Yocha Dehe Wintun Nation (YDH)
- Yolo County Housing (YCH)

It needs to be recognized that, although risk ratings for identified municipalities were generally confined to established legal boundaries, in many instances vulnerabilities and impacts associated with selected hazards are shared with neighboring unincorporated communities. In these cases, the ratings for both incorporated and unincorporated locations will be similar if not identical, regardless of jurisdictional boundary.

As applied to tribal government risks, the federal designation as sovereign nation state represents a specific area of localized concern that includes trust lands. Tribal government also holds title to other properties, off trust lands that are located within the unincorporated areas of Yolo County. For the purpose of this plan, the risk assessment for trust lands were conducted independent of surrounding unincorporated areas to maintain jurisdictional distinct, although the threats may be identical based upon a shared general locality. See the Community Risk ratings in the Appendices Section of this document.

**Unincorporated Communities**
In the process of conducting a risk assessment for unincorporated areas of Yolo County, selected communities, town sites, settlements, and spatially connected neighborhoods and developments were evaluated. The focus was given to assessing risk to areas that were populated, developed, and otherwise potentially impacted by a hazardous event.

| Community | Community Designators |
|---|---|
| **Brooks** | Town site and surrounding developed and undeveloped non-tribal lands |
| **Capay** | Town site and surrounding developed and undeveloped unincorporated lands |
| **Clarksburg** | Town site and surrounding developed and undeveloped unincorporated lands |
| **Dunnigan** | Town site and surrounding developed and undeveloped unincorporated lands |
| **Elkhorn** | Developed and undeveloped unincorporated lands along Old River Road |
| **El Macero** | Community development bordering Davis to the east |
| **Esparto** | Town site and surrounding developed and undeveloped unincorporated lands |
| **Guinda** | Town site and surrounding developed and undeveloped unincorporated lands |
| **Knights Landing** | Town site and surrounding developed and undeveloped unincorporated lands |
| **Madison** | Town site and surrounding developed and undeveloped unincorporated lands |
| **Monument Hill** | Developed unincorporated area that includes Wild Wings and the Woodland airport |
| **Rumsey** | Town site and surrounding developed and undeveloped unincorporated lands |
| **Yolo** | Town site and surrounding developed and undeveloped unincorporated lands |
| **Zamora** | Town site and surrounding developed and undeveloped unincorporated lands |

The unincorporated communities designated within this plan represent primary townships and settlements that are represented as such within the Yolo County General Plan. Some latitude was used in designating all such locations, as the value of risk assessment is based upon impacts to concentrated settlements. Within a rural environment, the identification of each and every residential, agricultural, or commercial development is not feasible, as the population densities and potential impacts are hard to differentiate.

In assessing the primary unincorporated communities, the Steering Committee used the following location criteria:

- Is the location identified within the County General Plan?

- Does the location have an identified core, or a significant central point of activity (i.e. airport)
- Is the location part of a named residential or commercial development that contains a concentrated population or at-risk commercial/industrial complex?
- Is the location well separated from adjoining municipalities, or simply an unincorporated extension of that incorporated city?
- Does the location have a specific historical reference?
- Does the location function as a central service area for more disparate and rural settlements?

**Disaster Declaration History**
One method to identify hazards is to look at the events that have triggered federal and/or state disaster declaration that included Yolo County. The following table lists the disaster declarations where Yolo County was designated federal and/or state disaster declarations since the last plan update (2005 to the present).

| Hazard Type | Disaster Number | Year | State Declaration | Federal Declaration |
|---|---|---|---|---|
| Severe Storms, Flooding, Mudslides and Landslides | DR-1628 | 2006 | ☑ | ☑ |
| Hurricane Katrina Evacuations | EM-3248 | 2005 | | ☑ |

## B.1. HAZARD DESCRIPTIONS

### *DAM FAILURE*

**General**
In the area there are six dams, of various types of construction the failure of any one would cause some degree of flooding in Yolo County. Failure of a dam structure may result due to impact from strong ground motion, such as following a major earthquake,

| | |
|---|---|
| Monticello Dam | Putah Creek |
| Indian Valley Dam | Cache Creek |
| Shasta Dam | Sacramento River |
| Oroville Dam | Feather River |
| Folsom Dam | American River |
| Nimbus Dam | American River |

**Geographic Extent and Potential Magnitude**
Dam Failure was rated as Catastrophic: more than 50 percent of the operational area affected.

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.

California has had about 45 failures of non-federal dams. The failures occurred for a variety of reasons, the most common being overtopping. Other reasons include specific shortcomings in the dams themselves or an inadequate assessment of surrounding geomorphologic characteristics.

California's first notable dam failure was in 1883 in Sierra County, while the most recent failure occurred in 1965. The most catastrophic event was the failure of William Mulholland's infamous St. Francis Dam, which failed in 1928 and killed an estimated 450 people, only slightly fewer then the 1906 San Francisco earthquake. The actual number of dead from the St. Francis Dam failure was likely substantially higher. San Francisquito Canyon, which was flooded in the event, was home to hundreds of transients and illegal immigrants who were never accounted for in the death totals.

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

The 1963 failure of the Baldwin Hills Dam in Southern California led the Legislature to amend the California Water Code to include within state jurisdiction both new and existing off-stream storage facilities.

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 United States. 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.

The extent of local damage and destruction associated with failure of a major dam will range from catastrophic to marginal. The sudden failure of an earthen or concrete dam of any significant size would result in the release of hundreds of thousands of acre-feet of water, depending upon the level of impoundment at the time of failure. It would be anticipated that areas directly downstream from the face of a failed dam would be immediately inundated and that devastation would be substantial. The further a location is from the dam would result in a reduced impact over time, although geography and the placement of diversionary facilities and other improvements would play a part in how floodwaters would be channeled.

In the following information about the dams, the times and areas given for potential inundation are the best available estimates. Actual inundation times and areas may vary.

Monticello Dam

Monticello Dam is a thin arch concrete structure 270 feet high. It impounds a maximum of 1,602,300 acre-feet creating Lake Berryessa in Napa County, 10 miles west of Winters. In the event of failure, Monticello Dam presents a high hazard to downstream areas and extensive loss of life and property would likely occur.

Large uncontrolled water releases into Putah Creek could occur resulting from either a major or partial dam failure, or earthen slides into Lake Berryessa, which could cause overtopping of the dam.

Seismic evaluation of Monticello Dam indicates it could withstand an earthquake of Richter magnitude 6.5 with the epicenter located 0.5 miles from the dam. Thus, the dam is considered secure from such an occurrence. The topography of the lake relative to the size of potential slides makes the possibility of dam overtopping very unlikely. Any landslide that would move into the outlet works or spillway area would be especially dangerous to the dam.

The unstable area adjacent to the dam crest at its contact with the left abutment will be closely monitored by the dam tender during the raining season and after seismic activity. Landslides into the down stream channel could impound water but releases would be expected to be gradual as the new "dam" was eroded away. Severe storms are not expected to cause rapid rises in the water surface of Lake Berryessa.

*Inhabited Areas of Potential Inundation*

| Monticello Dam | | |
|---|---|---|
| Location | Time From Dam Break To Flooding | Response Actions |
| SR128 & CR87 | 0 hr. 20 min. | Evacuate, close roads |
| City of Winters | 0 hr. 30 min | Evacuate, close roads |
| D.Q. University | 1 hr. 45 min. | Evacuate campus |
| Fairfield School (CR98 & Russell Blvd) | 2 hr. 30 min. | Evacuate school |

| Monticello Dam | | |
|---|---|---|
| City of Davis (west edge) | 2 hr. 45 min. | Evacuate |
| Sutter- Davis Hospital | 3 hr. 00 min. | Evacuate |
| City of Davis (downtown) | 3 hr. 30 min. | Evacuate |
| El Macero (I-80 & Mace Blvd) | 4 hr. 15 min | Evacuate, close roads |
| I-80 & CR105 | 4 hr. 30 min. | Close roads |

Indian Valley Dam

Indian Valley Dam is an earth-filled dam producing a lake of 359,000 acre-feet storage capacity (maximum). The dam is located in Lake County, northwest of Yolo County, on the North Fork of Cache Creek. Depending upon the rate of discharge following dam failure the area of potential inundation extends along the Cache Creek all the way to the I-80 and the Yolo Bypass. The extent of downstream flooding will be dependent upon

Inhabited Areas of Potential Inundation

| Indian Valley Dam | | |
|---|---|---|
| Location | Time From Dam Break To Flooding | Response Actions |
| Cache Creek along stream channel from dam to Rumsey | 0 hr. 00 min to 1 hr. 59 min | Evacuate recreationists to high ground |
| SR120 & Long Valley Rd (Lake County) | 0 hr. 31 min. | Evacuate, close roads |
| SR16 where it parallels Cache Creek | 1 hr. 34 min to 8+ hr. (depending on location) | Evacuate, close roads |
| Cache Creek Canyon Regional Park | 1 hr. 40 min. | Evacuate recreationists to high ground |
| Camp Haswell (Boy Scouts of America) | 1 hr. 52 min. | Evacuate to high ground |
| Rumsey | 1 hr. 59 min. | Evacuate town to high ground |
| Guinda | 2 hr. 24 min. | Evacuate town to high ground |
| Tancred | 3 hr. 04 min. | Evacuate town to high ground |
| Brooks | 3 hr. 25 min. | Evacuate town to high ground |
| Capay | 4 hr. 00 min. | Evacuate town to high ground |
| Esparto | 4 hr. 00 min. | Evacuate town to high ground |
| Madison | 5 hr. 00 min. | Evacuate town to high |

| Indian Valley Dam | | |
|---|---|---|
| | | ground |
| I-505 | 5 hr. 00 min. | Evacuate residents in the area to high ground, close road |
| CR94B | 5 hr. 30 min. | Evacuate residents in the area to high ground, close road |
| I-5 at Yolo | 7 hr. 00 min. | Evacuate town to high ground, close road |
| SR113 north of I-5 | 7 hr. 30 min. | Evacuate residents in the area to high ground, close road |
| SR113 south of I-5 | 8 hr. 00 min. | Evacuate residents in the area to high ground, close road |
| Woodland | 8 hr. 00 min. | Evacuate north and west residents to the south |
| I-80 at Davis | 9 hr. 00 min. | Evacuate east, north, and west residents to the south |
| I-80 at Yolo Bypass | 10 hr. 48 min. | Evacuate, close road |

Shasta Dam

Shasta Dam is a concrete gravity dam. The reservoir (Lake Shasta) has a maximum storage capacity of 4,552,000 acre-feet. The dam is located in Shasta County north of Summit City. Dam failure would result in varying degrees of inundation to eastern and northeastern Yolo County.

Inhabited Areas of Potential Inundation

| Shasta Dam | | |
|---|---|---|
| Location | Time From Dam Break To Flooding | Response Actions |
| North County Line, with Colusa County | 6 days 00 hr. | Evacuate to high ground, close roads |
| Knights Landing | 7 days 22 hr. | Evacuate to high ground, close roads |
| City of West Sacramento | 10 days 05 hr. | Evacuate entire city to high ground, close roads |
| Clarksburg | Not specified | Evacuate, close roads |

Oroville Dam

Oroville Dam is an earth-filled dam. The reservoir (Oroville Lake) has a maximum storage capacity of 3,500,000 acre-feet. The dam is located in Butte County, northeast of Yolo County, above the Sacramento River.

*Inhabited Areas of Potential Inundation*

| Oroville Dam | | |
|---|---|---|
| Location | Time From Dam Break To Flooding | Response Actions |
| Knights Landing | 16 hr. 00 min. | Evacuate and close roads |
| City of West Sacramento | 23 hr. 15 min. | Evacuate entire city and close roads |
| Clarksburg | 27 hr. 30 min. | Evacuate and close roads |

*Folsom Dam*
Folsom Dam is a concrete and earth dam. The lake has a maximum storage capacity of 977,000 acre-feet. The dam is located in Sacramento County, east of Yolo County on the American River.

Dam failure would result in some degree of inundation to areas of Yolo County bounded on the west by the west levee of the Yolo Bypass, on the north by a point on Old River Road one-half mile south of Kiesel Crossing and on the south by the county line.

*Inhabited Areas of Potential Inundation*

| Folsom Dam | | |
|---|---|---|
| Location | Time From Dam Break To Flooding | Response Actions |
| Bradshaw Road at the American River | 2 hr. 05 min. | Not specified |
| Perkins | 3 hr. 30 min. | Not specified |
| City of West Sacramento | 5 hr. 00 min to 6 hr. 00 min. | Warn, evacuate |
| Borges Clarksburg Airstrip | 8 hr. 30 min. | Warn, evacuate |
| South County Line | 15 hr. 30 min. | Close roads |

Nimbus Dam
Nimbus Dam is a concrete gravity dam. The reservoir (Lake Natoma) has a maximum storage capacity of 8,760 acre-feet. The dam is located in Sacramento County, east of Yolo County. All actions relating to a failure of Nimbus Dam would be identical to those required by a failure of Folsom Dam except the resulting inundation would be less severe.

**Previous Occurrences**
None.

**Probability of Future Occurrences**
There are no specific local government mitigation actions relating to a possible failure of any of the dams affecting Yolo County. Dam safety is a comprehensive and long-term process that continues throughout the life span of any dam. Appropriate site maintenance,

continuous inspection and monitoring, and implementation of periodic site improvements will improve the safety of most dam facilities.

From a local perspective, any mitigation efforts would be directly related to down stream flood plain management activities, which would include land use regulations, engineered flood control improvements, flow-monitoring devices, and other activities not directly associated with the dam itself.

The probability of future occurrences based on history is Unlikely: less than 1 percent chance of occurrence in the next 100 years or has a recurrence interval of greater than every 100 years.

### *EARTHQUAKE*

**General**

Earthquake activity is characterized by a sudden, unpredictable movement in the earth's subsurface structure, usually associated with the shifting of tectonic plates that result in severe ground motion and surface deformation.

**Geographic Extent and Potential Magnitude**

Earthquake was rated as Catastrophic: More than 50 percent of the operational area affected for each jurisdiction by the Hazard Mitigation Steering Committee.

There are several faults known to exist within Yolo County. They are in the Midland Fault Zone and the Capay Valley area. The Midland Fault Zone is located between the City of Winters and the Coast range in the southwestern portion of the county. Two concealed faults are located within this zone.

Within the Capay Valley area, two major faults border the valley in the Capay Hills. The Sweitzer Fault is located just below the ridgeline of the Capay Hills paralleling the valley. The Eisner Fault is located at the upper end of the Capay Valley just below the Sweitzer Fault. Sweitzer is a thrust fault in nature. The remainder of the known faults located within the immediate area, are on the western and northwestern border of Yolo County in the Blue Ridge and Rocky Ridge Hills.

No known faults are located under any of the major inhabited areas of the county. The existing faults are a result of the faulting and folding in development of the Blue Ridge and Rocky Ridge formations. Many major faults lie to the west of Yolo County whose movement could affect Yolo County.

**City of Winters**

The Midland fault zone is located between the City of Winters and the Coast Range in the southwestern part of the county. Two concealed faults are located within this zone. Within the Capay valley area, two major faults border the valley in the Capay Hills.

**City of Woodland**

The primary seismic and geologic hazards affecting Woodland include earthquake and expansive soils. Generally flat in topography. Woodland does not face risks from landslides or seiches.

Earthquakes occur infrequently, but can inflict major damage. In the 1890's, Woodland experienced moderate building damage from an earthquake. Since then, the city has experienced ground shaking from earthquakes in the area, but no major damage. Modern building construction codes require that buildings be designed to resist stresses produced by lateral forces caused by winds and earthquakes. ~ City of Woodland General Plan

**City of Davis**

No earthquake faults run through the Davis area, although the San Andreas Fault system is to the west and the Western Sierra fault system is to the east. Numerous quakes along these faults have been felt in Davis. Major quakes occurred in 1833, 1968, 1892, 1902, 1906 and most recently in 1989, but Davis suffered no significant damage. The Office of Planning and Research has placed the Davis area in Seismic Activity Zone II, which indicates that the maximum intensity of an earthquake would be VII or VIII on the Modified Mercalli Intensity Scale. An earthquake of such magnitude would result in "slight damage in specifically designed structures; considerable in ordinary substantial buildings, with partial collapse; great in poorly built structures." The Uniform Building Code places all of California in the zone of greatest earthquake severity because recent studies indicate high potential for severe ground shaking. ~ City of Davis General Plan

**City of West Sacramento**

West Sacramento is located in one of the least active seismic regions in California. According to existing geologic information, there are no known or inferred faults within West Sacramento. The nearest known faults are generally located west to southwest of West Sacramento. The Midland fault zone is located approximately 18 miles southwest, the Greenville fault is situated about 40 miles southwest, and the Rodgers Creek fault is approximately 65 miles west of West Sacramento. Because these faults are reported to have had horizontal displacements in the past, they are considered potentially active.

The active faults nearest to West Sacramento are the Calaveras (50 miles east), the Hayward (60 miles west), and the San Andreas (80 miles west)… The critical earthquake for West Sacramento would originate at the nearest point of the Midland or Dunnigan Hills faults west of West Sacramento.

West Sacramento has experienced a relatively low level of historic seismic activity. While the area has not been the source of quakes in recent geologic time, activity in neighboring regions suggests that the West Sacramento area could be affected by future activity in those regions. ~ West Sacramento General Plan

In addition to the standard seismic risk, there are four major areas where seiches (seismically generated waves) could occur during major seismic activity which would affect Yolo County. These include:

- Lake Berryessa, where the effects could be felt along Putah Creek.
- The Sacramento River, which could impact bordering communities.
- The Yolo Bypass, when the bypass is filled with water.
- Lake Washington Harbor and the West Sacramento Deep Water Channel, the Port of West Sacramento and nearby communities would be affected.

**Previous Occurrences**
By California standards, Yolo County is in a low earthquake probability zone. However for the county and its jurisdictions earthquake pose a high risk due to its secondary effects. The most recent recorded earthquakes appear to have occurred in the late 1800's. Yolo County history books reference one such quake as causing swaying in Woodland with no reference to property damage. Winters and Davis, however, did experience structural damage to buildings from an 1892 earthquake whose epicenter was northwest of Winters, in Napa County. Notwithstanding, the existence of known fault lines in Yolo County indicate future earthquakes will occur. Further, significant earthquakes outside the county have occurred in areas with previously undetected fault lines.

