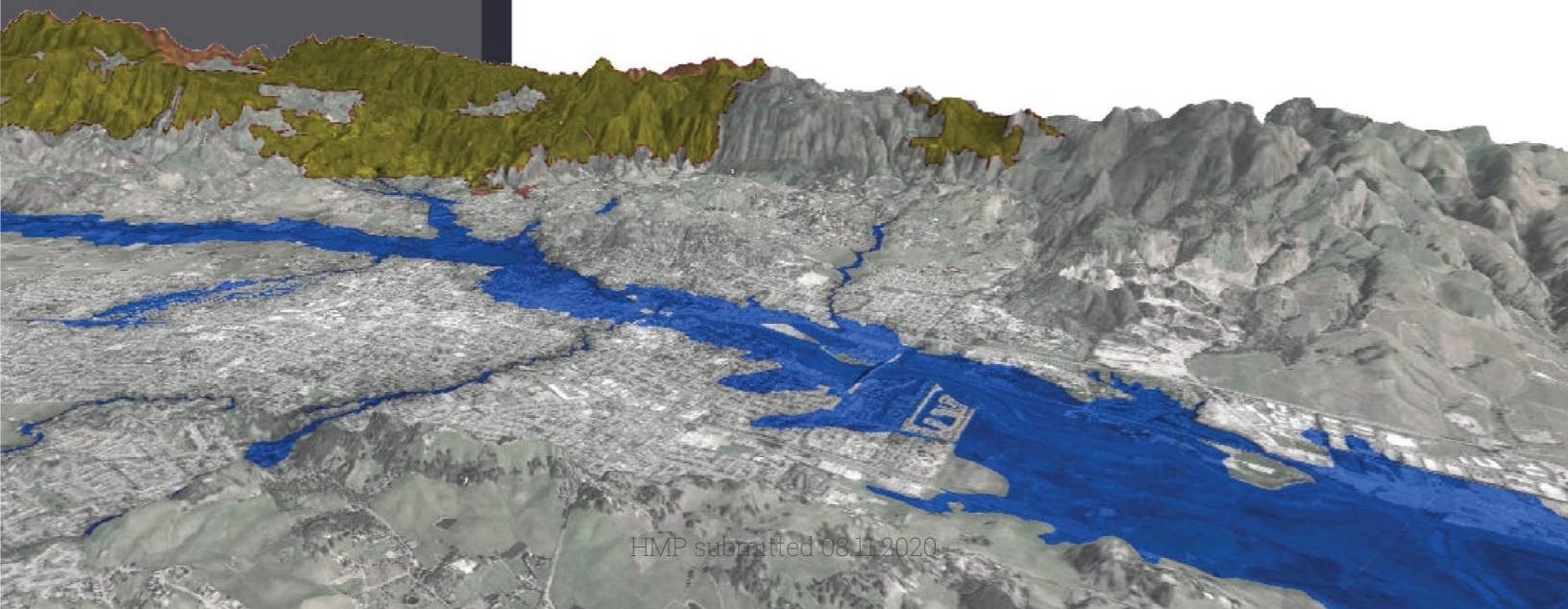
NAPA COUNTY

OPERATIONAL AREA

HAZARD MITIGATION PLAN

NAPA COUNTY OFFICE OF EMERGENCY SERVICES
1195 THIRD STREET B-20
NAPA, CA 94559



HMP submitted 08.11.2020

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U.S. Department of Homeland Security
FEMA Region IX
1111 Broadway, Suite 1200
Oakland, CA 94607

FEMA

August 13, 2020

Kevin Twohey
Emergency Services Coordinator
Napa County Office of Emergency Services
1195 Third Street b-20
Napa, CA 94559

Dear Mr. Twohey:

We have received documentation from all participating jurisdictions, confirming their adoption of the *Napa County Multi-Jurisdictional Hazard Mitigation Plan 2020 Update.* These jurisdictions are now in compliance with the planning requirements of the Disaster Mitigation Act of 2000.

The *Napa County Multi-Jurisdictional Hazard Mitigation Plan 2020 Update* is valid for five years from the approval date, August 13, 2020, for all approved participants. The plan must be reviewed, updated and submitted to FEMA Region IX for approval at least once every five years. An updated list of the current status of participating jurisdictions is enclosed with this letter.

The approval of this plan ensures all participating jurisdictions' continued eligibility for project grants under FEMA's Hazard Mitigation Assistance programs, including the Hazard Mitigation Grant Program, Building Resilient Infrastructure and Communities Program, and Flood Mitigation Assistance Program. All requests for funding, however, will be evaluated individually according to the specific eligibility, and other requirements of the particular program under which applications are submitted.

Also, approved hazard mitigation plans may be eligible for points under the National Flood Insurance Program's Community Rating System (CRS). Additional information regarding the CRS can be found at https://www.fema.gov/national-flood-insurance-program-community-rating-system or through your local floodplain manager.

If you have any questions regarding the planning or review processes, please contact the FEMA Region IX Hazard Mitigation Planning Team at fema-r9-mitigation-planning@fema.dhs.gov.

Sincerely,

for Juliette Hayes
Director
Mitigation Division
FEMA Region IX

Enclosure

cc: Jennifer Hogan, State Hazard Mitigation Officer, California Governor's Office of Emergency Services
Victoria LaMar-Haas, Hazard Mitigation Planning Chief, California Governor's Office of Emergency Services

Status of Participating Jurisdictions as of August 13, 2020

Jurisdictions – Adopted and Approved

#	Jurisdiction	Date of Adoption
1	Napa County	6/9/2020
2	City of American Canyon	6/2/2020
3	City of Calistoga	6/16/2020
4	City of St. Helena	6/9/2020
5	Town of Yountville	5/19/2020
6	Napa County Flood and Water Conservation District	6/9/2020
7	Napa County Office of Education	6/2/2020
8	Napa Valley College	6/9/2020
9	Howell Mountain Mutual Water Co	6/23/2020

Jurisdictions – Approvable Pending Adoption

#	Jurisdiction

Napa County

Multi-Jurisdictional Hazard Mitigation Plan

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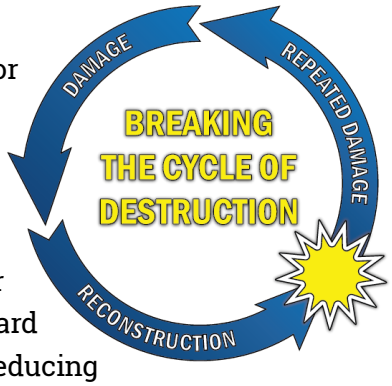
Executive Summary

NAPA COUNTY
OPERATIONAL AREA
HAZARD MITIGATION PLAN

NAPA COUNTY OFFICE OF EMERGENCY SERVICES
1195 THIRD STREET B-20
NAPA, CA 94559

Napa County prepared this hazard mitigation plan to guide County and City Officials and Special Districts Mangers in protecting the people and property within the County from the effects of natural disasters and hazard events. This plan demonstrates Napa County's commitment to reducing risk from natural hazards through mitigation and serves as a tool to direct County resources to achieve optimum results with available administrative, technical, and financial resources.



The term **"hazard mitigation"** refers to actions or strategies that can reduce or eliminate long-term risks caused by natural disasters. Mitigation activities can be developed, planned, and implemented before or after a disaster occurs. After disasters, repairs and reconstruction often are completed in such a way as to simply restore damaged property to pre-disaster conditions. These efforts may return property and infrastructure to "the norm", but the replication of pre-disaster conditions may result in a repetitive cycle of damage and reconstruction. Hazard mitigation planning in Napa County can break this repetitive cycle by reducing vulnerability to hazards through smart construction and proper planning of future development and critical infrastructure. Hazard mitigation activities can be conducted through a wide variety of mitigation strategies, such as construction of regional flood control projects or implementing fuel reduction around buildings within high wildfire risk areas.

What is a hazard mitigation plan?

This hazard mitigation plan provides an explanation of prevalent hazards within the County and how hazards may affect the County and participating cities and special districts differently based upon proximities to natural hazards. This plan also identifies risks to vulnerable assets, both people and property. Most importantly, the mitigation strategy presented in this plan responds to the identified vulnerabilities within each community and provides prescriptions or actions to achieve the greatest risk reduction based upon available resources. The County and participating jurisdictions through mitigation activities has an extreme desire to saved lives, reduced injuries, reduced property damage, and protect natural resources for future generations.

Why have a hazard mitigation plan?

The passage of the Disaster Mitigation Act in 2000 (DMA 2000) requires proactive pre-disaster planning as a condition of receiving certain federal financial assistance under the Robert T. Stafford Act. DMA 2000 encourages state and local authorities to work together on pre-disaster planning to assist local governments to accurately assess mitigation needs, resulting in faster allocation of funding and more cost-effective risk reduction projects under FEMA's Hazard Mitigation Assistance program. The purpose of this multijurisdictional hazard mitigation plan (MJHMP) is twofold. First, it provides the County and participating jurisdictions continued access to grant funding from the FEMA to conduct hazard mitigation activities for participating jurisdictions. Secondly, it provides resources for residents wishing to conduct

hazard mitigation efforts by identifying areas of extreme risk and providing financial and technical mitigation resources based upon current gaps.

Why is the plan updated so often?

As a DMA 2000 requirement, the plan must be updated every five years to remain in compliance with federal mitigation grant conditions. Federal regulations require hazard mitigation plans to include a plan for monitoring, evaluating, and updating the hazard mitigation plan. An update process provides an opportunity to reevaluate recommendations, monitor the impacts of actions that have been accomplished, and determine if there is a need to change the focus of mitigation strategies over time. Grant compliance is contingent on meeting the plan update requirements that are contained in the Code of federal regulations (CFRs). Jurisdictions that allow a plan to expire are not able to pursue funding under the Robert T. Stafford Act for which a current hazard mitigation plan is a prerequisite.

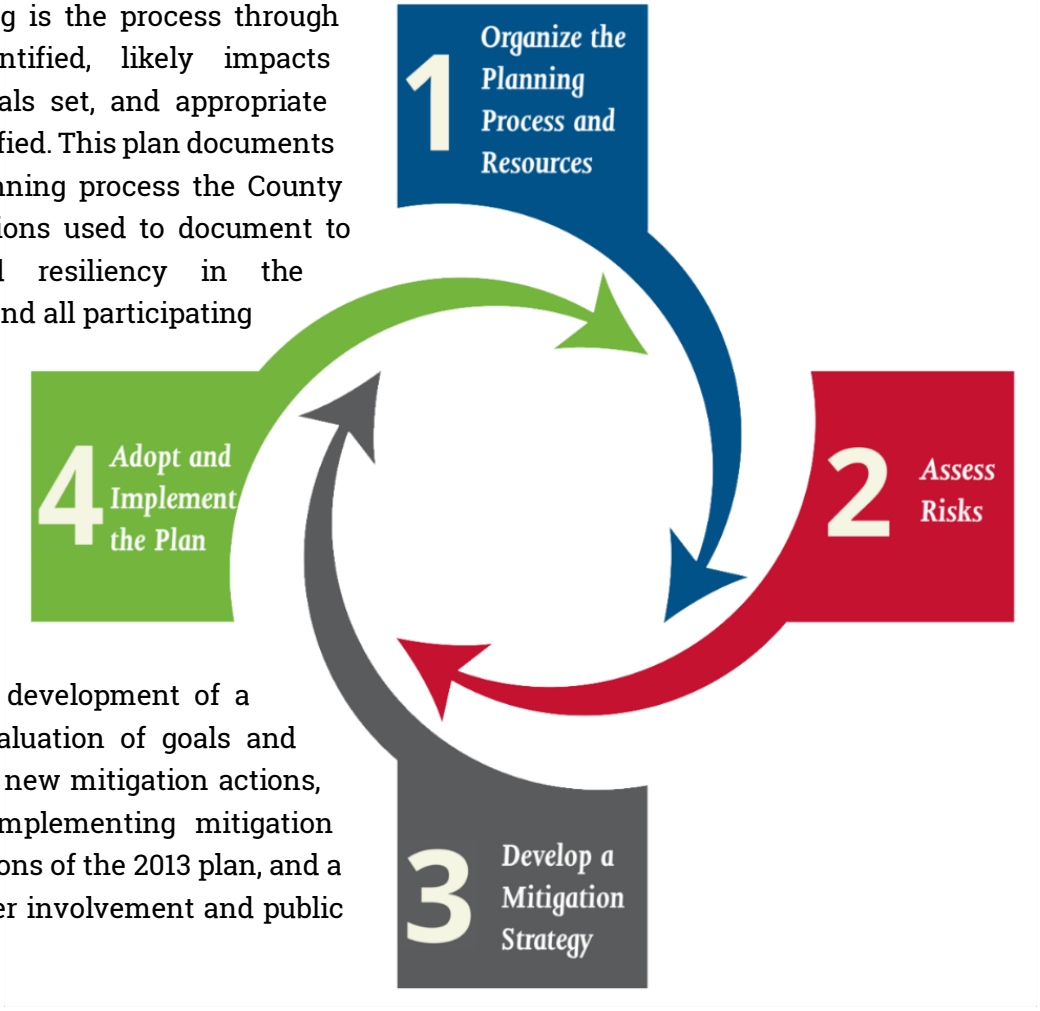
Participating Jurisdictions

The Napa County Multijurisdictional Hazard Mitigation Plan has multiple participating jurisdictions and geographically covers the entire area within Napa County (hereinafter referred to as the "planning area"). A planning partnership was formed to develop and steer content in this plan. This partnership consists of Napa County stakeholders and participating jurisdictions who have worked together to create the goals, objectives, mitigation strategies, and implementation methods to reduce risk. Any local government or non-profit agency with the ability to regulate building or infrastructure development or maintenance may participate in the planning process. However, to obtain FEMA approval, each of the local jurisdictions must meet all FEMA planning requirements outline in federal regulations at 44 CFR § 201.6 *et seq*. The following jurisdictions have elected to become participating jurisdictions as part of this plan update:

Napa County (Countywide)		Umbrella Plan: VOLUME 1
Municipalities	**Governmental Agencies or Districts**	
City of American Canyon	Napa County Flood Control and Water Conservation District	**Participating Jurisdictions:** **Volume 2**
City of Calistoga	Napa County Office of Education	
City of St. Helena	Napa Valley College	
Town of Yountville	Howell Mountain Mutual Water Company	

Plan Development and Update Methods

Hazard mitigation planning is the process through which hazards are identified, likely impacts determined, mitigation goals set, and appropriate mitigation strategies identified. This plan documents the hazard mitigation planning process the County and participating jurisdictions used to document to increase natural hazard resiliency in the community. Napa County and all participating jurisdictions followed the recommended FEMA four-step process to develop this 2020 update. This updated planning process included a re-organization of planning partners to provide clear delineation of jurisdictional information, development of a new risk assessment, revaluation of goals and objectives, development of new mitigation actions, new enhancements for implementing mitigation actions, updates to all sections of the 2013 plan, and a new website for stakeholder involvement and public information.

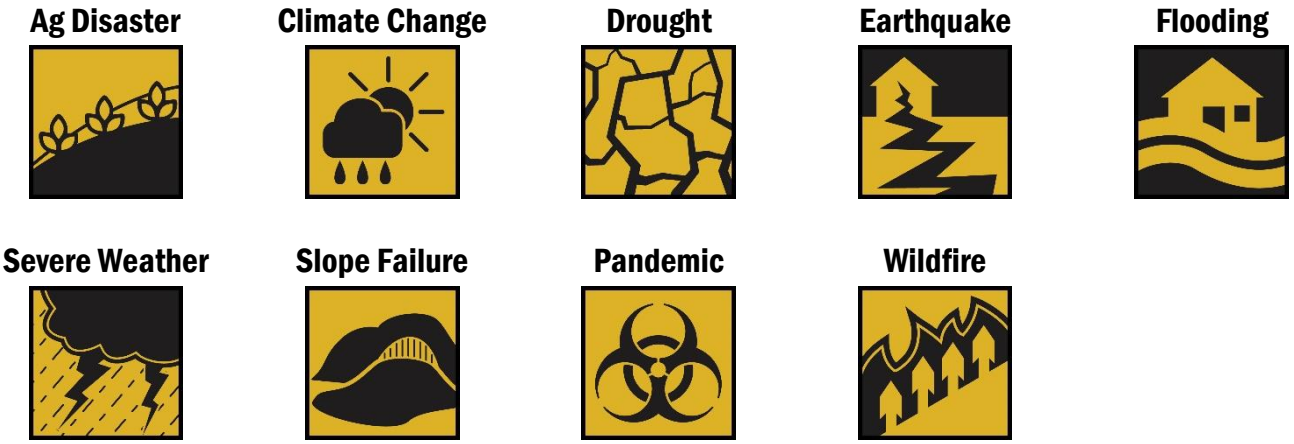


Risk Assessment

The risk assessment measures the potential loss of life, personal injury, economic injury, and property or infrastructure damage resulting from natural hazards in order to determine vulnerability. For this update, the risk assessment utilized new data and technologies that have become available since 2015. The County and participating jurisdictions used risk assessment information to rank risk and to gauge the potential impacts of each hazard of concern in the Operational Area. The risk assessment included:

- Hazard identification and profiling,
- An assessment of the impact of hazards on physical, social, and economic assets,
- Identification of particular areas of vulnerability, and
- Estimates of the cost of potential damage.

The following natural hazard threats were identified and profiled as County priority hazards:



Participating jurisdictions also individually assessed risks applicable to the jurisdiction. Some participating jurisdictions identified fewer than the County-identified hazards. Those jurisdiction-specific profiles are included in Volume 2 of this MJHMP.

Hazard Exposure and Damage Estimation

In Napa County, earthquakes, flooding, slope failure, dam failure, and wildfire have known geographic extents and corresponding spatial information, which make exposure and damage estimation possible. In order to describe vulnerability for each hazard, it is important to understand the total population and total assets at risk. This provides the estimated damage and losses expected during a "worst case scenario" event for each hazard.

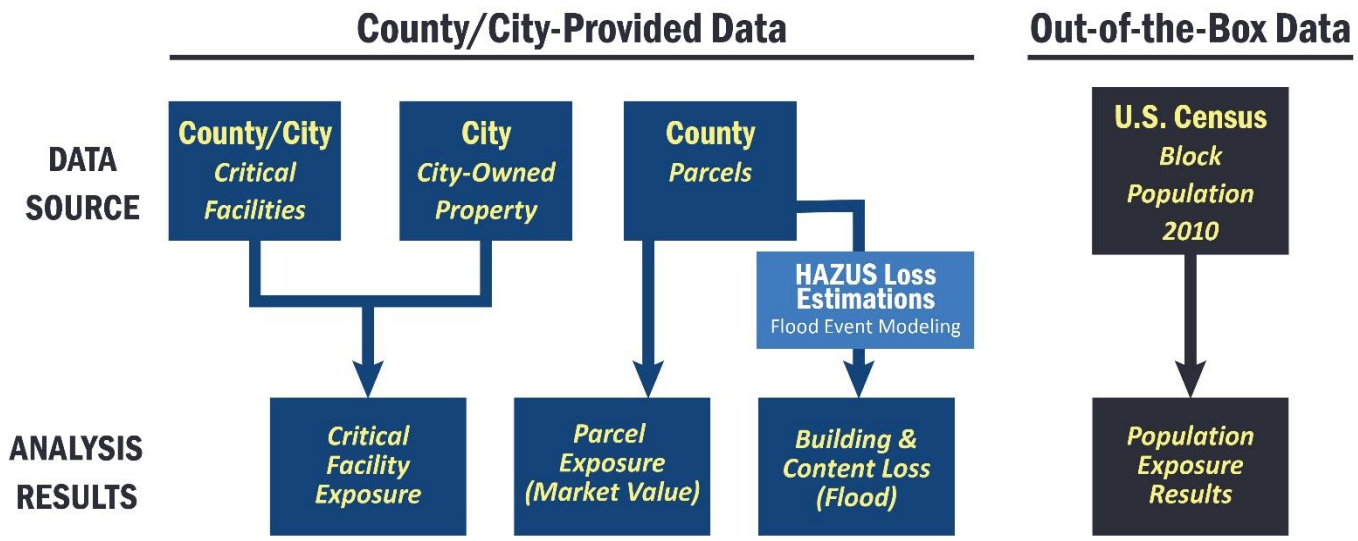


Figure ES- 1: Risk Assessment Methodology Summary

Population and Asset Exposure

The total counts of parcels, people, facilities, assets and the sum of values within the planning area which could be exposed to a hazard event is referred to as the "exposure" in this plan. A natural hazards overlay was developed to reflect the combination of many known natural hazard spatial footprints. The spatial overlay method enables summarization of building values, parcel counts, population exposure, and critical facility exposure within a hazard's geographic extents (see Figure ES- 2 exposure example). This method has been used to evaluate exposure for earthquakes, landslides, flooding, dam inundation, wildfire and sea level rise. For a more detailed explanation on Risk Assessment Methodologies, see Section 4.4 and 0.

Figure ES- 2: Exposure Explanation Graphic

Damage Assessments

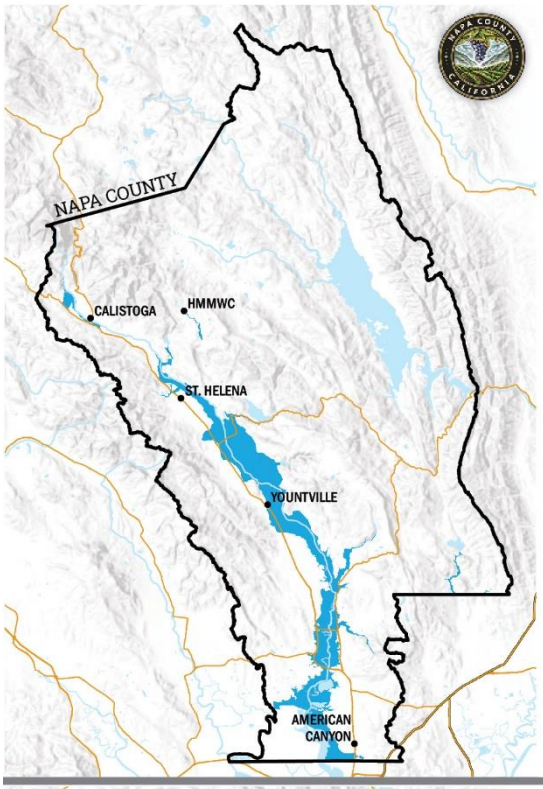
FEMA's Hazus software was used to conduct a detailed loss estimation for flood and earthquake. Hazus is a nationally-applicable, standardized methodology that contains models for estimating potential losses from earthquakes, floods, and hurricanes. Hazus uses Geographic Information Systems (GIS) technology to estimate physical, economic, and social impacts of disasters. For this planning effort, Hazus was used to generate damage estimations due to possible earthquakes and flooding. The estimated damage and losses provided by the Hazus Software is a "worst case scenario" event and provides the ability to understand possible widescale damage to buildings and facilities.

In the hypothetical map in Figure ES- 3, even though both structures are exposed to flooding, it is predicted that the structure with a first floor height below the depth of flooding will receive significantly more damage than the structure with a first floor height above the expected water depth. For a more detailed explanation on risk Assessment Methodologies see Section 4.4 and Appendix A.

Figure ES- 3: Hazus Damage Estimation Example

Summary of Vulnerable Assets: People, Value and Infrastructure

Hazards with spatial boundaries can be evaluated to demonstrate the amount of population, critical infrastructure, and parcels within each hazard's footprint. At-risk populations, critical infrastructure, improved parcels, and loss results for each hazard category are provided in bar chart summary tables throughout this Plan to evaluate the percentage of assets exposed to different types of hazards. The side-by-side comparison allows officials to evaluate the impacts of potential hazards to determine what hazards to direct energy and financial resource for mitigation activities. For detailed vulnerabilities assessment information see the individual hazard specific sections presented in Section 4.5. This Executive Summary provides map summaries for the profiled hazards.



DAM INUNDATION HAZARD

INUNDATION ZONE

NAPA COUNTY, CALOES

HAZARD EXPOSURE SUMMARIES*

POPULATION

COUNT OF PERSONS

4,183 12%

PARCEL

COUNT

1,708 12%

PARCEL VALUE

SUM OF IMPROVEMENT

$1,370,643,525 15%

SUM OF CONTENT

$1,417,846,353 16%

CRITICAL INFRASTRUCTURE

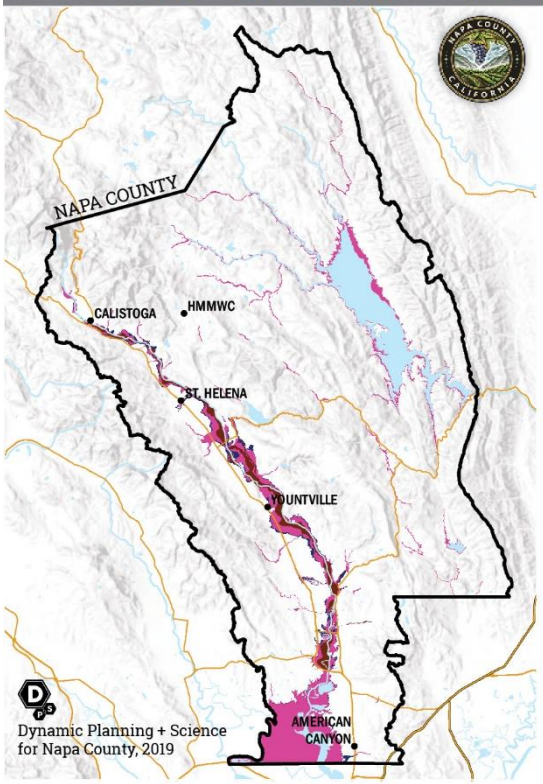
POINT COUNT

Essential Facilities	**8**	17%
High Potential Loss	**192**	18%
Transportation & Lifeline	**377**	9%

LINEAR MILEAGE

Transportation & Lifeline	**243**	11%

*Exposure summaries include all dam inundation areas. Hazard data sources: Napa County, CalOES.



FEMA FLOOD ZONE HAZARD

100-YR **100-YR FLOODWAY**

500-YR

FEMA NATIONAL FLOOD HAZARD LAYER

HAZARD EXPOSURE SUMMARIES*

POPULATION

COUNT OF PERSONS

4,068 12%

PARCEL

COUNT

1,096 7%

PARCEL VALUE

SUM OF IMPROVEMENT

$849,176,624 9%

SUM OF CONTENT

$848,144,383 9%

CRITICAL INFRASTRUCTURE

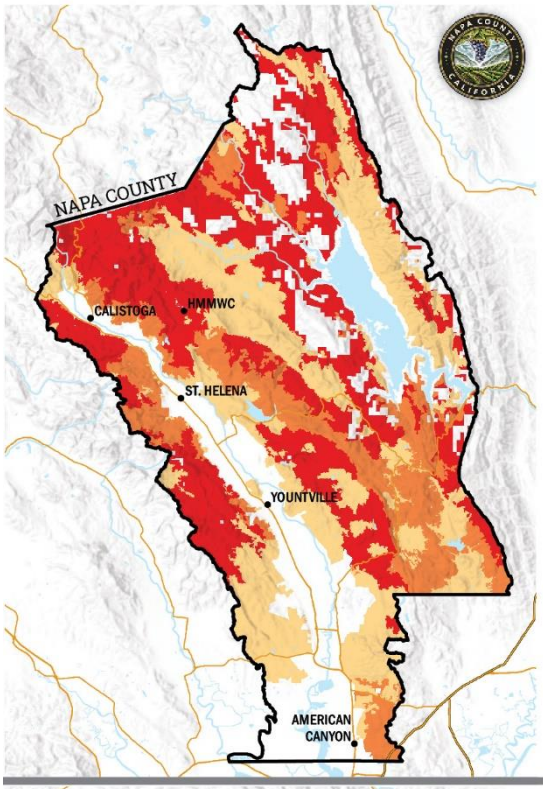
POINT COUNT

Essential Facilities	**4**	8%
High Potential Loss	**102**	10%
Transportation & Lifeline	**407**	10%

LINEAR MILEAGE

Transportation & Lifeline	**271**	13%

*Exposure summaries include 100-year and 500-year flood zone areas. Hazard data sources: FEMA National Flood Hazard Layer.



WILDFIRE THREAT HAZARD

MODERATE
HIGH
VERY HIGH

CAL FIRE WILDFIRE HAZARD SEVERITY ZONE

HAZARD EXPOSURE SUMMARIES*

POPULATION

COUNT OF PERSONS

12,241 36%

PARCEL

COUNT

5,531 38%

PARCEL VALUE

SUM OF IMPROVEMENT

$2,358,845,867 26%

SUM OF CONTENT

$2,164,573,909 24%

CRITICAL INFRASTRUCTURE

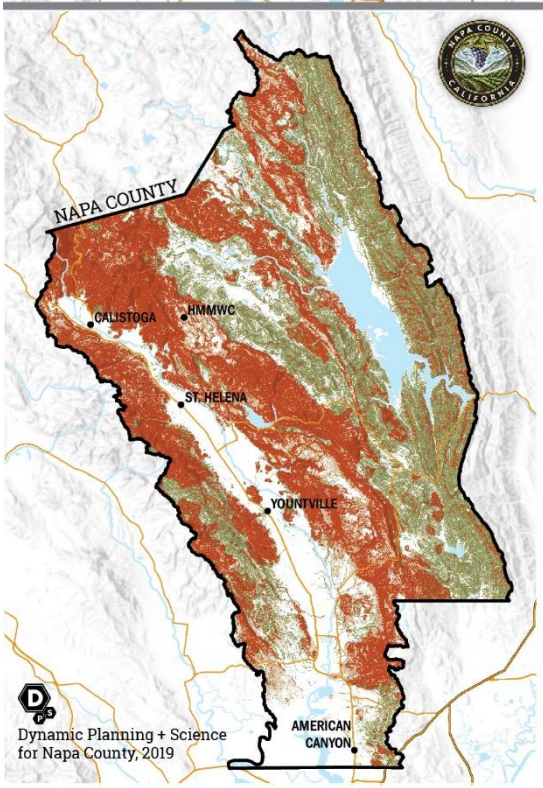
POINT COUNT

Essential Facilities	14	29%
High Potential Loss	241	23%
Transportation & Lifeline	1,484	36%

LINEAR MILEAGE

Transportation & Lifeline	714	33%

*Exposure summaries include high and very high LRA and SRA zones. Hazard data sources: Cal Fire Wildfire Hazard Severity Zone.



LANDSLIDE SUSCEPTIBILITY

LOW
MODERATE
HIGH

CALIFORNIA GEOLOGICAL SURVEY

HAZARD EXPOSURE SUMMARIES*

POPULATION

COUNT OF PERSONS

10,717 31%

PARCEL

COUNT

2,501 17%

PARCEL VALUE

SUM OF IMPROVEMENT

$1,562,439,625 17%

SUM OF CONTENT

$1,553,387,268 17%

CRITICAL INFRASTRUCTURE

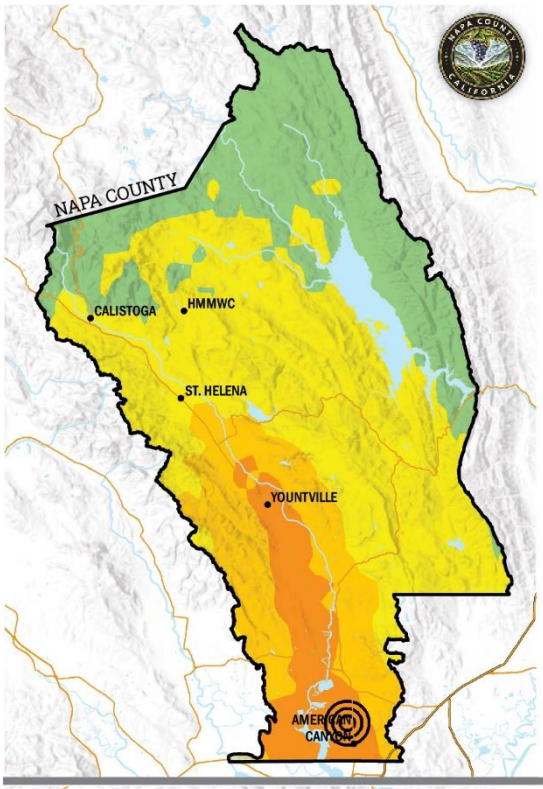
POINT COUNT

Essential Facilities	3	6%
High Potential Loss	175	17%
Transportation & Lifeline	758	19%

LINEAR MILEAGE

Transportation & Lifeline	416	19%

*Exposure summaries include high susceptibility only. Hazard data sources: California Geological Survey.



EARTHQUAKE SHAKING HAZARD

WEST NAPA M 6.7 SCENARIO

III	IV	V	VI	VII	VIII	IX	X
WEAK	LIGHT	MODERATE	STRONG	VERY STRONG	SEVERE	VIOLENT	EXTREME

MMI

USGS

HAZARD EXPOSURE SUMMARIES*

POPULATION

COUNT OF PERSONS

32,807 96%

PARCEL

COUNT

13,855 95%

PARCEL VALUE

SUM OF IMPROVEMENT

$9,024,317,778 98%

SUM OF CONTENT

$8,964,188,585 98%

CRITICAL INFRASTRUCTURE

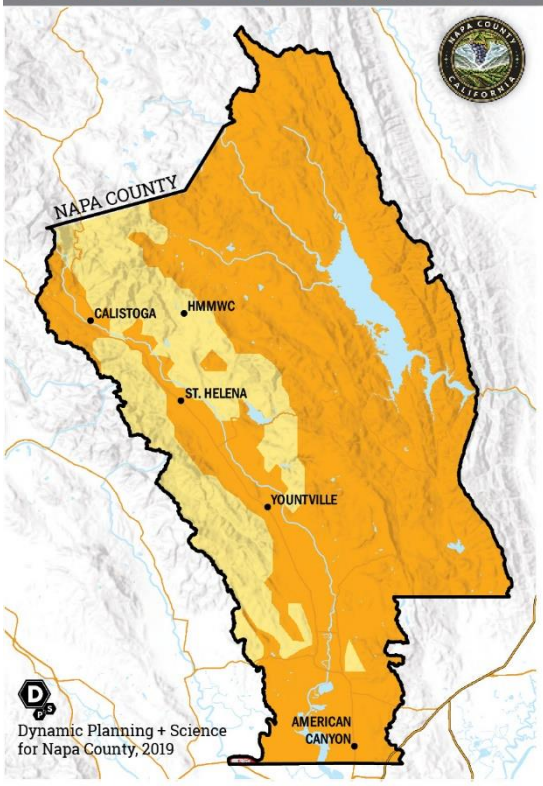
POINT COUNT

Essential Facilities	47	98%
High Potential Loss	1,002	96%
Transportation & Lifeline	3,657	89%

LINEAR MILEAGE

Transportation & Lifeline	1,895	88%

*Exposure summaries include severe and very strong MMI classes. Hazard data sources: USGS.



