

CITY OF HEALDSBURG

LOCAL HAZARD MITIGATION PLAN

2023



Healdsburg

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Acronyms

AB	Assembly Bill
ABAG	Association of Bay Area Governments
AFG	Assistance to Firefighters Grant
BMD	Best Management Practices
Cal OES	California Governor’s Office of Emergency Services
CalFire	California Department of Forestry and Fire Protection
Caltrans	California Department of Transportation
CDBG	Community Development Block Grant
CFR	Code of Federal Regulations
CGS	California Geological Survey
CIP	Capital Improvement Plan
CWPP	Community Wildfire Protection Plan
DMA 2000	Disaster Mitigation Act of 2000
DRI	Disaster Recovery Initiative
EMPG	Emergency Management Performance Grants
EO	Executive Order
FEMA	Federal Emergency Management Agency
FHSZ	Fire Hazard Severity Zones
FIRM	Flood Insurance Rate Map
FMA	Flood Mitigation Assistance
FRA	Federal Responsibility Area
GIS	Geographic Information Systems
HCD	California Department of Housing and Community Development
HMGP	Hazard Mitigation Grant Program
HSGP	Homeland Security Grant Program
IRWM	Integrated Regional Water Management
LAFCO	Local Agency Formation Commission
LHMP	Local Hazard Mitigation Plan

Acronyms

LID	Low Impact Development
LRA	Local Responsibility Area
MMI	Modified Mercalli Intensity
MMS	Moment Magnitude Scale
NFIP	National Flood Insurance Program
PDAs	Priority Development Areas
PDM	Pre-Disaster Mitigation
RHNA	Regional Housing Need allocation
RL	repetitive loss
SRA	State Responsibility Area
SWGP	Storm Water Grant Program
SWRP	Storm Water Resource Plan
the Stafford Act	Robert T. Stafford Disaster Relief and Emergency Act
UCERF3	third Uniform California Earthquake Rupture Forecast
USC	United States Code
USGS	US Geological Survey
WUI	wildland-urban interface

Section 1. Introduction

Natural disasters can cause significant damage to property and infrastructure, as well as loss of life. These damages and losses can take a toll economically, psychologically, and financially on communities in the response and recovery processes. The City of Healdsburg (the City) Local Hazard Mitigation Plan (LHMP) is an effort undertaken by the City to mitigate the effects of natural hazards and plan for resiliency in the future that respects the character and needs of the people who live and work in Healdsburg.

The City's 2023 LHMP is written to address the local mitigation planning requirements of the Disaster Mitigation Act of 2000 (DMA 2000) for the City of Healdsburg. The 2023 LHMP supersedes the 2018 LHMP. The 2023 and 2018 LHMP have been developed as stand-alone plans. The 2011 LHMP was developed as an Annex to region-wide multi-jurisdictional hazard mitigation plans (HMPs) prepared by the Association of Bay Area Governments (ABAG).

This section introduces hazard mitigation planning and describes the various sections and appendices of the 2023 LHMP.

1.1 Scope and Purpose

There are five phases of emergency management, as illustrated in **Figure 1.1**.

- **Response:** Taking action to save lives, limit injury, and prevent further damage of infrastructure in a disaster.
- **Recovery:** Returning actions to normal conditions directly following a disaster.
- **Mitigation:** Reducing loss of life and property damage by lessening the impact of future disasters.
- **Prevention:** Preventing hazards from occurring.
- **Preparedness:** Preparing to save lives and critical infrastructure and to help response and rescue operations in and directly following a disaster.



Figure 1.1

This plan focuses on the mitigation component of the cycle. Hazard mitigation plays an important role in reducing the impacts of disasters by identifying effective and feasible actions to reduce the risks posed by potential hazards. Hazard mitigation is defined by the Federal Emergency Management Agency (FEMA) as “any sustained action taken to reduce or eliminate long-term risk to human life and property from a hazard event.” As such, hazard mitigation is any work that minimizes the impacts of any type of hazard event before it occurs. A hazard event cannot be prevented from occurring, but the impact it will have on our communities can be reduced. Looking at results of 23 years of federally funded mitigation grants, the National Institute of Building Science completed a study to assess future savings from mitigation activities. The study found that on average, each dollar spent on mitigation saves society an average of \$6 in avoided future losses in addition to saving lives and preventing injuries, evidence that mitigation activities are highly cost-effective (National Institute 2019).

This plan develops mitigation actions to strengthen community resilience, which helps ensure coordinated and consistent hazard mitigation activities across the city. The City has developed the 2023 LHMP to be consistent with current standards and regulations, ensuring that the understanding of hazards facing its communities reflects the best available science and current conditions. This plan is also consistent with FEMA requirements, and the mitigation measures included in the plan are grounded in best practices and available resources.

1.2 Authority

1.2.1 Federal

The federal Robert T. Stafford Disaster Relief and Emergency Act (the Stafford Act), as amended by DMA 2000 and supported by various pieces of regulation, directs hazard mitigation planning activities such as this plan. The Stafford Act requires state, local, and tribal governments that wish to be eligible for federal hazard mitigation grant funds to submit a HMP that outlines the processes for identifying the natural and man-made hazards, risks, and vulnerabilities of the jurisdiction (United States Code [USC] Title 42, Section 5156[a]). FEMA has promulgated the Code of Federal Regulations (CFR) Title 44, Part 201 to carry out the hazard mitigation planning requirements in the Stafford Act. These regulations direct the planning process, plan content, and FEMA approval for HMPs. The City of Healdsburg is subject to many kinds of hazards; thus, access to these federal grant funds is vital.

This LHMP complies with the Stafford Act and DMA 2000, along with the appropriate sections of CFR Title 44, including Part 201 (Regulation Checklist boxes illustrating the various hazard mitigation requirements are found throughout this plan; accompanied by the text/data supporting the regulations).

1.2.2 State

The State of California passed Assembly Bill (AB) 2140 in 2006, enacting California Government Code Sections 8685.9 and 65302.6. These sections concern federal requirements mandating that jurisdictions have a valid HMP to be eligible for certain grants. Specifically, Section 8685.9 limits the State of California to paying no more than 75 percent of disaster relief funds not covered by FEMA to a local community, unless the affected community (1) has a valid HMP that is consistent with DMA 2000 and (2) has adopted the HMP as part of its general plan. If this is the case, the State may pay for more than 75 percent of the disaster relief funds not covered by FEMA. Section 65302.6 authorizes local communities to adopt HMPs as part of their safety element or a comparable section of their general plan.

1.2.3 Plan Use and Organization

Information in this plan will be used to help guide and coordinate mitigation activities and decisions for City land use policies in the future. Proactive mitigation planning will help reduce the cost of disaster response and recovery to communities and their residents by protecting critical community facilities, reducing liability exposure, and minimizing overall community impacts and disruptions. With the memory of the impacts from past hazard events, the City of Healdsburg is committed to reducing future impacts from similar hazard events and maintaining eligibility for mitigation-related federal funding.

The 2018 LHMP was integrated into the City of Healdsburg's Emergency Operations Plan, Community Wildfire Protection Plan, and 2030 General Plan. These plans will also be updated following the adoption

of the 2023 LHMP so that existing planning mechanisms can be integrated to help the City achieve successful mitigation.

Objectives of the LHMP include the following:

- Establish and foster a basis for coordination and collaboration among City departments, and other key stakeholders.
- Work in conjunction with other local planning efforts, including the City's General Plan.
- Increase community awareness and empowerment.
- Meet the requirements of federal assistance grant programs, including FEMA's Hazard Mitigation Grant Program (HMGP) and Pre-Disaster Mitigation (PDM) funding.
- Reduce the risk of loss and damage from hazard events, especially repetitive loss and damage.
- Coordinate hazard mitigation planning activities between City departments and in concert with resource management, land use planning, and emergency operation activities.

The LHMP is organized into nine sections to reflect the logical progression of activities undertaken to develop the plan and includes all relevant documentation required to meet the necessary criteria for FEMA approval. Each section is briefly described below.

- **Section 1, Introduction**, describes the background and purpose of the plan.
- **Section 2, Community Profile**, describes the city's history and general background of the community, historical trends for population and housing, and trends in land use and development.
- **Section 3, Planning Process**, describes the 2023 LHMP planning process, as well as the meetings and outreach activities undertaken to engage the Planning Team members and the public.
- **Section 4, Hazard Assessment**, identifies, describes, and prioritizes the hazards that threaten Healdsburg. This chapter discusses past events, risks of future events, and the effects of future conditions for each type of hazard.
- **Section 5, Vulnerability Assessment**, describes the risks posed by each hazard type to city residents, particularly those who are more likely to be socially vulnerable, and to critical facilities.
- **Section 6, Capability Assessment**, identifies and evaluates the legal and regulatory, human and technical, and financial resources available to accomplish mitigation.
- **Section 7, Mitigation Strategy**, identifies mitigation goals, assesses the City's capabilities to implement mitigation actions, and identifies and prioritizes mitigation actions.
- **Section 8, Plan Implementation and Maintenance**, discusses plan adoption and implementation, as well as the process to monitor, evaluate, and update the plan.
- **Section 9, References**
- **Appendices**
 - **Appendix A**, Planning Process Documents
 - **Appendix B**, Public Outreach
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- **Appendix D**, Plan Maintenance Forms
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Section 2. Community Profile

The Community Profile provides a general history and background of the community, historical trends for population and housing, and trends in land use and development.

2.1 History

The area that now comprises Healdsburg was originally inhabited by Native Americans—the Southern Pomo and Wappo tribes in the Dry Creek and Alexander Valleys, respectively. Their population once numbered close to 10,000 before it was decimated by smallpox epidemics and hostility from Mexican people who came to the area and later by secondary Euro-American settlement in the 1850s. Those who survived were displaced to missions or rancherias (Healdsburg, City of 2015).

The territory that is now Healdsburg was claimed in 1841 by Captain Henry Fitch, brother-in-law of Governor Mariano Vallejo, as part of Fitch’s 48,880-acre Sotoyome Rancho. In 1851, would-be gold seeker Harmon Heald, a native of Ohio, built a cabin on the west side of the well-traveled path between San Francisco and the northern mines (now Healdsburg Avenue). Heald built a small general store and opened a post office in the store in 1854, around which a small settlement grew. In 1857, Heald hired a surveyor to lay out a central plaza with streets and 85 lots, and a town was born, populated by 300 (non-native) residents (Healdsburg Museum & Historical Society 2018). In 1867, Healdsburg was incorporated as a city.

In 1871, the railroad opened new markets for farm produce and established Healdsburg as a prosperous agricultural district. By the 1880s, the major regional revenue besides tourism was derived from grapes, lumber, and hops. The bottom dropped out of Healdsburg’s flourishing wine industry with passage of the Volstead Act in 1919 and Prohibition. During the 1920s, most of Healdsburg’s vineyards were pulled up and replanted with fruit trees, especially French prunes, Imperial prunes, and apples. By 1930, prunes were the most important industry in Healdsburg and remained the largest cash crop until the 1970s when many orchards were removed, with the land again planted with vineyards (Healdsburg Museum & Historical Society 2018).

2.2 Geography

Healdsburg is in Sonoma County, situated in an inland valley defined principally by US Highway 101, the Russian River, surrounding agricultural lands, and mountains to the east and west. US Highway 101 is the principal coastal route between San Francisco and the Oregon border. The Russian River flows through Healdsburg on its way to the Pacific Ocean, approximately 20 miles to the west. The city lies at the intersection of three rich agricultural valleys—Russian River Valley, Dry Creek Valley, and Alexander Valley—and is at an elevation of between 100 and 430 feet above sea level. East and west beyond the agricultural lands rise subsystems of the Coastal Mountain Range. As of 2009, the Healdsburg city limits contain 4.42 square miles (Healdsburg, City of, 2018). **Figure 2.1** illustrates the city’s location.

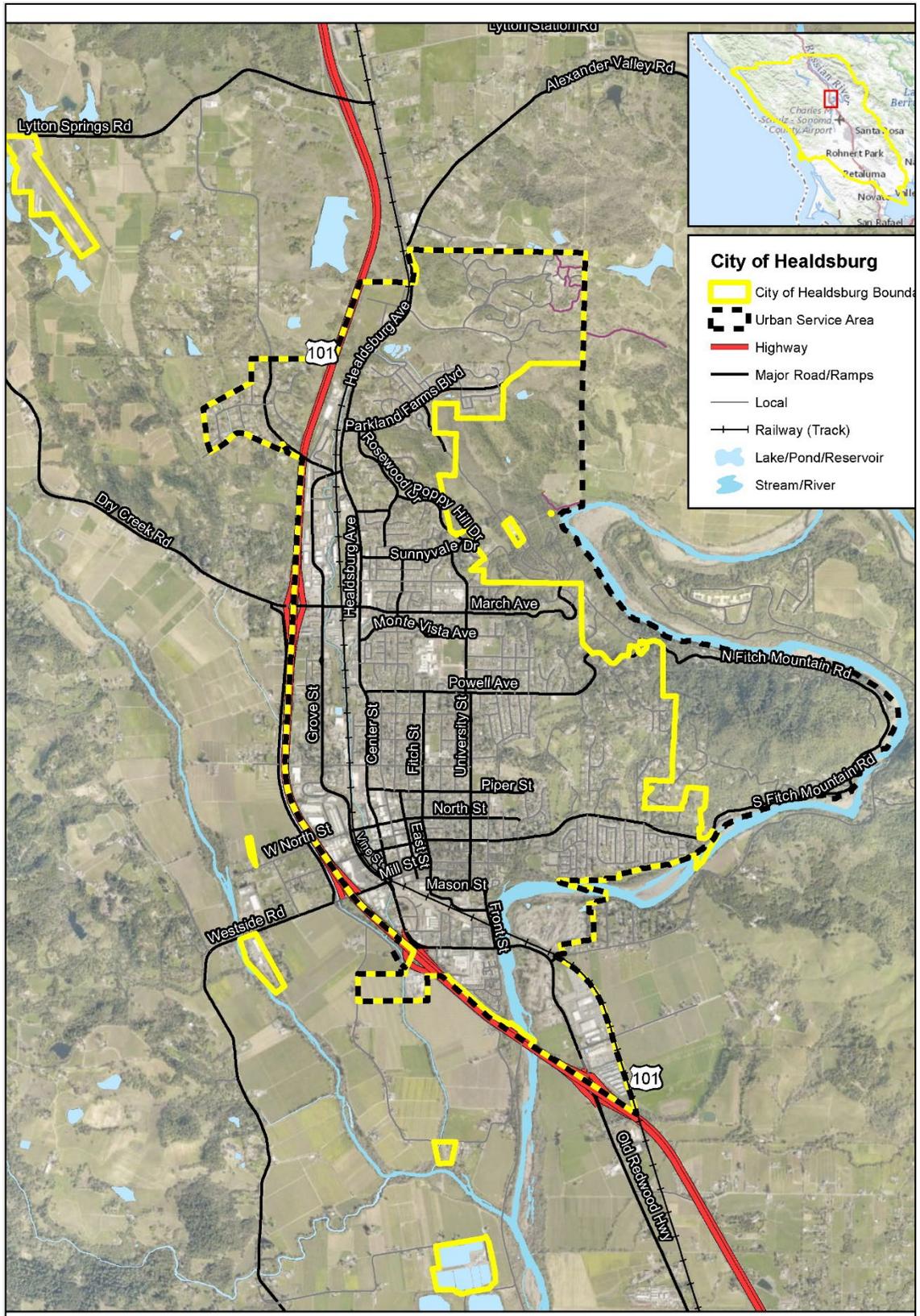


Figure 2.1: City of Healdsburg Location Map

Healdsburg’s city limits include more than 100 acres of noncontiguous, City-owned land. These properties contain several critical facilities, including the Healdsburg Municipal Airport, Corporation Yard, and Water Reclamation Facility.

The Sonoma County General Plan limits urban development in unincorporated areas by establishing Urban Service Boundaries, which designate geographic areas planned for a full range of public services and infrastructure, such as sewer, water, roads, and police and fire protection. Healdsburg’s Urban Service Area coincides with an Urban Growth Boundary adopted by City voters and a Sphere of Influence determined by Sonoma Local Agency Formation Commission (LAFCO). The Urban Service Area includes more than 1,000 acres located outside the incorporated city, including the Fitch Mountain area. Bounded by the City to the west and the Russian River to the north, east, and south, this portion of unincorporated Sonoma County includes low-density residential development on the flanks of the mountain. The higher portions of the mountain remain open space that is permanently protected by a conservation easement.

2.3 Population and Housing

According to the 2020 Census, the population of Healdsburg was estimated to be 11,340. **Table 2-1** shows changes in population and households between the three most recent US Censuses.

The data illustrates that while Healdsburg’s population continues to grow, the rate at which the city is growing has reduced significantly, from 13.2 percent growth in 2000 to 5.0 percent growth in 2010 to less than 1 percent growth in 2020. A large factor in the City’s population growth during the 1990s was the annexation of land, known as “Area A,” to the north (Sonoma LAFCO 2006). Nevertheless, the reduction in growth after 2000 reflects similar trends seen in Sonoma County and across the entire state.

Table 2-1: Population and Household Changes

	Healdsburg	Sonoma County	California
Population			
2020	11,340	488,863	39,538,223
2010	11,254	483,878	37,253,956
2000	10,722	458,614	33,871,648
Growth (2010-2020)	0.8%	1.0%	5.8%
Growth (2000–2010)	5.0%	5.5%	10.0%
Growth (1990–2000)	13.2%	18.1%	13.8%
Households			
2020	4,626	188,841	13,217,586
2010	4,378	185,825	12,577,498
2000	3,968	172,403	11,502,870
Average Household Size			
2020	2.46	2.56	2.92
2010	2.56	2.55	2.90
2000	2.69	2.60	2.87

Sources: Healdsburg, City of. 2015., US Census Bureau. 2021.

A household is defined as a person or group of persons living in a housing unit. According to the 2020 Census, there were 4,626 households in Healdsburg and the average household size was 2.46. Most residents live in single-family housing or mobile homes. **Table 2--2** shows the composition of the housing stock in 2000, 2010, and 2016, and the percentage change over time.

Table 2-2: Healdsburg Housing Units, 2000, 2010, 2016

Unit Type	2000		2010		2016	
	Number	Percentage	Number	Percentage	Number	Percentage
Single-Family	3,257	78.4	3,761	79.5	4,008	79
2-4 Units	423	10.2	475	10.1	640	12.7
5-9 Units	156	3.8	162	3.4	82	1.4
10+ Units	218	5.3	262	5.5	272	5.4
Mobile Home & Other	98	2.4	69	1.5	73	1.5
Totals	4,152	100	4,729	100	5,075	100

Source: US Census Bureau. 2022.

2.4 Land Use and Development Trends

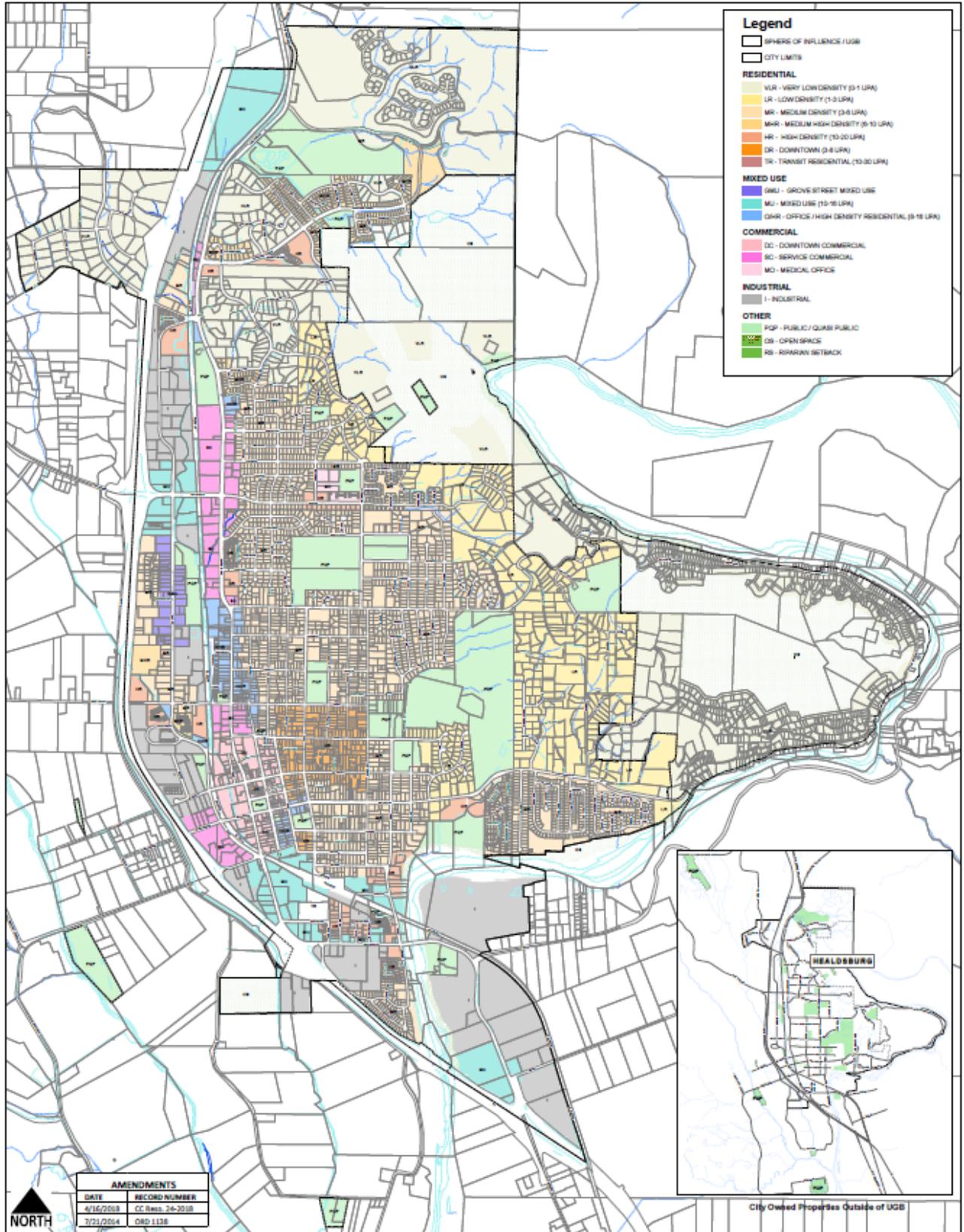
Table 2-3 shows the various land uses and their acreage within the Planning Area in 2004. According to the 2030 General Plan, approximately 68 percent of the city’s land was developed in 2004. The Planning Area, which includes the entire Sphere of Influence/Urban Service Area contains a significant amount of vacant or underdeveloped acreage, including approximately 492.13 acres in the northern part of the Planning Area (Areas A, B, and C). Areas B and C, however, include 158.87 acres that the Sonoma County Agricultural and Open Space District owns or controls through conservation easements that prohibit development. Therefore, the northern Planning Area has a total of about 333.26 acres that remains potentially developable. The Grove Street area (Area G) also contains a relatively significant amount of land that is vacant or underdeveloped. Although within the Urban Growth Boundary, Fitch Mountain (Area K) is not expected to accommodate growth due to infrastructure and environmental constraints.

Table 2-3: Land Uses within Healdsburg Planning Area (2004)

General Plan Land Use Designation	Total Acreage	Developed Acres	Vacant Acres
Agricultural	16.69	16.69	0
Residential	1,733.04	1,351.22	381.82
Commercial	204.67	181.25	23.42
Mixed Uses	16.91	16.91	0
Light Industrial	124.37	113.25	11.12
Heavy Industrial	203.26	130.92	72.34
Institutional (Public & Semi-Public)	342.12	342.12	0
Open Space	432.75	n/a	n/a

Source: Healdsburg, City of. 2015.

Current land uses, as identified in the 2030 General Plan, are illustrated in **Figure 2.2**.



Healdsburg 2030 General Plan

Figure 3 - Land Use Plan

Figure 2.2: City of Healdsburg Land Use Plan

2.4.1 Future Growth

In the Bay Area, a long-range plan titled Plan Bay Area has been developed that looks ahead to 2040. Plan Bay Area is a state-mandated, integrated long-range transportation, land use, and housing plan that will support a growing economy, provide more housing and transportation choices, and reduce transportation-related pollution in the nine-county San Francisco Bay Area (Plan Bay Area 2018.). Two concepts directly affect growth in a community: the Regional Housing Need allocation (RHNA) and the Plan Bay Area Priority Development Areas (PDAs).

The California Department of Housing and Community Development (HCD) identifies the total housing need for the San Francisco Bay Area for eight-year periods (the current period being from 2023 to 2031). ABAG then develops a methodology to distribute the need to local governments. The RHNA for Healdsburg and the entirety of Sonoma County is illustrated in **Table 2-4**; housing allocations are divided into four different income categories.

Table 2-4: Regional Housing Need Allocation 2023-2031 by Income Category

	Very Low 0–50%	Low 51–80%	Moderate 81–120%	Above Moderate 120%+	Total
City of Healdsburg	190	109	49	128	476
Sonoma County Total	3,999	2,302	2,302	5,959	14,562
Bay Area Region Total	114,442	65,892	72,712	188,130	441,176

Source: ABAG 2022.

PDAs are areas where growth and development will be focused. Plan Bay Area identifies nearly 200 PDAs; these existing neighborhoods are served by public transit and have been identified as appropriate for additional compact development. There are no PDAs in Healdsburg.

Plan Bay Area concentrates growth in the “Big 3 Cities” of San Jose, San Francisco, and Oakland, as well as in east and west Bayside corridors along the region’s core transit network. As illustrated in **Figure 2.3**, 83 percent of all growth will occur in four counties (Santa Clara, Alameda, San Francisco, and Contra Costa), while the remaining five counties will see modest growth over the next 24 years. Four percent of the Bay Area’s growth will occur in Sonoma County.

The growth for Healdsburg set forth in Plan Bay Area is consistent with past growth patterns and current land use policies.

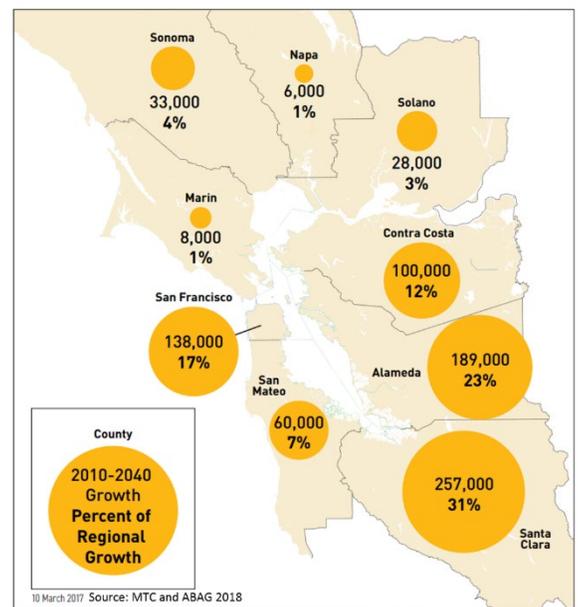


Figure 2.3: Household Growth by County
(Percent of Regional 2010-2040 Growth)

2.5 Changes in Development

Since the 2018 LHMP, Healdsburg has experienced development and growth, but the general development trend that existed when the 2018 LHMP was developed is still relevant: The City will continue to focus inward with infill development and redevelopment of underutilized sites. New development will be compact and efficient to make the best use of remaining land. With this growth, an increased number of people are vulnerable to various hazards, but the recent development has not changed the city's landscape; therefore, no new hazard areas, such as floodplains, have been added to Healdsburg. Additionally, the City is implementing mitigation measures for new developments and their construction. For example, water mains that cross fault lines are equipped for emergency connection, and curbs under construction at the new roundabout as part of the Central Healdsburg Avenue Plan have porous concrete. As such, development that has occurred since the last plan has not significantly affected the vulnerabilities of Healdsburg.

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Section 3. Planning Process

For the development of the LHMP, a planning process was created based on the various federal guidance documents and regulations. As shown in **Figure 3.1**, the LHMP planning process included organizing resources, assessing risk, developing the mitigation strategy, and developing the plan (including drafting, reviewing and revising, and adopting and submitting the plan). Documents that further illustrate the planning process are provided in **Appendix A**.

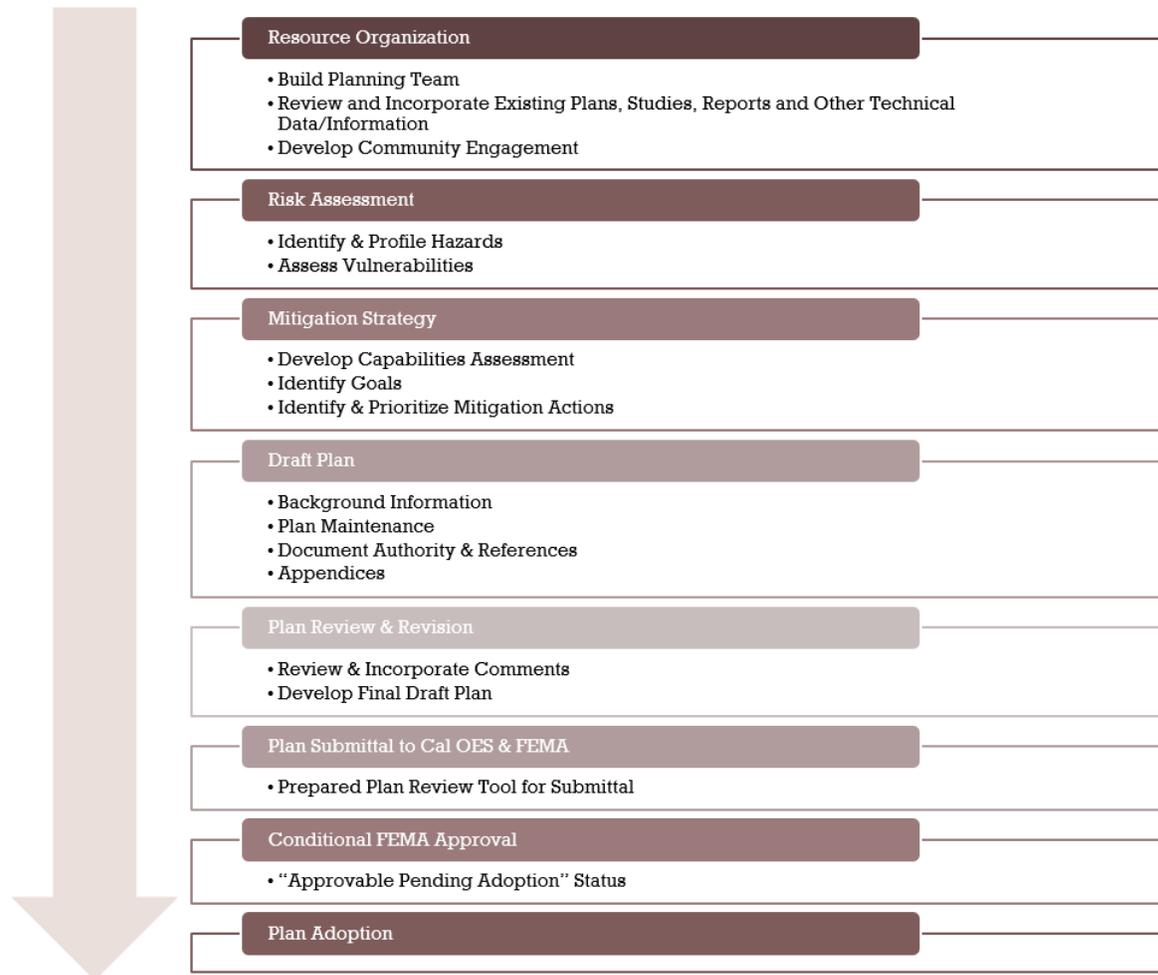


Figure 3.1: Hazard Mitigation Planning Process

3.1 Organize Resources

The planning process began by organizing resources, which included establishing a planning team and identifying stakeholders, collecting and analyzing relevant plans, and developing a community engagement strategy.

3.1.1 LHMP Planning Team

At the core of the LHMP planning process is the LHMP Planning Team, which served as the backbone of the LHMP planning process. Team members provided data for the plan, made key decisions to guide the development of the plan, and served as liaisons to their departments. The membership of the 2018 LHMP

Planning Team was used as a starting point for the 2023 LHMP Planning Team. The 2023 LHMP Planning Team includes staff from a variety of City departments, as shown in **Table 3-1**. An email inviting all City department leads to join the planning process the planning team can be found in **Appendix A**.

Table 3-1: LHMP Planning Team

Planning Team Member	Title	Department
Kelsey Carreiro	Emergency Manager	Police Department
Raina Allen	Public Information Officer	City Manager’s Office
Allison Mattioli	Administrative Analyst II	City Manager’s Office
Matt Jenkins	Police Chief	Police Department
Jason Boaz	Fire Chief	Fire Department
Lance Macdonald	Fire Marshal	Fire Department
Andrew Sturmfels	Assistant City Manager	City Manager’s Office
Ellen McDowell	Senior Planner	Community Development
Tyler Kettmann	Central Services Manager	City Manager’s Office
Curt Bates	Principal Engineer	Public Works
Terry Crowley	Utility Director	Electric Department
Adam McKenna	IT Manager	IT & GIS Department

The Planning Team met throughout the development of the 2023 LHMP. Meetings were conducted in person; follow-up activities were conducted on the phone or via email. The LHMP Planning Team met three times between March 2023 and May 2023, addressing the following items:

- **Meeting 1 – March 27, 2023:** Summarize the project purpose and process, identify hazards, introduce capability assessment, discuss community outreach strategies
- **Meeting 2 – April 24, 2023:** Introduce/review hazard assessment, revisit capability assessment, identify critical facilities
- **Meeting 3 – May 22, 2023:** Review updated hazard maps, discuss community workshop format and outreach, introduce and discuss the mitigation strategy

Meeting documentation, including agendas, PowerPoint presentations, sign-in sheets, and other relevant handouts, are provided in **Appendix A**.

3.1.2 Review and Incorporate Existing Information

The LHMP Planning Team reviewed and assessed existing plans, studies, and data available from local, state, and federal sources. Key documents reviewed as part of the LHMP planning process and how they were incorporated are shown in **Table 3-2**; a complete list of resources is found in **Section 9**. Additionally, at the beginning of the plan update process, the 2018 LHMP was reviewed and recommendations for

updates were provided. These are described in the subsection “LHMP Review and Recommendations” below.

Table 3-2: Existing Plans, Studies, Reports, and Other Technical Data/Information

Document/Data	Use
2023 State of California Hazard Mitigation Plan	Disaster declaration information and hazard descriptions
Healdsburg 2030 General Plan Background Report and Policy Documents, 2015	Hazard identification, historical hazard and location information
2021 Sonoma County Multijurisdictional Hazard Mitigation Plan	Historical hazard and location information
Foss Creek Flood Control Study (West Yost Associates)	Historic flooding mapping and event data
City of Healdsburg Geographic Information Systems (GIS) data	Mapping data for hazards and demographics
Disaster Mitigation Act	Current federal legislation for hazard mitigation planning
2023 FEMA Local Hazard Mitigation Planning Policy Guide	Updated guidance on hazard mitigation planning
City of Healdsburg 2020-2025 Strategic Plan	Strategic initiatives and goals for Healdsburg

The following local regulations, codes, ordinances, and plans were reviewed to develop complementary and mutually supportive goals, objectives, and mitigation strategies that are consistent across local and regional planning and regulatory mechanisms:

- General plans (land use, housing, safety, and open space elements)
- Building codes
- Zoning and subdivision ordinances
- NFIP flood damage prevention ordinances
- Stormwater management plans
- Emergency management and response plans
- Land use and open space plans
- Climate action plans
- Community wildfire protection plans

LHMP Revisions and Changes to Community Priorities

This 2023 LHMP is the fourth iteration of the plan. The LHMP was originally developed as part of the 2005 ABAG Multi-Jurisdictional Hazard Mitigation Plan. An Annex specific to the City of Healdsburg was adopted in 2007, and a second version was developed in 2011. The City’s first stand-alone plan was developed in 2018 and was used as the basis for the 2023 LHMP. Areas identified for updates based on the planning team’s assessment and changes in community priorities included:

- Vulnerability to specific hazards will be updated for individual critical facilities.

- The capability assessment will be updated.
- Mitigation actions will be updated and newly identified mitigation actions will be added.
- A severe weather hazard profile will be added.
- A Public Safety Power Shutoff (PSPS) hazard profile will be added.

The severe weather and PSPS hazard profiles have been added to the 2023 LHMP due to the increased community priority on preparing for and mitigating these two hazards. There has not been any other significant change in community priorities that required further revision of this plan.

3.2 Community Engagement Strategy

The community engagement strategy included an initial media release, an online hazards questionnaire, a community workshop and availability of the draft plan for review and comment. Each aspect of the engagement strategy is described in more detail below, and associated documentation is included in **Appendix B**. The community engagement strategy was drafted at the commencement of the plan and was modified as needed throughout the plan development process. During each stage of community outreach during the plan's development process, special attention was paid to ensuring that underserved communities and vulnerable populations in Healdsburg were provided an opportunity to be involved in the planning process such as the City's Spanish speaking population, senior members, and the unhoused community. Since Healdsburg has a high population of Spanish speakers, all community outreach was done in both English and Spanish. Additionally, large print flyers were posted in the Healdsburg Senior Center with information about how to participate in the planning process. The Healdsburg Emergency Manager also discussed the LHMP with members of the public who attended the annual Emergency Preparedness Expo and Annual Senior Emergency Preparedness Seminar. Hard copy flyers and surveys were available at the Healdsburg Emergency Management booth for those interested in learning more or participating in the planning process.

Media Release

A media release was distributed announcing the project. It described the purpose of the project and provided points of contact for anyone who wanted to participate in the planning process or wanted more information about the project. The media release was distributed via email and social media by the City's Public Information Officer in April 2023. A copy of the press release, as well as screenshots of the social media posts are included in **Appendix B**.

Stakeholder Outreach

Development of the 2023 LHMP was discussed at the weekly Sonoma County Emergency Operational Area Coordination Call. This meeting is hosted by Sonoma County Department of Emergency Management and is comprised of 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. The group meets weekly to discuss and coordinate emergency management, preparedness, training and disaster recovery-related issues. The project was announced at the weekly meeting held on April 10th, 2023. The LHMP Planning Team Lead, Kelsey Carreiro, described the purpose and timeline of the project. She invited all stakeholders to attend the planning meetings or

receive updates on the plan development. Kelsey Carreiro provided points of contact for anyone who wanted to participate in the planning process or wanted more information about the project. A link to the online hazard questionnaire was provided as well as an invitation to the Community Workshop. The project was discussed again at the Sonoma County Emergency Operational Area Coordination Call with the same stakeholders present held on June 26th, 2023, when the public review draft of the 2023 LHMP was ready and a link was provided. Representatives from the Operational Area were invited to review the draft plan and provide comments to the LHMP Planning Team. The representatives in attendance at the operational area calls were:

- **Local and Regional Agencies involved in hazard mitigation:**
 - Healdsburg Police Department
 - Healdsburg Fire Department
 - Healdsburg Emergency Management
 - Santa Rosa Emergency Management
 - Santa Rosa Fire Department
 - Sonoma County Emergency Management
 - Sonoma County Fire District
 - Marin County Office of Emergency Management
 - Petaluma Emergency Management
 - Cal OES
 - National Weather Service
 - Graton Fire Protection District
 - United States Coast Guard
 - Sonoma Valley Fire
 - Rancho Adobe Fire
 - CAL Fire
 - REDCOM
 - Cloverdale Fire
 - Petaluma Fire Department
 - Northern Sonoma County Fire District
- **Agencies that have the authority to regulate development:**
 - City of Healdsburg
 - Sonoma County Permit & Resource Management Department
 - Sonoma County Public Infrastructure
 - Sonoma County Agriculture, Weights, and Measures
 - Sonoma County Regional Parks
 - Sonoma County Water Agency
- **Neighboring Communities:**
 - Cloverdale
 - Cotati
 - Windsor
 - Petaluma
 - Rohnert Park

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- Santa Rosa
- Sebastopol
- Sea Ranch
- Sonoma
- **Representatives of business, academia, and other private organizations:**
 - Santa Rosa Junior College
 - Sonoma State University
 - Sonoma County Office of Education
 - Redwood Empire Schools' Insurance Group
 - Sonoma County Fairgrounds
 - Public Gas & Electric Company
- **Representatives that provide support to underserved communities:**
 - Coastal Valleys EMS Agency
 - American Red Cross
 - California 2-1-1
 - Legal Aid of Sonoma County
 - Sonoma County Council on Aging
 - Sonoma County Health and Human Services
 - Graton Rancheria

Additionally, the following agencies and cities were notified through email of the draft plan's availability for review and comment:

- **Local and Regional Agencies involved in hazard mitigation:**
 - Healdsburg Police Department
 - Healdsburg Fire Department
 - Healdsburg Emergency Management
 - Santa Rosa Emergency Management
 - Santa Rosa Fire Department
 - Sonoma County Emergency Management
 - Sonoma County Fire District
 - Marin County Office of Emergency Management
 - Petaluma Emergency Management
 - Cal OES
 - National Weather Service
 - National Oceanic and Atmospheric Administration
 - Graton Fire Protection District
 - United States Coast Guard
 - Sonoma Valley Fire
 - Rancho Adobe Fire
 - California Department of Forestry and Fire Protection
 - REDCOM
 - Cloverdale Fire

- Petaluma Fire Department
- Northern Sonoma County Fire District
- North Sonoma Coast Fire Protection District
- Petaluma Police Department
- California Highway Patrol
- Sonoma County Sheriff's Department
- Cloverdale Fire Department
- Cloverdale Police Department
- Gold Ridge Fire Department
- Marin County Sheriff's Department
- Rancho Adobe Fire Protection District
- Bodega Bay Fire Protection District
- Sonoma Valley Fire & Rescue Authority
- Rincon Valley Fire Protection District
- **Agencies that have the authority to regulate development:**
 - City of Healdsburg
 - Sonoma County Permit & Resource Management Department
 - Sonoma County Public Infrastructure
 - Sonoma County Agriculture, Weights, and Measures
 - Sonoma County Regional Parks
 - Sonoma County Water Agency
 - Department of Transportation
 - California Army National Guard
- **Neighboring Communities:**
 - Cloverdale
 - Cotati
 - Windsor
 - Petaluma
 - Rohnert Park
 - Santa Rosa
 - Sebastopol
 - Sonoma
 - Marin County
 - Sonoma County
- **Representatives of business, academia, and other private organizations:**
 - Santa Rosa Junior College
 - Sonoma State University
 - Sonoma County Office of Education
 - Redwood Empire Schools' Insurance Group
 - Sonoma County Fairgrounds
 - Public Gas & Electric Company
 - Sonoma Marin Area Rail Transit

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- Golden Gate Bridge, Highway and Transportation District
- Sweetwater Springs Water District
- **Representatives that provide support to underserved communities:**
 - Coastal Valleys EMS Agency
 - American Red Cross
 - California 2-1-1
 - Legal Aid of Sonoma County
 - Sonoma County Council on Aging
 - Sonoma County Health and Human Services
 - Graton Rancheria
 - Dry Creek Rancheria
 - Cloverdale Rancheria
 - The Sea Ranch Association
 - Community Action Partnership
 - United Way Wine Country
 - Reach for Home
 - Corazon Healdsburg
 - Catholic Charities of the Diocese of Santa Rosa
 - Stewarts Point
 - Redwood Empire Food Bank

A copy of the email announcing availability of the public review draft is found in **Appendix B**.

Hazard Questionnaire

A questionnaire was developed for the public to provide feedback on their concerns about natural and human-caused hazards. The online questionnaire was advertised on the City's website, Facebook, Instagram, and Nextdoor. Hard copies were available at the community workshop for immediate completion. All formats of the hazard questionnaire were available in both English and Spanish. Reach for Home, an organization that engages with the unhoused population in and around the planning area, were given hard copies of the hazard questionnaire so they could pass them out to unhoused individuals in the area that may be interested in participating in the planning process but may not have access to a computer or smartphone. Additionally, the Healdsburg Senior Center and Communities Organized to Prepare for Emergencies (COPE) received hardcopies of the questionnaire to ensure that the elderly community within and around the planning area had several options to participate in the LHMP planning process.

A copy of the questionnaire is included in **Appendix B**, as well as an analysis of the 69 responses received.

Key takeaways from the questionnaire responses are that:

- The LHMP Planning Team and the community are in agreement in terms of hazards of concern and hazards experienced. The community identified the following hazards as their top concerns: wildfire, drought, earthquake, flooding, and Excessive Heat/cold. The community did not note any hazards of concern that the LHMP Planning Team had not discussed.

- 95 percent of community members who replied to the questionnaire have signed up to receive City community alerts.
- Community members stated that utility bills and mail, the City’s website, social media, newspapers, and public meetings are the most effective ways to disseminate information. The City is providing information/outreach in the desired mediums. While newspapers are not as commonly used to provide information, the City regularly uses the other four mediums to reach community members.
- 99 percent of community members are implementing at least one mitigation method within their own household. The vast majority have implemented multiple mitigation actions across multiple hazards. It could be deduced that this level of awareness and personal responsibility indicates that public education and outreach is an effective approach to reducing risk in Healdsburg.

As these responses were in line with the LHMP Planning Team’s current thinking, the responses did not alter the planning process. Rather, the responses reinforced that the LHMP Planning Team has the correct approach and priorities in mind.

Community Workshop

A community workshop was held on June 7th, 2023. The workshop was open-house style and lasted for two hours, from 5 to 7 p.m. It was advertised that a short formal presentation would occur 15 minutes after the hour at 5:15 and 6:15 p.m. LHMP Planning Team members attended the community workshop to answer questions and interact with the public. Additionally, translation and childcare services were advertised and provided during the workshop. Reach for Home, an organization that engages with the unhoused population in and around the planning area, were made aware of the workshop so they could invite unhoused individuals in the area that may be interested in participating in the planning process but may not have access to a computer or smartphone. Additionally, the Healdsburg Senior Center and Communities Organized to Prepare for Emergencies (COPE) advertised the workshop to ensure that the elderly community within and around the planning area was aware of the opportunity to participate in the LHMP planning process.

The community workshop included:

- Large-scale, large print hazard maps for the public to view to accommodate anyone who may have vision impairments.
- A map where community members were asked to write down their concerns and to identify location-specific concerns as well as general concerns.
- Handouts on mitigation planning, mitigation and preparedness activities that can be completed by an individual, and complementary planning efforts being undertaken by the City.
- Hard copies of the hazard questionnaire, as well as flyers advertising the questionnaire with the link to the online version in both English and Spanish.

Documentation of outreach for the workshop and of the workshop itself is provided in **Appendix B**.

Public Review Draft Plan

At the beginning of August, the Public Review Draft Plan was posted to the City’s website. Availability of the draft was advertised as a newsflash on the home page of the City’s website as well as on Facebook, Instagram, and Nextdoor. Also, as previously described, various neighboring communities and local and regional agencies and nonprofits were directly notified when the Public Review Draft became available. Reach for Home, Corazon Healdsburg, COPE and the Senior Center were all contacted by phone to ensure they would use word of mouth to invite community members to review the public draft and provide comments. Due to a lack of feedback, the comment period was extended for an additional two weeks. Ultimately, no feedback for the LHMP Public Review Draft was received from the public or local and regional agencies. Documentation of the availability of the Public Review Draft is included in **Appendix B**.

3.3 Assess Risks

In accordance with FEMA requirements, this step of the LHMP planning process identified and prioritized the natural hazards affecting Healdsburg and assessed the vulnerability from the identified hazards. Results from this phase in the LHMP planning process formed the foundation for the subsequent identification of appropriate mitigation actions for reducing risk and losses in the city. This component of the LHMP planning process is detailed in **Sections 4 and 5**.

3.3.1 Identify/Profile Hazards

Based on a review of past hazards as well as a review of the existing plans, reports, and other technical studies/data/information, the Planning Team determined whether the hazards from the previous plan were still valid and identified new hazards that could affect Healdsburg. The Planning Team decided to profile the following hazards: drought, earthquake (including liquefaction), flooding (including dam failure), landslide, and wildfire (including high winds). Additionally, it was decided that discussions of future conditions would be incorporated into each hazard profile. Further details about the hazard identification process are found in **Section 4.1**; each hazard is profiled in **Section 4.2**.

3.3.2 Assess Vulnerabilities

Hazard profiling exposes the unique characteristics of individual hazards and begins the process of determining which areas in Healdsburg are vulnerable to specific hazard events. The vulnerability assessment included a GIS overlaying method for all geographically defined hazards. Using this methodology, an analysis identified the critical facilities, population, and residential buildings that might be impacted by the hazards. Detailed information on each hazard vulnerability assessment is provided in **Section 5**.

3.4 Develop Mitigation Strategy

The LHMP is the explicit strategy that provides the blueprint for hazard mitigation planning to better protect people and property in the city from the effects of future natural hazard events. Developing the mitigation strategy involved developing a capabilities assessment, identifying goals, and finally identifying and prioritizing mitigation actions. This step of the LHMP planning process is detailed in **Sections 6 and 7**.

3.4.1 Develop Capabilities Assessment

A capabilities assessment is a comprehensive review of all the various mitigation capabilities and tools currently available to the City of Healdsburg to implement the mitigation actions prescribed in the LHMP.

The LHMP Planning Team identified legal and regulatory, human and technical, and financial capabilities, as detailed in **Section 6**.

3.4.2 Identify Goals

Mitigation goals are general guidelines that explain what the community wants to achieve in terms of hazard loss and prevention. The LHMP Planning Team began by reviewing the goal from the existing LHMP and decided that, with a minor tweak, the goal would still be relevant and appropriate for the 2023 LHMP.

3.4.3 Identify Mitigation Actions

The LHMP Planning Team and the LHMP Planning Team worked together to identify and develop a mitigation action plan. The mitigation action plan is the City's road map for the next five years, illustrating the priority mitigation actions the City would like to implement in the near future. **Section 7** details the approach to review of the existing mitigation actions, identification and prioritization of new mitigation actions, and creation of the implementation strategy.

3.5 Develop the Plan

All information, data, and associated narratives from the previous tasks were incorporated into the 2023 LHMP. There will be four versions of the plan:

- The first draft will be an **administrative draft**, distributed to the LHMP Planning Team for their review and comment.
- Comments received from the LHMP Planning Team will be incorporated into the plan and a **public review draft** will be developed. This second draft will be available for public review and comment.
- All comments received by the public will be compiled and addressed; the 2023 LHMP will be revised as appropriate. This third version of the plan is the **courtesy review draft**, which will be sent to Cal OES and FEMA for their review and comment.
- The final version of the plan will have addressed any comments received by Cal OES and FEMA. This **final 2023 LHMP** will be presented to the City Council for adoption.

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Section 4. Hazard Assessment

Table 4-1: Hazard History and Hazards in Various Planning Documents

Hazard	State of CA HMP (2023)	Sonoma County HMP (2021)	Healdsburg General Plan (2030)	2018 Healdsburg LHMP	Disaster Declaration* (# of events)	Include in 2023 Healdsburg LHMP?
Avalanche	X					No (no history)
Coastal Flooding, Erosion, and Sea Level Rise	X					No (city is landlocked)
Dam Failure	X		X	X		Yes (flood sub-hazard)
Drought	X			X	1	Yes
Earthquake (including liquefaction)	X	X	X	X	1	Yes
Excessive Heat	X					Yes (severe weather sub-hazard)
Flood	X	X	X	X	12 ^a	Yes
Freeze	X				2 ^b	Yes (severe weather sub-hazard)
Landslide	X	X	X	X		Yes
Levee Failure	X					No (no levees)
PSPS	X					Yes
Severe Weather	X	X				Yes
Tsunami	X					No (city is landlocked)
Volcano	X					No (low concern)
Wildfire	X	X	X	X	14 ^c	Yes

Future Condition Considerations will be discussed for each hazard.

* 1950–Present, Declarations for Sonoma County not just Healdsburg.

^a Flood: 9 federally declared flood disasters, 3 additional incidents that were not federally declared.

^b Freeze: 1 federally declared freeze disaster, 1 additional incident that was not federally declared.

^c Wildfire: 11 federally declared wildfire disasters, 3 additional incidents that were not federally declared.

The hazard assessment identifies and describes the hazards that threaten Healdsburg.

4.1 Hazard Identification

To aid in the process of identifying hazards, the LHMP Planning Team considered the hazards included in the previous version of the City’s LHMP, looked at associated HMPs, reviewed other relevant planning documents, and considered hazard history to determine the natural hazards with the potential to affect

the city. **Table 4-1** provides a crosswalk of hazards considered and the final determination by the LHMP Planning Team.

Based on the above analysis, the Planning Team determined that all of the hazards identified in the 2018 LHMP should be included in the 2023 LHMP. In addition, it was decided that the hazards of severe weather and PSPS should be added in the 2023 LHMP. Future condition considerations will be discussed for each hazard profiled.

As such, the following seven hazards are profiled in the 2023 LHMP:

- Drought
- Earthquake (including liquefaction)
- Flooding (including dam failure)
- Landslide
- PSPS
- Severe Weather
- Wildfire

Table 4-2: Federal and State Declared Disasters

Event DR #	Event Type	Incident Period	Impacts to Planning Area
DR-4699-CA	Severe Weather	2/21/23-7/10-23	No Measurable Impacts
EM-3592-CA	Severe Weather	3/9/23-7/10/23	No Measurable Impacts
DR-4683-CA	Severe Weather	12/27/22-1/31/23	No Measurable Impacts
EM-3591-CA	Severe Weather	1/8/23-1/31/23	No Measurable Impacts
DR-4569-CA	Wildfire	9/4/20-11/17/20	No Measurable Impacts
FM-5376-CA	Wildfire	9/27/20-Continuing	No Measurable Impacts
DR-4558-CA	Wildfire	8/14/20-9/26/20	No Measurable Impacts
FM-5331-CA	Wildfire	8/17/20-Continuing	No Measurable Impacts
DR-4482-CA	Covid-19	1/20/20-5/11/23	No Measurable Impacts
EM-3428-CA	Covid-19	1/20/20-5/11/23	No Measurable Impacts
FM-5295-CA	Wildfire	10/24/19-Continuing	No Measurable Impacts
DR-4434-CA	Severe Weather	2/24/19-3/1/19	No Measurable Impacts

4.2 Hazard Profiles

For each hazard, a profile has been established describing the hazard in general, as well as details specific to Healdsburg. The hazard profiles discuss the following topics:

- **Hazard Description** - This section gives a description of the hazard and associated issues followed by details on the hazard specific to the City of Healdsburg Planning Area.
- **Strength/Magnitude** - This section gives a description of the potential strength or magnitude of the hazard as it pertains to the City of Healdsburg. Different hazards may have different measures of extent.

- **Past Occurrences** - This section contains information on historical incidents, including impacts where known.
- **Location** - This section provides a spatial description of the potential locations or geographic areas in the City of Healdsburg where the hazard is expected to impact.
- **Warning Time** – This section provides the amount of warning time, if any, that the City of Healdsburg expects to have for each hazard.
- **Secondary Hazards** – This section discusses the what secondary hazards are associated with each hazard.
- **Frequency and Probability of Future Occurrence** - The frequency of past events is used in this section to gauge the likelihood of future occurrences. Where possible, frequency was calculated based on existing data. Frequency was determined by dividing the number of events observed by the number of years on record and multiplying by 100. This gives the percent chance of an event happening in any given year (e.g., three droughts over a 30-year period equates to a 10 percent chance of a drought in any given year). The likelihood of future occurrences is categorized into one of the following classifications:
 - Highly Likely - Nearly 100 percent chance of occurrence in next year or happens every year.
 - Likely - Between 10 and 99 percent chance of occurrence in next year or has a recurrence interval of 10 years or less.
 - Occasional - Between 1 and 10 percent chance of occurrence in the next year or has a recurrence interval of 11 to 100 years.
 - Unlikely - Less than 1 percent chance of occurrence in next 100 years or has a recurrence interval of every 100 years or greater.
- **Climate Change Considerations** - Climate change refers to a long-term change in the earth’s temperature, precipitation, humidity, and seasons. This section addresses the probable effects of climate change qualitatively and as a secondary impact for each identified hazard. In other words, it describes the potential for climate change to affect the frequency and severity of natural hazards. Impacts can include water supply shortages, changes in the frequency, intensity, and extent of drought and extreme heat events, more precipitation and flooding risks, and increasing temperatures.

The hazards are discussed in alphabetical order; the order does not signify the level of risk. Hazard maps are included within the hazard profiles, but larger and higher resolution versions of these maps can be found in **Appendix C**.

4.2.1 Drought

Hazard Description

A drought is a long-term water shortage caused by an extended period with little to no precipitation that can lead to a decline in available water supplies. Droughts may cause increases in water rates or additional restrictions on water use. In severe cases, communities may not have enough available water to meet basic needs. Drought conditions can significantly harm agricultural operations, particularly in areas that grow water-intensive crops. Planted landscapes may become drought-stressed, causing them to become weak or die from lack of water. If drought conditions are severe enough, the lack of water may pose a human health risk.

Droughts also have several indirect impacts. The lack of precipitation can cause soil to harden and become less permeable so that when precipitation does eventually occur, the soil cannot absorb water as easily, potentially leading to increased flooding. Drier soil may become decompressed, increasing its susceptibility to sliding and eroding. Droughts may dry out wildland vegetation, potentially increasing the risk of fire. Water-stressed plants may also be more vulnerable to disease or pests.

Unlike most other hazards, droughts develop over a long period of time. It often takes multiple dry years to cause drought conditions, and these conditions may persist for years. They are usually a region-wide hazard, and at times may extend statewide or cover multiple states. However, the specific impacts of a drought can depend on local conditions, including water supply systems, soil types, and land uses. As a result, two communities under similar drought conditions may experience different impacts. Droughts may also have a significant impact on communities not directly in the affected area. For example, if a community relies on imported water that travels a great distance, the community may be substantially impacted if a drought occurs at the source of the imported water, even if precipitation levels in the community itself are normal. Similarly, communities may be facing local drought conditions, but impacts may be minor if the community's water comes from a distant unaffected area.

Strength/Magnitude

There are multiple ways to measure the severity of different drought conditions. The US Drought Monitor Classification Scheme, shown in **Table 4-2**, combines many of these systems into a single index. D1 is the least intense level and D4 the most intense. Drought is defined as a moisture deficit bad enough to have social, environmental, or economic effects. D0 areas are not in drought but are experiencing abnormally dry conditions that could turn into drought or are recovering from drought but are not yet back to normal.

Table 4-2: US Drought Monitor Classification Scheme

Category	Description	Possible Impacts
D0	Abnormally dry	Slower growth of crops and pastures compared to normal activities.
D1	Moderate drought	Some damage to crops and pastures. Streams, reservoirs, or wells low. Some water shortages may be developing or imminent.
D2	Severe drought	Likely crop and pasture losses. Water shortages are common, leading to restrictions.
D3	Extreme drought	Major crop and pasture losses. Widespread water shortages.
D4	Exceptional drought	Exceptional and widespread crop and pasture losses. Emergency shortages develop.

Source: US Drought Monitor, 2018

Past Occurrences

Droughts are a common feature of the climate in much of California, and many of the state’s native plants and animals have evolved strategies to survive during drought conditions. The state also has an extensive water supply network that helps to reduce the impacts of droughts with the assistance of large storage reservoirs and pipes that can move water from regions with available supplies to drought-affected areas, although this system primarily benefits the urban areas of California.

Historic droughts in California occurred from 1976 to 1977, 1986 to 1992, 2007 to 2009, and 2011 to 2017. During the statewide drought of 1976 to 1977, four Bay Area counties (Contra Costa, Napa, San Mateo, and Marin) were among those where a state disaster was declared. Marin, Solano, and Sonoma counties were affected in the 1986–92 drought, which caused \$1.7 billion in crop losses nationwide (Cal OES 2013, as cited by ABAG 2017).

The most recent drought in California lasted from 2019 to 2023 and was declared a state of emergency by Governor Gavin Newsom on April 21, 2021. Initially, it covered the Russian River Watershed of Sonoma and Mendocino counties, but Governor Newsom expanded it statewide October 19, 2021 (California Drought Action 2023). Locally, Sonoma County proclaimed an emergency for drought, the Proclamation of Local Emergency Due to Drought Conditions in the Sonoma County Operational Area. The proclamation was first adopted in April 2021, and the County extended the emergency proclamation through the beginning of 2023. This proclamation was in response to an intensification of the state’s ongoing drought and was guided by mandatory state emergency conservation regulations issued to all water providers in California. The proclamation applied to the entire Sonoma County Operational Area, including all special districts and incorporated cities (including Healdsburg).

The US Drought Monitor placed nearly all of Sonoma County in the most severe category, D4 (Exceptional Drought), for most of the latter half of 2021, from late July through early December. **Figure 4.1** offers snapshots of US Drought Monitor classifications for Sonoma County at the start of California’s rainy season in October and the end of the rainy season in March for each year since 2018. The progression demonstrates how the area affected by the more severe categories spread and receded over the course of the drought. At the end of 2022 and start of 2023, California experienced nine atmospheric rivers over three weeks. The state experienced a flood emergency while still in an active drought emergency. By June 2023, 95% of California was no longer in any drought category, including Healdsburg.

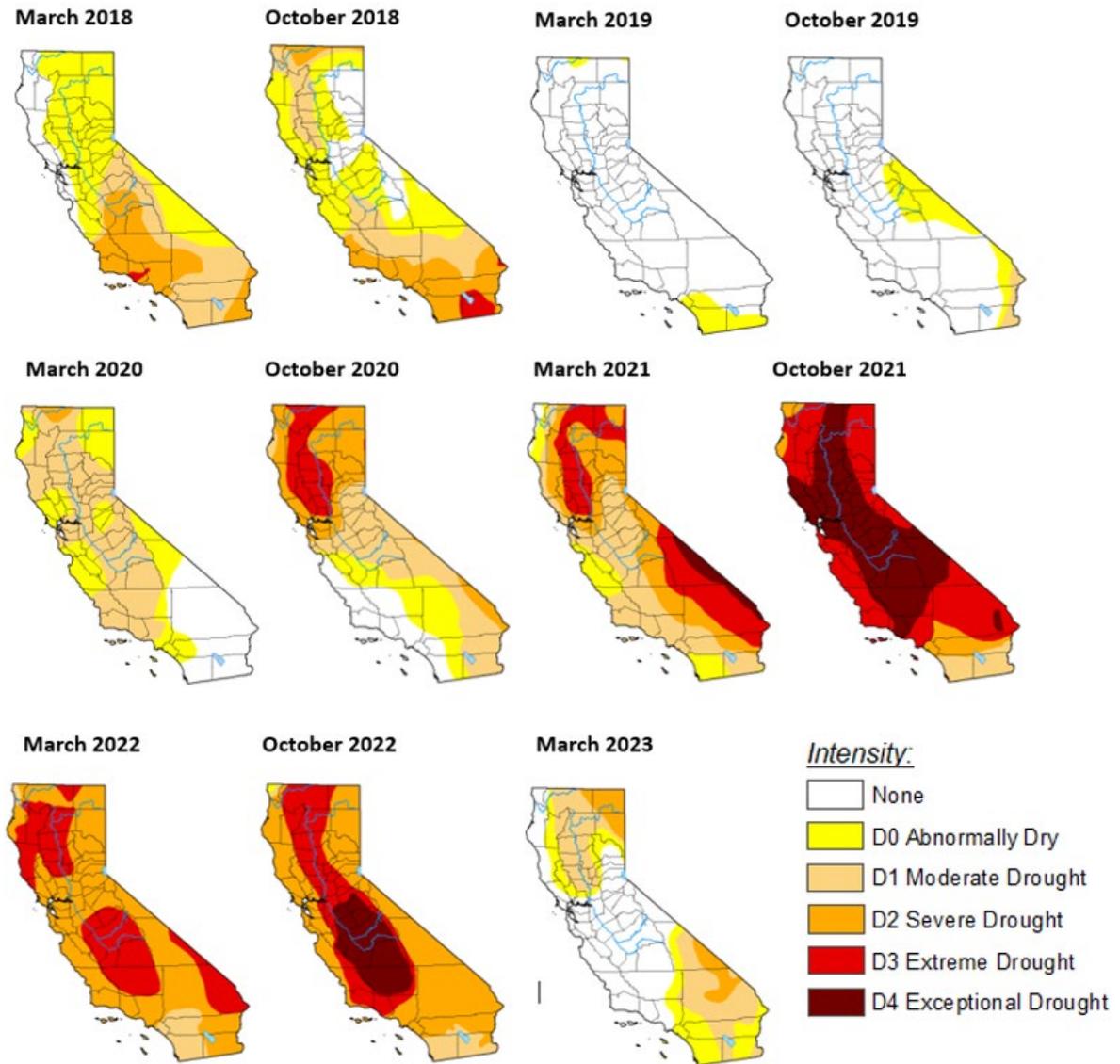


Figure 4.1: Drought History for Sonoma County 2018–2023

(See Appendix C for a larger and higher resolution map)

Location

Droughts are regional by nature, so occurrences of drought that occur in Healdsburg will likely affect the entire city. No one part of the city is at more or less risk of drought conditions, although some areas may be impacted more than others depending on individual water needs and accessibility.

Warning Time

Predicting drought depends on the ability to forecast precipitation and temperature. Only generalized warning can take place due to the numerous variables that scientists have not pieced together well enough to make accurate and precise predictions.

Determination of when drought begins is based on impacts on water users and assessments of available water supply, including water stored in reservoirs or groundwater basins. Different water agencies have different criteria for defining drought. Some issue drought watch or drought warning announcements.

Secondary Hazards

The secondary hazard most associated with drought is wildfire. A prolonged lack of precipitation dries out vegetation, which becomes increasingly susceptible to ignition as the duration of the drought extends. In addition, lack of sufficient water resources can stress trees and other vegetation, making them more vulnerable to infestation from pests, which in turn, can make them more vulnerable to ignition. Millions of board feet of timber have been lost, and in many cases, erosion occurred, which caused serious damage to aquatic life, irrigation, and power production by heavy silting of streams, reservoirs, and rivers.

Frequency/Probability of Future Occurrence

Likely – As noted above, droughts are a regular feature in California. They are almost certain to continue to occur in the future, with varying severity and duration. Healdsburg sources water locally from three well fields: two located along the Russian River and one located on Dry Creek (Healdsburg 2015). Because drought is an expected occurrence in California and Sonoma County, it is highly likely Healdsburg will have future periods of drought.

Since the US Drought Monitor began producing data in 2000, there have been 338 weeks when at least half of Sonoma County was classified as experiencing severe to exceptional drought based on US Drought Monitor categories, or about 29 percent of the time. A more established drought classification system, the Palmer Drought Severity Index, shows that California’s North Coast Drainage climate division (which includes Healdsburg) has experienced periods of severe or extreme drought on six occasions since 1970, or every eight years on average. Such frequencies are likely to increase in the future, as discussed below.