**Impact**
The impact from any moderate to large-scale seismic event, occurring within or on the periphery of Yolo County, could produce an assortment of conditions that would adversely affect public health and safety, critical infrastructure, and economic well-being throughout the area.

**Seismic Ground Response**
Most of Yolo County's development and population are located in areas of moderate to moderately low damage susceptibility. Major landslides, settling and tilting buildings on level ground, and failure of water retaining structures have been observed as a result of liquefaction. Local ground conditions vary. Sound structures on firm, dry alluvium typically perform well, but water-saturated areas are potentially hazardous. Underground components of utility systems are often extensively damaged during significant earthquakes. Pipelines for domestic and fire fighting water, sewer service, gas, and for electrical services and communications can be shattered. Aboveground transmission and distribution systems are also susceptible to earthquake damage, but they are usually easier and less expensive to restore than the underground installations.

Transportation facilities are vulnerable to earthquakes. Roads and streets are easily blocked, and are often buckled and broken, but emergency routes can be readily improvised. The major roadways within the county are State Route 113, US Highway 50, and Interstates 5, 80 and 505. The interchanges of freeways and similar installations (bridges and overpasses) are often damaged but not readily restored. A major earthquake affecting Yolo County would be expected to cause widespread damage to its transportation systems.

Critical industrial facilities are of special concern because of potential hazardous materials spillage or critical industrial process disruption. Many forms of hazardous materials are present in Yolo County. They are present in permanent storage locations, roadway and railway transport mediums, long-distance pipelines and at various industrial and agricultural application sites. The County's location, astride major rail and highway

transportation routes and its service as an agriculture center, indicate the potential for serious hazardous material incidents in the event of a major earthquake.

**Ground Failure and Landslide Hazards**

The major geologic hazards in Yolo County, aside from earthquake rupture and direct effects of ground shaking, are unstable hill slopes. Slopes may suffer landslides, slumping, soil slips, and rockslides. Reclaimed wetlands, whether filled or not, experience amplified lateral and vertical movements that can be damaging to structures, utilities, and transportation routes and facilities. During non-earthquake conditions, landslides most frequently occur during the rainy season.

Important effects of ground failure, in addition to direct life and structure loss and injuries, include loss of access for emergency services and repairs at important facilities, which are accessed by traversing unstable ground and the potential release of hazardous materials from containment facilities.

Although landslides due to slope failure are most frequent in "wet years" with above-average rainfall, they can occur anytime. Landslides may also occur on slopes of 15% or less; however, the probability is greater on steeper slopes, with old landslide deposits being the most likely to experience failure. Slope failures are not expected to produce a disaster affecting a large number of people. Rather, there is a persistent risk of damage to public and private property at isolated locations.

Whether a landslide will or will not occur presently cannot be predicted. Land which has a history of movement is believed to be generally more slide-prone, and also more sensitive to man-induced changes, such as grading, watering, removing or changing the type of vegetation, and changing drainage patterns, among many other factors.

**Probability of Future Occurrences**

Based on the earthquake shaking potential for Yolo County, the proximity to the Bay Area and the history of shaking the probability of damaging seismic ground shaking in Yolo County and its jurisdictions is **Occasional:** Between 1 percent and 10 percent chance of occurrence in the next year or has a recurrence interval of 11 to 100 years.

### *ENVIRONMENTAL EMERGENCY*

**General**

This hazard category is defined by those naturally occurring events that are environmentally or meteorologically initiated, and have either a long-term rate of occurrence or occur with regular frequency. Their impacts, although normally not considered of an exigent nature, have the capacity to present significant challenges to Yolo County is the areas of public safety, economic vitality, environmental quality, and other social consequences.

**Geographic Extent and Potential Magnitude**

Air Pollution

Located within the Sacramento Valley, Yolo County is at risk for accumulation of unhealthy levels of air pollution. This pollution can come from a variety of sources, including vehicle exhaust and fires, both wildland and industrial. In the event the air pollution is found to be at emergency levels, mitigation will likely consist of restriction of movement outdoors. Likely, there will be increased visitation to hospitals.

Drought

Periods of drought have followed years in which both the prevailing weather phenomena were El Nino and La Nina. Drought cycles appear to be every 7 – 11 years. During periods of drought, emergency response measures will consist of land use planning practices consistent with water conservation goals and various water conservation measures. There will also be increased risk of wildland fires.

Infestation

Being a predominantly agricultural area, Yolo County is at significant risk from the onslaught of infestation from crop destroying insects and other vectors. The massive movement of a variety of insects with voracious appetites can destroy entire regions of cultivated farmland, laying waste to an entire year's production in a few weeks. Although great strides have been made in eradication of pests and vectors, there remains the overriding possibility that the county could be visited by a large swarm of crop destroying insects.

**Impact**

Air Pollution Incidents

An air pollution emergency is essentially a public health concern. Air quality standards can deteriorate overnight, causing problems for the young, elderly and individuals with pre-existing respiratory ailments. Air pollution is also detrimental to crops, livestock, and even affects the lifespan of equipment and systems that are degraded due to the exposure to pollutants.

Extended Drought Conditions

Generally, extended drought events present a major economic impact, especially in areas heavily involved in agricultural production or industrial processes. Moreover, if the drought is long-term, potable water supplies may dwindle, resulting in the need for rationing, importation of emergency water supplies and other mitigation strategies. Long-term impacts may also include the destruction of essential ground cover, economic losses from reduced retail sales and even depopulation as residents move to areas with a more reliable water supply.

Infestation

The most probable consequence of infestation is crop loss, resulting in economic disaster to the agricultural industry. Loss of crops may result in the closure of farms, workforce layoffs, substantially lower revenue, and a greater reliance on funding relief. Insect swarms have also been known to down aircraft, interrupt power distribution, harass livestock, contaminate open water sources, and disrupt traffic.

**Previous Occurrences**

None

**Probability of Future Occurrences**
Based on the previous occurrences of this disaster type there is an Occasional: Between 1 percent and 10 percent chance of occurrence in the next year or has a recurrence interval of 11 to 100 years.

### *FIRE*

**Geographic Extent and Potential Magnitude**
Fires were rated by the Hazard Mitigation Steering Committee as **Catastrophic,** with more than 50 percent of the operational area affected.

Fire is of concern to the county, not only for its destructive tendencies, but also because of the potentially dangerous smoke produced. Fires can occur as a result of system failure (downed power lines), human action (arson), natural occurrence (lightning strike), accidental (i.e. hazardous materials, motor vehicle accident, industrial explosion, etc.).

During the fire season, generally July through September, Yolo County and its municipalities are called upon to fight a large number of vegetation fires, especially along the major highways and railways that are interspersed throughout the county. Generally, most of the fires do not damage structures, however, fires that are fanned by hot north winds, during extremely low humidity and fed by brittle, dry grass and vegetation can quickly get out-of-hand and threaten nearby structures and facilities.

The interface of residential and business development near highways that have dry, un-mowed vegetation along medians and shoulders are especially vulnerable.

**Levels of Wildland Fire Protection Services**
Fire suppression in Yolo County is provided by fire districts (many of which are staffed by volunteers) as well as the cities that provide fire protection services.

The history of California wildfires indicates that the following trends will continue. Risk from wildfire to life, property, natural resources, and firefighter safety is increasing.
Population will grow and more people will live and use wildland areas, especially in the Central Sierra and in the Southern California counties of Riverside, San Bernardino and San Diego.

- Topography and climate support ecosystems where large wildfires can be expected.
- Drought and fuel moisture conditions will be unpredictable but almost always dangerous in fire season.
- More structures will be constructed in areas that are very susceptible to wildfire.
- Historical legacy of narrow roads, difficult entrance, insufficient water supplies, flammable building construction and location that make many communities and homes wildfire-prone still exits.
- Public demand for wildland fire protection and other services will increase.
- Deteriorating forest health, increasing fuel loads and other factors have led to more intense, destructive wildfires; unabated, this pattern will continue.
- Assets at risk will increase, especially watershed assets, because of the rapid rise in the demand for water to supply more people. Based on population projections, the potential for accelerating loss of protected assets, especially life and property, will be greater from disastrous wildfires.

Large wildfires do not respect political or property boundaries. Historically, a strength of California's firefighting agencies is found within a concept of mutual cooperation at the federal, state, and local levels of government. Day-to-day mutual aid for initial attack, as well as a statewide mutual-aid system for fire disasters, is the basis of this cooperation and coordination. The ability to rapidly mobilize, effectively deploy and support large numbers of specialized firefighting resources is essential to cope with large multiple fires. Hence, the California Department of Forestry (CDF), in cooperation with other fire agencies, must maintain infrastructure, including communications and capital improvements necessary to facilitate such a response.

Fire protection forces in California must have sufficient depth to respond to large, multiple wildfires and still prevent other small fires from becoming large damaging fires. CDF plays a key role in supplying and coordinating such forces; it should maintain and enhance this ability. The 1985 Fire Plan includes a model to provide adequate depth of resources that show CDF needing 96 additional engines and 825 personnel for managing large fires using the Incident Command System. There is a greater need today as reflected in the California Fire Plan.

**Wildland Fire Protection Fiscal Issues**

Multi-year fiscal problems are occurring at all governmental levels, constraining the availability of funding to address the increasing workload, costs and losses of the California wildland fire protection system.

The increasing number of structures and people in California wildlands and the growing importance of the state's natural resources create a growing demand to fund additional wildland fire protection services for both the structures and the wildland resource assets.

The primary fiscal responsibilities for the initial attack responsibilities: (1) for federal wildland fire protection are the federal taxpayers, (2) for privately owned wildland fire protection are the state taxpayers, and (3) for structure fire protection in wildland areas are the local taxpayers. However, during the annual fire season, the state and federal taxpayers provide a minimum level of structural fire protection that is incidental to their primary missions of wildland fire protection. Similarly, in most wildland areas, local taxpayers provide year-round wildland fire protection on both state and federal responsibility areas that is incidental to the local government primary mission of structural fire protection.

Over the last decade, part of the increased costs for additional initial attack wildland resource protection and structural protection have been funded by local taxpayers through property taxes, fire district fees and volunteer firefighters. However, when a wildland fire overwhelms local resources and reaches a major fire status, both the state and the federal taxpayers pay for the costs of wildfires, structure protection, and the resulting disaster relief.

For the local taxpayers, the following continue to increase: (1) the structural values and number of people being protected on wild lands, (2) the costs of wildland and structure initial attack fire suppression funded at the local levels, and (3) the losses from the extended attack and larger fires.

For state and federal taxpayers, the following will continue to increase: (1) extended and large fire emergency fund expenditures for wildland fires, (2) protecting structures during

initial attack and extended attack fires, and (3) state and federal agency disaster expenditures for damages to wildland resources and structures.

Health and Safety Code Section 13009 allows for recovery of fire suppression costs which, when obtained, be placed back into the state's general fund rather than invested in a pre-fire management program.

There is a direct relationship between reduced expenditures for pre-fire management and suppression and increased emergency fund expenditures, disaster funding, and private taxpayers expenditures and losses. Reduction of pre-fire management or suppression resources allows more fires to become major disastrous fires. Major fires create additional suppression and disaster relief costs at all levels of government and increase citizen and business losses.

According to representatives of the insurance industry that insures structures in California wildland areas, (1) the insurer average costs and losses are about $1.09 for each $1.00 received in premiums, and (2) the urban dwellers are subsidizing the wildland homeowner through service-wide rating schedules.

**Fire-Safe and Land Use Planning**
Population increases in wildland areas have raised strategic concerns about wildfire protection. Clearance laws, zoning, and related fire safety requirements implemented by state and local authorities need to address these factors:

- **Fire-resistant construction standards:** We can no longer view a wildland fire as affecting only watershed, wildlife and vegetation resources; we must now consider their effect on people and their structures. Further, this increase in people and structures have provided increasing ignition sources for fire, which, due to their proximity, can spread into the wildland. Building construction standards that encompass such items as roof covering, opening protection and fire resistance are designed to both protect the structure from external fires and to contain internal fires for longer periods.
- **Hazard reduction near structures** (defensible space): The public image of defensible space as part of pre-fire management should be expanded to include such immediate benefits as improved aesthetics, increased health of large remaining trees and other valued plants, and enhanced wildlife habitat. The use of defensible space that provides landscape naturalness, along with its compatibility with wildlife, water conservation and forest health, should be emphasized.
- **Infrastructure:** Effective fire protection in the inter-mix cannot be accomplished solely through the acquisition of equipment, personnel and training. The area's infrastructure also must be considered during the formulation of development plans. Specific fire hazard areas should be evaluated and reasonable safety standards adopted, covering such elements as adequacy of nearby water supplies, routes or throughways for fire equipment, addresses and street signs, and maintenance. The ultimate objectives for fire-safe planning and construction are (1) improve the ability of communities and other high value assets that will survive a large, high intensity wildfire with minimal fire suppression effort and (2) provide for improved citizen and firefighter safety.

According to this map by the California Department of Forestry, the western quarter of Yolo County poses the greatest risk of danger from Wild Fire. Generally the topography in this area is foothills from the mountains containing Lake Berryessa.

**City of Woodland**

Structural and wildland fire hazards can threaten life and property in Woodland. Wildland fires resulting from either natural or manmade causes occur in forest, brush, or grasslands, so the threat is minimal in Woodland, although vacant lots and fallow agricultural areas with weeds can be fire hazards. Structural fires usually result from manmade causes and can spread easily. Structural fire hazards are greatest in those structures built before building and fire codes were established. Chapter 8.C of the City of Woodland General Plan (Dec 17, 2002) describes the Goal and Policies to minimize the risk of loss of life, injury, and damage to property and watershed resources resulting from unwanted fires.

**City of Davis**

The Fire Department provides emergency and non-emergency services. The non-emergency services are provided to attempt to prevent an emergency response. Non-emergency services include plan checking, construction inspection services, fire and life safety inspections, fire code investigations, public education and weed abatement. Emergency services include fire response, emergency medical response, hazardous materials response and public assistance.

**City of West Sacramento**

Fire is of concern to the city, not only for its inherent destructiveness, but also because of the potentially dangerous smoke produced. Fires can occur as a result of system failure (downed power lines), human action (arson), natural occurrence (lightning strike), accidental (i.e. hazardous materials, motor vehicle accident, industrial explosion, etc.).

Major fires, whether involving structures or wildland areas, may result in significant risk to life and property. Rapid moving fires in structures or grasslands can quickly overwhelm firefighting efforts, resulting in possible danger to life safety. Farm animals in pastures are at risk unless they can be moved or protected. Power lines and other infrastructure may also be at risk and can be heavily damaged when exposed to major fire activity. Smoke resulting from nearby fires can have serious public health effects.

**Smoke Hazards as a Result of Wildland Fires**

Smoke is composed primarily of carbon dioxide, water vapor, carbon monoxide, particulate matter, hydrocarbons and other organic chemicals, nitrogen oxides, trace minerals and several thousand other compounds. The actual composition of smoke depends on the fuel type, the temperature of the fire, and the wind conditions. Different types of wood and vegetation are composed of varying amounts of cellulose, lignin, tannins and other polyphenolics, oils, fats, resins, waxes and starches, which produce different compounds when burned.

Particulate matter is the principal pollutant of concern from wildfire smoke for the relatively short-term exposures (hours to weeks) typically experienced by the public. Particulate matter is a generic term for particles suspended in the air, typically as a mixture of both solid particles and liquid droplets. Particles from smoke tend to be very small - less than one micrometer in diameter. For purposes of comparison, a human hair is about 60 micrometers in diameter. Particulate matter in wood smoke has a size range near the

wavelength of visible light (0.4 – 0.7 micrometers). Thus, smoke particles efficiently scatter light and reduce visibility. Moreover, such small particles can be inhaled into the deepest recesses of the lung and are thought to represent a greater health concern than larger particles.

Another pollutant of concern during smoke events is carbon monoxide. Carbon monoxide is a colorless, odorless gas, produced by incomplete combustion of wood or other organic materials. Carbon monoxide levels are highest during the smoldering stages of a fire. Other air pollutants, such as acrolein, benzene, and formaldehyde, are present in smoke, but in much lower concentrations than particulate matter and carbon monoxide.

The effects of smoke range from eye and respiratory tract irritation to more serious disorders, including reduced lung function, bronchitis, exacerbation of asthma, and premature death. Studies have found that fine particles are linked (alone or with other pollutants) with increased mortality and aggravation of pre-existing respiratory and cardiovascular disease. In addition, particles are respiratory irritants, and exposures to high concentrations of particulate matter can cause persistent cough, phlegm, wheezing and difficulty breathing. Particles can also affect healthy people, causing respiratory symptoms, transient reductions in lung function, and pulmonary inflammation. Particulate matter can also affect the body's immune system and make it more difficult to remove inhaled foreign materials from the lung, such as pollen and bacteria. The principal public health threat from short-term exposures to smoke is considered to come from exposure to particulate matter.

Wildfire smoke also contains significant quantities of respiratory irritants. Formaldehyde and acrolein are two of the principal irritant chemicals that add to the cumulative irritant properties of smoke, even though the concentrations of these chemicals individually may be below levels of public health concern.

**Sensitive Populations**

Most healthy adults and children will recover quickly from smoke exposures and will not suffer long-term consequences. However, certain sensitive populations may experience more severe short-term and chronic symptoms from smoke exposure. Much of the information about how particulate matter affects these groups has come from studies involving airborne particles in cities, though a few studies examining the effects of exposure to smoke suggest that the health effects of wildfire smoke are likely to be similar. More research is needed to determine whether particles from wildfires affect susceptible subpopulations differently.