EARTHQUAKE SHAKING HAZARD

PHSA PROBABALISTIC SCENARIO

III	IV	V	VI	VII	VIII	IX	X
WEAK	LIGHT	MODERATE	STRONG	VERY STRONG	SEVERE	VIOLENT	EXTREME

MMI

USGS, ABAG

HAZARD EXPOSURE SUMMARIES*

POPULATION

COUNT OF PERSONS

34,147 100%

PARCEL

COUNT

14,649 100%

PARCEL VALUE

SUM OF IMPROVEMENT

$9,233,267,966 100%

SUM OF CONTENT

$9,140,441,984 100%

CRITICAL INFRASTRUCTURE

POINT COUNT

Essential Facilities	48	100%
High Potential Loss	1,045	100%
Transportation & Lifeline	4,094	100%

LINEAR MILEAGE

Transportation & Lifeline	2,157	100%

*Exposure summaries include violent and severe MMI classes. Hazard data sources: USGS, ABAG.

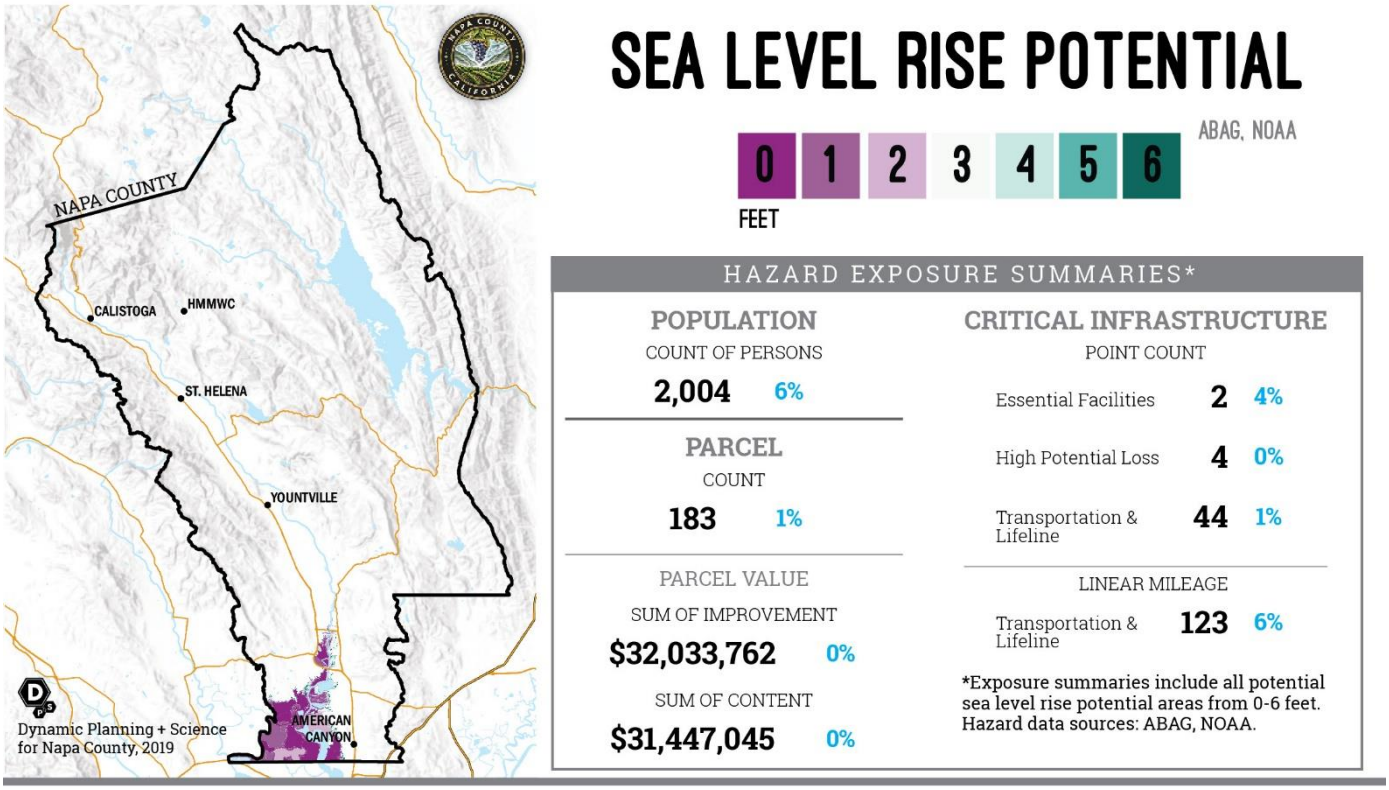


Table ES- 1: Unincorporated County Snap Shots

Mitigation Goals

The Steering Committee reviewed and updated the goals from the 2014 Napa County Hazard Mitigation Plan and confirmed a set of objectives. The following guiding principle guided the Steering Committee and planning partners in selecting actions contained in this plan update:

Goal 1: Reduce deaths, injuries and structural damage through the use of planning, regulations and preventative measures.

Goal 2: Reduce deaths, injuries and structural damage through the use of public education and awareness programs.

Goal 3: Reduce deaths, injuries and structural damage through the use of natural resource/ systems protection.

Goal 4: Reduce deaths, injuries and structural damage through the use of structural/ infrastructure projects.

Goal 5: Reduce deaths, injuries and structural damage through the use of emergency services in relation to natural hazards.

Mitigation Strategy

The mitigation strategies and activities designed to reduce or eliminate losses resulting from natural hazards are the centerpiece of the mitigation planning process. Through the mitigation actions, participating jurisdictions will become more resilient to disasters. Action in this plan may or may not be geared toward grant funding under HMA. Rather, the focus was the initiatives' effectiveness in achieving the goals of the plan within each jurisdiction's capabilities.

Participating jurisdictions individually selected a range of appropriate mitigation actions to work toward achieving the MJHMP's goals, compiled in Volume 2. In addition, the Steering Committee and participating jurisdictions identified countywide actions benefiting the whole partnership, as listed in Volume 1. These initiatives also are summarized in the following tables.

County Wide Priority Mitigation Actions

Mitigation No.	Hazard Type	Description
NC-56-2020	Ag Disaster	Allow disaster management issues within the agricultural sector to be addressed at more localized levels.
NC-57-2020	Ag Disaster	Offer agricultural disaster training and networking opportunities for farmers and ag regulatory agencies.
CL-14-2020	All Hazard	Develop microgrids to provide emergency power during natural disasters.
NC-09-2013	All Hazard	Hardening and building redundant (power and other) capability into Public Safety buildings.
NC-11-2020	All Hazard	Construct/Install back up power generators for fire stations, pump houses, emergency shelters and cooling centers.
NC-32-2020	All Hazard	Develop a "Natural Hazard Awareness Week" campaign and conduct corresponding outreach to the community and all interested parties. Activities will focus on flooding and other natural hazards, including associated hazard functions, governing laws/regulations, mitigation strategies and precautions. Outreach will also be conducted throughout the year, wherever possible.
SH-06-2020	All Hazard	Inform residents and tourists of shelter locations and evacuation routes and procedures for storing or taking valued items before large scale evacuations.
SH-07-2020	All Hazard	Develop microgrids to provide emergency power during natural disasters.
SH-12-2020	All Hazard	Provide hazard mitigation information (e.g. ways to reduce risk) to first responders living within hazard-prone areas.
AC-04-2020	Climate Change	Plan for and construct sea level rise protection for American Canyon Critical Infrastructure such as Public Works Yard, Sewer Treatment Plant, and Pump Station.
CL-08-2020	Climate Change	Map and identify locations and implement fuel reduction projects in high risk areas in the City such as the areas west of Highway 128.
NC-20-2020	Climate Change	Support ongoing analysis of sea-level rise data.
NC-21-2020	Climate Change	Create a comprehensive outreach strategy that informs residents in potentially affected areas of County efforts to protect and increase community resiliency to sea-level rise.
NC-24-2020	Climate Change	Construct or identify existing locations for cooling centers near farmworker populations.
NC-25-2020	Climate Change	Develop air conditioning replacement/reimbursement program for low income and elderly residents.
NC-27-2020	Climate Change	Support risk assessments in relation to warmer climate on the agriculture and wine industries.
NC-28-2020	Climate Change	Construct and develop alternative water supplies to augment single sources of water delivery.
NC-29-2020	Climate Change	Construct rainwater catchment systems to recharge groundwater in government ROWs.
AC-02-2020	Drought	Require mandatory water conservation measures during drought emergencies.

CL-04-2020	Drought	During Drought conditions increase fuel reduction in parks and open space areas.
CL-09-2020	Drought	Augment City water supply systems with supply contingency projects for Drought years, such as increasing water supply and treatment capacity of Kimball Reservoir. Contingency planning/projects will include provisions for ag sector.
NC-16-2020	Drought	Develop a public education campaign to encourage water conservation during drought.
NC-17-2020	Drought	Install water monitoring devices on government-owned facilities.
NC-18-2020	Drought	Install drought tolerant landscaping at government-owned facilities.
NC-22-2020	Drought	Amend or revise water conservation regulations for landscape design.
NC-23-2020	Drought	Adopt a new water conservation ordinance for commercial and residential land uses limiting outdoor watering.
NCOE-01-2020	Drought	Retrofit water supply systems in order to improve water supply and delivery and conserve water.
SH-15-2020	Drought	Develop landscape planting procedures and planting plans for residents and business wishing to reduce water usage through landscape design.
SH-16-2020	Drought	During drought conditions increase fuel reduction in parks and open space areas.
YV-01-2020	Drought	Increase engagement between the fire and drought communities.
AC-05-2013	Earthquake	Develop a public outreach program for mitigation of earthquake risk for residents of American Canyon proper.
AC-06-2020	Earthquake	Retrofit critical facilities that are vulnerable to extreme and violent shaking.
CL-12-2020	Earthquake	Retrofit critical facilities that are vulnerable to failure during extreme and violent shaking.
CL-13-2020	Earthquake	Develop a public outreach program for mitigation of earthquake risk for residents of Calistoga proper.
NC-10-2013	Earthquake	Earthquake month public education program. Develop a comprehensive public outreach program for earthquake risk reduction for Napa County Residents.
NC-51-2020	Earthquake	Encourage privately owned critical facilities (e.g. churches, hotels, other gathering facilities) to evaluate the ability of the buildings to withstand earthquakes and to address any deficiencies identified.
NC-52-2020	Earthquake	Retrofit / Harden County-owned critical facilities and buildings and their ability to withstand earthquakes.
NC-54-2020	Earthquake	Adopt and enforce updated building codes to reduce earthquake damage to structures.
NCOE-02-2020	Earthquake	Retrofit / Harden Main Office to withstand extreme and violent earthquakes.
NVC-02-2020	Earthquake	Encourage communities and constituents to participate in the Great California ShakeOut. Continue staff EOC and emergency messaging training.
NVC-04-2020	Earthquake	Design and construct new critical facilities to higher than the minimum seismic standards required by building codes, especially for facilities that may serve as emergency shelters or their public infrastructure.
NVC-05-2013	Earthquake	Research geological soil makeup of lower tier of campus to determine if additional structural mitigation steps are necessary.

SH-14-2020	Earthquake	Develop resource kits for mitigation of earthquake risk for residents of St. Helena proper. This includes targeted outreach and project development for adult care providers, private schools and other gathering facilities.
YV-06-2020	Earthquake	Earthquake month public education program
AC-01-2013	Flood	Elevate 100 of the most flood prone residential structures along areas not receiving direct protection from Measure "A" Flood Project. Provide flood mitigation resource (e.g. ways to reduce flood risk) to residents within the American Canyon Mobile Home Park (68 parcels).
AC-07-2020	Flood	Inform American Canyon residents and in-home Adult Care providers of possible flooding during "major" flood events.
CL-01-2013	Flood	Implement localized flood reduction projects or flood-proof 100 of the most flood-prone residential structures along with areas "not" receiving direct protection from Measure "A" Flood Project in the City of Calistoga.
CL-10-2013	Flood	Routinely inspect and maintain storm water inlets and outfalls for debris and obstructions, sand & gravel build-up, and structural damage or vandalism.
CL-11-2020	Flood	Develop a localized remap of the floodplain, flood projects, or flood-proofing for Critical Facilities within the City. Specifically north of Lincoln Avenue.
NC-01-2013	Flood	Mitigate flood risk for flood-prone residential structures along areas not receiving direct protection from Measure "A" Flood Project.
NC-30-2020	Flood	Develop a public outreach program that informs property owners located in the dam or levee inundation areas about voluntary flood insurance (preferred risk policies).
NC-31-2020	Flood	Increase participation in the NFIP.
NC-33-2020	Flood	Draft stream channel ordinance that would place responsibility for maintenance on the property owner and give Napa enforcement power.
NC-34-2020	Flood	Construct, install and maintain warning gauges on local dams as the opportunity or need arises.
NC-35-2020	Flood	Improve risk assessments for dams located within the county.
NC-37-2020	Flood	Complete an inventory of all publicly-owned stormwater facilities.
NC-38-2020	Flood	Create an inventory and establish a priority list for culvert replacement that takes into account fish passage, flood depth reduction, and future losses avoided.
NC-39-2020	Flood	Relocate farmwork centers from flood risk areas.
NC-46-2020	Flood	Elevate and or retrofit bridges, culverts to allow proper stormwater / 100-YR flows.
NC-47-2020	Flood	Mitigate flood risk to NFIP repetitive loss properties.
NC-48-2020	Flood	Construct / improve stormwater basins County-wide to accomplish 100-YR protection .
NC-50-2020	Flood	Adopt higher regulatory standards (including but not limited to freeboard, comp storage, lower substantial damage thresholds, setbacks and fill restrictions) as means to reduce future flood risk and support a no-adverse-impact philosophy of floodplain management.
NFC-01-2013	Flood	Maintain Countywide Storm Watch System
NFC-02-2013	Flood	Completion of the Measure "A" Flood Control Project

NFC-03-2013	Flood	Routinely inspect storm water channels for vegetation build up or encroachment, trash and debris, silt and gravel build up, and erosion or bank failure and maintain said channels permitted by California Department of Fish and Wildlife.
NFC-04-2013	Flood	Secure grant funding to develop and implement a river restoration program that would reduce flood damages and increase environmental quality on the river, maintain fish habitat, decrease impediment to drainage by preventing silt build-up and loss of stream bed capacity.
NVC-01-2013	Flood	Routinely inspect storm water channels an inlets for vegetation build up or encroachment, trash and debris, silt and gravel build up, and erosion or bank failure and maintain said channels permitted by California Department of Fish and Game.
SH-01-2020	Flood	Provide flood protection resources to residents on the Napa River to reduce flood losses. Resources could include technical, education and grant application assistance for floodproofing properties.
SH-04-2020	Flood	Provide flood mitigation resources (e.g. ways to reduce flood risk) to residents within the Vineyard Valley Mobile Home Park.
SH-13-2020	Flood	Improve stormwater drainage system capacity and maintenance for Pratt and Pope Street bridges in St. Helena.
YV-02-2020	Flood	Develop evacuation plans for communities and residents downstream from the Rector Creek Dam.
YV-03-2020	Flood	Identify properties that are potential candidates for elevation, relocation or buyout based on an evaluation of flood risks, project feasibility, and planned flood risk reduction capital projects.
YV-04-2020	Flood	Secure grant funding to develop and implement river restoration program that would reduce flood damages and increase environmental quality on the river, maintain fish habitat, decrease impediment to drainage by preventing silt build up and loss of stream bed capacity.
YV-07-2020	Flood	Invest in flood prediction and forecast modeling to support all facets of the Napa County floodplain management program, including, but not limited to, flood hazard identification, flood threat recognition in support of flood notification programs, climate change adaptation, and risk assessment.
YV-08-2020	Flood	Enhance the existing flood notification program to achieve real-time flood threat recognition capability.
NC-40-2020	Pandemic	Increase the capacity of existing hospitals through retrofits or upgrades such as isolation wings.
NC-43-2020	Pandemic	Retrofit critical care facilities with enhanced HVAC and isolation areas.
CL-02-2020	Severe Weather	Establish tree pruning / removal standards for above ground utilities lines within City limits.
CL-07-2020	Severe Weather	Identify schools that have been designated as emergency shelters by the Red Cross within City Limits and ensure they have sufficient back up power generators.
NC-12-2020	Severe Weather	Organize outreach to vulnerable populations, including establishing and promoting accessible shelters in the community.
NC-13-2020	Severe Weather	Develop a public information campaign on 72-hour kits.

NC-15-2020	Severe Weather	Procure backup generators in the event that public meeting spaces such as community centers or town halls will be used as Emergency Command Centers. Perform regular maintenance on generators at water treatment plants.
NC-41-2020	Slope Failure	Establish a priority list of slope failure locations and implement slope stabilization projects in the highest risk areas.
NC-42-2020	Slope Failure	Construct a slope stabilization project to protect the Angwin VFD storage facility.
AC-03-2013	Wildfire	Maintain and Further Develop the Fuel Reduction Program to include provisions for Legacy High School fuel breaks.
CL-03-2013	Wildfire	Retrofit Critical Public Safety Infrastructure.
CL-05-2013	Wildfire	Revise the General Plan Safety Element with lessons learned from to include new information from HMP and Fire-wise programs and analysis.
CL-06-2013	Wildfire	Focus on human causes of ignition and address the problem through education and enforcement actions. Develop "mitigation" resources for residents in high hazard areas including incentives for fuel reduction and building material retrofits.
NC-03-2020	Wildfire	Continue technical and financial assistance to private property owners to implement fuel reduction projects.
NC-04-2013	Wildfire	Develop & conduct a Defensible Space community education program.
NC-05-2013	Wildfire	Draft & promulgate Defensible Space Ordinance.
NC-06-2013	Wildfire	Foster & form neighborhood based Firewise Councils through grant writing.
NC-07-2013	Wildfire	Retrofit critical public safety infrastructure with fire resistant materials and or create defensible space around structures.
NC-08-2013	Wildfire	Focus on human causes of ignition and address the problem through education and enforcement actions, to include vigorous investigation and prosecution of arson.
NC-19-2020	Wildfire	Conduct prescribed burns as part of wildfire mitigation strategy.
NC-44-2020	Wildfire	Retrofit care facilities (adult care, child care) with fire-resistant materials and or create defensible space around structures.
NC-45-2020	Wildfire	Complete vegetation management projects as prescribed in CWPPs.
NC-49-2020	Wildfire	Construct shaded fuel breaks and complete roadside treatment projects as prescribed in CWPPs.
NC-53-2020	Wildfire	Install proper addressing in rural areas to assist in wildfire emergencies.
NC-55-2020	Wildfire	Work with utility providers to move above ground lines underground.
NC-58-2020	Wildfire	Construct or improve egress for wildfire emergencies in wildland urban interface (WUI) areas.
SH-02-2020	Wildfire	Provide smoke/air quality mitigation measures for Critical Facility Air Intakes.
SH-03-2020	Wildfire	Implement fuel reduction projects to reduce impacts to homes and businesses.
SH-05-2020	Wildfire	Retrofit At-Risk Structures with Ignition-Resistant Materials or Require or Encourage Fire-Resistant Construction Techniques.
SH-08-2020	Wildfire	Develop and or share outreach material on air quality mitigation measures for residents before wildfire season.
SH-09-2020	Wildfire	Implement fuel reduction/building retrofit projects to limit combustibility to school facilities.

SH-10-2020	Wildfire	Develop Public awareness information for wildfire season related to flame/sparking equipment.
YV-05-2020	Wildfire	Work with local agencies to develop evacuation plans and provide education and outreach to populations vulnerable to wildfire.
NVC-07-2020	Flood	Storm water collection location check valves
HM-01-2020	Earthquake	Retrofit / HMMWCO Critical Facilities and buildings and their ability to withstand earthquakes.
HM-02-2020	All Hazard	Construct/Install back up power generators or alternative communication systems to mitigate the potential for power outages or loss of cell service during emergencies.
HM-03-2020	Drought	Develop a public education campaign to encourage water conservation during drought.
HM-04-2020	Wildfire	Develop alternative sources of water for emergency supply purposes such as for fighting wildfires.
HM-05-2020	All Hazard	Develop alternate access and evacuation routes to ensure critical facilities are accessible during emergencies.
HM-06-2020	All Hazard	Water Quality may be affected by natural hazard events.
HM-07-2020	Flood	Retrofit dams to reduce the risk of failure.
HM-08-2020	Climate Change	Severe weather may cause increased flooding in the District.

Mitigation Action Implementation

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

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

Full implementation of the recommendations of this plan will take time and resources. The measure of the plan's success will be the coordination and pooling of resources within the participating jurisdictions. Keeping this coordination and communication intact will be the key to the successful implementation of this plan. Teaming together to seek financial assistance at the state and federal level will be a priority to initiate projects that are dependent on alternative funding sources. This plan was built upon the effective leadership of a multi-disciplined steering committee and a process that relied heavily on public input and support. The plan will succeed for the same reasons.

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Adoption Records

To comply with DMA 2000, the County Board of Supervisors and participating jurisdictions have officially adopted this Napa County Multi-Jurisdictional Hazard Mitigation Plan Volume 1 and Volume 2. The adoption of the MJHMP in its entirety recognizes the jurisdictions' commitment to reducing the impacts of natural hazards within the Cities and County. See below record of Adoption.

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Napa County Adoption Record

RESOLUTION 2020-76

A RESOLUTION OF THE NAPA COUNTY BOARD OF SUPERVISORS, ADOPTING THE 2020 MULTI-JURISDICTIONAL HAZARD MITIGATION PLAN FOR NAPA COUNTY AS THE COUNTY'S OFFICIAL PLAN

WHEREAS, Napa County, a political subdivision of the State of California, is an official participating jurisdiction of the 2020 Napa County Multi-Jurisdictional Hazard Mitigation Plan ("MJHMP"); and

WHEREAS, Napa County recognizes the MJHMP as the official hazard mitigation plan for the County and participating jurisdictions; and

WHEREAS, Napa County has gathered information and prepared the MJHMP in accordance with Federal Emergency Management Agency (FEMA) requirements set forth in 44 C.F.R. § 201.6; and

WHEREAS, Napa County Annex in Vol 2 of the MJHMP recognizes the threat that natural hazards pose to people and property within our community; and

WHEREAS, Napa County has reviewed the MJHMP and affirms that the Plan actions in Napa County's Annex will reduce the potential for harm to people and property from future hazard occurrences within our community; and

WHEREAS, Congress passed the Disaster Mitigation Act of 2000 ("Disaster Mitigation Act") emphasizing the need for pre-disaster mitigation of potential hazards; and

WHEREAS, the Disaster Mitigation Act made available mitigation grants to state and local governments; and

WHEREAS, an adopted multi-hazard 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 Board of Supervisors fully participated in the FEMA-prescribed mitigation planning process to prepare the MJHMP; and

WHEREAS, citizens were afforded opportunities to comment and provide input on the MJHMP and the actions in the Plan; and

WHEREAS, Napa County, as a fully participating jurisdiction of the MJHMP, is an eligible sub-applicant to the State of California under FEMA's hazard mitigation grant program guidance; and

WHEREAS, the California Office of Emergency Services (Cal OES), and the FEMA Region IX officials have reviewed the MJHMP and approved it contingent upon this official adoption by the participating governing body; and

Napa County Adoption Record

WHEREAS, the Board of Supervisors desires to comply with the requirements of the Disaster Mitigation Act and to augment its emergency planning efforts by formally adopting the MJHMP; and

WHEREAS, adoption by the Board of Supervisors for Napa County demonstrates the jurisdiction's commitment to fulfilling the mitigation goals and objectives outlined in the MJHMP; and

WHEREAS, adoption of the Plan helps to coordinate responsible agencies to carry out their responsibilities under the MJHMP.

NOW, THEREFORE, BE IT RESOLVED by the Board of Supervisors of Napa County:

1. That Napa County adopts the 2020 Multi-Jurisdictional Hazard Mitigation Plan Vol. 1 for Napa County and Napa County Annex in Vol. 2, as approved by FEMA and Cal OES, as the Mitigation Plan for Napa County.

2. That the Board of Supervisors authorizes the County Emergency Services Coordinator to submit an approved and signed copy of this resolution to the Cal OES and for FEMA Region IX officials to enable the Plan's final approval.

THE FOREGOING RESOLUTION WAS DULY AND REGULARLY ADOPTED by the Napa County Board of Supervisors, State of California, at a regular meeting of the Board held on the 9th day of June 2020 by the following vote:

AYES:	SUPERVISORS	GREGORY, PEDROZA, WAGENKNECHT, RAMOS and DILLON
NOES:	SUPERVISORS	NONE
ABSTAIN:	SUPERVISORS	NONE
ABSENT:	SUPERVISORS	NONE

NAPA COUNTY, a political subdivision of the State of California

By: Diane Dillon

DIANE DILLON, Chair of the Board of Supervisor

Napa County Adoption Record

APPROVED AS TO FORM Office of County Counsel By: *S. Darbinian* Date: May 19, 2020	APPROVED BY THE NAPA COUNTY BOARD OF SUPERVISORS Date: June 9, 2020 Processed by: Deputy Clerk of the Board	ATTEST: JOSE LUIS VALDEZ Clerk of the Board of Supervisors By:

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City of American Canyon Adoption Record

RESOLUTION NO. 2020-44

A RESOLUTION OF THE CITY COUNCIL OF THE CITY OF AMERICAN CANYON APPROVING THE 2020 NAPA COUNTY MULTI-JURISDICTIONAL HAZARD MITIGATION PLAN

WHEREAS, participating jurisdictions and public agencies within Napa County, including the City of American Canyon ("City"), have prepared the Napa County Multi-Jurisdictional Hazard Mitigation Plan ("Mitigation Plan") in efforts to implement better mitigation planning and projects for the entire County of Napa; and

WHEREAS, preparation of the Mitigation Plan was overseen by the Multi-Jurisdictional Hazard Mitigation Plan Planning Committee, comprised of representatives from each participating jurisdiction, and development of the Mitigation Plan was aided by consultants from the firm Dynamic Planning + Science, as well as staff of the Napa County Office of Emergency Services; and

WHEREAS, the Mitigation Plan has been submitted to the California Office of Emergency Services and the Federal Emergency Management Agency for review and comment; and

WHEREAS, each jurisdiction participating in the Mitigation Plan and the public have contributed to this planning approach, consistent with applicable law, including the Federal Disaster Mitigation Act of 2000 ("DMA"), as amended; and

WHEREAS, fire protection, fire prevention, and emergency response services within the City are provided by the American Canyon Fire Protection District ("District"), a subsidiary special district of the City, which has also participated in the formulation of the Mitigation Plan; and

WHEREAS, the District has, by resolution, adopted the draft 2020 Mitigation Plan, which is now presented to the City for ratification and adoption; and

WHEREAS, the City has read and agrees to abide by the DMA's guidance and grant guidelines, and this Mitigation Plan represents the compliance with same; and

NOW, THEREFORE THE CITY COUNCIL OF THE CITY OF AMERICAN CANYON RESOLVES that the 2020 Napa County Operational Hazard Mitigation Plan, as shown on the following webpage: www.cityofamericancanyon.org/hazardmitigationplan is formally adopted by the City of American Canyon and shall be used to enhance the community's preparation for, and resistance to, disasters.

City of American Canyon Adoption Record

PASSED, APPROVED and **ADOPTED** at a regularly scheduled meeting of the City Council of the City of American Canyon held on the 2nd day of June, 2020, by the following vote:

AYES:	Council Members Aboudamous, Joseph, Leary, Vice Mayor Oro, and Mayor Garcia
NOES:	None
ABSTAIN:	None
ABSENT:	None

Leon Garcia, Mayor

ATTEST:

Suellen Johnston, CMC, City Clerk

APPROVED AS TO FORM:

William D. Ross, City Attorney

American Canyon Fire Protection District Adoption Record

RESOLUTION NO. 2020-08

A RESOLUTION OF THE BOARD OF DIRECTORS OF THE AMERICAN CANYON FIRE PROTECTION DISTRICT APPROVING THE 2020 NAPA COUNTY MULTI-JURISDICTIONAL HAZARD MITIGATION PLAN

WHEREAS, the American Canyon Fire Protection District ("District") provides fire protection, fire prevention, and emergency response services within its jurisdictional territory, including the City of American Canyon ("City"), for which the District is a subsidiary special district; and,

WHEREAS, participating jurisdictions and public agencies within Napa County, including the City and District, have prepared the Napa County Multi-Jurisdictional Hazard Mitigation Plan ("Mitigation Plan") in efforts to implement better mitigation planning and projects for the entire County of Napa; and

WHEREAS, preparation of the Mitigation Plan was overseen by the Multi-Jurisdictional Hazard Mitigation Plan Planning Committee, comprised of representatives from each participating jurisdiction, and development of the Mitigation Plan was aided by consultants from the firm Dynamic Planning + Science, as well as staff of the Napa County Office of Emergency Services; and

WHEREAS, the Mitigation Plan has been submitted to the California Office of Emergency Services and the Federal Emergency Management Agency for review and comment; and

WHEREAS, each jurisdiction participating in the Mitigation Plan and the public have contributed to this planning approach, consistent with applicable law, including the Federal Disaster Mitigation Act of 2000 ("DMA"), as amended; and

WHEREAS, the District has read and agrees to abide by the DMA's guidance and grant guidelines, and this Mitigation Plan represents the compliance with same; and

NOW, THEREFORE, THE BOARD OF DIRECTORS OF THE AMERICAN CANYON FIRE PROTECTION DISTRICT RESOLVES that the 2020 Napa County Operational Hazard Mitigation Plan is formally adopted by the District and shall be used to enhance the community's preparation for, and resistance to, disasters.

APPROVED AND ADOPTED at a joint meeting of the City Council of the City of American Canyon and the Board of Directors of the American Canyon Fire Protection District held on the 2nd day of June, 2020 by the following vote:

AYES:	Chairman Garcia, Vice-Chair Oro, Board Members Aboudamous, Joseph and Leary
NOES:	None
ABSTAIN:	None
ABSENT:	None

American Canyon Fire Protection District Adoption Record

Leon Garcia

Leon Garcia, Board President

ATTEST:

Glen E. Weeks, District Clerk

APPROVED AS TO FORM

William D. Ross, District Counsel

Resolution 2020-08

RESOLUTION NO. 2020-053

A RESOLUTION OF THE CITY COUNCIL OF THE CITY OF CALISTOGA, COUNTY OF NAPA, STATE OF CALIFORNIA, ADOPTING THE 2020 NAPA COUNTY MULTI-JURISDICTIONAL HAZARD MITIGATION PLAN AND INCORPORATING IT BY REFERENCE INTO THE GENERAL PLAN PUBLIC SAFETY ELEMENT

WHEREAS, the City is a political subdivision of the State of California and an official participating jurisdiction of the "2020 Napa County Multi-Jurisdictional Hazard Mitigation Plan" (MJHMP); and

WHEREAS, the City recognizes the MJHMP as the official hazard mitigation plan for the County and participating jurisdictions; and

WHEREAS, the City, with the assistance from Napa County, has gathered information and prepared the MJHMP in accordance with Federal Emergency Management Agency (FEMA) requirements at 44 C.F.R. § 201.6; and

WHEREAS, the City Annex in Vol 2. of the MJHMP recognizes the threat that natural hazards pose to people and property within our community; and

WHEREAS, the City has reviewed the MJHMP and affirms that the plan actions in the City's Annex will reduce the potential for harm to people and property from future hazard occurrences with our community; and

WHEREAS, Congress passed the Disaster Mitigation Act of 2000 (Disaster Mitigation Act) emphasizing the need for pre-disaster mitigation of potential hazards; and

WHEREAS, the Disaster Mitigation Act made available mitigation grants to state and local governments; and

WHEREAS, an adopted multi-hazard 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 citizens were afforded opportunities to comment and provide input in the MJHMP and the actions in the Plan; and

WHEREAS, the City, as a fully participating jurisdiction of the MJHMP is an eligible sub-applicant to the State of California under FEMA's hazard mitigation grant program guidance; and

WHEREAS, the California Office of Emergency Services (CalOES), and the FEMA Region IX officials have reviewed the MJHMP, and approved it contingent upon this official adoption by the participating governing body; and

WHEREAS, the City Council desires to comply with the requirements of the Disaster Mitigation Act and to augment its emergency planning efforts by formally adopting the MJHMP; and

WHEREAS, adoption by the City Council for the City demonstrates the jurisdiction's commitment to fulfilling the mitigation goals and objectives outlined in this MJHMP; and

WHEREAS, the incorporation of this Plan into the Calistoga Public Safety Element will satisfy requirements of SB 379 by addressing climate change hazards; and

WHEREAS, the City Council reviewed the MJHMP and the proposed amendment to the Safety Element at a public hearing on June 16, 2020, and during its review, considered the public record, including the written and oral staff reports and written materials and testimony presented by the public during the hearing; and

WHEREAS, in accordance with Section 15061(b)(3) of the California Environmental Quality Act (CEQA) Guidelines, the proposed updated Infrastructure Element is not subject to CEQA because it can be seen with certainty that there is no possibility that the Element itself could have a significant effect on the environment.

NOW, THEREFORE, BE IT RESOLVED THAT THE CITY COUNCIL OF THE CITY OF CALISTOGA DOES RESOLVE, DECLARE, DETERMINE AND ORDER AS FOLLOWS:

Section 1. Adopts the 2020 Napa County Multi-Jurisdictional Hazard Mitigation Plan Vol. 1 for Napa County and the City of Calistoga Annex in Vol. 2, as approved by FEMA and CalOES, as the mitigation plan for the City.

Section 2. Orders the City Manager to submit an approved and signed copy of this resolution to the CalOES and FEMA Region IX officials to enable the plan's final approval.

Section 3. Adopts the updated Public Safety Element with the incorporation by reference of the 2020 Napa County Multi-Jurisdictional as shown in Exhibit A attached hereto.

PASSED, APPROVED AND ADOPTED by the City Council of the City of Calistoga at a regular meeting held on the 16th day of June 2020.