Future Condition Considerations

The climate of California has been drier and warmer than in previous decades, and this trend is expected to continue in the state as a whole due to climate change, according to the most recent climate data. It is likely that drought conditions will become more frequent and more severe as a result. These drier conditions will also alter the timing of water supply availability, potentially impacting Healdsburg if local water sources are affected. A reduction in the overall regional water supply due to reduced precipitation would only exacerbate the local effects of drought. Water resources are also already experiencing the following stresses: population growth, poor water quality, groundwater overdraft, and aging water infrastructure. A reduction in snowpack in the mountainous regions of California would also limit options for the City to supplement local water supply with external sources. Ongoing drought not only would reduce local water supply but would also stress regional supplies and constrict the availability of statewide water sources.

4.2.2 Earthquake

Hazard Description

The category of seismic hazards includes three different but related hazard types—fault rupture, ground shaking, and liquefaction—all of which are consequences of earthquakes. Earthquakes themselves are caused by the movement of large pieces of the earth’s crust, called tectonic plates. As the tectonic plates

move against each other, they can become stuck together, causing stress between the plates to build up until it eventually overcomes the friction holding them together. When this happens, the stress is released and the plates suddenly slip past each other, creating the shaking that is called an earthquake.

Earthquakes occur along boundaries called fault lines. These fault lines may be the actual border between plates, but they may also be borders between two sections of a single plate, created by the repeated process of accumulated and released stress. California sits on the boundary between the Pacific and North American tectonic plates. The motion between these plates occurs primarily on the faults of the Eastern California Shear Zone and the San Andreas fault system, which includes the Healdsburg-Rodgers Creek fault that passes through the eastern and northern areas of the city, as well as the San Andreas fault, 19 miles to the west, and the Maacama fault, 4 miles to the east. Fault rupture is the actual movement of the ground's surface along a fault line when an earthquake occurs. This movement may be vertical, horizontal, or both, depending on the type of fault. Damage from fault rupture is limited to the area of the fault boundary itself, although depending on the amount of movement along the fault, the damage may be severe. Some earthquakes, known as "blind thrust earthquakes," occur without causing visible surface rupture, although they may still cause substantial damage. The 1994 Northridge Earthquake, one of the most damaging in California history, was a blind thrust earthquake.

Ground Shaking

Ground shaking is generally the most damaging of seismic hazards and is the specific hazard most commonly associated with earthquakes. The severity of ground shaking is affected by local geology, but in general it will be most severe closest to the site of the earthquake and decrease with distance. Ground shaking may occur in an up-and-down, side-to-side, or rolling motion, depending on the type of seismic waves produced by the earthquake.

Liquefaction

Liquefaction occurs when loosely packed sand or silt is saturated with water and then shaken hard enough for it to temporarily behave like a fluid. This causes the soil to lose its strength, which may in turn damage structures built on or in it in a variety of ways. Liquefaction risk depends primarily on the height of the groundwater table and the composition of the soil.

Strength/Magnitude

Ground shaking is measured using either the moment magnitude scale (MMS, denoted as Mw or simply M) or the Modified Mercalli Intensity (MMI) Scale. The MMS is a replacement for the Richter scale, which is still often referred to but is no longer actively used, as the Richter scale is not reliable when measuring large earthquakes (USGS 2023). The weakest earthquakes measured by the MMS start at 1.0, with the numbers increasing with the strength of the earthquake. The strongest recorded earthquake, which struck Chile in 1960, measured 9.5 on the MMS (USGS 2023). Like the Richter scale, the MMS is a logarithmic scale, meaning the difference in strength between two earthquakes is much larger than the difference in their measurements. For example, a M6.0 earthquake is 1,000 times stronger than a M4.0 earthquake and about 1.4 times as strong as a M5.9 event.

The MMI Scale is based on the damage caused by the earthquake and how it is perceived, rather than an actual measurement. When comparing multiple earthquakes, one event may have a higher Mercalli rating

than another even if it released less energy and thus was measured lower on the MMS. The MMI scale ranges from I (instrumental, rarely felt by people) to XII (catastrophic, total damage and lines of sight are distorted). **Table 4-3** shows a general comparison between the MMS and the MMI Scale. Note that there is some overlap toward the higher end of the Mercalli ratings, with certain intensities produced by multiple ranges of magnitude measurements.

Table 4-3: Comparison of MMS and MMI Scale

Magnitude (MMS)	Modified Mercalli Intensity (MMI) Scale		
	Intensity	Description	
1.0 to 3.0	I	Not felt except by very few people under especially favorable conditions.	
3.0 to 3.9	II	Weak: Felt only by a few persons at rest, especially on upper floors of buildings.	
	III	Weak: Felt quite noticeably by persons indoors, especially on upper floors of buildings. Many people do not recognize it as an earthquake. Standing motor cars may rock slightly. Vibrations are similar to the passing of a truck. Duration estimated.	
4.0 to 4.9	IV	Light: Felt indoors by many, outdoors by few during the day. At night, some awakened. Dishes, windows, doors disturbed; walls make cracking sound. Sensation like heavy truck striking building. Standing motor cars rocked noticeably.	
	V	Moderate: Felt by nearly everyone; many awakened. Some dishes and windows broken. Unstable objects overturned. Pendulum clocks may stop.	
5.0 to 5.9	VI	Strong: Felt by all, many frightened. Some heavy furniture moved; a few instances of fallen plaster. Damage slight.	
	VII	Very Strong: Damage negligible in buildings of good design and construction; slight to moderate in well-built ordinary structures; considerable damage in poorly built or badly designed structures; some chimneys broken.	
7.0 and greater	6.0 to 6.9	VIII	Severe: Damage slight in specially designed structures; considerable damage in ordinary substantial buildings with partial collapse. Damage great in poorly built structures. Fall of chimneys, factory stacks, columns, monuments, walls. Heavy furniture overturned.
		IX	Violent: Damage considerable in specially designed structures; well-designed frame structures thrown out of plumb. Damage is great in substantial buildings, with partial collapse. Buildings shifted off foundations.
	7.0 and greater	X	Extreme: Some well-built wooden structures are destroyed; most masonry and frame structures are destroyed with foundations. Rails bent.
XI		Extreme: Few, if any (masonry) structures remain standing. Bridges destroyed. Rails bent greatly.	
XII		Extreme: Damage total. Lines of sight and level are distorted. Objects thrown into the air.	

Source: USGS 2023a

Past Occurrences

Earthquakes in California are a frequent occurrence, and smaller earthquakes often do not cause damage or disruption. There have been a few significant earthquakes in the region, though several happened prior to 1900 when documentation was less reliable. **Table 4-4** lists significant earthquakes that have occurred since 1868 in the Healdsburg region.

Table 4-4: Earthquakes Felt in Healdsburg

Earthquake Name	Year	Fault	Location	Damage in Healdsburg	Magnitude	MMI Scale – Healdsburg
Hayward	1868	Southern Hayward	East Bay	Moderate	Unknown	V–VI
Winters	1892	Unknown	Central Valley	Minor to moderate	Unknown	V
Santa Rosa	1893	Unknown	8 miles east of Santa Rosa	Minor	Unknown	V
Mare Island	1898	Rodgers Creek	Mare Island	Moderate	M6.3	V–VI
Great San Francisco	1906	San Andreas	Near San Francisco	Extensive	M7.9	VII–IX
Santa Rosa	1969	Rodgers Creek	Northern Santa Rosa	Minor	M5.6 and M5.7	VI
Loma Prieta	1989	Near San Andreas	Near Santa Cruz	Slight	M7.1	V
South Napa	2014	West Napa Fault	Near Napa	None	M6.0	IV

Source: USGS 2023c

According to the City’s General Plan, the only reported case of liquefaction in Healdsburg was during the 1906 San Francisco earthquake, when there was evidence of lateral spreading and sand boils along the banks of the Russian River.

Location

The city is in a seismically active region, and all of Healdsburg is at risk of one or more seismic hazards. **Table 4-5** shows faults in proximity to Healdsburg, along with their distance from the city and maximum moment magnitude.

Table 4-5: Fault Parameters

Fault	Distance and Direction from Healdsburg	Maximum Moment Magnitude
Healdsburg-Rodgers Creek	Crosses portions of Healdsburg	7.0
Maacama	4.5 miles north	6.9
San Andreas	19 miles west	7.9

Hunting Creek	29 miles northeast	6.9
West Napa	28 miles southeast	6.5
Concord-Green Valley	40 miles east	6.9
Cordelia	43 miles southeast	6.7
Hayward	46 miles southeast	7.1
San Gregorio	52 miles south	7.3

Source: Healdsburg, City of, 2015.

Scenario-specific ShakeMaps for the Rodgers Creek, Maacama, and San Andreas faults are illustrated in **Figures 4.2 through 4.4**. These maps illustrate the expected level of ground shaking based on a specific event. Although it has not been mapped as part of California’s Alquist-Priolo Earthquake Fault Zoning Act (which regulates areas at risk of fault rupture), a stepover from the Rodgers Creek fault extends through the city. Sometimes identified as the Healdsburg fault, it follows the hills on the city’s eastern boundary before passing through the Saggio Hills Planning Area.

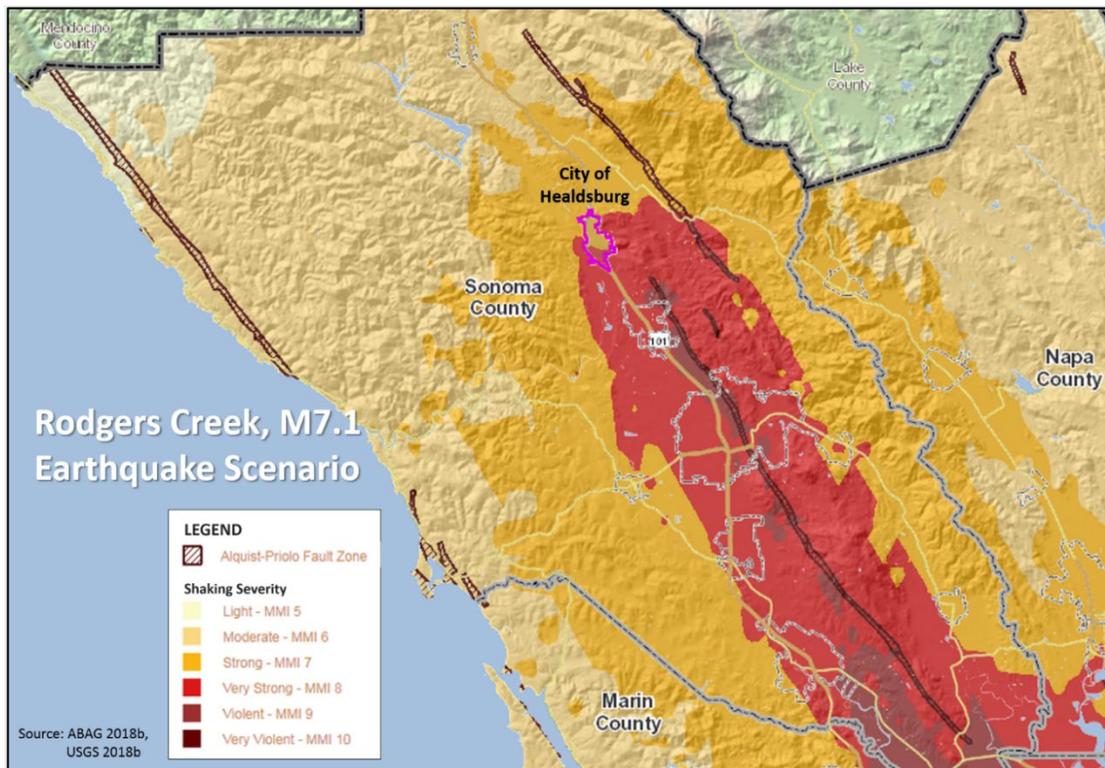


Figure 4.2: Rodgers Creek Fault ShakeMap

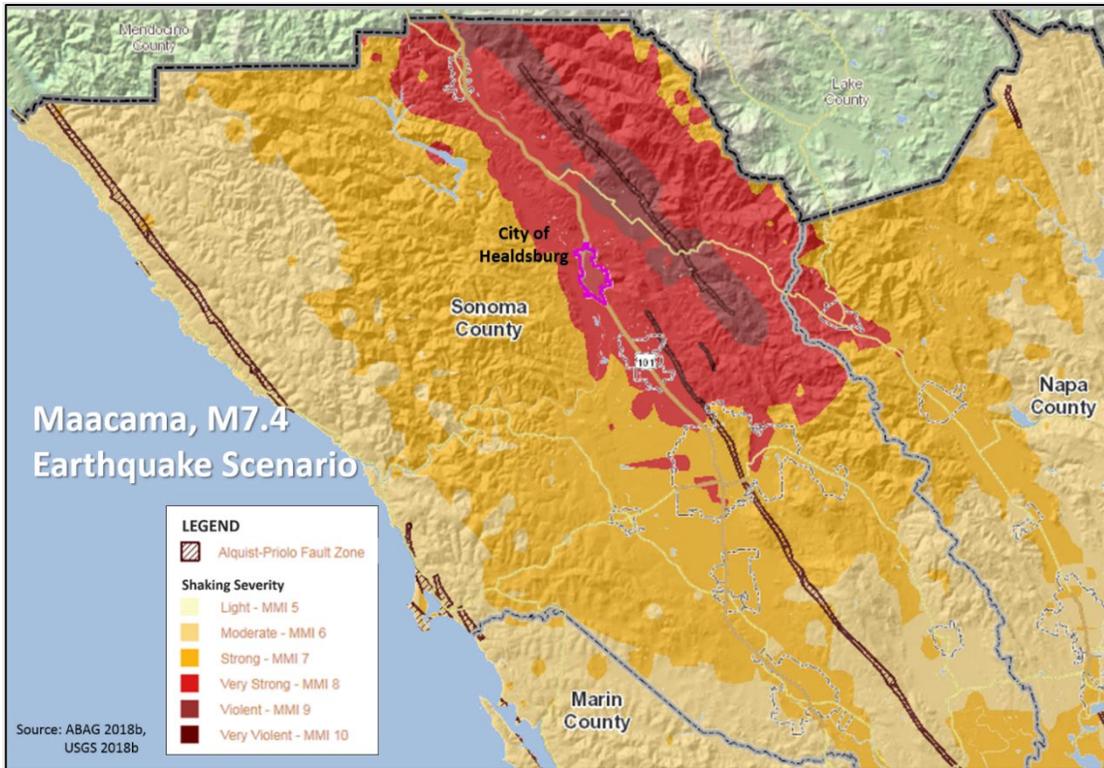


Figure 4.3: Maacama Fault ShakeMap

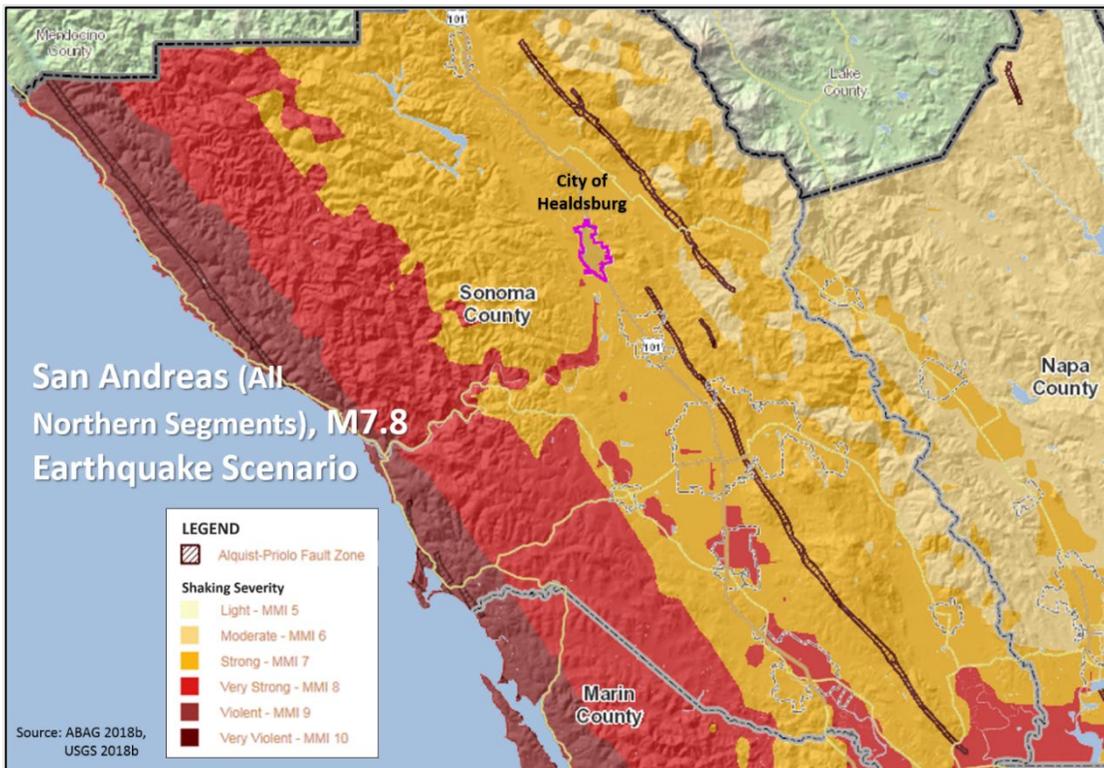


Figure 4.4: San Andreas (All Northern Segments) Fault ShakeMap

Figure 4.5 shows faults that have been active within the last 1.6 million years, including those in Healdsburg and the surrounding county, as well as the epicenters of earthquakes since 1973 that measured at least M3.5. The map indicates a cluster of earthquakes near The Geysers, a geothermal field about 14 miles northeast of Healdsburg. These earthquakes are frequent but relatively weak, associated with human actions at the Calpine Corporation’s power plant as opposed to fault activity. Geologists do not believe that the field is capable of producing a strong, destructive earthquake (USGS 2023).

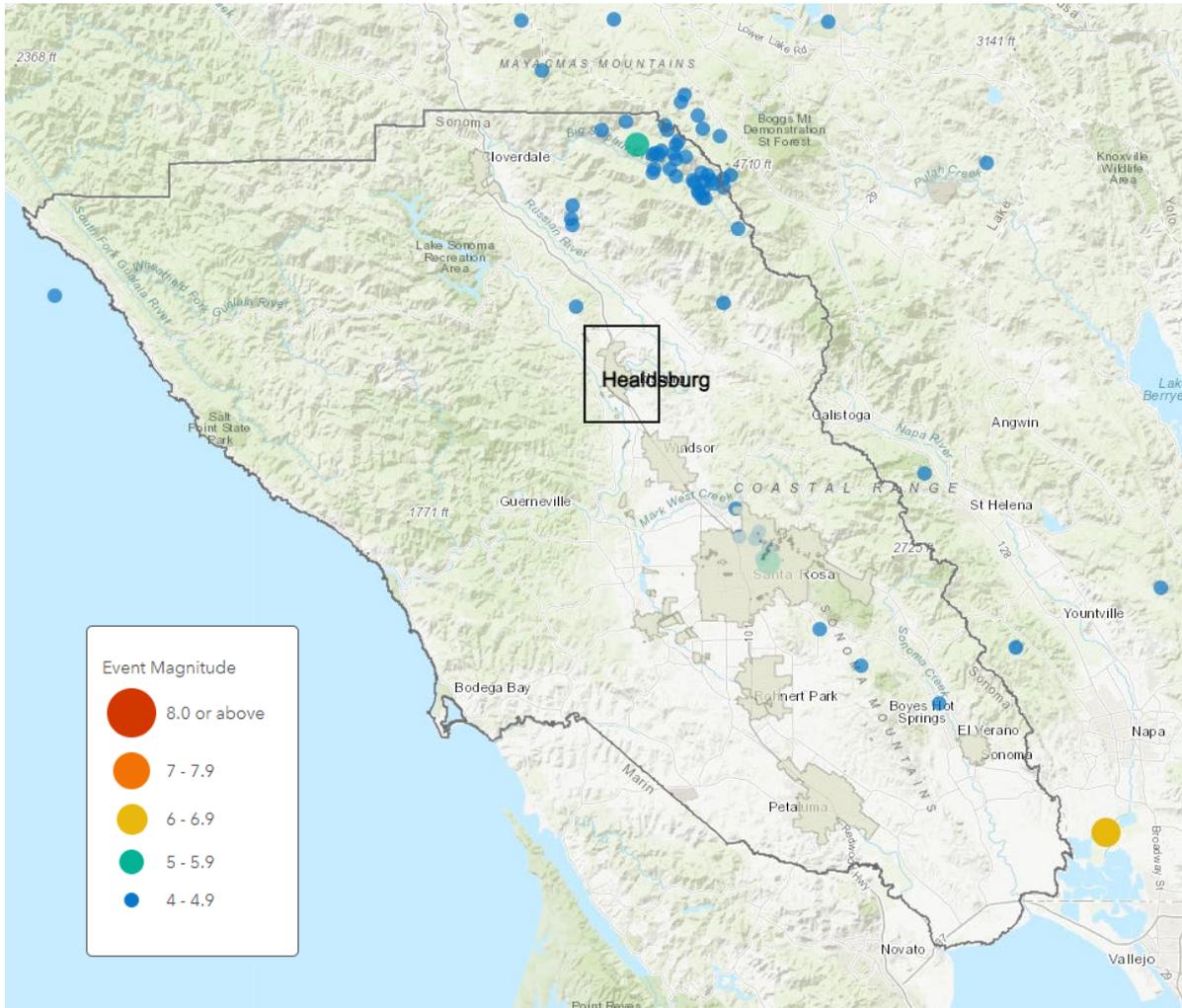


Figure 4.5: Historic Earthquake Activity in Sonoma County
 (See Appendix C for a larger and higher resolution map)

Healdsburg’s seismic risk comes primarily from regional faults in the area. US Geological Survey (USGS) studies show that these faults are capable of producing earthquakes with a peak ground acceleration equivalent to a g-force of 0.65 or greater throughout much of Sonoma County, including the entirety of Healdsburg. Two MMI categories of ground shaking are present in Healdsburg, Category IX described as violent shaking and Category X described as extreme shaking. **Figure 4.6** shows which areas are susceptible to different levels of ground shaking.

Different from the scenario specific ShakeMaps above, **Figure 4.6** illustrates the overall shaking potential or the overall susceptibility. This map takes into account potential shaking on all major faults and incorporates that information into a single map, with the goal of illustrating the maximum level of shaking anticipated from any earthquake event. As described by the California Geological Survey (CGS), earthquake shaking potential is calculated considering historic earthquakes, slip rates on major faults and deformation throughout the region, and the potential for amplification of seismic waves by near-surface geologic materials. The complete analysis is called a Probabilistic Seismic Hazard Analysis. The resulting earthquake shaking potential is used in developing building code design values, estimating future earthquake losses, and prioritizing earthquake retrofit (Branum, Chen, Peterson & Wills 2016).

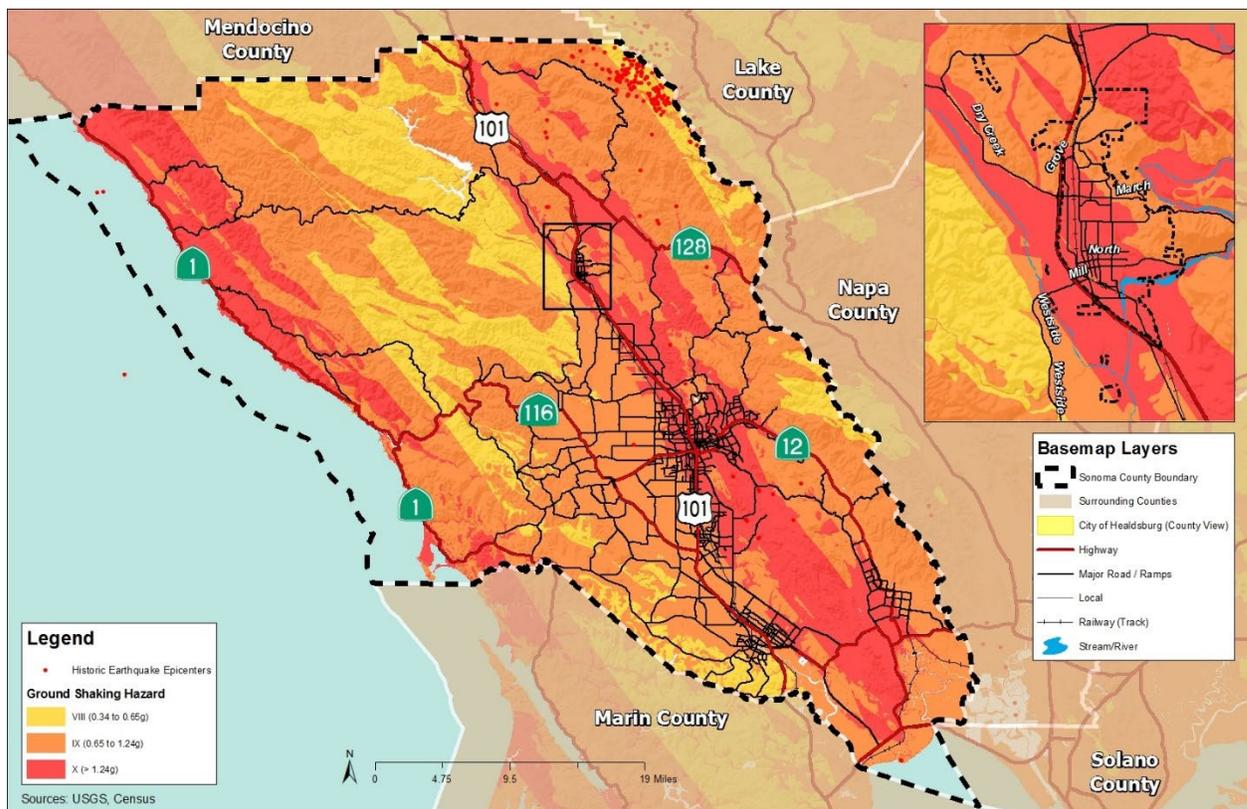


Figure 4.6: Susceptibility to Ground Shaking in Sonoma County

(See Appendix C for a larger and higher resolution map)

Most of Healdsburg has a very low to moderate susceptibility to liquefaction, although there are areas of high susceptibility along the city's southern edge that includes portions of downtown west of Center Street and residential subdivisions on the north bank of the Russian River. **Figure 4.7** shows liquefaction hazard areas in the city.

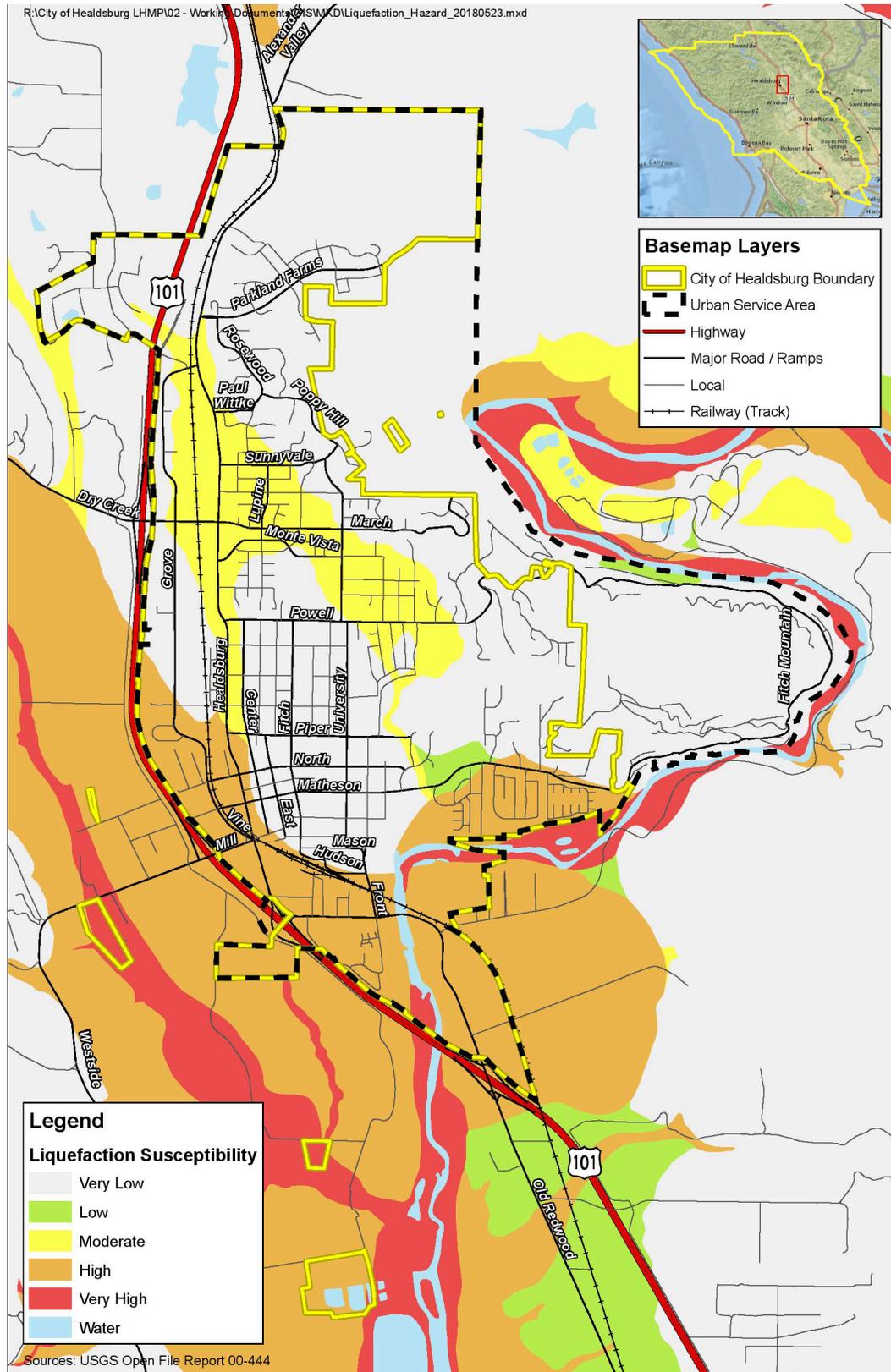


Figure 4.7: Liquefaction Susceptibility in Healdsburg
(See Appendix C for a larger and higher resolution map)

Warning Time

There is no current reliable way to predict the day or month that an earthquake will occur at any given location. Research is being done with warning systems that detect the lower energy compressional waves (P waves) that precede the secondary waves (S waves) experienced as an earthquake. Earthquake early warning systems may provide a few seconds’ or minutes’ notice that a major earthquake is about to occur. The warning time is very short, but it could allow for someone to get under a desk, pause hazardous or high-risk work, or initiate protective automated systems in structures or critical infrastructure.

Secondary Hazards

Earthquakes can cause landslides, often as a result of loss of cohesion in clay-rich soils. Earthen dams and levees are highly susceptible to seismic events, and the impacts of their eventual failures can be considered secondary risk exposure to earthquakes. Additionally, fires can result from gas lines or power lines that are broken or downed during the earthquake. It may be difficult to control a fire, particularly if the water lines feeding fire hydrants are also broken.

Frequency/Probability of Future Occurrence

Likely - Seismologists do not know when a large earthquake will hit the region again but do know that one will occur. The city’s location on and near numerous faults, including several capable of causing significant earthquakes, means that Healdsburg will continue to face threats from earthquakes and related hazards.

The third Uniform California Earthquake Rupture Forecast (UCERF3), developed in 2014 by the Working Group on California Earthquake Probabilities and led by the USGS, provides estimates of the magnitude, location, and likelihood of fault rupture for more than 2,600 fault segments throughout the state, including two segments of the Rodgers Creek fault that passes through Healdsburg. The forecast for these segments indicates a 5.5 to 6.9 percent chance that a M6.7 earthquake will occur within the next 30 years. **Table 4-6** lists faults in Sonoma County included in UCERF3, showing the range of probabilities for earthquakes of varying magnitude occurring on a fault segment within the next 30 years.

Figure 4.8 illustrates the probability forecasts of the three faults of greatest concern (Rodgers Creek, Maacama, and San Andreas-Northern Coast) for $M \geq 6.7$, $M \geq 7.5$ and $M \geq 8.0$ earthquakes. A single probability is not provided for an entire fault; rather, the probability varies depending on the location on the fault in question. To illustrate the range in probabilities for each fault, three points on each fault have been chosen, points that represent the lowest and highest probabilities as well as a mid-range probability.

Table 4-6: UCERF3 30-Year Earthquake Probabilities by Fault

Fault	M6.7			M7.0			M7.5		
	Min.	Max.	Avg.	Min.	Max.	Avg.	Min.	Max.	Avg.
Bennett Valley	0.01%	1.75%	0.27%	0.01%	1.25%	0.2%	0.01%	0.55%	0.1%
Hayward	7.18%	19.97%	13.06%	5.79%	17.31%	11.12%	0.33%	7.64%	3.54%
Maacama	4.78%	16.19%	9.09%	4.19%	14.42%	8.32%	0.01%	7.58%	1.86%
Rodgers Creek-Healdsburg	1.31%	14.92%	6.93%	0.72%	12.5%	6.02%	0.04%	5.88%	2.31%
San Andreas (North Coast)	.12%	18.85%	6.76%	0.11%	18.2%	6.64%	0.1%	16.93%	6.35%

Source: WGCEP 2021

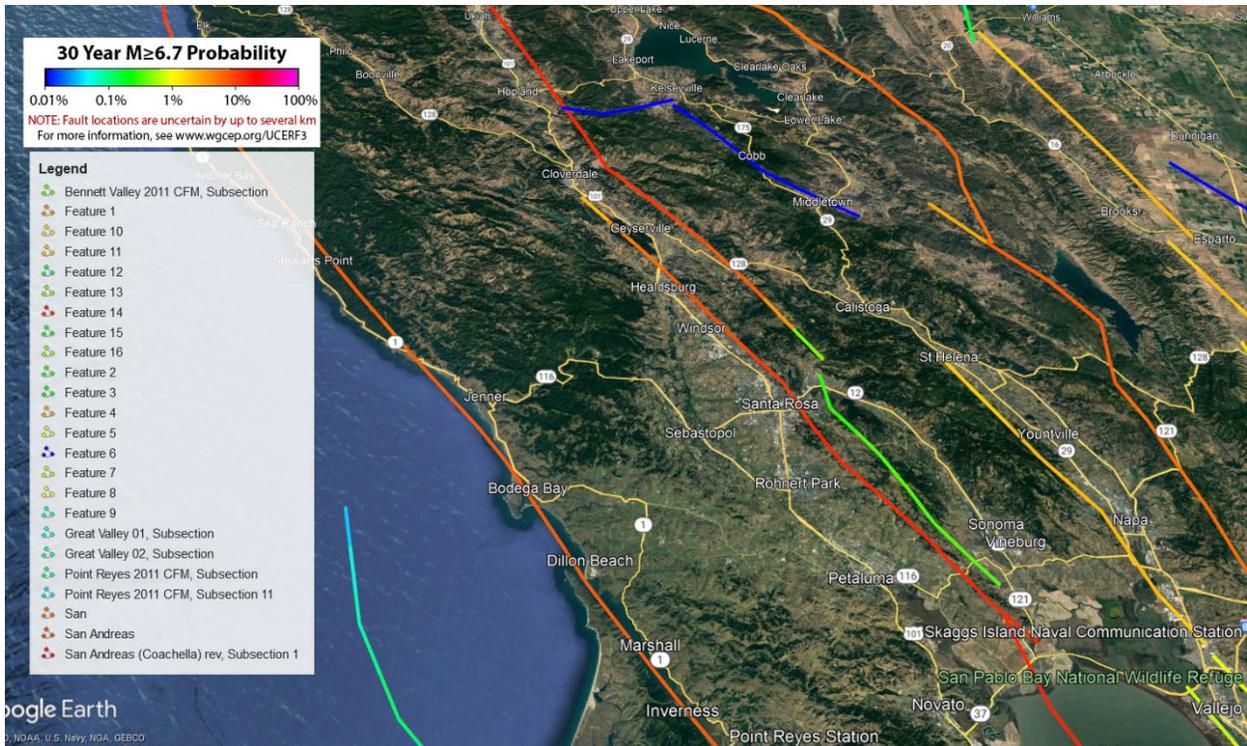


Figure 4.8: UCERF3 30-Year M6.7 Earthquake Probabilities

(Source: WGCEP 2021)

Faults not identified in the forecast are still capable of causing significant earthquakes. Depending on the magnitude and location of the earthquake, Healdsburg could be affected by earthquakes originating in all parts of the Bay Area.

Future Condition Considerations

The likelihood, size, and severity of seismic events are not expected to be directly impacted by any changes in future climate conditions. There is no evidence that climate change affects earthquakes. It is possible that anticipated changes to precipitation levels and storm intensity may affect groundwater aquifer levels, which could expand or contract areas of potential liquefaction in the Planning Area.

4.2.3 Flooding

Hazard Description

Flooding occurs when normally dry land is partially or completely inundated and can occur for a number of reasons. The water levels in bodies such as streams, rivers, lakes, and reservoirs can exceed the water body's banks due to heavy rainfall or snowmelt, causing water to overflow into nearby areas. Heavy precipitation can overwhelm the ability of soil to absorb water or of local storm drains to carry it away, causing water to build up on the surface. Flooding may also occur from infrastructure failure, such as a burst water tank or dam failure.

Dam failure occurs when a dam structure or its foundation is damaged to such a degree that the dam partially or completely loses its ability to hold back water. When this happens, some or all of the water impounded by the dam is suddenly released, causing a very fast-moving flood downstream of the dam.

Like other flash floods, dam failures can cause widespread injury or loss of life, extensive property damage, and displacement of a large number of people in the flood's path. If the failed dam is part of a water supply network, a dam failure may also cause local and regional disruption to water service if there is no sufficient alternative supply.

Dams can fail for a number of reasons. Seismic or geologic hazards, such as earthquake shaking or a landslide, may damage the dam or its foundations, causing it to weaken to the point of failure. During intense rainfalls, the dam itself or the surrounding rock can erode sufficiently to cause a failure. Additionally, the dam itself may be poorly sited, designed, or maintained, and so may collapse independent of any other hazard event. At times, these factors can work together, such as if a design flaw in a dam causes the floodwaters from an intense rainfall to erode parts of the dam and lead to a failure.

Regardless of the type of flood, a flood event can damage buildings and infrastructure either by debris carried along in the water or by the pressure of the water itself. Floods can weaken foundations and wash away soil, increasing the risk of damage or destruction. According to California's Multi-Hazard Mitigation Plan, floods are the second most common disaster type in California, second only to fires (CNRA and Cal OES 2020).

Strength/Magnitude

Flood severity is often described in years, such as a 100-year event. This does not mean that such an event will occur just once every 100 years. Rather, the term indicates a 1-in-100 probability, or that there is a 1 percent risk of such an event in any given year. Similarly, a 500-year flood indicates the risk of such an event is 1-in-500, or 0.2 percent, in any given year.

The magnitude of a flood may also be expressed in terms of the water's depth. A 2017 flood control study prepared for the City of Healdsburg by West Yost Associates estimated flood depths along Foss Creek, the city's primary source of flood risk. Using historic rainfall totals logged by the National Oceanic and Atmospheric Administration, along with locally collected hydrologic and hydraulic modeling, the study generated a flooding scenario that would result from a storm with a 1 percent chance of occurring in any given year. Based on existing conditions in the city, the report estimated that such a flood would produce 1.0 to 4.3 feet of flooding at eight locations, with an average depth of 2.3 feet.

Past Occurrences

The most recent flooding in Healdsburg occurred between February 24-March 1, 2019. This flood had a peak discharge of 67,300 cubic feet per second recorded and the flood reached a gauge height of 26.84 feet at Healdsburg. The majority of the flooding was in the Rivers Bend neighborhood with some flooding occurring downtown from Foss Creek. The city's water reclamation facility also flooded causing significant damage to the facility and its contents.

A December 2014 flood originating from Foss Creek was Healdsburg's most significant event. Following a series of storms, more than 8 inches of rain fell in a 24-hour period on December 10 and 11, flooding about 78 acres in the downtown area. The City identified 178 residential buildings and 143 commercial buildings that were affected, with roughly two dozen businesses suffering interior water damage. Total damage was estimated at \$1.5 million.

Sonoma County has experienced significant flooding on the Russian River on at least seven occasions since 1955. Of these, only the three most severe events caused flooding in Healdsburg. In those cases, inundated areas were centered on the bend in the river upstream of the Healdsburg Avenue bridge near Badger Park. The largest flood in recent history occurred between February 14 and 18, 1986, when a peak discharge of 102,000 cubic feet per second was recorded and the flood reached a gauge height of 48.6 feet at Guerneville. Heavy rains fell from December 26, 2005, to January 3, 2006, and the Russian River rose above flood stage at all USGS gaging stations in Sonoma County. At Guerneville, the river crested at 41.6 feet. The rainfall measured in the City of Santa Rosa during this storm was near record-setting at 17.6 inches. The President declared this flood a major disaster, and more than 100 roadways were blocked due to flooding or landslides.

Areas that flooded during February 1986, December 2005–January 2006, December 2014, and February - March 2019 events are shown in **Figure 4.9**.

Section 4
Hazard Assessment

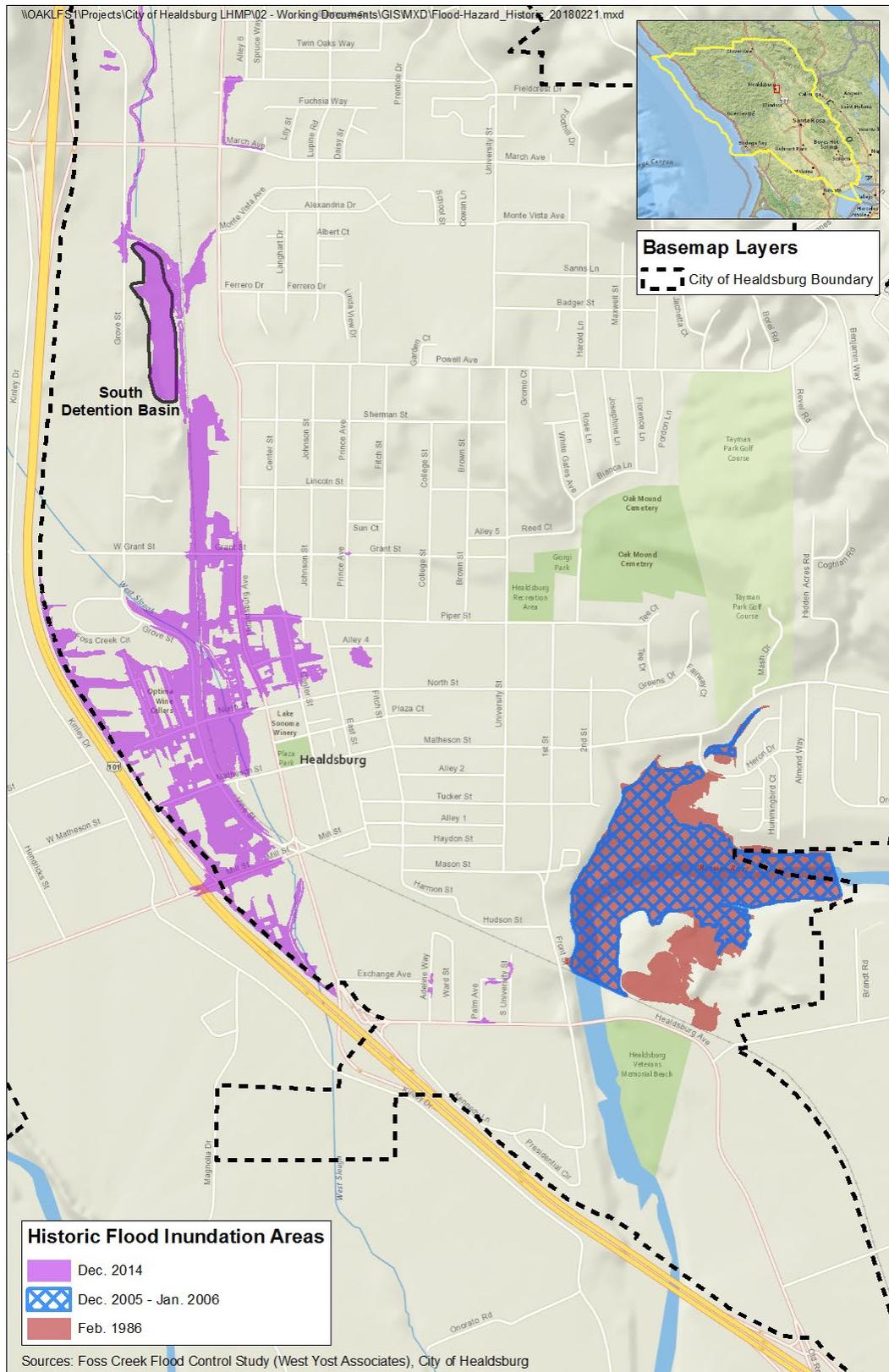


Figure 4.9: Historic Flooding in Healdsburg
 (See Appendix C for a larger and higher resolution map)

The city has never experienced flooding caused by a dam failure, nor have there been any significant dam failures elsewhere in Sonoma County. The near-catastrophic failure of the spillway of the Oroville Dam in Butte County, about 100 miles northeast of Healdsburg, in 2017 posed no direct threat to the city but serves as a reminder of the ongoing risk presented by dams.

Location

The Russian River and Foss Creek are the dominant flooding hazards for Healdsburg, with Foss Creek causing most of the flooding in the city.

FEMA produces Flood Insurance Rate Map (FIRM) panels that identify which areas would be affected by flood events with a 1 percent and 0.2 percent chance of happening in any given year. FEMA revised its flood maps for the Healdsburg area in 2006. In addition, Healdsburg's Public Works Department submitted an application for a Letter of Map Revision that modified the floodway for Foss Creek from where it crosses Grove Street to where it crosses US Highway 101; these revisions became effective in 2010. **Figure 4.10** shows the location of flood hazard zones based on current FEMA data.

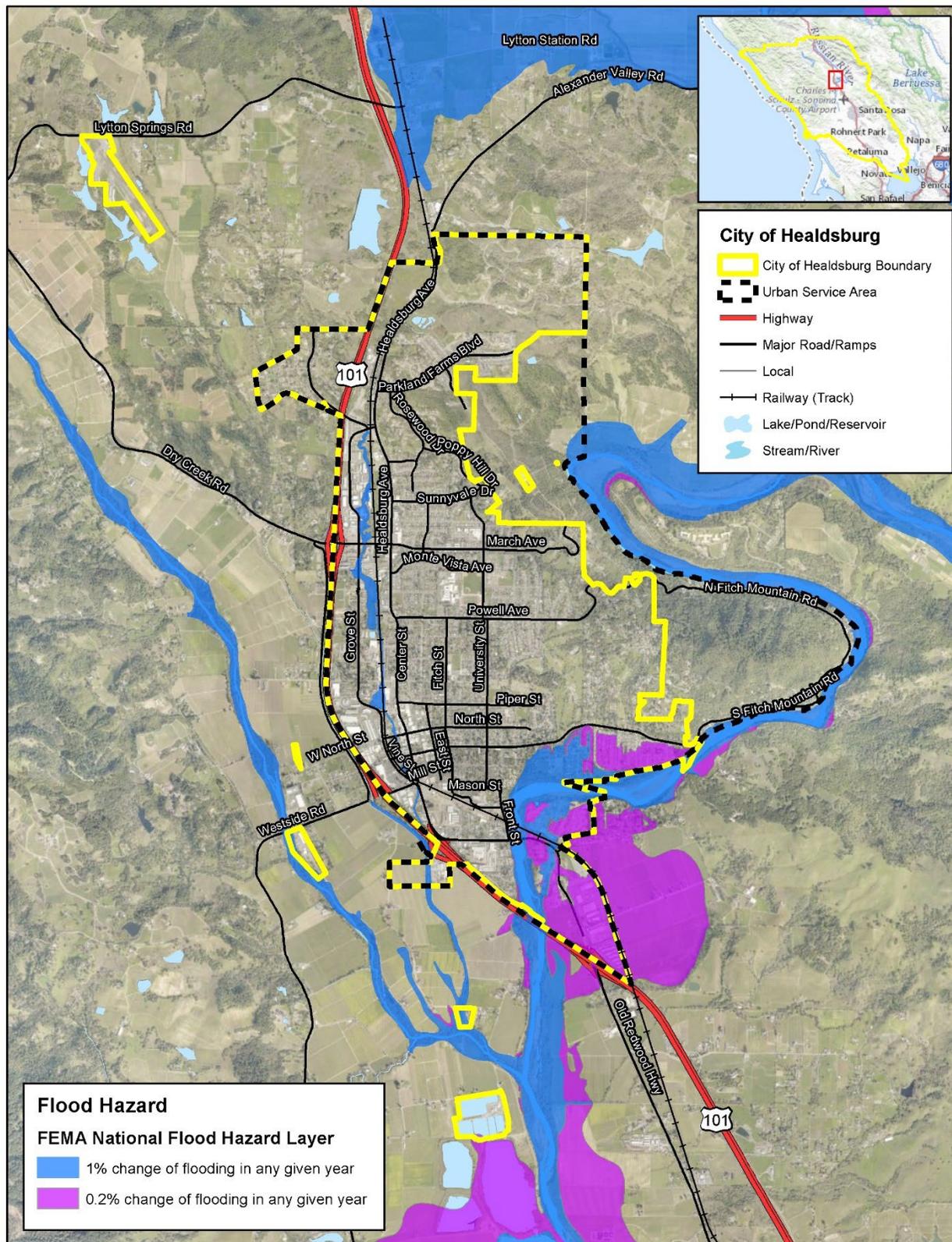


Figure 4.10: Flood Hazard Zones for Healdsburg
(See Appendix C for a larger and higher resolution map)

Russian River

The Russian River extends 110 miles and drains approximately 1,500 square miles in Mendocino and Sonoma counties into the Pacific Ocean. The river defines part of the eastern boundary of Healdsburg's Urban Service Area. After rounding Fitch Mountain, the river crosses the city's southern tip. FEMA's flood maps show much of this area has at least a 0.2 percent annual chance of flooding, with a 1 percent annual chance for parts of Badger Park and the Rio Vista Estates subdivision. All or portions of approximately 100 homes and a few nonresidential properties within the city limits are included in the river's 1 percent annual chance flood hazard zone. To maintain participation in the National Flood Insurance Program (NFIP), the City updated its floodplain regulations to bring the City's floodplain management ordinance into conformance with the current federal regulations and adopted the new flood hazard map.

Foss Creek

The other important surface water in the city is Foss Creek, which has its origins at the northeastern-most corner of the city's Urban Service Area and empties into the Russian River. Most of the area within the city limits and over half of the Urban Service Area falls within the drainage area of Foss Creek. A portion of the Urban Service Area to the north of the city limits drains to Alexander Valley, and the balance of the Urban Service Area drains to the Russian River. Foss Creek runs north-south through town, roughly paralleling the Northwestern Pacific Railroad tracks, and flows first through a detention basin near the northern city limits (75 acre-feet capacity) and to a second detention basin (off-stream) south of Dry Creek Road (49 acre-feet capacity), then runs south in channels and conduits, leaving the city through double concrete boxes under US Highway 101 near Exchange Avenue and Healdsburg Avenue. The northern detention basin, located north of the Parkland Farms subdivision, was sized to accommodate anticipated development in the Foss Creek watershed portion of the city's northern Planning Area. The detention basin accepts increases in storm runoff from development and detains the peak storm flows, thereby reducing downstream flooding. The detention basin is designed with upper and lower sections so that the lower area nearest the creek has 3:1 banks, fills first, and functions as a riparian habitat and wetland. During a peak storm, an infrequent event, the upper portion of the detention basin fills as stormwater backs in from the lower area. This area is designed with a gradual 6:1 slope and rectangular shape to be available for secondary use as a recreational area. The detention capacity for the basin was calculated for housing densities higher than have actually been approved, resulting in a substantial factor of safety. Therefore, no other major flood control or off-site storm drain improvements are anticipated to be required for further development in the northern Planning Area. This was the basis of the flood map amendment the City filed with FEMA, reflecting a significant reduction in the flood hazard areas for Foss Creek as a result of the detention basins' construction.

The 2014 flood, however, inundated areas outside the revised hazard areas shown on FEMA flood maps, even as the detention basins functioned as intended. The Foss Creek Flood Control Study by West Yost Associates found the storm that produced the flood was less than a 1 percent annual chance event, with approximately a 1-in-67 chance of occurring in any given year. The study further estimated that a rainstorm with a 1-in-100 annual probability would flood much of southwestern Healdsburg and the downtown area, as shown in **Figure 4.10**. All this suggests that the hazard posed by Foss Creek may not be limited to the Special Flood Hazard Area shown on FIRM panels, and properties that do not fall within the regulatory 1 percent annual chance floodplain may still be at risk of flooding.

Dam Failure Inundation

Flood control for the lower Russian River is provided primarily by Warm Springs Dam. It is located on Dry Creek, a tributary of the Russian River, approximately 10 miles northwest of the city. Lake Sonoma was created by the dam and has a storage capacity of 381,000 acre-feet and a total surface area of 3,600 acres. Warm Springs Dam is located on a medium-sized fault but was designed to absorb the maximum expected displacement and ground shaking from any fault in the region. Failure of this dam could inundate most of the city, to an elevation of 230 feet.

Coyote Dam is an earthen dam on the East Fork of the Russian River above Ukiah (north and upstream of the city, in Mendocino County) and is part of a system that provides water to Mendocino, Sonoma, and Marin counties. The dam provides storage capacity of 122,500 acre-feet at Lake Mendocino. Failure of this dam could inundate the southern portion of the city with water traveling down the Russian River.

Warning Time

Due to the sequential pattern of meteorological conditions needed to cause serious flooding, it is unusual for a flood to occur without warning. Warning times for floods can be between 24 and 48 hours. Flash flooding can be less predictable, but potential hazard areas can be warned in advanced of potential flash flooding danger. Flash flooding is infrequent in the planning area.

As major storm systems approach, the National Weather Service, in coordination with the California Department of Water Resources, monitors weather conditions and real-time precipitation and river stage data; forecasts the amount and timing of expected precipitation; and issues official river forecasts and hydrologic statements. Updated a minimum of twice daily, these river forecasts are available as both text products and as graphical river guidance plots, which provide river stage information for each official forecast point for the next five days following the forecast issuance. As storm events continue with streams and rivers rising to threatening levels, these forecasts may be updated more frequently if needed.

Secondary Hazards

The most problematic secondary hazard for flooding is bank erosion. In many cases the threat and effects of erosion are worse than actual flooding. This is especially true on the upper courses of rivers where there are steep gradients. Floodwaters in these reaches may pass quickly and without much damage, but scour the banks, edging properties closer to the floodplain or causing them to fall in. Flooding is also responsible for hazards such as landslides when high flows over-saturate soils on steep slopes, causing them to fail. Hazardous materials spills are also a secondary hazard of flooding if storage tanks rupture and spill into streams, rivers or drainage sewers.

Frequency/Probability of Future Occurrence

Likely – Areas illustrated in blue in **Figure 4.10** have a 1 percent chance of flooding in any given year. There is a 0.2 percent chance that a flood will occur in any given year in the floodplain areas shown in purple. Some flooding may occur annually, but it may not be as severe as a 1 percent annual chance event, and it may not occur within the identified 1 percent annual chance floodplain. Significant, widespread flooding is most likely to occur when heavy rains fall over already saturated ground.

The risk of flooding can increase significantly in areas that have been burned by wildfire. Fires alter terrain and ground conditions, eliminating vegetation that can absorb rainfall. Flooding is also often more severe,

as ash and debris left from the fire can contribute to mudflows. It can take up to five years before vegetation is restored. See the Wildfire section (**Section 4.2.5**) for information on areas at risk of wildfire.

The lack of any previous dam failure events in Sonoma County makes it difficult to make a precise prediction about future probability. A 2018 independent forensic report on the Oroville Dam incident identified systemic failures in dam safety regulations and industry practices and suggested that dam owners may be overconfident in their assessments (IFT 2018). Still, with only two actual failures among California's 1,500 dams in the last 90 years and none since 1963, future occurrences can still be regarded as extremely unlikely.

Future Condition Considerations

There is some evidence that frequent intense storms, known as atmospheric river events, could increase in the coming decades due to climate change. Statewide, some studies suggest that more years will have an increased number of atmospheric river events and that the largest of these atmospheric river events will be more intense than they have been historically (Dettinger 2011). In general, Northern California is expected to see more frequent atmospheric river events, potentially up to twice as many by 2100 as the region currently does, while Southern California is expected to see the same number of atmospheric river events but with each individual storm an average of 10 to 20 percent more intense. However, the specific impacts on the Healdsburg region are not yet known (Oskin 2014).

As noted in the Drought section, dry conditions cause soil to harden, making it less absorbent to precipitation and increasing the risk of flooding, particularly at the beginning of the rainy season. Since drought conditions are expected to increase also, there is a greater risk of flooding from drought-induced changes in soil characteristics. These impacts may already be felt; in July 2015, Lieutenant Governor Gavin Newsom, acting temporarily as governor, issued a disaster proclamation for large parts of Southern California due to flooding and related hazards as a result of severe storms. In the proclamation, Newsom noted the drought's impact of drying out soil and increasing the risk of flash floods (Office of the Governor 2015).

4.2.4 Landslide

Hazard Description

Landslides occur when the soils of a slope, such as a hillside or mountain, become unstable. When this happens, the soil slides down toward the base of the slope, damaging or destroying structures built on the moving soil or in its path. While landslides are often thought of as fast-moving events, some landslides may happen slowly over a long period of time.

The types of materials that compose a slope and the steepness of the slope help determine the overall risk that a landslide may occur. Soil stability and time also contribute to the risk of rockfall, which is of particular risk along roadways and trails where a path or highway has been cut into a hillside, exaggerating the angle of repose and increasing the likelihood of rockfalls.

Landslides may be triggered by other hazard events. The shaking of an earthquake or the loss of soil stability as a result of earthquake-induced liquefaction can cause the soil to slide. Alternatively, precipitation can result in saturated soil and a loss of stability, or flowing water may erode the base of a

slope. The risk of a landslide is often exacerbated in areas recently burned by wildfire, as the fire burns vegetation that can absorb water and hold back soil. Without the vegetation to stabilize a slope and prevent runoff, sediment and debris are more susceptible to sliding.

Landslide hazards in Healdsburg are common, and generally occur as a result of heavy rainfall. Large earthquakes and improper grading or drainage practices can also cause landslides.

Within Healdsburg, many of the swales or ravines that occupy the steep hill slopes may be capable of generating debris flows. Debris flows are most likely to originate on slopes underlain by sandstone or Glen Ellen sediments. Areas underlain by mudstone of the Great Valley Sequence are generally characterized by earthflows or slumps and are considered less likely to generate debris flows (Healdsburg 2015).

Strength/Magnitude

As defined in a CGS Special Report for Sonoma County, five categories of stability, based on terrain and geology, have been established to help the County understand landslide susceptibility. The slope categories are shown in **Table 4-7**.

Table 4-7: Categories of Stability

Risk	Category	Description
<p>Most stable/lowest risk</p>  <p>Least stable/highest risk</p>	A	Areas of greatest relative stability due to low slope inclination—predominantly less than 15%.
	Bf	Locally level areas within hilly terrain; may be underlain or bounded by unstable or potentially unstable rock materials.
	B	Areas of relatively stable rock and soil units, on slopes greater than 15%, containing few landslides.
	C	Areas of relatively unstable rock and soil units, on slopes greater than 15%, containing abundant landslides.
	Landslide	Areas of lowest relative slope stability. Failure and downslope movement of rock and soil have occurred or may have occurred.

Source: Huffman, Armstrong 1980

Notable landslide events are often described in terms of the volume of soil that moved or the depth of debris. Landslides that occurred in the Bay Area during the 1997–98 El Niño rainstorms, for example, ranged from 25 cubic meters to 13 million cubic meters (Godt 1999).

Past Occurrences

The Healdsburg General Plan Background Report identified 36 smaller landslides in Healdsburg along the northwestern to southeastern stretch of the city, and a larger landslide in the central portion of the eastern city boundary. These landslides are mainly slow-moving or earthflow landslides that are confined to the soil mantle and shallow, weathered bedrock. They represent identified; ongoing hazard areas as opposed to the location of specific events that caused damage.

The most notable example of damaging landslides in Sonoma County occurred during the 1997–98 El Niño rainstorms. Approximately 300 landslides were documented in 10 Bay Area counties. In Sonoma County,

the USGS recorded seven major landslides that caused a total of \$21 million in damages (Godt 1999). While not among the most damaging, two of the seven were centered on Fitch Mountain near Healdsburg (Ramsey & Godt 1999). In one case, a small slide on the north side of the mountain liquefied at the toe—the lower margin of displaced soil—and moved down onto North Fitch Mountain Road near two homes (DOC 2023). The worst of the Sonoma County landslides occurred in the unincorporated community of Rio Nido near Guerneville, where debris flows on January 6–7, 1998, forced the evacuation of 140 homes, three of which were destroyed and dozens more damaged.

During the week of March 21, 2011, heavy rainfall caused a landslide near Burgundy Road in the portion of northern Healdsburg west of US Highway 101. The slide damaged the city’s water system, which in turn damaged the road and adjacent properties. The City Council declared a local emergency on September 19, 2011, and paid \$500,000 to regrade the hill, install reinforcements and erosion control measures, and repair water and sewer mains and the road (Healdsburg, City of 2013).

More recently, the December 11, 2014, rainstorm that flooded downtown Healdsburg also caused part of a hillside to fail at a vineyard on West Dry Creek Road about 5 miles northwest of the city. The debris flow caused a large amount of soil to reach a tributary that feeds Dry Creek (Callahan 2016).

Location

The area most susceptible to landslides trends from the northwestern part of Healdsburg to the southeastern part, along the hills that define the city’s eastern edge. Much of this area also has mapped landslide deposits, which identifies higher risk of future landslides. The population in this area is less dense, but the area contains enough housing to pose a risk to life and property.

In addition to Burgundy Road and North Fitch Mountain Road locations, there is an active slide in the Parkland Farms area.

The Healdsburg General Plan Background Report maps areas of landslide risk based on CGS’s slope categorization. Virtually all the hillside areas are mapped as Zone C, areas with moderate to high landslide risk. **Figure 4.11** shows the location of slope hazard zones in the city.

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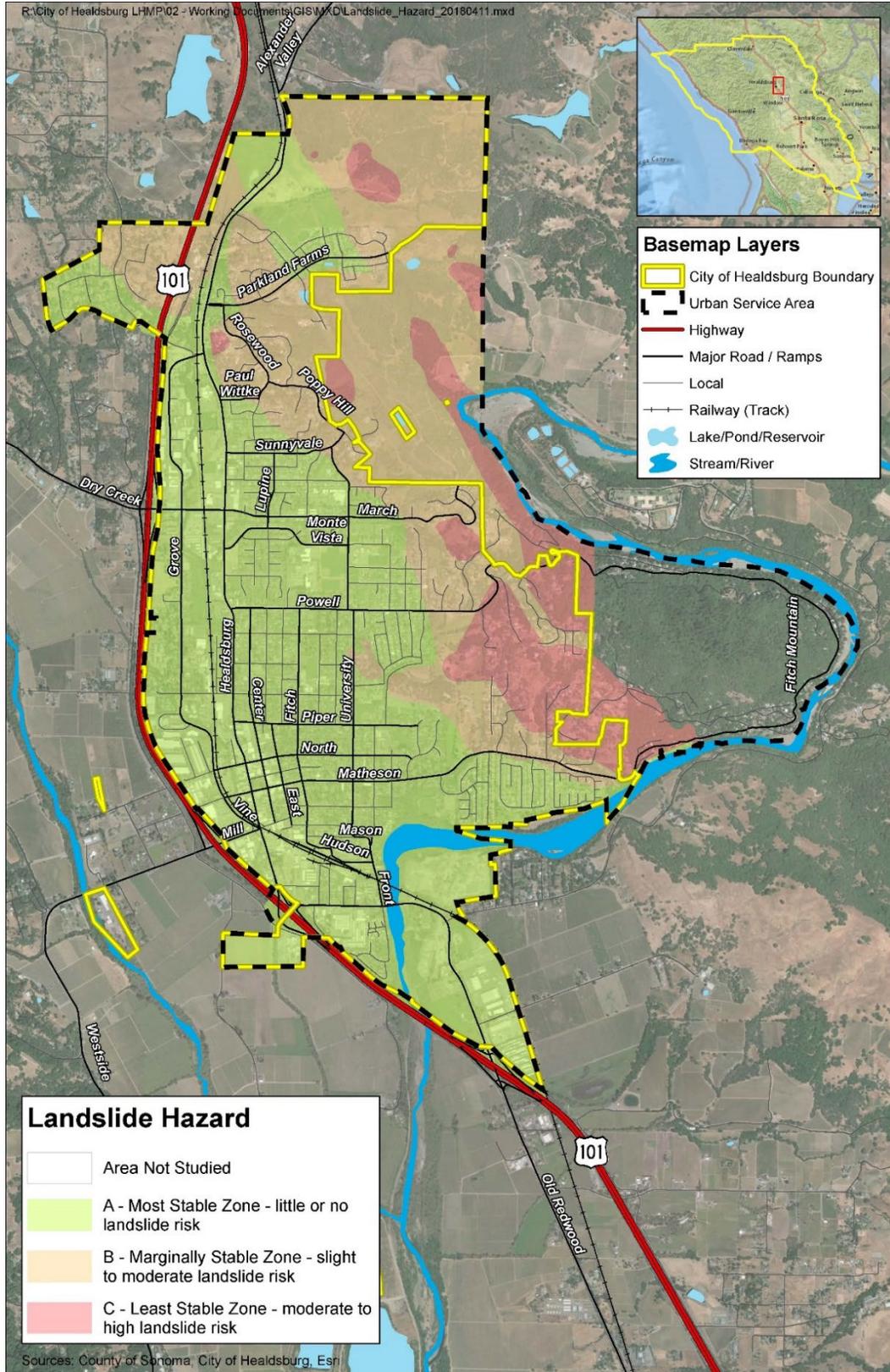


Figure 4.11: Healdsburg Landslide Hazard Zones
(See Appendix C for a larger and higher resolution map)

Warning Time

The velocity of landslides ranges from a slow creep of inches per year to many feet per second, depending on slope angle, material and water content. Some methods used to monitor landslides can provide an idea of the type of movement and the amount of time prior to failure. It is also possible to determine what areas are at risk during general time periods. Assessing the geology, vegetation and amount of predicted precipitation for an area can help in these predictions. However, there is no practical warning system for individual landslides. The current standard operating procedure is to monitor situations on a case-by-case basis and respond after the event has occurred.

Generally accepted warning signs for landslide activity include the following:

- Springs, seeps, or saturated ground in areas that have not typically been wet before
- New cracks or unusual bulges in the ground, street pavements or sidewalks
- Soil moving away from foundations
- Ancillary structures such as decks and patios tilting and/or moving relative to the main house
- Tilting or cracking of concrete floors and foundations
- Broken water lines and other underground utilities
- Leaning telephone poles, trees, retaining walls or fences
- Offset fence lines
- Sunken or down-dropped road beds
- Rapid increase in creek water levels, possibly accompanied by increased turbidity (soil content)
- Sudden decrease in creek water levels though rain is still falling or just recently stopped
- Sticking doors and windows, and visible open spaces indicating jambs and frames out of plumb
- A faint rumbling sound that increases in volume as the landslide nears
- Unusual sounds, such as trees cracking or boulders knocking together.