Individuals with asthma and other respiratory diseases: Levels of pollutants that may not affect healthy people may cause breathing difficulties for people with asthma or other chronic lung diseases. Asthma, derived from the Greek word for panting, is a condition characterized by chronic inflammation of the airways, with intermittent bronchial-constriction and airflow obstruction, causing shortness of breath, wheezing, chest tightness, coughing, sometimes accompanied by excess phlegm production. During an asthma attack, the muscles tighten around the airways and the lining of the airways becomes inflamed and swollen, constricting the free flow of air. Because children's airways are narrower than those of adults, irritation that would create minor problems for an adult may result in significant obstruction in the airways of a young child. However, the highest mortality rates from asthma occur among older adults. Individuals with chronic obstructive pulmonary disease (COPD), which is generally considered to encompass emphysema and chronic

bronchitis, may also experience a worsening of their conditions because of exposure to wildfire smoke. Patients with COPD often have an asthmatic component to their condition, which may result in their experiencing asthma-like symptoms. However, because their pulmonary reserve has typically been seriously compromised, additional bronchial-constriction in individuals with COPD may result in symptoms requiring medical attention. Epidemiological studies have indicated that individuals with COPD run an increased risk of requiring emergency medical care after exposure to particulate matter or forest fire smoke. Exposure to smoke may also depress the lung's ability to fight infection. People with COPD may develop lower respiratory infections after exposure to wildfire smoke, which may require urgent medical care as well. In addition, because COPD is usually the result of many years of smoking, individuals with this condition may also have heart disease, and are potentially at risk from both conditions.

Individuals with airway hyper-responsiveness: A significant fraction of the population may have airway hyper-responsiveness, an exaggerated tendency of the bronchi and bronchioles to constrict in response to respiratory irritants and other stimuli. While airway hyper-responsiveness is considered a hallmark of asthma, this tendency may also be found in many non-asthmatics, as well; for example, during and following a lower respiratory tract infection. In such individuals, smoke exposure may cause bronchial-spasm and asthma-like symptoms.

Individuals with cardiovascular disease: Diseases of the circulatory system include, among others, high blood pressure, cardiovascular diseases, such as coronary artery disease and congestive heart failure, and cerebro-vascular conditions, such as atherosclerosis of the arteries bringing blood to the brain. These chronic conditions can render individuals susceptible to attacks of angina pectoris, heart attacks, sudden death due to a cardiac arrhythmia, acute congestive heart failure, or stroke. Cardiovascular diseases represent the leading cause of death in the United States, responsible for about 30 to 40 percent of all deaths each year. The vast majority of these deaths are in people over the age of 65. Studies have linked urban particulate matter to increased risks of heart attacks, cardiac arrhythmias, and other adverse effects in those with cardiovascular disease. People with chronic lung or heart disease may experience one or more of the following symptoms: shortness of breath, chest tightness, pain in the chest, neck, shoulder or arm, palpitations, or unusual fatigue or lightheadedness. Chemical messengers released into the blood because of particle-related lung inflammation may increase the risk of blood clot formation, angina episodes, heart attacks and strokes.

The elderly. In several studies researchers have estimated that tens of thousands of elderly people die prematurely each year from exposure to particulate air pollution, probably because the elderly are more likely to have pre-existing lung and heart diseases, and therefore are more susceptible to particle-associated effects. The elderly may also be more affected than younger people because important respiratory defense mechanisms may decline with age. Particulate air pollution can compromise the function of alveolar macrophages, cells involved in immune defenses in the lungs, potentially increasing susceptibility to bacterial or viral respiratory infections.

Children. Children, even those without any pre-existing illness or chronic conditions, are considered a sensitive population because their lungs are still developing, making them more susceptible to air pollution than healthy adults. Several factors lead to increased exposure in children compared with adults: they tend to spend more time outside; they

engage in more vigorous activity, and they inhale more air (and therefore more particles) per pound of body weight. Studies have shown that particulate pollution is associated with increased respiratory symptoms and decreased lung function in children, including symptoms such as episodes of coughing and difficulty breathing. These can result in school absences and limitations of normal childhood activities.

Pregnant women. While there have not been studies of the effects of exposure to wildfire smoke on pregnancy outcomes, there is substantial evidence of adverse effects of repeated exposures to cigarette smoke, including both active and passive smoking. Wildfire smoke contains many of the same compounds as cigarette smoke. In addition, recent data suggest that exposures to ambient air pollution in cities may result in low birth weight and possibly other, more serious adverse reproductive effects. Therefore, it would be prudent to consider pregnant women as a potentially susceptible population as well.

Smokers. People who smoke, especially those who have smoked for many years, have already compromised their lung function. However, due to adaptation of their lungs to ongoing irritation, smokers are less likely to report symptoms from exposure to irritant chemicals than are nonsmokers. However, they may still be injured by wildfire smoke. Therefore, some smokers may unwittingly put themselves at greater risk of potentially harmful wildfire smoke exposures, believing that they are not being affected.

**Hazards Associated Cleanup of Wildland Fires**

Heat sources may remain as a result of smoldering wood or other debris that could reignite if contact is made with a combustible material or if oxygen becomes available. Workers and employers must therefore take extra precautions.

Cleanup activities may involve walking on unstable surfaces such as construction debris, trees and other vegetation. Piles of debris and other unstable work surfaces create a risk for traumatic injury from slips, falls, puncture wounds from nails and sharp objects, and collapsing materials. Extreme caution is necessary when working on these surfaces. Protective equipment, such as hard hats, safety glasses, leather gloves, and steel toe boots should be considered to minimize the risk of injury.

Cleanup workers are at risk for developing serious musculoskeletal injuries to the hands, back, knees, and shoulders. Special attention is needed to avoid back injuries associated with manual lifting and handling of debris and building materials.

Cleanup workers are at serious risk for developing heat stress. Excessive exposure to hot environments can cause a variety of heat-related problems, including heat stroke, heat exhaustion, heat cramps, and fainting.

Fires can rearrange and damage natural walkways, as well as sidewalks, parking lots, roads, and buildings. Never assume that fire-damaged structures or ground are stable. Buildings that have been burned may have suffered structural damage and could be dangerous.

Fires to commercial and residential buildings and water used to fight the fire can dislodge tanks, drums, pipes, and equipment, which may contain hazardous materials such as pesticides or propane. Containers may be damaged by fire and heat.

All of these concerns (suppression efforts, damage and destruction of structures and facilities, smoke injuries to citizens, and the cost of clean-up and associated hazards to firefighters and workers) along with the threat of flooding and erosion to areas swept by fire add to the cost of fire protection and suppression for Yolo County and its municipalities.

**Previous Occurrences**
Most wildland fires in Yolo County are quickly contained due to rapid reporting and response, but if this first effort fails, a wild fire can get very big very fast. Such fires can require extensive firebreaks and/or a weather change for containment.

The most notable recent fire in Yolo County was in October 2006 when 11,000 acres of rangeland, destroyed three houses and six vehicles, and damaged three or four houses plus 15 barns and outbuildings. More than 300 animals, mainly sheep, had to be put down as a result of injuries suffered when the fire roared across their pasture. The total animal death toll is estimated to top 500. No human lives were lost. High winds blew a fire west of Capay near County Road 82B and Highway 16 to about 1,000 acres before it was contained. There were two other fires, near Interstate 505 and County Roads 12A and 14, that merged together and grew to 10,000 acres before being contained to the south at Cache Creek.

**Probability of Future Occurrences**
The probability of future wildland fires in Yolo County is Occasional: between 1 percent and 10 percent chance of occurrence in the next year or has a recurrence interval of 11 to 100 years.

### *FLOOD*

**General**
Flooding occurs when water flow increases at a rate that exceeds the soils ability to absorb it through percolation over a short period of time; or the capacity of natural or manmade flood control structure (i.e. levee, canal, trough, etc.) is exceeded allowing water to escape and spread across low lying areas. Flooding may occur from locally heavy rainfall or as a result of heavy runoff being channeled into Yolo County from distant sources along established rivers and canals.

**Geographic Extent and Potential Magnitude**
Flood was rated as a Catastrophic: more that 50 percent of the operational area affected for each jurisdiction by the Hazard Mitigation Steering Committee.

Flooding is an ongoing issue within Yolo County. Seasonal rains, coupled with a dependence on levees to protect low lying areas places the county at risk from periodic widespread flooding. The existence of local river systems (i.e. Cache Creek, Putah Creek, etc.) also contributes to the problem of localized flooding on a periodic basis. Finally, the eastern border of the county is flanked by a major levee system that contains the Sacramento River. Failure of any segment of that levee system during periods of major stream flow could prove disastrous to large segments of Yolo County.

Flooding is the most common hazard occurring in the State of California. Heavy rains and rains associated with severe thunderstorms cause local flooding. The flooding that occurs in the State of California may be divided into three specifically named types:

- Channel Flooding.

- Lateral channel migration during major flows, which results in abrupt changes in the horizontal alignment or location of the channel;
- Localized channel bed and bank-scour; and
- Over-bank flow inundation.

**Sheet Flooding**
Characteristics include channels that have minimal capacity, water flowing across broad areas at relatively shallow depths, and gently sloping terrain. Damage is caused by flooding, localized scour, and deposition of extensive amounts of sediments and debris typically associated with sheet flow. If the depth of the water is high enough, water may flow through residential areas and structures. One of the most dangerous aspects of sheet flooding is that the opportunity for evacuation through roadway access is lost.

**Alluvial Fan and Distributary Flooding**
Characterized by dynamic flow across steep or moderately-sloped terrain with ill-defined channels, such that flow paths are unpredictable and flow splits and breakouts, as well as convergent flow paths, are typical. Like sheet flow, flow depths are relatively shallow. Large quantities of sediment and debris are carried by floodwaters. Damage is due to inundation, changing flow paths, localized scour and sediment, and debris deposition.

Flooding is an ongoing issue within Yolo County. Seasonal rains, coupled with a dependence on levees to protect low lying areas places the county at risk from periodic widespread flooding. The existence of local river systems (i.e. Cache Creek, Putah Creek, etc.) also contributes to the problem of localized flooding on a periodic basis. Finally, the eastern border of the county is flanked by a major levee system that contains the Sacramento River. Failure of any segment of that levee system during periods of major stream flow could prove disastrous to large segments of Yolo County.

Areas subject to flooding in Yolo County are spread throughout the county. Areas of particular concern are adjacent to the Sacramento River that borders the county on the east. Other areas that flood periodically are low-lying lands near Cache Creek, Putah Creek, and various sloughs. The Yolo Bypass affords an appreciable level of flood protection from Sacramento River overflows during the winter and spring months. The State/Federal River Forecast Center monitors the Sacramento River and tributaries through a series of stations located along the waterways. The system affords a degree of advance flood warning for emergency responders. Stream and river gages are monitored in the EOC.

According to FEMA records, the majority of the County's creeks and shoreline areas lay within the 100-year flood plain (an area subject to flooding in a storm that is likely to occur according to averages based upon recorded measurements once every 100 years). The FEMA records are maintained as a means of determining flood insurance rates through the National Flood Insurance Program.

**Significant Issues**
The current flood protection system along the lower Cache Creek was designed to convey flood flows having a 1 in 10 chance of occurring in any given year with 3 feet of freeboard. Historically, the existing levee system has conveyed flood flows having an annual chance of occurrence of 1 in 20 by encroaching into the freeboard. Due to the limited conveyance capacity of the lower reach of Cache Creek, the Federal Emergency Management Agency (FEMA) has issued new flood insurance rate maps that show significant areas of Yolo

County and Woodland are subject to floods having a 1 in 100 chance of occurring in any given year.

Factors other than limited channel capacity also affect flooding in the area. These include the I-5 embankment and the west levee of the Cache Creek Settling Basin. These features tend to divert portions of the easterly overflow from Cache Creek toward Woodland. Solving the flooding problems is not a simple matter of increasing the capacity of the existing system. Increasing the design flow of the channel and levee system, without a corresponding increase in the flow area, results in increased flow velocities. At some point, increased channel velocities require substantial rock slope protection measures (riprap) to protect banks and bridges against excessive scour.

The rock slope protection measures are generally associated with significant environmental impacts. Construction of new levees, raising existing levees, and rock slope protection require environmental mitigation. The shaded riverine aquatic habitat along the creek and the abundant number of elderberry bushes along the creek bank (the habitat of the endangered valley elderberry longhorn beetle) make the creek area an environmentally sensitive area. Other significant environmental considerations include the presence of habitat of the following special-status species: giant garter snake, Swainson's hawk, bank swallow, northwestern pond turtle, central valley steelhead, and Chinook salmon.

**West Sacramento Levees and Flooding**

Flooding is an ongoing issue of concern within West Sacramento. Seasonal rains, coupled with a dependence on levees to protect low lying areas places the city at risk from periodic widespread flooding. The borders of the city are flanked by a major levee system that contains the Sacramento River, deep water ship channel and the Sacramento and Yolo Bypasses. Failure of any segment of these levee systems during periods of major stream flow could prove disastrous to segments of West Sacramento.

Areas subject to shallow localized flooding in West Sacramento are spread throughout the city. Most of West Sacramento is vulnerable to deep flooding from levee failures on the Sacramento River, Sacramento Bypass or Yolo Bypass. The Sacramento Bypass and the Yolo Bypass convey Sacramento and American River overflows during the winter and spring months. The State/Federal River Forecast Center monitors the Sacramento River, the Yolo Bypass and tributaries through a series of stations located along the waterways. The system affords a degree of advance flood warning for emergency responders. Stream and river gauges are monitored in the EOC.

The impact from any flooding event will vary based upon a number of factors: source of the water; location of water flow; duration of rainfall or source release; topography; presence and/or effectiveness of flood control systems; changes in land use and vegetation. Resulting damage would include:

- Injury and death associated with people being trapped in rapidly moving waterways or caught unaware during slow rise conditions
- Injury and death for individuals attempting to ford (in vehicles or on foot) submerged roadways
- Damage to critical infrastructure and essential services through inundation
- Damage to roadways, bridges and other transportation structures affecting mobility and the ability for people to evacuate flooded areas

- Release of hazardous materials and start of fires within damaged or affected structures
- Damage to buildings and structures in the pathway of rising flood waters
- Public health hazards from contamination of potable water sources; damage to sanitation systems; long term presence of standing water; vector infestation; and introduction of hazardous materials contaminants
- Loss of agricultural products and crops from inundation
- Impact to local economy stemming from loss in agricultural, industrial, and commercial productivity
- Societal impacts involving long-term interruption of normal activity

Although flooding incidents are generally of short duration, the need for ongoing response and long-term recovery operations cannot be underestimated. Moreover, loss of essential flood control structures, including levees and control devices may hinder recovery efforts and pose significant problems should additional flooding occur.

**Previous Occurrences**

Lower Cache Creek has a history of flooding. Twenty severe floods have occurred since 1900 in the Cache Creek basin. The most severe floods of recent years downstream from Clear Lake occurred in 1955,1956, 1958, 1964,1965, 1970, 1983, 1995, and 1997. In 1983, a levee failure near County Road (CR) 102 caused flooding in the area which is now Woodland's industrial area. The flood hazard evaluation conducted for this study also determined that a significant portion of the project area is subject to floods having a 1 in 100 chance of occurring in any given year. The primary purpose of this study is to identify economically feasible and environmentally sensitive methods to reduce flood-related damages to Woodland and adjacent areas. Without a flood damage reduction project, average annual flood damages to real property from overflows from Cache Creek are expected to be in the millions, most of which would be in Woodland. Other adverse effects and losses would include the potential for flood-related loss of life, contamination from sanitary sewage and hazardous materials, and the extended closure of the section of Interstate 5 (I-5) east and north of Woodland.

Flood flows are most likely to occur between November and April; no known floods have occurred between June and August. Large floods result from rainstorms. Due to the nature of the storms, floods often have multiple peak flows over a 4- to 5-day period. Large peaks result from cloudbursts within a regular storm.

**Putah Creek (Winters Area)**
Generally, flooding within the Winters Area is a result of runoff due to periods of heavy rain. Runoff is water that can no longer be absorbed into saturated ground and follows a "downhill" route to gutters, ditches, streams, creeks, and rivers. During periods of heavy runoff, debris caught in the rush of water can interfere with outlets and culverts causing water to back-up at constricted areas. Hydraulic pressure can cause catastrophic damage to drain systems and the surrounding areas when their outlets become blocked. In level areas, once subterranean saturation occurs, water will accumulate and stand on the surface until evaporated or until an outlet is opened.

The impact from any flooding event will vary based upon a number of factors: source of the water; location of water flow; duration of rainfall or source release; topography; presence and/or effectiveness of flood control systems; changes in land use, vegetation; and

- Injury and death associated with people being trapped in rapidly moving waterways or caught unaware during slow rate of rise conditions
- Injury and death for individuals attempting to ford (in vehicles or on foot) submerged roadways
- Damage to critical infrastructure and essential services through inundation
- Damage to roadways, bridges and other transportation structures affecting mobility and the ability for people to evacuate flooded areas
- Release of hazardous materials and start of fires within damaged or affected structures.
- Damage to buildings and structures in the pathway of rising flood waters
- Public health hazards from contamination of potable water sources; damage to sanitation systems; long term presence of standing water; vector infestation; and introduction of hazardous materials contaminants.
- Loss of agricultural products and crops from inundation
- Impact to local economy stemming from loss in agricultural, industrial, and commercial productivity
- Impact to local economy based upon reduction in tourism
- Societal impacts involving long-term interruption of normal activity

Although flooding incidents are generally of short duration, the need for ongoing response and long-term recovery operations cannot be underestimated. Moreover, loss of essential flood control structures, including levees and control devices may hinder recovery efforts and pose significant problems should additional flooding occur.

**Probability of Future Occurrences**
Although flooding incidents are generally of short duration, the need for ongoing response and long-term recovery operations cannot be underestimated. Moreover, loss of essential flood control structures, including levees and control devices may hinder recovery efforts and pose significant problems should additional flooding occur. Based on historical data the probability of future occurrences for flood countywide is Likely: Between 10 percent and 100 percent chance of occurrence in next year or has a recurrence interval of 10 years or less.

## *SEVERE WEATHER*

### Geographic Extent and Potential Magnitude

Severe Weather was rated as Critical: between 35-50 percent of the operational area affected for each jurisdiction by the Hazard Mitigation Steering Committee.

Yolo County is occasionally visited by severe summer and winter storms that can produce heavy rains, cyclonic winds, ice storms, and other significant short-term weather phenomenon. Although usually of short duration, the intensity of these meteorological events can severely impact people and critical infrastructure, threatening public safety and interrupting the normal flow of daily life.

