



**Draft Hazard Mitigation Plan
August 2024**

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EXECUTIVE SUMMARY

Table of Contents

ES.1	Plan Requirements and Objectives.....	ES-1
ES.2	Mitigation Definition.....	ES-4
ES.3	Planning Process Summary	ES-5
ES.4	Hazard Analysis	ES-7
ES.5	Mitigation Strategies and Implementation Plan	ES-5
ES.6	Monitoring, Evaluating, and Updating the Plan	ES-11

List of Tables

Table ES.1: Zone 7 Hazard Ranking Summary	ES-7
Table ES.2: Loss Estimate Summary	ES-4
Table ES.3: Mitigation Action Summary	ES-7

ES.1 Plan Requirements and Objectives

Zone 7 Water Agency's (Zone 7) Hazard Mitigation Plan is a living document that reflects ongoing hazard mitigation activities. Hazard mitigation involves strategies to reduce short and long-term vulnerability to identified hazards. This document serves as the framework for the ongoing identification and implementation of hazard mitigation strategies developed for the Zone 7 Service Area.

In 2017, Zone 7 sought to develop a single-jurisdiction Local Hazard Mitigation Plan after taking part in a multi-jurisdictional hazard mitigation planning effort organized by the Association of Bay Area Governments. Zone 7 was successful and established its own Hazard Mitigation Plan in 2018. The current document serves as an update to that 2018 Plan.

Background Information

In 2000, the United States Congress determined that disasters and, more importantly, lack of preparedness for disasters, were significant causes of loss of life, human suffering, loss of income, and property damage. Furthermore, because disasters often disrupt the normal functioning of governments and communities and adversely affect individuals and families with great severity, special measures designed to assist the efforts of the affected States in expediting the rendering of aid, assistance, and emergency services, and the reconstruction and rehabilitation of devastated areas, were necessary. As a result, Congress passed the Disaster Mitigation Act of 2000 (DMA 2000), or Public Law 106-390, to amend the Robert T. Stafford Disaster Relief and Emergency Assistance Act. This provides an opportunity for States, Tribal governments, and local jurisdictions to apply for assistance from the Federal government in carrying out their responsibilities to alleviate the suffering and damage which results from such disasters by:

- a. revising and broadening the scope of existing disaster relief programs;
- b. encouraging the development of comprehensive disaster preparedness and assistance plans, programs, capabilities, and organizations by the States, local governments, and special districts;
- c. achieving greater coordination and responsiveness of disaster preparedness and relief programs;
- d. encouraging hazard mitigation measures to reduce losses from disasters, including development of land use and construction regulations; and

- e. providing Federal assistance programs for both public and private losses sustained in disasters.

DMA 2000 allows State, Tribal, and local jurisdictions to obtain Federal assistance through pre-disaster hazard mitigation planning. As part of the requirements for receiving Federal grants for improving a locality's resistance to disasters, each locality must determine their existing vulnerabilities and develop a plan to reduce or eliminate these vulnerabilities and must have this plan approved by the appropriate State and Federal officials. Upon approval of this plan, each locality is eligible to receive various types of disaster-related assistance through the Federal Emergency Management Agency's (FEMA) Hazard Mitigation Assistance (HMA) Program. This includes the Building Resilient Infrastructure and Communities (BRIC) program and Hazard Mitigation Grant Program (HMGP) which releases grant funds before and after a hazard event as well as the Flood Mitigation Assistance Grant (FMA) Program which appropriates funds for projects and planning that will reduce long-term risk of flood damage to structures insured under the National Flood Insurance Program (NFIP). Although Zone 7 is not the NFIP Flood Plain Manager, Zone 7 personnel can work with local Flood Plain Managers/cities to improve flood control.

The BRIC program provides funds for hazard mitigation planning and the implementation of mitigation actions prior to a disaster event. These grants are funded and approved through FEMA on a competitive basis. The HMGP provides grants to implement long-term hazard mitigation measures after a major disaster declaration. These grants are funded by FEMA but are distributed by the State. In California, that agency is the Governor's Office of Emergency Services (Cal OES).

FEMA has developed guidance to assist communities in developing both the vulnerability assessments and plans to reduce or eliminate their vulnerabilities to disasters. These tools, coupled with techniques from the safety and security industries were used to develop Zone 7's Hazard Mitigation Plan. Additional information regarding the HMGP and BRIC programs can be found in FEMA's "Hazard Mitigation Assistance Unified Guidance" document, located in [FEMA's Hazard Mitigation Planning portal](#). Additional information including guidance and regulations can be found at the [Cal OES's Local Hazard Mitigation Planning Program portal](#).

In order to be eligible for certain Federal disaster assistance and mitigation funding, Zone 7 is required to have a Cal OES- and FEMA-approved Hazard Mitigation Plan in place. Hazard Mitigation Plans are required to be updated every five years. As a result, Zone 7 initiated this update in December of 2022 to provide updated direction and guidance on implementing hazard mitigation actions on a hazard-level, probability, and

cost-priority basis. The overall goal of the Hazard Mitigation Plan is to reduce the potential for damage to critical assets from natural and man-made hazards. In addition, the plan describes past and current hazard mitigation activities and philosophies and outlines future mitigation goals and strategies.

FEMA Requirements

FEMA requires that the Hazard Mitigation Plan meet certain requirements. First, the planning process must be open and public, and must allow the public to have an opportunity to comment during the drafting stage and prior to plan approval. Second, the process must allow other local jurisdictions to be involved in the planning process. Third, the Plan must incorporate, if appropriate, existing plans, studies, reports, and technical information.

FEMA expects that each Hazard Mitigation Plan have the following information:

1. Documentation of the **planning process** used to develop the plan
2. A **risk assessment** that provides a factual basis for upgrades and recommendations
3. A **description of the natural hazards** that can affect the jurisdiction
4. A **description of the jurisdiction's vulnerability** to these hazards
5. A **description of land usage**, and an **estimate of losses** should a disaster occur
6. A **mitigation strategy**
7. A plan **maintenance process**
8. **Documentation** that the plan has been adopted by the jurisdiction's governing body
9. **Review** by the State Hazard Mitigation Officer

ES.2 Mitigation Definition

Mitigation is the ongoing effort to prevent or lessen future emergency or disaster incidents, and the impacts they might have on people, property, and the environment. Examples of mitigation activities include the following:

- Policies and procedures;
- Engineering and building policies;
- Hazard mitigation plans & teams;
- Technical guidance & assistance;
- Financial assistance;
- Hazard Identification;
- Risk Analysis;
- Evaluation;
- Research; and
- Education.

Mitigation decreases the demand for emergency response resources, reduces the principal causes of injuries and deaths, enables a quicker lifesaving response and economic recovery because the community infrastructure remains intact, and reduces the societal impacts of the emergency because it results in less disruption to the social environment. In essence, mitigation is the foundation of sustainable community development.

ES.3 Planning Process Summary

Hazard mitigation planning is a dynamic process built on realistic assessments of past and present information that enables Zone 7 personnel to anticipate future hazards and provide mitigation strategies to address possible impacts and identified needs. The overall approach to the Hazard Mitigation Plan included developing a baseline understanding of natural and man-made hazards, determining ways to reduce those risks, and prioritizing mitigation recommendations for implementation.

To complete these objectives, Zone 7 compiled a qualified team with various expertise, including Finance, Flood Protection Engineering, Water Supply Engineering, Administration, Integrated Planning, Safety, Maintenance, and Operations as well as local Fire personnel representatives to participate on a Steering Committee to guide the development of Zone 7's updated Hazard Mitigation Plan. Local Cities, Alameda County, first responders, and Zone 7's water retailers were also invited. In addition, the Steering Committee solicited public involvement throughout the planning process, including the release of a public survey through the Zone 7 website, allowing the public to comment during the drafting stage, and making the draft Plan available to allow the public to comment on its content.

Additionally, Zone 7 held a special planning meeting on December 15, 2023, to allow the Plan to be developed with specific concern for sensitive populations. It was determined that the cities and county deal directly with the identified vulnerable populations. Therefore, the Cities of Dublin, Livermore, and Pleasanton were invited to a Hazard Mitigation Plan meeting for an update on the process to date and to provide feedback. The Cities of Livermore and Pleasanton's Planning staff attended and provided feedback on vulnerable populations. In regards to gathering feedback from business and academia, The City of Livermore and City of Pleasanton's Chambers of Commerce Representatives, as well as the Director of Student Equity and Success of Las Positas College were invited to participate. To gather involvement from non-profit organizations who cater directly to vulnerable populations, the Education Director of Temple Beth Emek and Cedar Grove Community Church were invited to the planning meeting. It was determined that these organizations help vulnerable populations with resources, therefore making them valuable groups to garner participation from. Lastly, CityServe of the Tri-Valley Area was invited to the meeting as this organization deals specifically with members of the public who are classified as vulnerable due to cognitive and mobility issues.

Chapter 1: Planning Process and Appendix D contains descriptions of the Planning process, including information on the Steering Committee and public involvement.

ES.4 Hazard Analysis

Zone 7's Service Area is vulnerable to a wide range of natural and man-made hazards that threaten life and property. In order to identify the hazards that Zone 7 perceives as the largest threat, each member of the Steering Committee participated in the Hazard Identification Workshop during the first Steering Committee Meeting. The Steering Committee brainstormed potential hazards based on past incidents that have impacted the Service Area and information incorporated from other studies. Each identified hazard was then qualitatively ranked based upon hazard probability/frequency, consequence/severity, and Zone 7's overall vulnerability using an interactive model. Section 3.2 Hazard Identification contains detailed information regarding the hazard ranking. Table ES.1 provides a summary of the hazard ranking.

Table ES.1: Zone 7 Hazard Ranking Summary

Hazard Rank	
High	
None of the evaluated hazards ranked High	
Moderately High	
None of the evaluated hazards ranked Moderately High	
Moderate	
Flood/ Severe Storm	
Drought	
Moderately Low	
Wildfire	
Earthquake	
Infrastructure Failure	
Water Contamination	
Terrorism/Adversarial Events	
Utility Loss	
Dam Failure	
Low	
None of the evaluated hazards ranked Low	

Asset Inventory and Loss Estimates

In addition to the hazard profiles, the Risk Assessment contains a detailed asset inventory that lists Zone 7's assets, such as operations facilities, administration building, pipelines, and flood control channels. This asset inventory was used in the vulnerability assessment to estimate potential losses for each hazard. The Steering Committee reviewed each hazard and assigned a potential percentage of damage expected. This also included loss of function values for water service. Section 3.13 Loss Estimates, includes a detailed breakdown of the vulnerability assessment calculations.

Table ES.2: Loss Estimate Summary

Hazard	Estimated Losses
Water Contamination	\$1,236,900,000
Earthquake	\$367,336,000
Dam Release	\$274,430,000
Wildfire	\$93,422,000
Infrastructure Failure	\$53,996,000
Flood/ Severe Storm	\$53,402,000
Terrorism/ Adversarial Events	\$20,478,000
Utility Loss/ Public Safety Power Shutoff	\$10,285,000
Drought	\$9,267,000

Note: A total value is not included since it is not expected for all hazards to occur simultaneously.

Note: Values are rounded to the nearest thousand.

ES.5 Mitigation Strategies and Implementation Plan

Plan Goals and Objectives

As part of the development process, Plan goals and objectives were revalidated to provide a framework for mitigating hazards and proposing potential mitigation actions. The goals were developed by the Steering Committee and are consistent with the California State Hazard Mitigation Plan and the Alameda County Hazard Mitigation Plan. Zone 7's overall Plan goals are to:

- Protect Life and Property
- Improve Emergency Services and Management Capability
- Protect the Environment
- Promote Public Awareness and Outreach

In addition to the overall Plan goals, individual objectives were developed which support the overall Plan goals and translate more easily into mitigation actions. Section 4.1 Mitigation Goals and Objectives contains the full list of the Plan goals and objectives.

Mitigation Strategies

Mitigation strategies are administrative and/or engineering project recommendations to reduce the vulnerability to the identified hazards. The Steering Committee identified specific mitigation actions to reduce the impact or likelihood of the hazards that reflected the Plan goals and objectives.

Implementation Plan

Following the identification of mitigation actions, a simplified Benefit-Cost Review was applied in order to prioritize the mitigation actions for implementation. The priority for implementing mitigation actions depended upon the overall cost effectiveness of the action, when taking into account monetary and non-monetary costs and benefits associated with each action. Additionally, the following questions were considered when developing the Benefit-Cost Review:

- How many people will benefit from the action?
- How large of an area is impacted?
- How critical are the assets that benefit from the action?
- Environmentally, does it make sense?

The Benefit-Cost Review yielded a relative priority ranking (High, Medium, or Low) for each mitigation action. Each ranking is defined as follows.

- High: Benefits are perceived to exceed costs without further study or evaluations; or the action is critical.
- Medium: Benefits are perceived to exceed costs but may require further study or evaluation prior to implementation.
- Low: Benefits and costs require evaluation prior to implementation.

Mitigation actions identified as high priority are typically implemented before lower ranked actions. Results from the Benefit-Cost Review are located in Chapter 4.4 Prioritization of Mitigation Recommendations. It should be noted, that while the steering committee proposed certain mitigation actions and strategies, implementation of these actions are contingent upon being appropriately authorized. The steering committee evaluated projects at a high level, many of which are still conceptual and are not included in Zone 7's current approved budget. Implementation of the mitigation actions and recommendations proposed herein is subject to available funding and project authorization.

Chapter 4 Mitigation Strategies contains additional information regarding the mitigation strategies and implementation plan. Table ES.3 on the following pages provides a summary of each mitigation action, including the hazard(s) mitigated, responsible department, and relative priority rank taken from the Benefit-Cost Review. All mitigation actions listed in this plan are the entirety of actions considered and chosen. The Steering Committee identified gaps in resilience efforts and created a mitigation action for each of the gaps identified. No mitigation actions were considered and then omitted from this plan.

Table ES.3: Mitigation Action Summary

Action ID	Mitigation Action	Hazards Mitigated	Responsible Department	Priority
HMP.2023.01	Initiate a study to investigate opportunities for cross-functional and multi-benefit mitigation projects that achieve benefits in the areas of flood protection, drinking water quality and supply, environmental and habitat quality, regional economic impacts, and other social and public health effects. Develop a framework for quantifying individual projects and multi-project benefits and conduct a feasibility study to develop a multi-hazard mitigation program.	Multi-Hazard	Integrated Planning/ Engineering/ Operations	High
HMP.2023.02	Implement flood protection, conjunctive water management, and water supply infrastructure projects emphasizing multi-benefit hazard mitigation projects.	Drought, Flood/ Stormwater	Integrated Planning/ Engineering/ Flood Protection/ Groundwater	High
HMP.2023.03	Conduct studies and implement projects that leverage the Chain of Lakes to reduce service area flood risk, increase water supply resilience to drought conditions, and contribute to increased resilience of groundwater production facilities to power disruptions.	Drought, Flood/ Stormwater, Utility Loss	Integrated Planning/ Engineering	High
HMP.2023.04	Rehabilitation of select flood protection facilities to improve the resilience of flood water management infrastructure.	Flood/ Stormwater	Flood Protection	High
HMP.2023.05	Consider construction of additional flood attenuation basins throughout the region.	Flood/ Stormwater	Flood Protection	Medium
HMP.2023.06	Continue implementation of a redundant and resilient SCADA, computer, and communication networks to protect critical infrastructure/operations and better respond to cyber threats.	Infrastructure Failure/ Adversarial events	Engineering/ Operations	High

Action ID	Mitigation Action	Hazards Mitigated	Responsible Department	Priority
HMP.2023.07	Continue investment and implementation of capital projects to improve water treatment capabilities and address emerging and identified contaminants including PFAS.	Infrastructure Failure/ Water Contamination	Engineering	High
HMP.2023.08	Improve engagement and participation with the Department of Water Resources regarding DWR dam safety, including EAP participation and tabletop exercises and consider mitigation projects.	Dam Failure	Integrated Planning	High
HMP.2023.09	Research new opportunities and refresh existing contracts to expand the range of mutual aid agreements which could bolster emergency response efforts (i.e., diesel providers) in the event of a disaster and secure new support agreements.	Multi-Hazard	Engineering/ Operations/ Flood Protection	Medium
HMP.2023.10	Evaluate past hazard events and subsequent responses to identify areas of organizational and operational improvement as well as possible mitigation actions.	Multi-Hazard	Operations/ Emergency Staff	Medium
HMP.2023.11	Continue and enhance public outreach campaigns. Consider using social media, leveraging local partnerships, and materials prepared by specialist groups in order to maintain cost efficiency.	Multi-Hazard	Engineering/ Operations/ Flood Protection	Medium
HMP.2023.12	Procure redundant materials/equipment and improve procurement procedures to be used during an emergency to allow for a speedier recovery.	Multi-Hazard	Engineering/ Operations/ Flood Protection	Medium
HMP.2023.13	Initiate structural upgrade projects to mitigate the effects of an earthquake. Projects might include installation of earthquake resistant piping, retrofits for water-retention structures, and/or the addition of portable facilities to allow pipeline to bypass failure zones	Earthquake	Engineering/ Operations/ Flood Protection	High
HMP.2023.14	Participate in wildfire planning and safety efforts to protect Zone 7 facilities and the local watershed.	Wildfire	Engineering/ Operations/ Flood Protection	Medium

Action ID	Mitigation Action	Hazards Mitigated	Responsible Department	Priority
HMP.2023.15	Identify critical elements within the water system where process redundancies don't exist, and implement projects that will allow water service to continue even when critical equipment is offline	Infrastructure Failure	Engineering/ Operations/ Flood Protection	High
HMP.2023.16	Continue communications and educate local retailers on water availability and system limitations/capabilities during disaster events so they can, in turn, prepare and lead the public when water supply is unavailable due to system failure or interruption.	Infrastructure Failure	Engineering/ Operations	Medium
HMP.2023.17	Continue current public outreach campaigns regarding water conservation and flood events.	Drought, Flood/ Stormwater	Engineering/ Operations/ Integrated Planning	Medium
HMP.2023.18	Continue to study the effects of drought on long-term water supply reliability, engage in regional efforts to increase supply reliability and develop new supply sources, and make strategic investments that increase water supply reliability and resilience within the service area.	Drought	Engineering/ Operations /Integrated Planning	High
HMP.2023.19	Consider investments in energy system reliability and resilience to minimize the potential impacts of utility system outages	Utility Loss	Integrated Planning/ Engineering/ Operations	Medium
HMP.2023.20	Continue existing modeling efforts and embark on new modeling efforts. This includes modeling focused on groundwater, water supply, flood protection, and watersheds and risks posed to each category.	Flood/ Stormwater, Drought	Engineering/ Flood Protection	High
HMP.2023.21	Improve coordination with local Law Enforcement Agencies to improve reaction to security issues/ threats.	Adversarial/ Human-Caused Events	Operations/ Administration	High
HMP.2023.22	Update security features accordingly for assets identified as most vulnerable to a security breach.	Adversarial/ Human-Caused Events	Operations/ Administration	High

Action ID	Mitigation Action	Hazards Mitigated	Responsible Department	Priority
HMP.2023.23	Update the Emergency Response Plan to include specific actions for Zone 7 personnel should an adversarial event occur.	Adversarial/ Human-Caused Events	Operations/ Administration	Medium
HMP.2023.24	Consider opportunities to utilize innovative and nature-based solutions that provide complementary environmental and flood risk reduction benefits, such as projects that improve resilience of flood channels to the impacts of high stage and velocity during storm events while enhancing natural processes and channel habitats within the region.	Flood/ Stormwater, Drought	Integrated Planning/ Engineering/ Operations	High
HMP.2023.25	Consider opportunities to leverage ecosystem services to mitigate hazard risk and provide co-benefits within the community, such as projects that contribute to improved water quality, groundwater recharge, improved habitat quality, and that support complementary recreational and aesthetic opportunities	Flood/ Stormwater, Drought	Integrated Planning/ Engineering/ Operations	High

ES.6 Monitoring, Evaluating, and Updating the Plan

The Hazard Mitigation Plan is a living document that reflects ongoing hazard mitigation activities and requires monitoring, evaluating, and updating to ensure mitigation actions are implemented. Zone 7 anticipates updating its Hazard Mitigation Plan as needed for major revisions or in five years (the current update interval required by FEMA). Chapter 5: Plan Maintenance outlines the update requirements and planning mechanisms Zone 7 has in place for ongoing hazard mitigation.

1 PLANNING PROCESS

Table of Contents

1.1	Narrative Description of the Planning Process	1-1
1.2	Steering Committee & Public Involvement	1-6
1.2.1	Steering Committee Participant Solicitation	1-6
1.2.2	Steering Committee Participants	1-6
1.2.3	Steering Committee Meeting Descriptions	1-9
1.2.4	Public Meetings & Outreach	1-13
1.3	Review and Incorporation of Existing Plans.....	1-14

List of Tables

Table 1.1:	Steering Committee Participants.....	1-7
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1.1 Narrative Description of the Planning Process

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

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

§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 planning is a dynamic process built on realistic assessments of past and present information to anticipate future hazards and provide meaningful strategies to address possible impacts and identified needs. The hazard mitigation planning process involves the following tasks.

- Organizing resources
- Assessing risks
- Developing mitigation strategies, goals, and priorities
- Adopting a plan
- Implementing the plan
- Monitoring progress
- Revising the plan as necessary



The overall approach to updating the Hazard Mitigation Plan (HMP) includes building off of the baseline understanding of the hazards as defined in the 2018 HMP and determining ways to continue reducing those risks and prioritizing those recommendations for

implementation. The following task descriptions provide a detailed narrative of the overall project progression.

Organize Resources

Identify Stakeholders and Compile Steering Committee

Zone 7 Water Agency (Zone 7) staff set out to organize an HMP Steering Committee comprised of;

- Representatives from local and regional agencies,
- Internal and external representatives involved in Zone 7 infrastructure development,
- Representatives from neighboring communities,
- Representatives from local private businesses and academia, and
- Non-profit organizations.

The Steering Committee would be responsible for providing essential insight into past hazard events, current hazard vulnerability (including specific locations), critical assets, vulnerable populations and possible mitigation projects. Although participation was limited due to personnel availability, varying levels of interest and a dynamic regulatory environment, the following groups were invited via email to participate in the plan development:

- Key Zone 7 Personnel (Finance, Flood Protection Engineering, Water Supply Engineering, Administration, Groundwater, Integrated Planning, Safety, Maintenance, and Operations)
- Local Fire Departments
- Alameda County (Sheriff's Office, General Services Administration)
- Local Planning Jurisdictions
- Local Chambers of Commerce
- Local College and Religious Organizations
- Water Retailers/City Personnel

Details regarding invited representatives can be found in Appendix D.

Identify Hazards

This task was designed to identify the natural and man-made hazards that *might* affect Zone 7 and then narrow the list to the hazards that are most likely to occur. The hazards included natural, technical, and human-caused events, with an emphasis on the effect of disasters on Zone 7's critical assets. To compile the list, the Steering Committee built upon the list of hazards identified in the 2018 HMP and then continued to research news articles, historical records, and websites to determine any additional hazards. In addition, the Steering Committee reviewed a list of hazards that have affected Zone 7 in the past with specific information regarding frequency, magnitude, and associated consequences. A Hazard Identification Workshop was conducted during the first Steering Committee Meeting to identify and evaluate each selected hazard. The following hazards were included in the HMP:

- Flood/Severe Storm
- Drought
- Wildfire
- Earthquake
- Infrastructure Failure
- Water Contamination
- Terrorism/Adversarial Events
- Utility Loss
- Dam Failure

This list does not include all the hazards discussed during the Hazard Identification Workshop. Hazards not thought to pose significant risk to Zone 7 were not included in this Plan. In addition, some items were captured as sub-items of the hazards listed above. For example, climate change is discussed with hazards where the impact of changes in weather patterns could act as a catalyst for those scenarios (i.e., Flooding, Wildfire and Drought).

Profile Hazard Events

The hazard event profiles consist of either a map indicating the area impacted by each hazard or an important piece of data regarding the characteristics of hazard events within

Zone 7 and the surrounding area. To update the detailed hazard profiles, the Steering Committee researched and reviewed relevant open-source hazard studies and mapping projects. This task determined the hazard magnitude, frequency, and location characteristics (e.g., predicted ground acceleration values, fault locations, flood plains, etc.) that were used as the design-basis for the loss estimates and hazard ranking.

Asset Inventory

The purpose of this task was to determine the quantity of Zone 7 assets that lie in the different hazard areas and what proportion of the service area this represents. The asset inventory was completed by reviewing a list of Zone 7 assets from the 2018 HMP during a Steering Committee meeting and including any new or recently acquired facilities.

The completed asset inventory enabled the Steering Committee to estimate losses resulting from hazard events and to determine where resources should be allocated to address mitigation issues.

Loss Estimates

The Steering Committee developed loss assessment tables for each specific hazard which identifies potential damage to Zone 7's assets and service losses. This task was crucial in determining which assets are subject to the greatest potential damage and which hazard event is likely to produce the greatest potential losses. The conclusion of this task precipitated a comprehensive loss estimate (vulnerability assessment) for each identified hazard for each specific asset in terms of damages, economic loss, and the associated consequences.

Mitigation Strategy Development

Development of Mitigation Goals and Objectives

For each of the hazard events, mitigation goals and objectives were developed with the intention of reducing or eliminating the potential hazard impacts. The mitigation goals and objectives were developed at a Steering Committee meeting to provide the basis for determining the mitigation projects listed in Table 4.1.

Identify and Prioritize Mitigation Actions

Mitigation strategies are administrative and/or engineering project recommendations to reduce the vulnerability to the identified hazards. The diverse experience and perspective of Steering Committee members was invaluable to develop strategies and projects that will mitigate the hazards cost-effectively, as well as ensure consistency with Zone 7's long-term mitigation goals and capital improvements. The Steering Committee utilized a team-based approach to brainstorm mitigation projects based on the identified hazards and associated loss estimates. The evaluation and prioritization of the mitigation actions produced a list of recommended mitigation actions to incorporate into the HMP. The Steering Committee also conducted a Benefit-Cost Review for each proposed mitigation action to determine the relative priority level of the recommendation.

Implementation & Monitoring

Preparation of Implementation Strategy

The Steering Committee developed an action plan to detail how mitigation recommendations will be prioritized, implemented, and administered by Zone 7. During the HMP creation process, the Steering Committee determined the mitigation project implementation strategy (including identifying responsible departments, funding resources, and estimated implementation timeframe).

1.2 Steering Committee & Public Involvement

While Zone 7 and Risk Management Professionals had lead responsibility for the update of the HMP, neighboring communities, agencies, businesses, and other interested parties were invited to participate on the Steering Committee to review the HMP during document development. Each participating member of the Steering Committee had the opportunity to impact all aspects of the planning process. In addition, Zone 7 and Risk Management Professionals personnel solicited community involvement and engagement through the use of a public survey



1.2.1 Steering Committee Participant Solicitation

Zone 7 solicited participation in the HMP Steering Committee by contacting both internal and external stakeholders. Internal stakeholders included members of the various departments. External stakeholders were comprised of representatives from local agencies.

1.2.2 Steering Committee Participants

Zone 7 staff invited a total of 12 outside agencies and 16 internal staff to participate in the Steering Committee. The internal staff represented personnel from Water Supply Engineering, Flood Protection Engineering, Operations, Safety, Maintenance, Water Quality, Groundwater, Finance and Integrated Planning sections to ensure the Steering Committee included members with a variety of backgrounds. Ultimately, the Steering Committee consisted of 14 individuals who are listed in Table 1.1, two of whom served on the Steering Committee for Zone 7's 2018 Hazard Mitigation Plan. Additionally, Zone 7 compiled historical hazard data, provided relevant planning documents for incorporation into the HMP, and coordinated participation with the public through a survey. Each draft chapter was reviewed by the Steering Committee and specific comments and input were incorporated into the Plan. The multidisciplinary Steering Committee enabled Zone 7 to work together and incorporate each individual's expertise, which provided for a more comprehensive HMP.

Table 1.1: Steering Committee Participants

Name	Affiliation	Title	SCM 1	SCM 2	SCM 3	SCM 4	SCM 5
Bray, Ryan	Risk Management Professionals	Project Coordinator	X	X	X	X	X
Carney, James	Zone 7 Water Agency	Water Resources Planner	X	X	X	X	X
Foss, Lizzie	Zone 7 Water Agency	Financial Analyst	X	X	X		
Gould, Rich	Zona 7 Water Agency	Operations Manager	X	X	X	X	X
Green, JaVia	Zone 7 Water Agency	Financial Analyst	X	X	X	X	
Miller, Michael	Zone 7 Water Agency	Maintenance Manager	X				X
Minn, Ken	Zone 7 Water Agency	Groundwater/ Integrated Planning Manager	X			X	
Olmsted, Mona	Zone 7 Water Agency	Principal Engineer	X	X	X	X	X
Padway, Kevin	Zone 7 Water Agency	Water Resources Planner	X	X	X	X	X
Rank, Elke	Zone 7 Water Agency	Water Resources Planner	X	X	X	X	X
Segura, Sal	Zone 7 Water Agency	Associate Civil Engineer	X	X	X	X	X
Slimick, Breanne	Alameda County Fire Department	Public Education Assistant	X		X	X	X

Name	Affiliation	Title	SCM 1	SCM 2	SCM 3	SCM 4	SCM 5
Tang, Jeff	Zone 7 Water Agency	Associate Civil Engineer		X	X	X	
Winey, Collen	Zone 7 Water Agency	Associate Geologist	X	X	X	X	

The Steering Committee met five times over the course of the project to discuss project progress and obtain valuable input and information for documenting the HMP. The scope of these meetings is detailed over the next subsequent pages. Also, Appendix D – Public Participation contains copies of the presentations used at each meeting, specific meeting handouts, and attendance records.

1.2.3 Steering Committee Meeting Descriptions

Steering Committee Meeting #1 – Project Initiation and Hazard Identification

Date: February 23, 2023

During the Project Initiation, and Hazard Identification Meeting, Risk Management Professionals gave an overview presentation that detailed the objectives and scope of the project. After a review of the project schedule and key tasks, the Steering Committee participants’ areas of expertise, resultant member responsibilities, and community participation methods were discussed.

The Steering Committee Meeting also served as a mechanism to determine the hazards the Plan would profile in detail. To effectively characterize Zone 7’s risk and vulnerability, Risk Management Professionals facilitated a discussion of the historical hazards with the Steering Committee members during this meeting. This meeting also served as a forum to discuss any background information and obtain asset inventory specifics.

The Steering Committee determined the initial hazard profile ranking through a facilitated exercise using an automated, interactive spreadsheet that asked specific questions regarding potential hazards and then assigned a relative value to each potential hazard, accordingly, assigning numerical rankings (1-5) for the following criteria:

- **Consequence/Severity** – How widespread is the impact area?

Example Hazard Ranking Worksheet

HAZARD IDENTIFICATION AND RISK RANKING			
	Hazard Rank Factors	Hazard Factor Description	Rank
Earthquake	Probability/Frequency		0
	Consequence/Severity		0
	Vulnerability	Probable event - not applicable due to geographic location characteristics	0
	Risk Rank	Rare event - occurs less than once every 50 years	0
	Comments	Uncommon event - occurs between once every 10 years and once every 50 years (inclusive) Regular event - occurs between once a year and once every 7 years Frequent event - occurs more than once a year	
Wildfire	Hazard Rank Factors		
	Probability/Frequency		0
	Vulnerability		0
	Consequence		0
	Risk Rank	Not a Hazard	0
Flood	Hazard Rank Factors		
	Probability/Frequency		0
	Vulnerability		0
	Consequence		0
	Risk Rank	Not a Hazard	0

- **Secondary Effects** – Could the event trigger another event and separate response?
- **Probability/Frequency** – Historical view of how often this type of event occurs locally and projected recurrence intervals.
- **Warning/Onset** – Advance warning of the event, or none.
- **Duration** – Length of elapsed time where response resources are active.
- **Recovery** – Length of time until lives and property return to normal.

Chapter 3: Risk Assessment outlines the methodology used for hazard rankings.

Steering Committee Meeting #2 – Planning Goals and Objectives

Date: March 20, 2023

During the second Steering Committee meeting, the Plan’s mitigation goals and objectives were updated with the intention of reducing or eliminating the potential hazard impacts, which also provided the basis for determining the associated mitigation projects. The Steering Committee reviewed the goals and objects from the 2018 HMP, the California State Multi-Hazard Mitigation Plan, and the Alameda County Hazard Mitigation Plan as a baseline for determining Zone 7’s current mitigation goals and objectives.

Lastly, during this first meeting, the asset inventory was developed to determine the quantity of buildings, facilities, and other assets in the service area that lie in the different hazard areas and what proportion of the service area this represents. The asset inventory included locations and specifications for general buildings: well sites, administration buildings, reservoirs, water treatment plants, piping, and flood channels. The asset inventory was reviewed with the Steering Committee for completeness and assignments were given to those who could retrieve missing information.

Steering Committee Meeting #3 – Asset Inventory and Vulnerability Assessment

Date: April 10, 2023

As part of the third Steering Committee meeting, the completed asset inventory was used to develop loss estimates for all identified hazard scenarios. The hazard probabilities and recurrence intervals were applied to Zone 7 assets to determine which assets were subject to the greatest potential damages and which hazard events were likely to produce the greatest potential losses.

Additionally, each Steering Committee participant was given a Mitigation Activity Identification worksheet to document potential projects to be discussed during Steering Committee Meeting #3.

Steering Committee Meeting #4 – Mitigation Action Identification

Date: April 24, 2023

The purpose of the fourth meeting was to identify potential mitigation actions and projects that will reduce the impact of identified hazards. First, the mitigation goals and objectives from Steering Committee Meeting #1 were reviewed and validated. Then, the Steering Committee participants brainstormed possible projects and actions to mitigate the effects of the identified hazards. This was done using the hazard profiles and asset-specific loss estimates as starting points.

As the mitigation projects were identified, the Steering Committee discussed the mitigation action implementation plan according to the following characteristics:

- Mitigation Action Category – Prevention, Property Protection, Public Education and Awareness, Natural Resource Protection, Emergency Services, and Structural Projects
- Corresponding Goals and Objectives
- Responsible Department – Operations, Safety, Water Supply Engineering, Administration, Flood Protection Engineering, Integrated Planning, etc.
- Resources – Operating budget, Grant Programs, Staff Time, Capital Improvements Fund, etc.
- Implementation Timeframe – Ongoing, Short-Term (within two years), Medium-term (between three and ten years), and Long-Term (greater than ten years)
- Whether or not the project protects new or future facilities

A list of the mitigation strategies can be found in Chapter 4.

Steering Committee Meeting #5 – Benefit-Cost Review

Date: May 3, 2023

During the final Steering Committee meeting, the team performed a high-level Benefit-Cost Review on each of the identified mitigation actions. The review consisted of identifying all benefits and costs associated with implementing each mitigation action. Typical benefits include:

- Avoided physical damages (e.g., to buildings, infrastructure, and equipment)
- Avoided loss of function costs (e.g., loss of utilities and lifelines)
- Avoided casualties
- Avoided emergency management costs (e.g., emergency operations center costs, evacuation/rescue costs, and other management costs)

Example FEMA Benefit-Cost Analysis

Actions	Benefits (Pros)	Costs (Cons)	Priority
Floodproof 10 businesses in the downtown area	<ul style="list-style-type: none"> - Avoidance of 1 loss of life every 20 years (casualties reduced by half) - Saving of \$90,000 in private damages and \$5,000 in public cost - Loss of use of 10 downtown businesses completely eliminated - Community's problem of business interruption solved - Federal grants like FMA and FDM can be applied for to implement the proposed floodproofing - Will help improve CRS rating in the long term (so entire community's flood insurance premium will be reduced) - More than half the members of the City Council are opposed to buy-outs; it might be easier to get their support for an alternative to buy-outs 	<ul style="list-style-type: none"> - Floodproofing cost = \$10,000 X 10 = \$100,000 - Need at least 3 people to administer (after obtaining technical assistance from the State) - Need a year to implement 	High (Priority no. 1)
Build safe rooms for a neighborhood of 50 homes without basements	<ul style="list-style-type: none"> - Avoidance of 5 lives lost every 20 years (casualties reduced by half) - Public and political support for mitigating this hazard exists (due to regular recurrence of tornadoes) 	<ul style="list-style-type: none"> - City will share 50% of the cost per existing home = \$2,000 X 50 = \$100,000 - Administrative cost per home = \$1,000 X 50 = \$50,000 - Need 3 years to complete - Tornadoes are unpredictable; they may never strike this exact area again 	Medium (Priority no. 2)
Broadcast educational video on local channel on hazard mitigation	<ul style="list-style-type: none"> - Local channel might be willing to broadcast free of cost - Publicity would spread awareness about mitigation methods as well as what to do in an emergency 	<ul style="list-style-type: none"> - Cost of preparing video = \$5,000 - Only 5% of population might notice the broadcast - Only 5% of that 5% might actually consider acting on individual mitigation methods 	Low (Priority no. 3)

Once the benefits and costs were estimated, a relative priority was assigned for each action based upon the evaluation.

1.2.4 Public Meetings & Outreach

The Disaster Mitigation Act of 2000 requires an “Open and Public Process” for developing the HMP. This process requires, at a minimum, the public be allowed to comment on the HMP during the drafting phase and prior to adoption. To meet this requirement, Zone 7 published a survey to allow for public comment during the drafting stage of the HMP prior to submittal of the Plan for California Governor’s Office of Emergency Services (Cal OES) and Federal Emergency Management Agency (FEMA) review. Zone 7 actively solicited public involvement through its website. In May 2023, Zone 7 invited the public to participate in a hazard mitigation survey which was advertised via the an



advertisement on Zone 7’s website and social media posts. The survey assessed the community’s level of concern with various hazards and the steps each respondent had taken to prepare for a disaster.

Members of the public were also able to provide direct input for HMP development via a public workshop to review the HMP during the approval stage and provide comments. The Draft HMP was provided on the Zone 7 website 30 days prior to the public workshop to allow the public to review the document before providing comments.

Lastly, Zone 7 held a special planning meeting on December 15, 2023 to solicit additional feedback regarding sensitive populations for the specific purpose of learning more about the way Zone 7 can improve its efforts to more-effectively serve those who experience the impacts of hazard events to a great extent. Non-profit, local business, educational, and local jurisdictional representatives were asked to participate so that a fresh perspective to allow the plan to be developed in such a way that concern for sensitive populations would be an intrinsic part of the plan. The result of the meeting demonstrate that local emergency planning and resiliency efforts of the organizations within the service area of Zone 7 assume resilient water supply. Specifically, the efforts outlined in the Tri-Valley Local Hazard Mitigation Plan representing the cities of Dublin, Livermore, Pleasanton, and the Dublin San Ramon Services District were examined for alignment. For each initiative, reliance on Zone 7 water resource supply was critical to providing ongoing hazard mitigation service to sensitive populations, the public at large, and infrastructure.

Additional documentation regarding public involvement is provided in Appendix D.

1.3 Review and Incorporation of Existing Plans

In developing Zone 7's HMP update, the Steering Committee reviewed existing plans (detailed below) and incorporated relevant information into the planning efforts.

2018 State of California Hazard Mitigation Plan

The State Hazard Mitigation Plan was reviewed to ensure consistency between the State and Zone 7 Plan, with respect to identified hazards and vulnerability, goals and objectives, and mitigation actions. The State goals served as the basis for developing the goals at the Agency level. Zone 7 goals and objectives are outlined in Chapter 4.

2021 Alameda County Local Hazard Mitigation Plan

Like the California Hazard Mitigation Plan (2021), the Alameda County Local Hazard Mitigation Plan was reviewed to ensure consistency between the County and Zone 7 Plan. County goals served as a basis for developing Zone 7's goals (along with the State). Additionally, methods described in the Risk Assessment of the County's Plan were utilized in Zone 7's Risk Assessment.

2018 Zone 7 Hazard Mitigation Plan

Zone 7's 2018 Hazard Mitigation Plan was the basis for this plan update, crucial in comparing the previous mitigation ideas and attitudes to Zone 7's current needs and concerns. The project team referred to this plan constantly throughout the updating process. The Plan provides insight into hazard ranking, hazard history, previously proposed mitigation projects, etc.

Zone 7 Planning Documents

The Steering Committee was guided by multiple Zone 7 planning documents and studies on file. This includes, but is not limited to, Zone 7's Asset Management Plan, 2020 Urban Water Management Plan, Capital Improvement Program, Water Supply Evaluation, Strategic Plan, and Emergency Response Plan.

2020 California Adaptation Planning Guide

FEMA, Cal OES, and the California Natural Resources Agency developed the California Adaptation Planning Guide to assist municipalities in recognizing local climate change and to provide guidance addressing potential vulnerabilities. The information was used to develop potential hazards and to provide background information that allowed the Steering

Committee to make educated decisions regarding mitigation actions designed to alleviate the effects of climate change.

Tri-Valley Hazard Mitigation Plan

A partnership between the cities of Dublin, Livermore, Pleasanton, and the Dublin San Ramon Services District, this Hazard Mitigation Plan includes considerations for hazard awareness and potential actions to support sensitive populations within the Zone 7 service area. It's planning initiatives and projected projects provided insight into the role Zone 7 plays in regional resiliency effort.

2 PLANNING AREA PROFILE

Table of Contents

2.1	Service Area Description	2-1
2.2	Development Trends	2-3
2.3	Population	2-6

List of Tables

Table 2.1:	Land Use Designations.....	2-5
Table 2.2:	Population Data and Projection Estimates	2-6

List of Figures

Figure 2.1:	Zone 7 Water Agency Service Area Map.....	2
Figure 2.2:	Zone 7 Water Agency Flood Control Facilities	4

2.1 Service Area Description

The Zone 7 Water Agency (Zone 7) was created on June 18, 1957, in order to localize control of flood protection and water resource management in eastern Alameda County. Through a board of locally elected directors, Zone 7 provides flood and stream management, groundwater management, wholesale treated drinking water supplies for approximately 266,000 people. The treated drinking water supplies are provided to the end user through four “water retailers” comprised of Dublin San Ramon Services District, California Water Service, the City of Pleasanton, and the City of Livermore. Additionally, Zone 7 provides untreated water to a number of wineries, agricultural businesses, and recreational industry customers with water supplied directly from the South Bay Aqueduct (SBA). Zone 7 is located 40 miles southeast of San Francisco and has a total service area of 425 square miles.

Zone 7 receives its water supply through three primary sources: imported surface water from the State Water Project (SWP) via the SBA, local runoff from Arroyo del Valle, and water stored in the local groundwater basin. SWP water makes up the majority of Zone 7’s water supply and is either treated at one of Zone 7’s treatment plants, served directly to untreated water customers, or stored for later use in the local groundwater basin, or ground water banks in Kern County. Zone 7 shares water rights for available flows on the Arroyo del Valle (a local creek) with Alameda County Water District, and runoff is captured in Lake Del Valle under an agreement with the Department of Water Resources.

As stated in the 2020 Zone 7 Water Agency Urban Water Management Plan, Zone 7’s service area climate can be described as Mediterranean; characterized by hot, dry summers and cool, mild winters with monthly average temperatures ranging from 47° to 70° throughout the year. The service area is subject to wide variations in annual rainfall; typically peaking in the winter months at 3.36 inches and dropping to 0.09 inches in the summer.

The map on the following page provides an overview of Zone 7’s service area.

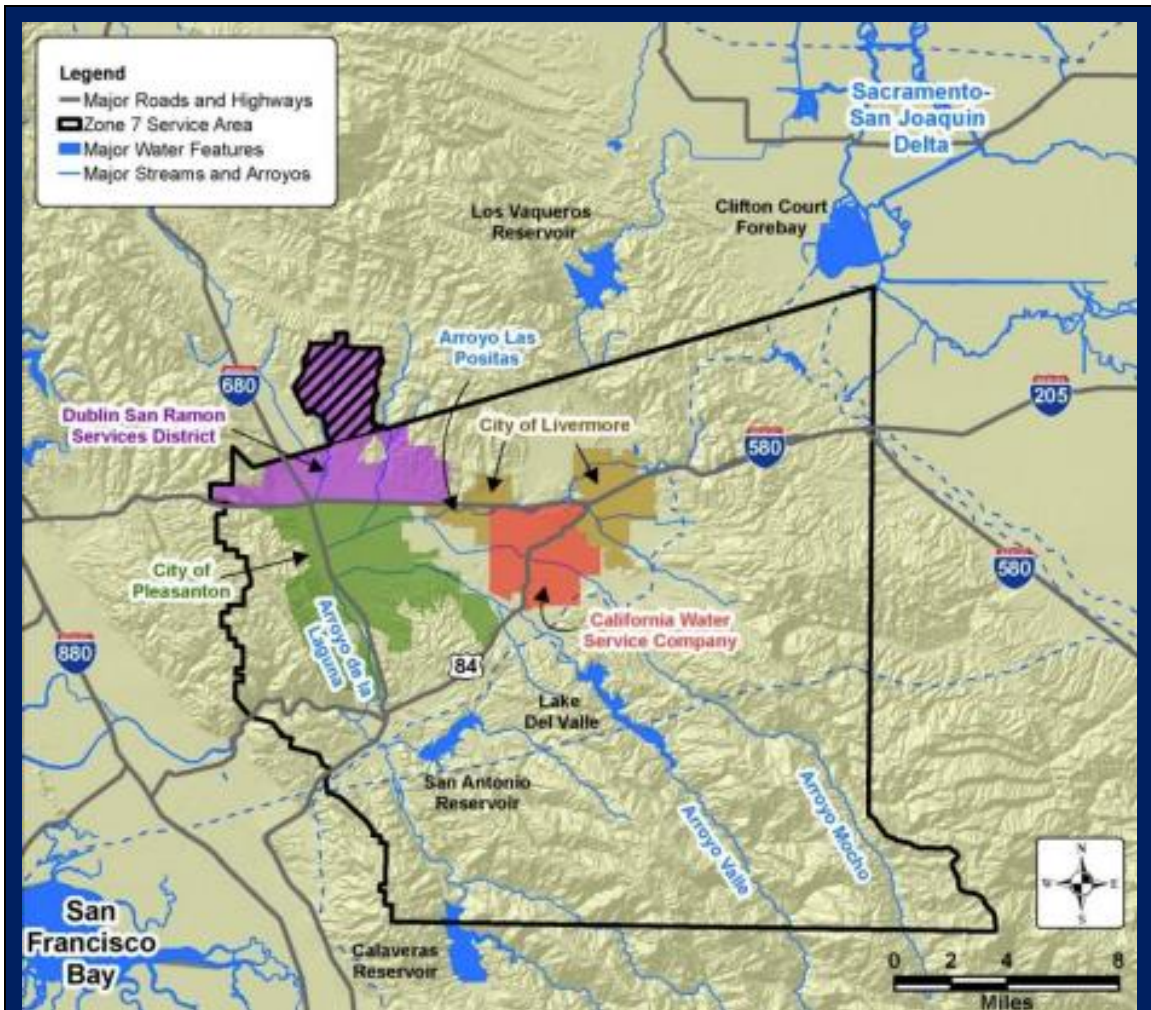


Figure 2.1: Zone 7 Water Agency Service Area Map

2.2 Development Trends

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

Since Zone 7 is not responsible for overall land use for the land within its service area, it relies on the General Plans adopted by local cities and Alameda County to anticipate future development. However, as mentioned above, Zone 7 provides wholesale water as well as flood and stream management services. The subsections below outline land use and development trends for both functions of Zone 7. Since the development of the 2018 HMP, there have been no major changes in development which have greatly affected Zone 7's vulnerability to the identified hazards outlined in Chapter 3.

Flood & Stream Management

Zone 7 owns and maintains a third of the Livermore-Amador Valley's (Valley) channels and creeks; totaling 37 miles of local flood protection channels. The Valley's flood protection system begins at city-owned storm drains which route storm water through underground pipelines into creeks or man-made channels that feed into Arroyo Mocho, Arroyo las Positas and Arroyo del Valle. These larger channels then converge with Arroyo de la Laguna which ultimately drains into San Francisco Bay through Alameda Creek. The network of channels is concentrated in the northwestern, populated regions of the service area. Figure 2.2 below illustrates the location of Zone 7's flood channel network.

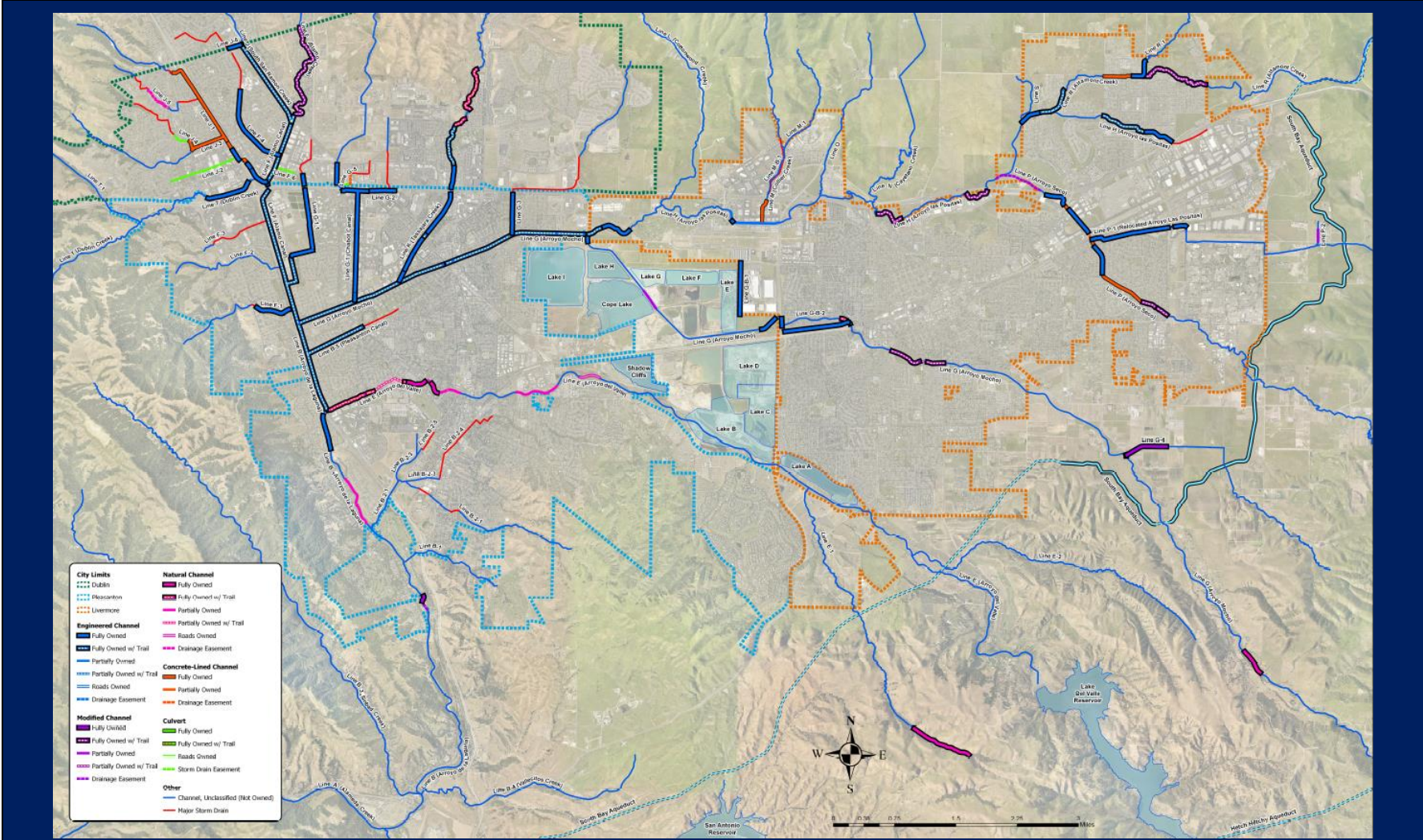


Figure 2.2: Zone 7 Water Agency Flood Control Facilities

Water Service

Zone 7 provides water service to retailers located in the northwestern portion of the service area. This region is characterized by medium to high urban development, including residential, commercial, industrial, and agriculture sectors. As stated in Zone 7’s 2019 Water Supply Evaluation, water supplied through these retailers makes up approximately 80% of Zone 7’s total water demand. Please note this percentage does not take into account water meant for storage or groundwater recharge. The majority of retailer demand is provided for residential use. However, commercial sectors include oil wells and acres of energy-generating windmills in the far eastern reaches of the service area while other sectors include large companies such as AT&T, Oracle, Providian Financial, SAP, and Lawrence Livermore National Laboratory in addition to a number of wineries. Industrial water users include Applied Biosystems (Biotech), Clorox Services Company, Roche Molecular Systems, and A-1 Enterprise. Landscape irrigation for storefront areas is the primary use of water to commercial customers. Within Zone 7’s service area, agricultural water use accounts for approximately 14% of total demand. Table 2.1 provides an overview of the recent and projected water demands.

Table 2.1: Water Use Demands (2020 – 2040), Acre-Feet

Water Use Sector	Year				
	2020	2025	2030	2035	2040
Retailer Demands	38,020	43,000	43,200	43,400	43,700
Untreated Agricultural Demands	5,810	5,500	7,800	8,300	8,300
Direct Retail Potable Demands	730	800	800	800	800
Losses	180	1,000	1,000	1,000	1,000
Total	44,070	50,300	52,800	53,800	55,300

Source: Zone 7 Water Agency Urban Water Management Plan 2020

2.3 Population

Zone 7's service area population has increased steadily since its inception in 1957; intermittently experiencing periods of rapid growth as a result of local development. For example, from 1970 to 1980, the cities in the western part of the service area more than doubled in population according to the State of California Department of Finance; with some area's population increasing more than 400%. This may be attributed to the construction of the Interstate 680 freeway which passes through both Dublin and Pleasanton. In addition, the cities in the service area saw considerable population increases between 2000 and 2010. According to an article published by the California State University, East Bay, this could be a result of increased immigration and new housing developments in the area. The City of Livermore has historically been the most populated city within the service area.

According to Zone 7's 2018 HMP, the service area population increased by 80% between 1990 and 2015. The area is expected to experience an increase of another 20% by 2030 as the result of anticipated buildout. Population projections within Zone 7's service area are presented in Table 2.2 with their corresponding percentage increase.

Table 2.2: Population Data and Projection Estimates

Year	Population Estimates	Percent Increase
2020	266,000	-
2025	284,000	6.8%
2030	299,000	5.3%
2035	312,000	4.3%
2040	323,000	3.5%
2045	323,000	0%

Source: Zone 7 Water Agency Urban Water Management Plan 2020

Population growth within Zone 7's service area represents an increased vulnerability to hazards as there are more people to be at risk of the impacts of hazard scenarios. As noted in the plan Goals & Objectives included in Chapter 4, Zone 7 is committed to protecting life and property. As part of the Mitigation Actions, also included in Chapter 4, the Steering Committee has outlined several strategies to aid in mitigating loss in the populated regions of the service area.

2.4 Demographics

When considering the impacts of hazard scenarios on the community, Zone 7 is cognizant that some portions of the service area will be impacted to a greater extent than others. While the physical characteristics of a hazard may result geographic concentration of impacts, demographic factors within the service area may contribute to a disproportionate vulnerability to hazard impacts for certain populations. A better understanding of how disasters affect vulnerable populations can help guide efforts to identify and mitigate differential impacts within the service area. Although many social and demographic factors may be used to identify vulnerable populations, this section will focus on economic status and age to describe population hazard vulnerability in the service area. At the time of this report, readily available information on economic status and age make the use of these indicators appropriate for identifying the potential for differential population impacts within the service area.

Economic Status

The July 2017 issue of the Supplemental Research Bulletin published by the Substance Abuse and Mental Health Services Administration (SAMSA) states that disasters are experienced differently by low income populations, even at the preparedness stage. The Supplemental Research Bulletin also notes, according to a 2004 report by Fothergill and Peek, low income populations are likely to have less access to education and are typically not able to be as prepared for disasters, increasing their vulnerability. Preparedness actions may be costly, and possibly too expensive, for people with low incomes to be able to implement. Furthermore, low income populations may live in homes with lower quality construction which are more susceptible to the impacts of disasters. The bulletin also cites a 1983 report (Rossi, Wright, Weber-Burdin, & Pereira) which found higher rates of injury during natural disasters for lower income households, which may also be tied to the high cost of preparedness measures. World Bank and the Global Facility for Disaster Reduction and Recovery (GFDRR) report authors note that people in poverty around the world are more likely than others to live in areas at high risk of disaster impacts. They explain that this may be the case because these more dangerous areas are less expensive, or simply more available, in parts of the world with limited space for housing (Hallegatte et al., 2017).

Age

According to a statement from the Red Cross, “new research has found that older adults are more vulnerable and experience more casualties after natural disasters compared to other age groups”. While not universal, older adults are more likely to have a greater prevalence of chronic conditions, multi-morbidity, cognitive impairment, and medical concerns than other age groups. Generally, older adults are more likely to be dependent on assistive devices and caregivers, more likely to be isolated, more likely to have gaps in preparedness, and potentially be at higher risk for psychological distress. All of these factors increase the potential for injury during a disaster event.

Like older adults, children may also be disproportionately vulnerable to hazard impacts, including long-term health impacts. According to the Center for Disease Control and Prevention (CDC), children may experience anxiety, fear, sadness, sleep disruption, irritability, difficulty concentrating, and anger outburst following a disaster. Furthermore, the CDC states children under 8 years of age are at particular risk for long-term mental health issues after experiencing a disaster.

Disability

An article developed by the United Nations Department of Economic and Social Affairs Disability, details that “a common experience reveals that persons with disabilities are more likely to be left behind or abandoned during evacuation in disasters and conflicts due to a lack of preparation and planning.” This is coordinated with the idea that emergency preparedness utilities such as facilities, services, and transportation systems are often inaccessible for the disabled community. The UN identified that communities with disabilities can often be turned away during disaster due to a lack of necessary medical services and inadequate resource availability to handle those who are disabled. The UN clearly identifies that a “disruption to physical, social, economic, and environmental networks and support systems affect persons with disabilities much more than the general population.”

Limited English Proficient Communities

Effective emergency preparedness should ensure that the Limited English Proficient (LEP) community is informed of and has access to relevant information in a language and format that is appropriate and comprehensible. Individuals and communities with LEP are those who do not speak English as their primary language or have limited speaking, reading, or

writing ability. LEP populations are at increased vulnerability because they are less likely to understand directives and warnings, therefore increasing their susceptibility to the effects of disaster.

Zone 7 Population Vulnerability

To estimate the impact of low income, population age, disability, and LEP communities on Zone 7, Table 2.4 summarizes some of the applicable estimates provided by the 2021 United States Census and 2021 American Community Survey regarding the economic status of the service area. The service area encompasses geographies such as the City of Pleasanton and City of Livermore. Census data from the Livermore-Pleasanton Census County Division (Livermore-Pleasanton CCD), which is an Alameda County Subdivision, will be used as an estimate to gauge percentiles of customers within the service area. It is understood this subdivision does not represent the whole service area, the values can be used, as mentioned previously, to estimate values for the entire service area.

Table 2.4: Livermore-Pleasanton CCD Demographic Estimates

Estimate Category	Census* Estimates
Population (2021)	244,841
Persons under 5 years (2021)	6.3%
Person under 18 years (2021)	24.1%
Persons 65 years and over (2021)	13.1%
Persons with a disability under age 65 (2021)	9,059
Persons with a disability under age 65, percent (2021)	3.8%
Households (2021)	83,215
Persons per household (2021)	2.88
Limited English Speaking (LEP) Households (2021)	25,470
Limited English Speaking (LEP) Households, percent (2021)	11.2%
Median Household Income (2021)	\$156,881

Persons in poverty, percent of persons aged 16 years+ (2021)	4.4%
--	------

Note: Populated data obtained from the United States Census Bureau: <https://data.census.gov/table?q=Livermore-Pleasanton+CCD,+Alameda+County,+California&t=Disability:Telephone,+Computer,+and+Internet+Access>

*Note: Population estimates are for the Livermore-Pleasanton CCD which does not include the entire service area for Zone 7. However, as this represents a large portion of the developed areas of the service area, the values are meant to serve as an estimate.