Secondary Hazards

Mass movements are not generally known to result in secondary hazards. A landslide that blocks a river or stream does have the potential to cause flooding.

Frequency/Probability of Future Occurrence

Occasional - Because of Healdsburg's topography, future landslides will most likely occur during periods of heavy rain. Just two damaging landslides have occurred within Healdsburg's Urban Service Area in the last 20 years, both during the same winter storms. Road closures due to mud flows may occur more frequently, particularly during El Niño years, which have occurred in 7 of the last 20 winter seasons. The probability of a geologic hazard occurring in any given area is unknown, although landslide risks are likely to remain highest in the areas identified as having a high susceptibility. The geologic conditions in the county that have been responsible for past landslide events are not expected to change.

Future Condition Considerations

The expected increase in the frequency and/or intensity of storms that will affect California could make moisture-related landslides more common. The increase in average temperature and periods of drought may also cause soil to become less cohesive, making soil more unstable and potentially increasing landslide risk.

4.2.5 PSPS

Hazard Description

In 2012, the California Public Utilities Commission (CPUC) ruled that the California Public Utility Code gives electric utilities the authority to shut off electric power to protect public safety, since power supply systems have the potential to ignite wildfires (California Public Utilities Commission 2022a). Electric utility infrastructure has historically been responsible for less than 10 percent of reported wildfires. However, fires attributed to power lines consist of roughly half of the most destructive fires in California history (California Public Utilities Commission 2022a).

A public safety power shutoff (PSPS) is an event in which a major electric power provider (e.g., PG&E, SDG&E, or Southern California Edison) temporarily shuts off electrical power to an elected area to prevent power lines from sparking wildfires and threatening human lives. Utilities usually undertake these during hot, dry days with sustained winds or strong gusts. The duration of a shutoff event is tied directly to the weather that triggers it; the shutoff typically ends within 24 hours after the weather conditions have subsided. However, PSPS events may extend beyond the 24-hour timeframe, depending on conditions (Pacific Gas & Electric n.d.).

Electrical systems may also be disrupted or degraded for other reasons including production failure, network management failure (rotating outages), infrastructure failure (ex. transmission line failure), attack, or impacts from other hazards (Ex. earthquake, wildfire). These are usually no-notice (or “unintentional”) incidents limited to specific geographic regions. While PSPS incidents are most similar to the Cal OES classification of an “unplanned” disruption, these outages may simultaneously affect large regions of Northern California.

Strength/Magnitude

A PSPS can impact the health and well-being of the community. Residents may experience heat illnesses and have food spoil when air conditioning and refrigeration systems cannot function due to the power loss. Other impacts include food losses due to no refrigeration, which can lead to cascading effects on those who cannot afford to restock their food; food service/restaurant industry (supply loss, spoilage, etc.); and disruption to lifelines and infrastructure.

An extended outage may prove very challenging for people with disabilities and those with access and/or functional needs who rely on medical equipment requiring electricity and have limited or no battery backup. Local police and fire dispatch centers may receive many calls for assistance from people at home with these types of needs. Power outages are especially difficult for people with respiratory conditions and/or chronic health problems. Hospitals may see a surge in the number of patients with chronic respiratory illnesses exacerbated by excessive heat and loss of air conditioning. Loss of power may severely compound the effects of other simultaneous hazards including wildfire and Excessive Heat. PSPS may directly or indirectly threaten public safety in several areas:

Personal Safety

1. Individuals with medical conditions that are dependent on electricity to power medical equipment, provide mobility, maintain temperature, or refrigerate medicines. Local agencies may make use of three

databases that could assist in identifying individuals that may be dependent on electricity for these issues: The PG&E Medical Baseline Program, the County In-Home Supportive Services, and the federal Medicare emPOWER map.

2. Skilled Nursing Facilities (SNFs) and other congregate care institutions such as board and care facilities could also be impacted. In California, long-term care and skilled nursing facilities are required to have all-hazards emergency plans and working generators to provide power for essential patient treatment needs. However, these emergency power systems are not always reliable and failure could create sudden significant demands on the EMS system.

3. Although not expected, loss of power in hospitals will result in reduced services including advance imagery and cancellation of elective and non-urgent surgeries. Delays may cause patient health to deteriorate. Hospitals may see an increase in emergency room visits from those seeking support for medical devices.

4. Seniors, newborns, and other individuals may be challenged by lack of air conditioning. Home healthcare providers may be unable to provide services to all clients. Existing medical conditions may be exacerbated due to a) delays in receiving aid or resources, b) loss of temperature management systems, or c) the relocation of individuals.

5. Loss of traffic management systems and traffic signal lights may result in additional collisions and injuries.

6. Health and safety hazards may develop from improper food storage/handling, loss of remote health monitoring systems, and unsafe operation of generators (fire, burns, and carbon monoxide).

7. Acute and long-term behavioral health challenges may increase due to individual and community stress, trauma, uncertainty, and economic losses.

Public Safety Systems

1. 9-1-1. Loss of power in homes and businesses may prevent residents from using their VoIP and cordless phones to call 9-1-1. Similarly, loss of power will also eliminate use of most cell phone towers once the tower batteries run down. Plain Old Telephone Service (POTS) phones (i.e., copper lines) may continue to work. Communication providers who offer end-user access to the public switched telephone network to provide access to 9-1-1 are not required to provide access to 9-1-1 during a power outage or PSPS incident. 28 If residents are able to call via other means, automatic addressing may not be available increasing the potential for incorrect addressing and loss of local Records Management System (RMS) data.

2. Public Warning systems. Local public safety agencies may be unable to deliver warning messages in impacted areas due to loss of cell towers and failure of broadband wireless data, VoIP, and cable systems. This will significantly diminish or eliminate the effectiveness of the SoCoAlert, WEA, and EAS systems.

3. Public Safety Communications. Public safety radio antenna sites have 8 hours of battery backup and are on emergency generator power. Most sites can run generators at load for 96 hours before needing to be

re-fueled. However, voice and data applications that depend on commercial broadband wireless may not be available in a prolonged outage.

4. Degradation of first responder capabilities. Approximately 65% of fire stations have emergency power. Departments/districts may be challenged in maintaining and surging communications, equipment and staff.

5. Backup electrical generators have a failure rate of between 3% and 20% due to improper configuration, automatic transfer switch (ATS) failure, mechanical failure, overheating, or oil/fuel issues.

6. Public Safety Answering Points (PSAPs). During both the warning and outage phases, PSAPs will potentially experience a significant increase in calls for services due to medical emergencies, rescues, those seeking services such as additional oxygen supplies as well as actual/perceived security concerns including potential alarm responses. Additionally, many callers will be seeking information about the status of the outage and/or red flag warning or asking for public safety agencies to check on the welfare of their family members.

Infrastructure

1. Wireless broadband voice and data systems. For California providers, 88% of cell sites have emergency power backup and 80% have four or greater hours. The California Public Utilities Commission (CPUC) recently required wireless providers to maintain 72-hours backup power for their systems in Tier 2 and Tier 3 High Fire Threat Districts – this requirement goes into effect in 2021. The major providers have reported that they have rapidly deployable resources including mobile generators and refueling which could support systems in a sustained outage if the number of sites requiring power does not exceed this capacity.

2. Cable/fiber systems may also lose power. Most residents will lose power to home routers and home satellite systems thereby losing access to the internet, VoIP phones, and EAS. Similar to wireless broadband, new CPUC requirements for 72 hours of backup power for wireline broadband providers are to take effect in 2022. Internet Service Providers (ISPs) may continue to function using backup power.

3. Loss of fuel production/distribution. Very few gasoline stations have generator power to continue dispensing. A large regional outage could also disrupt production and distribution. Some government fueling facilities may also not be equipped with generators. There is one Compressed Natural Gas (CNG) fueling station in the County, which would also lose the ability to serve customers. In prolonged incidents, local governments may be asked to provide fuel to allied stakeholders including private sector ambulances, critical commodities haulers, and mutual aid resources.

4. Potable water systems. Sonoma Water expects to maintain the ability to provide wholesale water supplies using backup power and pumping systems. However, smaller retail systems may lose the ability to maintain adequate water pressure and/or supply resulting in turbidity and potential compromised water quality. This may require issuing notices to boil water or conserve water in some areas.

5. Cooling Centers. There will be challenges for opening cooling centers, as most facilities do not incorporate HVAC in emergency power circuits. Most traditional informal cooling facilities (malls, libraries,

movie theatres, etc.) do not have emergency power and will close. County government has no public assembly buildings with capacity to operate HVAC under emergency power.

6. Wastewater systems. Most systems have emergency power for lift stations. However, there may be isolated losses in capabilities to pump and/or treat sewage in some areas – some spills may result in extended outages.

Transportation

1. Roads and highways may lose power to traffic signals and traffic metering/sensors. Most traffic signals will default to flashing red when on battery backup power – generally limited to 8 hours. A few key intersections may have generator backup power. Some traffic signals will go totally dark. Residents may seek power, cooling, food, or other services with friends or commercial centers in unaffected areas, thereby creating congestion on roads no longer served by operating signals.

3. The County airport may have to suspend commercial operations. While the Control Tower is equipped with an emergency generator, the terminal is not. The CalFire Air Attack Base is equipped with a generator.

4. Residents, businesses, and government agencies may be unable to recharge electric vehicles.

Business Community

1. Notification by PG&E of a potential PSPS may encourage residents to stock up on key supplies similar to what occurs during a hurricane warning. Areas may see shortages in batteries, bottled water, and long lines at gas stations.

2. The use of emergency generators in retail establishments varies widely. Most supermarkets have some generator power but will not be able to maintain refrigerators or freezers. Pharmacies generally do not have emergency power.

3. Loss of power will generally prevent electronic Point-of-Sale (POS) transactions. Some systems can operate on battery and then save transactions for later transmission when power is restored. Some merchants may use backup systems such as mobile devices. Most ATMs have some short-term battery power.

4. Widespread loss of power may impact regional warehouse, distribution, and delivery systems including just-in-time services for critical facilities (ex. hospital pharmacies). Small and large businesses across all sectors could see cancelled and diminished tourist bookings, disrupted production schedules, an interrupted supply chain, lost inventory, refunds. This could also reduce sales tax and Transitory Occupancy Tax (TOT) revenue. PSPS incidents generally occur during the County’s major tourist season (July-November).

5. Losses could continue long-term as “Continued news coverage of the possibility of PSPS incidents may lead to a reduction of future bookings from business and leisure travel, meetings, events and wedding segments regardless of the actual occurrence of an outage”.

6. Most hotels do not have emergency power. If they do, it may only support emergency lighting, refrigeration, and/or limited business systems. These facilities may be forced to close. Thus, hotels may be unable to support residents seeking relief from an extended power outage or to serve as shelters in the event of evacuations. This may also limit their ability to serve as alternate worksites for impacted businesses and governments.

7. Closure of commercial retail spaces and movie theaters would prevent access by residents seeking relief from high heat.

Other

1. Food storage/preparation. A lack of refrigeration, degraded potable water, and/or lack of hot water for sanitation may increase the risk for food-borne illness in personal residences and in food service facilities. Food service facilities must close if they cannot maintain food safety standards.

2. Schools. Each school district will assess the potential or actual impact of PSPS on their operations and safety. Schools will select the appropriate response measure depending on the time of day and year, including alternate curriculum, early dismissal, reunification and release procedures, and/or cancellation of classes for the next day(s). School closures could significantly disrupt the social fabric of our communities, limit the ability of parents and care providers to go to work, and impact other school-affiliated functions such as nutrition programs.

3. Other organizations including childcare centers, congregate care facilities, social organizations, and libraries may be forced to close.

4. Although improvements have been made, areas actually impacted by PSPS outages may differ from those forecasted.

Past Occurrences

During the October 2019 Kincade Fire, PG&E de-energized the City of Healdsburg's transmission source creating a citywide power outage. This outage lasted for four-days and impeded fire-fighting efforts due to a lack of utility power at several critical facilities. PG&E has communicated with the City of Healdsburg that the City's transmission source may be directly or indirectly affected by future PSPS events causing citywide power outages. PG&E's most recent forecast for this level of event is one in every ten years.

Other areas surrounding Healdsburg continue to experience PSPS events on an annual and seasonal basis. During the strongest of wind events wide areas of Sonoma County, including areas within the City of Healdsburg are placed on alert for the potential of PSPS events. While rare for the City, there are still overhead powerlines within the wildland urban interface (WUI) and the City may choose to de-energize these lines ahead of high-wind and low-humidity weather events.

Location

PSPS events often target wild land areas with high wildfire risk, but they can impact a much wider region. The targeted area is the area at risk due to weather conditions. Given the long, connected nature of power supply systems, a shutoff event targeted to a small at-risk zone can affect power to larger areas beyond.

As an example of potentially affected areas, Figure 4.12 shows the PSPS areas mapped by PG&E for its system statewide.

Warning Time

Forecasts of weather conditions such as red flag warnings, low humidity, and high winds can provide some warning of potential upcoming PSPS events. However, since PSPS events can impact areas beyond where the fire-risk weather conditions are being observed, due to the grid nature of electrical power distribution systems, some locations without forecast fire-risk conditions may still be vulnerable to an imminent PSPS. Prior to a PSPS, electric utilities are required to notify customers who may be affected:

- Outages likely - Customers notified up to two days prior to shut off if the customer may be affected by a shutoff.
- Outages required - Customers notified one to four hours before shutoff and can be notified at any time.

Many utilities offer notification services through text or email, but the sign-up process for these notifications tends to be voluntary and typically targets customers/clients rather than all consumers.

Advanced warning times from electric providers to government agencies may vary depending on weather and environmental conditions. In advance of a PSPS event, the electric provider usually notifies the emergency management agency for the local operational area. That agency in turn notifies local jurisdictions and public safety providers. Some jurisdictions choose to notify residents, and some electric providers provide information on websites among other places.

Secondary Hazards

PSPS events can cause disruption of communications, water, and gas lines. These secondary hazards can lead to closures of retail businesses, grocery stores, gas stations, banks, and other services. Food spoilage and water contamination are other secondary hazards associated with PSPS events. The inability to use electrical medical devices and assistive technology during a PSPS event can also be a secondary hazard requiring mitigation by the City of Healdsburg.

Frequency/Probability of Future Occurrence

Likely - PSPS alerts continue to be based on weather and environmental conditions and are expected to continue into the foreseeable future. These events are most likely to occur during summer months with high temperatures, increased wind speeds, drier conditions, and low humidity.

California's 33 reported PSPS events between 2013 and 2019 represent an average of almost five events per year. The State is expected to continue to experience multiple PSPS events each year. Per information provided by PG&E, the City of Healdsburg is expected to experience a citywide PSPS less than once every 10 years.

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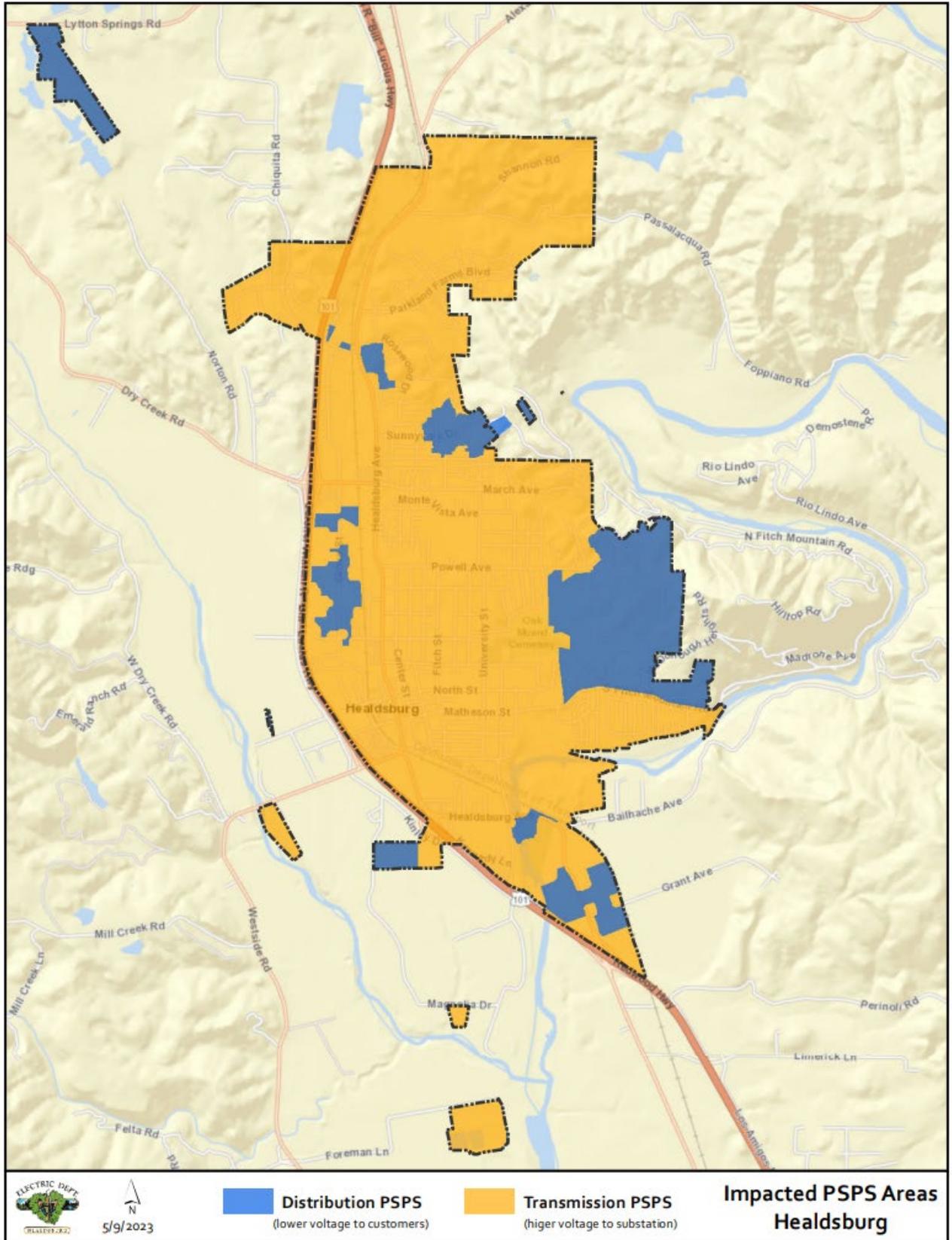


Figure 4.12: Healdsburg PSPS Potential Outage Zones
(See Appendix C for a larger and higher resolution map)

Future Condition Considerations

Conditions for wildfire are expected to become more common in the future due to climate change. This will likely increase the probability of PSPS events each year.

4.2.6 Severe Weather

Severe weather refers to any dangerous meteorological phenomena with the potential to cause damage, serious social disruption, or loss of human life. The most common severe weather events impacting Healdsburg are storms, high winds and excessive heat. For this risk assessment, the term “severe weather” refers to these three event types in aggregate. They are assessed as a single hazard for the following reasons:

- Records indicate that each of these weather event types has impacted the planning area to some degree, and all have similar frequencies of occurrence.
- None of these weather event types have a clearly defined extent or location. Therefore, no quantitative, geospatial analysis is available to support exposure or vulnerability analysis; the analyses for this hazard are qualitative.

Hazard Description

Excessive Heat

Excessive Heat events can have severe impacts on human health and mortality, natural ecosystems, the agriculture sector and other economic sectors. According to information provided by FEMA, Excessive Heat is defined as temperatures that hover 10 degrees or more above the average high temperature for the region and last for several weeks. Heat kills by taxing the human body beyond its abilities. In a normal year, about 175 Americans succumb to the demands of summer heat. According to the National Weather Service (NWS), among natural hazards, only the cold of winter takes a greater toll nationally — not lightning, hurricanes, tornadoes, floods, or earthquakes. However, there is a lack of cold weather and extreme cold temperatures events in Sonoma County. During the 40-year period from 1936 through 1975, nearly 20,000 people were killed in the United States by the effects of heat and solar radiation. In the heat wave of 1980, more than 1,250 people died. The 2018 California SHMP notes the heat wave during the summer of 2006 led to 650 deaths in a 13-day period (Cal OES 2018), and in the past 15 years heat waves have claimed more lives in California than all other declared disaster events combined (California Climate Adaptation Strategy 2018).

Heat disorders generally have to do with a reduction or collapse of the body’s ability to shed heat by circulatory changes and sweating or a chemical (salt) imbalance caused by too much sweating. When heat gain exceeds the level the body can remove, or when the body cannot compensate for fluids and salt lost through perspiration, the temperature of the body’s inner core begins to rise, and heat-related illness may develop. The elderly, small children, patients with chronic medical conditions, those on prescription medication therapy, and people with weight or alcohol problems are particularly susceptible to heat reactions, especially during heat waves in areas where moderate climate usually prevails.

Storms

A storm disaster is generally defined as a violent atmospheric disturbance occurring over land and/or water and is distinguished by its strength, characteristics, and the scale of the resulting damage. Storms

can represent a major potential threat to the state's population because of their frequency, the size of areas devastated and the population affected, and the scale of the potential resulting damage. Storms in California also have historically caused flooding, mudflows, landslides, electrical outages, and other impacts (NOAA 2023).

There are different types of storms including thunderstorms and winter storms, both of which can produce hazardous conditions. Thunderstorms can produce damaging winds, tornadoes, large hail, flooding and flash flooding. Winter storms can include freezing rain, sleet, heavy snow, and strong winds.

Severe thunderstorms are officially defined as storms that are capable of producing large hail (inch or larger) and/or wind gusts over 58 miles per hour (NOAA 2009). Hail this size can damage property such as plants, roofs, and vehicles. Wind this strong is able to break off large branches, knock over trees, or cause structural damage to trees. Thunderstorms also produce tornadoes and dangerous lightning; heavy rain can cause flash flooding.

A freeze is when the surface air temperature is expected to be 32 degrees or below over a widespread area for a climatologically significant period of time. Use of the term is usually restricted to advective situations or to occasions when wind or other conditions prevent frost. "Killing" may be used during the growing season when the temperature is expected to be low enough for a sufficient duration to kill all but the hardiest herbaceous crops (NOAA 2009). Sometimes a freeze warning will be issued during the growing season when surface temperatures are expected to drop below freezing over a large area for an extended period of time, regardless of whether or not frost develops.

High Winds

High winds, often accompanying severe thunderstorms, can cause significant property and crop damage, threaten public safety and have adverse economic impacts from business closures and power loss. Windstorms in the City of Healdsburg are typically straight-line winds. Straight-line winds are generally any thunderstorm wind that is not associated with rotation (i.e., is not a tornado). These winds can exceed 100 miles per hour (mph) and are responsible for most wind damage related to thunderstorms. These winds can overturn mobile homes, tear roofs off houses, topple trees, snap power lines, shatter windows, and sandblast paint from cars. Other associated hazards include utility outages, arcing power lines, debris blocking streets, dust storms, and an occasional structure fire. High winds and tornadoes can cause damage to property and loss of life. Property damage can include damage to buildings, fallen trees and power lines, broken gas lines, broken sewer and water mains, and the outbreak of fires. Agricultural crops and industries may also be damaged or destroyed. Access roads and streets may be blocked by debris, delaying necessary emergency response.

Strength/Magnitude

Excessive Heat

Limited – The City of Healdsburg begins to experience hot weather in June or July of each year, and the heat continues throughout the summer months. According to the Western Regional Climate Center (WRCC), the average high temperature for the City of Healdsburg in July is 81.8°F. Temperatures that are 10 degrees above normal are considered excessive. The California OES Contingency Plan for Excessive

Heat Emergencies (2014) indicates that through the use of historical weather and mortality data, the NWS and the California Department of Public Health (CDPH) have identified five major types of climate regions within California to account for climate differences among regions in order to recognize what constitutes an excessive heat event in each of the regions. When temperatures spike for two or more consecutive days without an adequate drop in nighttime temperature to cool the outdoor and indoor environments, there is a significant increase in the risk to vulnerable populations.

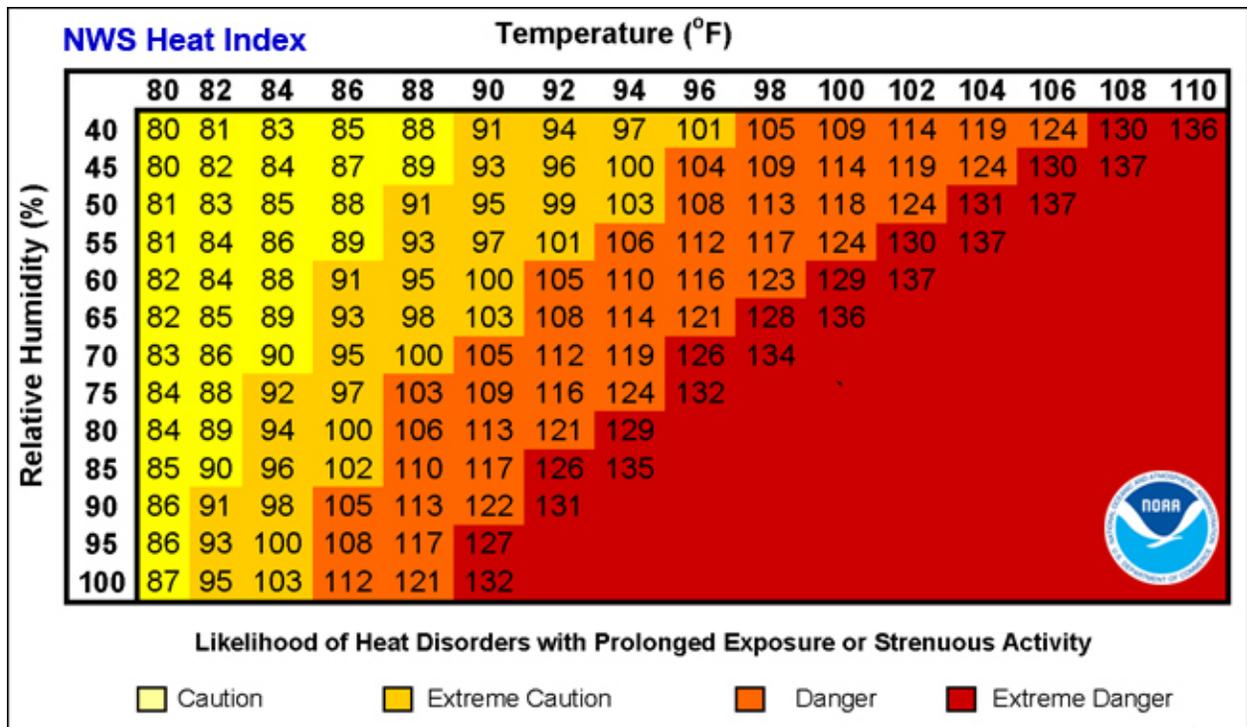
The NWS has in place a system to initiate alert procedures (outlooks, advisories, watches, and warnings) when high temperatures are expected to have a significant impact on public safety. The expected severity of the heat determines which type of alert is issued. During past heat waves, the City of Healdsburg has designated facilities as Cooling Centers. In 2017 the Healdsburg Community Center and the Healdsburg Senior Center were designated as City Cooling Centers. The Centers also accepted cats and dogs on leashes or inside appropriate pet carriers. In summary, Excessive Heat impacts would likely be limited in the Planning Area, with 10 to 25 percent of the Planning Area affected. Excessive Heat will have an impact on vulnerable populations and could also impact livestock and crops if the event occurs during certain times of the year. These are the criteria for each alert and the associated NWS Heat Index:

Excessive Heat Outlook: When the potential exists for an excessive heat event in the next 3 to 7 days. An outlook is used to indicate that a heat event may develop. It is intended to provide information to those who need considerable lead time to prepare for the event, such as public utilities, emergency management and public health officials.

Excessive Heat Watch: Conditions favorable for an excessive heat event to meet/exceed heat warning criteria in the next 12 to 48 hours.

Heat Advisory: Heat index of 105°F daytime and/or 80°F nighttime.

Excessive Heat Warning: Heat Index at least 115°F for 3 hours or more, with minimum nighttime heat index at or above 80°F or based on the heat health watch warning system.



Storms

Limited –Storms that involve heavy rain and hail, can be measured according to hail by diameter size. Common problems associated with severe storms include the loss of utilities or immobility. Loss of life is uncommon but can occur during severe storms. Immobility can occur when roads become impassable due to dense fog, flooding, downed trees, ice, or a landslide. Fog specifically poses a risk to commuters and driving conditions as fog typically forms rapidly in the early morning hours. Nighttime driving in the conditions and visibility. Loss of utilities can occur when severe thunderstorms cause trees or tree limbs to fall and damage powerlines. Lightning can also cause severe damage and injury, particularly when it causes wildfires.

The heavy precipitation that is possible in the City of Healdsburg and all of California is often the result of an atmospheric river. Atmospheric rivers are categorized by a unit of measurement known as the Integrated Water Vapor Transport (IVT), which takes into account the amount of water vapor in the system and the wind that moves it around. For a storm to be classified as an atmospheric river it has to reach an IVT threshold of 250 units; 1,000 IVT or more is considered to be “extreme” (Arcuni, 2019). In 2019 a system for categorizing the strength and impacts of atmospheric rivers was developed by the Center for Western Weather and Water Extremes (CW3E), out of the Scripps Institution of Oceanography at the University of California San Diego. The newly developed scale ranks ARs into five categories from weak to exceptional. Unlike the Fujita scale for tornadoes that focuses on potential damage, the AR scale accounts for both storms that may be hazardous and storms that can provide benefits to the local water supply. A category one AR is considered to be primarily beneficial, generally lasting only 24 hours and producing modest rainfall. On the other end of the scale, a category five AR is considered “exceptional” and primarily hazardous, lasting for several days and associated with heavy rainfall and runoff that may cause significant damages.

Three categories of damage threats for Severe Thunderstorm Warnings were developed by NWS. The categories, in order of lowest to highest damage threat, are base, considerable, and destructive. These tags and additional messaging are designed to promote immediate action based on the threats. These are the conditions for each storm category:

Base – The criteria for a baseline or “base” severe thunderstorm warning remains unchanged: 1.00 inch (quarter-sized) hail and/or 58 mph thunderstorm winds. This will not activate a Wireless Emergency Alert (WEA) on smartphones. When no damage threat tag is present, damage is expected to be at the base level.

Considerable – The criteria for a considerable damage threat is at least 1.75 inch diameter (golf ball-sized) hail and/or 70 mph thunderstorm winds. This will not activate a WEA.

Destructive – The criteria for a destructive damage threat is at least 2.75 inch diameter (baseball-sized) hail and/or 80 mph thunderstorm winds. Warnings with this tag will automatically activate a (WEA) on smartphones within the warned area.

High Winds

Limited – Based on NCEI records between 1950 and November 16, 2023, there have been 211 high and strong High Winds in Sonoma County, causing a total of \$3,858,300 in property damage. The most damaging event took place on December 27, 2006 and was a 30 mph wind event that resulted in over \$1 million of property damage to both commercial and residential structures. The highest magnitude event recorded occurred on February 14, 2019 and was in association with an atmospheric river that moved through the region. Recorded winds were as high as 80-mph and resulted in downed trees, power outages, and property damages.

High Winds in Sonoma County have led to six recorded fatalities and five injuries. Overall, high wind event impacts to Healdsburg would likely be limited, with a majority of impacts being related to property damages caused by down trees as well as power outages. Overall, impacts from High Winds would likely be limited, with 10 to 25 percent of property severely damaged.

The Beaufort Wind Scale is used to define the extent of high winds in the planning area:

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Beaufort number	Wind type	Wind speed	Wave height	Land conditions
0	Calm	0 m/s	0 m	Calm. Smoke rises vertically
1	Light air	0-2 m/s	0 m	Wind motion visible in smoke
2	Light breeze	2-3 m/s	1 m	Wind felt on exposed skin. Leaves rustle
3	Gentle breeze	3-5 m/s	1 m	Leaves and smaller twigs in constant motion
4	Moderate breeze	5-8 m/s	1-2 m	Dust and loose paper is raised. Small branches move
5	Fresh breeze	8-11 m/s	2-3 m	Smaller trees sway
6	Strong breeze	11-14 m/s	3-4 m	Large branches in motion. Whistling heard in overhead wires. Umbrella use becomes difficult
7	Near gale	14-17 m/s	4-5 m	Whole trees in motion. Some difficulty when walking into the wind
8	Gale, fresh gale	17-21 m/s	5-7 m	Twigs broken from trees. Cars veer on road
9	Severe gale	21-24 m/s	7-10 m	Light structure damage
10	Storm whole gale	24-28 m/s	9-12 m	Trees uprooted. Considerable structural damage
11	Violent storm	28-33 m/s	12-16 m	Widespread structural damage
12	Hurricane force	≥ 33 m/s	≥ 14 m	Considerable and widespread structural damage

Past Occurrences

In the past five years, from 1/1/2018 to 11/16/2023, the NOAA Storm Events Database has reported 49 severe weather events (NOAA 2023).

Table 4-8: Severe Weather in the Sonoma County, North Bay Interior Valleys and Mountains

Event Type	Start Date	Deaths	Injuries	Property Damage	Crop Damage
Excessive Heat	9/6/2020	0	0	\$0	\$0
Excessive Heat	7/10/2021	0	0	\$0	\$0
Excessive Heat	7/1/2023	0	0	\$0	\$0
High Winds	1/1/2019	0	0	\$0	\$0
High Winds	1/5/2019	0	0	\$0	\$0
High Winds	1/8/2019	0	0	\$0	\$0
High Winds	1/16/2019	1	0	\$0	\$0
High Winds	2/2/2019	0	0	\$0	\$0
High Winds	2/13/2019	0	0	\$0	\$0
High Winds	2/25/2019	0	0	\$0	\$0
High Winds	3/5/2019	0	0	\$0	\$0
High Winds	5/16/2019	0	0	\$1,000	\$0
High Winds	10/9/2019	0	0	\$0	\$0
High Winds	10/23/2019	0	0	\$3,000	\$0
High Winds	10/29/2019	0	0	\$0	\$0
High Winds	2/9/2020	0	0	\$0	\$0
High Winds	3/1/2020	0	0	\$0	\$0
High Winds	9/8/2020	0	0	\$0	\$0
High Winds	9/27/2020	0	0	\$0	\$0

High Winds	10/14/2020	0	0	\$0	\$0
High Winds	10/25/2020	0	0	\$0	\$0
High Winds	11/6/2020	0	0	\$0	\$0
High Winds	11/7/2020	0	0	\$0	\$0
High Winds	12/7/2020	0	0	\$0	\$0
High Winds	1/18/2021	0	0	\$0	\$0
High Winds	1/24/2021	0	0	\$0	\$0
High Winds	2/24/2021	0	0	\$0	\$0
High Winds	3/30/2021	0	0	\$0	\$0
High Winds	1/22/2022	0	0	\$0	\$0
High Winds	3/4/2022	0	0	\$0	\$0
High Winds	4/11/2022	0	0	\$0	\$0
High Winds	9/18/2022	0	0	\$0	\$0
High Winds	1/4/2023	0	0	\$0	\$0
High Winds	1/14/2023	0	0	\$10,000	\$0
High Winds	2/21/2023	0	0	\$20,000	\$0
High Winds	3/9/2023	0	0	\$10,000	\$0
High Winds	3/14/2023	0	0	\$0	\$0
High Winds	3/28/2023	0	0	\$0	\$0
Storms	1/16/2019	1	0	\$0	\$0
Storms	2/15/2019	0	0	\$0	\$0
Storms	10/31/2019	0	0	\$0	\$0
Storms	11/28/2019	0	0	\$0	\$0
Storms	3/25/2020	0	0	\$0	\$0
Storms	8/16/2020	0	0	\$0	\$0
Storms	11/10/2020	0	0	\$0	\$0
Storms	1/26/2021	0	0	\$0	\$0
Storms	2/23/2021	0	0	\$0	\$0
Storms	3/10/2021	0	0	\$0	\$0
Storms	1/21/2023	0	5	\$0	\$0
Storms	3/9/2023	0	0	\$10,000	\$0

Source: NOAA, 2023

One of the most recent significant storm/wind events was in January 2023 when a strong atmospheric river combined with a bomb cyclone led to widespread heavy rain, damaging wind gusts, and high surf across the Bay Area and Central Coast that resulted in one death in Occidental from a downed redwood tree.

A prolonged and oppressive heat wave swept the Central Coast and Bay Area for almost a week from August 14th to August 19th with widespread record-breaking temperatures observed across the region. This was caused by a strong high-pressure system over the Desert Southwest that expanded westward into California. This dome of heat brought hot temperatures to the area for several days. Multiple days of triple digit afternoon highs were recorded inland with some coastal locations even reaching the mid-90s. Several days of hot and dry weather further dried fuels over the area increasing fire danger. During this event, a surge of monsoonal and tropical moisture from a former Tropical Storm advected northward with

sufficient instability to generate multiple high based and dry thunderstorms that produced several thousand lightning strikes over the Greater Bay Area. Many locations saw wind gusts of 40-50 mph with isolated areas seeing gusts of 60-75 mph. This prompted the San Francisco Bay Area forecast office to issue a rare severe thunderstorm warning. These lightning strikes in combination with gusty and erratic outflow winds sparked hundreds of wildfires across the state of California. Several smaller fires combined to form complexes, some of which are now among the largest wildfires in state history. Most of which were still actively burning at the end of August. Hundreds of thousands of acres have been burned with several hundred structures destroyed as well as a handful of deaths and injuries. Tens of thousands of residents were also forced to evacuate. Additionally, all of these wildfires burning simultaneously across the state gave the Bay Area the worst air quality in the world at one point.

Location

None of these weather event types have a clearly defined extent or location. Therefore, no quantitative, geospatial analysis is available to support exposure or vulnerability analysis; the analyses for this hazard are qualitative. Excessive heat, Storms, and High Winds all have the potential to occur anywhere in the planning area.

Warning Time

Meteorologists can often predict the likelihood of a severe weather event including excessive heat, Storms, and High Winds. This can give several days of warning time. However, meteorologists cannot predict the exact time of onset or severity of a storm. Some storms may come on quickly, with only a few hours of warning time.

Secondary Hazards

Excessive Heat can contribute to fire-prone dry vegetation. Major riverine or urban flooding can result from heavy rain. Rain falling on saturated soils on slopes or on areas recently burned by wildfire may lead to landslides. Lightning during storms presents a risk of starting a wildfire. High winds can lead to PSPS events and increase the risk of a wildfire.

Frequency/Probability of Future Occurrence

Excessive Heat

Likely – Temperatures of Excessive Heat are likely to continue to occur annually in the Planning Area.

Storms

Likely – Storms events are well-documented seasonal occurrences that will continue to occur annually in the Planning Area.

High Winds

Likely – A total of 211 combined high and strong High Winds have occurred in Sonoma County over 68 years of record keeping, which equates to an average of three events in a typical year. Historical wind activity within the Planning Area indicates that the area will likely continue to experience high High Winds during adverse weather conditions. The actual risk of a wind event to the City is dependent on the nature and location and the magnitude of a high wind event.

Future Condition Considerations

Severe weather events are expected to increase in Healdsburg over the coming decades due to climate change. Statewide, some studies suggest that more years will have an increased number of severe weather events and that the largest of these events will be more intense than they have been historically. In general, Northern California is expected to see more frequent severe weather events, potentially up to twice as many by 2100 as the region currently does, while Southern California is expected to see the same number of events but with each individual storm an average of 10 to 20 percent more intense. However, the specific impacts on the Healdsburg region are not yet known.

Excessive Heat

Heat waves are likely to become more frequent, which will have direct impacts on human health in terms of heat related illness. With the general trend of increased warming of average temperatures, extreme high temperatures will likely also increase. Cascading impacts include increased stress on water quantity and quality, degraded air quality, and increased potential for more severe or catastrophic natural events such as heavy rain, droughts, and wildfire. Another cascading impact includes increased duration and intensity of wildfires with warmer temperatures.

Storms

As average temperatures increase over time, this generally will result in higher extreme temperatures and more warming in the atmosphere can trigger climate changes, which could result in more frequent extreme weather events. According to California's Fourth Climate Change Assessment, the number of days each year on which the atmospheric rivers bring "extreme" amounts of rain and snow to the region are expected to increase under the projected climate change for the state, possibly increasing more than a quarter. Pacific Northwest National Laboratory researchers found that atmospheric rivers will reach the

West Coast more frequently if GHG emissions continue to rise under business-as-usual conditions. Currently, the West receives rain or snow from these atmospheric rivers between 25 and 40 days each year. By the end of this century, days on which the atmospheric rivers reach the coast could increase by a third this century, between 35 and 55 days a year. Meanwhile, the number of days each year on which the atmospheric rivers bring "extreme" amounts of rain and snow to the region could increase by more than a quarter.

High Winds

There presently is not enough data or research to quantify the magnitude of change that climate change may have related to wind frequency and intensity. Studies referenced in California's Fourth Climate Assessment indicated that extreme fire weather, particularly in the form of hot and dry winds, can strongly influence shrub-land fire regimes. Strong winds have also been associated with severe forest fires in California, meaning climate change impacts on wind patterns may also affect forest health and wildfire susceptibility. Lastly, other ongoing research compiled in the recent climate assessment has resulted in different conclusions on the effect of climate change on wind regimes, particularly extreme High Winds, such as the Santa Ana and Diablo winds that created some of the most devastating wildfires (California

Natural Resources Agency 2018a). At this time, these changing factors are not well understood and are still being incorporated into state and regional research and risk analysis.

4.2.7 Wildfire

Hazard Description

The term *wildfire* refers to any conflagration that starts in a rural, sparsely populated or largely undeveloped area. In many parts of the world, wildfires form part of the ecosystem and often burn at a safe distance from areas of human settlement. Under dry conditions and when fanned by strong winds, however, fires can spread into heavily populated areas, causing major damage to property. Buildings may be set alight by radiant heat, contact with the flames, or flying embers. Smoke can also cause property damage and health concerns, and indirect losses can result from business interruption.

A complex interplay of natural anthropogenic factors influences the extent and magnitude of wildfires. Most wildfires are sparked by human activity and expand due to factors such as the type and dryness of vegetation, slope, wind, and other climatic components such as temperatures and precipitation. Wind plays a significant factor in the spread of fire, and the strong, dry Santa Ana and foehn winds significantly increase the risk and severity of wildfire (Sonoma County 2017). Recent issues with Sudden Oak Death, a forest disease caused by a fungus-like organism that has been responsible for the death of thousands of oaks and tanoaks in California's coastal areas, has increased the amount of dead and dry vegetation that can serve as tinder for a wildfire. Drought also can increase the likelihood and magnitude of wildfires. The complicated nature of wildfire spread makes it difficult to predict; even if hazard zones can be clearly identified, fires can cause significant losses in unexpected locations under unique circumstances.

In December 2022, the City of Healdsburg adopted a Community Wildfire Protection Plan (CWPP) as an annex to this plan. A CWPP is a plan developed in the collaborative framework established by the Wildland Fire Leadership Council and agreed to by land management agencies managing land in the vicinity of the planning area (USDA 2023). A CWPP also identifies and prioritizes areas for hazardous fuel reduction treatments and recommends the types and methods of treatment that will protect one or more at-risk communities and essential infrastructure and recommends measures to reduce structural ignitability throughout the at-risk community. CWPP also identified a home out approach to create defensible space and prevent home-to-home ignition from a wildfire conflagration.

Strength/Magnitude

CalFire gauges wildfires in terms of the number of acres burned. On average, wildfires in Sonoma County since the 1960s have burned about 34,000 acres each, and as much as 363,220 acres. The median fire is the 2017 Tubbs Fire, which burned 36, 807 acres.

Past Occurrences

Wildfires have occurred regularly in the Bay Area region, with documented fires going back to the 1960s. CalFire 2023 reports large wildfires as having occurred in 1961, 1962, 1964, 1965, 1970, 1981, 1985, 1988, 1991, 2008, 2017, 2019, and 2020.

The 2017 fire season was the worst in California's history and included major, highly destructive fires in Sonoma and Napa counties. These included the Pocket Fire to the north of Healdsburg and the Tubbs Fire

to the south and east. The Tubbs Fire is the most destructive wildfire in modern state history, claiming 36,432 acres of land, 5,300 structures, and 22 lives. Within hours of its ignition, the fire swept out of the mountainous areas north of Santa Rosa and into densely populated city neighborhoods. The Pocket Fire burned 17,357 acres of mostly undeveloped land in the Geyserville area, destroying only a few structures. These fires burned in concert with the Nuns and Atlas fires farther to the south, all of which started on October 8 and 9, 2017, spurred by high winds and recent drought conditions that caused the fires to spread quickly and unpredictably (Cal Fire 2018). While none of these fires reached Healdsburg, the Tubbs and Pocket fire perimeters both were less than 6 miles from the city's border. On October 11, 2017, city officials advised residents of Fitch Mountain and along Bailhache and Rio Lindo avenues to be prepared to evacuate if necessary. No official evacuation orders were issued, but some residents did leave their homes as a precaution. The Healdsburg Community Center served as an emergency shelter for those displaced by the fires, registering 195 evacuees by the second day (Avants 2017).

Prior to the Sonoma and Napa County fires, the 1991 fire in the Oakland-Berkeley Hills was the largest urban wildland fire in the Bay Area and resulted in \$1.7 billion in losses. In the fire, 3,354 single-family dwellings and 456 apartments were destroyed, while 25 people were killed and 150 people were injured (ABAG 2017).

The Kincade Fire, an unparalleled wildfire that started in the late hours of October 23, 2019, was a significant event in Sonoma County, California. Originating in The Geysers region, just northeast of Geyserville, the fire rapidly engulfed an expansive area of 77,758 acres, propelled by the extreme wind conditions at the time. Over 90,000 structures fell under threat, prompting widespread evacuations throughout the county, affecting communities including Geyserville, Healdsburg, Windsor, and Santa Rosa. The severity of the fire led to evacuation warnings and orders extending to parts of Lake County. At its peak, the Kincade Fire became the most extensive wildfire in the 2019 California wildfire season, and the largest recorded in Sonoma County before being surpassed by the LNU Lightning Complex fires in 2020. The cause of the fire was traced back to the failure of a 230,000-volt transmission line near the point of origin. The fallout saw power being cut off to millions of residents and widespread property damage, leading to massive disruptions in communication and power infrastructure in the region. Despite the challenges, the tireless efforts of the fire management teams led to the full containment of the fire by November 6, 2019.

The LNU Lightning Complex Fire, which broke out in the summer of 2020, was a destructive ensemble of wildfires across several counties in Northern California, with one of its constituent fires being the infamous Walbridge Fire. The Walbridge Fire, ignited by a series of intense lightning storms, originated west of Healdsburg in Sonoma County and swiftly spread across vast swathes of land, menacing both residential and natural environments. Due to an extreme combination of high temperatures, dry conditions, and gusty winds, the fire escalated at a rapid pace, posing serious challenges to containment efforts. The flames seared through an expansive terrain, leaving a trail of devastated structures and prompting widespread evacuation orders in threatened communities. The severe environmental toll of the fire was further reflected in the extensive damage to the region's ecological systems, particularly impacting the local wildlife. Amidst its devastation, the Walbridge Fire underscored the increasingly concerning impact of climate change on the frequency and intensity of wildfires in California.

Hundreds of fires have burned in Sonoma County since the 1960s, including those listed in **Table 4-8** and shown in **Figure 4.12**. Historically, major fires have not significantly impacted Healdsburg, but they could in the future.

Table 4-9: Historic Sonoma County Fires

Year	Name	Acres Burned	Structures Burned
1964	Hanley	52,700	108
1964	Nuns Canyon	10,400	27
1965	Knight's Valley	6,000	0
1965	Pocket Ranch	4,000	0
1965	Austin Creek	7,000	0
1972	Bradford	1,760	4
1978	Creighton Ridge	11,405	64
1988	Cloverdale	1,833	100
1988	Geysers	9,000	7
1996	Porter Creek	300	0
1996	Cavedale	2,100	0
1999	Geyser Road	1,300	0
2000	Berryessa	5,731	15
2004	Geysers	12,000	6
2008	85	322	0
2008	Pine	989	0
2013	McCabe	3,505	1
2015	Valley	76,067	1,955
2017	Tubbs	36,807	5,643
2017	Nuns	54,382	1,355
2017	Pocket	17,357	6
2019	Kincade	77,758	374
2020	LNU (Walbridge)	363,220	1,491
2020	Glass	67,484	661

Source: CalFire, 2023

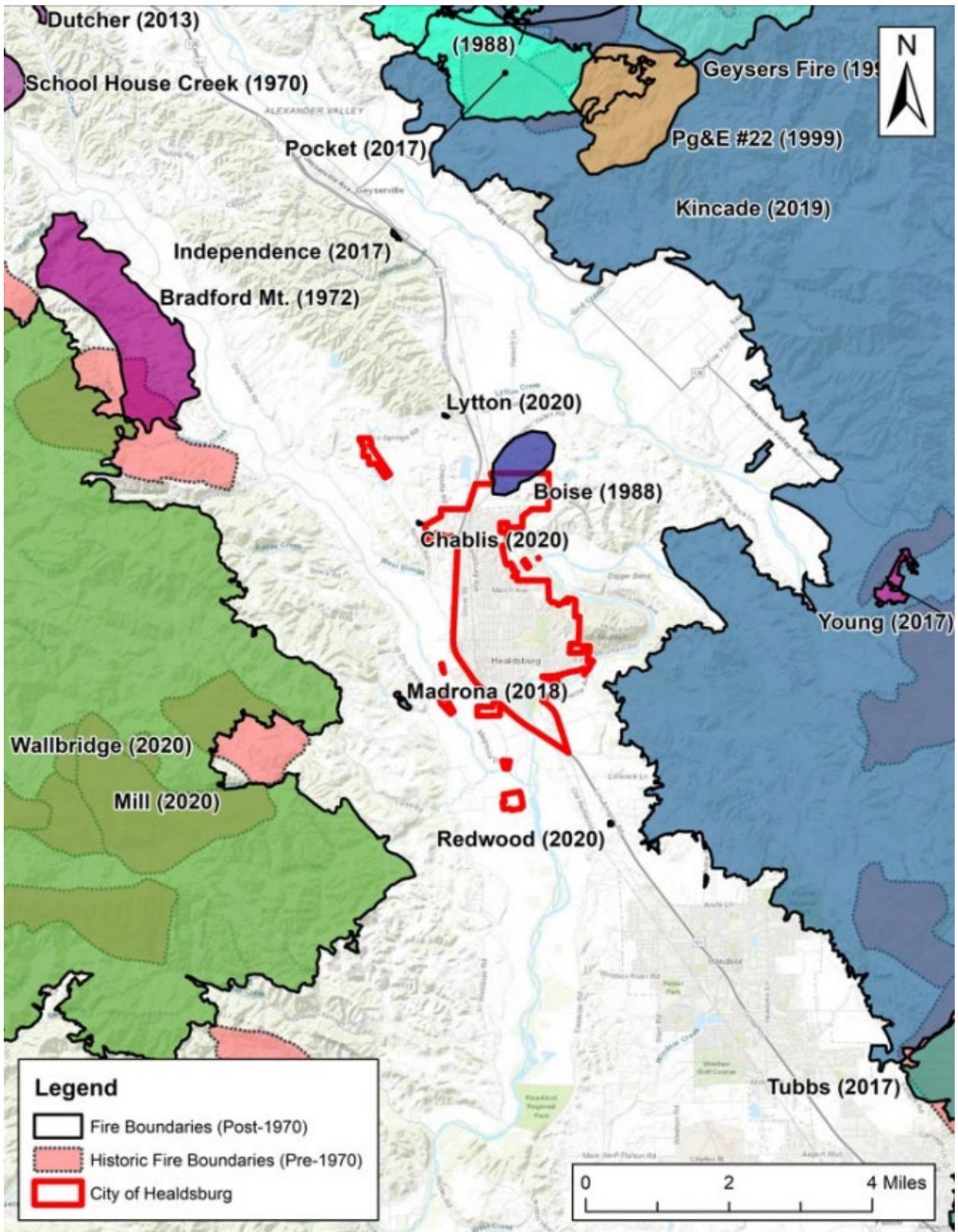


Figure 4-13: Historic Fire Perimeters in the Healdsburg Vicinity
(See Appendix C for a larger and higher resolution map)

Location

Fire-prone areas in California are divided into three categories: Federal Responsibility Areas (FRAs), State Responsibility Areas (SRAs), and Local Responsibility Areas (LRAs). FRAs are lands where federal agencies are responsible for preventing and fighting fires, and include lands protected by the US Forest Service, the US Department of Agriculture, and the Department of the Interior (including the National Park Service, the Bureau of Land Management, and the Bureau of Indian Affairs). SRAs are areas where CalFire is responsible for fire prevention and firefighting, while local agencies have responsibilities in the LRAs. The LRA for the Healdsburg region is shown in **Figure 4.14**.

CalFire is required by state law to map areas of significant fire hazards based on fuels, terrain, weather, and other relevant factors. These zones, referred to as Fire Hazard Severity Zones (FHSZ), influence how people construct buildings and protect property to reduce risk associated with wildland fires. Determining fire hazard severity has two key components: probability of burning and expected fire behavior. The factors considered in determining hazard are how often an area will burn, and when it does burn, what characteristics might lead to buildings being ignited? Based on these factors, each area is categorized as a Moderate, High, or Very High FHSZ. The classification system is intended to provide a broad stroke understanding of the level of wildfire hazard across the state and may not always reflect hazard from highly localized and fine-grained factors.

Figure 4.14 shows the FHSZs for both the SRA and LRA in the Healdsburg area. The area around Healdsburg is generally classified as either moderate or high fire hazard, with the high fire hazard areas on the eastern side encompassing much of Fitch Mountain and the wooded and brush-covered ridges. Although these are the areas of greatest concern, the rest of the city could be affected by the spread of fire into urban areas, high winds and mountainous terrain that make firefighting difficult, and the resulting particulate matter causing health concerns in the region. Areas of wildland-urban interface (WUI) are particularly vulnerable because fire can easily spread from the wildland area to the urban, putting property and lives at risk.

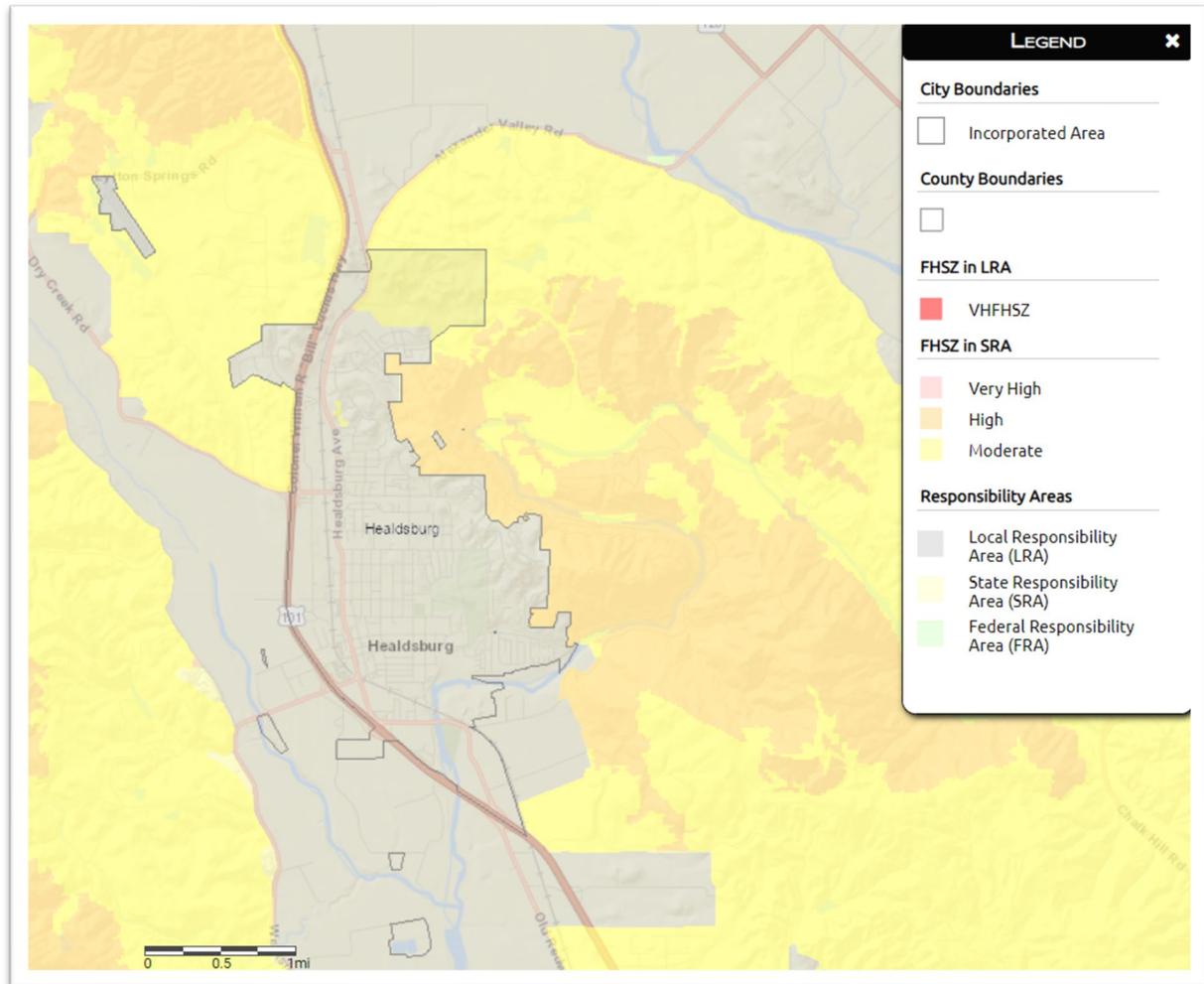


Figure 4.14: Healdsburg Fire Hazard Severity Zones and Areas of Responsibility

(See Appendix C for a larger and higher resolution map)

Warning Time

Warning time for wildfires in regions like Sonoma County, California, varies greatly and is contingent upon numerous factors, with a notable influence being weather conditions. Sometimes, meteorological forecasts provide early indicators of potential 'red flag' conditions such as high temperatures, low humidity, and strong winds, offering residents and firefighters a precious lead time to prepare. However, fast-spreading wind-driven wildfires can ignite and spread with very little advanced warning. These rapidly evolving situations can catch communities off guard, offering limited evacuation time and complicating firefighting efforts. Therefore, constant preparedness is vital for residents in these areas. This readiness involves creating and maintaining defensible spaces around homes, planning evacuation routes, and staying updated on local fire conditions. In the face of the unpredictable nature of wildfires, such preparedness can significantly enhance community resilience and safety.

Secondary Hazards

Wildfires not only pose immediate threats through the flames themselves but also give rise to a number of secondary hazards that continue to endanger life and property even after the fire has passed. Downed

power lines are one such hazard; they can be hidden amongst debris and cause electrocution risks. Hazard trees, weakened or killed by the fire, may collapse unexpectedly, posing a risk to both people and structures. Similarly, structures partially damaged by the fire may be structurally unsound and prone to collapse, representing another dangerous situation. Additionally, access roads might be blocked by fallen debris or damaged infrastructure, impeding evacuation and emergency response efforts. Beyond these immediate post-fire risks, other secondary hazards include landslides and soil erosion, due to the destruction of vegetation that normally stabilizes the soil. Furthermore, ash and fire-retardant chemicals can contaminate water supplies, presenting longer-term environmental and health hazards. Therefore, proper mitigation and clean-up measures are vital to ensure safety after a wildfire event.

Frequency/Probability of Future Occurrence

Occasional – Considering the local fuels, weather conditions, and the flat topography in the area combined with a lack of extensive WUI development means that fires may only occur occasionally in or immediately surrounding the City. A widely damaging wildland fire within the City is considered to be more unlikely, although changing issues and increasing record-high temperatures accompanied by low humidity, strong winds, and drought conditions could worsen the likelihood of fires in the Planning Area in the future.

Fires are a common feature in California and the Healdsburg area. In the last 25 years, one in every three fire seasons has involved a major wildfire in Sonoma County. In addition, development in rural and suburban areas along Healdsburg’s WUI is expected to increase with population growth, which increases the risk of wildfire damage. Increased development in the area can also lead to more fires caused by human activity, including faulty or downed utility lines. It is therefore assumed that wildfires will continue to occur and pose a risk to people and assets in Healdsburg, and possibly increase in frequency and magnitude.

Future Condition Considerations

Future fire risk modeling analyzes two primary variables: fuel availability and flammability. In California, the change in fire risk is a result of two climate factors. First, fire risk can increase due to a densely forested ecosystem as a result of higher temperatures, less snowpack, and earlier springs. Second, fire risk can decrease when formerly dry climates experience substantial vegetation growth after a year of above average precipitation. This type of ecosystem will be dominated by grass and low-density shrubs, resulting in a potential for reduced risk due to decreased availability of fuel.

Although the northern Bay Area will not be impacted by climate change as severely as other parts of California, as precipitation lessens and average temperatures warm, wildfires will have an easier time igniting and spreading. This has already become apparent in the recent trend of larger and more frequent fires that have occurred in the western region, most likely due to hotter, longer, and drier summers stemming from climate change. An anticipated increase in droughts due to climate change will reduce moisture in vegetation, making it easier to ignite, and reduce the water available for combatting fires when they occur.

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Section 5. Vulnerability Assessment

The vulnerability assessment provides an explicit representation of what a community stands to lose in a disaster. This is useful for City staff and other decision-makers who will need to balance the costs of mitigation against the potential harm to residents and damage to property. The assessment provides comparable measurements of community exposure to natural hazard and helps determine which hazards and/or what areas of the City to focus on or prioritize when improving resiliency. Based on possible assets at risk, hazard mitigation resources can be directed where need be, in part, through a vulnerability assessment and information found in the hazard profiles in **Section 4.2**.

The vulnerability assessment is developed using quantitative and qualitative information for each hazard. Through an exposure analysis, quantitative data is developed for each hazard. An exposure analysis quantifies the assets at risk for particular hazards. Qualitative data has been developed and presented in this section for hazards without measurable data. Rather than quantities of assets at risk, qualitative data provides a description of how the hazard could affect the region.

5.1 Methodology

A vulnerability assessment was conducted for each of the hazards profiled in **Section 4.2**. Vulnerability can be quantified in instances where there is a known hazard area, such as a mapped floodplain or high fire hazard area. Geospatial analysis can be conducted if a natural hazard has a particular spatial footprint that can be overlaid against the locations of people, residential buildings, and critical facilities. In Healdsburg, earthquakes, flooding, liquefaction (as a sub-hazard to earthquake), landslide, and wildfire have known geographic extents and corresponding spatial information about each hazard.

The hazard of drought is the only hazard in this plan that is not associated with a specific mapped area. The vulnerability and potential impacts from profiled hazards that do not have specific mapped areas or the data to support additional vulnerability analyses are discussed in more general terms.

Critical facilities are described as assets that are essential for people and a community to function, including public utilities such as lift stations. The LHMP Planning Team compiled a list of 46 critical facilities as shown in **Table 5-1** and **Figure 5.1**.

A critical facility spatial database was developed to translate critical facilities information into georeferenced points.¹ Critical facility points were overlaid with the spatial hazard layers to develop a list of “at-risk” critical facilities. The City critical facilities that intersect with natural hazards are referred to as facilities with hazard “exposure.” The exposure analysis for individual critical facilities is illustrated in **Table 5-2** (results summarized by hazard are provided in the subsequent section).

Population data is derived from the US Census Bureau’s 2012-2016 5-Year American Community Survey (2012-2016 ACS), utilizing census block groups. Residential building data is derived from City of Healdsburg and Sonoma County GIS files detailing land use designations, zoning, building footprints, and tax

¹ To georeference something means to define its existence in physical space; that is, establishing its location in terms of map projections or coordinate systems. The term is used both when establishing the relation between raster or vector images and coordinates, and when determining the spatial location of other geographical features.

information. Then, a combination of spatial overlay and proportional analysis was used to determine the number of people and residential buildings in areas where hazards are likely to occur. Maps illustrating the population density and residential building density data used are found in **Appendix C**.