As weather patterns are only marginally predictable, and long-term forecasting is still only marginally effective for specific area forecasts, the frequency to which Yolo County might be impacted can only be speculated upon. There exists sufficient historical data to conclude that severe weather will be an ongoing, periodic challenge for the county.

Strong or long-duration storms may result in various disruptions. Widespread or long-term utility (telephone, power, sewage) outages may occur. Buildings may be damaged or destroyed due to storm impact, especially involving conditions of high wind or severe hail. Major areas of impact may include:

- Injury to individuals and livestock caught in severe storm conditions and lacking adequate shelter
- Interruption of critical infrastructure systems due to damage and impact
- Disruption of traffic flows due to reduced visibility or roadway debris
- Damage to crops under cultivation at key time periods
- Economic losses due to closed businesses, delayed arrival/shipment of products, and power outages

### Thunderstorms

Thunderstorms are common types of severe weather in the State of California. Annually, throughout the United States, thunderstorms kill more people than tornadoes. The five main threats from thunderstorms are lightning, flooding, straight-line winds, hail and tornadoes.

Flash floods and floods from a thunderstorm have caused death in the State of California. Property damage from thunderstorms is also extensive annually (see Flood).

### High Winds

Historical data indicates that there is no trend, or certain time period during a given year, for damaging high winds to occur in the State of California; however, high winds can accompany severe storms and thunderstorms in the State. For this reason, they are considered a risk factor. Examples of high winds are the nighttime down slope winds that blow out into the Reese River Valley at Austin. At times, when there is a large pressure change over a long distance, these winds become strong causing extensive damage.

Mobile homes, power lines, billboards, airplanes, vehicles, roofs and other structures have been damaged by severe winds. Due to the high incidence of damage to mobile homes, insurance companies have adopted policies which require tie downs.

**Previous Occurrences**
On February 9, 1998, President Clinton signed a major disaster declaration that designated "El Nino '98, FEMA-1203-DR-CA." As a result of the Presidential declaration, section of the Robert T. Stafford Disaster Relief and Emergency Assistance Act were implemented, providing Individual Assistance and Public Assistance to the designated counties. The declaration also activated the Hazard Mitigation Grant Program (HMGP) which is applicable to all counties in the State. After the initial declaration by President Clinton, 14 additional counties requested to receive a federal declaration, bringing the total number of designated counties to 41.

The 41 designated counties were: Alameda, Amador, Butte, Calaveras, Colusa, Contra Costa, Del Norte, Fresno, Glenn, Humboldt, Kern, Lake, Los Angeles, Marin, Mendocino, Merced, Monterey, Napa, Orange, Riverside, Sacramento, San Benito, San Bernardino, San Diego, San Francisco, San Joaquin, San Luis Obispo, San Mateo, Santa Barbara, Santa Clara, Santa Cruz, Solano, Sonoma, Stanislaus, Sutter, Tehama, Trinity, Tulare, Ventura, Yolo, Yuba.

**El Nino '98**
In the spring of 1997, Pacific Ocean temperatures along the equator from South America to Australia were rising above normal, changing wind patterns in the area. This is a phenomenon known as El Nino. As part of the global impact of El Nino, heavy storms for 1997-1998 were predicted for the State of California.

In anticipation of a serious El Nino winter season, emergency services agencies throughout the State started making preparations. During a summit convened on October 6, 1997, Governor Pete Wilson directed the State to take a series of actions to prepare for the severe storms that were predicted to hit California as a result of El Nino. The Governor directed the Office of Emergency Services (OES) and the Department of Water Resources (DWR) to conduct a series of regional briefings over the next two months to assist local communities in their El Nino preparations. In October 1997, the first of six briefings for local and state agencies was held. FEMA held the "El Nino Community Preparedness Summit" in Santa Monica, on October 14, 1997

Agencies such as DWR and the Corps of Engineers accelerated efforts to complete projects and work which began as a result of the prior year's disastrous flooding. Many local agencies accelerated repairs, cleaned storm channels, and implemented community education efforts, while the State issued environmental permits that allowed repair and mitigation work to move forward prior to the arrival of the storms. Although difficult to quantify, it is clear that without these and a multitude of other efforts, the devastation from the disaster would have been far greater.

About 170% of normal precipitation was experienced in most areas, with several locations receiving 300% or more above normal. Rainstorms occurred continuously in February, ranging in duration from 1 to 3 days, with only a day of rest between cycles. The season's most severe storm occurred on February 2nd, and a series of storms continued until February 24, 1998. A strong jet stream was present across the Pacific during this time and this colder air mass also increased rain and snow. February rains were three times normal, and the mountain snow pack rose from 15% to 185%. The pattern was similar to the winter of 1982-83, the most serious past El Nino year. The El Nino '98 Storms were of average

temperature --unlike those of 1997, which were warmer, resulting in rainfall at higher elevations.

**Description of Damage and Impact**
Damage occurred almost as soon as the first heavy rains began in November, 1997. In Orange County, the damage became serious enough for a local disaster declaration on December 6, 1997. This was followed by a gubernatorial disaster declaration on December 10, 1997.

Casualties included 17 confirmed deaths and 29 confirmed injuries. The total amount of residential damage was estimated at over $120 million. Roads, utilities, and levees were also damaged. As of April 29, 1998, the Disaster Field Office (DFO) estimated damages as follows: 91 homes have been destroyed, 2,303 homes suffered major damages, and 4,252 homes incurred minor damage.

According to the California Coastal Commission, Storm Summary Report for Coastal California, March 10, 1998, the El Nino '98 Storms caused extensive damage along Coastal California. In many cases, coastal bluff and mountain soils lost stability due to saturation from copious precipitation and large waves. High river levels caused flooding of several low elevation areas. There was a great deal of beach erosion in Los Angeles, Orange, and San Mateo Counties, as well as other parts of California. Storm waves damaged many low-lying oceanfront structures. The Coastal Commission issued approximately 75 emergency coastal permits, mostly for rip rap and seawall repairs to protect residential structures.

**Impacts to Individuals**
By April 28, 1998, FEMA's Human Services Division had received over 70,125 tele-registrations for FEMA disaster assistance. The Disaster Housing Program had received a total of 46,730 applications, and had provided $20.6 million in assistance. As of April 15th the Small Business Administration (SBA) had issued 31,509 home and personal property loan applications and had approved more than $16 million in low interest loans. In addition, the SBA had issued 9,699 business loan applications and approved $6,504,400 in business loan funds. The Individual and Family Grant Program (IFGP) had received 37,093 requests as of April 28th. For serious, unmet needs beyond the maximum IFGP award, the State Supplemental Grant (SSG) could provide up to an additional $10,000, and had awarded 17 grants for an additional $82,663 in aid to individuals. The Public Assistance (Infrastructure) Program had received 269 Damage Survey Reports (DSRs) totaling $26,582,560 as of April 28, 1998. According to the preliminary damage assessment, damage to local government facilities was estimated at $300 million.

**Shelters**
The El Nino '98 Storms created a need to feed and shelter thousands of people. The American Red Cross (ARC), members of the National Volunteer Organizations Active in Disaster (NVOAD), and numerous other voluntary agencies, are usually the first to respond to the needs of disaster victims. The Red Cross provided housing for 5,112 people at 91 shelter locations, more than 140,000 meals were served, and financial assistance was extended to more than 2,300 households. The Red Cross relief efforts for the El Nino winter storms exceeded $4.6 million.

**Levees**
Unlike the flooding in the year (FEMA-1155-DR-CA), California Winter Storms of 1997), there were less widespread floods and levee problems. Due in part top the lower temperatures, the duration of rains, and pre-storm repair efforts to shore-up levees at risk, there were only a few levee breaks and seepage. According to DWR, The Sacramento River was not strained to capacity. The San Joaquin River briefly approached flood stage at the Vernalis Gage, but did not exceed it. Many of the areas that flooded were predictable, such as Rio Linda in Sacramento County and the residential areas along the Pajaro River in Monterey County. The area around Clear Lake in Lake County repeated its flooding history, and set a record for the stage height. The Russian River at Guerneville was above flood stage, as was the Petaluma River.

**Landslides**
Landslides and debris flows had a greater impact during this disaster than in the federal disasters of 1995 and 1997. The severity of the problems ranged from the catastrophic losses in the Rio Nido community of Sonoma County, to small erosion problems with minor impact. Landslides and erosion also caused residential damage and destruction in Alameda County, Humboldt County, Los Angeles County, San Mateo County, San Francisco County, Santa Cruz County, Ventura County, and various other sites within the state.

**Geological Discussion**
The frequent storms that occurred in February 1998 saturated soils and triggered numerous debris flows and landslides, resulting in severe damage throughout river valleys and coastal areas. Eroding cliffs jeopardized homes, and debris flows forced many residents to evacuate their homes. Such headline grabbing events focused attention on the geologic problems produced by the wet season. It should be noted, however, that deep-seated landslide movements could continue after the heavy rains have stopped.

Soil and rock that comprises hill slopes will eventually move downhill. Some of this material will move grain-by-grain thorough erosion and soil creep, and some will move as larger slabs or liquefied masses, commonly called landslides and mudslides. Geologists generally classify landslides on their shape, rate (speed) of movement, type of motion, and material properties. In most classification schemes, there are three distinct types of movement: flow (e.g. debris flows and mudflows); sliding along a discrete plane or failure (e.g. debris slide); and falling (e.g. rock falls and avalanches).

Landslides can be small, involving only a few cubic yards of material, or large, involving more than a square mile of land. Some landslides are shallow, only a few feet deep, while others can be hundreds of feet deep. Landslides can be slow, and move only a few inches a year. It can also be fast and move at tens to hundred of miles per hour.

While most hill slopes are marginally stable under dry conditions, the addition of water from rainfall, snowmelt, or human activities (e.g. watering lawns) can radically alter the character of the soil and weathered rock and lessen the stability of slopes. Generally, all other conditions being equal, if groundwater is at or near the ground surface, there is a great probability that a landslide or debris flow will occur.

Another major factor that may trigger landslides is sudden changes in the shape of the slope. Slope changes that may trigger landslides include, but are not limited to, man-made cuts and fills, undermining of slopes by stream erosion or formation of gullies, or undermining

and overloading of slopes due to landslide movement on adjacent land. In fact, landslide movement in one part of a hill slope can radically affect the stability of adjacent slopes. Events at Rio Nido in Sonoma County illustrate how complex the changes in stability can be. In simplified terms, the Rio Nido landslide began when a block of soil and rock, high on a ridge, rotated down and out on the slope. This movement pushed a bulge of material onto the existing steep slope at the toe of the landslide. Fissures opened at both the top of the rotational block and within the toe of the landslide. The rotational movement of the landslide also undermines up-slope areas (decreasing stability), changing the groundwater flow patterns (increasing stability in parts of the slide while decreasing stability in other). Because the toe of the landslide was no longer supported by the surrounding slope (the slope became overly steep), the saturated outside edge failed by toppling and breaking apart. This loose material then mobilized as debris flow down a stream channel, picking up additional debris, including sediment and trees, as it flowed toward the houses on the canyon flow below. Immediate concerns were that the landslide mass would continue to move high on the slope, and as it did, the entire mass would break apart and fail as a massive debris flow that would inundate a much larger down slope area. Currently, the rotational component of the Rio Nido landslide has not shifted since monitoring equipment was installed two weeks after the failure began.

Hillsides may also be more vulnerable to debris flows following wildfires. Removal of vegetation generally makes hillsides more susceptible to erosion and landslides. After a forest fire there is reduction in the amount of vegetation on the hillsides to hold the soil in place. Also, the roots decay over a period of years following the fire. This results in an increased landslide hazard for 3 to 5 years following a large fire. In 1997, Southern California had 27 wildfires greater than 300 acres. At least 22 of those sites had some erosion damage in 1987, and it came in the form of debris flows and minor flooding. There is evidence to suggest that most landslides and debris flows occur where they have happened in the past. For example, the Rio Nido landslide is next to an existing landslide deposit identified on a CA Division of Mines and Geology (DMG) map. Though landslides are fairly common in California's hillside areas, there is considerable pressure to construct new homes at these locations. Some communities require site-specific investigations prior to permitting development. Engineers attempt to stabilize slopes by providing drainage, flattening slopes, and filing-in valleys. Sometimes, these modified slopes and fills require maintenance and while many of these modified slopes could last decades, some failures occur. This is what happened to houses in Laguna Niguel, Orange County, which were built on an engineered slope that had shown signs of distress for three years.

Just as there is pressure to develop hill slope areas, the beautiful ocean views from sea cliffs make them desirable places to live. During the recent disaster, accelerated cliff erosion in Pacifica resulted from slightly higher than normal seasonal ground water infiltration. When the ground becomes saturated, wave action can more easily remove materials that have fallen to the bottom of the cliffs, temporarily accelerating cliff retreat in the areas up slope. The rocks in these particular cliffs are highly fractured and nonresistant. They include sandstone, shale, and metamorphic rocks that are prone to rapid erosion during the rainy season. Erosion usually has occurred episodically, not continually at the same time. This year the cliffs locally eroded as much as 10 feet, compared to the frequently noted annual averages of 3 to 4 inches.

**Probability of Future Occurrences**
The probability of future sever weather events in Yolo County is Occasional: between 1 percent and 10 percent chance of occurrence in the next year or has a recurrence interval of 11 to 100 years.

### *VOLCANIC ACTIVITY*

**Geographic Extent and Potential Magnitude**
Volcanic Activity was rated as Catastrophic: more than 50 percent of the operational area affected for each jurisdiction by the Hazard Mitigation Steering Committee.

Volcanic eruptions are characterized by a number of different behaviors. Some eruptions involve the slow and non-violent release of molten lava from fissures in the ground over a hot spot in the earth's mantle. Other eruptions are more radical, resulting in the explosive release of molten rock (tephra), ash, and toxic gases. Additional eruptive traits include area seismic activity, lava bombs, landslides, subsidence, peculiar localized weather phenomenon, and plume dominated columns that can project debris for hundreds of miles.

**Previous Occurrences**
There is a history of ancient volcanic action in the State of California; however, the risk is not considered significant within the State's geographic area. Volcanic activity surrounding the State of California could potentially cause some ash fall over portions of the State. However this is predicted to cause little or no damage or significant disruptions.

Certain areas of California are recognized as being at risk from potential volcanic eruptions. There are two such areas that could affect Yolo County. The closest is the Mt. Konocti / Clear Lake area. The second site is within the Mt. Shasta/Mt. Lassen/Medicine Lake areas, located several hundred miles north/northeast of Yolo County.

Although each of the aforementioned volcanic sites is considered dormant, each is capable of producing eruptive activity, including devastating explosive behavior. Historically, each of these volcanoes has been active within recorded human experience, with Lassen Peak being the most recent in the early 20th Century. Although volcanic activity is extraordinarily destructive and disruptive, methods exists for monitoring volcanic sites that provide adequate early warning of potential eruptions.

The following Forum Report was made available to the Hazard Mitigation Steering Committee on volcanic hazard risks in California from the California Bureau of Mines and Geology:

**Volcanic Hazards**
The most likely volcanic hazard for California is an eruption from the Mono Craters area near Mono Lake in Eastern California. Small eruptions from these volcanoes have sent ash into California as recently as about 260 years ago. Other volcanoes that could deposit ash in California include Mount Lassen, Mount Shasta and the Long Valley Caldera in California and volcanoes in the Cascade Mountains in Oregon.

The biggest threat for California from eruptions in California and Oregon is damage to flying aircraft. Ash from eruptions in California or Oregon is not likely to cause long-term problems in California, because the ash deposits are likely to be thin, typically only a few inches thick at most.

A massive eruption from the Long Valley Caldera near Mammoth Lakes, California over 700,000 years ago devastated a considerable area. Air-fall ash from these eruptions did collect as thick piles of ash in parts of California, and some of the ash may have been hot enough or thick enough to devastate the landscape locally. Scientists would expect to see strong indications from seismographs before another eruption of this magnitude. The U.S. Geological Survey continues to monitor the area around Mammoth Lakes, and will issue warnings prior to any subsurface changes that could precede a major eruption.

**Probability of Future Occurrences**

Mt. Konocti

If an eruption involved Mt. Konocti, Yolo County could suffer from the release of large amounts of tephra (ash and larger particles). The tephra, even in depths of as little as 5 mm, could disrupt communications, transportation, and affect breathing. Clear Lake could also suffer from seiches, which could overflow down Cache Creek, resulting in flooding. Large areas downwind of the eruption would be disrupted for years to come.

Mt. Lassen/Mt. Shasta/Medicine Lake

It is more likely that an eruption could occur in the Mt. Lassen / Mt. Shasta / Medicine Lake area. Prevailing winds would tend to bring tephra down the Sacramento Valley to Yolo County. Pyroclastic and debris flows from Mt. Shasta could impact the Sacramento River, either through damming and/or melting of snow. This could result in the Sacramento River flowing outside its banks.

The probability of future occurrences is Unlikely: less than 1 percent chance of occurrence in next 100 years or has a recurrence interval of greater than every 100 years.