The data contained in Table 2.4 will be used as relative reference for the service area of Zone 7. It can be noted that the population information for Livermore-Pleasanton CCD reflects that 6.3% of the population is recorded as being under the age of 5. Additionally, 13.1% of the population is recorded as being over the age of 65. It is also critical to note that 4.4% of the population within the Livermore-Pleasanton CCD is currently at or below the poverty level. Based on the data provided by the Livermore-Pleasanton CCD, 3.8% of the population under the age of 65 are classified as being disabled. Of the total households within the service area, it can be assumed based on the Livermore-Pleasanton CCD, that 11.2% of households include individuals that can be classified as LEP.

Overall, population vulnerability within Zone 7's service area is relatively low based on economic status, when compared to the County and state. However, the other demographic statistics do indicate the potential for populations within the service that may be more vulnerable to the impacts of natural hazards. To provide effective and equitable mitigation, projects and activities performed by Zone 7 should consider and seek to alleviate differential hazard impacts on at-risk groups within the service area.

3 RISK ASSESSMENT

Table of Contents

3.1	Risk Assessment	1
3.2	Hazard Identification and Profiling	3
3.2.1	Hazard Profiling.....	6
3.2.2	Trends in Perceived Hazard Vulnerability	7
3.3	Flood Profile	8
3.3.1	Flood Hazard Information and Background	8
3.3.2	Flood Hazard History.....	10
3.3.3	Flood Hazard Probability, Frequency, and Magnitude	14
3.4	Drought Hazard Profile	16
3.4.1	Drought Hazard Information and Background.....	16
3.4.2	Drought Hazard History	17
3.4.3	Drought Hazard Probability, Frequency, and Magnitude.....	20
3.5	Wildfire Hazard Profile	23
3.5.1	Wildfire Hazard Information and Background	23
3.5.2	Wildfire Hazard History	24
3.5.3	Wildfire Hazard Probability, Frequency, and Magnitude	27
3.6	Earthquake Hazard Profile	30
3.6.1	Earthquake Hazard Information and Background	30
3.6.2	Earthquake Hazard History.....	34
3.6.3	Earthquake Hazard Probability, Frequency, and Magnitude	41
3.7	Infrastructure Failure Hazard Profile	49
3.7.1	Infrastructure Failure Hazard Information and Background.....	49
3.7.2	Infrastructure Failure Hazard History	50

3.7.3	Infrastructure Failure Hazard Probability, Frequency, and Magnitude	51
3.8	Water Contamination Hazard Profile	53
3.8.1	Water Contamination Hazard Information and Background	53
3.8.2	Water Contamination Hazard History	54
3.8.1	Water Contamination Hazard Probability, Frequency, and Magnitude	56
3.9	Adversarial/ Human-Caused Events Hazard Profile	57
3.9.1	Adversarial/ Human-Caused Events Hazard Information and Background	57
3.9.2	Adversarial/Human-Caused Events Hazard History	58
3.9.3	Adversarial/ Human-Caused Events Hazard Probability, Frequency, and Magnitude	58
3.10	Utility Loss Hazard Profile	59
3.10.1	Utility Loss Hazard Information and Background	59
3.10.2	Utility Loss Hazard History	60
3.10.3	Utility Loss Hazard Probability, Frequency, and Magnitude	61
3.11	Dam Failure Hazard Profile	63
3.11.1	Dam Failure Hazard Information and Background	63
3.11.2	Dam Failure Hazard History	64
3.11.3	Dam Failure Hazard Probability, Frequency, and Magnitude	66
3.12	Climate Change	67
3.13	Asset Inventory	69
3.14	Loss Estimates	77

List of Figures

Figure 3.1: Zone 7 Service Area – FEMA Flood Zones	10
Figure 3.2: Zone 7 FEMA Insurance Rate Map (FIRM)	15
Figure 3.3: California Drought Monitor.....	19
Figure 3.4: Zone 7 Fire Threat Map.....	29
Figure 3.5: Bay Area Historic Earthquakes Map	36
Figure 3.6: Zone 7 Service Area Earthquake Fault Map	42
Figure 3.7: Zone 7 Peak Ground Acceleration Map.....	47
Figure 3.8: Flint Drinking Water Test Levels for Lead.....	56

List of Tables

Table 3.1: Risk Factors for Hazard Identification	4
Table 3.2 Risk Ranking Matrix.....	5
Table 3.3: Risk Rank Categorization	6
Table 3.4: Hazard Ranking Summary.....	6
Table 3.5: Selected storms and flooding affecting the Zone 7 services area.....	11
Table 3.6: Selected Historical Droughts.....	19
Table 3.7: Selected Historical Fires in Northern California (1923-2022).....	25
Table 3.6: Modified Mercalli Intensity Scale.....	32
Table 3.8: Bay Area Historical Earthquakes	34
Table 3.9: San Andreas Fault Information	43
Table 3.10: Hayward Fault Information.....	44
Table 3.11: Calaveras Fault Information.....	45
Table 3.12: Greenville Fault Information.....	45
Table 3.13: Mercalli Intensity and Corresponding Peak Group Acceleration.....	48
Table 3.14: Economic Impacts of Electric Power.....	62
Table 3.15: Selected Dam Failure Events in California.....	65
Table 3.16: Loss of Function Values Per Capita – Utilities & Lifelines	70
Table 3.17: Asset Inventory Summary.....	71
Table 3.18: Loss of Function	76
Table 3.19: Loss Estimates/ Vulnerability Assessment – Flood/Severe Storm, Drought, and Wildfire	78
Table 3.20: Loss Estimates / Vulnerability Assessment – Earthquake, Infrastructure Failure, and Water Contamination.....	82
Table 3.21: Loss Estimates / Vulnerability Assessment – Adversarial/Human-Caused Events, Utility Loss/ Public Safety Power Shutoff, and Dam Failure	86
Table 3.22: Loss Estimates Summary	90
Table 3.23: Impacted Assets and Personnel within Hazard Zones	91

3.1 Risk Assessment

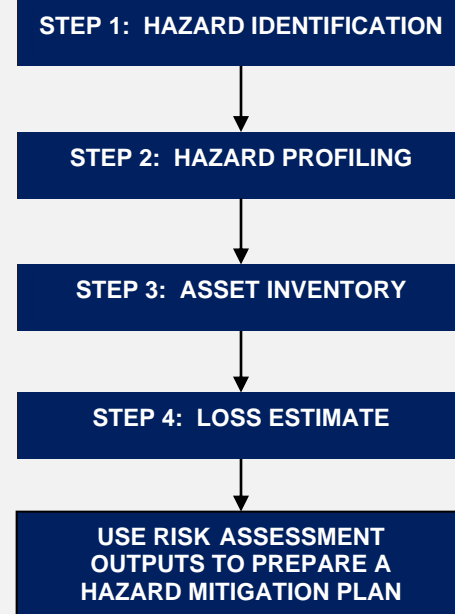
The Risk Assessment consists of four steps: Hazard Identification, Hazard Profiling, Asset Inventory, and Loss Estimates. This chapter includes the Hazard Identification and Hazard Profiling steps to evaluate the hazards of primary concern to local decision-makers to provide a basis for loss estimates which is also included within this chapter. Additionally, the Risk Assessment provides a foundation for the evaluation of mitigation measures, included in Chapter 4 of this plan, that can help reduce the impacts of a potential hazard event.

Step 1: Identify Hazards

In this step, the Steering Committee identified the natural and man-made hazards which might affect the Zone 7 Water Agency (Zone 7) and then narrowed the list to the hazards that are most likely to occur. These hazards included natural, technical, and human-caused events with an emphasis on the effect of natural disasters on critical facilities and services (e.g., critical buildings, channels, piping, and water service). The Steering Committee participated in a hazard identification exercise during the first Steering Committee Meeting to identify and rank the potential hazards within Zone 7.

Step 2: Hazard Profiling

The hazard profiles consist of either a map indicating the area impacted by each hazard or key information regarding the characteristics of hazard events within the planning area. To develop detailed hazard profiles, relevant open-source hazard studies and mapping projects were reviewed and documented within this report. In addition, Zone 7 supplied local accounts of hazard events that included specific hazard and emergency information. This planning step also determined the magnitude, frequency, and location characteristics of relevant natural hazards (wildfire, fault locations, floodplains, etc.) that were utilized as the design-basis for the loss estimates.



Step 3: Inventory Assets

The purpose of this step is to determine the quantity of Zone 7 assets that lie in the different hazard areas and what proportion of Zone 7's Service Area this represents. The asset inventory was completed utilizing spatial Geographic Information Systems (GIS) asset locations and specifications for the following assets:

- Administration buildings
- Water Treatment Facilities
- Flood Channels
- Piping
- Wells

The development of the comprehensive inventory facilitated the development of loss estimates for all hazard scenarios.

Step 4: Loss Estimates

The loss estimate step relied on detailed information regarding the hazard probability and maps that were completed as part of the hazard profiles. This information was utilized to apply the hazard probabilities and recurrence intervals to Zone 7's assets and inventory (buildings and infrastructure). This step was critical in determining which assets were subject to the greatest potential damage and which hazard events were likely to produce the greatest potential losses.

To estimate potential asset losses due to hazard scenarios, detailed spreadsheets, including the asset inventory and potential hazards, were used to find the monetary impact of each hazard to Zone 7. The conclusion of this step precipitated a comprehensive loss estimate (vulnerability assessment) for each identified hazard for each specific Zone 7 asset in terms of damages, economic loss, and the associated consequences for Zone 7.

3.2 Hazard Identification and Profiling

§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.

§201.6(c)(2)(ii): [The risk assessment] must also address National Flood Insurance Program (NFIP) insured structures that have been repetitively damaged by floods.

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

The hazard identification and ranking were obtained from the hazard identification exercise. Each hazard profile includes a summary of the hazard identification exercise identified risk factors and overall rank for each hazard, in addition to the detailed hazard description, historical occurrences, and projected future probability, magnitude, and frequency.

Each member of the Steering Committee participated in the hazard identification exercise to update the perceived vulnerability for the identified hazards. The hazard identification exercise was facilitated utilizing an interactive spreadsheet program that asks specific questions on potential hazards and then rates them accordingly. These questions guide the team in the correct facilitation and application of the program. Table 3.1 summarizes the hazard identification exercise risk factors, lists the descriptions of each factor, provides the specific descriptor choices for each risk factor and description, and summarizes the risk ranking associated with each hazard.

Table 3.1: Risk Factors for Hazard Identification

Risk Factor	Description	Descriptors	Value
Probability/ Frequency	Prediction of how often a hazard will occur in the future	Infeasible event - not applicable due to geographic location characteristics	0
		Rare event - occurs less than once every 50 years	1
		Infrequent event - occurs between once every 8 years and once every 50 years (inclusive)	2
		Regular event - occurs between once a year and once every 7 years	3
		Frequent event - occurs more than once a year	4
Consequence/ Severity	Physical Damage - structures and lifelines Economic Impact – loss of function for power, water, sanitation, roads, etc.	No damage	1
		Minor/slight damage to buildings and structures, no loss of lifelines	2
		Moderate building damage, minor loss of lifelines (less than 12 hours)	3
		Moderate building damage, lifeline loss (less than 24 hours)	4
		Extensive building damage, widespread loss of lifelines (water, gas, electricity, sanitation, roads), loss of life	5
Vulnerability	Impact Area - area impacted by a hazard event Secondary Impacts - Capability of triggering additional hazards Onset - Period of time between initial recognition of an approaching hazard and when the hazard begins to impact the community	No physical damage, no secondary impacts	1
		Localized damage area	2
		Localized damage area, minor secondary impacts, delayed hazard onset	3
		Moderate damage area, moderate secondary impacts, moderate warning time	4
		Widespread damage area, significant secondary impacts, no warning time	5

Each profile also includes a ranking of the hazard (ranging from low hazard to high hazard). Table 3.2 illustrates the matrix for how each hazard was ranked according to all of the previously mentioned factors. Table 3.3 provides the value determinations for each ranking. The Steering Committee determined this initial profile ranking based on all of the hazard identification, profile research, group discussion, and evaluation of all of the data.

Table 3.2 Risk Ranking Matrix

Probability/Frequency Description		Risk Ranking Matrix					
Rare Event: Occurs less than once every 50 years	Probability/Frequency	Consequence/Severity					
	Value	1	1	2	3	4	5
	Vulnerability	1	1	2	3	4	5
		2	2	4	6	8	10
		3	3	6	9	12	15
		4	4	8	12	16	20
5	5	10	15	20	25		
Infrequent Event: Occurs between once every 8 years and once every 50 years (inclusive)	Probability/Frequency	Consequence/Severity					
	Value	2	1	2	3	4	5
	Vulnerability	1	2	4	6	8	10
		2	4	8	12	16	20
		3	6	12	18	24	30
		4	8	16	24	32	40
5	10	20	30	40	50		
Regular Event: Occurs between once a year and once every 7 years	Probability/Frequency	Consequence/Severity					
	Value	3	1	2	3	4	5
	Vulnerability	1	3	6	9	12	15
		2	6	12	18	24	30
		3	9	18	27	36	45
		4	12	24	36	48	60
5	15	30	45	60	75		
Frequent Event: Occurs more than once a year	Probability/Frequency	Consequence/Severity					
	Value	4	1	2	3	4	5
	Vulnerability	1	4	8	12	16	20
		2	8	16	24	32	40
		3	12	24	36	48	60
		4	16	32	48	64	80
5	20	40	60	80	100		

Table 3.3: Risk Rank Categorization

High Hazard	50 to 100
Moderately High Hazard	25 to 49
Moderate Hazard	15 to 24
Moderately Low Hazard	5 to 14
Low Hazard	1 to 4

3.2.1 Hazard Profiling

This section presents additional information regarding the hazards of concern (detailed below) as hazard profiles. Hazard profiles are designed to assist agencies in evaluating and comparing the hazards that can impact their community by comparing a number of hazard factors. Each type of hazard has unique characteristics, and the impact associated with a specific hazard can vary depending on the magnitude and location of each event (a hazard event is a specific, uninterrupted occurrence of a particular type of hazard). Furthermore, the probability of occurrence of a hazard in a given location impacts the priority assigned to that hazard. Finally, each hazard will impact different communities in different ways, based on geography, local development, population distribution, age of buildings, and mitigation measures already implemented. Table 3.4 provides the hazard ranking summary for Zone 7.

Table 3.4: Hazard Ranking Summary

Hazard Rank	Score
High	
None of the evaluated hazards ranked High	
Moderately High	
None of the evaluated hazards ranked Moderately High	
Moderate	
Flood/ Severe Storm	27
Drought	27
Moderately Low	
Wildfire	24
Earthquake	24
Infrastructure Failure	24
Water Contamination	16
Adversarial/Human-Caused Events	15
Utility Loss	12

Dam Failure	12
Low	
None of the evaluated hazards ranked Low	

3.2.2 Trends in Perceived Hazard Vulnerability

As illustrated above, the Steering Committee reviewed its perceived vulnerability to determine the potential impact of each hazard to Zone 7 assets. The Steering Committee began with the hazards identified in the 2018 Hazard Mitigation Plan and used the list as a springboard in determining current perceived vulnerability. One of the major changes was the de-escalation of the Earthquake vulnerability based on the current team’s understanding of Zone 7’s assets and recent upgrades in stability that are intended to reduce vulnerability. Additionally, the current team discussed the burden of ensuring sufficient water supply for the area and increased the hazard ranking for drought. The team noted that with such a large service area dependent on Zone 7 for water, water shortage presented a much higher risk than other hazards.

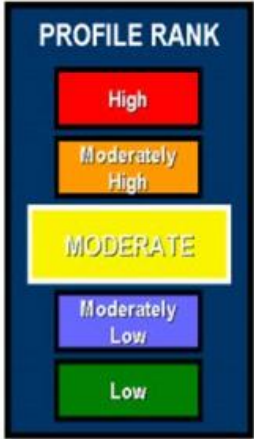
The team discussed several hazards which were not included in the Plan update. Following the COVID-19 pandemic, many agencies looked to find ways to make their communities more resilient to future pandemics. The Steering Committee discussed at length how Zone 7 might improve vulnerability to the spread of infectious disease and it was determined that it was not within the Zone’s capabilities to impact the community’s vulnerability to such a hazard because the hazard is not tied to water service or flood control.

Separately, the team discussed the potential for a tsunami in the region. Although California has not been subject to a tsunami event in quite some time, the coastal regions must stay vigilant of the impending possibility of a tsunami event. However, it was determined that the service area is shielded by the San Francisco Peninsula and that even the western-most parts of the service area are well-cleared from any potential tsunami area. As a result. This hazard was not included in the Plan update.

3.3 Flood Profile

Flood Failure Risk Assessment Summary

Risk Rank: Moderate

Probability/ Frequency:	Regular Event- occurs between once a year and once every 7 years.	
Consequence/ Severity:	Moderate building damage, minor loss of lifelines (less than 12 hours), lost time injury but no disability.	
Vulnerability:	Localized damage area, minor secondary impacts, delayed hazard onset	
Hazard Risk Rank Score:	27	

3.3.1 Flood Hazard Information and Background

According to the NFIP, flood is the most common type of disaster including both man-made and naturally occurring incidents in the U.S. Land along rivers, streams, lakeshores, and coastlines are particularly susceptible to flooding.

The common causes of flooding in the Livermore Amador Valley are the result of:

- Heavy rains, severe storms, atmospheric rivers, et cetera
- Flood protection channel/storm drain overflow or bank failure
- Debris blockages at culverts, storm drains, or bridges
- Infrastructure failure (water main breaks, leaking water conveyance facilities, et cetera)

What are Floods?

Flooding is a natural, recurring process that supports native species life cycles, geomorphic processes, and other ecosystem functions. A floodplain is any land area susceptible to

being inundated by floodwaters from any source. The area susceptible to inundation varies depending on the source and magnitude of flooding; a higher magnitude flood would generally be expected to inundate a larger area than a smaller flood. Riverine flooding would generally be expected to inundate areas adjacent to the channel bank, while pluvial flooding might inundate downslope areas lacking adequate drainage. In short, there is no single “floodplain,” but rather, many areas with varying susceptibility to inundation.

When floodplains are developed for human use, their natural beneficial functions are disrupted, and the floodplain becomes a location of potential risk to the people and property within it. Urban development also expands the area susceptible to flooding, by increasing runoff, constraining runoff, encroaching into channels, and altering natural flood dynamics.

FEMA sets minimum floodplain management criteria for the “100-year floodplain,” or the land area that has a 1 percent or greater annual chance of inundation. While the 100-year floodplain is typically considered the baseline area in which floodplain management decisions and actions should occur, this is an insurance standard and not a public safety standard. FEMA’s flood insurance studies and flood insurance rate maps (FIRMs) identify the 100-year floodplain for riverine and coastal flooding sources; flooding from pluvial sources is generally not included. FIRMs identify the 100-year floodplain as the “Special Flood Hazard Area.”

FIRMs identify a “regulatory floodway” within the 100-year floodplain. FEMA defines the regulatory floodway as the channel of a river or other watercourse and the adjacent land areas required to discharge the 100-year flood without cumulatively increasing the water surface elevation by more than one foot.

When flooding occurs, affected areas may sustain damage to structures and personal property, as well as severe damage to the environment in the form of soil erosion, pollutants and damage to utilities and transportation systems.

Flash Flooding Including Dam Failure

A flash flood is a rapid flooding of areas, rivers and streams that is caused by the intense rainfall. Flash floods can also occur when water infrastructure such as canals, pipelines, and dams fail.

3.3.2 Flood Hazard History

According to the FEMA Flood Insurance Study, heavy rainfall, steep topography, and constricted floodways are the primary causes for flooding in Zone 7's service area and Alameda County. As shown in Figure 3.1, some parts of Zone 7's service area are located in the FEMA floodplains. During heavy rainfall, local storm runoff is collected in the arroyos (creeks) before it flows out of the Livermore-Amador Valley to Alameda Creek. These arroyos flow through the hills and the flat Livermore-Amador Valley where the channels become more susceptible to floods.

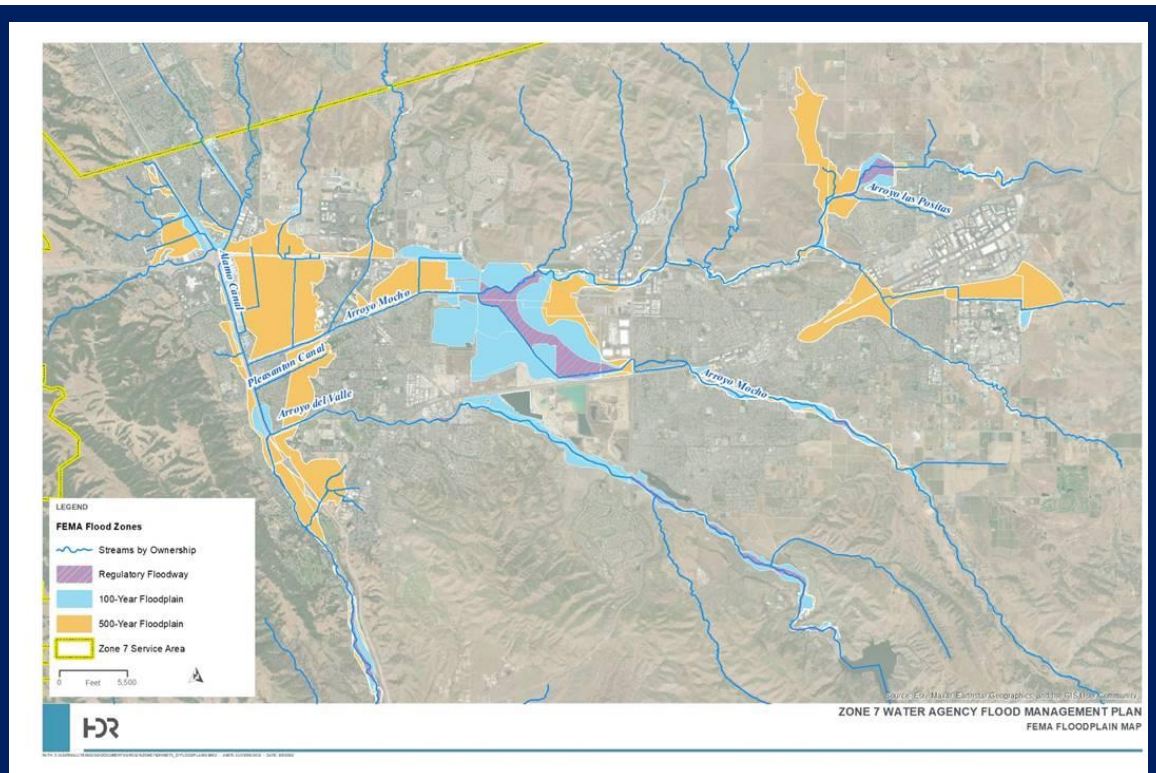


Figure 3.1: Zone 7 Service Area – FEMA Flood Zones (2022)

Historical Flooding Events

According to the Associated of Bay Area Governments (ABAG) disaster history report, flooding associated with severe storms has been the most common disaster in the Bay Area and Alameda County since 1950. One of the largest floods recorded in Zone 7’s service area was in the City of Livermore. On January 1952, according to [USGS](#), floodwaters backed up at the Western Pacific Railroad and spread out over the flat land. This caused widespread flooding across the Livermore area within 30 minutes and caused \$1,400,000 in losses (approximately \$17,863,000 in 2023) The constricted flow due to undersized storm channels and drains also resulted in flooding and damage of U.S. Route 50 (now Interstate 580).

In 1955, the valley again experienced widespread flooding. The areas of the former Pleasanton Marsh (including Arroyo Mocho and Arroyo De La Laguna) refilled to historic levels, causing extensive flooding in the City of Pleasanton. As seen during the flood of 1955 and also in 1958, inundation of the streams can also occur during low-intensity rainfall over a long period of time.

The following table includes a selection of Federally- declared disasters resulting from flood hazards which impacted the Zone 7 services area.

Table 3.5: Selected storms and flooding affecting the Zone 7 services area.

Year	Storm Duration	Federal Declaration	Magnitude
1955	Dec.-Jan.	DR-47	<ul style="list-style-type: none"> Widespread flooding across California Considered the “Storm of Record” which initiated the formation of Zone 7 Federal repairs carried out under several Public Laws (PLs)
1970	Feb.	DR-283	<ul style="list-style-type: none"> Heavy winds and flooding occurred across the Bay Area including Alameda County. Estimated over \$27 million in damage across the Bay Area
1983	Jan-Mar	DR-677	<ul style="list-style-type: none"> High wind, flooding, and levee breaks occurred across California. Estimated over \$500 million in damage across California
1986	Feb.-Mar.	DR-758	<ul style="list-style-type: none"> Flooding occurred across California. Estimated over \$407.5 million in damages to California

Year	Storm Duration	Federal Declaration	Magnitude
1995	Jan.-Feb. Feb.-Apr.	DR-1044 & DR10-46	<ul style="list-style-type: none"> • Flooding and landslides occurred across California • Estimated over \$1 billion in damage to California • Flooding occurred in stream/creeks within the Zone 7 service area. • I-580 flooded at Chabot Canal from debris blocking bypass culvert • Zone 7 helped residents apply for Nation Resource Conservation Service (NRCS), Emergency Watershed Protection (EWP) funding (for Arroyo de la Laguna [ADLL]).
1996-97	Dec.-Apr.	DR-1115	<ul style="list-style-type: none"> • Flooding, mudslides, and landslides occurred throughout Alameda County. • Estimated over \$1.8 billion in damages to California.
1998	Feb.	NA	<ul style="list-style-type: none"> • Flash flood event with minor flooding and damage to roads and structures within the Zone 7 service area (Arroyo Mocho flooded Stanley Blvd and structures experience partial flooding) • Estimated \$100,000 in damage within the Zone 7 service area.
2005-06	Dec.-Jan.	DR-1628	<ul style="list-style-type: none"> • Flooding, mudslides, and landslides occurred throughout the Bya Area, including Alameda County. • Estimated over \$100 million in damage to Alameda County
2006	Mar-Apr.	DR-1646	<ul style="list-style-type: none"> • Landslides and erosion of hillsides occurred throughout Alameda County • Galaxy Court experiences street flooding from debris blocking storm drain outlets in channel
2009	Oct.	NA	<ul style="list-style-type: none"> • Heavy rain and winds led to downed trees and utility lines (power) within the Zone 7 service area. • Flooding occurred at Bernal Avenue and Valley Avenue within the Zone 7 service area.
2014	Nov.	NA	<ul style="list-style-type: none"> • Heavy rain and winds lead to downed trees within the Zone 7 service area.

Year	Storm Duration	Federal Declaration	Magnitude
			<ul style="list-style-type: none"> • Flooding at I-580 in Dublin and Livermore with the Zone 7 service area.
2017	Jan.-Feb.	DR-4301 DR-4305, DR-4308	<ul style="list-style-type: none"> • Flooding, debris flows, and mudslides occurred throughout Alameda County. • Collier Canyon Creek flooded adjacent area due to debris-jammed culvert • Flooded streets and business parks. Temporary road closures within the Zone 7 service area. • Extensive channel slope failure throughout the Zone 7 service area.

Source: [1] Zone 7 Staff [2] Tri-Valley Local HMP Tetra Tech 2018

Flood control operations at Lake Del Valle help mitigate risk of flooding within the service along Arroyo del Valle and portions of Arroyo de la Laguna. Flood risk management benefits associated with regulation of Arroyo del Valle are also realized outside of the Zone 7 service area, in downstream communities along Alameda Creek in Niles and Fremont.

Within the Zone 7 service area, other stream and arroyos, including Arroyo Mocho, Arroyo Las Positas, South San Ramon Creek, Alamo Creek, and other creeks and streams, remain unregulated. Given their locations within developed areas, many channel sections along these streams were highly modified prior to Zone 7 ownership and Zone 7 must expend significant resources to maintain flood protection functions while addressing competing regulatory, recreational/aesthetic, and fiscal demands.

Severe storms pose a significant threat to Zone 7 flood protection channels, especially in the western portions of the valley where development has occurred atop historical marshlands. Poor bank soil conditions make these channels highly susceptible to damage during severe storms. High and fast flows contribute to bank erosion, bank failures, and general channel degradation, posing risks to adjacent homes and businesses. Water years having several severe storms in short succession can increase bank failure risk and related flood and property risks due to the lack of adequate time to perform emergency bank repairs between storms. Such risks may be exacerbated by the effects of climate change which is expected to bring more extreme and frequent storms.

3.3.3 Flood Hazard Probability, Frequency, and Magnitude

Prior to 1968 (construction of Lake Del Valle), the valley experienced occasional widespread flooding. Since that time, the valley has not experienced widespread flooding, but still sees localized flooding from time to time.

Figure 3.2 provides a FEMA Flood Insurance Rate Maps (FIRM) for the developed portion of Zone 7's service area. According to the map, the Zone 7 Service Area has areas within the 500 and 100-year zones as well as areas prone to more frequent flooding. With that in mind, it is important to remember much of the Zone 7 Service Area has little development, however, the portions with development are generally where the flood zones are found.

Along the channels within developed areas, channel segment ownership is often a mix of segments owned by Zone 7 and segments owned by cities, requiring active coordination with other local entities during storm events to monitor channel conditions.

Zone 7 anticipates that as weather patterns continue to change, the region will have a more intense wet season coupled with extended dry periods. Although the effects of climate change cannot be determined specifically, the probability of increased intensity storms, and associated higher streamflow effects, occurring within the jurisdictional boundaries is increased.

Impacts to Sensitive Populations

As mentioned above, Zone 7 does have select areas that may be prone to flooding. For this reason, flood water management is an integral part of Zone 7 operations. When considering the populations at risk, residents of the Cities within the developed areas of the service area are more likely to be impacted if a flooding event occurred. Developed areas roughly comprise the northwestern portion of the service area and generally include the Cities of Pleasanton, Livermore, and Dublin. Residents of these cities would be more vulnerable in the event of large-scale flooding.

For this reason, the Steering Committee proposed Hazard Mitigation Actions HMP.2023.04, HMP.2023.05, HMP.2023.03, and HMP.2023.017 (found in Table 4.5) to improve flood capacity for flood management in the region thereby reducing the likelihood of large-scale local flooding in developed areas of the service area. Particularly, the proposed Chain of Lakes buildout (HMP.2023.10) is intended to increase local capacity to accept rainwater and runoff to avoid high flow downstream thereby reducing the likelihood of a flood scenario with the populated regions of the service area.

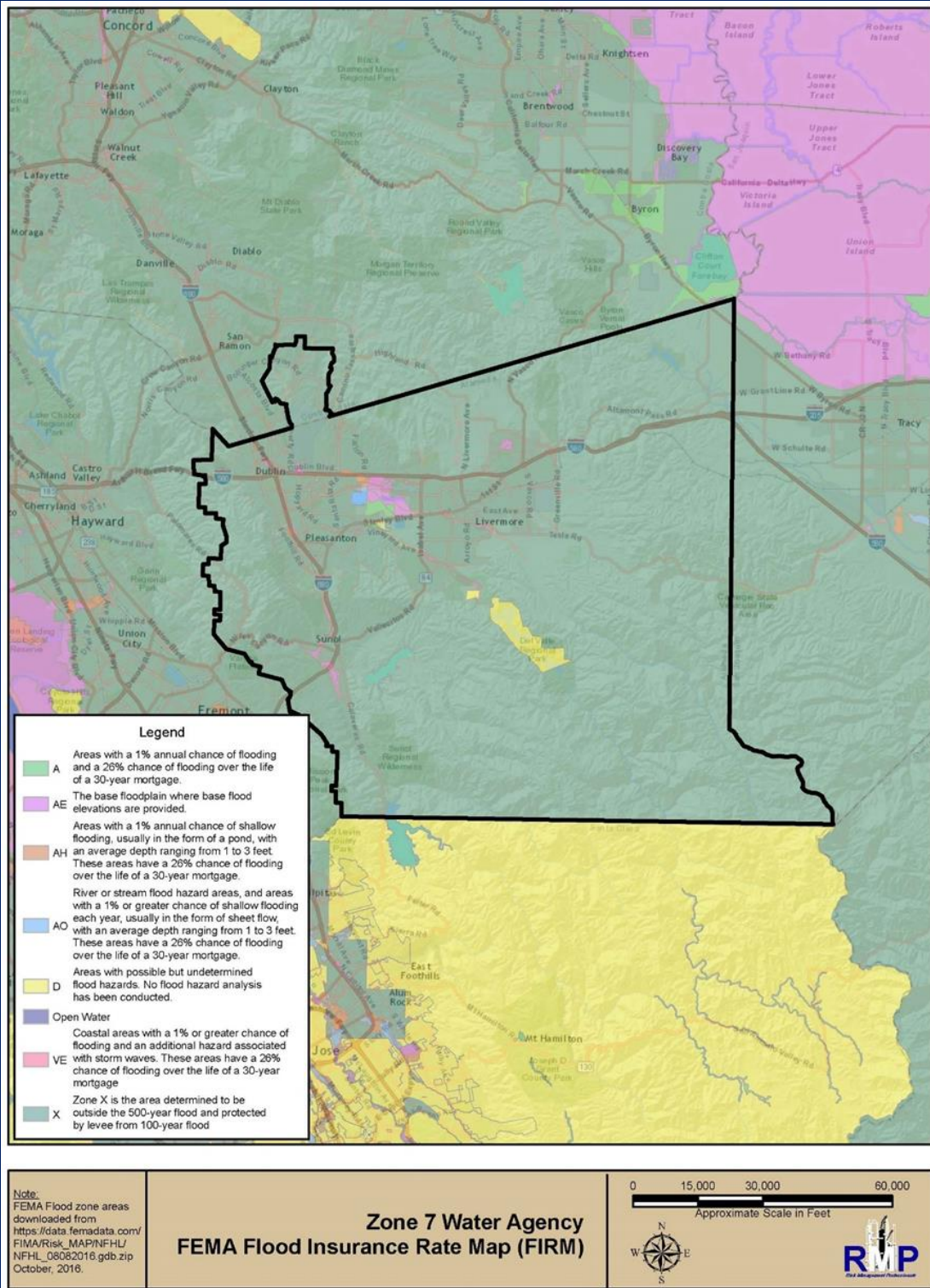


Figure 3.2: Zone 7 FEMA Insurance Rate Map (FIRM)

3.4 Drought Hazard Profile

Drought Risk Assessment Summary

Risk Rank: Moderate

Probability/ Frequency:	Infrequent event - occurs between once every 8 years and once every 50 years	
Consequence/ Severity:	Moderate building damage, minor loss of lifelines (less than 12 hours), lost time injury but no disability	
Vulnerability:	Localized damage area, minor secondary impacts, delayed hazard onset	
Hazard Risk Rank Score:	27	

3.4.1 Drought Hazard Information and Background

A drought or an extreme dry periodic climate is an extended period where water availability falls below the statistical averages for a region. The precise definition of drought is made complex owing to political considerations, but there are generally four types of conditions that are referred to as drought.

- **Meteorological drought** is brought about when there is a prolonged period with less than average precipitation.
- **Agricultural drought** is brought about when there is insufficient moisture for average crop or range production. This condition can arise, even in times of average precipitation, owing to soil conditions or agricultural techniques.
- **Hydrologic drought** is brought about when the water reserves available in sources such as aquifers, lakes, and reservoirs fall below the statistical average. This

condition can arise, even in times of average (or above average) precipitation, when increased usage of water diminishes the reserves.

- **Socioeconomic drought** associates the supply and demand of water services with elements of meteorological, hydrologic, and agricultural drought. Socioeconomic drought occurs when the demand for water exceeds the supply as a result of weather-related supply shortfall.

Due to the extensive nature of water supply infrastructure – reservoirs, groundwater basins, and inter-regional conveyance facilities – mitigation for the effect of short-term dry periods is implicit for most systems. Defining when a drought begins is a function of drought impacts to water users. Hydrologic conditions constituting a drought for water users in one location may not constitute a drought for water users elsewhere, or for water users having a different water supply. Individual water suppliers may use criteria such as rainfall/runoff, amount of water in storage, or expected water supply to define their water supply conditions.

Drought is a gradual phenomenon. Although droughts are sometimes characterized as emergencies, they differ from typical emergency events. Most natural disasters, such as floods or wildland fires, occur rapidly and afford little time for preparing for disaster response. Droughts, however, occur slowly and over a multi-year period. There is no universal definition of when a drought begins or ends. Impacts of drought are typically felt first by those most reliant on annual rainfall – ranchers engaged in dryland grazing, rural residents relying on wells in low-yield rock formations, or small water systems lacking a reliable source. Drought impacts increase with the length of a drought, as carry-over supplies in reservoirs are depleted and water levels in groundwater basins decline.

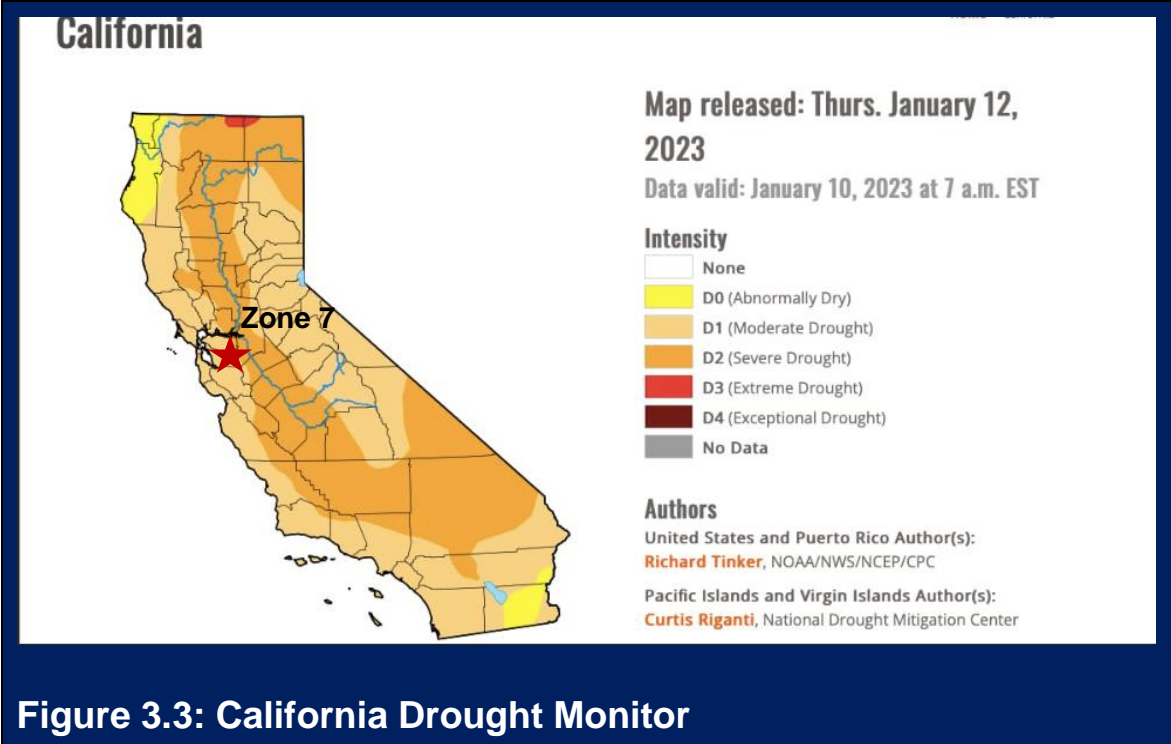
Droughts may cause a shortage of water for human and industrial consumption, hydroelectric power, recreation, and navigation. Water quality may also decline and the number and severity of wildland fires may increase. Severe droughts may result in the loss of agricultural crops and forest products, undernourished wildlife and livestock, lower land values, and raise unemployment.

3.4.2 Drought Hazard History

According to the current [U.S. Drought Monitor map](#) for California (as of January 12, 2023), Zone 7 is in the Moderate-Severe Drought Zone. This point is illustrated in Figure 3.3 on the next page; however, this drought intensity can increase up to an Exceptional Drought Zone for Zone 7 during the summer. While the California Drought map provided on June

22, 2023 shows a significant decrease in drought conditions, this does not negate the drought pattern that we expect to occur over the next five to ten years. Typically, with drought conditions, the area is exposed to long, dry periods, with intense, but short periods of intense precipitation. While the data from June 2023 highlights the current improvement, it is important to note that this is only temporary, and will be followed with another long period of hot, dry weather. Over the past century, many of the droughts experienced in the U.S. affected vegetation, food supply and livelihood for tens of thousands of families. This, in turn, created the need for water conservation and water management efforts across the country including California. For example, the Dust Bowl was an extended period of severe drought in the 1930s which affected Oklahoma and parts of Texas, New Mexico, Colorado, and Kansas. Over the course of a decade, the region experienced four of the driest calendar years since 1895. Topsoil erosion and strong winds resulted in large dust storms. Reduced vegetation severely impacted the farming-reliant economy forcing tens of thousands of families to relocate in search of better economic condition. Various dam and reservoir projects to allow for a more reliable water supply for the public were constructed as a result of this historic drought.

The California drought of 1976 to 1977 is another example of severe drought conditions. By the end of the “wet season” in 1976, California reservoirs were depleted and melting snow from the Sierra snowpack was minimal. The following year was marked as one of the driest years on record. Out of the 58 counties in California, 47 of them declared a local drought emergency, making them eligible for relief money at both State and Federal levels. The drought hit farmers especially hard, with many experiencing economic losses in every stage of food production and supply. This drought marked the beginning of an extensive water conservation movement across California that has continued even through times of abundance.



Much of California just weathered a three-year drought (2020-2022) with below average snowpack, followed by one of the largest snowpacks on record in 2023. During this drought, Zone 7, which is highly dependent on the State Water Project for water supplies received a 20%, 5%, and 5% allotment in 2020, 2021, and 2022 respectively. Zone 7 resultantly had to procure water transfers, rely on stored groundwater, and implement 15% mandatory conservation in the region. Zone 7 had similar experiences during the 2012-2015 drought. The California Department of Water Resources (DWR) has records back to 1906 classifying water year types as Wet, Above Normal, Below Normal, Dry, and Critical. According to these records, the Sacramento Valley has faced three or more years of below normal or worse conditions during the following periods.

Table 3.6: Selected Historical Droughts

Years	Dry Water Year Scenario Classification
1918-1920	Dry, Below Normal, Critical
1923-1926	Below Normal, Critical, Dry, Dry
1929-1937	Critical, Dry, Critical, Dry, Critical, Critical, Below Normal, Below Normal, Below Normal

1944-1950	Dry, Below Normal, Below Normal, Dry, Below Normal, Dry, Below Normal
1959-1962	Below Normal, Dry, Dry, Below Normal
1987-1992	Dry, Critical, Dry, Critical, Critical, Critical
2007-2010	Dry, Critical, Dry, Below Normal
2012-2016	Below Normal, Dry, Critical, Critical, Below Normal
2020-2023	Dry, Critical, Critical

While Zone 7’s service area is not in the Sacramento Valley, the majority of Zone 7’s water supplies come from that hydrologic region, with Zone 7 first receiving water from the Sacramento Valley in 1962 via the State Water Project. Of note, the drought of 1976 and 1977 only consisted of two critically dry years, with 1977 still being the driest water year on record.

While there have been drought conditions since the inception of the last plan, there have been no FEMA-declared disasters for drought since then.

3.4.3 Drought Hazard Probability, Frequency, and Magnitude

Zone 7 relies heavily on its allocation of State Water Project supplies. In an average year, supplies imported via the South Bay Aqueduct account for 70-80% of total water demand in the service area, with the balance supplemented with groundwater, recycled water, and local surface water.

Drought is a hazard which is expected to become more frequent and severe with climate change. As a result, Zone 7 is evaluating new and innovative water management programs, including new or expanded supply sources, expanded water storage, rebate incentives and water use efficiency programs. These efforts are helping to enhance long-term water supply reliability and water quality.

While drought has the potential to impact all areas of the service area, social and economic impacts of are drought are likely to be concentrated in the developed portions of the service area, including the cities and agricultures areas of the Livermore-Amador Valley.

Drought and Climate Change

Increased population and exploitation of fossil fuels during the past century has led to longer and more prevalent droughts in many parts of the U.S. The global warming phenomenon has led to increased rainfall instead of snowfall in many regions resulting in increased flooding. This, combined with earlier and rapid melting of snow, has led to fluctuation in water availability and resulted in increased floods in wet regions and drought in dry regions. As Bay Area temperatures rise and water sources are depleted, the potential for droughts in California, including Zone 7's service area, are expected to continue to increase. As drought conditions continue to endure and become more frequent as a result of climate change, Zone 7's water reliability will be impacted.

As mentioned in Section 3.12, Zone 7 personnel would recognize decreased water supply and decreased precipitation, common impacts of climate change, as a drought scenario. As mitigation activities focused on water supply reliability are indifferent to the root cause of water shortage, Zone 7 has chosen to blend the applicable impacts of climate change with its drought mitigation efforts. All mitigation actions for drought described in Chapter 4 also take into account the impacts of climate change.

Impacts on Sensitive Populations

As stated by the California Department of Water Resources, at the time of this report, the state is entering another period of drought, and populations that are housed in special facilities in the Agency might be affected to a greater degree than others. The various medical clinics that serve the physically and mentally impaired, as well as schools that attend to young children under the age of 5, are distributed throughout the developed regions of the service area. Since these locations fall under local jurisdictions, there is no way for Zone 7 to know which of these is more likely to be impacted by the drought. Consequently, Zone 7 can assume that the sensitive population will be impacted equally since droughts are regional hazards expected to impact the entire service area. It is useful to note that the City and county emergency plans will include considerations for sensitive populations for response in the event of drought conditions and provide supplemental water resources.

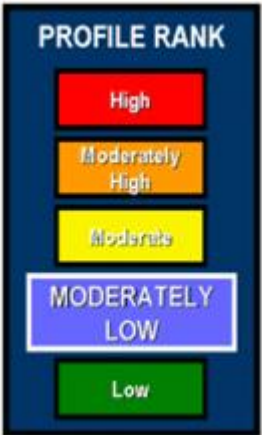
No major land use developments are expected in the next five years. However, Zone 7 does not have land use authority. Rather the Cities and County are the ultimate jurisdictions that determine major land use developments.

Drought conditions would affect water reliability and Zone 7 economic stability, which is why the Steering Committee, as a wholesale water provider, proposed mitigation actions HMP.2023.03 (found in Table 4.5) to reduce the impact of dry years on the region and bolster water reliability. Specifically, the proposed Chain of Lakes buildout (HMP.2023.03) is intended to increase local capacity to accept rainwater and runoff and store the excess water to be used for potable use when needed. If implemented, Zone 7 would be able to store a higher percentage of anticipated demands reducing the potential for loss of water service in the event of a drought. This would improve water reliability for the region including locations serving sensitive populations.

3.5 Wildfire Hazard Profile

Wildfire Risk Assessment Summary

Risk Rank: Moderately Low

Probability/ Frequency:	Infrequent event - occurs between once every 8 years and once every 50 years	
Consequence/ Severity:	Extensive building damage, widespread loss of lifelines (water, gas, electricity, sanitation, roads), loss of life	
Vulnerability:	Localized damage area, minor secondary impacts, delayed hazard onset	
Hazard Risk Rank Score:	24	

3.5.1 Wildfire Hazard Information and Background

Fire is a rapid oxidation process that can lead to uncontrolled burning, exposing and possibly consuming structures. Fires often spread quickly, and are usually signaled by dense smoke that may fill the area for miles around. Fires can be human-caused through acts such as arson or can be caused by natural events such as lightning. Fires are typically classified according to the following categories:

- **Urban fires** are primarily those associated with structures and the activities in and around them.
- **Wildland fires** occur in forests or other generally uninhabited areas and are fueled primarily by natural vegetation.



- **Urban Interface fires** occur where development and forest interface, with both vegetation and structures providing fuel, and are sometimes referred to as urban-wildland interface fires.

The following factors contribute significantly to aforementioned fire behavior.

- **Slope/Topography:** As slope increases the rate of fire spread increases. In the northern hemisphere, south facing slopes are also subject to greater solar radiation, making them drier and thereby intensifying fire behavior.
- **Fuel:** Weight and volume are the two methods of classifying fuel, with volume also referred to as fuel loading. Each fuel is assigned a burn index (the estimated amount of potential energy released during a fire), an estimate of the effort required to contain a fire, and an expected flame length.
- **Weather:** Variations in weather conditions have a significant effect on the occurrence and behavior of fires.

Firestorms that occur during extreme weather (e.g. high temperatures, low humidity, and high winds) have high intensity, which can make fire suppression virtually impossible at times. These events typically burn until the conditions change or the fuel is exhausted. Even small fires can threaten lives and resources as well as destroy properties. It is also important to note that, in addition to affecting people, fires may severely affect livestock and pets.

Fire Secondary Events

The aftermath of a fire can be as disastrous, if not more so, than the fire. A particularly destructive fire burns away plants and trees that prevent erosion. If heavy rains occur after a fire, landslides, ash flows, and flash floods can occur. This can result in property damage outside the immediate fire area and can affect the water quality of streams, rivers, and lakes.

Fire as a Secondary Event

In addition to typical ignition sources for fires, earthquakes and floods have the potential to rupture buried gas lines, and high winds or accidents can cause overhead electric lines to break, creating ignition sources for fires. Catastrophic earthquakes have the potential to cause widespread urban fires, as multiple gas and electrical lines could be broken or disrupted.

3.5.2 Wildfire Hazard History

Wildfire is a major hazard to California. The dry, hot weather conditions along with strong dry winds have added to the long history of devastating wildfires. In the past five years,

there have been numerous declared wildfire disasters. These include, but are not limited to, DR-4558-CA, DR-4569-CA, DR-4610-CA, and DR-4619-CA. Table 3.7 provides a selection of some significant wildfires in Northern California and Bay Area along with the number of deaths, acres of land burned and damage to structures, including commercial and residential properties.

Table 3.7: Selected Historical Fires in Northern California (1923-2022)

Year	Fire Name	Location	Acres Burned	Structures Burned	Deaths
1923	City of Berkeley	Alameda	130	584	0
1953	Rattlesnake	Glenn	1,340	0	15
1977	Marble Cone	Monterey	177,866	0	0
1987	Stanislaus Complex	Tuolumne	145,980	28	1
1990	Campbell Complex	Tehama	125,892	27	0
1991	Tunnel - Oakland Hills	Alameda	1,600	2900	25
1992	Fountain	Shasta	63,960	636	0
1999	Jones	Shasta	26,200	954	1
1999	Big Bar Complex	Trinity	140,948	0	0
2008	Basin Complex	Monterey	162,818	58	0
2008	Iron Alps Complex	Trinity	105,855	10	10
2008	Klamath Theater Complex	Siskiyou	192,038	0	2
2012	Rush	Lassen	315,577	0	0
2013	Rim	Tuolumne	257,314	112	0
2014	Happy Camp Complex	Siskiyou	134,056	6	0
2015	Rough	Fresno	151,623	4	0
2015	Valley	Lake, Napa, Sonoma	76,067	1955	4
2015	Butte	Amador, Calaveras	70,868	921	2
2016	Soberanes	Monterey	132,127	68	1
2017	Thomas	Santa Barbara	281,893	1060	0
2017	Atlas	Napa and Solano	51,624	783	6
2017	Central LNU Complex	Napa and Solano	44,573	1355	3
2018	Ranch	Colusa	410,203	246	1
2018	Carr	Shasta and Trinity	229,651	1614	7
2018	Camp	Butte	153,336	18804	85

Year	Fire Name	Location	Acres Burned	Structures Burned	Deaths
2019	Kincade	Sonoma	77,758	374	0
2020	August Complex	Mendocino	1,032,648	935	1
2020	SCU Lightning	Santa Clara	396,624	225	0
2020	Creek	Fresno and Madera	379,895	856	0
2021	Dixie	Butte and Plumas	963,309	1311	1
2021	Monument	Trinity	223,124	28	0
2021	Caldor	El Dorado	221,835	1005	0
2021	River Complex	Siskiyou	199,359	122	0
2022	McKinney	Siskiyou	60,138	185	4
2022	Mill	Siskiyou	3,939	118	2

Source: Information was taken from The Department of Forestry and Fire Protection - [CAL Fire Incident Information](#)

3.5.3 Wildfire Hazard Probability, Frequency, and Magnitude

Wildfires are a major hazard that have historically cost California more than \$800 million each year and contribute to "bad air days" throughout the state. Heat and smoke from fires can be more dangerous than flames.

Figure 3.4 on the following pages illustrates the wildfire threat to Zone 7's service area through the [California Department of Forestry and Fire Protection's Fire and Resource Assessment Program \(FRAP\) map](#). As shown in the figure below, the expected fire hazard is high in the underdeveloped portions of the service area. The Cities of Pleasanton and Livermore are shown in white because fire suppression is the responsibility of the local jurisdiction. Although it is likely that vulnerability to rural hazards exists within these rural areas, Zone 7's critical assets lie mostly in these developed areas.

Wildfires and Climate Change

Wildfires in the U.S. have been on an increasing trend and the effects of climate change has shown to aggravate the frequency and duration of wildfires. Zone 7 anticipates that, as weather patterns continue to change due to climate change, the area will have more intense wet seasons, followed by longer dry periods. When mixed with regular summer temperatures and dryness from reduced precipitation, the probability of wildfires increases.

Impacts on Sensitive Populations

The Steering Committee discussed the populations and assets most likely to be impacted by a wildfire event. In general, it was assumed that those who live on the outskirts of the developed areas were more likely to be impacted. In addition to residents who live in these areas, it was determined that members of the community who are very young and those with mobility and/or cognitive issues would be more vulnerable in the event of a wildfire due to a lack of independence. Limitations that these groups may face would impact their resiliency and ability to respond quickly in the event of a disaster. However, being a wholesale water provider, the most helpful action the Steering Committee could identify was to provide reliable water service for fire suppression. By doing this, the general public, as well as vulnerable populations, would still be able to rely on water for fire suppression, therefore making them more resilient to a wildfire emergency. In order to improve participation in emergency response procedures and coordination with local fire departments, the Steering Committee proposed mitigation action HMP.2023.14 (found in Table 4.5).

In addition to the general public, the Steering Committee identified that the Del Valle Water Treatment Plant was close to being impacted by the 2020 SCU Complex Fires in addition to Lake Del Valle, a State Water Project reservoir which partially supplies Zone 7. However, Zone 7 staff had already reviewed this hazard and implemented a brush abatement policy of 100ft in accordance with National Fire Protection Agency (NFPA) guidance and did not determine additional mitigation actions were needed.

State Responsibility Area Fire Hazard Severity Zones

June 15, 2023

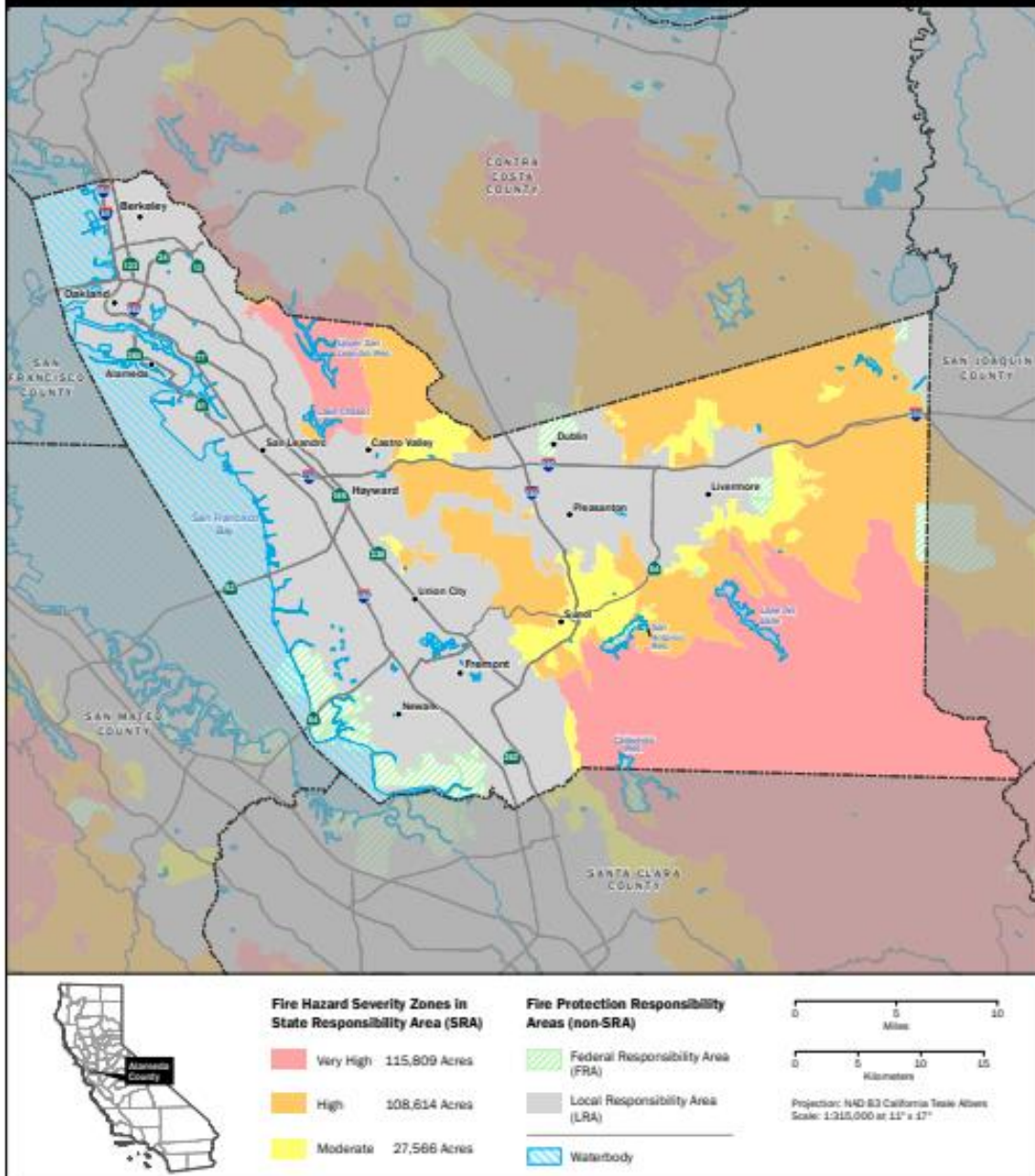
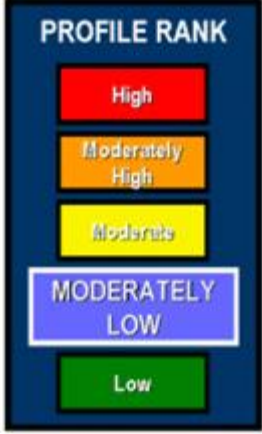


Figure 3.4: Zone 7 Fire Threat Map

3.6 Earthquake Hazard Profile

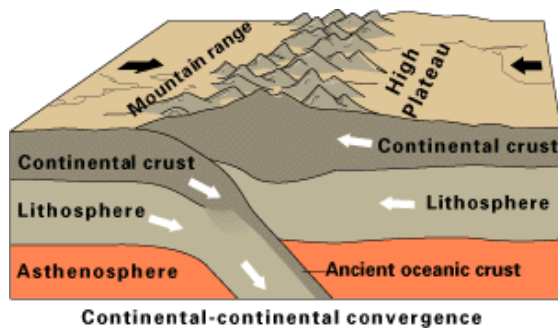
Earthquake Risk Assessment Summary

Risk Rank: Moderately Low

Probability/ Frequency:	Regular event - occurs between once a year and once every 7 years	
Consequence/ Severity:	Moderate building damage, lifeline loss (less than 24 hours), severe injury or disability	
Vulnerability:	Localized damage area, minor secondary impacts, delayed hazard onset	
Hazard Risk Rank Score:	24	

3.6.1 Earthquake Hazard Information and Background

Plate tectonics is a starting point for understanding the forces within the Earth that cause earthquakes. Plates are thick slabs of rock that make up the outermost 60 miles of the Earth. The term "tectonics" describes the deformation of the Earth's crust, the forces producing such deformation, and the geologic and structural features that result. The constant motion of the plates causes stress in the brittle upper crust of the Earth. These tectonic stresses build as the rocks are gradually deformed. The rock deformation, or strain, is stored in the rocks as elastic strain energy. When the strength of the rock is exceeded, ruptures occur along a fault. The rocks on opposite sides of the fault slide past each other as they spring back into a relaxed position.