Table 5-1: Healdsburg Critical Facilities by Type

Critical Facility	Type
Alliance Medical Center	Health/Hospital
Badger Electrical Substation	Electric Utility
Cadoul Reservoir	Water Utility
Chablis Lift Station	Wastewater Utility
City Hall	Government
Corporation Yard	Government
Data Center Infrastructure	Government
Dry Creek Well Field	Water Utility
Electric Distribution System	Electric Utility
Fire Station	Police/Fire
Fire Substation	Police/Fire
Fitch Mountain Well Field	Water Utility
Gauntlett Communications Tower	Police/Fire
Gauntlett Well Field	Water Utility
Gauntlett Well Field Control Station	Water Utility
Gauntlett/Fitch Water Treatment Plant	Water Utility
Gauntlett/Iverson Reservoirs	Water Utility
Healdsburg Avenue Bridge	Bridge
Healdsburg Community Center	Community
Healdsburg District Hospital	Health/Hospital
Healdsburg Municipal Airport	Airport
Hendricks Lift Station	Wastewater Utility
Heron Drive Lift Station	Wastewater Utility
Highway 101 Bridge	Bridge
Kennedy Lift Station	Wastewater Utility
Kinley Drive Lift Station	Wastewater Utility
Magnolia Drive Lift Station	Wastewater Utility
McDonough Pump Station	Water Utility
Network/Telecom Infrastructure	Government
North Detention Basin	Stormwater
North Street Pressure Reducing Station	Water Utility
Orangewood Lift Station	Wastewater Utility
Orchard Lift Station	Wastewater Utility
Panorama Pressure Reducing Station	Water Utility

Table 5-1: Healdsburg Critical Facilities by Type

Critical Facility	Type
Panorama Water Facilities	Water Utility
Passalacqua Pump Station	Water Utility
Police Station	Police/Fire
Recycled Water Bridge	Bridge
Revel/Hidden Acres Pressure Reducing Station	Water Utility
Senior Center	Community
South Detention Basin	Stormwater
Fitch Well Field Control Building	Water Utility
Sunset Reservoir	Water Utility
Tayman Park Water Facilities	Water Utility
Villa Pressure Reducing Station	Water Utility
Water Reclamation Facility	Wastewater Utility
Water Distribution System	Water Utility
Wastewater Collection System	Wastewater Utility
Winding Creek Lift Station	Wastewater Utility

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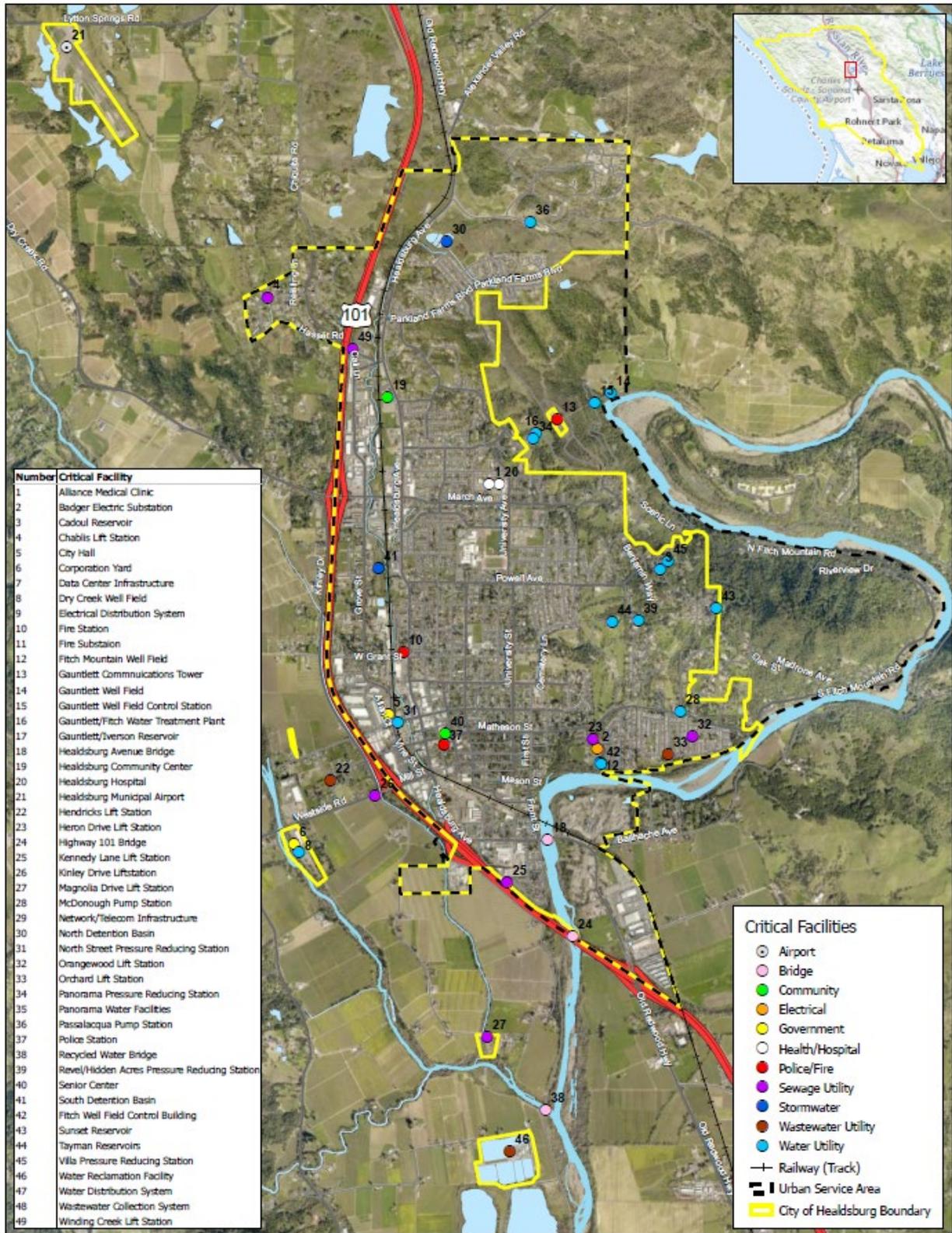


Figure 5.1: City of Healdsburg Critical Facilities
(See Appendix C for a larger and higher resolution map)

Table 5-2: Exposure Analysis Results for Critical Facilities in Healdsburg

Map #	Critical Facility	Type	EQ: IX, Violent	EQ: X, Extreme	LQ: Mod	LQ: High	LQ: Very High	Flood: 1%	Flood: 0.2%	LS: Slight to Mod	LS: Mod to High	Wildfire: Mod	Wildfire: High	Heat: All	Wind: All	Storm: All
1	Alliance Medical Center	Health/Hospital	X		X							X		X	X	X
2	Badger Electrical Substation	Electrical		X		X		X	X					X	X	X
3	Cadoul Reservoir	Water Utility	X							X			X	X	X	X
4	Chablis Lift Station	Sewage Utility	X									X		X	X	X
5	City Hall	Government		X		X								X	X	X
6	Corporation Yard	Government		X			X					X		X	X	X
7	Data Center Infrastructure	Government												X	X	X
8	Dry Creek Well Field	Water Utility		X			X					X		X	X	X
9	Electrical Distribution System	Electrical	X	X	X	X	X	X	X	X	X	X	X	X	X	X
10	Fire Station	Police/Fire		X	X									X	X	X
11	Fire Substation	Police/Fire												X	X	X
12	Fitch Mountain Well Field	Water Utility		X		X		X						X	X	X
13	Gauntlett Communications Tower	Police/Fire	X							X			X	X	X	X
14	Gauntlett Well Field	Water Utility		X				X	X		X		X	X	X	X
15	Gauntlett Well Field Control Station	Water Utility	X								X		X	X	X	X
16	Gauntlett/Fitch Water Treatment Plant	Water Utility	X							X			X	X	X	X
17	Gauntlett/Iverson Reservoirs	Water Utility	X							X			X	X	X	X
18	Healdsburg Avenue Bridge	Bridge												X	X	X
19	Healdsburg Community Center	Community	X		X							X		X	X	X
20	Healdsburg District Hospital	Health/Hospital	X									X		X	X	X

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Map #	Critical Facility	Type	EQ: IX, Violent	EQ: X, Extreme	LQ: Mod	LQ: High	LQ: Very High	Flood: 1%	Flood: 0.2%	LS: Slight to Mod	LS: Mod to High	Wildfire: Mod	Wildfire: High	Heat: All	Wind: All	Storm: All
21	Healdsburg Municipal Airport	Airport	X									X		X	X	X
22	Hendricks Lift Station	Wastewater Utility		X		X								X	X	X
23	Heron Drive Lift Station	Wastewater Utility		X		X		X						X	X	X
24	Highway 101 Bridge	Bridge												X	X	X
25	Kennedy Lift Station	Wastewater Utility		X		X								X	X	X
26	Kinley Drive Lift Station	Wastewater Utility		X		X								X	X	X
27	Magnolia Drive Lift Station	Sewage Utility		X			X	X						X	X	X
28	McDonough Pump Station	Water Utility	X			X				X			X	X	X	X
29	Network/Telecom Infrastructure	Government												X	X	X
30	North Detention Basin	Stormwater	X									X		X	X	X
31	North Street Pressure Reducing Station	Water Utility		X		X								X	X	X
32	Orangewood Lift Station	Wastewater Utility		X		X			X				X	X	X	X
33	Orchard Lift Station	Wastewater Utility		X		X		X						X	X	X
34	Panorama Pressure Reducing Station	Water Utility	X							X			X	X	X	X
35	Panorama Water Facilities	Water Utility	X							X			X	X	X	X
36	Passalacqua Pump Station	Water Utility												X	X	X
37	Police Station	Police/Fire		X										X	X	X
38	Recycled Water Bridge	Bridge												X	X	X
39	Revel/Hidden Acres Pressure Reducing Station	Water Utility	X								X		X	X	X	X
40	Senior Center	Community		X										X	X	X

Map #	Critical Facility	Type	EQ: IX, Violent	EQ: X, Extreme	LQ: Mod	LQ: High	LQ: Very High	Flood: 1%	Flood: 0.2%	LS: Slight to Mod	LS: Mod to High	Wildfire: Mod	Wildfire: High	Heat: All	Wind: All	Storm: All
41	South Detention Basin	Stormwater		X				X						X	X	X
42	Fitch Well Field Control Building	Water Utility		X		X		X						X	X	X
43	Sunset Reservoir	Water Utility	X							X			X	X	X	X
44	Tayman Park Water Facilities	Water Utility	X								X	X		X	X	X
45	Villa Pressure Reducing Station	Water Utility	X								X	X		X	X	X
46	Water Reclamation Facility	Wastewater Utility		X		X			X		X	X	X	X	X	X
47	Water Distribution System	Water Utility	X	X		X	X			X	X	X	X	X	X	X
48	Wastewater Collection System	Wastewater Utility	X	X		X	X	X	X	X	X	X	X	X	X	X
49	Winding Creek Lift Station	Wastewater Utility	X	X		X	X		X	X	X	X	X	X	X	X

EQ – Earthquake

LQ – Liquefaction

LS – Landslide

*Note: No critical facilities located in Alquist-Priolo Fault Rupture Zones or Very High Fire Hazard Zones

5.2 Hazard-Specific Vulnerability

This section summarizes the possible impacts and quantifies, where data permits, the city's vulnerability to each of the hazards identified in **Section 4.0**. **Tables 5-3** through **5-17** illustrate the total exposure analysis by hazard. The exposure analysis details the number and percentage of critical facilities, residential units, and population. For residential units, the total value and total square footage of exposed units is also included.

5.2.1 Drought

Drought should not be viewed as merely a physical phenomenon or natural event. Its impacts on society result from the interplay between a natural event (less precipitation than expected) and the demand humans place on the water supply.

Due to the lack of defined geographical boundaries, the vulnerability assessment for drought differs from other natural hazards discussed earlier. The impacts of drought can be categorized as economic, environmental, or social. The incidence of forest and range fires increases substantially during extended droughts, which in turn places humans and critical facilities at higher levels of risk.

Property

No structures will be directly affected by drought conditions, though some structures may become vulnerable to wildfires, which are more likely following years of drought. Droughts can have significant impacts on other types of property such as landscaped areas and economically important natural resources. Drought causes the most significant economic impacts on industries that use water or depend on water for their business, most notably agriculture and related sectors. In addition to losses in yields in crop and livestock production, drought is associated with increased insect infestations, plant diseases, and wind erosion. Drought can lead to other losses because so many sectors are affected such as losses that include reduced income for farmers and reduced business for retailers and others who provide goods and services to farmers. This leads to unemployment, increased credit risk for financial institutions, capital shortfalls, and loss of tax revenue. Prices for food, energy, and other products may also increase as supplies decrease.

Critical facilities in Healdsburg will continue to be operational during a drought. The most direct impact of drought will be on the City's water supply. Drought can also directly affect the water storage, treatment, and distribution and conveyance systems. Critical facility features such as landscaping may not be maintained due to limited water resources, but the risk to critical facility core functions is low.

Population

According to the 2020 Census, the population of Healdsburg was estimated to be 11,340. population is expected to continue to increase in the future. This projected population growth would add additional strain to the surface water supplies. There are also several initiatives that emphasize water conservation, and its planned expansion of the City's recycled water system is expected to reduce the water demand for irrigation water in the summer months. Water conservation will also ensure that the existing groundwater remains operational during severe drought conditions and readily available during emergencies.

The entire population of Healdsburg is vulnerable to drought events. Drought can affect people's health and safety, including health problems related to low water flows, poor water quality, or dust. Droughts can also lead to loss of human life. Other possible impacts include recreational risks; effects on air quality; diminished living conditions related to energy, air quality, and hygiene; compromised food and nutrition; and increased incidence of illness and disease (Centers for Disease Control and Prevention, 2012).

Generally, drought may require conservation of water resources, which means that water use is restricted to essential uses, which may reduce watering for landscaping. The community may also exhibit a range of abilities to prepare for, respond to, and recover from drought hazards, as these conditions impact populations with health-related issues related to heat-related illness, respiratory problems, and people who work outdoors. These conditions can also impact lower-income populations, as food and water prices increase. There are sensitive and socially vulnerable populations residing within the Planning Area that may be the most susceptible to water restrictions, and health-related illnesses. Socially vulnerable populations may also be sensitive to increases in water rates and in turn, food prices.

Economy and Natural Resources

Drought vulnerability is primarily measured by its potential impact on sectors of the city's economy and natural resources. Healdsburg is known as a wine and culinary epicenter. Fortunately, as discussed in a report to the City Council, Healdsburg's economy is relatively balanced, and the city does not depend on tourism to support its economy (Eyler 2018). According to the report, over 57 percent of jobs are not related to wineries (Eyler 2018). While the city's economy may be impacted by the presence of a drought, the impact will not be as severe as assumptions based on conventional wisdom.

Potential impacts to the economy include the following:

- Decreased municipal and industrial water supply
- Loss of recreation/tourism

Drought may lead to significant direct costs, due to such factors as increased pumping because of lower groundwater levels, investment in infrastructure to compensate for reduced yields and developing alternative water sources. Social impacts mainly involve public safety, health, conflicts between water users, reduced quality of life, and inequities in the distribution of impacts and disaster relief.

Drought generally does not affect groundwater sources as quickly as surface water supplies, but groundwater supplies generally take longer to recover. Reduced precipitation during a drought means that groundwater supplies are not replenished at a normal rate. This can lead to a reduction in groundwater levels and problems such as reduced pumping capacity or wells going dry. Shallow wells are more susceptible than deep wells. Reduced replenishment of groundwater affects streams, especially during the summer when there is little or no precipitation. Reduced groundwater levels mean that even less water will enter streams when stream flows are lowest. Where stream flows are reduced, development that relies on surface water may seek to establish new groundwater wells, which could further increase groundwater depletion.

Other environmental losses from drought are associated with damage to plants, animals, wildlife habitat, and air and water quality; forest and range fires; degradation of landscape quality; loss of biodiversity;

and soil erosion. Some of the effects are short-term and conditions quickly return to normal following the end of the drought. Other environmental effects linger for some time or may even become permanent. Although environmental losses are difficult to quantify, growing public awareness and concern for environmental quality has forced public officials to focus greater attention and resources on these effects. The following are potential impacts of drought:

- Wildlife habitat may be degraded through the loss of wetlands and vegetation. The degradation of landscape quality, including increased soil erosion, may lead to a more permanent loss of biological productivity.
- Drought conditions greatly increase the likelihood of wildfires, a major threat to timber resources, structures, and other property.
- Shortage of water supply can have significant economic impacts.
- Drought conditions often are associated with harmful algal blooms—specifically cyanobacteria that can cause severe illness and death in mammals.

5.2.2 Earthquake

Major impacts from earthquakes are primarily casualties and damage to infrastructure occurring from ground movement along a particular fault. The degree of infrastructure damage depends on the magnitude; focal depth; distance from fault; duration of shaking; type of surface deposits; presence of high groundwater; topography; and the design, type, and quality of infrastructure construction.

Property

Healdsburg is not located within the Alquist-Priolo Earthquake Fault Zone. However, the city is in a seismically active region, and all of Healdsburg is at risk of one or more seismic hazards. All of Healdsburg, including all critical facilities, and residential building units fall within areas with the potential for either violent or extreme level of ground shaking. **Tables 5-3** and **5-4** illustrate the summary of impacts from an earthquake on critical facilities and residential structures.

Liquefaction is a secondary hazard that can occur from earthquakes. Liquefaction susceptibility is five categories: very low, low, moderate, high, and very high. For this exposure analysis, the focus was on the top three most vulnerable categories. **Tables 5-5** and **5-6** summarize impacts from liquefaction in the categories of moderate, high, and very high susceptibility on Healdsburg.

Earthquakes pose numerous risks to critical facilities and infrastructure. Risks, or the harm or losses, that are likely to result from exposure to earthquakes and liquefaction include:

- Fire from broken gas lines and power lines
- Flooding from broken dams
- Casualties (fatalities and injuries) from falling debris or secondary hazards
- Utility outages
- Economic losses for repair and replacement of critical facilities, roads, buildings, etc.
- Indirect economic losses, such as income lost during the downtime that results from damage to private property or public infrastructure

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- Roads or railroads that are blocked or damaged can prevent access throughout the area and can isolate residents and emergency service providers needing to reach vulnerable populations or to make repairs

Table 5-3: Earthquake Exposure Analysis Summary – Critical Facilities

Category	# of Critical Facilities: Violent Shaking	Percentage of Total	# of Critical Facilities: Extreme Shaking	Percentage of Total
Airport	1	100.00%	0	0.00%
Bridge	0	0.00%	3	100.00%
Community	0	0.00%	2	100.00%
Electrical	0	0.00%	1	100.00%
Government	0	0.00%	2	100.00%
Health/Hospital	2	100.00%	0	0.00%
Police/Fire	1	33.33%	2	66.67%
Sewage Utility	1	14.29%	6	85.71%
Stormwater	1	50.00%	1	50.00%
Wastewater Utility	0	0.00%	3	100.00%
Water Utility	10	66.67%	5	33.33%
TOTAL	16	39.02%	25	60.98%

Table 5-4: Earthquake Exposure Analysis Summary – Residential Structures

Structure	Number	Percentage of Total	Total Value	Total Square Feet
Healdsburg				
IX, Violent Shaking				
Single-Family Dwellings	1160	26.11%	\$458,858,338	2,481,551
Planned Unit Development	166	30.79%	\$43,696,367	246,166
Multi-Family Dwellings	38	9.35%	\$136,032,071	116,028
Mixed Use	5	0.17%	\$4,800,580	27,343
Other	0	0.00%	\$0	0
Total	1,369	25.27%	\$643,387,356	2,871,088
X, Extreme Shaking				
Single-Family Dwellings	3282	73.88%	\$805,735,821	4,464,161
Planned Unit Development	373	69.20%	\$86,826,126	471,579
Multi-Family Dwellings	368	90.64%	\$126,446,792	915,185
Mixed Use	24	82.76%	\$5,944,906	37,591
Other	0	0.00%	\$0	0

Table 5-4: Earthquake Exposure Analysis Summary – Residential Structures

Structure	Number	Percentage of Total	Total Value	Total Square Feet
Total	4,047	74.72%	\$1,024,953,645	5,888,516
Unincorporated County within Healdsburg Urban Service Area				
IX, Violent Shaking				
Single-Family Dwellings	304	73.79%	\$63,395,874	338,781
Multi-Family Dwellings	18	78.26%	\$3,636,383	23,422
Other	2	100.00%	\$1,065,246	3,668
Total	324	74.14%	\$68,097,503	365,871
X, Extreme Shaking				
Single-Family Dwellings	109	26.46%	\$17,769,339	104,405
Multi-Family Dwellings	5	21.74%	\$429,289	4,988
Other	0	0.00%	\$0	0
Total	114	26.09%	\$18,198,628	109,393

Table 5-5: Liquefaction Exposure Analysis Summary – Critical Facilities

Category	Number: Moderate	Percentage of Total	Number: High	Percentage of Total	Number: Very High	Percentage of Total
Airport	0	0.00%	0	0.00%	0	0.00%
Bridge	0	0.00%	0	0.00%	0	0.00%
Community	1	11.11%	1	11.11%	0	0.00%
Electrical	0	0.00%	1	100.00%	0	0.00%
Government	2	0.00%	1	50.00%	1	50.00%
Health/Hospital	0	50.00%	0	0.00%	0	0.00%
Police/Fire	1	33.33%	0	0.00%	0	0.00%
Sewage Utility	6	0.00%	7	77.78%	1	11.11%
Wastewater Utility	3	0.00%	0	0.00%	0	0.00%
Stormwater	1	0.00%	4	25.00%	1	6.25%
Water Utility	4	6.67%	14	31.11%	3	6.67%
TOTAL	18	43.90%	28	68.29%	6	14.63%

Table 5-6: Liquefaction Exposure Analysis Summary – Residential Structures

Structure	Number	Percentage of Total	Total Value	Total Square Feet
Healdsburg				
Moderate				

Table 5-6: Liquefaction Exposure Analysis Summary – Residential Structures

Structure	Number	Percentage of Total	Total Value	Total Square Feet
Single-Family Dwellings	1296	29.18%	\$295,833,363	2,020,268
Planned Unit Development	260	48.24%	\$59,258,193	341,742
Multi-Family Dwellings	79	19.46%	\$47,546,912	436,515
Mixed Use	12	41.38%	\$3,742,132	19,501
Other	0	0.00%	\$0	0
Total	1647	30.41%	\$406,380,600	2818026
High				
Single-Family Dwellings	6	0.14%	\$1,731,331	12,326
Planned Unit Development	0	0.00%	\$0	0
Multi-Family Dwellings	0	0.00%	\$0	0
Mixed Use	0	0.00%	\$0	0
Other	0	0.00%	\$0	0
Total	6	0.11%	\$1,731,331	12,326
Unincorporated County within Healdsburg Urban Service Area				
Moderate				
Single-Family Dwellings	15	3.64%	2668236	16981
Multi-Family Dwellings	3	13.04%	51623	1812
Other	0	0.00%	0	0
Total	18	4.12%	2719859	18793
High				
Single-Family Dwellings	20	4.85%	4184254	28957
Multi-Family Dwellings	0	0.00%	0	0
Other	0	0.00%	0	0
Total	9	2.06%	4184254	28957

* Numbers may not add up due to rounding

Population

Some populations in the Planning Area may be more vulnerable to an earthquake event than others. For example, those with mobility issues as well as the elderly may have challenges with evacuating or traveling to a shelter without assistance if they cannot stay in their homes. Other vulnerable populations may be individuals whom English is not their native language. Of these socially vulnerable populations and according to the census tracts and block groups in the City, several of these populations are anticipated to reside within southern Healdsburg and within older housing that may have been constructed prior to the seismic code improvements.

The City of Healdsburg has a large Spanish speaking population and tourists visiting daily that may not receive or understand evacuation information including where shelters are located or where to receive

resources to aid in the recovery process. These same individuals and households are designated as socially vulnerable populations.

The entire population of Healdsburg falls within areas with the potential for either violent or extreme level of ground shaking. **Table 5-7** illustrates the summary of impacts from an earthquake on the City’s population. **Table 5-8** summarizes impacts from liquefaction in the categories of moderate, high, and very high susceptibility on Healdsburg’s population.

Table 5-7: Earthquake Exposure Analysis Summary – Population

Jurisdiction	Number: IX, Violent Shaking	Percentage of Total	Number: X, Extreme Shaking	Percentage of Total
City of Healdsburg	4,192	37.49%	6,991	62.51%
Unincorporated County within Healdsburg Urban Service Area	801	93.31%	57	6.69%

Note: Estimates based on assumption of equal distribution of population across Census Block Groups

Table 5-8: Liquefaction Exposure Analysis Summary – Population

Jurisdiction	Number: Moderate	Percentage of Total	Number: High	Percentage of Total	Number: Very High	Percentage of Total
City of Healdsburg	3,894	34.82%	35	0.31%	55	0.50%
Unincorporated County within Healdsburg Urban Service Area	15	1.75%	14	1.63%	11.42	1.33%

Note: Estimates based on assumption of equal distribution of population across Census Block Groups

Economy and Natural Resources

Earthquakes can have a severe impact on local and regional economies. Another secondary impact of an earthquake is business disruption and the resulting economic loss as a result of that disruption. Another economic impact of an earthquake is the economic losses as a result of transportation and utility lifeline losses and the direct repair cost for each component. The debris removal required following an earthquake may also generate economic effects on the City.

Environmental problems as a result of an earthquake can be numerous. Secondary hazards will likely have some of the most damaging effects on the environment. Earthquake-induced landslides can significantly damage surrounding habitat. It is also possible for streams to be rerouted after an earthquake. Rerouting can change the water quality, possibly damaging habitat and feeding areas. Streams fed by groundwater wells can dry up because of changes in underlying geology.

5.2.3 Flooding

Historically, the Planning Area has been at risk of flooding primarily on the west and southeast portion of the City. Normally, storm floodwaters are kept within defined limits by a variety of storm drainage and flood control measures. But, occasionally, extended heavy rains result in floodwaters that exceed local drainage infrastructure capacity and cause damage. Flooding has occurred in the past: within the 100-year floodplain and in other localized areas. In addition to damage to area infrastructure and City facilities, other problems associated with flooding include erosion, sedimentation, degradation of water quality, loss of environmental resources, certain health hazards, and the inconvenience or potential financial and accessibility issues that come with road closures and other such effects.

Property

For this exposure analysis, the flood zones from FEMA's Digital FIRM were used in coordination with City asset data. Per the exposure analysis, 20 percent of the city's critical facilities, about 8 percent of residential structures, and about 9 percent of the city's population are in a flood zone (residential structures and population from the unincorporated county within Healdsburg's Urban Service Area are also illustrated). **Tables 5-9** and **5-10** illustrate the summary of impacts from flooding on Healdsburg for two floodplains: the 1% annual chance and 0.2% annual chance.

Flooding poses numerous risks to critical facilities and infrastructure. Risks, or the harm or losses, that are likely to result from exposure to flooding include:

- Roads or railroads that are blocked or damaged can prevent access throughout the area and can isolate residents and emergency service providers needing to reach vulnerable populations or to make repairs
- Bridges washed out or blocked by floods or debris from floods can cause isolation
- Creek or river floodwaters can back up drainage systems, causing localized flooding
- Floodwaters can get into drinking water supplies, causing contamination
- Sewer systems can back up, causing waste to spill into homes, neighborhoods, rivers, and streams
- Underground utilities can be damaged

Table 5-9: Flood Exposure Analysis Summary – Critical Facilities

Category	Number: 1% Flood	Percentage of Total	Number: 0.2% Flood	Percentage of Total
Airport	0	0.00%	0	0.00%
Bridge	3	100.00%	0	0.00%
Community	0	0.00%	0	0.00%
Electrical	1	100.00%	0	0.00%
Government	0	0.00%	0	0.00%
Health/Hospital	0	0.00%	0	0.00%
Police/Fire	0	0.00%	0	0.00%
Sewage Utility	2	28.57%	1	14.29%
Wastewater Utility	0	0.00%	1	50.00%
Stormwater	1	33.33%	0	0.00%
Water Utility	3	20.00%	0	0.00%
TOTAL	10	24.39%	2	4.88%

Table 5-10: Flood Exposure Analysis Summary – Residential Structures

Structure	Number	Percentage of Total	Total Value	Total Square Feet
Healdsburg				
1% Annual Chance of Flood				
Single-Family Dwellings	78	1.76%	\$21,223,752	115,863
Planned Unit Development	103	19.11%	\$24,359,705	154,538
Multi-Family Dwellings	20	4.93%	\$26,320,514	284,918
Mixed Use	2	6.90%	546823	2194
Other	0	0.00%	0	0
Total	203	3.75%	\$72,450,794	557,513
0.2% Annual Chance of Flood				
Single-Family Dwellings	34	0.77%	\$6,756,032	47,410
Planned Unit Development	317	58.81%	\$79,738,418	508,199
Multi-Family Dwellings	5	1.23%	4870402	39393
Mixed Use	0	0.00%	0	0
Other	0	0.00%	\$0	0
Total	356	6.57%	\$91,364,852	595,002
Unincorporated County within Healdsburg Urban Service Area				
1% Annual Chance of Flood				
Single-Family Dwellings	76	18.45%	\$14,173,425	84,328
Multi-Family Dwellings	11	47.83%	\$1,339,758	10,795

Table 5-10: Flood Exposure Analysis Summary – Residential Structures

Structure	Number	Percentage of Total	Total Value	Total Square Feet
Other	0	0.00%	\$0	0
Total	87	19.91%	\$15,513,183	95,123
0.2% Annual Chance of Flood				
Single-Family Dwellings	11	2.67%	\$2,537,697	13,481
Multi-Family Dwellings	0	0.00%	0	0
Other	0	0.00%	0	0
Total	11	2.52%	\$2,537,697	13,481

Population

Of greatest concern in the event of a flooding event is the potential for injury or loss of life. For this exposure analysis, the flood zones from FEMA’s Digital FIRM were used in coordination with City asset data. Per the exposure analysis, about 9 percent of the city’s population are in a flood zone (population from the unincorporated county within Healdsburg’s Urban Service Area are also illustrated). **Table 5-11** illustrates the summary of impacts from flooding on Healdsburg for two floodplains: the 1% annual chance and 0.2% annual chance. Given the number of households and populations identified as socially vulnerable, disadvantaged, or sensitive in the City’s planning area and the proximity of these census tracks and block groups to the flood zones, it is assumed that a portion of this population segment may also be disproportionately impacted during a flood event.

Table 5-11: Flood Exposure Analysis Summary – Population

Community Name	Number: 1% Flood	Percentage of Total	Number: 0.2% Flood	Percentage of Total
City of Healdsburg	674	6.03%	671	6.00%
Unincorporated County within Healdsburg Urban Service Area	23	2.67%	1	0.14%

Note: Estimates based on assumption of equal distribution of population across Census Block Groups

Economy and Natural Resources

Similar to a dam inundation event which would affect infrastructure (e.g. roads), homes, and populations (possibly displacing families), impacts to the local economy could include business interruptions, lost or reduced wages from potential relocation of populations, infrastructure and resource downtime costs, and reduced city revenues from lack of tourism or inability to run/maintain certain services (like potable water based utilities). Other secondary hazard impacts such as reduced water quality or resource availability, which could in turn raise costs of water processing and distribution are also possible results from a severe flooding event, whether from riverine flooding, flash flooding, or an event caused by local stormwater/drainage infrastructure failures. Based on the history of flooding in Healdsburg, the Rivers Bend neighborhood and nearby areas have historically been affected the most in terms of economic

losses, which largely encompass damages to property (including disruption to business and commerce operations) and City infrastructure.

Based on Sonoma County's 2016 CAP and GHG emission modelling, climate change is projected to result in an increased risk of extreme flood, and an increased seasonal variability of precipitation, runoff, and stream flows for Sonoma County, along with increased likelihood of "extreme" precipitation and drought events. There may be more years with more frequent storm events and occasional events that are much stronger than historical ones and the length of season over which storm events occur is predicted to increase (SCTA 2016). Also, according to the CAP, more frequent coastal flooding and increased erosion is anticipated. In addition to flooding, sea levels are projected to rise between 16.5 and 65.8 inches by 2100. Rising sea levels combined with increased storm surge is anticipated to lead to more frequent inundation of the low-lying areas, and flooding of homes, infrastructure, agricultural land, and natural areas on the shores of San Pablo Bay. The greatest impacts are anticipated during winter storms. For these reasons, climate change would have a "high" influence on flooding hazards.

Floodplain Management Regulations for Substantial Improvement/Damage

The City of Healdsburg has adopted floodplain regulations in chapter 17.28 of the city's municipal code. The Public Works Director has been appointed as official floodplain administrator. The floodplain regulations require, in part, that a development permit must be obtained for any construction or other development work within the special flood hazard area and that all local and state/federal permits must be obtained for any substantial improvement or substantial damage of any existing structures. There is not a written SOP but there is a general standard of practice which is as follows:

- Damage occurs from a flood event.
- City forces work with property owners to perform flood damage assessments and determine if construction permitting is required for repair work and if it does, requires all necessary permits.
- City forces review the building permit application to determine if the work triggers requirements for substantial improvements or not. If it does, the city enforces the substantial improvement section of its floodplain regulations.

The below are relevant excerpts from the city's municipal code:

- 17.28.140 Development permit:
 - A development permit shall be obtained before any construction or other development, including manufactured homes, within any area of special flood hazard established in HMC 17.28.080. Application for a development permit shall be made on forms furnished by the City of Healdsburg. The applicant shall provide the following minimum information:
- 17.28.120 Designation of the floodplain administrator:
 - The director of public works is hereby appointed to administer, implement, and enforce this chapter by granting or denying development permits in accord with its provisions. (Ord. 1043 § 4.1, 2006.)
- 17.28.130 Duties and responsibilities of the floodplain administrator:
 - The duties and responsibilities of the floodplain administrator shall include, but not be limited to, the following:
 - Permit Review. Review all development permits to determine:

- Permit requirements of this chapter have been satisfied, including determination of substantial improvement and substantial damage of existing structures.
- All other required state and federal permits have been obtained.
- 17.28.050 Definitions:
 - “Substantial damage” means:
 - Damage of any origin sustained by a structure whereby the cost of restoring the structure to its before-damaged condition would equal or exceed 50 percent of the market value of the structure before the damage occurred; or
 - Flood-related damages sustained by a structure on two separate occasions during a 10-year period for which the cost of repairs at the time of each such event, on the average, equals or exceeds 25 percent of the market value of the structure before the damage occurred. This is also known as “repetitive loss.”
 - “Substantial improvement” means any reconstruction, rehabilitation, addition, or other improvement of a structure, the cost of which equals or exceeds 50 percent of the market value of the structure before the “start of construction” of the improvement. This term includes structures which have incurred “substantial damage,” regardless of the actual repair work performed. The term does not, however, include either:
 - Any project for improvement of a structure to correct existing violations of state or local health, sanitary, or safety code specifications which have been identified by the local code enforcement official and which are the minimum necessary to assure safe living conditions; or
 - Any alteration of a “historic structure”; provided, that the alteration will not preclude the structure’s continued designation as a “historic structure.”

The entire City of Healdsburg Floodplain Ordinance may be found here: [Chapter 17.28 FLOODPLAIN MANAGEMENT REGULATIONS \(codepublishing.com\)](#).

National Flood Insurance Program

The NFIP, managed by FEMA, enables homeowners, business owners, and renters in participating communities to purchase federally backed flood insurance. Participating communities agree to adopt and enforce floodplain management ordinances to reduce future flood damage (Benefits.gov. 2023).

The City of Healdsburg has participated in the NFIP since 1980; the City’s participation is illustrated in **Table 5-12**. The current effective map date is from 2008. Since then, the Healdsburg Public Works Department submitted an application for a Letter of Map Revision that modified the floodway for Foss Creek from where it crosses Grove Street to where it crosses US Highway 101; the revisions became effective in 2010.

Table 5-12: National Flood Insurance Participation Summary

City of Healdsburg		
Date Jointed/Initial FIRM Identified	March 4, 1980	
Current Effective Map Date	December 2, 2008	
Community Rating System	Not a Participant	
Repetitive Losses (RL)	Number	Total Payout
Number of RL Properties (inc. two Severe RL property listed below)	8	\$358,237.47
Number of Severe RL Properties	2	\$68,206.32
NFIP Compliance		
<ul style="list-style-type: none"> City continues to require all new development and substantial property improvement to comply with the City Municipal Code and FEMA regulations that regulate development in the designated 100-year floodplain and encourages buffer/setback area from waterways. City implements the NFIP requirements pursuant to Chapter 17.28 of the Healdsburg Municipal Code. 		

Note: Number of repetitive and severe repetitive loss properties is as of March 2021

Repetitive loss (RL) properties are insured properties that have incurred two or more flood losses greater than \$1,000 within any 10-year period. A subset of these properties is designated severe repetitive loss (SRL) properties; these are insured properties that have incurred four or more flood-related losses of at least \$5,000 each, or at least two separate claims with the cumulative amount of the building payments exceeding the value of the structures on the property. At least two claims under each of these scenarios must have occurred within any 10-year period. As illustrated above, Healdsburg has eight RL properties, including two SRL properties. Five of these RL properties are residential and three are non-residential. There is one residential SRL property and one non-residential SRL property. It is unknown whether the three non-residential properties are commercial, industrial, or governmental.

5.2.4 Landslide

Property

The landslide risk in Healdsburg is largely in the hillier northern and eastern parts of the community. Because of Healdsburg’s topography, landslides will most likely occur during periods of heavy rain. Landslide hazard zones have been divided into three categories: A, B, and C. Category A is the Most Stable Zone, B is the Marginally Stable Zone, and C is the Least Stable Zone. For this exposure analysis, the top two categories were the focus. Per the analysis, about 30 percent of the city’s critical facilities and 25 percent of residential structures are in a slight to high landslide zone (residential structures and population from the unincorporated county within Healdsburg’s Urban Service Area are also illustrated). **Tables 5-13** and **5-14** summarize the impacts from landslides in the categories of marginally and least stable zones in Healdsburg.

Landslides pose numerous risks to critical facilities and infrastructure. Risks, or the harm or losses, that are likely to result from exposure to landslide include:

- Blocked and/or damaged roads
- Casualties (fatalities and injuries)
- Damage to utility distribution lines
- Economic losses for repair and replacement of critical facilities, roads, buildings, etc.
- Damaged vegetation (debris flows often uproot trees and wipe out vegetation in their path)
- Impacts to river ecosystems (soil, debris, and rocks sliding downhill can end up in rivers and affect their natural flow)

Table 5-13: Landslide Exposure Analysis Summary – Critical Facilities

Category	Number: Slight to Moderate	Percentage of Total	Number: Moderate to High	Percentage of Total
Airport	0	0.00%	0	0.00%
Bridge	0	0.00%	0	0.00%
Community	1	50.00%	2	100.00%
Electrical	0	0.00%	0	0.00%
Government	0	0.00%	0	0.00%
Health/Hospital	2	100.00%	0	0.00%
Police/Fire	1	33.33%	0	0.00%
Sewage Utility	2	28.57%	0	0.00%
Stormwater	0	0.00%	0	0.00%
Wastewater Utility	0	0.00%	0	0.00%
Water Utility	2	13.33%	8	53.33%
TOTAL	8	19.51%	10	24.39%

Table 5-14: Landslide Exposure Analysis Summary – Residential Structures

Structure	Number	Percentage of Total	Total Value	Total Square Feet
Healdsburg				
Slight to Moderate				
Single-Family Dwellings	4154	93.52%	\$1,131,057,091	6,284,964
Planned Unit Development	505	93.69%	\$129,019,826	706,199
Multi-Family Dwellings	405	99.75%	\$134,247,559	990,165
Mixed Use	30	103.45%	16547990	105982
Other	0	0.00%	\$0	0
Total	5094	94.05%	\$1,410,872,466	8087310

Table 5-14: Landslide Exposure Analysis Summary – Residential Structures

Structure	Number	Percentage of Total	Total Value	Total Square Feet
Moderate to High				
Single-Family Dwellings	279	6.28%	\$128,316,287	640,772
Planned Unit Development	11	2.04%	1502667	9086
Multi-Family Dwellings	0	0.00%	0	0
Mixed Use	0	0.00%	0	0
Other	0	0.00%	\$0	0
Total	290	5.35%	\$129,818,954	649,858
Unincorporated County within Healdsburg Urban Service Area				
Slight to Moderate				
Single-Family Dwellings	238	57.77%	\$41,123,714	247,205
Multi-Family Dwellings	22	95.65%	3737579	25930
Other	0	0.00%	\$0	0
Total	260	59.50%	\$44,861,293	273135
Moderate to High				
Single-Family Dwellings	174	42.23%	\$40,041,499	195,981
Multi-Family Dwellings	1	4.35%	328093	2480
Other	1	50.00%	\$1,065,246	3,668
Total	176	40.27%	\$41,434,838	202,129

* Numbers may not add up due to rounding

Population

Some populations in the Planning Area may be more vulnerable to a landslide event than others. For example, those with mobility issues as well as the elderly may have challenges with evacuating or traveling to a shelter without assistance if they cannot stay in their homes. Other vulnerable populations may be individuals whom English is not their native language. Of these socially vulnerable populations and according to the census tracts and block groups in the City, several of these populations are anticipated to reside within older housing in Healdsburg that may not withstand a landslide.

For this exposure analysis, the top two categories were the focus. Per the analysis, about 17 percent of the population are in a slight to high landslide zone (residential structures and population from the unincorporated county within Healdsburg’s Urban Service Area are also illustrated). **Table 5-15** summarizes the impacts from landslides in the categories of marginally and least stable zones in Healdsburg.

Table 5-15: Landslide Exposure Analysis Summary – Population

Jurisdiction	Number: Slight to Moderate	Percentage of Total	Number: Moderate to High	Percentage of Total
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Section 5
Vulnerability Assessment

City of Healdsburg	9,844	88.02%	1339	11.98%
Unincorporated County within Healdsburg Urban Service Area	584	67.93%	275	32.06%

Note: Estimates based on assumption of equal distribution of population across Census Block Groups

Economy and Natural Resources

Landslides can have a moderate impact on local and regional economies. Another secondary impact of landslides is business disruption and the resulting economic loss as a result of that disruption. Another economic impact of a landslide is the economic losses as a result of transportation and utility lifeline losses and the direct repair cost for each component. The debris removal required following a landslide may also generate economic effects on the City.

Environmental problems as a result of an earthquake can be numerous. Secondary hazards will likely have some of the most damaging effects on the environment. Earthquake-induced landslides can significantly damage surrounding habitat. It is also possible for streams to be rerouted after an earthquake. Rerouting can change the water quality, possibly damaging habitat and feeding areas. Streams fed by groundwater wells can dry up because of changes in underlying geology.

5.2.5 PSPS

Property

Critical facilities without generators are the most vulnerable to the effects of a PSPS event. **Tables 5-16** and **5-17** illustrate the summary of impacts from PSPS on Healdsburg from distribution lines and transmission lines.

Table 5-16: PSPS Exposure Analysis Summary – Critical Facilities

Category	Number: Slight to Moderate	Percentage of Total	Number: Moderate to High	Percentage of Total
Airport	1	100.00%	0	0.00%
Bridge	2	66.67%	0	0.00%
Community	0	0.00%	2	100.00%
Electrical	0	0.00%	1	100.00%
Government	0	0.00%	1	50.00%
Health/Hospital	0	0.00%	2	100.00%
Police/Fire	0	0.00%	3	100.00%
Sewage Utility	0	0.00%	5	71.43%
Wastewater Utility	0	0.00%	1	50.00%
Stormwater	1	33.33%	1	33.33%
Water Utility	6	40.00%	8	53.33%
TOTAL	10	24.39%	24	58.54%

Table 5-17: PSPS Exposure Analysis Summary – Residential Structures

Structure	Number	Percentage of Total	Total Value	Total Square Feet
Healdsburg				
Slight to Moderate				
Single-Family Dwellings	3864	86.99%	\$1,064,041,092	5,878,111
Planned Unit Development	538	99.81%	\$130,339,379	715,769
Multi-Family Dwellings	385	94.83%	\$134,983,845	964,565
Mixed Use	29	100.00%	10745486	64934
Other	0	0.00%	\$0	0
Total	4816	88.92%	\$1,340,109,802	7623379
Moderate to High				
Single-Family Dwellings	578	13.01%	\$200,553,067	1,067,601
Planned Unit Development	1	0.19%	5066218	1976
Multi-Family Dwellings	21	5.17%	183114	66648
Mixed Use	0	0.00%	0	0
Other	0	0.00%	\$0	0
Total	600	11.08%	\$205,802,399	1,136,225
Unincorporated County within Healdsburg Urban Service Area				
Slight to Moderate				
Single-Family Dwellings	5	1.21%	\$1,920,449	10,063
Multi-Family Dwellings	0	0.00%	0	0
Other	0	0.00%	\$0	0
Total	5	1.14%	\$1,920,449	10063
Moderate to High				
Single-Family Dwellings	25	6.07%	\$10,866,466	43,153
Multi-Family Dwellings	0	0.00%	0	0
Other	2	100.00%	\$1,065,246	3,668
Total	27	6.18%	\$11,931,712	46,821

* Numbers may not add up due to rounding

Population

People with medical conditions requiring electrical devices are the most vulnerable to the effects of a PSPS event. Additionally, people without generators are also highly vulnerable to the effects of a PSPS event. **Table 5-18** illustrate the summary of impacts from PSPS on Healdsburg from distribution lines and transmission lines.

Following the unprecedented 2018 wildfire season in California, Pacific Gas & Electric (PG&E) announced it will be conducting Public Safety Power Shutoffs (PSPS) when there are high winds and dry conditions and generally a heightened fire risk forecasted. The outages could last several days, and PG&E has

suggested customers be prepared for outages that could last longer than 48 hours. A majority of Sonoma County could be affected by the power outages including the entire City of Healdsburg. PG&E does have a plan to install a resource area at the Sonoma County and Sonoma-Marín Fairgrounds within 24 hours of a PSPS, and will offer power, air conditioning and updates for local residents.

Table 5-18: PSPS Exposure Analysis Summary – Population

Jurisdiction	Number: Slight to Moderate	Percentage of Total	Number: Moderate to High	Percentage of Total
City of Healdsburg	1,419	13.90%	296	2.90%
Unincorporated County within Healdsburg Urban Service Area	594	75.60%	130	16.60%

Note: Estimates based on assumption of equal distribution of population across Census Block Groups

Economy and Natural Resources

In the event of a PSPS during red flag warnings, as described above, large portions of the City could be without power including several businesses. At this time, it is unclear what the economic impacts may be due to the PSPS, and it may depend on the length of the shutoff. However, given the recent planned PSPS in October 2019, economic impacts were reported across northern California as many businesses and restaurants and other tourism-based operations had to close due to limited to no power supply. In 2018, PG&E abruptly shut down the power in the Napa Valley region and the City of Calistoga reported that numerous small business lost tens of thousands of dollars in missed revenue and inventory (Argus- Courier 2019).

5.2.6 Excessive Heat

Excessive heat can have severe impacts on human health, the natural environment, and the economy. The average number of days per year in the United States with a heat index above 100°F will double, while the number of days per year above 105°F will quadruple if no actions to reduce heat-trapping emissions are taken. Climate change is expected to result in higher average temperature and more excessive heat events. In other words, climate change will have a “high” influence on the number of excessive heat days. Overall, the significance of excessive heat is Medium.

Property

Excessive heat can affect road infrastructure, but direct impacts to critical infrastructure are expected to be minimal. Critical infrastructure that relies on public utility systems that could be overloaded may result in impacts during excessive heat events. The loss of utilities or power outages during excessive heat events could also result in adverse secondary impacts to sensitive populations.

Since structures are not usually directly impacted by severe temperature fluctuations, continued development is less impacted by this excessive heat than others in the plan. Continued development implies continued population growth, which raises the number of individuals potentially exposed to temperature variations. Public education efforts should continue to help the population understand the

risks and vulnerabilities of outdoor activities, property maintenance, and regular exposures during periods of excessive heat.

Excessive heat may also be a secondary effect of droughts or may cause temporary drought-like conditions. For example, several weeks of excessive heat increases evapotranspiration and reduces moisture content in vegetation, leading to higher wildfire vulnerability for that time period even if the rest of the season is relatively moist. Excessive heat can cause infrastructure damage to roads. In summary, all property is vulnerable to excessive heat.

Population

Recent research indicates that the impact of excessive heat, particularly on populations, has been historically under-represented. The risks of excessive heat are often profiled as part of larger hazards, such as drought or wildfire. However, as temperature variances may occur independent of other hazards or outside of the expected seasons, but still incur large costs, it is important to examine them as stand-alone hazards. Excessive heat can overload demands for electricity to run air conditioners in homes and businesses during prolonged periods of exposure and presents health concerns to individuals who are outside.

The very young, the elderly, people with poor physical health, and the unhoused are more susceptible to the impacts of excessive heat but any populations outdoors during periods of extreme temperatures are exposed, including otherwise young and healthy adults. While everyone is vulnerable to excessive heat incidents, some populations are more vulnerable than others. Excessive heat also poses a danger to outdoor laborers, police and fire personnel, and construction workers. Arguably, the young-and-otherwise-healthy demographic may also experience a higher vulnerability of exposure, due to the increased likelihood that they will be out in temperatures of excessive heat, whether due to commuting for work or school, conducting property maintenance such as lawn care, or for recreational reasons.

It is difficult to isolate the City's specific vulnerability to this hazard, as the impacts from excessive heat can be spread across an entire state or region. In general, all the population of the City can be considered at risk for this hazard.

Economy and Natural Resources

Excessive heat impacts on the economy may be more indirect compared to other hazards. Infrastructure such as roads could be damaged and lead to increased need for repaving. Critical facilities may be vulnerable to the indirect impact of prolonged excessive heat (i.e., electrical power outages), which may impact response capabilities or care capabilities for hospitals and clinics. Hospitals and clinics may see a surge in patients during the heat event as the exposed population suffers from the effects of the heat, but it is not anticipated that these increases will overwhelm the capacities of hospitals and clinics in Healdsburg. Essential infrastructure, especially the electrical distribution system, is also posed to be stressed during excessive heat events as demand increases to run air conditioning. Peak demand exceeding the local utility's capacity for supply can lead to blackout or brownout conditions.

Excessive heat may cause temporary drought-like conditions. For example, several weeks of excessive heat increases evapotranspiration and reduces moisture content in vegetation, leading to higher wildfire

vulnerability for that time period even if the rest of the season is relatively moist. Changing heating and cooling patterns globally can have destructive secondary impacts, intensifying a variety of weather-related disasters that directly impact jurisdictions.

5.2.7 Storms

The overall significance for storms is Medium. Based on historical information, these storms have not directly resulted in significant injury or damage to people and property, or the losses are typically covered by insurance. It is the secondary hazards caused by weather, such as floods, that have had the greatest impact on the City's Planning Area.

Property

But while the primary effects may not result in significant injury or property damage, all property is vulnerable during severe weather events; properties in poor condition or closer to overhead power lines and large trees may be more vulnerable to damage.

New critical facilities, such as communication towers should be built to withstand heavy rain, lightning, and hail damage. Population and commercial growth in the City will increase the potential for complications with traffic accidents and commerce interruptions associated with dense fog. Future development projects should also consider severe weather hazards at the planning, engineering and architectural design stage with the goal of reducing vulnerability. Storm water master planning and site plan review should account for building to withstand severe weather events and be considered for all new development. Future development in the City is not expected to be vulnerable to the hazard, but all development will be affected by severe weather and storm events.

Due to the unpredictability of thunderstorm strength and path, most critical infrastructure that is above ground is equally exposed to the storm's impacts. According to historical data the Planning Area has experienced power outages in the past due to severe storms, but due to the random nature of these hazards, a more specific risk assessment was not conducted for this plan. Heavy rain and thunderstorms, particularly those that result in hail could significantly impact motorists travelling along U.S. Highway 101. Depending on the severity of the storm, these events could slow traffic, reduce visibility, and increase the likelihood of vehicle accidents along the highway, which may result in greater traffic delays. These effects are also likely to occur along highway segments in adjacent counties.

Population

Exposure is the greatest danger to people from thunderstorms. People can be hit by lightning, pelted by hail, and caught in rising waters. However, serious injury and loss of human life is rarely associated with hailstorms. While national data shows that lightning causes more injuries and deaths than any other natural hazard except extreme heat, there does not seem to be any trend in the data to indicate that one segment of the population is at a disproportionately high risk of being directly affected. Anyone who is outside during a thunderstorm is at risk of being struck by lightning. Aspects of the population who rely on constant, uninterrupted electrical supplies may have a greater, indirect vulnerability to lightning. As a group, the elderly or disabled, especially those with home health care services rely heavily on an uninterrupted source of electricity. Resident populations in nursing homes, residential facilities, or other special needs housing may also be vulnerable if electrical outages are prolonged. If they do not have a back-up power source, rural residents and agricultural operations reliant on electricity for heating, cooling, and water supplies are also vulnerable to power outages. Thunderstorms have the potential energy and strong winds to topple dead trees and injure people. As a result, power outages that occur

from severe weather can be life threatening and these populations could face more exposure and could experience greater secondary effects of the hazard.

Economy and Natural Resources

The economic impacts of storms are typically short term. Lightning can cause power outages and fires. Hail can destroy exposed property; an example is car lots, where entire inventories can be damaged. Generally, long-term economic impacts center around hazards that cascade from a thunderstorm, including wildfires ignited by lightning and flooding due to heavy rain.

Thunderstorms can have devastating effects on transportation corridors in the City and throughout the County. Thunderstorms may increase the potential for transportation accidents along U.S. Highway 101 which could in turn cause longer traffic delays and timely movement of goods and services. Multi-car pileups have resulted from drivers using excessive speed for the conditions and visibility. Other disruptions from thunderstorms include delayed emergency response vehicles and school closures.

Thunderstorms are a natural environmental process. Environmental impacts include the sparking of potentially destructive wildfires by lightning and localized flattening of plants by hail. As a natural process, the impacts of most severe thunderstorms by themselves are part of the overall natural cycle and do not cause long-term consequential damage.

5.2.8 Wind Events

Overall, the significance of severe weather associated with wind is Medium.

Property

General damage from high wind events can be both direct and indirect. Direct impacts refer to what the wind physically destroys, while indirect impacts include additional costs, damages and losses attributed to secondary hazards spawned by the event or resulting from the direct damages caused by the wind event. Construction practices and building codes can help maximize the resistance of the structures to damage. Secondary impacts of damage caused by wind events often result from damage to infrastructure. Downed power and communications transmission lines, coupled with disruptions to transportation, create difficulties in reporting and responding to emergencies. These indirect impacts of a wind event put tremendous strain on a community.

Public gathering places such as schools, community centers, shelters, nursing homes, and churches may have increased impacts at certain times of day. Due to the random nature of the hazard, a more specific risk assessment was not conducted for this plan.

Population

Community members are the most vulnerable to high wind events. However, there are also segments of the population that are especially exposed to the indirect impacts of high winds, particularly the loss of electrical power. These populations include the elderly or disabled, especially those with medical needs and treatments dependent on electricity. Nursing homes, community-based residential facilities, other special needs housing facilities, and other socially susceptible populations are vulnerable if electrical outages are prolonged since backup power generally operates only minimal functions for a short period of time.

Economy and Natural Resources

Winds typically don't have long-term impacts on the economy. The most common problems associated with high winds are loss of utilities. Downed power lines can cause power outages, leaving large parts of the City isolated, and without electricity, water, and communication. Damage may also limit timely emergency response and the number of evacuation routes.

High winds can cause massive damage to the natural environment, uprooting trees and other debris. This is part of a natural process, however, and the environment will return to its original state over time.

5.2.9 Wildfire

The City's wildfire risk and vulnerability is a medium concern. Wildfires can affect major transportation roads, such as U.S. Highway 101 by impeding commuters to get to and from their destinations (e.g. to the Bay Area), as well as potentially block emergency responders. As previously mentioned, wildfire can also damage or destroy property and infrastructure, injure people or even cause death. During the May to October fire season, the dry vegetation and hot sometimes windy weather, combined with a growing population, results in an increase in the number of potential ignitions. Any fire, once ignited, has the potential to quickly become a large, out-of-control fire. Fires that prevent essential goods or services from entering or leaving the City could negatively affect local residents and businesses by impacting the local economy and the community's livelihood (e.g. limited access to jobs, daycare, schools, resources, and residences).

Property

Wildfire severity is categorized into three zones: moderate, high, and very high. Healdsburg has no areas located in the very high severity zone; therefore, this exposure analysis focuses on the moderate and high FHSZs. Per the analysis, over 50 percent of the city's critical facilities and about 30 percent of residential structures are in a wildfire severity zone (residential structures and population from the unincorporated county within Healdsburg's Urban Service Area are also illustrated). **Tables 5-19** and **5-20** summarize the impacts from wildfire in Healdsburg.

Wildfire poses numerous risks to critical facilities and infrastructure. Risks, or the harm or losses, that are likely to result from exposure to wildfire include:

- Casualties (fatalities and injuries)
- Utility outages
- Economic losses for repair and replacement of critical facilities, roads, buildings, etc.
- Indirect economic losses, such as income lost during the downtime that results from damage to private property or public infrastructure.
- Loss of natural and cultural resources
- Smoke and air pollution
- Creation of more favorable conditions for other hazards such as flooding, landslides, and erosion during the subsequent rainy season

Based on Sonoma County's 2016 CAP and Basin Characterization Model (BCM) future climate change projections for Sonoma County include more frequent and intense wildfires are likely to occur. Risk of

wildfire is likely to continue to rise due to increased dryness of vegetation, compounded by productivity of plants in the spring (which creates more fuel for dry season wildfires). By the end of this century, the chances of one or more fires during a 30-year period are projected to increase from 15-20% at present to 25-33% in the mountainous areas of the county. Additional information about the impact of climate change on Healdsburg’s vulnerability to wildfires can be found in Annex A: Community Wildfire Protection Plan (CWPP).

Table 5-19: Wildfire Vulnerability Summary – Critical Facilities

Category	Number: Moderate	Percentage of Total	Number: High	Percentage of Total
Airport	0	0.00%	0	0.00%
Bridge	0	0.00%	0	0.00%
Community	0	0.00%	0	0.00%
Electrical	0	0.00%	0	0.00%
Government	0	0.00%	0	0.00%
Health/Hospital	0	0.00%	0	0.00%
Police/Fire	0	0.00%	0	0.00%
Sewage Utility	0	0.00%	0	0.00%
Wastewater Utility	0	0.00%	0	0.00%
Stormwater	0	0.00%	0	0.00%
Water Utility	1	6.67%	4	26.67%
TOTAL	1	2.44%	4	9.76%

Note: No critical facilities are located in the Very High FHSZ.

Table 5-20: Wildfire Vulnerability Summary – Residential Structures

Structure	Number	Percentage of Total	Total Value	Total Square Feet
Healdsburg				
Moderate				
Single-Family Dwellings	127	2.86%	\$55,638,715	255,085
Planned Unit Development	30	5.57%	\$3,962,379	21,162
Multi-Family Dwellings	0	0.00%	\$0	0
Mixed Use	0	0.00%	0	0
Other	0	0.00%	\$0	0
Total	157	2.90%	\$59,601,094	276,247
High				
Single-Family Dwellings	141	3.17%	\$72,763,571	363,227
Planned Unit Development	18	3.34%	\$5,439,946	30,575
Multi-Family Dwellings	0	0.00%	\$0	0

Table 5-20: Wildfire Vulnerability Summary – Residential Structures

Structure	Number	Percentage of Total	Total Value	Total Square Feet
Mixed Use	0	0.00%	0	0
Other	0	0.00%	\$0	0
Total	159	0.15%	\$78,203,517	393,802
Unincorporated County within Healdsburg Urban Service Area				
Moderate				
Single-Family Dwellings	33	8.01%	\$5,686,115	35,253
Multi-Family Dwellings	4	17.39%	145125	2940
Other	0	0.00%	0	0
Total	37	8.47%	\$5,831,240	38,193
High				
Single-Family Dwellings	412	100.00%	\$81,165,213	443,186
Multi-Family Dwellings	23	100.00%	\$4,065,672	28,410
Other	2	100.00%	\$1,065,246	3,668
Total	437	100.00%	\$86,296,131	475,264

Population

Some populations in the Planning Area may be more vulnerable to a wildfire than others. For example, those with mobility issues as well as the elderly may have challenges with evacuating or traveling to a shelter without assistance if they cannot stay in their homes. Other vulnerable populations may be individuals whom English is not their native language. Of these socially vulnerable populations and according to the census tracts and block groups in the City, several of these populations are anticipated to reside within older housing in and near Healdsburg that may not utilize fire safe practices.

The Healdsburg Fire Department has a program called Citizens Organized to be Prepared for Emergencies, or COPE, which holds quarterly seminars on preparedness. The COPE program stresses the importance of encouraging neighborhood organization through efforts such as the “Map Your Neighborhood.” In future wildfire events this program could be useful in effectively engaging the local populations in avoiding damage to fires or evacuating before a fire, hence preventing injuries and losses. The City website also contains information and resources regarding these recent projects and efforts.

Per the analysis, almost 25 percent of the population are in a wildfire severity zone (residential structures and population from the unincorporated county within Healdsburg’s Urban Service Area are also illustrated). **Table 5-21** summarizes the impacts from wildfire in Healdsburg.

Table 5-21: Wildfire Vulnerability Summary – Population

Jurisdiction	Number: Moderate	Percentage of Total	Number: to High	Percentage of Total
City of Healdsburg	1,069	9.56%	10	0.09%
Unincorporated County within Healdsburg Urban Service Area	47	5.43%	795	92.52%

Note: Estimates based on assumption of equal distribution of population across Census Block Groups

Economy and Natural Resources

Wildfires can be incredibly destructive depending on the circumstances of the event, particularly the type of resources and populations they affect due to fire size, location, length of the burn, and ongoing or existing weather or hazard conditions. For example, damages to structures and properties are obvious impacts to the economy due to fire, though cascading negative effects on the economic sectors include road closures, lower revenue to the City based on reduced tourism and visitation, or excessive costs of firefighting and relocating people or natural and man-made resources (thus indirectly impacting city revenues). Transportation lifelines being closed and/or damaged could impede a majority of the population’s ability to commute to nearby cities and the Bay Area. Additional direct or indirect impacts to the economy could be further exacerbated by existing hazard issues such as earthquakes, drought, or severe weather, if those make it difficult to control the fires or reestablish the economic drivers in the Planning Area.

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Section 6. Capability Assessment

The capability assessment identifies and evaluates the planning and regulatory, administrative and technical, financial, and education and outreach resources available to accomplish mitigation. Completing the capability assessment is a helpful exercise to clearly illustrate the capabilities that currently exist, which helps to assess and prioritize potential mitigation actions. Mitigation actions should push to expand on a community’s resiliency, but the actions need to be grounded in something achievable; the capability assessment is necessary to evaluate the feasibility of proposed mitigation actions based on local capabilities. Conducting the capability assessment will also help identify gaps in capabilities and resources and will provide an opportunity to start discussing how current capabilities can be improved and expanded.

6.1 Planning and Regulatory Mitigation Capabilities

The City of Healdsburg has several plans and programs in place that guide the City’s mitigation of development in hazard-prone areas. **Table 6-1** lists planning and land management tools typically used by local jurisdictions to implement hazard mitigation activities and indicates those that are in place in Healdsburg.

Table 6-1: Planning and Regulatory Capabilities

Planning and Regulatory Resources (Ordinances, Codes, Plans)	Yes/No	Comments
General Plan	Yes	Addressed hazards and affects development in hazard areas.
Comprehensive/Master Plan	Yes	Healdsburg has specific Master Plans.
Capital Improvements Plan	Yes	Addressed hazards and affects development in hazard areas.
Zoning Ordinance	Yes	Addressed hazards and affects development in hazard areas.
Subdivision Ordinance	Yes	Addressed hazards and affects development in hazard areas.
Floodplain Ordinance	Yes	Addressed hazards and affects development in hazard areas.
Growth Management Ordinance	Yes	
Building Code	Yes	Version: CBC 2022 Addressed hazards and affects development in hazard areas.
Fire Department ISO Rating	Yes	Rating: 2 (due for evaluation)
Erosion or Sediment Control Program	Yes	Addressed hazards and affects development in hazard areas.
Transportation Plan	Yes	
City of Healdsburg Community Wildfire Protection Plan (CWPP)	Yes	Adopted as an Annex to this document in December 2022.

Table 6-1: Planning and Regulatory Capabilities

Planning and Regulatory Resources (Ordinances, Codes, Plans)	Yes/No	Comments
Neighboring CWPPs	Yes	Sonoma County, Fitch Mountain, Mill Creek and Cloverdale all have current CWPPs.
Storm Water Management Program	Yes	Addressed hazards and affects development in hazard areas.
Site Plan Review Requirements	Yes	Addressed hazards and affects development in hazard areas for new builds and extensive remodels.
Capital Improvements Plan	Yes	Addressed hazards and affects development in hazard areas.
Economic Development Plan	No	
Local Emergency Operation Plan	Yes	New EOP published 2021.
Flood Insurance Study or other engineering study for streams	Yes	Addressed hazards and affects development in hazard areas.
Elevation Certificates	Yes	Addressed hazards and affects development in hazard areas.
California Vegetation Treatment Plan (Cal-VTP)	Yes	Healdsburg Ridge Open Space and Fitch Mountain Preserves.
Vegetation Management/Weed Abatement Ordinance	Yes	Done annually by resolution. Documents from fire department, follows Government Code.
Foss Creek Control Study	Yes	Completed in 2019. Foss Creek is the primary source of flood threat for the planning area.
Are there gaps in your capabilities/resources? How can your planning and regulatory capabilities be expanded and improved to further reduce risk?		
<ul style="list-style-type: none"> • Develop an economic development plan. Assessment done in 2006. 		

6.2 Administrative and Technical Capabilities

Table 6-2 identifies the City personnel responsible for or who have skills for activities related to mitigation.

Table 6-2: Administrative and Technical Capabilities

Administrative and Technical Resources	Yes/No	Department/Position & Comments
Planning Commission	Yes	
Mitigation Planning Committee	Yes	Framework for LHMP Planning Team to continue meeting on regular basis will be outlined in plan maintenance section
Maintenance programs to reduce risk (e.g., tree trimming, clearing drainage systems)	Yes	Parks, Public Works, California Conservation Corps: tree maintenance, stormwater inlet cleaning (understaffed), Foss Creek cleaning
Mutual aid agreements	Yes	With communities around Healdsburg, with their public works departments
Hazard data and information	Yes	Planning and Building, Public Works, IT
Grant writing	Yes	Fire, Public Works Within Public Works, have staff with the ability, but not staff dedicated to grant writing
HAZUS analysis	No	
Planner/Engineer with knowledge of land development/land management practices	Yes	Planning and Building
Engineer/Professional trained in construction practices related to building and/or infrastructure	Yes	Planning and Building
Planner/Engineer/Scientist with an understanding of natural hazards	Yes	Planning and Building
Personnel skilled in GIS	Yes	Utility and IT Departments
Full-time building official	Yes	Planning and Building
Floodplain Manager	Yes	Public Works
Emergency Manager	Yes	Police Department (Position created and filled in 2022)
Public Information Officer	Yes	City Manager's Office, as well as Public Safety Officials
GIS Data (hazard areas, critical facilities, building footprints, land use, links to assessor's data)	Yes	Planning and Building
Warning Systems/Services (Reverse 911, cable override, outdoor warning signals)	Yes	Nixle, subscription-based
Foss Creek Flood Gauge	Yes	Flood Gauge for Foss Creek was installed and is operational.
Fire Marshal	Yes	Fire Department

Table 6-2: Administrative and Technical Capabilities

Administrative and Technical Resources	Yes/No	Department/Position & Comments
Predevelopment Meetings	Yes	Twice weekly meetings for new development on any scale, with all departments that will be reviewing plans in attendance
Utility Conservation Analyst	Yes	Utility Department
<p>Are there gaps in your capabilities/resources? How can your administrative and technical capabilities be expanded and improved to further reduce risk?</p> <ul style="list-style-type: none"> • Train or hire a staff member with knowledge of HAZUS. • Add an additional Fire Inspector position to the Fire Department. 		

6.3 Fiscal Capabilities

This section identifies the financial tools or resources that the City could potentially use to help fund mitigation activities. These include City-specific capabilities (**Table 6-3**), as well as state and federal resources (**Table 6-4**). It is important to note that funding can also be sourced from participating agencies/organizations that collaborate with the County in the implementation of mitigation actions.

Table 6-3: Financial Capabilities

Financial Resources	Accessible/ Eligible to Use (Y/N)	Purpose and Comments
Capital improvements project funding	Yes	
Authority to levy taxes for specific purposes	Yes	Subject to Prop 218
Fees for water, sewer, gas, or electric services	Yes	
Impact fees for new development	Yes	Includes fire impact fees
Stormwater utility fee	Yes	Really minimal, subject to new state law classifying stormwater as Utility for Prop 218 purposes
Incur debt through general obligation bonds	Yes	Currently paying off bonds (and good credit rating)
Incur debt through special tax bonds	Yes	
Other federal funding programs	Yes	
State funding programs	Yes	
<p>Are there gaps in your capabilities/resources? How can your fiscal capabilities be expanded and improved to further reduce risk?</p> <ul style="list-style-type: none"> • Unless it's an emergency situation, new expenditures in excess of \$50,000 require approval from City Council. However, the City does not have the ability or authority to improve this gap. • The City of Healdsburg could apply for a grant, such as a BRIC grant, to improve their fiscal capabilities. 		

6.3.1 State and Federal Funding Resources

Table 6-4 lists potential funding programs and resources provided by state and federal agencies/programs the City can tap into for hazard mitigation activities. Please note that the information listed below is not exhaustive.