I, Kendall Rose Granucci, City Clerk of the City of Calistoga, hereby certify that the foregoing Resolution was duly adopted by the City Council of the City of Calistoga at a regular meeting held on the 16th day of June 2020, by the following vote:

AYES:	**Councilmembers Kraus, Lopez-Ortega, and Williams, Vice Mayor Dunsford and Mayor Canning**
NOES:	**None**
ABSTAIN:	**None**
ABSENT:	**None**

ATTEST:

Kendall Rose Granucci, City Clerk

APPROVED:

Chris Canning, Mayor

CITY OF ST. HELENA

RESOLUTION NO. 2020-54

A RESOLUTION FOR THE CITY OF ST. HELENA TO ADOPT THE 2020 MULTI-JURISDICTIONAL HAZARD MITIGATION PLAN FOR NAPA COUNTY AS ITS OFFICIAL PLAN

RECITALS

A. The City of St. Helena is a political subdivision of the State of California and an official participating jurisdiction of the "2020 Napa County Multi-Jurisdictional Hazard Mitigation Plan" (MJHMP); and

B. The City of St. Helena recognizes the MJHMP as the official hazard mitigation plan for the County and participating jurisdictions; and

C. The City of St. Helena, with the assistance from Napa County, has gathered information and prepared the MJHMP in accordance with Federal Emergency Management Agency (FEMA) requirements at 44 C.F.R. § 201.6; and

D. The City of St. Helena Annex in Vol 2. of the MJHMP recognizes the threat that natural hazards pose to people and property within our community; and

E. City of St. Helena has reviewed the MJHMP and affirms that the plan actions in the City of St. Helena's Annex will reduce the potential for harm to people and property from future hazard occurrences with our community; and

F. Congress passed the Disaster Mitigation Act of 2000 (Disaster Mitigation Act) emphasizing the need for pre-disaster mitigation of potential hazards; and

G. The Disaster Mitigation Act made available mitigation grants to state and local governments; and

H. An adopted multi-hazard plan is required as a condition of future funding for mitigation projects under multiple FEMA pre- and post-disaster mitigation grant programs; and

I. The City Council fully participated in the FEMA-prescribed mitigation planning process to prepare this MJHMP; and

J. The citizens were afforded opportunities to comment and provide input in the MJHMP and the actions in the Plan; and

K. The City of St. Helena, as a fully participating jurisdiction of the MJHMP, is an eligible sub-applicant to the State of California under FEMA's hazard mitigation grant program guidance; and

L. The California Office of Emergency Services (Cal OES), and the FEMA Region IX officials have reviewed the MJHMP, and approved it contingent upon this official adoption by the participating governing body; and

M. The City of St. Helena desires to comply with the requirements of the Disaster Mitigation Act and to augment its emergency planning efforts by formally adopting the MJHMP; and

N. Adoption by the City Council for the City of St. Helena demonstrates the jurisdiction's commitment to fulfilling the mitigation goals and objectives outlined in this MJHMP; and

O. Adoption of this plan helps to coordinate the responsible agencies to carry out their responsibilities under the MJHMP.

RESOLUTION

The City Council of the City of St. Helena hereby resolves as follows:

1. The City of St. Helena adopts the 2020 Multi-Jurisdictional Hazard Mitigation Plan Vol. 1 for Napa County and the City of St. Helena Annex in Vol. 2, as approved by FEMA and Cal OES, as the mitigation plan for the City of St. Helena.

2. The City Council orders the City Manager to submit an approved and signed copy of this resolution to the Cal OES and FEMA Region IX officials to enable the plan's final approval.

Approved at a regular meeting of the St. Helena City Council on June 9, 2020 by the following vote:

Mayor Ellsworth:	Yes
Vice Mayor Dohring:	Yes
Council Member Chouteau:	Yes
Council Member Knudsen:	Yes
Council Member Koberstein:	Yes

APPROVED:

Geoff Ellsworth, Mayor

CITY OF ST. HELENA Incorporated March 24, 1876 Reincorporated May 14, 1992 STATE OF CALIFORNIA

ATTEST:

Cindy Tzafopoulos, City Clerk

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Town of Yountville Adoption Record

Town of Yountville

Resolution Number 20-3988

Adopt Resolution Approving the 2020 Multi-Jurisdictional Hazard Mitigation Plan for Napa County as its Official Plan

Recitals

A. **WHEREAS**, the Town of Yountville is a political subdivision of the State of California and an official participating jurisdiction of the "2020 Napa County Multi-Jurisdictional Hazard Mitigation Plan" (MJHMP); and

B. **WHEREAS**, the Town of Yountville recognizes the MJHMP as the official hazard mitigation plan for the County and participating jurisdictions; and

C. **WHEREAS**, the Town of Yountville, with the assistance from Napa County, has gathered information and prepared the MJHMP in accordance with Federal Emergency Management Agency (FEMA) requirements at 44 C.F.R. § 201.6; and

D. **WHEREAS**, the Town of Yountville Annex in Volume 2 of the MJHMP recognizes the threat that natural hazards pose to people and property within our community; and

E. **WHEREAS**, the Town of Yountville has reviewed the MJHMP and affirms that the plan actions in the Town of Yountville's Annex will reduce the potential for harm to people and property from future hazard occurrences with our community; and

F. **WHEREAS**, Congress passed the Disaster Mitigation Act of 2000 (Disaster Mitigation Act) emphasizing the need for pre-disaster mitigation of potential hazards; and

G. **WHEREAS**, the Disaster Mitigation Act made available mitigation grants to state and local governments; and

H. **WHEREAS**, an adopted multi-hazard plan is required as a condition of future funding for mitigation projects under multiple FEMA pre- and post-disaster mitigation grant programs; and

I. **WHEREAS**, the Town of Yountville fully participated in the FEMA-prescribed mitigation planning process to prepare this MJHMP; and

J. **WHEREAS**, the citizens were afforded opportunities to comment and provide input in the MJHMP and the actions in the Plan; and

K. **WHEREAS**, the Town of Yountville, as a fully participating jurisdiction of the MJHMP is an eligible sub-applicant to the State of California under FEMA's hazard mitigation grant program guidance; and

L. **WHEREAS**, the California Office of Emergency Services (Cal OES), and the FEMA Region IX officials have reviewed the MJHMP, and approved it contingent upon this official adoption by the participating governing body; and

M. **WHEREAS**, the Town Council desires to comply with the requirements of the Disaster Mitigation Act and to augment its emergency planning efforts by formally adopting the MJHMP; and

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Town of Yountville Adoption Record

N. **WHEREAS**, adoption by the Town Council for the Town of Yountville demonstrates the jurisdiction's commitment to fulfilling the mitigation goals and objectives outlined in this MJHMP; and

O. **WHEREAS**, adoption of this plan helps to coordinate the responsible agencies to carry out their responsibilities under the MJHMP;

Now therefore, the Town Council of the Town of Yountville does resolve as follows:

1. That the Town of Yountville adopts the 2020 Multi-Jurisdictional Hazard Mitigation Plan Vol. 1 for Napa County and the Town of Yountville Annex in Vol. 2, as approved by FEMA and Cal OES, as the mitigation plan for the Town of Yountville.

2. That the Town Council orders the Town Manager to submit an approved and signed copy of this resolution to the Cal OES and FEMA Region IX officials to enable the plan's final approval.

3. The Resolution is hereby adopted and becomes effective and in full force immediately upon adoption.

PASSED AND ADOPTED at a regular meeting of the Town Council of the Town of Yountville, State of California, held on this 19th day of May, 2020 by the following vote:

AYES: Mohler, Dorman, Dorenbecher, Durham, Dunbar
NOES: None
ABSENT: None
ABSTAIN: None

DocuSigned by:
54[illegible]CA8E4D...
John F. Dunbar, Mayor

ATTEST:

DocuSigned by:
Michelle Dahme
A[illegible]
Michelle Dahme, CMC
Town Clerk

RESOLUTION 2020-06 (FC)

A RESOLUTION FOR THE NAPA COUNTY FLOOD AND WATER CONSERVATION DISTRICT TO ADOPT THE 2020 MULTI-JURISDICTIONAL HAZARD MITIGATION PLAN FOR NAPA COUNTY AS ITS OFFICIAL PLAN

WHEREAS, the Napa County Flood and Water Conservation District, as a California Special District, is a political subdivision of the State of California and an official participating jurisdiction of the "2020 Napa County Multi-Jurisdictional Hazard Mitigation Plan" (MJHMP); and

WHEREAS, the Napa County Flood and Water Conservation District recognizes the MJHMP as the official hazard mitigation plan for the County and participating jurisdictions; and

WHEREAS, the Napa County Flood and Water Conservation District, with the assistance from Napa County, has gathered information and prepared the MJHMP in accordance with Federal Emergency Management Agency (FEMA) requirements at 44 C.F.R. § 201.6; and

WHEREAS, the Napa County Flood and Water Conservation District Annex in MJHMP, Volume 2, Section 5, recognizes the threat that natural hazards pose to people and property within our community; and

WHEREAS, the Napa County Flood and Water Conservation District has reviewed the MJHMP and affirms that the plan actions in the Napa County Flood and Water Conservation District's Annex will reduce the potential for harm to people and property from future hazard occurrences with our community; and

WHEREAS, Congress passed the Disaster Mitigation Act of 2000 (Disaster Mitigation Act) emphasizing the need for pre-disaster mitigation of potential hazards; and

WHEREAS, the Disaster Mitigation Act made available mitigation grants to state and local governments; and

WHEREAS, an adopted multi-hazard 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 District Council fully participated in the FEMA-prescribed mitigation planning process to prepare this MJHMP; and

WHEREAS, the citizens were afforded opportunities to comment and provide input in the MJHMP and the actions in the Plan; and

WHEREAS, the Napa County Flood and Water Conservation District, as a fully participating jurisdiction of the MJHMP is an eligible sub-applicant to the State of California under FEMA's hazard mitigation grant program guidance; and

WHEREAS, the California Office of Emergency Services (Cal OES), and the FEMA Region IX officials have reviewed the MJHMP, and approved it contingent upon this official adoption by the participating governing body; and

WHEREAS, the District Council desires to comply with the requirements of the Disaster Mitigation Act and to augment its emergency planning efforts by formally adopting the MJHMP; and

WHEREAS, adoption by the District Council for the Napa County Flood and Water Conservation District demonstrates the jurisdiction's commitment to fulfilling the mitigation goals and objectives outlined in the MJHMP; and

WHEREAS, adoption of this plan helps to coordinate the responsible agencies to carry out their responsibilities under the MJHMP.

NOW, THEREFORE, BE IT RESOLVED by the District Council of the Napa County Flood and Water Conservation District that:

1. The Napa County Flood and Water Conservation District adopts the 2020 Multi-Jurisdictional Hazard Mitigation Plan Volume 1 for Napa County and the 2020 Multi-Jurisdictional Hazard Mitigation Plan Volume 2, Napa County Flood and Water Conservation District Annex, as approved by FEMA and Cal OES, as the mitigation plan for the Napa County Flood and Water Conservation District.

2. The District Council orders the District Engineer to submit an approved and signed copy of this resolution to Cal OES and FEMA Region IX officials to enable the plan's final approval.

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THE FOREGOING RESOLUTION WAS PASSED AND ADOPTED by the Board of Directors of the Napa County Flood Control and Water Conservation District at a regular meeting thereof on June 9, 2020, by the following vote, the number following each Director's name indicating the number of votes cast by that Director:

AYES:	SUPERVISORS	WAGENKNECHT, GARCIA, ALESSIO, DILLON, DUNBAR, DUNSFORD, ELLSWORTH, GREGORY, PEDROZA, RAMOS, and TECHEL
NOES:	SUPERVISORS	NONE
ABSTAIN:	SUPERVISORS	NONE
ABSENT:	SUPERVISORS	NONE

NAPA COUNTY FLOOD CONTROL AND WATER CONSERVATION DISTRICT, a special district of the State of California

By: Jill Techel
JILL TECHEL, Chairperson of the Board of Directors

APPROVED AS TO FORM Office of County Counsel	APPROVED BY THE BOARD OF DIRECTORS OF THE NAPA COUNTY FLOOD CONTROL AND WATER CONSERVATION DISTRICT	ATTEST: JOSE LUIS VALDEZ Secretary of the District Board
By: *Shana A. Bagley (e-sign)* County Counsel Date: May 20, 2020	Date: June 9, 2020 Processed By: H Haskin Deputy Secretary of the District Board	By: Jose Luis Valdez

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Napa County Office of Education Adoption Record

RESOLUTION 2020-10
A RESOLUTION FOR THE NAPA COUNTY OFFICE OF EDUCATION TO ADOPT THE 2020 MULTI-JURISDICTIONAL HAZARD MITIGATION PLAN FOR NAPA COUNTY AS ITS OFFICIAL PLAN

WHEREAS, the Napa County Office of Education is a political subdivision of the State of California and an official participating jurisdiction of the "2020 Napa County Multi-Jurisdictional Hazard Mitigation Plan" (MJHMP); and

WHEREAS, the Napa County Office of Education recognizes the MJHMP as the official hazard mitigation plan for the County and participating jurisdictions; and

WHEREAS, the Napa County Office of Education, with the assistance from Napa County, has gathered information and prepared the MJHMP in accordance with Federal Emergency Management Agency (FEMA) requirements at 44 C.F.R. § 201.6; and

WHEREAS, the Napa County Office of Education Annex in Vol 2. of the MJHMP recognizes the threat that natural hazards pose to people and property within our community; and

WHEREAS, the Napa County Office of Education has reviewed the MJHMP and affirms that the plan actions in the Napa County Office of Education's Annex will reduce the potential for harm to people and property from future hazard occurrences with our community; and

WHEREAS, Congress passed the Disaster Mitigation Act of 2000 (Disaster Mitigation Act) emphasizing the need for pre-disaster mitigation of potential hazards; and

WHEREAS, the Disaster Mitigation Act made available mitigation grants to state and local governments; and

WHEREAS, an adopted multi-hazard 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 Napa County Office of Education Trustees (Trustees) fully participated in the FEMA-prescribed mitigation planning process to prepare this MJHMP; and

WHEREAS, the citizens were afforded opportunities to comment and provide input in the MJHMP and the actions in the Plan; and

WHEREAS, the Napa County Office of Education, as a fully participating jurisdiction of the MJHMP is an eligible sub-applicant to the State of California under FEMA's hazard mitigation grant program guidance; and

WHEREAS, the California Office of Emergency Services (Cal OES), and the FEMA Region IX officials have reviewed the MJHMP, and approved it contingent upon this official adoption by the participating governing body; and

WHEREAS, the Trustees desire to comply with the requirements of the Disaster Mitigation Act and to augment its emergency planning efforts by formally adopting the MJHMP; and

WHEREAS, adoption by the Trustees for the Napa County Office of Education demonstrates the jurisdiction's commitment to fulfilling the mitigation goals and objectives outlined in this MJHMP; and

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Napa County Office of Education Adoption Record

WHEREAS, adoption of this plan helps to coordinate the responsible agencies to carry out their responsibilities under the MJHMP;

NOW, THEREFORE, BE IT RESOLVED by the Board of Trustees of the Napa County Office of Education:

1. That the Napa County Office of Education adopts the 2020 Multi-Jurisdictional Hazard Mitigation Plan Vol. 1 for Napa County and the Napa County Office of Education Annex in Vol. 2, as approved by FEMA and Cal OES, as the mitigation plan for the Napa County Office of Education.

2. That the Trustees orders the General Services Director to submit an approved and signed copy of this resolution to the Cal OES and FEMA Region IX officials to enable the plan's final approval.

PASSED AND ADOPTED at a meeting of the Napa County Board of Education on June 2, 2020.

AYES: Jennifer Kresge, Don Huffman, Ann Cash, Janna Waldinger, Sindy Biederman, Jim Haslip

NOES: None

ABSTAIN: None

ABSENT: Steve Ornsdorf

DocuSigned by:
Barbara Nemko
5E0A7F2A4E3...

Secretary of the Napa County Board of Education

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Napa Valley Community College District Adoption Record

Napa Valley Community College District

Resolution No. 20-11

A RESOLUTION FOR THE NAPA VALLEY COMMUNITY COLLEGE DISTRICT TO ADOPT THE 2020 MULTI-JURISDICTIONAL HAZARD MITIGATION PLAN FOR NAPA COUNTY AS ITS OFFICIAL PLAN

WHEREAS, Napa Valley College is a political subdivision of the State of California and an official participating jurisdiction of the "2020 Napa County Multi-Jurisdictional Hazard Mitigation Plan" (MJHMP); and

WHEREAS, Napa Valley College recognizes the MJHMP as the official hazard mitigation plan for the County and participating jurisdictions; and

WHEREAS, Napa Valley College, with assistance from Napa County, has gathered information and prepared the MJHMP in accordance with Federal Emergency Management Agency (FEMA) requirements at 44 C.F.R. § 201.6; and

WHEREAS, Napa Valley College Annex in Vol 2. of the MJHMP recognizes the threat that natural hazards pose to people and property within our community; and

WHEREAS, Napa Valley College has reviewed the MJHMP and affirms that the plan actions in the Napa Valley College's Annex will reduce the potential for harm to people and property from future hazard occurrences with our community; and

WHEREAS, Congress passed the Disaster Mitigation Act of 2000 (Disaster Mitigation Act) emphasizing the need for pre-disaster mitigation of potential hazards; and

WHEREAS, the Disaster Mitigation Act made available mitigation grants to state and local governments; and

WHEREAS, an adopted multi-hazard 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 citizens were afforded opportunities to comment and provide input in the MJHMP and the actions in the plan; and

WHEREAS, the Trustees, as a fully participating jurisdiction of the MJHMP is an eligible sub-applicant to the State of California under FEMA's hazard mitigation grant program guidance; and

WHEREAS, California Office of Emergency Services (Cal OES) and FEMA Region IX officials have reviewed the MJHMP and approved it contingent upon this official adoption by the participating governing body; and

WHEREAS, the Trustees desire to comply with the requirements of the Disaster Mitigation Act and to augment its emergency planning efforts by formally adopting the MJHMP; and

WHEREAS, adoption by the Trustees for Napa Valley College demonstrates the jurisdiction's commitment to fulfilling the mitigation goals and objectives outlined in this MJHMP; and

WHEREAS, adoption of this plan helps to coordinate the responsible agencies to carry out their responsibilities under the MJHMP;

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Napa Valley Community College District Adoption Record

NOW, THEREFORE, BE IT RESOLVED by the Board of Trustees of Napa Valley College:

1. That Napa Valley College adopts the 2020 Multi-Jurisdictional Hazard Mitigation Plan Volumes 1 for Napa County and Napa Valley College Annex in Volume 2, as approved by FEMA and Cal OES, as the mitigation plan for the Napa Valley College.

2. That the Trustees direct staff to submit an approved and signed copy of this resolution to the Cal OES and FEMA Agency Region IX officials to enable the plan's final approval.

AYES: 8

NOES: 0

ABSENT: 0

ABSTAINED: 0

DocuSigned by:

Ms. Rosaura Segura, President
Napa Valley Community College District
Board of Trustees

DocuSigned by:

Ronald D. Kraft, Ph.D., Secretary
Napa Valley Community College District
Board of Trustees

Howell Mountain Mutual
Water Company

RESOLUTION 06-2020-23
A RESOLUTION FOR THE HOWELL MOUNTAIN MUTUAL WATER COMPANY TO ADOPT THE 2020 MULTI-JURISDICTIONAL HAZARD MITIGATION PLAN FOR NAPA COUNTY AS ITS OFFICIAL PLAN

WHEREAS, the Howell Mountain Mutual Water Company is a 501(c)(12) mutual benefit corporation and an official participating jurisdiction of the "2020 Napa County Multi-Jurisdictional Hazard Mitigation Plan" (MJHMP); and

WHEREAS, the Howell Mountain Mutual Water Company recognizes the MJHMP as the official hazard mitigation plan for the County and participating jurisdictions; and

WHEREAS, the Howell Mountain Mutual Water Company, with the assistance from Napa County, has gathered information and prepared the MJHMP in accordance with Federal Emergency Management Agency (FEMA) requirements at 44 C.F.R. § 201.6; and

WHEREAS, the Howell Mountain Mutual Water Company Annex in Vol 2. of the MJHMP recognizes the threat that natural hazards pose to people and property within our community; and

WHEREAS, the Howell Mountain Mutual Water Company has reviewed the MJHMP and affirms that the plan actions in the Howell Mountain Mutual Water Company's Annex will reduce the potential for harm to people and property from future hazard occurrences with our community; and

WHEREAS, Congress passed the Disaster Mitigation Act of 2000 (Disaster Mitigation Act) emphasizing the need for pre-disaster mitigation of potential hazards; and

WHEREAS, the Disaster Mitigation Act made available mitigation grants to state and local governments; and

WHEREAS, an adopted multi-hazard 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 Board of Directors fully participated in the FEMA-prescribed mitigation planning process to prepare this MJHMP; and

WHEREAS, the citizens were afforded opportunities to comment and provide input in the MJHMP and the actions in the Plan; and

WHEREAS, the Howell Mountain Mutual Water Company, as a fully participating jurisdiction of the MJHMP is an eligible sub-applicant to the State of California under FEMA's hazard mitigation grant program guidance; and

WHEREAS, the California Office of Emergency Services (Cal OES), and the FEMA Region IX officials have reviewed the MJHMP, and approved it contingent upon this official adoption by the participating governing body; and

Phone (707) 965-2205 **P.O. Box 9, Angwin CA 94508** **Fax (707) 965-2655**
hmmwco@napanet.net

WHEREAS, the Board of Directors desire to comply with the requirements of the Disaster Mitigation Act and to augment its emergency planning efforts by formally adopting the MJHMP; and

WHEREAS, adoption by the Board of Directors for the Howell Mountain Mutual Water Company demonstrates the jurisdiction's commitment to fulfilling the mitigation goals and objectives outlined in this MJHMP; and

WHEREAS, adoption of this plan helps to coordinate the responsible agencies to carry out their responsibilities under the MJHMP;

NOW, THEREFORE, BE IT RESOLVED by the Board of Directors of the Howell Mountain Mutual Water Company:

1. That the Board of Directors of the Howell Mountain Mutual Water Company adopts the 2020 Multi-Jurisdictional Hazard Mitigation Plan Vol. 1 for Napa County and the Howell Mountain Mutual Water Company Annex in Vol. 2, as approved by FEMA and Cal OES, as the mitigation plan for the Howell Mountain Mutual Water Company.

2. That the Board of Directors orders Shannon Damonte, the Office Manager, to submit an approved and signed copy of this resolution to the Cal OES and FEMA Region IX officials to enable the plan's final approval.

THE FOREGOING RESOLUTION WAS DULY AND REGULARLY adopted by the Howell Mountain Mutual Water Company Board of Director's, in Angwin California, County of Napa in a regular meeting of the Board held on the 23th day of June, 2020 by the following vote:

AYES: 6

NOES: 0

ABSENT: 1

FRANK DOTZLER, President
Howell Mountain Mutual Water Company

ATTEST:

SHANNON DAMONTE, Office Manager

Phone (707) 965-2205 P.O. Box 9, Angwin CA 94508 Fax (707) 965-2655
hmmwco@napanet.net

Volume 1

NAPA COUNTY
OPERATIONAL AREA
HAZARD MITIGATION PLAN

NAPA COUNTY OFFICE OF EMERGENCY SERVICES
1195 THIRD STREET B-20
NAPA, CA 94559

HMP submitted 08.11.2020

Section 1. Introduction

1.1 Participating Jurisdictions

The Napa County Hazard Mitigation Plan is a multi-jurisdictional plan that geographically covers the entire area within Napa County's jurisdictional boundaries (hereinafter referred to as the planning area). A planning partnership was formed to develop and steer content in this plan. This partnership consists of Napa County and local government planning partners who worked together to create the goals, objectives, mitigation strategies and implementation methods to reduce natural hazard risk within the planning area. Any jurisdiction or organization may participate in the planning process. However, to obtain Federal Emergency Management Agency (FEMA) approval, each local jurisdiction must meet all requirements of the hazard mitigation planning outlined in 44 C.F.R. § 201.6. The following jurisdictions have elected to become participating jurisdictions as part of this plan update, as shown in Figure 1-1:

- **Napa County**
- **City of American Canyon**
- **City of Calistoga**
- **City of St. Helena**
- **Town of Yountville**
- **Napa County Flood and Water Conservation District**
- **Napa County Office of Education**
- **Napa Valley College**
- **Howell Mountain Mutual Water Company**

1.2 Why Update This Plan?

Hazard mitigation is a way to reduce or alleviate the loss of life, personal injury, and property damage that can result from a disaster through long and short-term strategies. It involves strategies such as planning, policy changes, programs, projects, and other activities that can mitigate the impacts of hazards. The responsibility for hazard mitigation lies with many, including private property owners, business and industry, and local, state and federal government.

The Federal Disaster Mitigation Act (DMA) of 2000, (Pub. L. No. 106-390; 42 U.S.C. § 5121 *et seq.*), required state and local governments to develop hazard mitigation plans as a condition of federal disaster grant assistance. Prior to 2000, federal disaster funding focused on disaster relief and recovery, with limited funding for hazard mitigation planning. The DMA increased the emphasis on planning for disasters before they occur.

The DMA encourages state and local authorities to work together on pre-disaster planning and promotes sustainability. Sustainable hazard mitigation includes the sound management of natural resources and the recognition that hazards and mitigation must be understood in the broadest possible social and economic context. The enhanced planning network called for by the DMA helps local governments articulate accurate mitigation needs, resulting in faster allocation of funding and more cost-effective risk reduction projects.

HMP submitted 08.11.2020

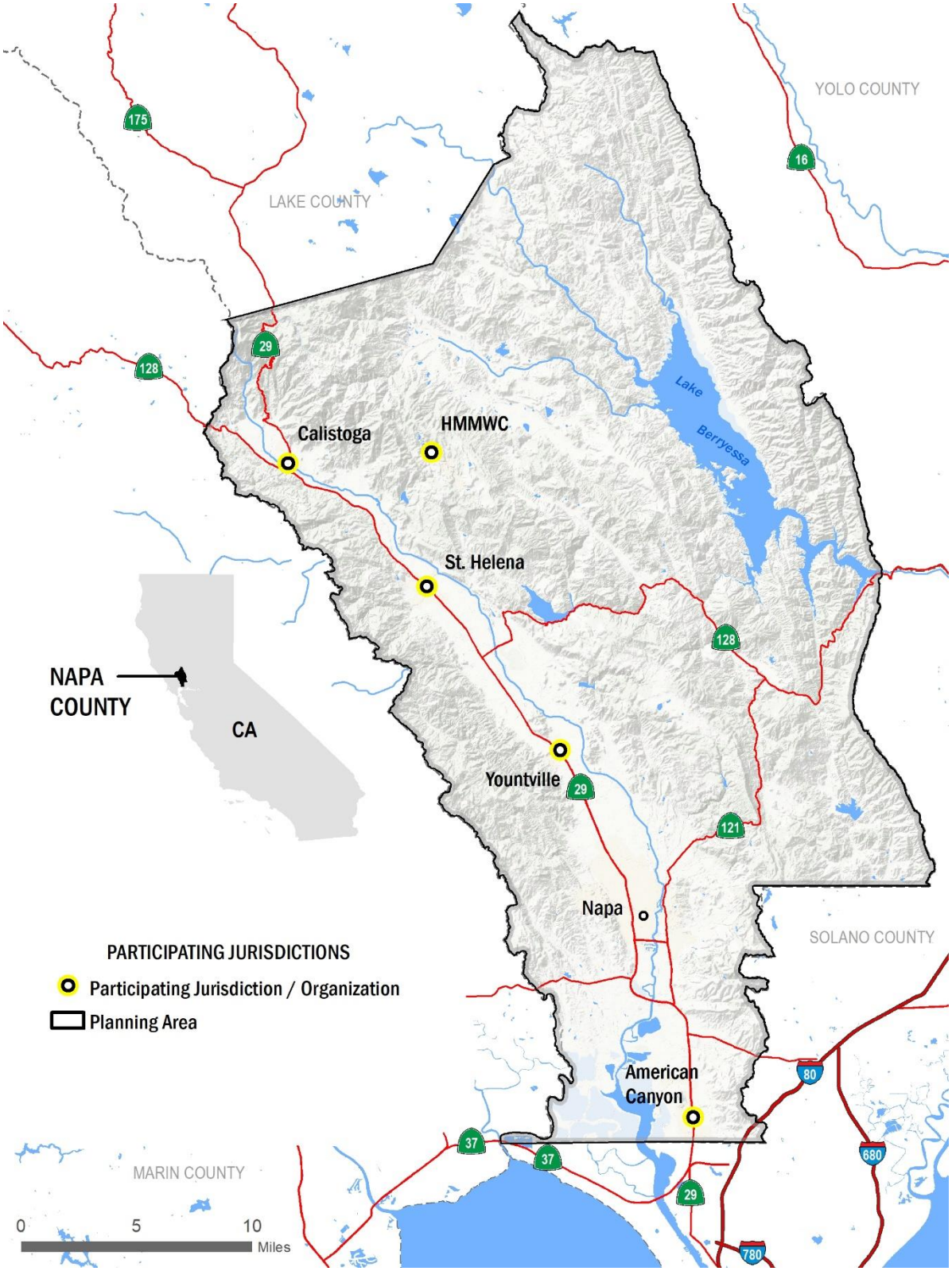

Figure 1-1: Participating Jurisdictions Map

1.2.1 Purposes for Planning

This Hazard Mitigation Plan identifies resources, information, and strategies for reducing risk from natural hazards. Napa County and the local jurisdictions that participated as planning partners (collectively "the planning partners") initiated this planning effort in part because:

- the Napa County area has significant exposure to numerous natural hazards that have caused millions of dollars in past damage;
- the planning partners want to be proactive in preparing for the probable impacts of natural hazards; and
- limited local resources make it difficult to implement proactive risk-reduction measures. Federal and State financial assistance is paramount to successful hazard mitigation in the area.

Elements and strategies in the Plan were selected because they best meet the needs of the planning partners and their citizens. The Plan was developed to meet the following objectives:

- Meet or exceed requirements of the DMA and SB 379
- Enable all planning partners to continue using federal grant funding to reduce risk through mitigation.
- Meet the needs of each planning partner as well as state and federal requirements.
- Create a risk assessment that focuses on Napa County hazards of concern.
- Create a single planning document that integrates all planning partners into a framework that supports partnerships within the County, and puts all partners on the same planning cycle for future updates.
- Meet the planning requirements of FEMA's Community Rating System (CRS), allowing planning partners that participate in the CRS program to maintain or enhance their CRS classifications.
- Coordinate existing plans and programs so that high-priority initiatives and projects to mitigate possible disaster impacts are funded and implemented.

1.3 Who Will Benefit from This Plan?

One benefit of multi-jurisdictional planning is the ability to pool resources and eliminate redundant activities within a planning area that has uniform risk exposure and vulnerabilities. The Federal Emergency Management Agency (FEMA) encourages multi-jurisdictional planning under its guidance for the DMA. The Plan will help guide and coordinate mitigation activities throughout Napa County.

All citizens and businesses of Napa County are the ultimate beneficiaries of this Hazard Mitigation Plan. The plan reduces risk for those who live in, work in, and visit the County. It provides a viable planning

framework for all foreseeable natural hazards that may impact the County. County stakeholder participation helped ensure that Plan outcomes will be mutually beneficial. The resources and background information in the Plan are applicable countywide, and the Plan's goals and recommendations can lay groundwork for the development and implementation of local mitigation activities and partnerships.

1.4 How to Use This Plan

This Plan has been set up in two volumes to separate jurisdiction-specific elements (Vol. 2) from those that apply to the whole planning area (Vol. 1):

- **Volume 1**—Volume 1 includes all federally-required elements of a hazard mitigation plan that apply to the entire planning area. This includes the description of the planning process, public involvement strategy, goals and objectives, countywide hazard risk assessment, countywide mitigation initiatives, and a plan maintenance strategy. Volume 1 includes the following appendices:
    - Appendix A—Mitigation Action Tracker (Short List)
    - Appendix B—Planning Process Documentation
- **Volume 2**—Volume 2 includes all federally-required, jurisdiction-specific elements for each participating jurisdiction as annexes. It describes participation requirements established by the Steering Committee. All planning partners have adopted Volume 1 in its entirety and each partner's jurisdiction-specific annex from Volume 2.

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Section 2. What's New

This section of the plan includes background information on the 2013 HMP and this MJHMP Update. The 2013 Mitigation Actions were reviewed and have been changed, updated, and revised to reflect new priorities in this MJHMP. The sections below describe the planning process for this update.

2.1 Participating Jurisdictions in the 2013 HMP vs MJHMP Update

In October of 2013, the County met all approval requirements from DMA 2000 and officially adopted its first HMP. Eligibility status of the planning partnership was monitored by the Napa County Point of Contact (POC) over the five-year update process. A partner was deemed to be meeting participation requirements based on:

- Progress reports being submitted annually by the specified time frames,
- Partners notifying the POC of changes in designated points of contact,
- Partners supporting the Steering Committee by attending designated meetings or responding to needs identified by the Committee, and
- Partners continuing to be supportive as specified in the planning partner expectations package provided to them at the beginning of the process.

Table 2-1 tracks 2013 and 2020 Participating Jurisdictions.

Table 2-1: Participating Jurisdiction Tracker

Jurisdiction Name	2013 Participating Jurisdiction	2019 Participating Jurisdiction
Municipalities		
City of American Canyon	Y	Y
City of Calistoga	Y	Y
City of St. Helena	Y	Y
City of Napa	N*	N*
Town of Yountville	Y	Y
Special Purpose Districts		
Napa County Flood and Water Conservation District	Y	Y
Napa County Office of Education	Y	Y
Napa Valley College	Y	Y
Howell Mountain Mutual Water Company	N	Y

**City of Napa has authored a standalone plan and thus is not a formally-participating jurisdiction of this Plan. City of Napa plan expiration dates and update requirements are not associated with this plan.*

2.2 Mitigation Actions

During this MJHMP update process, each of the 2013 County-wide mitigation actions were examined for relevancy and the potential for future implementation and then evaluated for potential follow-up. Some mitigation actions developed during the 2013 HMP effort are an inherent part of the HMP update process or were not detailed enough for implementation at a local jurisdictional level, and thus were not included in this update. The County has made significant changes to other 2013 Mitigation Actions because of the updated risk assessment and implementation strategy, to include more detail, or to update based on current mitigation practices. Table 2-2 provides a record of 2013 County-wide Mitigation Actions, the status, and additional notes for each action.

2.3 New Analysis and Risk Assessment Methodology

The County strengthened this Plan by using new research methods and information systems. Geographic Information Systems (GIS) mapping provided the County with the tools to develop more comprehensive data sets than those in the 2013 HMP.

This MJHMP focuses on natural hazards and the human-caused hazard of pandemic. New MJHMP mitigation actions focus on four different classifications, including:

- Local Plans and Regulations – intended to reduce the County's vulnerability to future hazard events through the implementation of codes and regulations.
- Structure and Infrastructure Projects – intended to protect existing structures by retrofitting, relocating, or modifying the structure to withstand a hazard event.
- Natural Systems – to reduce the effects of hazards on the natural resources within a region by preserving and/or restoring natural areas along with their mitigation functions.
- Public Information and Awareness – to advise residents, potential buyers, and visitors about hazards, potentially hazardous areas, and mitigation techniques.

Since the 2013 HMP was adopted, the County has allowed single family residential (SFR) units to be built in Zone A flood zones. At least one of these SFRs was built in a floodway after a hydrology study and report showed it could safely be completed with the proper mitigation. These changes did not impact the County's vulnerability to these or other hazards. These structures were built to the standards established by the National Flood Insurance Program (NFIP), Community Rating System (CRS) (in participating communities) and the Napa County Floodplain Management Regulations (Napa County Code of Ordinances, § 16.04.270 *et seq.*). These regulations are explained in detail in Section 4.5 of this plan.