The strain energy is released partly as heat and partly as elastic waves called seismic waves. The passage of these seismic waves produces the ground shaking in earthquakes.

Faults are more likely to produce future earthquakes if they have rapid rates of movement, have had recent earthquakes along them, experience greater total displacements, and are aligned so that movement can relieve the accumulating tectonic stresses. Geologists classify faults by their relative hazards. “Active” faults, which represent the highest hazard, are those that have ruptured to the ground surface during the Holocene period (about the last 11,000 years). In contrast, “potentially active” faults are those that displaced layers of rock from the Quaternary period (the last 1,800,000 years). Determining if a fault is “active” or “potentially active” depends on geologic evidence, which may not be available for every fault.

Shaking

The amount of energy released during an earthquake is usually expressed as a magnitude and is measured directly from the earthquake as recorded on seismographs. An earthquake’s magnitude is expressed in whole numbers and decimals (e.g., 6.8). Seismologists have developed several magnitude scales. One of the first was the Richter scale, developed in 1932 by Dr. Charles F. Richter of the California Institute of Technology. The most commonly used scale today is the Moment Magnitude (M_w) Scale. Moment magnitude is related to the total area of the fault that ruptured and the amount of offset (displacement) across the fault. It is a more uniform measure of the energy released during an earthquake.

The other commonly used measure of earthquake severity is intensity. Intensity is an expression of the amount of shaking at any given location on the ground surface. In general, it decreases with distance from the source of an earthquake, but it may be increased or decreased by a number of factors.

The Modified Mercalli Intensity Scale and Corresponding Richter Scale Magnitudes

Shaking intensity is often described using the Modified Mercalli Intensity Scale which rates an earthquake’s effects based on human observation. While an earthquake has only one magnitude, it may have many intensity values which will generally decrease with distance from the epicenter. Table 3.6 lists the Mercalli Scale’s various intensity levels and corresponding Richter scale magnitudes.

Table 3.6: Modified Mercalli Intensity Scale

Mercalli Intensity		Description	Richter Scale Magnitude
I	Instrumental	Detected only by a seismograph	
II	Feeble	Noticed by sensitive people	0.1 to 3.4
III	Slight	Like the vibrations due to a passing truck	3.5 to 4.2
IV	Moderate	Felt by people while walking; rocking of loose objects, including standing vehicles	4.3 to 4.8
V	Rather Strong	Felt generally; most sleepers are awakened and bells ring	
VI	Strong	Trees sway and all suspended objects swing; damage by over-turning and falling of loose objects	4.9 to 5.4
VII	Very Strong	General alarm; walls crack; plaster falls	
VIII	Destructive	Car drivers seriously disturbed; masonry fissured; chimneys fall; poorly constructed buildings damaged	5.5 to 6.1
IX	Ruinous	Some houses collapse where ground begins to crack, and pipes break	6.2 to 6.9
X	Disastrous	Ground cracks badly; many buildings destroyed and railway lines bent; landslides on steep slopes	7.0 to 7.3
XI	Very disastrous	Few buildings remain standing; bridges destroyed; all services (railway, pipes, and cables) out of action; great landslides and floods	7.4 to 8.1
XII	Catastrophic	Total Destruction; objects thrown into air; ground rises and falls in waves	8.1 +

Amplification of Seismic Shaking

Although seismic waves radiate from their source like ripples on a pond, the radiation is not uniform due to the complex nature of an earthquake rupture, the different paths the waves follow through the Earth, and the different rock and soil layers near the Earth's surface. Large earthquakes begin to rupture at their hypocenter deep in the Earth and the fault ruptures outward from that point. Because the speed of an earthquake rupture on a fault is

similar to the speed of seismic waves, waves closer to the epicenter can be compounded by waves from farther along the rupture, creating a pulse of very strong seismic waves that moves along the fault in the direction of the fault rupture. Seismic waves may also be modified as they travel through the Earth's crust.

As seismic waves approach the ground surface, they commonly enter areas of loose soils where the waves travel more slowly. As the waves slow down, their amplitude increases, resulting in larger waves with frequencies that are more likely to damage structures. Waves can also be trapped within soft sediments between the ground surface and deep, hard basement rocks, their destructive energy multiplying as they bounce back and forth, producing much greater shaking at the ground surface.

Ground Failure

Fissuring, settlement, and permanent horizontal and vertical shifting of the ground often accompanies large earthquakes. Although not as pervasive or as costly as the shaking itself, these ground failures can significantly increase damage and, under certain circumstances, can be the dominant cause of damage. The following is a list of different ground failure scenarios.

Fault Rupture

The sudden sliding of one part of the earth's crust past another releases the vast store of elastic energy in the rocks as an earthquake. The resulting fracture is known as a fault, while the sliding movement of Earth on either side of a fault is called fault rupture. Fault rupture begins below the ground surface at the earthquake hypocenter, typically between three and ten miles below the ground surface in California. If an earthquake is large enough, the fault rupture will actually travel all the way to the ground surface, severely damaging structures built across its path.

Liquefaction

In addition to the primary fault rupture that occurs right along a fault during an earthquake, the ground many miles away can also fail during the intense shaking. One common type of failure occurs when soft, water-saturated soil settles, causing the water to eject sediment particles as it works its way to the ground surface. This phenomenon, known as liquefaction, turns the soil into a fluid, causing it to lose the ability to support buildings and other structures. Areas susceptible to liquefaction include places where sandy sediments have been deposited by rivers along their course or by wave action along beaches.

3.6.2 Earthquake Hazard History

In the past five years, there have been numerous declared earthquake disasters in California. These include DR-4692 (Bear River Band of Rohnerville Rancheria Earthquake) and EM-3415-CA (California Earthquakes). While DR-4692 impacted Northern California, neither of the two declared disasters are specific to Zone 7's service area. To indicate the potential for an earthquake event, Table 3.8 lists significant recorded earthquakes near the Bay Area and the associated magnitudes over the last couple of hundreds of years (excerpted from the [USGS Earthquake Archives](https://www.usgs.gov/earthquake-archives) and www.earthquakesafety.com):

Table 3.8: Bay Area Historical Earthquakes

■ Under Magnitude 4.5 ■ Magnitude 4.5 - 5.4 ■ Magnitude 5.5 - 6.4 ■ Magnitude 6.5 to 7.4 ■ Magnitude > 7.5		
Magnitude	Year	Earthquake Name/Location
■ Magnitude 6.5 - 7.4	1836	South San Francisco Bay Region
■ Magnitude 6.5 - 7.4	1838	San Francisco Peninsula
■ Magnitude 6.5 - 7.4	1865	San Andreas Fault
■ Magnitude 6.5 - 7.4	1868	Hayward Earthquake
■ Magnitude 6.5 - 7.4	1892	Vacaville Earthquake
■ Magnitude 6.5 - 7.4	1898	Mare Island Earthquake
■ Magnitude > 7.5	1906	Great San Francisco Earthquake
■ Magnitude 6.5 - 7.4	1911	Morgan Hill Earthquake
■ Magnitude 4.5 - 5.4	1932	S of Opal Cliffs, California
■ Magnitude 4.5 - 5.4	1958	17km E of Gilroy, California
■ Magnitude 4.5 - 5.4	1973	Northern California
■ Magnitude 4.5 - 5.4	1974	Central California
■ Magnitude 4.5 - 5.4	1977	San Francisco Bay area, California
■ Magnitude 4.5 - 5.4	1977	Northern California
■ Magnitude 5.5 - 6.4	1979	Northern California
■ Magnitude 4.5 - 5.4	1980	NNE of Concord, California
■ Magnitude 5.5 - 6.4	1980	Livermore Earthquake
■ Magnitude 4.5 - 5.4	1980	NNE of Concord, California

■ Under Magnitude 4.5 ■ Magnitude 4.5 - 5.4 ■ Magnitude 5.5 - 6.4 ■ Magnitude 6.5 to 7.4 ■ Magnitude > 7.5		
Magnitude	Year	Earthquake Name/Location
■ Magnitude 4.5 - 5.4	1981	NNE of Hollister, California
■ Magnitude 5.5 - 6.4	1982	NNW of Coalinga, California
■ Magnitude 4.5 - 5.4	1983	NNW of Coalinga, California
■ Magnitude 5.5 - 6.4	1984	Morgan Hill Earthquake
■ Magnitude 4.5 - 5.4	1986	San Francisco Bay area, California
■ Magnitude 4.5 - 5.4	1988	San Francisco Bay area, California
■ Magnitude 4.5 - 5.4	1989	San Francisco Bay area, California
■ Magnitude 6.5 - 7.4	1989	Northern California
■ Magnitude 4.5 - 5.4	1990	San Francisco Bay area, California
■ Magnitude 4.5 - 5.4	1993	E of Gilroy, California
■ Magnitude 4.5 - 5.4	1993	ESE of East Foothills, California
■ Magnitude 4.5 - 5.4	1996	San Francisco Bay area, California
■ Magnitude 4.5 - 5.4	1999	San Francisco Bay area, California
■ Magnitude 4.5 - 5.4	2002	ESE of La Selva Beach, California
■ Magnitude 4.5 - 5.4	2006	E of San Martin, California
■ Magnitude 5.5 - 6.4	2007	Alum Rock Earthquake
■ Magnitude 4.5 - 5.4	2012	ENE of King City, California
■ Magnitude 4.5 - 5.4	2014	E of Blackhawk, California
■ Magnitude 5.5 - 6.4	2014	NW of American Canyon, California
■ Magnitude 4.5 - 5.4	2022	ESE of Alum Rock, California

Source. [USGS Earthquake Archives](https://earthquake.usgs.gov/)

Figure 3.5, taken from the [USGS Earthquake Archives](https://earthquake.usgs.gov/) on June 26, 2023, details the locations of significant historical earthquakes around the Bay Area with the circle size reflective of the magnitude of the earthquake experienced.



Figure 3.5: Bay Area Historic Earthquakes Map

Bay Area Historic Earthquakes

One of the best indicators of earthquake potential is learning the earthquake history of the area. The following is a discussion on large earthquakes that affected the Bay Area in general, which were also included in Table 3.8

1868 Hayward Earthquake

On October 21, 1868, an earthquake with a magnitude of approximately 7.0 on the Richter scale shook the San Francisco Bay area. With the epicenter at the heart of the Bay Area, this was recorded as one of the most destructive earthquakes in California history resulting in extensive property loss and 30 casualties. The cracking of the ground along the Hayward Fault was traced from San Leandro to Berkeley. Damage was most severe in Hayward and nearby towns along the Hayward fault in Alameda County. At Hayward, then a town with about 500 residents situated on the Hayward Fault, almost every building was damaged extensively or wrecked. At San Leandro, a town of about 400, the second floor of the Alameda County courthouse collapsed, and other buildings were wrecked. At Mission San

Jose, in southern Fremont, the old adobe church and other buildings were destroyed and in San Jose, which lay in the hills several kilometers west of the fault trace with about 9000 residents, experienced extensive property damage. Across the Bay, in the City of San Francisco, the Custom House and several other structures built on a landfill reclaimed from the former Yerba Buena Cove (today's Financial District), sustained



severe damage, and many cornices, awnings, and walls fell, but, as occurred later in the shock of 1906, well-constructed buildings on firm ground sustained little damage. Damage in Oakland, having a population of about 12,000, and mainly wood frame buildings, was much less than observed farther south at San Leandro and Hayward.

This earthquake was known as the "great San Francisco earthquake" until the magnitude 7.8 shock on April 18, 1906.

1906 The Great San Francisco Earthquake

On the morning of April 18, 1906, one of the most devastating earthquakes in the history of California hit the City of San Francisco with an estimated magnitude of 7.8 on the Richter scale. The earthquake was felt from southern Oregon to Los Angeles and inland as far as



central Nevada. The earthquake also ignited several fires around the city that burned for three days and destroyed nearly 500 city blocks.

The earthquake and resulting fires caused an estimated 3,000 deaths and 524 million dollars in property loss. The earthquake ruptured the northern section of the San Andreas fault, and its displacement was observed over a distance of 300 kilometers from San Juan Bautista to Point Arena, where it passes out to sea. This earthquake caused the lengthiest rupture of a fault that has been observed in the contiguous United States.

The earthquake and resulting fires caused an estimated 3,000 deaths and 524 million dollars in property loss. The earthquake



Hibernia bank building



Southwest from the corner of Geary and Mason streets

1911 Morgan Hill Earthquake

The 1911 Morgan Hill earthquake occurred five years after the devastating 1906 earthquake along the Calaveras Fault with a magnitude of 6.5 on the Richter scale. This short time interval contradicted the estimated failure rate of the Calaveras fault segment. This earthquake destroyed chimneys and cracked brick walls in Gilroy, Los Gatos, Morgan Hill, San Jose, Santa Clara, and shock waves were felt as far as Reno and Carson City in Nevada.

1989 Loma Prieta Earthquake

The 1989 Loma Prieta earthquake occurred on October 17, 1989, with a magnitude of 6.9 on the Richter scale. The quake rocked the California coast from Monterey to San Francisco. The earthquake was triggered by a slip along the San Andreas Fault. Its epicenter was in the Forest of Nisene Marks State Park, near Loma Prieta peak in the Santa Cruz Mountains, northeast of Santa Cruz and approximately 60 miles (100 km) south of San Francisco. The earthquake killed 63 people, nearly 3,800 injuries and caused an estimated 6 billion dollars in property damage. This earthquake ended decades of tranquility in the San Francisco Bay area since the Great San Francisco earthquake of 1906.



The most severe damage was suffered by the Cities of San Francisco and Oakland, but communities throughout the region, including Alameda, Santa Clara, Santa Cruz, and Monterey, also were affected. San Francisco's Marina district was particularly hard hit because it had been built on filled land (comprising loose, sandy soil) Unreinforced masonry buildings in Santa Cruz (many of which were 50 to 100 years old) failed completely. The earthquake significantly damaged the transportation system of the Bay Area. The collapse of the Cypress Street Viaduct (Nimitz Freeway) caused most of the earthquake-related deaths. The San Francisco–Oakland Bay Bridge was also damaged when a span of the top deck collapsed. In the aftermath, all bridges in the area underwent seismic retrofitting to make them more resistant to earthquakes.



Collapsed San Francisco- Oakland Bay Bridge



House Moved off Cement



Damaged building due to lack of shear walls



Collapsed Cypress viaduct

When comparing the greatest recorded earthquakes in American history and the level of population and development today against that which existed at the time of the event, the scale of potential damage is staggering.

Cost of Past Disasters in Today's Dollars:

- 1868 Hayward Earthquake, Estimated insured losses in today's dollars (according to Verisk Analytics) - \$23 Billion
- 1906 The Great San Francisco Earthquake, Estimated insured losses in today's dollars (according to Verisk Analytics) - \$93 Billion
- 1989 Loma Prieta Earthquake, Estimated insured losses in today's dollars (according to Verisk Analytics) - \$7 Billion

Even if the epicenter of a major earthquake is not located directly within Zone 7, the aftershocks associated with that earthquake can cause significant damage. The hazards associated with aftershock earthquakes are the same as mainshock earthquakes and may cause significant damage and disruption. The primary difference between mainshock and aftershock earthquakes is aftershock earthquakes are categorized by the following two guidelines. First, it must occur within one rupture length of the mainshock rupture surface, or alternatively, within an "aftershock zone" based upon early aftershock activity and defined by seismologists. Second, it must occur within that designated area before the seismicity rate in that area returns to its "background", meaning pre-mainshock, level.

3.6.3 Earthquake Hazard Probability, Frequency, and Magnitude

The Steering Committee ranked earthquakes as the fourth largest threat. Zone 7 is located in a seismic fault zone near the Greenville Fault, Calaveras Fault, Las Positas Fault, Hayward Fault, Chabot Fault, Pleasanton Fault, Willems Fault, Mission Fault and the Black Butte Fault according to a Preliminary Alquist-Priolo Earthquake Fault Zone map provided by the California Department of Conservation website and is located in a moderately high seismic risk zone. Figure 3.6 shows the local earthquake faults around Zone 7's service area and demonstrates that all parts of the Service Area are vulnerable to earthquakes. However, it should be noted the southern portion of the Service Area is sparsely populated and less developed; greatly diminishing the impacts of an earthquake event in those areas.

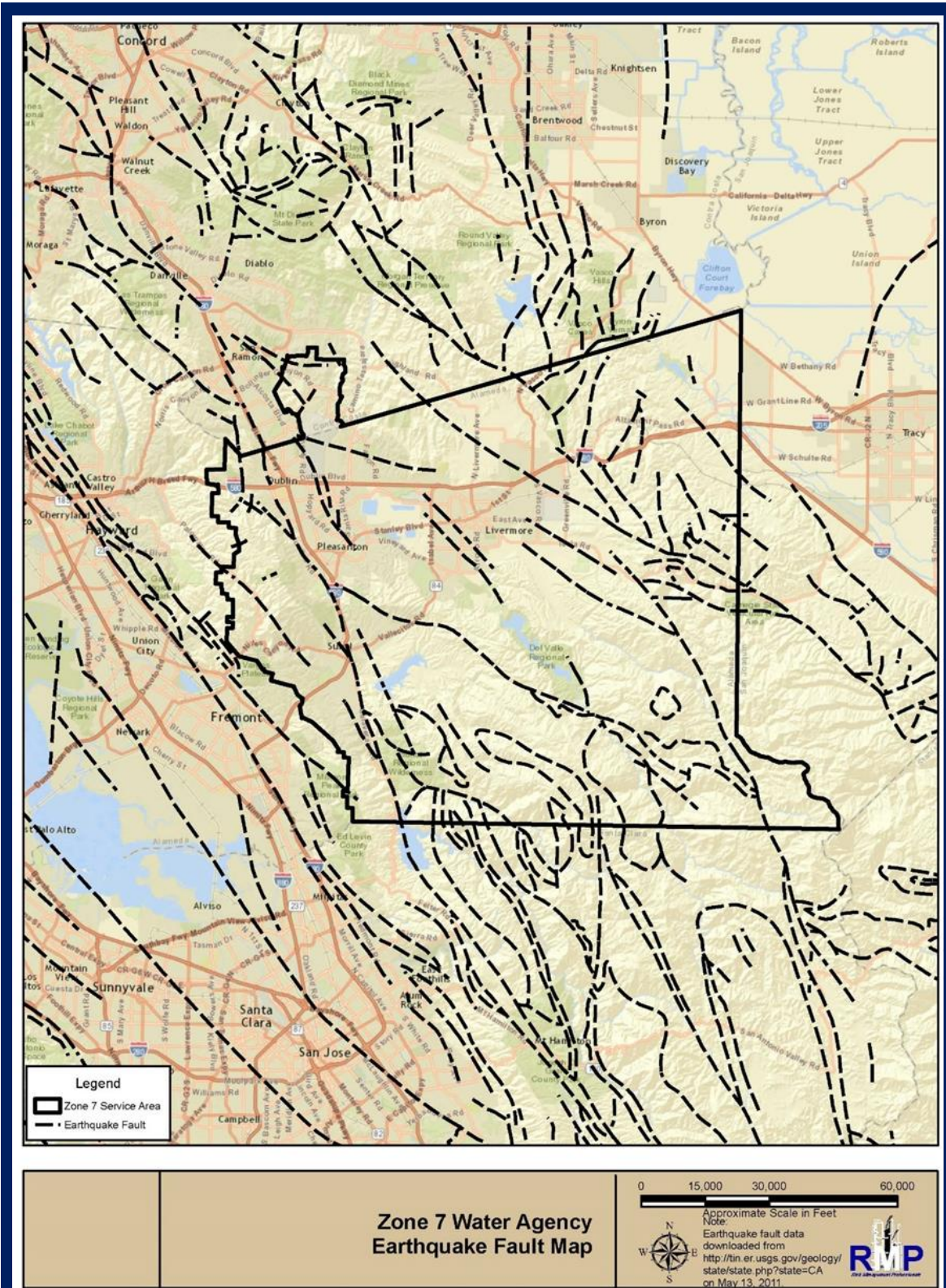


Figure 3.6: Zone 7 Service Area Earthquake Fault Map

Fault Zones

There are many faults and fault zones throughout the Bay Area. After reviewing maps of the United States, California and specifically the Bay Area, the research showed potential earthquake areas that could impact Zone 7. These faults, all considered active and are capable of producing earthquakes in the 4.5 – 8+ magnitude range. This report focused on the following faults that could most seriously impact Zone 7.

- San Andreas Fault
- Hayward Fault
- Calaveras Fault
- Greenville Fault

A major earthquake along any of these faults could result in substantial casualties and damage resulting from collapsed buildings, damaged roads and bridges, fires, flooding, and other threats to life and property. There may still be unmapped earthquake faults throughout the Bay Area that could also affect Zone 7. Tables 3.9 through 3.12 give fault specific information for local faults that could affect Zone 7.

The San Andreas Fault

Table 3.9: San Andreas Fault Information

Type of fault:	Right-lateral strike-slip
Length:	1,200 kilometers (km)
Nearby Communities:	San Jose, San Mateo, Palo Alto, South San Francisco, and Sunnyvale
Last Major Rupture:	June, 1838 (Northern segment), January 9, 1857 (Mojave segment); April 18, 1906 (Northern segment), October 17, 1989 (Northern segment)
Slip rate:	20-35 mm/year
Interval Between Major Ruptures:	Recurrence intervals vary greatly from under 20 years (at Parkfield only) to over 300 years
Probable Magnitudes:	6.8 to 8.0
Distance and Direction from Zone 7:	Approximately 40 miles west

Source: [Southern California Earthquake Data Center at Caltech](#)

This fault marks the boundary between the North American and Pacific tectonic plates and is capable of producing earthquakes in the magnitude 8+ range. It has been scientifically determined through a carbon dating process, over the past 1,400 to 1,500 years, a major earthquake on this fault has occurred approximately every 140 to 150 years. In the northern section of the San Andreas, there is a slightly lower potential for a great earthquake within the next few decades as compared to the southern San Andreas section. This is because less than 100 years have passed since the great 1906 earthquake, however, moderately-sized, potentially damaging earthquakes could occur on this fault at any time near Zone 7.

The Hayward Fault

Table 3.10: Hayward Fault Information

Type of fault:	Right-lateral strike-slip
Length:	119 km (74 miles [mi])
Nearby Communities:	San Jose, Oakland, Fremont, Richmond, Berkeley, Hayward, San Leandro, San Lorenzo, El Cerrito, Emeryville, Kensington and Milpitas
Last Major Rupture	October 2007 (5.6 Magnitude); October 21, 1868 (7.0 Magnitude)
Slip rate:	One-fifth of an inch/year (5 mm/year)
Interval Between Major Ruptures:	About 140 years according to past 5 major earthquakes
Probable Magnitudes:	6.0 to 7.5
Distance and Direction from Zone 7:	Runs adjacent to Zone 7's service area

Source: [United States Geological Survey](#)

The Hayward Fault is situated mainly along densely populated areas along the San Francisco Bay Area. It runs through parallel to the San Andreas Fault and to the north of Calaveras Fault. Scientists have determined according to the past five earthquakes, that large destructive earthquakes occur every 140 years. As the last major earthquake was in 1868, it is understood that the Hayward Fault is past due for a major earthquake. According to USGS, a major earthquake along the Hayward Fault would impact more than five million people, leaving hundreds of thousands homeless and cause 165 billion dollars in property damage. It is also expected to cause post-quake fires, landslides and wildfires.

The Calaveras Fault

Table 3.11: Calaveras Fault Information

Type of fault:	Right-lateral strike-slip
Length:	123 km (76 mi)
Nearby Communities:	Alamo, Danville, San Ramon, Dublin, Pleasanton, Sunol, Milpitas, San Jose, Gilroy, and Hollister
Most Recent Surface Rupture	1984 Morgan Hill, 2007 Alum Rock earthquake
Slip rate:	6 mm/yr. north of its intersection with the Hayward Fault and 15 mm/yr. to the south.
Interval Between Major Ruptures:	Unknown (approximated at 465 years +/- 130 years)
Probable Magnitudes:	6.7
Distance and Direction from Zone 7:	Runs through Zone 7's service area

Source: [United States Geological Survey](#)

The Calaveras Fault is a major branch of the San Andreas Fault. The 1911 and 1984 Morgan Hill earthquakes were a result of the failure of the southern half of the central segment of the Calaveras fault failure. The Alum Rock earthquake that occurred on October 2007 with a magnitude of 5.4 on the Richter scale was a result of the failure of the northern end of the central segment of the Calaveras Fault. The last known major surface rupture was prior to 1776. According to a 2003 USGS report, there is an 11% probability for an earthquake of 6.7 magnitude or larger at the Calaveras Fault in the next 30 years.

The Greenville Fault

Table 3.12: Greenville Fault Information

Type of fault:	Right-lateral strike-slip
Length:	180 km
Nearby Communities:	Livermore, Pleasanton, and Dublin
Last Major Rupture	1980 Livermore Earthquake
Slip rate:	2 mm/yr.

Interval Between Major Ruptures:	240 years
Probable Magnitudes:	6.2 to 6.9
Distance and Direction from Zone 7:	Runs through Zone 7's service area

Source: [United States Geological Survey](#)

The Greenville fault runs parallel to the San Andreas Fault, but has much less capacity for rupture. It borders the eastern side of Livermore Valley and extends along the Marsh Creek and Clayton faults toward Clayton Valley. The January 24, 1980 Livermore earthquake occurred on this fault with a magnitude of 5.8. According to the slip rate and interval between major ruptures, a large earthquake along the Greenville fault in the next 30 years is relatively low.

Peak Ground Acceleration

Peak Ground Acceleration (PGA) mapping represents peak horizontal acceleration of the ground on firm-rock conditions. The approach of representing peak horizontal ground acceleration on firm-rock is a common and widely used method of showing ground accelerations. The development of probabilistic acceleration maps are a result of three types of basic input parameters:

- Attenuation of ground shaking with distance from the earthquake source;
- Frequency of earthquakes within an area or region, termed recurrence; and
- The character and extent of regions and faults that generate earthquakes.

According to the following Peak Ground Acceleration Map in Figure 3.6, Zone 7 is located in an area that will experience a PGA ranging from 0.59g to 1.00g with 2% exceedance in 50 years (0.0004 annual probability).

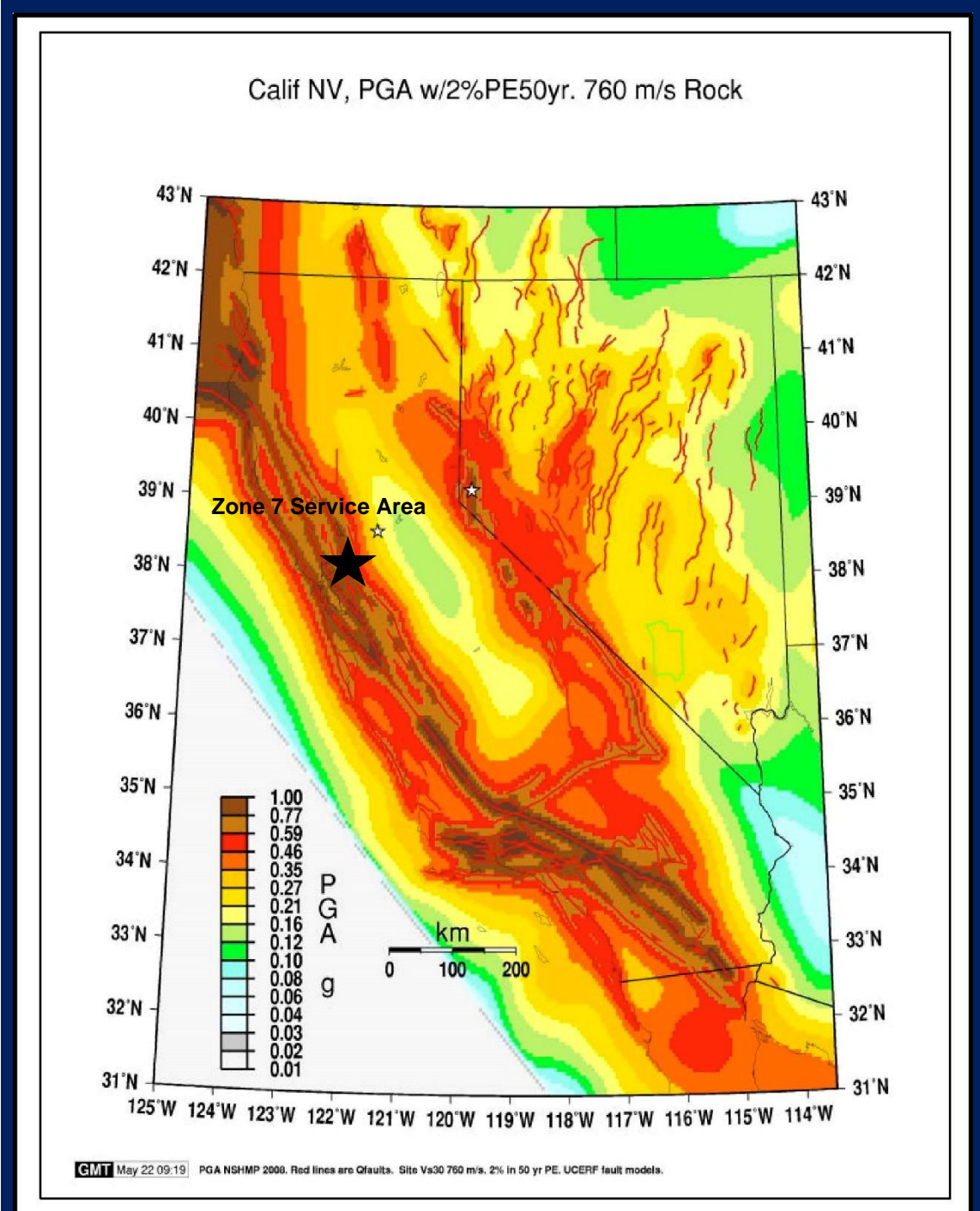


Figure 3.7: Zone 7 Peak Ground Acceleration Map

According to Table 3.13 below (provided by the USGS), this PGA Value is typically associated with a 6.2 to 6.9 magnitude earthquake. Thus, there is a 0.0004% annual possibility of a 6.2 to 6.9 magnitude earthquake affecting Zone 7.

Table 3.13: Mercalli Intensity and Corresponding Peak Group Acceleration

Mercalli Intensity	Richter Intensity	Acceleration (%g)	Velocity (cm/s)	Perceived Shaking	Potential Damage
I	3.5	< 0.17	< 0.1	Not Felt	None
II-III	4.2 – 4.3	0.17 - 1.4	0.1 - 1.1	Weak	None
IV	4.8	1.40 – 3.9	1.1 - 3.4	Light	None
V	4.9 – 5.4	3.9 - 9.2	3.4 - 8.1	Moderate	Very light
VI	5.5 – 6.0	9.2 - 18	8.1 - 16	Strong	Light
VII	6.1	18 - 34	16 - 31	Very Strong	Moderate
VIII	6.2	34 - 65	31 - 60	Severe	Moderate to Heavy
IX	6.9	65 - 124	60 - 116	Violent	Heavy

Source: [United States Geological Survey](https://www.usgs.gov/media/factsheet/mercalli-intensity-scale)

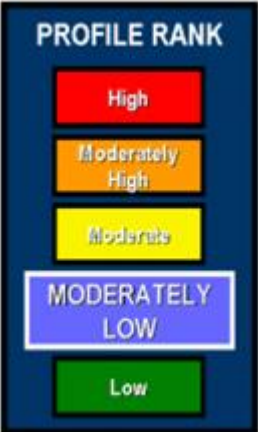
Impacts to Vulnerable Populations & Assets

It is important to note that while an earthquake might have the capacity to affect the District’s underground infrastructure, in general the sensitive populations would not be impacted in a greater way than other community members. Furthermore, the impacts of Earthquake as they relate to water service, are expected to be handled by the local jurisdiction for the developed regions of the service area. However, the Steering Committee noted a ranch house owned by Zone 7 which houses a tenant. The location is remote and, of Zone 7’s assets, most likely to be impacted by earthquake. As a result, the Steering Committee proposed mitigation action HMP.2023.13 to tackle any structural improvements needed at Zone 7 facilities. This action is meant to include the Ranch House as well as other structural integrity needs throughout Zone 7’s network of assets.

3.7 Infrastructure Failure Hazard Profile

Infrastructure Failure Risk Assessment Summary

Risk Rank: Moderately Low

Probability/ Frequency:	Infrequent event - occurs between once every 8 years and once every 50 years	
Consequence/ Severity:	Moderate building damage, minor loss of lifelines (less than 12 hours), lost time injury but no disability	
Vulnerability:	Moderate damage area, moderate secondary impacts, moderate warning time	
Hazard Risk Rank Score:	24	

3.7.1 Infrastructure Failure Hazard Information and Background

Water is conveyed from the supply source to the end user through a network of pipelines, canals, pumps, and other appurtenances. According to the Centers of Disease Control and Prevention (CDC), drinking water supplied to homes in the U.S. is one of the safest in the world. Water supply agencies use various methods of water treatment to ensure the drinking water provided to the public is safe for consumption. The treatment processes used by Zone 7 are described below.

Coagulation/Flocculation: In this step, iron or aluminum salts called coagulants are added to the source water. The particles then bind together or coagulate. Gentle mixing helps create larger particle groups called floc.

Sedimentation: In this step, the heavy floc settle, leaving clarified water.

Filtration: Clarified water travels through layers of sand and anthracite coal to remove remaining sediment.

Disinfection: This is a crucial step in the water treatment process. A disinfectant residual is also provided to protect from microbial growth in the distribution system.

Causes of Infrastructure Failure:

With increasing population and the need for reliable water supply, infrastructure failure is a critical hazard that is commonly overlooked. One of the main causes of infrastructure failure in the water supply systems is aging of equipment such as pipelines, tunnels, dams, pumps, tanks and buried equipment. Protecting the pump and filtration systems from inlet sand and gravel is vital in extending the life of filter membranes and pump internals. Lack of regular maintenance, improper operation and corrosion over time can add to the loss of mechanical integrity. This can also lead to water quality issues and contaminated water supply to the public.

Infrastructure failure can also occur as a secondary impact during natural disasters such as earthquakes, landslides, and flooding. Ground shaking and support damage can cause failure of piping and aqueducts which may result in disrupted water flow to the public. Failure history, probability, frequency, and magnitude of hazards such as earthquakes, landslides and flooding are discussed in other sections.

3.7.2 Infrastructure Failure Hazard History

The most common infrastructure failure seen in California’s water system is water main failure. These failures have been known to result in property damage, disruption of traffic, loss of water and high repair costs. The following are examples of some of the reported main break in the Alameda County Area.

2020 Oakland Area Main Break

On August 13, 2020, [ABC News](#) reported that hundreds of residents of Berkeley, Emeryville, and Oakland were left without water due to multiple water main breaks. It was reported that the first break was likely caused by too much pressure being applied on older pipes. In addition to this first break, at least 16 more were reported at smaller distribution pipelines, due to older and more brittle pipes. Despite the fact that no one was seriously injured, the



EBMUD crews set up caution signs while responding to flooding in the street

incident left over 300 residents without water while East Bay Municipality Utility District officials worked to quickly repair the water main breaks.

2022 Richmond District Main Break



San Francisco Fire Department responds to water main break

According to [SFGate](#), in October of 2022, a water main broke in the Outer Richmond District of San Francisco on the edge of Golden Gate park. The break affected four homes and a multi-residence unit. The Fire Department reported that the break was associated with a 6 foot by 6-foot sinkhole, causing flooding in the streets. Directly after the break occurred, residents were reporting that their water faucets were dispensing brown water, causing concern.

3.7.3 Infrastructure Failure Hazard Probability, Frequency, and Magnitude

Zone 7 has an extensive network of channels and piping that is susceptible to failure throughout its service area which could cause localized flooding of property, disrupt traffic and businesses, create sinkholes, and disrupt water service. Other infrastructure failures such as pump failures and water filtration system failures can also disrupt water supply to public. However, Zone 7's treatment and transmission system incorporates redundancy to minimize the risk of any major disruption to the public. The majority of Zone 7's water supply comes from the State Water Project, which conveys water from Lake Oroville to the Livermore-Amador Valley on facilities owned, maintained, and operated by the California Department of Water Resources (DWR). Zone 7, as a State Water Project Contractor, is ultimately responsible for the costs associated with construction, operations, and maintenance of DWR's facilities in proportion to its reserved capacity. Therefore, the Steering Committee decided to include one DWR facility, the South Bay Aqueduct, in the asset inventory. The South Bay Aqueduct is the sole conveyance facility that Zone 7 utilizes to import water from outside the Livermore-Amador Valley.

Once water reaches the Livermore-Amador Valley, Zone 7 takes control of the water and distributes water via its own facilities.

Zone 7's water supply system generally consists of:

- 43 miles of Potable Water Transmission Lines

- 2 Surface Water Treatment Plants
- 10 Groundwater Production Wells
- 1 Groundwater Demineralization Plant
- 3 Booster Pump Stations

Failure of these facilities could potentially cause localized flooding of property, disrupt traffic and businesses and disrupt water supply to the public. Other infrastructure failures resulting from earthquakes, flooding and drought can compound to the hazards and are discussed in other sections. For example, in the event either one of the water treatment plants goes offline unexpectedly, the other treatment plant can be brought online. Well sites can be brought online as well.

The age of Zone 7's facilities vary, ranging from World War II to present. The two water treatment plants, Del Valle and Patterson Pass, were constructed in 1974 and 1962 respectively. Significant upgrades were completed on the Patterson Pass Water Treatment Plant in 2022 while Del Valle Water Treatment Plant was last upgraded in 2020.

Zone 7 also provides regional flood protection for eastern Alameda County. Zone 7's flood control infrastructure generally consists of 37 miles of flood protection channels and appurtenances (about a third of the miles of channel in the Livermore-Amador Valley). These facilities are used year-around to convey water, but typically see the most intensive use during the winter when storm flows and watershed runoff are at their highest. If this infrastructure does fail, Zone 7 might not be able to immediately repair these facilities due to active storm flows, residual flows from a previous storm, an impending storm, access and safety issues, and environmental regulations.

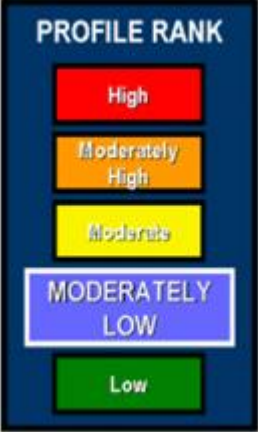
Zone 7's flood protection channels are generally below ground surface, and do not rely on levees or raised banks. The primary concern for infrastructure failure is bank slope failures channel blockage, reduced capacities, sedimentation, and erosion/avulsion. The steering committee considered these types of failures as part of the severe storm/flood hazard.

Other hazards such as earthquake and wildfire can also cause infrastructure failure, and the Steering Committee considered those failures as part of the primary hazard.

3.8 Water Contamination Hazard Profile

Water Contamination Hazard Assessment Summary

Risk Rank: Moderately Low

Probability/ Frequency:	Rare event- occurs less than once every 50 years	
Consequence/ Severity:	Moderate building damage, lifeline loss (less than 24 hours), severe injury or disability	
Vulnerability:	Moderate damage area, moderate secondary impacts, moderate warning time	
Hazard Risk Rank Score:	16	

3.8.1 Water Contamination Hazard Information and Background

Signed in 2012, California Assembly Bill 685 recognizes the value of safe drinking water, stating “every human being has the right to safe, clean, affordable, and accessible water adequate for human consumption, cooking, and sanitary purposes”. Water contamination was deemed to be a moderately low hazard risk to impact the public water supply, but extremely important considering Zone 7 is a water agency. Water contamination can be characterized as the presence of waste, chemicals, or other particles that make water sources harmful to the organisms that need that water to survive. Some contaminants are naturally occurring while others are anthropogenic. Examples of water contaminants found in Zone 7’s service area are PFAS and Hexavalent Chromium.

PFAS are a group of human-made chemicals which have properties that allow them to repel water, oil, grease, and stains. These substances affect water providers across the globe, being that they are substances found in a variety of consumer, commercial, and industrial products. These contaminants don’t break down like normal substances and are extremely small, which prevents systems from filtering them out completely. The result is a buildup of

these substances, with higher usage resulting in higher levels. It is important to note that there are thousands of PFAS chemicals, and that scientific studies show that levels have been detected in water, air, fish, and soil around the world. In addition, it has been determined that exposure to some of these chemicals can be linked to harmful health effects in animals and humans. The US EPA is in the process of setting maximum contaminant level for PFAS compounds.

3.8.2 Water Contamination Hazard History

The following are historic examples of water contamination disasters.

2010 Deepwater Horizon

The Deepwater Horizon Oil Spill was an industrial disaster that caused extensive damage to the Gulf of Mexico and surrounding areas. This incident is classified as the largest offshore oil spill in the history of the United States. A crew on the Deepwater Horizon drilling rig was working on closing an exploratory oil well in the Gulf of Mexico when a pulse of gas shot up, buckling the drill pipe. The emergency valve failed, with gas reaching the drill rig, causing an explosion that injured 17 people and killed 11 crew members.

Releasing over 200 million gallons of oil over a period of 87 days, five states' shorelines were impacted. The northern Gulf of Mexico was home to thousands of marine animals and exposed them to dangerous quantities of oil. This water contamination incident contaminated every type of habitat that the marine mammals occupied. Not only did the oil affect the habitats of the animals, but it also exposed the animals to oil by inhalation, aspiration, ingesting contaminated sediment, water, or prey, and through absorption of contaminants through the skin. This caused harmful effects to their health such as reproductive failure and organ damage. Specifically, sea turtles were reported to have decreased mobility, exhaustion, dehydration, overheating, and decreased ability to evade predators. In addition, many species of birds in the region faced adverse health effects such as poisoning, skin irritation, and matting of feathers which prevented them from flying.

The surrounding ecosystems and local economies were significantly compromised because of the incident, and the response and natural resources damage assessment was the most extensive in the nation's history. While a lot of the effects were felt soon after the explosion, there were a significant number of long-term consequences that the nation is still facing. Oil has the potential to remain in the environment much after a spill occurs and is still detected to this day in the regions near the explosion.

2014 Flint Michigan

One of the most widely discussed instances of water contamination in the United States is the incident in Flint, Michigan. In 2014, the city of Flint changed its water supply from Detroit's water system to the Flint River. While it was done to save costs, and as a temporary measure until a new pipeline from Lake Huron was built, it ended up costing the city much more when the water became contaminated with lead.

For over a hundred years, the Flint River was used as an unofficial waste disposal area for both treated and untreated refuse. The city has a long history of functioning car factories, paper mills, and meatpacking plants. Much of the waste, as well as raw sewage from Flint's waste treatment plant and urban and agricultural runoff, entered the Flint River. Even though it was acknowledged that the water was highly corrosive, and the water was contaminated, the city did not treat the water properly, leading to lead from the aging pipes entering the water distribution.

What ensued after this decision was detrimental to the health of many residents of the city. Soon after being supplied the water from the Flint River, members of the community began complaining about the look, taste, and smell of the water. Only a year later it was revealed to the public that water samples taken from various homes citywide show that lead levels had risen and were above the "federal action level" of 15 ppb (parts per billion). Additionally, it was discovered that the switch in water supply to the contaminated water coincided with an outbreak of Legionnaires' disease. This outbreak resulted in the illness of 87 people and death of 12 people by 2015. Figure 3.8 highlights the dangerous levels of lead that were in the contaminated water being distributed to residents of the city.

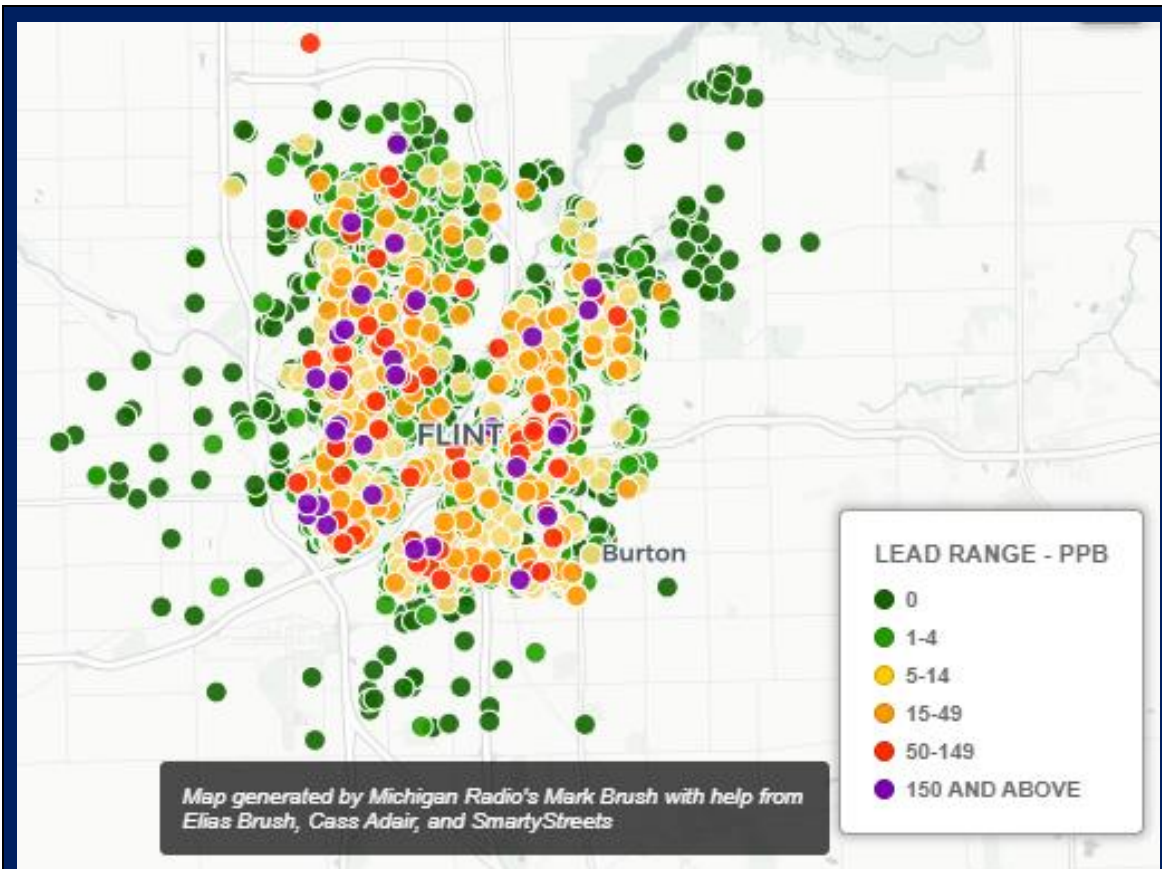


Figure 3.8: Flint Drinking Water Test Levels for Lead

Note: Map acquired from [pbs.org](https://www.pbs.org)

3.8.3 Water Contamination Hazard Probability, Frequency, and Magnitude

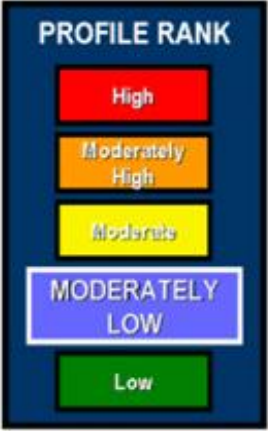
While there is no way to determine the probability of a water contamination incident, Zone 7 recognizes the potential for an incident to impact the service area.

To address water contamination from PFAS in the groundwater, Zone 7 is in the process of constructing two PFAS treatment facilities, the first of which became operational in fall of 2023. Zone 7 continues to make investments and upgrades in its water treatment facilities to reduce the risk and effects of water contamination.

3.9 Adversarial/ Human-Caused Events Hazard Profile

Adversarial/ Human-Caused Events Risk Assessment Summary

Risk Rank: Moderately Low

Probability/ Frequency:	Rare event – occurs less than once every 50 years	
Consequence/ Severity:	Extensive building damage, widespread of lifelines (water, gas, electricity, sanitation, roads), loss of life	
Vulnerability:	Localized damage area, minor secondary impacts, delayed hazard onset	
Hazard Risk Rank Score:	15	

3.9.1 Adversarial/ Human-Caused Events Hazard Information and Background

An adversarial/ human-caused event can be described as the unlawful use of force or violence against persons or property to intimidate or coerce a government, the civilian population, or any segment thereof, in furtherance of a political or social objective. This term is closely linked to the word terrorism and may be used interchangeably in the sections below.

There are a number of methods an adversarial event/ human cause hazard can be carried out, including attacks of a chemical, biological, radiological, nuclear, explosive, and cyber nature. In addition, adversarial events can also include arson, assaults, violence, sabotage of critical infrastructures such as utilities and transportation, and the dissemination of confidential or otherwise sensitive information.

3.9.2 Adversarial/Human-Caused Events Hazard History

The U.S. has proven to be a high priority target for both domestic and international adversarial/ human-caused events and several events have targeted the utility industry in the Bay Area.

For example, an adjacent water district to Zone 7 experienced an adversarial event on May 21, 2015, where four men vandalized an inflatable dam on Alameda Creek. This led to a loss of nearly 50 million gallons of water, enough to supply about 500 homes for a year, into the San Francisco Bay.

Another notable event in the Bay Area occurred on April 16, 2013 when a sniper shot 17 transformers at a Pacific Gas and Electric substation near Morgan Hill in the middle of the night resulting in \$15 million in damage.

In January 2021, a former contractor for the town of Discovery Bay allegedly hacked into the City's computer networks in an attempt to uninstall critical software needed to operate its water treatment plant and distribution system which serves 15,000 residents.

3.9.3 Adversarial/ Human-Caused Events Hazard Probability, Frequency, and Magnitude

Although there is no way to determine the probability, Zone 7 recognizes the potential for a terrorism event to impact the service area. The Lawrence Livermore National Laboratory campus is located within Zone 7's service area, along with a large population, and an Army Reserve Base. Given current terrorism trends, the threat of an adversarial event is a credible possibility, and the Steering Committee ranked the probability of terrorism accordingly during the Hazard Identification Workshop. Several members of the Steering Committee were involved in Zone 7's 2020 Emergency Response Plan effort.

3.10 Utility Loss Hazard Profile

Utility Loss Hazard Assessment Summary

Risk Rank: Moderately Low

Probability/ Frequency:	Infrequent event – occurs between once every 8 years and once every 50 years	
Consequence/ Severity:	Minor/slight damage to buildings and structures, no loss of lifelines, first aid injury and no disability	
Vulnerability:	Localized damage area, minor secondary impacts, delayed hazard onset	
Hazard Risk Rank Score:	12	

3.10.1 Utility Loss Hazard Information and Background

While electric power, water, telecommunications, highway transportation, wastewater systems, and natural gas are all examples lifeline utilities necessary for a community to thrive, loss of power is the utility that has the most potential for disrupting Zone 7 operations. Loss of any power may occur as a secondary impact of earthquakes, landslides, or failure of pipes or as a result of human error, among other factors.

Power Failure

A power outage is the loss of the electricity supply to an area. In addition to natural hazards, power failure can result from a defect in a power station, damage to a power line or other part of the distribution system, a short circuit, or the overloading of electricity mains.

A power outage may be referred to as a blackout if power is lost completely, or as a brownout if some power supply is retained, but the voltage level is below the minimum level specified for the system, and a short circuit indicates a loss of power for a short amount of

time (usually seconds). Some brownouts, called voltage reductions, are made intentionally to prevent a full power outage.

Zone 7 is heavily dependent upon energy to produce and distribute drinking water supplies. Electricity is used at the water treatment plants, at various transmission pump stations, and for all 10 well sites. The most critical sites have backup power generation onsite to minimize any potential water service disruptions. During an extended power outage, Zone 7 would have to consider refueling these diesel fueled generators.

3.10.2 Utility Loss Hazard History

The Bay Area has experienced a number of power outages; either as a result of human error or as a secondary effect of natural hazards such as earthquakes, landslides, etc. Power outages can also occur as a result of weather cycles and increased fluctuations in energy demands. Some of the significant power outages in the history of California are discussed below.

1998 San Francisco Power Outage

On December 8, 1998, over 350,000 buildings and almost a million people were affected by an outage caused when the Pacific Gas and Electric Company placed a San Mateo substation online while the station was still grounded following maintenance. This drew so much power that it immediately shutdown 25 substations in the San Francisco Bay Area. Power outages continued for over eight hours and estimated losses were in tens of millions of dollars.

2000-2001 California Energy Crisis

In 2000 and 2001, California experienced multiple large-scale blackouts due to losses in transmission, generation, energy market manipulation, and/or extremely severe temperatures that lead to heavy electric power consumption. This crisis brought to light many critical issues surrounding the state's power generation and distribution system, including its dependency on out-of-state resources.

2011 Southwest Blackout

During September 2011, a system disturbance led to cascading outages and left about 2.7 million people without power. The outages affected parts of Arizona, southern California and Baja California, Mexico. All of about 1.5 million people in San Diego lost power for about 12 hours. This affected schools, businesses, traffic, flights, public transportation and even water and sewage pumping stations.

2016 Power Outages

While not as severe as the 2011 blackout event, the Bay Area experienced a significant loss of power on October 14, 2016 as the result of a powerful storm. Between the North Bay and East Bay areas, over 22,800 customers were without power according to CBS news coverage of the event. In addition, 41,000 in Oakland were without power in another outage on December 10, 2016.

2019 California Power Shutoffs Power Outages

In 2019, Pacific Gas and Electric Company, Southern California Edison, and San Diego Gas & Electric performed public safety power shutoff events that lasted from October 9 to November 1, 2019 and on November 20, 2019. These shutoff events were an attempt to prevent wildfires from occurring during strong and dry winds. These shutoffs initially affected 2.5 million people but later expanded to over 3 million people. These events developed into an emergency situation, but they stand as a case-in-point that the area is vulnerable to significant power outages. It should be noted that Pacific Gas and Electric, Zone 7's electric provider, continues to implement Public Safety Power Events during severe weather to prevent wildfires.

In order to mitigate severe consequences and protect the communities from power outages, California has implemented several energy conservation programs, energy efficiency and alternative energy programs. Rolling blackouts during heat waves are an indication of the higher demand for power and the need for appropriate planning for alternate power sources.

3.10.3 Utility Loss Hazard Probability, Frequency, and Magnitude

Currently, there is no mechanism to calculate the probability of a power failure without evaluating the failure as a cascade effect from natural hazards (i.e., earthquakes). However, based upon historical events, minor power failure occurs at least annually in any place in the service area. To help mitigate the severity in an extreme power outage, Zone 7 has back-up diesel generators to provide power to water treatment and distribution facilities. In order to evaluate the damage inflicted by a power outage, FEMA has assigned economic values to the loss of electric power. Table 3.14 summarizes the loss estimates per capita per day.

Table 3.14: Economic Impacts of Electric Power

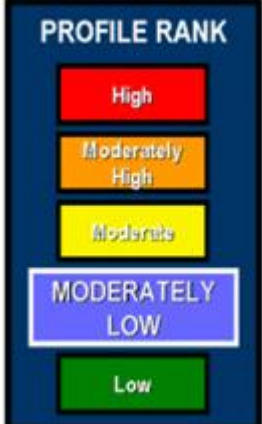
Category	Estimated Economic Impact
Reduced Regional Economic Activity	\$87
<i>Impacts on Residential Customers</i> <ul style="list-style-type: none"> <li data-bbox="266 516 626 548">• Direct Economic Losses <li data-bbox="266 579 678 611">• Disruption Economic Impact <li data-bbox="266 642 565 674">• Total Best Estimate 	<p data-bbox="1057 516 1198 548">\$30 to \$35</p> <p data-bbox="1057 579 1190 611">\$63 to 85</p> <p data-bbox="1092 642 1161 674">\$101</p>
<i>Total Economic Impacts</i>	\$188

Note: Values are per capita per day

3.11 Dam Failure Hazard Profile

Dam Failure Risk Assessment Summary

Risk Rank: Moderately Low

Probability/ Frequency:	Infrequent event – occurs between once every 8 years and once every 50 years	
Consequence/ Severity:	Minor/slight damage to buildings and structures, no loss of lifelines, first aid injury and no disability	
Vulnerability:	Localized damage area, minor secondary impacts, delayed hazard onset	
Hazard Risk Rank Score:	12	

3.11.1 Dam Failure Hazard Information and Background

Within Zone 7's service area there are four dams owned and operated by California Department of Water Resources; Del Valle Dam, Dyer Dam, Patterson Dam, and Bethany Forebay Dam. Del Valle Dam impounds the greatest amount of water and there would be major inundation within Zone 7's service area should that dam be severely damaged or fail entirely. The Steering Committee considered the potential inundation from a catastrophic failure these dams and how it might impact Zone 7's assets given their location.

In addition to considering catastrophic failures of each of these dams, the Steering Committee also considered a high flood release flow scenario from Del Valle Dam. Of the four dams operated by DWR, it is the only on-stream reservoir. It should be noted that all four of DWR's dams are part of the State Water Project, a vast water conveyance network which Zone 7 relies on for a portion of its water supplies. A failure of any one of the four DWR dams in the service area, or any of the other dams of the State Water Project, could have water supply impacts to Zone 7.

Within the service area there are two other dams which are owned and operated by the San Francisco Public Utilities Commission; New Calaveras Dam and James H. Turner Dam (San Antonio Reservoir). The potential inundation areas from a catastrophic failure of either of these dams are downstream of Zone 7's infrastructure. Likewise, while these are both on-stream reservoirs, high flow flood releases would also occur downstream of any Zone 7 infrastructure. New Calaveras Dam was completed in 2019 to increase the seismic resilience of Calaveras Reservoir compared to the original 1925 dam.

3.11.2 Dam Failure Hazard History

Historical Dam Failure Events

Zone 7's service area has not been impacted by a dam failure. However, there have been a number of dam failures in California's history. Failures have occurred for a variety of reasons. According to the United States Bureau of Reclamation, overtopping accounts for 30 percent of all dam failures in the United States in the last 75 years. Other dams have failed due to specific shortcomings in the dam itself or an inadequate assessment of the surrounding geomorphologic characteristics. The first notable dam failure occurred in 1883 in Sierra County, while the most recent failure occurred in 1965. Another notable catastrophe relating to California dam failures was the St. Francis Dam, which failed in 1928 and resulted in a major disaster. Because of this failure and the exposure to potential risk to the general populace from a number of water storage dams in California, the Legislature in 1929 enacted legislation providing for supervision over non-federal dams in the State.

The statute enacted in 1929 provided for:

- examination and approval or repair of dams completed prior to the effective date of the statute, August 14, 1929,
- approval of plans and specifications, and supervision of construction of new dams, and of the enlargement, alteration, repair, or removal of existing dams, and
- supervision over maintenance and operation of all dams of jurisdictional size.

