

**Sonoma County
Hazard Mitigation Plan**

EXECUTIVE SUMMARY

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EXECUTIVE SUMMARY TABLE OF CONTENTS

1. PLAN ORGANIZATION	3
2. PURPOSE	3
3. BACKGROUND	4
4. HAZARD AND RISK ASSESSMENT	4
Earthquakes	4
Floods	5
Wildland Fires	5
Landslides	6
Climate Change	7
5. HAZARD MITIGATION GOALS, PRIORITIES, AND STRATEGIES	7
6. PLAN IMPLEMENTATION	8

LIST OF TABLES

Table ES-1:	Summary of Sonoma Coast Hazard Exposure
Table ES-2:	Summary of Estimated Value of County Property in Hazard Zones

EXECUTIVE SUMMARY

Under the Federal Disaster Mitigation Act of 2000 (DMA 2000), the County of Sonoma is required to have a Federal Emergency Management Agency (FEMA) - approved Local Hazard Mitigation Plan in order to be eligible for certain pre- and post-disaster mitigation funds. Adoption of this Plan by the County Board of Supervisors, and approval by FEMA will serve the dual objectives of providing direction and guidance on implementing hazard mitigation in Sonoma County, and qualify the County to obtain federal assistance. To achieve these objectives, the Local Hazard Mitigation Plan identifies and addresses potential hazards in the County. Nothing in this Plan is intended to be an admission, either expressed or implied, by or on behalf of the County, of any County obligation, responsibility, duty, fault or liability for any particular hazard or hazardous condition, and no such County obligation, responsibility, duty, fault or liability should be inferred or implied from the Plan, except where expressly stated.

1. PLAN ORGANIZATION

The Sonoma County Hazard Mitigation Plan is organized into four sections and several appendices. Section I Introduction, details the purpose and scope of the Local Hazard Mitigation Plan. Section II Community Profile, identifies and describes the plans applicable jurisdiction. Section III Hazards Assessment, is segmented into four distinct discussions on previously identified local hazards, including Seismic, Floods, Wildland Fires, and Landslides. Section IV Mitigation Strategy and Implementation, outlines implementable measures to reduce the risk of damage from hazards and specifies the responsible body and timeline for completing such tasks. Appendices include reference materials, and definitions. Finally, an Annex is attached to the Local Hazard Mitigation Plan addressing drought and extreme weather as a result of climate change as a hazard. Maps as referenced in the Plan are included as attachments.

2. PURPOSE

This document, the Sonoma County Hazard Mitigation Plan, assesses the County's vulnerabilities to various hazards and presents mitigation strategy, including goals, objectives, and actions that the County will strive to implement over the next five years. Mitigation actions are intended to reduce the disruption or loss of life, property, and economy that might result from a natural disaster. The Mitigation actions also aim to lower the costs that multiple disasters have begun to impose on the Federal budget. It differs from an emergency response plan in that it is proactive rather than reactive. The main goal of the Sonoma County Hazard Mitigation Plan, consistent with the Sonoma County General Plan 2020's (GP2020) Public Safety Element, is to:

- Prevent unnecessary exposure of people and property to risks of damage or injury from earthquakes, landslides wildland fires and floods (GP2020: PS-1, 2 & 3).

The Board of Supervisors directed the Fire and Emergency Services Department (FES) and the Permit and Resource Management Department (PRMD) to prepare a Local Hazard Mitigation Plan for adoption. The County adopted its first Hazard Mitigation Plan in 2006, and the Plan has been updated every 5 years, in accordance with FEMA guidelines. This plan, once approved by FEMA, maintains Sonoma County's eligibility for various types of federal pre- and post-disaster funding through 2021. The mitigation projects and programs identified in the Hazard Mitigation Plan are given priority for funding and technical assistance by the state and federal government. The Hazard Mitigation Plan is incorporated by reference into the General Plan 2020 and its implementation is identified as a work program of the Public Safety Element.

3. BACKGROUND

To reduce personal injury, property damage, and disaster response and recovery costs resulting from natural disasters, Congress adopted the Federal Disaster Mitigation Act of 2000 (DMA 2000). The DMA 2000 encourages states and local jurisdictions to plan more wisely and pursue pro-active mitigation actions. Mitigation actions reduce vulnerability to natural hazards and increase post disaster resiliency.

The Federal Disaster Mitigation Act of 2000 requires jurisdictions to prepare and adopt a FEMA approved hazard mitigation plan to remain eligible for various pre and post disaster grants and community aid. The guidelines require local governments to incorporate the hazard analysis and mitigation strategies into other planning mechanisms such as General Plans, Capital Improvement Plans, Zoning and Building Codes, and ongoing operations and programs where appropriate.