Table 2-2: MJHMP Mitigation Action Record of Revision Review

Napa Unincorporated Area 2013 Mitigation Action Tracker					
2013 Action No.	**Hazard Type**	**Initiative**	**Completed, Deleted or Deferred**	**Explanation**	**2020 MA Number**
CW-1	Flood	Maintain Napa Valley Regional Rainfall and Stream Monitoring System	Ongoing; Implementation is complete, and the system operation is ongoing.	Napa County maintains a system of approximately 30 stream and rainfall gages countywide. The Napa Valley Regional Rainfall and Stream Monitoring System was maintained throughout 2018 and serves as a local source of information to the public and emergency managers regarding the status of local streams. (https://napa.onerain.com/home.php)	**NFC-01-2013**
CW-2	Flood	Completion of the Measure "A" Flood Control Project	Ongoing	Ongoing local/federal flood protection project; the completed features of the project are operated and maintained by the Napa County Flood Control and Water Conservation District. The District continues to work with the US Army Corps of Engineers ("Corps") towards full project completion. The Napa River/Napa Creek Flood Protection Project is 70% complete, and construction is dependent upon federal funding through the Corps. The most recent feature of the project is the Napa River Bypass, completed in 2015. Additional floodwalls and related features remain to be built pending additional federal appropriations. Actions: Finish Contract 2 construction; Finish Contract 3 construction; Re-map the City of Napa's floodplain.	**NFC-02-2013**
CW-3	Flood	Elevate 100 of the most flood prone residential structures along areas not receiving direct protection from Measure "A" Flood Project	Deferred (changed/edited)	Napa County has a high number of repetitive loss properties. Preliminary Identified Task for Napa County Planning & Building: Identify Repetitive Loss Properties; Identify Property Owners; Identify Mitigation for Flood; Identify Funding Source; Get Project Shovel Ready. In 2017, a house elevation grant was applied for to benefit properties within the FEMA Special Flood Hazard Area. The application has been in review by FEMA/OES throughout 2018. Interested property owners will be able to avail themselves to funding support for house elevations upon approval of grant application.	**NC-01-2013/ CL-10-2013/ AC-01-2013**
CW-4	Flood	Secure grant funding to develop and implement river restoration program that would reduce flood damages and increase environmental quality on the river, maintain fish habitat, decrease impediment to drainage by preventing silt build up and loss of stream bed capacity.	Ongoing; River restoration efforts are ongoing and on schedule	Napa County has been implementing restoration action along the Napa River in the Rutherford and Oakville reaches (approximately 15 miles of the river) since 2009. In 2018, construction was completed on Group C sites in the Oakville to Oak Knoll Project.	**NFC-03-2013**

Napa Unincorporated Area 2013 Mitigation Action Tracker

2013 Action No.	Hazard Type	Initiative	Completed, Deleted or Deferred	Explanation	2020 MA Number
CW-5	Flood	Routinely inspect storm water channels for vegetation build up or encroachment, trash and debris, silt and gravel build up, and erosion or bank failure and maintain said channels permitted by California Department of Fish and Game.	Ongoing	Napa County has been implementing river restoration projects to address erosion and reduce sedimentation in the Napa River since 2009. Preliminary Identified Tasks for Napa Valley Community College: Quarterly Inspection of Tulocay Creek; Repair Corridor and College Pond and Drainage Pathway; Maintain drainage pathway through College Property focusing on Pond and Corridor. Routine inspection of campus wide storm water inlets.	**NFC-04-2013/ NVC-01-2013**
CW-6	Flood	Routinely inspect and maintain storm water inlets and outfalls for debris and obstructions, sand & gravel build-up, and structural damage or vandalism.	Ongoing	Preliminary Identified Tasks for City of Calistoga: Inspection Program: Already in Progress	**CL-10-2013**
CW-7	Earthquake	Earthquake month public education program	Ongoing	Develop a comprehensive public outreach program for earthquake risk reduction for Napa County Residents. Preliminary Identified Tasks for Napa County OES: Utilize Info from Great ShakeOut; Coordinate with OP Area cooperators; Encourage all agencies' participation & reporting on results; Report at Op Area Meeting prior to Earthquake Vote; Identify the number of Earthquake Kits needed for Public Outreach. Preliminary Identified Tasks for American Canyon: Participate in Earthquake Month Public Education	**NC-10-2013/ AC-05-2013**
CW-8	Earthquake	Participate in "The Great Shake Out" Statewide	Deleted (same as the MA CW-7)	Redundant	**NA**
CW-9	All Hazard	Hardening and building redundant capability into Public Safety buildings.	Deferred	Preliminary Identified Tasks for Napa County Fire: Develop a plan through outside communication consultant; Survey all communication and data sites for seismic compliance; Identify sites to provide adequate redundancy during major disasters.	**NC-09-2013**
CW-10	Wildfire	Develop & conduct a Defensible Space chipping and community education program.	Ongoing	The Napa County Fire Department (NCFD) provides a free chipping service to all Napa County residents who live in a designated fire hazard zone – meaning most of rural Napa.	**NC-04-2013**
CW-11	Wildfire	Draft and Promulgate Defensible Space Ordinance and Program	Completed	The ordinance was completed in 2007 (attached as Appendix K in Napa County 2013 HMP). Preliminary Identified Tasks for Napa County OES: Review and monitor existing Ordinance to meet CWPP objectives; Initiate Community Wildfire Protection Plans for each identified community; Make necessary improvements to program as needed.	**NC-05-2013**

Napa Unincorporated Area 2013 Mitigation Action Tracker

2013 Action No.	Hazard Type	Initiative	Completed, Deleted or Deferred	Explanation	2020 MA Number
CW-12	Wildfire	Form and foster neighborhood-based Firewise Councils.	Ongoing	The Napa Community Firewise Foundation is a non-profit organization whose mission is to reduce wildfire hazards and improve fire-safety awareness in Napa County. Preliminary Identified Tasks for Napa County Fire: continue to identify neighborhoods/ communities to develop Firewise Councils in Napa County.	**NC-06-2013**
CW-13	Wildfire	Retrofit Critical Public Safety Infrastructure	Ongoing	Preliminary Identified Tasks for Napa County Fire: Identify 9 Napa County Fire Stations; Start Feasibility Study that will identify which buildings are structurally sound and will remain or be demolished and estimate costs.; Hire architect to develop building plans and building documents. Preliminary Identified Tasks for Calistoga: Identify critical infrastructure (utilities); Replace infrastructure	**NC-07-2013/ CL-03-2013**
CW-14	Wildfire	Revise General Plan Safety Element with lessons learned from Fire-wise programs and analysis.	Ongoing	Revise the City of Calistoga General Plan Safety Element with lessons learned and new information from HMP and Fire-wise programs and analysis.	**CL-05-2013**
CW-15	Wildfire	Maintain and Further Develop the Fuel Reduction Program	Ongoing	Maintain and further develop the fuel reduction program to include provisions for Legacy High School fuel breaks. Solar panels and other infrastructure from school is encroaching into high fuel grasslands. A larger, more consistent fuel break could be established on Newell Rd. to protect developments to the west.	**AC-03-2013**
CW-16	Wildfire	Address the human causes of ignition through education and enforcement actions, to include vigorous investigation and prosecution of arson.	Ongoing	Preliminary Identified Tasks for Napa County Fire: Current Contract with all fire and county fire; County local fire marshals; Coordinate with local jurisdictions and fire marshal offices.	**NC-08-2013**
CW-17	All Hazard	Ensure training is provided for Command & General Staff positions in EOC's. Ensure EOC exercises are performed at least annually.	Deleted	Not a priority.	**NA**

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2.4 Successful Mitigation Activities Since 2013

The 2013 Napa County HMP guiding principle, goals, objectives and mitigation actions have been implemented through various on-going projects, plans and programs. With respect to the mitigation actions and strategies developed in 2013, Napa County has made improvements toward reducing natural hazard risks to life and property within the County. Significant risk reduction efforts have been made for floodplain management, flood damage prevention, and fire hazard abatement. These successful policies, programs, and projects are summarized below.

2.4.1 Napa River Restoration – Napa County Flood Control District

Figure 2-1: Napa River Restoration – Napa County Flood Control

Related HMP Objectives:

Increase the resiliency of Infrastructure and critical Restoration of natural floodplain functions.

Project involves restoring 14 miles of the Napa River, focused on the Rutherford and Oakville reaches, into a more natural, sustainable condition. Restoration plans include: active channel widening, secondary channel creation, floodplain excavation and grading, berm set back and reconstruction, and managed bank retreat. The Project provides environmental restoration by incorporating the following engineered components to achieve flood damage reduction while maintaining the living river principles:

- Reconstructing old levees,
- Providing floodplain terraces, and
- Bank stabilization and protection (including grade control structures).

Living rivers are created by letting the river extend over new floodplains and into multiple channels and backwater alcoves. These more complex features re-establish and support resilient processes for riffle-pool formation and provide migrating salmonids a place to take refuge during high flows. The results of extensive research and landowner coordination are being realized as the restoration design that protects both natural and agricultural resources is constructed, monitored, and adapted for improvement.

River restoration is ongoing, with many projects completed and many slated for continued funding and action. In 2018, construction was completed on Group C sites in the Oakville to Oak Knoll Project.

2.4.2 Napa County joins CRS – Napa County Planning, Building, & Environmental Services

Related HMP Objectives:

- ***Educate the public on the risk from natural hazards***
- ***Maintain and make available maps of identified risk areas and improve early warning emergency response systems.***
- ***Increase the resiliency of Infrastructure and critical facilities***
- ***Reduce the Possibility of Localized Flooding.***
- ***Consider the impacts of natural hazards for future development.***

Napa County's enrollment in FEMA's Community Rating System (CRS) became effective October 1, 2017. FEMA implemented the CRS program in 1990 to recognize and encourage community floodplain management activities exceeding the minimum National Flood Insurance Program (NFIP) standards.

Napa County proudly joined 1,444 other communities nationwide and received a CRS rating of 7 in 2017. Publication of notice on an annual basis allows the County to continue this rating until the next assessment in 2022. This means that residents in the unincorporated areas are eligible to receive up to a 15 percent discount on their flood insurance premiums.

2.4.3 Riverside Pond and Headworks Riverbank Repair Project- City of Calistoga

Related HMP Objectives:

Structural and Non-Structural flood and environmental mitigation for critical wastewater treatment plant infrastructure

In 2016, the City of Calistoga applied for FEMA Hazard Mitigation Grant Program funding to repair the wastewater treatment plant (WWTP) Riverside Ponds and headworks. The primary project goals are to improve the resilience of critical WWTP infrastructure from catastrophic failure due to adjacent river bank erosion and provide flood protection from 100-year floodway events to the City's four Riverside Ponds and Headworks structure. This project is ongoing.

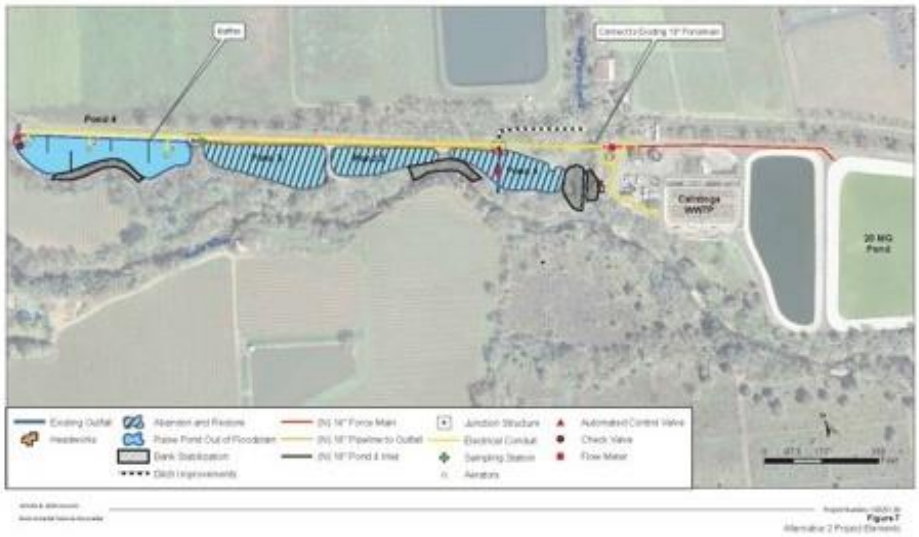


Figure 2-2: Headworks and Riverbank Repair Project

2.4.4 Feige Canyon Water Tank Replacement- City of Calistoga

Figure 2-3: Feige Canyon Water Tank Replacement

Related HMP Objectives:

Structural Retrofit for Earthquake and Seismic Deficiency for critical 1MG Drinking water tank

The purpose of this project was to mitigate a seismically deficient drinking water tank which was on the verge of catastrophic failure. Mitigation was to replace the 1960's welded steel tank with a new one million-gallon, glass lined bolted steel tank designed to current seismic standards. The existing 50-year old, 1.0 MG tank was at the end of its useful life, and without a foundation was at major risk of seismic failure due to its structural deficiencies. The new tank was online in December of 2018 and funded by the Hazard Mitigation Grant Program.

2.5 Incorporation of 2013 HMP into other Planning Mechanisms

Over the past 5 years, the 2013 HMP was incorporated into other planning mechanisms as a demonstration of progress in local hazard mitigation effort.

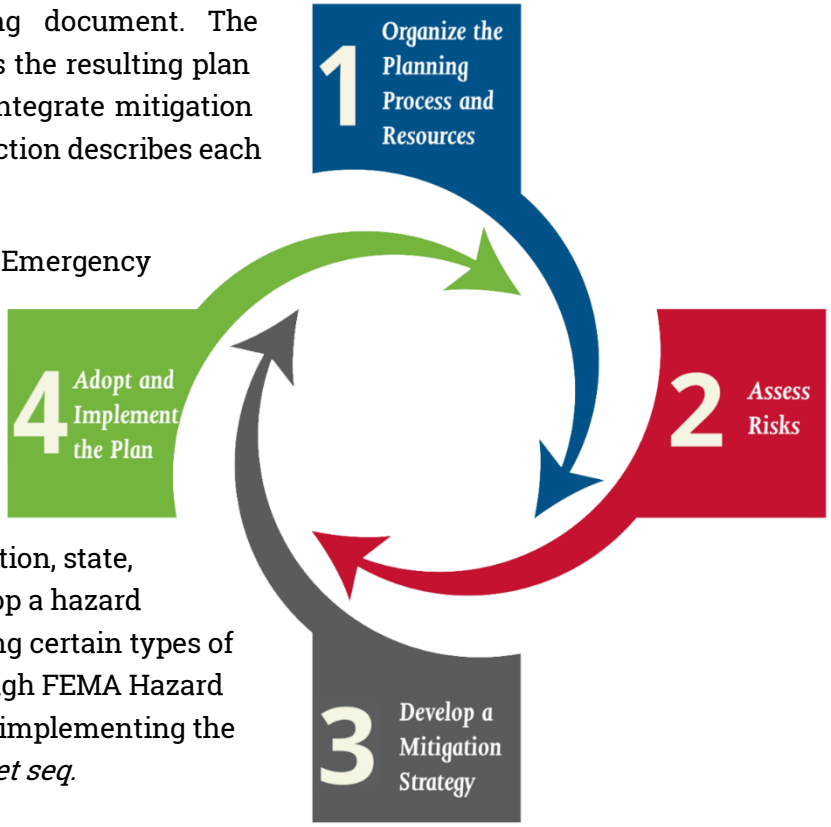
Table 2-3. Planning Mechanisms and 2013 HMP Incorporation

Legend:	Green= thoroughly incorporated	Yellow = referenced or plan not updated	Orange = not incorporated
Planning mechanism:	**Incorporate 2013 HMP?**		
Napa County General Plan	2008 Plan		
Napa County Emergency Operations Plan	Being updated in 2020, will be referenced		
Napa County Integrated Water Resource Management Plan	2011 Plan		
Napa County Community Wildfire Protection Plan (CWPP)	In development		
Napa River Flood Management Plan	1998 Plan		
Groundwater Sustainability Plan	In development		
General County Communications and Website	2013 HMP referenced and linked in many places throughout County website including, for example, Emergency Services page.		

Section 5.3 highlights where the 2013 HMP was integrated into planning mechanisms and where future opportunities to incorporate this 2020 MJHMP Update into plans and processes, such as the County Flood Mitigation Plan, Groundwater Management Plan, Groundwater Sustainability Plan, General Plan, Wildfire Protection Plan, and a 6-County Integrated Regional Water Management (IRWM) Plan. The 2013 and newly-updated HMP will be referenced in the 2020 Napa County Emergency Operations Plan, authored by the County's Risk Management Department.

Section 3. Planning Process

This section describes each stage of the planning process used to develop the MJHMP. The planning process provides a framework for document development and follows the FEMA recommended steps as enumerated in federal regulation and outlined below. This MJHMP is a community-driven, living document. The planning process itself is as important as the resulting plan because it encourages communities to integrate mitigation with day-to-day decision making. This section describes each stage of the planning process.



The Robert T. Stafford Disaster Relief and Emergency Assistance Act, as amended by the Disaster Mitigation Act of 2000 (DMA 2000, 42 U.S.C. § 5165), is intended to "reduce the loss of life and property, human suffering, economic disruption, and disaster assistance costs resulting from natural disasters." Under this legislation, state, tribal, and local governments must develop a hazard mitigation plan as a condition for receiving certain types of non-emergency disaster assistance through FEMA Hazard Mitigation Assistance. FEMA regulations implementing the DMA 2000 are located at 44 C.F.R. § 201.6 *et seq.*

FEMA prescribes 4 major planning steps based on its regulations:

- **Step 1: Organize resources**
- **Step 2: Assess risk**
- **Step 3: Develop a Mitigation Strategy**
- **Step 4: Adopt and Implement the Plan**

Each jurisdiction that participated in the MJHMP independently followed the FEMA four step process. Figure 3-1 provides a detailed phased breakdown of the planning process that each participating jurisdiction completed.

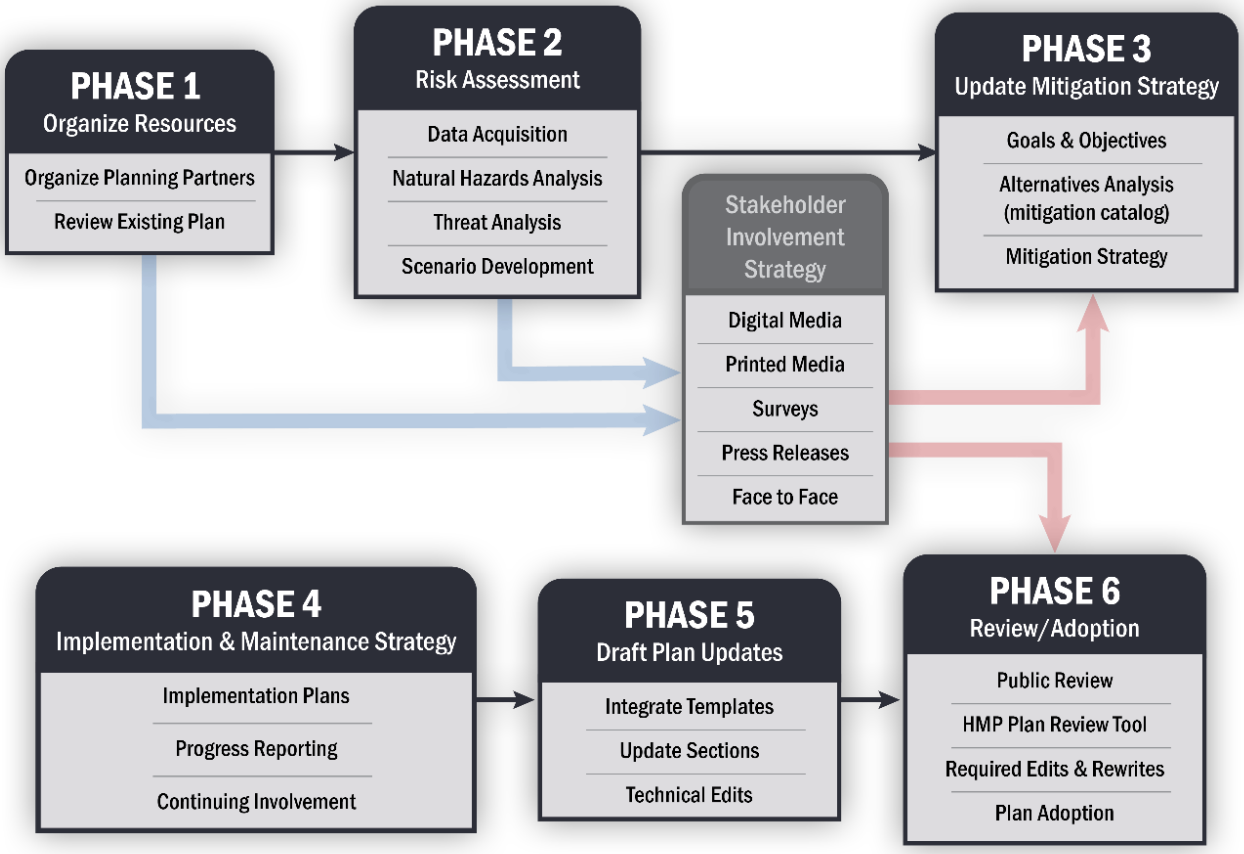


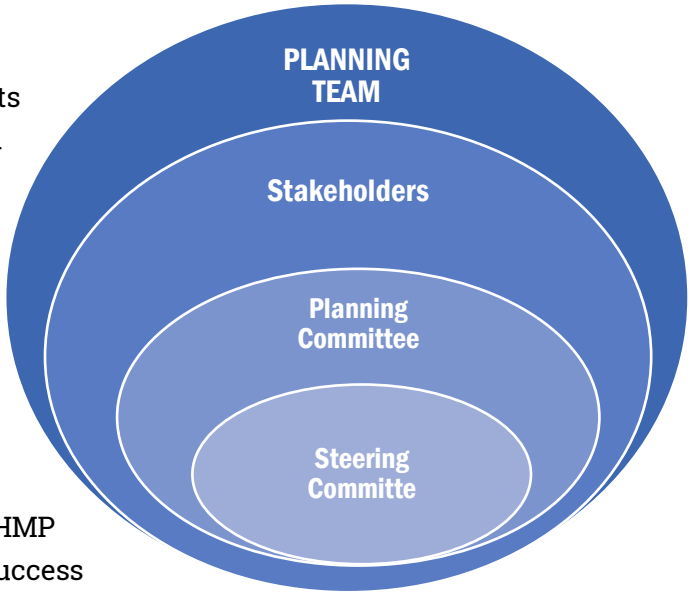
Figure 3-1: Napa County Planning Process

STEP 1: Organize Resources

The first step of the MJHMP planning process was organizing resources, consisting of developing the planning team development and reviewing relevant existing documents.

Building the Planning Team

The Planning Team was comprised of participants from all participating jurisdictions who worked together to develop the MJHMP. The Planning Team consisted of a Steering Committee, Planning Committee, a broader group of residents and regional stakeholders, and an HMP consultant used for plan development and facilitation.



Steering Committee

The Steering Committee was at the core of the MJHMP planning process and was integral to ensuring the success of the planning process, its implementation, and future maintenance. Members of the Steering Committee, listed in Table 3-1 below, represented each participating jurisdiction and were also a part of the MJHMP Planning Committee, discussed below and in the individual annexes in Volume 2.

Table 3-1: MJHMP Steering Committee

Jurisdiction	Point of Contact	Title
Napa County	Kevin Twohey	OES Coordinator
City of American Canyon	Glen Weeks	Fire Chief, American Canyon Fire Protection District
City of Calistoga	Steve Campbell	Fire Chief, Calistoga Fire Department
City of St. Helena	Mark Prestwich	City Manager
Town of Yountville	Steven Rogers	Town Manger
Napa County Flood Control and Water Conservation District	Andrew Butler	Senior Engineer
Napa County Office of Education	Allen Rossi	Director of Maintenance and Operations
Napa Valley College	Amber Wade	Chief of Police, Napa Valley College
Howell Mountain Mutual Water Company	Shannon Damonte	Administrative Manager.

Planning Committee

The MJHMP Planning Committee consisted of multiple key decisionmakers with specific expertise to contribute to the planning process from each participating jurisdiction. The Planning Committee served as liaisons to the greater community. Each Planning Committee member was responsible for communicating the direction and status of the planning effort to respective departments and constituents of each jurisdiction and were expected to represent the perspectives of the participating jurisdiction to the Committee.

The MJHMP Planning Committee consisted of multiple key decisionmakers with specific expertise to contribute to the planning process from each participating jurisdiction. The Planning Committee served as liaisons to the greater community. Each Planning Committee member was responsible for communicating the direction and status of the planning effort to respective departments and constituents of each jurisdiction and were expected to represent the perspectives of the participating jurisdiction to the Committee.

The Planning Committee was involved in various planning processes, including:

- Structured coordination and meetings
- Collection of valuable local information and other requested data
- Decision making on plan process and content
- Development of mitigation actions
- Review and comment on plan drafts
- Coordination of the public input process

All Planning Committee members did not necessarily attend stakeholder group meetings. Some participated by reviewing draft documents, assisting in individual jurisdictional vulnerability assessments, with public outreach, or at other stages of the process. Table 3-2 provides a list of the Planning Committee Members. Documentation of Planning Committee invitations are provided in Appendix B.

Table 3-2: MJHMP Planning Committee

Name	Title	Department	CRS Expertise Category
Allen Rossi	Director of Maintenance and Operations	Napa County Office of Education	Property Protection
Amber Wade	Chief of Police	Napa Valley College Police	Emergency Services
Andrew Damron	Technical Services Director	Napa Sanitation District	
Andrew Butler	Senior Engineer	Napa County, Public Works Department / Watershed Management	

Name	Title	Department	CRS Expertise Category
Andy Eaman	GIS Technician I	Napa County Planning, Building, and Environmental Services	
Anthony Halstead	Assistant Director of Library Services & Community Outreach	Napa County Library	
Ashlee Llewlling	Information Systems/GIS	Napa County	
Barry Biermann	Cal Fire/Napa County Fire Chief	Cal Fire/ Napa County Fire Department	Emergency Services
Bernard Sick	Health & Safety Officer	Yountville Veterans Home	
Bill McWhirt	Safety Officer	Napa Sanitation District	Natural Resource Protection
Brent Cooper	Community Development Director	City of American Canyon, Planning	Preventive Measures
Brian Henricksen	EMS Administrator	Napa County, Emergency Management Division	
Charlie Rhodes	Administrative Battalion Chief/ Disaster Program Manager	City of Napa, Operations	Emergency Services
Chip Bouril	Soil Conservationist	Natural Resource Conservation Service	
Chris Ochs	Director of Facilities, Maintenance & Operations	Calistoga Joint Unified School District	
Chris Carlisle	Captain	Napa County Sheriff Department	Emergency Services
Chris Hartley	Police Chief	City of St. Helena Police Department	
Dale Carnathan	Emergency Services Manager	Lake County Office of Emergency Services	
Danis Kreimeier	Director of Library Services & Community Outreach	Napa County Library	
David Morrison	Director	Napa County, Planning, Building & Environmental Services	
Derek Rayner	Deputy Public Works Director	City of Calistoga	
Don Ryan	Emergency Services Manager	Solano County, Office of Emergency Services	Emergency Services

Name	Title	Department	CRS Expertise Category
Dorothee Stangle	Director	Napa Valley Community Organizations Active in Disaster	Emergency Services
Doug Parker	President & CEO	Land Trust of Napa County	
Dustin Leno	Assistant Airport Manager	Napa County Airport	
Dylan Feik	City Manager	City of Calistoga	Preventive Measures
Ed Halsell	Napa State Hospital Administrator	Napa State Hospital	
Eddy Gomez	Management Fellow Town Manager's Office	Town Manager's Office	Public Information
Erica Smithies	Public Works Director, City Engineer	City of St. Helena Public Works Department	Structural Flood Control Projects
Erica Teagarden	Public Works and Finance Management Analyst	Town of Yountville, Finance Department	Property Protection
Erin Smith-Hagberg	Superintendent	Calistoga Joint Unified School District	
Frances Knapczyk	Conservation Program Manager	Napa County RCD	
Garrett Veyna	Cal Fire/Napa County Fire Marshall	Cal Fire/ Napa County Fire Department	Emergency Services
Geoff Belyea	Cal Fire/ Napa Co Fire Asst Chief	Cal Fire/ Napa County Fire Department	Emergency Services
Glen Weeks	Fire Chief	American Canyon Fire Protection District	Emergency Services
Greg Baer	Airport Manager	Napa County Airport	
Jack LaRochelle	Public Works Director	City of Napa	Natural Resource Protection
James Cooper	Disaster Program Manager	Red Cross	Emergency Services
Janet Tufts	Superintendent	Howell Mountain School District	
Jay Gardner	Chairman	Napa River Reclamation District #2109	
Jeff Sharp	Watershed Coordinator	Napa County Watershed Information & Conservation Council	
Jeff Joiner	Emergency Services Coordinator	Pacific Union College	
Jennifer Tydingco	Assessors Supervisor	Napa County Assessor's Office	
Jesse Rainer	Community & Industry Relations Manager	Napa Valley Vintners	

Name	Title	Department	CRS Expertise Category
Joe Tagliaboschi	Public Works Director	Town of Yountville, Public Works Department	Structural Flood Control Projects
Joe Perez	Director of Facilities & Aquatics	St. Helena Unified School District	
John Coates	Parks & Recreation Director	City of Napa	Property Protection
John Ferons	Deputy Public Works Director	Town of Yountville, Public Works Department	Structural Flood Control Projects
John McDowell	Principal Planner	Napa County, Planning Division	Preventive Measures
John Woodbury	General Manager	Napa County Regional Park & Open Space District	
John Roncoroni	Weed Science Farm Advisor	Napa County University of California Cooperative Extension	
Jon Crawford	Undersheriff	Napa County Sheriff Department	
Jonathon Huff		Yountville Veteran's Home	
Josh Schultz	Deputy Superintendent	Napa County Office of Education	Public Information
Juan Zuniga	Associate Civil Engineer	City of Napa, Public Works	
Karen Relucio	Public Health Officer	Napa County, Public Health	
Kate Miller	Executive Director	Napa Valley Transportation Authority	
Kelli Jurgenson	Construction Management	Napa Valley Unified School District	
Kelly Gin	Soil Conservationist	Natural Resource Conservation Service	
Ken Arnold	Police Chief	Napa Valley College	Emergency Services
Ken Burkhart	Superintendent	Pope Valley School District	
Kerry Whitney	Risk and Emergency Management Services Manager	Napa County, Risk Management	Preventive Measures
Kevin Twohey	OES Coordinator	Napa County, Office of Emergency Services	
Kris Breiner	Fire Captain	Calistoga Fire Department	Emergency Services
Laura Aguiar		Yountville Veteran's Home	

Name	Title	Department	CRS Expertise Category
Lena Pollastro	Land Programs Manager	Land Trust of Napa County	
Lisa Fletcher	Public Health Manager	Napa County	
Lois Husted	Base/Emergency Management Coordinator	Queen of the Valley Hospital	
Lucas Patzek	Executive Director	Napa County Resource Conservation District	
Lynn Goldberg	Planning and Building Director	City of Calistoga	Property Protection
Marcia Ritz	General Manager	Spanish Flat Water District	
Mark Prestwich	City Manager	City of St. Helena, Administration	Public Information
Marylou Wilson	Superintendent	St. Helena Unified School District	
Matt Christensen	Facilities Director	Napa Valley College	
Matt Lamborn	GIS Coordinator	Napa County, Planning, Building & Environmental Services	
Matt Rembold	Environmental Health and Safety Specialist	St. Helena Hospital	
Matthew Russell	Instructor of Emergency Services	Pacific Union College	
Michael Kirn	Public Works Director	City of Calistoga	
Mike Palladini	Stewardship Program Manager	Land Trust of Napa County	
Mike Pearson	Executive Director	Napa Valley Unified School District	
Nancy Levenburg	Executive Director	Napa Historical Society	
Nancy Johnson	Housing and Community Development Program Manager	Napa County, Housing & Intergovernmental Affairs	
Maya DeRosa	Planning & Building Director	City of St. Helena	Preventive Measures
Oscar Ortiz	Police Chief	City of American Canyon, Police Department	Emergency Services
Pat Kowta	Information Systems Manager	Napa County	
Paul Quarneri	District Manager	Circle Oaks County Water District	
Penny Wilson	District Assistant Manager	Napa River Reclamation District #2109	

Name	Title	Department	CRS Expertise Category
Phillip Miller	Deputy Director, Flood Control and Water Resources	Napa County, Public Works Department / Watershed Management	Structural Flood Control Projects
Preya Nixon	Assistant to City Manager	City of St. Helena	Public Information
Rick Kaufman	AC Public Works Director	City of American Canyon Public Works	
Rick Thomasser	Watershed and Flood Control Operations Manager	Napa Watershed Management	Natural Resource Protection
Rosanna Mucetti	Superintendent	Napa Valley Unified School District	
Ryan Klobas	Chief Executive Officer	Napa County Farm Bureau	
Samantha Holland	Parks & Recreation Director	Town of Yountville, Parks & Recreation Department	Natural Resource Protection
Sandra Liston	Planning and Building Director	Town of Yountville, Planning and Building Department	Preventive Measures
Seana Wagner	Public Information Officer	Napa County Office of Education	Public Information
Shaun Vincent	EMS Specialist	Napa County EMS Agency	
Stephanie Proft	Senior Engineering Aide	City of Napa, Development Engineering	
Steve Campbell	Fire Chief	Calistoga Fire Department	Emergency Services
Steve Brassfield	City of Napa Fire Chief	Napa Fire Department	Emergency Services
Steve Lederer	District Manager	Silverado Community Services District, Public Works	
Steve Potter	City Manager	City of Napa	Preventive Measures
Steven Rogers	Town Manager	Town of Yountville, Town Manager's Office	Public Information
Terrence Mulligan	President	Napa Valley Community Foundation	
Tim Eggers	Appraiser	Napa County	
Timothy Healy	General Manager/District Engineer	Napa Sanitation District	
Tom Vreeland	Atlas Peak FSC Lead	Napa Communities Firewise Foundation	Public Information
Trent Schager	Napa State Hospital Fire Chief	Napa State Hospital	

Name	Title	Department	CRS Expertise Category
Wendy Rash	District Conservationist	Natural Resource Conservation Service	
Zach Tusinger	Senior Planner	City of Calistoga	

The County enlisted Dynamic Planning + Science (DP+S or Planning Consultant Team) due to its expertise in assisting public sector entities with developing hazard mitigation plans. DP+S staff facilitated the planning process, collect and analyze data, produce meeting materials, and produced drafts of the MJHMP for review. The MJHMP Consultant Team, as shown in Table 3-3, consisted of a variety of hazard mitigation and certified urban planning professionals.