Currently, non-federally owned dams are regulated by the Division of Safety of Dams in California.

Overall, there have been at least 460 deaths from dam failures in California. These failures are outlined in Table 3.15.

Table 3:15: Selected Dam Failure Events in California

Year Failed	Dam	Location	Cause of Failure/Deaths
1883	English	Sierra County	Dam crumbles to foundations, decay of timber used
1892	Long Valley Creek	San Jacinto	Heavy rains, dam carried away by flood
1895	The Angels	Calaveras County	Undetermined during flood, poor foundation/ 1 death reported
1896	Vernon Heights	Oakland	Shallow foundation
1898	Snake Ravine	Stanislaus County	Poor compaction
1905	Piedmont No.1	Oakland	Outlet pipe sheared off at core wall
1906	San Andreas	San Mateo County	Crack along axis
1912	Morena	San Diego	Overtopping
1916	Lower Otay	San Diego	Leakage and overtopping due to inadequate spillway
1918	Lake Hodges	San Diego	Cracks in pier
1928	St. Francis	Los Angeles	Ground instability and design flaws
1963	Baldwin Hills	Los Angeles	Leak through embankment turned into washout/ 3 Deaths
1964	Hell Hole	Rubicon River	Failed during construction due to unprecedented rains
1965	Matilija	Ventura	Bad foundation and concrete disintegrating

Note: Information was taken from UC Davis Civil & Environmental Engineering Department

Although no significant dam failure has occurred in California within the last half century, California contains several high-hazard dams that could pose a risk in the future. As a whole, the U.S. dam infrastructure has received a D rating by the American Society of Civil Engineers and several near misses have shown how vulnerable the aging dams are.

The Oroville Dam Crisis

Built in 1968 Oroville Dam is the tallest dam in the country and forms Lake Oroville, the second largest reservoir in California, and the main reservoir of the State Water Project. Zone 7 receives its water supplies in part from Lake Oroville, as do 27 million other Californians. On February 7th, 2017 after a period of heavy rain, a large section of concrete

broke off the main spillway for Lake Oroville while water was being released. In reaction, DWR ceased/limited releases through that spillway leading to an increase in reservoir level. Four days later, the water level of Lake Oroville reached the uncontrolled spillway, which consists of a concrete ogee weir. Approximately 32 hours after water began to flow over the uncontrolled spillway, higher than anticipated rates of erosion were observed, raising concerns of catastrophic failure. An evacuation was ordered for 188,000 people located downstream of the dam. In response to the erosion, DWR again modified reservoir release operations and was able to avoid a catastrophic failure of Oroville Dam, however significant damage was incurred.

The environmental and economic damage caused to the surrounding communities is impossible to measure; however, in total, the repairs alone cost over \$1 billion. Moreover it temporarily displaced of thousands of residents downstream of the dam.

3.11.3 Dam Failure Hazard Probability, Frequency, and Magnitude

Zone 7 has several facilities located in the inundation hazard areas of Del Valle Dam and Patterson Dam. Patterson Dam is located adjacent to Zone 7's Patterson Pass Water Treatment Plant impounds the 90-acre foot Patterson Reservoir. The Del Valle Dam is located in Zone 7's service area boundary and impounds a maximum of 77,000 acre feet, although a large portion of the reservoir is kept available for flood control purposes. Absent flood control operations, the reservoir does not exceed 40,000 acre-feet. The failure of these dams could potentially flood the areas and cities within Zone 7's service area. Moreover, as stated above, both of these dams are part of the State Water Project and they are owned and operated by DWR. Failure of these dams, or certain other State Water Project dams would impact Zone 7's water supplies.

3.12 Climate Change

Zone 7's 2020 Urban Water Management Plan discusses potential effects of climate change on Zone 7's water demands, supplies, and reliability. The plan identifies potential effects of climate change including increased frequency and intensity of wildfires, altering rainfall and snowfall patterns, increased irrigation demand and more variability year to year in weather patterns.

In addition to the Urban Water Management Plan, Zone 7 aimed to include the effects of climate change from the June 2020 California Adaptation Planning Guide (APG) into the Hazard Mitigation Plan update. As identified in the "Understanding Regional Characteristics" portion of the APG, Zone 7 is located in the Bay Area Region of California. As a result, the Steering Committee considered the following climate change impacts as recommended by the APG:

- Increased Temperatures
- Reduced Precipitation
- Sea Level Rise- Coastal Inundation and Erosion
- Reduced Tourism
- Reduced Agricultural Productivity
- Inland Flooding
- Public Health – Heat and Air Quality

The Steering Committee engaged in a discussion to determine which impacts posed a viable threat to Zone 7. The steering committee established the following list of perceived feasible impacts of climate change that might affect Zone 7 over the next 5 to 10 years:

- Increased Temperatures
- Reduced Precipitation
- Inland Flooding

After reviewing the results of each of these impacts, the Steering Committee decided to include hazards in the Plan update that represented how the impacts would be felt by Zone 7. For example, increased temperatures and reduced precipitation would be recognized as a drought. Additionally, increased temperatures and reduced precipitation might result in a wildfire. Therefore, the Steering Committee identified Drought and Wildfire as perceived hazards. Any information regarding the effects of these impacts on Zone 7 will be found under the hazard profiles listed above. Additionally, mitigation strategies that apply

to these impacts will be classified under Drought and Wildfire in the mitigation actions identified in Chapter 4.

The Agency's infrastructure is well above sea level, meaning that the service area would not feel the impacts of sea level rise due to climate change. As mentioned in Chapter 2, the service area is made up of developed areas served by retail customers and open spaces. As the developed areas are built out, the wildfire vulnerability around these developed areas is not expected to change. Contrarily, the open areas may be more susceptible to wildfire due to ever increasing dry periods due to climate change. The Zone 7 assets within these open areas are estimated to be more vulnerable as a result of more frequent potential wildfire occurrences. However, Zone 7 assets within these open areas maintain defensible space and implement brush clearing, so the increase in vulnerability is expected to be minimal. Overall, the area should not see a large impact from climate change in the next 5 years since the effects of climate change are a long-range issue.

3.13 Asset Inventory

§201.6(c)(2)(ii)(A): [The plan **should** describe vulnerability in terms of] the types and numbers of existing and future buildings, infrastructure, and critical facilities located in the identified hazard area

A critical step required to complete the Risk Assessment is to develop a detailed asset inventory and document potential asset damages due to each identified hazard. The calculated loss estimates were based on the values determined during the initial asset inventory. In order to produce accurate loss estimates, Zone 7 developed a comprehensive inventory of all assets. The location of these assets was considered as part of the committee's discussion but was not detailed in this Plan.

The following section focuses on potential asset damage. These values do not represent actual monetary losses, but further demonstrate the perceived physical vulnerability to Zone 7's assets from the identified hazard scenarios.

The service area population and area land use is not expected to have a material shift in the next 5 years. As previously mentioned, the Tri-Valley area is already substantially developed, which does impact Zone 7's ability to access and maintain its facilities. Much of the local undeveloped areas are reserved either for open space or agricultural use.

In order to develop loss estimates, specific values were assigned to critical Zone 7 facilities in the asset inventory. Replacement value estimates were developed utilizing internal sources which included, but was not limited to, the most recent, available versions of the Asset Management Program and Asset Value Report.

Loss of Function Values

In order to provide a mechanism for evaluating the importance of lifelines and critical services, the table on the following page was used to identify per capita values for loss of potable water service. Based upon the population in Zone 7's service area, the following values were assigned.

Table 3.16: Loss of Function Values Per Capita – Utilities & Lifelines

Loss of Potable Water Service	Cost of Complete Loss of Service	Cost of Water Unsafe for Drinking
Reduced Regional Economic Activity	\$35	\$8.75
Impacts on Residential Customers	\$68	\$34
Total economic impact (all hazards)	\$103	\$43

Note: The values listed in this table were obtained from FEMA’s guidance document entitled “What is a Benefit? - Guidance on Benefit-Cost Analysis of Hazard Mitigation Projects, Draft Revision 2.0”

Note: The values listed above are per capita per day

Asset Inventory

The Asset Inventory Summary Tables and maps depicting the asset locations for Zone 7 are presented on the following tables.

Any future assets built or acquired by Zone 7 will be reflected in the next Hazard Mitigation Plan update.

Table 3.17: Asset Inventory Summary

Type	Name	Estimated Replacement Value
Administration	Zone 7 Distribution (Parkside)	\$3,581,700
Administration	North Canyons Office Building	\$11,000,000
Water Plant	Del Valle WTP	\$179,085,000
Water Plant	Patterson Pass Conventional WTP	\$130,000,000
Water Plant	Mocho Groundwater Demineralization Plant	\$47,756,000
Storage Tank	Dougherty Reservoir	\$4,000,000
Reservoir	Cope Lake & Lake I	\$8,357,300
Well	Chain of Lakes Well - #1	\$8,357,300
Well	Chain of Lakes Well - #2	\$7,163,400
Well	Mocho Well - #1	\$7,163,400
Well	Mocho Well - #3	\$8,357,300
Well	Mocho Well - #4	\$8,357,300
Well	Chain of Lakes - #5	\$7,163,400
Well	Hopyard Well - #6	\$8,357,300

Type	Name	Estimated Replacement Value
Well	Hopyard Well - #9	\$7,163,400
Well	Stoneridge Well	\$8,357,300
Pipelines	Livermore Pipeline Unit #1	\$23,878,000
Pipelines	Cross-Valley Pipeline	\$47,756,000
Pipelines	Del Valle - Livermore Pipeline	\$35,817,000
Pipelines	Santa Rita/ Dougherty Pipeline	\$47,756,000
Pipelines	Mocho Pipeline	\$17,908,500
Pipelines	Vineyard Pipeline	\$47,756,000
Pipelines	El Charro Pipeline I	\$35,817,000
Pipelines	Altamont Pipeline - Livermore Reach	\$41,786,500
Pipelines	Cope Lake - Lake I Pipeline	\$2,387,800
Pipelines	Line J-2	\$10,745,100
Pipelines	Sycamore Pipeline	\$41,786,500
Pipelines	Hopyard Pipeline	\$41,786,500
Pipelines	Vasco Pipeline	\$35,817,000

Type	Name	Estimated Replacement Value
Channels	South San Ramon Creek – Line J	\$963,477
Channels	Alamo Creek - Line F	\$355,782
Channels	Arroyo Mocho - Line G	\$9,423,478
Channels	Altamont Creek - Line R	\$246,438
Channels	Arroyo Las Positas - Line H	\$349,289
Channels	Arroyo Del Valle - Line E	\$103,921
Channels	Chabot Canal - Line G-1	\$93,235
Channels	Dublin Creek - Line T	\$27,831
Channels	Line G-3	\$26,863
Channels	Arroyo Seco - Line P	\$345,071
Channels	Collier Creek - Line M	\$42,277
Channels	Tassajara Creek - Line K	\$489,058
Channels	Alamo Creek - Line F	\$254,759
Channels	Arroyo de la Laguna - Line B	\$62,324
Channels	Relocated Arroyo Las Positas - Line P-1	\$21,360

Type	Name	Estimated Replacement Value
Channels	Line R-1	\$35,140
Channels	Arroyo Las Positas – Line H	\$4,373,375
Channels	Arroyo Mocho - Line G	\$2,915,504
Channels	Hewlet Canal - Line G-2	\$3,701,090
Channels	Pleasanton Canal - Line B-5	\$9,551,200
Channels	Tehan Creek - Line F-1	\$4,894,990
Channels	Line G-1-1	\$20,296,300
Channels	Line F-4	\$13,132,900
Channels	Big Canyon Creek - Line J-1	\$23,878,000
Channels	Line J-3	\$4,775,600
Channels	Line J-6	\$2,387,800
Aqueduct	South Bay Aqueduct	\$119,390,000
Pump Stations	Silver Oaks Lane Pump Station	\$5,730,720

Type	Name	Estimated Replacement Value
Pump Stations	Vasco Road Rate Control Station	\$5,730,720
Pump Stations	Airway Blvd. Rate Control Station	\$5,730,720
Pump Stations	Vineyard Rate Control Station	\$5,730,720
Pump Stations	Cross Valley Rate Control Station	\$5,730,720
Pump Stations	Valley Booster Station	\$7,300,000
Misc.	Patterson Ranch	\$22,087,150
Note: Values estimated utilizing the 2015 Asset Value report and the 2010 Asset Management Program		\$1,136,008,661
Note: Inflation estimated using data from the U.S. Bureau of Labor Statistics Consumer Price Index (2018-2023, or \$1 to \$1.1939)		

Table 3.18: Loss of Function

Loss of Function / Continuity Premium (1 day)	
Population: 266,000	
Category	Total
Water Service	\$2,739,800
Subtotal	\$27,398,000
Note: Population taken from the Zone 7's 2020 Urban Water Management Plan	
Note: Values were obtained from FEMA's guidance document entitled "What is a Benefit? - Guidance on Benefit-Cost Analysis of Hazard Mitigation Projects, Draft Revision 2.0"	

3.14 Loss Estimates

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

Loss Assessment Calculations

The Steering Committee reviewed each asset category and assigned a potential percentage of damage expected due to each identified hazard. In addition, if there were identified lifeline interruptions the loss of function values were also included. The tables on the following pages identify each asset category, name, total value, and the percentage damage/damage value for each asset. The damages for each asset are totaled for each hazard to obtain the overall loss estimate for each hazard.

Table 3.19 summarizes loss estimates from a flood/severe storm, drought and wildfire, Table 3.20 summarizes loss estimate from an earthquake, infrastructure, and water contamination, Table 3.20 summarizes loss estimates from adversarial/human-caused events, utility loss/ public safety shutoffs, and dam failure. Table 3.22 summarizes the loss estimates for each hazard.

Table 3.19: Loss Estimates/ Vulnerability Assessment – Flood/Severe Storm, Drought, and Wildfire

Zone 7 Water Agency Vulnerability Assessment Calculations								
			Flood/Severe Storm		Drought		Wildfire	
Type	Name	Estimated Replacement Value	% Damage	Loss Estimate	%	Loss Estimate	%	Loss Estimate
Administration	Zone 7 Distribution (Parkside)	\$3,581,700	2%	\$71,634	0%	\$0	0%	\$0
Administration	North Canyons Office Building	\$11,000,000	0%	\$0	0%	\$0	0%	\$0
Water Plant	Del Valle WTP	\$179,085,000	0%	\$0	0%	\$0	30%	\$53,725,500
Water Plant	Patterson Pass Conventional WTP	\$130,000,000	0%	\$0	0%	\$0	30%	\$39,000,000
Water Plant	Mocho Groundwater Demineralization Plant	\$47,756,000	10%	\$4,775,600	0%	\$0	0%	\$0
Storage Tank	Dougherty Reservoir	\$4,000,000	0%	\$0	0%	\$0	5%	\$200,000
Reservoir	Cope Lake & Lake I	\$8,357,300	25%	\$2,089,325	0%	\$0	0%	\$0
Well	Chain of Lakes Well - #1	\$8,357,300	2%	\$167,146	0%	\$0	5%	\$417,865
Well	Chain of Lakes Well - #2	\$7,163,400	2%	\$143,268	0%	\$0	5%	\$358,170
Well	Mocho Well - #1	\$7,163,400	0%	\$0	0%	\$0	0%	\$0
Well	Mocho Well - #3	\$8,357,300	0%	\$0	0%	\$0	0%	\$0
Well	Mocho Well - #4	\$8,357,300	5%	\$417,865	0%	\$0	0%	\$0
Well	Chain of Lakes - #5	\$7,163,400	2%	\$143,268	0%	\$0	5%	\$358,170
Well	Hopyard Well - #6	\$8,357,300	2%	\$167,146	0%	\$0	0%	\$0
Well	Hopyard Well - #9	\$7,163,400	2%	\$143,268	0%	\$0	0%	\$0
Well	Stoneridge Well	\$8,357,300	2%	\$167,146	0%	\$0	0%	\$0
Pipelines	Livermore Pipeline Unit #1	\$23,878,000	1%	\$238,780	0%	\$0	0%	\$0
Pipelines	Cross-Valley Pipeline	\$47,756,000	5%	\$2,387,800	0%	\$0	0%	\$0

Zone 7 Water Agency Vulnerability Assessment Calculations								
			Flood/Severe Storm		Drought		Wildfire	
Type	Name	Estimated Replacement Value	% Damage	Loss Estimate	%	Loss Estimate	%	Loss Estimate
Pipelines	Del Valle - Livermore Pipeline	\$35,817,000	1%	\$358,170	0%	\$0	0%	\$0
Pipelines	Santa Rita/ Dougherty Pipeline	\$47,756,000	1%	\$477,560	0%	\$0	0%	\$0
Pipelines	Mocho Pipeline	\$17,908,500	5%	\$895,425	0%	\$0	0%	\$0
Pipelines	Vineyard Pipeline	\$47,756,000	1%	\$477,560	0%	\$0	0%	\$0
Pipelines	El Charro Pipeline I	\$35,817,000	2%	\$716,340	0%	\$0	0%	\$0
Pipelines	Altamont Pipeline - Livermore Reach	\$41,786,500	2%	\$835,730	0%	\$0	0%	\$0
Pipelines	Cope Lake - Lake I Pipeline	\$2,387,800	1%	\$23,878	0%	\$0	0%	\$0
Pipelines	Line J-2	\$10,745,100	1%	\$107,451	0%	\$0	0%	\$0
Pipelines	Sycamore Pipeline	\$41,786,500	1%	\$417,865	0%	\$0	0%	\$0
Pipelines	Hopyard Pipeline	\$41,786,500	3%	\$1,253,595	0%	\$0	0%	\$0
Pipelines	Vasco Pipeline	\$35,817,000	1%	\$358,170	0%	\$0	0%	\$0
Channels	South San Ramon Creek – Line J	\$963,477	30%	\$289,043	3%	\$28,904	0%	\$0
Channels	Alamo Creek - Line F	\$355,782	30%	\$106,735	3%	\$10,673	1%	\$3,558
Channels	Arroyo Mocho - Line G	\$9,423,478	30%	\$2,827,043	3%	\$282,704	1%	\$94,235
Channels	Altamont Creek - Line R	\$246,438	30%	\$73,931	3%	\$7,393	1%	\$2,464
Channels	Arroyo Las Positas - Line H	\$349,289	30%	\$104,787	3%	\$10,479	1%	\$3,493
Channels	Arroyo Del Valle - Line E	\$103,921	30%	\$31,176	3%	\$3,118	1%	\$1,039
Channels	Chabot Canal - Line G-1	\$93,235	30%	\$27,971	3%	\$2,797	1%	\$932
Channels	Dublin Creek - Line T	\$27,831	30%	\$8,349	3%	\$835	1%	\$278

Zone 7 Water Agency Vulnerability Assessment Calculations								
			Flood/Severe Storm		Drought		Wildfire	
Type	Name	Estimated Replacement Value	% Damage	Loss Estimate	%	Loss Estimate	%	Loss Estimate
Channels	Croak Creek - Line G-3	\$26,863	30%	\$8,059	3%	\$806	1%	\$269
Channels	Arroyo Seco - Line P	\$345,071	30%	\$103,521	3%	\$10,352	1%	\$3,451
Channels	Collier Creek - Line M	\$42,277	30%	\$12,683	3%	\$1,268	1%	\$423
Channels	Tassajara Creek - Line K	\$489,058	30%	\$146,718	3%	\$14,672	1%	\$4,891
Channels	Alamo Creek - Line F	\$254,759	30%	\$76,428	3%	\$7,643	1%	\$2,548
Channels	Arroyo de la Laguna - Line B	\$62,324	30%	\$18,697	3%	\$1,870	1%	\$623
Channels	Relocated Arroyo Las Positas Creek - Line P-1	\$21,360	30%	\$6,408	3%	\$641	1%	\$214
Channels	Line R-1	\$35,140	30%	\$10,542	3%	\$1,054	1%	\$351
Channels	Arroyo Las Positas – Line H	\$4,373,375	30%	\$1,312,013	3%	\$131,201	1%	\$43,734
Channels	Arroyo Mocho - Line G	\$2,915,504	30%	\$874,651	3%	\$87,465	1%	\$29,155
Channels	Hewlet Canal - Line G-2	\$3,701,090	30%	\$1,110,327	3%	\$111,033	1%	\$37,011
Channels	Pleasanton Canal - Line B-5	\$9,551,200	30%	\$2,865,360	3%	\$286,536	1%	\$95,512
Channels	Tehan Creek - Line F-1	\$4,894,990	30%	\$1,468,497	3%	\$146,850	1%	\$48,950
Channels	Line G-1-1	\$20,296,300	30%	\$6,088,890	3%	\$608,889	1%	\$202,963
Channels	Line F-4	\$13,132,900	30%	\$3,939,870	3%	\$393,987	1%	\$131,329
Channels	Big Canyon Creek - Line J-1	\$23,878,000	15%	\$3,581,700	3%	\$716,340	1%	\$238,780
Channels	Line J-3	\$4,775,600	15%	\$716,340	3%	\$143,268	1%	\$47,756
Channels	Line J-6	\$2,387,800	30%	\$716,340	3%	\$71,634	1%	\$23,878
Aqueduct	South Bay Aqueduct	\$119,390,000	3%	\$3,581,700	0%	\$0	2%	\$2,387,800

Zone 7 Water Agency Vulnerability Assessment Calculations								
			Flood/Severe Storm		Drought		Wildfire	
Type	Name	Estimated Replacement Value	% Damage	Loss Estimate	%	Loss Estimate	%	Loss Estimate
Pump Stations	Silver Oaks Lane Pump Station	\$5,730,720	2%	\$114,614	0%	\$0	0%	\$0
Pump Stations	Vasco Road Rate Control Station	\$5,730,720	2%	\$114,614	0%	\$0	0%	\$0
Pump Stations	Airway Blvd. Rate Control Station	\$5,730,720	3%	\$171,922	0%	\$0	0%	\$0
Pump Stations	Vineyard Rate Control Station	\$5,730,720	2%	\$114,614	0%	\$0	0%	\$0
Pump Stations	Cross Valley Rate Control Station	\$5,730,720	2%	\$114,614	0%	\$0	0%	\$0
Pump Stations	Valley Booster Station	\$7,300,000	2%	\$146,000	0%	\$0	0%	\$0
Misc.	Patterson Ranch	\$22,087,150	1%	\$220,872	0%	\$0	10%	\$2,208,715
Water Service		\$24,738,000	5%	\$1,236,9000	25%	\$6,184,500	10%	\$2,473,800
			Flood/Severe Storm	\$53,402,325	Drought	\$9,266,912	Wildfire	\$102,147,856

Table 3.20: Loss Estimates / Vulnerability Assessment – Earthquake, Infrastructure Failure, and Water Contamination

Zone 7 Water Agency Vulnerability Assessment Calculations								
			Earthquake		Infrastructure Failure		Water Contamination	
Type	Name	Estimated Replacement Value	% Damage	Loss Estimate	%	Loss Estimate	%	Loss Estimate
Administration	Zone 7 Distribution (Parkside)	\$3,581,700	25%	\$895,425	0%	\$0	0%	\$0
Administration	North Canyons Office Building	\$11,000,000	10%	\$1,100,000	0%	\$0	0%	\$0
Water Plant	Del Valle WTP	\$179,085,000	40%	\$71,634,000	5%	\$8,954,250	0%	\$0
Water Plant	Patterson Pass Conventional WTP	\$130,000,000	60%	\$78,000,000	5%	\$6,500,000	0%	\$0
Water Plant	Mocho Groundwater Demineralization Plant	\$47,756,000	40%	\$19,102,400	5%	\$2,387,800	0%	\$0
Reservoir	Dougherty Reservoir	\$4,000,000	100%	\$4,000,000	5%	\$200,000	0%	\$0
Reservoir	Cope Lake & Lake I	\$8,357,300	20%	\$1,671,460	5%	\$417,865	0%	\$0
Well	Chain of Lakes Well - #1	\$8,357,300	40%	\$3,342,920	5%	\$417,865	0%	\$0
Well	Chain of Lakes Well - #2	\$7,163,400	40%	\$2,865,360	5%	\$358,170	0%	\$0
Well	Mocho Well - #1	\$7,163,400	40%	\$2,865,360	5%	\$358,170	0%	\$0
Well	Mocho Well - #3	\$8,357,300	40%	\$3,342,920	5%	\$417,865	0%	\$0
Well	Mocho Well - #4	\$8,357,300	40%	\$3,342,920	5%	\$417,865	0%	\$0
Well	Chain of Lakes - #5	\$7,163,400	40%	\$2,865,360	5%	\$358,170	0%	\$0
Well	Hopyard Well - #6	\$8,357,300	40%	\$3,342,920	5%	\$417,865	0%	\$0
Well	Hopyard Well - #9	\$7,163,400	40%	\$2,865,360	5%	\$358,170	0%	\$0
Well	Stoneridge Well	\$8,357,300	40%	\$3,342,920	5%	\$417,865	0%	\$0
Pipelines	Livermore Pipeline Unit #1	\$23,878,000	20%	\$4,775,600	5%	\$1,193,900	0%	\$0
Pipelines	Cross-Valley Pipeline	\$47,756,000	20%	\$9,551,200	5%	\$2,387,800	0%	\$0

**Zone 7 Water Agency
Vulnerability Assessment Calculations**

Earthquake

Infrastructure Failure

Water Contamination

Type	Name	Estimated Replacement Value	% Damage	Loss Estimate	%	Loss Estimate	%	Loss Estimate
Pipelines	Del Valle - Livermore Pipeline	\$35,817,000	20%	\$7,163,400	5%	\$1,790,850	0%	\$0
Pipelines	Santa Rita/ Dougherty Pipeline	\$47,756,000	20%	\$9,551,200	5%	\$2,387,800	0%	\$0
Pipelines	Mocho Pipeline	\$17,908,500	20%	\$3,581,700	5%	\$895,425	0%	\$0
Pipelines	Vineyard Pipeline	\$47,756,000	20%	\$9,551,200	5%	\$2,387,800	0%	\$0
Pipelines	El Charro Pipeline I	\$35,817,000	20%	\$7,163,400	5%	\$1,790,850	0%	\$0
Pipelines	Altamont Pipeline - Livermore Reach	\$41,786,500	20%	\$8,357,300	5%	\$2,089,325	0%	\$0
Pipelines	Cope Lake - Lake I Pipeline	\$2,387,800	20%	\$477,560	5%	\$119,390	0%	\$0
Pipelines	Line J-2	\$10,745,100	20%	\$2,149,020	5%	\$537,255	0%	\$0
Pipelines	Sycamore Pipeline	\$41,786,500	20%	\$8,357,300	5%	\$2,089,325	0%	\$0
Pipelines	Hopyard Pipeline	\$41,786,500	20%	\$8,357,300	5%	\$2,089,325	0%	\$0
Pipelines	Vasco Pipeline	\$35,817,000	20%	\$7,163,400	5%	\$1,790,850	0%	\$0
Channels	South San Ramon Creek – Line J	\$963,477	20%	\$192,695	2%	\$19,270	0%	\$0
Channels	Alamo Creek - Line F	\$355,782	20%	\$71,156	2%	\$7,116	0%	\$0
Channels	Arroyo Mocho - Line G	\$9,423,478	20%	\$1,884,696	2%	\$188,470	0%	\$0
Channels	Altamont Creek - Line R	\$246,438	20%	\$49,288	2%	\$4,929	0%	\$0
Channels	Arroyo Las Positas - Line H	\$349,289	20%	\$69,858	2%	\$6,986	0%	\$0
Channels	Arroyo Del Valle - Line E	\$103,921	20%	\$20,784	2%	\$2,078	0%	\$0
Channels	Chabot Canal - Line G-1	\$93,235	20%	\$18,647	2%	\$1,865	0%	\$0
Channels	Dublin Creek - Line T	\$27,831	20%	\$5,566	2%	\$557	0%	\$0

**Zone 7 Water Agency
Vulnerability Assessment Calculations**

Earthquake

Infrastructure Failure

Water Contamination

Type	Name	Estimated Replacement Value	% Damage	Loss Estimate	%	Loss Estimate	%	Loss Estimate
Channels	Croak Creek - Line G-3	\$26,863	20%	\$5,373	2%	\$537	0%	\$0
Channels	Arroyo Seco - Line P	\$345,071	20%	\$69,014	2%	\$6,901	0%	\$0
Channels	Collier Creek - Line M	\$42,277	20%	\$8,455	2%	\$846	0%	\$0
Channels	Tassajara Creek - Line K	\$489,058	20%	\$97,812	2%	\$9,781	0%	\$0
Channels	Alamo Creek - Line F	\$254,759	20%	\$50,952	2%	\$5,095	0%	\$0
Channels	Arroyo de la Laguna - Line B	\$62,324	20%	\$12,465	2%	\$1,246	0%	\$0
Channels	Relocated Arroyo Las Positas Creek - Line P-1	\$21,360	20%	\$4,272	2%	\$427	0%	\$0
Channels	Line R-1	\$35,140	20%	\$7,028	2%	\$703	0%	\$0
Channels	Arroyo Las Positas – Line H	\$4,373,375	20%	\$874,675	2%	\$87,468	0%	\$0
Channels	Arroyo Mocho - Line G	\$2,915,504	20%	\$583,101	2%	\$58,310	0%	\$0
Channels	Hewlet Canal - Line G-2	\$3,701,090	20%	\$740,218	2%	\$74,022	0%	\$0
Channels	Pleasanton Canal - Line B-5	\$9,551,200	20%	\$1,910,240	2%	\$191,024	0%	\$0
Channels	Tehan Creek - Line F-1	\$4,894,990	20%	\$978,998	2%	\$97,900	0%	\$0
Channels	Line G-1-1	\$20,296,300	20%	\$4,059,260	2%	\$405,926	0%	\$0
Channels	Line F-4	\$13,132,900	20%	\$2,626,580	2%	\$262,658	0%	\$0
Channels	Big Canyon Creek - Line J-1	\$23,878,000	30%	\$7,163,400	5%	\$1,193,900	0%	\$0
Channels	Martin Canyon Creek Line J-3	\$4,775,600	30%	\$1,432,680	5%	\$238,780	0%	\$0
Channels	Line J-6	\$2,387,800	20%	\$477,560	2%	\$47,756	0%	\$0
Aqueduct	South Bay Aqueduct	\$119,390,000	30%	\$35,817,000	5%	\$5,969,500	0%	\$0

Zone 7 Water Agency Vulnerability Assessment Calculations								
			Earthquake		Infrastructure Failure		Water Contamination	
Type	Name	Estimated Replacement Value	% Damage	Loss Estimate	%	Loss Estimate	%	Loss Estimate
Pump Stations	Silver Oaks Lane Pump Station	\$5,730,720	40%	\$2,292,288	5%	\$286,536	0%	\$0
Pump Stations	Vasco Road Rate Control Station	\$5,730,720	40%	\$2,292,288	5%	\$286,536	0%	\$0
Pump Stations	Airway Blvd. Rate Control Station	\$5,730,720	40%	\$2,292,288	5%	\$286,536	0%	\$0
Pump Stations	Vineyard Rate Control Station	\$5,730,720	40%	\$2,292,288	5%	\$286,536	0%	\$0
Pump Stations	Cross Valley Rate Control Station	\$5,730,720	40%	\$2,292,288	5%	\$286,536	0%	\$0
Pump Stations	Valley Booster Station	\$7,300,000	40%	\$2,920,000	5%	\$365,000	0%	\$0
Misc.	Patterson Ranch	\$22,087,150	10%	\$2,208,715	0%	\$0	0%	\$0
Water Service		\$24,738,000	50%	\$12,369,000	5%	\$1,236,900	50%	\$12,369,000
			Earthquake	\$378,969,832	Infrastructure Failure	\$55,450,444	Water Contamination	\$1,236,900,000

Table 3.21: Loss Estimates / Vulnerability Assessment – Adversarial/Human-Caused Events, Utility Loss/ Public Safety Power Shutoff, and Dam Failure

Zone 7 Water Agency Vulnerability Assessment Calculations								
Type	Name	Adversarial/Human-Caused Events			Utility Loss / Public Safety Power Shutoff		Dam Failure	
		ERV	% Damage	Loss Estimate	% Damage	Loss Estimate	% Damage	Loss Estimate
Administration	Zone 7 Distribution (Parkside)	\$3,581,700	1%	\$35,817	0%	\$0	0%	\$0
Administration	North Canyons Office Building	\$11,000,000	1%	\$110,000	0%	\$0	0%	\$0
Water Plant	Del Valle WTP	\$179,085,000	3%	\$5,372,550	1%	\$1,790,850	0%	\$0
Water Plant	Patterson Pass Conventional WTP	\$130,000,000	3%	\$3,900,000	1%	\$1,300,000	50%	\$65,000,000
Water Plant	Mocho Groundwater Demineralization Plant	\$47,756,000	1%	\$477,560	3%	\$1,432,680	0%	\$0
Reservoir	Dougherty Reservoir	\$4,000,000	1%	\$40,000	0%	\$0	0%	\$0
Reservoir	Cope Lake & Lake I	\$8,357,300	1%	\$83,573	0%	\$0	0%	\$0
Well	Chain of Lakes Well - #1	\$8,357,300	1%	\$83,573	2%	\$167,146	0%	\$0
Well	Chain of Lakes Well - #2	\$7,163,400	1%	\$71,634	2%	\$143,268	0%	\$0
Well	Mocho Well - #1	\$7,163,400	1%	\$71,634	2%	\$143,268	0%	\$0
Well	Mocho Well - #3	\$8,357,300	1%	\$83,573	2%	\$167,146	0%	\$0
Well	Mocho Well - #4	\$8,357,300	1%	\$83,573	2%	\$167,146	0%	\$0
Well	Chain of Lakes - #5	\$7,163,400	1%	\$71,634	2%	\$143,268	0%	\$0
Well	Hopyard Well - #6	\$8,357,300	1%	\$83,573	2%	\$167,146	0%	\$0
Well	Hopyard Well - #9	\$7,163,400	1%	\$71,634	2%	\$143,268	0%	\$0
Well	Stoneridge Well	\$8,357,300	1%	\$83,573	2%	\$167,146	0%	\$0
Pipelines	Livermore Pipeline Unit #1	\$23,878,000	0.5%	\$119,390	0%	\$0	0%	\$0
Pipelines	Cross-Valley Pipeline	\$47,756,000	0.5%	\$238,780	0%	\$0	0%	\$0

Zone 7 Water Agency Vulnerability Assessment Calculations								
Type	Name	ERV	Adversarial/Human-Caused Events		Utility Loss / Public Safety Power Shutoff		Dam Failure	
			% Damage	Loss Estimate	% Damage	Loss Estimate	% Damage	Loss Estimate
Pipelines	Del Valle - Livermore Pipeline	\$35,817,000	0.5%	\$179,085	0%	\$0	100%	\$35,817,000
Pipelines	Santa Rita/ Dougherty Pipeline	\$47,756,000	0.5%	\$238,780	0%	\$0	0%	\$0
Pipelines	Mocho Pipeline	\$17,908,500	0.5%	\$89,543	0%	\$0	0%	\$0
Pipelines	Vineyard Pipeline	\$47,756,000	0.5%	\$238,780	0%	\$0	50%	\$23,878,000
Pipelines	El Charro Pipeline I	\$35,817,000	0.5%	\$179,085	0%	\$0	0%	\$0
Pipelines	Altamont Pipeline - Livermore Reach	\$41,786,500	0.5%	\$208,933	0%	\$0	0%	\$0
Pipelines	Cope Lake - Lake I Pipeline	\$2,387,800	0.5%	\$11,939	0%	\$0	0%	\$0
Pipelines	Line J-2	\$10,745,100	0.5%	\$53,726	0%	\$0	0%	\$0
Pipelines	Sycamore Pipeline	\$41,786,500	0.5%	\$208,933	0%	\$0	100%	\$41,786,500
Pipelines	Hopyard Pipeline	\$41,786,500	0.5%	\$208,933	0%	\$0	0%	\$0
Pipelines	Vasco Pipeline	\$35,817,000	0.5%	\$179,085	0%	\$0	0%	\$0
Channels	South San Ramon Creek – Line J	\$963,477	0.5%	\$4,817	0%	\$0	0%	\$0
Channels	Alamo Creek - Line F	\$355,782	0.5%	\$1,779	0%	\$0	0%	\$0
Channels	Arroyo Mocho - Line G	\$9,423,478	0.5%	\$47,117	0%	\$0	0%	\$0
Channels	Altamont Creek - Line R	\$246,438	0.5%	\$1,232	0%	\$0	0%	\$0
Channels	Arroyo Las Positas - Line H	\$349,289	0.5%	\$1,746	0%	\$0	0%	\$0
Channels	Arroyo Del Valle - Line E	\$103,921	0.5%	\$520	0%	\$0	50%	\$51,960
Channels	Chabot Canal - Line G-1	\$93,235	0.5%	\$466	0%	\$0	0%	\$0
Channels	Dublin Creek - Line T	\$27,831	0.5%	\$139	0%	\$0	0%	\$0

Zone 7 Water Agency Vulnerability Assessment Calculations								
Type	Name	Adversarial/Human-Caused Events			Utility Loss / Public Safety Power Shutoff		Dam Failure	
		ERV	% Damage	Loss Estimate	% Damage	Loss Estimate	% Damage	Loss Estimate
Channels	Croak Creek - Line G-3	\$26,863	20%	\$5,373	2%	\$537	0%	\$0
Channels	Arroyo Seco - Line P	\$345,071	20%	\$69,014	2%	\$6,901	0%	\$0
Channels	Collier Creek - Line M	\$42,277	20%	\$8,455	2%	\$846	0%	\$0
Channels	Tassajara Creek - Line K	\$489,058	20%	\$97,812	2%	\$9,781	0%	\$0
Channels	Alamo Creek - Line F	\$254,759	20%	\$50,952	2%	\$5,095	0%	\$0
Channels	Arroyo de la Laguna - Line B	\$62,324	20%	\$12,465	2%	\$1,246	0%	\$0
Channels	Relocated Arroyo Las Positas Creek - Line P-1	\$21,360	20%	\$4,272	2%	\$427	0%	\$0
Channels	Line R-1	\$35,140	20%	\$7,028	2%	\$703	0%	\$0
Channels	Arroyo Las Positas – Line H	\$4,373,375	20%	\$874,675	2%	\$87,468	0%	\$0
Channels	Arroyo Mocho - Line G	\$2,915,504	20%	\$583,101	2%	\$58,310	0%	\$0
Channels	Hewlet Canal - Line G-2	\$3,701,090	20%	\$740,218	2%	\$74,022	0%	\$0
Channels	Pleasanton Canal - Line B-5	\$9,551,200	20%	\$1,910,240	2%	\$191,024	0%	\$0
Channels	Tehan Creek - Line F-1	\$4,894,990	20%	\$978,998	2%	\$97,900	0%	\$0
Channels	Line G-1-1	\$20,296,300	20%	\$4,059,260	2%	\$405,926	0%	\$0
Channels	Line F-4	\$13,132,900	20%	\$2,626,580	2%	\$262,658	0%	\$0
Channels	Big Canyon Creek - Line J-1	\$23,878,000	30%	\$7,163,400	5%	\$1,193,900	0%	\$0
Channels	Martin Canyon Creek Line J-3	\$4,775,600	30%	\$1,432,680	5%	\$238,780	0%	\$0
Channels	Line J-6	\$2,387,800	20%	\$477,560	2%	\$47,756	0%	\$0
Aqueduct	South Bay Aqueduct	\$119,390,000	1%	\$1,193,900	0%	\$0	100%	\$119,390,000
Pump Stations	Silver Oaks Lane Pump Station	\$5,730,720	1%	\$57,307	3%	\$171,922	0%	\$0

Zone 7 Water Agency Vulnerability Assessment Calculations								
			Adversarial/Human-Caused Events		Utility Loss / Public Safety Power Shutoff		Dam Failure	
Type	Name	ERV	% Damage	Loss Estimate	% Damage	Loss Estimate	% Damage	Loss Estimate
Pump Stations	Vasco Road Rate Control Station	\$5,730,720	1%	\$57,307	3%	\$171,922	0%	\$0
Pump Stations	Airway Blvd. Rate Control Station	\$5,730,720	1%	\$57,307	3%	\$171,922	0%	\$0
Pump Stations	Vineyard Rate Control Station	\$5,730,720	1%	\$57,307	3%	\$171,922	0%	\$0
Pump Stations	Cross Valley Rate Control Station	\$5,730,720	1%	\$57,307	3%	\$171,922	0%	\$0
Pump Stations	Valley Booster Station	\$7,300,000	1%	\$73,000	1%	\$73,000	0%	\$0
Misc.	Patterson Ranch	\$22,087,150	0%	\$0	0%	\$0	0%	\$0
Water Service		\$24,738,000	25%	\$6,184,500	15%	\$3,710,700	50%	\$12,369,000
			Adversarial/ Human-Caused Events	\$21,350,562	Utility Loss / Public Safety Power Shutoff	\$10,575,640	Dam Failure	\$274,430,041

Table 3.22: Loss Estimates Summary

Hazard	Estimated Losses
Water Contamination	\$1,236,900,000
Earthquake	\$378,970,000
Dam Release	\$274,430,000
Wildfire	\$102,148,000
Infrastructure Failure	\$55,450,000
Flood	\$53,402,000
Adversarial/Human-Caused Events	\$21,351,000
Utility Loss/Public Safety Power Shut Off	\$10,576,000
Drought	\$9,267,000

*Values are rounded to the nearest thousand

Hazard Zone-Specific Loss Estimate

While the initial loss estimates included in Tables 3.19 through 3.22 provide good insight into the overall vulnerability of all Zone 7's assets to specific hazards, the Steering Committee felt it necessary to compare, where possible, the hazard zones outlined in many of the maps included in previous hazard profiles with the Zone 7 assets located in those zones. This enabled the Steering Committee to gain a better understanding of the potential impacts associated with certain identified hazards.

The Steering Committee considered impacts as the result of flood, earthquake, wildfire, and dam failure/release. Man-made hazards were not included in this assessment because, with the exception of dam failure, human error cannot be evaluated with the same parameters as natural hazards. Basic information for impacted assets is included in Table 3.23 below.

Table 3.23: Impacted Assets and Personnel within Hazard Zones

Hazard	Number of Impacted Assets	Type of Assets Impacted
Earthquake	62	Pipelines and Treatment Plants
Dam Release	38	Pipelines, Flood Channels, Treatment Plans, Pumping Stations, Wells, Reservoirs, and Administrative facilities
Flood	12	Pipelines, Flood Channels, Treatment Plants, Pumping Stations, and Wells
Wildfire	7	Pipelines, Flood Channels, Rate Control Stations, and Wells

Note: Provided and estimated by Zone Staff

4 MITIGATION STRATEGIES

Table of Contents

4.1	Mitigation Goals and Objectives.....	4-1
4.2	Identification of Mitigation Recommendations.....	4-3
4.3	National Flood Insurance Program Compliance.....	4-8
4.4	Prioritization of Mitigation Recommendations	4-9
4.5	Implementation Strategy	4-18

List of Tables

Table 4.1:	Overall Plan Goals and Objectives	4-2
Table 4.2:	Mitigation Action Identification	4-5
Table 4.3:	Zone 7 Service Area NFIP Participation	4-8
Table 4.4:	Mitigation Action Prioritization: Benefit-Cost Review	4-11
Table 4.5:	Ongoing Mitigation Strategies.....	4-19

4.1 Mitigation Goals and Objectives

In order to structure goals and objectives that produce appropriate mitigation actions, the hazard profiles and loss estimates were thoroughly reviewed to identify patterns in the location of potential hazard events and the vulnerability of the infrastructure identified within those locations. This information was used to develop clear goals to mitigate the effects of hazard events.

Mitigation goals provide guidelines for developing mitigation projects which, in turn, provide prioritized hazard reduction. The mitigation goals included in this Plan are based on:

- Previous goals from the 2018 Zone 7 Hazard Mitigation Plan,
- Findings of the Risk Assessment, and
- Input from the Steering Committee
- Zone 7's Strategic Plan
- Zone 7' Flood Management Plan Phase 1

These goals are identified for the purpose of characterizing long-term hazard reduction targets as well as the enhancement of current mitigation capabilities.

§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.

Table 4.1 includes the Plan goals and corresponding mitigation objectives. These objectives were developed and reviewed by the Steering Committee using knowledge of the service area (including high-hazard areas and sensitive populations), review of past efforts, findings of the Risk Assessment, and identification of mitigation projects.



Table 4.1: Overall Plan Goals and Objectives

1. Protect Life and Property
<ul style="list-style-type: none">• <i>Strategy 1a:</i> Implement activities that assist in protecting lives by making infrastructure more resistant to losses from hazards.• <i>Strategy 1b:</i> Enhance infrastructure plans and improvement projects by including hazard mitigation concepts, goals, and objectives that may reduce losses due to hazards.
2. Improve Emergency Preparedness and Management Capability
<ul style="list-style-type: none">• <i>Strategy 2a:</i> Strengthen emergency preparedness by increasing collaboration and coordination among public agencies, citizens, nonprofit organizations, utility providers, and businesses within the service area.• <i>Strategy 2b:</i> Prepare Zone 7 staff to efficiently support emergency events and inter-agency coordination.
3. Protect the Environment
<ul style="list-style-type: none">• <i>Strategy 3a:</i> Enhance environmental stewardship by implementing water supply and flood protection solutions in an environmentally sensitive way for new and existing infrastructure.• <i>Strategy 3b:</i> Incorporate environmentally sustainable solutions into Zone 7's normal operations to realize environmental benefits while maximizing flood protection.• <i>Strategy 3c:</i> Improve flood protection/water supply planning efforts and infrastructure to better prepare for the impacts of climate change.
4. Promote Public Awareness and Outreach
<ul style="list-style-type: none">• <i>Strategy 4a:</i> Enhance existing outreach efforts by including hazard mitigation goals and concepts into outreach and training programs.

4.2 Identification of Mitigation Recommendations

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

Mitigation actions are administrative and/or engineering project recommendations to reduce Zone 7's vulnerability to the identified hazards. Water Supply Operations, Engineering, and Flood Protection staff were engaged in the development of actions and projects that are designed to mitigate the impact of identified hazards, address problems cost-effectively, and ensure consistency with Zone 7's long-term mitigation goals and capital improvement framework. During the third Steering Committee meeting, a team-based approach was used to brainstorm mitigation projects based on the identified hazards and associated loss estimates. In addition, the Federal Emergency Management Agency's (FEMA) Local Mitigation Planning Handbook and the California Adaptation Planning Guide were used to identify actions to mitigate the effects of climate change.

Each of the mitigation recommendations listed in Table 4.2 fell into one or more of the following categories:

- Prevention – planning, capital improvement projects, and water resource management
- Property Protection – acquisition, elevation, relocation, and structural retrofits
- Personnel Education and Awareness – outreach projects, hazard information resources, and education programs
- Natural Resource Protection – sediment and erosion control, stream corridor restoration, watershed management, and vegetation management
- Emergency Preparedness – warning systems, Zone 7 emergency incident capabilities, and protection of critical facilities
- Structural Projects – flood protection channels, pipelines, treatment plants, retaining walls, and wells

All mitigation actions listed in this plan are the entirety of actions considered and chosen. The Steering Committee identified gaps in resilience efforts and created a mitigation action

for each of the gaps identified. No mitigation actions were considered and then omitted from this plan.

Table 4.3 provides an overview of the mitigation actions and other relevant information, in no specific order. Following the identification of mitigation actions, a Cost-Benefit Review was conducted in order to determine a prioritization of the items. Section 4.4 contains more information on the Cost-Benefit Review and the prioritization of the projects.

Table 4.2: Mitigation Action Identification

Mitigation Activity	Hazards Mitigated	Mitigation Action Category	Goals & Objectives	Responsible Department	Resources	Estimated Project Cost ¹	Timeframe	Protects New Buildings	Protects Existing Buildings
HMP.2023.01 - Initiate a study to investigate opportunities for cross-functional and multi-benefit mitigation projects that achieve benefits in the areas of flood protection, drinking water quality and supply, environmental and habitat quality, regional economic impacts, and other social and public health effects. Develop a framework for quantifying individual project and mutli-project benefits and conduct a feasibility study to develop a multi-hazard mitigation program.	Multi-Hazard	Prevention/ Structural Projects/ Property Protection	1b	Integrated Planning/ Engineering/ Operations	Staff Time, Grant Funding, General Fund	\$2,000,000	Medium	Yes	Yes
HMP.2023.02 - Implement flood protection, recharge, and water supply infrastructure projects emphasizing multi-benefit hazard mitigation projects.	Drought, Flood/Stormwater	Prevention/ Structural Projects/ Property Protection	2a	Integrated Planning/ Engineering/ Flood Protection/ Groundwater	Grant Funding/ Flood Protection Operations Fund	\$50,000,000	Medium	Yes	Yes
HMP.2023.03 - Continue build-out and integration of the Chain of Lakes improvement projects, including maximizing on-site power generation and the Chain of Lakes Pipeline. (possible floating solar - maybe wellsite power generation)	Drought, Flood/ Stormwater, Utility Loss	Structural Projects/ Property Protection	2b	Integrated Planning/ Engineering	Grant Funding/ General Fund	\$120,000,000	Long	Yes	Yes
HMP.2023.04 - Rehabilitation of select flood protection facilities to improve the reliability of flood water management.	Flood/Stormwater	Structural Projects/ Property Protection	4a	Flood Protection	Flood Protection Operations/ Grant Funding	\$15,000,000	Medium	Yes	Yes
HMP.2023.05 - Consider construction of additional flood attenuation basins throughout the region	Flood/Stormwater	Structural Projects/ Property Protection/ Prevention	1b	Flood Protection	General Flood Control Fund/ Grant Funding	\$20,000,000	Medium	Yes	Yes
HMP.2023.06 - Continue implementation of a redundant and resilient SCADA, computer, and communication networks to protect critical infrastructure/operations and better respond to cyber threats.	Infrastructure Failure/ Adversarial events	Prevention	1b	Engineering/ Operations	General / Grant Funding/ Staff Time	\$1,000,000	Medium	Yes	Yes
HMP.2023.07 - Continue investment and implementation of capital projects to improve water treatment capabilities and address emerging and identified contaminants including PFAS.	Infrastructure Failure/ Water Contamination	Structural Projects/ Prevention	2a	Engineering	General / Grant Funding	\$50,000,000	On-Going	No	No
HMP.2023.08 - Improve engagement and participation with the Department of Water Resources regarding DWR dam safety, including EAP participation and tabletop exercises and consider mitigation projects.	Dam Failure	Prevention/ Emergency Preparednes s	3b	Integrated Planning	Staff Time	Staff time/ Mitigation Project Costs TBD	On-Going	Yes	Yes
HMP.2023.09 - Research new opportunities and refresh existing contracts to expand the range of mutual aid agreements which could bolster emergency response efforts (i.e., diesel providers) in the event of a disaster and secure new support agreements.	Multi-Hazard	Emergency Preparednes s	1b	Engineering/ Operations/ Flood Protection	Renewal and Replacement Fund/ General Flood Control Fund/ Grant Funding	Staff Time	On-Going	Yes	Yes

Mitigation Activity	Hazards Mitigated	Mitigation Action Category	Goals & Objectives	Responsible Department	Resources	Estimated Project Cost ¹	Timeframe	Protects New Buildings	Protects Existing Buildings
HMP.2023.10 - Evaluate past hazard events and subsequent responses to identify areas of organizational and operational improvement as well as possible mitigation actions.	Multi-Hazard	Prevention	4a	Operations/ Emergency Staff	Staff Time	Staff Time	Short	No	No
HMP.2023.11 - Continue and enhance public outreach campaigns. Consider using social media, leveraging local partnerships, and materials prepared by specialist groups in order to maintain cost efficiency.	Multi-Hazard	Public Education and Awareness	4b	Engineering/ Operations/ Flood Protection	Grant Funding/ Staff Time	\$50,000	Medium	No	No
HMP.2023.12 – Procure redundant materials/equipment and improve procurement procedures to be used during an emergency to allow for a speedier recovery.	Multi-Hazard	Property Protection	3a	Engineering/ Operations/ Flood Protection	Renewal and Replacement Fund/ General Flood Control Fund/ Grant Funding	\$10,000,000	Long	Yes	Yes
HMP.2023.13 - Initiate structural upgrade projects to mitigate the effects of an earthquake. Projects might include installation of earthquake resistant piping, retrofits for water-retention structures, and/or the addition of portable facilities to allow pipeline to bypass failure zones.	Earthquake	Structural Projects	1a	Engineering/ Operations/ Flood Protection	Renewal and Replacement Fund/ General Flood Control Fund/ Grant Funding	\$4,000,000 - \$25,000,000	Long	Yes	Yes
HMP.2023.14 - Participate in wildfire planning and safety efforts to protect Zone 7 facilities and the local watershed.	Wildfire	Emergency Preparedness	1b	Engineering/ Operations/ Flood Protection	Staff Time	Staff Time	Short	Yes	Yes
HMP.2023.15 - Identify critical elements within the water system where process redundancies don't exist and implement projects that will allow water service to continue even when critical equipment is offline.	Infrastructure Failure	Property Protection/ Structural Projects	3b	Engineering/ Operations/ Flood Protection	System-wide Improvement Fund/ General Flood Control Fund/ Grant Funding	\$20,000,000	Long	No	Yes
HMP.2023.16 - Continue communications and educate local retailers on water availability and system limitations/capabilities during disaster events so they can, in turn, prepare and lead the public when water supply is unavailable due to system failure or interruption."	Infrastructure Failure	Public Education and Awareness	1b	Engineering/ Operations	Staff Time/ General Fund	Staff Time	On-Going	Yes	Yes
HMP.2023.17 - Continue current public outreach campaigns regarding water conservation and flood events.	Drought, Flood/Stormwater	Public Education and Awareness	2a	Engineering/ Operations/ Integrated Planning/	General Fund	\$200,000	On-Going	No	No
HMP.2023.18 - Continue to study the effects of drought on long-term water supply reliability, engage in regional efforts to increase supply reliability and develop new supply sources, and make strategic investments that increase water supply reliability and resilience within the service area.	Drought	Natural Resource Protection/ Structural Projects	1a	Engineering/ Operations/ /Integrated Planning	Grant Funding, Staff Resources	\$100,000,000	Long	Yes	No
HMP.2023.19 - Consider investments in energy system reliability and resilience to minimize the potential impacts of utility system outages	Utility Loss	Property Protection	1a	Integrated Planning/ Engineering/ Operations	General Fund/ General Flood Control	Staff Time/ \$10,000,000 project estimates	Medium	Yes	Yes

Mitigation Activity	Hazards Mitigated	Mitigation Action Category	Goals & Objectives	Responsible Department	Resources	Estimated Project Cost ¹	Timeframe	Protects New Buildings	Protects Existing Buildings
HMP.2023.20 - Continue existing modeling efforts and embark on new modeling efforts. This includes modeling focused on groundwater, water supply, flood protection, and watersheds and risks posed to each category.	Flood/Stormwater /Drought	Prevention	1b	Engineering/ Flood Protection	Staff Time/ Flood Control	\$1,500,000	Long Term	No	No
HMP.2023.21 - Improve coordination with local Law Enforcement Agencies to improve reaction to security issues/ threats.	Adversarial/ Human- Caused Events	Emergency Preparednes s	2a	Operations/ Emergency Staff	Staff Time	Staff Time	Short	Yes	Yes
HMP.2023.22 - Update security features accordingly for assets identified as most vulnerable to a security breach	Adversarial/ Human- Caused Events	Emergency Preparednes s	1a	Operations/ Emergency Staff	Grant Funding/ Staff Time	\$5,000,000	Long	Yes	Yes
HMP.2023.23 - Update the Emergency Response Plan to include specific actions for Zone 7 personnel should an adversarial event occur.	Adversarial/ Human- Caused Events	Emergency Preparednes s	2b	Operations/ Emergency Staff	Staff Time	Staff Time	Medium	No	Yes
HMP.2023.24 - Consider opportunities to utilize innovative and nature-based solutions that provide complementary environmental and flood risk reduction benefits, such as projects that improve resilience of flood channels to the impacts of high stage and velocity during storm events while enhancing natural processes and channel habitats within the region.	Flood/Stormwater /Drought	Natural Resource Protection/ Prevention	3b	Integrated Planning/ Engineering/ Operations	Grant Funding/ Staff Time	\$25,000	Medium	No	Yes
HMP.2023.25 - Consider opportunities to leverage ecosystem services to mitigate hazard risk and provide co-benefits within the community, such as projects that contribute to improved water quality, groundwater recharge, improved habitat quality, and that support complementary recreational and aesthetic opportunities.	Flood/Stormwater /Drought	Natural Resource Protection/ Prevention	3b	Integrated Planning/ Engineering/ Operations	Grant Funding/ Staff Time	\$25,000	Medium	No	Yes

Note: All values estimated by Steering Committee

Note: All projects marked as "Grant Funding" will come from Table 5.4. Please see the table for additional information.

Note: Timeframe definitions are as follows.

- a) Short: Task to be completed within 1-2 years
- b) Medium Task to be completed within 3-5 years
- c) Long: Task to be completed beyond the 5-year planning period

4.3 National Flood Insurance Program Compliance

§201.6(c)(3)(ii): [The mitigation strategy] must also address the jurisdiction’s participation in the National Flood Insurance Program (NFIP), and continued compliance with NFIP requirements, as appropriate.

The National Flood Insurance Program (NFIP) is a federal program enabling property owners in participating communities to purchase insurance as a protection against flood losses in exchange for State and community floodplain management regulations that reduce future flood damages. Participation in the NFIP is based on an agreement between communities and the Federal Government. If a community adopts and enforces a floodplain management ordinance to reduce future flood risk to new construction in floodplains, the Federal Government will make flood insurance available within the community as a financial protection against flood losses. This insurance is designed to provide an alternative to disaster assistance and reduce the escalating costs of repairing damage to buildings and their contents caused by floods.

Zone 7 is not a floodplain manager and relies on local cities and Alameda County’s floodplain managers. Table 4.3 represents the participation of the cities in Zone 7’s service area and Alameda County.

Table 4.3: Zone 7 Service Area NFIP Participation

CID	Community Name	County	Init. FHBM Identified	Init. FIRM Identified	Curr. Eff. Map Date	Reg-Emer. Date	Tribal
060008	City of Livermore	Alameda	08/13/76	07/05/77	08/03/09	07/05/77	No
060012	City of Pleasanton	Alameda	06/28/74	12/16/80	08/03/09	12/16/80	No
060710	City of San Ramon	Contra Costa	-	09/27/85	06/16/09	09/27/85	No
060705	City of Dublin	Alameda	-	08/18/83	08/03/09	04/15/81	No
060001	Alameda County	Alameda	11/01/74	04/15/81	12/21/18	04/15/81	No

Note: Empty spaces indicate data was not included in the FEMA Community Statute Book Report for California

Flood Recommendations/Repetitive Loss Properties

There were no properties identified as having repetitive losses or assets impacted by regular flooding. Zone 7 facilities are robust, and damage is expected to be minimal. Having said that, Zone 7 did identify several recommendations to mitigate flood hazards in the Mitigation Action Identification table. Specifically, actions HMP.2023.2, HMP.2023.3, HMP.2023.4, HMP.2023.5, HMP.2023.20, HMP.2023.24, and HMP.2023.25 are designed to minimize losses to critical Zone 7 facilities from flooding.

4.4 Prioritization of Mitigation Recommendations

§201.6(c)(3)(iii): [The mitigation strategy section **shall** include] an action plan describing how the actions identified in section (c)(3)(ii) will be prioritized, implemented, and administered by the local jurisdiction. Prioritization **shall** include a special emphasis on the extent to which benefits are maximized according to a cost benefit review of the proposed projects and their associated costs.