Table 6-4: Potential Funding Programs/Grants from State and Federal Agencies

Agency	Potential Programs/Grants
Department of Homeland Security – Federal Emergency Management Agency	<ul style="list-style-type: none"> • Homeland Security Grant Program (HSGP) • Emergency Management Performance Grants (EMPG) Program • Transit Security Grant Program • Assistance to Firefighters Grant (AFG) Program • HMGP (gain eligibility by having a FEMA-approved HMP) • PDM Grant Program (gain eligibility by having a FEMA-approved HMP) • Flood Mitigation Assistance (FMA) Program (gain eligibility by having a FEMA-approved HMP)
US Department of Housing and Urban Development	Community Development Block Grant (CDBG) Program
US Department of the Interior	<ul style="list-style-type: none"> • Coastal Impact Assistance Program • USGS Research and Data Collection • WaterSMART Grants
US Department of Defense – US Air Force	Training Requirements Funding
US Department of Health and Human Services	Grants for Public Health Emergency Preparedness
US Department of Commerce	Coastal Resilience Networks
California Governor’s Office of Emergency Services	<ul style="list-style-type: none"> • Regional Catastrophic Preparedness Grant Program • Interoperable Emergency Communications Center Grant Program • Proposition 1B Grant • Citizens Corps Program • Metropolitan Medical Response System Program • Earthquake and Tsunami Grants Program
California Department of Housing and Community Development	Disaster Recovery Initiative (DRI)
California Department of Forestry and Fire Protection	Western States WUI Fire Assistance Grant
California Department of Water Resources	Integrated Regional Water Management (IRWM) Grant Programs
State Water Resources Control Board	Storm Water Grant Program (SWGPP) – Proposition 1
California Coastal Conservancy	Proposition 1 Grants
California Department of Fish and Wildlife	Watershed Restoration Grant Program

6.4 Education and Outreach Capabilities

This section identifies the education and outreach tools or resources that the City could potentially use to help carry out mitigation activities.

Table 6-5: Education and Outreach Capabilities

Education and Outreach Resources	Accessible/ Eligible to Use (Y/N)	Purpose and Comments
Healdsburg Fire and Emergency Preparedness Expo	Yes	An annual Expo held for Northern Sonoma County with emergency preparedness and response agencies and vendors with free workshops, resources, and activities.
Senior Emergency Preparedness Seminar	Yes	Annual Seminar held at the Healdsburg Senior Center to provide emergency preparedness and response education and resources to the senior community in and around Healdsburg. The seminar also includes a Q&A with the City’s Emergency Manager, Police Chief, and Fire Chief.
National Preparedness Month	Yes	National Preparedness Month (NPM) is recognized each September to promote family and community disaster planning now and throughout the year. The City make weekly social media posts to provide preparedness education and resources.
Great ShakeOut	Yes	The Great ShakeOut is an annual earthquake drill.
COPE	Yes	COPE stands for Citizens Organized to be Prepared for Emergencies. The Fire Department holds a quarterly seminar on preparedness and encouraging neighborhood organization through “Map Your Neighborhood.”
City Website	Yes	The City of Healdsburg’s website provides public information and resources. Including information on water conservation efforts and information related to all hazards identified in this plan.
Social Media	Yes	The City’s social media accounts (Instagram, Twitter, Facebook, Nextdoor, and LinkedIn) are used to disseminate public information.
<p align="center">Are there gaps in your capabilities/resources? How can your education and outreach capabilities be expanded and improved to further reduce risk?</p>		
<ul style="list-style-type: none"> • The City can improve providing hazard training for staff or hazard mitigation grant funding in partnership with Sonoma County and Cal OES. • Continuing to train City staff on mitigation and the hazards that pose a risk to the City of Healdsburg will lead to more informed staff members who can better communicate this information to the public. • The City could improve its participation in the Great Shake Out by making it a citywide event. 		

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Section 7. Mitigation Strategy

The intent of the mitigation strategy is to provide the City of Healdsburg with the tools that will serve as guiding principles for future hazard mitigation policy and project administration. The development of the mitigation strategy includes the creation of a mitigation action plan, which involves a prioritization process for selected mitigation actions. The mitigation action plan represents the key outcomes of the LHMP planning process.

7.1 Hazard Mitigation Goals

Goals are broad policy statements representing the City's desire for long-term hazard mitigation results. The LHMP Planning Team first looked at the goal in the current LHMP, which is a general goal that addresses all hazards covered in the plan. The group considered developing more goals and having hazard-specific goals, but the LHMP Planning Team determined that the preference was a single general goal. The Planning Team also noted that the goal from the current LHMP does not contradict the Guiding Principles in the current General Plan.

The LHMP Planning Team decided to keep the mitigation goal from the current plan:

To maintain and enhance a disaster-resistant community by reducing the potential for loss of life, property damage, and environmental degradation from natural disasters, while accelerating economic recovery from those disasters.

7.2 Review of the 2018 Mitigation Action Plan

During the 2023 LHMP planning process, the 2018 mitigation action plan was reviewed to determine which mitigation actions had been completed, deleted, deferred, or are ongoing. Mitigation actions are activities, measures, and/or projects that help achieve the goals of a mitigation plan. The results of this review, shown in **Table 7-1**, illustrate the progress in the City's local mitigation efforts over the five-year period, under the guidance of the 2018 LHMP. Recent mitigation activities that were not specifically called out in the 2018 LHMP have also been included in the table to create a more comprehensive list of the City's mitigation efforts.

Some actions identified in the 2018 mitigation action plan were not able to be completed for varying reasons. Most notably, the City did not have a dedicated Emergency Manager or assigned staff member who was able to carry out the specified mitigation strategies during the Hazard Mitigation Plan cycle. Compounding this issue was the COVID-19 pandemic, which further reduced staffs' time to address mitigation strategies and goals.

Table 7-1: Status of 2018 LHMP Mitigation Actions and Other Recent Mitigation

Status (Current, Ongoing, Completed, or No Action)	Project/Program Name	Description	Responsible Agency	Year(s)	Add to 2023 Mitigation Plan
<p>Ongoing This program has been initiated and is ongoing.</p>	<p>Equip water mains crossing fault lines for emergency connection</p>	<p>Include “areas subject to high ground shaking, earthquake-induced ground failure, and surface fault rupture” in the list of criteria used for determining a replacement schedule for pipelines. Where active faults are found based on geologic investigations, public water mains will include additional valves and fire hydrants placed on each side of the fault, which in the event of pipeline rupture will allow the rupture to be isolated limiting water loss and damage. Temporary water lines can then be run overland to “shunt” water between fire hydrants and thereby maintain service for domestic water and fire protection. Design of sewer mains will include a manhole on each side of the fault, which in the event of pipeline rupture, would allow the pipelines nearest to the break to be plugged from inside the manholes and prevent or minimize the spread of environment damage, and also allow installing a temporary “bypass” between these manholes using portable pumps so that sewer service can continue during the emergency.</p>	<p>Public Works Department</p>	<p>Start date unknown, from at least 2009–Ongoing</p>	<p>Yes</p>

Table 7-1: Status of 2018 LHMP Mitigation Actions and Other Recent Mitigation

Status (Current, Ongoing, Completed, or No Action)	Project/Program Name	Description	Responsible Agency	Year(s)	Add to 2023 Mitigation Plan
<p>Complete Federally funded, addressed seismic retrofitting.</p>	<p>Retrofit or replace critical lifeline infrastructure. Healdsburg Bridge seismic retrofits</p>	<p>The City is currently in the process of rehabilitating the 90-year-old Healdsburg Avenue Bridge over the Russian River. This rehabilitation will include protection against scours resulting from high flood flows and seismic activities. In addition to mitigation of these hazards, the functioning of the bridge is critical for evacuation in case of severe flooding, dam failure, or any disaster that might close US Highway 101 over the Russian River.</p>	<p>Public Works Department</p>	<p>2014–15</p>	<p>No</p>
<p>No Action The lack of a dedicated Emergency Manager for most of this Hazard Mitigation Plan cycle prevented the City from taking proactive outreach efforts on this item. The City does not have the ability to enforce this but access to information has improved. More information is now available on the City website but no active outreach to real estate agents has been completed.</p>	<p>Work more effectively with real estate agents regarding hazard disclosures</p>	<p>Assist in ensuring adequate hazard disclosure by working with real estate agents to improve enforcement of real estate disclosure requirements for residential properties with regard to seven official natural hazard zones: (1) Special Flood Hazard Areas (designated by FEMA), (2) Areas of Potential Flooding from dam failure inundation, (3) Very High Fire Hazard Severity Zones, (4) Wildland Fire Zones, (5) Earthquake Fault Zones (designated under the Alquist-Priolo Earthquake Fault Zoning Act), and the (6) Liquefaction and (7) Landslide Hazard Zones (designated under the Seismic Hazard Mapping Act).</p>	<p>Planning and Building Department</p>	<p>N/A</p>	<p>Yes</p>

Table 7-1: Status of 2018 LHMP Mitigation Actions and Other Recent Mitigation

Status (Current, Ongoing, Completed, or No Action)	Project/Program Name	Description	Responsible Agency	Year(s)	Add to 2023 Mitigation Plan
<p>Ongoing For new construction of health care facilities, the City has imposed conditions for the development to submit an Emergency Response/Action Plan.</p>	<p>Encourage health care facilities to develop disaster mitigation plans</p>	<p>Encourage ancillary facilities, medical offices, pharmacies, free or specialty clinics, etc. facility operators to develop disaster mitigation plans.</p>	<p>Fire Department</p>	<p>2024</p>	<p>Yes</p>
<p>Ongoing Funding for the substation was impacted by the pandemic and was also tied to the development of two parcels. Funding was secured in 2023 and construction began in November 2023. Completion is scheduled for late 2024 to spring 2025.</p>	<p>Construction of a Healdsburg Fire Department Substation</p>	<p>This new substation will be an alternate station should the main station be impacted by flooding. Regarding the area of geology and soils, the environmental impact report for the project identified five mitigation measures to be implemented during the construction process.</p>	<p>Planning and Building Department</p>	<p>2007–current</p>	<p>Yes</p>
<p>Ongoing The program has been initiated and is ongoing.</p>	<p>Water Conservation Program</p>	<p>Lawns that are removed and replaced and maintained with low-water-use plantings, permeable landscape surfaces (mulch, decorated rock, stone pavers, or similar), gardens, trees, shrubs, and/or decorative outdoor landscape elements are eligible for a one-time cash rebate.</p>	<p>Utility Department</p>	<p>2014–ongoing</p>	<p>Yes</p>

Table 7-1: Status of 2018 LHMP Mitigation Actions and Other Recent Mitigation

Status (Current, Ongoing, Completed, or No Action)	Project/Program Name	Description	Responsible Agency	Year(s)	Add to 2023 Mitigation Plan
<p>Ongoing The program has been initiated and is ongoing.</p>	<p>Energy efficiency rebates</p>	<p>Energy efficiency rebates for items such as:</p> <ul style="list-style-type: none"> • Heat pumps • Air conditioners and evaporative coolers • Duct sealing and weatherization. • AC and heat pump tune-ups • Replacement of appliances: electric water heater, dishwasher, and clothes washer 	<p>Utility Department</p>	<p>2014–ongoing</p>	<p>Yes</p>
<p>Ongoing The program has been initiated and is ongoing</p>	<p>Water conservation Education and Outreach</p>	<p>The City has offered a variety of water conservation workshops, such as:</p> <ul style="list-style-type: none"> • Welcome to Greywater 101 • 2010 Urban Water Management Plan • Home-scale Greywater • Inspect and Evaluate Your Irrigation System • State Mandated Water Restrictions and You • Basics of Drought Tolerant Landscaping • Setting a Landscape Water Budget • Practical Solutions to Create a Water-Wise Home Series: <ul style="list-style-type: none"> – Water Conservation 101 – Indoor Solutions – Harvest the Rain and Slow the Flow 	<p>Utility Department</p>	<p>2015–ongoing</p>	<p>Yes</p>
<p>Ongoing The program has been initiated and is ongoing</p>	<p>Free water-saving items</p>	<p>Free water-saving items:</p> <ul style="list-style-type: none"> • A variety of water savings items such as low-flow shower heads and faucet aerators. • Other conservation programs exist with sufficient funding. 	<p>Utility Department</p>	<p>2014–ongoing</p>	<p>Yes</p>

Table 7-1: Status of 2018 LHMP Mitigation Actions and Other Recent Mitigation

Status (Current, Ongoing, Completed, or No Action)	Project/Program Name	Description	Responsible Agency	Year(s)	Add to 2023 Mitigation Plan
Ongoing The program has been initiated and is ongoing	Free energy audits & education	The City offers free energy audits for commercial electric customers and education for residential customers.	Utility Department	Start date unknown–Ongoing	Yes
Ongoing The program has been initiated and is ongoing	Weed Abatement	The Fire Department conducts annual inspections. Residents are asked to abate high weeds, trim up limbs at least 6 feet off the ground, and remove ladder fuels.	Fire Department	Ongoing	Yes
Current	Russian River Watershed Association Storm Water Resource Plan (SWRP)	An active participant in the development of the SWRP, one of 11 local entities represented. The main goals of the SWRP are to identify and prioritize stormwater and dry weather runoff capture projects and other multi-benefit projects that advance stormwater goals in the Russian River watershed. (Healdsburg submitted 17 projects during the planning process, 13 projects made the list of prioritized projects (51 total “prioritized” projects), including 12 of Top 20 ranked projects.)	Public Works Department	2017–18	Yes
Complete	Storage Tank for Sunset Pressure Zone	Install a storage tank for the Sunset pressure zone to increase the capacity and flow for fighting fires in this vulnerable area.	Public Works Department	2021-2022	No

7.3 2023 Mitigation Actions

With the results of the hazard risk assessment finalized, the mitigation goal established, and capabilities assessed, the City then set out to identify mitigation actions that would reduce the impacts of the focused natural hazards.

FEMA identifies four categories of mitigation actions. Understanding these categories helps communities to realize the full breadth of mitigation and develop a comprehensive mitigation strategy. FEMA's four hazard mitigation categories are described below.

- **Local Plans and Regulations:** Government administrative or regulatory actions (authorities, policies, or codes) or processes that influence the way land and buildings are developed and built.
- **Structure and Infrastructure Projects:** Actions that involve modifying or removing existing buildings or infrastructure to protect them from a hazard. Mitigation projects intended to lessen the impact of a hazard by using structures to modify the environment.
- **Natural Systems Protection:** Actions that, in addition to minimizing hazard damage/losses, also preserve or restore the functions of natural systems.
- **Education and Awareness Programs:** Actions to inform and educate citizens, elected/public officials, and property owners about potential risks from hazards and potential ways to mitigate them.

7.3.1 Identification and Prioritization of Mitigation Actions

The LHMP Planning Team worked with the LHMP Planning Team to review and assess existing plans and studies.

Development of the mitigation action plan occurred in three general steps:

1. Establish a list of potential mitigation actions.
2. Discuss the pros and cons of each potential mitigation action.
3. Identify the priority mitigation actions and provide additional details for each.

The LHMP Planning Team began the process of developing the mitigation action plan by identifying a list of potential mitigation actions. Potential actions are actions that are feasible and will benefit the City but may not be priority actions for the five-year planning period.

As shown in **Table 7-2**, for each potential mitigation action, the following information is listed: description, hazard(s) addressed, mitigation category, and type of development affected by the action.

Table 7-2: Potential Mitigation Actions

No.	Description	Hazard	Mitigation Category	New or Existing Construction Affected?
1	Integrate the hazard analysis and mitigation strategy into the General Plan’s Safety Element.	All	Local Plans and Regulations	Not Applicable
2	Have a booth at the annual Safety Fair to provide outreach and education about what residents can do in their own homes. Coordinate this effort with social media outreach.	All	Education and Awareness	Existing Construction
3	Make energy efficiency a priority through building code improvements, retrofitting City facilities with energy-efficient lighting, and urging employees to conserve energy and save money.	Climate Change	Local Plans and Regulations	Existing Construction
4	Restore and protect the ability of natural ecosystems to capture and store carbon.	Climate Change	Natural Systems Protection	New and Existing Construction
5	Develop and implement a Climate Mobilization Strategy (CMS) in support of State and Regional greenhouse gas (GHG) reduction goals.	Climate Change	Local Plans and Regulations	New and Existing Construction
6	Develop a water conservation outreach program that focuses on recycled water.	Drought	Education and Awareness	Not Applicable
7	Install earthquake sensors that can automatically open vehicle bay doors at Police and Fire stations.	Earthquake	Structure and Infrastructure	Not Applicable
8	Seismically retrofit or upgrade seismically deficient government facilities and pre-identified shelter facilities.	Earthquake	Structure and Infrastructure	Existing Construction
9	Develop and implement plans to increase building owners’ general knowledge of and appreciation for the value of seismic upgrading of their buildings’ structural and nonstructural elements.	Earthquake	Local Plans and Regulations, Education and Awareness	Existing Construction
10	Develop an outreach program to talk to the public about earthquake risk and mitigation activities that can be completed in homes, schools, and businesses.	Earthquake	Education and Awareness	Existing Construction

Table 7-2: Potential Mitigation Actions

No.	Description	Hazard	Mitigation Category	New or Existing Construction Affected?
11	Remove storm drains from backyards and relocate to streets. This is also an opportunity to increase stormwater capacity; ensure that relocation of storm drains also increases overall capacity.	Flooding	Structure and Infrastructure	Existing Construction
12	Reinforce roads/bridges from flooding through protection activities, including elevating the roads/bridges and installing/widening culverts beneath the roads/bridges or upgrading storm drains.	Flooding	Structure and Infrastructure	Existing Construction
13	Acquire, relocate, or elevate residential structures, in particular those that have been identified as Repetitive Loss properties, within the 100-year floodplain.	Flooding	Structure and Infrastructure	Existing Construction
14	Acquire, relocate, or elevate critical facilities within the 100-year floodplain (such as the Fire Station).	Flooding	Structure and Infrastructure	Existing Construction
15	Encourage the use of Low Impact Development (LID) Best Management Practices (BMPs) to reduce stormwater runoff and increase groundwater recharge.	Flooding	Structure and Infrastructure, Natural Systems Protection	New and Existing Construction
16	Develop a Healdsburg-specific outreach strategy to utilize the materials being developed through the Russian River Watershed Association as part of the Storm Water Resource Plan (SWRP) currently in development.	Flooding	Education and Awareness	Not Applicable
17	Raise utilities or other mechanical devices above expected flood levels.	Flooding	Structure and Infrastructure	Existing Construction
18	Establish standards for all utilities regarding tree pruning around lines.	High Winds	Local Plans and Regulations	Not Applicable
19	Underground power lines whenever they are relocated, such as during efforts to move power lines that travel through back yards.	High Winds	Structure and Infrastructure	Existing Construction

Table 7-2: Potential Mitigation Actions

No.	Description	Hazard	Mitigation Category	New or Existing Construction Affected?
20	Implement landslide stabilization and/or protection measures into the North Fitch Mountain Slide Repair. Stabilization measures include grading the unstable portion of the slope to a lower gradient, construction of rock buttresses and retaining walls, and drainage improvements. Protection measures include containment and/or diversion of the moving debris, such as walls, berms, ditches, and catchment basins.	Landslide	Structure and Infrastructure, Natural Systems Protection	New and Existing Construction
21	Implement post-fire debris flow hillslope and channel treatments, such as seeding, mulching, check dams, and debris racks, as needed.	Post-Fire Debris Flow	Natural Systems Protection	New and Existing Construction
22	Encourage the use of non-combustible materials (e.g., stone, brick, and stucco) in new construction and the use of fire-resistant roofing and materials in remodels, upgrades, and new construction.	Wildfire	Local Plans and Regulations	New and Existing Construction
23	Implement an outreach program that educates residents on mitigation actions they can take at their homes such as removing dead or dry leaves and combustibles from roofs, decks, eaves, porches, and yards; and creating a defensible spaces or buffer zones around their houses.	Wildfire	Education and Awareness	Existing Construction
24	Install a storage tank for the Sunset pressure zone to increase the capacity and flow for fighting fires in this vulnerable area.	Wildfire	Structure and Infrastructure	New and Existing Construction
25	When replacing water lines, put in laterals for sprinklers to residential buildings (already included for commercial, industrial, and new construction, but not for existing residential buildings).	Wildfire	Structure and Infrastructure	Existing Construction

Table 7-2: Potential Mitigation Actions

No.	Description	Hazard	Mitigation Category	New or Existing Construction Affected?
26	Implement storm water runoff reduction projects to reduce the impacts of flooding.	Flooding	Structure and Infrastructure	New and Existing Construction

After the list of potential mitigation actions was developed, the LHMP Planning Team was asked to consider the pros and cons of each action. Then, through a group discussion, the list of actions was narrowed down to a set of priority mitigation actions. While considering the pros and cons of the actions and during the priority action discussion, the group was asked to consider the following questions:

- **Does the action:** Solve the problem? Address multiple hazards? Offer benefits that equal or exceed costs (is there a cost benefit)? Implement a goal, policy, or project identified in the General Plan or Capital Improvement Plan?
- **Can the action:** Be implemented with existing funds? Be implemented by existing state or federal grant programs? Be completed within the five-year life cycle of the HMP?
- **Will the action:** Be implemented with currently available technologies? Be accepted by the community? Be supported by community leaders (is there political support)? Adversely affect segments of the population or neighborhoods? Require a change in local ordinances or zoning laws? Result in positive or neutral impact on the environment? Comply with all local, state, and federal environmental laws and regulations?
- **Is there:** Sufficient staffing to undertake the project? Existing authority to undertake the project? An example of a similar project being successful? A champion for the project?

To further support the prioritization process, the Planning Team considered HMA program requirements (**Table 7-3**), as these projects have the greatest chance of leading to enhanced project scoping and the lowest probability of HMA funding delays.

The format of this approach to prioritization differs from the previous plan, but similar concepts are covered. The previous plan determined prioritization on economic cost-benefit analysis, technical and administrative feasibility, political acceptability, social appropriateness, legality, and the action not being harmful to the environment or the community’s heritage. All of these criteria are addressed in the questions above and the HMA Program Requirements below.

Mitigation actions not selected as priority actions may be considered at a later date for implementation if the priority actions have been completed or deferred, as additional funding sources become available, or if the goals and objectives of the LHMP shift.

Table 7-3: Priority Mitigation Action Criteria (HMA Program Requirements)

Requirement	Description
Mitigation Planning	Links the existing mitigation plan, particularly the vulnerability analysis and capability assessment, to project scoping.
Technical Feasibility and Effectiveness	Conforms with accepted engineering practices, established codes, standards, modeling techniques, or best practices. Effective mitigation measures funded under HMA should provide a long-term or permanent solution.
Floodplain Management and Protection of Wetlands	Conforms to 44 CFR Part 9, which incorporates the requirements of Executive Order (EO) 11988 (Floodplain Management) and EO 11990 (Protection of Wetlands).

Table 7-3: Priority Mitigation Action Criteria (HMA Program Requirements)

Requirement	Description
Environmental Planning and Historic Review and Compliance	Complies with all environmental and historic preservation (EHP) laws and with 44 CFR Part 10.
Cost Effectiveness	Is cost-effective or in the interest of the National Flood Insurance Fund.
Cost Review	Is reasonable in costs compared to the probable benefits.
General Program Requirements	Is an eligible activity, including: property acquisition and structure demolition; property demolition and structure relocation; structure elevation; mitigation reconstruction; dry floodproofing of historic residential structures; dry floodproofing of nonresidential structures; minor localized flood reduction projects; structural retrofitting of existing buildings; nonstructural retrofitting of existing buildings and facilities; infrastructure retrofit; soil stabilization; wildfire mitigation; post-disaster code enforcement.

Source: FEMA 2015

Once priority actions were chosen, additional details were included for each action: the facility to be mitigated (if known and/or applicable), potential funding source, department or agency lead, and time frame. The final prioritized list of actions is the 2023 Mitigation Action Plan, as shown in **Table 7-4**.

Section 7
Mitigation Strategy

Table 7-4: 2023 Mitigation Action Plan

No.	Description	Hazard	Mitigation Category	New or Existing Construction Affected? Facility to Be Mitigated (if known and/or applicable)	Potential Funding Source	Department or Agency Lead	Time Frame (0–5 Years)
1	Integrate the hazard analysis and mitigation strategy into the General Plan’s Safety Element.	All	Local Plans and Regulations	Not Applicable Not Applicable	General Fund	Planning & Building Department	2 Years
2	Have a booth at the annual Safety Fair to provide outreach and education about what residents can do in their own homes. Coordinate this effort with social media outreach.	All	Education and Awareness	Existing Construction Not Applicable	General Fund	Fire Department	1 Year, Annually Thereafter
3	Develop a water conservation outreach program that focuses on recycled water.	Drought	Education and Awareness	Not Applicable Not Applicable	General Fund, WaterSMART Grants	Public Works Department	3 Years
4	Develop and implement plans to increase building owners’ general knowledge of and appreciation for the value of seismic upgrading of their buildings’ structural and nonstructural elements.	Earthquake	Local Plans and Regulations, Education and Awareness	Existing Construction Not Applicable	Hazard Mitigation Grant Program (HMGP)	Planning & Building Department	3–5 Years
5	The City is interested in removing storm drains from backyards and relocating the storm drains to streets. This is also an opportunity to increase stormwater capacity; ensure that relocation of storm drains also increases overall capacity.	Flooding	Structure and Infrastructure	Existing Construction Housing with storm drains in their back yards	Community Development Block Grant (CDBG) Program	Public Works Department	5 Years
6	Acquire, relocate, or elevate critical facilities within high hazard areas (specify severity for each hazard)	All	Structure and Infrastructure	Existing Construction Fire Station	HMGP	Public Works Department	5 Years

Table 7-4: 2023 Mitigation Action Plan

No.	Description	Hazard	Mitigation Category	New or Existing Construction Affected? Facility to Be Mitigated (if known and/or applicable)	Potential Funding Source	Department or Agency Lead	Time Frame (0–5 Years)
7	Comply with Low Impact Development (LID) Best Management Practices (BMPs) to reduce stormwater runoff and increase groundwater recharge.	Flooding	Structure and Infrastructure, Natural Systems Protection	New and Existing Construction Not Applicable	General Fund	Public Works Department	Ongoing
8	Develop a Healdsburg-specific outreach strategy to utilize the materials being developed through the Russian River Watershed Association on the in-development Storm Water Resource Plan (SWRP).	Flooding	Education and Awareness	Not Applicable Not Applicable	General Fund	Public Works Department	Ongoing
9	Underground powerlines, when possible, to reduce the risk of utility caused wildfire. Prioritize undergrounding in WUI and other areas with high vegetative fuels.	High Winds	Structure and Infrastructure	Existing Construction replaced with modern designs to lower risk.	CDBG Program	Utilities Department	Ongoing
10	Develop utility scale microgrids to mitigate the impacts of PSPS events, heatwaves that limit supply from the electric grid and provide redundant power systems for critical public facilities.	PSPS, Excessive Heat	Structure and Infrastructure	New construction at existing facilities	State and Federal Grant Funding	Utilities Department	5 years
11	Funding for Cal vegetation treatment plan	Wildfire	Natural Systems Protection	Not Applicable	State and Federal Grant Funding	Fire Department	Ongoing

Table 7-4: 2023 Mitigation Action Plan

No.	Description	Hazard	Mitigation Category	New or Existing Construction Affected? Facility to Be Mitigated (if known and/or applicable)	Potential Funding Source	Department or Agency Lead	Time Frame (0–5 Years)
12	Wastewater infiltration and inflow reductions to mitigate overwhelming the sewer collection system during rain events.	Storm and Flooding	Structure and Infrastructure	Existing construction	State and Federal Funding	Public Works Department	5 years
13	Fire Station Flooding Mitigation	Flooding	Structure and Infrastructure	New and Existing Construction	State and Federal Funding	Fire Department	2-3 years
14	Tower being overloaded with equipment	High Winds	Structure and Infrastructure	Existing construction	State and federal funding	Public Works Department	5 years
15	Implement landslide stabilization and/or protection measures into the North Fitch Mountain Slide Repair to include Fitch Mountain Open Space Preserve. Stabilization measures include grading the unstable portion of the slope to a lower gradient, construction of rock buttresses and retaining walls, and drainage improvements. Protection measures include containment and/or diversion of the moving debris, such as walls, berms, ditches, and catchment basins.	Landslide	Structure and Infrastructure, Natural Systems Protection	New and Existing Construction North Fitch Mountain landslide	HMGP	Public Works Department	3–5 Years

Table 7-4: 2023 Mitigation Action Plan

No.	Description	Hazard	Mitigation Category	New or Existing Construction Affected? Facility to Be Mitigated (if known and/or applicable)	Potential Funding Source	Department or Agency Lead	Time Frame (0–5 Years)
16	Implement an outreach program that educates residents on mitigation actions they can take at their homes such as removing dead or dry leaves and combustibles from roofs, decks, eaves, porches, and yards; and creating a defensible spaces or buffer zones around their houses as outlined in the Healdsburg CWPP Annex.	Wildfire	Education and Awareness	Existing Construction Not Applicable	HMGP	Fire Department	1 Year, Ongoing
18	When replacing water lines, put in laterals for sprinklers to residential buildings (already included for commercial, industrial and new construction, but not for existing residential buildings).	Wildfire	Structure and Infrastructure	Existing Construction Existing Residential Buildings	General Fund, CDBG Program	Public Works Department	1 Year, Ongoing
19	Implement storm water runoff reduction projects to reduce the impacts of flooding.	Flooding	Structure and Infrastructure	New and Existing Construction Not Applicable	HMGP, Prop 1	Public Works Department	5 Years
20	Develop and implement a Climate Mobilization Strategy (CMS) in support of State and Regional greenhouse gas (GHG) reduction goals. The Strategy should identify key measures and actions that will be most impactful in reducing GHG emissions, are equitable, feasible, and community driven.	All	Structure and Infrastructure	New and Existing Construction Not Applicable	General Fund	City Manager's Office	1 Year, Ongoing

Table 7-4: 2023 Mitigation Action Plan

No.	Description	Hazard	Mitigation Category	New or Existing Construction Affected? Facility to Be Mitigated (if known and/or applicable)	Potential Funding Source	Department or Agency Lead	Time Frame (0–5 Years)
21	Assist in ensuring adequate hazard disclosure by working with real estate agents to improve enforcement of real estate disclosure requirements for residential properties with regard to seven official natural hazard zones.	All	Structure and Infrastructure, Education and Awareness	New and Existing Construction Not Applicable	General Fund	Planning and Building Department	Ongoing
22	Encourage health care facilities to develop disaster mitigation plans.	All	Local Plans and Regulations	New and Existing Construction Not Applicable	General Fund	Emergency Management	Ongoing
23	Complete construction of a Healdsburg Fire Department Substation that will serve as an alternate station should the main station be impacted.	All	Structure and Infrastructure	New Construction Fire Station	General Fund	Building and Planning Department	2 Years
24	Provide energy efficiency rebates for items such as heat pumps, air conditioners & evaporative coolers, duct sealing and weatherization, AC & heat pump tune-ups, and replacement of water heater, dishwasher, and clothes washer with electric appliances.	Drought	Structure and Infrastructure	New and Existing Construction Not Applicable	General Fund, WaterSMART Grants	Utility Department	Ongoing
25	Provide free water saving items such as low-flow shower heads and faucet aerators to the public.	Drought	Structure and Infrastructure, Education and Awareness	New and Existing Construction Not Applicable	General Fund, WaterSMART Grants	Utility Department	Ongoing

Table 7-4: 2023 Mitigation Action Plan

No.	Description	Hazard	Mitigation Category	New or Existing Construction Affected? Facility to Be Mitigated (if known and/or applicable)	Potential Funding Source	Department or Agency Lead	Time Frame (0–5 Years)
26	Provide free energy audits for commercial electric customers and education for residential customers.	Drought	Education and Awareness	New and Existing Construction Not Applicable	General Fund	Utility Department	Ongoing
27	Offer water conservation education and outreach opportunities to the public such as: <ul style="list-style-type: none"> • Home-scale Greywater • Inspect and Evaluate Your Irrigation System • State Mandated Water Restrictions and You • Basics of Drought Tolerant Landscaping • Setting a Landscape Water Budget • Practical Solutions to Create a Water-Wise Home Series: <ul style="list-style-type: none"> ○ Water Conservation 101 ○ Indoor Solutions ○ Harvest the Rain & Slow the Flow 	Drought	Education and Awareness	New and Existing Construction Not Applicable	General Fund, WaterSMART Grants	Utility Department	Ongoing
28	Manage a Weed Abatement Program for the City by conducting annual inspections to ensure all residents abate high weeds, trim up limbs at least 6 feet off the ground, and remove ladder fuels.	Wildfire	Plans and Regulations, Education and Awareness	Not Applicable Not Applicable	General Fund	Fire Department	Ongoing

Table 7-4: 2023 Mitigation Action Plan

No.	Description	Hazard	Mitigation Category	New or Existing Construction Affected? Facility to Be Mitigated (if known and/or applicable)	Potential Funding Source	Department or Agency Lead	Time Frame (0–5 Years)
29	Equip water mains crossing fault lines for emergency connection. Include “areas subject to high ground shaking, earthquake-induced ground failure, and surface fault rupture” in the list of criteria used for determining a replacement schedule for pipelines. Where active faults are found based on geologic investigations, public water mains will include additional valves and fire hydrants placed on each side of the fault. Design of sewer mains will include a manhole on each side of the fault.	Earthquake	Structure and Infrastructure	New and Existing Construction Not Applicable	General Fund	Public Works Department	Ongoing

Section 8. Plan Implementation and Maintenance

Because this plan is a living document, it is important that it becomes a tool in the City's resources to ensure minimal damage in the event of a natural disaster. This section discusses plan adoption and the processes for monitoring, evaluating, and updating the LHMP to ensure the plan remains relevant and continues to address the changing environment in Healdsburg. In addition, this section describes the incorporation of the LHMP into existing City of Healdsburg planning mechanisms, as well as how the City will continue to engage the public.

8.1 Plan Adoption

To comply with DMA 2000, the City of Healdsburg will officially adopt the 2023 City of Healdsburg LHMP within one year of receiving FEMA "approval pending adoption" status. The adoption of the LHMP recognizes the City's commitment to reducing the impacts of natural hazards in Healdsburg. The adoption resolution is presented in **Appendix E**.

8.2 Monitoring, Evaluating, and Updating the LHMP

Led by the Emergency Manager, the LHMP Planning Team will meet annually to officially monitor and evaluate the plan. Forms have been developed to facilitate monitoring and evaluating the plan. A summary of the annual meeting will be posted on the City's website for public viewing.

- **Monitoring:** The Mitigation Project Progress Report form (**Appendix D**) will be used to monitor/track each of the mitigation actions included in the 2023 Mitigation Action Plan (and any additional actions that may be added). The LHMP Planning Team is looking into converting this Microsoft Word form into an Excel worksheet that will be housed on a shared drive for regular access by Planning Team members. At a minimum, the form will be updated annually as a progress report for discussion at the annual LHMP Planning Team meeting. This form discusses the status of the mitigation project, including any changes made to the project, identifies implementation problems, and describes appropriate strategies to overcome them.
- **Evaluating:** Evaluation of the 2023 LHMP will look at the overall effectiveness of the plan to analyze if the plan goal is being met and if the goal is still relevant, if progress is being made, and if there have been any changes in the community that would necessitate an informal update or an amendment to the plan. The Annual Review Questionnaire form (**Appendix D**) will be used to evaluate the plan. At a minimum, the form will be updated annually for discussion at the annual LHMP Planning Team meeting; should a disaster occur, the Emergency Manager will determine if an evaluation should occur prior to the scheduled annual evaluation.
- **Updating:** The LHMP will be updated every five years, as required by DMA 2000. After the third year, the LHMP Planning Team will look into funding/grants for the plan update. After the fourth year, the LHMP Planning Team will begin updating the plan. The plan update process will follow a similar planning process that was used to develop the 2023 LHMP. Future updates to the LHMP will account for any new hazard vulnerabilities, special circumstances, or new information that becomes available. Issues that arise during monitoring and evaluating the LHMP, which require changes to the risk assessment, mitigation strategy, and other components of the LHMP, will be incorporated into the next update of the City of Healdsburg LHMP in 2028.

The plan maintenance process is summarized in **Table 8-1**.

Table 8-0-1: Plan Monitoring, Evaluation, and Updating Process

	Monitor	Evaluate	Update
<i>By Whom</i>	Emergency Manager has primary responsibility to call meetings and delegate responsibilities as necessary.	Emergency Manager has primary responsibility to call meetings and delegate responsibilities as necessary.	Emergency Manager has primary responsibility to call meetings and delegate responsibilities as necessary.
<i>When</i>	Annual meeting along with evaluation.	Annual meeting along with monitoring.	<ul style="list-style-type: none"> • Every 5 years. • Begin investigating funding/grants following third annual monitoring/evaluation meeting. • Begin updating plan following fourth annual monitoring/evaluation meeting.
<i>How</i>	<ul style="list-style-type: none"> • Responsible agency to monitor mitigation action process regularly. Progress Report form to be updated at least annually. • LHMP Planning Team will reconvene to discuss/review Mitigation Project Progress Report form. • Summary of the annual meeting to be posted on the City’s website. 	<ul style="list-style-type: none"> • Annual Review Questionnaire form to be completed at least annually by each LHMP Planning Team member. • LHMP Planning Team will reconvene to discuss/review Annual Review Questionnaire forms. • Summary of the annual meeting to be posted on the City’s website. • Annual Hazard Mitigation Survey will be circulated via City Council meetings, Social Media, Senior Center, Reach for Home, and Corazon Healdsburg to gather public feedback. 	<ul style="list-style-type: none"> • Develop scope of work. • Investigate and apply for funding/budget cost. • Review/revise plan accounting for: <ul style="list-style-type: none"> – new hazard vulnerabilities – special circumstances – new information – new priorities – issues from monitoring/ evaluation – progress in mitigation efforts

8.3 Incorporation into Existing Planning Mechanisms

Another important implementation mechanism is to incorporate the recommendations and underlying principles of the LHMP into other community plans and mechanisms, such as comprehensive planning, capital improvement budgeting, economic goals and incentives, and regional plans. Mitigation is most successful when it is incorporated within the day-to-day functions and priorities of government and development. Thus, the integration of a variety of City administrative departments into the LHMP Planning Team provides an opportunity for constant and pervasive efforts to network, identify, and highlight mitigation activities and opportunities at all levels of government, through the monitoring of agendas, attendance at meetings, and distribution of memos. This collaborative effort is also important in the monitoring of funding opportunities that can be leveraged to implement the mitigation actions.

Based on the comprehensive nature of the LHMP, the LHMP Planning Team believes that this document will be highly useful when updating existing and developing new planning mechanisms in the City. Specific documents that have been identified for incorporating elements of the LHMP include:

- **Building/Development Codes and Ordinances:** The 2023 LHMP will provide information to enable the City to make decisions on appropriate building/development codes and ordinances. Appropriate building codes and ordinances can increase Healdsburg's resilience following natural disasters.
- **Emergency Operation Plan:** The 2023 LHMP will provide information on risk and vulnerability that will be extremely important to consider and incorporate into the City's emergency management plans including the Emergency Operations Plan. Probability and vulnerability can direct emergency management and response efforts and can influence public outreach efforts around emergency preparedness.
- **General Plan:** The 2023 LHMP will provide information that can be incorporated into the Land Use and the Safety sections of the plan during the next General Plan update. Specific risk and vulnerability information from the LHMP can help to identify areas where development should not take place.
- **CWPP:** The 2023 LHMP highlights wildfire areas of concern in the city. Suitable mitigation actions contained in the LHMP can be included in future updates of the City of Healdsburg CWPP and the Fitch Mountain CWPP.
- **Capital Improvement Plan (CIP):** Projects identified in the 2023 LHMP can be included in the annual CIP.

8.4 Continued Public Involvement

As occurred during the development of the 2023 LHMP, the LHMP Planning Team will involve the public during the monitoring, evaluating and updating processes. A downloadable copy of the 2023 LHMP and any proposed changes or updates will be posted on the City's website, and a point of contact will be provided to which people can direct their comments or concerns. Following the annual monitoring/evaluating meeting, a summary of the meeting will be posted to the City's website for public viewing.

Section 8
Plan Implementation and Maintenance

As noted above, the LHMP Planning Team will continue to oversee implementation, examine the annual review questionnaires and project progress reports, modify the implementation strategy and process as needed, and update the LHMP as required. The LHMP Planning Team will also look for opportunities to raise community awareness about the 2023 LHMP and the hazards that affect the city. This effort could include attendance and provision of materials at City-sponsored events, public mailings, and social media posts (such as Facebook, Twitter, and Nextdoor). Per the responses from the Hazard Questionnaire, the preferred methods for the public to receive information are City Manager’s Biweekly Update, City’s website, social media, and utility bills. Any public comments received regarding the 2023 LHMP will be collected by the LHMP Planning Team, addressed as needed, and considered during future LHMP updates.

The City will circulate an Annual Review Questionnaire form annually every September to engage the public and gather data about the City's priorities and progress of mitigation activities. The Annual Review Questionnaire will be circulated via City Council meetings, City Manager's Biweekly Update, and Social Media. A flyer and hard copies of the questionnaire will also be available at the Senior Center to engage the senior community, Reach for Home to reach unhoused individuals, and Corazon Healdsburg to reach Spanish speakers ensure all vulnerable populations in Healdsburg are reached. The Annual Review Questionnaire will be available in both English and Spanish.

The City will hold a Community Workshop to engage the public and brainstorm in person about the City's priorities and progress of mitigation activities. The Community Workshop will be advertised via City Council meetings, City Manager's Biweekly Update, and Social Media. A invitation to the Community Workshop will also be posted at the Senior Center to engage the senior community, Reach for Home to reach unhoused individuals, and Corazon Healdsburg to reach Spanish speakers ensure all vulnerable populations in Healdsburg are reached. The Community Workshop will have childcare available for those that would otherwise be unable to attend. The Community Workshop will also have Spanish translation available.

The plan public outreach process is summarized in Table 8-2.

Table 8-2: Plan Public Outreach Process

	Monitor	Evaluate	Update
<i>By Whom</i>	Emergency Manager has primary responsibility to coordinate public outreach.	Emergency Manager has primary responsibility to coordinate public outreach.	Emergency Manager has primary responsibility to coordinate public outreach.
<i>When</i>	<ul style="list-style-type: none"> Annually every September 	<ul style="list-style-type: none"> Every two years 	<ul style="list-style-type: none"> Every five years Begin investigating funding/grants following third annual monitoring/evaluation meeting. Begin updating plan following fourth annual monitoring/evaluation meeting.

How	<ul style="list-style-type: none"> Annual Review Questionnaire form to be circulated annually via City Council meetings, Social Media, Senior Center to reach senior community, Reach for Home to reach unhoused, and Corazon Healdsburg to reach Spanish speakers ensuring all vulnerable populations in Healdsburg are reached. Summary of the annual LHMP Planning Team meeting to be posted on the City's website and a link will be included in the Annual Review Questionnaire. Beginning next year, the City will also include a Utility bill insert to extend the City's reach. 	<ul style="list-style-type: none"> Community Workshop will be held every two years to provide an opportunity to discuss and brainstorm with the public in person. Community Workshop flyers to be circulated via City Council meetings, Social Media, Senior Center to reach senior community, Reach for Home to reach unhoused, and Corazon Healdsburg to reach Spanish speakers ensuring all vulnerable populations in Healdsburg are reached. Summary of Community Workshop to be posted on the City's Website. 	<ul style="list-style-type: none"> LHMP Planning Process will begin every 5 years. The public will be notified and invited to join the process via City Council meetings, Social Media, Senior Center to reach senior community, Reach for Home to reach unhoused, and Corazon Healdsburg to reach Spanish speakers ensuring all vulnerable populations in Healdsburg are reached. The next planning cycle will also include a Utility bill insert to extend the City's reach to all City Utility customers.
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Section 9. References

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Section 9
References

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CITY OF HEALDSBURG

**LOCAL
HAZARD
MITIGATION
PLAN
APPENDICES**

2023



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Appendix A
Stakeholder Outreach and
Planning Process
Documents

From: [Kelsey Carreiro](#)
To: [Andrew J Sturmfels](#); [Raina Allan](#); [Allison Mattioli](#); [Matt Jenkins](#); [Luis Rodriguez](#); [Jason Boaz](#); [Lance Macdonald](#); [Larry Zimmer](#); [Curt Bates](#); [Terry Crowley](#); [Clay Thistle](#); [Mark Themig](#); [Tyler Kettmann](#); [Adam McKenna](#); [Scott Duiven](#)
Subject: Local Hazard Mitigation Plan 5-year Review
Date: Thursday, March 2, 2023 12:04:00 PM

Will you be on the LHMP Planning Team? ([View/vote in browser](#))

Good afternoon,

Our Local Hazard Mitigation Plan (LHMP) is due for its 5-year review by January 2024. To begin this process, we need to establish a planning team to conduct the plan review process. The LHMP can be found at "S:\EOC\Published Plans\LHMP Final Signed January 2019.pdf" if you are unfamiliar with the plan. Please use the poll to answer if you will be on the Planning Team or if you need to delegate this duty to someone with the knowledge and authority to review and make decisions regarding the information within this plan. If you plan to delegate, please send me the name of the person you are delegating this responsibility to.

Here is a brief summary of each section of the plan:

Plan Sections

Section 1, Introduction, describes the background and purpose of the plan.

Section 2, Community Profile, describes the city's history and general background of the community, historical trends for population and housing, and trends in land use and development.

Section 3, Planning Process, describes the 2018 LHMP planning process, as well as the meetings and outreach activities undertaken to engage the Planning Team members and the public.

Section 4, Hazard Assessment, identifies, describes, and prioritizes the hazards that threaten Healdsburg. This chapter discusses past events, risks of future events, and the effects of future conditions for each type of hazard.

Section 5, Vulnerability Assessment, describes the risks posed by each hazard type to city residents, particularly those who are more likely to be socially vulnerable, and to critical facilities.

Section 6, Capability Assessment, identifies and evaluates the legal and regulatory, human and technical, and financial resources available to accomplish mitigation.

Section 7, Mitigation Strategy, identifies mitigation goals, assesses the City's capabilities to implement mitigation actions, and identifies and prioritizes mitigation actions.

Section 8, Plan Implementation and Maintenance, discusses plan adoption and implementation, as well as the process to monitor, evaluate, and update the plan.

Section 9, References

Appendices

- **Appendix A**, Planning Process Documents
- **Appendix B**, Public Outreach

- **Appendix C**, Hazard and Vulnerability Figures
- **Appendix D**, Plan Maintenance Forms
- **Appendix E**, Adoption Resolution
- **Appendix F**, FEMA Plan Review Tool

Thank you,

KELSEY CARREIRO | Emergency Manager
City of Healdsburg | Police Department
238 Center Street, Healdsburg, CA 95448
Office: (707) 431-3372 | Cell: (707) 955-6362
[Healdsburg Emergency Management](#)

Sonoma County Operational Area Weekly Situational Briefing

Neighboring Jurisdictions Outreach

Kelsey Carreiro, Healdsburg Emergency Manager, made the following announcement during the Sonoma County Operational Area Weekly Situational Briefing held on April 17th at 10:00am:

Good morning, I have a quick announcement for the group:

The City of Healdsburg has launched an effort to update our Local Hazard Mitigation Plan.

The LHMP update process will review the hazards the City is susceptible to and identify mitigation actions that can be implemented to reduce vulnerability and damage from these risks.

The planning process is scheduled through September 2023.

There are a few opportunities for public comments on the plan throughout the process. Currently, we have a hazard survey available online and we will be holding a community workshop on June 7th from 5:00-7:00pm at the Healdsburg Community Center.

If you are interested in attending planning team meetings or being provided with updates on our plan development process, please let me know.

More information on the 2023 LHMP Update can be found at healdsburgemergency.org. I will drop the link in the comments for anyone interested in learning more or filling out the hazard survey.

Thank you!

The following 53 representatives from each of the 5 stakeholder groups within the Operational Area and neighboring jurisdictions were present during this briefing:

OA Report Outs

- Cloverdale
- Cotati
- Healdsburg
- Petaluma
- Rohnert Park
- Santa Rosa
- Sebastopol
- Sonoma
- Town of Windsor
- Tribal Government Partners



- Education Partners (SRJC, SSU, SCOE)
- Transportation Partners
- U.S. Coast Guard – Training Center Petaluma
- NGO's/ARC/2-1-1/Sea Ranch
- OA Coordinators (Law/Fire/MHOAC)
- Cal OES
- County Departments, Agencies, and Special Districts *
- County DEM

OA Report Outs

- Cloverdale
- Cotati
- Healdsburg
- Petaluma
- Rohnert Park
- Santa Rosa
- Sebastopol
- Sonoma
- Town of Windsor
- Tribal Government Partners



- **Agriculture, Weights, and Measures**
- **County Communications**
- **Fairgrounds**
- **Health Services**
- **Human Services Department**
- **Information Systems Department**
- **Public Infrastructure**
- **Regional Parks**
- **Sonoma Water**
- Cal OES
- County Departments, Agencies, and Special Districts *
- County DEM

-  Kelsey Carreiro (Me)
-  James Cooper (Host)
-  Brian Garcia - NWS
-  Nancy Brown, PhD - DEM (Co-host)
-  17077657690
-  Adam Brand
-  Becky Bartling
-  Bill Bullard
-  Brian Diemer
-  Brittany Miller
-  Carly Sullivan - CVEMSA
-  Chris Angle
-  Cory O'Donnell
-  Danielle Letourneau
-  Daryl Dunston, ACM
-  dcarter
-  Eric Glentzer
-  Eric Wittmershaus
-  Gina Stocker
-  Jeff Veliquette
-  Jerry Smith
-  JFerguson
-  Jon Davis
-  Katie Duran
-  Ken Savano - Region 3
-  Kendall Jarvis
-  Kismet Baldwin-Santana
-  Kristina Owens - Town of Windsor
-  Leland Montell Red Cross
-  Lon Peterson
-  Mark Heine-SCFD
-  Matt Jenkins
-  Michelle Maxwell
-  Mike McCallum
-  Missy Brunetta
-  Paul Gullixson, Communications Manager
-  Paul Lowenthal
-  Pete Albers
-  psmith1
-  RESIG- Christine Dektor
-  Safety Matt
-  Sarah Finnigan - Cal OES
-  Scott Westrope
-  Sheri Lang

-  Sonja Moug
-  Steve Akre's iPhone
-  Steven Torrence - Director Marin County OEM
-  Susie Gilley Sea Ranch
-  T Campbell
-  Tom Jordan - City of Petaluma
-  Wayne Wirick - City of Sonoma
-  Yesenia Gaytan-UWWC/211 Sonoma & Mendocino
-  Call-In User_1



2023 Local Hazard Mitigation Plan Update

Meeting #1 Minutes

Meeting Time & Location:

Meeting #1 was held on March 27th, 2023, from 10:30am to 11:30am in the Emergency Operations Center at 238 Center Street in Healdsburg, CA.

Attendance:

Planning Team Member	Title
Kelsey Carreiro	Emergency Manager
Allison Mattioli	Administrative Analyst II
Matt Jenkins	Police Chief
Jason Boaz	Fire Chief
Lance Macdonald	Fire Marshal
Andrew Sturmfels	Assistant City Manager
Terry Crowley	Utility Director
Ellen McDowell	Senior Planner
Tyler Kettmann	Central Services Manager
Curt Bates	Principal Engineer
Adam McKenna	IT Manager

Meeting Agenda:

- Introduction of the LHMP and the planning process
- Timeline of the 2023 LHMP Update
- LHMP documents, supporting plans, and additional resources
- Community Outreach Strategy
- Hazard Identification
- Capabilities Assessment
- Expectations and Assignments

Meeting Minutes:

The following PowerPoint slideshow was presented by Kelsey Carreiro to the LHMP Planning Team. The meeting was an open forum format to encourage participation and comments from all LHMP Planning Team members. Discussion points and comments are documented below each slide.



City of Healdsburg

2023 Local Hazard Mitigation Plan Update

Meeting #1 Minutes

2023 LOCAL HAZARD MITIGATION PLAN

Meeting #1

March 27th, 2023



Kelsey Carreiro began the meeting at 10:30am in the Emergency Operations Center at the Healdsburg Police Department.

- Introduction
- Timeline
- Resources
- Community Outreach Strategy
- Hazard Identification
- Capabilities Assessment
- Expectations & Assignments

AGENDA

A brief description of each agenda item was provided to the LHMP Planning Team.



2023 Local Hazard Mitigation Plan Update

Meeting #1 Minutes

2023 LOCAL HAZARD MITIGATION PLAN

What is Hazard Mitigation?

- Sustained actions taken to reduce or eliminate long-term risk to life and property from hazards.

What is an LHMP?

- A plan based on a community's values and needs
- An all-hazards look at community risk and vulnerability
- A process to develop of mitigation strategies and actions

Disaster Mitigation Act of 2000 (DMA 2000)

- Represents a shift toward mitigation
- Establishes funding requirements
- LHMP must be updated every 5 years



A Hazard Mitigation Plan (HMP) forms the foundation for a community’s long-term strategy to reduce disaster losses and break the cycle of disaster damage, reconstruction, and repeated damage. The planning process is as important as the plan itself. It creates a framework for risk-based decision making to reduce damages to lives, property, and the economy from future disasters. This all began in 1974 with the passing of the Disaster Relief Act of 1974 (established the process of disaster declarations – the triggering of physical and financial assistance) In 1988 Congress amended the Act and renamed it the Stafford Disaster Relief and Emergency Assistance Act (the Stafford act was designed to encourage states and localities to develop comprehensive disaster preparedness plans, prepare for better intergovernmental coordination in the face of a disaster, encourage the use of insurance coverage, and provide federal assistance programs for losses due to a disaster).

The Federal Disaster Mitigation Act of 2000 (DMA 2000) is an amendment to the Stafford Act, it outlines a process which cities, counties, and special districts follow to develop an HMP DMA 2000 is important because it marks the shift from a focus on disaster response and recovery to a focus on mitigation.

Local jurisdictions must have a FEMA-approved HMP to receive certain types of federal funding. Local HMPs must be updated, adopted, and approved by FEMA every 5 years.



2023 Local Hazard Mitigation Plan Update

Meeting #1 Minutes

LHMP BENEFITS

Creates a 5-year mitigation roadmap

Builds partnerships

Increases education and awareness

Contributes to a resilient community

Establishes funding priorities

Gains funding eligibility

Development of a 5-year mitigation roadmap. (will cover this more in detail later, but at the end of this planning process we will basically have a to-do/wish list of mitigation actions)

Builds partnerships (brings together groups of people that might not normally work or interact with each other)

Contributes to a resilient community (mitigation reduces risk -> increased resilience)

Establishes funding priorities (this goes back to the 5-year mitigation roadmap)

Maintains funding eligibility (expires January 2024)



2023 Local Hazard Mitigation Plan Update

Meeting #1 Minutes

LHMP SECTIONS

- Introduction
- Community Profile
- Planning Process
- Hazard Assessment
- Vulnerabilities Assessment
- Capabilities Assessment
- Mitigation Strategy
- Plan Implementation & Maintenance
- References
- Appendices

Section 1, Introduction, describes the background and purpose of the plan.

Section 2, Community Profile, describes the city’s history and background of the community, historical trends for population and housing, and trends in land use and development.

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Section 9, References

Appendix A, Planning Process Documents, Appendix B, Public Outreach, Appendix C, Hazard and Vulnerability Figures, Appendix D, Plan Maintenance Forms, Appendix E, Adoption Resolution, and Appendix F, FEMA Plan Review Tool



2023 Local Hazard Mitigation Plan Update

Meeting #1 Minutes

LHMP PLANNING TEAM

Planning Team Member	Title
Kelsey Carreiro	Emergency Manager
Allison Mattioli	Public Information Officer
Matt Jenkins	Police Chief
Jason Boaz	Fire Chief
Lance Macdonald	Fire Marshall
Andrew Sturfels	Assistant City Manager
Patrick Fuss	Utilities Engineering Manager
Ellen McDowell	Senior Planner
Tyler Kettmann	Central Services Manager
Curt Bates	Principle Engineer
Terry Crowley	Utility Director
Adam McKenna	IT Manager



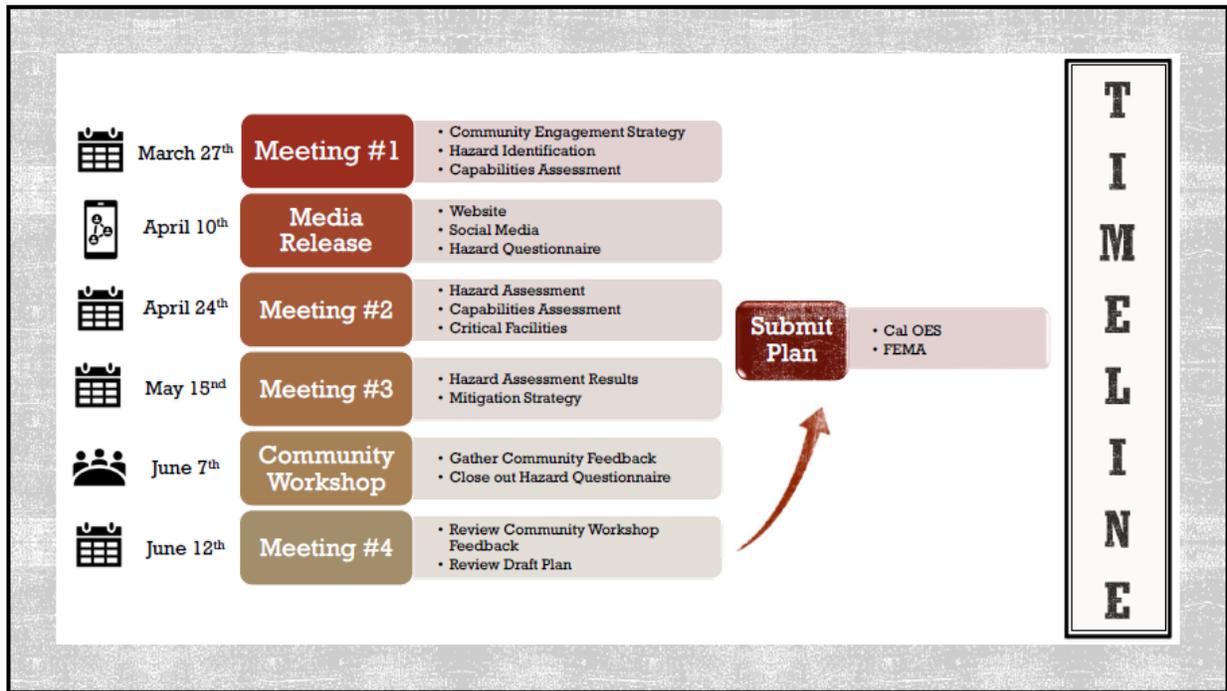
All LHMP Planning Team members confirmed there name and title were correct and agreed to be listed in the 2023 LHMP.



City of Healdsburg

2023 Local Hazard Mitigation Plan Update

Meeting #1 Minutes



The proposed timeline for the 2023 LHMP Planning Process was presented. The LHMP Planning Team requested that meeting #3 be moved to May 22nd to deconflict with a City Council Meeting. The Community Workshop is awaiting approval by Community Services to ensure they have availability at the Healdsburg Community Center to host the event.



City of Healdsburg

2023 Local Hazard Mitigation Plan Update

Meeting #1 Minutes



All LHMP Planning Process documents will be uploaded and edited in this OneDrive location to allow for real-time collaboration.



City of Healdsburg

2023 Local Hazard Mitigation Plan Update

Meeting #1 Minutes

Timeline	Outreach Item	Assignment	Status	Notes
4/5/23	<u>Social Media Campaign</u>	Allison		Banners & Posts – tag Corazon, COPE, & Chamber
4/5/23	Main Webpage	Allison		Newsflash
4/5/23	Emergency Page	Kelsey		Kelsey to Update Healdsburg Emergency
4/5/23	Press Release	Allison		PD, Tribune, Public & Council - Share With All City Staff
4/5/23	Chamber	Allison		Flyers, Newsletter
4/7/23	City Manager's Update	Allison		
4/10/23	Senior Center Newsletter	Anna		Flyers & Newsletter
4/17/23	Pre-Council Slideshow	Allison		
4/17/23	Council Update – CM Reports	Jeff		City Manager's Update about Hazard Questionnaire
4/17/23 6/5/23	Weekly Op Area Call	Kelsey		



The proposed Community Outreach Strategy was announced by the Allison Mattioli and the LHMP Planning Team agreed to the proposal. It was suggested that the PIO include both English and Spanish versions of the Hazard Questionnaire in all outreach materials. It was also suggested that the LHMP Planning Team all attend the Community Workshop to be available to answer the public's questions and concerns.



City of Healdsburg

2023 Local Hazard Mitigation Plan Update

Meeting #1 Minutes

Hazard	State of CA HMP (2023)	SoCo HMP (2021)	Healdsburg General Plan (2030)	2018 HMP Annex	Disaster Declaration* (# of events)	Include in 2023 LHMP?
Avalanche	X					No
Coastal Flooding, Erosion, Sea Level Rise	X					No (landlocked)
Dam Failure	X		X	X		Yes (sub-hazard to flood)
Drought	X			X	X (1)	Yes
Earthquake (including liquefaction)	X	X	X	X		Yes
Extreme Heat	X					(in Future Conditions)
Flood	X	X	X	X	X (16 ^a)	Yes
Freeze	X				X (2 ^b)	No
Landslide	X	X	X	X		Yes
Levee Failure	X					No (no levees)
Tsunami	X					No (city is landlocked)
Volcano	X					No (not a priority concern)
Wildfire	X	X	X	X	X (8 ^c)	Yes (including high winds)

HAZARD IDENTIFICATION

Future Condition Considerations will be discussed for each hazard.

* 1950–Present, Declarations for Sonoma County not just Healdsburg

^a Flood: 13 federally declared flood disasters, 3 additional incidents that were not federally declared

^b Freeze: 1 federally declared freeze disaster, 1 additional incident that was not federally declared

^c Wildfire: 2 federally declared wildfire disasters, 3 additional incidents that were not federally declared

It was decided unanimously that all hazards in the 2018 LHMP be included in the 2023 LHMP. The LHMP Planning Team discussed adding an Extreme Weather hazard profile to the plan. This hazard profile will be discussed more in depth at the next meeting.



2023 Local Hazard Mitigation Plan Update

Meeting #1 Minutes

CAPABILITIES ASSESSMENT

- As part of a Hazard Mitigation Plan, we will conduct a capability assessment to identify and evaluate capabilities in three categories:
 - Legal And Regulatory Resources
 - Human And Technical Resources
 - Financial Resources
- The capability assessment will be used to evaluate the feasibility of proposed mitigation actions based upon our local capabilities.
- It will also help identify gaps in capabilities and resources and will provide an opportunity to start discussing how current capabilities can be improved and expanded.
- [Capabilities Worksheet.docx](#)



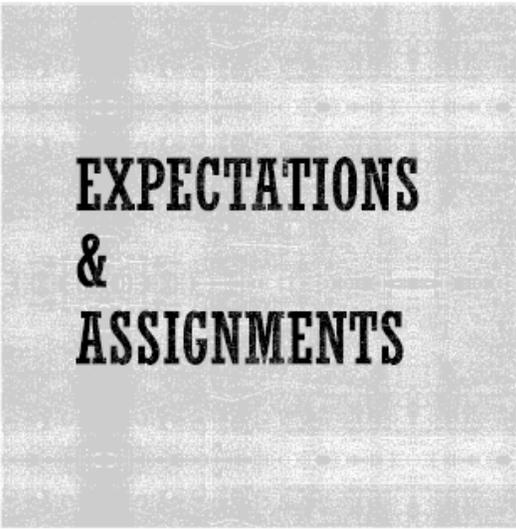
The previous capabilities worksheet was reviewed and updated. It was agreed that Kelsey Carreiro would finalize updates on the worksheet and a final capabilities review would take place at the next meeting.



2023 Local Hazard Mitigation Plan Update

Meeting #1 Minutes

Planning Team Member	Assignment	Due Date
Kelsey Carreiro	• Assign Comments to team members	3/28/2023
	• Update Capabilities Assessment	4/24/2023
Allison Mattioli	• Review LHMP on OneDrive	4/24/2023
	• Create Community Outreach Deliverables	4/15/2023
Matt Jenkins	• Review LHMP on OneDrive	4/24/2023
Jason Boaz	• Review LHMP on OneDrive	4/24/2023
	• Update Fire Maps	4/24/2023
Lance MacDonald	• Review LHMP on OneDrive	4/24/2023
Andrew Sturfels	• Review LHMP on OneDrive	4/24/2023
Mark Themig	• Review LHMP on OneDrive	4/24/2023
Ellen McDowell	• Review LHMP on OneDrive	4/24/2023
	• Begin Updates in Section 3	4/24/2023
Tyler Kettmann	• Review LHMP on OneDrive	4/24/2023
Curt Bates	• Review LHMP on OneDrive	4/24/2023
Terry Crowley	• Review LHMP on OneDrive	4/24/2023
Adam McKenna	• Review LHMP on OneDrive	4/24/2023



All LHMP Planning Team members were asked to review the 2018 LHMP and few other planning team members were given specific assignments based on their expertise. All LHMP Planning Team members were all in agreement with the expectations and assignments set forth in the presentation.



City of Healdsburg
2023 Local Hazard Mitigation Plan Update
Meeting #1 Minutes

A screenshot of a meeting wrap-up interface. On the left is a large, textured red circle with the text 'WRAP UP' in white. To the right of this circle is a vertical line of small, illegible text. Further to the right are four light gray rounded rectangular buttons stacked vertically. Each button contains an icon on the left and a text label on the right: a red question mark icon for 'Questions', two speech bubble icons for 'Comments', a red warning triangle icon for 'Concerns', and two gray gear icons for 'Input'.

No questions or input was voiced at the end of the meeting.



City of Healdsburg

2023 Local Hazard Mitigation Plan Update

Meeting #1 Minutes

Action Items:

- All LHMP Planning team members will review the 2018 LHMP prior to meeting #2 on April 24th, 2023.
- Kelsey Carreiro will add all comments and assignments into the “2023 LHMP Working Copy” by March 28th, 2023, at 4:00pm.
- Kelsey Carreiro will complete Meeting #1 Minutes and send to the LHMP Planning Team for approval by March 30th, 2023, at 4:00pm.
- Kelsey Carreiro will submit a Room Rental Request to Healdsburg Community Services by March 30th, 2023 at 4:00pm.
- Kelsey Carreiro will provide verbiage to Allison Mattioli for all community outreach materials by April 3rd, 2023, at 4:00pm.
- Allison Mattioli will create community outreach deliverables by April 5th, 2023, at 5:00pm.
- Jason Boaz will provide updated Wildfire Hazard Maps to the LHMP Planning Team prior to meeting #2 on April 24th, 2023.
- Ellen McDowell will begin updates on Section 2 of the “2023 LHMP Working Copy” prior to meeting #2 on April 24th, 2023.