Table 3-3: MJHMP Update Consultant Team

HMP Update Project Team	HMP Update Project Team Role
Ethan Mobley, AICP	Project Manager / Hazard Mitigation Planner
Brian Greer	GIS Specialist/Spatial Analyst
Torie Jarvis	Assistant Project Manager
Ty Johnson	Hazard Mitigation Planner
Alex Krebs	GIS Associate

Planning Committee Meetings

The Planning Committee met throughout the development of the updated MJHMP. Table 3-4 provides a charts those meetings, including date, type, and topics discussed. Meeting documentation, including agendas, hazard maps, PowerPoint presentations, minutes, sign-in sheets, and other relevant handouts, are provided in Appendix B.

Table 3-4: Meeting Summary

Date	Meeting Type	Topics
October 1st, 2018	Planning Committee Kickoff Meeting #1	▪ *Welcome and Introductions* ▪ *Statement of Work Review* ▪ *Expectations from Participating Jurisdictions* ▪ *DMA vs. CRS Public Outreach Process* ▪ *Project Schedule* ▪ *Data Calls/Data Review* ▪ *Next Steps*
November 15th, 2018	Planning Committee Meeting #1	▪ *Welcome and Introductions* ▪ *Background* ▪ *Mitigation Planning Defined* ▪ *Planning Process Review* ▪ *Project Schedule* ▪ *Website Review* ▪ *FEMA Hazard Mitigation Program* ▪ *2013 Mitigation Plan Review* ▪ *Risk Assessment / Community Vulnerability Review* ▪ *Risk Factor Exercise* ▪ *Mitigation Strategy Exercise* ▪ *Next Steps*
January 31st, 2019	Planning Committee Meeting #2	▪ *Welcome and Introductions* ▪ *Meeting #1 Recap* ▪ *Problem Statement Exercise* ▪ *Mitigation Plan Goals Exercise* ▪ *Jurisdictional Homework Assignments* ▪ *Close-out*

Date	Meeting Type	Topics
April 11th, 2019	Planning Committee Meeting #3	▪ *Welcome and Introductions* ▪ *Meeting #2 Recap* ▪ *Outreach Materials* ▪ *Community Survey* ▪ *Web Content* ▪ *Draft Mitigation Strategy Review* ▪ *Mitigation Action Planning* ▪ *Mitigation Prioritization* ▪ *Mitigation Implementation* ▪ *Closeout*

Public Involvement and Outreach

Public involvement is an important and requisite component of any HMP update. The public outreach strategy for this update maximized public involvement throughout the planning process and utilized websites, local media, and community face-to-face efforts.

As required by FEMA, the general public was given an opportunity to be involved in the planning process while developing the HMP Update through surveys, a project website, and public review periods. Each is described below.

Surveys

A 10-question community survey was distributed via the County Nixle Account and website, Facebook page, and e-mail blasts. A total of 973 survey responses were collected. The results of the survey were used to ensure that the priorities of the County and participating jurisdictions match those of the residents/community members. For example, community members were asked if they believe their property was at risk from a natural hazard disaster; 72.3% said "yes." Results are displayed in Figure 3-2 below. The full survey results can be found in Appendix B.

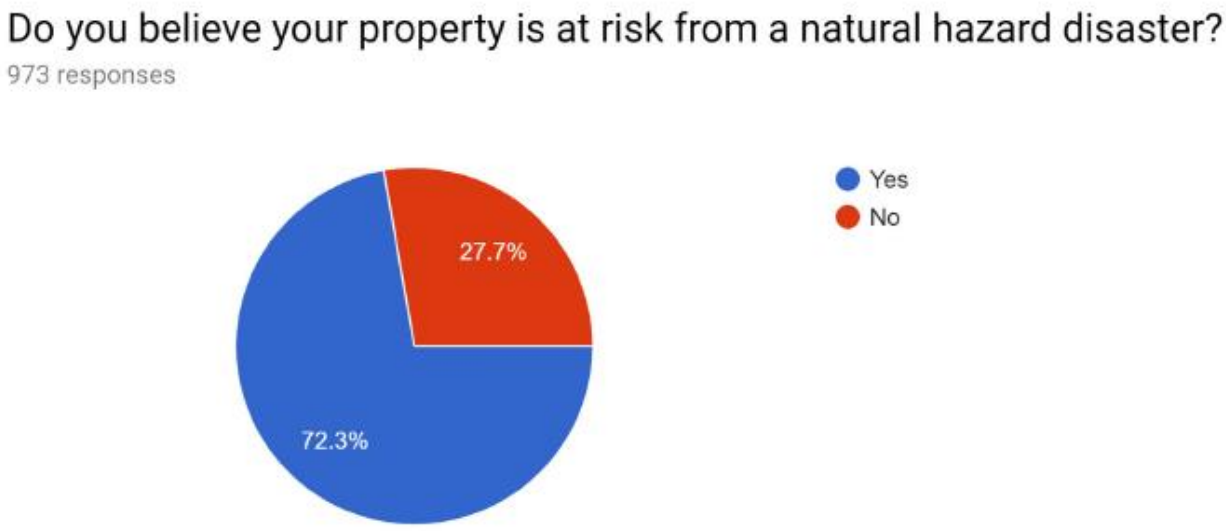


Figure 3-2 Snapshot of Community Survey Results

HMP Update Website

For this MJHMP, a project portal at http://mitigatehazards.com/napa-county-mjhmp/ served and will continue to serve as a centralized project information and file-sharing platform. This website provides a tool for project management, collaborative content, and one-stop-shop for mitigation planning resources.

In addition to internal coordination, the project portal played a critical role in public involvement throughout the planning process and documenting public involvement including the community survey, meetings, working sessions, and the Public Open House. Resources such as the Risk Assessment Mapping Platform (RAMP) and links to all meeting summaries are available to the public via the website. Project participants and stakeholders used the website as a project resource for the duration of the planning process and will continue to have access during the 5-year update cycle and beyond.

Public Review of Draft HMP

The public reviewed the draft HMP during April of 2020. The County and several other jurisdictions announced the available public draft via their websites, and the drafts were available at http://mitigatehazards.com/napa-county-mjhmp/. The public was able to provide comment via a collaborative PDF, an online submission form, or an email. The notice and response to comments received are available in Appendix B.

STEP 2: Assess the Risk

In accordance with FEMA requirements, the Planning Committee identified and prioritized the natural hazards affecting both Napa County as a whole and each participating jurisdiction individually and assessed the vulnerability from those identified hazards. Results from this risk assessment aided subsequent identification of appropriate mitigation actions. While the process is described in more detail below, the substance of this risk assessment is detailed in Section 4.

Identify/Profile Hazards

Based on a review of past hazard events, existing plans, reports, and other technical studies/data/information, the Planning Committee determined if regional hazards could affect the District. The Planning Committee completed a Risk Assessment to determine priority hazards to be assessed in future MJHMP planning processes.

Assess Vulnerabilities

Assessing vulnerabilities exposes the unique characteristics of individual hazards and begins the process of narrowing down which areas within Napa County are vulnerable to specific hazard events. The vulnerability assessment included field visits and a GIS overlaying method for examining such vulnerabilities more in depth. Participating jurisdictions completed this exercise both singly and jointly with the County, and the identified hazards varied widely depending on the geographic make-up of, priorities of, and services provided by the participating jurisdiction. Using these methods, participating jurisdictions estimated vulnerable populations, infrastructure, and potential losses from hazards.

Updated content for each hazard profile for the County, including vulnerability, is provided in Section Section 3 through Section 0. Participating jurisdictions are profiled individually is Volume 2 of this Plan as annexes.

Web Based Risk Assessment Mapping and Analysis

The web based and interactive Risk Assessment Mapping Platform (RAMP), accessed via the project website at www.mitigatehazards.com, allows interactive discovery of robust risk, vulnerability, and exposure data developed especially for Napa County. RAMP is a mapping platform built specifically for mitigation planning. It displays County facilities and buildings overlaid with natural hazards layers to bring interactivity and individual discovery to the GIS analysis performed for the MJHMP. Figure 3-3 shows the location of RAMP on the project website.

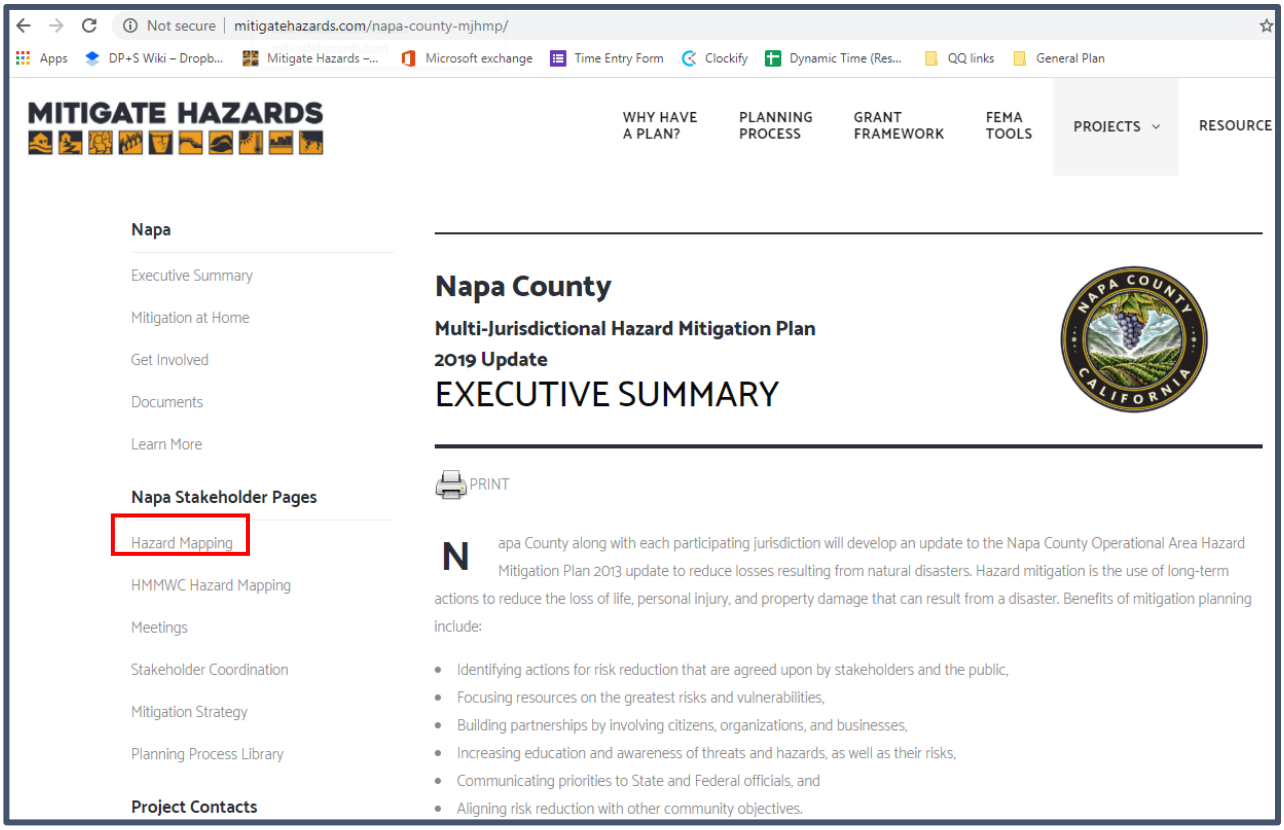


Figure 3-3: RAMP Facilities Map Access at mitigatehazards.com

The Planning Team used RAMP in meetings and as needed to understand vulnerabilities to the County and participating jurisdiction facilities. Users interactively filter facilities and buildings by natural hazard zones and/or construction characteristics.

RAMP's robust data filtering and summation calculations allow the user to understand and visualize vulnerabilities at the facility level with detailed information on the number of structures exposed to various natural hazards. RAMP enables Napa County to pinpoint vulnerabilities and reinforces problem statements in the mitigation strategy. Figure 3-4 demonstrates the RAMP web-based interface.

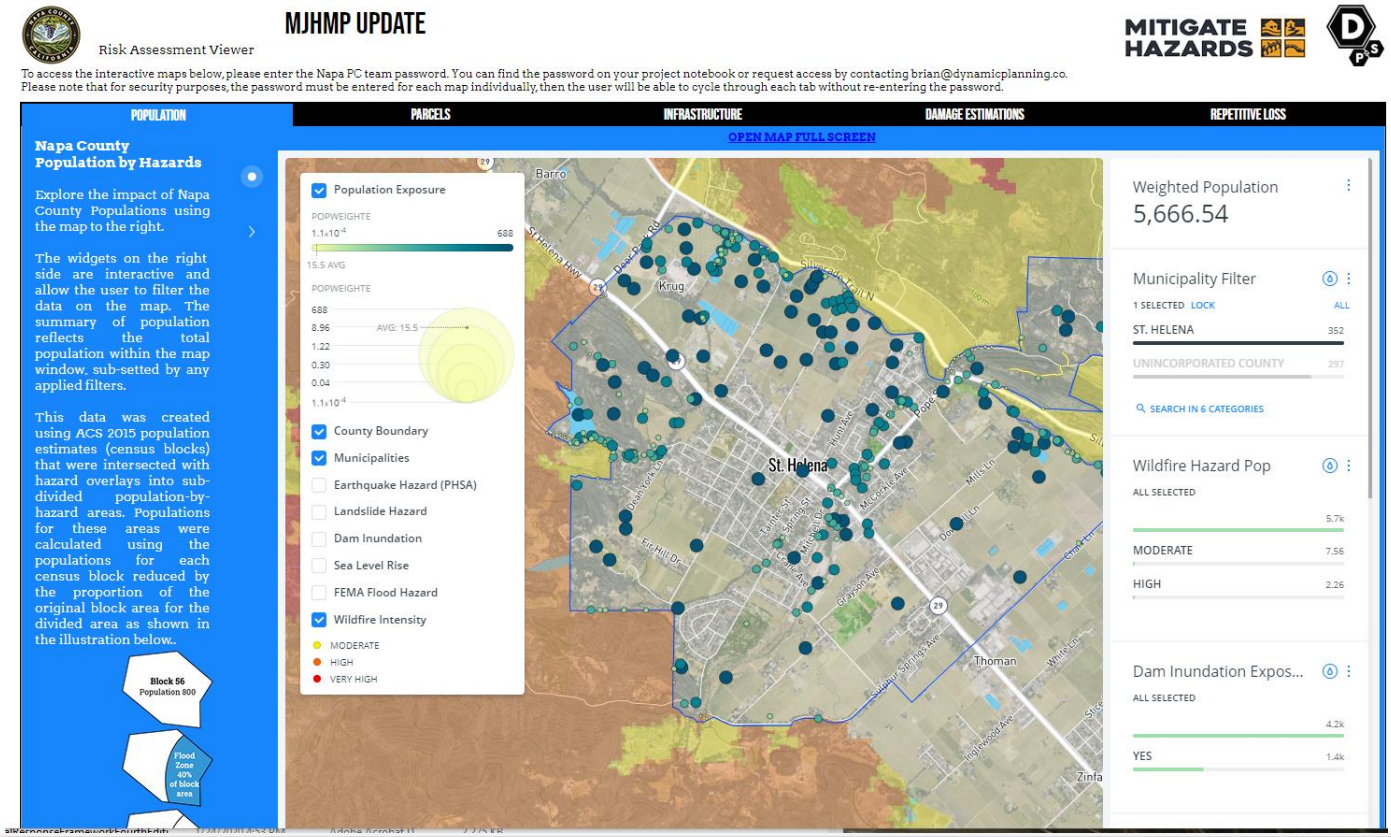


Figure 3-4: RAMP-Population of St. Helena Overlaid with Wildfire Zones

STEP 3: Develop a Mitigation Strategy

The MJHMP was prepared in accordance with DMA 2000 plan update requirements, the California Office of Planning and Research (OPR), and FEMA's HMP guidance. This document provides an explicit strategy and blueprint for reducing potential losses identified in the risk assessment based on existing authorities, policies, programs and resources, and participating jurisdictions' abilities to expand on and improve these existing tools. MJHMP development included identifying goals, assessing existing capabilities, reviewing the 2013 HMP goals, and identifying new mitigation actions. The substance of the mitigation strategy is detailed in 4.5.10.9 for the County and as appendices for other participating jurisdictions and is summarized below.

Identify Goals

The Planning Committee reviewed the 2013 HMP goals and determined their current day validity, consistent with FEMA requirements. The goals and objectives were updated to meet the current hazard environments and to be consistent with the changing policies and goals of participating organizations. The Goals and Objectives are presented in Section 0.

Develop Capabilities Assessment

A capabilities assessment is a comprehensive review of participating jurisdictions' capabilities and tools to implement the mitigation actions in the MJHMP. The Planning Committee identified technical, financial, and administrative capabilities to implement mitigation actions, as detailed in 4.5.10.9.

Identify Hazard Problem Statements

The Planning Committee developed mitigation actions, as both planning activities and projects, to address problems that could originate from hazards identified in the risk assessment, in line with identified capability of each jurisdiction. Mitigation actions were created by identifying hazard problem statements. As a rule of thumb, each hazard problem statement should be mitigated with a combination of short-term and long-range planning activities, either through operational and or physical projects. Hazard Problem Statements are located at the conclusion of each hazard profile in table format and are also uploaded in an interactive web-based Mitigation Action Support Tool (MAST), described below. Hazard problem statements for the County and other participating jurisdictions are categorized as impact-related, victim-related, or threat-related, as described in Figure 3-5.

IMPACT

Casualties

Property Damage

Business Interruption

Financial Loss

Environmental Contamination

VICTIM

School Children in Hazard High Hazard Areas

Care Facilities in High Hazard Area

Vulnerable Population Exposed to hazards

THREAT

Increased Fuels due to drought

Hotter, drier climates

More Intense Storms

Impervious surfaces = greater runoff

Increases of Invasive Species

Figure 3-5. Categories of Issues Addressed in Problem Statements

Identify Mitigation Actions

As part of the MJHMP planning process, the Planning Committee reviewed and analyzed the status of the mitigation actions identified in the 2013 HMP. The Consultant Team and Planning Committee then worked together to identify and develop new mitigation actions with implementation elements. The Planning Committee prioritized and further detailed the implementation strategies during Planning Committee Meeting #3. Additional detail on these mitigation actions is provided in 4.5.10.9.

Mitigation Action Support Tool (MAST)

As a living document, hazard problem statements and mitigation activities will be updated through a web interface application developed specifically for participating jurisdictions. The Mitigation Action Support Tool (MAST) is accessible through www.mitigatehazards.com

MAST is a web based interactive tool that enables multiple users to search, view, enter, and update mitigation actions, ideas or projects, and other information. MAST provides participating jurisdictions and plan reviewers (Cal OES/FEMA) access to valuable mitigation information that can be leveraged by future planning or other risk reduction efforts within the County. Participating jurisdictions can update the status of their mitigation projects throughout the planning lifecycle, and this web-based tool will improve participating jurisdiction's ability to apply for FEMA's Hazard Mitigation Assistance (HMA) grant programs including initial grant application processes through Cal OES.

Multi-jurisdictional Planning Process

Multi-jurisdictional hazard mitigation planning offers many benefits, such as increased coordination and efficiency in planning and implementation efforts. At the same time, each jurisdiction has specific hazards and specific mitigation actions that must be addressed individually. The MJHMP balances the benefits of a comprehensive, coordinated approach to hazard mitigation with the very specific realities of individual participating jurisdictions. Multi-jurisdictional plans are contemplated under FEMA regulations at 44 C.F.R. § 201.6(4). Table 3-5 documents each jurisdiction's HMP resources.

Table 3-5. Participating Jurisdictions and Links to Individual HMP Resources

Jurisdiction	Planning Library Links
Napa County	Risk Assessment – View Maps / Download Maps Hazard Prioritization – View Risk Matrix Areas of Concern – View Problem Statements Capability Assessments – View Capability Assessment

Jurisdiction	Planning Library Links
City of American Canyon	Risk Assessment – View Maps / Download Maps Hazard Prioritization – View Risk Matrix Areas of Concern – View Problem Statements Capability Assessments – View Capability Assessment
City of Calistoga	Risk Assessment – View Maps / Download Maps Hazard Prioritization – View Risk Matrix Areas of Concern – View Problem Statements Capability Assessments – View Capability Assessment
City of St. Helena	Risk Assessment – View Maps / Download Maps Hazard Prioritization – View Risk Matrix Areas of Concern – View Problem Statements Capability Assessments – View Capability Assessment
Town of Yountville	Risk Assessment – View Maps / Download Maps Hazard Prioritization – View Risk Matrix Areas of Concern – View Problem Statements Capability Assessments – View Capability Assessment
Howell Mountain Mutual Water Company	Risk Assessment – View Maps / Download Maps Hazard Prioritization – View Risk Matrix Areas of Concern – View Problem Statements Capability Assessments – View Capability Assessment
Napa County Flood Control and Water Conservation District	Risk Assessment – View Maps / Download Maps Hazard Prioritization – View Risk Matrix Areas of Concern – View Problem Statements Capability Assessments – View Capability Assessment
Napa County Office of Education	Risk Assessment – View Maps / Download Maps Hazard Prioritization – View Risk Matrix Areas of Concern – View Problem Statements Capability Assessments – View Capability Assessment
Napa Valley College	Risk Assessment – View Maps / Download Maps Hazard Prioritization – View Risk Matrix Areas of Concern – View Problem Statements Capability Assessments – View Capability Assessment

STEP 4: Adopt and Implement the Plan

Once the risk assessment and mitigation strategy were completed, information, data, and associated narratives were compiled into the MJHMP. Section 2 provides detailed information on new and updated elements of the MJHMP.

Plan Review and Revision

Once the "Draft" MJHMP Update was completed, a public and government review period was established for official review and revision. Public comments were accepted, reviewed, and incorporated into this update. Applicable comments from the public have been received and addressed prior to the *"authorization to submit"* to FEMA and Cal OES review parties.

Plan Adoption and Submittal

This plan has been submitted and approved by FEMA and adopted by the County. Copies of the resolutions are provided in forward of this document. ***Adoptions proceedings will be completed after approval by Cal OES and FEMA.***

Implement, Evaluate, and Revise the Plan

The true worth of any mitigation plan is its implementation and success under FEMA's grant programs. This MJHMP has been assembled to reduce the risk of natural hazards, and also to meet the requirements of the DMA 2000 and maintain eligibility under FEMA's Hazard Mitigation Assistance (HMA) grant programs.

FEMA administers three programs that provide funding for local agencies with approved mitigation plans:

- **Hazard Mitigation Grant Program (HMGP),** which assists in implementing long-term hazard mitigation planning and projects following a Presidential major disaster declaration.
- **Pre-Disaster Mitigation (PDM),** which provides funds for hazard mitigation planning and projects on an annual basis.
- **Flood Mitigation Assistance (FMA),** which provides funds for planning and projects to reduce or eliminate risk of flood damage to buildings that are insured under the National Flood Insurance Program (NFIP) on an annual basis. *Note: Napa County Flood Control and Water Conservation District is not insured through the NFIP and therefore ineligible for funding projects under FMA.*

For more information about FEMA HMA, visit: https://www.fema.gov/hazard-mitigation-assistance.

Plan Maintenance

The County will update and monitor this Plan in accordance with all FEMA requirements in order maintain eligibility for FEMA HMA. Evaluation and revision procedures for this plan are detailed in Section 6.

Section 6 includes the measures Napa County and participating jurisdictions will take to ensure the MJHMP's continuous long-term implementation, including MJHMP monitoring, reporting, evaluation, maintenance, and updating. Most of this implementation and maintenance will be done through MAST. Figure 3-6 demonstrates how MAST information will translate into Cal OES NOIs and grant Sub application requests.

Section 6 also contains specifics on integrating mitigation with day-to-day decision making and submitting Notice of Interest (NOIs) for FEMA grant opportunities administered by Cal OES.

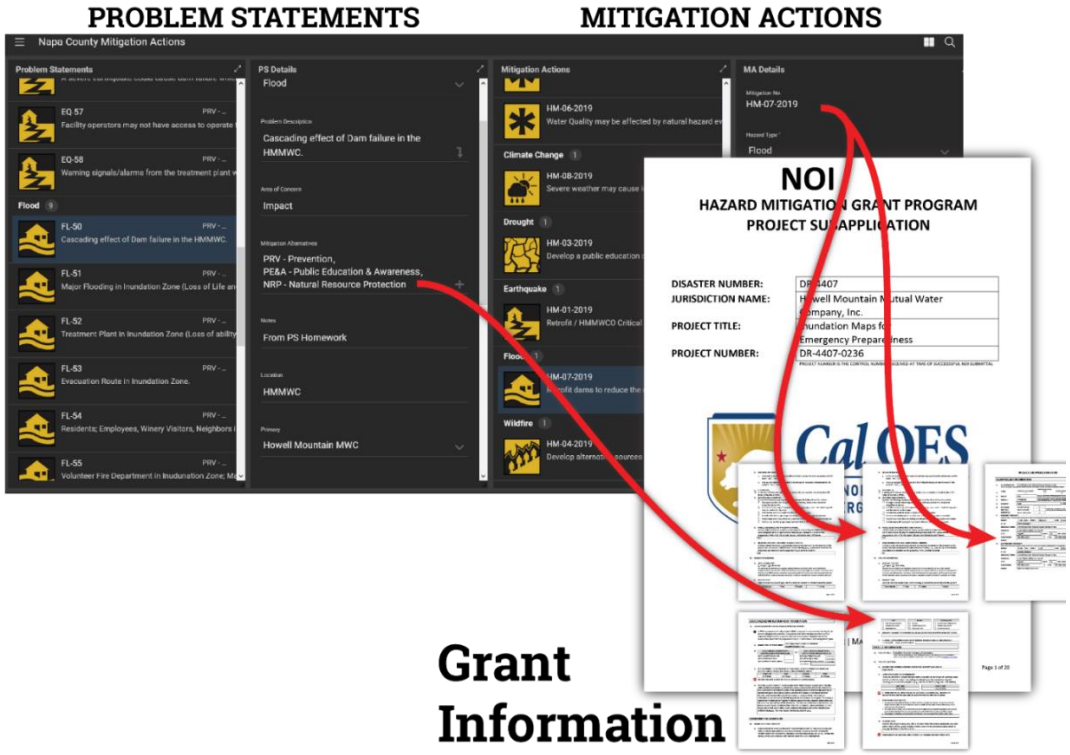


Figure 3-6 MAST Elements and Cal OES Grant Applications

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Section 4. Risk Assessment

The risk assessment measures the potential impact to life, property, and the economy resulting from natural hazards. The intent of the Risk Assessment is to identify the qualitative and quantitative vulnerabilities of a community to the greatest extent possible given available data. The risk assessment increases understanding of natural hazard impacts to the community and provides a foundation to develop and prioritize mitigation actions. In turn, mitigation actions reduce damage from natural disasters through increased preparedness and focus resources to areas of greatest vulnerability.

This risk assessment section evaluates potential loss from a hazard event by assessing the vulnerability of buildings, infrastructure, and people. It identifies the characteristics and potential consequences of hazards, explores how much of the County could be affected by a hazard, and assesses the impact on County assets. The risk assessment approach consists of three (3) components:

- **HAZARD IDENTIFICATION AND SCREENING**
  Identification and screening of hazards (Section 4.1 and 4.1.2)
- **HAZARD PRIORITIZATION**
  Identifying "priority hazards" for each participating jurisdiction to be profiled in more detail (Section 4.1.2)
- **VULNERABILITY ASSESSMENT**
  Determination of potential losses or impacts to buildings, infrastructure and population
  This section contains HAZARD PROFILES for individual priority hazards (Section4.5)

4.1 Hazard Identification and Screening

Per FEMA Guidance, the first step in developing the Risk Assessment is identifying the hazards. This step includes two parts. First, the MJHMP Planning Team considered and screened a broad set of hazards presented in relevant local, regional, and statewide hazard planning documents. The crosswalk of documents reviewed and the results of screening the relevant hazards to be reviewed are outlined in Section 4.1.1. Second, the MJHMP considered past hazard events in Napa County to help prioritize hazards to be evaluated in this document, as outlined in Section 4.1.2.

4.1.1 Hazard Screening

The County's MJHMP Planning Team first reviewed previously-prepared hazard mitigation plans and other relevant documents to determine the realm of natural hazards that have the potential to affect the County and the nearby region. Table 4-1 provides a crosswalk of hazards identified in the 2013 Napa County Operational Area Hazard Mitigation Plan, 2008 Napa County General Plan, 2010 San Francisco Bay Area Hazard Mitigation Plan, and 2018 California State Hazard Mitigation Plan. Sixteen different hazards were

identified based on a thorough document review. The crosswalk was used to develop a preliminary hazards list, providing a framework for MJHMP Planning Team members to evaluate which hazards were truly relevant to participating jurisdictions and which ones were not. For example, volcanoes were considered to have no relevance to the County, while earthquake, flood and wildfire were indicated in every hazard document.

Table 4-1: Document Review Crosswalk

Hazards	2013 Napa County Operational Area HMP	2008 Napa County General Plan	2010 San Francisco Bay Area HMP	2018 California State HMP
Agricultural Pests				■
Climate Change			■	■
Dam Failure			■	■
Drought			■	■
Earthquake	■	■	■	■
Flood	■	■	■	■
Landslide		■	■	■
Levee Failure			■	■
Manmade Hazards		■		■
Pandemic Disease				■
Sea Level Rise				■
Severe Weather				■
Terrorism & Tech Hazards		■		■
Tsunami			■	■
Volcano				■
Wildfire	■	■	■	■

The crosswalk provided the basis for prioritizing hazards to be profiled, as described in greater detail in 4.1.2. The most significant, prioritized hazards have detailed hazard profiles and are analyzed further in Section 4.3 Vulnerability Assessment.

Table 4-2. Hazard Prioritization

Hazard Type	Explanation
Climate Change	**High priority county-wide, profiled hazard.**
Dam failure	**High priority county-wide, profiled hazard.**
Drought	**High priority county-wide, profiled hazard**
Earthquake/ Geologic Hazards	**High priority county-wide, profiled hazard**
Extreme Heat	**Profiled as part of Severe Weather hazard**
Extreme Cold	**Profiled as part of Severe Weather hazard**
Flood	**High priority county-wide, profiled hazard**
Hail	**Profiled as part of Severe Weather hazard**
Hazardous Material	While hazardous materials can release and impact the County, there are better avenues to address this hazard outside this Plan.
High Winds/ Straight Line Winds	**High priority county-wide, profiled as part of Wildfire and Severe Weather hazards**
Infestation	**High priority county-wide, profiled as part of Ag Disaster hazard**
Lightning	While lightning does occur in Napa County, no property damage, injuries, or death have been reported since 2000; not a priority in the County
Pandemic Disease	**High priority county-wide, profiled hazard.**
Severe Thunderstorm	While severe thunderstorms can occur in Napa County, no property damage, injuries, or death have been reported since 2000; not a priority in the County
Slope Failure	**High priority county-wide, profiled hazard**
Terrorism/Human Caused Threats	While terrorism is certainly a threat to the County and participating jurisdictions, it is best addressed in other plans as this HMP does not address human caused threats.
Tornado	Impacts to the County from tornados are extremely unlikely, if any.
Volcanic Activity	Due to distance from volcanoes and the limited chance of an eruption, this hazard was not identified as a priority.
Wildfire	**High priority county-wide, profiled hazard**
Winter Storm	**Profiled as part of Severe Weather hazard**

4.1.2 Past Major Hazard Events

One important consideration in identifying and prioritizing hazards is past major hazard events, especially those that triggered federal or state disaster declarations. The MJHMP Planning Team reviewed and considered past major hazard events in Napa County as part of the screening and identification process.

Most available information on major past hazard events comes from federal or state disaster declarations. These declarations may be granted when the severity and magnitude of an event surpasses the ability of the local government to respond and recover. Additional federal or state disaster funding (or both) is generally available in response to a disaster declaration. State funding assistance is provided when a local government's capacity to respond to the disaster is exceeded. Should the disaster be so severe that both the local and state governments' capacities are exceeded, a federal emergency or disaster declaration may be issued allowing for the provision of federal assistance.

The federal government may issue a disaster declaration through FEMA, the U.S. Department of Agriculture (USDA), and the Small Business Administration (SBA). FEMA also issues emergency declarations, which are more limited in scope and do not include the long-term federal recovery programs that accompany major disaster declarations. Quantity and types of damage are the determining factors.

Napa County has received 28 federal disaster declarations[1] since 1953, some of which were statewide, including:

9 Wildfires

2 Earthquakes

11 Severe Storms / Weather

1 Drought

5 Floods

Severe weather and flooding events are most likely to occur in the winter months, with ten of the 29 federally-declared disasters occurring in January and February. Wildfires have typically occurred in the late summer, with 8 wildfire declarations from July through October. Table 4-3 lists federal disaster declarations in Napa County since 1995.

[1] Officially, 29 disasters have been declared, as California was declared as part of Hurricane Katrina evacuation; however, no disaster occurred in California.

HMP submitted 08.11.2020

Table 4-3: Disaster Declarations in Napa County 1995-Present

Year	Date Declared	Incident Description	Disaster Number
2019	*05/01; 05/17*	Severe Storm, Winter Storm, Mud & Landslides, Flooding	*DM-4431/4434*
2017	*10/09*	California Atlas Fire	*FM-5214*
2017	*10/09*	California Patrick/Nuns Fire	*FM-5222*
2017	*2/14; 3/16; 04/01*	Severe Storm, Winter Storm, Mud & Landslides, Flooding	*DM-4301/4305/4308*
2017	*10/08*	California Tubbs Fire	*FM-5215*
2017	*10/10*	Wildfire	*DM-4344*
2015	*07/23*	California Wragg Fire	*FM-5091*
2015	*09/13*	California Valley Fire	*FM-5112*
2014	*09/11*	California Earthquake	*DR-4193*
2014	*03/12*	California Butts Fire	*FM-5057*
2008	*06/22*	Wildfire	*DR-2776*
2006	*03/29*	Severe Storm, Winter Storm, Mud & Landslides, Flooding	*DR-1646*
2006	*12/17*	Severe Storm, Winter Storm, Mud & Landslides, Flooding	*DR-1628*
2000	*09/03*	California Earthquake	*DR-1342*
1999	*08/24*	California Extreme Fire Hazards	*EM-3140*
1998	*02/02*	Severe Storms, Flooding	*DR-1203*
1997	*02/16*	Severe Storms, Flooding, Mud & Landslides	*DR-1155*
1995	*01/03*	Severe Storm, Winter Storm, Mud & Landslides, Flooding	*DR-1044*
1995	*02/13*	Severe Storm, Winter Storm, Mud & Landslides, Flooding	*DR-1046*

Source: FEMA Disaster Database via http://mitigatehazards.com/hazard-mapping/ , accessed 01/24/2020.