***44 CFR Requirement §201.6(c)(2)(ii): The risk assessment shall include (A) The types and numbers of existing and future buildings, infrastructure, and critical facilities located in the identified hazard areas; (B) An estimate of the potential dollar losses to vulnerable structures...and a description of the methodology used to prepare the estimate; (C) A general description of land uses and development trends within the community so that mitigation options can be considered in future land use decisions.***

## B.2. VULNERABILITY ASSESSMENT

The vulnerability assessment was conducted based on the best available data and the significance of the hazard. Data to support the vulnerability assessment was collected from the following sources:

- FEMA's HAZUS loss estimation software
- Jurisdictional representatives and documentation

## B.3. ESTIMATING POTENTIAL LOSSES

**HAZUS Modeling For Yolo County**

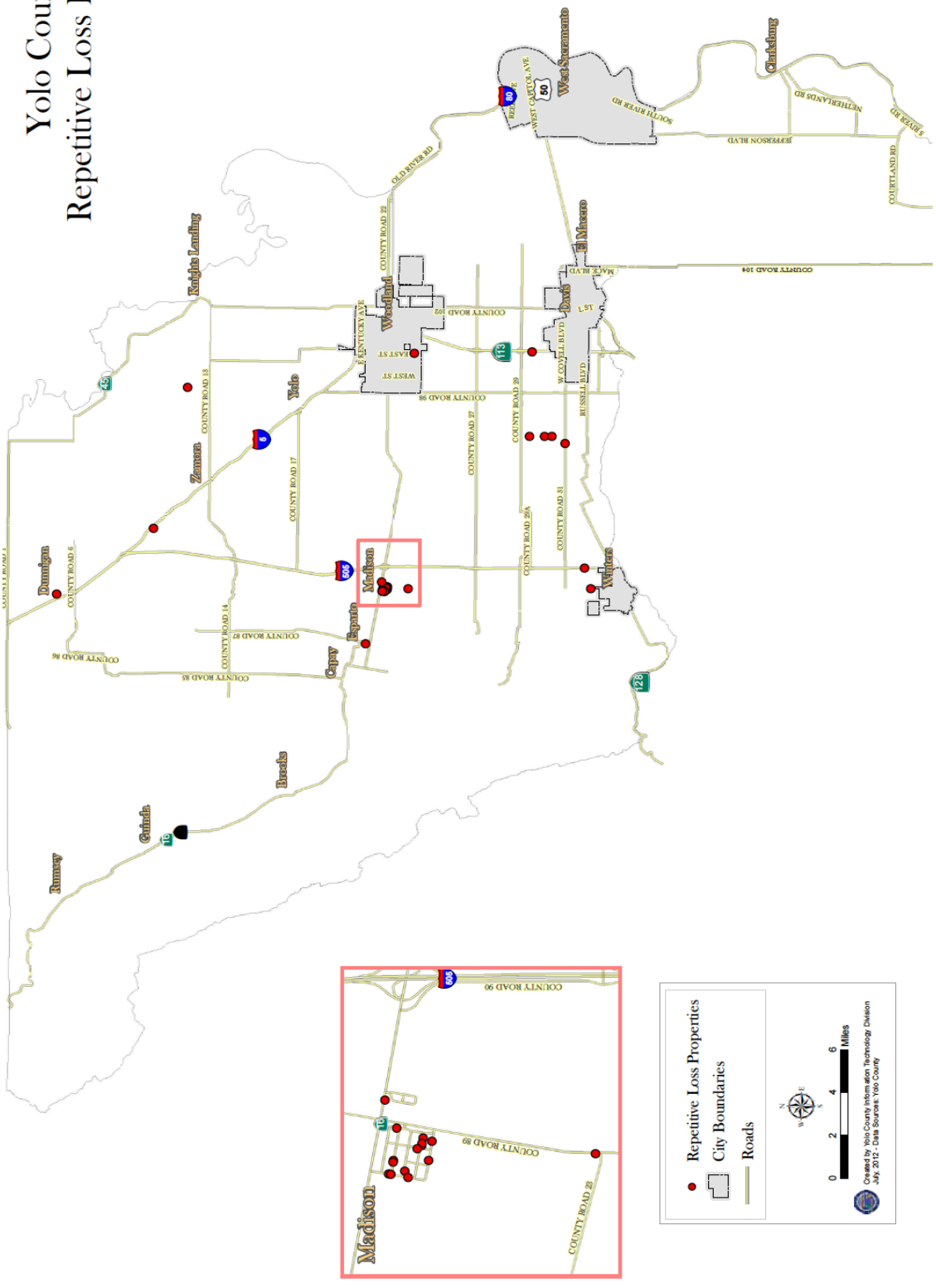
The HAZUS modeling conducted to illustrate estimated potential losses to Yolo County demonstrated the vulnerability of the county and it's participating jurisdictions. This data was the best available data at the time of the development of this planning document.

Please refer to the Hazus Model section at the end of this document.

## B.4. REPETITIVE LOSS AND SEVERE REPETITIVE LOSS PROPERTIES

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

According to FEMA records as of July 16, 2012. The map on the following page represents the Repetitive Loss Properties in Yolo County including the cities. There are a total of **32** of these property types countywide.


Yolo County
Repetitive Loss Properties
Repetitive Loss Properties
City Boundaries
Roads
Miles
Created by Yolo County Information Technology Division
July, 2012 - Data Sources: Yolo County
Madison
Woodland
West Sacramento
Clarksburg
Knights Landing
Davis
El Macero
Winters
Zamora
Yolo
Dunnigan
Esparto
Capay
Brooks
Guinda
Rumsey

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# Element C: Mitigation Strategy

***Requirement §201.6(c)(3) [The plan shall include the following:] A mitigation strategy hat 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.***

## IDENTIFICATION & PRIORITIZATION OF MITIGATION ACTIONS

Mitigation actions that address the goals and objectives developed in the previous step were identified, evaluated, and prioritized. These actions form the core of the mitigation plan. Jurisdictions conducted a capabilities assessment, reviewing existing local plans, policies, and regulations for any other capabilities relevant to hazard mitigation planning. An analysis of their capability to carry out these implementation measures with an eye toward hazard and loss prevention was conducted.

The capabilities assessment required an inventory of each jurisdiction's legal, administrative, fiscal and technical capacities to support hazard mitigation planning. After completion of the capabilities assessment, each jurisdiction evaluated and prioritized their proposed mitigations. Each jurisdiction considered the social, technical, administrative, political, legal, economic, and environmental opportunities and constraints of implementing a particular mitigation action. This step resulted in a list of acceptable and realistic actions that address the hazards identified in each jurisdiction.

A full suite of goals, objectives and action items for each jurisdiction is presented in this Plan. 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 is identified for each prioritized action item.

**Constraints to Strategy Implementation**

The Steering Committee considered a list of issues existing in Yolo County that can be considered constraints to mitigation planning strategy implementation: (from the perspective of the participating steering committee members).

- Legal constraints (lawful prohibition, voter rejection)
- Community perception, preference, and resistance
- Economic constraint (fee based agencies may be restrained from participating in the planning process due to lack of funds to pay for their involvement.)
- Budgetary and funding constraints
- Staffing constraints
- Land ownership constraints
- State and federal influences or restrictions
- Sensitivity of information needed to complete the Plan.
- Building code restrictions
- Cultural demands, barriers, and expectations

- Interpretation of law (court decisions)
- Identified conflicts with organizational policy or strategic vision

## ELEMENT C.1 EXISTING AUTHORITIES, POLICIES, PROGRAMS AND RESOURCES

***Requirement §201.6(c)(3) [The plan shall include the following:] A mitigation strategy hat 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.***

Yolo County and its jurisdictions each has an Emergency Operations Plan, a General Plan, which includes a Safety Element, an Emergency Services Ordinance that clearly defines roles and responsibilities in accordance with state and federal guidelines. The County CAO and jurisdictions noted in this document serve as the Directors of Emergency Services for their respective areas by law and ordinance. The Board or Supervisors, City Councils or Councils (tribal, Housing, etc.) serves as the administering agency and the promulgation authority for all plans, policies and procedures within Yolo County and its member jurisdictions. The county and participating jurisdictions recognizes the enhanced Hazard Mitigation Plan of the State of California, the California Emergency Services Act, and the appropriate Federal Regulations including 44 CFR 201. Yolo County is subject to the State of California Uniformed Building Code (UBC), which dictates standards on all current and future construction within Yolo County.

### 2030 General Plan

The 2030 General Plan provides comprehensive and long-term policies for the physical development of the county and is often referred to as "the constitution" for local government. This is only the third time in the county's history that the General Plan has been comprehensively updated, and the first time since 1983. While the fundamental goals of promoting agriculture, enhancing open space, and creating sustainable communities are the same as they have been over the past 50 years, the circumstances facing the county have changed. Issues such as the global economy, climate change, and the role of local government create new challenges to maintaining the county's historic vision. The 2030 General Plan charts a course for the county over the next twenty years that will achieve its goals and address these concerns. The General Plan contains over 500 separate action items that will implement the variety of programs needed to realize the county's vision, this plan works in coordination with the 2012 revision of the Operational Area Multi-jurisdictional Hazard Mitigation Plan.

### Climate Change Action Plan

The Climate Action Plan represents a significant milestone for Yolo County, which has a long history of being in the forefront of the green movement with land use policies that emphasize growth management, open space preservation and agricultural protection. In 1982, Yolo County adopted an Energy Plan, which was one of the first of its kind. In 1985, the county landfill completed a gas-to-energy facility, which generates 20,000 kilowatt hours per year and captures 90% of methane emissions.

In 2007, Yolo County became one of 12 charter members from throughout the country to sponsor the Cool Counties Initiative, which pledges each county collectively to reduce greenhouse gas emissions by 80% by 2050. That same year, the county organized local cities, special districts

and UC Davis to form the Yolo County Climate Change Compact, providing an ongoing forum for exchanging information on how best to analyze and address greenhouse gas emissions.

In 2009, Yolo County adopted its 2030 General Plan, which contains more than 350 policies that deal with climate change, including the requirement to develop a Climate Action Plan. In addition to implementing General Plan policy, the Climate Action Plan also fulfills the requirements of state legislation, including Assembly Bill 32, Senate Bills 97 and 375, and Executive Order S-3-05.

The Climate Action Plan estimates that in 2008, the unincorporated area (excluding UC Davis, the Yocha Dehe Wintun Nation and special districts) produced 651,470 metric tons of carbon dioxide equivalents, or greenhouse gasses. Approximately 48% of those emissions are created by agriculture. Transportation and energy account for an additional 47%, with the remainder made up by such sectors as the landfill, wastewater treatment, construction, mining and stationary sources.

A target is established in the Climate Action Plan to reduce the 2008 emissions back to the levels estimated for 1990, or 613,651 metric tons. To achieve this target, 15 programs are proposed, including such measures as increasing renewable energy production, enhancing energy and water conservation, expanding alternative transportation, planting trees and reducing fertilizer application. In order to meet the reductions envisioned in the Cool Counties Initiative and state legislation, the Climate Action Plan also includes voluntary goals to reduce greenhouse emissions to 447,965 metric tons by 2030, and 122,730 metric tons by 2050.

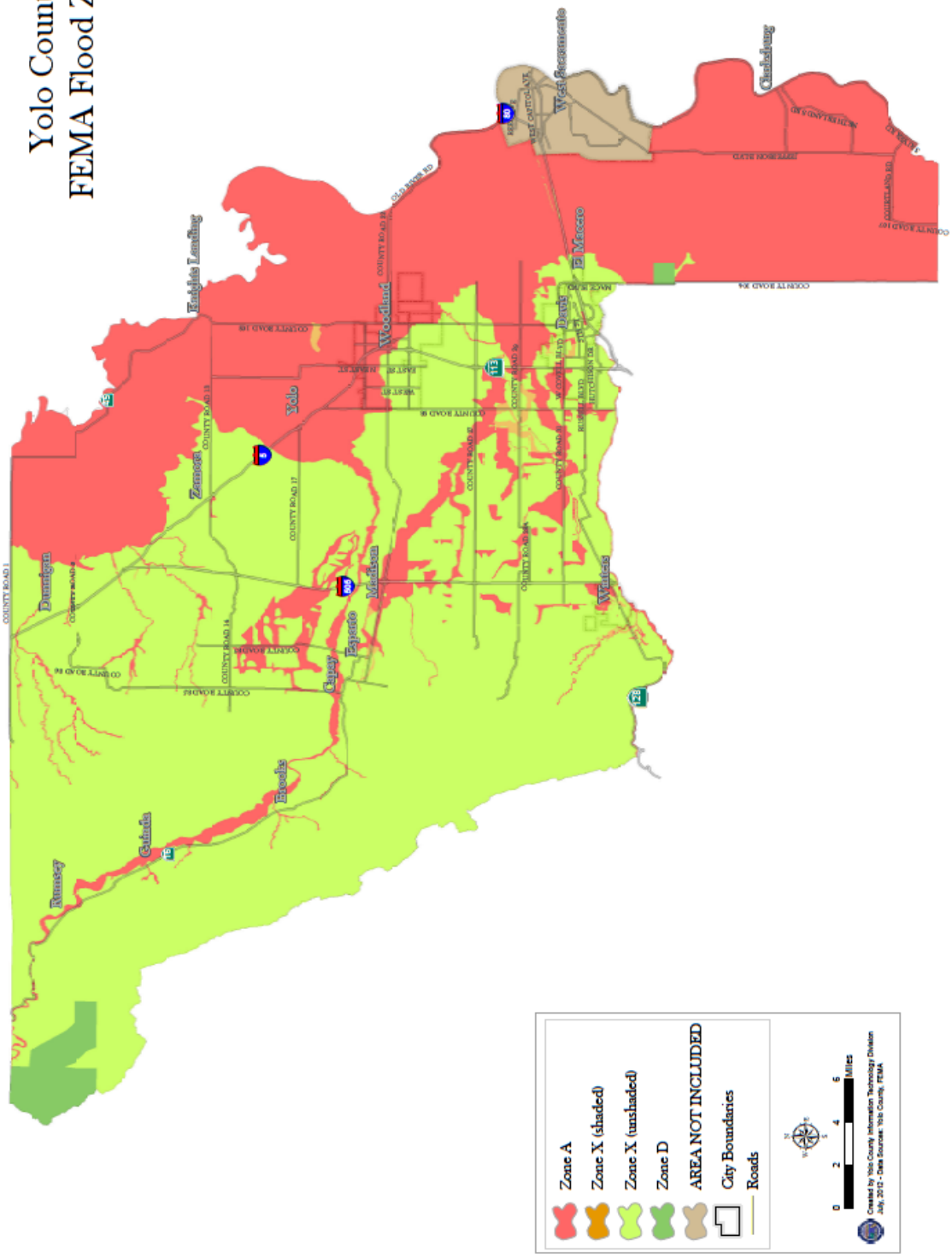
## ELEMENT C.2 PARTICIPATION IN THE NATIONAL FLOOD INSURANCE PROGRAM (NFIP)

***§201.6(c)(3)(ii) [The hazard mitigation strategy shall include a] section that identifies and analyzes a comprehensive range of specific mitigation actions and projects being considered to reduce the effects of each hazard, with particular emphasis on new and existing buildings and infrastructure. All plans approved by FEMA after October 1, 2008, must also address the jurisdiction's participation in the NFIP, and continued compliance with NFIP requirements, as appropriate.***

Despite the construction of massive and relatively effective flood control projects, California remains vulnerable to flooding. A rise in population and development contribute to increased flood risk throughout the state. Yolo County and the cities of Davis, Winters, West Sacramento and Woodland participate in the program. Yolo County has 434 square miles, 256,571 acres and 5,423 individual parcels of floodplain defined by the Federal Emergency Management Agency (FEMA) and the County of Yolo. The regulated floodplain areas are subject to flooding during severe storms. The Yolo County Flood Insurance Rate Maps (FIRM) was first published in 1980 and has been revised over time, mapping Special Flood Hazard Areas (SFHA). Yolo County also has an adopted comprehensive Floodplain Management Program. The flood zones in Yolo County are shown in the map on the following page.

| CID # | Community Name | FHBM Identified | FIRM Identified | Current Effective Map Date | Reg-Emer Date | Tribal |
|---|---|---|---|---|---|---|
| 060424 | City of Davis | 11/08/77 | 11/15/79 | 06/08/10 | 11/15/79 | No |
| 060728 | City of West Sacramento | | 03/05/90 | 01/19/95 | 03/13/90 | No |
| 060425 | City of Winters | 01/23/74 | 12/01/78 | 06/18/10 | 12/01/78 | No |
| 060426 | City of Woodland | 02/01/74 | 10/16/79 | 05/16/12 | 10/16/70 | No |
| 060423 | Yolo County | 10/18/77 | 12/16/80 | 05/16/12 | 12/16/80 | No |

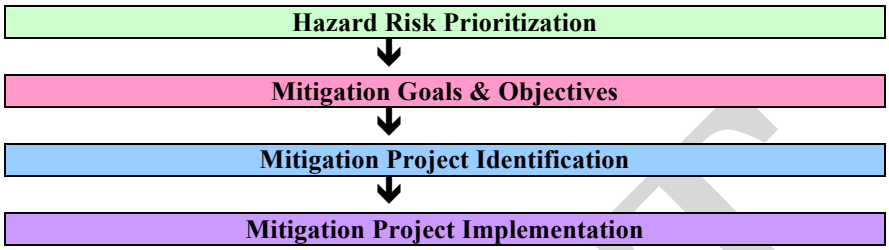
*Data obtained from the FEMA Community Status Book Report, http://www.fema.gov/fema/csb.shtm*


Yolo County
FEMA Flood Zones
Zone A
Zone X (shaded)
Zone X (unshaded)
Zone D
AREA NOT INCLUDED
City Boundaries
Roads
Miles
Created by Yolo County Information Technology Division
July, 2012 - Data Sources: Yolo County, FEMA

## ELEMENT C.3 MITIGATION GOALS

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

The information developed for the risk assessment used as the primary basis for developing mitigation goals and objectives. Mitigation goals are defined as general guidelines explaining what each jurisdiction wants to achieve in terms of hazard and loss prevention.




Goal statements are typically long-range, policy-oriented statements representing jurisdiction-wide visions. Objectives are statements that detail how each jurisdiction's goals will be achieved, and typically define strategies or implementation steps to attain identified goals. Other important inputs to the development of jurisdiction-level goals and objectives include performing reviews of existing local plans, policy documents, and regulations for consistency and complementary goals, as well as soliciting input from the public.

**Mitigation Principles Goals & Objectives**
**Strategic Planning Goals**

The following represents overarching strategic goals associated with the identification and eventual implementation of appropriate and meaningful hazard mitigation efforts in relation to prioritized hazards and threats confronting the Yolo Operational Area. These goals form the basis for specific supporting process objectives and are shown from the highest priority, at the top of the list, to those of lesser importance.