4. HAZARD AND RISK ASSESSMENT

As discussed in detail in Section III, the 2016 update of the Sonoma County Hazard Mitigation Plan continues to focus on earthquake, flood, wildland fire, and landslide hazards as these are considered to constitute the greatest risk to the County based on past disaster events, future probabilities, and degree of vulnerability. The Hazard Mitigation Plan addresses relevant secondary and tertiary hazards such as winter storms, coastal erosion and bluff failure, tsunamis, and post fire erosion. The 2016 update discusses the implications that climate change may have on hazard trends in Sonoma County and includes an expanded discussion of sea level rise and drought.

Earthquakes

Although less frequent than other hazards, earthquakes have a high probability of future occurrence in the County. The United States Geological Survey concludes that there is a 63 percent probability of at least one magnitude 6.7 or greater earthquake striking somewhere in the San Francisco Bay region before 2032. The Rodgers Creek fault runs through Sonoma County and Santa Rosa and has 31 percent chance for a magnitude 6.7 or greater earthquake occurring before 2032. An earthquake on the Northern San Andreas Fault has a 21 percent probability of occurrence by 2032.

Though earthquake events occur less frequently than other hazards, an earthquake has the greatest potential to affect the largest area, and the greatest number of people and structures. An earthquake occurring on either the Rodgers Creek or Northern San Andreas fault systems would affect large numbers of people and result in serious damage to buildings, facilities and infrastructure. Though the San Andreas Fault has potential for a larger magnitude quake, a major quake on the Rodgers Creek Fault has the greatest potential for damage and injury because the fault is in closer proximity to County population centers along the Highway 101 corridor.

Large earthquakes on faults that are not local to the County can result in strong ground shaking and extensive damage that can haphazardly affect locations across a large region. The extent of damage depends on the size and type of earthquake, underlying rock types and densities, and the reflective characteristics of earth materials that can re-direct seismic waves resulting in areas of severe damage a great distance from the epicenter.

Floods

Historically, flood disasters have occurred more frequently than other types of natural hazards. The County experienced thirteen floods since 1991, with seven of those events resulting in local disaster declarations. Flood damage occurs primarily along the lower Russian River, but also occurs along the Petaluma River, Sonoma Creek, and various tributaries. Inundation hazards can also arise from dam failure, sea level rise and tsunamis. Flooding, often coupled with winter storms, may concurrently cause wind damage, power and communication outages, and tree falls. Approximately 5,132 buildings are located within the 100-year floodplain. County infrastructure, including roads and water treatment facilities are also exposed to flood hazards. Sonoma County has the highest number of repetitive flood loss properties in the State of California; the cost of which is higher than the next nine highest repetitive loss communities combined. Repetitive flood loss properties comprise only one percent of the flood insured properties but account for 25 to 30 percent of all claims paid by the National Flood Insurance Program (NFIP).

Wildland Fires

Though there have been five local emergencies declared for large wildland fires since 1991, the frequency of wildland fires is much greater than other hazards. Since 1991, California Department of Forestry and Fire Protection (CAL FIRE) and local fire districts have responded to between 70 and 200 non-structural wildland fires each year, any of which could have grown into a larger fire in the absence of rapid fire suppression responses. Firefighting entities are an important part of the mitigation strategy because unlike other hazards, the speed and effectiveness of the initial response has a dramatic impact on overall size of the fire, property damage, and injury. The combination of highly flammable fuel, long dry summers and steep slopes creates a significant natural hazard of large wildland fires in many areas of Sonoma County.

An estimated 33,900 people, seven percent of the population, reside in the unincorporated areas of Sonoma County, potentially at risk of wildland fires. Increased development in these areas exacerbates the risk and can overwhelm firefighting efforts and resources. Numerous

roads, communication, and power infrastructure pass through areas identifies as being at risk for wildland fires and could be damaged or interrupted by fire events.

Landslides

Landslides occur most frequently during high rainfall years. Sonoma County's landscape which is characterized by steep slopes formed on weak rock material, contributes to a widespread landslide hazard. While generally limited in size and impact, there is potential for future large landslide or debris flow events such as the Rio Nido debris flow that occurred during the 1998 winter storms. Areas of the County that are vulnerable to landslide hazards may contain structures, roads, sidewalks, and both underground and aboveground utilities. Vulnerable areas also include roads that are critical for emergency access and evacuation for some communities.