Future Meetings Scheduled:

- Meeting #2 will be held on April 24th, 2023, from 1:30pm to 3:00pm at the Emergency Operations Center at 238 Center St in Healdsburg, California.
- Meeting #3 will be held on May 22nd, 2023, from 2:00pm to 3:30pm at the Emergency Operations Center at 238 Center St in Healdsburg, California.
- Meeting #4 will be held on June 12th, 2023, from 1:00pm to 3:00pm at the Emergency Operations Center at 238 Center St in Healdsburg, California.



City of Healdsburg

2023 Local Hazard Mitigation Plan Update

Meeting #2 Minutes

Meeting Time & Location:

Meeting #2 was held on April 24th, 2023, from 1:30pm to 3:00pm in the Emergency Operations Center at 238 Center Street in Healdsburg, CA.

Attendance:

Planning Team Member	Title
Kelsey Carreiro	Emergency Manager
Matt Jenkins	Police Chief
Andrew Sturfels	Assistant City Manager
Terry Crowley	Utility Director
Curt Bates	Principle Engineer
Allison Mattioli	Administrative Analyst II
Ellen McDowell	Senior Planner
Tyler Kettman	Central Services Manager
Adam McKenna	IT Manager
Lance Macdonald	Fire Marshal

Meeting Agenda:

- Review final draft of the Capability Assessment
- Review Hazard Assessment
- Identify Critical Facilities
- Discuss Appendices
- Assignments

Meeting Minutes:

The following PowerPoint slideshow was presented by Kelsey Carreiro to the LHMP Planning Team. The meeting was an open forum format to encourage participation and comments from all LHMP Planning Team members. Discussion points and comments are documented below each slide.



City of Healdsburg

2023 Local Hazard Mitigation Plan Update

Meeting #2 Minutes



2023 LOCAL HAZARD MITIGATION PLAN

Meeting #2

April 24th, 2023

Kelsey Carreiro began the meeting at 1:30pm in the Emergency Operations Center at the Healdsburg Police Department.

- Review final draft of the Capability Assessment
- Review Hazard Assessment
- Identify Critical Facilities
- Appendices
- Assignments

- [2023 LHMP Working Copy.docx](#)

AGENDA

A brief description of each agenda item was provided to the LHMP Planning Team.



City of Healdsburg

2023 Local Hazard Mitigation Plan Update

Meeting #2 Minutes

The graphic features three light gray rounded rectangular boxes on the left, each with an icon and text. The top box has a document icon and text: 'The Capabilities Assessment (Section 6 beginning on page 83 in the 2023 LHMP) has been updated with the information gathered from Meeting #1.' The middle box has a checkmark icon and text: 'Complete final review of Section 6 Capabilities Assessment'. The bottom box has a speech bubble icon and text: 'Answer assigned comments throughout the section'. To the right is a large, semi-transparent image of a document cover titled 'CAPABILITIES ASSESSMENT' with the HEM logo in the bottom right corner.

A final Capabilities Assessment review was conducted, and final updates were made to Section 6 of the 2023 Local Hazard Mitigation Plan.



2023 Local Hazard Mitigation Plan Update

Meeting #2 Minutes

HAZARD IDENTIFICATION

- Drought
- Earthquake
 - Liquefaction
- Flooding
 - Dam Failure
- Landslide
- PSPS
- Severe Weather
 - Thunderstorms, Lightning & Hail
 - Damaging Winds
 - Extreme Heat
 - Winter Weather, Extreme Cold & Freeze
- Wildfire

These hazards were discussed and the LHMP Planning Team chose to include PSPS and Severe Weather in the 2023 LHMP.



2023 Local Hazard Mitigation Plan Update

Meeting #2 Minutes

HAZARD PROFILES

Current Sections:

- Hazard Description
- Strength/Magnitude
- Past Occurrences
- Location
- Location/Probability of Future Occurrence
- Future Condition Considerations

Additional Sections to Include:

- Warning Time
- Secondary Hazards
- Exposure
- Vulnerability
 - People, Property, Critical Facilities, Environment
- Worst Case Scenario



The LHMP Planning Team discussed the current sections for each Hazard Profile. Additional Sections in both the County and State HMP were discussed and the Planning Team decided to include Warning Time, Secondary Hazards, Exposure, and Vulnerability for each Hazard Profile. The LHMP planning team decided Worst Case Scenario was not a necessary topic to include.



2023 Local Hazard Mitigation Plan Update

Meeting #2 Minutes

Table 5-1: Healdsburg Critical Facilities by Type		Table 5-1: Healdsburg Critical Facilities by Type	
Critical Facility	Type	Critical Facility	Type
Healdsburg Municipal Airport	Airport	Magnolia Drive Lift Station	Sewage Utility
Boys and Girls Club	Community	Orangewood Lift Station	Sewage Utility
Carnegie Library	Community	Orchard Lift Station	Sewage Utility
Chamber of Commerce	Community	Water Reclamation Facility	Sewage Utility
Healdsburg Community Center	Community	North Detention Basin	Stormwater
Library	Community	South Detention Basin	Stormwater
L&M Motel	Community	Cadoul Reservoir	Water Utility
Rental Property/Victory Apartments	Community	Dry Creek Well Field	Water Utility
Senior Center	Community	Fitch Mountain Well Field	Water Utility
Villa Annex	Community	Gauntlett Well Field	Water Utility
Villa Chanticleer	Community	Gauntlett Well Field Control Station	Water Utility
Badger Electrical Substation	Electrical	Gauntlett/Fitch Water Treatment Plant	Water Utility
City Hall	Government	Gauntlett/Iverson Reservoirs	Water Utility
Corporation Yard	Government	McDonough Pump Station	Water Utility
Alliance Medical Center	Health/Hospital	North Street Pressure Reducing Station	Water Utility
Healdsburg District Hospital	Health/Hospital	Panorama Pressure Reducing Station	Water Utility
Fire Station	Police/Fire	Panorama Water Facilities	Water Utility
Gauntlett Communications Tower	Police/Fire	Passalacqua Pump Station	Water Utility
Police Station	Police/Fire	Revel/Hidden Acres Pressure Reducing Station	Water Utility
Chablis Lift Station	Sewage Utility	South Fitch Mountain Control Building	Water Utility
Handricks Lift Station	Sewage Utility	Sunset Reservoir	Water Utility
Heron Drive Lift Station	Sewage Utility	Tayman Park Water Facilities	Water Utility
Kennedy Lift Station	Sewage Utility	Villa Pressure Reducing Station	Water Utility
Kinley Drive Lift Station	Sewage Utility		

CRITICAL FACILITIES



The 2018 Critical Facilities List was reviewed which included 45 identified facilities. Tyler Kettmann requested to add Passalacqua Pump Station and L&M Motel to the list of Critical Facilities as well. The LHMP Planning Team agreed to adding Passalacqua Pump Station but determined that the L&M Motel doesn't impact operations, so it was not added to the list of critical facilities. Additionally, the LHMP Planning Team determined that several of the Critical Facilities listed under the type "Community" could be removed from the list because they have no impact on operations. The LHMP Planning Team decided these facilities would be better covered as a list of Vulnerable Facilities listed in the City's Emergency Operations Plan instead. The LHMP Planning Team identified several critical infrastructure items to add to the list including data center infrastructure, network/telecom infrastructure, and Electric Distribution Infrastructure. These types of infrastructure are critical to the City's operations. Additionally, the Healdsburg Avenue Bridge was also added to the list.



City of Healdsburg

2023 Local Hazard Mitigation Plan Update

Meeting #2 Minutes

APPENDICES

- Order of Appendices
 - Appendix A Planning Process Documents
 - Appendix B Public Outreach
 - Appendix C Hazard and Vulnerability Figures
 - Appendix D Plan Maintenance Forms
 - Appendix E Adoption Resolution
 - Appendix F FEMA Documentation



Kelsey asked the LHMP Planning Teams opinion on the order of the Appendices and if everyone agreed to keep them the same for the 2023 LHMP. The Healdsburg CWPP has been added as an Annex and will be included as a separate document to the 2023 LHMP.



2023 Local Hazard Mitigation Plan Update

Meeting #2 Minutes

ASSIGNMENTS

Planning Team Member	Assignment	Due Date
Kelsey Carreiro	<ul style="list-style-type: none"> Complete Assigned Comments in 2023 LHMP Working Copy Write & Distribute new Hazard Profiles 	5/22/2023
Allison Mattioli	<ul style="list-style-type: none"> Complete Assigned Comments in 2023 LHMP Working Copy Push LHMP on Social Media, City Council, & Emergency Fair 	
Matt Jenkins	<ul style="list-style-type: none"> Complete Assigned Comments in 2023 LHMP Working Copy 	
Jason Boaz	<ul style="list-style-type: none"> Complete Assigned Comments in 2023 LHMP Working Copy Add Updated Fire Maps into 2023 LHMP Working Copy 	
Lance Macdonald	<ul style="list-style-type: none"> Complete Assigned Comments in 2023 LHMP Working Copy 	
Andrew Sturmfels	<ul style="list-style-type: none"> Complete Assigned Comments in 2023 LHMP Working Copy 	
Mark Thernig	<ul style="list-style-type: none"> Complete Assigned Comments in 2023 LHMP Working Copy 	
Ellen McDowell	<ul style="list-style-type: none"> Complete Assigned Comments in 2023 LHMP Working Copy Complete Updates in Section 3 	
Tyler Kettmann	<ul style="list-style-type: none"> Complete Assigned Comments in 2023 LHMP Working Copy 	
Curt Bates	<ul style="list-style-type: none"> Complete Assigned Comments in 2023 LHMP Working Copy 	
Terry Crowley	<ul style="list-style-type: none"> Complete Assigned Comments in 2023 LHMP Working Copy 	
Adam McKenna	<ul style="list-style-type: none"> Complete Assigned Comments in 2023 LHMP Working Copy 	



All LHMP Planning Team members were asked to complete assigned comments in the 2023 LHMP Working Copy and a few other planning team members were given specific assignments based on their expertise. All LHMP Planning Team members were all in agreement with the expectations and assignments set forth in the presentation.



City of Healdsburg

2023 Local Hazard Mitigation Plan Update

Meeting #2 Minutes



No questions or input was voiced at the end of the meeting.



City of Healdsburg

2023 Local Hazard Mitigation Plan Update

Meeting #2 Minutes

Action Items:

- All LHMP Planning team members will complete all assigned comments in the “2023 LHMP Working Copy” prior to meeting #3 on May 22nd, 2023.
- Kelsey Carreiro will complete Meeting #2 Minutes and send to the LHMP Planning Team for approval by May 30th, 2023, at 4:00pm.
- Kelsey Carreiro will write hazard profiles for PSPS and Severe Weather for LHMP Planning Team review by meeting #3 on May 22nd, 2023.
- Kelsey Carreiro will attend the upcoming Emergency Preparedness Expo in Healdsburg on May 6th, 2023, to advertise the LHMP Update including the Hazard Survey and Community Workshop.
- Allison Mattioli will continue social media outreach biweekly for the LHMP Update.
- Lance Macdonald will update the Wildfire hazard profile meeting #3 on May 22nd, 2023.
- Ellen McDowell will finish updates on Section 2 of the “2023 LHMP Working Copy” prior to meeting #3 on May 22nd, 2023.

Future Meetings Scheduled:

- Meeting #3 will be held on May 22nd, 2023, from 2:00pm to 3:30pm at the Emergency Operations Center at 238 Center St in Healdsburg, California.
- Meeting #4 will be held on June 12th, 2023, from 1:00pm to 3:00pm at the Emergency Operations Center at 238 Center St in Healdsburg, California.



2023 Local Hazard Mitigation Plan Update

Meeting #3 Minutes

Meeting Time & Location:

Meeting #3 was held on May 22nd, 2023, from 2:00pm to 3:30pm in the Emergency Operations Center at 238 Center Street in Healdsburg, CA.

Attendance:

Planning Team Member	Title
Kelsey Carreiro	Emergency Manager
Matt Jenkins	Police Chief
Terry Crowley	Utility Director
Curt Bates	Principle Engineer
Allison Mattioli	Administrative Analyst II
Ellen McDowell	Senior Planner
Tyler Kettman	Central Services Manager
Adam McKenna	IT Manager
Lance Macdonald	Fire Marshal

Meeting Agenda:

- LHMP Status Update
- Hazard Profiles
- Mitigation Goal
- 2018 Mitigation Action Plan
- Potential Mitigation Actions
- 2023 Mitigation Action Plan
- Community Workshop
- Assignments

Meeting Minutes:

The following PowerPoint slideshow was presented by Kelsey Carreiro to the LHMP Planning Team. The meeting was an open forum format to encourage participation and comments from all LHMP Planning Team members. Discussion points and comments are documented below each slide.



City of Healdsburg

2023 Local Hazard Mitigation Plan Update

Meeting #3 Minutes

2023 LOCAL HAZARD MITIGATION PLAN

Meeting #3

May 22nd, 2023



Kelsey Carreiro began the meeting at 2:00pm in the Emergency Operations Center at the Healdsburg Police Department.

- LHMP Update Status
- Hazard Profiles
- Mitigation Goal
- Mitigation Action Items
- Community Workshop
- Expectations & Assignments

AGENDA

A brief description of each agenda item was provided to the LHMP Planning Team.



2023 Local Hazard Mitigation Plan Update

Meeting #3 Minutes

LHMP UPDATE STATUS

- Introduction
- Community Profile
 - Population and Housing
 - Land Use Development and Trends
- Planning Process
 - Community Engagement Strategy
- Hazard Assessment
 - Drought
 - Earthquake
 - Flooding
 - Landslide
 - PSPS
 - Severe Weather
 - Wildfire
- Vulnerabilities Assessment
 - Methodology
 - Earthquake
 - Flooding
- PSPS
- Severe Weather
- Wildfire
- Capabilities Assessment
 - Regulatory Mitigation Capabilities
 - Human/Technical Capabilities
 - Fiscal Capabilities
- Mitigation Strategy
 - Hazard Mitigation Goals
 - Review of 2018 Mitigation Action Plan
 - 2023 Mitigation Actions
- Plan Implementation & Maintenance
- References

Kelsey Carreiro provided a update on the status of each section of the LHMP and detailed what was left to complete for each unchecked section.



2023 Local Hazard Mitigation Plan Update

Meeting #3 Minutes

HAZARD PROFILES

Drought

Earthquake

Flooding

Landslide

PSPS

Severe
Weather

Wildfire

The LHMP Planning Team reviewed the hazard profiles and discussed what was left to complete for each hazard. Assigned comments in the LHMP Hazard section were reviewed and the team made a plan to complete the hazard profiles by June 12th, 2023.



City of Healdsburg

2023 Local Hazard Mitigation Plan Update

Meeting #3 Minutes

MITIGATION GOAL

- *To maintain and enhance a disaster-resistant community by reducing the potential for loss of life, property damage, and environmental degradation from natural disasters, while accelerating economic recovery from those disasters.*



The LHMP Planning Team reviewed the 2018 Mitigation Goal and determined that it was still relevant and appropriate to use as the 2023 Mitigation Goal.



City of Healdsburg

2023 Local Hazard Mitigation Plan Update

Meeting #3 Minutes

MITIGATION ACTION PLAN

[Local Hazard Mitigation Plan \(OneDrive Folder Link\)](#)

The LHMP Planning Team reviewed the 2018 Mitigation Action Plan and updated the status of each item. The team then discussed potential mitigation actions and updated the LHMP table as needed. Finally, the LHMP Planning Team identified and created the 2023 Mitigation Action Plan.



City of Healdsburg

2023 Local Hazard Mitigation Plan Update

Meeting #3 Minutes

Team Member	Assignment	Due Date
Isabel Carrasco	Complete Assigned Comments in 2023 LHMP Working Copy Conduct Community Workshop	
Allison Mattoli	Complete Assigned Comments in 2023 LHMP Working Copy Push LHMP on Social Media, City Council, & Emergency Net	
Matt Jendow	Complete Assigned Comments in 2023 LHMP Working Copy	
Lance MacDonald	Complete Assigned Comments in 2023 LHMP Working Copy Add Updated Fire Maps into 2023 LHMP Working Copy	
Jason Rose	Complete Assigned Comments in 2023 LHMP Working Copy	6/12/2023
Andrew Szaradskis	Complete Assigned Comments in 2023 LHMP Working Copy	
Mark Theunig	Complete Assigned Comments in 2023 LHMP Working Copy	
Elian McDowell	Complete Assigned Comments in 2023 LHMP Working Copy Complete Updates in Section 3	
Tyler Kettmann	Complete Assigned Comments in 2023 LHMP Working Copy	
Clay Bese	Complete Assigned Comments in 2023 LHMP Working Copy	
Terry Crowley	Complete Assigned Comments in 2023 LHMP Working Copy	
Adam McLeana	Complete Assigned Comments in 2023 LHMP Working Copy	

All LHMP Planning Team members were asked to complete any remaining assigned comments in the LHMP, and few other planning team members were given specific assignments based on their expertise. All LHMP Planning Team members were all in agreement with the expectations and assignments set forth in the presentation.



City of Healdsburg

2023 Local Hazard Mitigation Plan Update

Meeting #3 Minutes



No questions or input was voiced at the end of the meeting.



City of Healdsburg

2023 Local Hazard Mitigation Plan Update

Meeting #3 Minutes

Action Items:

- All LHMP Planning team members will complete all assigned comments in the “2023 LHMP Working Copy” prior to meeting #4 on June 12th, 2023.
- Kelsey Carreiro will complete Meeting #3 Minutes and send to the LHMP Planning Team for approval by May 30th, 2023, at 4:00pm.
- Kelsey Carreiro, Matt Jenkins, Lance MacDonald, Curt Bates, and Ellen McDowell will conduct the Community Workshop on June 7th, 2023 from 5:00 to 7:00pm at the Healdsburg Community Center.
- Allison Mattioli will continue social media outreach biweekly for the LHMP Update.

Future Meetings Scheduled:

- Meeting #4 will be held on June 12th, 2023, from 1:00pm to 3:00pm at the Emergency Operations Center at 238 Center St in Healdsburg, California.

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Appendix B

Public Outreach

City Manager's Update sent out on April 7th, 2023 to all city staff and community subscribers:

2023 LOCAL HAZARD MITIGATION PLAN UPDATE PROCESS



On Thursday, April 6, the City of Healdsburg announced the launch of the 2023 Local Hazard Mitigation Plan (LHMP) update process.

A Local Hazard Mitigation Plan:

- Identifies risks and vulnerabilities that area-specific local natural disasters pose
- Serves as a long-term strategy for reducing identified risks and associated impacts to people and property
- Provides a framework for future requests for Federal assistance

The City of Healdsburg is vulnerable to a wide range of natural disasters, including droughts, wildfires, flooding, landslides, and earthquakes. The 2023 LHMP update process will work to reassess these and other risks outlined in the [2018 Local Hazard Mitigation Plan](#), and provide the City with the necessary tools to prioritize future actions for reducing those risks.

The LHMP planning process is a collaborative effort with multiple opportunities for public input, including a future community workshop. The first opportunity for public input is the LHMP survey in order to assess the community's hazard mitigation awareness, preparedness, and priorities.

"We encourage community members to take the survey and provide their input," said Healdsburg Emergency Manager Kelsey Carreiro. "This is an opportunity for the community to have a say in the mitigation planning process, and help us develop a plan that reflects their needs and priorities."

The survey can be completed in English, [here](#), and in Spanish, [here](#), before Monday, June 12.

The [Federal Disaster Mitigation Act of 2000](#) requires an LHMP to be updated every five years in order for an agency to continue to receive certain forms of Federal disaster assistance. Healdsburg's first version of an LHMP was developed in 2005 as part of a larger regional plan, and was updated in 2011. In 2018, the LHMP update process resulted in a stand-alone Plan, which the 2023 Plan will replace.

For additional information, or if you are interested in participating in the plan update process, please contact Kelsey Carreiro, at kcarreiro@healdsburg.gov, or (707) 431-3372.

Newsflash posted to City website on April 7th, 2023:

2023 Local Hazard Mitigation Plan



On Thursday, April 6, the City of Healdsburg announced the launch of the 2023 Local Hazard Mitigation Plan (LHMP) update process.

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"We encourage community members to take the survey and provide their input," said Healdsburg Emergency Manager Kelsey Carreiro. "This is an opportunity for the community to have a say in the mitigation planning process and help us develop a plan that reflects their needs and priorities."

The Hazard Survey can be completed in English, [here](#), and in Spanish, [here](#), before Monday, June 12.

The second opportunity for public input is the **Community Workshop on June 7th from 5:00-7:00pm at the Healdsburg Community Center in the Community Meeting Room.** This workshop will be open-house style with a formal 10-minute presentation at 5:00 and 6:00pm. Community members are encouraged to attend at any time during the two-hour workshop to discuss identified threats and how to reduce or prevent injury or damage and to reduce risk from these hazards in the City.

The workshop will provide a general overview of what hazard mitigation planning is and what the benefits are of mitigation planning, the planning process, and next steps. Hazard maps will be illustrated throughout the room as well as potential mitigation actions, for the public to view and provide feedback on, and LHMP Planning Team members from public safety, utilities and will be available for the public to speak with and to ask questions of.

The [Federal Disaster Mitigation Act of 2000](#) requires an LHMP to be updated every five years in order for an agency to continue to receive certain forms of Federal disaster assistance. Healdsburg's first version of an LHMP was developed in 2005 as part of a larger regional plan and was updated in 2011. In 2018, the LHMP update process resulted in a stand-alone Plan, which the 2023 Plan will replace.

For additional information, or if you are interested in participating in the plan update process, please contact Kelsey Carreiro, at kcarreiro@healdsburg.gov, or (707) 431-3372.

City Manager's Update sent out on September 8th, 2023 to all city staff and community subscribers:



Did you know that having a local hazard mitigation plan (LHMP) can help reduce the impact of natural disasters on our community?

The City of Healdsburg is vulnerable to:

- droughts
- wildfires
- flooding
- landslides
- earthquakes

An LHMP identifies risks and vulnerabilities that area-specific natural disasters pose, serves as a long-term strategy for reducing identified risks and associated impacts to people and property, and provides a framework for future requests for Federal assistance.

The City of Healdsburg has published the 2023 LHMP Public Review Draft as part of the five-year LHMP update process. The 2023 LHMP update process will work to reassess risks outlined in the 2018 Local Hazard Mitigation Plan and provide the City with the necessary tools to prioritize future actions for reducing those risks.

Scan the code or visit healdsburgemergency.org to read the draft Plan and provide feedback. The deadline has been extended to Friday, September 15.



healdsburgemergency.org



All Facebook posts from April 6th to August 2023:



City of Healdsburg is with City of Healdsburg Fire Department and 3 others.

Apr 6 · 🌐

Did you know that having a local hazard mitigation plan (LHMP) can help reduce the impact of disasters on our community?

A hazard mitigation plan identifies the risks that natural disasters pose - like earthquakes, floods, and wildfires - and serves as a long-term strategy for reducing those risks and their impacts.

Help us build an LHMP together by providing your input on your experiences and priorities!

To take the survey, visit: surveymonkey.com/r/LHMPEnglish.

¿Sabía que contar con un plan local de mitigación de riesgos (PLMP) puede ayudar a reducir el impacto de las catástrofes en nuestra comunidad?

Un plan de mitigación de peligros identifica los riesgos que plantean las catástrofes naturales -como terremotos, inundaciones e incendios forestales- y sirve como estrategia a largo plazo para reducir esos riesgos y sus repercusiones.

Ayúdenos a construir juntos un LHMP aportando sus experiencias y prioridades.

Para participar en la encuesta, visite surveymonkey.com/r/LHMPEspañol.

[#Healdsburg](#) [#CityOfHealdsburg](#) [#HealdsburgLHMP](#)



3

3 comments 2 shares



City of Healdsburg



Apr 24 · 🌐

Did you know that having a local hazard mitigation plan (LHMP) can help reduce the impact of natural disasters on our community?

The City of Healdsburg is vulnerable to:

- ☀️ Droughts
- 🔥 Wildfires
- 💧 Flooding
- ⚠️ Landslides
- 🌍 Earthquakes

Take the LHMP survey and help us:

- 📄 Identify risks and vulnerabilities that local natural disasters pose
- 📖 Create a long-term strategy for reducing those risks and their impact on our community
- 💰 Provide a framework for future requests for Federal assistance

Visit healdsburgemergency.org to take the survey!

¿Sabía usted que tener un plan local de mitigación de riesgos (LHMP) puede ayudar a reducir el impacto de los desastres naturales en nuestra comunidad?

La ciudad de Healdsburg es vulnerable a:

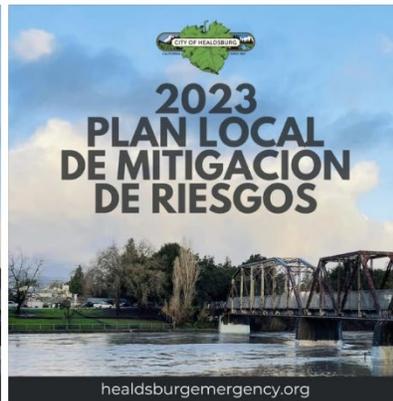
- ☀️ Sequías
- 🔥 Incendios forestales
- 💧 Inundaciones
- ⚠️ Desprendimientos de tierra
- 🌍 Terremotos

Realiza la encuesta LHMP y ayúdanos:

- 📄 Identificar los riesgos y vulnerabilidades que suponen las catástrofes naturales locales
- 📖 Crear una estrategia a largo plazo para reducir esos riesgos y su impacto en nuestra comunidad
- 💰 Proporcionar un marco para futuras solicitudes de ayuda federal

¡Visite healdsburgemergency.org para tomar la encuesta!

[#Healdsburg](#) [#CityOfHealdsburg](#)



 You and 2 others

1 share



City of Healdsburg

May 25 · 🌐



Join us for a community workshop to discuss the City's 2023 Local Hazard Mitigation Plan!

Take the survey and learn more 🖱️
healdsburgemergency.org.

—

Participe en un taller comunitario para debatir el Plan Local de Mitigación de Riesgos 2023 de la ciudad.

Tome la encuesta y aprenda más 🖱️
healdsburgemergency.org.

[#Healdsburg](#) [#CityOfHealdsburg](#)



👍 4

205 views



City of Healdsburg



May 25 · 🌐

Participe en un taller comunitario para debatir el Plan Local de Mitigación de Riesgos 2023 de la ciudad.

Tome la encuesta y aprenda más 🖱️
healdsburgemergency.org.

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Take the survey and learn more 🖱️
healdsburgemergency.org.

#Healdsburg #CityOfHealdsburg



👍 11

3 comments 1 share 531 views



City of Healdsburg

May 30 · 🌐



We are ONE week away from our LHMP Workshop!

Join us for an open house to discuss the risks that natural disasters pose to our community, and provide your feedback on our local hazard plan to help reduce those risks.

¡Estamos a UNA semana de nuestro Taller LHMP!

Únase a nosotros para una jornada de puertas abiertas para discutir los riesgos que los desastres naturales plantean a nuestra comunidad, y dar su opinión sobre nuestro plan de peligro local para ayudar a reducir esos riesgos.

[#Healdsburg](#) [#CityOfHealdsburg](#)



WED, 7 JUN

**2023 Local Hazard Mitigation Plan
(LHMP) Workshop**

☆ Interested



City of Healdsburg

5 d · 🌐



Have plans tonight? Join us for an open-house workshop to discuss how we can reduce the impact that local hazards have on Healdsburg - including droughts, wildfires, flooding, landslides, and earthquakes.

Can't make it? Take the survey at healdsburgemergency.org.

¿Tiene planes para esta noche? Acompáñenos en un taller de puertas abiertas para debatir cómo podemos reducir el impacto de los peligros locales en Healdsburg, como sequías, incendios forestales, inundaciones, corrimientos de tierras y terremotos.

¿No puede asistir? Responda a la encuesta en healdsburgemergency.org.

[#Healdsburg](#) [#CityOfHealdsburg](#)



WED, 7 JUN

2023 Local Hazard Mitigation Plan (LHMP) Workshop

☆ Interested



City of Healdsburg

1 d · 🌐



Today is the LAST day to take the survey!

The City of Healdsburg is currently working to update our community's Local Hazard Mitigation Plan (LHMP); a written guide that addresses how to lessen the effects of natural hazards and plan for resiliency.

Natural disasters can cause significant damage to property and infrastructure, as well as loss of life. These damages and losses can take a toll economically, psychologically, and financially on communities.

Please complete the survey at healdsburgemergency.org in order to help us build a LHMP together - in a way that respects the character and needs of the people who live and work in Healdsburg.

¡Hoy es el ÚLTIMO día para realizar la encuesta!

La Ciudad de Healdsburg está trabajando actualmente para actualizar el Plan Local de Mitigación de Peligros (LHMP) de nuestra comunidad; una guía escrita que aborda cómo disminuir los efectos de los peligros naturales y planificar la resiliencia.

Las catástrofes naturales pueden causar importantes daños a la propiedad y las infraestructuras, así como la pérdida de vidas humanas. Estos daños y pérdidas pueden afectar económica, psicológica y financieramente a las comunidades.

Por favor, complete la encuesta en healdsburgemergency.org con el fin de ayudarnos a construir un LHMP juntos - de una manera que respete el carácter y las necesidades de las personas que viven y trabajan en Healdsburg.

[#Healdsburg](#) [#CityOfHealdsburg](#)



3 comments

2:52



Aug 15 · 🌐



Did you know that having a local hazard mitigation plan (LHMP) can help reduce the impact of natural disasters on our community?

An LHMP identifies risks and vulnerabilities that area-specific natural disasters pose, serves as a long-term strategy for reducing identified risks and associated impacts to people and property, and provides a framework for future requests for Federal assistance.

The City of Healdsburg has published the 2023 LHMP Public Review Draft as part of the five-year LHMP update process. The 2023 LHMP update process will work to reassess risks outlined in the 2018 Local Hazard Mitigation Plan and provide the City with the necessary tools to prioritize future actions for reducing those risks.

Visit healdsburgemergency.org to read the draft Plan and provide feedback before Friday, September 1.

¿Sabía usted que tener un plan local de mitigación de riesgos (LHMP) puede ayudar a reducir el impacto de los desastres naturales en nuestra comunidad?

Un LHMP identifica los riesgos y vulnerabilidades que plantean los desastres naturales en zonas específicas, sirve como estrategia a largo plazo para reducir los riesgos identificados y los impactos asociados para las personas y la propiedad, y proporciona un marco para futuras solicitudes de ayuda federal.

La Ciudad de Healdsburg ha publicado el Borrador de Revisión Pública del LHMP 2023 como parte del proceso de actualización quinquenal del LHMP. El proceso de actualización del LHMP 2023 trabajará para reevaluar los riesgos descritos en el Plan Local de Mitigación de Peligros 2018 y proporcionará a la Ciudad las herramientas necesarias para priorizar las acciones futuras para reducir esos riesgos.

Visite healdsburgemergency.org para leer el borrador del Plan y enviar sus comentarios antes del viernes 1 de septiembre.

[#Healdsburg](#) [#CityOfHealdsburg](#)

See Translation



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All Instagram posts from April th to September 11th 2023:



cityofhealdsburg
Healdsburg, California



15 likes

cityofhealdsburg Did you know that having a local hazard mitigation plan (LHMP) can help reduce the impact of disasters on our community?

A hazard mitigation plan identifies the risks that natural disasters pose - like earthquakes, floods, and wildfires - and serves as a long-term strategy for reducing those risks and their impacts.

Help us build an LHMP together by providing your input on your experiences and priorities! Link in bio.

¿Sabía que contar con un plan local de mitigación de riesgos (PLMP) puede ayudar a reducir el impacto de las catástrofes en nuestra comunidad?

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Ayúdenos a construir juntos un LHMP aportando sus experiencias y prioridades. Enlace en la biografía.

[#Healdsburg](#) [#CityOfHealdsburg](#) [#HealdsburgLHMP](#)

6 April · [See Translation](#)



cityofhealdsburg



14 likes

cityofhealdsburg Did you know that having a local hazard mitigation plan (LHMP) can help reduce the impact of natural disasters on our community?

The City of Healdsburg is vulnerable to:

- Droughts
- Wildfires
- Flooding
- Landslides
- Earthquakes

Take the LHMP survey and help us:

- 📄 Identify risks and vulnerabilities that local natural disasters pose
- 📖 Create a long-term strategy for reducing those risks and their impact on our community
- 💰 Provide a framework for future requests for Federal assistance

Tap the link in our bio to take the survey!

¿Sabía usted que tener un plan local de mitigación de riesgos (LHMP) puede ayudar a reducir el impacto de los desastres naturales en nuestra comunidad?

La ciudad de Healdsburg es vulnerable a:

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- 🔥 Incendios forestales
- 💧 Inundaciones
- 🏠 Desprendimientos de tierra
- 🌍 Terremotos

Realiza la encuesta LHMP y ayúdanos:

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- 📖 Crear una estrategia a largo plazo para reducir esos riesgos y su impacto en nuestra comunidad
- 💰 Proporcionar un marco para futuras solicitudes de ayuda federal

¡Toque el enlace en nuestra biografía para tomar la encuesta!

[#Healdsburg](#) [#CityOfHealdsburg](#)

24 April · See Translation



cityofhealdsburg
Healdsburg, California



15 likes

cityofhealdsburg Today is the LAST day to take the survey!

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[#Healdsburg](#) [#CityOfHealdsburg](#)

1 day ago · [See Translation](#)

1:56

33%



Reels



KELSEY CARREIRO
emergency manager



cityofhealdsburg

Join us for a community workshop to discuss the City's 2023 Local Hazard Mitigation Plan!

Take the survey and learn more 🖱️
healdsburgemergency.org.

Participe en un taller comunitario para debatir el Plan Local de Mitigación de Riesgos 2023 de la ciudad.

Tome la encuesta y aprenda más 🖱️
healdsburgemergency.org.

#Healdsburg #CityOfHealdsburg

See Translation

🎵 yofhealdsburg · Origin 👤 2 people



29



1



...



Add comment...

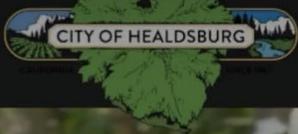
📷 Try It

1:56

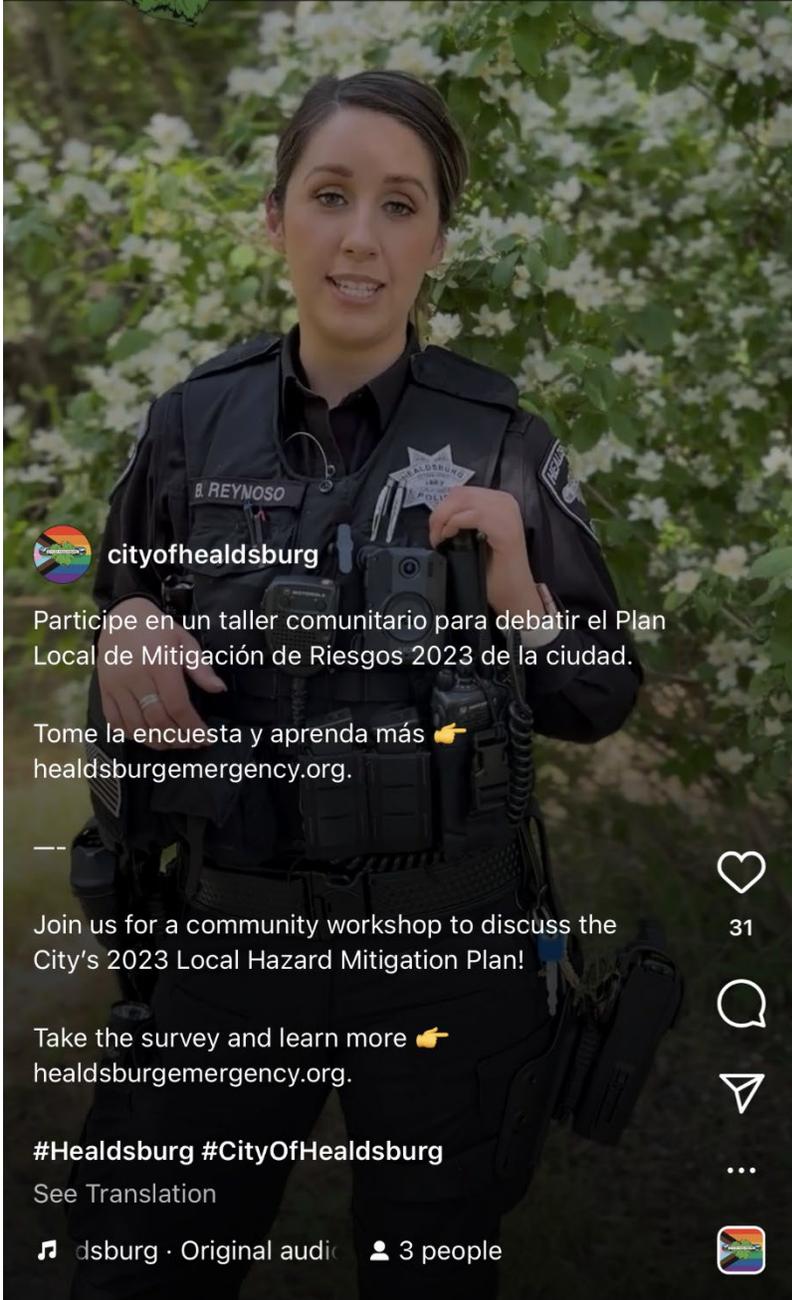
33%



Reels



BIANCA REYNOSO
police officer



cityofhealdsburg

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dsburg · Original audio 3 people



31



Add comment...

Try It



CITYOFHEALDSBURG

Posts



cityofhealdsburg
Healdsburg, California



11 likes

cityofhealdsburg Did you know that having a local hazard mitigation plan (LHMP) can help reduce the impact of natural disasters on our community?

The City of Healdsburg is vulnerable to droughts, wildfires, flooding, landslides, and earthquakes.

An LHMP identifies risks and vulnerabilities that area-specific natural disasters pose, serves as a long-term strategy for reducing identified risks and associated impacts to people and property, and provides a framework for future requests for Federal assistance.



CITYOFHEALDSBURG

Posts

The City of Healdsburg has published the 2023 LHMP Public Review Draft as part of the five-year LHMP update process. The 2023 LHMP update process will work to reassess risks outlined in the 2018 Local Hazard Mitigation Plan and provide the City with the necessary tools to prioritize future actions for reducing those risks.

Visit healdsburgemergency.org to read the draft Plan and provide feedback before Friday, September 1.

¿Sabía usted que tener un plan local de mitigación de riesgos (LHMP) puede ayudar a reducir el impacto de los desastres naturales en nuestra comunidad?

La ciudad de Healdsburg es vulnerable a sequías, incendios forestales, inundaciones, corrimientos de tierras y terremotos.

Un LHMP identifica los riesgos y vulnerabilidades que plantean los desastres naturales en zonas específicas, sirve como estrategia a largo plazo para reducir los riesgos identificados y los impactos asociados para las personas y la propiedad, y proporciona un marco para futuras solicitudes de ayuda federal.

La Ciudad de Healdsburg ha publicado el Borrador de Revisión Pública del LHMP 2023 como parte del proceso de actualización quinquenal del LHMP. El proceso de actualización del LHMP 2023 trabajará para reevaluar los riesgos descritos en el Plan Local de Mitigación de Peligros 2018 y proporcionará a la Ciudad las herramientas necesarias para priorizar las acciones futuras para reducir esos riesgos.

Visite healdsburgemergency.org para leer el borrador del Plan y enviar sus comentarios antes del viernes 1 de septiembre.

[#Healdsburg](#) [#CityOfHealdsburg](#)

15 August · [See Translation](#)

City of Healdsburg 2023 Hazard Mitigation Plan Survey

QUESTION SUMMARIES

DATA TRENDS

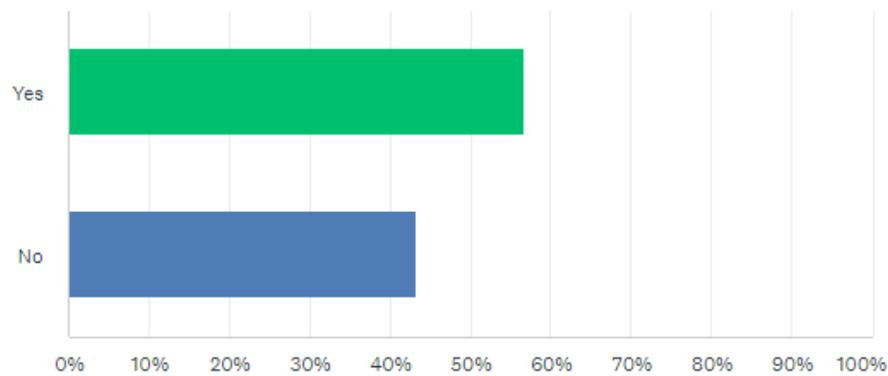
INDIVIDUAL RESPONSES

Q1



Were you aware that the City of Healdsburg has a Local Hazard Mitigation Plan?

Answered: 67 Skipped: 1



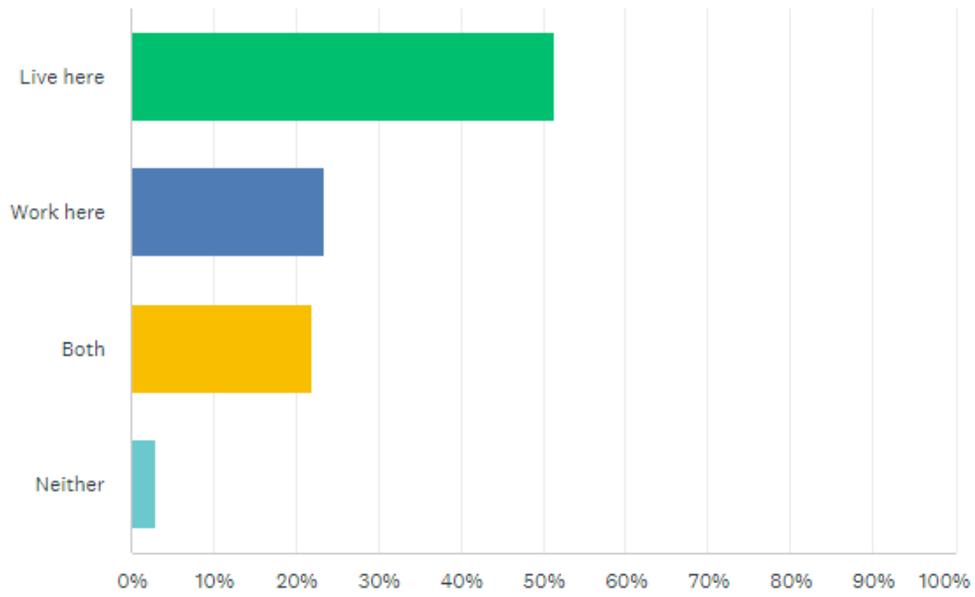
ANSWER CHOICES	RESPONSES	
Yes	56.72%	38
No	43.28%	29
TOTAL		67

Q2



Do you:

Answered: 68 Skipped: 0



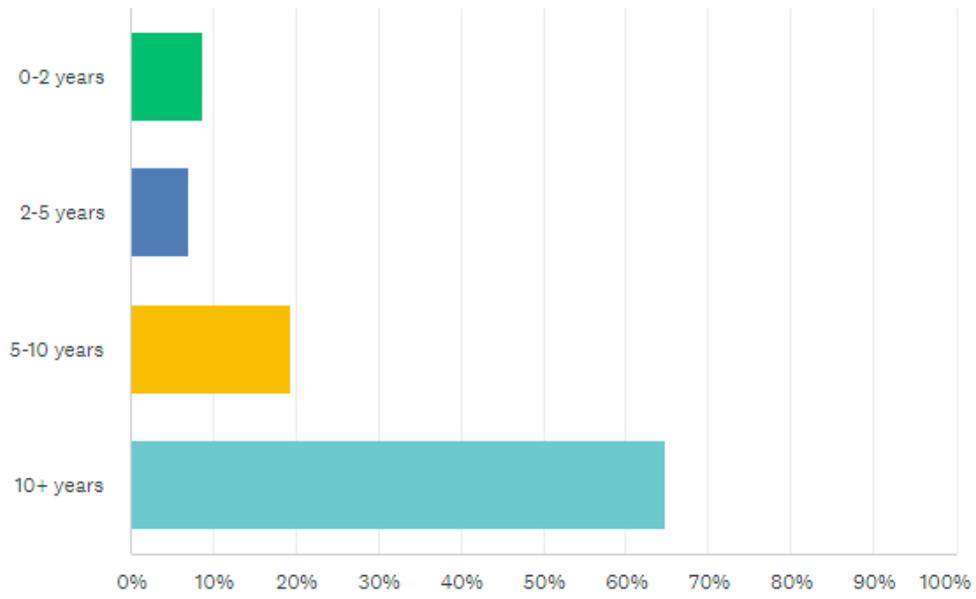
ANSWER CHOICES	RESPONSES	
Live here	51.47%	35
Work here	23.53%	16
Both	22.06%	15
Neither	2.94%	2
TOTAL		68

Q3



If yes, how many years have you lived in Healdsburg?

Answered: 57 Skipped: 11



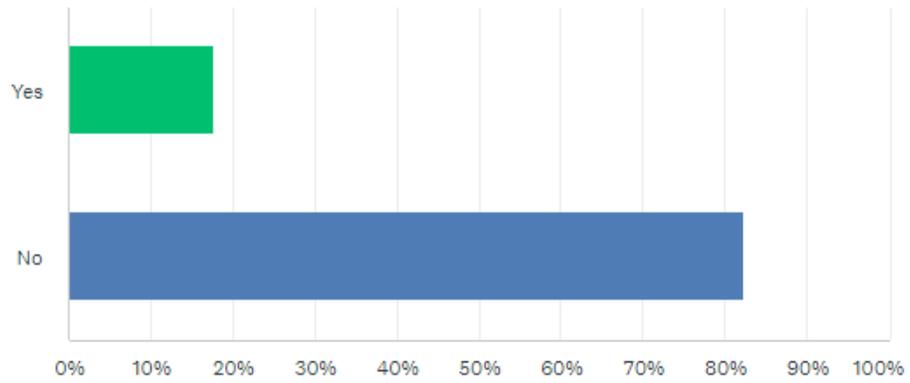
ANSWER CHOICES	RESPONSES	
0-2 years	8.77%	5
2-5 years	7.02%	4
5-10 years	19.30%	11
10+ years	64.91%	37
TOTAL		57

Q4



Do you own or operate a business in Healdsburg?

Answered: 68 Skipped: 0



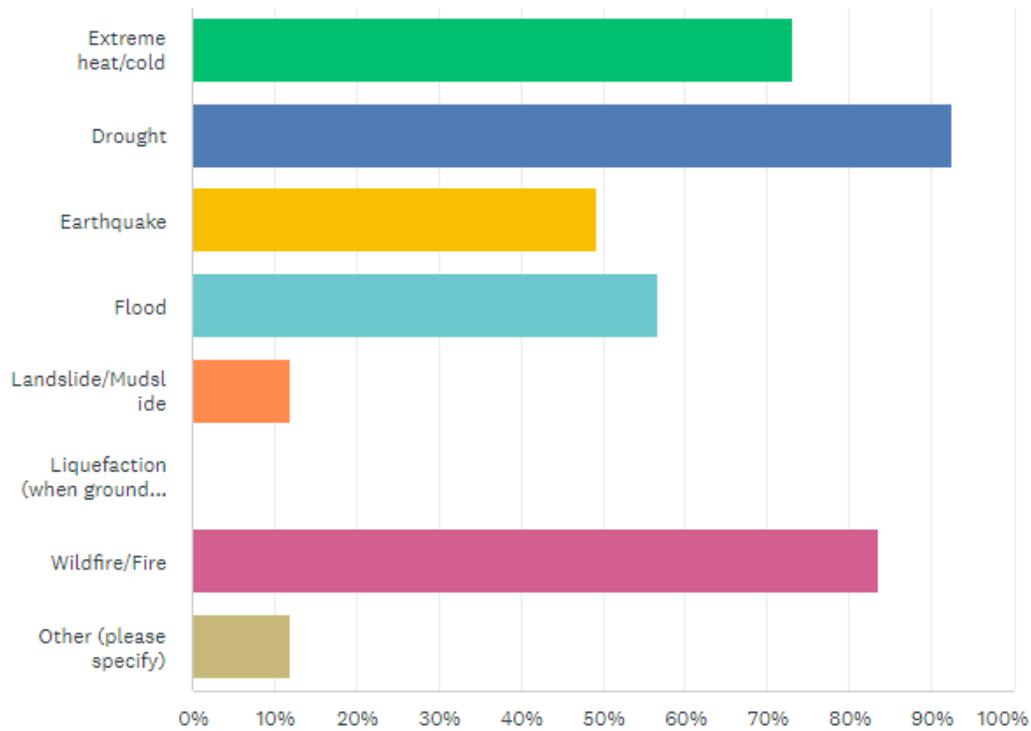
ANSWER CHOICES	RESPONSES	
Yes	17.65%	12
No	82.35%	56
TOTAL		68

Q5



What hazards have you experienced in Healdsburg? (Check all that apply.)

Answered: 67 Skipped: 1



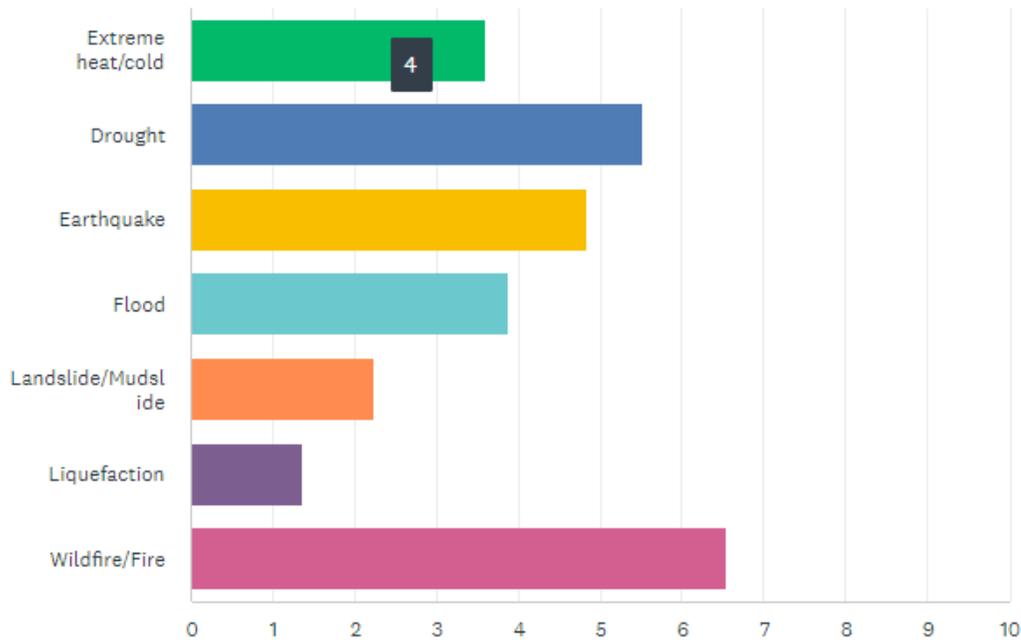
ANSWER CHOICES	RESPONSES
Extreme heat/cold	73.13% 49
Drought	92.54% 62
Earthquake	49.25% 33
Flood	56.72% 38
Landslide/Mudslide	11.94% 8
Liquefaction (when ground vibrations from earthquakes temporarily cause otherwise solid soil to behave as a liquid)	0.00% 0
Wildfire/Fire	83.58% 56
Other (please specify)	Responses 11.94% 8
Total Respondents: 67	

Q6



What hazards are you most concerned about?(Please rank them in order of concern, with 1 being your top concern.)

Answered: 67 Skipped: 1



	1	2	3	4	5	6	7
Extreme heat/cold	0.00% 0	7.46% 5	20.90% 14	29.85% 20	19.40% 13	11.94% 8	10.45% 7
Drought	17.91% 12	46.27% 31	16.42% 11	10.45% 7	7.46% 5	1.49% 1	0.00% 0
Earthquake	10.45% 7	20.90% 14	26.87% 18	26.87% 18	13.43% 9	1.49% 1	0.00% 0
Flood	0.00% 0	8.96% 6	25.37% 17	20.90% 14	34.33% 23	8.96% 6	1.49% 1
Landslide/Mudslide	0.00% 0	0.00% 0	1.49% 1	5.97% 4	20.90% 14	58.21% 39	13.43% 9
Liquefaction	0.00% 0	0.00% 0	1.49% 1	1.49% 1	4.48% 3	17.91% 12	74.63% 50
Wildfire/Fire	71.64% 48	16.42% 11	7.46% 5	4.48% 3	0.00% 0	0.00% 0	0.00% 0

Q7



If there is a hazard you're concerned about that is not listed above, please specify below.

Answered: 13 Skipped: 55

Speeders and people who run stop sign. No net up on the rec park field. No additional stop signs at fitch and Powell

6/11/2023 07:56 PM

Over population of hotels

6/11/2023 09:26 AM

Lack of pubic safety

5/25/2023 01:27 PM

Attack on Utilities - Major utility failure (Electric or Water)

5/25/2023 10:25 AM

Civil unrest

5/25/2023 10:19 AM

Poor condition of road leading in and out of my neighborhood. In the event of evacuation my road (Sunset leading down from the Villa Chanticleer) is quite hazardous. Sunset is actually sinking.

5/24/2023 01:50 PM

Affordability

4/27/2023 11:11 AM

NO

4/24/2023 08:01 AM

power outages

4/13/2023 12:33 PM

Too many rich part time residents controlling the towns future with no concern for the working class that make the town run.

4/6/2023 05:58 PM

Lack of neighborhood planning!

4/6/2023 04:09 PM

Lack of neighborhood planning!

4/6/2023 04:09 PM

No

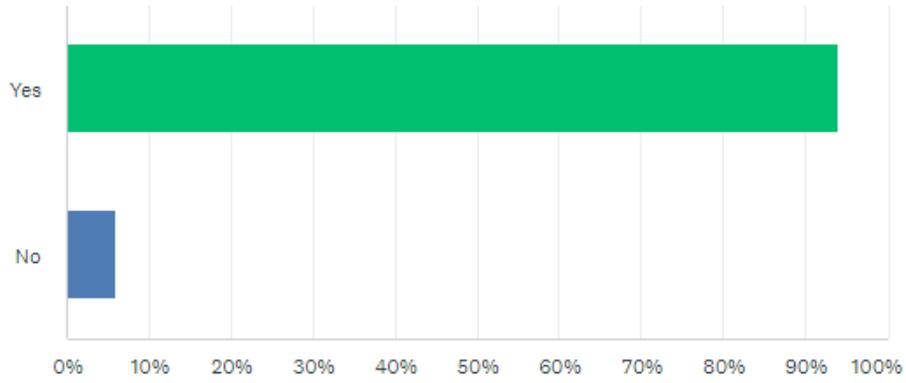
4/6/2023 04:03 PM

Q8



Have you signed up to receive emergency alerts?

Answered: 68 Skipped: 0



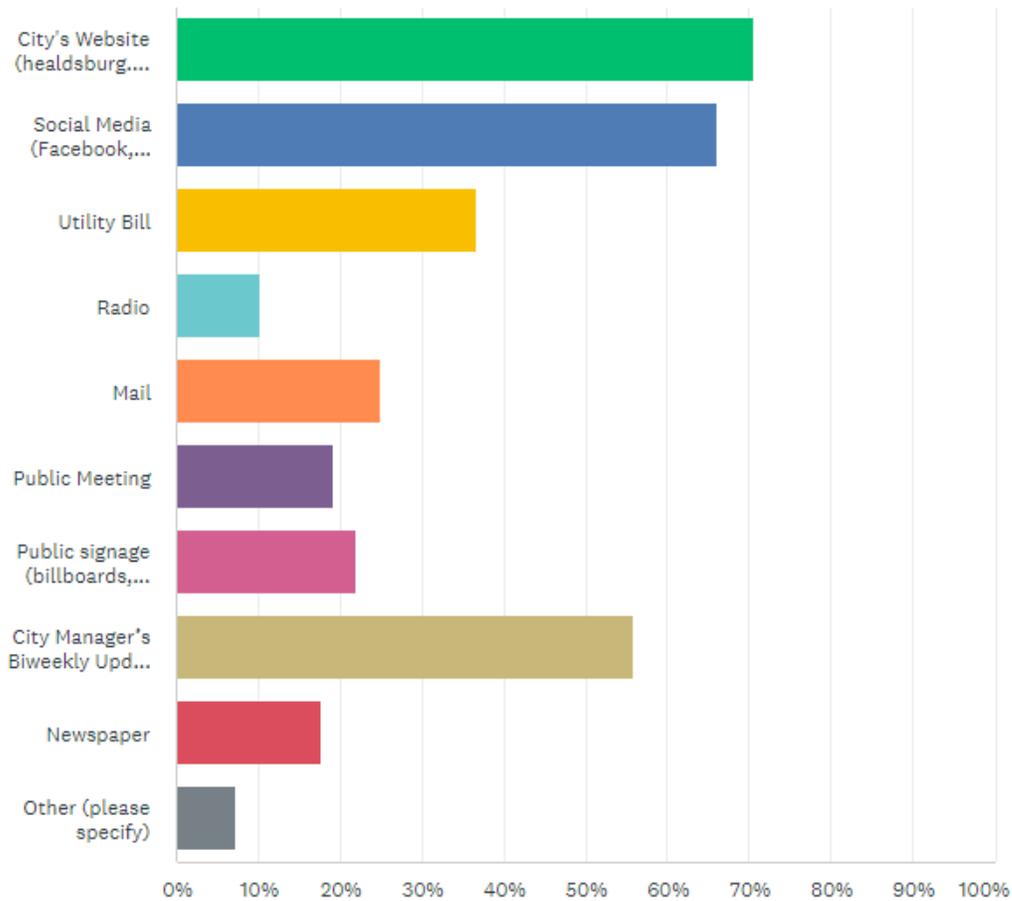
ANSWER CHOICES	RESPONSES	
Yes	94.12%	64
No	5.88%	4
TOTAL		68

Q9



How do you prefer to receive information from the City about how to make your home safer, and what the City is doing to reduce disaster risks?(Check all that apply.)

Answered: 68 Skipped: 0



ANSWER CHOICES	RESPONSES	
City's Website (healdsburg.gov)	70.59%	48
Social Media (Facebook, Instagram, Nextdoor)	66.18%	45
Utility Bill	36.76%	25
Radio	10.29%	7
Mail	25.00%	17
Public Meeting	19.12%	13
Public signage (billboards, Plaza signboard, flyers, etc.)	22.06%	15
City Manager's Biweekly Update (healdsburg.gov/cmupdate)	55.88%	38
Newspaper	17.65%	12
Other (please specify)	Responses	7.35% 5

Text Message/Nixle Alert

5/31/2023 09:42 AM

email, Healdsburg tribune

4/30/2023 12:17 PM

text and/or email

4/13/2023 01:27 PM

Email alerts ! why is this not in the list?

4/11/2023 10:58 AM

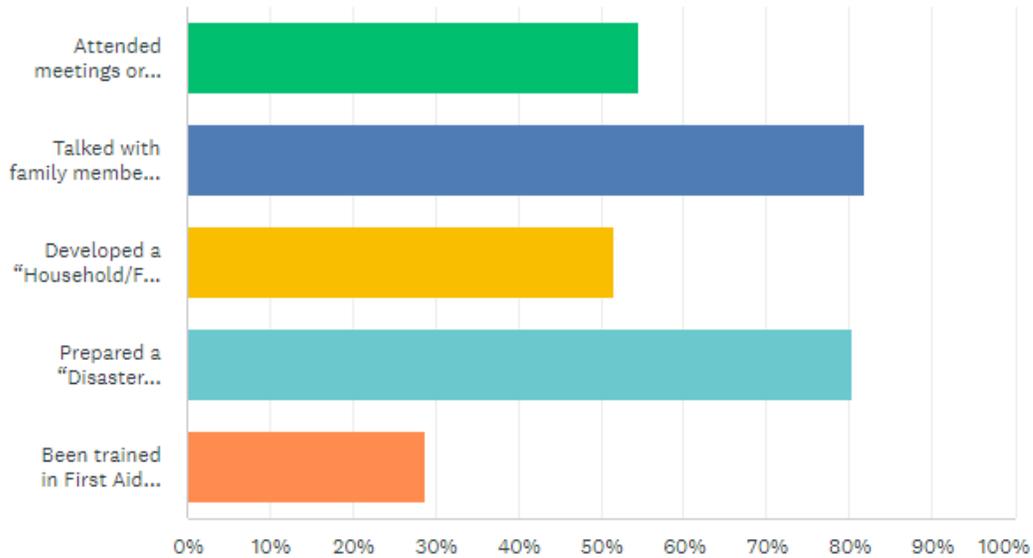
Text and email

Q10



What preparedness activities have you or someone in your household participated in? (Check all that apply.)

Answered: 66 Skipped: 2



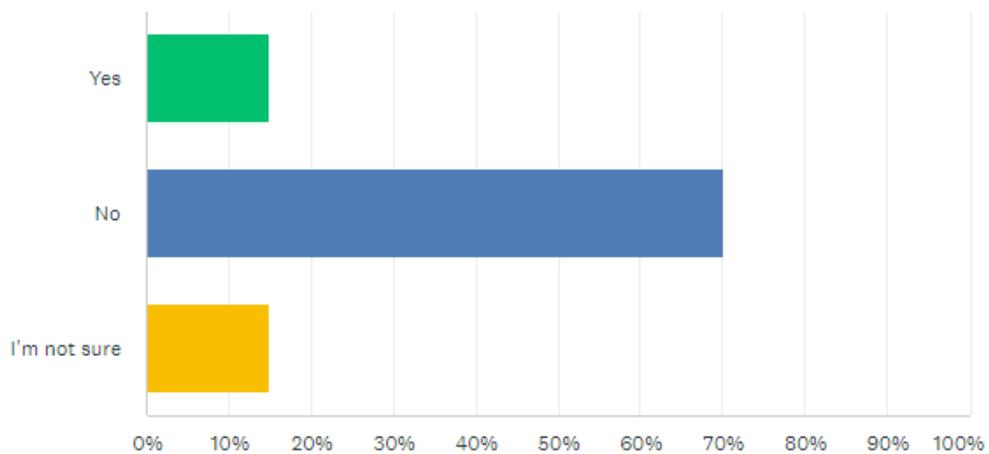
ANSWER CHOICES	RESPONSES
Attended meetings or received written information on natural disasters or emergency preparedness	54.55% 36
Talked with family members about what to do in case of a disaster or emergency	81.82% 54
Developed a "Household/Family Emergency Plan" in order to decide what everyone would do in the event of a disaster	51.52% 34
Prepared a "Disaster Supply Kit" or "Go Bag" (extra food, water, medications, batteries, first aid items and other emergency supplies)	80.30% 53
Been trained in First Aid or Cardio-Pulmonary Resuscitation (CPR) in the last year	28.79% 19
Total Respondents: 66	

Q11



Is your property located in or near a Federal Emergency Management Agency (FEMA) designated flood zone? (To find out if your property is in or near a flood zone, please visit Healdsburg's Floodplain Mapping site, [here](#), or FEMA's Flood Map Service Center, [here](#).)

Answered: 67 Skipped: 1



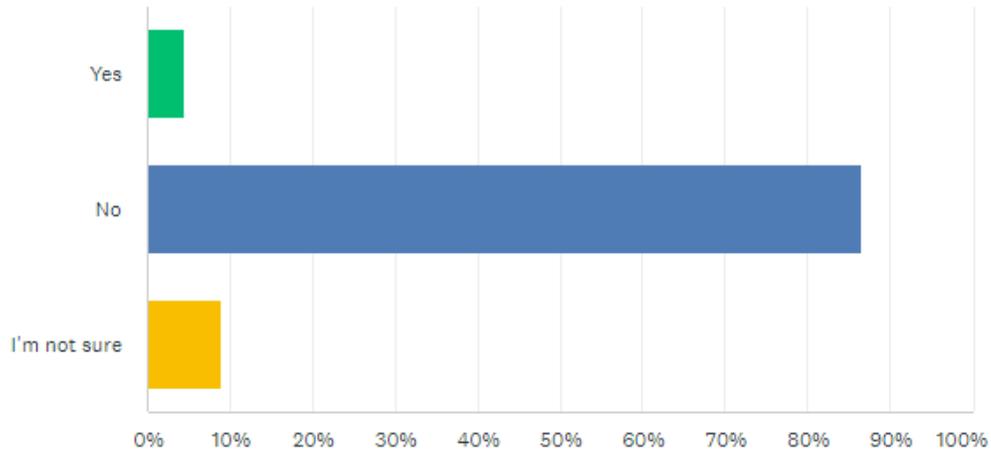
ANSWER CHOICES	RESPONSES	
Yes	14.93%	10
No	70.15%	47
I'm not sure	14.93%	10
TOTAL		67

Q12



Do you carry flood insurance?

Answered: 67 Skipped: 1



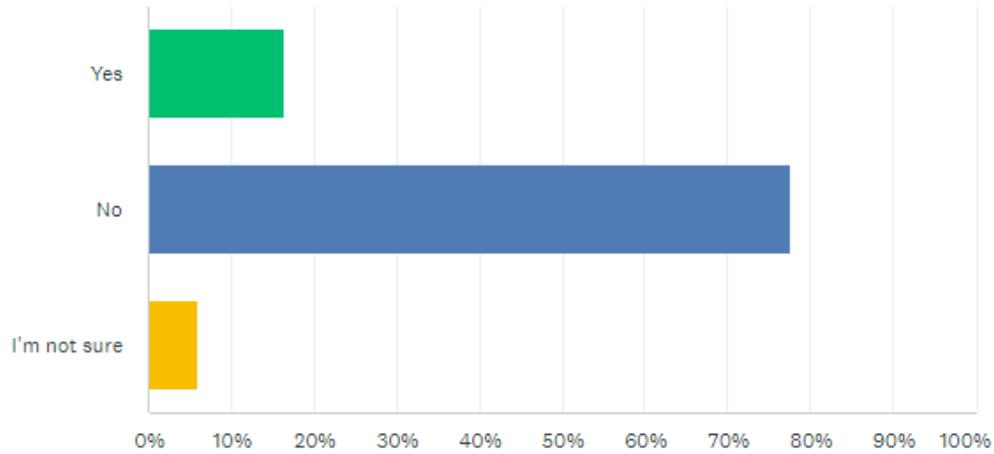
ANSWER CHOICES	RESPONSES	
Yes	4.48%	3
No	86.57%	58
I'm not sure	8.96%	6
TOTAL		67

Q13



Do you carry earthquake insurance?