A simplified Benefit-Cost Review was applied in order to prioritize the mitigation recommendations for implementation. The priority for implementing mitigation recommendations depends upon the overall cost effectiveness of the recommendation, when taking into account monetary and non-monetary costs and benefits associated with each action. Additionally, the following questions were considered when developing the Benefit-Cost Review:

- How many people will benefit from the action?
- How large an area is impacted?
- How critical are the facilities that benefit from the action?
- Environmentally, does it make sense to do this project for the overall community?

Table 4.4 provides a detailed benefit-cost review for each mitigation recommendation, as well as a relative priority rank (High, Medium, and Low) based upon the judgment of the Steering Committee. The general category guidelines are listed below.

- High – Benefits are perceived to exceed costs without further study or evaluation
- Medium – Benefits are perceived to exceed costs, but may require further study or evaluation prior to implementation

- Low – Benefits and cost evaluations requires additional evaluation prior to implementation

It should be noted that the values for costs (cons) are estimates only.

Table 4.4: Mitigation Action Prioritization: Benefit-Cost Review

Mitigation Activity	Benefits (Pros)	Costs (Cons)	Priority
<p>HMP.2023.01 - Initiate a study to investigate opportunities for cross-functional and multi-benefit mitigation projects that achieve benefits in the areas of flood protection, drinking water quality and supply, environmental and habitat quality, regional economic impacts, and other social and public health effects. Develop a framework for quantifying individual project and multi-project benefits and conduct a feasibility study to develop a multi-hazard mitigation program.</p>	<ul style="list-style-type: none"> • Avoided physical damages . • Avoided loss of function costs . • Improved resiliency throughout the District. • Avoided hazard impacts on the community. 	<ul style="list-style-type: none"> • \$2,000,000 in project costs • Staff Time 	<p>High</p>
<p>HMP.2023.02 - Implement flood protection, conjunctive water management, and water supply infrastructure projects emphasizing multi-benefit hazard mitigation projects.</p>	<ul style="list-style-type: none"> • Avoided physical damages • Improved infrastructure • Improved water supply reliability. • Avoided emergency management costs following flood event 	<ul style="list-style-type: none"> • \$50,000,000 • Staff Time 	<p>High</p>
<p>HMP.2023.03 - Conduct studies and implement projects that leverage the Chain of Lakes to reduce service area flood risk, increase water supply resilience to drought conditions, and contribute to increased resilience of groundwater production facilities to power disruptions.</p>	<ul style="list-style-type: none"> • Avoided loss of function costs • Improved water supply reliability 	<ul style="list-style-type: none"> • \$120,000,000 • Staff Time 	<p>High</p>

Mitigation Activity	Benefits (Pros)	Costs (Cons)	Priority
HMP.2023.04 - Rehabilitation of select flood protection facilities to improve the resilience of flood water management infrastructure.	<ul style="list-style-type: none"> • Avoided physical damages • Avoided emergency management costs • Avoided casualties • Avoided loss of function costs 	<ul style="list-style-type: none"> • \$15,000,000 • Staff Time 	High
HMP.2023.05 - Consider construction of additional flood attenuation basins throughout the region.	<ul style="list-style-type: none"> • Avoided physical damages • Avoided emergency management costs • Avoided casualties • Avoided loss of function costs 	<ul style="list-style-type: none"> • \$20,000,000 • Potential for Environmental Impact • Land Acquisition Costs 	Medium
HMP.2023.06 - Continue implementation of a redundant and resilient SCADA, computer, and communication networks to protect critical infrastructure/operations and better respond to cyber threats.	<ul style="list-style-type: none"> • Avoided emergency management costs • Avoided loss of function costs • Avoided casualties • Improved security of the water supply/quality - Improved potential for continuity of operations 	<ul style="list-style-type: none"> • \$1,000,000 in Improvement costs 	High

Mitigation Activity	Benefits (Pros)	Costs (Cons)	Priority
HMP.2023.07 - Continue investment and Continue investment and implementation of capital projects to improve water treatment capabilities and address emerging and identified contaminants including PFAS.	<ul style="list-style-type: none"> Improved water service/supply resiliency Avoided adverse human health impacts 	<ul style="list-style-type: none"> \$30,000,000 per project in construction/planning costs 	High
HMP.2023.08 - Improve engagement and participation with the Department of Water Resources regarding DWR dam safety, including EAP participation and tabletop exercises and consider mitigation projects.	<ul style="list-style-type: none"> Avoided physical damages Avoided emergency management costs Avoided casualties Avoided loss of function costs 	<ul style="list-style-type: none"> Staff Time Potential Mitigation Project Costs 	High
HMP.2023.09 - Research new opportunities and refresh existing contracts to expand the range of mutual aid agreements which could bolster emergency response efforts (i.e., diesel providers) in the event of a disaster and secure new support agreements.	<ul style="list-style-type: none"> Avoided emergency management costs Avoided casualties 	<ul style="list-style-type: none"> Staff Time 	Medium
HMP.2023.10 - Evaluate past hazard events and subsequent responses to identify areas of organizational and operational improvement as well as possible mitigation actions.	<ul style="list-style-type: none"> Avoided emergency management costs Avoided loss of function costs 	<ul style="list-style-type: none"> Staff Time Potential Mitigation Project Costs 	Medium

Mitigation Activity	Benefits (Pros)	Costs (Cons)	Priority
HMP.2023.11 - Continue and enhance public outreach campaigns. Consider using social media, leveraging local partnerships, and materials prepared by specialist groups in order to maintain cost efficiency.	<ul style="list-style-type: none"> • Avoided casualties • Avoided loss of function costs 	<ul style="list-style-type: none"> • \$50,000 in materials • Staff Time 	Medium
HMP.2023.12 - Procure redundant materials/equipment and improve procurement procedures to be used during an emergency to allow for a speedier recovery.	<ul style="list-style-type: none"> • Avoided loss of function costs emergency management costs • Avoided loss of function costs 	<ul style="list-style-type: none"> • \$10,000,000 in equipment/material costs 	Medium
HMP.2023.13 - Initiate structural upgrade projects to mitigate the effects of an earthquake. Projects might include installation of earthquake resistant piping, retrofits for water-retention structures, and/or the addition of portable facilities to allow pipeline to bypass failure zones	<ul style="list-style-type: none"> • Avoided physical damages • Avoided loss of function • Avoided casualties • Avoided emergency management costs 	<ul style="list-style-type: none"> • \$4,000,000 - \$25,000,000 in project costs • Staff Time 	High
HMP.2023.14 - Participate in wildfire planning and safety efforts to protect Zone 7 facilities and the local watershed.	<ul style="list-style-type: none"> • Avoided emergency management costs • Avoided casualties • Avoided physical damages 	<ul style="list-style-type: none"> • Staff Time • Increased maintenance costs 	Medium

Mitigation Activity	Benefits (Pros)	Costs (Cons)	Priority
HMP.2023.15 - Identify critical elements within the water system where process redundancies don't exist, and implement projects that will allow water service to continue even when critical equipment is offline	<ul style="list-style-type: none"> • Avoided loss of function. • Avoided emergency management costs 	<ul style="list-style-type: none"> • \$30,000,000 in project costs/ per project • Staff Time 	High
HMP.2023.16 - Continue communications and educate local retailers on water availability and system limitations/capabilities during disaster events so they can, in turn, prepare and lead the public when water supply is unavailable due to system failure or interruption.	<ul style="list-style-type: none"> • Avoided emergency management costs • Improved coordination with retailers 	<ul style="list-style-type: none"> • Staff Time 	Medium
HMP.2023.17 - Continue current public outreach campaigns regarding water conservation and flood events.	<ul style="list-style-type: none"> • Improved coordination with retailers and the community • Avoided emergency management costs 	<ul style="list-style-type: none"> • \$200,000 in campaign costs 	Medium
HMP.2023.18 - Continue to study the effects of drought on long-term water supply reliability, engage in regional efforts to increase supply reliability and develop new supply sources, and make strategic investments that increase water supply reliability and resilience within the service area.	<ul style="list-style-type: none"> • Improved water service/supply reliability • Avoided loss of function • Avoided emergency management costs 	<ul style="list-style-type: none"> • \$100,000,000 in investment costs 	High
HMP.2023.19 - Consider investments in energy system reliability and resilience to minimize the potential impacts of utility system outages	<ul style="list-style-type: none"> • Avoided loss of function • Avoided Emergency Management Costs 	<ul style="list-style-type: none"> • Staff Time • \$10,000,000 project estimates 	Medium

Mitigation Activity	Benefits (Pros)	Costs (Cons)	Priority
HMP.2023.20 - Continue existing modeling efforts and embark on new modeling efforts. This includes modeling focused on groundwater, water supply, flood protection, and watersheds and risks posed to each category.	<ul style="list-style-type: none"> Improved understanding of hazard vulnerabilities 	<ul style="list-style-type: none"> \$1,500,000 	High
HMP.2023.21 - Improve coordination with local Law Enforcement Agencies to improve reaction to security issues/threats	<ul style="list-style-type: none"> Avoided emergency management costs Avoided casualties Avoided physical damages 	<ul style="list-style-type: none"> Staff Time 	High
HMP.2023.22 - Update security features accordingly for assets identified as most vulnerable to a security breach	<ul style="list-style-type: none"> Avoided emergency management costs Avoided casualties Avoided physical damages 	<ul style="list-style-type: none"> \$5,000,000 in project costs 	High
HMP.2023.23 - Update the Emergency Response Plan to include specific actions for Zone 7 personnel should an adversarial event occur.	<ul style="list-style-type: none"> Avoided emergency management costs Avoided casualties 	<ul style="list-style-type: none"> Staff Time Consultant Costs 	Medium

Mitigation Activity	Benefits (Pros)	Costs (Cons)	Priority
<p>HMP.2023.24 - Consider opportunities to utilize innovative and nature-based solutions that provide complementary environmental and flood risk reduction benefits, such as projects that improve resilience of flood channels to the impacts of high stage and velocity during storm events while enhancing natural processes and channel habitats within the region.</p>	<ul style="list-style-type: none"> • Improved environmental stewardship • Avoided emergency management costs • Avoided casualties • Avoided physical damages 	<ul style="list-style-type: none"> • \$5,000,000 in project costs 	<p>High</p>
<p>HMP.2023.25 - Consider opportunities to leverage ecosystem services to mitigate hazard risk and provide co-benefits within the community, such as projects that contribute to improved water quality, groundwater recharge, improved habitat quality, and that support complementary recreational and aesthetic opportunities</p>	<ul style="list-style-type: none"> • Improved environmental stewardship • Improved water service/supply reliability • Avoided loss of function costs 	<ul style="list-style-type: none"> • \$5,000,000 in project costs 	<p>High</p>

4.5 Implementation Strategy

Mitigation actions classified as high-priority mitigation actions provide the most significant vulnerability reduction, as related to cost and probability, and are typically implemented before lower ranked improvements. Zone 7 may, however, find that under some circumstances a recommendation classified as a low-priority mitigation action may need to be implemented before a higher priority recommendation. The priority levels associated with each improvement are indicated on the “Mitigation Action Prioritization: Benefit-Cost Review” table (Table 4.4) in the previous section.

It should be noted, that while the steering committee proposed certain mitigation actions and strategies, implementation of these actions are contingent upon being appropriately authorized. The steering committee evaluated projects at a high level, many of which are still conceptual and are not included in Zone 7’s approved budget.

2018 Zone 7 Water Agency Hazard Mitigation Plan

The Project Team reviewed the mitigation strategies and actions from the 2018 HMP. The 2018 Plan outlined mitigation strategies scheduled for completion. Several of the actions contained in the Plan were on-going and Agency staff were able to implement them over the last 5 years. However, these goals were generally part of the Agency’s normal operations.

There was, however, measurable progress for some specific mitigation actions outlined in the 2018 Plan. Implementation of mitigation objectives along with existing planning mechanisms are described on page 5-6 of this plan. Several of the Mitigation Strategies from the 2018 Plan have been carried through into this update, albeit modified. Table 4.5 provides some of the mitigation strategies from the 2018 Plan and their correlation to the current Plan.

During the planning process, it was determined that the best way to build resiliency and develop mitigation actions was to prioritize efforts to maintain water reliability. Since Zone 7 is a water wholesaler, it was determined that maintaining water reliability would benefit all water end users including vulnerable populations. All mitigation actions that were touched on in the Tri-Valley HMP assumed Zone 7’s service would provide a water reliable source to residents in the event of a natural disaster. Consequently, providing reliable access to water was the main priority of all mitigation actions developed in this Plan.

Table 4.5: Ongoing Mitigation Strategies

2018 Plan Mitigation Strategies	Correlated Current Mitigation Strategies
<p>HMP.2016.01 - Conduct a multi-hazard risk assessment of Zone 7's service area to better understand the hazard vulnerabilities to identified hazards and highlight opportunities for mitigation projects. Implement mitigation actions, as necessary.</p>	<p>HMP.2023.01 - Initiate a study to investigate opportunities for cross-functional and multi-benefit mitigation projects that achieve benefits in the areas of flood protection, drinking water quality and supply, environmental and habitat quality, regional economic impacts, and other social and public health effects. Develop a framework for quantifying individual projects and multi-project benefits and conduct a feasibility study to develop a multi-hazard mitigation program.</p>
<p>HMP.2016.02 - Research new opportunities to expand the range of mutual aid contracts which could bolster emergency response efforts in the event of a disaster and secure new support agreements.</p>	<p>HMP.2023.09 - Research new opportunities and refresh existing contracts to expand the range of mutual aid agreements which could bolster emergency response efforts (i.e., diesel providers) in the event of a disaster and secure new support agreements.</p>
<p>HMP.2016.03 - Develop a Continuity of Operations Plan (COO) to bolster organizational resiliency in the event of a disaster.</p>	<p>This item was removed from the 2023 update. The Steering Commit felt this item was already covered under current emergency planning efforts.</p>
<p>HMP.2016.04 - Continue and enhance public outreach campaigns. Consider using social media and materials prepared by specialist groups in order to maintain cost efficiency.</p>	<p>HMP.2023.11 - Continue and enhance public outreach campaigns. Consider using social media, leveraging local partnerships, and materials prepared by specialist groups in order to maintain cost efficiency.</p>
<p>HMP.2016.05 - Implement channel slope stabilization projects, where possible, and procure redundant materials and equipment to be used during an emergency to allow for a speedier recovery.</p>	<p>This mitigation action was removed. Zone 7 successfully obtained grant funding to complete needed projects in 2018.</p>
<p>HMP.2016.06 - Initiate structural upgrade projects to mitigate the effects of an earthquake. Projects might include installation of earthquake resistant piping, retrofits for water-retention structures,</p>	<p>HMP.2023.13 - Initiate structural upgrade projects to mitigate the effects of an earthquake. Projects might include installation of earthquake resistant piping, retrofits for water-retention structures,</p>

and/or the addition of portable facilities to allow pipeline to bypass failure zones.	and/or the addition of portable facilities to allow pipeline to bypass failure zones
HMP.2016.07 - Participate in local and regional wildfire prevention groups (i.e., Diablo Firesafe Council, ABAG Resilience Program) and local jurisdictions in order to support local wildfire safety efforts.	HMP.2023.14 - Participate in wildfire planning and safety efforts to protect Zone 7 facilities and the local watershed.
HMP.2016.08 - Continue and expand thinning/ clearing of non-fire resistive vegetation near evacuation roads and routes to critical facilities.	The Steering Committee removed this element from the plan. Clearing brush is part of Zone 7's normal operations and it is ongoing.
HMP.2016.09 - Identify critical elements within the water system where process redundancies don't exist and implement projects that will allow water service to continue even when critical equipment is offline.	HMP.2023.15 - Identify critical elements within the water system where process redundancies don't exist, and implement projects that will allow water service to continue even when critical equipment is offline
HMP.2016.10 - Continue communications and educate local retailers on water availability and system limitations/capabilities during disaster events so they can, in turn, prepare and lead the public when water supply is unavailable due to system failure or interruption.	HMP.2023.16 - Continue communications and educate local retailers on water availability and system limitations/capabilities during disaster events so they can, in turn, prepare and lead the public when water supply is unavailable due to system failure or interruption.
HMP.2016.11 - Continue current public outreach campaigns regarding water conservation.	HMP.2023.17 - Continue current public outreach campaigns regarding water conservation and flood events.
HMP.2016.12 - Consider Adding new facilities or initiating strategic buildings projects which will increase access to additional water supplies and thereby increase supply reliability.	HMP.2023.18 - Continue to study the effects of drought on long-term water supply reliability, engage in regional efforts to increase supply reliability and develop new supply sources, and make strategic investments that increase water supply reliability and resilience within the service area.

HMP.2016.13 - Consider coordinating with Utility system providers to upgrade or replace critical lifelines infrastructure to minimize the potential impacts of hazard events.	HMP.2023.19 - Consider investments in energy system reliability and resilience to minimize the potential impacts of utility system outages
HMP.2016.14 - Reexamine and refresh terms for existing generator and diesel fuel contracts to ensure agreements are active; securing emergency resources.	Combined and included in HMP.2023.09 in the 2023 Update.
HMP.2016.15 - Develop a procedure and conduct a watershed analysis to predict area of insufficient capacity for drainage and examine the impacts of development on flooding potential downstream.	HMP.2023.20 - Continue existing modeling efforts and embark on new modeling efforts. This includes modeling focused on groundwater, water supply, flood protection, and watersheds and risks posed to each category.
HMP.2016.16 - Continue to repair and make structural improvements to channels to enable them to perform to their design capacity in handling water flows	Combined and included in HMP.2023.20 in the 2023 Update.
HMP.2016.17 - Continue regularly monitoring security messages released through Law Enforcement Agencies pertaining to the water community concerns.	HMP.2023.21 - Improve coordination with local Law Enforcement Agencies to improve reaction to security issues/ threats.
HMP.2016.18 - Update security features accordingly for assets identified as most vulnerable to a security breach	HMP.2023.22 - Update security features accordingly for assets identified as most vulnerable to a security breach.
HMP.2016.19 - Conduct Terrorism and Human-Caused Events Sensitivity Training to prepare Zone 7 staff to recognize, report, and react to potential threats	HMP.2023.23 - Update the Emergency Response Plan to include specific actions for Zone 7 personnel should an adversarial event occur.

5 PLAN MAINTENANCE

Table of Contents

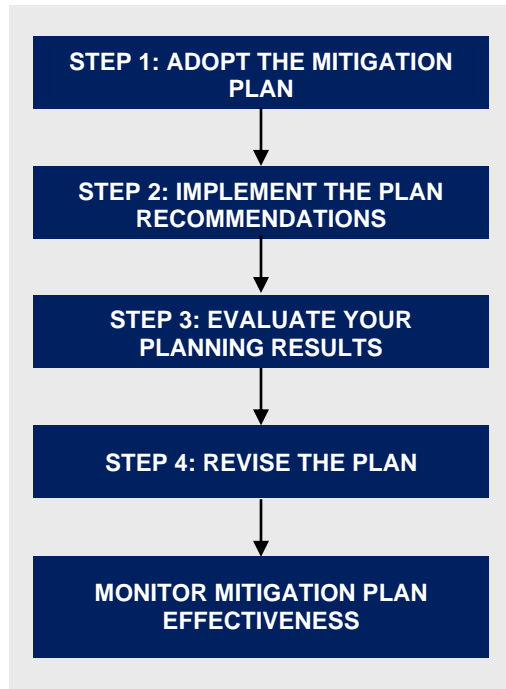
5.1	Mitigation Progress Monitoring	5-1
5.2	Planning Mechanisms	5-9
5.2.1	Incorporation of the Mitigation Strategy into Planning Mechanisms	5-9
5.2.2	Available Planning Mechanisms for Mitigation	5-10
5.3	Periodic Assessment Requirements	5-18
5.4	Update Requirements.....	5-19
5.4.1	Plan Update.....	5-20
5.4.2	Continued Public Involvement	5-22

List of Tables

Table 5.1: Mitigation Action Implementation.....	2
Table 5.2: Regulatory Tools Table	12
Table 5.3: Administrative/Technical Tools Table	12
Table 5.4: Fiscal Tools table.....	13
Table 5.4: Grant Funding Tools Table.....	13
Table 5.5: Education and Outreach Tools Table	15
Table 5.6: Plan Goal Update Summary	20

5.1 Mitigation Progress Monitoring

The Mitigation Strategies report in the Hazard Mitigation Plan (HMP) identifies mitigation actions that have been prioritized based on the loss estimates and the probability of each hazard, which will typically be implemented according to the priority rank. To thoroughly track hazard mitigation status, Zone 7 must continuously monitor and document the progress of the implementation of the mitigation actions. Though mitigation actions may be delegated to different departments within Zone 7, the Integrated Planning Section will have responsibility for the plan overall.



§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.

To facilitate this monitoring process, Table 5.1: “Mitigation Action Implementation” was developed to provide a mechanism for monitoring progress of mitigation actions. The table is designed to monitor mitigation actions according to project managers, project status, and project milestones and is located on the following pages.

Table 5.1: Mitigation Action Implementation

Action ID	Recommendation Description	Responsible Department	Implementation Timeframe	Status	Details/Status Summary
HMP.2023.01	Initiate a study to investigate opportunities for cross-functional and multi-benefit mitigation projects that achieve benefits in the areas of flood protection, drinking water quality and supply, environmental and habitat quality, regional economic impacts, and other social and public health effects. Develop a framework for quantifying individual project and mutli-project benefits and conduct a feasibility study to develop a multi-hazard mitigation program.	Integrated Planning/ Engineering/ Operations	Medium	Open	
HMP.2023.02	Implement flood protection, recharge, and water supply infrastructure projects emphasizing multi-benefit hazard mitigation projects.	Integrated Planning/ Engineering/ Flood Protection/ Groundwater	High	Open	

Action ID	Recommendation Description	Responsible Department	Implementation Timeframe	Status	Details/Status Summary
HMP.2023.03	Continue build-out and integration of the Chain of Lakes improvement projects, including maximizing on-site power generation and the Chain of Lakes Pipeline. (possible floating solar - maybe wellsite power generation)	Integrated Planning/ Engineering	Long	Open	
HMP.2023.04	Rehabilitation of select flood protection facilities to improve the reliability of flood water management.	Flood Protection	Medium	Open	
HMP.2023.05	Consider construction of additional flood attenuation basins throughout the region	Flood Protection	Medium	Open	
HMP.2023.06	Continue implementation of a redundant and resilient SCADA, computer, and communication networks to protect critical infrastructure/operations and better respond to cyber threats.	Engineering/ Operations	Medium	Open	
HMP.2023.07	Continue investment and implementation of capital projects to improve water treatment capabilities and address emerging and identified contaminants including PFAS.	Engineering	On-Going	Open	

Action ID	Recommendation Description	Responsible Department	Implementation Timeframe	Status	Details/Status Summary
HMP.2023.08	Improve engagement and participation with the Department of Water Resources regarding DWR dam safety, including EAP participation and tabletop exercises and consider mitigation projects.	Integrated Planning	On-Going	Open	
HMP.2023.09	Research new opportunities and refresh existing contracts to expand the range of mutual aid agreements which could bolster emergency response efforts (i.e., diesel providers) in the event of a disaster and secure new support agreements.	Engineering/ Operations/ Flood Protection	On-Going	Open	
HMP.2023.10	Evaluate past hazard events and subsequent responses to identify areas of organizational and operational improvement as well as possible mitigation actions.	Operations/ Emergency Staff	Short	Open	
HMP.2023.11	Continue and enhance public outreach campaigns. Consider using social media, leveraging local partnerships, and materials prepared by specialist groups in order to maintain cost efficiency.	Engineering/ Operations/ Flood Protection	Medium	Open	

Action ID	Recommendation Description	Responsible Department	Implementation Timeframe	Status	Details/Status Summary
HMP.2023.12	Procure redundant materials/equipment and improve procurement procedures to be used during an emergency to allow for a speedier recovery.	Engineering/ Operations/ Flood Protection	Long	Open	
HMP.2023.13	Initiate structural upgrade projects to mitigate the effects of an earthquake. Projects might include installation of earthquake resistant piping, retrofits for water-retention structures, and/or the addition of portable facilities to allow pipeline to bypass failure zones.	Engineering/ Operations/ Flood Protection	Long	Open	
HMP.2023.14	Participate in wildfire planning and safety efforts to protect Zone 7 facilities and the local watershed.	Engineering/ Operations/ Flood Protection	Short	Open	
HMP.2023.15	Identify critical elements within the water system where process redundancies don't exist and implement projects that will allow water service to continue even when critical equipment is offline.	Engineering/ Operations/ Flood Protection	Long	Open	

Action ID	Recommendation Description	Responsible Department	Implementation Timeframe	Status	Details/Status Summary
HMP.2023.16	Continue communications and educate local retailers on water availability and system limitations/capabilities during disaster events so they can, in turn, prepare and lead the public when water supply is unavailable due to system failure or interruption."	Engineering/ Operations	On-Going	Open	
HMP.2023.17	Continue current public outreach campaigns regarding water conservation and flood events.	Engineering/ Operations/ Integrated Planning/	On-Going	Open	
HMP.2023.18	Continue to study the effects of drought on long-term water supply reliability, engage in regional efforts to increase supply reliability and develop new supply sources, and make strategic investments that increase water supply reliability and resilience within the service area.	Engineering/ Operations /Integrated Planning	Long	Open	

Action ID	Recommendation Description	Responsible Department	Implementation Timeframe	Status	Details/Status Summary
HMP.2023.19	Consider investments in energy system reliability and resilience to minimize the potential impacts of utility system outages	Integrated Planning/ Engineering/ Operations	Medium	Open	
HMP.2023.20	Continue existing modeling efforts and embark on new modeling efforts. This includes modeling focused on groundwater, water supply, flood protection, and watersheds and risks posed to each category.	Engineering/ Flood Protection	Long-term	Open	
HMP.2023.21	Improve coordination with local Law Enforcement Agencies to improve reaction to security issues/ threats.	Operations/ Emergency Staff	Short	Open	
HMP.2023.22	Update security features accordingly for assets identified as most vulnerable to a security breach.	Operations/ Emergency Staff	Long	Open	
HMP.2023.23	Update the Emergency Response Plan to include specific actions for Zone 7 personnel should an adversarial event occur.	Operations/ Emergency Staff	Medium	Open	

Action ID	Recommendation Description	Responsible Department	Implementation Timeframe	Status	Details/Status Summary
HMP.2023.24	Consider opportunities to utilize innovative and nature-based solutions that provide complementary environmental and flood risk reduction benefits, such as projects that improve resilience of flood channels to the impacts of high stage and velocity during storm events while enhancing natural processes and channel habitats within the region.	Integrated Planning/ Engineering/ Operations	Medium	Open	
HMP.2023.25	Consider opportunities to leverage ecosystem services to mitigate hazard risk and provide co-benefits within the community, such as projects that contribute to improved water quality, groundwater recharge, improved habitat quality, and that support complementary recreational and aesthetic opportunities.	Integrated Planning/ Engineering/ Operations	Medium	Open	

5.2 Planning Mechanisms

§201.6(c)(4)(ii): [The plan shall include a] process by which local governments incorporate the requirements of the mitigation plan into other planning mechanisms such as comprehensive or capital improvement plans, when appropriate.

5.2.1 Incorporation of the Mitigation Strategy into Planning Mechanisms

Zone 7 maintains the following processes to incorporate HMP mitigation strategies into planning mechanisms. The following resources were identified by the Steering Committee as being most inherent to Zone 7 operations and most likely to be avenues for the first steps in hazard mitigation implementation. A list of identified resources is described in Tables 5.2 through 5.6 later in this section.

Website

Zone 7 will post the HMP on its website to enable members of the public to review and provide feedback regarding mitigation objectives and strategies. Feedback from the community can be incorporated on an ongoing basis, during the annual review, or during the five-year update of the Plan through any of these mediums.

Zone 7 Water Agency Board of Directors

The Board of Directors is responsible for approving projects and programs Agency-wide. By providing mitigation planning concepts to the Board of Directors, mitigation actions and concepts will be incorporated into relevant planning efforts.

Office of the General Manager

The Office of the General Manager provides leadership in the management of Zone 7 and execution of Zone 7 policies. The General Manager serves as Zone 7's chief executive officer and oversees the day-to-day operations of Zone 7's departments. The General Manger will expand integration of hazard mitigation with the planning, direction, and management of the water and flood protection operations of Zone 7.

Engineering Department, Maintenance, and Operations Department

Facilities Engineering plans, designs, and constructs major Capital Improvement Projects (CIP) consisting of water supply, conveyance, production, and delivery facilities for

expansion, system-wide improvements, and renewal/replacement programs. It also designs and constructs flood protection channel improvements and manages the Asset Management Program. The Operations Section operates and maintains Zone 7's surface water treatment plants, ground water demineralization plant, wells, and the distribution system, including pipelines, meters, valves, pressure reducing stations, and cathodic protection systems. The Maintenance Section provides maintenance and construction services for the entire treated water system. These departments can implement and expand ongoing hazard mitigation projects into Zone 7's infrastructure and incorporate key mitigation actions.

Integrated Planning

The Integrated Planning Section is responsible for the HMP overall and the objective of the Section is to integrate planning efforts for water supply/quality, water conservation, flood protection, stream management, groundwater, watershed protection and environmental planning activities. For this reason, almost all members of the Integrated Planning Section took part in the HMP steering committee. Integrated Planning will also be responsible for specific mitigation actions as identified in Table 5.1.

5.2.2 Available Planning Mechanisms for Mitigation

Zone 7 uses the following planning mechanisms for incorporating the mitigation requirements of the Plan:

Urban Water Management Plan

Zone 7 is responsible for updating and incorporating mitigation actions and concepts into Zone 7 Agency Urban Water Management Plan (UWMP). The Plan is updated every five years to identify future water supply and demands to ensure adequate water supplies to meeting demands under a range of water supply conditions. The UWMP was updated in 2020, with its next revision scheduled within the next five years. Action Items from the Hazard Mitigation Plan will be reviewed during the next scheduled update and incorporated, as applicable.

Emergency Response Plan

Zone 7 maintains an Emergency Response Plan (ERP) that includes profiles and specific responses for several hazards which are mentioned in the HMP. This document was last updated in 2020.

Capital Improvements Program

Zone 7 maintains a Capital Improvements Program (CIP) with projects, costs, schedules, and priorities that are budgeted for a ten-year Water System Plan and a five-year Flood Protection Plan. The CIP was last updated for 2022-2023. The CIP will be reviewed for mitigation improvements as funding warrants.

Asset Management Plan

Zone 7 maintains an Asset Management Plan (AMP) which includes a fixed asset inventory and its expected useful life. The asset management plan is a reference for hazard mitigation planning.

Resource Tables

This section serves as a high-level capability assessment of Zone 7's resources through which hazard mitigation objectives may be achieved. The following subsections attempt to document the Planning and Regulatory, Administrative and Technical, Financial, and Education and Outreach resources available to Zone 7.

Planning/Regulatory Resources

Table 5.2: Planning/Regulatory Tools Table

Regulatory Tool	Comments
Asset Management Plan	The asset management plan lays out potential and planned improvements for Zone 7 facilities and may be used to incorporate structural improvement projects to improve resiliency.
Urban Water Management Plan	The Plan outlines forecasts for drought probability and magnitude while expanding upon awareness of drought hazard vulnerability.
Emergency Response Plan	The Plan includes profiles and specific responses for several hazards which are mentioned in the HMP
Capital Improvement Plan	The plan outlines proposed efforts for capital projects and programs needed to carry out the goals and objectives of the agency; including those regarding hazard mitigation.

Administrative/Technical Resources

Table 5.3: Administrative/Technical Tools Table

Administrative/Technical Tool	Personnel/Resources
Board of Directors	The Board of Directors can review and approve mitigation proposal for implementations.
Engineering/Maintenance/Operations / Integrated Planning Departments	Engineering, Maintenance, Operations, and Integrated Planning personnel are responsible for emergency preparedness and hazard mitigation planning. This is the position which is ultimately responsible for promoting the implementation of hazard mitigation objectives.
Administration	Administration is a multi-faceted resource. Zone 7 may utilize experts in its many departments for mitigation activity implementation.

Fiscal Resources

Table 5.4: Fiscal Tools table

Fiscal Tool	Available
Water Enterprise Operations Fund	Yes, with Board approval
Water Renewal/Replacement & Systemwide Improvement Capital Fund	Yes, with Board approval
Flood Protection Operations Fund	Yes, with Board approval

Grant Funding

Table 5.4: Grant Funding Tools Table

Grant Funding Tool	Agency	Purpose	Contact
Building Resilient Infrastructure & Communities (BRIC)	Federal Emergency Management Agency	To fund effective and innovative projects that will reduce risk and increase and serve as a catalyst to encourage the whole community to invest in and adopt policies related to mitigation.	FEMA 500 C. Street, SW Washington, DC 20472 Phone: (202) 646-4621 www.fema.gov
Hazard Mitigation Grant Program	U.S. Department of Homeland Security, Federal Emergency Management Agency	To prevent future losses of lives property due to disasters; to implement State of local hazard mitigation plans; to enable mitigation measures to be implemented during immediate	FEMA 500 C Street S.W. Washington, DC 20472 Phone (202) 646-4621 www.fema.gov

		recovery from a disaster; and to provide funding for previously identified mitigation measures to benefit the disaster area.	
Flood Mitigation Assistance (FMA)	U.S. Department of Homeland Security, Federal Emergency Management Agency	To help States and communities plan and carry out activities designed to reduce the risk of flood damage to structures insurable under the NFIP.	FEMA 500 C Street S.W. Washington, DC 20472 Phone (202) 646-4621 www.fema.gov
Emergency Management Performance Grants (EMPG)	U. S. Department of Homeland Security; Federal Emergency Management Agency	To encourage the development of comprehensive emergency management at the State and local level and to improve emergency management planning, preparedness, mitigation, response, and recovery capabilities.	FEMA 500 C Street S.W. Washington, DC 20472 Phone (202) 646-4621 www.fema.gov
Public Assistance Program (PA)	U.S. Department of Homeland Security, Federal Emergency Management Agency	To provide supplemental assistance to States, local governments, and certain private nonprofit organizations to alleviate suffering and hardship resulting from major disasters or emergencies declared by the President. Under Section 406, Public Assistance funds may be used to mitigate the impact of future disasters.	FEMA 500 C Street S.W. Washington, DC 20472 Phone (202) 646-4621 www.fema.gov
Emergency Watershed Protection	U.S. Department of Agriculture, Natural Resource Conservation Service	To provide emergency technical and financial assistance to install or repair	NRCS PO BOX 2890 Washington, DC 20013

		structures that reduce runoff and prevent soil erosion to safeguard life and property.	Phone: (202) 720-3527 www.nrcs.usda.gov
Disaster Mitigation and Technical Assistance Grants	U.S. Department of Commerce, Economic Development Administration	To help States and localities to develop and /or implement a variety of disaster mitigation strategies.	EDA Herbert C. Hoover Building Washington, DC 20230 Phone: (800) 345-1222 www.eda.gov
Watershed Surveys and Planning	U.S. Department of Agriculture, Natural Resource Conservation Service	To provide planning assistance to Federal, State, and local agencies for the development of coordination water and related land resources programs in watersheds and river basins	NRCS PO Box 2890 Washington, DC 20013 Phone: (202) 720-3527 www.nrcs.usda.gov
National Earthquake Hazards Reduction Program (NEHRP)	U.S. Department of Homeland Security, Federal Emergency Management Agency	To mitigate earthquake losses that can occur in many parts of the nation providing earth science data and assessments essential for warning of imminent damaging earthquakes, land-use planning, engineering design, and emergency preparedness decisions.	FEMA 500 C Street S.W. Washington, DC 20472 Phone (202) 646-4621 www.fema.gov

Outreach and Partnerships Resources

Table 5.5: Education and Outreach Tools Table

Outreach/Partnership Tools	Comments
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Zone 7 Website	The Zone 7 website is an open forum for providing hazard information and for accepting ongoing comments from the public. The website will likely be the main avenue for maintaining an open dialogue with the public for hazard mitigation throughout the planning period.
Public Outreach	Zone 7 holds several educational training opportunities throughout the year. Public outreach will be able to be expanded to include a broader spectrum of hazard-specific information to improve hazard awareness.
Mutual Aid Agreements	As part of expanding its resilience to the impacts of hazard events, Zone 7 intends to review its current mutual aid agreements, identify gaps, and secure new agreements to expand its available mutual resources.

Progress for Mitigation Incorporation

The sections above demonstrate the many resources available to Zone 7 for successful mitigation action implementation. Some of these resources have already proven their usefulness through successful action implementation over the last planning period.

In updating the current Plan, the overall priority was to focus on activities which were specific to Zone 7 and realistic with Zone 7's resources. In doing so, Zone 7 anticipates an increased opportunity for implementation of mitigation strategies and incorporation of those strategies into planning mechanisms moving forward.

Zone 7 will reference the Plan when considering any other planning developments. The plan can be consulted during new projects to ensure that hazard vulnerability is a factor when considering risk. The planning teams can also incorporate the Plan when presenting to the Board of Directors for future projects that have a bearing on hazard vulnerability.

Building of Existing Capabilities

As part of the Plan update, potential improvements to Zone 7's existing capabilities were discussed. Zone 7 is cognizant of the need to continually evaluate its efforts and take an active role in promoting resiliency within the agency's service area. In addition to Zone 7's current efforts, the following is a list of potential new initiatives that would improve the agency's ability to promote resiliency.

- **Planning/Regulatory:** Enhance the CIP proposal procedure to include a Mitigation/Resiliency element to be considered for each project proposal. The intent is to consider how each CIP project might contribute to mitigation efforts, citing the HMP when proposed projects align with hazard mitigation planning efforts.
- **Administrative/Technical:** Expand the programs provided by the Safety Technician to provide specialized natural disaster training and safety for District personnel and the public, as appropriate.
- **Financial:** Expand search for grant funding specifically to assist with aging infrastructure improvements, energy efficiency, and facility upgrades.
- **Outreach/Education:** Engage local community commissions and committees and increase opportunities to work with the public.

5.3 Periodic Assessment Requirements

§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.

Mitigation planning is an ongoing process and, as such, the Hazard Mitigation Plan should be treated as a living document that must grow and adapt in order to keep pace with changes within Zone 7's service area. Continuing from the 2018 Hazard Mitigation Plan, a periodic assessment will be completed to document any changes in site hazards (e.g., updated FIRM maps, contemporary seismic studies, etc.) or the installation and purchase of new equipment (e.g., back-up generators, emergency response equipment, etc.) to ensure they do not have any major effects on Zone 7's hazard vulnerabilities that would impact the conclusions or actions associated with the HMP. In addition, these reviews are intended track the progress of proposed mitigation actions and the incorporation of mitigation planning in other Zone 7 planning documents. As needed, these reviews can be used to promote mitigation action with Zone 7 or alter mitigation strategies within the plan, as appropriate. The plan will be evaluated approximately one year before the plan expires, if not more frequent.

Prior to the fifth year of the revision cycle, these observations and assessments will be reviewed to determine what changes should be implemented in the required Hazard Mitigation Plan Update and what progress can be documented. The results of the evaluations will be folded back into each phase of the planning process and should yield decisions on how to update each section of the Plan.

The Integrated Planning Section has the responsibility of updating the plan on a five-year cycle, in accordance with the FEMA requirements in effect at the time. During the periodic review, if any updates are deemed minor, then the Integrated Planning Section will perform the updates. However, if major updates are required, then the Steering Committee will reconvene to discuss the effects on the Plan and take it to the Board of Directors, vulnerable populations, and the public for input. For the fifth-year revision, the entire Steering Committee will reconvene to use their expertise to update the Plan in its entirety. Each of the annual assessments will be utilized as an opportunity to evaluate the progress of hazard mitigation action implementation. In addition, the Integrated Planning Section will assess the situations of sensitive populations every year to determine if updates need to be made. As stated above, the Integrated Planning Section will be responsible for reviewing the mitigation actions periodically (at minimum one year before the plan

expires, if not more frequent) and encouraging implementation with the proper departments. If the Plan is not meeting its goals, the Integrated Planning Section will suggest modifications and implement changes to the plan as appropriate.

In addition to these periodic requirements, any significant modification to Zone 7's facilities should be considered with respect to a possible impact on the HMP. All Steering Committee members are responsible for providing updates for the Integrated Planning Section as necessary. As noted in the following section, the completed HMP will be available on Zone 7's website to allow the public to continue to be involved during these periodic reviews.

5.4 Update Requirements

§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.

§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 Emergency Management and Assistance regulations (44 CFR Part 201) state that it is the responsibility of local agencies (i.e., Zone 7) to “at a minimum, review and, update the local mitigation plan every five years from date of plan approval to continue program eligibility”. The evaluation procedures listed below will provide insight into the major changes that need to be included in the five-year update and resubmission to FEMA:

- Periodic HMP Review with respect to changes in hazard vulnerability (e.g., additional hazards identified, natural hazard events, etc.)
- Periodic HMP review with respect to development of new facilities
- Five-year comprehensive update to address changed to operations, facilities, goals, and findings of the annual reviews
- Re-submittal of the updated HMP to California Governor's Office of Emergency Services (Cal OES)/FEMA

Additionally, the risk assessment portion of the plan will be reviewed to determine if the information should be updated or modified. Each department responsible for the various implementation actions will report on:

- Status of their projects
- Implementation processes

- Any difficulties encountered
- How coordination efforts are proceeding
- Which strategies should be revised

The current update effort was begun prior to the release of the April 2023. Although the team attempted to meet the new requirements, the Steering Committee’s understanding of FEMA’s goal to incorporate the perspectives of vulnerable populations was not fully understood. In response to Cal OES feedback, the Steering Committee attempted to close the gap; holding additional planning meetings and giving new stakeholders the opportunity to change plan development. As part of the next 5-year update, Zone 7 personnel will ensure representatives for vulnerable populations are included at the start of the process.

5.4.1 Plan Update

Zone 7’s HMP was last updated in 2018. During the second Steering Committee meeting Plan goals were reviewed for consistency and applicability to Zone 7, along with the goals from the State and Alameda County HMPs. One of the main objectives of the review process was to update regional goals to make them more relevant to Zone 7 currently. Table 5.4 illustrates that changes were made to the overall Goals of the Plan.

Table 5.6: Plan Goal Update Summary

2018 Plan Goals	Current Plan Goals
Protect Life and Property	Protect Life and Property
Improve Emergency Services and Management Capability	Improve Emergency Preparedness and Management Capability
Protect the Environment	Protect the Environment
Promote Public Awareness and Outreach	Promote Public Awareness and Outreach

The 2018 Plan was critical in securing grant funding for stability work regarding flood channels in local areas in the service region, which has proven to reduce vulnerabilities in the area since then. However, due to personnel turnover, the plan was not highlighted over the past five years until current personnel were given time to become familiar with the Plan’s contents. As such, aside from the 2019 stability work, the plan was not integrated into any other planning mechanisms since that time.

Although Zone 7 did not make major changes to the Plan goals, distinctions were made to reflect changing priorities in the objectives which support these goals. A full list of Plan objectives can

be found in Chapter 4. Some of those distinctions included a thoughtful discussion about the role the agency plays in regional emergency response efforts. During an emergency, Zone 7 supports public safety by delivering reliable and resilient emergency water service for fire suppression and life preservation. Therefore, objectives were rewritten to focus on collaboration with local authorities and system redundancies to improve water service resiliency and best support emergency services agencies directly engaging with the public during emergency events. Additionally, it was determined that because Zone 7 is a wholesaler of drinking water to the local cities, it is somewhat detached from individual members of the public (i.e., Zone 7 is not shown on their water bill). Therefore, Zone 7 determined that it should focus on communicating important information about drinking water service to its retailer customers and allow its customers to lead the effort to relay pertinent information to end users (area residents and businesses). Zone 7's outreach should primarily be focused on these critical points of contact with retailers in order to make efficient uses of resources and ensure messaging has the desired impact.

5.4.2 Continued Public Involvement

To facilitate ongoing public input, the completed and adopted HMP will be posted on Zone 7's website to allow the public to remain engaged and provide feedback. The website will allow the public to submit comments to be integrated as appropriate. When updates to the HMP are required, Zone 7 will again solicit participation from Steering Committee members and discuss the issues that need to be addressed in the HMP update. Public participation will be solicited through public notices and advertised on the website as part of any future plan updates.

The goal of public outreach is to solicit public involvement in the hazard mitigation planning. This includes determining which hazards impact Zone 7 and discussing ways to mitigate those hazards. The public was encouraged to participate in the hazard mitigation process through participation through a workshop during the current Plan update. Zone 7 will continue to solicit for public comment to support future planning and when deciding which mitigation action to implement.

If Plan revisions are needed, Zone 7 will request involvement from vulnerable groups in the service area. It is anticipated that public announcements via the website will be supplemented by targeted outreach materials—such as letters and surveys—that Zone 7 representatives will deliver to representatives of vulnerable communities. This will guarantee that outreach efforts directed towards obtaining the involvement of vulnerable populations are more extensive.

A GLOSSARY

Active fault - For implementation of Alquist-Priolo Earthquake Fault Zoning Act (APEFZA) requirements, an active fault is one that shows evidence of, or is suspected of having experienced surface displacement within the last 11,000 years. APEFZA classification is designed for land use management of surface rupture hazards. A more general definition (National Academy of Science, 1988), states "a fault that on the basis of historical, seismological, or geological evidence has the finite probability of producing an earthquake" (see potentially active fault).

Aftershocks - Minor earthquakes following a greater one and originating at or near the same place.

Asset - Any man-made or natural feature that has value, including, but not limited to people, buildings, infrastructure like bridges, roads, and sewer and water systems; lifelines like electricity and communication resources; or environmental, cultural, or recreational features like parks, dunes, wetlands, or landmarks.

A zone - Under the National Flood Insurance Program, area subject to inundation by the 100-year flood where wave action does not occur or where waves are less than 3 feet high, designated Zone A, AE, A1-A30, A0, AH, or AR on a Flood Insurance Rate Map (FIRM).

Base flood - Flood that has a 1 percent probability of being equaled or exceeded in any given year. Also known as the 100-year flood.

Bedrock - The solid rock that underlies loose material, such as soil, sand, clay, or gravel.

Contour - A line of equal ground elevation on a topographic (contour) map.

Critical facility - Facilities that are critical to the health and welfare of the population and that are especially important following hazard events. Critical facilities include, but are not limited to, shelters, police and fire stations, and hospitals.

Debris - (Seismic) the scattered remains of something broken or destroyed; ruins; rubble; fragments. (Flooding, Coastal) Solid objects or masses carried by or floating on the surface of moving water.

Debris flow - A saturated, rapidly moving saturated earth flow with 50 percent rock fragments coarser than 2 mm in size which can occur on natural and graded slopes.

Duration - How long a hazard event lasts.

Earthquake - Vibratory motion propagating within the Earth or along its surface caused by the abrupt release of strain from elastically deformed rock by displacement along a fault.

Epicenter - The point at the Earth's surface directly above where an earthquake originated.

Erosion - Under the National Flood Insurance Program, the process of the gradual wearing away of landmasses. In general, erosion involves the detachment and movement of soil and rock fragments, during a flood or storm or over a period of years, through the action of wind, water, or other geologic processes.

Essential facility - Elements that are important to ensure a full recovery of a community or state following a hazard event. These would include government functions, major employers, banks, schools, and certain commercial establishments, such as grocery stores, hardware stores, and gas stations.

Extent - The size of an area affected by a hazard or hazard event.

Fault - A fracture in the continuity of a rock formation caused by a shifting or dislodging of the earth's crust, in which adjacent surfaces are differentially displaced parallel to the plane of fracture.

Fault slip rate - The average long-term movement of a fault (measured in cm/year or mm/year) as determined from geologic evidence.

Federal Emergency Management Agency (FEMA) - Independent agency created in 1978 to provide a single point of accountability for all Federal activities related to disaster mitigation and emergency preparedness, response, and recovery.

Flash flood - A flood event occurring with little or no warning where water levels rise at an extremely fast rate.

Flood - A general and temporary condition of partial or complete inundation of normally dry land areas from (1) the overflow of inland or tidal waters, (2) the unusual and rapid accumulation or runoff of surface waters from any source, or (3) mudflows or the sudden collapse of shoreline land.

Floodplain - Any land area, including watercourse, susceptible to partial or complete inundation by water from any source.

Frequency - A measure of how often events of a particular magnitude are expected to occur. Frequency describes how often a hazard of a specific magnitude, duration, and/or extent typically occurs, on average. Statistically, a hazard with a 100-year recurrence interval is expected to occur once every 100 years on average and would have a 1 percent chance – its probability – of happening in any given year. The reliability of this information varies depending on the kind of hazard being considered.

Geographic Information Systems (GIS) - A computer software application that relates physical features on the Earth to a database to be used for mapping and analysis.

Ground motion - The vibration or shaking of the ground during an earthquake. When a fault ruptures, seismic waves radiate, causing the ground to vibrate. The severity of the vibration increases with the amount of energy released and decreases with distance from the causative fault or epicenter, but soft soils can further amplify ground motions.

Ground rupture - Displacement of the earth's surface as a result of fault movement associated with an earthquake.

Hailstorm – Storm associated with spherical balls of ice. Hail is a product of thunderstorms or intense showers. It is generally white and translucent, consisting of liquid or snow particles encased with layers of ice. Hail is formed within the higher reaches of a well-developed thunderstorm. When hailstones become too heavy to be caught in an updraft back into the clouds of the thunderstorm (hailstones can be caught in numerous updrafts adding a coating of ice to the original frozen droplet of rain each time), they fall as hail, and a hailstorm ensues.

Hazard - A source of potential danger or adverse conditions. Hazards in this how-to series will include naturally occurring events such as floods, earthquakes, tornadoes, tsunami, coastal storms, landslides, and wildfires that strike populated areas. A natural event is a hazard when it has the potential to harm people or property.

Hazard event - A specific occurrence of a particular type of hazard.

Hazard identification - The process of identifying hazards that threaten an area.

Hazard mitigation - Sustained actions taken to reduce or eliminate long-term risk from hazards and their effects.

Hazard Mitigation Grant Program (HMGP) – Authorized under Section 404 of the Robert T. Stafford Disaster Relief and Emergency Assistance Act, HMGP is administered by FEMA and provides grants to states, tribes, and local governments to implement hazard mitigation actions after a major disaster declaration. The purpose of the program is to reduce the loss of life and property due to disasters and to enable mitigation activities to be implemented as a community recovers from a disaster.

Hazard Mitigation Plan – A collaborative document in which hazards affecting the community are identified, vulnerability to hazards assessed, and consensus reached on how to minimize or eliminate the effects of these hazards.

Hazard profile - A description of the physical characteristics of hazards and a determination of various descriptors including magnitude, duration, frequency, probability, and extent. In most cases, a community can most easily use these descriptors when they are recorded and displayed as maps.

Hazardous Material Facilities – Facilities housing industrial and hazardous materials, such as corrosives, explosives, flammable materials, radioactive materials, and toxins.

HAZUS (Hazards U.S.) - A GIS-based nationally standardized earthquake loss estimation tool developed by FEMA.

Hurricane - An intense tropical cyclone, formed in the atmosphere over warm ocean areas, in which wind speeds reach 74-miles-per-hour or more and blow in a large spiral around a relatively calm center or "eye." Hurricanes develop over the North Atlantic Ocean, northeast Pacific Ocean, or the South Pacific Ocean east of 160°E longitude. Hurricane circulation is counterclockwise in the Northern Hemisphere and clockwise in the Southern Hemisphere.

Hydrology - The science of dealing with the waters of the earth. A flood discharge is developed by a hydrologic study.

Infrastructure - Refers to the public services of a community that have a direct impact on the quality of life. Infrastructure includes communication technology such as phone lines or Internet access, vital services such as public water supplies and sewer treatment facilities, and includes an area's transportation system such as airports, heliports; highways, bridges, tunnels, roadbeds, overpasses, railways, bridges, rail yards, depots; and waterways, canals, locks, seaports, ferries, harbors, drydocks, piers and regional dams.

Landslide - A general term covering a wide variety of mass-movement landforms and processes involving the downslope transport, under gravitational influence, of soil and rock material en masse.

Liquefaction - Changing of soils (unconsolidated alluvium) from a solid state to weaker state unable to support structures; where the material behaves similar to a liquid as a consequence of earthquake shaking. The transformation of cohesionless soils from a solid or liquid state as a result of increased pore pressure and reduced effective stress.

Magnitude - A measure of the strength of a hazard event. The magnitude (also referred to as severity) of a given hazard event is usually determined using technical measures specific to the hazard.

Mitigation plan - A systematic evaluation of the nature and extent of vulnerability to the effects of natural hazards typically present in the state and includes a description of actions to minimize future vulnerability to hazards.

Nor'easter - An extra-tropical cyclone producing gale-force winds and precipitation in the form of heavy snow or rain.

Peak Ground Acceleration (PGA) - The greatest amplitude of acceleration measured for a single frequency on an earthquake accelerogram. The maximum horizontal ground motion generated by an earthquake. The measure of this motion is the acceleration of gravity (equal to 32 feet per second squared, or 980 centimeter per second squared), and generally expressed as a percentage of gravity.

Potentially active fault - A fault showing evidence of movement within the last 1.6 million years (750,000 years according to the U.S. Geological Survey) but before about 11,000 years ago, and that is capable of generating damaging earthquakes.

Probability - A statistical measure of the likelihood that a hazard event will occur.

Replacement value - The cost of rebuilding a structure. This is usually expressed in terms of cost per square foot and reflects the present-day cost of labor and materials to construct a building of a particular size, type, and quality.

Retrofit - Any change made to an existing structure to reduce or eliminate damage to that structure from flooding, erosion, high winds, earthquakes, or other hazards

Richter scale - A numerical scale of earthquake magnitude devised by seismologist C.F. Richter in 1935. Seismologists no longer use this magnitude scale because of limitations in how it measures large earthquakes and prefer instead to use moment magnitude as a measure of the energy released during an earthquake.

Risk - The estimated impact that a hazard would have on people, services, facilities, and structures in a community; the likelihood of a hazard event resulting in an adverse condition that causes injury or damage. Risk is often expressed in relative terms such as a high, moderate, or low likelihood of sustaining damage above a particular threshold due to a specific type of hazard event. It also can be expressed in terms of potential monetary losses associated with the intensity of the hazard.

Seismicity - Describes the likelihood of an area being subject to earthquakes.

Tectonic plate - Torsionally rigid, thin segments of the earth's lithosphere that may be assumed to move horizontally and adjoin other plates. It is the friction between plate boundaries that cause seismic activity.

Topographic - Characterizes maps that show natural features and indicate the physical shape of the land using contour lines. These maps may also include manmade features.

Tornado - A violently rotating column of air extending from a thunderstorm to the ground.

Tsunami - Great sea wave produced by a submarine earthquake, landslide, or volcanic eruption.

Vulnerability - Describes how exposed or susceptible to damage an asset is. Vulnerability depends on an asset's construction, contents, and the economic value of its functions. Like indirect damage, the vulnerability of one element of the community is often related to the vulnerability of another. For example, many businesses depend on uninterrupted electrical power – if an electric substation is flooded, it will affect not only the substation itself, but a number of businesses as well. Often, indirect effects can be much more widespread and damaging than direct ones.

Vulnerability assessment - The extent of injury and damage that may result from a hazard event of a given intensity in a given area. The vulnerability assessment should address impacts of hazard events on the existing and future built environment.

Wildfire - An uncontrolled fire spreading through vegetative fuels, exposing and possibly consuming structures.

Zone - A geographical area shown on a Flood Insurance Rate Map.

100-year flood – A flood that has a 1-percent chance of being equaled or exceeded in any given year. This flood event is also referred to as the base flood. The term "100-year flood" can be misleading; it is not the flood that will occur once every 100 years. Rather, it is the flood elevation that has a 1- percent chance of being equaled or exceeded each year. Therefore, the 100-year flood could occur more than once in a relatively short period of time. The 100-year flood, which is the standard used by most federal and state agencies, is used by the National Flood Insurance Program (NFIP) as the standard for floodplain management to determine the need for flood insurance.

500-year flood – A flood that has a 0.2-percent chance of being equaled or exceeded in any one year.

B REGULATIONS

The Disaster Mitigation Act of 2000 (P.L. 106-390) facilitates a new and revitalized approach to mitigation planning. DMA 2000 amended the Robert T. Stafford Disaster Relief and Emergency Assistance Act by repealing the previous mitigation planning provisions (Section 409) and replacing them with a new set of mitigation plan requirements (Section 322). This new section emphasizes the need for state, Tribal, and local entities to closely coordinate mitigation planning and implementation efforts. The following pages provide a description of the Disaster Mitigation Act of 2000, as well as the Interim Final Rule for mitigation planning.

PUBLIC LAW 106-390—OCT. 30, 2000

DISASTER MITIGATION ACT OF 2000

Public Law 106–390
106th Congress

An Act

Oct. 30, 2000
[H.R. 707]

To amend the Robert T. Stafford Disaster Relief and Emergency Assistance Act to authorize a program for predisaster mitigation, to streamline the administration of disaster relief, to control the Federal costs of disaster assistance, and for other purposes.

Disaster
Mitigation Act of
2000.
42 USC 5121
note.

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled,

SECTION 1. SHORT TITLE; TABLE OF CONTENTS.

(a) **SHORT TITLE.**—This Act may be cited as the “Disaster Mitigation Act of 2000”.

(b) **TABLE OF CONTENTS.**—The table of contents of this Act is as follows:

Sec. 1. Short title; table of contents.

TITLE I—PREDISASTER HAZARD MITIGATION

Sec. 101. Findings and purpose.

Sec. 102. Predisaster hazard mitigation.

Sec. 103. Interagency task force.

Sec. 104. Mitigation planning; minimum standards for public and private structures.

TITLE II—STREAMLINING AND COST REDUCTION

Sec. 201. Technical amendments.

Sec. 202. Management costs.

Sec. 203. Public notice, comment, and consultation requirements.

Sec. 204. State administration of hazard mitigation grant program.

Sec. 205. Assistance to repair, restore, reconstruct, or replace damaged facilities.

Sec. 206. Federal assistance to individuals and households.

Sec. 207. Community disaster loans.

Sec. 208. Report on State management of small disasters initiative.

Sec. 209. Study regarding cost reduction.

TITLE III—MISCELLANEOUS

Sec. 301. Technical correction of short title.

Sec. 302. Definitions.

Sec. 303. Fire management assistance.

Sec. 304. Disaster grant closeout procedures.

Sec. 305. Public safety officer benefits for certain Federal and State employees.

Sec. 306. Buy American.

Sec. 307. Treatment of certain real property.

Sec. 308. Study of participation by Indian tribes in emergency management.

**TITLE I—PREDISASTER HAZARD
MITIGATION**

42 USC 5133
note.

SEC. 101. FINDINGS AND PURPOSE.

(a) **FINDINGS.**—Congress finds that—

(1) natural disasters, including earthquakes, tsunamis, tornadoes, hurricanes, flooding, and wildfires, pose great danger to human life and to property throughout the United States;

(2) greater emphasis needs to be placed on—

(A) identifying and assessing the risks to States and local governments (including Indian tribes) from natural disasters;

(B) implementing adequate measures to reduce losses from natural disasters; and

(C) ensuring that the critical services and facilities of communities will continue to function after a natural disaster;

(3) expenditures for postdisaster assistance are increasing without commensurate reductions in the likelihood of future losses from natural disasters;

(4) in the expenditure of Federal funds under the Robert T. Stafford Disaster Relief and Emergency Assistance Act (42 U.S.C. 5121 et seq.), high priority should be given to mitigation of hazards at the local level; and

(5) with a unified effort of economic incentives, awareness and education, technical assistance, and demonstrated Federal support, States and local governments (including Indian tribes) will be able to—

(A) form effective community-based partnerships for hazard mitigation purposes;

(B) implement effective hazard mitigation measures that reduce the potential damage from natural disasters;

(C) ensure continued functionality of critical services;

(D) leverage additional non-Federal resources in meeting natural disaster resistance goals; and

(E) make commitments to long-term hazard mitigation efforts to be applied to new and existing structures.