Drought declarations may also occur through the United States Department of Agriculture (USDA), as agricultural areas such as Napa County can be particularly impacted from drought. A USDA disaster declaration certifies that the affected county has suffered at least a 30-percent loss in one or more crop or livestock areas and provides affected producers with access to low-interest loans and other programs to help mitigate the impact of the drought. Importantly, all counties neighboring those receiving disaster declarations are eligible for the same assistance. Since 2012, Napa County qualified for USDA drought assistance in 2014, 2015 and 2016.

It is important to be aware that hazard events that happen outside of the County boundaries also can have direct and indirect impacts to Napa County. For instance, dam failures and wildfires may occur outside Napa County but affect watersheds that drain into the County, and can result in flooding and other impacts related to watershed health. Power supply also could be interrupted by hazards outside of the County.

4.2 Hazard Prioritization

The Planning Committee's hazard prioritization process combines historical data, local knowledge, and consensus opinions to produce a matrix that illustrates whether each profiled hazard is an extreme, high, or medium priority. The criteria below were used to evaluate hazards and identify the highest risk hazard in Napa County. The results of the prioritization process for Napa County are shown in Table 4-4.

Each participating jurisdiction also completed the hazard prioritization process specifically for the jurisdiction, and this important initial stage informed the rest of the planning process for each jurisdiction. Individual prioritization matrices are available in Volume 2 of this MJHMP.

The following questions and guidance shaped the ranking on the matrices:

Probability

What is the likelihood of a hazard event occurring in a given year?

Unlikely- less than 1% annual probability or occurs rarely in the region or community

Possible- 1%-10% annual probability or could occur. Uncommon in the region or community

Likely- 10%- 100% annual probability or recurrent. Not frequent in the region or community

Highly likely- 100% annual probability or occurs frequently in the region or community

Impact

In terms of injuries, damage, or death, would you anticipate impacts to be minor, limited, critical, or catastrophic when a significant hazard event occurs?

Minor- very few injuries, if any. Only minor property damage and minimal disruption on quality of life. Temporary shutdown of critical facilities.

Limited- minor injuries only. 10%-25% of property in affected area damaged or destroyed. Complete shutdown of critical facilities for more than one day.

Critical- multiple deaths or injuries possible. 25%-50% of property in affected area damaged or destroyed. Complete shutdown of critical facilities for more than one week.

Catastrophic- high number of deaths or injuries possible. More than 50% of property in affected area damaged or destroyed. Complete shutdown of critical facilities for 30 days or more.

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Table 4-4: Prioritized Hazard Assessment Matrix for Napa County

Risk Assessment Matrix Definitions

PROBABILITY RATING

The likelihood of a hazard event occurring within a time period?

PROBABILITY

- **Highly Likely** - **Highly likely** - 100% annual probability. Or Likely to occur every year in your lifetime.
- **Likely** - **Likely** - between 10 & 100% annual probability. Or will occur several times in your lifetime.
- **Possible** - **Possible** - between 1 & 10% annual probability. Or Likely to occur some time in your lifetime.
- **Unlikely** - **Unlikely** - less than 1% annual probability. Or unlikely but possible to occur in your lifetime.

IMPACT RATING

In terms of injuries, damage, or death, would you anticipate impacts to be minor, limited, critical, or catastrophic when a significant hazard event occurs? The impact could be in terms of one hazard event (flooding from a culvert failure) or a large-scale event (multiple rivers flooding) in the same jurisdictional boundary.

IMPACT

Minor	Limited	Critical	Catastrophic

Minor - very few injuries, if any. Only minor property damage & minimal disruption on quality of life. Temporary shutdown of critical facilities.

Limited - minor injuries only. Approx. 10% or less of property in disaster footprint damaged or destroyed. Complete shutdown of critical facilities for more than one day.

Critical - multiple deaths/injuries possible. Between 25% and 50% of property in disaster footprint is damaged or destroyed. Complete shutdown of critical facilities for more than one week.

Catastrophic - high number of deaths/injuries possible. More than 50% of property in affected area damaged or destroyed. Complete shutdown of critical facilities for 30 days or more.

To concentrate resources, the jurisdictional planning team primarily focus on "High" and "Extreme" risk hazards, but may also focus on other hazards with medium impact. These hazards have the higher probability and greater impact as it relates to the jurisdictions planning area.

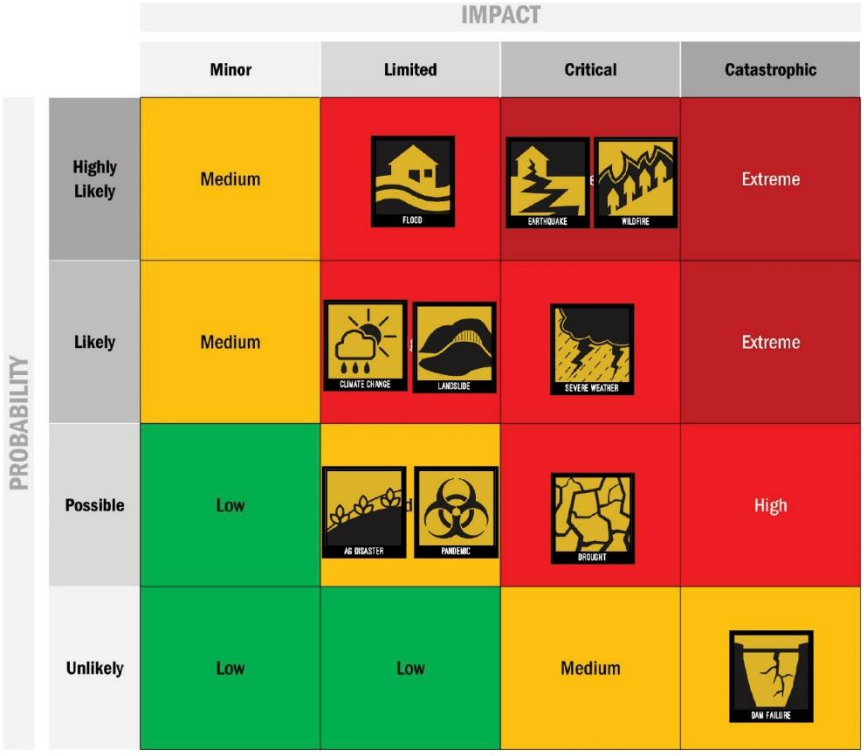
Hazard definitions are included in Vol. 1 of this plan. Some hazards are discussed as subset hazards— e.g., "Sea Level Rise" within the "Climate Change" hazard profile. If a hazard is not present on the risk matrix or are grey in color, the jurisdictional planning team felt the hazard had a minimal footprint within their planning area and was not ranked.

Hazard Information / Legend:

Climate change may change the frequency, duration and intensity of hazards within each planning area. If applicable Climate Change impacts are described at the end of each section.

If hazard symbol is grey or not present, the jurisdictional planning team did not develop hazard vulnerability information related to the planning areas due to perceived probability and impact described above.

Napa County Risk Matrix



4.3 Napa County Geographic and Demographic Profile

The geographic and demographic profile for Napa County and participating jurisdictions sets the stage for the vulnerabilities assessment. Paired with the vulnerabilities assessment, the regional profile can help guide jurisdictions' resources to key populations and geographic areas.

4.3.1 Geography

Napa County is located in the North Bay Area of California, north of San Pablo Bay and 50 miles north of San Francisco. It is one of the nine San Francisco Bay Area counties and one of four North Bay counties. Contiguous counties include Solano, Sonoma, Lake and Yolo. The County is approximately 788 square miles in area, of which approximately 754 square miles are land and 34 square miles are water. Geographic features include the Napa River Delta, to the south and west, and the Mayacmas Mountain range in the north. The County is located in the Governor's Office of Emergency Services Coastal Region and Mutual Aid Region II.

Several key roads may provide important accesses and linkage during a hazard event. State Route (SR) 29 is the largest-capacity road running north and south through the Napa Valley, becoming a four-lane limited-access expressway in the City of Napa. State Route 29 connects American Canyon, Napa, Yountville, St. Helena, and Calistoga. It connects Napa County to Lake County in the north and to Solano County in the south.

State Routes 128, 121, and 12 provide some redundancy with SR 29. State Highway 128 cuts through the County in the east through the Lake Berryessa Resort area and to the northwest connecting the Napa Valley to the Knights, Alexander, and Anderson Valleys in Sonoma County. SR 12 connects Interstate 80 to Hwy 101. SR 121 connects Napa County to Sonoma County to the west, overlapping SR 12. It then merges with SR 29 into the City of Napa. It continues northward for several miles before reaching its northerly end at SR 128.

4.3.2 Climate

The general climate of Napa County can be described as Mediterranean, with cool, wet winters and warm, dry summers. It varies slightly across the County due to terrain and geography. For example, the southern end of the valley, where American Canyon and the City of Napa are located, is cooler than the northern part of the County due to its location near San Pablo Bay, the northern tip of the San Francisco Bay. Winds from the Bay cool southern Napa County as far north as Yountville. St. Helena and Calistoga areas do not encounter those cooling winds and thus tend to be much warmer.

Average annual rainfall in Napa County is less than 21 inches, with over half of the rain occurring in the winter months of December, January, and February. (U.S. Climate Data, 2020) The western side of the valley, in the Mayacamas Mountains, gets more rain and supports redwood and fir forests and numerous streams and waterfalls. The eastern side of the valley, in the Vacas Mountains, receives much less rain and supports desert-like scrub brush and cactus. Temperatures in Napa County typically range from a

winter high temperature of 55 degrees Fahrenheit in January and an average summer high of 80 degrees Fahrenheit. (U.S. Climate Data, 2020)

4.3.3 Demographics and Vulnerable Populations

Population information directly relates to land needs such as housing, industry, stores, public facilities and services, and transportation, and impacts from hazards. Knowledge of the composition of the population, how it has changed, and how it may change in the future helps with future decision making. The United States Census Bureau estimated Napa County's population to be 139,417 in 2018, an estimated 2.1% increase since 2010. (U.S. Census Bureau, 2019) This is in contrast to an estimated 6.1% population increase in California in the same period. (Id.)

Importantly, demographics helps identify what populations may be particularly vulnerable to hazard events. Some populations are at greater risk from hazard events because of age, resources, physical abilities, or other factors. Vulnerability in the face of a hazard event is not a fixed characteristic; the same person may be at risk for some hazards but not at risk for others. For example, a low-income family without a car may be at risk for a wildfire or flood if a quick evaluation is necessary but prepared in the event of an earthquake. Some individuals are highly and permanently vulnerable to many hazards, such as the frail elderly; people living with chronic sensory, mobility, or cognitive impairments; and individuals dependent upon assistive devices or complex medical regimens in order to survive. (National Center for Disaster Preparedness, 2020) Vulnerable populations also may be living in hazard-prone areas, compounding their risk.

In the context of all-hazards preparedness and response planning, **at-risk individuals** (often used interchangeably with "**vulnerable populations**") are defined federally as "children, pregnant women, senior citizens, and other individuals who have access or functional needs in the event of a public health emergency." (42 U.S.C. § 2802(b)(4)(B)(2019)) Examples of these populations may include but are not limited to individuals with disabilities, individuals who live in institutional settings, individuals from diverse cultures, individuals who have limited English proficiency or are non-English speaking, individuals who are transportation disadvantaged, individuals experiencing homelessness, individuals who have chronic medical disorders, and individuals who have pharmacological dependency.

Natural resource managers may be able to reduce vulnerability of certain populations by increasing the adaptive capacity of affected communities. Examples include cost-sharing to reduce fuels, stabilize structures, or implement flood-reducing measures or educational programs offered in English and Spanish and targeted to specific populations. And considering vulnerable populations may assist in prioritizing resources where they will be the most effective.

This section explores the various demographic and economic circumstances surrounding common vulnerable populations.

4.3.3.1 Income & Housing

Income or wealth is one of the most important factors in natural hazard vulnerability. First, lower income populations are less able to afford housing and other infrastructure that can withstand extreme events. The poor typically occupy more poorly-built and inadequately-maintained housing. For example, mobile or modular homes are more susceptible to damage in earthquakes and floods than other types of housing. In urban areas, the poor often live in older houses and apartment complexes which are more likely to be made of un-reinforced masonry, a building type that is particularly susceptible to damage during earthquakes.

Second, low income populations are less able to purchase resources needed for disaster response. In the United States, individual households are expected to use private resources to prepare for, respond to, and recover from disasters, to a large extent. This means that households living in poverty and minority pare disadvantaged when confronting hazards. The more affluent are able to relocate to safer areas or rebuild following a hazard event. Moreover, individuals do not own cars or who cannot afford gas for their cars will likely decide not to evacuate. (Krause & Reeves, 2017)

Furthermore, residents below the poverty level are less likely to have insurance to compensate for losses incurred from natural disasters. This means that residents below the poverty level have a great deal to lose during an event and are the least prepared to deal with potential losses. Recent hurricane events such as Harvey, Irma, and Katrina demonstrated that low-income and minority communities are more vulnerable to hazard events, and they struggle to recover the most. (Id.)

Figure 4-1 shows the median household income distribution for Napa County in 2015. The "median" is the value that divides the distribution of household income into two equal parts (e.g., the middle). The median household income in Napa County from 2013-2017 (in 2017 dollars) was estimated to be $79,637, compared to $57,652 across the U.S. (Bureau, 2017)

About 6.8% of individuals in Napa County are below the poverty level. (U.S. Census Bureau, 2019) The most vulnerable residents (in terms of income and housing condition) to natural hazards are outside Calistoga and St. Helena, south of Yountville and on the outskirts of Napa. See map in Figure 4-1.

4.3.3.2 Age

Children and the elderly may be more vulnerable during an extreme hazard event.

Specific planning attention for the elderly is an important consideration, especially given the current aging of the American population. Elderly vulnerability can vary significantly based on health, age, and economic security. However, as a group, the elderly are more apt to lack the physical and economic resources necessary for response to hazard events and are more likely to suffer health-related consequences making recovery slower. They are more likely to be vision, hearing, and/or mobility impaired, and more likely to experience mental impairment or dementia.

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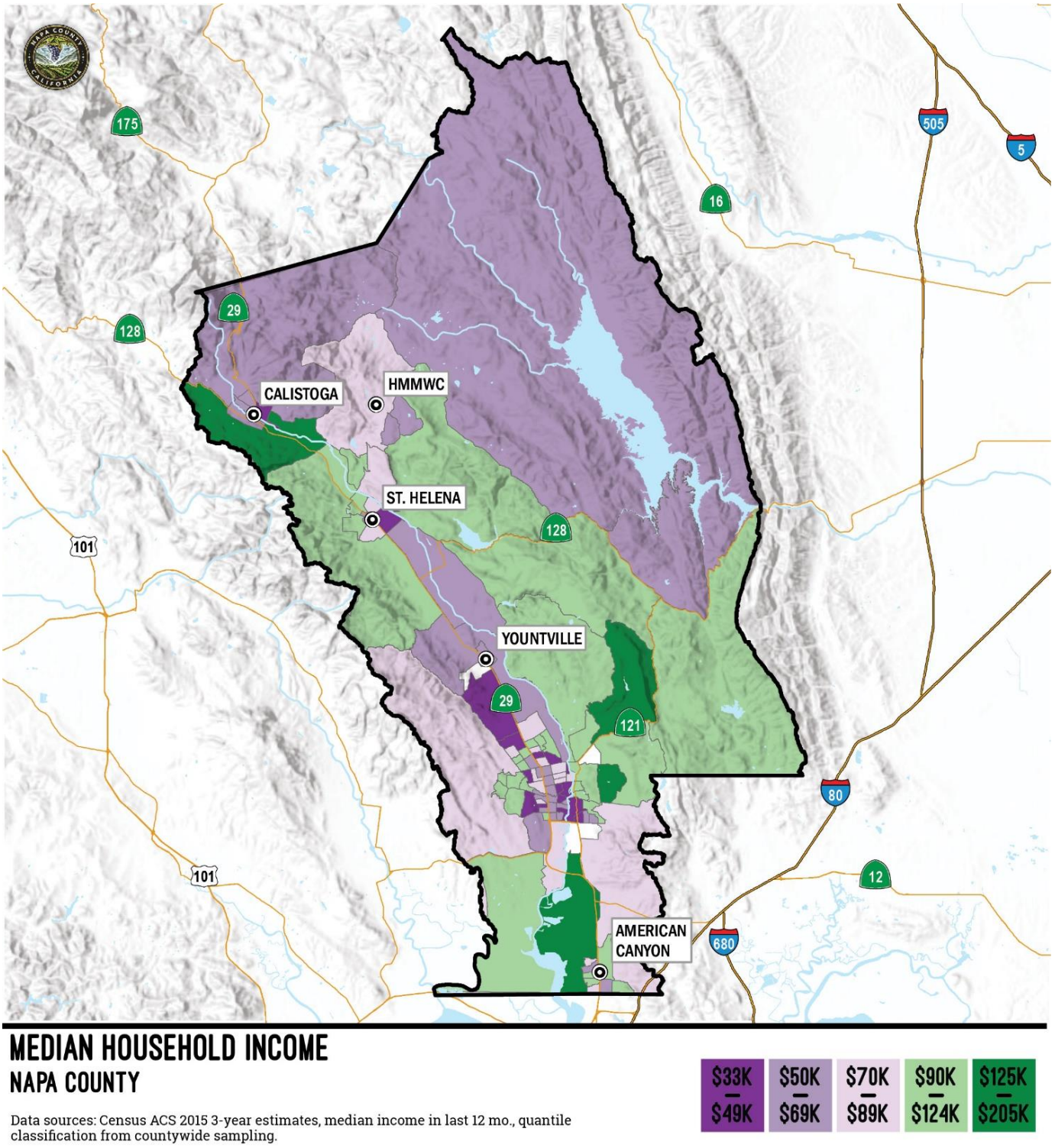

Figure 4-1: Median Household Income Distribution

Additionally, elderly persons are more likely to live in assisted-living facilities where emergency preparedness occurs at the discretion of facility operators. These facilities are typically identified as "critical facilities" by emergency managers because they require extra notice to implement evacuation. Elderly residents living in their own homes may have more difficulty evacuating their homes and could be stranded in dangerous situations.

Lower-income elderly populations are less likely to have access to medical care due to financial hardship and are more likely to need special medical attention which may not be readily available during natural disasters.

In many cases, both children and the elderly depend on others to care for them during day-to-day life. Very young children and the elderly may be vulnerable to injury or sickness; this vulnerability can be worsened during a natural disaster because they may not understand the measures that need to be taken to protect themselves from hazards. They also may be weaker and less able to survive a hazard event.

Finally, both children and the elderly have fewer financial resources and are frequently dependent on others for survival. For these populations to remain resilient before and after a natural hazard event, it may be necessary to assist residents with resources provided by the County, Cities, State and Federal emergency management agencies and organizations.

Based on the 2017 American Community Survey, 17.4% of Napa County's population is 65 or older. In addition, 11.6% of the County's over-65 population have disabilities of some kind and 2.4% have incomes below the poverty line. An estimated 21.5% of the County's population is 18 or younger. About 3.7% of children under the age of 18 are living below the poverty level. The overall age distribution for Napa County is illustrated in Figure 4-2.

As seen in Figure 4-2, the areas with the highest concentration of people under 18 years old are located west of Napa, and outside of American Canyon and St. Helena. Figure 4-3 shows that the highest concentrations of people over the age of 65 are west of St. Helena.

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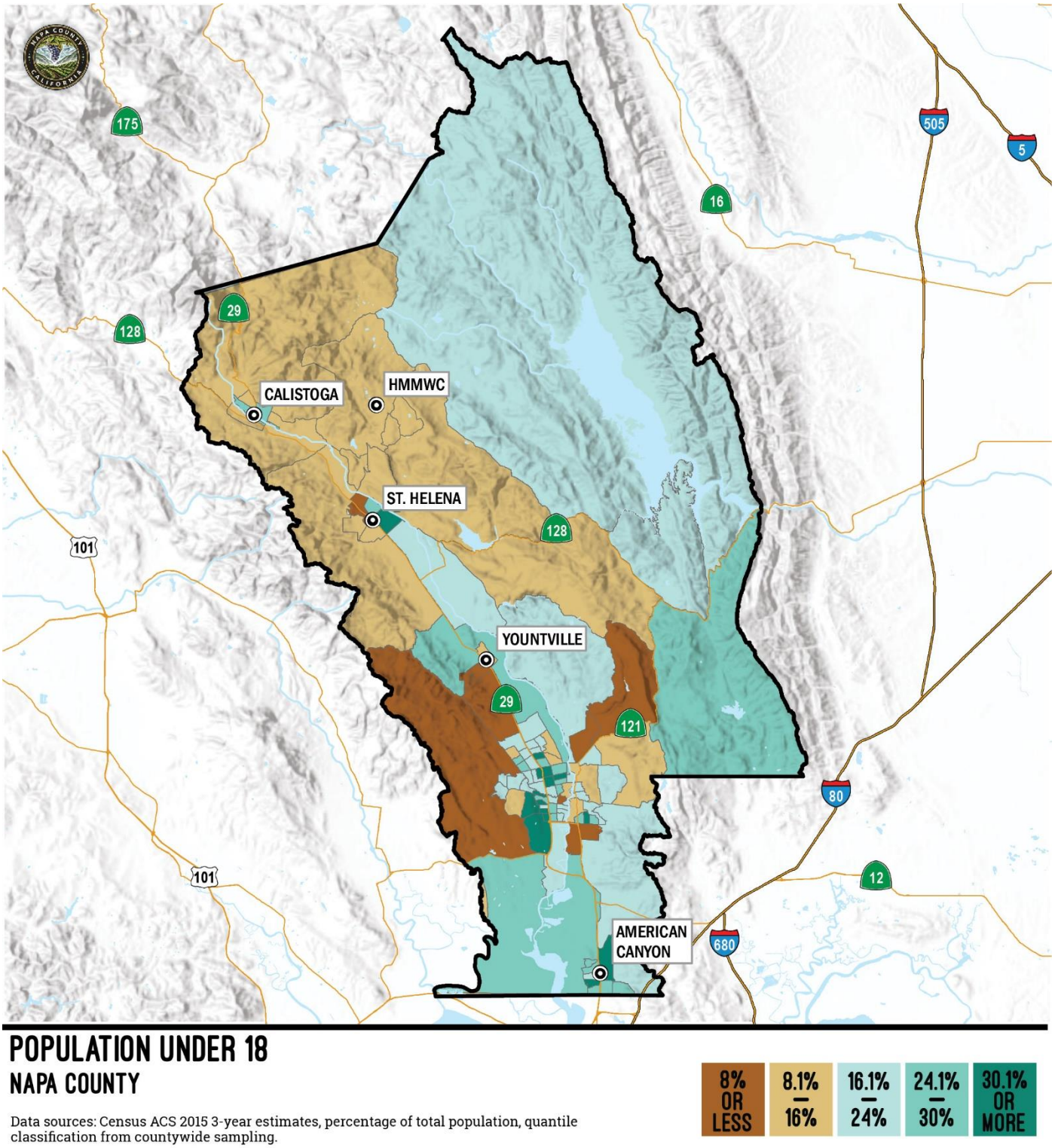

Figure 4-2: Napa County Population Under Age 18

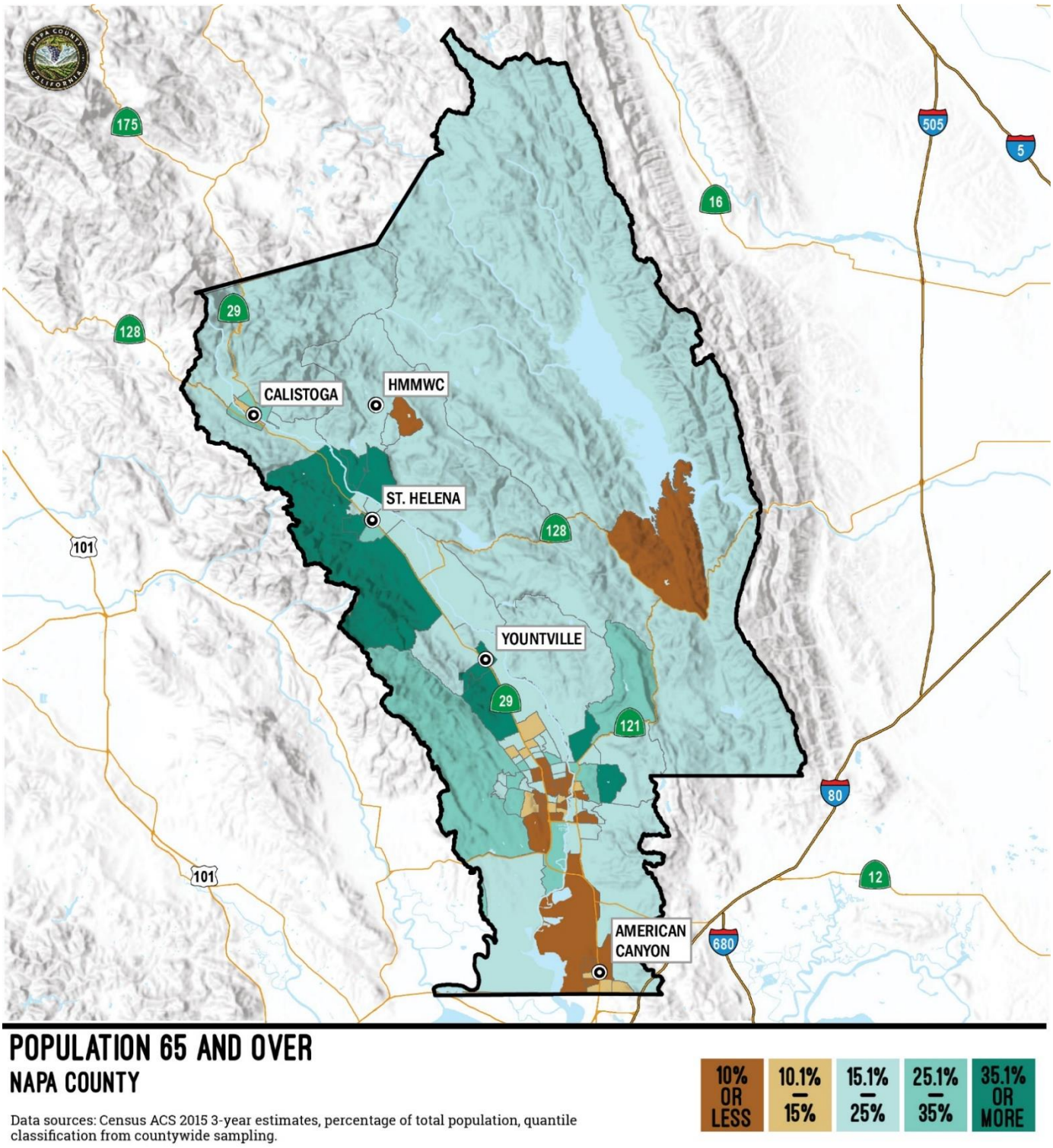

Figure 4-3: Napa County Population Over Age 65

4.3.3.3 Race, Ethnicity and Language

Non-English or limited-English speakers may have difficulty understanding emergency information as a result of language and literacy barriers. Non-white communities in fire-prone areas appear from research to be less able to adapt to a wildfire event. (Levin & Davies, 2019) Another study found that communities of color lose up to $29,000 on average in personal wealthy following events like hurricanes and wildfires. (Mandel, 2018) Since higher proportions of ethnic minorities live below the poverty line than the majority white population, poverty can compound vulnerability.

According to the 2017 American Community Survey estimates, Napa County is predominately white, at 71.5% of the total population. The largest minority population is Hispanic or Latino at 32.2% of the total county population. Figure 4-4 shows the racial distribution within Napa County.

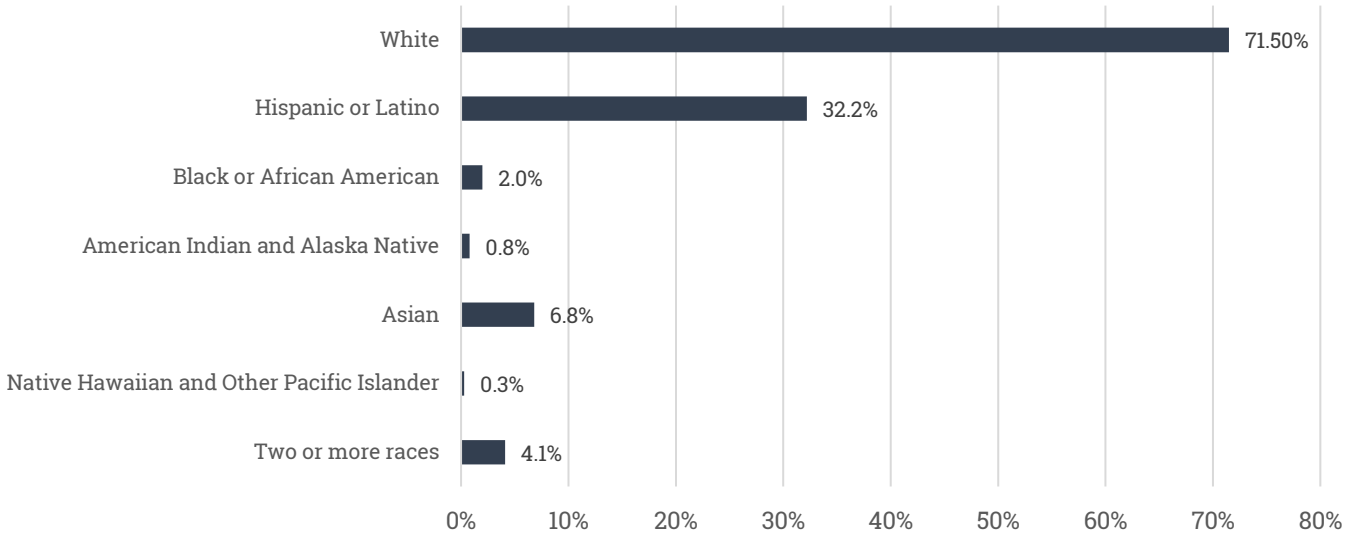

Figure 4-4: Napa County Race Distribution in 2017

Source: 2017 American Community Survey

4.3.3.4 Farm Workers

Farm workers may be particularly vulnerable during a hazard event, especially those non-English speaking and those living in temporary worker housing. In the north coastal agricultural region of California, which includes Napa County, there are approximately 17,700 agricultural workers, of whom 6,100 work in the grape sector. (California Employment Development Department, 2019) Moreover, 3,750 of the farmworkers in Napa County are estimated to be migrant workers. (U.S. Dep't of Ag, 2017)

Some of these farm workers may not have proper documentation to be working in the U.S. and may be more hesitant to seek aid or ask questions to properly prepare for a hazard event because of their immigration status.

Farmworkers in Napa County are generally paid a higher wage than in other parts of the country. Napa County farm laborers have the second-highest median hourly and annual wages in the state, behind the greater Bay Area. (Napa Valley Vinters, 2020) In 2014, farmworkers in the grape sector in the north coastal agricultural region made an average of $16.75 an hour, compared to $15.15 an hour for agricultural jobs in general in the region. In California, the average farmworker wage is $14.18 an hour. (California Employment Development Department, 2019)

The Napa region is unique among agricultural communities, as the growers assess themselves at $15 per acre of vineyards in order to provide farmworker housing, meals, laundry, and recreational amenities. (Napa Valley Vinters, 2020) These existing services and infrastructure provide an opportunity to integrate hazard preparedness for farmworkers into existing programs within Napa County.

4.3.3.5 At-risk Individuals with Access and Functional Needs

Another vulnerable population is individuals with access and functional needs that may interfere with their ability to access or receive medical care before, during, or after a disaster or emergency. Irrespective of specific diagnosis, status, or label, the term "access and functional needs" is a broad set of common and cross-cutting access and function-based needs, generally distinguished into access-based or function-based needs according to the following:

- **Access-based needs** require that resources are accessible to all individuals, such as social services, accommodations, information, transportation, medications to maintain health, and so on.
- **Function-based needs** refer to restrictions or limitations an individual may have that requires assistance before, during, and/or after a disaster or public health emergency.

At-risk individuals may have additional needs that must be considered in planning for, responding to, and recovering from a disaster or emergency. A recommended approach for integrating the access and functional needs of these individuals is the CMIST Framework as follows:

- Communication – Individuals who may have limitations that interfere with the receipt of and response to information require information be provided in an appropriate and accessible format. This can include individuals who are deaf or hard of hearing, individuals who speak American Sign Language, individuals who have limited or no English proficiency, individuals who are blind or have low vision, and individuals who have cognitive or physiological limitations.

- Maintaining Health – Individuals who may require Personal Assistance Services (or personal care assistance) in maintaining their activities of daily living such as eating, dressing, grooming, transferring, and toileting.

- Independence – Includes individuals who function independently if they have their assistive devices, such as consumable medical supplies (diapers, formula, bandages, ostomy supplies, etc.), durable medical equipment (wheelchairs, walkers, scooters, etc.), and/or service animals.

- Services and Support – Includes support for individuals with behavioral health needs, those who have psychiatric conditions (such as dementia, Alzheimer's disease, Schizophrenia, severe mental illness), pregnant women, nursing mothers, and infants, and children.

- Transportation – Includes individuals with transportation needs because of age, disability, temporary injury, poverty, addiction, legal restriction, or those who do not have access to a vehicle. This requires coordination to ensure access to mass transit and accessible vehicles such as para-transit. (Public Health Emergency, 2016)

While most individuals with access and functional needs do not have acute medical needs requiring the support of trained medical professionals, many will require assistance to maintain health and minimize preventable medical conditions. These individuals may require more time and assistance during an evacuation. According to the 2017 American Community Survey, 48.9% of the County's population has some form of disability. It is estimated that 11.6% of people over age 65 have some form of disability, as shown in Table 4-5. These numbers warrant special attention from planners and emergency managers.

Table 4-5: Disability Status of Non-Institutionalized Population in Napa County in 2017

Age	Persons with a Disability	Percent of Age Group
Under 18 years	930	3.1
18 to 64 years	2,326	14.6
Age 65 years and over	16,148	11.6

Source: 2017 American Community Survey

4.3.4 Economy

Hazard events can have a significant impact on the economy of a region, including lost jobs and unemployment following the disaster. Loss of agricultural production and tourism impacts are particularly significant in Napa County, given the percentage of jobs in the food service sector are four percent more than the national average, and jobs in the farming sector are four percent higher than nationally. (U.S. Census Bureau, 2019)

According to the Bureau of Labor Statistics, in June 2019 there were 82,323 jobs in all industries in Napa County. Table 4-6 shows the number of jobs by sector in the County of the top ten occupations in 2017. The top sectors were food preparation and serving related, sales and related, and office and administrative support.

Table 4-6: Top 10 Jobs by Occupation in Napa County in May 2018

Occupation	Percent of total employment (in %)	Mean hourly wage (in $)
Food Preparation and Serving Related Occupations	12.8	16.25
Sales and Related Occupations	12.3	21.85
Office and Administrative Support Occupations	11.9	21.68
Production Occupations	6.5	22.19
Healthcare Practitioners and Technical Occupations	6.5	50.84
Management Occupations	5.8	60.43
Building and Grounds Cleaning and Maintenance Occupations	5.2	15.71
Personal Care and Service Occupations	5	14.66
Farming, Fishing, and Forestry	4.5	17.23
Education, Training, and Library Occupations (tied 10th)	4.4	27.58
Construction and Extraction (tied 10th)	4.4	31.15

Source: Bureau of Labor Statistics, May 2018, https://www.bls.gov/regions/west/news-release/occupationalemploymentandwages_napa.htm.