Table ES-1: Summary of Sonoma County Hazard Exposure

	Earthquakes	Flood	Wildland Fire	Landslides
Population	162,000	6,858	33,900	19,200
Number of Buildings	61,000 Buildings	5,132 Buildings	12,600 Buildings	6,500 Buildings
Estimated Value	\$15.5 billion	\$ 768 million	\$4.8 billion	\$2.6 billion

Source: Sonoma County Risk Management and Sonoma County Permit and Resource Management, Department Information Systems Division

Table ES-2: Summary of Estimated Value of County Property in Hazard Zones

Hazard Zone	Number of County facilities in hazard zone	Total value of County buildings in hazard Zone (Millions)*	Total value of County's building contents in hazard zone (Millions)*
Earthquake - Violent Shaking	67	\$228.2	\$46.7
Earthquake - Liquefaction	26	\$14.9	\$1.8
Earthquake - Fault Rupture	3	\$4.6	\$1.1
Landslide	18	\$11.2	\$1.3
100-year Flood Risk	9	\$9.6	\$1.8
Wildland fire Risk	21	\$10.5	\$0.4
Sea Level Rise	N/A		
Total		\$294.8	\$54.8

Note: Values are insured values for buildings plus and contents, which may not accurately represent current value or replacement value. Source: Sonoma County Risk Management

Climate Change

The 2015 report entitled “Climate Ready Sonoma County: Hazards and Vulnerability” prepared by the North Bay Climate Adaptation Initiative (NBCAI) for the Sonoma County Regional Climate Protection Authority (RCPA) as part of the County’s 2020 Climate Action initiative provides four different climate change scenarios and identifies community resources that are vulnerable to climate change hazards. Climate change scenarios examined for Sonoma County suggest that Sonoma County is likely to experience:

- Hotter, drier weather with longer summers and more extreme heat events
- Longer and more frequent droughts
- Greater frequency and intensity of wildland fires
- Fewer winter nights that freeze
- Larger, more variable floods
- Higher sea levels and storm surges

Climate change is expected to increase and be felt for decades, possibly centuries to come. Though the County has experienced severe storms, floods, droughts, heat waves, fires, and landslides in the past, the severity and frequency of these events is likely to increase as the climate changes. Climate change could cause new hazards such as pest outbreaks, and sea-level rise resulting in salt water intrusion and crop failure. This increases the importance of carrying out proactive pre-disaster mitigation measures and greenhouse gas reduction measures concurrently.

This plan discusses climate change as it relates to the existing hazards posed by floods, storms, wildland fire and landslides hazards. Potential impacts of climate change are much broader and long term, which may result in high costs for public health, safety, and economic vitality, and will continue to be evaluated in each five year update of the Local Hazard Mitigation Plan.

5. HAZARD MITIGATION GOALS, PRIORITIES, AND STRATEGIES

An effective plan and mitigation strategy increase the resiliency of a community and minimize community disruption when natural disasters occur. The following factors were considered to determine what mitigation and strategies should be given highest priority for implementation over the next five year period under this Plan:

- The frequency and probability of disaster events
- The number of people and structures vulnerable to different hazards;
- Goals, objectives and funding priorities of the State Hazard Mitigation Plan;
- Goals and objectives in the Sonoma County Hazard Mitigation Plan and General Plan Public Safety Element;
- Potential for protecting life and property in areas of highest risk or vulnerability;
- Cost/benefit considerations;
- Potential to help assure critical County infrastructure, structures and government services remain functional following a disaster;

- Degree to which strategies help mitigate, reduce repetitive flood loss properties and or help assure continued compliance with the National Flood Insurance Program;
- Achievability in terms of social acceptance, technical feasibility, administrative, political, legal, economic and environmental considerations outlined by FEMA in its “developing the Mitigation Plan” guide;
- Priority implementation actions from the 2011 Hazard Mitigation Plan which were not fully completed and should be carried forward into the new five-year plan.

Communities expect government agencies, facilities, and infrastructure to remain functional in a post disaster setting to aid in emergency response and recovery efforts. Whole-community resilience requires prepared local governments capable of a quick recovery after an emergency. This can be accomplished through specific, measurable, achievable, and time-oriented mitigation measures developed to maintain essential services and protect critical infrastructure. While the County works to increase the resiliency of its own facilities, it must also seek to foster and encourage mitigation actions that reduce the vulnerability of private buildings through education, incentives, programs, funding assistance, and siting and construction regulations. Implicit in this plan is the assumption that the County will continue to enforce existing policies and code requirements, consider hazard exposure implications during development review, and make hazard information and maps available for land use, development and real estate decisions.