The establishment of hazard mitigation goals represents both individual and collective strategies that have been mutually agreed upon by the Steering Committee, which represents the local and tribal jurisdictions, and major special public agencies within the Yolo Operational Area. Eventually, these goals will be adopted by each participating jurisdiction and public agency as the guiding policy behind local hazard mitigation efforts, in conjunction with other associated principles.

| | |
|---|---|
| **Goal 1:** | Protection of life during and after the occurrence of disasters from identified hazards; |
| **Goal 2:** | Preventing loss of life and reducing the impact of damage where problems cannot be eliminated |
| **Goal 3:** | Protection of emergency response capability |
| **Goal 4:** | Protection of developed property, homes and businesses, industry, educational |

| | |
|---|---|
| | opportunities and the cultural fabric by combining hazard loss reduction with the community's environmental, social and economic needs |
| **Goal 5:** | Promoting public awareness of community hazards and mitigation measures and encouraging public participation in the planning objectives |
| **Goal 6:** | Preserving or restoring natural mitigation values such as flood plains. |
| **Goal 7:** | Protection of natural resources and the environment. |

### Planning Process Objectives

The following objectives are meant to serve as a metric upon which the Yolo Operational Area Hazard Mitigation Plan can be evaluated. Meeting these objectives assures the Multi Hazard Mitigation Plan as a functional document that identifies short-and long-term strategies, and describes each measure including:

| | |
|---|---|
| **Objective 1:** | Identification of individuals, agencies or organizations responsible for project implementation. |
| **Objective 2:** | Projecting a realistic and doable time frame for project implementation. |
| **Objective 3:** | Explanation of how the project will be financed including the conditions for financing and implementation as information is available. |
| **Objective 4:** | Identification of alternative measures, should financing not be available. |
| **Objective 5:** | Maintain consistent support for the implementation of existing hazard mitigation planning goals and objectives for the operational area. |
| **Objective 6:** | Base mitigation strategies on hazards as identified within the Yolo OA Risk Assessment. |
| **Objective 7:** | Provide significant potential for the effective reduction of damage to public and/or private property, or to costs associated with local, state, and federal recovery from future potential impacts. |
| **Objective 8:** | Establish and maintain a benchmark for identifying the most practical, cost effective, socially acceptable, and environmentally sound mitigation solution after consideration of available alternatives. |
| **Objective 9:** | Address a repetitive problem, or one that has the potential to have a major impact on an area, reducing the potential for loss of life, loss of essential services and personal property, damage to critical facilities, economic loss, hardship or human suffering. |

| | |
|---|---|
| **Objective 10:** | Meet applicable permit requirements. |
| **Objective 11:** | Develop mitigation standards for development in hazardous areas. |
| **Objective 12:** | Contribute to both the short-and long-term solution to the hazard vulnerability risk problem. |
| **Objective 13:** | Assuring the benefits of a mitigation measure is equal to or exceeds the cost of implementation. |
| **Objective 14:** | Have manageable maintenance and modification costs. |
| **Objective 15:** | When feasible, be designed to accomplish multiple objectives including improvement of life safety, damage reduction, restoration of essential services, protection of critical infrastructure, security of economic development, recovery, and environmental sustainability. |
| **Objective 16:** | Whenever feasible, use existing resources, agencies and programs to implement the project. |
| **Objective 17:** | Include regional hazard mitigation concerns and strategies |

## ELEMENT C.4 MITIGATION ACTIONS AND PROJECTS

High Risk Priority Hazards represent those threats that, in the process of assessment, demonstrate the most significant potential for impact or vulnerability, given identified conditions and information. High-risk priority hazards are those identified as demanding the most immediate attention, while affording the best possible solutions for mitigation. High-risk hazards were identified as part of the area-wide risk assessment conducted by OES and reviewed by the inter-jurisdictional Steering Committee.

| HIGH RISK PRIORITY HAZARDS | | | | | | |
|---|---|---|---|---|---|---|
| **HAZARD** | **Yolo County** | **Woodland** | **Davis** | **West Sac** | **Winters** | **Yocha Dehe** |
| **All Hazards** | | | DAV 1-1 | WSC 1-1 | | YD 1-1 |
| **Flood** | YCO 2-1, YCO 3-1 | WLD 2-1, WLD 3-1 | DAV 2-1, DAV 3-1 | WSC 2-1, WSC 3-1 | WIN 2-1 | |
| **Dam Failure** | YCO 4-1 | | DAV 4-1 | WSC 4-1 | WIN 4-1 | |
| **Fires** | YCO 6-1 | WLD 6-1 | DAV 6-1 | WSC 6-1 | WIN 6-1 | |

## ELEMENT C.5 MITIGATION STRATEGY ACTION PLAN

***§201.6(c)(3)(iii) [The hazard mitigation strategy shall include an] action plan, describing how the action identified in paragraph (c)(3)(ii) of this section will be prioritized, implemented, and administered by the local jurisdiction. Prioritization shall include a special emphasis on the extent to which benefits are maximized according to a cost benefit review of the proposed projects and their associated costs. §201.6(c)(3)(iv) For multi-jurisdictional plans, there must be identifiable action items specific to the jurisdiction requesting FEMA approval or credit of the plan.***

Tables were developed to rank the mitigation projects using the following criteria; each project was assigned a priority rank, an approximate cost, a time horizon, whether the project requires Board of Supervisors regulatory action, and an assumption as to whether or not the project would be subject to CEQA or federal EIR requirements. Those highest priority projects for the county and the participating jurisdictions are on the following pages.

The cost benefit review process will be completed for each project that will be submitted during a given fiscal year. The general priorities of the cost benefit risk analysis will focus on projects that are life saving, life safety, property protection and lastly environmental protection. A ratio of at least three dollars of benefit for each dollar invested will be considered the minimum cost benefit ratio for any projects submitted within Yolo County and its participating jurisdictions.

## ALL HAZARDS

### CITY OF WEST SACRAMENTO

| WSC 1-1 | |
|---|---|
| **Program/Project Description** | Community Warning System Project: involves the procurement and installation of a community wide siren system to alert residents during severe weather conditions, industrial disasters and incidents of civil unrest |
| **Project Elements** | |
| **Location Targeted** | |
| **Estimated Cost** | $ 1.0 million |
| **Timeline/Schedule** | TBD |
| **Lead Agency** | Police and Fire Departments |
| **Partners** | |
| **Financing** | Grant: Federal funding with local match |
| **Action Focus** | |
| **Impediments** | |
| **Goal Addressed** | Mitigation of rapid public notification deficiency<br>• Protect Life and Property<br>• Public awareness<br>• Increase Effectiveness of Emergency Services |
| **Project Maintenance** | |
| **Related Hazard** | This project will support the mitigation of all incidents that involve emergency operations that impact the general public i.e. earthquakes, fire, floods, terrorism incidents, civil unrest, hazardous materials incidents etc. |

## CITY OF DAVIS

| DAV 1-1 | |
|---|---|
| **Program/Project Description** | Project is for a Joint Community (City of Davis) and Campus (UC Davis) alerting system design, purchase, installation and public education program |
| **Project Elements** | |
| **Location Targeted** | |
| **Estimated Cost** | TBD |
| **Timeline/Schedule** | TBE |
| **Lead Agency** | City of Davis Fire Department & University of California Davis Campus Emergency Planner |
| **Partners** | |
| **Financing** | Seeking grant opportunities |
| **Action Focus** | |
| **Impediments** | |
| **Goal Addressed** | Protect Life & Property<br>Public Education and Awareness<br>Increase Effectiveness of Emergency Services |
| **Project Maintenance** | |
| **Related Hazard** | ALL HAZARDS that involve emergency operations that affect the general public and campus population. |

## YOCHA DEHE WINTUN NATION

| YD 1-1 | |
|---|---|
| **Program/Project Description** | Community Warning System Project: involves the procurement and installation of a community alert and notification system to alert residents guests during severe weather conditions and other potential natural hazards |
| **Project Elements** | |
| **Location Targeted** | |
| **Estimated Cost** | $200,000 |
| **Timeline/Schedule** | TBD |
| **Lead Agency** | Fire Department |
| **Partners** | |
| **Financing** | Local Funds |
| **Action Focus** | |
| **Impediments** | |
| **Goal Addressed** | Mitigation of rapid public notification deficiency<br>• Protect Life and Property<br>• Public awareness<br>• Increase Effectiveness of Emergency Services |
| **Project Maintenance** | |
| **Related Hazard** | This project will support the mitigation of all incidents that involve emergency operations that impact the general public i.e. earthquakes, fire, floods, etc. |

## FLOODS

### YOLO COUNTY

| YCO 2-1 | |
|---|---|
| **Program/Project Description** | • Continue enforcement of County Code (Flood Damage Prevention) regarding building in flood-plains<br>• Continue enforcement of building codes (mechanical, plumbing, fire)<br>• Require new developments to mitigate displaced and increased flows.<br>• Continue drainage channel maintenance<br>• Participate in National Flood Insurance Program |
| **Project Elements** | |
| **Location Targeted** | |
| **Estimated Cost** | |
| **Timeline/Schedule** | Ongoing program |
| **Lead Agency** | Planning and Public Works Department |
| **Partners** | Operating budget – fees, and general fund |
| **Financing** | Currently funded in operating budgets.<br>Grant opportunities as they arise |
| **Action Focus** | |
| **Impediments** | |
| **Goal Addressed** | Protect life and property<br>Minimize property damage<br>Increase public awareness regarding NFIP |
| **Project Maintenance** | |
| **Related Hazard** | Levee failure |

## City of Woodland

Specific to Cache Creek Flooding

| WLD 2-1 | |
|---|---|
| **Program/Project Description** | This program/project would provide permanent flood protection for the City of Woodland in a 100 year Cache Creek flood event and reduce flood damage costs. FEMA Flood study placed 50% of City in 100 year zone and the Corps of Engineer's 2003 draft Feasibility Study shows a total annual flood damage reduction benefit of about $12 million depending on the flood protection alternative selected. Two solutions have been found feasible: a flood barrier and setback levees. No other alternatives have been found feasible to date. The voters in Woodland rejected the flood barrier concept and indicated a desire for a "regional" solution. |
| **Project Elements** | |
| **Location Targeted** | |
| **Estimated Cost** | The project costs depend on protection alternative selected. The estimated cost for the flood barrier is $43 million (non-federal cost of $16 million) and the estimated cost for the setback levees is $162 million (non-federal cost of $128 million). FTEs: TBD |
| **Timeline/Schedule** | This project was originally initiated in 2001, however, local funding rejected by voters precluding additional study and solution exploration. The project timeline is estimated to be 8-10 years from determination of viable alternative to complete real estate acquisitions, design, and construction with identified source funding for local share, assuming State and Federal support. It is unknown at this time whether a viable alternative that is supported by the community can be found. |
| **Lead Agency** | The City of Woodland was the local sponsor of the Corps of Engineer's Feasibility Study. It is unclear at this time if a project can effectively proceed without the County's active participation, which has not been forthcoming to date. Typically the Department of Water Resources is the non-federal sponsor and the Corps of Engineers is the federal sponsor for major flood protection projects. |
| **Partners** | |
| **Financing** | Major flood protection projects are typically jointly funded by Congress, the State, and the local sponsor, and project must be competitive and generally non-contentious at both the State level and at the congressional level. Local funding (estimated at approximately $8 million) for the flood barrier would be relatively easy to commit, however, State and Congressional funding for other solutions may be limited to that required for the flood barrier project (the Corps' tentatively recommended plan), potentially leaving the local cost share at $120 million for a setback levee solution. Other as yet undetermined alternatives may be more or less costly than the setback levee option. At present, voter initiative precludes local funding which eliminates state and federal funding matches. |

| | |
|---|---|
| **Action Focus** | |
| **Impediments** | |
| **Goal Addressed** | The implementation/completion of this project will accomplish the following:<br>• Permanent flood protection (life safety and property damage) to the community in a 100 year Cache Creek flood event.<br>• Avert requirement for flood insurance on residential properties with federally insured loans (estimated cost over $1 million a year).<br>• Avert requirements to comply with expensive building restrictions for building in the flood plain.<br>• Avery requirement for a separate flood protection project for the wastewater treatment plant at a cost of $4 million (required by State if protection not otherwise provided).<br>• Avert loss of City and County property and sales tax revenues (and related reductions in recreation and public safety programs due to decreased property values and increased vacancy rates of commercial/industrial properties in the flood plain (much of the industrial area is in the deep flood zone).<br>• Avert need to amend General Plan to delete industrial growth areas currently in the 100 year flood plain and either forgo the net increase in revenues associated with that type of development, or shift those growth areas to the south on prime farm land.<br>• Develop community and political consensus of best solution.<br>• Seek funding for solution. |
| **Project Maintenance** | |
| **Related Hazard** | • Flooding<br>• Levee Failure<br>• Dam Failure (Indian Valley Dam) |

## City of Davis

| DAV 2-1 | |
|---|---|
| **Program/Project Description** | • Continue enforcement of building codes (mechanical, plumbing, fire)<br>• Require new developments to mitigate displaced and increased flows.<br>• Continue drainage channel maintenance<br>• Participate in National Flood Insurance Program |
| **Project Elements** | |
| **Location Targeted** | |
| **Estimated Cost** | • Currently funded in operating budgets.<br>Grant opportunities as they arise |
| **Timeline/Schedule** | Ongoing Program |
| **Lead Agency** | Public Works and Community Development Departments |
| **Partners** | |
| **Financing** | Operating budget-fees, enterprise funds and general fund |
| **Action Focus** | |
| **Impediments** | |
| **Goal Addressed** | • Protect life and property<br>• Minimize Property damage<br>• Increase public awareness regarding NFIP |
| **Project Maintenance** | |
| **Related Hazard** | Dam failure |

## City of West Sacramento

| WSC 2-1 | |
|---|---|
| **Program/Project Description** | Flood fighting activities. This project involves the development of procedures to handle localized flooding within the city, strengthening the levees that surround the city and operation of the Emergency Operations Center during flooding conditions |
| **Project Elements** | |
| **Location Targeted** | |
| **Estimated Cost** | 200 hr. FTE/year |
| **Timeline/Schedule** | Ongoing |
| **Lead Agency** | Fire Departments, Public Works, and the Engineering Division |
| **Partners** | |
| **Financing** | General Fund |
| **Action Focus** | |
| **Impediments** | |
| **Goal Addressed** | Mitigation of Flooding<br>• Protect Life and Property<br>• Increase Effectiveness of Emergency Services<br>• Strengthen Partnerships<br>• Increase Public Awareness |
| **Project Maintenance** | |
| **Related Hazard** | Flooding can cause severe property damage, compromise transportation, threaten public health and result in economic devastation. |

## City of Winters

| WIN 2-1 | |
|---|---|
| **Program/Project Description** | Flood Preparedness |
| **Project Elements** | Public Education Program |
| **Location Targeted** | |
| **Estimated Cost** | |
| **Timeline/Schedule** | Ongoing |
| **Lead Agency** | City of Winters |
| **Partners** | |
| **Financing** | When funds become available |
| **Action Focus** | |
| **Impediments** | |
| **Goal Addressed** | • Early warning. Public education and communication<br>• Comply with FEMA flooding plan<br>• Implement Army Corp of Engineers Plan<br>• Update Storm drain master plan |
| **Project Maintenance** | |
| **Related Hazard** | Public health issues. Loss of life and property. Bridge integrity Flood at pump station |

## YOLO COUNTY

| YCO 3-1 | |
|---|---|
| **Program/Project Description** | • Develop relationships with reclamation districts, Department of Water Resources, Fish & Game and Corps of Engineers.<br>• Continue drainage channel maintenance<br>• Participate in National Flood Insurance Program<br>• Monitor effects of weather |
| **Project Elements** | |
| **Location Targeted** | |
| **Estimated Cost** | • Currently funded staff time<br>• Grant opportunities as they arise |
| **Timeline/Schedule** | • Ongoing program |
| **Lead Agency** | Planning and Public Works Department |
| **Partners** | |
| **Financing** | • Operating budget |
| **Action Focus** | |
| **Impediments** | |
| **Goal Addressed** | • Protect life and property<br>• Minimize property damage<br>• Increase public awareness regarding NFIP |
| **Project Maintenance** | |
| **Related Hazard** | • Flood |

## City of Woodland

| WLD 3-1 | |
|---|---|
| **Program/Project Description** | This project is for a Flood Warning System and Emergency Response/Evacuation Exercise Program to provide an early warning to the City of Woodland and unincorporated areas north of the City of a pending flood event allowing for orderly evacuation and a degree of site specific protection measures. Emergency response exercises would occur on a five year cycle to insure citizens know of the potential dangers and how to respond. |
| **Project Elements** | |
| **Location Targeted** | |
| **Estimated Cost** | The cost for this project is estimated to be $1.2 million for the flood warning system (page K-7 of Corps 2003 draft Feasibility Report. Exercise costs would be part of normal O & M expenses and absorbed by the City at an estimated cost of $10k per cycle.<br>FTEs: TBD |
| **Timeline/Schedule** | The timeline for this project is not known at this time. The schedule depends on funding availability for Flood Warning System. Exercises should commence in 2005 and every five years thereafter. |
| **Lead Agency** | The City of Woodland and County of Yolo would be responsible for both the Flood Warning System and the Emergency Response/Evacuation Exercise Program. |
| **Partners** | |
| **Financing** | The City of Woodland anticipates applying for a FEMA Grant for the Flood Warning System portion of the project. |
| **Action Focus** | |
| **Impediments** | |
| **Goal Addressed** | The implementation/completion of this project would accomplish the following:<br>• Life safety<br>• Protection of property |
| **Project Maintenance** | |
| **Related Hazard** | • Flooding<br>• Dam Failure |

## City of Davis

| DAV 3-1 | |
|---|---|
| **Program/Project Description** | • Develop relationships with reclamation districts, Department of Water Resources, Fish & Game and Corp of Engineers<br>• Continue drainage channel maintenance<br>• Participate in the National Flood Insurance Program<br>• Monitor effects of weather |
| **Project Elements** | |
| **Location Targeted** | |
| **Estimated Cost** | • Currently funded staff time<br>• Grant Opportunities as they arise |
| **Timeline/Schedule** | Ongoing program |
| **Lead Agency** | Public Works |
| **Partners** | |
| **Financing** | Operating budget-fees, enterprise funds and general fund |
| **Action Focus** | |
| **Impediments** | |
| **Goal Addressed** | • Protect life and property<br>• Minimize property damage<br>• Increase public awareness regarding NFIP |
| **Project Maintenance** | |
| **Related Hazard** | • Flood |