Answered: 67 Skipped: 1



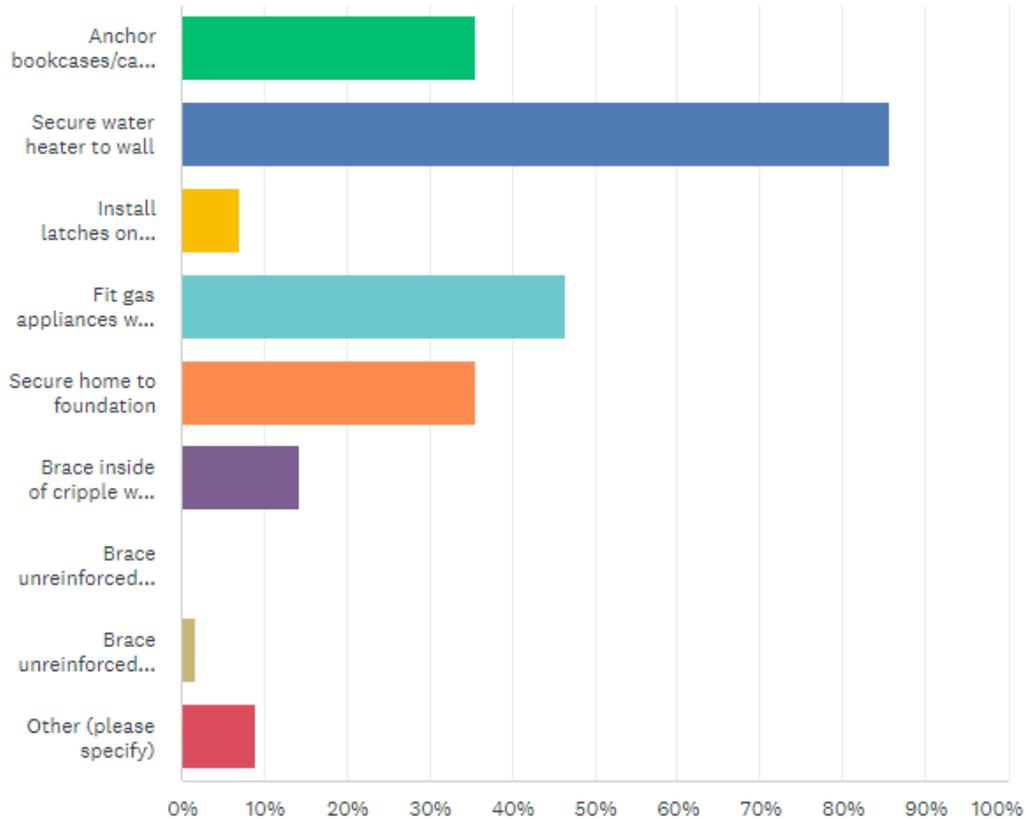
ANSWER CHOICES	RESPONSES	
Yes	16.42%	11
No	77.61%	52
I'm not sure	5.97%	4
TOTAL		67

Q14



What modifications or construction practices, if any, have you made or used to mitigate earthquake risks to your home? (Check all that apply.)

Answered: 56 Skipped: 12



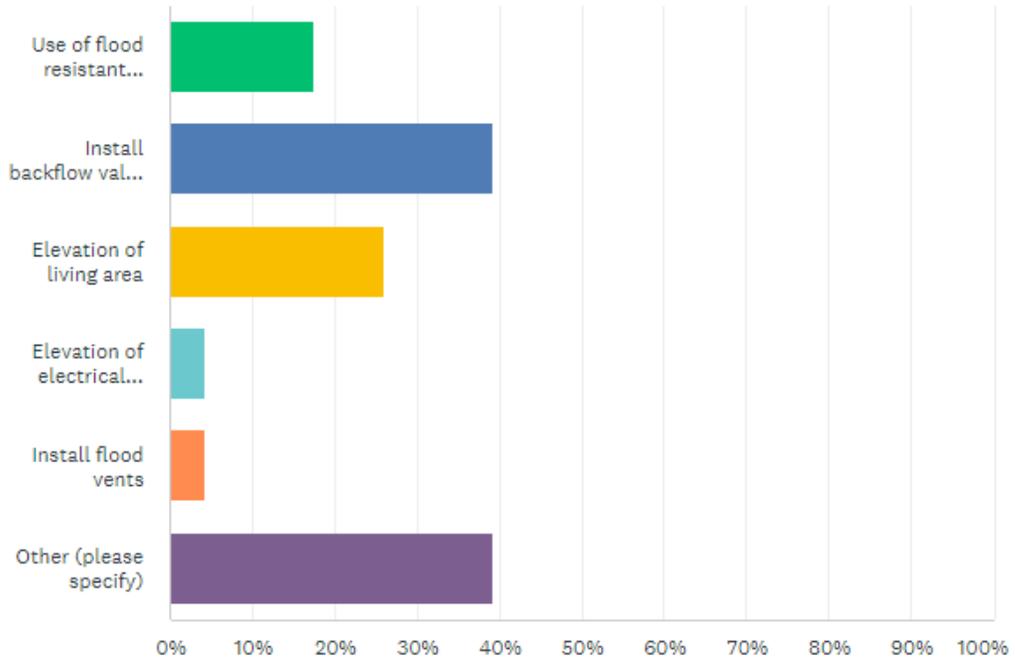
ANSWER CHOICES	RESPONSES	
Anchor bookcases/cabinets to wall	35.71%	20
Secure water heater to wall	85.71%	48
Install latches on drawers/cabinets	7.14%	4
Fit gas appliances with flexible connections	46.43%	26
Secure home to foundation	35.71%	20
Brace inside of cripple wall with sheathing	14.29%	8
Brace unreinforced chimney	0.00%	0
Brace unreinforced masonry & concrete walls and foundations	1.79%	1
Other (please specify)	Responses	8.93% 5
<p>Renter, unsure of construction practices completed</p> <p>5/25/2023 10:19 AM</p> <p>A strong foundation built on 22 footings down to the bedrock.</p> <p>5/24/2023 01:50 PM</p> <p>I rent an apartment at Citrine, and they made many modification when they built in 2018</p> <p>4/13/2023 01:04 PM</p> <p>Nothing</p> <p>4/6/2023 04:09 PM</p> <p>Nothing</p>		

Q15



What modifications or construction practices, if any, have you made or used to mitigate flood risks to your home? (Check all that apply.)

Answered: 23 Skipped: 45



ANSWER CHOICES	RESPONSES	
Use of flood resistant materials	17.39%	4
Install backflow valves and/or internal drainage systems	39.13%	9
Elevation of living area	26.09%	6
Elevation of electrical systems	4.35%	1
Install flood vents	4.35%	1
Other (please specify)	Responses	39.13% 9

Installed a sump pump to drain accumulated water

6/8/2023 05:33 PM

N/A - not in flood hazard area

5/30/2023 12:35 PM

Flood Wall

5/25/2023 10:20 AM

Renter, unsure of construction practices completed

5/25/2023 10:19 AM

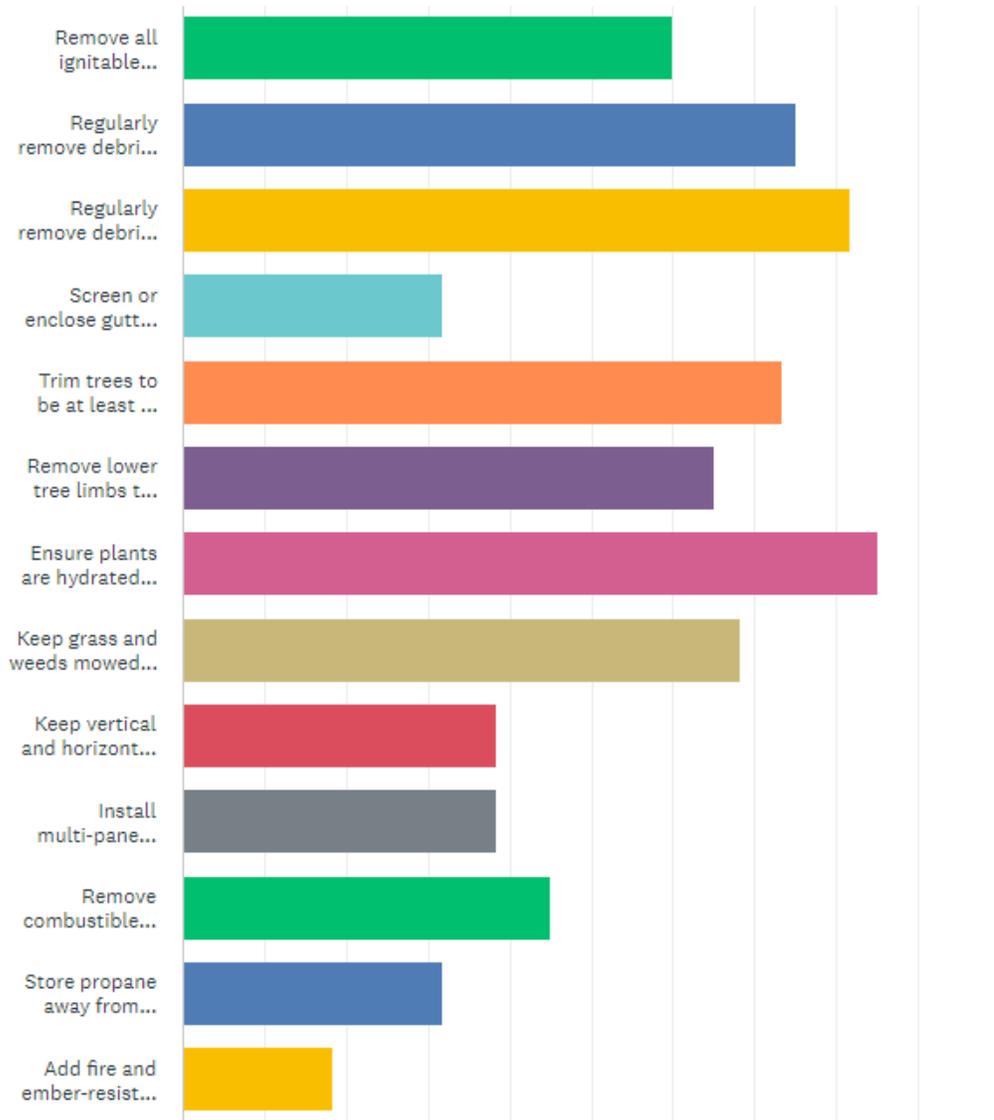
None

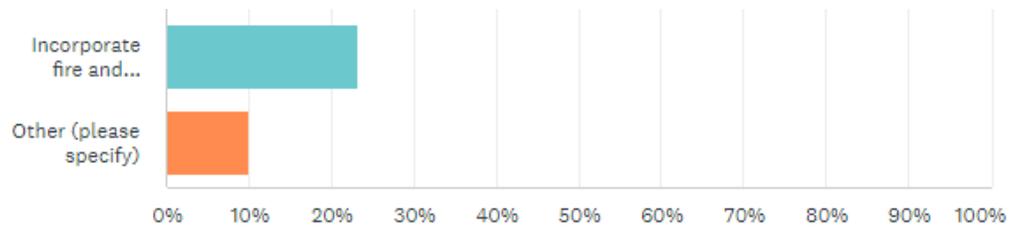
Q16



What modifications or construction practices, if any, have you made or used to mitigate wildfire risks to your home? (Check all that apply.)

Answered: 60 Skipped: 8





ANSWER CHOICES	RESPONSES
Remove all ignitable vegetation within 5 feet of structures	60.00% 36
Regularly remove debris from the roof (such as pine needles and leaves)	75.00% 45
Regularly remove debris from gutters	81.67% 49
Screen or enclose gutters to prevent accumulation of debris	31.67% 19
Trim trees to be at least 10 feet away from chimneys, cut tree branches within 6 feet of the roof	73.33% 44
Remove lower tree limbs to reduce "fire ladder" fuels	65.00% 39
Ensure plants are hydrated and healthy and regularly remove older or dying plants	85.00% 51
Keep grass and weeds mowed around home or business	68.33% 41
Keep vertical and horizontal separation between plants	38.33% 23
Install multi-pane tempered glass windows	38.33% 23
Remove combustible materials from under decks (such as fire wood)	45.00% 27
Store propane away from structures	31.67% 19
Add fire and ember-resistant attic and basement vents	18.33% 11
Incorporate fire and ember-resistant construction materials	23.33% 14
Other (please specify) Responses	10.00% 6

Installed gutter guards.

6/9/2023 10:56 AM

In-house sprinkler system and fire/smoke alarms.

5/24/2023 01:50 PM

SEE notes above

4/13/2023 01:04 PM

Use of rocks close to the structure

4/13/2023 12:53 PM

Stone facade on lower exterior of house. Concrete Tile roof. 40 inch stone masonry exterior walls on 3 sides of concrete patio in wildfire area

4/6/2023 11:01 PM

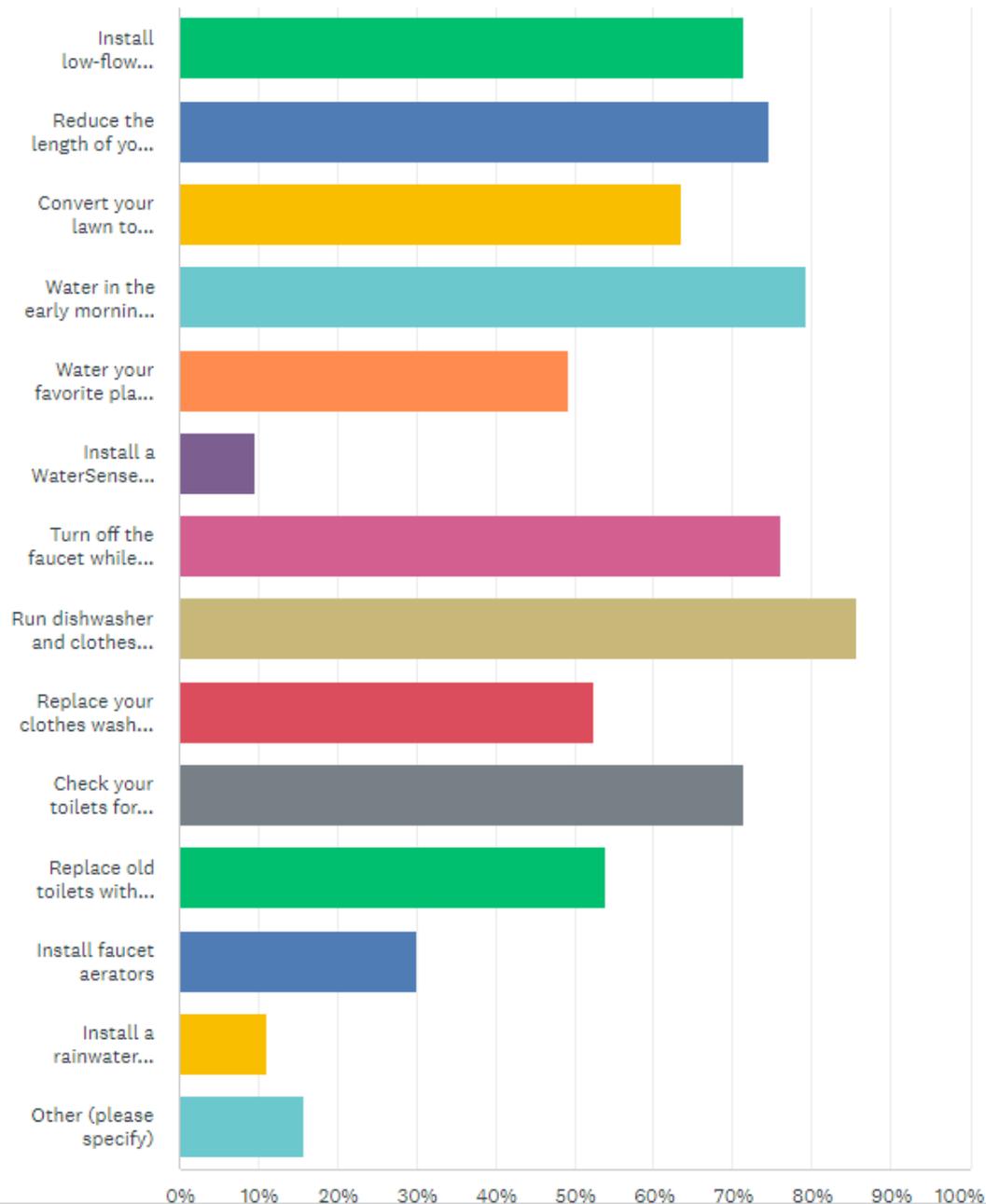
Class A roof (metal)

4/6/2023 05:02 PM



What modifications, if any, have you made or used to reduce your water usage? (Check all that apply.)

Answered: 63 Skipped: 5



ANSWER CHOICES	RESPONSES
Install low-flow showerheads	71.43% 45
Reduce the length of your shower to five minutes or less	74.60% 47
Convert your lawn to drought-resistant plants and landscaping	63.49% 40
Water in the early morning or the late evening	79.37% 50
Water your favorite plants only as needed, by hand, using a hose with an automatic shutoff nozzle instead of using sprinklers	49.21% 31
Install a WaterSense labeled sprinkler controller	9.52% 6
Turn off the faucet while brushing your teeth, shaving, or rinsing dishes	76.19% 48
Run dishwasher and clothes washer with full loads only	85.71% 54
Replace your clothes washer with a front-load washing machine	52.38% 33
Check your toilets for leaks	71.43% 45
Replace old toilets with newer more water-efficient toilets	53.97% 34
Install faucet aerators	30.16% 19
Install a rainwater capture system to collect rainwater from the roof and use later in the year	11.11% 7
Other (please specify) Responses	15.87% 10

Installed a Flume device to detect leaks and monitor water usage.

6/9/2023 10:56 AM

Use a Flume water monitor

6/8/2023 05:33 PM

Install FLUME @ water main to monitor water usage.

5/25/2023 10:16 AM

Hot water recirculator during peak use times

5/2/2023 08:10 PM

Have recycled water delivered to irrigate plants during drought

Use city provided recycled water to water plants

4/13/2023 12:53 PM

Landscaped with native/low water consuming plants

4/7/2023 12:18 PM

Reduce consumption of water-intensive foods

4/6/2023 05:02 PM

Laundry to Landscape and Rain Catchment!

4/6/2023 04:09 PM

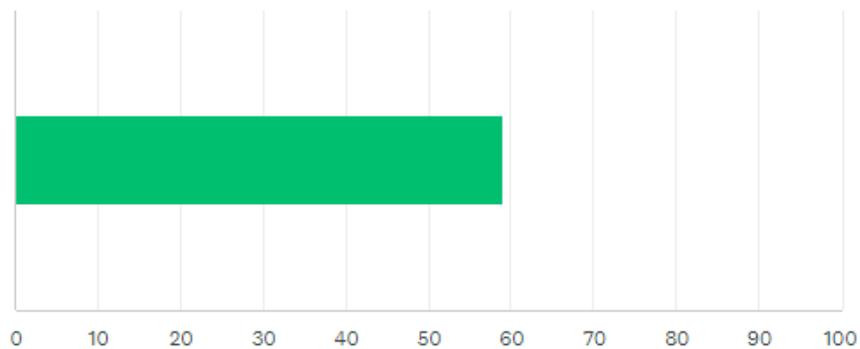
Laundry to Landscape and Rain Catchment!

Q18



Please rank how prepared you feel your household is for the probable impacts of natural hazard events.

Answered: 67 Skipped: 1



ANSWER CHOICES	AVERAGE NUMBER	TOTAL NUMBER	RESPONSES
Responses	59	3,957	67
Total Respondents: 67			

Q19



Do you have any other feedback, comments, or suggestions for City staff to consider?

Answered: 20 Skipped: 48

My biggest fear is not being covered by insurance and not being able to fix my home and my business that I own because I can't afford earthquake insurance and flood insurance. I have State Farm and they told me they would not renew my policy if I ever filed a claim that results in a loss for them because Healdsburg is in a high fire risk zone. Basically I can never use my insurance unless it's a total loss of my property. Quotes for earthquake insurance start at over double per year what I pay for my homeowners policy and business policies and that's with a \$50,000 deductible! I have put my life savings into this home and my business I'm more scared of dealing with insurance companies after a disaster than I am of the actual natural disaster. Can there be a city fund that would help homeowners and business owners subsidize the cost of getting earthquake insurance or other insurances? Or offer assistance for costly upgrades to make homes more earthquake proof? Also, lobby and fight for changes to regulate insurance companies to allow for more affordable plans and to not be able to kick people off insurance in a natural disaster? Thanks for listening!

6/11/2023 06:00 PM

0

6/11/2023 09:26 AM

Continue and expand vegetation management of the Healdsburg Ridge and Fitch Mountain. Support COPE to organize neighborhoods to prepare, mitigate hazards, and respond to emergencies. Provide financial assistance or incentives for residents to prepare for emergencies.

6/9/2023 10:56 AM

I am affiliated with COPE Northern Sonoma County -- Neighbors Helping Neighbors. It'd be great if the City of Healdsburg partnered with COPE for disaster preparedness outreach.

6/8/2023 05:33 PM

This is a wonderful survey! It not only helped gather information for the test provider, but it had a lot of useful take away information for the test taker. For instance, I had not considered some of the wildlife mitigation efforts in no. 16, and the additional resource links embedded in the questions for further assistance/information as in no.'s 11, 14 and 16, were extremely helpful!

5/31/2023 09:42 AM

Check out the roadways leading out of HE-10. Evacuations would not be safe or quick with the current state of the roads.

5/24/2023 01:50 PM

No

4/24/2023 08:01 AM

Thank you for all the city and police, fire etc. departments are doing! I am very interested in learning more, from experts and neighbors in town, about things they have done to their homes and yards for better fire safety. I attend zoom meetings from Fire Safe Sonoma, but am not sure what work is appropriate for my home/location.

4/14/2023 07:00 PM

I'm interested in learning about and helping with a neighborhood emergency system.

Please consider reinstating water restrictions - I understand that we are not considered to be in a drought after the incredible rainy season we just had, but we all need to conserve water for the future. Climate change is here and now.

4/13/2023 01:04 PM

Getting information during natural hazard events from COH has not been timely, nor has it been clear where to get the information. COH needs to be very clear ahead of time when, how, where it will be getting essential/important to the residents. It's been rather like looking for a mouse in the house.

4/13/2023 12:53 PM

Yes, neighbors have pines that are 2-3 ft apart very near their house (and ours). They should have something else planted there.

4/13/2023 12:26 PM

We live in Asti

4/13/2023 12:21 PM

Evacuation routes and zones have become more clear, but still confusing and difficult to locate. The new bike path on HBG Ave from Powell to Parkland farms will be an impediment to evacuation and is a duplicate construction given the well celebrated bike path on Foss Creek that is new already exists. Pulling onto HBG AVE is already a problem with all car lanes. Reduce those lanes and the problem is amplified.

4/9/2023 07:20 AM

Grant of money to homeowners in wildfire zones to install steel gutter guards and fine mesh screen over attic vents. Particularly those parcels abutting the new Fitch Mountain Park where public access will be increasing the risk of fires.

4/6/2023 11:01 PM

Neighborhood Readiness! Like COPE but on the streets of Healdsburg!

4/6/2023 04:09 PM

Neighborhood Readiness! Like COPE but on the streets of Healdsburg!

4/6/2023 04:09 PM

I appreciate all the hard work.

4/6/2023 04:03 PM



SIGN UP FREE



Encuesta del Plan de Mitigación de Riesgos de la Ciudad de Healdsburg 2023

QUESTION SUMMARIES

DATA TRENDS

INDIVIDUAL RESPONSES

COMPLETE

Started: Tuesday, May 02, 2023 11:23:26 AM
Last Modified: Tuesday, May 02, 2023 11:43:55 AM
Time Spent: 00:20:28
IP Address: 207.213.205.220

Page 1

Q1

¿Sabía que la ciudad de Healdsburg cuenta con un Plan Local de Mitigación de Riesgos?

No

Q2

Usted:

Ambos

Q3

¿En caso afirmativo, cuántos años lleva viviendo en Healdsburg?

10+ años

Q4

¿Tienes o operas un negocio en Healdsburg?

No

Q5

¿Qué peligros ha experimentado en Healdsburg? (Marque todos los que correspondan.)

Calor/frío extremos

Sequía

Inundación

Incendios forestales

Q6

¿Qué peligros le preocupan más?(Por favor, clasifíquelos por orden de preocupación, siendo 1 su mayor preocupación).

Calor/frío extremo 5

Sequía 4

Terremoto 1

Share Link

<https://www.surveymonkey.com/re:>

COPY

Share

Tweet

Share

1 response



SIGN UP FREE



Incendios forestales

3

Q7

Si hay algún peligro que le preocupe y que no aparece en la lista anterior, especifíquelo a continuación.

Respondent skipped this question

Q8

¿Se ha inscrito para recibir alertas de emergencia?

Sí

Q9

¿Cómo prefiere recibir información de la Ciudad sobre cómo hacer su casa más segura y qué está haciendo la Ciudad para reducir los riesgos de catástrofe?(Marque todo lo que corresponda).

Sitio web de la ciudad (healdsburg.gov)

Redes sociales (Facebook, Instagram, Nextdoor)

Radio

Periódico

Q10

¿En qué actividades de preparación ha participado usted o alguien de su familia? (Marque todas las que apliquen).

Asistió a reuniones o recibió información escrita sobre catástrofes naturales o preparación para emergencias.

Elaborar un "Plan de Emergencia Familiar" para decidir qué haría cada uno en caso de catástrofe.

Ha recibido entrenamiento en primeros auxilios o reanimación cardiopulmonar (RCP) en el último año.

Q11

¿Se encuentra su propiedad dentro o cerca de una zona inundable designada por la Agencia Federal para el Manejo de Emergencias (FEMA)? (Para averiguar si su propiedad se encuentra dentro o cerca de una zona inundable, visite el sitio de cartografía de llanuras inundables de Healdsburg, aquí, o el Centro de servicio de mapas de inundaciones de FEMA, aquí.

Sí

Q12

¿Tiene aseguranza contra inundaciones?

Sí

Q13

¿Tiene aseguranza contra terremotos?

No

Q14

¿Qué modificaciones o prácticas de construcción, en su caso, ha realizado o utilizado para mitigar los riesgos sísmicos de su vivienda? (Marque todas las que apliquen.)

Anclar librerías/armarios a la pared

Share Link

COPY

1 response

¿Qué modificaciones o prácticas de construcción, en su caso, ha realizado o utilizado para mitigar los riesgos de inundación de su vivienda? (Marque todas las que apliquen.)

Respondent skipped this question

Q16

¿Qué modificaciones o prácticas de construcción, en su caso, ha realizado o utilizado para mitigar los riesgos de incendio forestal en su vivienda? (Marque todas las que apliquen.)

Elimine toda la vegetación inflamable a menos de 1.5 metros de las estructuras

Retire regularmente los residuos de los canalones

Podar los árboles para que estén al menos a 3 metros de las chimeneas, cortar las ramas de los árboles a menos de 2 metros del tejado

Eliminar las ramas bajas de los árboles para reducir la "escalera de incendios"

Mantenga una separación vertical y horizontal entre las plantas

Q17

¿Qué modificaciones, en su caso, ha realizado o utilizado para reducir el consumo de agua? (Marque todas las que apliquen.)

Reduzca la duración de su ducha a cinco minutos o menos

Convierta su pasto en plantas y jardines resistentes a la sequía

Cierre la llave de agua mientras se cepilla los dientes, se afeita o lava los platos.

Sustituye tu lavadora por una de carga frontal

Instalar un sistema de captación de lluvia para recoger el agua del tejado y utilizarla más adelante durante el año.

Q18

Por favor, clasifique el grado de preparación que cree que tiene su hogar para hacer frente a los probables efectos de los fenómenos naturales.

55

Q19

¿Tiene alguna otra opinión, comentario o sugerencia para que el personal municipal lo tenga en cuenta?

Respondent skipped this question

Q20

Facilitar su información de contacto es totalmente opcional y no afectará a los resultados de esta encuesta. Su información se mantendrá confidencial y sólo será utilizada por el personal de la ciudad en caso de que tenga preguntas o preocupaciones adicionales, o si tenemos más información que proporcionarle sobre asuntos cubiertos por esta encuesta.

Respondent skipped this question

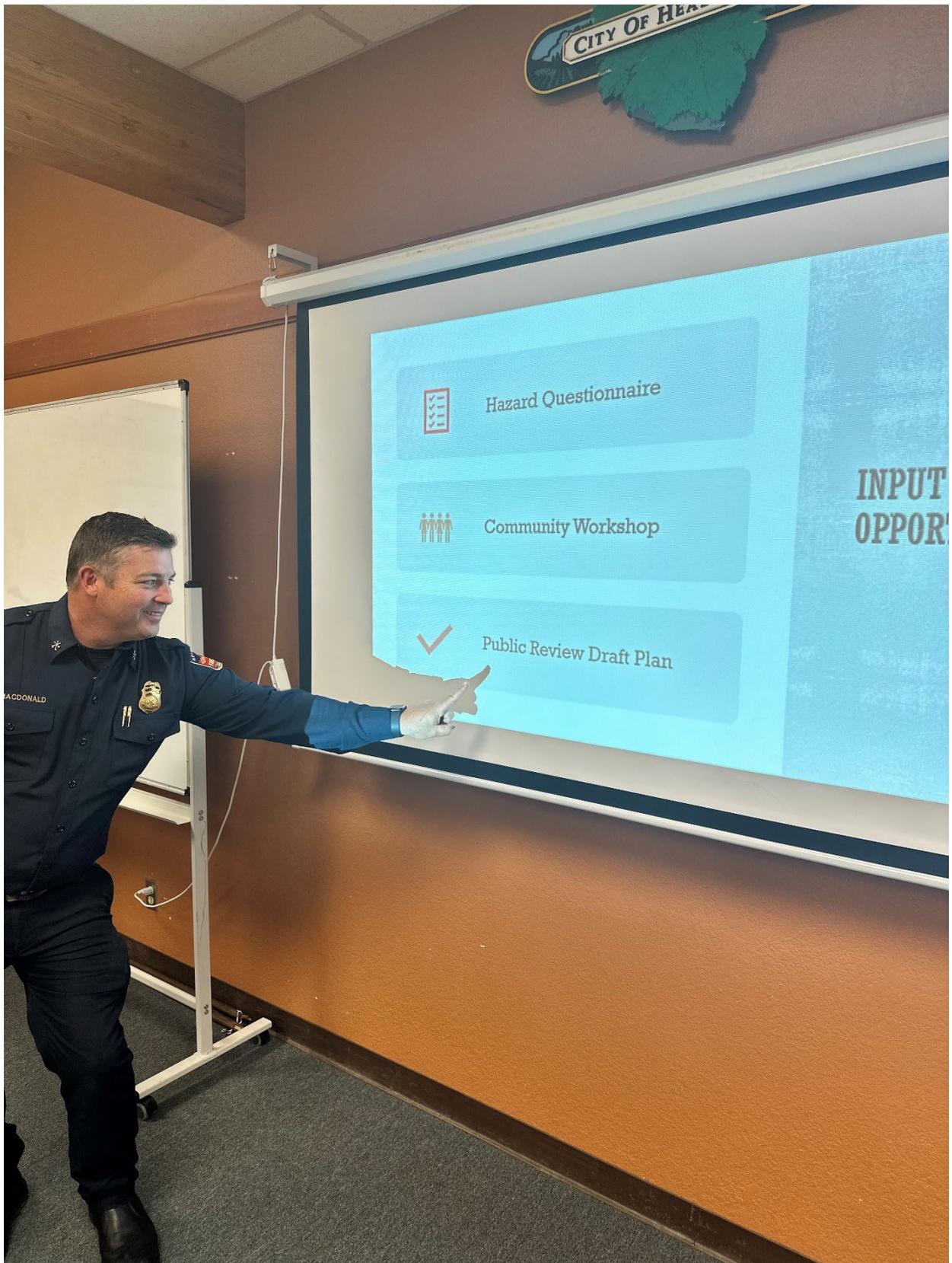
Powered by  SurveyMonkey

Check out our [sample surveys](#) and [create your own now!](#)

Community Workshop







CITY OF HEALING



Hazard Questionnaire



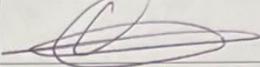
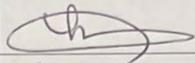
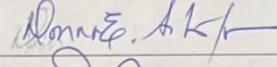
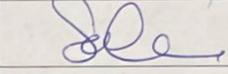
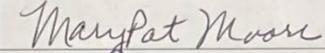
Community Workshop



Public Review Draft Plan

INPUT
OPPOR

MACDONALD

Name	Association to Healdsburg (Resident, Business Owner, City Employee, etc.)	Signature
CURT BATES	PUBLIC WORKS	
Lance Macdonald	HFD	
Ellen McDowell	CDD	
Donna Schafer	donna_schafer@sbcglobal.net Resident - COPE Napa Co. Board	
S CASINS	resident	
MARYPAT MOORE	resident AND HOA River's Bend	
Chris Herrsd	City Council	
MATT JEWINS	POLICE DEPT / RESIDENT	

2023 LOCAL HAZARD MITIGATION PLAN

Community Workshop

June 7th, 2023



2023 LOCAL HAZARD MITIGATION PLAN

What is Hazard Mitigation?

- Sustained actions taken to reduce or eliminate long-term risk to life and property from hazards.

What is an LHMP?

- A plan based on a community's values and needs
- An all-hazards look at community risk and vulnerability
- A process to develop of mitigation strategies and actions

Disaster Mitigation Act of 2000 (DMA 2000)

- Represents a shift toward mitigation
- Establishes funding requirements
- LHMP must be updated every 5 years



LHMP BENEFITS

Creates a 5-year mitigation roadmap

Builds partnerships

Increases education and awareness

Contributes to a resilient community

Establishes funding priorities

Gains funding eligibility



HEALDSBURG LHMP HISTORY

Association of Bay Area Governments (ABAG) Regional HMP

- 2005
- 2011

Healdsburg LHMP

- 2018
- 2023 (Current Draft)

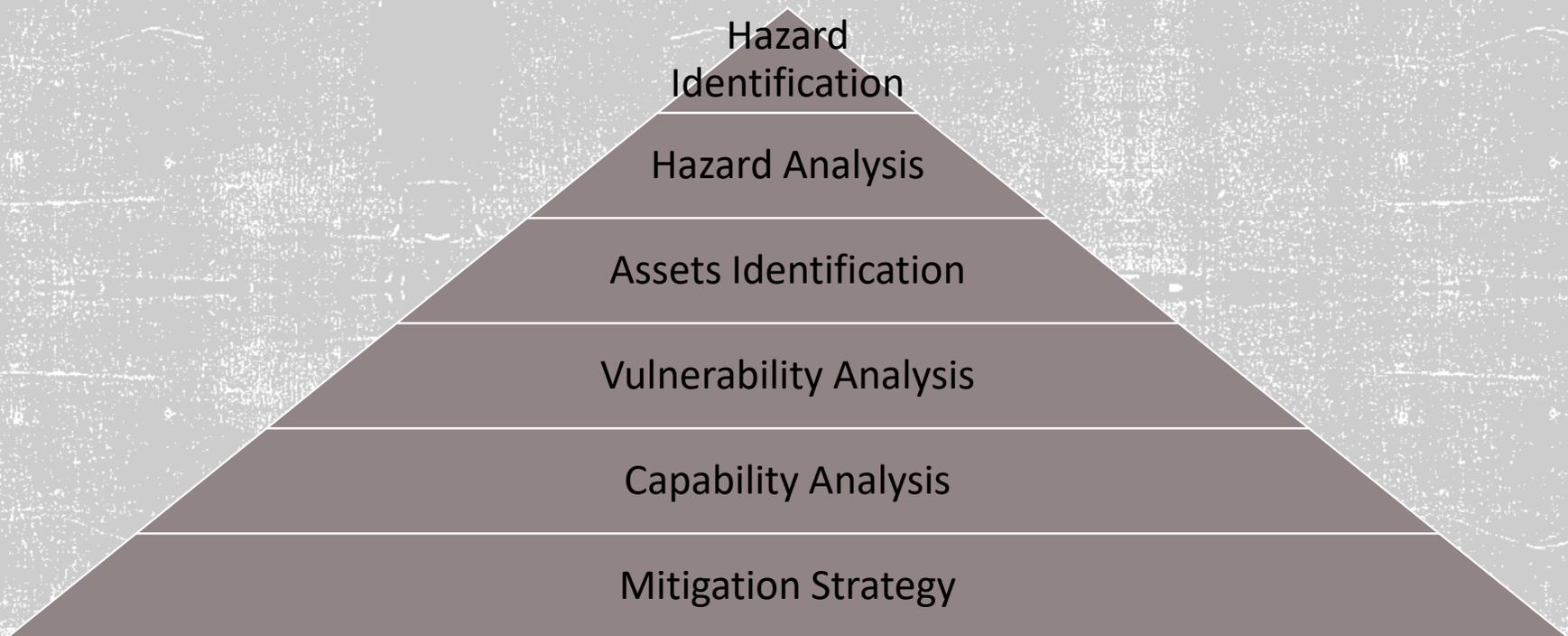


PAST MITIGATION PROJECTS

- Replacement of the Healdsburg Bridge included seismic retrofits
- Vegetation management/weed abatement programs
- Curbs under construction at new roundabout have porous concrete
- Water mains have emergency connector hoses where they cross fault lines
- City offers free energy audits to residential and commercial electric customers
- City offers free water saving items (such as toilet tank displacement bag, 1.5 gallon per minute showerhead)



PLAN DEVELOPMENT



LHMP SECTIONS

- Introduction
- Community Profile
- Planning Process
- Hazard Assessment
- Vulnerabilities Assessment
- Capabilities Assessment
- Mitigation Strategy
- Plan Implementation & Maintenance
- References
- Appendices



HAZARD PROFILES

- Drought
- Earthquake
- Landslide
- Flood
- PSPS
- Severe Weather
- Wildfire



LHMP PLANNING TEAM

Planning Team Member	Title
Kelsey Carreiro	Emergency Manager
Allison Mattioli	Public Information Officer
Matt Jenkins	Police Chief
Jason Boaz	Fire Chief
Lance Macdonald	Fire Marshall
Andrew Sturfels	Assistant City Manager
Patrick Fuss	Utilities Engineering Manager
Ellen McDowell	Senior Planner
Tyler Kettmann	Central Services Manager
Curt Bates	Principle Engineer
Terry Crowley	Utility Director
Adam McKenna	IT Manager

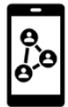




March 27th

Meeting #1

- Community Engagement Strategy
- Hazard Identification
- Capabilities Assessment



April 10th

Media Release

- Website
- Social Media
- Hazard Questionnaire



April 24th

Meeting #2

- Hazard Assessment
- Capabilities Assessment
- Critical Facilities



May 15nd

Meeting #3

- Hazard Assessment Results
- Mitigation Strategy



June 7th

Community Workshop

- Gather Community Feedback
- Close out Hazard Questionnaire



June 12th

Meeting #4

- Review Community Workshop Feedback
- Review Draft Plan

Submit Plan

- Cal OES
- FEMA



T I M E L I N E



Hazard Questionnaire



Community Workshop



Public Review Draft Plan

**INPUT
OPPORTUNITIES**





Questions



Comments



Concerns

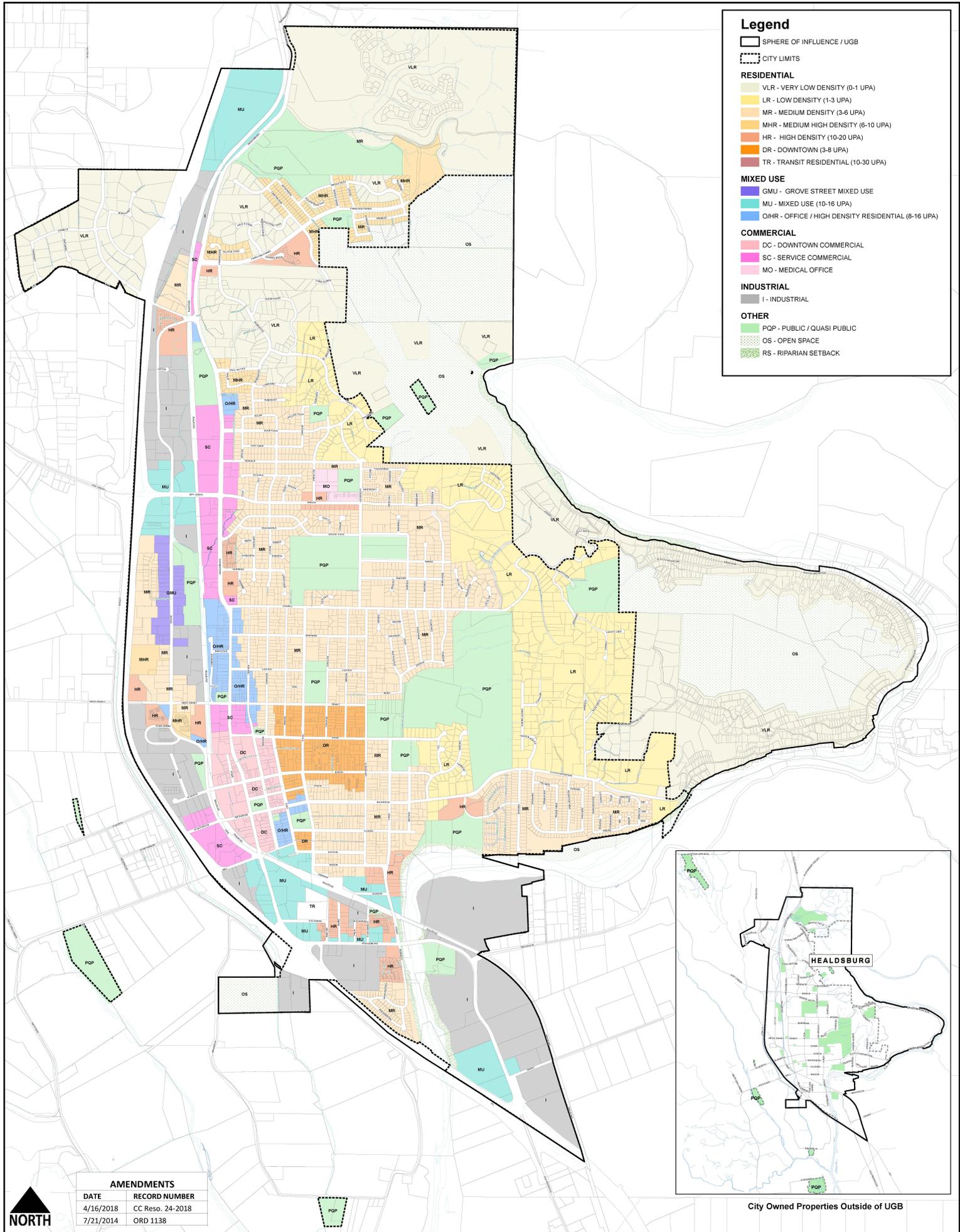


Input

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Appendix C

Hazard & Vulnerability Figures



Legend

- SPHERE OF INFLUENCE / UGB
- CITY LIMITS

RESIDENTIAL

- VLR - VERY LOW DENSITY (0-1 UPA)
- LR - LOW DENSITY (1-3 UPA)
- MR - MEDIUM DENSITY (3-6 UPA)
- MHR - MEDIUM HIGH DENSITY (6-10 UPA)
- HR - HIGH DENSITY (10-20 UPA)
- DR - DOWNTOWN (3-8 UPA)
- TR - TRANSIT RESIDENTIAL (10-30 UPA)

MIXED USE

- GMU - GROVE STREET MIXED USE
- MU - MIXED USE (10-16 UPA)
- OHR - OFFICE / HIGH DENSITY RESIDENTIAL (8-16 UPA)

COMMERCIAL

- DC - DOWNTOWN COMMERCIAL
- SC - SERVICE COMMERCIAL
- MO - MEDICAL OFFICE

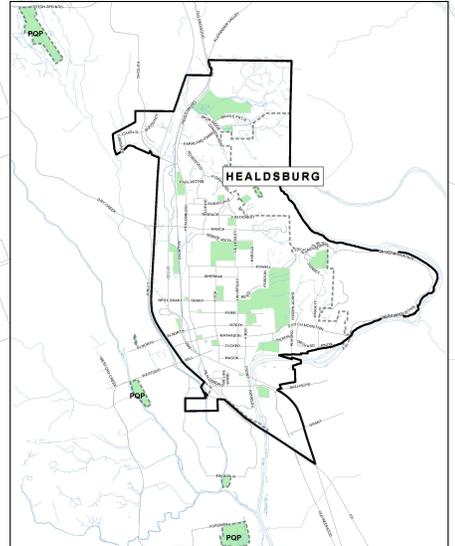
INDUSTRIAL

- I - INDUSTRIAL

OTHER

- POP - PUBLIC / QUASI PUBLIC
- OS - OPEN SPACE
- RS - RIPARIAN SETBACK

AMENDMENTS	
DATE	RECORD NUMBER
4/16/2018	CC Reso. 24-2018
7/21/2014	ORD 1138



City Owned Properties Outside of UGB

March 2018



October 2018



March 2019



October 2019



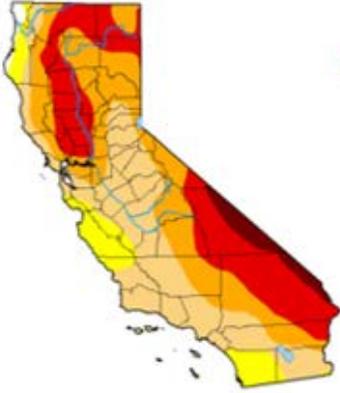
March 2020



October 2020



March 2021



October 2021



March 2022



October 2022



March 2023



Intensity:

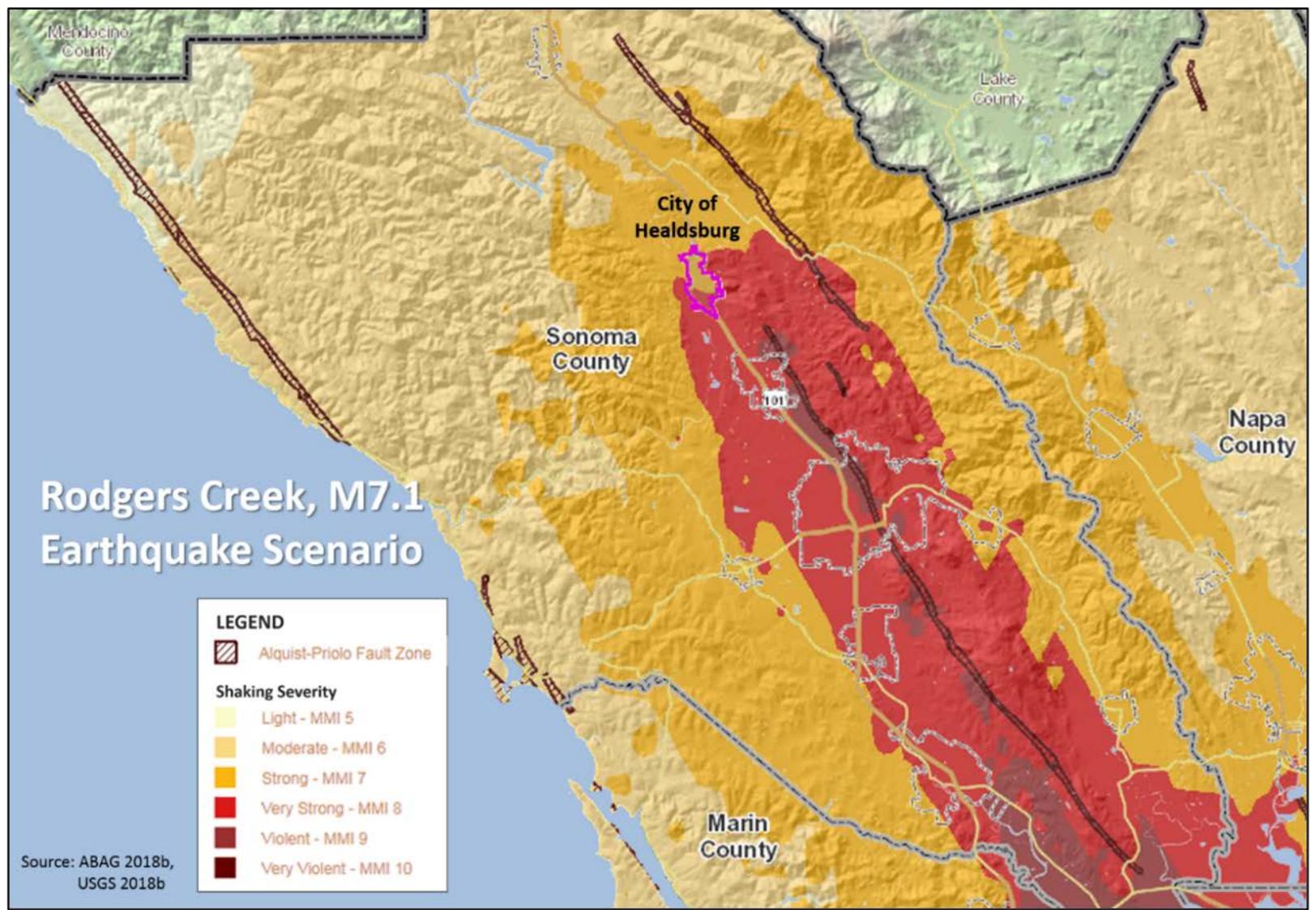
-  None
-  D0 Abnormally Dry
-  D1 Moderate Drought
-  D2 Severe Drought
-  D3 Extreme Drought
-  D4 Exceptional Drought

Rodgers Creek, M7.1 Earthquake Scenario

LEGEND

-  Alquist-Priolo Fault Zone
- Shaking Severity**
 -  Light - MMI 5
 -  Moderate - MMI 6
 -  Strong - MMI 7
 -  Very Strong - MMI 8
 -  Violent - MMI 9
 -  Very Violent - MMI 10

Source: ABAG 2018b, USGS 2018b

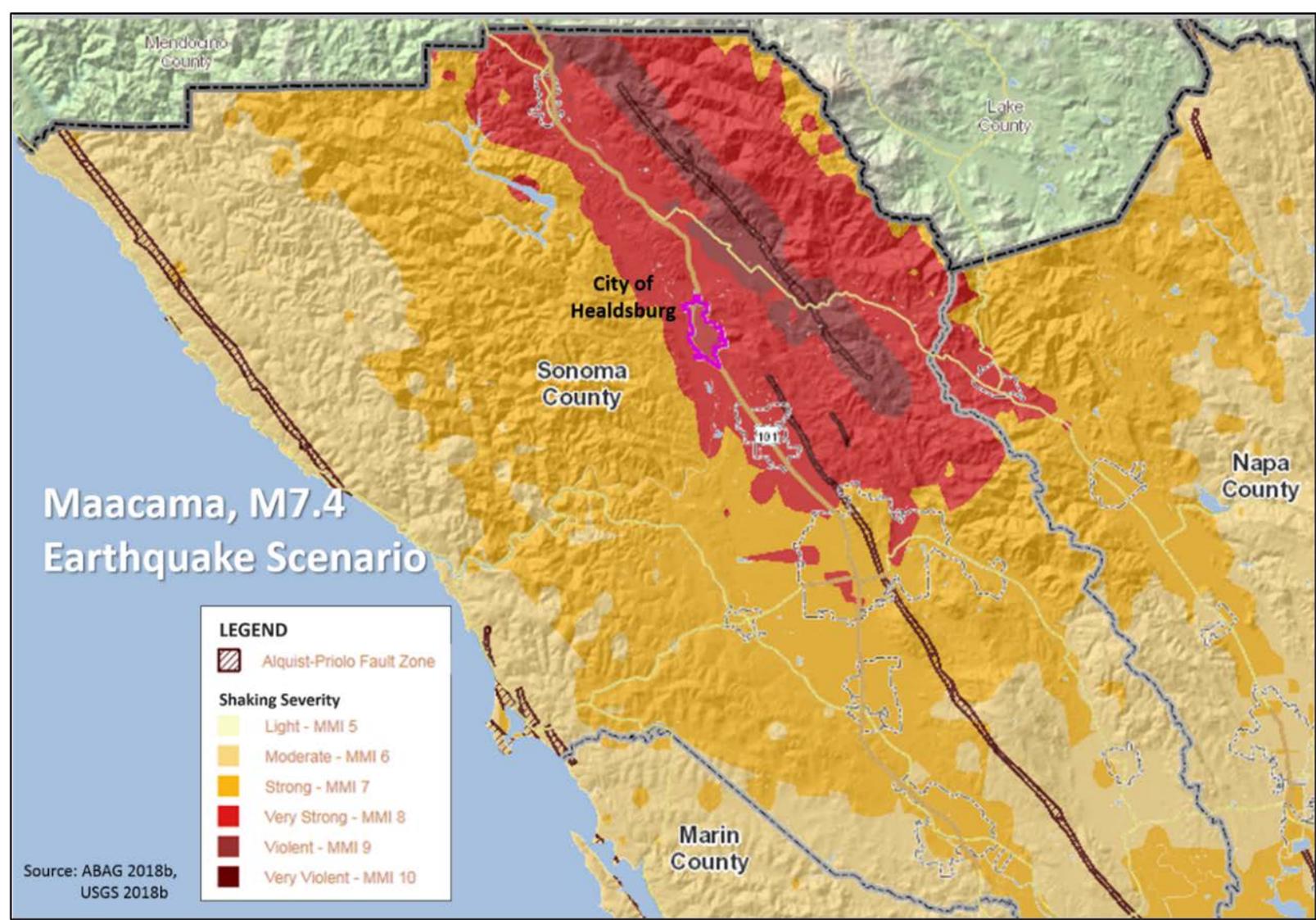


Maacama, M7.4 Earthquake Scenario

LEGEND

-  Alquist-Priolo Fault Zone
- Shaking Severity**
-  Light - MMI 5
-  Moderate - MMI 6
-  Strong - MMI 7
-  Very Strong - MMI 8
-  Violent - MMI 9
-  Very Violent - MMI 10

Source: ABAG 2018b,
USGS 2018b

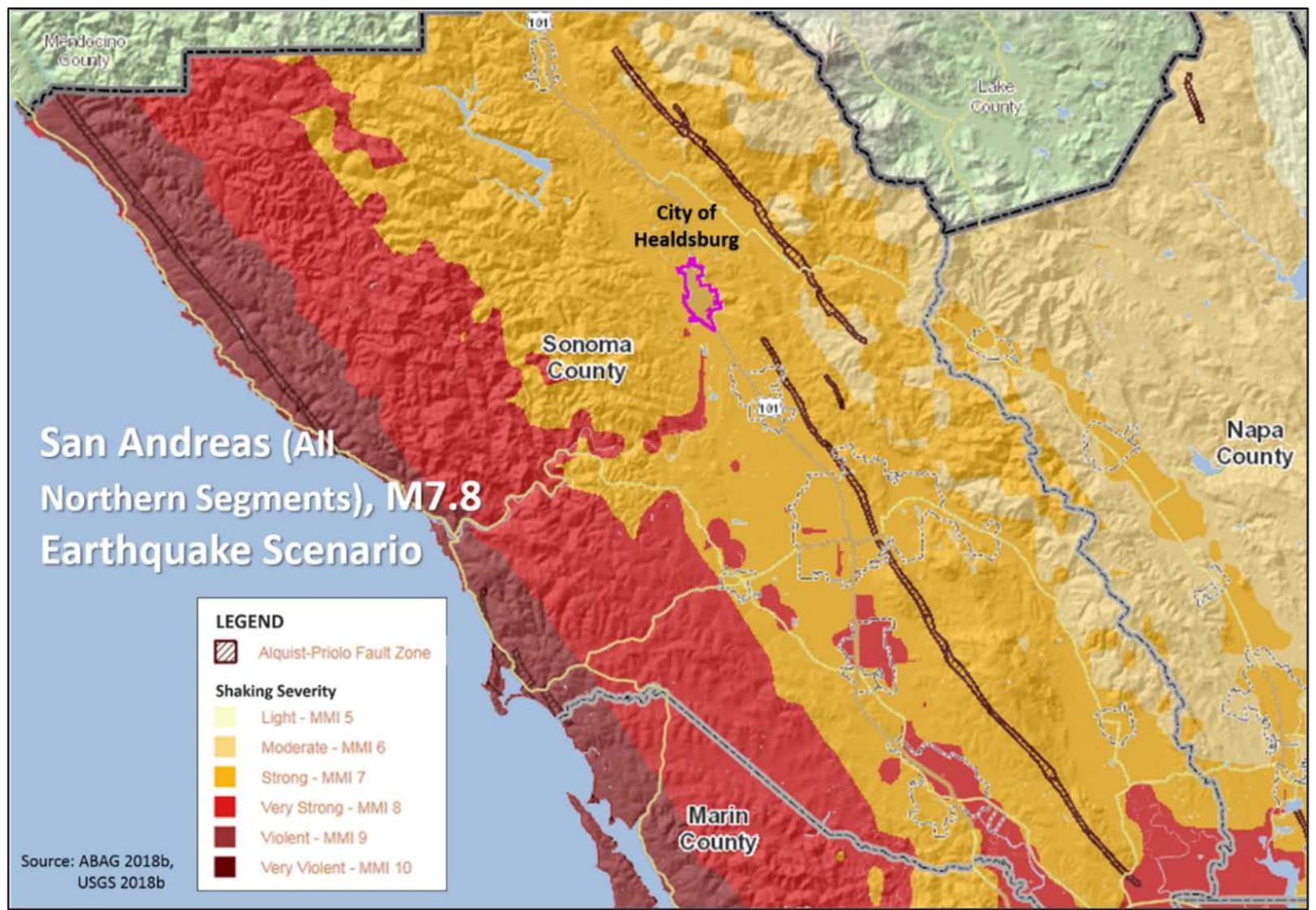


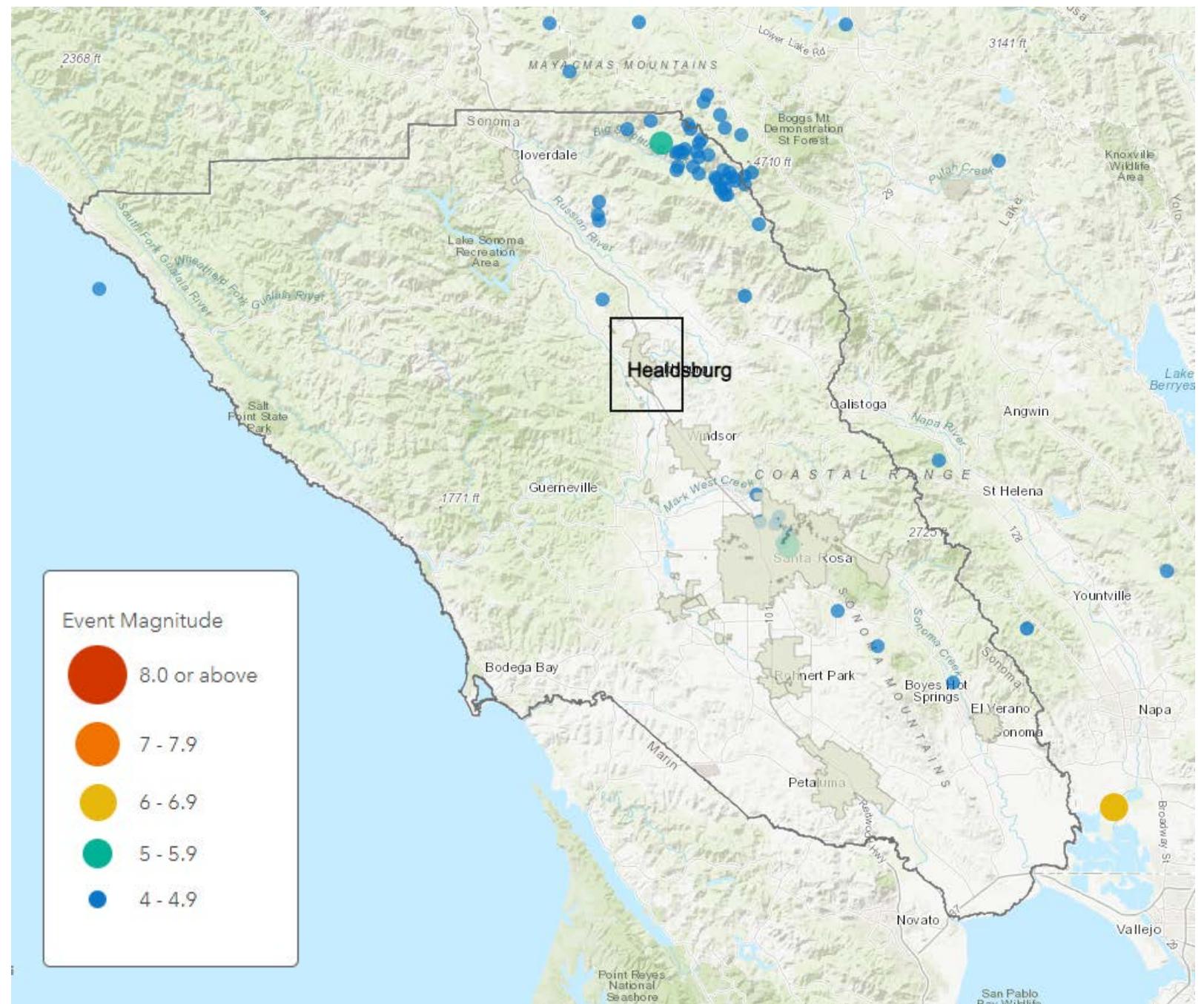
San Andreas (All Northern Segments), M7.8 Earthquake Scenario

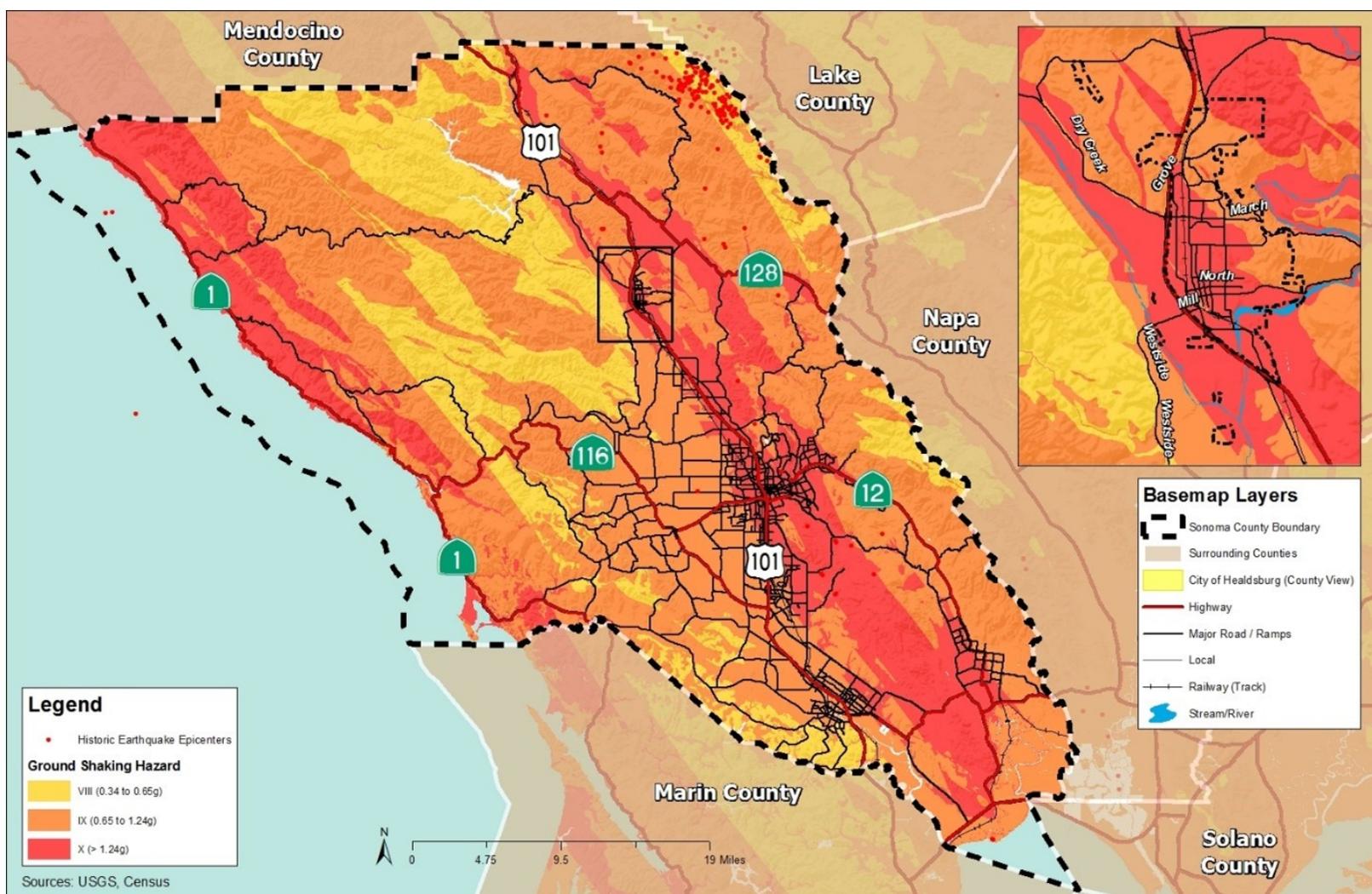
LEGEND

-  Alquist-Priolo Fault Zone
- Shaking Severity**
-  Light - MMI 5
-  Moderate - MMI 6
-  Strong - MMI 7
-  Very Strong - MMI 8
-  Violent - MMI 9
-  Very Violent - MMI 10