Napa County is the center of California's wine industry the County is particularly susceptible to economic losses to the wine industry in the event of a hazard event, particularly wildfire or agricultural disaster. The Napa County wine industry accounts for $9.4 billion in economic impact in Napa County, while the wine industry accounts for $17.3 billion in California and $33.5 billion nationwide. (Stonebridge Research Group, 2017, p. 2) That means Napa County accounts for 54% of California economic impact from the wine industry and 28% nationwide. In 2016, all wine produced in Napa County, whether Napa County grown or grown elsewhere and processed in Napa County, represented 6.5 % of all the wines produced in California and 5.5% of all the wine produced in the United States. (Stonebridge Research Group, 2017, p. 4)

Housing was one of the greatest losses tracked during the 2017 Sonoma Complex fires, which primarily affected neighboring Sonoma County but also westerly portions of Napa County. Sonoma County lost 5,300 home or 2.5% of its housing stock in the fire, while already facing growth constraints due to the high cost of housing. After the fires, this put Sonoma County on track to need 26,000 new homes constructed by 2020 to meet growth and employment needs; a daunting number considering Sonoma County permitted 730 units in 2016. (Beacon Economics, 2018, p. 3)

Loss of tourism in the aftermath of a hazard event is another economic impact of particular concern for Napa County. After wildfire events in 2017 and 2018 which affected Napa County but focused considerably more damage in Sonoma County, the region cited public perception of wildfires in a downtick in tourism. The region is focusing on diversifying the season of tourism travel away from the fire-prone fall harvest season as one way to reduce those economic impacts. (Lenhard, 2019)

4.3.5 Past and Future Trends in Development

Napa County has long been on the forefront of planning for the preservation of agricultural lands and intends to remain leaders in planning for a sustainable future. Napa County has retained its prime vineyard lands in production, even while vast tracts of farmland in other parts of the Bay Area have been urbanized. The County established the first Agricultural Preserve in California in 1968, and the urban-centered growth (homes and businesses concentrated in incorporated areas to preserve farmland) which has characterized the Napa Valley since well before the turn of the century foreshadowed by decades the "smart growth" movement. The County continues to apply these same principles to reducing hazard risks to its residences and its critical resources into the future.

Past development that most increased the risk of hazards in the County happened many decades and even more than a century ago. The County and other participating jurisdictions are well aware of areas of increased hazard risk through older development.

More recently, development in the last few decades has occurred with minimized hazard risk because of existing overlay of federal, state, and local regulation. First, the County and its municipal planning partners all adopt general plans (GPs) which serve as blueprints for establishing long-range development policies, as directed with California's General Planning Law. A GP provides a basis for private development proposals and public projects to remain consistent with existing city, regional and state policies. The GP is designed to help the County and participating jurisdictions address issues related to land use, circulation (traffic), housing, open space, conservation, noise, and safety. The Land Use portion of the plan helps guide the County and participating jurisdictions in determining the location of future development(s), to include possible future annexations for municipal jurisdictions. The Safety Element of the GP serves to decrease risk of impact from natural hazards through multiple required elements and subsection most importunately through the health and safety as required by the California Sate Law.

All planning partners reviewed their general plans under the capability assessments undertaken for this hazard mitigation plan. Deficiencies revealed by these reviews are identified as mitigation actions to decrease risks to move beyond past trends.

Moreover, while past development has occurred in hazard areas to some degree, increasing hazard risks, development standards and performance measures, often times incorporated into specific plans, policy plans, and master plans, are employed to reduce risk. These development standards are continually improving and will continue to strengthen into the future.

Looking to the future, there are a number of demographic trends and land use issues that the County and municipalities will face, not the least of which is the expected growth in population. Based on regional trends, the Association of Bay Area Governments (ABAG) projects that Napa County will add 19,800 new residents between 2005 and 2030, and that 2,700 of those will reside within the unincorporated area.

Single-family detached units constitute the majority of the housing units in Napa County as a whole, leaving a minimal number of alternative housing options. However, the housing stock is relatively new

and the incidence of overcrowding in the Unincorporated Area is below those of both Napa County as a whole and the Bay Area region. (Napa County General Plan, 2008).

Participating jurisdictions have gone to great lengths to ensure future development within hazard areas is minimized and mitigated to the greatest extent possible. Section 5.3 (Capabilities Assessment) of Volume 1 for the County and each jurisdiction's capabilities assessment of Volume 2 of this MJHMP explain those proactive steps in greater detail in. Buildings are increasingly more resilient to hazards through California's building codes, some of the strongest in the country. Nationally, building codes have continually improved disaster resilience, and since 1990 those great improvements have only added about 1% to construction costs. (National Institute of Building Sciences, 2019)

For example, the Napa County Flood Control and Water Conservation District continues to implement its Napa River Flood Management Plan to protect existing development from flood impacts and reduce or mitigate impacts from new development in floodplains. Napa County and the Cities of American Canyon, Napa, St. Helena, Calistoga and the Town of Yountville collectively administer the Napa County Stormwater Pollution Prevention Program. The communities in the Napa County Operational Area have all adopted Seismic Retrofit ordinances to reinforce all historic buildings. All jurisdictions in the county have adopted a single Countywide Building & Fire Code to streamline permitting and enforcement and ensure consistent protective standards for new development; all new facilities in the County will be built to current Essential Service Facility Standards. To further mitigate wildfire damage in new construction, the County also has Defensible Space Guidelines (Resolution 08-45), Weeds & Rubbish for Fire Protection Ordinance (Ordinance 1290), requirements for automated fire sprinkler systems and set requirements for water storage and access road standards, and various ongoing wildfire mitigation programs.

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4.4 Vulnerability Assessment Methods

This section provides an overview of the methods used in the vulnerability assessments in Section 4.5. Vulnerabilities to each hazard are assessed in a two-step process, as outlined in this section. First, population, critical facilities, and county parcels are inventories to develop a "lay of the land." Second, the inventories are utilized in calculating estimated exposure and damage from hazards at various levels of severity. A more detailed explanation of the methodology is included in 0 to this document.

The vulnerability assessment utilizes geospatial data along with local knowledge of past events. Geospatial data is essential in determining population and assets exposed to hazards identified in this plan. Geospatial analysis can be conducted if a natural hazard has a spatial footprint that can be analyzed against the locations of people and assets. In Napa County, dam failure, earthquake, flooding, landslide, sea level rise, and wildfire have identifiable geographic extents and corresponding spatial information about each hazard.

Figure 4-5 illustrates the data inputs and outputs used to create the vulnerability analyses for each hazard in Section 4.5.

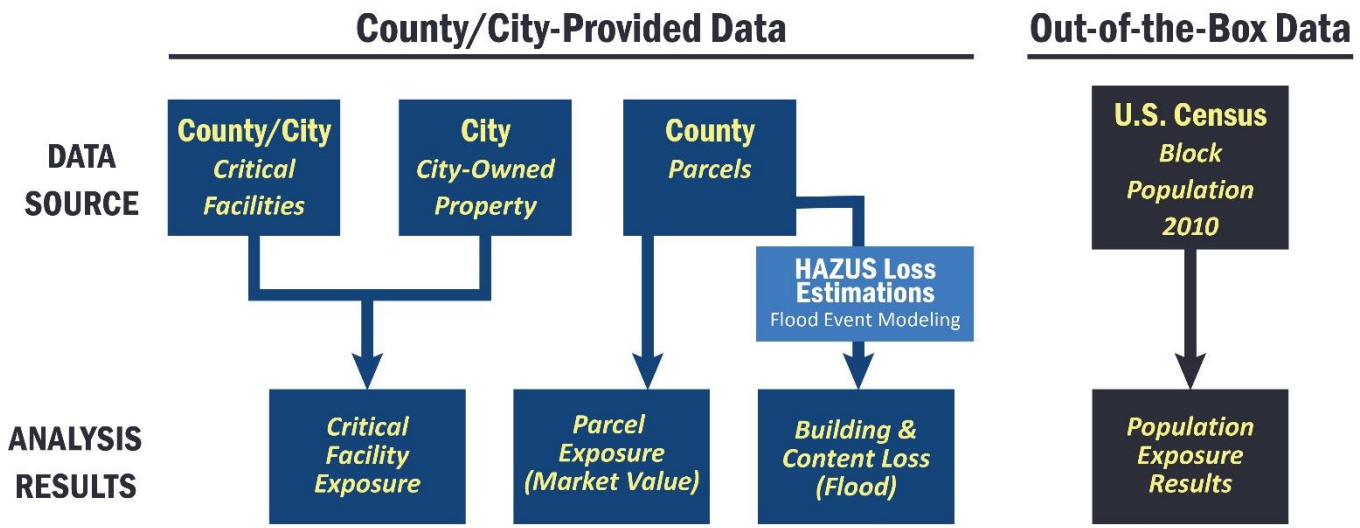

Figure 4-5: Data Source and Method

4.4.1 Population and Asset Inventory

In order to describe vulnerability for each hazard, it is important to first understand the total population and total assets at risk. The population and asset inventories provide a baseline to measure the significance or vulnerability to people and assets for natural hazard events. The asset inventories can also be used to estimate damages and losses expected during a "worst case scenario" event for each hazard. The following sections provide a description of the total population, critical facilities, and parcel inventory inputs.

4.4.1.1 Population

Another step in producing the hazard-specific vulnerability assessments is to determine the population near each natural hazard. Population estimates were derived from 2015 Census American Community Survey (ACS) information. For purposes of the vulnerability assessment approximately 140,000[2] persons or 100% of the County's population is exposed to one or more hazards within or near the County boundaries. Each natural hazard scenario affects the County residents differently depending on the location of the hazard and the population density of where the hazard event could occur. Vulnerability assessments presented in Section 4.5 summarize the population exposure for each natural hazard if available.

4.4.1.2 Critical Facilities Inventory

Critical facilities are of particular concern when conducting hazard mitigation planning. A critical facility is a structure or other improvement that, because of its function, size, service area, or uniqueness, has the potential to cause disruption of vital socioeconomic activities if it is destroyed, damaged, or functionally impaired.

Critical facilities inventory data was developed from a variety of sources, including County, City, District, State, Federal, and private industry datasets. A critical infrastructure spatial database was developed to translate critical facilities information into georeferenced[3] points and lifelines.

Critical facility points include police stations, fire stations, hospitals, elder care facilities, day care facilities, buildings containing hazardous materials (HAZMAT), schools, transportation infrastructure, utilities, and government buildings. Lifelines include communication, electric power, liquid fuel, natural gas, and transportation routes. A current representation of the critical facility points and lifelines are provided in Figure 4-6. Some critical facility information has been omitted from this document due to national security purposes.

Critical facilities and transportation/lifeline data came from a collection of sources including but not limited to Napa County GIS, Napa County and local jurisdiction insurance data, California Department of Social Services (CDSS), California Energy Commission (CEC), Federal Communications Commission (FCC), HAZUS, U.S. Army Corps of Engineers (USACE), FEMA, and National Park Service (NPS). All data sources have a level of accuracy acceptable for planning purposes. Due to the sensitivity of this information, a detailed list of facilities is not provided. The list is on file with each planning partner. The risk assessment for each hazard qualitatively discusses critical facilities with regard to that hazard.

[2] According to the U.S. Census Bureau, 2010 Census of Population, the total population for the County in 2010 was 136,484.
[3] 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.

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4.4.1.3 Parcel Value Inventory

The Napa County Assessor's data is essential to developing parcel values exposed to each hazard and includes current fair market value of at-risk assets. Napa County Parcel Value Inventory is summarized in Table 4-7. The Parcel Value Inventory includes market value[4], content replacement value, and total assessed value ("total value"), and each hazard profile outlines predicted impacts to this Inventory for each hazard's geographic extent. These elements are called out in the table because, in the event of a disaster, the value of the infrastructure or improvements to the land is usually the focus of concern. Generally, the land is not a total loss, and structures can be rebuilt or contents replaced.

"Total market value" as presented in this Plan reflect Napa County Assessor data including fair market value where available. If no fair market value was available for a given property, the value reflects the assessed improvement value.

"Total content value" was calculated based on assessor's use codes, translated to occupancy-based multipliers. Each occupancy class prescribes a specific content cost multiplier used to calculate the content cost values shown in the summary and in the hazard profiles in Section 4.5. Occupancy-based content cost multipliers used in this plan reflect those found in the FEMA Hazus-MH 4.2 technical manuals.

Table 4-7: Parcel Counts and Value

	Total Parcels	Total Market Value ($)	Total Content Value ($)	Total Value ($)
Unincorporated County	14,654	$ 9,233,654,827	$ 9,140,828,845	$ 18,374,483,672

Total market value as provided by County Assessor's Office. Content value calculated using content multipliers per Hazus occupancy classes. Total value is the sum of total market value and total content value.

[4] Market Value Includes a long-term asset which indicates the cost of the constructed improvements to land, such as buildings, driveways, walkways, lighting, and parking lots.

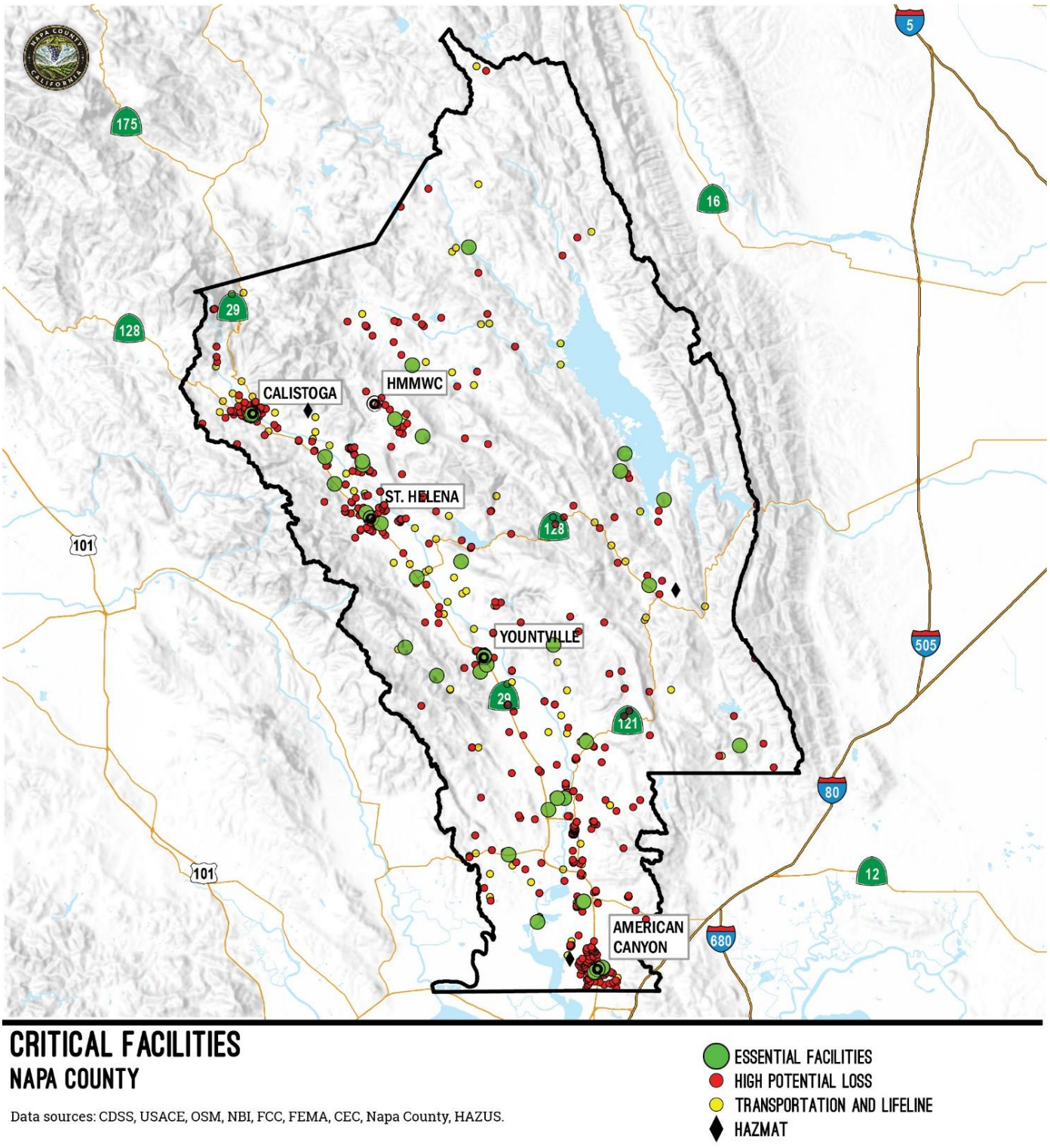

Figure 4-6: Critical Facilities in Napa County

4.4.2 Hazard Exposure and Damage Estimation

The population and inventory information is then used to generate specific exposure and damage estimations based on the severity of specific hazard events. The hazards in Napa County which have known geographic extends and corresponding spatial information, and thus have exposure and damage estimations, are:

- earthquake,
- flooding,
- slope failure,
- sea level rise,
- dam failure, and
- wildfire.

4.4.2.1 Population and Asset Exposure

"Exposure" of assets and population refers to the total counts of parcels, people, facilities, and assets within the planning area in which a hazard event may occur. A natural hazards overlay was developed to reflect the combination of many known natural hazard spatial footprints. The spatial overlay method enables summarization of building values, parcel counts, population exposure, and critical facility exposure within a hazard's geographic extents. See Figure 4-7 as an exposure hypothetical for flooding. Exposure numbers were generated using Napa County Assessor, address point, and parcel data for replacement and content cost estimates.

Figure 4-7: Hazard Exposure Explanation Graphic

4.4.2.2 Damage Assessments

For flood and earthquake, detailed damage assessments were conducted through FEMA's Hazus software. Hazus is a nationally applicable standardized methodology that contains models for estimating potential losses from earthquakes, floods, and hurricanes. Hazus uses Geographic Information Systems (GIS)

technology to estimate physical, economic, and social impacts of disasters. The estimated damage and losses provided by the Hazus Software is a based upon chosen severity of events and provides the ability to understand possible widescale damage to buildings and facilities.

In the hypothetical geography shown in Figure 4-8, even though both structures are exposed to flooding, it is expected that the structure with a first floor height below the depth of flooding will receive significantly more damage than the structure with a first floor height above the expected water depth. For a more detailed explanation on risk assessment methods, see Appendix A.

At-risk populations, critical infrastructure, improved parcels, and loss results for each hazard category are provided in bar chart summary tables in Section 4.5 to evaluate the percentage of assets exposed to different types of hazards. The side-by- side comparison allows participating jurisdictions to evaluate impacts of potential hazards to prioritize hazard mitigation energy and resources.

Figure 4-8: Hazus Damage Estimation Example

4.5 Vulnerability to Specific Hazards

This section introduces prevalent hazards within the unincorporated portions of Napa County and analyzes how each may affect populations, property, and critical facilities within the County's jurisdiction. Most importantly, the hazard mitigation strategy presented in Section 5 responds to the particular vulnerabilities outlined in this section. The mitigation strategy provides prescriptions or actions to achieve the greatest reduction of vulnerability based on this section, which results in saved lives, reduced injuries, reduced property damage, and protection for the environment in the event of a natural hazard. Methods for calculating exposure and loss estimates have been described in Section 4.4.

This section provides quantifiable exposures to people and property and also contains damage and loss estimates for the unincorporated portions of the County. Participating Jurisdictional Annexes contain specific vulnerabilities to hazards in Vol. 2. of this Plan. Based upon MJHMP Planning Committee prioritization and screening, this section provides information for the following hazards:

Wildfire
SECTION 4.5.1

Earthquake
SECTION 4.5.2

Flood
SECTION 4.5.3

Severe Weather
SECTION 4.5.4

Drought
SECTION 0

Climate Change
SECTION 4.5.6

Slope Failure
SECTION 4.5.7

Ag Disaster
SECTION 4.5.8

Dam Failure
SECTION 4.5.9

Pandemic Disease
SECTION 4.5.10

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4.5.1 Wildfire Hazard Profile

A wildfire is any uncontrolled fire occurring on undeveloped land that requires fire suppression. Wildfires can be ignited by lightning or by human activity such as smoking, campfires, equipment use, and arson. The 2018 California State Hazard Mitigation Plan provides the following definition of wildfires:

> *any free-burning vegetative fire that initiates from an unplanned ignition, whether natural (e.g., lightning) or human-caused (e.g., powerlines, mechanical equipment, escaped prescribed fires), where the management objective is full suppression.*

Wildfires are costly, putting lives and property at risk and compromising rivers and watersheds, open space, timber, range, recreational opportunities, wildlife habitats, endangered species, historic and cultural assets, scenic assets, and local economies. Vulnerability to flooding increases due to the destruction of forest and ground cover within watersheds. The potential for significant damage to life and property increases in areas where development is adjacent to densely vegetated areas, known as wildland urban interface (WUI) areas.

While some fires are allowed to burn naturally in order to maintain or restore the health of forest lands, out of control wildfires need to be prevented through cooperative, community, and land management planning.

4.5.1.1 Local Conditions Relating to Wildfire

Napa County is characterized by a narrow valley floor surrounded by and intermingled with steep, hilly, wooded terrain—areas highly susceptible to wildfires. Such fires expose residential and other development within the County to an increased risk of conflagration, or extensive fire which destroys a great deal of land or property. The hilly/mountainous terrain on the east and west side of Napa Valley strongly influences both wildland fire behavior and fire suppression capabilities.

Wind is also a significant factor in the spread of fire, as fires spread faster, and burning embers are carried with the wind to adjacent exposed areas. The Napa Valley has a characteristic southerly wind that originates from the San Francisco Bay and, during the dry season, an occasional north wind of significant velocity. Both are significant factors in the spread of wildland fires.

In densely-populated areas, flying ember production is the principal driver of wildfire. A related concern in built-out areas is the relative density of vegetative fuels that can serve as sites for new spot fires within the urban core and spread to adjacent structures.

4.5.1.2 Policies, Plans, and Regulatory Environment

Wildfire Protection Responsibility in California

Local, state, tribal, and federal organizations all have legal and financial responsibility for wildfire protection. In many instances, two fire organizations have dual primary responsibility on the same parcel of land—one for wildfire protection and the other for structural fire protection. To address wildfire jurisdictional responsibilities, in 1981 the California State Legislature outlined various wildfire responsibilities, described below, in Cal. Pub. Res. Code § 4291.5 and Cal. Health & Safety Code § 13108.5:

- **Federal Responsibility Areas (FRAs)**—FRAs are fire-prone wildland areas that are owned or managed by a federal agency such as the U.S. Forest Service, National Park Service, Bureau of Land Management, U.S. Fish and Wildlife Service, or U.S. Department of Defense. Primary financial and rule-making jurisdictional authority rests with the federal land agency. In many instances, FRAs are interspersed with private land ownership or leases. Fire protection for developed private property is usually not the responsibility of the federal land management agency but of the relevant local government agency.

- **State Responsibility Areas (SRAs)**—SRAs are lands in California where the California Department of Forestry and Fire Protection (CAL FIRE) has legal and financial responsibility for wildfire protection and where CAL FIRE administers fire hazard classifications and building standard regulations. Las Posadas Demonstration State Forest (LPDSF) is a 796-acre mixed conifer forest located in Napa County, which also incorporates the most eastern stand of redwood trees in California. (Strategic Fire Plan Sonoma-Lake-Napa Unit, 2017) SRAs are defined as lands that:

    - are county unincorporated areas,
    - are not federally owned,
    - have wildland vegetation cover rather than agricultural or ornamental plants,
    - have row crops or seasonal crops, or
    - have watershed, range, or forage values.

SRA boundaries are those adopted by the California Board of Forestry and Fire Protection and are reviewed and updated every 5 years. Where SRAs contain structures or development, the responsibility for fire protection of those improvements falls to the relevant local government agencies.

- **Local Responsibility Areas (LRAs)**—LRAs include land in cities, cultivated agriculture lands, unincorporated non-flammable areas, and lands that do not meet the criteria for SRA or FRA. LRA fire protection is typically provided by city or county fire departments, fire protection

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districts, or by CAL FIRE under contract to local governments. LRAs may still include areas of flammable vegetation and WUI.

In 2012, as part of local General Plan requirements, California began requiring local governments in State Responsibility Areas (SRAs) and Very High Fire Hazard Severity Zones (VHFHSZ) to:

- Update their general plan safety elements to recognize specific wildfire risks in such areas,
- Adopt special findings when approving subdivisions in such areas, and
- Use wildfire safety guidelines and California Environmental Quality Act (CEQA) initial study wildfire hazards checklist updates issued by the Governor's Office of Planning and Research (OPR) when those become available. Cal. Gov. Code § 65040.20 and § 65302.5.

For further information on the details and implications of these Safety Element requirements, see Progress Summaries 3.F and 8.A of the 2018 California State Hazard Mitigation Plan.

Healthy Forests Restoration Act (2003)

In 2003, the federal Healthy Forests Restoration Act (HFRA) appropriated specific funding to address five main sub-categories through the National Fire Plan (NFP): preparedness, suppression, reduction of hazardous fuels, burned-area rehabilitation, and state and local assistance to firefighters. Appropriations under this Act continue through the present. The spirit of the HFRA and NFP is reflected in the many Community Wildfire Protection Plans (CWPPs) developed in Napa County.

CWPPs strive to meet the requirements of HFRA by:

1. identifying and prioritizing fuels reduction opportunities across the landscape,
2. addressing structural ignitability,
3. assessing community fire suppression capabilities, and
4. collaborating with stakeholders.

California Fire Code (2019)

Napa County has adopted the 2019 Edition of the California Fire Code to safeguard the public health, safety, and general welfare from the hazards of fire, explosion, or dangerous conditions in new and existing buildings, structures, and premises, and to provide safety and assistance to fire fighters and emergency responders during emergency operations.

California Building Standards Code (2019)

The 2019 California Building Code, adopted by the County, includes materials and construction methods for exterior wildfire exposure and standards of quality for fire-resistant buildings. See Cal. Building Codes, Chapter 7a (2019).

CAL FIRE Strategic Fire Plan, Sonoma-Lake-Napa Unit (2017)

The California Department of Forestry and Fire Protection (CAL FIRE), Sonoma-Lake-Napa Unit (LNU) serves the counties of Sonoma, Lake, Napa, Solano, Yolo, and Colusa. The LNU Strategic Fire Plan is a product of the implementation of the 2018 State Fire Plan.

The State Fire Plan provides an analysis procedure to assess fire fuel hazards and risks in order to design and implement mitigating activities. The LNU Fire Management Plan provides background information, fuels and fire data, proposed projects, and individual Battalion reports outlining mitigating activities commonly carried out each year. The Plan is a local road map for the fire service and the public to create and maintain defensible landscapes to protect those assets vital to the state and its citizens.

The LNU Strategic Fire Plan outlines a comprehensive program designed to reduce total government costs and citizen losses from wildland fire in the Unit. It also strives to assist the public with assistance and education to create fire adapted communities that can more safely withstand a wildland fire. To accomplish this, CAL FIRE continues to implement this plan to address such factors as:

- Firefighter and Public Safety
- Hazardous Fuel Treatment
- Fire Suppression
- Information/Education
- Inter-agency Cooperation

Napa County General Plan (2008)

The 2008 Napa County General Plan includes the following policies and goals pertaining to wildfire mitigation:

Goal SAF-3 (Safety): It is the goal of Napa County to effectively manage forests and watersheds, and to protect homes and businesses from fire and wildfire and minimize potential losses of life and property.

Policy SAF-14: The County will prepare a fire management plan and will continue, enhance, and implement programs seeking to reduce losses and costs associated with catastrophic fires.

Policy SAF-15: The County shall coordinate with CAL FIRE and fire agencies in neighboring counties to plan for future fire prevention and suppression needs.

Policy SAF-16: Consistent with building and fire codes, development in high wildland fire hazard areas shall be designed to minimize hazards to life and property.

- **Action Item SAF-16.1:** Develop site criteria and construction standards for development in high fire hazard areas, and adopt standards to restrict urbanizing these areas as defined in Policy AG/LU-27 unless adequate fire services are provided.

- **Action Item SAF-16.2:** Continue to implement "Napa Firewise" through information and education programs, community outreach, and fuel modification.

Policy SAF-17: The County supports the use of prescribed fuel management programs, including prescribed burns and brush clearing, for managing fire hazardous areas; to reduce wildfire hazard, improve watershed capabilities, promote wildlife habitat diversification, and improve grazing.

Policy ROS-10 (Trails): As appropriate, combine trails with fire breaks and design trails to facilitate access for control of wildfires. Utilize temporary and seasonal trail closures, and type and intensity of use restrictions as appropriate during periods of high wildfire risk and to protect sensitive species and habitats and avoid conflict with agricultural operations.

Telecommunications in Napa County Code § 18.119

Napa County Code requires all radio, television and voice communication facilities providing service to government or the general public be designed to survive a natural disaster without interruption in operation, including structural modifications to reduce flammability. § 18.119.080. Telecommunication facilities also shall be designed and operated in such a manner so as to minimize the risk of igniting a wildfire or intensifying one that otherwise occurs, including many related structural and operational requirements. § 18.119.150.

Napa County Road and Street Standards (2020)

The Napa County Road and Street Standards are developed to be consistent with the State Responsibility Area (SRA) Fire Safe Regulations. (Cal. Code Regs. tit. 14, § 1270 *et. seq.*) The County is only one of four Counties to have road standards that meet these stringent requirements. (Napa County Climate Action Plan, 2018, p. 4.10). The Road and Street Standards are available here.

Residential Fire Protection (Napa County Code § 8.36) and Napa County Hazard Abatement Ordinance (2018)

Napa County regulations require property owners to maintain a defensible space in accordance with the Defensible Space Guidelines. Failure to maintain defensible space, including the accumulation or storage of materials within established boundaries, is considered a nuisance and subject to County enforcement. Napa County Code § 8.36.60 (2019).

The Guidelines define **defensible space** as:

> *[t]he area where basic wildfire protection practices are implemented, providing the key point of defense from an approaching wildfire or escaping a structure fire. The area is characterized by the establishment and maintenance of a firebreak within 30 feet of an occupied building or structure and a reduced fuel zone that extends to 100 feet away from a building or structure. Guidelines at 2.*

According to the guidelines, a property owner must provide 100 feet of defensible space around all structures and occupied buildings on their property or to the property line if it is less than 100 feet from any structure. Property owners of vacant parcels that are one acre or less in size are required to maintain fuel on their property. The full Guidelines are available here:
https://www.countyofnapa.org/DocumentCenter/View/825/Defensible-Space-Guidelines-PDF

Napa County Chipping Program

The Napa County Fire Department runs a Chipping Program that is available free of charge to County residents. This program has had a major impact in fuel reduction each year. The Napa County Firewise Foundation collects requests, monitors and reports chipping activities. NCFF's long-term efforts to prepare Napa County for wildfire are an essential component of any long-term countywide strategy to address wildfire hazards. Information on the chipping program is available here.

4.5.1.3 Past Events

There are four major factors that contribute to historic wildfire events:

1. Extreme vegetation diversity
2. Diverse fire weather and fire behavior
3. Dynamic fire history
4. Complex land use patterns

From 2000-2019 there were 10 wildfires burning over 1,000 acres in Napa County, one of which was human caused. These events are listed in Table 4-8 and displayed in Figure 4-9. The most recent events are described in detail below.

Table 4-8: Wildfire Events in Napa County 1000 Acres or Greater 2000-2019

Date	Event Name	Size in Acres	Cause
9/8/2018	Snell Fire	2,488	Unknown
6/30/2018	County Fire	89,831	Unknown
10/8/2017	Tubbs Fire	36,702	Unknown
10/8/2017	Atlas Fire	51,625	Unknown
10/8/2017	Nuns Fire	55,798	Unknown
8/2/2016	Cold Fire	5,730	Unknown
9/12/2015	Valley Fire	76,085	Unknown
8/9/2015	Jerusalem Fire	25,118	Unknown
7/22/2015	Wragg Fire	8,049	Vehicle
7/1/2014	Butts Fire	4,297	Unknown

Source: CALFIRE

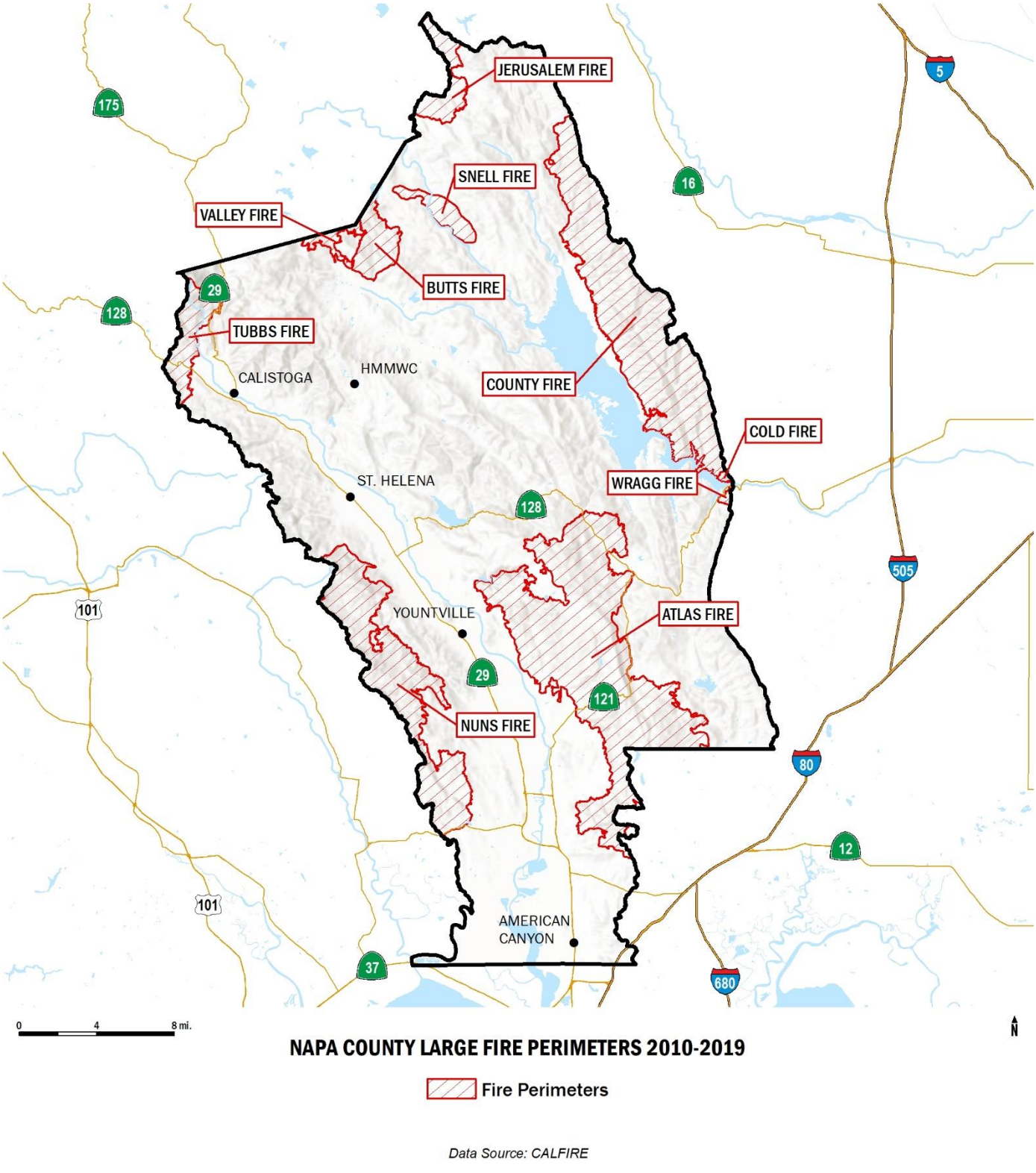

Figure 4-9: Historic Fire Occurrence Map (Fires Greater than 1,000 acres, 2010-2019)

Recent Large Wildfire Events

Butts Fire (2014) and Wragg Fire (2015)

Recent large fire activity in the division includes the Butts Fire of 2014 and the Wragg Fire of 2015. Both fires started under "normal" summertime conditions and rapidly grew to major incidents with in the first few hours. Ultimately, the Butts Fire consumed 4,300 acres and destroyed 2 residences, while the Wragg Fire consumed 8,051 acres and destroyed 2 outbuildings. (Strategic Fire Plan Sonoma-Lake-Napa Unit, 2017)

Atlas Fire, Tubbs Fire, and Patrick Fire (2017)

Figure 4-10: 2017 Tubbs Fire

Photo: Justin Sullivan (Getty Images, October 2017)

The October 2017 Northern California wildfires, also known as the Northern California firestorm, North Bay Fires, and Wine Country Fires, were a series of 250 wildfires that started burning across California. The fires broke out throughout Napa, Lake, Sonoma, Mendocino, Butte, and Solano Counties during severe fire weather conditions. (Nix, 2017) The Atlas Tubbs and Patrick Fires started on October 8th, 2017 in Napa County and together damaged over 1,110 structures and destroyed over 5,756. (Cal Fire, 2018). At the time, the Tubbs Fire was the most destructive wildfire in California history, burning parts of Napa, Sonoma, and Lake counties and inflicting its greatest losses in the City of Santa Rosa. Its destructiveness was surpassed only a year later by the Camp Fire of 2018.