## City of West Sacramento

| WSC 3-1 | |
|---|---|
| **Program/Project Description** | Levee Improvements |
| **Project Elements** | Improve the condition and capacity of the levees surrounding West Sacramento to raise the level of protection to the 200-year level. |
| **Location Targeted** | Citywide |
| **Estimated Cost** | $500 Million |
| **Timeline/Schedule** | Pending Congressional Authority for federal funding, this project is scheduled for completion in 2025. |
| **Lead Agency** | City of West Sacramento |
| **Partners** | • City of West Sacramento<br>• U.S. Army Corps of Engineers<br>• Local Reclamation Districts |
| **Financing** | Levee project funding from local, state and federal funds. |
| **Action Focus** | Identify and mitigate potential flood risk. |
| **Impediments** | Reallocation or denial of federal funds. |
| **Goal Addressed** | Mitigation of flooding caused by overtopping or breaching of the level system. |
| **Project Maintenance** | Ongoing as individual levee projects are completed and new funding allocated. |
| **Related Hazards** | This project will support the mitigation of potential flooding caused by the overtopping or breaching of the levees surrounding the City of West Sacramento. |

## DAM FAILURE

### YOLO COUNTY

| YCO 4-1 | |
|---|---|
| **Program/Project Description** | • Develop relationships with reclamation districts, Department of Water Resources, Fish & Game and Corps of Engineers.<br>• Continue drainage channel maintenance<br>• Participate in National Flood Insurance Program<br>• Monitor effects of weather |
| **Project Elements** | |
| **Location Targeted** | |
| **Estimated Cost** | • Currently funded staff time<br>• Grant opportunities as they arise |
| **Timeline/Schedule** | • Ongoing program |
| **Lead Agency** | • Planning and Public Works Department |
| **Partners** | |
| **Financing** | • Operating budget |
| **Action Focus** | |
| **Impediments** | |
| **Goal Addressed** | • Protect life and property<br>• Minimize property damage<br>• Increase public awareness regarding NFIP |
| **Project Maintenance** | |
| **Related Hazard** | • Dam Failure |

## City of Davis

| DAV 4-1 | |
|---|---|
| **Program/Project Description** | • Develop relationships with reclamation districts, Department of Water Resources, Fish & Game and Corp of Engineers.<br>• Continue drainage channel maintenance<br>• Participate in National flood Insurance Program<br>• Monitor effects of weather |
| **Project Elements** | |
| **Location Targeted** | |
| **Estimated Cost** | • Currently funded staff time<br>• Grant opportunities as they arise |
| **Timeline/Schedule** | • Ongoing program |
| **Lead Agency** | • Public Works |
| **Partners** | |
| **Financing** | • Operating budget-fees, enterprise funds and general fund |
| **Action Focus** | |
| **Impediments** | |
| **Goal Addressed** | • Protect life and property<br>• Minimize property damage<br>• Increase public awareness regarding NFIP |
| **Project Maintenance** | • Dam failure |
| **Related Hazard** | |

## City of West Sacramento

| WSC 4-1 | |
|---|---|
| **Program/Project Description** | Dam Failure: Because there is not a dam within close proximity to the City of West Sacramento, the City has not established a specific project for dam failure. The projects for flooding and levee will mitigate the dam failure. |
| **Project Elements** | |
| **Location Targeted** | |
| **Estimated Cost** | N/A |
| **Timeline/Schedule** | N/A |
| **Lead Agency** | Fire Department, Public Works, and the Engineering Division |
| **Partners** | |
| **Financing** | General fund |
| **Action Focus** | |
| **Impediments** | |
| **Goal Addressed** | Mitigation of Flooding<br>• Protect life and property<br>• Increase public awareness<br>• Strengthen partnerships<br>• Increase Effectiveness of Emergency Services |
| **Project Maintenance** | |
| **Related Hazard** | Flooding can cause sever property damage, compromise transportation, threaten public health and result in economic devastation. |

## City of Winters

| WIN 4-1 | |
|---|---|
| **Program/Project Description** | Dam Failure |
| **Project Elements** | |
| **Location Targeted** | |
| **Estimated Cost** | More than $2 billion |
| **Timeline/Schedule** | Ongoing |
| **Lead Agency** | City of Winters, Solano Irrigation District, Corp of Engineers |
| **Partners** | |
| **Financing** | As funding becomes available |
| **Action Focus** | |
| **Impediments** | |
| **Goal Addressed** | • Public education and early warning<br>• Communication drills |
| **Project Maintenance** | |
| **Related Hazard** | Wide-spread flooding. Loss of income and public infrastructure. Loss of life and property |

## FIRE
## Yolo County

| YCO 6-1 | |
|---|---|
| **Program/Project Description** | • Require weed abatement– public properties and non agricultural private properties<br>• Support League of California Cities and CSAC efforts to decrease impacts on public health and safety resulting from wildland urban interface fires |
| **Project Elements** | |
| **Location Targeted** | |
| **Estimated Cost** | • TBD<br>• Grant opportunities as they arise |
| **Timeline/Schedule** | • Ongoing, continuous programs |
| **Lead Agency** | • Fire Departments |
| **Partners** | • Parks Department and Planning<br>• Public Works Department |
| **Financing** | • Existing staff |
| **Action Focus** | |
| **Impediments** | |
| **Goal Addressed** | • Protect life and property<br>• Increase public awareness<br>• Incorporate environmental and historical preservation |
| **Project Maintenance** | |
| **Related Hazard** | Fire |

## City of Woodland

| WLD 6-1 | |
|---|---|
| **Program/Project Description** | This project is for Freeway Fire Mitigation to reduce freeway fires on major arteries intersecting and traversing Woodland. On an annual basis, the City of Woodland and Caltrans would hold a joint planning and evaluation session to examine prior year freeway fire experience and to plan the strategy to control freeway fires during the upcoming year. Caltrans would implement the strategy. |
| **Project Elements** | |
| **Location Targeted** | |
| **Estimated Cost** | The estimated annual cost for freeway fire suppression by the Woodland Fire Department exceeds $50.0K. |
| **Timeline/Schedule** | This project would be implemented on an annual basis including a joint planning session and preventive maintenance. |
| **Lead Agency** | The responsible agencies for this project are the City of Woodland and the State of California Department of Transportation (Caltrans). |
| **Partners** | |
| **Financing** | Funding for this project would be provided by the General Fund of the City of Woodland and Caltrans State funding. |
| **Action Focus** | |
| **Impediments** | |
| **Goal Addressed** | The implementation/completion of this project would accomplish the following:<br>• Reduce the number of freeway fires<br>• Reduce the frequency of freeway fires<br>• Reduce the severity of freeway fires<br>• Reduce the exposure of Fire personnel to hazardous freeway fire control responses<br>• Reduce motor vehicle accidents<br>• Reduce private property fire damage |
| **Project Maintenance** | |
| **Related Hazard** | • Freeway Fires<br>• Motor vehicle accidents |

## City of Davis

| DAV 6-1 | |
|---|---|
| **Program/Project Description** | • Continue the weed abatement program- public and private properties<br>• Continue Open space maintenance<br>• Continue Drainage Channel maintenance<br>• Support League of California Cities and CSAC efforts to decrease impacts on public health and safety resulting from wild land urban interface fires |
| **Project Elements** | |
| **Location Targeted** | |
| **Estimated Cost** | • $5000.00 in Fire Department budget for weed abatement<br>• $??? In parks Department budget for maintenance of open space<br>• $??? In Public Works budget for maintenance of drainage channels<br>• Additional grant opportunities as they arise |
| **Timeline/Schedule** | • Ongoing, continuous programs |
| **Lead Agency** | • Fire Department |
| **Partners** | • Public Works, and Parks Department |
| **Financing** | • Operating budget consisting of general fund, open space fund and storm sewer-drainage fund |
| **Action Focus** | |
| **Impediments** | |
| **Goal Addressed** | • Protect life and property<br>• Increase public awareness<br>• Incorporate environmental and historical preservation |
| **Project Maintenance** | |
| **Related Hazard** | • Wildland/Urban Interface Fires |

## City of West Sacramento

| WSC 6-1 | |
|---|---|
| **Program/Project Description** | Wildland/Freeway Urban Interface Fire Project: This project is to cover those fires that occur along the freeways running through the City of West Sacramento and tat the interface between the urban areas of the city and the surroundings farmlands. As these fire suppression activities are apart of the general responsibilities of the West Sacramento Fire Department this effort is covered under the continuing operations of the Department. If additional support is required in this area it will be provided through mutual aid agreement with other departments in the Sacramento area. |
| **Project Elements** | |
| **Location Targeted** | |
| **Estimated Cost** | $70,000<br>• Additional grant opportunities as they arise |
| **Timeline/Schedule** | Ongoing |
| **Lead Agency** | Fire Department |
| **Partners** | |
| **Financing** | General Fund |
| **Action Focus** | |
| **Impediments** | |
| **Goal Addressed** | Mitigation of wild land fires<br>• Protect Life and Property<br>• Increase Effectiveness of Emergency Services<br>• Strengthen Partnerships<br>• Increase Public Awareness |
| **Project Maintenance** | |
| **Related Hazard** | Wildland fires can cause severe property damage, compromise transportation, threaten public health and result in economic devastation. |

## City of Winters

| WIN 6-1 | |
|---|---|
| **Program/Project Description** | Wildland/Urban fire Clearance and Fire Break in high fire danger areas |
| **Project Elements** | |
| **Location Targeted** | |
| **Estimated Cost** | |
| **Timeline/Schedule** | Ongoing |
| **Lead Agency** | Winters Fire Department |
| **Partners** | |
| **Financing** | General fund operating budget |
| **Action Focus** | |
| **Impediments** | |
| **Goal Addressed** | • Prevention programs.<br>• Pubic education and communications.<br>• Early warning |
| **Project Maintenance** | |
| **Related Hazard** | Putah Creek risk to homes in immediate creek vicinity |

## ELEMENT C.6 PROJECT IMPLEMENTATION

***§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 improvements, when appropriate.***

Some projects are currently budgeted or completed by the local governments with out recourse to the grant process. Project requiring grant funds will be conducted as time, staff, priority and funding allow. The Yolo County operational area will seek mitigation funding from numerous sources with the pre-disaster hazard mitigation grant program being recognized as only one of several potential sources.

The plan allows for an umbrella of integrated approaches to mitigation to the threats all the jurisdictions face. The cohesiveness of the area, its size and the proximity of all jurisdictions to the numerous rivers and streams, the Wild-land Urban interface, the Northern California fault complexes and the their shared major transportation routes make the projects and work done on the projects potentially beneficial to all.

The each jurisdiction will serve as the coordination body for the day to day tracking of projects within that jurisdiction. The association of governments will represent the opportunity to address the political issues of project prioritization and implementation in a forum that represents all the governmental stakeholders. In all projects, all jurisdictions recognize that they may be responsible for twenty-five % of the cost either in cash or in

kind. The jurisdictions based upon the budgetary condition will be responsible for setting aside funding for projects that cannot be met by in kind contributions.

The Yolo County Office of Emergency Services will be the central coordination point for maintaining this plan and will serve as a lead staff for grant project applications on the countywide projects selected for application under the PDM grant program. Additionally, each jurisdiction applying for grant funds on their own will serve as lead staff for project implementation with assistance from the county as requested.

The legal protections for the selection, administration and financing these projects is provided by the local government governing boards and councils. For the county the Board of Supervisors (and for the participating jurisdictions councils and boards) provide guaranteed public access and scrutiny through the open public meetings and agenda, budget authority, accountability, and inclusion of any granted funds into the federal annual single audit. All grant efforts are approved by these bodies prior to application and accepted formally by these bodies upon their award. As elected public officials, they are the stewards of the public trust.

Local ordinance in all signatory agencies all reflect the state model ordinance. The County CAO and/or participating jurisdictions councils and boards are by ordinance the Director's of Emergency Services; as such they will have day-to-day oversight of any of these mitigation programs. Since all involved staff are within their chain of supervision, this provides an additional legal safeguard for the management and implementation of these projects.

# Element D: Plan Review, Evaluation and Implementation

***§201.6(d)(3) A local jurisdiction must review and revise its plan to reflect changes in development, progress in local mitigation efforts, and changes in priorities, and resubmit if for approval within 5 years in order to continue to be eligible for mitigation project grant funding.***

## ELEMENT D.1 CHANGES IN DEVELOPMENT

***§201.6(d)(3) A local jurisdiction must review and revise its plan to reflect changes in development, progress in local mitigation efforts, and changes in priorities, and resubmit if for approval within 5 years in order to continue to be eligible for mitigation project grant funding.***

**General Discussion**

The Yolo Operational Area Multi Hazard Mitigation Plan (MHMP) and associated hazard mitigation strategies establish the framework within which the pre disaster mitigation activities of local and tribal governments may be carried out on a prioritized.

The plan is based upon the experience of the Yolo Operational Area through the input of the Hazard Mitigation Steering Committee, the Yolo County Office of Emergency Services, internal agency planning staff, and adjunct member contributors.

The plan recognizes the varied conditions that exist and can be found throughout the Yolo Operational Area. No single mitigation strategy will effectively meet the needs of all of the communities. However, by embracing a coordinated approach and the objectives found in this plan, the Yolo Operational Area can make significant strides in the efficient and effective use of its resources to resolve and mitigate hazards threatening or affecting the local communities.

One of the most important accomplishments of the hazard mitigation planning project was the process itself, where the participants shared information, resources, and methodologies – community-wide, for the benefit of reducing or eliminating risk to critical areas. This was not an easy task, and it involved commitment on the part of local officials and those members of the broader community who recognize the importance of embracing a collaborative mitigation strategy.

**Direction**

The establishment of appropriate direction in the implementation of hazard mitigation strategies will require local collaboration and coordination to ensure that maximum mutual benefit can be obtained for all participating jurisdictions. Although some mitigation projects will have only local impact, in a broad sense even localized actions can result in a positive effect for the entire region through the reduction of threats that would otherwise require extensive response and recovery.

For all participating jurisdictions, the issue of future mitigation direction will involve both local policy development, as well as inter-organizational collaboration, within the framework of state and federal guidance.

**Implementation Considerations**
Implementation of sustainable or project-specific mitigation strategies will remain the responsibility of each individual jurisdiction or agency participating with this multi-jurisdictional process. Ultimately, it will be the responsibility of each participating jurisdiction or agency to determine how mitigation strategies will be implemented based upon the following identifiable factors:

- Priority of mitigation need based upon ongoing assessment of risk and consequences
- Anticipated realization of success, using adopted metrics
- Results of a cost-benefit analysis, as derived form a comprehensive assessment of total implementation costs over a specified period of time
- Degree of difficulty in both implementation of identified mitigation strategy, especially in respect to potential unanticipated consequences and vulnerability conflicts
- Degree of anticipated long-term maintenance considerations and requirements following implementation
- Funding availability and sources
- Situational changes that result in modified risk conditions and the need for adjusted mitigation strategies
- Legal, environmental, social, or cultural impediments that hamper or nullify the potential gain of a previously identified mitigation strategy or solution
- The eventual and unexpected eradication or minimization of an identified hazard or threat that nullifies the need to pursue the identified mitigation strategy

**Implementation Process**
In preparing for the local institution of sustained or prioritized project-specific mitigation strategies, it will be necessary for each jurisdiction to establish a mechanism for implementation that covers the period of solution inception through project completion. In real terms, this involves time, materials, funding, policy development, planning, and executive support and commitment.

In consideration of that process, the following phases have been identified that would be required for implementation:

**1. Initial Assessment Phase**
The first phase of implementation involves review of prioritized hazards, identified mitigation solutions, and assessment of initial considerations prior to project commitment

- ➢ Review prioritized hazards and threats as identified within the Plan's risk assessment and supporting documentation
- Assess the anticipated success associated with mitigation implementation
- Evaluate the technical difficult associated with implementation
- Evaluate cost-benefit data

- Identify secured funding sources for implementation and maintenance
- Obtain executive commitment

**2. Development Phase**

The second phase involves the development of a project or action plan that will guide implementation. The project or action plan will focus on how solution implementation will be accomplished or instituted utilizing identified administrative and technical data.

- ➢ Conduct comprehensive project analysis to include technical, engineering, design, and organizational data
- Develop realistic timeline for implementation
- Identify needed vendors, contractors, technicians, sponsors, and other implementation resources
- Identify potential obstacles, issues, considerations, conflicts, and concerns that may adversely impact implementation
- Secure funding

**3. Action Phase**

The third phase involves initiation of functions identified within the project/action plan. This may involve construction, repair, removal, relocation, protection, or other functions that result in implementation of the identified mitigation strategy.

- Resource allocation, procurement, collection, or deployment
- Site preparation
- Institution of scheduled work activity based upon project plan
- Evaluation of implementation progress, including necessary adjustments or modifications
- Final work completion and inspection

**4. Evaluation Phase**

The fourth phase involves an assessment of the efficacy of the project/action, and whether or not the solution resulted in the anticipated level of mitigation according to the strategy. The evaluation phase may not result in immediate verification as in some instances the level of efficacy and completeness will not be realized until some time after the project/action is implemented.

- Assess the completeness of the project: Does it meet the expectation and is it properly implemented?
- Assess the potential for unintended consequences, conflicts, or complications that may arise in the course of implementation. Will additional modifications be needed?
- If mitigation efficacy is not readily assured at time of implementation completion, determine the time line for such identification. Identify trigger points for periodic assessment in conjunction with the Maintenance Phase.

**5. Maintenance Phase**

The fifth and final phase represents the ongoing monitoring and potential maintenance of the mitigation solution. Ideally, the mitigation strategy was selected because of the anticipated level of surety and efficacy needed to reduce either vulnerability of impact. In addition, although ongoing maintenance may not be a preferred element of the adopted mitigation solution, it may be an unavoidable consequence of the process or scope of the threat being addressed.