After considering the above, hazard mitigation actions were identified under each of the following objectives:

- Assure that adequate and up to date natural hazard information and maps are available and utilized to guide decisions that impact risk.
- Update and enforce County codes to minimize the risks of natural hazards.
- Reduce vulnerability of public buildings at risk from natural hazards.
- Improve the ability of county infrastructure to withstand natural hazard events.
- Reduce natural hazard risk to, and increase the mitigation capability of, private residents, businesses and others who could be affected by hazards.
- Increase the County capability to respond to and recover from emergencies and disasters caused by natural hazards.

Each mitigation strategy was then assigned a priority ranking: (A) for “High Priority”, (B) for “Important Priority”. All mitigation measures ranked as “High Priority” are included in the proposed five-year implementation plan for 2016-2021.

6. PLAN IMPLEMENTATION

Despite the County's efforts, no amount of planning or mitigation can prevent disasters from occurring or eliminate the risk and impacts of such events all together. Natural disasters will continue to occur, the County will take actions to reduce the risks and impacts these hazards pose to life, property, and economy. While this Hazard Mitigation Plan seeks to identify opportunities for reasonable mitigation actions, each individual has a responsibility to be aware of the potential hazards where they live and to minimize their own household's vulnerability.

This Hazard Mitigation Plan includes a five-year implementation plan which sets forth the mitigation actions that the County will commit to implementing during the 2016 to 2021 time cycle. The mitigation actions outlined are to be carried out through the normal governmental and operational mechanisms used by the County in the performance of its duties and responsibilities on a day-to-day basis. The County Departments will strive to fully incorporate the Mitigation Strategy into existing programs. Many of the mitigation objectives and actions included in this plan may not be fully implemented without additional staffing or access to external funding sources.

The County's ability to carry out mitigations is limited to those facilities it has authority over. For instance, the County does not have direct authority over some school, fire, water and sanitation districts, private gas, electric and communication utilities, state and federal highways and facilities, private hospitals, and neighboring cities and tribes. The County will focus on things it is empowered to do while still seeking to cooperatively work with other entities to address mutual areas of vulnerability and interdependence.

Many measures included in the 2006 and 2011 plans have become a routine and ongoing part of the County's operations such as providing hazard information to building and design professionals, real estate professionals, land owners, and the general public, and considering the implications of hazard vulnerability in County land use and project review decisions. Key accomplishments in the 2011 to the 2016 period include:

- The Community Development Commission, elevated 46 additional homes in the flood plain since 2011, raising the total to 287. Grant funds have been applied for to continue the program.
- The Department of Transportation and Public Works completed three more seismic retrofits/replacements of county bridges since 2011 raising the total since 2000 to 18. Other bridge retrofit projects are underway.
- The Community Development Commission carried out the installation of earthquake resistant bracing installations and water heater strapping on 167 additional homes since 2011 raising the total to 1,309. Grant funding has been pursued to continue the program.
- Information Systems Department has replaced all core communications infrastructure with modernized Cisco Unified Communications systems. The new system includes greater redundancy and rerouting features in the event of failure. ISD has replaced phones and switches with Voice over Internet Protocol (VoIP) capable equipment, relocated the communications infrastructure to the ISD Data center and entered into contracts with Alameda County to serve as a duplicate offsite IT infrastructure as a back-up system.
- Fire and Emergency Services has purchased a new system hosted through the internet, called SoCo Alert, which provides Sonoma County first responders the ability to notify residents and businesses by telephone, mobile phone, text message, email, and social media regarding geo-specific, time-sensitive emergency notifications such as shelter-in-place, boil water advisories, tsunami warnings, and flood warnings.

- Risk Management carried out a more detailed comprehensive review of the hazard vulnerability of county facilities using GIS analysis to aid decision making regarding risks such as the County Facilities plan and the Continuing of Operations Plan.
- General Services has upgraded seven of 11 radio tower sites and provided them with emergency power. Two more tower sites will be completed this year. General services has also installed two new fire garages, expanded the REDCOM dispatch center, developed emergency action plans for the La Plaza and Veterans buildings, and carried out seismic retrofit of the data processing Building.
- The Permit and Resource Management Department has implemented a voluntary seismic retrofit compliance program for Unreinforced Masonry Buildings.

A list of Mitigation Actions proposed for inclusion in the 2016 to 2021 Hazard Mitigation Plan can be found in the Mitigation Strategy section.