Source: ABAG 2018b, USGS 2018b



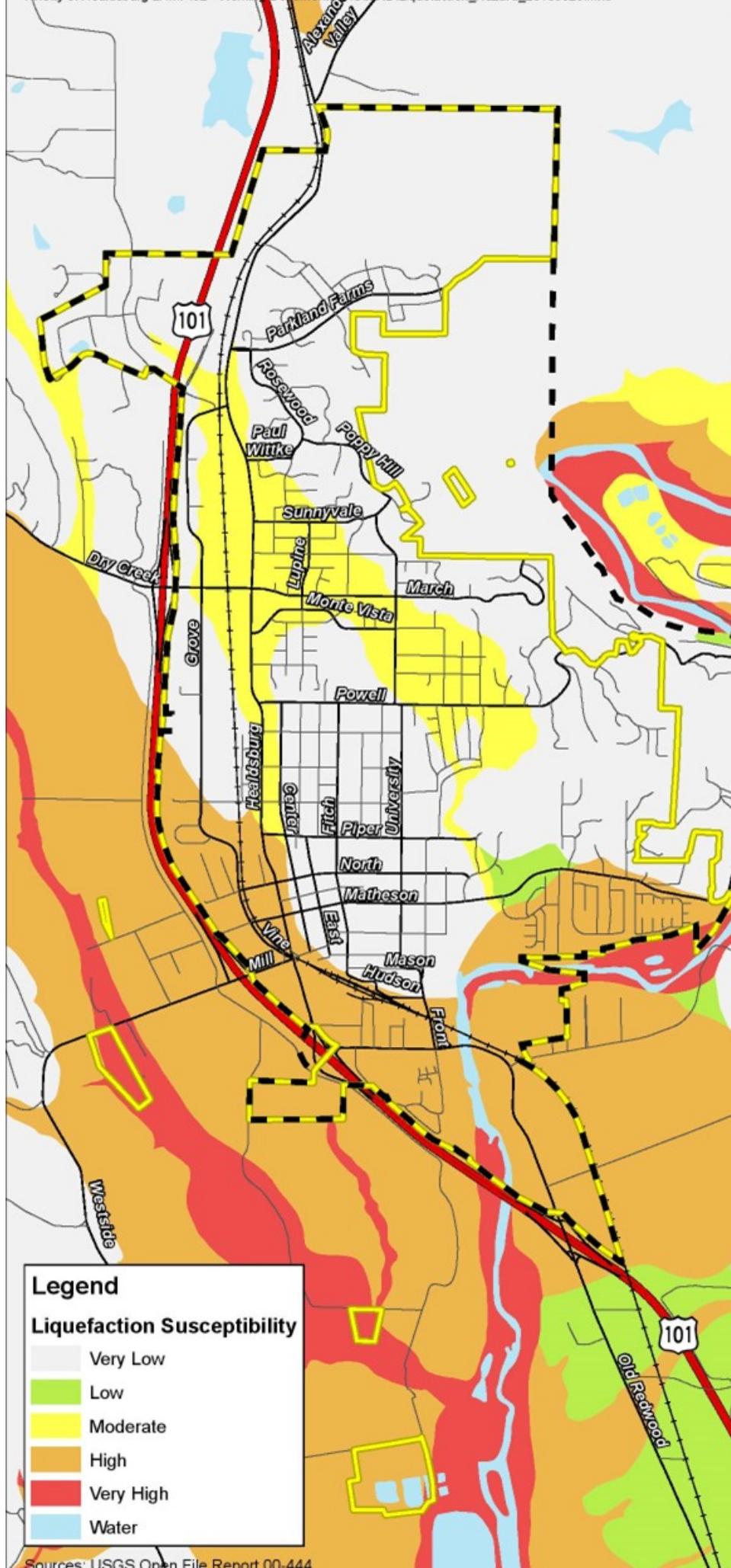






Basemap Layers

- City of Healdsburg Boundary
- Urban Service Area
- Highway
- Major Road / Ramps
- Local
- Railway (Track)

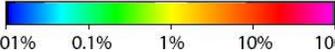


Legend

Liquefaction Susceptibility

- Very Low
- Low
- Moderate
- High
- Very High
- Water

30 Year $M \geq 6.7$ Probability



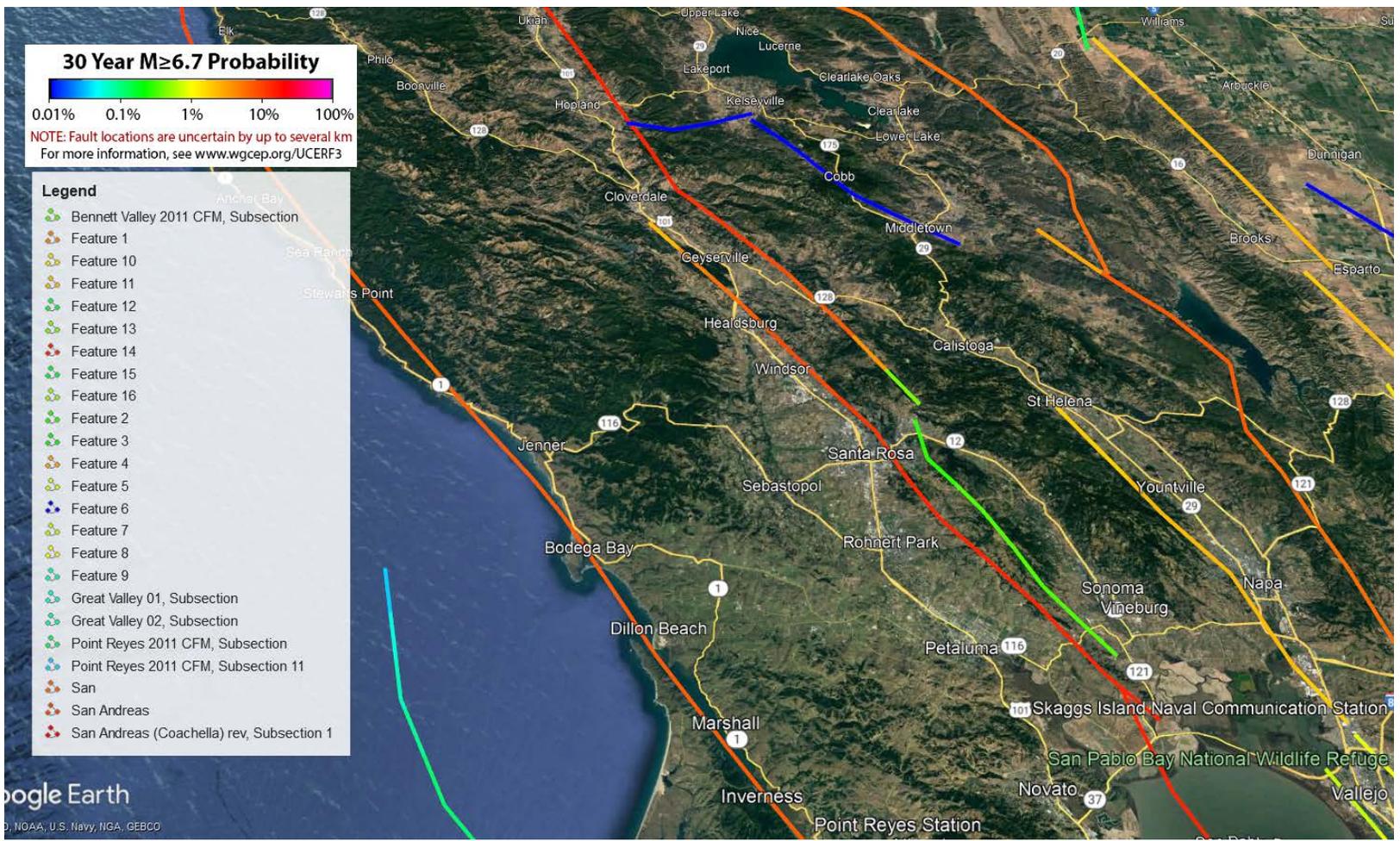
NOTE: Fault locations are uncertain by up to several km
For more information, see www.wgcep.org/UCERF3

Legend

- Bennett Valley 2011 CFM, Subsection
- Feature 1
- Feature 10
- Feature 11
- Feature 12
- Feature 13
- Feature 14
- Feature 15
- Feature 16
- Feature 2
- Feature 3
- Feature 4
- Feature 5
- Feature 6
- Feature 7
- Feature 8
- Feature 9
- Great Valley 01, Subsection
- Great Valley 02, Subsection
- Point Reyes 2011 CFM, Subsection
- Point Reyes 2011 CFM, Subsection 11
- San
- San Andreas
- San Andreas (Coachella) rev, Subsection 1

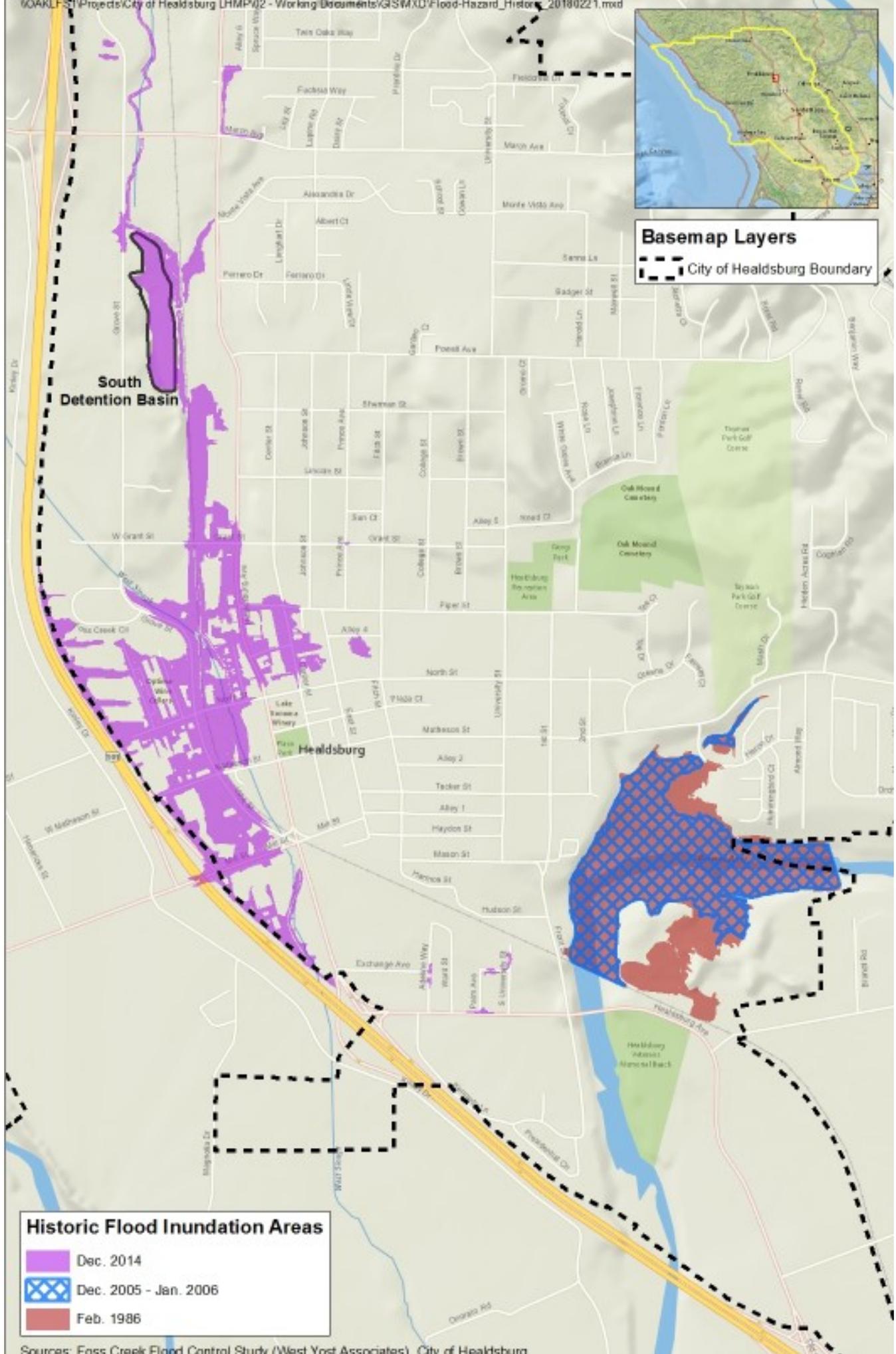
Google Earth

© 2013 Google, NOAA, U.S. Navy, IGA, GEBCO





Basemap Layers
--- City of Healdsburg Boundary

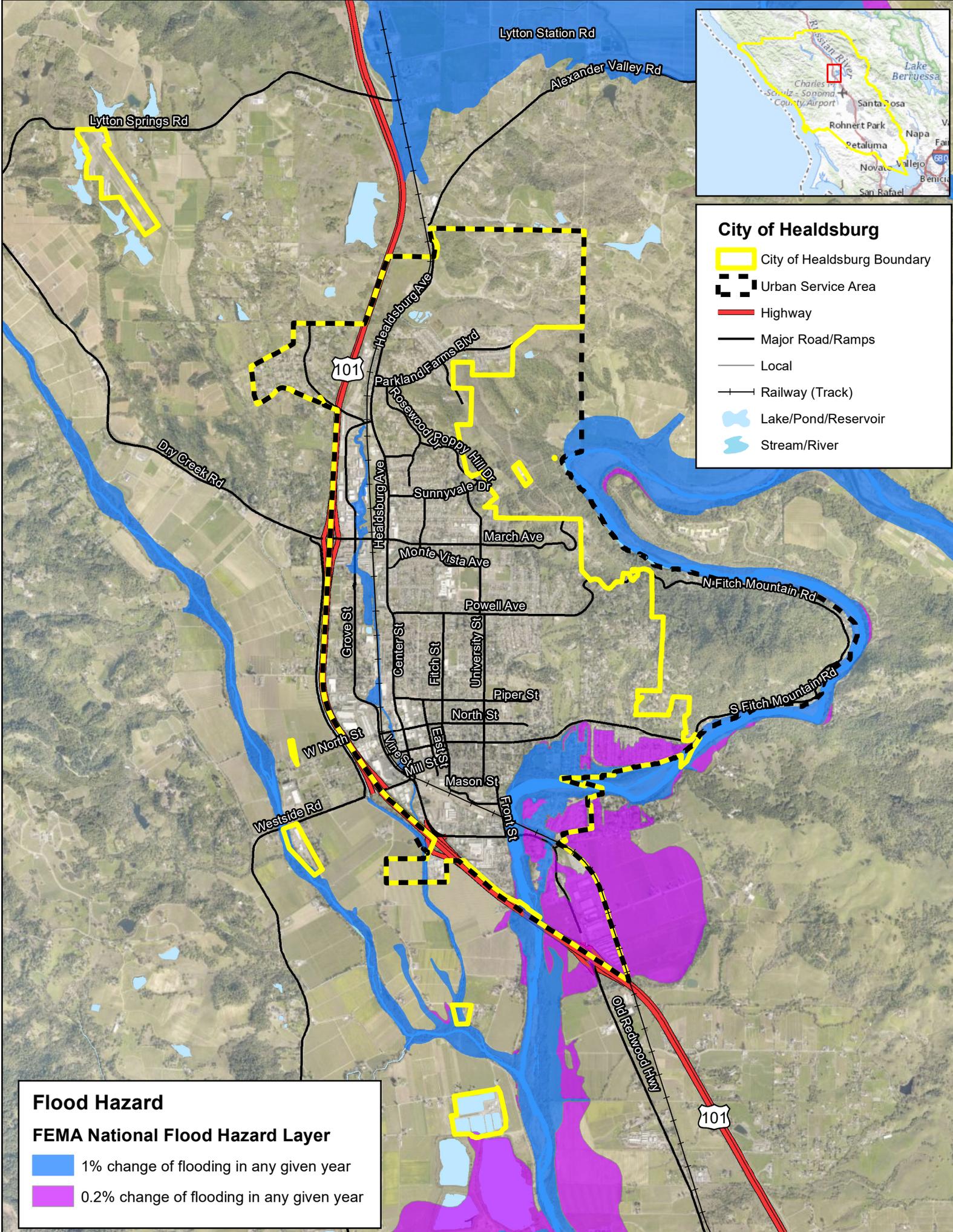


South Detention Basin

Healdsburg

Historic Flood Inundation Areas

- Dec. 2014
- Dec. 2005 - Jan. 2006
- Feb. 1986



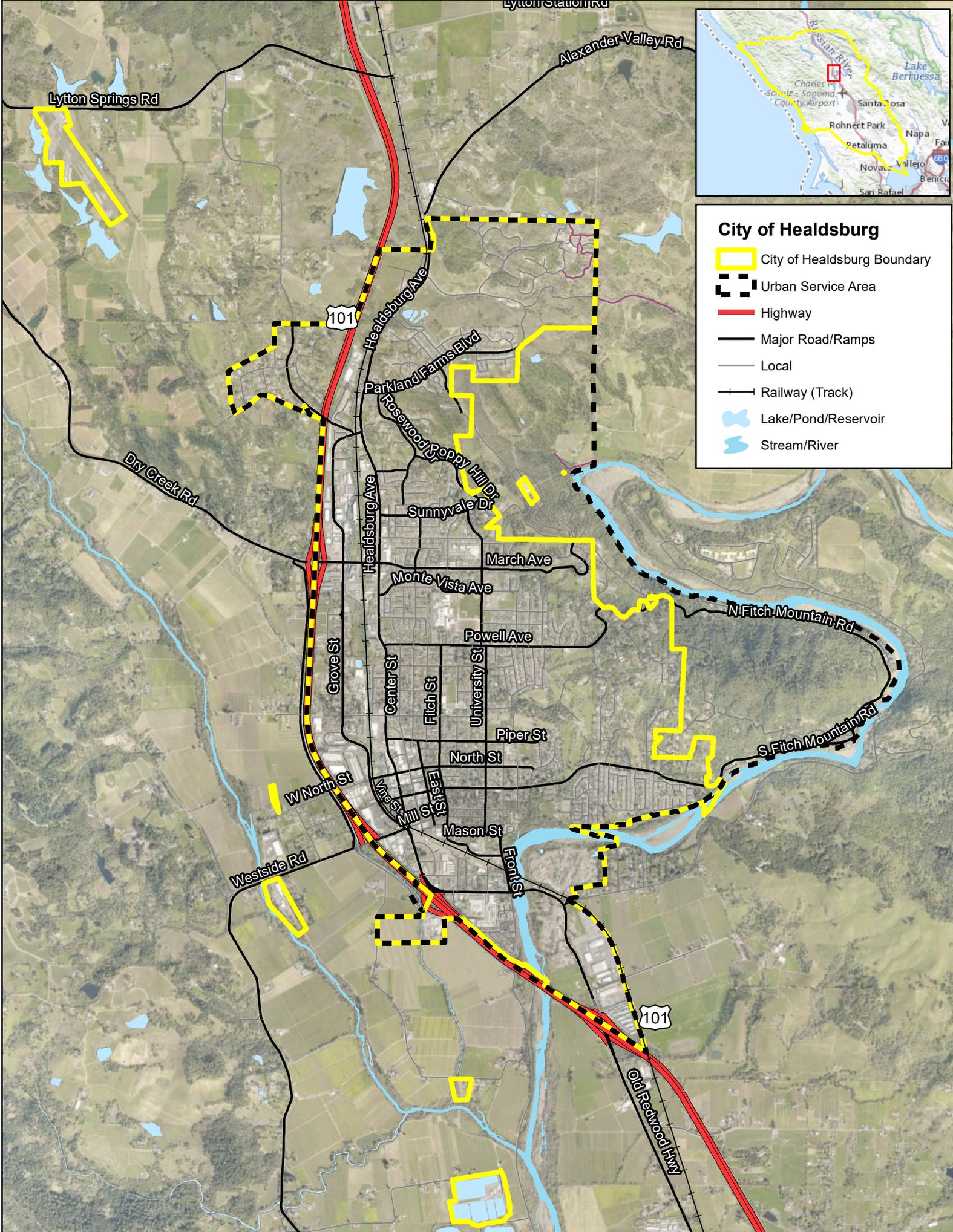
City of Healdsburg

- City of Healdsburg Boundary
- Urban Service Area
- Highway
- Major Road/Ramps
- Local
- Railway (Track)
- Lake/Pond/Reservoir
- Stream/River

Flood Hazard

FEMA National Flood Hazard Layer

- 1% change of flooding in any given year
- 0.2% change of flooding in any given year



City of Healdsburg

- City of Healdsburg Boundary
- Urban Service Area
- Highway
- Major Road/Ramps
- Local
- Railway (Track)
- + Lake/Pond/Reservoir
- ~ Stream/River

Lytton Springs Rd

Lytton Station Rd

Alexander Valley Rd

101

Healdsburg Ave

Parkland Farms Blvd

Rosewood/Poppy Hill Dr

Sunnyvale Dr

March Ave

Monte Vista Ave

Powell Ave

University St

Fitch St

Center St

Grove St

Piper St

North St

W North St

Mason St

Mill St

Five St

Four St

Westside Rd

101

Old Redwood Hwy

N Fitch Mountain Rd

S Fitch Mountain Rd

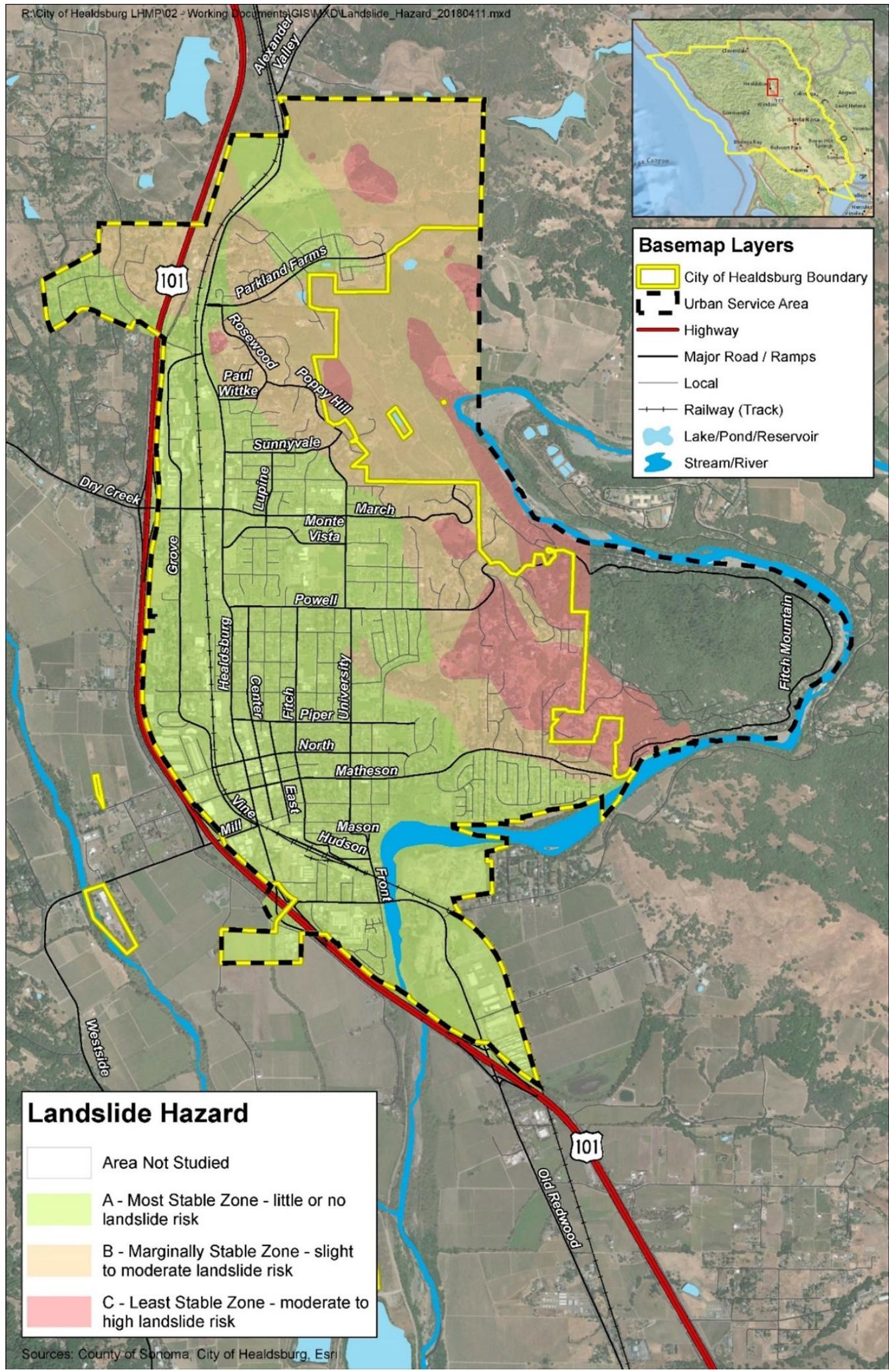


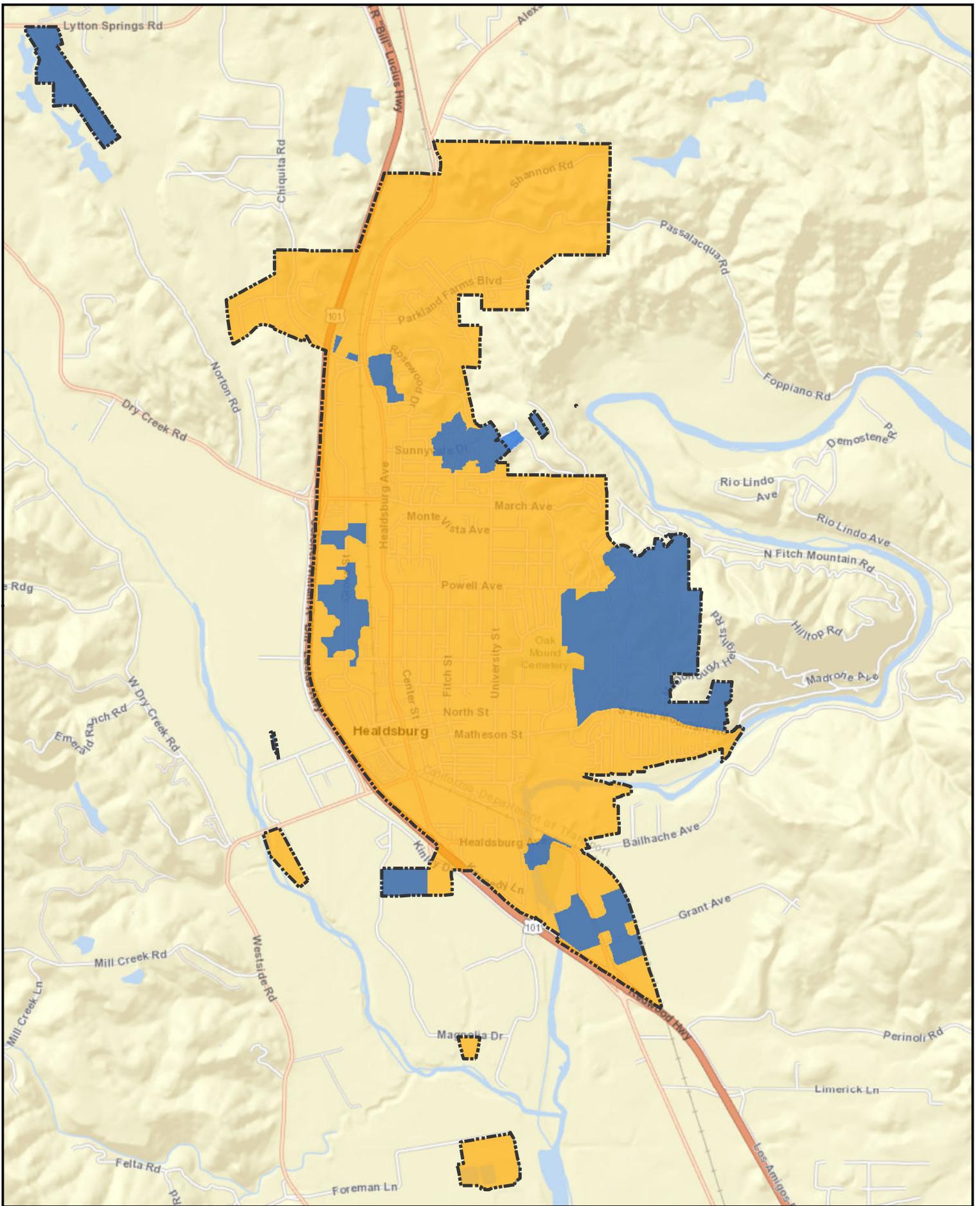
Basemap Layers

- City of Healdsburg Boundary
- Urban Service Area
- Highway
- Major Road / Ramps
- Local
- Railway (Track)
- Lake/Pond/Reservoir
- Stream/River

Landslide Hazard

- Area Not Studied
- A - Most Stable Zone - little or no landslide risk
- B - Marginally Stable Zone - slight to moderate landslide risk
- C - Least Stable Zone - moderate to high landslide risk





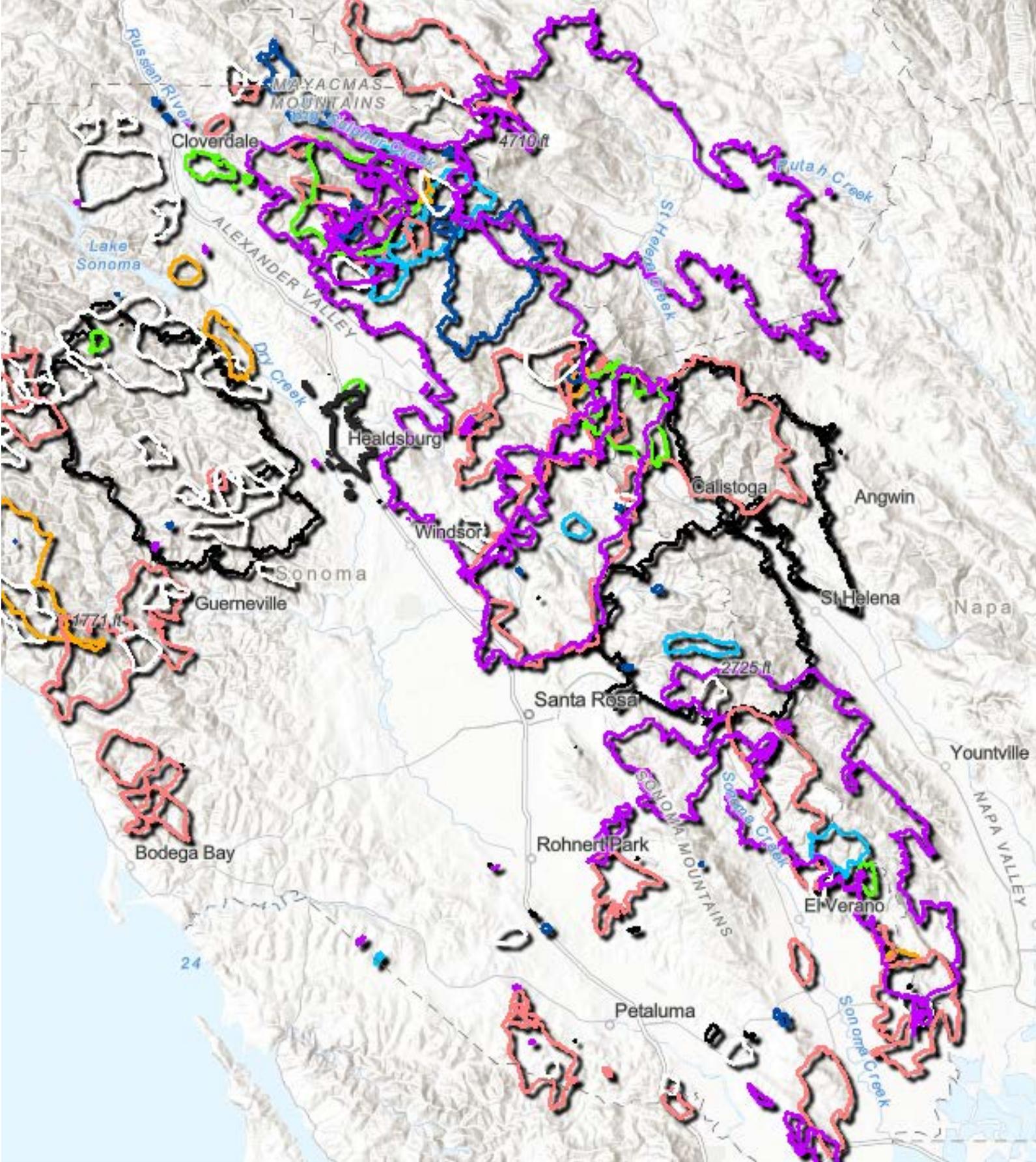
5/9/2023

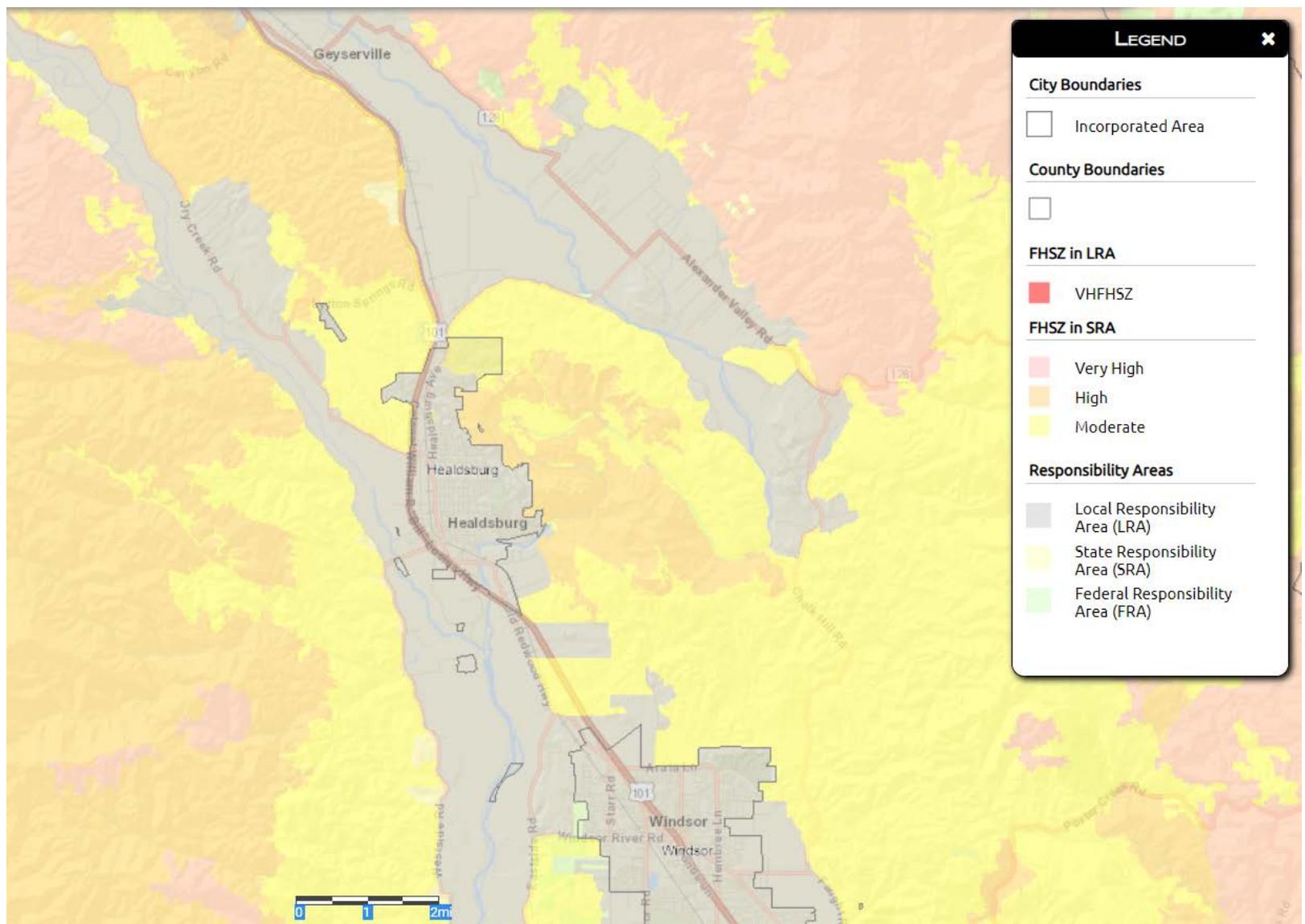


Distribution PSPS
(lower voltage to customers)

Transmission PSPS
(higher voltage to substation)

Impacted PSPS Areas Healdsburg





LEGEND ✕

City Boundaries

Incorporated Area

County Boundaries

FHSZ in LRA

VHFHSZ

FHSZ in SRA

Very High

High

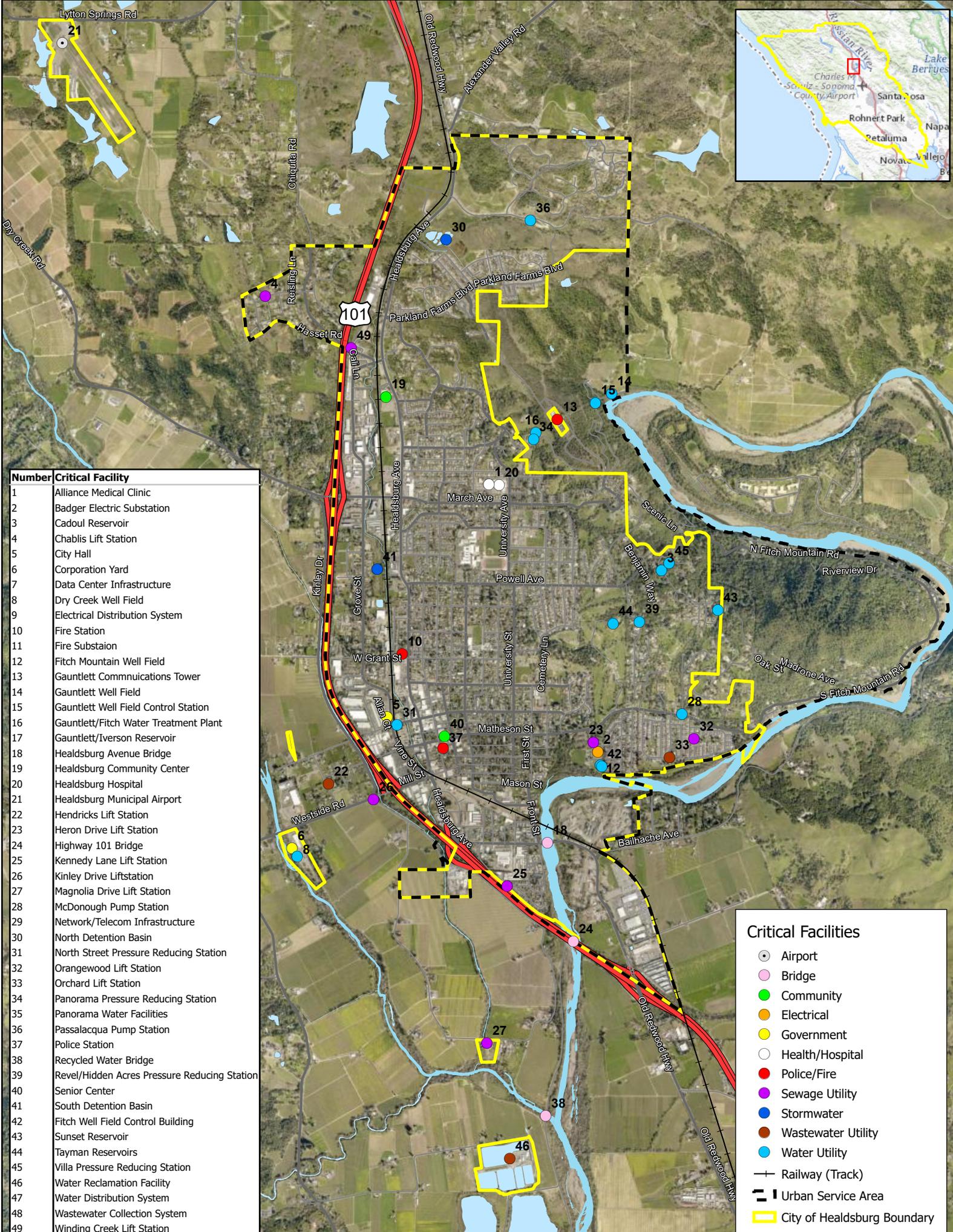
Moderate

Responsibility Areas

Local Responsibility Area (LRA)

State Responsibility Area (SRA)

Federal Responsibility Area (FRA)



Number	Critical Facility
1	Alliance Medical Clinic
2	Badger Electric Substation
3	Cadoul Reservoir
4	Chablis Lift Station
5	City Hall
6	Corporation Yard
7	Data Center Infrastructure
8	Dry Creek Well Field
9	Electrical Distribution System
10	Fire Station
11	Fire Substaion
12	Fitch Mountain Well Field
13	Gauntlett Commnuications Tower
14	Gauntlett Well Field
15	Gauntlett Well Field Control Station
16	Gauntlett/Fitch Water Treatment Plant
17	Gauntlett/Iverson Reservoir
18	Healdsburg Avenue Bridge
19	Healdsburg Community Center
20	Healdsburg Hospital
21	Healdsburg Municipal Airport
22	Hendricks Lift Station
23	Heron Drive Lift Station
24	Highway 101 Bridge
25	Kennedy Lane Lift Station
26	Kinley Drive Liftstation
27	Magnolia Drive Lift Station
28	McDonough Pump Station
29	Network/Telecom Infrastructure
30	North Detention Basin
31	North Street Pressure Reducing Station
32	Orangewood Lift Station
33	Orchard Lift Station
34	Panorama Pressure Reducing Station
35	Panorama Water Facilities
36	Passalacqua Pump Station
37	Police Station
38	Recycled Water Bridge
39	Revel/Hidden Acres Pressure Reducing Station
40	Senior Center
41	South Detention Basin
42	Fitch Well Field Control Building
43	Sunset Reservoir
44	Tayman Reservoirs
45	Villa Pressure Reducing Station
46	Water Reclamation Facility
47	Water Distribution System
48	Wastewater Collection System
49	Winding Creek Lift Station

Critical Facilities

- Airport
- Bridge
- Community
- Electrical
- Government
- Health/Hospital
- Police/Fire
- Sewage Utility
- Stormwater
- Wastewater Utility
- Water Utility
- Railway (Track)
- Urban Service Area
- City of Healdsburg Boundary

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Appendix D

Planning Maintenance Forms

Mitigation Project Progress Report (Page 1)			
Progress Report Period From (date):		To (date):	
Project Title:			
Project ID:			
Description of Project:			
Implementing Agency:			
Supporting Agencies:			
Contact Name:			
Contact E-mail:			
Contact Number:			
Grant/Finance Administrator:			
Total Project Cost:			
Anticipated Cost Overrun/Underrun:			
Date of Project Approval:			
Project Start Date:			
Anticipated Completion Date:			
Summary of Progress of Project for this Reporting Period			
1. What was accomplished during this reporting period?			
2. What obstacles, problems, or delays did the project encounter, if any?			
3. How were the problems resolved?			

Mitigation Project Progress Report (Page 2)			
Milestones		Complete	Project Date of Completion
Plan Goal Addressed:			
Goal:			
Indicator of Success:			
Project Status		Project Cost Status	
<input type="checkbox"/>	Project on Schedule	<input type="checkbox"/>	Cost Unchanged
<input type="checkbox"/>	Project Completed	<input type="checkbox"/>	Cost Overrun*
<input type="checkbox"/>	Project Delayed*	*explain:	
explain:		<input type="checkbox"/>	Cost Underrun
<input type="checkbox"/>	Project Canceled	*explain:	

Annual Review Questionnaire				
LHMP Section	Questions	Yes	No	Comments
PLANNING PROCESS	Are there internal or external organizations and agencies that have been invaluable to the plan update process or to implementing a mitigation project?			
	Are there procedures (e.g., meeting announcements, plan updates) that can be done differently or more efficiently?			
	Has the Planning Team undertaken any public outreach activities regarding the LHMP or a mitigation project?			
HAZARD ANALYSIS	Has any natural and/or human-caused disaster occurred in this reporting period?			
	Are there any natural and/or human-caused hazards that have not been addressed in this LHMP and should be?			
	Are new maps, reports, or studies available? If so, what are they and what have they revealed?			
VULNERABILITY ANALYSIS	Do any new assets need to be included?			
	Have there been changes in development trends that could create additional risks?			
CAPABILITY ASSESSMENT	Are there different or additional resources (financial, technical, and human) that are now available for mitigation planning?			
MITIGATION STRATEGY	Should new mitigation actions be added? Should any existing mitigation actions be deleted?			

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Appendix E

Adoption Resolution

CITY OF HEALDSBURG

RESOLUTION NO. 14-2024

A RESOLUTION OF THE CITY COUNCIL OF THE CITY OF
HEALDSBURG ADOPTING THE CITY OF HEALDSBURG
2023 LOCAL HAZARD MITIGATION PLAN

WHEREAS, the City of Healdsburg recognizes the threat that natural hazards pose to people and property within Healdsburg; and

WHEREAS, undertaking hazard mitigation actions will reduce the potential for harm to people and property from future hazard occurrences; and

WHEREAS, the City of Healdsburg has prepared a multi-hazard mitigation plan, hereby known as the City of Healdsburg 2023 Local Hazard Mitigation Plan in accordance with the Disaster Mitigation Act of 2000; and

WHEREAS, the City of Healdsburg 2023 Local Hazard Mitigation Plan identifies mitigation goals and actions to reduce or eliminate long-term risk to people and property in Healdsburg from the impacts of future hazards and disasters; and

WHEREAS, an adopted Local Hazard Mitigation Plan is required as a condition of future funding for mitigation projects under multiple FEMA pre- and post-disaster mitigation grant programs; and

WHEREAS, the City of Healdsburg fully participated in the FEMA-prescribed mitigation planning process to prepare this local hazard mitigation plan; and

WHEREAS, the California Office of Emergency Services and Federal Emergency Management Agency, Region IX officials have reviewed the City of Healdsburg Local Hazard Mitigation Plan and approved it contingent upon adoption by the participating governing body; and

WHEREAS, adoption by the Healdsburg City Council demonstrates their commitment to hazard mitigation and achieving the goals outlined in the City of Healdsburg 2023 Local Hazard Mitigation Plan.

NOW, THEREFORE, BE IT RESOLVED that the City Council of the City of Healdsburg hereby adopts the City of Healdsburg 2023 Hazard Mitigation Plan.

PASSED, APPROVED, AND ADOPTED by the City Council of the City of Healdsburg this 20th day of February 2024, by the following vote:

AYES: Councilmembers: (5) Edwards, Herrod, Kelley, Mitchell and Mayor Hagele

NOES: Councilmembers: (0) None

ABSENT: Councilmembers: (0) None

ABSTAINING: Councilmembers: (0) None

SO ORDERED:



David Hagele, Mayor

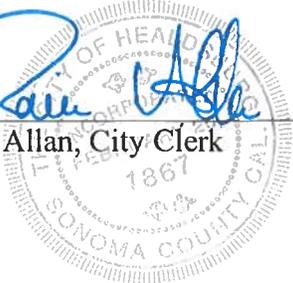
ATTEST:



Raina Allan, City Clerk

I, RAINA ALLAN, City Clerk of the City of Healdsburg, do hereby certify that the foregoing is a full, true, and correct copy of Resolution No. 14-2024 adopted by the City Council of the City of Healdsburg on the 20th day of February, 2024.


Raina Allan, City Clerk



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Appendix F
FEMA Documentation
Local Hazard Mitigation Plan
Review Tool

REGION IX LOCAL HAZARD MITIGATION PLAN REVIEW TOOL

Updated 12/4/2019

The *Local Hazard Mitigation Plan Review Tool* demonstrates how the Local Hazard Mitigation Plan meets the regulation in 44 CFR §201.6 and offers State and FEMA Mitigation Planners an opportunity to provide feedback to the community.

- The **Regulation Checklist** provides a summary of FEMA’s evaluation of whether the plan has addressed all requirements.
- The **Plan Assessment** identifies the plan’s strengths as well as documents areas for future improvement. This section also includes a list of resources for implementation of the plan.
- The **Multi-Jurisdiction Summary Sheet** is a mandatory worksheet for multi-jurisdictional plans that is used to document which jurisdictions are eligible to adopt the plan.
- The **Hazard Identification and Risk Assessment Matrix** is a tool for plan reviewers to identify if all components of Element B are met.

Jurisdiction: City of Healdsburg	Title of Plan: Local Hazard Mitigation Plan	Date of Plan: 2023
Local Point of Contact: Kelsey Carreiro	Address: 238 Center Street Healdsburg, CA 95448	
Title: Emergency Manager		
Agency: Police Department		
Phone Number: 707-955-6362	E-Mail: Kcarreiro@healdsburg.gov	

State Reviewer:	Title:	Date:
Date Received at State Agency		
Date Sent to FEMA		

FEMA Reviewer:	Title:	Date:
Date Received in FEMA Region IX		
Date Not Approved		
Date Approvable Pending Adoption		
Date Approved		

**SECTION 1:
REGULATION CHECKLIST**

INSTRUCTIONS: The Regulation Checklist must be completed by FEMA. The purpose of the Checklist is to identify the location of relevant or applicable content in the plan by element/sub-element and to determine if each requirement has been ‘Met’ or ‘Not Met.’ The ‘Required Revisions’ summary at the bottom of each element must be completed by FEMA to provide a clear explanation of the revisions that are required for plan approval. Required revisions must be explained for each plan sub-element that is ‘Not Met.’ Sub-elements should be referenced in each summary by using the appropriate numbers (A1, B3, etc.), where applicable. Requirements for each Element and sub-element are described in detail in the *Local Plan Review Guide* in Section 4, Regulation Checklist.

1. REGULATION CHECKLIST		Location in	Met	Not
Regulation (44 CFR 201.6 Local Mitigation Plans)		Plan		Met
		(section		Met
		and/or		
		page number)		
ELEMENT A. PLANNING PROCESS				
A1. Does the plan document the planning process, including how it was prepared and who was involved in the process for each jurisdiction? (Requirement §201.6(c)(1))	a. Does the plan provide documentation of how the plan was prepared? This documentation must include the schedule or timeframe and activities that made up the plan’s development as well as who was involved.	Section 3		
	b. Does the plan list the jurisdiction(s) participating in the plan that are seeking approval?	3.1		
	c. Does the plan identify who represented each jurisdiction? (At a minimum, it must identify the jurisdiction represented and the person’s position or title and agency within the jurisdiction.)	3.1		
A2. Does the plan document an opportunity for neighboring communities, local and regional agencies involved in hazard mitigation activities, agencies that have the authority to regulate development as well as other interests to be involved in the planning process? (Requirement §201.6(b)(2))	a. Does the plan document an opportunity for neighboring communities, local, and regional agencies involved in hazard mitigation activities, agencies that have the authority to regulate development, as well as other interested parties to be involved in the planning process?	3.2		
	b. Does the plan identify how the stakeholders were invited to participate in the process?	3.2		

1. REGULATION CHECKLIST		Location in	Met	Not
Regulation (44 CFR 201.6 Local Mitigation Plans)		Plan (section and/or page number)		Met
A3. Does the plan document how the public was involved in the planning process during the drafting stage? (Requirement §201.6(b)(1))	a. Does the plan document how the public was given the opportunity to be involved in the planning process?	3.2		
	b. Does the plan document how the public's feedback was incorporated into the plan?	3.2		
A4. Does the plan describe the review and incorporation of existing plans, studies, reports, and technical information? (Requirement §201.6(b)(3))		3.1.2		
A5. Is there discussion of how the community(ies) will continue public participation in the plan maintenance process? (Requirement §201.6(c)(4)(iii))		8.4		
A6. Is there a description of the method and schedule for keeping the plan current (monitoring, evaluating and updating the mitigation plan within a 5-year cycle)? (Requirement §201.6(c)(4)(i))	a. Does the plan identify how, when, and by whom the plan will be monitored (how will implementation be tracked) over time?	8.2		
	b. Does the plan identify how, when, and by whom the plan will be evaluated (assessing the effectiveness of the plan at achieving stated purpose and goals) over time?	8.2		
	c. Does the plan identify how, when, and by whom the plan will be updated during the 5-year cycle?	8.2		
ELEMENT A: REQUIRED REVISIONS				
ELEMENT B. HAZARD IDENTIFICATION AND RISK ASSESSMENT (Reviewer: See Section 4 for assistance with Element B)				
B1. Does the plan include a description of the type, location, and extent of all natural hazards that can affect each jurisdiction(s)? (Requirement §201.6(c)(2)(i))	a. Does the plan include a general description of all natural hazards that can affect each jurisdiction?	4.1		
	b. Does the plan provide rationale for the omission of any natural hazards that are commonly recognized to affect the jurisdiction(s) in the planning area?	4.1		
	c. Does the plan include a description of the type of all natural hazards that can affect each jurisdiction?	4.2		
	d. Does the plan include a description of the location for all natural hazards that can affect each jurisdiction?	4.2		
	e. Does the plan include a description of the extent for all natural hazards that can affect each jurisdiction?	4.2		

1. REGULATION CHECKLIST		Location in	Met	Not
Regulation (44 CFR 201.6 Local Mitigation Plans)		Plan		Met
		(section		Met
		and/or		
		page number)		
B2. Does the plan include information on previous occurrences of hazard events and on the probability of future hazard events for each jurisdiction? (Requirement §201.6(c)(2)(i))	a. Does the plan include information on previous occurrences of hazard events for each jurisdiction?	4.2		
	b. Does the plan include information on the probability of future hazard events for each jurisdiction?	4.2		
B3. Is there a description of each identified hazard's impact on the community as well as an overall summary of the community's vulnerability for each jurisdiction? (Requirement §201.6(c)(2)(ii))	a. Is there a description of each hazard's impacts on each jurisdiction (what happens to structures, infrastructure, people, environment, etc.)?	5.2		
	b. Is there a description of each identified hazard's overall vulnerability (structures, systems, populations, or other community assets defined by the community that are identified as being susceptible to damage and loss from hazard events) for each jurisdiction?	5.2		
B4. Does the plan address NFIP insured structures within the jurisdiction that have been repetitively damaged by floods? (Requirement §201.6(c)(2)(ii))		5.2.3		
ELEMENT B: REQUIRED REVISIONS				
ELEMENT C. MITIGATION STRATEGY				
C1. Does the plan document each jurisdiction's existing authorities, policies, programs and resources and its ability to expand on and improve these existing policies and programs? (Requirement §201.6(c)(3))	a. Does the plan document each jurisdiction's existing authorities, policies, programs and resources?	Section 6		
	b. Does the plan document each jurisdiction's ability to expand on and improve these existing policies and programs?	Section 6		
C2. Does the plan address each jurisdiction's participation in the NFIP and continued compliance with NFIP requirements, as appropriate? (Requirement §201.6(c)(3)(ii))		5.2.3		
C3. Does the plan include goals to reduce/avoid long-term vulnerabilities to the identified hazards? (Requirement §201.6(c)(3)(i))		7.1		
C4. Does the plan identify and analyze a comprehensive range of specific mitigation actions and projects for each jurisdiction being considered to reduce	a. Does the plan identify and analyze a comprehensive range of specific mitigation actions and projects to reduce the impacts from hazards?	7.3.1		

1. REGULATION CHECKLIST		Location in	Met	Not
Regulation (44 CFR 201.6 Local Mitigation Plans)		Plan		Met
		(section		Met
		and/or		
		page number)		
the effects of hazards, with emphasis on new and existing buildings and infrastructure? (Requirement §201.6(c)(3)(ii))	b. Does the plan identify mitigation actions for every hazard posing a threat to each participating jurisdiction?	7.3.1		
	c. Do the identified mitigation actions and projects have an emphasis on new and existing buildings and infrastructure?	7.3.1		
C5. Does the plan contain an action plan that describes how the actions identified will be prioritized (including cost benefit review), implemented, and administered by each jurisdiction? (Requirement §201.6(c)(3)(iv)); (Requirement §201.6(c)(3)(iii))	a. Does the plan explain how the mitigation actions will be prioritized (including cost benefit review)?	7.3.1		
	b. Does the plan identify the position, office, department, or agency responsible for implementing and administering the action, potential funding sources and expected timeframes for completion?	7.3.1		
C6. Does the plan describe a process by which local governments will integrate the requirements of the mitigation plan into other planning mechanisms, such as comprehensive or capital improvement plans, when appropriate? (Requirement §201.6(c)(4)(ii))	a. Does the plan identify the local planning mechanisms where hazard mitigation information and/or actions may be incorporated?	8.3		
	b. Does the plan describe each community's process to integrate the data, information, and hazard mitigation goals and actions into other planning mechanisms?	8.3		
	c. The updated plan must explain how the jurisdiction(s) incorporated the mitigation plan, when appropriate, into other planning mechanisms as a demonstration of progress in local hazard mitigation efforts.	8.3		
<u>ELEMENT C: REQUIRED REVISIONS</u>				
ELEMENT D. PLAN REVIEW, EVALUATION, AND IMPLEMENTATION				
(Applicable to plan updates only)				
D1. Was the plan revised to reflect changes in development? (Requirement §201.6(d)(3))		1.5		
D2. Was the plan revised to reflect progress in local mitigation efforts? (Requirement §201.6(d)(3))		7.2		
D3. Was the plan revised to reflect changes in priorities? (Requirement §201.6(d)(3))		3.1.2 7.3.1		
<u>ELEMENT D: REQUIRED REVISIONS</u>				

1. REGULATION CHECKLIST Regulation (44 CFR 201.6 Local Mitigation Plans)	Location in Plan (section and/or page number)	Met	Not Met
ELEMENT E. PLAN ADOPTION			
E1. Does the plan include documentation that the plan has been formally adopted by the governing body of the jurisdiction requesting approval? (Requirement §201.6(c)(5))			
E2. For multi-jurisdictional plans, has each jurisdiction requesting approval of the plan documented formal plan adoption? (Requirement §201.6(c)(5))			
<u>ELEMENT E: REQUIRED REVISIONS</u>			
OPTIONAL: HIGH HAZARD POTENTIAL DAM RISKS (Applicable to jurisdictions interested in becoming sub applicants to FEMA’s Rehabilitation of High Hazard Potential Dams (HHPD) Grant Program only)			
HHPD1. Did Element A4 (planning process) describe the incorporation of existing plans, studies, reports, and technical information for high hazard potential dams?			
HHPD2. Did Element B3 (risk assessment) address HHPDs?			
HHPD3. Did Element C3 (mitigation goals) include mitigation goals to reduce long-term vulnerabilities from high hazard potential dams that pose an unacceptable risk to the public?			
HHPD4. Did Element C4-C5 (mitigation actions) address HHPDs prioritize mitigation actions to reduce vulnerabilities from high hazard potential dams that pose an unacceptable risk to the public?			
<u>REQUIRED REVISIONS</u>			
ELEMENT F. ADDITIONAL STATE REQUIREMENTS (Optional for State Reviewers only; not to be completed by FEMA)			
F1.			
F2.			
<u>ELEMENT F: REQUIRED REVISIONS</u>			

SECTION 2: PLAN ASSESSMENT

INSTRUCTIONS: The purpose of the Plan Assessment is to offer the local community more comprehensive feedback to the community on the quality and utility of the plan in a narrative format. The audience for the Plan Assessment is not only the plan developer/local community planner, but also elected officials, local departments and agencies, and others involved in implementing the Local Mitigation Plan. The Plan Assessment must be completed by FEMA. The Assessment is an opportunity for FEMA to provide feedback and information to the community on: 1) suggested improvements to the Plan; 2) specific sections in the Plan where the community has gone above and beyond minimum requirements; 3) recommendations for plan implementation; and 4) ongoing partnership(s) and information on other FEMA programs, specifically RiskMAP and Hazard Mitigation Assistance programs. The Plan Assessment is divided into two sections:

1. Plan Strengths and Opportunities for Improvement
2. Resources for Implementing Your Approved Plan

Plan Strengths and Opportunities for Improvement is organized according to the plan Elements listed in the Regulation Checklist. Each Element includes a series of italicized bulleted items that are suggested topics for consideration while evaluating plans, but it is not intended to be a comprehensive list. FEMA Mitigation Planners are not required to answer each bullet item and should use them as a guide to paraphrase their own written assessment (2-3 sentences) of each Element.

The Plan Assessment must not reiterate the required revisions from the Regulation Checklist or be regulatory in nature and should be open-ended and to provide the community with suggestions for improvements or recommended revisions. The recommended revisions are suggestions for improvement and are not required to be made for the Plan to meet Federal regulatory requirements. The italicized text should be deleted once FEMA has added comments regarding strengths of the plan and potential improvements for future plan revisions. It is recommended that the Plan Assessment be a short synopsis of the overall strengths and weaknesses of the Plan (no longer than two pages), rather than a complete recap section by section.

Resources for Implementing Your Approved Plan provides a place for FEMA to offer information, data sources and general suggestions on the plan implementation and maintenance process. Information on other possible sources of assistance including, but not limited to, existing publications, grant funding or training opportunities, can be provided. States may add state and local resources, if available.

A. Plan Strengths and Opportunities for Improvement

This section provides a discussion of the strengths of the plan document and identifies areas where these could be improved beyond minimum requirements.

Element A: Planning Process

How does the Plan go above and beyond minimum requirements to document the planning process with respect to:

- *Involvement of stakeholders (elected officials/decision makers, plan implementers, business owners, academic institutions, utility companies, water/sanitation districts, etc.);*
- *Involvement of Planning, Emergency Management, Public Works Departments or other planning agencies (i.e., regional planning councils);*
- *Diverse methods of participation (meetings, surveys, online, etc.); and*
- *Reflective of an open and inclusive public involvement process.*

Element B: Hazard Identification and Risk Assessment

In addition to the requirements listed in the Regulation Checklist, 44 CFR 201.6 Local Mitigation Plans identifies additional elements that should be included as part of a plan's risk assessment. The plan should describe vulnerability in terms of:

- 1) *A general description of land uses and future development trends within the community so that mitigation options can be considered in future land use decisions;*
- 2) *The types and numbers of existing and future buildings, infrastructure, and critical facilities located in the identified hazard areas; and*
- 3) *A description of potential dollar losses to vulnerable structures, and a description of the methodology used to prepare the estimate.*

How does the Plan go above and beyond minimum requirements to document the Hazard Identification and Risk Assessment with respect to:

- *Use of best available data (flood maps, HAZUS, flood studies) to describe significant hazards;*
- *Communication of risk on people, property, and infrastructure to the public (through tables, charts, maps, photos, etc.);*
- *Incorporation of techniques and methodologies to estimate dollar losses to vulnerable structures;*
- *Incorporation of Risk MAP products (i.e., depth grids, Flood Risk Report, Changes Since Last FIRM, Areas of Mitigation Interest, etc.); and*
- *Identification of any data gaps that can be filled as new data became available.*

Element C: Mitigation Strategy

How does the Plan go above and beyond minimum requirements to document the Mitigation Strategy with respect to:

- *Key problems identified in, and linkages to, the vulnerability assessment;*
- *Serving as a blueprint for reducing potential losses identified in the Hazard Identification and Risk Assessment;*
- *Plan content flow from the risk assessment (problem identification) to goal setting to mitigation action development;*
- *An understanding of mitigation principles (diversity of actions that include structural projects, preventative measures, outreach activities, property protection measures, post-disaster actions, etc);*
- *Specific mitigation actions for each participating jurisdiction that reflects their unique risks and capabilities;*
- *Integration of mitigation actions with existing local authorities, policies, programs, and resources; and*
- *Discussion of existing programs (including the NFIP), plans, and policies that could be used to implement mitigation, as well as document past projects.*

Element D: Plan Update, Evaluation, and Implementation (Plan Updates Only)

How does the Plan go above and beyond minimum requirements to document the 5-year Evaluation and Implementation measures with respect to:

- *Status of previously recommended mitigation actions;*
- *Identification of barriers or obstacles to successful implementation or completion of mitigation actions, along with possible solutions for overcoming risk;*
- *Documentation of annual reviews and committee involvement;*
- *Identification of a lead person to take ownership of, and champion the Plan;*
- *Reducing risks from natural hazards and serving as a guide for decisions makers as they commit resources to reducing the effects of natural hazards;*
- *An approach to evaluating future conditions (i.e. socio-economic, environmental, demographic, change in built environment etc.);*
- *Discussion of how changing conditions and opportunities could impact community resilience in the long term; and*
- *Discussion of how the mitigation goals and actions support the long-term community vision for increased resilience.*

B. Resources for Implementing and Updating Your Approved Plan

This resource section is organized into three categories:

- 1) Guidance and Resources
- 2) Training Topics and Courses
- 3) Funding Sources

Guidance and Resources

Local Mitigation Planning Handbook

<https://www.fema.gov/media-library/assets/documents/31598>

Beyond the Basics

<http://mitigationguide.org/>

Mitigation Ideas

<https://www.fema.gov/media-library/assets/documents/30627>

Plan Integration: Linking Local Planning Efforts

<https://www.fema.gov/media-library/assets/documents/108893>

Integrating Disaster Data into Hazard Mitigation Planning

<https://www.fema.gov/media-library/assets/documents/103486>

Integrating Historic Property and Cultural Resource Considerations into Hazard Mitigation Planning

<https://www.fema.gov/ar/media-library/assets/documents/4317>

Community Rating System User Manual

<https://www.fema.gov/media-library/assets/documents/8768>

U.S. Climate Resilient Toolkit

<https://toolkit.climate.gov/>

2014 National Climate Assessment

<http://nca2014.globalchange.gov/>

Managing the Risks of Extreme Events and Disasters to Advance Climate Change Adaptation

http://ipcc-wg2.gov/SREX/images/uploads/SREX-All_FINAL.pdf

FY15 Hazard Mitigation Assistance Unified Guidance

<https://www.fema.gov/media-library/assets/documents/103279>

Climate Resilient Mitigation Activities for Hazard Mitigation Assistance

<https://www.fema.gov/media-library/assets/documents/110202>

Training

More information at <https://training.fema.gov/emi.aspx> or through your State Training Officer

Mitigation Planning

IS-318 Mitigation Planning for Local and Tribal Communities

<https://training.fema.gov/is/courseoverview.aspx?code=is-318>

IS-393 Introduction to Hazard Mitigation

<https://training.fema.gov/is/courseoverview.aspx?code=is-393.a>

G-318 Preparing and Reviewing Local Plans

G-393 Mitigation for Emergency Managers

Hazard Mitigation Assistance (HMA) Grant Programs

IS-212.b Introduction to Unified HMA

<http://www.training.fema.gov/is/courseoverview.aspx?code=IS-212.b>

IS-277 Benefit Cost Analysis Entry Level

<http://www.training.fema.gov/is/courseoverview.aspx?code=IS-277>

E-212 HMA: Developing Quality Application Elements

E-213 HMA: Application Review and Evaluation

E-214 HMA: Project Implementation and Programmatic Closeout

E-276 Benefit-Cost Analysis Entry Level

GIS and Hazus-MH

IS-922 Application of GIS for Emergency Management

<http://www.training.fema.gov/is/courseoverview.aspx?code=IS-922>

E-190 ArcGIS for Emergency Managers

E-296 Application of Hazus-MH for Risk Assessment

E-313 Basic Hazus-MH

Floodplain Management

E-273 Managing Floodplain Development through the NFIP

E-278 National Flood Insurance Program/ Community Rating System

Potential Funding Sources

Hazard Mitigation Grant Program

POC: FEMA Region IX and State Hazard Mitigation Officer

Website: <https://www.fema.gov/hazard-mitigation-grant-program>

Pre-Disaster Mitigation Grant Program

POC: FEMA Region IX and State Hazard Mitigation Officer

Website: <https://www.fema.gov/pre-disaster-mitigation-grant-program>

Flood Mitigation Assistance Grant Program

POC: FEMA Region IX and State Hazard Mitigation Officer

Website: <https://www.fema.gov/flood-mitigation-assistance-grant-program>

Emergency Management Performance Grant Program

POC: FEMA Region IX

Website: <https://www.fema.gov/emergency-management-performance-grant-program>

**SECTION 3:
MULTI-JURISDICTIONAL SUMMARY SHEET**

INSTRUCTIONS: For multi-jurisdictional plans, this summary sheet must be completed by listing each participating jurisdiction that is eligible to adopt the plan.

MULTI-JURISDICTION SUMMARY SHEET					
#	Jurisdiction Name	Jurisdiction Type	Eligible to Adopt the Plan?	Plan POC	Email
1					
2					
3					
4					
5					
6					
7					
8					
9					
10					
11					
12					
13					
14					
15					

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