(b) **PURPOSE.**—The purpose of this title is to establish a national disaster hazard mitigation program—

(1) to reduce the loss of life and property, human suffering, economic disruption, and disaster assistance costs resulting from natural disasters; and

(2) to provide a source of predisaster hazard mitigation funding that will assist States and local governments (including Indian tribes) in implementing effective hazard mitigation measures that are designed to ensure the continued functionality of critical services and facilities after a natural disaster.

SEC. 102. PREDISASTER HAZARD MITIGATION.

(a) **IN GENERAL.**—Title II of the Robert T. Stafford Disaster Relief and Emergency Assistance Act (42 U.S.C. 5131 et seq.) is amended by adding at the end the following:

“SEC. 203. PREDISASTER HAZARD MITIGATION.

“(a) **DEFINITION OF SMALL IMPOVERISHED COMMUNITY.**—In this section, the term ‘small impoverished community’ means a community of 3,000 or fewer individuals that is economically disadvantaged, as determined by the State in which the community is located and based on criteria established by the President.

“(b) **ESTABLISHMENT OF PROGRAM.**—The President may establish a program to provide technical and financial assistance to States and local governments to assist in the implementation of

President.
42 USC 5133.

predisaster hazard mitigation measures that are cost-effective and are designed to reduce injuries, loss of life, and damage and destruction of property, including damage to critical services and facilities under the jurisdiction of the States or local governments.

“(c) APPROVAL BY PRESIDENT.—If the President determines that a State or local government has identified natural disaster hazards in areas under its jurisdiction and has demonstrated the ability to form effective public-private natural disaster hazard mitigation partnerships, the President, using amounts in the National Predisaster Mitigation Fund established under subsection (i) (referred to in this section as the ‘Fund’), may provide technical and financial assistance to the State or local government to be used in accordance with subsection (e).

“(d) STATE RECOMMENDATIONS.—

“(1) IN GENERAL.—

“(A) RECOMMENDATIONS.—The Governor of each State may recommend to the President not fewer than five local governments to receive assistance under this section.

“(B) DEADLINE FOR SUBMISSION.—The recommendations under subparagraph (A) shall be submitted to the President not later than October 1, 2001, and each October 1st thereafter or such later date in the year as the President may establish.

“(C) CRITERIA.—In making recommendations under subparagraph (A), a Governor shall consider the criteria specified in subsection (g).

“(2) USE.—

President.

“(A) IN GENERAL.—Except as provided in subparagraph (B), in providing assistance to local governments under this section, the President shall select from local governments recommended by the Governors under this subsection.

“(B) EXTRAORDINARY CIRCUMSTANCES.—In providing assistance to local governments under this section, the President may select a local government that has not been recommended by a Governor under this subsection if the President determines that extraordinary circumstances justify the selection and that making the selection will further the purpose of this section.

“(3) EFFECT OF FAILURE TO NOMINATE.—If a Governor of a State fails to submit recommendations under this subsection in a timely manner, the President may select, subject to the criteria specified in subsection (g), any local governments of the State to receive assistance under this section.

“(e) USES OF TECHNICAL AND FINANCIAL ASSISTANCE.—

“(1) IN GENERAL.—Technical and financial assistance provided under this section—

“(A) shall be used by States and local governments principally to implement predisaster hazard mitigation measures that are cost-effective and are described in proposals approved by the President under this section; and

“(B) may be used—

“(i) to support effective public-private natural disaster hazard mitigation partnerships;

“(ii) to improve the assessment of a community’s vulnerability to natural hazards; or

“(iii) to establish hazard mitigation priorities, and an appropriate hazard mitigation plan, for a community.

“(2) DISSEMINATION.—A State or local government may use not more than 10 percent of the financial assistance received by the State or local government under this section for a fiscal year to fund activities to disseminate information regarding cost-effective mitigation technologies.

“(f) ALLOCATION OF FUNDS.—The amount of financial assistance made available to a State (including amounts made available to local governments of the State) under this section for a fiscal year—

“(1) shall be not less than the lesser of—

“(A) \$500,000; or

“(B) the amount that is equal to 1.0 percent of the total funds appropriated to carry out this section for the fiscal year;

“(2) shall not exceed 15 percent of the total funds described in paragraph (1)(B); and

“(3) shall be subject to the criteria specified in subsection

(g).

“(g) CRITERIA FOR ASSISTANCE AWARDS.—In determining whether to provide technical and financial assistance to a State or local government under this section, the President shall take into account—

“(1) the extent and nature of the hazards to be mitigated;

“(2) the degree of commitment of the State or local government to reduce damages from future natural disasters;

“(3) the degree of commitment by the State or local government to support ongoing non-Federal support for the hazard mitigation measures to be carried out using the technical and financial assistance;

“(4) the extent to which the hazard mitigation measures to be carried out using the technical and financial assistance contribute to the mitigation goals and priorities established by the State;

“(5) the extent to which the technical and financial assistance is consistent with other assistance provided under this Act;

“(6) the extent to which prioritized, cost-effective mitigation activities that produce meaningful and definable outcomes are clearly identified;

“(7) if the State or local government has submitted a mitigation plan under section 322, the extent to which the activities identified under paragraph (6) are consistent with the mitigation plan;

“(8) the opportunity to fund activities that maximize net benefits to society;

“(9) the extent to which assistance will fund mitigation activities in small impoverished communities; and

“(10) such other criteria as the President establishes in consultation with State and local governments.

President.

“(h) FEDERAL SHARE.—

“(1) IN GENERAL.—Financial assistance provided under this section may contribute up to 75 percent of the total cost of mitigation activities approved by the President.

“(2) SMALL IMPOVERISHED COMMUNITIES.—Notwithstanding paragraph (1), the President may contribute up to 90 percent of the total cost of a mitigation activity carried out in a small impoverished community.

“(i) NATIONAL PREDISASTER MITIGATION FUND.—

“(1) ESTABLISHMENT.—The President may establish in the Treasury of the United States a fund to be known as the ‘National Predisaster Mitigation Fund’, to be used in carrying out this section.

“(2) TRANSFERS TO FUND.—There shall be deposited in the Fund—

“(A) amounts appropriated to carry out this section, which shall remain available until expended; and

“(B) sums available from gifts, bequests, or donations of services or property received by the President for the purpose of predisaster hazard mitigation.

“(3) EXPENDITURES FROM FUND.—Upon request by the President, the Secretary of the Treasury shall transfer from the Fund to the President such amounts as the President determines are necessary to provide technical and financial assistance under this section.

“(4) INVESTMENT OF AMOUNTS.—

“(A) IN GENERAL.—The Secretary of the Treasury shall invest such portion of the Fund as is not, in the judgment of the Secretary of the Treasury, required to meet current withdrawals. Investments may be made only in interest-bearing obligations of the United States.

“(B) ACQUISITION OF OBLIGATIONS.—For the purpose of investments under subparagraph (A), obligations may be acquired—

“(i) on original issue at the issue price; or

“(ii) by purchase of outstanding obligations at the market price.

“(C) SALE OF OBLIGATIONS.—Any obligation acquired by the Fund may be sold by the Secretary of the Treasury at the market price.

“(D) CREDITS TO FUND.—The interest on, and the proceeds from the sale or redemption of, any obligations held in the Fund shall be credited to and form a part of the Fund.

“(E) TRANSFERS OF AMOUNTS.—

“(i) IN GENERAL.—The amounts required to be transferred to the Fund under this subsection shall be transferred at least monthly from the general fund of the Treasury to the Fund on the basis of estimates made by the Secretary of the Treasury.

“(ii) ADJUSTMENTS.—Proper adjustment shall be made in amounts subsequently transferred to the extent prior estimates were in excess of or less than the amounts required to be transferred.

“(j) LIMITATION ON TOTAL AMOUNT OF FINANCIAL ASSISTANCE.—The President shall not provide financial assistance under this section in an amount greater than the amount available in the Fund.

“(k) MULTHAZARD ADVISORY MAPS.—

“(1) DEFINITION OF MULTHAZARD ADVISORY MAP.—In this subsection, the term ‘multihazard advisory map’ means a map

on which hazard data concerning each type of natural disaster is identified simultaneously for the purpose of showing areas of hazard overlap.

“(2) DEVELOPMENT OF MAPS.—In consultation with States, local governments, and appropriate Federal agencies, the President shall develop multihazard advisory maps for areas, in not fewer than five States, that are subject to commonly recurring natural hazards (including flooding, hurricanes and severe winds, and seismic events).

President.

“(3) USE OF TECHNOLOGY.—In developing multihazard advisory maps under this subsection, the President shall use, to the maximum extent practicable, the most cost-effective and efficient technology available.

“(4) USE OF MAPS.—

“(A) ADVISORY NATURE.—The multihazard advisory maps shall be considered to be advisory and shall not require the development of any new policy by, or impose any new policy on, any government or private entity.

“(B) AVAILABILITY OF MAPS.—The multihazard advisory maps shall be made available to the appropriate State and local governments for the purposes of—

“(i) informing the general public about the risks of natural hazards in the areas described in paragraph (2);

“(ii) supporting the activities described in subsection (e); and

“(iii) other public uses.

“(1) REPORT ON FEDERAL AND STATE ADMINISTRATION.—Not later than 18 months after the date of the enactment of this section, the President, in consultation with State and local governments, shall submit to Congress a report evaluating efforts to implement this section and recommending a process for transferring greater authority and responsibility for administering the assistance program established under this section to capable States.

Deadline.

“(m) TERMINATION OF AUTHORITY.—The authority provided by this section terminates December 31, 2003.”

(b) CONFORMING AMENDMENT.—Title II of the Robert T. Stafford Disaster Relief and Emergency Assistance Act (42 U.S.C. 5131 et seq.) is amended by striking the title heading and inserting the following:

**“TITLE II—DISASTER PREPAREDNESS
AND MITIGATION ASSISTANCE”.**

SEC. 103. INTERAGENCY TASK FORCE.

Title II of the Robert T. Stafford Disaster Relief and Emergency Assistance Act (42 U.S.C. 5131 et seq.) (as amended by section 102(a)) is amended by adding at the end the following:

“SEC. 204. INTERAGENCY TASK FORCE.

42 USC 5134.

“(a) IN GENERAL.—The President shall establish a Federal interagency task force for the purpose of coordinating the implementation of predisaster hazard mitigation programs administered by the Federal Government.

“(b) CHAIRPERSON.—The Director of the Federal Emergency Management Agency shall serve as the chairperson of the task force.

“(c) MEMBERSHIP.—The membership of the task force shall include representatives of—

“(1) relevant Federal agencies;

“(2) State and local government organizations (including Indian tribes); and

“(3) the American Red Cross.”.

SEC. 104. MITIGATION PLANNING; MINIMUM STANDARDS FOR PUBLIC AND PRIVATE STRUCTURES.

(a) IN GENERAL.—Title III of the Robert T. Stafford Disaster Relief and Emergency Assistance Act (42 U.S.C. 5141 et seq.) is amended by adding at the end the following:

42 USC 5165.

“SEC. 322. MITIGATION PLANNING.

“(a) REQUIREMENT OF MITIGATION PLAN.—As a condition of receipt of an increased Federal share for hazard mitigation measures under subsection (e), a State, local, or tribal government shall develop and submit for approval to the President a mitigation plan that outlines processes for identifying the natural hazards, risks, and vulnerabilities of the area under the jurisdiction of the government.

“(b) LOCAL AND TRIBAL PLANS.—Each mitigation plan developed by a local or tribal government shall—

“(1) describe actions to mitigate hazards, risks, and vulnerabilities identified under the plan; and

“(2) establish a strategy to implement those actions.

“(c) STATE PLANS.—The State process of development of a mitigation plan under this section shall—

“(1) identify the natural hazards, risks, and vulnerabilities of areas in the State;

“(2) support development of local mitigation plans;

“(3) provide for technical assistance to local and tribal governments for mitigation planning; and

“(4) identify and prioritize mitigation actions that the State will support, as resources become available.

“(d) FUNDING.—

“(1) IN GENERAL.—Federal contributions under section 404 may be used to fund the development and updating of mitigation plans under this section.

“(2) MAXIMUM FEDERAL CONTRIBUTION.—With respect to any mitigation plan, a State, local, or tribal government may use an amount of Federal contributions under section 404 not to exceed 7 percent of the amount of such contributions available to the government as of a date determined by the government.

“(e) INCREASED FEDERAL SHARE FOR HAZARD MITIGATION MEASURES.—

“(1) IN GENERAL.—If, at the time of the declaration of a major disaster, a State has in effect an approved mitigation plan under this section, the President may increase to 20 percent, with respect to the major disaster, the maximum percentage specified in the last sentence of section 404(a).

President.

“(2) FACTORS FOR CONSIDERATION.—In determining whether to increase the maximum percentage under paragraph (1), the President shall consider whether the State has established—

“(A) eligibility criteria for property acquisition and other types of mitigation measures;

“(B) requirements for cost effectiveness that are related to the eligibility criteria;

“(C) a system of priorities that is related to the eligibility criteria; and

“(D) a process by which an assessment of the effectiveness of a mitigation action may be carried out after the mitigation action is complete.

“SEC. 323. MINIMUM STANDARDS FOR PUBLIC AND PRIVATE STRUCTURES.

42 USC 5165a.

“(a) IN GENERAL.—As a condition of receipt of a disaster loan or grant under this Act—

“(1) the recipient shall carry out any repair or construction to be financed with the loan or grant in accordance with applicable standards of safety, decency, and sanitation and in conformity with applicable codes, specifications, and standards; and

“(2) the President may require safe land use and construction practices, after adequate consultation with appropriate State and local government officials.

“(b) EVIDENCE OF COMPLIANCE.—A recipient of a disaster loan or grant under this Act shall provide such evidence of compliance with this section as the President may require by regulation.”.

(b) LOSSES FROM STRAIGHT LINE WINDS.—The President shall increase the maximum percentage specified in the last sentence of section 404(a) of the Robert T. Stafford Disaster Relief and Emergency Assistance Act (42 U.S.C. 5170c(a)) from 15 percent to 20 percent with respect to any major disaster that is in the State of Minnesota and for which assistance is being provided as of the date of the enactment of this Act, except that additional assistance provided under this subsection shall not exceed \$6,000,000. The mitigation measures assisted under this subsection shall be related to losses in the State of Minnesota from straight line winds.

President.

(c) CONFORMING AMENDMENTS.—

(1) Section 404(a) of the Robert T. Stafford Disaster Relief and Emergency Assistance Act (42 U.S.C. 5170c(a)) is amended—

(A) in the second sentence, by striking “section 409” and inserting “section 322”; and

(B) in the third sentence, by striking “The total” and inserting “Subject to section 322, the total”.

(2) Section 409 of the Robert T. Stafford Disaster Relief and Emergency Assistance Act (42 U.S.C. 5176) is repealed.

TITLE II—STREAMLINING AND COST REDUCTION

SEC. 201. TECHNICAL AMENDMENTS.

Section 311 of the Robert T. Stafford Disaster Relief and Emergency Assistance Act (42 U.S.C. 5154) is amended in subsections (a)(1), (b), and (c) by striking “section 803 of the Public Works and Economic Development Act of 1965” each place it appears

and inserting “section 209(c)(2) of the Public Works and Economic Development Act of 1965 (42 U.S.C. 3149(c)(2))”.

SEC. 202. MANAGEMENT COSTS.

(a) **IN GENERAL.**—Title III of the Robert T. Stafford Disaster Relief and Emergency Assistance Act (42 U.S.C. 5141 et seq.) (as amended by section 104(a)) is amended by adding at the end the following:

42 USC 5165b.

“SEC. 324. MANAGEMENT COSTS.

“(a) **DEFINITION OF MANAGEMENT COST.**—In this section, the term ‘management cost’ includes any indirect cost, any administrative expense, and any other expense not directly chargeable to a specific project under a major disaster, emergency, or disaster preparedness or mitigation activity or measure.

Regulations.

“(b) **ESTABLISHMENT OF MANAGEMENT COST RATES.**—Notwithstanding any other provision of law (including any administrative rule or guidance), the President shall by regulation establish management cost rates, for grantees and subgrantees, that shall be used to determine contributions under this Act for management costs.

Deadline.

“(c) **REVIEW.**—The President shall review the management cost rates established under subsection (b) not later than 3 years after the date of establishment of the rates and periodically thereafter.”.

42 USC 5165b
note.

(b) **APPLICABILITY.**—

(1) **IN GENERAL.**—Subject to paragraph (2), subsections (a) and (b) of section 324 of the Robert T. Stafford Disaster Relief and Emergency Assistance Act (as added by subsection (a)) shall apply to major disasters declared under that Act on or after the date of the enactment of this Act.

(2) **INTERIM AUTHORITY.**—Until the date on which the President establishes the management cost rates under section 324 of the Robert T. Stafford Disaster Relief and Emergency Assistance Act (as added by subsection (a)), section 406(f) of the Robert T. Stafford Disaster Relief and Emergency Assistance Act (42 U.S.C. 5172(f)) (as in effect on the day before the date of the enactment of this Act) shall be used to establish management cost rates.

SEC. 203. PUBLIC NOTICE, COMMENT, AND CONSULTATION REQUIREMENTS.

Title III of the Robert T. Stafford Disaster Relief and Emergency Assistance Act (42 U.S.C. 5141 et seq.) (as amended by section 202(a)) is amended by adding at the end the following:

42 USC 5165c.

“SEC. 325. PUBLIC NOTICE, COMMENT, AND CONSULTATION REQUIREMENTS.

“(a) **PUBLIC NOTICE AND COMMENT CONCERNING NEW OR MODIFIED POLICIES.**—

President.

“(1) **IN GENERAL.**—The President shall provide for public notice and opportunity for comment before adopting any new or modified policy that—

“(A) governs implementation of the public assistance program administered by the Federal Emergency Management Agency under this Act; and

“(B) could result in a significant reduction of assistance under the program.

“(2) APPLICATION.—Any policy adopted under paragraph (1) shall apply only to a major disaster or emergency declared on or after the date on which the policy is adopted.

“(b) CONSULTATION CONCERNING INTERIM POLICIES.—

“(1) IN GENERAL.—Before adopting any interim policy under the public assistance program to address specific conditions that relate to a major disaster or emergency that has been declared under this Act, the President, to the maximum extent practicable, shall solicit the views and recommendations of grantees and subgrantees with respect to the major disaster or emergency concerning the potential interim policy, if the interim policy is likely—

“(A) to result in a significant reduction of assistance to applicants for the assistance with respect to the major disaster or emergency; or

“(B) to change the terms of a written agreement to which the Federal Government is a party concerning the declaration of the major disaster or emergency.

“(2) NO LEGAL RIGHT OF ACTION.—Nothing in this subsection confers a legal right of action on any party.

“(c) PUBLIC ACCESS.—The President shall promote public access to policies governing the implementation of the public assistance program.”.

President.

SEC. 204. STATE ADMINISTRATION OF HAZARD MITIGATION GRANT PROGRAM.

Section 404 of the Robert T. Stafford Disaster Relief and Emergency Assistance Act (42 U.S.C. 5170c) is amended by adding at the end the following:

“(c) PROGRAM ADMINISTRATION BY STATES.—

“(1) IN GENERAL.—A State desiring to administer the hazard mitigation grant program established by this section with respect to hazard mitigation assistance in the State may submit to the President an application for the delegation of the authority to administer the program.

“(2) CRITERIA.—The President, in consultation and coordination with States and local governments, shall establish criteria for the approval of applications submitted under paragraph (1). The criteria shall include, at a minimum—

“(A) the demonstrated ability of the State to manage the grant program under this section;

“(B) there being in effect an approved mitigation plan under section 322; and

“(C) a demonstrated commitment to mitigation activities.

“(3) APPROVAL.—The President shall approve an application submitted under paragraph (1) that meets the criteria established under paragraph (2).

President.

“(4) WITHDRAWAL OF APPROVAL.—If, after approving an application of a State submitted under paragraph (1), the President determines that the State is not administering the hazard mitigation grant program established by this section in a manner satisfactory to the President, the President shall withdraw the approval.

“(5) AUDITS.—The President shall provide for periodic audits of the hazard mitigation grant programs administered by States under this subsection.”.

President.

SEC. 205. ASSISTANCE TO REPAIR, RESTORE, RECONSTRUCT, OR REPLACE DAMAGED FACILITIES.

(a) CONTRIBUTIONS.—Section 406 of the Robert T. Stafford Disaster Relief and Emergency Assistance Act (42 U.S.C. 5172) is amended by striking subsection (a) and inserting the following:

“(a) CONTRIBUTIONS.—

“(1) IN GENERAL.—The President may make contributions—

“(A) to a State or local government for the repair, restoration, reconstruction, or replacement of a public facility damaged or destroyed by a major disaster and for associated expenses incurred by the government; and

“(B) subject to paragraph (3), to a person that owns or operates a private nonprofit facility damaged or destroyed by a major disaster for the repair, restoration, reconstruction, or replacement of the facility and for associated expenses incurred by the person.

“(2) ASSOCIATED EXPENSES.—For the purposes of this section, associated expenses shall include—

“(A) the costs of mobilizing and employing the National Guard for performance of eligible work;

“(B) the costs of using prison labor to perform eligible work, including wages actually paid, transportation to a worksite, and extraordinary costs of guards, food, and lodging; and

“(C) base and overtime wages for the employees and extra hires of a State, local government, or person described in paragraph (1) that perform eligible work, plus fringe benefits on such wages to the extent that such benefits were being paid before the major disaster.

“(3) CONDITIONS FOR ASSISTANCE TO PRIVATE NONPROFIT FACILITIES.—

“(A) IN GENERAL.—The President may make contributions to a private nonprofit facility under paragraph (1)(B) only if—

“(i) the facility provides critical services (as defined by the President) in the event of a major disaster; or

“(ii) the owner or operator of the facility—

“(I) has applied for a disaster loan under section 7(b) of the Small Business Act (15 U.S.C. 636(b)); and

“(II)(aa) has been determined to be ineligible for such a loan; or

“(bb) has obtained such a loan in the maximum amount for which the Small Business Administration determines the facility is eligible.

“(B) DEFINITION OF CRITICAL SERVICES.—In this paragraph, the term ‘critical services’ includes power, water (including water provided by an irrigation organization or facility), sewer, wastewater treatment, communications, and emergency medical care.

“(4) NOTIFICATION TO CONGRESS.—Before making any contribution under this section in an amount greater than \$20,000,000, the President shall notify—

“(A) the Committee on Environment and Public Works of the Senate;

“(B) the Committee on Transportation and Infrastructure of the House of Representatives;

“(C) the Committee on Appropriations of the Senate; and

“(D) the Committee on Appropriations of the House of Representatives.”

(b) **FEDERAL SHARE.**—Section 406 of the Robert T. Stafford Disaster Relief and Emergency Assistance Act (42 U.S.C. 5172) is amended by striking subsection (b) and inserting the following:

“(b) **FEDERAL SHARE.**—

“(1) **MINIMUM FEDERAL SHARE.**—Except as provided in paragraph (2), the Federal share of assistance under this section shall be not less than 75 percent of the eligible cost of repair, restoration, reconstruction, or replacement carried out under this section.

“(2) **REDUCED FEDERAL SHARE.**—The President shall promulgate regulations to reduce the Federal share of assistance under this section to not less than 25 percent in the case of the repair, restoration, reconstruction, or replacement of any eligible public facility or private nonprofit facility following an event associated with a major disaster—

President.
Regulations.

“(A) that has been damaged, on more than one occasion within the preceding 10-year period, by the same type of event; and

“(B) the owner of which has failed to implement appropriate mitigation measures to address the hazard that caused the damage to the facility.”

(c) **LARGE IN-LIEU CONTRIBUTIONS.**—Section 406 of the Robert T. Stafford Disaster Relief and Emergency Assistance Act (42 U.S.C. 5172) is amended by striking subsection (c) and inserting the following:

“(c) **LARGE IN-LIEU CONTRIBUTIONS.**—

“(1) **FOR PUBLIC FACILITIES.**—

“(A) **IN GENERAL.**—In any case in which a State or local government determines that the public welfare would not best be served by repairing, restoring, reconstructing, or replacing any public facility owned or controlled by the State or local government, the State or local government may elect to receive, in lieu of a contribution under subsection (a)(1)(A), a contribution in an amount equal to 75 percent of the Federal share of the Federal estimate of the cost of repairing, restoring, reconstructing, or replacing the facility and of management expenses.

“(B) **AREAS WITH UNSTABLE SOIL.**—In any case in which a State or local government determines that the public welfare would not best be served by repairing, restoring, reconstructing, or replacing any public facility owned or controlled by the State or local government because soil instability in the disaster area makes repair, restoration, reconstruction, or replacement infeasible, the State or local government may elect to receive, in lieu of a contribution under subsection (a)(1)(A), a contribution in an amount equal to 90 percent of the Federal share of the Federal estimate of the cost of repairing, restoring, reconstructing, or replacing the facility and of management expenses.

“(C) **USE OF FUNDS.**—Funds contributed to a State or local government under this paragraph may be used—

“(i) to repair, restore, or expand other selected public facilities;

“(ii) to construct new facilities; or

“(iii) to fund hazard mitigation measures that the State or local government determines to be necessary to meet a need for governmental services and functions in the area affected by the major disaster.

“(D) LIMITATIONS.—Funds made available to a State or local government under this paragraph may not be used for—

“(i) any public facility located in a regulatory floodway (as defined in section 59.1 of title 44, Code of Federal Regulations (or a successor regulation)); or

“(ii) any uninsured public facility located in a special flood hazard area identified by the Director of the Federal Emergency Management Agency under the National Flood Insurance Act of 1968 (42 U.S.C. 4001 et seq.).

“(2) FOR PRIVATE NONPROFIT FACILITIES.—

“(A) IN GENERAL.—In any case in which a person that owns or operates a private nonprofit facility determines that the public welfare would not best be served by repairing, restoring, reconstructing, or replacing the facility, the person may elect to receive, in lieu of a contribution under subsection (a)(1)(B), a contribution in an amount equal to 75 percent of the Federal share of the Federal estimate of the cost of repairing, restoring, reconstructing, or replacing the facility and of management expenses.

“(B) USE OF FUNDS.—Funds contributed to a person under this paragraph may be used—

“(i) to repair, restore, or expand other selected private nonprofit facilities owned or operated by the person;

“(ii) to construct new private nonprofit facilities to be owned or operated by the person; or

“(iii) to fund hazard mitigation measures that the person determines to be necessary to meet a need for the person’s services and functions in the area affected by the major disaster.

“(C) LIMITATIONS.—Funds made available to a person under this paragraph may not be used for—

“(i) any private nonprofit facility located in a regulatory floodway (as defined in section 59.1 of title 44, Code of Federal Regulations (or a successor regulation)); or

“(ii) any uninsured private nonprofit facility located in a special flood hazard area identified by the Director of the Federal Emergency Management Agency under the National Flood Insurance Act of 1968 (42 U.S.C. 4001 et seq.).”

(d) ELIGIBLE COST.—

(1) IN GENERAL.—Section 406 of the Robert T. Stafford Disaster Relief and Emergency Assistance Act (42 U.S.C. 5172) is amended by striking subsection (e) and inserting the following:

“(e) ELIGIBLE COST.—

“(1) DETERMINATION.—

“(A) IN GENERAL.—For the purposes of this section, the President shall estimate the eligible cost of repairing, restoring, reconstructing, or replacing a public facility or private nonprofit facility—

“(i) on the basis of the design of the facility as the facility existed immediately before the major disaster; and

“(ii) in conformity with codes, specifications, and standards (including floodplain management and hazard mitigation criteria required by the President or under the Coastal Barrier Resources Act (16 U.S.C. 3501 et seq.)) applicable at the time at which the disaster occurred.

“(B) COST ESTIMATION PROCEDURES.—

“(i) IN GENERAL.—Subject to paragraph (2), the President shall use the cost estimation procedures established under paragraph (3) to determine the eligible cost under this subsection.

“(ii) APPLICABILITY.—The procedures specified in this paragraph and paragraph (2) shall apply only to projects the eligible cost of which is equal to or greater than the amount specified in section 422.

“(2) MODIFICATION OF ELIGIBLE COST.—

“(A) ACTUAL COST GREATER THAN CEILING PERCENTAGE OF ESTIMATED COST.—In any case in which the actual cost of repairing, restoring, reconstructing, or replacing a facility under this section is greater than the ceiling percentage established under paragraph (3) of the cost estimated under paragraph (1), the President may determine that the eligible cost includes a portion of the actual cost of the repair, restoration, reconstruction, or replacement that exceeds the cost estimated under paragraph (1).

“(B) ACTUAL COST LESS THAN ESTIMATED COST.—

“(i) GREATER THAN OR EQUAL TO FLOOR PERCENTAGE OF ESTIMATED COST.—In any case in which the actual cost of repairing, restoring, reconstructing, or replacing a facility under this section is less than 100 percent of the cost estimated under paragraph (1), but is greater than or equal to the floor percentage established under paragraph (3) of the cost estimated under paragraph (1), the State or local government or person receiving funds under this section shall use the excess funds to carry out cost-effective activities that reduce the risk of future damage, hardship, or suffering from a major disaster.

“(ii) LESS THAN FLOOR PERCENTAGE OF ESTIMATED COST.—In any case in which the actual cost of repairing, restoring, reconstructing, or replacing a facility under this section is less than the floor percentage established under paragraph (3) of the cost estimated under paragraph (1), the State or local government or person receiving assistance under this section shall reimburse the President in the amount of the difference.

“(C) NO EFFECT ON APPEALS PROCESS.—Nothing in this paragraph affects any right of appeal under section 423.

“(3) EXPERT PANEL.—

“(A) ESTABLISHMENT.—Not later than 18 months after the date of the enactment of this paragraph, the President, acting through the Director of the Federal Emergency Management Agency, shall establish an expert panel, which shall include representatives from the construction industry and State and local government.

“(B) DUTIES.—The expert panel shall develop recommendations concerning—

“(i) procedures for estimating the cost of repairing, restoring, reconstructing, or replacing a facility consistent with industry practices; and

“(ii) the ceiling and floor percentages referred to in paragraph (2).

President.

“(C) REGULATIONS.—Taking into account the recommendations of the expert panel under subparagraph (B), the President shall promulgate regulations that establish—

“(i) cost estimation procedures described in subparagraph (B)(i); and

“(ii) the ceiling and floor percentages referred to in paragraph (2).

Deadline.

“(D) REVIEW BY PRESIDENT.—Not later than 2 years after the date of promulgation of regulations under subparagraph (C) and periodically thereafter, the President shall review the cost estimation procedures and the ceiling and floor percentages established under this paragraph.

Deadline.

“(E) REPORT TO CONGRESS.—Not later than 1 year after the date of promulgation of regulations under subparagraph (C), 3 years after that date, and at the end of each 2-year period thereafter, the expert panel shall submit to Congress a report on the appropriateness of the cost estimation procedures.

“(4) SPECIAL RULE.—In any case in which the facility being repaired, restored, reconstructed, or replaced under this section was under construction on the date of the major disaster, the cost of repairing, restoring, reconstructing, or replacing the facility shall include, for the purposes of this section, only those costs that, under the contract for the construction, are the owner’s responsibility and not the contractor’s responsibility.”.

42 USC 5172
note.

(2) EFFECTIVE DATE.—The amendment made by paragraph (1) takes effect on the date of the enactment of this Act and applies to funds appropriated after the date of the enactment of this Act, except that paragraph (1) of section 406(e) of the Robert T. Stafford Disaster Relief and Emergency Assistance Act (as amended by paragraph (1)) takes effect on the date on which the cost estimation procedures established under paragraph (3) of that section take effect.

(e) CONFORMING AMENDMENT.—Section 406 of the Robert T. Stafford Disaster Relief and Emergency Assistance Act (42 U.S.C. 5172) is amended by striking subsection (f).

SEC. 206. FEDERAL ASSISTANCE TO INDIVIDUALS AND HOUSEHOLDS.

(a) IN GENERAL.—Section 408 of the Robert T. Stafford Disaster Relief and Emergency Assistance Act (42 U.S.C. 5174) is amended to read as follows:

“SEC. 408. FEDERAL ASSISTANCE TO INDIVIDUALS AND HOUSEHOLDS.

“(a) IN GENERAL.—

“(1) PROVISION OF ASSISTANCE.—In accordance with this section, the President, in consultation with the Governor of a State, may provide financial assistance, and, if necessary, direct services, to individuals and households in the State who, as a direct result of a major disaster, have necessary expenses and serious needs in cases in which the individuals and households are unable to meet such expenses or needs through other means.

“(2) RELATIONSHIP TO OTHER ASSISTANCE.—Under paragraph (1), an individual or household shall not be denied assistance under paragraph (1), (3), or (4) of subsection (c) solely on the basis that the individual or household has not applied for or received any loan or other financial assistance from the Small Business Administration or any other Federal agency.

“(b) HOUSING ASSISTANCE.—

“(1) ELIGIBILITY.—The President may provide financial or other assistance under this section to individuals and households to respond to the disaster-related housing needs of individuals and households who are displaced from their predisaster primary residences or whose predisaster primary residences are rendered uninhabitable as a result of damage caused by a major disaster.

“(2) DETERMINATION OF APPROPRIATE TYPES OF ASSISTANCE.—

“(A) IN GENERAL.—The President shall determine appropriate types of housing assistance to be provided under this section to individuals and households described in subsection (a)(1) based on considerations of cost effectiveness, convenience to the individuals and households, and such other factors as the President may consider appropriate.

President.

“(B) MULTIPLE TYPES OF ASSISTANCE.—One or more types of housing assistance may be made available under this section, based on the suitability and availability of the types of assistance, to meet the needs of individuals and households in the particular disaster situation.

“(c) TYPES OF HOUSING ASSISTANCE.—

“(1) TEMPORARY HOUSING.—

“(A) FINANCIAL ASSISTANCE.—

“(i) IN GENERAL.—The President may provide financial assistance to individuals or households to rent alternate housing accommodations, existing rental units, manufactured housing, recreational vehicles, or other readily fabricated dwellings.

“(ii) AMOUNT.—The amount of assistance under clause (i) shall be based on the fair market rent for the accommodation provided plus the cost of any transportation, utility hookups, or unit installation not provided directly by the President.

“(B) DIRECT ASSISTANCE.—

“(i) IN GENERAL.—The President may provide temporary housing units, acquired by purchase or lease, directly to individuals or households who, because of a lack of available housing resources, would be unable

to make use of the assistance provided under subparagraph (A).

“(ii) PERIOD OF ASSISTANCE.—The President may not provide direct assistance under clause (i) with respect to a major disaster after the end of the 18-month period beginning on the date of the declaration of the major disaster by the President, except that the President may extend that period if the President determines that due to extraordinary circumstances an extension would be in the public interest.

“(iii) COLLECTION OF RENTAL CHARGES.—After the end of the 18-month period referred to in clause (ii), the President may charge fair market rent for each temporary housing unit provided.

“(2) REPAIRS.—

“(A) IN GENERAL.—The President may provide financial assistance for—

“(i) the repair of owner-occupied private residences, utilities, and residential infrastructure (such as a private access route) damaged by a major disaster to a safe and sanitary living or functioning condition; and

“(ii) eligible hazard mitigation measures that reduce the likelihood of future damage to such residences, utilities, or infrastructure.

“(B) RELATIONSHIP TO OTHER ASSISTANCE.—A recipient of assistance provided under this paragraph shall not be required to show that the assistance can be met through other means, except insurance proceeds.

“(C) MAXIMUM AMOUNT OF ASSISTANCE.—The amount of assistance provided to a household under this paragraph shall not exceed \$5,000, as adjusted annually to reflect changes in the Consumer Price Index for All Urban Consumers published by the Department of Labor.

“(3) REPLACEMENT.—

“(A) IN GENERAL.—The President may provide financial assistance for the replacement of owner-occupied private residences damaged by a major disaster.

“(B) MAXIMUM AMOUNT OF ASSISTANCE.—The amount of assistance provided to a household under this paragraph shall not exceed \$10,000, as adjusted annually to reflect changes in the Consumer Price Index for All Urban Consumers published by the Department of Labor.

“(C) APPLICABILITY OF FLOOD INSURANCE REQUIREMENT.—With respect to assistance provided under this paragraph, the President may not waive any provision of Federal law requiring the purchase of flood insurance as a condition of the receipt of Federal disaster assistance.

“(4) PERMANENT HOUSING CONSTRUCTION.—The President may provide financial assistance or direct assistance to individuals or households to construct permanent housing in insular areas outside the continental United States and in other remote locations in cases in which—

“(A) no alternative housing resources are available; and

“(B) the types of temporary housing assistance described in paragraph (1) are unavailable, infeasible, or not cost-effective.

“(d) TERMS AND CONDITIONS RELATING TO HOUSING ASSISTANCE.—

“(1) SITES.—

“(A) IN GENERAL.—Any readily fabricated dwelling provided under this section shall, whenever practicable, be located on a site that—

“(i) is complete with utilities; and

“(ii) is provided by the State or local government, by the owner of the site, or by the occupant who was displaced by the major disaster.

“(B) SITES PROVIDED BY THE PRESIDENT.—A readily fabricated dwelling may be located on a site provided by the President if the President determines that such a site would be more economical or accessible.

“(2) DISPOSAL OF UNITS.—

“(A) SALE TO OCCUPANTS.—

“(i) IN GENERAL.—Notwithstanding any other provision of law, a temporary housing unit purchased under this section by the President for the purpose of housing disaster victims may be sold directly to the individual or household who is occupying the unit if the individual or household lacks permanent housing.

“(ii) SALE PRICE.—A sale of a temporary housing unit under clause (i) shall be at a price that is fair and equitable.

“(iii) DEPOSIT OF PROCEEDS.—Notwithstanding any other provision of law, the proceeds of a sale under clause (i) shall be deposited in the appropriate Disaster Relief Fund account.

“(iv) HAZARD AND FLOOD INSURANCE.—A sale of a temporary housing unit under clause (i) shall be made on the condition that the individual or household purchasing the housing unit agrees to obtain and maintain hazard and flood insurance on the housing unit.

“(v) USE OF GSA SERVICES.—The President may use the services of the General Services Administration to accomplish a sale under clause (i).

“(B) OTHER METHODS OF DISPOSAL.—If not disposed of under subparagraph (A), a temporary housing unit purchased under this section by the President for the purpose of housing disaster victims—

“(i) may be sold to any person; or

“(ii) may be sold, transferred, donated, or otherwise made available directly to a State or other governmental entity or to a voluntary organization for the sole purpose of providing temporary housing to disaster victims in major disasters and emergencies if, as a condition of the sale, transfer, or donation, the State, other governmental agency, or voluntary organization agrees—

“(I) to comply with the nondiscrimination provisions of section 308; and

“(II) to obtain and maintain hazard and flood insurance on the housing unit.

“(e) FINANCIAL ASSISTANCE TO ADDRESS OTHER NEEDS.—

“(1) MEDICAL, DENTAL, AND FUNERAL EXPENSES.—The President, in consultation with the Governor of a State, may provide financial assistance under this section to an individual or household in the State who is adversely affected by a major disaster to meet disaster-related medical, dental, and funeral expenses.

“(2) PERSONAL PROPERTY, TRANSPORTATION, AND OTHER EXPENSES.—The President, in consultation with the Governor of a State, may provide financial assistance under this section to an individual or household described in paragraph (1) to address personal property, transportation, and other necessary expenses or serious needs resulting from the major disaster.

“(f) STATE ROLE.—

“(1) FINANCIAL ASSISTANCE TO ADDRESS OTHER NEEDS.—

“(A) GRANT TO STATE.—Subject to subsection (g), a Governor may request a grant from the President to provide financial assistance to individuals and households in the State under subsection (e).

“(B) ADMINISTRATIVE COSTS.—A State that receives a grant under subparagraph (A) may expend not more than 5 percent of the amount of the grant for the administrative costs of providing financial assistance to individuals and households in the State under subsection (e).

“(2) ACCESS TO RECORDS.—In providing assistance to individuals and households under this section, the President shall provide for the substantial and ongoing involvement of the States in which the individuals and households are located, including by providing to the States access to the electronic records of individuals and households receiving assistance under this section in order for the States to make available any additional State and local assistance to the individuals and households.

“(g) COST SHARING.—

“(1) FEDERAL SHARE.—Except as provided in paragraph (2), the Federal share of the costs eligible to be paid using assistance provided under this section shall be 100 percent.

“(2) FINANCIAL ASSISTANCE TO ADDRESS OTHER NEEDS.—In the case of financial assistance provided under subsection (e)—

“(A) the Federal share shall be 75 percent; and

“(B) the non-Federal share shall be paid from funds made available by the State.

“(h) MAXIMUM AMOUNT OF ASSISTANCE.—

“(1) IN GENERAL.—No individual or household shall receive financial assistance greater than \$25,000 under this section with respect to a single major disaster.

“(2) ADJUSTMENT OF LIMIT.—The limit established under paragraph (1) shall be adjusted annually to reflect changes in the Consumer Price Index for All Urban Consumers published by the Department of Labor.

President.

“(i) RULES AND REGULATIONS.—The President shall prescribe rules and regulations to carry out this section, including criteria, standards, and procedures for determining eligibility for assistance.”

(b) CONFORMING AMENDMENT.—Section 502(a)(6) of the Robert T. Stafford Disaster Relief and Emergency Assistance Act (42 U.S.C. 5192(a)(6)) is amended by striking “temporary housing”.

(c) **ELIMINATION OF INDIVIDUAL AND FAMILY GRANT PROGRAMS.**—Section 411 of the Robert T. Stafford Disaster Relief and Emergency Assistance Act (42 U.S.C. 5178) is repealed.

(d) **EFFECTIVE DATE.**—The amendments made by this section take effect 18 months after the date of the enactment of this Act.

42 USC 5174
note.

SEC. 207. COMMUNITY DISASTER LOANS.

Section 417 of the Robert T. Stafford Disaster Relief and Emergency Assistance Act (42 U.S.C. 5184) is amended—

(1) by striking “(a) The President” and inserting the following:

“(a) **IN GENERAL.**—The President”;

(2) by striking “The amount” and inserting the following:

“(b) **AMOUNT.**—The amount”;

(3) by striking “Repayment” and inserting the following:

“(c) **REPAYMENT.**—

“(1) **CANCELLATION.**—Repayment”;

(4) by striking “(b) Any loans” and inserting the following:

“(d) **EFFECT ON OTHER ASSISTANCE.**—Any loans”;

(5) in subsection (b) (as designated by paragraph (2))—

(A) by striking “and shall” and inserting “shall”; and

(B) by inserting before the period at the end the following: “, and shall not exceed \$5,000,000”; and

(6) in subsection (c) (as designated by paragraph (3)), by

adding at the end the following:

“(2) **CONDITION ON CONTINUING ELIGIBILITY.**—A local government shall not be eligible for further assistance under this section during any period in which the local government is in arrears with respect to a required repayment of a loan under this section.”.

SEC. 208. REPORT ON STATE MANAGEMENT OF SMALL DISASTERS INITIATIVE.

42 USC 5121
note.

Not later than 3 years after the date of the enactment of this Act, the President shall submit to Congress a report describing the results of the State Management of Small Disasters Initiative, including—

Deadline.

(1) identification of any administrative or financial benefits of the initiative; and

(2) recommendations concerning the conditions, if any, under which States should be allowed the option to administer parts of the assistance program under section 406 of the Robert T. Stafford Disaster Relief and Emergency Assistance Act (42 U.S.C. 5172).

SEC. 209. STUDY REGARDING COST REDUCTION.

42 USC 5121
note.
Deadline.

Not later than 3 years after the date of the enactment of this Act, the Director of the Congressional Budget Office shall complete a study estimating the reduction in Federal disaster assistance that has resulted and is likely to result from the enactment of this Act.

TITLE III—MISCELLANEOUS

SEC. 301. TECHNICAL CORRECTION OF SHORT TITLE.

The first section of the Robert T. Stafford Disaster Relief and Emergency Assistance Act (42 U.S.C. 5121 note) is amended to read as follows:

“SECTION 1. SHORT TITLE.

“This Act may be cited as the ‘Robert T. Stafford Disaster Relief and Emergency Assistance Act’.”

SEC. 302. DEFINITIONS.

Section 102 of the Robert T. Stafford Disaster Relief and Emergency Assistance Act (42 U.S.C. 5122) is amended—

(1) in each of paragraphs (3) and (4), by striking “the Northern” and all that follows through “Pacific Islands” and inserting “and the Commonwealth of the Northern Mariana Islands”;

(2) by striking paragraph (6) and inserting the following:
“(6) LOCAL GOVERNMENT.—The term ‘local government’ means—

“(A) a county, municipality, city, town, township, local public authority, school district, special district, intrastate district, council of governments (regardless of whether the council of governments is incorporated as a nonprofit corporation under State law), regional or interstate government entity, or agency or instrumentality of a local government;

“(B) an Indian tribe or authorized tribal organization, or Alaska Native village or organization; and

“(C) a rural community, unincorporated town or village, or other public entity, for which an application for assistance is made by a State or political subdivision of a State.”; and

(3) in paragraph (9), by inserting “irrigation,” after “utility,”.

SEC. 303. FIRE MANAGEMENT ASSISTANCE.

(a) IN GENERAL.—Section 420 of the Robert T. Stafford Disaster Relief and Emergency Assistance Act (42 U.S.C. 5187) is amended to read as follows:

“SEC. 420. FIRE MANAGEMENT ASSISTANCE.

“(a) IN GENERAL.—The President is authorized to provide assistance, including grants, equipment, supplies, and personnel, to any State or local government for the mitigation, management, and control of any fire on public or private forest land or grassland that threatens such destruction as would constitute a major disaster.

President.

“(b) COORDINATION WITH STATE AND TRIBAL DEPARTMENTS OF FORESTRY.—In providing assistance under this section, the President shall coordinate with State and tribal departments of forestry.

“(c) ESSENTIAL ASSISTANCE.—In providing assistance under this section, the President may use the authority provided under section 403.

“(d) RULES AND REGULATIONS.—The President shall prescribe such rules and regulations as are necessary to carry out this section.” President.

(b) EFFECTIVE DATE.—The amendment made by subsection (a) takes effect 1 year after the date of the enactment of this Act. 42 USC 5187 note.

SEC. 304. DISASTER GRANT CLOSEOUT PROCEDURES. 42 USC 5205.

Title VII of the Robert T. Stafford Disaster Relief and Emergency Assistance Act (42 U.S.C. 5101 et seq.) is amended by adding at the end the following:

“SEC. 705. DISASTER GRANT CLOSEOUT PROCEDURES.

“(a) STATUTE OF LIMITATIONS.—

“(1) IN GENERAL.—Except as provided in paragraph (2), no administrative action to recover any payment made to a State or local government for disaster or emergency assistance under this Act shall be initiated in any forum after the date that is 3 years after the date of transmission of the final expenditure report for the disaster or emergency.

“(2) FRAUD EXCEPTION.—The limitation under paragraph (1) shall apply unless there is evidence of civil or criminal fraud.

“(b) REBUTTAL OF PRESUMPTION OF RECORD MAINTENANCE.—

“(1) IN GENERAL.—In any dispute arising under this section after the date that is 3 years after the date of transmission of the final expenditure report for the disaster or emergency, there shall be a presumption that accounting records were maintained that adequately identify the source and application of funds provided for financially assisted activities.

“(2) AFFIRMATIVE EVIDENCE.—The presumption described in paragraph (1) may be rebutted only on production of affirmative evidence that the State or local government did not maintain documentation described in that paragraph.

“(3) INABILITY TO PRODUCE DOCUMENTATION.—The inability of the Federal, State, or local government to produce source documentation supporting expenditure reports later than 3 years after the date of transmission of the final expenditure report shall not constitute evidence to rebut the presumption described in paragraph (1).

“(4) RIGHT OF ACCESS.—The period during which the Federal, State, or local government has the right to access source documentation shall not be limited to the required 3-year retention period referred to in paragraph (3), but shall last as long as the records are maintained.

“(c) BINDING NATURE OF GRANT REQUIREMENTS.—A State or local government shall not be liable for reimbursement or any other penalty for any payment made under this Act if—

“(1) the payment was authorized by an approved agreement specifying the costs;

“(2) the costs were reasonable; and

“(3) the purpose of the grant was accomplished.”.

SEC. 305. PUBLIC SAFETY OFFICER BENEFITS FOR CERTAIN FEDERAL AND STATE EMPLOYEES.

(a) IN GENERAL.—Section 1204 of the Omnibus Crime Control and Safe Streets Act of 1968 (42 U.S.C. 3796b) is amended by striking paragraph (7) and inserting the following:

“(7) ‘public safety officer’ means—

“(A) an individual serving a public agency in an official capacity, with or without compensation, as a law enforcement officer, as a firefighter, or as a member of a rescue squad or ambulance crew;

“(B) an employee of the Federal Emergency Management Agency who is performing official duties of the Agency in an area, if those official duties—

“(i) are related to a major disaster or emergency that has been, or is later, declared to exist with respect to the area under the Robert T. Stafford Disaster Relief and Emergency Assistance Act (42 U.S.C. 5121 et seq.); and

“(ii) are determined by the Director of the Federal Emergency Management Agency to be hazardous duties; or

“(C) an employee of a State, local, or tribal emergency management or civil defense agency who is performing official duties in cooperation with the Federal Emergency Management Agency in an area, if those official duties—

“(i) are related to a major disaster or emergency that has been, or is later, declared to exist with respect to the area under the Robert T. Stafford Disaster Relief and Emergency Assistance Act (42 U.S.C. 5121 et seq.); and

“(ii) are determined by the head of the agency to be hazardous duties.”.

42 USC 3796b
note.

(b) **EFFECTIVE DATE.**—The amendment made by subsection (a) applies only to employees described in subparagraphs (B) and (C) of section 1204(7) of the Omnibus Crime Control and Safe Streets Act of 1968 (as amended by subsection (a)) who are injured or who die in the line of duty on or after the date of the enactment of this Act.

42 USC 5206.

SEC. 306. BUY AMERICAN.

(a) **COMPLIANCE WITH BUY AMERICAN ACT.**—No funds authorized to be appropriated under this Act or any amendment made by this Act may be expended by an entity unless the entity, in expending the funds, complies with the Buy American Act (41 U.S.C. 10a et seq.).

(b) **DEBARMENT OF PERSONS CONVICTED OF FRAUDULENT USE OF “MADE IN AMERICA” LABELS.**—

Deadline.

(1) **IN GENERAL.**—If the Director of the Federal Emergency Management Agency determines that a person has been convicted of intentionally affixing a label bearing a “Made in America” inscription to any product sold in or shipped to the United States that is not made in America, the Director shall determine, not later than 90 days after determining that the person has been so convicted, whether the person should be debarred from contracting under the Robert T. Stafford Disaster Relief and Emergency Assistance Act (42 U.S.C. 5121 et seq.).

(2) **DEFINITION OF DEBAR.**—In this subsection, the term “debar” has the meaning given the term in section 2393(c) of title 10, United States Code.

SEC. 307. TREATMENT OF CERTAIN REAL PROPERTY.

(a) **IN GENERAL.**—Notwithstanding the National Flood Insurance Act of 1968 (42 U.S.C. 4001 et seq.), the Flood Disaster

Protection Act of 1973 (42 U.S.C. 4002 et seq.), or any other provision of law, or any flood risk zone identified, delineated, or established under any such law (by flood insurance rate map or otherwise), the real property described in subsection (b) shall not be considered to be, or to have been, located in any area having special flood hazards (including any floodway or floodplain).

(b) REAL PROPERTY.—The real property described in this subsection is all land and improvements on the land located in the Maple Terrace Subdivisions in the City of Sycamore, DeKalb County, Illinois, including—

- (1) Maple Terrace Phase I;
- (2) Maple Terrace Phase II;
- (3) Maple Terrace Phase III Unit 1;
- (4) Maple Terrace Phase III Unit 2;
- (5) Maple Terrace Phase III Unit 3;
- (6) Maple Terrace Phase IV Unit 1;
- (7) Maple Terrace Phase IV Unit 2; and
- (8) Maple Terrace Phase IV Unit 3.

(c) REVISION OF FLOOD INSURANCE RATE LOT MAPS.—As soon as practicable after the date of the enactment of this Act, the Director of the Federal Emergency Management Agency shall revise the appropriate flood insurance rate lot maps of the agency to reflect the treatment under subsection (a) of the real property described in subsection (b).

SEC. 308. STUDY OF PARTICIPATION BY INDIAN TRIBES IN EMERGENCY MANAGEMENT.

42 USC 5121
note.

(a) DEFINITION OF INDIAN TRIBE.—In this section, the term “Indian tribe” has the meaning given the term in section 4 of the Indian Self-Determination and Education Assistance Act (25 U.S.C. 450b).

(b) STUDY.—

(1) IN GENERAL.—The Director of the Federal Emergency Management Agency shall conduct a study of participation by Indian tribes in emergency management.

(2) REQUIRED ELEMENTS.—The study shall—

(A) survey participation by Indian tribes in training, predisaster and postdisaster mitigation, disaster preparedness, and disaster recovery programs at the Federal and State levels; and

(B) review and assess the capacity of Indian tribes to participate in cost-shared emergency management programs and to participate in the management of the programs.

(3) CONSULTATION.—In conducting the study, the Director shall consult with Indian tribes.

(c) REPORT.—Not later than 1 year after the date of the enactment of this Act, the Director shall submit a report on the study under subsection (b) to—

Deadline.

(1) the Committee on Environment and Public Works of the Senate;

(2) the Committee on Transportation and Infrastructure of the House of Representatives;

(3) the Committee on Appropriations of the Senate; and

(4) the Committee on Appropriations of the House of Representatives.

Approved October 30, 2000.

LEGISLATIVE HISTORY—H.R. 707 (S. 1691):

HOUSE REPORTS: No. 106-40 (Comm. on Transportation and Infrastructure).

SENATE REPORTS: No. 106-295 accompanying S. 1691 (Comm. on Environment and Public Works).

CONGRESSIONAL RECORD:

Vol. 145 (1999): Mar. 4, considered and passed House.

Vol. 146 (2000): July 19, considered and passed Senate, amended.

Oct. 3, House concurred in Senate amendment with an amendment.

Oct. 5, Senate concurred in House amendment with an amendment.

Oct. 10, House concurred in Senate amendment.





Federal Register

**Tuesday,
February 26, 2002**

Part III

**Federal Emergency
Management Agency**

44 CFR Parts 201 and 206

**Hazard Mitigation Planning and Hazard
Mitigation Grant Program; Interim Final
Rule**

**FEDERAL EMERGENCY
MANAGEMENT AGENCY**
44 CFR Parts 201 and 206
RIN 3067-AD22
**Hazard Mitigation Planning and Hazard
Mitigation Grant Program**
AGENCY: Federal Emergency
Management Agency.

ACTION: Interim final rule.

SUMMARY: This rule addresses State mitigation planning, identifies new local mitigation planning requirements, authorizes Hazard Mitigation Grant Program (HMGP) funds for planning activities, and increases the amount of HMGP funds available to States that develop a comprehensive, enhanced mitigation plan. This rule also requires that repairs or construction funded by a disaster loan or grant must be carried out in accordance with applicable standards and says that FEMA may require safe land use and construction practices as a condition of grantees receiving disaster assistance under the Stafford Act.

DATES: *Effective Date:* February 26, 2002.

Comment Date: We will accept written comments through April 29, 2002.

ADDRESSES: Please send written comments to the Rules Docket Clerk, Office of the General Counsel, Federal Emergency Management Agency, 500 C Street, SW., room 840, Washington, DC 20472, (facsimile) 202-646-4536, or (email) rules@fema.gov.

FOR FURTHER INFORMATION CONTACT: Margaret E. Lawless, Federal Insurance and Mitigation Administration, Federal Emergency Management Agency, 500 C Street, SW., Washington, DC, 20472, 202-646-3027, (facsimile) 202-646-3104, or (email) margaret.lawless@fema.gov.

SUPPLEMENTARY INFORMATION:
Introduction

Throughout the preamble and the rule the terms “we”, “our” and “us” refer to FEMA.

Section 322 of the Robert T. Stafford Disaster Relief and Emergency Assistance Act (Stafford Act or the Act), 42 U.S.C. 5165, enacted under § 104 the Disaster Mitigation Act of 2000, (DMA 2000) P.L. 106-390, provides new and revitalized approaches to mitigation planning. This section: (1) Continues the requirement for a Standard State Mitigation plan as a condition of disaster assistance; (2) provides for States to receive an increased

percentage of HMGP funds (from 15 to 20 percent of the total estimated eligible Federal assistance) if, at the time of the declaration of a major disaster, they have in effect a FEMA-approved Enhanced State Mitigation Plan that meets the factors listed in this rule; (3) establishes a new requirement for local mitigation plans; and (4) authorizes up to 7 percent of the HMGP funds available to a State to be used for development of State, tribal, and local mitigation plans. We will give Indian tribal governments the opportunity to fulfill the requirements of § 322 either as a grantee or a subgrantee. An Indian tribal government may choose to apply for HMGP funding directly to us and would then serve as a grantee, meeting the State level responsibilities, or it may apply through the State, meeting the local government or subgrantee responsibilities.

Section 322, in concert with other sections of the Act, provides a significant opportunity to reduce the Nation’s disaster losses through mitigation planning. In addition, implementation of planned, pre-identified, cost-effective mitigation measures will streamline the disaster recovery process. The Act provides a framework for linking pre- and post-disaster mitigation planning and initiatives with public and private interests to ensure an integrated, comprehensive approach to disaster loss reduction. The language in the Act, taken as a whole, emphasizes the importance of strong State and local planning processes and comprehensive program management at the State level. The new planning criteria also support State administration of the HMGP, and contemplate a significant State commitment to mitigation activities, comprehensive State mitigation planning, and strong program management.

The planning process also provides a link between State and local mitigation programs. Both State level and local plans should address strategies for incorporating post-disaster early mitigation implementation strategies and sustainable recovery actions. We also recognize that governments are involved in a range of planning activities and that mitigation plans may be linked to or reference hazardous materials and other non-natural hazard plans. Improved mitigation planning will result in a better understanding of risks and vulnerabilities, as well as to expedite implementation of measures and activities to reduce those risks, both pre- and post-disaster.

Section 409 of the Stafford Act, 42 U.S.C. 5176, which required mitigation

plans and the use of minimum codes and standards, was repealed by the DMA 2000. These issues are now addressed in two separate sections of the law: mitigation planning is in section 322 of the Act, and minimum codes and standards are in section 323 of the Act. We previously implemented section 409 through 44 CFR Part 206, Subpart M. Since current law now distinguishes the planning from the codes and standards in separate sections, we will address them in different sections of the CFR. We address the new planning regulations in Part 201 to reflect the broader relevance of planning to all FEMA mitigation programs, while the minimum standards remain in Part 206, Federal Disaster Assistance, Subpart M. The regulations implementing the Hazard Mitigation Grant Program are in Part 206, Subpart N. This rule also contains changes to Subpart N, to reflect the new planning criteria identified in section 322 of the Act.

The administration is considering changes to FEMA’s mitigation programs in the President’s Budget for FY 2003. However, States and localities still would be required to have plans in effect, which meet the minimum requirements under this rule, as a condition of receiving mitigation assistance after November 1, 2003.