## ELEMENT D.2 PROGRESS IN LOCAL MITIGATION EFFORTS

***§201.6(d)(3) A local jurisdiction must review and revise its plan to reflect changes in development, progress in local mitigation efforts, and changes in priorities, and resubmit if for approval within 5 years in order to continue to be eligible for mitigation project grant funding.***

This plan has been created as a living document with significant input from the population and professionals within Yolo County.

**Yolo OA Hazard Mitigation Plan Steering Committee**

The core membership of the planning team assembled to coordinate plan revision will constitute the Yolo Operational Area Hazard Mitigation Plan Steering Committee as it relates to future mitigation coordination. The Hazard Mitigation Plan Steering Committee will periodically meet and review the mitigation recommendations and strategies identified within this plan.

- This Committee will support the recommendations adopted by each jurisdiction for implementation and coordination on a state and regional basis.

- Each jurisdiction will review and adopt, as necessary, the work of the Hazard Mitigation Steering Committee on an annual basis.

- The Committee will review the quarterly progress reports on the implementation of the adopted hazard mitigation strategies brought forth by participating local and tribal government entities within the Yolo Operational Area.

- As required under prevailing state and federal requirements, this plan will be reviewed and updated on a five-year cycle. The strategies may be updated based on changing priorities and relieved constraints as identified below.

**Hazard Mitigation Steering Committee Process**

The Yolo Operational Area Hazard Mitigation Steering Committee will meet on an annual basis to review the progress made on the identified local hazard mitigation strategies. The Committee will also seek input on future hazard mitigation programs and strategies from the local hazard mitigation planning team or representative from each of the participating jurisdictions.

- Contact and work with each Hazard Mitigation Strategy's Lead Agency for an annual progress report on funding and implementation of the program recommended.

- Receive an annual report from each jurisdiction on the status of the strategies adopted and implemented.

- Meet annually, with each political subdivision, to identify new hazard mitigation strategies to be pursued on a state and regional basis, and review the progress and implementation of those programs already identified.

- Meet annually to review the progress of the Hazard Mitigation program and bring forth community input on new strategies.

- Coordinate with and support the efforts of the Yolo County Office of Emergency Services to promote and identify resources and grant money for implementation of recommended hazard mitigation Strategies within local jurisdictions and participating public agencies.

**Local Hazard Mitigation Planning Team**
Each participating local jurisdiction will establish a mechanism for the development and implementation of jurisdictional mitigation projects, as identified within this plan and associated locally-specific supporting documents. As deemed necessary and appropriate, participating jurisdictions will organize local mitigation planning teams or other groups to facilitate and administer internal activities.

Typically, the local planning team may consist of representatives from any of the following agencies or groups:

- Administrative departments and offices
- Public works departments
- Community planning and development departments
- Facility management agencies
- Fire departments
- Finance departments
- Public utility agencies
- Business development agencies
- Community service/Public service agencies

When constituted and organized, local hazard mitigation planning teams or entities may perform the following mitigation functions to meet local goals and objectives:

- Continue to review and assess local hazard mitigation needs and capacities in conjunction with this plan and other supporting documents and information
- Revise key local mitigation data and information
- Receive and process supplemental and supporting hazard mitigation reference information and guidance as released by the state and/or FEMA
- Provide guidance to local emergency management in the integration of adopted risk information and adjustments to local mitigation activities
- Provide local hazard mitigation information and guidance to resident populations, inquiring organizations, vendors, and other interested parties
- Provide information and guidance to the local governing body relative to hazard mitigation issues, needs, gaps, and project activities

**Long term Goals & Strategies**
The following represents long-term hazard mitigation goals and strategies as identified within the process of plan development, and as approved by the member jurisdictions and organizations constituting the Hazard Mitigation Plan Steering Committee.

**Goal #1**
Eliminate or reduce the long-term risk to human life and property from identified hazards.

**Goal #2**
Aid both the private and public sectors in understanding the risks they may be exposed to and finding mitigation strategies to reduce those risks.

**Goal #3**
Avoid risk of exposure to identified hazards.

**Goal #4**
Minimize the impacts of those risks when they cannot be avoided.

**Goal #5**
Mitigate the impacts of damage as a result of identified hazards.

**Goal #6**
Accomplish mitigation strategies in such a way that negative environmental impacts are minimized.

**Goal #7**
Distill local planning efforts and existing interagency group efforts into a comprehensive set of recommendations for Yolo Operational Area's long-term regional mitigation strategy. Mitigation is most successful when it grows from local and regional planning activities.

**Goal #8**
Provide a basis for funding priorities for the Hazard Mitigation strategies developed.

**Goal #9**
Establish a framework and database that the State and its political subdivisions may use to apply for State and Federal Hazard Mitigation Grants.

**Goal #10**
Establish an ongoing process to accomplish Hazard Mitigation Strategy identification on an annual basis. To be effective, mitigation must be a continuing activity.

**Goal #11**
Establish a regional platform to enable the community to take advantage of shared goals and resources and the availability of outside resources for minimizing vulnerability analysis and critical area risks.

**Capabilities Assessment**

The Yolo Operational Area Hazard Mitigation Steering Committee identified current capabilities available for implementing hazard mitigation activities. The Capability Assessment portion of the Operational Area mitigation plan identifies administrative, technical, legal and fiscal capabilities. This includes a generalized summary of departments and their responsibilities associated to hazard mitigation planning as well as codes, ordinances, and plans already in place associated to hazard mitigation planning. The second part of the Assessment provides Yolo Operational Area's fiscal capabilities that may be applicable to providing financial resources to implement identified mitigation action items.

**Existing Institutions, Plans, Policies and Ordinances**

The following is (1) a summary of existing positions their responsibilities related to hazard mitigation planning and implementation; and (2) a list of existing planning documents and regulations related to mitigation efforts within the Operational Area. The administrative and technical capabilities of each jurisdiction, as shown in the table below, 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 human-caused hazards, floodplain managers, surveyors, personnel with GIS skills and scientists familiar with hazards in the community.

**Administrative & Technical Capacity**

The following represents a generalized listing of identified administrative and technical capacities available to participating local and tribal governments that would support hazard mitigation activities.

**(Figure-1: Local Administrative & Technical Capacities)**

| Position | YCO | WLD | DAV | WSC | WIN | YDH | Dept/Agency |
|---|---|---|---|---|---|---|---|
| Planner(s) or engineer(s) with knowledge of land development and land management practices | √ | √ | √ | √ | √ | | Engineering, Planning, Redevelopment |
| Engineer(s) or professional(s) trained in construction practices related to buildings and/or infrastructure | √ | √ | √ | √ | √ | | Building Department |
| Planners or Engineer(s) with an understanding of natural and/or human-caused hazards | √ | √ | √ | √ | √ | | Engineering, Planning, Fire Marshal |
| Floodplain manager | √ | | | | | | Engineering, Public Works |
| Surveyors | √ | | √ | √ | | | |
| Staff with education or expertise to assess the community's vulnerability to hazards | √ | √ | √ | √ | √ | √ | Building, Fire, Engineering, Public Works |
| Personnel skilled in GIS and/or HAZUS | √ | √ | √ | √ | √ | | GIS Staff in Planning, GIS, Public Works |
| Scientists familiar with the hazards of the community | √ | √ | √ | √ | | | |
| Emergency manager | √ | √ | √ | √ | √ | √ | CAO; City Manager (EOC Director or Designee); Agency Director |
| Grant writers | √ | √ | √ | √ | √ | √ | Various Departments; local agencies |

**Regulatory Tools**

The legal and regulatory capabilities of each jurisdiction are shown in the table below, which presents the existing ordinances and codes that affect the physical or built environment of each jurisdiction. Examples of legal and/or regulatory capabilities can include: a jurisdiction's building codes, zoning ordinances, subdivision ordnances, special purpose ordinances, growth management ordinances, site plan review, general plans, capital improvement plans, economic development plans, emergency response plans, and real estate disclosure plans.

**(Figure-2: Local Regulatory Tools)**

| Regulatory Tools | YCO | WLD | DAV | WSC | WIN | YDH |
|---|---|---|---|---|---|---|
| Building code | √ | √ | √ | √ | √ | |
| Zoning ordinance | √ | √ | √ | | √ | |
| Subdivision ordinance or regulations | √ | √ | √ | | √ | |
| Special purpose ordinances (floodplain management, storm water management, hillside or steep slope ordinances, wildfire ordinances, hazard setback requirements) | √ | √ | √ | √ | √ | |
| Growth management ordinances (also called "smart growth" or anti-sprawl programs) | √ | √ | √ | √ | √ | |
| Site plan review requirements | √ | √ | √ | √ | √ | |
| General or comprehensive plan | √ | √ | √ | √ | √ | |
| A capital improvements plan | √ | √ | √ | | √ | |
| An economic development plan | √ | √ | √ | √ | √ | |
| An emergency response plan | √ | √ | √ | √ | √ | |
| A post-disaster recovery plan | | | | | | |
| A post-disaster recovery ordinance | | | | | | |
| Real estate disclosure requirements | √ | √ | √ | √ | √ | |
| Habitat Management Plan | √ | √ | √ | √ | √ | |
| Master Drainage, Sewer, Water, & Reclaimed Water | √ | √ | √ | √ | √ | |
| Redevelopment Master Plan | √ | √ | √ | | √ | |

**Fiscal Resources**

The table below shows specific financial and budgetary tools available to the jurisdictions 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.

**(Figure-3: Local Fiscal Resources)**

| Financial Resources | YCO | WLD | DAV | WSC | WIN | YDH |
|---|---|---|---|---|---|---|
| Community Development Block Grants | √ | √ | √ | √ | √* | |
| Capital improvements project funding | √ | √ | √ | √ | √ | |
| Authority to levy taxes for specific purposes | √ | √ | √ | √ | √** | |
| Fees for water, sewer, gas, or electric service | √ | √ | √ | √ | √ | |
| Impact fees for homebuyers or developers for new developments/homes | √ | √ | √ | √ | √ | |
| Incur debt through general obligation bonds | √ | √ | √ | √ | √** | |
| Incur debt through special tax and revenue bonds | √ | √ | √ | √ | √** | |
| Incur debt through private activity bonds | √ | √ | √ | √ | √** | |
| Withhold spending in hazard-prone areas | √ | √ | √ | √ | √ | |

* Subject to grant from State
** Subject to voter approval

# Element E: Plan Adoption

***Requirement §201.6(c)(5) [The plan shall include...] Documentation that the plan has been formally adopted by the governing body of the jurisdiction requesting approval of the plan (e.g., City Council, County commissioner, Tribal Council).***

## ELEMENT E.1 FORMAL ADOPTION DOCUMENTATION
## ELEMENT E.2 YOLO COUNTY OPERATIONAL AREA HAZARD MITIGATION PLAN

***Requirement §201.6(c)(5) [The plan shall include...] Documentation that the plan has been formally adopted by the governing body of the jurisdiction requesting approval of the plan (e.g., City Council, County commissioner, Tribal Council).***

The strategies presented are deemed appropriate and effective by recommendation of the Yolo Operational Area Hazard Mitigation Steering Committee, senior management of local and tribal governments and public agencies, and individual organizations and groups that have participate in its creation, or reviewed the end product.

Upon submission to the California Emergency Management Agency (Cal EMA) for review, and subsequent approval by the Federal Emergency Management Agency (FEMA), the approved plan will be presented to local and tribal governments, and public agency executive governance and leadership for formal adoption. As appropriate, adopted plans will then be incorporated into local general plans for integration into organizational policy.

**Implementation**
Upon approval and adoption by participating local and tribal government entities within the Yolo Operational Area, the prioritized mitigation strategies will be further developed for funding and implementation by the lead agencies. The plan describes the potential sources of Hazard Mitigation Strategy funding, and general procedures to obtain that funding.

The mitigation strategies represented and adopted within this plan are recommendations only, and must be approved and funded in order to be implemented as official mitigation solutions. Ultimately, it is the responsibility of jurisdictional and agency officials within the Yolo Operational Area to undertake project implementation based upon identified mitigation strategies, funding availability, and local need.

**Plan Maintenance**
The process of hazard mitigation does not end with the completion, approval, and adoption of this plan. Within the lifespan of this document (5 years), participating local and tribal governments, in conjunction with community-based organizations, will ensure that the mitigation goals and strategies identified are monitored, that plan administration will continue under a collaborative and cooperative umbrella, and that the document itself will be properly maintained.

The Yolo County Office of Emergency Services, as lead coordination agency for hazard mitigation planning within the Yolo OA, and will assist and support the ongoing collaborative efforts of local and tribal governments, through the established Hazard Mitigation Steering Committee.

Specific plan maintenance activities may include:

- Distribution of the Plan to all interested parties, including both written and digital formats
- Facilitation of regular Hazard Mitigation Steering Committee Meetings
- Monitoring of OA mitigation project activities and dissemination of status reports
- Generation of reports relative to plan status, project management, and revision updates to executive leadership
- Preparations for plan eventual revision and updating

# References

State of California Hazard Mitigation Plan (2010)

Yolo County General Plan (2030)

Yolo County General Plan, Safety Element (2030)

Yolo County Emergency Operations Plan

Yocha Dehe Wintun Nation Emergency Operations Plan - 2010

City of West Sacramento Critical Facilities List

City of West Sacramento Strategic Plan

City of West Sacramento 2011 – 2012 Operations Budget

City of West Sacramento Organizational Chart

City of West Sacramento Guide to City Services

City of West Sacramento General Plan

City of West Sacramento Emergency Operations Plan

City of West Sacramento Flood Plain Management Plan

City of Winters Emergency Operations Plan – 2010

City of Winters General Plan – 1992

City of Woodland Emergency Operations Plan – 2010

City of Woodland General Plan – 2002

City of Woodland Economic Development Strategic Plan Update – 2002
City of Davis Emergency Operations Plan

City of Davis General Plan – 2007

City of Davis Climate Action Adaptation Plan (CAAP) 2010

County of Yolo – FY 2011-12 Budget

Department of Finance Data, Yolo County 2012

California Fire Plan 2003

U.S. Geological Survey (USGS) *Summary of Floods and Droughts in the Southwestern States* (2004)

Origins and Development: A Chronology of Disasters in California, California Governor's office of Emergency Services

City-Data.com

Local Mitigation Plan Review Guide, Federal Emergency Management Agency, (2011)

Multi-Hazard Mitigation Planning Guidance under the Disaster Mitigation Act of 2000

FEMA How To Guide #1, Getting Starting: Building Support for Mitigation Planning

FEMA How-To Guide #2, Understanding Your Risks: Identifying Hazards and Estimating Losses

FEMA How-To Guide #3, Developing the Mitigation Plan: Identifying Mitigation Actions and Implementation Strategies

FEMA How-To Guide #4, Bringing the Plan To Life: Implementing the Hazard Mitigation Plan

FEMA How-To Guide #5, Using Benefit-Cost Review in Mitigation Planning

FEMA How-To Guide #6, Integrating Historic Property and Cultural Resource Considerations into Hazard Mitigation Planning

FEMA How-To Guide #7, Integrating Manmade Hazards into Mitigation Planning

FEMA How-To Guide #8, Multi-Jurisdictional Mitigation Planning

FEMA How-To Guide #9, Using the Hazard Mitigation Plan to Prepare Successful Mitigation Projects

Disaster Recovery and Mitigation Handbook, California Emergency Management Agency

# Legal Authorities

**Federal Laws**

- "The Federal Civil Defense Act of 1950"
- Public Law 96-342 "The Improved Civil Defense Act of 1980"
- Public Law 91-606 "Disaster Relief Act"
- Public Law 93-288 "The Robert T. Stafford Disaster Relief Act of 1974"
- Section 322, Mitigation Planning of the Robert T. Stafford Disaster Relief and Emergency Assistance Act
- Public Law 106-390 enacted by Section 104 of the Disaster Mitigation Act of 2000 (DMA)
- Interim Final Rule for DMA 2002 as published in the February 26,2002, at 44 CFR Part 201

**State Laws & Plans**

California Government Code, Section 3100, Title 1, Division 4, Chapter 4.
States those public employees are disaster service workers, subject to such disaster service activities as may be assigned to them by their superiors or by law. The term "public employees" includes all persons employed by the state or any county, city, city and county, state agency or public district, excluding aliens legally employed.

The law applies when:

- A local emergency has been proclaimed.
- A state of emergency has been proclaimed.
- A federal disaster declaration has been made.

This Section: Provides the basic authorities for conducting emergency operations following a proclamation of *Local Emergency*, *State of Emergency*, or *State of War Emergency*, by the Governor and/or appropriate local authorities, consistent with the provisions of this Act.

**The California Emergency Plan - Revised**

Promulgated by the Governor, and published in accordance with the Emergency Services Act, the Plan provides overall statewide authorities and responsibilities, and describes the functions and operations of government at all levels during extraordinary emergencies, including wartime. Section 8568 of the Act states, in part, that "...the State Emergency Plan shall be in effect in each political subdivision of the state, and the governing body of each political subdivision shall take such action as may be necessary to carry out the provisions thereof." Local emergency plans are, therefore, considered to be extensions of the California Emergency Plan.

**California Civil Code, Chapter 9, Section 1799.102**

This section of the California Civil Code provides for "Good Samaritan Liability" for those providing emergency care at the scene of an emergency. Specifically: "No person, who, in good faith and not for compensation, renders emergency care at the scene of an emergency, shall be liable for any civil damages resulting from any act or omission. The scene of an emergency shall not include emergency departments and other places where medical care is usually offered."

**State Hazard Mitigation Plan (SHMP) - 2010**
The State Hazard Mitigation Plan (SHMP) identifies policy, establishes goals, and stipulates actions associated with the implementation of enhanced hazard mitigation strategies for California. The SHMP is foundational for local government hazard mitigation planning efforts, and provides inter-organizational guidance and direction based upon established state agency actions and principles.

**Operational Area Governmental Authorities & Plans**
**Local Codes and Ordinances**
Local and tribal government codes, ordinances, and executive policies are identified within individual community information profiles, located in Section 2 of this plan.

**Yolo Operational Emergency Plans**
Local and tribal government emergency management plans and documents associated with hazard mitigation are identified in Section 2 of this plan.

# Appendices

## Community Profile Information
## Documentation of the Planning Process
## Hazus Modeling
## Formal Plan Adoption Documentation