Implementation Strategy. States must have an approved hazard mitigation plan in order to receive Stafford Act assistance, excluding assistance provided pursuant to emergency provisions. These regulations provide criteria for the new two-tiered State mitigation plan process: Standard State Mitigation Plans, which allow a State to receive HMGP funding based on 15 percent of the total estimated eligible Stafford Act disaster assistance, and Enhanced State Mitigation Plans, which allow a State to receive HMGP funds based on 20 percent of the total estimated eligible Stafford Act disaster assistance. Enhanced State Mitigation Plans must demonstrate that the State has developed a comprehensive mitigation program, that it effectively uses available mitigation funding, and that it is capable of managing the increased funding. All State Mitigation Plans must be reviewed, revised, and re-approved by FEMA every three years. An important requirement of the legislation is that we must approve a completed enhanced plan *before* a disaster declaration, in order for the State to be eligible for the increased funding.

We will no longer require States to revise their mitigation plan after every disaster declaration, as under former

section 409 of the Act, 42 U.S.C. 5176. We recommend, however, that States consider revising their plan if a disaster or other circumstances significantly affect its mitigation priorities. States with existing mitigation plans, approved under former section 409, will continue to be eligible for the 15 percent HMGP funding until November 1, 2003, when all State mitigation plans must meet the requirements of these regulations. If State plans are not revised and approved to meet the Standard State Mitigation Plan requirements by that time, they will be ineligible for Stafford Act assistance, excluding emergency assistance.

Indian tribal governments may choose to apply directly to us for HMGP funding, and would therefore be responsible for having an approved State level mitigation plan, and would act as the grantee. If an Indian tribal government chooses to apply for HMGP grants through the State, they would be responsible for having an approved local level mitigation plan, and would serve as a subgrantee accountable to the State as grantee.

This rule also establishes local planning criteria so that these jurisdictions can actively begin the hazard mitigation planning process. This requirement is to encourage the development of comprehensive mitigation plans before disaster events. Section 322 requires local governments to have an approved local mitigation plan to be eligible to receive an HMGP project grant; however, this requirement will not fully take effect until November 1, 2003. FEMA Regional Directors may grant an exception to this requirement in extenuating circumstances. Until November 1, 2003, local governments will be able to receive HMGP project grant funds and may prepare a mitigation plan concurrently with implementation of their project grant. We anticipate that the Predisaster Mitigation program authorized by section 203 of the Act, 42 U.S.C. 5133, will also support this local mitigation planning by making funds available for the development of comprehensive local mitigation plans. Managing States that we approve under new criteria established under section 404 of the Act, 42 U.S.C. 5170c(c), as amended by section 204 of DMA 2000 will have approval authority for local mitigation plans. This provision does not apply to States that we approved under the Managing State program in effect before enactment of DMA 2000.

Our goal is for State and local governments to develop comprehensive and integrated plans that are coordinated through appropriate State,

local, and regional agencies, as well as non-governmental interest groups. To the extent feasible and practicable, we would also like to consolidate the planning requirements for different FEMA mitigation programs. This will ensure that one local plan will meet the minimum requirements for all of the different FEMA mitigation programs, such as the Flood Mitigation Assistance Program (authorized by sections 553 and 554 of the National Flood Insurance Reform Act of 1994, 42 U.S.C. 4104c and 42 U.S.C. 4104d), the Community Rating System (authorized by section 541 of the National Flood Insurance Reform Act of 1994, 42 U.S.C. 4022), the Pre-Disaster Mitigation Program (authorized by section 203 of the Stafford Act), the Hazard Mitigation Grant Program (authorized by section 404 of the Stafford Act), and the mitigation activities that are based upon the provisions of section 323 and subsections 406(b) and (e) of the Stafford Act. The mitigation plans may also serve to integrate documents and plans produced under other emergency management programs. State level plans should identify overall goals and priorities, incorporating the more specific local risk assessments, when available, and including projects identified through the local planning process.

Under section 322(d), up to 7 percent of the available HMGP funds may now be used for planning, and we encourage States to use these funds for local plan development. In a memorandum to FEMA Regional Directors dated December 21, 2000, we announced that this provision of section 322 was effective for disasters declared on or after October 30, 2000, the date on which the Disaster Mitigation Act of 2000 became law. Regional Directors are encouraging States to make these funds immediately available to local and Indian tribal governments, although the funds can be used for plan development and review at the State level as well.

As discussed earlier in this Supplementary Information, subsection 323(a) of the Stafford Act, 42 U.S.C. 5166(a), requires as a precondition to receiving disaster assistance under the Act that State and local governments, as well as eligible private nonprofit entities, must agree to carry out repair and reconstruction activities "in accordance with applicable standards of safety, decency, and sanitation and in conformity with applicable codes, specifications, and standards." In addition, that subsection authorizes the President (FEMA, by virtue of Executive Order 12148, as amended) to "require safe land use and construction practices,

after adequate consultation with appropriate State and local officials" in the course of the use of Federal disaster assistance by eligible applicants to repair and restore disaster-damaged facilities.

At the same time that we implement the planning mandates of section 322 of the Stafford Act, we are also implementing the Minimum Standards for Public and Private Structures provision of section 323 of the Act. This rule appears at Subpart M of Part 206 of Title 44 of the Code of Federal Regulations. As mentioned earlier, the section 322 planning regulations are in Part 201, while Part 206, Subpart M includes only the minimum codes and standards regulations mandated in § 323. The rule to implement § 323 of the Act reinforces the link between pre-disaster planning, building and construction standards, and post-disaster reconstruction efforts.

We encourage comments on this interim final rule, and we will make every effort to involve all interested parties prior to the development of the Final Rule.

Justification for Interim Final Rule

In general, FEMA publishes a rule for public comment before issuing a final rule, under the Administrative Procedure Act, 5 U.S.C. 533 and 44 CFR 1.12. The Administrative Procedure Act, however, provides an exception from that general rule where the agency for good cause finds the procedures for comment and response contrary to public interest. Section 322 of the Stafford Act allows States to receive increased post-disaster grant funding for projects designed to reduce future disaster losses. States will only be eligible for these increased funds if they have a FEMA-approved Enhanced State Mitigation Plan.

This interim final rule provides the criteria for development and approval of these plans, as well as criteria for local mitigation plans required by this legislation. In order for State and local governments to be positioned to receive these mitigation funds as soon as possible, these regulations must be in effect. The public benefit of this rule will be to assist States and communities assess their risks and identify activities to strengthen the larger community and the built environment in order to become less susceptible to disasters. Planning serves as the vital foundation to saving lives and protecting properties, having integrated plans in place can serve to both streamline recovery efforts and lessen potential future damages. Therefore, we believe it is contrary to the public interest to delay

the benefits of this rule. In accordance with the Administrative Procedure Act, 5 U.S.C. 553(d)(3), we find that there is good cause for the interim final rule to take effect immediately upon publication in the **Federal Register** in order to meet the needs of States and communities by identifying criteria for mitigation plans in order to reduce risks nationwide, establish criteria for minimum codes and standards in post-disaster reconstruction, and to allow States to adjust their mitigation plans to receive the increase in mitigation funding.

In addition, we believe that, under the circumstances, delaying the effective date of this rule until after the comment period would not further the public interest. Prior to this rulemaking, FEMA hosted a meeting where interested parties provided comments and suggestions on how we could implement these planning requirements. Participants in this meeting included representatives from the National Emergency Management Association, the Association of State Floodplain Managers, the National Governors' Association, the International Association of Emergency Managers, the National Association of Development Organizations, the American Public Works Association, the National League of Cities, the National Association of Counties, the National Conference of State Legislatures, the International City/County Management Association, and the Bureau of Indian Affairs. We took comments and suggestions provided at this meeting into account in developing this interim final rule. Therefore, we find that prior notice and comment on this rule would not further the public interest. We actively encourage and solicit comments on this interim final rule from interested parties, and we will consider them in preparing the final rule. For these reasons, we believe we have good cause to publish an interim final rule.

National Environmental Policy Act

44 CFR 10.8(d)(2)(ii) excludes this rule from the preparation of an environmental assessment or environmental impact statement, where the rule relates to actions that qualify for categorical exclusion under 44 CFR 10.8(d)(2)(iii), such as the development of plans under this section.

Executive Order 12866, Regulatory Planning and Review

We have prepared and reviewed this rule under the provisions of E.O. 12866, Regulatory Planning and Review. Under Executive Order 12866, 58 FR 51735, October 4, 1993, a significant regulatory

action is subject to OMB review and the requirements of the Executive Order. The Executive Order defines "significant regulatory action" as one that is likely to result in a rule that may:

(1) Have an annual effect on the economy of \$100 million or more or adversely affect in a material way the economy, a sector of the economy, productivity, competition, jobs, the environment, public health or safety, or State, local, or tribal governments or communities;

(2) Create a serious inconsistency or otherwise interfere with an action taken or planned by another agency;

(3) Materially alter the budgetary impact of entitlements, grants, user fees, or loan programs or the rights and obligations of recipients thereof; or

(4) Raise novel legal or policy issues arising out of legal mandates, the President's priorities, or the principles set forth in the Executive Order.

The purpose of this rule is to implement section 322 of the Stafford Act which addresses mitigation planning at the State, tribal, and local levels, identifies new local planning requirements, allows Hazard Mitigation Grant Program (HMGP) funds for planning activities, and increases the amount of HMGP funds available to States that develop a comprehensive, enhanced mitigation plan. The rule identifies local mitigation planning requirements before approval of project grants, and requires our approval of an Enhanced State Mitigation plan as a condition for increased mitigation funding. The rule also implements section 323 of the Stafford Act, which requires that repairs or construction funded by disaster loans or grants must comply with applicable standards and safe land use and construction practices. As such the rule itself will not have an effect on the economy of more than \$100,000,000.

Therefore, this rule is a significant regulatory action and is not an economically significant rule under Executive Order 12866. The Office of Management and Budget (OMB) has reviewed this rule under Executive Order 12866.

Executive Order 12898, Environmental Justice

Under Executive Order 12898, Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations, 59 FR 7629, February 16, 1994, we incorporate environmental justice into our policies and programs. The Executive Order requires each Federal agency to conduct its programs, policies, and activities that substantially affect human health or the

environment, in a manner that ensures that those programs, policies, and activities do not have the effect of excluding persons from participation in our programs, denying persons the benefits of our programs, or subjecting persons to discrimination because of their race, color, or national origin.

No action that we can anticipate under the final rule will have a disproportionately high or adverse human health and environmental effect on any segment of the population. Section 322 focuses specifically on mitigation planning to: Identify the natural hazards, risks, and vulnerabilities of areas in States, localities, and tribal areas; support development of local mitigation plans; provide for technical assistance to local and tribal governments for mitigation planning; and identify and prioritize mitigation actions that the State will support, as resources become available. Section 323 requires compliance with applicable codes and standards in repair and construction, and use of safe land use and construction standards. Accordingly, the requirements of Executive Order 12898 do not apply to this interim final rule.

Paperwork Reduction Act of 1995

As required by the Paperwork Reduction Act of 1995 (44 U.S.C. 3507(d)) and concurrent with the publication of this interim final rule, we have submitted a request for review and approval of a new collection of information, which is contained in this interim final rule. Under the Paperwork Reduction Act of 1995, a person may not be penalized for failing to comply with an information collection that does not display a currently valid Office of Management and Budget (OMB) control number. The request was submitted to OMB for approval under the emergency processing procedures in OMB regulation 5 CFR 1320.1. OMB has approved this collection of information for use through August 31, 2002, under OMB Number 3067-0297.

We expect to follow this emergency request with a request for OMB approval to continue the use of the collection of information for a term of three years. The request will be processed under OMB's normal clearance procedures in accordance with provisions of OMB regulation 5 CFR 1320.10. To help us with the timely processing of the emergency and normal clearance submissions to OMB, we invite the general public to comment on the collection of information. This notice and request for comments complies with the provisions of the Paperwork

Reduction Act of 1995 (44 U.S.C. 3506(c)(2)(A)).

Collection of Information

Title: State/Local/Tribal Hazard Mitigation Plans under Section 322 of the Disaster Mitigation Act of 2000.

Abstract: Section 322 of the Robert T. Stafford Disaster Relief and Emergency Assistance Act, as amended by Section 104 of the Disaster Mitigation Act of 2000, provides new and revitalized approaches to mitigation planning. To obtain Federal assistance, new planning provisions require that each state, local, and tribal government prepare a hazard mitigation plan to include sections that describe the planning process, an assessment of the risks, a mitigation strategy, and identification of the plan maintenance and updating process. The Act provides a framework for linking pre- and post-disaster mitigation planning and initiatives with public and

private interests to ensure an integrated, comprehensive approach to disaster loss reduction. Under Section 322 there is a two-tiered State mitigation plan process. State mitigation plans must be reviewed, revised, and submitted to us every 3 years.

(1) A *Standard State Mitigation Plan* must be approved by us in order for States to be eligible to receive Hazard Mitigation Grant Program (HGMP) funding based on 15 percent of the total estimated eligible Federal disaster assistance. This plan demonstrates the State's goals, priorities, and commitment to reduce risks from natural hazards and serves as a guide for State and local decision makers as they commit resources to reducing the effects of natural hazards.

(2) An *Enhanced State Mitigation Plan* must be approved by us for a State to be eligible to receive HMGP funds based on 20 percent of the total

estimated eligible Federal disaster assistance. This plan must be approved by us within the 3 years prior to the current major disaster declaration. It must demonstrate that a State has developed a comprehensive mitigation program, is effectively using available mitigation funding, and is capable of managing the increased funding.

To be eligible to receive HMGP project grants, *local governments* must develop Local Mitigation Plans that include a risk assessment and mitigation strategy to reduce potential losses and target resources. Plans must be reviewed, revised, and submitted to us for approval every 5 years.

To receive HMGP project grants, *tribal governments* may apply as a grantee or subgrantee, and will be required to meet the planning requirements of a State or local government.

Estimated Total Annual Burden:

Type of collection/forms	No. of respondents	Hours per response	Annual burden hours
Update state or tribal mitigation plans (standard state mitigation plans)	18	320	5,760
State review of local plans	500 local plans	8	4,000
States develop Enhanced State Mitigation Plans	7	100	700
Local or tribal governments develop mitigation plans	500 local plans	300	150,000
Total burden	160,460

Comments: We are soliciting written comments to: (a) Evaluate whether the proposed data collection is necessary for the proper performance of the agency, including whether the information shall have practical utility; (b) evaluate the accuracy of the agency's estimate of the burden of the proposed collection of information; (c) obtain recommendations to enhance the quality, utility, and clarity of the information to be collected; and (d) evaluate the extent to which automated, electronic, mechanical, or other technological collection techniques may further reduce the respondents' burden. FEMA will accept comments through April 29, 2002.

Addressee: Interested persons should submit written comments to Muriel B. Anderson, Chief, Records Management Section, Program Services and Systems Branch, Facilities Management and Services Division, Administration and Resource Planning Directorate, Federal Emergency Management Agency, 500 C Street, Street, SW., Washington, DC 20472.

FOR FURTHER INFORMATION CONTACT: You may obtain copies of the OMB paperwork clearance package by

contacting Ms. Anderson at (202) 646-2625 (voice), (202) 646-3347 (facsimile), or by e-mail at muriel.anderson@fema.gov.

Executive Order 13132, Federalism

Executive Order 13132, Federalism, dated August 4, 1999, sets forth principles and criteria that agencies must adhere to in formulating and implementing policies that have federalism implications, that is, regulations that have substantial direct effects on the States, or on the distribution of power and responsibilities among the various levels of government. Federal agencies must closely examine the statutory authority supporting any action that would limit the policymaking discretion of the States, and to the extent practicable, must consult with State and local officials before implementing any such action.

We have reviewed this rule under E.O.13132 and have concluded that the rule does not have federalism implications as defined by the Executive Order. We have determined that the rule does not significantly affect the rights, roles, and responsibilities of States, and involves no preemption of State law nor

does it limit State policymaking discretion.

However, we have consulted with State and local officials. In order to assist us in the development of this rule, we hosted a meeting to allow interested parties an opportunity to provide their perspectives on the legislation and options for implementation of § 322. Stakeholders who attended the meeting included representatives from the National Emergency Management Association, the Association of State Floodplain Managers, the National Governors' Association, the International Association of Emergency Managers, the National Association of Development Organizations, the American Public Works Association, the National League of Cities, the National Association of Counties, the National Conference of State Legislatures, the International City/County Management Association, and the Bureau of Indian Affairs. We received valuable input from all parties at the meeting, which we took into account in the development of this rule. Additionally, we actively encourage and solicit comments on this interim final rule from interested parties, and we will

consider them in preparing the final rule.

Executive Order 13175, Consultation and Coordination With Indian Tribal Governments

We have reviewed this interim final rule under Executive Order 13175, which became effective on February 6, 2001. Under the Hazard Mitigation Grant Program (HMGP), Indian tribal governments will have the option to apply for grants directly to us and to serve as "grantee", carrying out "State" roles. If they choose this option, tribal governments may submit either a State-level Standard Mitigation Plan for the 15 percent HMGP funding or a State-level Enhanced Mitigation Plan for 20 percent HMGP funding. In either case, Indian tribal governments would be able to spend up to 7 percent of those funds on planning. Before developing this rule, we met with representatives from State and local governments and the Bureau of Indian Affairs, to discuss the new planning opportunities and requirements of § 322 of the Stafford Act. We received valuable input from all parties, which helped us to develop this interim final rule.

In reviewing the interim final rule, we find that it does not have "tribal implications" as defined in Executive Order 13175 because it will not have a substantial direct effect on one or more Indian tribes, on the relationship between the Federal Government and Indian tribes, or on the distribution of power and responsibilities between the Federal Government and Indian tribes. Moreover, the interim final rule does not impose substantial direct compliance costs on tribal governments, nor does it preempt tribal law, impair treaty rights or limit the self-governing powers of tribal governments.

Congressional Review of Agency Rulemaking

We have sent this interim final rule to the Congress and to the General Accounting Office under the Congressional Review of Agency Rulemaking Act, Public Law 104-121. The rule is a not "major rule" within the meaning of that Act. It is an administrative action in support of normal day-to-day mitigation planning activities required by section 322 and compliance under section 323 of the Stafford Act, as enacted in DMA 2000.

The rule will not result in a major increase in costs or prices for consumers, individual industries, Federal, State, or local government agencies, or geographic regions. It will not have "significant adverse effects" on competition, employment, investment,

productivity, innovation, or on the ability of United States-based enterprises to compete with foreign-based enterprises. This final rule is subject to the information collection requirements of the Paperwork Reduction Act, and OMB has assigned Control No. 3067-0297. The rule is not an unfunded Federal mandate within the meaning of the Unfunded Mandates Reform Act of 1995, Public Law 104-4, and any enforceable duties that we impose are a condition of Federal assistance or a duty arising from participation in a voluntary Federal program.

List of Subjects in 44 CFR Part 201 and Part 206

Administrative practice and procedure, Disaster assistance, Grant programs, Mitigation planning, Reporting and recordkeeping requirements.

Accordingly, Amend 44 CFR, Subchapter D—Disaster Assistance, as follows:

1. Add Part 201 to read as follows:

PART 201—MITIGATION PLANNING

Sec.

- 201.1 Purpose.
- 201.2 Definitions.
- 201.3 Responsibilities.
- 201.4 Standard State Mitigation Plans.
- 201.5 Enhanced State Mitigation Plans.
- 201.6 Local Mitigation Plans.

Authority: Robert T. Stafford Disaster Relief and Emergency Assistance Act, 42 U.S.C. 5121-5206; Reorganization Plan No. 3 of 1978, 43 FR 41943, 3 CFR, 1978 Comp., p. 329; E.O. 12127, 44 FR 19367, 3 CFR, 1979 Comp., p. 376; E.O. 12148, 44 FR 43239, 3 CFR, 1979 Comp., p. 412; and E.O. 12673, 54 FR 12571, 3 CFR, 1989 Comp., p. 214.

§ 201.1 Purpose.

(a) The purpose of this part is to provide information on the policies and procedures for mitigation planning as required by the provisions of section 322 of the Stafford Act, 42 U.S.C. 5165.

(b) The purpose of mitigation planning is for State, local, and Indian tribal governments to identify the natural hazards that impact them, to identify actions and activities to reduce any losses from those hazards, and to establish a coordinated process to implement the plan, taking advantage of a wide range of resources.

§ 201.2 Definitions.

Grantee means the government to which a grant is awarded, which is accountable for the use of the funds provided. The grantee is the entire legal entity even if only a particular component of the entity is designated in the grant award document. Generally,

the State is the grantee. However, after a declaration, an Indian tribal government may choose to be a grantee, or may act as a subgrantee under the State. An Indian tribal government acting as grantee will assume the responsibilities of a "state", as described in this part, for the purposes of administering the grant.

Hazard mitigation means any sustained action taken to reduce or eliminate the long-term risk to human life and property from hazards.

Hazard Mitigation Grant Program means the program authorized under section 404 of the Stafford Act, 42 U.S.C. 5170c and implemented at 44 CFR Part 206, Subpart N, which authorizes funding for certain mitigation measures identified through the evaluation of natural hazards conducted under section 322 of the Stafford Act 42 U.S.C. 5165.

Indian tribal government means any Federally recognized governing body of an Indian or Alaska Native tribe, band, nation, pueblo, village, or community that the Secretary of Interior acknowledges to exist as an Indian tribe under the Federally Recognized Tribe List Act of 1994, 25 U.S.C. 479a. This does not include Alaska Native corporations, the ownership of which is vested in private individuals.

Local government is any county, municipality, city, town, township, public authority, school district, special district, intrastate district, council of governments (regardless of whether the council of governments is incorporated as a nonprofit corporation under State law), regional or interstate government entity, or agency or instrumentality of a local government; any Indian tribe or authorized tribal organization, or Alaska Native village or organization; and any rural community, unincorporated town or village, or other public entity.

Managing State means a State to which FEMA has delegated the authority to administer and manage the HMGP under the criteria established by FEMA pursuant to 42 U.S.C. 5170c(c). FEMA may also delegate authority to tribal governments to administer and manage the HMGP as a Managing State.

Regional Director is a director of a regional office of FEMA, or his/her designated representative.

Small and impoverished communities means a community of 3,000 or fewer individuals that is identified by the State as a rural community, and is not a remote area within the corporate boundaries of a larger city; is economically disadvantaged, by having an average per capita annual income of residents not exceeding 80 percent of national, per capita income, based on

best available data; the local unemployment rate exceeds by one percentage point or more, the most recently reported, average yearly national unemployment rate; and any other factors identified in the State Plan in which the community is located.

The Stafford Act refers to the Robert T. Stafford Disaster Relief and Emergency Assistance Act, Public Law 93-288, as amended (42 U.S.C. 5121-5206).

State is any State of the United States, the District of Columbia, Puerto Rico, the Virgin Islands, Guam, American Samoa, and the Commonwealth of the Northern Mariana Islands.

State Hazard Mitigation Officer is the official representative of State government who is the primary point of contact with FEMA, other Federal agencies, and local governments in mitigation planning and implementation of mitigation programs and activities required under the Stafford Act.

Subgrantee means the government or other legal entity to which a subgrant is awarded and which is accountable to the grantee for the use of the funds provided. Subgrantees can be a State agency, local government, private non-profit organizations, or Indian tribal government. Indian tribal governments acting as a subgrantee are accountable to the State grantee.

§ 201.3 Responsibilities.

(a) *General.* This section identifies the key responsibilities of FEMA, States, and local/tribal governments in carrying out section 322 of the Stafford Act, 42 U.S.C. 5165.

(b) *FEMA.* The key responsibilities of the Regional Director are to:

(1) Oversee all FEMA related pre- and post-disaster hazard mitigation programs and activities;

(2) Provide technical assistance and training to State, local, and Indian tribal governments regarding the mitigation planning process;

(3) Review and approve all Standard and Enhanced State Mitigation Plans;

(4) Review and approve all local mitigation plans, unless that authority has been delegated to the State in accordance with § 201.6(d);

(5) Conduct reviews, at least once every three years, of State mitigation activities, plans, and programs to ensure that mitigation commitments are fulfilled, and when necessary, take action, including recovery of funds or denial of future funds, if mitigation commitments are not fulfilled.

(c) *State.* The key responsibilities of the State are to coordinate all State and

local activities relating to hazard evaluation and mitigation and to:

(1) Prepare and submit to FEMA a Standard State Mitigation Plan following the criteria established in § 201.4 as a condition of receiving Stafford Act assistance (except emergency assistance).

(2) In order to be considered for the 20 percent HMGP funding, prepare and submit an Enhanced State Mitigation Plan in accordance with § 201.5, which must be reviewed and updated, if necessary, every three years from the date of the approval of the previous plan.

(3) At a minimum, review and, if necessary, update the Standard State Mitigation Plan by November 1, 2003 and every three years from the date of the approval of the previous plan in order to continue program eligibility.

(4) Make available the use of up to the 7 percent of HMGP funding for planning in accordance with § 206.434.

(5) Provide technical assistance and training to local governments to assist them in applying for HMGP planning grants, and in developing local mitigation plans.

(6) For Managing States that have been approved under the criteria established by FEMA pursuant to 42 U.S.C. 5170c(c), review and approve local mitigation plans in accordance with § 201.6(d).

(d) *Local governments.* The key responsibilities of local governments are to:

(1) Prepare and adopt a jurisdiction-wide natural hazard mitigation plan as a condition of receiving project grant funds under the HMGP, in accordance with § 201.6.

(2) At a minimum, review and, if necessary, update the local mitigation plan every five years from date of plan approval to continue program eligibility.

(e) *Indian tribal governments.* Indian tribal governments will be given the option of applying directly to us for Hazard Mitigation Grant Program funding, or they may choose to apply through the State. If they apply directly to us, they will assume the responsibilities of the State, or grantee, and if they apply through the State, they will assume the responsibilities of the local government, or subgrantee.

§ 201.4 Standard State Mitigation Plans.

(a) *Plan requirement.* By November 1, 2003, States must have an approved Standard State Mitigation plan meeting the requirements of this section, in order to receive assistance under the Stafford Act, although assistance authorized under disasters declared prior to November 1, 2003 will continue

to be made available. In any case, emergency assistance provided under 42 U.S.C. 5170a, 5170b, 5173, 5174, 5177, 5179, 5180, 5182, 5183, 5184, 5192 will not be affected. The mitigation plan is the demonstration of the State's commitment to reduce risks from natural hazards and serves as a guide for State decision makers as they commit resources to reducing the effects of natural hazards. States may choose to include the requirements of the HMGP Administrative Plan in their mitigation plan.

(b) *Planning process.* An effective planning process is essential in developing and maintaining a good plan. The mitigation planning process should include coordination with other State agencies, appropriate Federal agencies, interested groups, and be integrated to the extent possible with other ongoing State planning efforts as well as other FEMA mitigation programs and initiatives.

(c) *Plan content.* To be effective the plan must include the following elements:

(1) Description of the *planning process* used to develop the plan, including how it was prepared, who was involved in the process, and how other agencies participated.

(2) *Risk assessments* that provide the factual basis for activities proposed in the strategy portion of the mitigation plan. Statewide risk assessments must characterize and analyze natural hazards and risks to provide a statewide overview. This overview will allow the State to compare potential losses throughout the State and to determine their priorities for implementing mitigation measures under the strategy, and to prioritize jurisdictions for receiving technical and financial support in developing more detailed local risk and vulnerability assessments. The risk assessment shall include the following:

(i) An overview of the type and location of all natural hazards that can affect the State, including information on previous occurrences of hazard events, as well as the probability of future hazard events, using maps where appropriate;

(ii) An overview and analysis of the State's vulnerability to the hazards described in this paragraph (c)(2), based on estimates provided in local risk assessments as well as the State risk assessment. The State shall describe vulnerability in terms of the jurisdictions most threatened by the identified hazards, and most vulnerable to damage and loss associated with hazard events. State owned critical or operated facilities located in the

identified hazard areas shall also be addressed;

(iii) An overview and analysis of potential losses to the identified vulnerable structures, based on estimates provided in local risk assessments as well as the State risk assessment. The State shall estimate the potential dollar losses to State owned or operated buildings, infrastructure, and critical facilities located in the identified hazard areas.

(3) A *Mitigation Strategy* that provides the State's blueprint for reducing the losses identified in the risk assessment. This section shall include:

(i) A description of State goals to guide the selection of activities to mitigate and reduce potential losses.

(ii) A discussion of the State's pre- and post-disaster hazard management policies, programs, and capabilities to mitigate the hazards in the area, including: an evaluation of State laws, regulations, policies, and programs related to hazard mitigation as well as to development in hazard-prone areas; a discussion of State funding capabilities for hazard mitigation projects; and a general description and analysis of the effectiveness of local mitigation policies, programs, and capabilities.

(iii) An identification, evaluation, and prioritization of cost-effective, environmentally sound, and technically feasible mitigation actions and activities the State is considering and an explanation of how each activity contributes to the overall mitigation strategy. This section should be linked to local plans, where specific local actions and projects are identified.

(iv) Identification of current and potential sources of Federal, State, local, or private funding to implement mitigation activities.

(4) A section on the *Coordination of Local Mitigation Planning* that includes the following:

(i) A description of the State process to support, through funding and technical assistance, the development of local mitigation plans.

(ii) A description of the State process and timeframe by which the local plans will be reviewed, coordinated, and linked to the State Mitigation Plan.

(iii) Criteria for prioritizing communities and local jurisdictions that would receive planning and project grants under available funding programs, which should include consideration for communities with the highest risks, repetitive loss properties, and most intense development pressures. Further, that for non-planning grants, a principal criterion for prioritizing grants shall be the extent to which benefits are maximized according

to a cost benefit review of proposed projects and their associated costs.

(5) A *Plan Maintenance Process* that includes:

(i) An established method and schedule for monitoring, evaluating, and updating the plan.

(ii) A system for monitoring implementation of mitigation measures and project closeouts.

(iii) A system for reviewing progress on achieving goals as well as activities and projects identified in the Mitigation Strategy.

(6) A *Plan Adoption Process*. The plan must be formally adopted by the State prior to submittal to us for final review and approval.

(7) *Assurances*. The plan must include assurances that the State will comply with all applicable Federal statutes and regulations in effect with respect to the periods for which it receives grant funding, in compliance with 44 CFR 13.11(c). The State will amend its plan whenever necessary to reflect changes in State or Federal laws and statutes as required in 44 CFR 13.11(d).

(d) *Review and updates*. Plan must be reviewed and revised to reflect changes in development, progress in statewide mitigation efforts, and changes in priorities and resubmitted for approval to the appropriate Regional Director every three years. The Regional review will be completed within 45 days after receipt from the State, whenever possible. We also encourage a State to review its plan in the post-disaster timeframe to reflect changing priorities, but it is not required.

§ 201.5 Enhanced State Mitigation Plans.

(a) A State with a FEMA approved Enhanced State Mitigation Plan at the time of a disaster declaration is eligible to receive increased funds under the HMGP, based on twenty percent of the total estimated eligible Stafford Act disaster assistance. The Enhanced State Mitigation Plan must demonstrate that a State has developed a comprehensive mitigation program, that the State effectively uses available mitigation funding, and that it is capable of managing the increased funding. In order for the State to be eligible for the 20 percent HMGP funding, FEMA must have approved the plan within three years prior to the disaster declaration.

(b) Enhanced State Mitigation Plans must include all elements of the Standard State Mitigation Plan identified in § 201.4, as well as document the following:

(1) Demonstration that the plan is integrated to the extent practicable with other State and/or regional planning

initiatives (comprehensive, growth management, economic development, capital improvement, land development, and/or emergency management plans) and FEMA mitigation programs and initiatives that provide guidance to State and regional agencies.

(2) Documentation of the State's project implementation capability, identifying and demonstrating the ability to implement the plan, including:

(i) Established eligibility criteria for multi-hazard mitigation measures.

(ii) A system to determine the cost effectiveness of mitigation measures, consistent with OMB Circular A-94, Guidelines and Discount Rates for Benefit-Cost Analysis of Federal Programs, and to rank the measures according to the State's eligibility criteria.

(iii) Demonstration that the State has the capability to effectively manage the HMGP as well as other mitigation grant programs, including a record of the following:

(A) Meeting HMGP and other mitigation grant application timeframes and submitting complete, technically feasible, and eligible project applications with appropriate supporting documentation;

(B) Preparing and submitting accurate environmental reviews and benefit-cost analyses;

(C) Submitting complete and accurate quarterly progress and financial reports on time; and

(D) Completing HMGP and other mitigation grant projects within established performance periods, including financial reconciliation.

(iv) A system and strategy by which the State will conduct an assessment of the completed mitigation actions and include a record of the effectiveness (actual cost avoidance) of each mitigation action.

(3) Demonstration that the State effectively uses existing mitigation programs to achieve its mitigation goals.

(4) Demonstration that the State is committed to a comprehensive state mitigation program, which might include any of the following:

(i) A commitment to support local mitigation planning by providing workshops and training, State planning grants, or coordinated capability development of local officials, including Emergency Management and Floodplain Management certifications.

(ii) A statewide program of hazard mitigation through the development of legislative initiatives, mitigation councils, formation of public/private

partnerships, and/or other executive actions that promote hazard mitigation.

(iii) The State provides a portion of the non-Federal match for HMGP and/or other mitigation projects.

(iv) To the extent allowed by State law, the State requires or encourages local governments to use a current version of a nationally applicable model building code or standard that addresses natural hazards as a basis for design and construction of State sponsored mitigation projects.

(v) A comprehensive, multi-year plan to mitigate the risks posed to existing buildings that have been identified as necessary for post-disaster response and recovery operations.

(vi) A comprehensive description of how the State integrates mitigation into its post-disaster recovery operations.

(c) *Review and updates.* (1) A State must review and revise its plan to reflect changes in development, progress in statewide mitigation efforts, and changes in priorities, and resubmit it for approval to the appropriate Regional Director every three years. The Regional review will be completed within 45 days after receipt from the State, whenever possible.

(2) In order for a State to be eligible for the 20 percent HMGP funding, the Enhanced State Mitigation plan must be approved by FEMA within the three years prior to the current major disaster declaration.

§ 201.6 Local Mitigation Plans.

The local mitigation plan is the representation of the jurisdiction's commitment to reduce risks from natural hazards, serving as a guide for decision makers as they commit resources to reducing the effects of natural hazards. Local plans will also serve as the basis for the State to provide technical assistance and to prioritize project funding.

(a) *Plan requirement.* (1) For disasters declared after November 1, 2003, a local government must have a mitigation plan approved pursuant to this section in order to receive HMGP project grants. Until November 1, 2003, local mitigation plans may be developed concurrent with the implementation of the project grant.

(2) Regional Directors may grant an exception to the plan requirement in extraordinary circumstances, such as in a small and impoverished community, when justification is provided. In these cases, a plan will be completed within 12 months of the award of the project grant. If a plan is not provided within this timeframe, the project grant will be terminated, and any costs incurred after

notice of grant's termination will not be reimbursed by FEMA.

(3) Multi-jurisdictional plans (e.g. watershed plans) may be accepted, as appropriate, as long as each jurisdiction has participated in the process and has officially adopted the plan. State-wide plans will not be accepted as multi-jurisdictional plans.

(b) *Planning process.* An open public involvement process is essential to the development of an effective plan. In order to develop a more comprehensive approach to reducing the effects of natural disasters, the planning process shall include:

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

(2) An opportunity for neighboring communities, local and regional agencies involved in hazard mitigation activities, and agencies that have the authority to regulate development, as well as businesses, academia and other private and non-profit interests to be involved in the planning process; and

(3) Review and incorporation, if appropriate, of existing plans, studies, reports, and technical information.

(c) *Plan content.* The plan shall include the following:

(1) Documentation of 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.

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

(i) 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.

(ii) 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. The plan should describe vulnerability in terms of:

(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 identified in paragraph (c)(2)(i)(A) of this section

and a description of the methodology used to prepare the estimate;

(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.

(iii) For multi-jurisdictional plans, the risk assessment section must assess each jurisdiction's risks where they vary from the risks facing the entire planning area.

(3) A *mitigation strategy* that provides the jurisdiction's blueprint for reducing the potential losses identified in the risk assessment, based on existing authorities, policies, programs and resources, and its ability to expand on and improve these existing tools. This section shall include:

(i) A description of mitigation goals to reduce or avoid long-term vulnerabilities to the identified hazards.

(ii) 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.

(iii) An action plan describing how the actions identified in paragraph (c)(2)(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.

(iv) For multi-jurisdictional plans, there must be identifiable action items specific to the jurisdiction requesting FEMA approval or credit of the plan.

(4) A *plan maintenance process* that includes:

(i) A section describing the method and schedule of monitoring, evaluating, and updating the mitigation plan within a five-year cycle.

(ii) A process by which local governments incorporate the requirements of the mitigation plan into other planning mechanisms such as comprehensive or capital improvement plans, when appropriate.

(iii) Discussion on how the community will continue public participation in the plan maintenance process.

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

(d) *Plan review.* (1) Plans must be submitted to the State Hazard Mitigation Officer for initial review and coordination. The State will then send the plan to the appropriate FEMA Regional Office for formal review and approval.

(2) The Regional review will be completed within 45 days after receipt from the State, whenever possible.

(3) Plans must be reviewed, revised if appropriate, and resubmitted for approval within five years in order to continue to be eligible for HMGP project grant funding.

(4) Managing States that have been approved under the criteria established by FEMA pursuant to 42 U.S.C. 5170c(c) will be delegated approval authority for local mitigation plans, and the review will be based on the criteria in this part. Managing States will review the plans within 45 days of receipt of the plans, whenever possible, and provide a copy of the approved plans to the Regional Office.

PART 206—FEDERAL DISASTER ASSISTANCE FOR DISASTERS DECLARED ON OR AFTER NOVEMBER 23, 1988

2. The authority citation for part 206 is revised to read as follows:

Authority: Robert T. Stafford Disaster Relief and Emergency Assistance Act, 42 U.S.C. 5121–5206; Reorganization Plan No. 3 of 1978, 43 FR 41943, 3 CFR, 1978 Comp., p. 329; E.O. 12127, 44 FR 19367, 3 CFR, 1979 Comp., p. 376; E.O. 12148, 44 FR 43239, 3 CFR, 1979 Comp., p. 412; and E.O. 12673, 54 FR 12571, 3 CFR, 1989 Comp., p. 214.

2a. Revise Part 206, Subpart M to read as follows:

Subpart M—Minimum Standards

Sec.
206.400 General.
206.401 Local standards.
206.402 Compliance.

§ 206.400 General.

(a) As a condition of the receipt of any disaster assistance under the Stafford Act, the applicant shall carry out any repair or construction to be financed with the disaster assistance in accordance with applicable standards of safety, decency, and sanitation and in conformity with applicable codes, specifications and standards.

(b) Applicable codes, specifications, and standards shall include any disaster resistant building code that meets the minimum requirements of the National Flood Insurance Program (NFIP) as well as being substantially equivalent to the recommended provisions of the National Earthquake Hazards Reduction

Program (NEHRP). In addition, the applicant shall comply with any requirements necessary in regards to Executive Order 11988, Floodplain Management, Executive Order 12699, Seismic Safety of Federal and Federally Assisted or Regulated New Building Construction, and any other applicable Executive orders.

(c) In situations where there are no locally applicable standards of safety, decency and sanitation, or where there are no applicable local codes, specifications and standards governing repair or construction activities, or where the Regional Director determines that otherwise applicable codes, specifications, and standards are inadequate, then the Regional Director may, after consultation with appropriate State and local officials, require the use of nationally applicable codes, specifications, and standards, as well as safe land use and construction practices in the course of repair or construction activities.

(d) The mitigation planning process that is mandated by section 322 of the Stafford Act and 44 CFR part 201 can assist State and local governments in determining where codes, specifications, and standards are inadequate, and may need to be upgraded.

§ 206.401 Local standards.

The cost of repairing or constructing a facility in conformity with minimum codes, specifications and standards may be eligible for reimbursement under section 406 of the Stafford Act, as long as such codes, specifications and standards meet the criteria that are listed at 44 CFR 206.226(b).

§ 206.402 Compliance.

A recipient of disaster assistance under the Stafford Act must document for the Regional Director its compliance with this subpart following the completion of any repair or construction activities.

Subpart N—Hazard Mitigation Grant Program

3. Revise § 206.431 to read as follows:

§ 206.431 Definitions.

Activity means any mitigation measure, project, or action proposed to reduce risk of future damage, hardship, loss or suffering from disasters.

Applicant means a State agency, local government, Indian tribal government, or eligible private nonprofit organization, submitting an application to the grantee for assistance under the HMGP.

Enhanced State Mitigation Plan is the hazard mitigation plan approved under 44 CFR part 201 as a condition of receiving increased funding under the HMGP.

Grant application means the request to FEMA for HMGP funding, as outlined in § 206.436, by a State or tribal government that will act as grantee.

Grant award means total of Federal and non-Federal contributions to complete the approved scope of work.

Grantee means the government to which a grant is awarded and which is accountable for the use of the funds provided. The grantee is the entire legal entity even if only a particular component of the entity is designated in the grant award document. Generally, the State is the grantee. However, an Indian tribal government may choose to be a grantee, or it may act as a subgrantee under the State. An Indian tribal government acting as a grantee will assume the responsibilities of a “state”, under this subpart, for the purposes of administering the grant.

Indian tribal government means any Federally recognized governing body of an Indian or Alaska Native tribe, band, nation, pueblo, village, or community that the Secretary of Interior acknowledges to exist as an Indian tribe under the Federally Recognized Tribe List Act of 1994, 25 U.S.C. 479a. This does not include Alaska Native corporations, the ownership of which is vested in private individuals.

Local Mitigation Plan is the hazard mitigation plan required of a local or Indian tribal government acting as a subgrantee as a condition of receiving a project subgrant under the HMGP as outlined in 44 CFR 201.6.

Standard State Mitigation Plan is the hazard mitigation plan approved under 44 CFR part 201, as a condition of receiving Stafford Act assistance as outlined in § 201.4.

State Administrative Plan for the Hazard Mitigation Grant Program means the plan developed by the State to describe the procedures for administration of the HMGP.

Subgrant means an award of financial assistance under a grant by a grantee to an eligible subgrantee.

Subgrant application means the request to the grantee for HMGP funding by the eligible subgrantee, as outlined in § 206.436.

Subgrantee means the government or other legal entity to which a subgrant is awarded and which is accountable to the grantee for the use of the funds provided. Subgrantees can be a State agency, local government, private nonprofit organizations, or Indian tribal government as outlined in § 206.433.

Indian tribal governments acting as a subgrantee are accountable to the State grantee.

4. Revise § 206.432(b) to read as follows:

§ 206.432 Federal grant assistance.

* * * * *

(b) *Amounts of assistance.* The total of Federal assistance under this subpart shall not exceed either 15 or 20 percent of the total estimated Federal assistance (excluding administrative costs) provided for a major disaster under 42 U.S.C. 5170b, 5172, 5173, 5174, 5177, 5178, 5183, and 5201 as follows:

(1) *Fifteen (15) percent.* Effective November 1, 2003, a State with an approved Standard State Mitigation Plan, which meets the requirements outlined in 44 CFR 201.4, shall be eligible for assistance under the HMGP not to exceed 15 percent of the total estimated Federal assistance described in this paragraph. Until that date, existing, approved State Mitigation Plans will be accepted.

(2) *Twenty (20) percent.* A State with an approved Enhanced State Mitigation Plan, in effect prior to the disaster declaration, which meets the requirements outlined in 44 CFR 201.5 shall be eligible for assistance under the HMGP not to exceed 20 percent of the total estimated Federal assistance described in this paragraph.

(3) The estimates of Federal assistance under this paragraph (b) shall be based on the Regional Director's estimate of all eligible costs, actual grants, and appropriate mission assignments.

* * * * *

5. Section 206.434 is amended by redesignating paragraphs (b) through (g) as paragraphs (c) through (h), respectively; adding a new paragraph (b); revising redesignated paragraphs (c) introductory text and (c)(1); and revising redesignated paragraph (d) to read as follows:

§ 206.434 Eligibility.

* * * * *

(b) *Plan requirement.* (1) For all disasters declared on or after November 1, 2003, local and tribal government applicants for subgrants, must have an approved local mitigation plan in accordance with 44 CFR 201.6 prior to receipt of HMGP subgrant funding. Until November 1, 2003, local mitigation plans may be developed concurrent with the implementation of subgrants.

(2) Regional Directors may grant an exception to this requirement in extraordinary circumstances, such as in a small and impoverished community

when justification is provided. In these cases, a plan will be completed within 12 months of the award of the project grant. If a plan is not provided within this timeframe, the project grant will be terminated, and any costs incurred after notice of grant's termination will not be reimbursed by FEMA.

(c) *Minimum project criteria.* To be eligible for the Hazard Mitigation Grant Program, a project must:

(1) Be in conformance with the State Mitigation Plan and Local Mitigation Plan approved under 44 CFR part 201;

* * * * *

(d) *Eligible activities.* (1) *Planning.* Up to 7% of the State's HMGP grant may be used to develop State, tribal and/or local mitigation plans to meet the planning criteria outlined in 44 CFR part 201.

(2) *Types of projects.* Projects may be of any nature that will result in protection to public or private property. Eligible projects include, but are not limited to:

- (i) Structural hazard control or protection projects;
- (ii) Construction activities that will result in protection from hazards;
- (iii) Retrofitting of facilities;
- (iv) Property acquisition or relocation, as defined in paragraph (e) of this section;
- (v) Development of State or local mitigation standards;
- (vi) Development of comprehensive mitigation programs with implementation as an essential component;
- (vii) Development or improvement of warning systems.

* * * * *

6. Revise § 206.435(a) to read as follows:

§ 206.435 Project identification and selection criteria.

(a) *Identification.* It is the State's responsibility to identify and select eligible hazard mitigation projects. All funded projects must be consistent with the State Mitigation Plan. Hazard Mitigation projects shall be identified and prioritized through the State, Indian tribal, and local planning process.

* * * * *

7. Revise § 206.436 to read as follows:

§ 206.436 Application procedures.

(a) *General.* This section describes the procedures to be used by the grantee in submitting an application for HMGP funding. Under the HMGP, the State or Indian tribal government is the grantee and is responsible for processing subgrants to applicants in accordance with 44 CFR part 13 and this part 206. Subgrantees are accountable to the grantee.

(b) *Governor's Authorized Representative.* The Governor's Authorized Representative serves as the grant administrator for all funds provided under the Hazard Mitigation Grant Program. The Governor's Authorized Representative's responsibilities as they pertain to procedures outlined in this section include providing technical advice and assistance to eligible subgrantees, and ensuring that all potential applicants are aware of assistance available and submission of those documents necessary for grant award.

(c) *Hazard mitigation application.* Upon identification of mitigation measures, the State (Governor's Authorized Representative) will submit its Hazard Mitigation Grant Program application to the FEMA Regional Director. The application will identify one or more mitigation measures for which funding is requested. The application must include a Standard Form (SF) 424, Application for Federal Assistance, SF 424D, Assurances for Construction Programs, if appropriate, and a narrative statement. The narrative statement will contain any pertinent project management information not included in the State's administrative plan for Hazard Mitigation. The narrative statement will also serve to identify the specific mitigation measures for which funding is requested. Information required for each mitigation measure shall include the following:

- (1) Name of the subgrantee, if any;
- (2) State or local contact for the measure;
- (3) Location of the project;
- (4) Description of the measure;
- (5) Cost estimate for the measure;
- (6) Analysis of the measure's cost-effectiveness and substantial risk reduction, consistent with § 206.434(c);
- (7) Work schedule;
- (8) Justification for selection;
- (9) Alternatives considered;
- (10) Environmental information consistent with 44 CFR part 9, Floodplain Management and Protection of Wetlands, and 44 CFR part 10, Environmental Considerations.

(d) *Application submission time limit.* The State's application may be amended as the State identifies and selects local project applications to be funded. The State must submit all local HMGP applications and funding requests for the purpose of identifying new projects to the Regional Director within 12 months of the date of disaster declaration.

(e) *Extensions.* The State may request the Regional Director to extend the application time limit by 30 to 90 day

increments, not to exceed a total of 180 days. The grantee must include a justification in its request.

(f) *FEMA approval.* The application and supplement(s) will be submitted to the FEMA Regional Director for approval. FEMA has final approval authority for funding of all projects.

(g) *Indian tribal grantees.* Indian tribal governments may submit a SF 424 directly to the Regional Director.

Subpart H—Public Assistance Eligibility

* * * * *

8. Revise § 206.220 to read as follows:

§ 206.220 General.

This subpart provides policies and procedures for determinations of eligibility of applicants for public assistance, eligibility of work, and eligibility of costs for assistance under sections 402, 403, 406, 407, 418, 419,

421(d), 502, and 503 of the Stafford Act. Assistance under this subpart must also conform to requirements of 44 CFR part 201, Mitigation Planning, and 44 CFR part 206, subparts G—Public Assistance Project Administration, I—Public Assistance Insurance Requirements, J—Coastal Barrier Resources Act, and M—Minimum Standards. Regulations under 44 CFR part 9—Floodplain Management and 44 CFR part 10—Environmental Considerations, also apply to this assistance.

9. Section 206.226 is amended by redesignating paragraphs

(b) through (j) as paragraphs (c) through (k), respectively; adding a new paragraph (b); and revising redesignated paragraph (g)(5) to read as follows:

§ 206.226 Restoration of damaged facilities.

* * * * *

(b) *Mitigation planning.* In order to receive assistance under this section, as

of November 1, 2003, the State must have in place a FEMA approved State Mitigation Plan in accordance with 44 CFR part 201.

* * * * *

(g) * * *

(5) If relocation of a facility is not feasible or cost effective, the Regional Director shall disapprove Federal funding for the original location when he/she determines in accordance with 44 CFR parts 9, 10, 201, or subpart M of this part 206, that restoration in the original location is not allowed. In such cases, an alternative project may be applied for.

* * * * *

Dated: February 19, 2002.

Michael D. Brown,
General Counsel.

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BILLING CODE 6718-05-P

C HAZARD ANALYSIS

The hazard identification and ranking was obtained primarily from the Zone 7 Water Agency (Zone 7) Hazard Identification Workshop. The Hazard Identification Workshop was conducted as a participatory Steering Committee workshop to identify the potential hazards within the Zone. The Hazard Identification Workshop was facilitated using an interactive software spreadsheet that asked specific questions on potential hazards and then rated them accordingly. These questions guide the team in the correct facilitation and application of the program. The following information summarizes the Hazard Identification Workshop risk ranking results, including the descriptions of each hazard factor, and provides the specific descriptor choices for each risk factor and description. Additionally, a risk ranking matrix is provided to designate the overall ranking score and categorization of each hazard.

Hazard Identification and Risk Ranking

Each hazard profile included a profile ranking of the hazard (ranging from low risk to high risk). The Steering Committee determined this initial profile ranking based on all of the hazard identification and profile research summarized and group discussion and evaluation of all of the data, including numerical rankings (1-5) of the following criteria:

- **Consequence/Severity** – How wide spread is the impact area?
- **Secondary Effects** – Could the event trigger another event and separate response?
- **Probability/Frequency** – Historical view of how often this type of event occurs locally and projected recurrence intervals.
- **Warning/Onset** – Advance warning of the event, or none.
- **Duration** – Length of elapsed time where response resources are active.
- **Recovery** – Length of time until lives and property return to normal.



Risk Factors for Hazard Identification

Risk Factor	Description	Descriptors	Value
Probability/ Frequency	Prediction of how often a hazard will occur in the future	Infeasible event - not applicable due to geographic location characteristics	0
		Rare event - occurs less than once every 50 years	1
		Infrequent event - occurs between once every 8 years and once every 50 years (inclusive)	2
		Regular event - occurs between once a year and once every 7 years	3
		Frequent event - occurs more than once a year	4
Consequence/ Severity	Physical Damage - structures and lifelines Economic Impact – loss of function for power, water, sanitation, roads, etc.	No damage	1
		Minor/slight damage to buildings and structures, no loss of lifelines	2
		Moderate building damage, minor loss of lifelines (less than 12 hours)	3
		Moderate building damage, lifeline loss (less than 24 hours)	4
		Extensive building damage, widespread loss of lifelines (water, gas, electricity, sanitation, roads), loss of life	5
Vulnerability	Impact Area - area impacted by a hazard event Secondary Impacts - Capability of triggering additional hazards Onset - Period of time between initial recognition of an approaching hazard and when the hazard begins to impact the community	No physical damage, no secondary impacts	1
		Localized damage area	2
		Localized damage area, minor secondary impacts, delayed hazard onset	3
		Moderate damage area, moderate secondary impacts, moderate warning time	4
		Widespread damage area, significant secondary impacts, no warning time	5

Each profile includes a ranking of the hazard. The hazard rankings were determined by assigning each hazard the appropriate risk factors as described above. The risk factors were then used with a hazard ranking matrix to determine the final hazard score. The following table provides the matrix used for determining each hazard’s score.

Risk Ranking Matrix							
Probability/Frequency Description	Risk Ranking Matrix						
Rare Event: Occurs less than once every 50 years	Probability/Frequency	Consequence/Severity					
	Value	1	1	2	3	4	5
	Vulnerability	1	1	2	3	4	5
		2	2	4	6	8	10
		3	3	6	9	12	15
		4	4	8	12	16	20
5		5	10	15	20	25	
Infrequent Event: Occurs between once every 8 years and once every 50 years (inclusive)	Probability/Frequency	Consequence/Severity					
	Value	2	1	2	3	4	5
	Vulnerability	1	2	4	6	8	10
		2	4	8	12	16	20
		3	6	12	18	24	30
		4	8	16	24	32	40
5		10	20	30	40	50	
Regular Event: Occurs between once a year and once every 7 years	Probability/Frequency	Consequence/Severity					
	Value	3	1	2	3	4	5
	Vulnerability	1	3	6	9	12	15
		2	6	12	18	24	30
		3	9	18	27	36	45
		4	12	24	36	48	60
5		15	30	45	60	75	
Frequent Event: Occurs more than once a year	Probability/Frequency	Consequence/Severity					
	Value	4	1	2	3	4	5
	Vulnerability	1	4	8	12	16	20
		2	8	16	24	32	40
		3	12	24	36	48	60
		4	16	32	48	64	80
5		20	40	60	80	100	

The hazard scores from the Hazard Ranking Matrix were compared to the hazard rank criteria to finally categorize each hazard with a hazard ranking. The table below provides the value determinations for each hazard ranking.

Risk Rank Categorization	
High Hazard	50 to 100
Moderately High Hazard	25 to 49
Moderate Hazard	15 to 24
Moderately Low Hazard	5 to 14
Low Hazard	1 to 4

The hazard ranking worksheets are provided in the following pages.

HAZARD IDENTIFICATION AND RISK RANKING

Flood

Hazard Rank Factors	Hazard Factor Description	Rank
Probability	Regular event - occurs between once a year and once every 7 years	3
Consequence	Moderate building damage, minor loss of lifelines (less than 12 hours), lost time injury but no disability	3
Vulnerability	Localized damage area, minor secondary impacts, delayed hazard onset	3
Risk	Moderate	27
Comments	Overbanking is more likely as the result of storm rains. It was mentioned that Flood Protection is a major service of Zone 7 and the team decided to include Flooding as part of this identified hazard. 2017 - bank damages as a result of excessive rains.	

Drought

Hazard Rank Factors	Hazard Factor Description	Rank
Probability	Infrequent event - occurs between once every 8 years and once every 50 years (inclusive)	3
Vulnerability	Moderate building damage, minor loss of lifelines (less than 12 hours), lost time injury but no disability	3
Consequence	Localized damage area, minor secondary impacts, delayed hazard onset	3
Risk	Moderate	27
Comments	As a water service provider, drought is a significant hazard to Zone 7. Droughts can impact incoming water supplies and result in water shortages for Zone 7's customers.	

Wildfire

Hazard Rank Factors	Hazard Factor Description	Rank
Probability	Infrequent event - occurs between once every 8 years and once every 50 years (inclusive)	2
Consequence	Extensive building damage, widespread loss of lifelines (water, gas, electricity, sanitation, roads), loss of life	4
Vulnerability	Localized damage area, minor secondary impacts, delayed hazard onset	3
Risk	Moderately Low	24
Comments	In 2020, the SCU Lightning Complex Fire came close to the WTP. Sedimentation from burned areas in the watershed impacted water quality.	

Earthquake

Hazard Rank Factors	Hazard Factor Description	Rank
Probability	Regular event - occurs between once a year and once every 7 years	2
Consequence	Moderate building damage, lifeline loss (less than 24 hours), severe injury or disability	4
Vulnerability	Localized damage area, minor secondary impacts, delayed hazard onset	3
Risk	Moderately Low	24
Comments	None.	

Infrastructure Failure

Hazard Rank Factors	Hazard Factor Description	Rank
Probability	Infrequent event - occurs between once every 8 years and once every 50 years (inclusive)	2
Consequence	Moderate building damage, minor loss of lifelines (less than 12 hours), lost time injury but no disability	3
Vulnerability	Moderate damage area, moderate secondary impacts, moderate warning time	4
Risk	Moderately Low	24
Comments	2017 - bank damages as a result of excessive rains.	

Water Contamination

Hazard Rank Factors	Hazard Factor Description	Rank
Probability	Rare event - occurs less than once every 50 years	1
Consequence	Moderate building damage, lifeline loss (less than 24 hours), severe injury or disability	4
Vulnerability	Moderate damage area, moderate secondary impacts, moderate warning time	4
Risk	Moderately Low	16
Comments		

Terrorism/ Adversarial Events

Hazard Rank Factors	Hazard Factor Description	Rank
Probability	Rare event - occurs less than once every 50 years	1
Consequence	Extensive building damage, widespread loss of lifelines (water, gas, electricity, sanitation, roads), loss of life	5
Vulnerability	Localized damage area, minor secondary impacts, delayed hazard onset	3
Risk	Moderately Low	15
Comments		

Utility Loss

Hazard Rank Factors	Hazard Factor Description	Rank
Probability	Infrequent event - occurs between once every 8 years and once every 50 years (inclusive)	2
Consequence	Minor/slight damage to buildings and structures, no loss of lifelines, first aid injury and no disability	2
Vulnerability	Localized damage area, minor secondary impacts, delayed hazard onset	3
Risk	Moderately Low	12
Comments	PG&E's 2020 PSPS shut off multiple wells. Since then, PG&E will split the system up so smaller regions are impacted. Surface water Treatment plants have full standby power.	

Dam Failure

Hazard Rank Factors	Hazard Factor Description	Rank
Probability	Infrequent event - occurs between once every 8 years and once every 50 years (inclusive)	2
Consequence	Minor/slight damage to buildings and structures, no loss of lifelines, first aid injury and no disability	2
Vulnerability	Localized damage area, minor secondary impacts, delayed hazard onset	3
Risk	Moderately Low	9
Comments	Several DWR Dams have the potential to impact Zone 7 if they failed. Both from a flooding and water supply standpoint.	

D PUBLIC PARTICIPATION & PLANNING PROCESS DOCUMENTATION

To facilitate the development of a Hazard Mitigation Plan that includes valuable input from the community, the Zone 7 Water Agency (Zone) solicited public participation in a survey posted on the Zone’s website. The survey included 11 questions designed to provide insight into the community’s opinion on perceived vulnerability for certain hazard events, to clarify which methods the community prefers to receive educational and outreach materials, and to illustrate the participants’ overall level of hazard awareness.



D.1 Survey Contents and Responses

This section includes the survey questions followed by the responses received. Over a period of several weeks, the Zone received 6 responses from the public. Those responses were tabulated and listed below.

- In the past five years, have you or someone in your household experienced a disaster such as an earthquake, severe windstorm, flood, Utility Loss, or other type of disaster?**

Yes	No	No Answer	Total
2	4	0	6

- If yes, which of these disasters have you or someone in your household experienced?**

- Earthquake
- Severe Windstorm
- Flood
- Utility Loss
- Other: _____

Hazard	Number
Earthquake	0
Severe Windstorm	1
Flood	1
Utility Loss	1
Other: Infrastructure Failure	1

3. How concerned are you about the following disasters affecting the area?

Hazard	Completely Unconcerned (1)	Moderately Unconcerned (2)	Concerned (3)	Moderately Concerned (4)	Extremely Concerned (5)
Flood/Severe Storm	1	0	2	0	2
Drought	1	1	2	1	1
Wildfire	2	0	2	1	1
Earthquake	1	0	2	2	1
Infrastructure Failure	0	2	1	1	1
Water Contamination	0	0	2	2	1
Terrorism	2	1	2	0	0
Utility Loss		1	3	0	2
Dam Failure	1	1	2	0	1

The results for each hazard were averaged and then ranked highest to lowest. The result was the following hazard ranking based on the participants' responses.

Table D-1: Participant Hazard Ranking

Hazard	Average Level of Concern
Flood/Severe Storm	3.40

Hazard	Average Level of Concern
Drought	3.00
Wildfire	2.83
Earthquake	3.33
Infrastructure Failure	3.20
Water Contamination	3.80
Terrorism	2.00
Utility Loss	3.50
Dam Failure	2.80

4. Have you ever received or requested information on ways to make your family and/or home safer from local hazards?

Yes	No	No Answer	Total
3	3	0	6

5. How recently did you receive this information?

- Within the last 6 months
- Between 6 and 12 months ago
- Between 1 and 2 years ago
- Between 2 and 5 years ago
- 5 years ago or more
- I don't remember

Timeframe	Number	Timeframe	Number
Within the last 6 months	2	5 years ago or more	0
Between 6 and 12 months ago	0	I don't remember	0
Between 1 and 2 years ago	1	-	-

Note: This is based on the 3 respondents who answered "yes" to Question 4.

6. From whom did you last receive this information?

- News Media
- Government Agency
- Insurance Agent or Company
- Utility Company
- American Red Cross
- Other Non-profit Organization
- Unsure
- Other: _____

Information Source	Number	Information Source	Number
News Media	0	American Red Cross	0
Government Agency	1	Other Non-profit Organization	0
Insurance Agent or Company	0	Unsure	1
Utility Company	0	Other: (Fire Dept., Books, Internet)	1

7. What are the best ways for you to receive information about making your family and home safer from local disasters? (Please check all that apply)

Newspapers:

- Newspaper stories
- Newspaper ads

Television:

- Television news
- Television ads

Radio:

- Radio news
- Radio ads

Other methods:

- Zone 7 website
- Schools

- Outdoor advertisements (billboards, etc.)
- Books
- Mail
- Fire Department/Rescue
- Internet search
- Fact sheet or brochure available at a city facility or event
- Public workshop/meeting
- Magazine
- Other (please explain)

The following table illustrates the number of responses for each information source listed from highest number of responses.

Information Source	Number	Information Source	Number
Mail	4	Radio ads	1
Newspaper stories	0	Schools	0
Zone website	0	Fire Department/Rescue	1
Internet search	4	Newspaper ads	0
Television news	1	Public workshop/meeting	1
Fact sheet or brochure available at a city facility or event	3	Other: (social media, email, Neighborhood watch program, brochure mailed to homes)	2
Television ads	1	Books	0
Radio news	1	Magazine	0
Outdoor advertisements (billboards, etc.)	1		

8. What steps, if any, have you or someone in your household taken to prepare for a disaster? (Check all that apply)

Our household has an emergency supply with the following:

- Food
- Water
- Flashlight(s)
- Batteries
- Battery-powered radio
- Medical supplies (First aid kit)
- Fire extinguisher
- Moist towelettes, garbage bags and plastic ties for personal sanitation
- Dust mask or cotton t-shirt (for air filtering)
- Plastic sheeting and duct tape (to shelter in-place)
- Wrench or pliers to shut off utilities
- Clothing
- Sleeping bag or warm blanket for each person

- Prescription medications
- Important family documents (copies of insurance policies, ID and bank account records)
- Other (please specify)

Our household has:

- Smoke detectors in each room of the house
- Received First Aid/CPR Training
- Made a fire escape plan
- Developed a reconnection plan: (where to go and who to call after a disaster)
- Discussed utility shutoffs
- Other: _____

The following table illustrates the number of responses for each disaster preparation action listed by total number of responses.

Emergency Supply Item	Number	Disaster Preparedness Action	Number
Food	4	Dust mask or cotton t-shirt	4
Water	3	Plastic sheeting and duct tape	1
Flashlight(s)	4	Wrench or pliers	5
Batteries	4	Clothing	2
Battery-powered radio	1	Sleeping bag or warm blanket	2
Medical supplies	3	Prescription medications	2
Fire extinguisher	5	Important family documents	2
Moist towelettes, garbage bags and plastic ties	3	Other: (fuel, water purification, tents, lantern)	0

The following table illustrates the number of responses for each disaster preparation action listed by total number of responses.

Disaster Preparedness Action	Number	Emergency Supply Item	Number
Smoke detectors in each room of the house	5	Developed a reconnection plan	4
Received First Aid/CPR Training	2	Discussed utility shutoffs	2
Made a fire escape plan	0	Other:	0

9. Do you live in the Zone 7 Water Agency Service Area (Pleasanton, Livermore, Dublin, Sunol or unincorporated eastern Alameda County)?

Yes	No	No Answer	Total
6	0	0	6

Note: Those that responded "no" continued to question 12

10. How many years?

Years of Residence			
0-15	1	36-45	0
16-25	3	46-55	1
26-35 years	1	55+ years	0

The years of residence for each participant ranges from 5 year to 50 years. The average length of residence among participants was 24.67 years with the majority of responders falling into the 16-25 years' residency range.

11. Do you own or rent your home?

Rent	Own	No Answer	Total
0	6	0	6

D.2 Inferences

The results of the public survey served three main purposes. It created a profile of the group of responders, provided insight regarding the methods the public would like to receive safety information, and, lastly, it provided the Steering Committee with the public's opinion of the hazard ranking. Conclusions drawn from the collected responses for each of these areas are discussed in more detail in the following subsections.

Participant Profile

It was important for the Steering Committee to identify certain characteristics of the participating group in order to give proper weight to the feedback received. First, since all participants were residents of the Zone 7 Service area, they were asked about their years of residence, and whether they owned or rented their home. With regards to years of residence, the assumption was made that those who had lived in the Zone service area over a long period of time would have a better understanding of the hazards that have affected the region historically. The Steering Committee assumed homeowners would take more interest in their community than renters due to higher personal investment in the long-term stability and functionality of the region. Survey results demonstrated the majority of participating residents had lived in the area for more than 10 years. Additionally, almost 70% percent had not experienced a disaster event in the last 5 years.

Based on this information, the Steering Committee decided that the individual responses may have demonstrated special knowledge of the region and proved to have a good understanding of the vulnerability of the service area to specific hazards. A basic knowledge of the region can be assumed as more than 80% of the participants had been residents for more than a decade.

Next, the Steering Committee wanted to assess whether the participating group had actively tried to mitigate hazards in their own homes. An assumption was made that those who took a proactive role in mitigating hazards individually would have a better understanding of the Zone's efforts to mitigate the effects of a regional hazard. Survey results showed over 80 percent of the participants had taken steps to prepare themselves for a disaster. In doing so, this demonstrated to the Steering Committee that the participating group was conscious of the threat of hazard events and were proactive about taking steps to mitigate loss. Coupled with their basic knowledge of the service area's vulnerabilities, the Steering Committee determined the feedback from the participating

group was most likely credible and beneficial to the Hazard Mitigation Plan update process.

Methods for Successful Public Outreach

For nearly every hazard identified by the Steering Committee, public education and outreach serves as one of the main ways to mitigate future losses. While the Zone already has many outreach campaigns in place, the Steering Committee decided it would be useful for the public to comment on which information distribution methods were best for receiving information. The data provided from this line of questioning will allow the Zone to maximize its outreach efforts by utilizing those methods provided by the public to guide future outreach campaign planning.

As outlined in question 4, 50 percent of participants had received or requested safety information regarding local hazards. This number is lower than the 83 percent who said they took steps in their homes to protect themselves against disasters. Therefore, a large number of the participating group took preventive actions without requesting information from local authorities. The Steering Committee discussed potential reasons for the difference in responses including: common knowledge surrounding the threat of some hazards and concern supported by hazards experienced outside the Zone. While this data tells us little about the best ways to reach the public, it provided a little more insight into the participating group profile.

According to the survey results, the primary method participants would like to receive safety information is through mailings. Other methods that received strong support from the public were internet searches, fact sheets or brochures available at a public facility or event, and social media. The Steering Committee discussed how the average age of survey responders, based on assumptions that used years of residency and homeownership to estimate the age of participants, that the survey may be demonstrating a culture shift as younger residents, who might typically prefer electronic communication, become more prominent in the demographic for service area residents. Future outreach campaigns within the Zone will consider using mail and fact sheets or brochures at public facilities along with internet data and social media to reach the public.

Participants were also asked how recently they had received safety information whether through outreach or personal research. The question was intended to determine how current the emergency information was, which was obtained by participants. Instead, the survey results showed that, consistently, only 50 percent of survey participants receive safety information at any given time. The Steering Committee is conscious that this percentage is less than ideal for overall outreach efforts and discussed the reasons for the survey results. One reason might be that the methods of public outreach are not aligned

with the public’s preferred communication methods. It is apparent that mail and the internet are the primary sources that the public rely on to get information. Therefore, the Steering Committee decided this data illuminated an area of improvement for the Zone. Future outreach efforts will focus on reaching a higher percentage of the community through mail and the internet, whether that be data online or through social media.

Hazard Profiling

To fulfill FEMA’s requirement to include the public in the planning process, the survey participants were asked to rank the hazards identified in the first Steering Committee meeting. The participants ranked the hazards based on their level of concern. The results were tallied and organized greatest to least to create a public hazard ranking. The list created by the Steering Committee and the Public ranking were reviewed side by side as shown below.

Steering Committee Hazard Ranking	Survey Participant Hazard Ranking
Flood/Severe Storm	Water Contamination
Drought	Utility Loss
Wildfire	Flood/Severe Storm
Earthquake	Earthquake
Infrastructure Failure	Infrastructure Failure
Water Contamination	Drought
Terrorism/Adversarial Events	Wildfire
Utility Loss	Dam Failure
Dam Failure	Terrorism

The Steering Committee reviewed the two hazard rankings and considered the difference between each list. The Steering Committee found that those hazards which affected individuals received the highest ranking from the public while the Steering Committee gave a higher ranking to hazards with the most perceived vulnerability to Zone 7 as a whole. The Steering Committee discussed several potential reasons for the differences in

perceived vulnerability. One of the main reasons may be that the public might only be privy to hazard information that affects them directly or that is publicized by the media. For example, water contamination and utility loss are ranked as the top areas of concern by the public, whereas they are ranked much lower by the Steering Committee. Asking about a personal level of concern may have led participants to reflect only on their personal safety rather than the vulnerability of the entire agency. With this in mind, the Steering Committee resolved to use the public's ranking as a guide to which mitigation actions would be well received by the community. The Steering Committee assumed when Zone 7 implements mitigation measures for hazards which present the highest level of concern, the action will lessen the magnitude of concern and will therefore be viewed favorably by the public. The Steering Committee intends for Zone 7 to use this information as a way to include the public's opinion as it continues to implement new mitigation measures.

D.3 Planning Process

As described in Chapter 1, Zone 7 personnel made extensive efforts to garner participation from internal and external stakeholders in order to develop a more robust plan. The following are a list of individuals who were invited to participate in the update process to provide perspectives from local agencies, planners, emergency response, local businesses, non-profits, academia, and more. The mutli-faceted approach was intended to create a steering committee that could provide a well-rounded view of regional hazards and vulnerable populations. Although all these individuals could not attend, the following is intended to document Zone 7's effort to include a diverse group in the update process.

The remainder of this section provides additional information and supporting documentation about the planning process implemented by the Steering Committee to update the Hazard Mitigation Plan. For descriptions of the content of each Steering Committee meeting, please refer to Chapter 1.

Table: Potential Stakeholders for Hazard Mitigation Plan Update Steering Committee

Affiliation	Title	Stakeholder Category
City of Dublin	Community Development Director	Neighboring communities ⁽²⁾ , Person with authority to regulate development
Risk Management Professionals	Project Coordinator	Consultant
CityServe of the Tri-Valley	Chief Executive Officer	Non-profit organization ⁽¹⁾
Zone 7 Water Agency	Water Resources Planner	Person with ability to impact Zone 7 capital projects/ development
Alameda County Fire Department	Emergency Preparedness Manager	Neighboring communities ⁽²⁾ , Person with authority to regulate development
City of Pleasanton	Community Development Director	Neighboring communities ⁽²⁾ , Person with authority to regulate development
City of Pleasanton	Planning and Permit Center Manager	Neighboring communities ⁽²⁾ , Person with authority to regulate development
City of Pleasanton	Environmental Services Manager	Neighboring communities ⁽²⁾ , Person with authority to regulate development
Cedar Grove Community Church	Executive Director	non-profit organization ⁽¹⁾
Temple Beth Emek	Educational Director	Representative of academia, non-profit organization ⁽¹⁾
Zone 7 Water Agency	Financial Analyst	Local and regional agencies involved in hazard mitigation

Affiliation	Title	Stakeholder Category
Zone 7 Water Agency	Operations Manager	Local and regional agencies involved in hazard mitigation
Zone 7 Water Agency	Financial Analyst	Local and regional agencies involved in hazard mitigation
Livermore-Pleasanton Fire Department	Emergency Preparedness Manager	Neighboring communities ⁽²⁾ , Person with authority to regulate development
Alameda County Sheriff's Office	Sr. Emergency Services Coordinator	Neighboring communities ⁽²⁾
City of Livermore Chamber of Commerce	Director of Member Services	Representative of Local businesses
Alameda County	Assistant Planning Director	Neighboring communities ⁽²⁾ , Person with authority to regulate development
California Water Service	Conservation Coordinator	Neighboring communities
Zone 7 Water Agency	Maintenance Manager	Local and regional agencies involved in hazard mitigation
Zone 7 Water Agency	Groundwater/ Integrated Planning Manager	Person with ability to impact Zone 7 capital projects/ development
Zone 7 Water Agency	Principal Engineer	Person with ability to impact Zone 7 capital projects/ development
Dublin San Ramon Services District	Clean Water Administrator	Neighboring communities

Affiliation	Title	Stakeholder Category
Zone 7 Water Agency	Water Resources Planner	Person with ability to impact Zone 7 capital projects/development
Zone 7 Water Agency	Water Resources Planner	Person with ability to impact Zone 7 capital projects/development
County of Alameda General Services Agency	Environmental Department Capital Program	Neighboring communities, Person with authority to regulate development
Zone 7 Water Agency	Associate Civil Engineer	Person with ability to impact Zone 7 capital projects/development
Alameda County Fire Department	Public Education Assistant	Neighboring communities ⁽²⁾
City of Livermore	Water Resources Division Manager	Neighboring communities
City of Livermore	Planning Manager	Neighboring communities ⁽²⁾ , Person with authority to regulate development
Zone 7 Water Agency	Associate Civil Engineer	Person with ability to impact Zone 7 capital projects/development
Las Positas College	Director Student Equity & Success	Representative of academia
City of Pleasanton Chamber of Commerce	Events & Communications Manager	Representative of Local businesses
Zone 7 Water Agency	Associate Geologist	Local and regional agencies involved in hazard mitigation

(1) Note: Non-profit organizations were selected as a result of the support they provide to the identified socially vulnerable populations, this may include, but is not limited to the elderly, youth, unhoused, physical/mentally handicapped, the unhoused, and the economically disadvantaged.

(2) Note: Zone 7 does not interface directly with the public due to their position as a wholesale water provider. Representatives retail customer agencies were asked to provide guidance for those more prone to identified hazards and the socially vulnerable.

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**Zone 7 Water Agency
HAZARD MITIGATION PLAN -
Steering Committee Meeting #1**

February 23, 2023

Name	Company	Position	Email Address	Phone #
Michael Wells	Zone 7	Went. Manager	Mike Wells @ Zone 7 Water.com	925-332-9888
Rick Gould	Z7	Ops Manager	rgould@zone7water.com	925519 3109
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Name	Company	Position	Email Address	Phone #
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ZONE 7 WATER AGENCY HAZARD MITIGATION PLAN

STEERING COMMITTEE #1

Ryan Bray

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DISCUSSION TOPICS

- Project Overview and Background
- Planning Team Goals
- Risk Assessment & Hazard Ranking
- Goals and Objectives

PROJECT OVERVIEW

DISASTER MITIGATION ACT OF 2000

- Revitalized Federal Planning Requirements
 - State and Local Hazard Mitigation Plans
 - Plans must be updated every five years
- Federal Grant Funding Eligibility
 - Hazard Mitigation Grant Program (HMGP)
 - Pre-Disaster Mitigation Program (PDM)
- Disaster Mitigation Act of 2000 is intended to facilitate cooperation between state and local authorities on risk reduction measures and to expedite funding allocation



FEMA

PUBLIC PROCESS

- DMA 2000 Stresses Public Participation
 - An open public involvement process that is comprehensive, starts early and continuous
 - Coordination with neighboring communities and various interest groups in Plan development

CLIMATE CHANGE

- California Adaptation Planning Guide (APG) Revised 2020
- APG released in response to several Executive Orders encouraging research of and response to climate change
- Zone 7 is located in the Bay Area Region and should consider the following hazards
 - Increased Temperatures
 - Reduced Precipitation
 - Sea Level Rise
 - Public Health (heat and air quality)
 - Reduced Agricultural Productivity
 - Inland Flooding
 - Reduced Flooding



PLANNING TEAM GOALS



Review existing Plan for implementation



Review the list of potential hazards and add additional hazards for the revision



Determine the hazard impacts throughout the Service Area



Interface with partner agencies to determine existing mitigation measures



Develop possible approaches to projects which will reduce the impacts



Prioritize mitigation projects for implementation

RISK ASSESSMENT METHODOLOGY

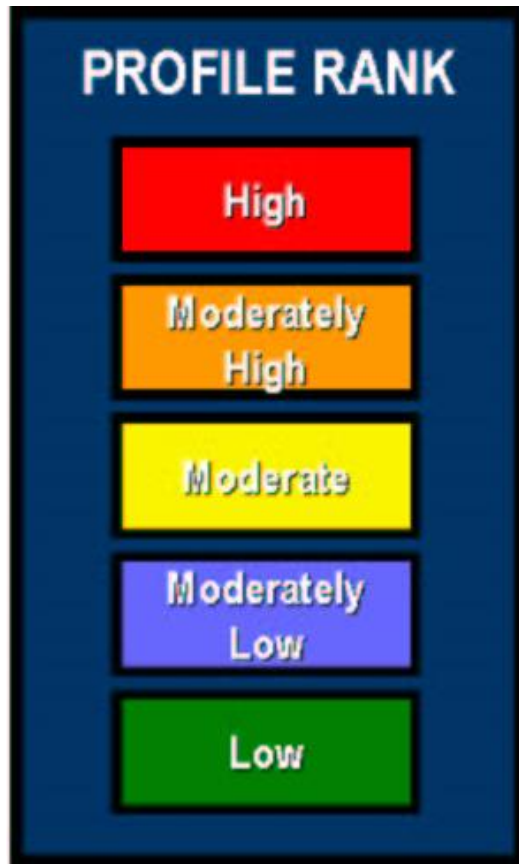
RISK ASSESSMENT – POTENTIAL HAZARDS

- Landslide
- Earthquake
- Wildfire
- Infrastructure Failure
- Drought
- Utility Loss/Public Safety
Power Shut Off
- Flood/Dam Failure
- Adversarial/Human
Caused Events
- Infectious Disease
- Tsunami
- Other?

RISK ASSESSMENT – CLIMATE CHANGE HAZARDS

- Increased Temperatures
- Reduced Precipitation
- Sea Level Rise
- Reduced Tourism
- Reduced Water Supply
- Wildfire Risk
- Public Health – heat and air quality
- Coastal Erosion

RISK RANK METHODOLOGY



- The risk ranking is facilitated using an automated interactive software spreadsheet program that asks specific questions on potential hazards and then assigns a relative value to each potential hazard accordingly.
- The result of the workshop will be a ranked list of hazards to be studied in detail in the Hazard Mitigation Plan.

HAZARD IDENTIFICATION AND RISK RANKING			
1			
2	Hazard Rank Factors	Hazard Factor Description	Rank
3	Earthquake	Probability/Frequency	0
4		Consequence/Severity	0
5		Vulnerability	0
6		Risk Rank	0
7		Comments	Probability/Frequency Infeasible event - not applicable due to geographic location characteristics Rare event - occurs less than once every 50 years Infrequent event - occurs between once every 8 years and once every 50 years (inclusive) Regular event - occurs between once a year and once every 7 years Frequent event - occurs more than once a year
8			
9	Hazard Rank Factors	Hazard Factor Description	Rank
10	Wildfire	Probability	0
11		Vulnerability	0
12		Consequence	0
13		Risk Rank	Not a Hazard
14		Comments	
15			
16	Hazard Rank Factors	Hazard Factor Description	Rank
17		Probability	0
18		Vulnerability	0
19		Consequence	0

HAZARD RANKING WORKSHEET

RISK RANKING – PROBABILITY/ FREQUENCY

- Recurrence Interval – Prediction of how often a hazard will occur in the future, including projected return intervals

Probability/Frequency Rank Descriptors	Rank
Infeasible event - not applicable due to geographic location characteristics	0
Rare event - occurs less than once every 50 years	1
Infrequent event - occurs between once every 8 years and once every 50 years (inclusive)	2
Regular event - occurs between once a year and once every 7 years	3
Frequent event - occurs more than once a year	4

RISK RANKING – CONSEQUENCE/ SEVERITY

- Physical Damage – Structures and lifelines
- Economic Impact – Loss of power, water, sanitation, roads, etc.

Consequence/ Severity Rank Descriptors	Rank
No damage	1
Minor/slight damage to buildings and structures, no loss of lifelines, first aid injury and no disability	2
Moderate building damage, minor loss of lifelines (less than 12 hours), lost time injury but no disability	3
Moderate building damage, lifeline loss (less than 24 hours), severe injury or disability	4
Extensive building damage, widespread loss of lifelines (water, gas, electricity, sanitation, roads), loss of life	5

RISK RANKING – VULNERABILITY

- Impact Area – Area impacted by a hazard event
- Secondary Impacts – Capability of triggering additional hazards
- Onset - Period of time between initial recognition of an approaching hazard and when the hazard begins to impact the community

Vulnerability Rank Descriptors	Rank
No physical damage, no secondary impacts	1
Localized damage area	2
Localized damage area, minor secondary impacts, delayed hazard onset	3
Moderate damage area, moderate secondary impacts, moderate warning time	4
Widespread damage area, significant secondary impacts, no warning time	5

RISK RANKING MATRIX

Probability/Frequency Description	Risk Ranking Matrix						
Rare Event: Occurs less than once every 50 years	Probability/Frequency		Consequence/Severity				
	Value	1	1	2	3	4	5
	Vulnerability	1	1	2	3	4	5
		2	2	4	6	8	10
		3	3	6	9	12	15
		4	4	8	12	16	20
5		5	10	15	20	25	
Infrequent Event: Occurs between once every 8 years and once every 50 years (inclusive)	Probability/Frequency		Consequence/Severity				
	Value	2	1	2	3	4	5
	Vulnerability	1	2	4	6	8	10
		2	4	8	12	16	20
		3	6	12	18	24	30
		4	8	16	24	32	40
5		10	20	30	40	50	
Regular Event: Occurs between once a year and once every 7 years	Probability/Frequency		Consequence/Severity				
	Value	3	1	2	3	4	5
	Vulnerability	1	3	6	9	12	15
		2	6	12	18	24	30
		3	9	18	27	36	45
		4	12	24	36	48	60
5		15	30	45	60	75	
Frequent Event: Occurs more than once a year	Probability/Frequency		Consequence/Severity				
	Value	4	1	2	3	4	5
	Vulnerability	1	4	8	12	16	20
		2	8	16	24	32	40
		3	12	24	36	48	60
		4	16	32	48	64	80
5		20	40	60	80	100	

MITIGATION GOALS & OBJECTIVES

PREVIOUS PLAN GOALS

1

Protect Life and
Property

2

Improve
Emergency
Services and
Management
Capability

3

Protect the
Environment

4

Promote Public
Awareness and
Outreach

CONTACT INFORMATION

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1. Summary

Meeting title	LHMP - Steering Committee Meeting #2	
Attended participants		11
Start time	3/20/23, 9:45:05 AM	
End time	3/20/23, 11:26:36 AM	
Meeting duration	1h 41m 30s	
Average attendance time	1h 27m 10s	

2. Participants

Name	First Join	Last Leave
Ryan Bray	3/20/23, 9:45:35 AM	3/20/23, 11:26:29 AM
Padway, Kevin	3/20/23, 9:45:41 AM	3/20/23, 11:26:25 AM
Carney, James	3/20/23, 9:46:38 AM	3/20/23, 11:26:25 AM
Segura, Sal	3/20/23, 9:58:23 AM	3/20/23, 11:26:36 AM
Winey, Colleen	3/20/23, 9:59:32 AM	3/20/23, 11:26:26 AM
Foss, Elizabeth	3/20/23, 10:00:33 AM	3/20/23, 11:26:23 AM
Green, JaVia	3/20/23, 10:00:41 AM	3/20/23, 11:26:24 AM
Gould, Rich	3/20/23, 10:00:51 AM	3/20/23, 11:26:22 AM
Rank, Elke	3/20/23, 10:01:21 AM	3/20/23, 11:26:22 AM
Olmsted, Mona	3/20/23, 10:01:36 AM	3/20/23, 11:26:25 AM
Tang, Jeff	3/20/23, 10:19:02 AM	3/20/23, 11:26:22 AM

3. In-Meeting Activities

Name	Join Time	Leave Time
Ryan Bray	3/20/23, 9:45:35 AM	3/20/23, 11:26:29 AM
Padway, Kevin	3/20/23, 9:45:41 AM	3/20/23, 11:26:25 AM
Carney, James	3/20/23, 9:46:38 AM	3/20/23, 10:27:18 AM
Carney, James	3/20/23, 10:39:14 AM	3/20/23, 11:26:25 AM
Segura, Sal	3/20/23, 9:58:23 AM	3/20/23, 11:26:36 AM
Winey, Colleen	3/20/23, 9:59:32 AM	3/20/23, 11:26:26 AM
Foss, Elizabeth	3/20/23, 10:00:33 AM	3/20/23, 11:26:23 AM
Green, JaVia	3/20/23, 10:00:41 AM	3/20/23, 11:26:24 AM
Gould, Rich	3/20/23, 10:00:51 AM	3/20/23, 11:26:22 AM
Rank, Elke	3/20/23, 10:01:21 AM	3/20/23, 11:26:22 AM
Olmsted, Mona	3/20/23, 10:01:36 AM	3/20/23, 11:26:25 AM
Tang, Jeff	3/20/23, 10:19:02 AM	3/20/23, 11:26:22 AM

In-Meeting Duration	Email	Participant ID (UPN)	Role
1h 40m 54s	ryan.bray@rmppcorp.com	ryan.bray@rmppcorp.com	Organizer
1h 40m 43s	kpadway@zone7water.com	kpadway@zone7water.com	Presenter
1h 27m 50s	jcarney@zone7water.com	jcarney@zone7water.com	Presenter
1h 28m 13s	ssegura@zone7water.com	ssegura@zone7water.com	Presenter
1h 26m 54s	cwiney@zone7water.com	cwiney@zone7water.com	Presenter
1h 25m 50s	efoss@zone7water.com	efoss@zone7water.com	Presenter
1h 25m 42s	jgreen@zone7water.com	jgreen@zone7water.com	Presenter
1h 25m 31s	rgould@zone7water.com	rgould@zone7water.com	Presenter
1h 25m 1s	erank@zone7water.com	erank@zone7water.com	Presenter
1h 24m 49s	molmsted@zone7water.com	molmsted@zone7water.com	Presenter
1h 7m 19s	jtang@zone7water.com	jeff@zone7water.com	Presenter

Duration	Email	Role
1h 40m 54s	ryan.bray@rmppcorp.com	Organizer
1h 40m 43s	kpadway@zone7water.com	Presenter
40m 39s	jcarney@zone7water.com	Presenter
47m 11s	jcarney@zone7water.com	Presenter
1h 28m 13s	ssegura@zone7water.com	Presenter
1h 26m 54s	cwiney@zone7water.com	Presenter
1h 25m 50s	efoss@zone7water.com	Presenter
1h 25m 42s	jgreen@zone7water.com	Presenter
1h 25m 31s	rgould@zone7water.com	Presenter
1h 25m 1s	erank@zone7water.com	Presenter
1h 24m 49s	molmsted@zone7water.com	Presenter
1h 7m 19s	jtang@zone7water.com	Presenter



ZONE 7 WATER AGENCY HAZARD MITIGATION PLAN

STEERING COMMITTEE #2

Ryan Bray

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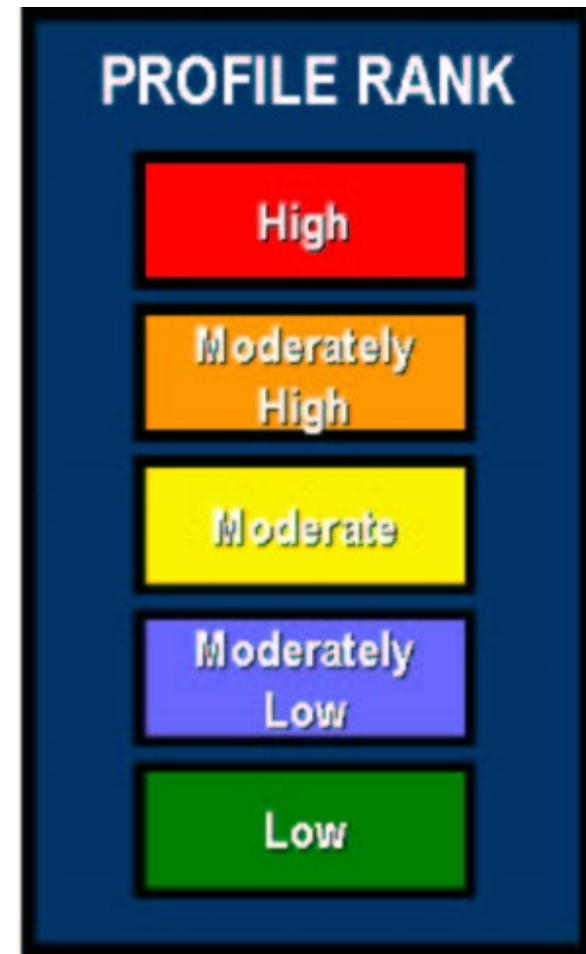
DISCUSSION TOPICS

- Review Hazard Rankings
- HMP Goals and Objectives
- Review and Update Asset Inventory List

HAZARD RANKING REVIEW

RISK RANKING METHODOLOGY

- The risk ranking is facilitated using an automated interactive software spreadsheet program that asks specific questions on potential hazards and then assigns a relative value to each potential hazard accordingly.
- The result of the exercise was a ranked list of hazards to be studied in detail in the Hazard Mitigation Plan.



RISK RANKING METHODOLOGY

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C3 fx

HAZARD IDENTIFICATION AND RISK RANKING			
1			
2	Hazard Rank Factors	Hazard Factor Description	Rank
3	Earthquake	Probability/Frequency	0
4		Consequence/Severity	0
5		Vulnerability	0
6		Risk Rank	0
7		Comments	Infeasible event - not applicable due to geographic location characteristics Rare event - occurs less than once every 50 years Infrequent event - occurs between once every 8 years and once every 50 years (inclusive) Regular event - occurs between once a year and once every 7 years Frequent event - occurs more than once a year
8			
9	Hazard Rank Factors	Hazard Factor Description	Rank
10	Wildfire	Probability	0
11		Vulnerability	0
12		Consequence	0
13		Risk Rank	Not a Hazard
14		Comments	
15			
16	Hazard Rank Factors	Hazard Factor Description	Rank
17	Flood	Probability	0
18		Vulnerability	0
19		Consequence	0
20		Risk Rank	Not a Hazard
		Comments	

Risk Ranking Matrix Risk Ranking Worksheet/ Ready

start Microsoft Excel - La H... C:\Documents and Se... Microsoft PowerPoint ... 10:12 AM

RISK RANKING METHODOLOGY

Probability/Frequency Description	Risk Ranking Matrix						
Rare Event: Occurs less than once every 50 years	Probability/Frequency		Consequence/Severity				
	Value	1	1	2	3	4	5
	Vulnerability	1	1	2	3	4	5
		2	2	4	6	8	10
		3	3	6	9	12	15
		4	4	8	12	16	20
5		5	10	15	20	25	
Infrequent Event: Occurs between once every 8 years and once every 50 years (inclusive)	Probability/Frequency		Consequence/Severity				
	Value	2	1	2	3	4	5
	Vulnerability	1	2	4	6	8	10
		2	4	8	12	16	20
		3	6	12	18	24	30
		4	8	16	24	32	40
5		10	20	30	40	50	
Regular Event: Occurs between once a year and once every 7 years	Probability/Frequency		Consequence/Severity				
	Value	3	1	2	3	4	5
	Vulnerability	1	3	6	9	12	15
		2	6	12	18	24	30
		3	9	18	27	36	45
		4	12	24	36	48	60
5		15	30	45	60	75	
Frequent Event: Occurs more than once a year	Probability/Frequency		Consequence/Severity				
	Value	4	1	2	3	4	5
	Vulnerability	1	4	8	12	16	20
		2	8	16	24	32	40
		3	12	24	36	48	60
		4	16	32	48	64	80
5		20	40	60	80	100	

RISK RANKING

Rank	Score
High	
Moderately High	
Moderate	
Flood/ Severe Storm	27
Drought	27
Moderately Low	
Wildfire	24
Earthquake	24
Infrastructure Failure	24
Water Contamination	16
Terrorism/ Adversarial Events	15
Utility Loss	12
Dam Failure	12
Low	

MITIGATION GOALS & OBJECTIVES



GOALS & OBJECTIVES

- Review Previous HMP Goals and Objectives
- Engage in discussions to review and develop Goals and Objectives specific to the needs of Zone 7

PREVIOUS PLAN GOALS

1

Protect Life and
Property

2

Improve
Emergency
Services &
Management
Capability

3

Protect the
Environment

4

Promote Public
Awareness &
Outreach

NEXT STEPS...

ASSET INVENTORY

Review Asset Inventory

- Types and number of existing and future buildings
- Infrastructure
- Critical Facilities

Loss Estimates

- Review each asset category and assign potential percentage of damage expected due to each identified hazard

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1. Protect Life and Property

- *Strategy 1a:* Implement activities that assist in protecting lives and property by making infrastructure more resistant to losses from hazards.
- *Strategy 1b:* Enhance infrastructure plans and improvement projects to include hazard mitigation concepts, goals and objectives to reduce losses due to hazards

2. Improve Effectiveness of Emergency Operations

- *Strategy 2a:* Strengthen emergency operations by increasing collaboration and coordination among public agencies (Cities, DWR), citizens, nonprofit organizations, utility providers, and businesses within the service area.
- *Strategy 2b:* Prepare Zone 7 staff to efficiently support emergency operations and inter-agency coordination.

3. Protect the Environment

- *Strategy 3a:* Enhance environmental stewardship by implementing water supply and flood protection solutions in an environmentally sensitive way for new and existing infrastructure.
- *Strategy 3b:* Incorporate environmentally sustainable solutions in Zone 7 normal operations to maximize effective flood control and improve flood protection strategy.
- *Strategy 3c:* Improve flood protection/water supply planning efforts and infrastructure to better prepare for the impacts of climate change.

4. Promote Public Awareness and Outreach

- *Strategy 4a:* Enhance existing outreach efforts by Including hazard mitigation goals and concepts into advertising and training programs

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1. Summary

Meeting title	LHMP - Steering Committee Meeting #3	
Attended participants		12
Start time	4/10/23, 9:57:31 AM	
End time	4/10/23, 11:48:20 AM	
Meeting duration	1h 50m 49s	
Average attendance time	1h 35m 8s	

2. Participants

Name	First Join	Last Leave
Ryan Bray	4/10/23, 9:57:35 AM	4/10/23, 11:48:20 AM
Breanne Slimick (Guest)	4/10/23, 9:59:18 AM	4/10/23, 11:48:20 AM
Padway, Kevin	4/10/23, 9:59:42 AM	4/10/23, 11:48:13 AM
Tang, Jeff	4/10/23, 10:00:14 AM	4/10/23, 11:00:14 AM
Foss, Elizabeth	4/10/23, 10:00:20 AM	4/10/23, 11:48:14 AM
Segura, Sal	4/10/23, 10:00:21 AM	4/10/23, 11:48:11 AM
Carney, James	4/10/23, 10:00:53 AM	4/10/23, 11:48:11 AM
Winey, Colleen	4/10/23, 10:01:02 AM	4/10/23, 11:48:15 AM
Green, JaVia	4/10/23, 10:01:19 AM	4/10/23, 10:52:35 AM
Rank, Elke	4/10/23, 10:03:40 AM	4/10/23, 11:48:12 AM
Gould, Rich	4/10/23, 10:04:49 AM	4/10/23, 11:48:10 AM
Olmsted, Mona	4/10/23, 10:07:21 AM	4/10/23, 11:48:14 AM

3. In-Meeting Activities

Name	Join Time	Leave Time
Ryan Bray	4/10/23, 9:57:35 AM	4/10/23, 11:48:20 AM
Breanne Slimick (Guest)	4/10/23, 9:59:18 AM	4/10/23, 11:48:20 AM
Padway, Kevin	4/10/23, 9:59:42 AM	4/10/23, 11:48:13 AM
Tang, Jeff	4/10/23, 10:00:14 AM	4/10/23, 11:00:14 AM
Foss, Elizabeth	4/10/23, 10:00:20 AM	4/10/23, 11:48:14 AM
Segura, Sal	4/10/23, 10:00:21 AM	4/10/23, 11:48:11 AM
Carney, James	4/10/23, 10:00:53 AM	4/10/23, 11:48:11 AM
Winey, Colleen	4/10/23, 10:01:02 AM	4/10/23, 11:48:15 AM
Green, JaVia	4/10/23, 10:01:19 AM	4/10/23, 10:14:21 AM
Green, JaVia	4/10/23, 10:16:05 AM	4/10/23, 10:17:13 AM
Green, JaVia	4/10/23, 10:52:18 AM	4/10/23, 10:52:35 AM
Rank, Elke	4/10/23, 10:03:40 AM	4/10/23, 11:48:12 AM
Gould, Rich	4/10/23, 10:04:49 AM	4/10/23, 11:48:10 AM
Olmsted, Mona	4/10/23, 10:07:21 AM	4/10/23, 11:48:14 AM

In-Meeting Duration	Email	Participant ID (UPN)	Role
1h 50m 44s	ryan.bray@rmppcorp.com	ryan.bray@rmppcorp.com	Organizer
1h 49m 2s			Presenter
1h 48m 31s	kpadway@zone7water.com	kpadway@zone7water.com	Presenter
59m 59s	jtang@zone7water.com	jeff@zone7water.com	Presenter
1h 47m 54s	efoss@zone7water.com	efoss@zone7water.com	Presenter
1h 47m 50s	ssegura@zone7water.com	ssegura@zone7water.com	Presenter
1h 47m 18s	jcarney@zone7water.com	jcarney@zone7water.com	Presenter
1h 47m 13s	cwiney@zone7water.com	cwiney@zone7water.com	Presenter
14m 26s	jgreen@zone7water.com	jgreen@zone7water.com	Presenter
1h 44m 31s	erank@zone7water.com	erank@zone7water.com	Presenter
1h 43m 20s	rgould@zone7water.com	rgould@zone7water.com	Presenter
1h 40m 52s	molmsted@zone7water.com	molmsted@zone7water.com	Presenter

Duration	Email	Role
1h 50m 44s	ryan.bray@rmppcorp.com	Organizer
1h 49m 2s		Presenter
1h 48m 31s	kpadway@zone7water.com	Presenter
59m 59s	jtang@zone7water.com	Presenter
1h 47m 54s	efoss@zone7water.com	Presenter
1h 47m 50s	ssegura@zone7water.com	Presenter
1h 47m 18s	jcarney@zone7water.com	Presenter
1h 47m 13s	cwiney@zone7water.com	Presenter
13m 2s	jgreen@zone7water.com	Presenter
1m 7s	jgreen@zone7water.com	Presenter
17s	jgreen@zone7water.com	Presenter
1h 44m 31s	erank@zone7water.com	Presenter
1h 43m 20s	rgould@zone7water.com	Presenter
1h 40m 52s	molmsted@zone7water.com	Presenter



ZONE 7 WATER AGENCY HAZARD MITIGATION PLAN

STEERING COMMITTEE #3

Ryan Bray

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PROGRESS REVIEW

Steering Committee
Meeting #1

HAZARD RANKING

Rank	Score
High	
Moderately High	
Moderate	
Flood/ Severe Storm	27
Drought	27
Moderately Low	
Wildfire	24
Earthquake	24
Infrastructure Failure	24
Water Contamination	16
Terrorism/ Adversarial Events	15
Utility Loss	12
Dam Failure	12
Low	

UPDATED PLAN GOALS

1

Protect Life
and Property

2

Improve
Effectiveness
of Emergency
Operations

3

Protect the
Environment

4

Promote
Public
Awareness &
Outreach



ASSET INVENTORY AND VULNERABILITY ASSESSMENT

- Validate Asset Inventory
- Conduct Vulnerability Assessment (Loss Estimates)

ASSET INVENTORY

- Validate Asset Inventory
 - Types and number of existing and future buildings
 - Infrastructure
 - Critical Facilities

Asset Inventory Summary – Zone 7 Water Agency		
Type	Name	Estimated Replacement Value
Administration	Zone 7 Distribution (Parkside)	\$3,581,700
Administration	North Canyons Office Building	\$11,000,000
Water Plant	Del Valle WTP	\$150,000,000
Water Plant	Patterson Pass Conventional WTP	\$130,000,000

VULNERABILITY ASSESSMENT ESTIMATES

- Review each asset and assign potential percentage of damage expected due to each identified hazard

Zone 7 Water Agency Vulnerability Assessment Calculations			Flood/ Dam Release		Drought	
Type	Name	ERV	% Damage	Loss Estimate	% Damage	Loss Estimate
Administration	Zone 7 Distribution (Parkside)	\$3,581,700	0%	\$0	0%	\$0
Administration	North Canyons Office Building	\$11,000,000				\$0
Water Plant	Del Valle WTP	\$150,000,000	0%	\$0	0%	\$0
Water Plant	Patterson Pass Conventional WTP	\$130,000,000	0%	\$0	0%	\$0

NEXT STEPS...

MITIGATION ACTION WORKSHEET

Develop Mitigation Actions

- Summarize mitigation project specifications
- Identify project goal categories
- Capital Improvements

Action Categories

- Prevention
- Property Protection
- Public Awareness
- Natural Resource Protection
- Emergency Services
- Structural Projects

CONTACT INFORMATION

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1. Summary

Meeting title	LHMP - Steering Committee Meeting #4	
Attended participants		12
Start time	4/24/23, 9:56:05 AM	
End time	4/24/23, 11:56:46 AM	
Meeting duration	2h 41s	
Average attendance time	1h 44m 16s	

2. Participants

Name	First Join	Last Leave
Ryan Bray	4/24/23, 9:56:10 AM	4/24/23, 11:56:46 AM
Padway, Kevin	4/24/23, 9:58:18 AM	4/24/23, 11:56:45 AM
Gould, Rich	4/24/23, 9:59:12 AM	4/24/23, 11:56:21 AM
Breanne Slimick	4/24/23, 9:59:46 AM	4/24/23, 11:48:27 AM
Winey, Colleen	4/24/23, 10:00:02 AM	4/24/23, 11:56:23 AM
Olmsted, Mona	4/24/23, 10:00:15 AM	4/24/23, 11:35:28 AM
Green, JaVia	4/24/23, 10:00:37 AM	4/24/23, 11:56:23 AM
Tang, Jeff	4/24/23, 10:00:48 AM	4/24/23, 11:56:23 AM
Segura, Sal	4/24/23, 10:01:23 AM	4/24/23, 11:56:21 AM
Carney, James	4/24/23, 10:02:11 AM	4/24/23, 11:56:24 AM
Minn, Ken	4/24/23, 10:20:27 AM	4/24/23, 10:42:50 AM
Rank, Elke	4/24/23, 10:24:28 AM	4/24/23, 11:56:23 AM

3. In-Meeting Activities

Name	Join Time	Leave Time
Ryan Bray	4/24/23, 9:56:10 AM	4/24/23, 11:56:46 AM
Padway, Kevin	4/24/23, 9:58:18 AM	4/24/23, 11:56:45 AM
Gould, Rich	4/24/23, 9:59:12 AM	4/24/23, 11:56:21 AM
Breanne Slimick	4/24/23, 9:59:46 AM	4/24/23, 11:48:27 AM
Winey, Colleen	4/24/23, 10:00:02 AM	4/24/23, 11:56:23 AM
Olmsted, Mona	4/24/23, 10:00:15 AM	4/24/23, 11:35:28 AM
Green, JaVia	4/24/23, 10:00:37 AM	4/24/23, 11:56:23 AM
Tang, Jeff	4/24/23, 10:00:48 AM	4/24/23, 11:56:23 AM
Segura, Sal	4/24/23, 10:01:23 AM	4/24/23, 11:56:21 AM
Carney, James	4/24/23, 10:02:11 AM	4/24/23, 11:56:24 AM
Minn, Ken	4/24/23, 10:20:27 AM	4/24/23, 10:42:50 AM
Rank, Elke	4/24/23, 10:24:28 AM	4/24/23, 11:56:23 AM

In-Meeting Duration	Email	Participant ID (UPN)	Role
2h 35s	ryan.bray@rmppcorp.com	ryan.bray@rmppcorp.com	Organizer
1h 58m 26s	kpadway@zone7water.com	kpadway@zone7water.com	Presenter
1h 57m 9s	rgould@zone7water.com	rgould@zone7water.com	Presenter
1h 48m 40s			Presenter
1h 56m 21s	cwiney@zone7water.com	cwiney@zone7water.com	Presenter
1h 35m 12s	molmsted@zone7water.com	molmsted@zone7water.com	Presenter
1h 55m 45s	jgreen@zone7water.com	jgreen@zone7water.com	Presenter
1h 55m 34s	jtang@zone7water.com	jeff@zone7water.com	Presenter
1h 54m 57s	ssegura@zone7water.com	ssegura@zone7water.com	Presenter
1h 54m 12s	jcarney@zone7water.com	jcarney@zone7water.com	Presenter
22m 23s	kminn@zone7water.com	kminn@zone7water.com	Presenter
1h 31m 55s	erank@zone7water.com	erank@zone7water.com	Presenter

Duration	Email	Role
2h 35s	ryan.bray@rmppcorp.com	Organizer
1h 58m 26s	kpadway@zone7water.com	Presenter
1h 57m 9s	rgould@zone7water.com	Presenter
1h 48m 40s		Presenter
1h 56m 21s	cwiney@zone7water.com	Presenter
1h 35m 12s	molmsted@zone7water.com	Presenter
1h 55m 45s	jgreen@zone7water.com	Presenter
1h 55m 34s	jtang@zone7water.com	Presenter
1h 54m 57s	ssegura@zone7water.com	Presenter
1h 54m 12s	jcarney@zone7water.com	Presenter
22m 23s	kminn@zone7water.com	Presenter
1h 31m 55s	erank@zone7water.com	Presenter



ZONE 7 WATER DISTRICT HAZARD MITIGATION PLAN

STEERING COMMITTEE #4

Ryan Bray

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DISCUSSION TOPICS

- Review Mitigation Goals and Objectives
- Develop Potential Mitigation Projects
- Benefit-Cost Review

HAZARD RANKING REVIEW

HAZARD RANKING SUMMARY

Rank	Score
High	
Moderately High	
Moderate	
Flood/ Severe Storm	27
Drought	27
Moderately Low	
Wildfire	24
Earthquake	24
Infrastructure Failure	24
Water Contamination	16
Terrorism/ Adversarial Events	15
Utility Loss	12
Dam Failure	12
Low	

MITIGATION GOALS & OBJECTIVES REVIEW

COMMUNITY SAMPLE PROFILE

- Protect Life, Property, and Commerce
- Promote Public Awareness
- Protect the Environment
- Develop and Expand Partnerships and Implementation
- Enhance Emergency Services Capabilities

IDENTIFY POTENTIAL MITIGATION ACTIONS

MITIGATION ACTION CATEGORIES

- Prevention
- Property Protection
- Public Education and Awareness
- Natural Resource Protection
- Emergency Services
- Structural Projects

FLOOD/DAM FAILURE EXAMPLE MITIGATION PROJECTS



- Acquisition, Relocation, & Elevation Projects
- Dry-Floodproofing (e.g., plastic sheeting)
- Wet-Floodproofing (e.g., water resistant materials)
- Stormwater Management Ordinances or Amendments
- Floodplain Ordinances or Amendments
- Storm Drainage System Improvements
- Structural Flood Control Measures (e.g., levees, dams, floodwalls)
Inundation Zone Mapping
- Preparedness and Response Plans
- Notification Systems
- Structural Storage Tank Reservoir Improvements

DROUGHT EXAMPLE MITIGATION PROJECTS



- Water Use Ordinances
- Contingency Plans
- Emergency Water Distribution and Storage Systems
- Water Conservation Education
- System Retrofits
- Leak Detection Programs

FIRE EXAMPLE MITIGATION PROJECTS



- Community Awareness
- Fire-safe Practices for Structures and Landscaping
- Enhancement of Fire-Suppression Capabilities
- Fire Risk Mapping

EARTHQUAKE EXAMPLE MITIGATION PROJECTS



- Building Retrofits
- Anchor Electrical Transformers
- Install Expansion Joints
- Reinforce Well Shaft or Install Submersible Pump
- Restrain Pipes
- Improve Pipe Materials
- Install Tank Anchors
- Install Friction Dampers on Elevated Tanks

ADVERSARIAL EVENT EXAMPLE MITIGATION PROJECTS



- Emergency Plans
- Emergency Response Teams
- Security
- Training

BENEFIT-COST REVIEW

PURPOSE OF BENEFIT-COST REVIEW

- FEMA requires the Steering Committee to prioritize actions for implementation
- The process is designed to help the Steering Committee weigh pros and cons for each action
- RMP's method utilizes a qualitative methodology with a High, Medium, and Low range
 - High – Benefits are perceived to exceed costs without further study or evaluations; or the action is critical
 - Medium – Benefits are perceived to exceed costs, but may require further study or evaluation prior to implementation
 - Low – Benefits and costs require evaluation prior to implementation

BENEFIT-COST REVIEW EXAMPLE

- Example from FEMA

Actions	Benefits (Pros)	Costs (Cons)	Priority
Floodproof 10 businesses in the downtown area	<ul style="list-style-type: none"> - Avoidance of 1 loss of life every 20 years (casualties reduced by half) - Saving of \$90,000 in private damages and \$5,000 in public cost - Loss of use of 10 downtown businesses completely eliminated - Community's problem of business interruption solved - Federal grants like FMA and PDM can be applied for to implement the proposed floodproofing - Will help improve CRS rating in the long term (so entire community's flood insurance premium will be reduced) - More than half the members of the City Council are opposed to buy-outs; it might be easier to get their support for an alternative to buy-outs 	<ul style="list-style-type: none"> - Floodproofing cost = $\\$10,000 \times 10 = \\$100,000$ - Need at least 3 people to administer (after obtaining technical assistance from the State) - Need a year to implement 	High (Priority no. 1)
Build safe rooms for a neighborhood of 50 homes without basements	<ul style="list-style-type: none"> - Avoidance of 5 lives lost every 20 years (casualties reduced by half) - Public and political support for mitigating this hazard exists (due to regular recurrence of tornadoes) 	<ul style="list-style-type: none"> - City will share 50% of the cost per existing home = $\\$2,000 \times 50 = \\$100,000$ - Administrative cost per home = $\\$1,000 \times 50 = \\$50,000$ - Need 3 years to complete - Tornadoes are unpredictable; they may never strike this exact area again 	Medium (Priority no. 2)
Broadcast educational video on local channel on hazard mitigation	<ul style="list-style-type: none"> - Local channel might be willing to broadcast free of cost - Publicity would spread awareness about mitigation methods as well as what to do in an emergency 	<ul style="list-style-type: none"> - Cost of preparing video = \$5,000 - Only 5% of population might notice the broadcast - Only 5% of that 5% might actually consider acting on individual mitigation methods 	Low (Priority no. 3)

NEXT STEPS...

NEXT STEPS...

The Draft Hazard Mitigation Plan will be provided to each member for review. Once comments are implemented, the Public Review Draft Hazard Mitigation Plan will be presented at a Board of Director's meeting:

Meeting Date: TBD

CONTACT INFORMATION

Ryan Bray
Senior Technical Consultant

Ryan.Bray@RMPCorp.com

Risk Management Professionals, Inc.

(949) 282-0123

(877) 532-0806

www.RMPCorp.com

Example Benefits

Avoided Physical Damages	<ul style="list-style-type: none"> ▪ Buildings ▪ Contents ▪ Infrastructure ▪ Landscaping ▪ Site Contamination ▪ Vehicles ▪ Equipment
Avoided Loss-of-Function Costs	<ul style="list-style-type: none"> ▪ Displacement costs for temporary quarters ▪ Loss of rental income ▪ Loss of business income ▪ Lost wages ▪ Disruption time for residents ▪ Loss of public services ▪ Economic impact of loss of utility services ▪ Economic impact of road/bridge closures
Avoided Casualties	<ul style="list-style-type: none"> ▪ Deaths ▪ Injuries ▪ Illnesses
Avoided Emergency Management Costs	<ul style="list-style-type: none"> ▪ Emergency operations center costs ▪ Evacuation or rescue costs ▪ Security costs ▪ Temporary protective measure costs ▪ Debris removal and cleanup costs ▪ Other management costs

Example Costs

- Planning Costs
- Construction Cost
- Administration/Management Cost
- Time Needed to Implement
- Social Impacts
- Public/Political Opposition
- Environmental Impacts

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LHMP Steering Committee Meeting #5

1. Summary

Meeting title
 Attended 9
 Start time 5/3/23, 12:25:12 PM
 End time 5/3/23, 1:56:03 PM
 Meeting duration 1h 30m 51s
 Average attendance 1h 19m 12s

2. Participants

Name	First join	Last leave	In-meeting	Email	Participant Role
Olmsted, Mona	5/3/23, 12:28:56 PM	5/3/23, 1:51:27m 1s	1h 27m 1s	molmsted@	Presenter
Ryan Bray	5/3/23, 12:29:07 PM	5/3/23, 1:51:26m 55s	1h 26m 55s	ryan.bray@	Presenter
Gould, Rich	5/3/23, 12:29:37 PM	5/3/23, 1:51:26m 20s	1h 26m 20s	rgould@zo	Presenter
Padway, Kevin	5/3/23, 12:29:51 PM	5/3/23, 1:51:26m 7s	1h 26m 7s	kpadway@	Organizer
Carney, James	5/3/23, 12:30:16 PM	5/3/23, 1:51:25m 42s	1h 25m 42s	jcarney@z	Presenter
Breanne Slimick	5/3/23, 12:30:48 PM	5/3/23, 1:51:57m 45s	1h 27m 45s		Presenter
Michael Miller	5/3/23, 12:30:54 PM	5/3/23, 1:51:25m	1h 25m		Presenter
Segura, Sal	5/3/23, 12:31:36 PM	5/3/23, 1:51:23m 12s	1h 23m 12s	ssegura@z	Presenter
Rank, Elke	5/3/23, 1:01:14 PM	5/3/23, 1:51:54m 44s	1h 54m 44s	erank@zor	Presenter

3. In-Meeting Activities

Name	Join time	Leave time	Duration	Email	Role
Olmsted, Mona	5/3/23, 12:28:56 PM	5/3/23, 1:51:27m 1s	1h 27m 1s	molmsted@	Presenter
Ryan Bray	5/3/23, 12:29:07 PM	5/3/23, 1:51:26m 55s	1h 26m 55s	ryan.bray@	Presenter
Gould, Rich	5/3/23, 12:29:37 PM	5/3/23, 1:51:26m 20s	1h 26m 20s	rgould@zo	Presenter
Padway, Kevin	5/3/23, 12:29:51 PM	5/3/23, 1:51:26m 7s	1h 26m 7s	kpadway@	Organizer
Carney, James	5/3/23, 12:30:16 PM	5/3/23, 1:51:25m 42s	1h 25m 42s	jcarney@z	Presenter
Breanne Slimick	5/3/23, 12:30:48 PM	5/3/23, 1:51:57m 45s	1h 27m 45s		Presenter
Michael Miller	5/3/23, 12:30:54 PM	5/3/23, 1:51:25m	1h 25m		Presenter
Segura, Sal	5/3/23, 12:31:36 PM	5/3/23, 1:51:30m 50s	1h 30m 50s	ssegura@z	Presenter
Segura, Sal	5/3/23, 1:03:36 PM	5/3/23, 1:51:52m 22s	1h 52m 22s	ssegura@z	Presenter
Rank, Elke	5/3/23, 1:01:14 PM	5/3/23, 1:51:54m 44s	1h 54m 44s	erank@zor	Presenter



ZONE 7 WATER AGENCY HAZARD MITIGATION PLAN

STEERING COMMITTEE #5

Ryan Bray

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DISCUSSION TOPICS

- Conduct a Benefit-Cost Review of Mitigation Projects
- Discuss schedule for last steps of update process

BENEFIT-COST REVIEW

PURPOSE OF BENEFIT-COST REVIEW

- FEMA requires the Steering Committee to prioritize actions for implementation
- The process is designed to help the Steering Committee weigh pros and cons for each action
- RMP's method utilizes a qualitative methodology with a High, Medium, and Low range
 - High – Benefits are perceived to exceed costs without further study or evaluations; or the action is critical
 - Medium – Benefits are perceived to exceed costs, but may require further study or evaluation prior to implementation
 - Low – Benefits and costs require evaluation prior to implementation

BENEFIT-COST REVIEW

- Review each identified mitigation project and quantify the benefits and costs of implementing each project
 - Assign a priority based on the benefit-cost review

Mitigation Action Prioritization: Benefit-Cost Review			
Mitigation Activity	Benefits (Pros)	Costs (Cons)	Priority
HMP.2023.01 -- Initiate a study to investigate opportunities for cross-functional and multi-benefit mitigation projects that achieve benefits in the areas of flood protection, drinking water quality and supply, environmental and habitat quality, regional economic impacts, and other social and public health effects. Develop a framework for quantifying individual project and multi-project benefits and conduct a feasibility study to develop a multi-hazard mitigation program.	• →	• → \$2,000,000-in-project costs	
HMP.2023.02 -- Implement flood protection, recharge, and water supply infrastructure projects emphasizing multi-benefit hazard mitigation projects.	• →	• → \$50,000,000	
HMP.2023.03 -- Continue build-out and integration of the Chain of Lakes improvement projects, including maximizing on-site power generation and the Chain of Lakes Pipeline. (possible floating solar -- maybe wellsite power generation)	• →	• → \$120,000,000	

BENEFIT-COST REVIEW EXAMPLE

- Example from FEMA

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City Council Meeting:
June 21, 2023

CONTACT INFORMATION

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Benefit Cost Review Example

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