See Figure 4-9 for locations of these historic fires.

4.5.1.4 Fire Hazard Severity Zones (FHSZs)

The County's hilly areas contain the major wildland fire hazard risks for residential structures and other development, characterized by steep slopes, poor fire suppression delivery access, inadequate water supply and highly flammable vegetation.

To help better refine areas of wildfire concern, CAL FIRE establishes and maps **Fire Hazard Severity Zones (FHSZ),** or areas of significant fire hazards based on factors such as fuel, weather, terrain, and the number of days of moderate, high and extreme fire hazard. These zones define the application of various mitigation strategies to reduce risk associated with wildfires.

The FHSV model inputs frequency of fire weather, ignition patterns, expected rate-of spread, and past fire history. It also accounts for flying ember production based on the area of influence where embers are likely to land and cause ignitions. The FHSZ model also is built from existing data and hazard constructs, and thus does not necessarily take into consideration significant land use and structural resiliency. The geography, weather patterns and vegetation in the planning area provide ideal conditions for recurring wildfires. See Figure 4-11 and Figure 4-12 for Napa County wildfire return intervals and fire severity zones. These maps are the basis for this wildfire risk assessment.

4.5.1.5 Frequency/ Probability of Future Occurrences

Generally, Napa County faces a wildland fire threat each and every year. In 2010 Ernie Loveless, Chief of the CAL FIRE Napa-Lake-Sonoma Unit at the time, stated, "We must be honest with ourselves. Wildland fires are part of our history and will certainly be part of our future. Being prepared is critical."

The wildland fire risk in Napa County can be attributed to three factors: ignition sources and fuel loading. Ignition sources, or fuels, in Napa County range include grass/oak woodland, 15 – 50 year-old chaparral, redwood forests, and timber over 50 years old. Critical concerns are when the chaparral dead-to-live ratio exceeds 50%, and live fuel moisture approaches 60% in late Summer and early Fall. (Strategic Fire Plan Sonoma-Lake-Napa Unit, 2017)

Fuel loading depends on the amount of growth or regrowth, determined in large part by the length of time between successive burns and the amount of rainfall allowing for regrowth.

The arrangement of fuels also affects the intensity of a fire and should be considered in vertical and horizonal planes. Horizonal limits on fuel sources can reduce the spread of fire, but may still be conducive to passive, single-tree torching and active crown fires. Even with a "no-till" management approach, a fire can still spread through a vineyard. Vertical arrangement affects the height to which flames cause damage. In Napa County, due to fire suppression and lack of aggressive wildland fuels management, both the vertical arrangement and horizontal continuity of fuels promote rapid fire growth and hinder conventional fire suppression tactics.

The majority of past wildfire events in Napa County were in summer months (typically June through August). Frequency of wildfire events may increase because of increasingly drier conditions caused by climate change. Fire risk will also continue to grow as more people build in WUI areas, which increases fuel loads and the risk of human-caused fires.

As seen in Figure 4-9, fire occurrences are the most common near Lake Berryessa and the majority of fires have occurred on BLM land. The probability of a wildfire occurring in Napa County is highly likely (100% annual chance).

4.5.1.6 Severity

The severity of the wildland fire hazard is determined by the relationship between three factors: fuel classification, topographic slope, and critical fire weather frequency. Napa had a medium about of wildfire fuels. Critical fire weather conditions occur in periods of relative low humidity, high heat and high winds. The Napa area typically has critical fire weather from two to seven days annually.

Smoke and air pollution from wildfires can be a health hazard, especially for sensitive populations including children, the elderly and those with respiratory and cardiovascular diseases. Wildfire may also threaten the health and safety of those fighting the fires. First responders are exposed to the dangers from the initial incident and after-effects from smoke inhalation and heat stroke. In addition, wildfire can lead to ancillary impacts such as landslides in steep ravine areas and flooding due to the impacts of silt in local watersheds.

4.5.1.7 Warning Time

Regardless of the circumstances around the start of a wildfire, response time can be rapid and warning time short.

Wildfires are often caused by humans, intentionally or accidentally. There is no way to predict when one might break out. The Fourth of July can be a time of heightened concern and outreach around wildfires, since fireworks can cause fires and usage is high. Dry seasons and droughts greatly increase fire likelihood. Dry lightning may trigger wildfires. Severe weather can be predicted, so special attention can be paid during weather events that may include lightning or wind events. Reliable National Weather Service lightning warnings are available on average 24 to 48 hours prior to a significant electrical storm.

If a fire does break out and spread rapidly, residents may need to evacuate within days or hours. A fire's peak burning period generally is between 1 p.m. and 6 p.m. Once a fire has started, fire alerting is reasonably rapid in most cases. The rapid spread of cellular and two-way radio communications in recent years has contributed to a significant improvement in warning time.

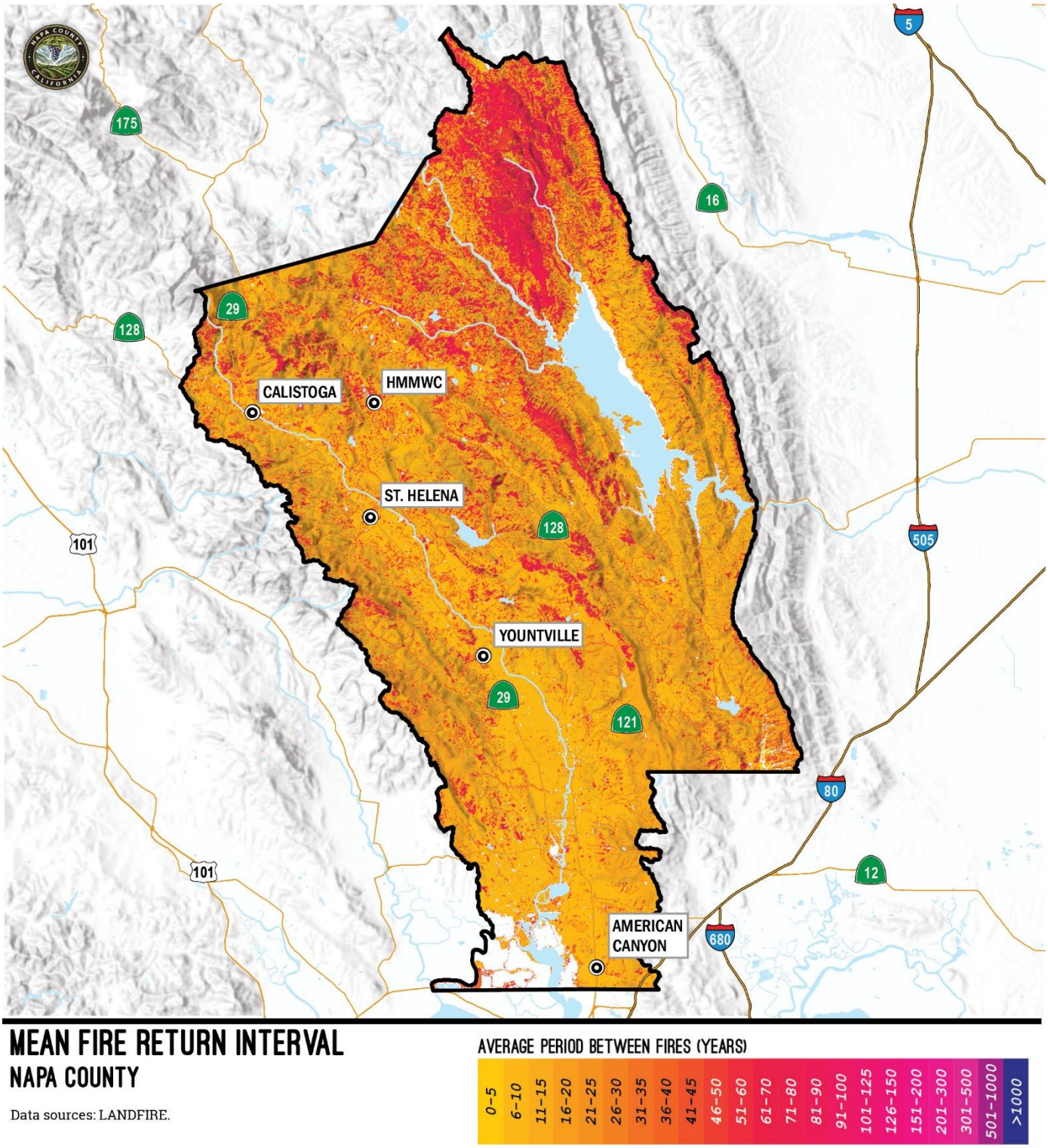

Figure 4-11: Wildfire Return Intervals

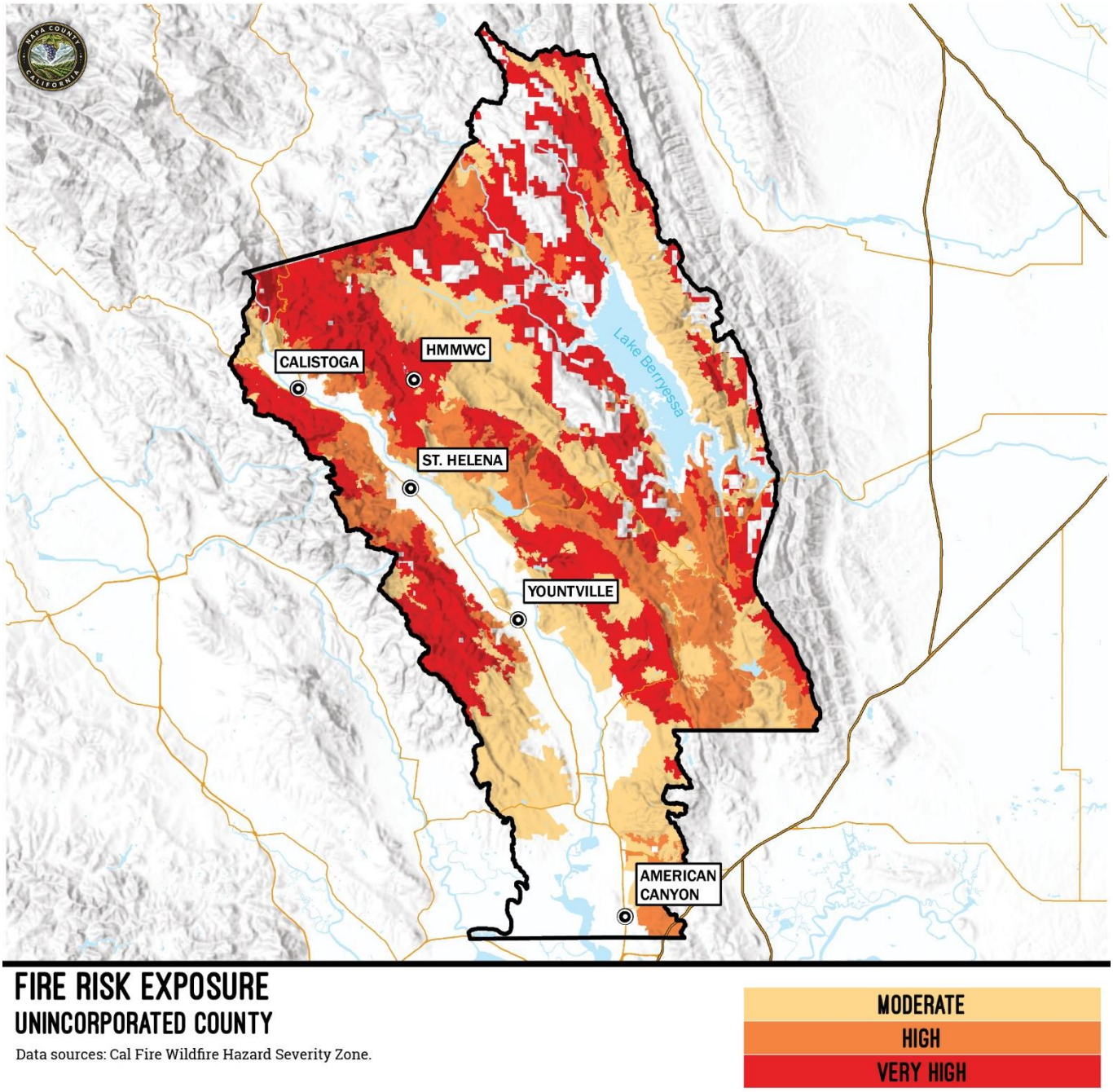

Figure 4-12: Wildfire Severity Zones

4.5.1.8 Secondary Hazards

Wildfires can generate a range of secondary effects, which in some cases may cause more widespread and prolonged damage than the fire itself. Fires can cause direct economic losses in the reduction of harvestable timber and indirect economic losses in reduced tourism and commerce. Wildfires cause the contamination of reservoirs, destroy transmission lines, and contribute to flooding. They strip slopes of vegetation, exposing them to greater amounts of runoff, weakening soils, and causing slope failures. Major landslides can occur several years after a wildfire. Most wildfires burn hot and for long durations that can bake soils, especially those high in clay content, thus creating hydrophobic soils that repel water. When it rains in burned areas, more soil washes off the hills and into roads, ditches, and streams and increases flooding. (Napa County Climate Action Plan, 2018)

Smoke from wildfires can also travel long distances and negatively impact public health and quality of life even many miles from the wildfire location. Wildfire smoke can disproportionately impact children, the elderly, pregnant women, and people with heart or respiratory conditions. (Cal. Air Resources Board, 2020) As wildfire occurrences increase, so can these secondary impacts.

4.5.1.9 Climate Change Impacts

Fire in western ecosystems is determined by climate variability, local topography, and human intervention. Climate change has the potential to affect multiple elements of the wildfire system: fire behavior, ignitions, fire management, and vegetation fuels. Hot, dry spells create the highest fire risk. Drought and increased temperatures intensify wildfire danger by warming and drying out vegetation. Climate change also may increase winds that spread fires. Faster fires are harder to contain, and thus are more likely to expand into residential neighborhoods.

The County is already considered to be an area that is at high-risk for wildfires. Climate change is projected to increase this current risk by anywhere from 10 to 20 percent, and the County will need to continue to adapt to this projected increase. This increase could cause additional threats to the County and has the potential to affect emergency services, roads, water supplies, housing access, and quality of life. For example, neighboring Sonoma County lost 5,300 homes, or 2.5 percent of its housing stock, in the October 2017 fires, in an already challenging housing market. (Beacon Economics, 2018, p. 3)

A changing climate is expected to subject forests to increased stress due to drought, disease, invasive species, and insect pests. These stressors are likely to make forests more vulnerable to catastrophic fire. While periodic fires are natural processes and fulfill an important ecological function, catastrophic fire events that cannot be contained or managed can cause serious threats to homes and infrastructure, especially for properties located at the wildland-urban interface. Moreover, rain events are predicted to become more severe in our changing climate, and post-fire flooding could worsen as well.

HMP submitted 08.11.2020

4.5.1.10 Wildfire Vulnerability Analysis

While Napa County has capacity to address wildfire risks, the County is still vulnerable to wildfire impacts, as evidenced by the October 2017 fires. (Napa County Climate Action Plan, 2018) This section describes vulnerabilities to wildfire in terms of population, property, and infrastructure. Wildfire population, parcel value, critical facilities and lifeline exposure numbers were generated by overlaying the inventory outlined in Section 4.4 with CalFire Wildfire Hazard Severity Zones. Figure 4-13 shows a snapshot of wildfire vulnerability in Napa County. All data sources have a level of accuracy acceptable for planning purposes. Details for each snapshot can be found in this section.

4.5.1.10.1 Population

Approximately 36% of Napa County population lives within wildfire hazard severity zones, as illustrated in Figure 4-13, and large wildfires can create a host of secondary affects throughout the County.

Smoke and air pollution from wildfires can be a severe health hazard, especially for sensitive populations including children, the elderly, and those with respiratory and cardiovascular diseases. Smoke generated by wildfire contain visible and invisible emissions that contain particulate matter such as soot, tar, water vapor, and minerals; gases such as carbon monoxide, carbon dioxide, and nitrogen oxides; and toxics such as formaldehyde, benzene. Emissions from wildfires depend on the type of fuel, the moisture content of the fuel, the efficiency or temperature of combustion, and the weather. Public health impacts associated with wildfire include difficulty in breathing, odor, and reduction in visibility. First responders likewise are exposed to the dangers from the initial incident and after-effects from smoke inhalation and heat stroke

Wildfire can also negatively impact farmworkers because of the potential degradation of transportation infrastructure and the need to work outside at key times such as grape harvesting. Because a large number of agricultural workers cannot afford to live in the County due to high housing costs and the lack of affordable housing, their access and mobility could be impaired. (Napa County Climate Action Plan, 2018)

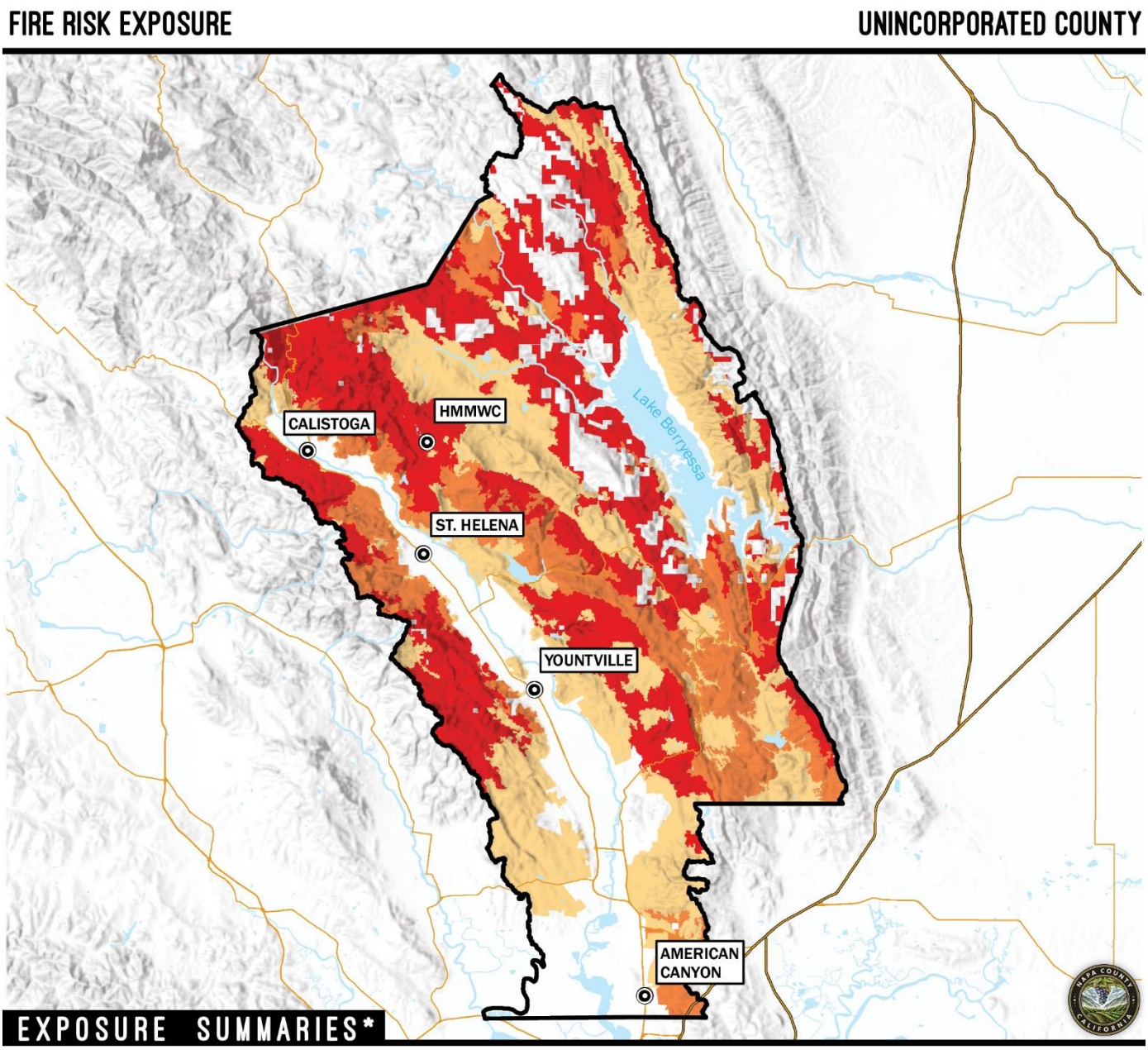

Figure 4-13: Exposure Wildfire Vulnerability and Snapshot Map

Wildfire is of greatest concern to populations residing in the moderate, high and very high fire hazard severity zones. U.S. Census Bureau block data was used to estimate populations within the CAL FIRE identified hazard zones. See Figure 4-14 for populations residing in wildfire risk areas.

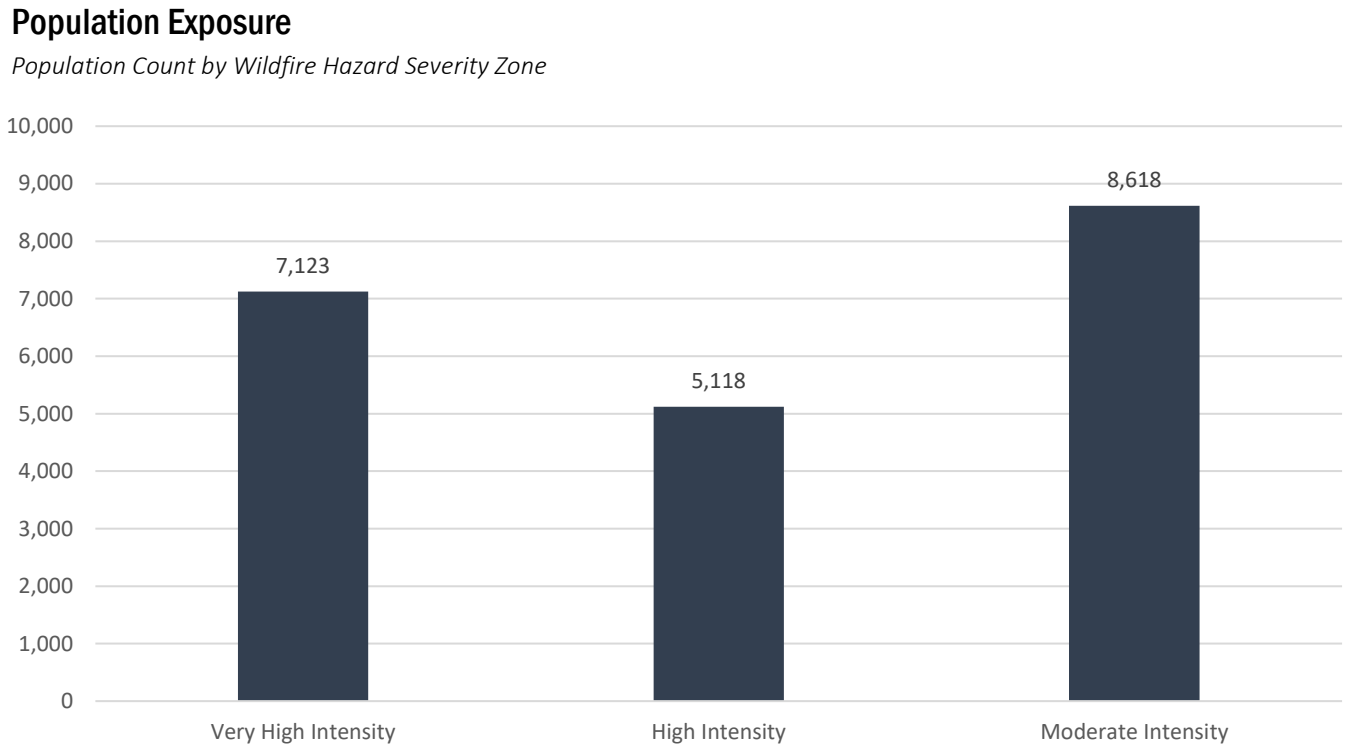

Figure 4-14: Populations Exposed to Wildfire Risk (Unincorporated County)

4.5.1.10.2 Property

This Section calculates the considerable assets at risk of wildfire in those severity zones. See Table 4-9, which utilizes County parcel information to calculate exposure. In some cases, a parcel will be within in multiple fire threat zones, and for this exercise every parcel with a square footage value greater than zero was developed in some way. Only improved parcels were analyzed.

Table 4-9: Residential Buildings within Wildfire Severity Zones (Unincorporated County)

	Total Parcels	Total Market Value ($)	Total Content Value ($)	Total Value ($)
Unincorporated County	14,654	$ 9,233,654,827	$ 9,140,828,845	$ 18,374,483,672

Fire Hazard Severity Zone	Parcel Count	% of Total	Market Value Exposure ($)	Content Value Exposure ($)	Total Exposure ($)	% of Total
Very High	4,512	*30.8%*	$ 1,556,388,480	$ 1,400,443,373	$ 2,956,831,853	*16.1%*
High	1,019	*7.0%*	$ 802,457,387	$ 764,130,536	$ 1,566,587,923	*8.5%*
Moderate	3,795	*25.9%*	$ 2,716,484,528	$ 2,654,664,224	$ 5,371,148,752	*29.2%*
Total	**9,326**	**64%**	**$5,075,330,395**	**$ 4,819,238,133**	**$ 9,894,568,528**	**53.8%**

The wine industry and thousands of acres of vines could also be affected by wildfire. Most wineries in Napa County were left intact after the October 2017 fires. Roughly 3,500 acres of vineyards were located within the fire areas; however, only 126 of those acres burned. In addition to direct impacts such as loss of vineyards and property, several indirect impacts could occur. The October 2017 fires took place during the peak of the winemaking season, resulting in a temporary downturn in tourism. For vineyards that are near fire-prone areas, smoke from wildfire could potentially cause problems, particularly for red grapes, where the grape skin is still used in the winemaking process. Studies have shown that wildfire smoke can potentially infuse with the grape skin and create abnormal flavors. Furthermore, wildfires could threaten vineyards, particularly at the start of harvest season. Oftentimes when wildfires occur, evacuation orders are established by CAL FIRE, which could leave certain vineyards inaccessible for a period. Without access, grapes could remain on the vine too long and over ripen, leaving them unsuitable for winemaking. (Napa County Climate Action Plan, 2018)

4.5.1.10.3 Critical Facilities and Infrastructure

Critical facilities of wood frame construction are especially vulnerable during wildfire events; power lines are also at risk from wildfire because some poles are made of wood and are susceptible to burning.

In many cases roads and railroads would are not susceptible damage except in the worst scenarios but create response issues if affected. Fires can create conditions that block or prevent access and can isolate residents and emergency service providers. Wildfire typically does not have a major direct impact on bridges, but it can create conditions in which bridges are obstructed. Many bridges in areas of high to moderate fire risk are important because they provide the only ingress and egress to large areas and in some cases to isolated neighborhoods.

Critical facilities data were overlain with fire hazard severity zone data to determine the type and number of facilities within each risk classification. Table 4-10 lists the critical facilities in wildfire hazard severity zones for Napa County, and Table 4-11 similarly lists critical infrastructure.

Table 4-10: Critical Facility Exposure to Wildfire Severity Zones (Unincorporated County)

Critical Infrastructure - Wildfire Severity Zone			
Infrastructure Type	Very High	High	Moderate
Essential Facility	6	1	9
EOC	-	-	-
Fire Station	5	1	8
Hospital	1	-	-
Police Station	-	-	1
High Potential Loss	38	17	91
Adult Residential Care	-	-	3
Child Care - Licensed	2	-	4
Church	5	2	5
Communication Tower	3	3	8
Dam	8	3	38
Family Child Care Home	-	-	-
Farm Worker Housing	-	-	-
Historic Building	1	2	1
Home Care Organization	-	-	-
*Insured Asset	3	-	11
Library	1	-	-
Mobile Home Park	2	1	3
NCFCWCD Asset	-	-	-
Residential Elder Care Facility	4	-	2
School	4	1	5
Rain Gauges	4	5	9
Water Treatment Plant	1	-	2
Transportation and Lifeline	13	6	32
Airport	-	-	4
Bridge	13	4	24
NG Station	-	1	1
Power Plant	-	-	-
Substation	-	1	3
Hazmat	-	2	-
Landfill	-	2	-
Grand Total	**57**	**26**	**132**

**Insured Assets are divided into sub-categories, main assets such as Airports are attributed to their appropriate categories.*

Table 4-11: Lifelines in Wildfire Severity Zones (Unincorporated County)

Linear Asset (miles) - Wildfire Severity Zone			
Infrastructure Type (Linear)	Very High	High	Moderate
Levee	-	-	-
Levee Centerline	-	-	-
Levee Flood Wall	-	-	-
NG Pipeline	0.53	5.35	7.84
Railroad	-	1.68	1.04
Street	179.37	81.86	248.18
4WD trail	0.62	-	-
Alley	-	-	-
Cul-de-sac	0.48	0.06	0.05
Driveway	4.21	3.92	13.23
Interstate	-	2.34	-
Local road	26.34	14.88	25.77
Local road, major	84.54	36.27	121.83
Primary highway	6.59	0.63	4.21
Ramp	0.05	0.24	0.38
Road, parking area	-	-	-
Service road	-	0.07	-
State/county highway	55.73	23.44	81.34
Thoroughfare, major	0.81	-	1.35
Traffic circle	-	-	-
Transmission Line	10.31	31.79	39.90
Grand Total	**190.21**	**120.68**	**296.96**

Many ecosystems adapt to historical patterns of fire occurrence. These patterns, called "fire regimes," include temporal attributes such as frequency and seasonality, spatial attributes such as size and spatial complexity, and magnitude attributes such as intensity and severity, each of which have ranges of natural variability. Ecosystem stability is threatened when any of the attributes for a given fire regime diverge from its range of natural variability.

4.5.1.10.4 Changes in Development and Future Trends

Fuel reduction projects are ongoing on federal, state, and private lands in Napa County. Such projects include vegetation management, broadcast burning, pre-commercial thinning, and the removal of dead, dying, and diseased trees. The CAL FIRE Sonoma Lake Napa Unit (LNU) has been impacted by forest pests such as western pine beetles, flat-headed woodborers, and Annosus root disease. Treatment methods to

reduce the brood material are also employed, such as lopping and scattering burning slash to reduce the population of pine beetles.

Outside of the State Forest Program, LNU is active in enforcing the Forest Practice Rules on private timberland where Timber Harvesting Plans (THPs) have been submitted. Most submitting THPs are small non-industrial timberland managers as timber harvesting is common. While evaluating THPs in the field, the Forest Practice Inspector enforces the Public Resources Code and Forest Practice Rules, which provide protection for forest and rangelands. Such rules include provisions for the operation of fire causing equipment, use of hydrocarbon powered engines near forest, grass, or brush lands, and for the operation of chainsaws in the forest environment. The Forest Practice Rules provide specific protection for lakes and watercourses, wildlife, and plants through restrictions on silviculture methods, harvesting practices and erosion control, site preparation, hazard reduction, and fire protection. (Strategic Fire Plan Sonoma-Lake-Napa Unit, 2017)

4.5.1.11 Wildfire Problem Statements

As part of the mitigation action identification process, the Planning Committee for each jurisdiction identified issues and weaknesses or "problem statements" for their respective facilities based on the risk assessment and vulnerability analysis, utilizing the RAMP mapping tool and historic wildfire data. Wildfire problem statements for all participating jurisdictions are listed in Table 4-12. This table lists problem statements for all participating jurisdictions; the Vol. 2 Annex also lists problem statements separately for each jurisdiction.

Identifying these common issues and weaknesses assists the Planning Committee in understanding the realm of resources needed for mitigation. The goal is to have at least one mitigation action for every problem statement. See Table 5-6 for a full list of mitigation actions and the corresponding problem statements that they address. Each problem statement is coded with a problem number for cross-referencing between Table 4-12 and Table 5-6.

Table 4-12 Wildfire Problem Statements

Problem No.	Area of Concern	Mitigation Alternatives	Primary	Problem Description	Related MA
WF-21	Victim	PPRO - Property Protection , PE&A - Public Education & Awareness	**American Canyon**	There are approx. 60 people living in a high wildfire intensity zone and close to 1,400 live in a moderate wildfire intensity zone.	**AC-03-2013, NC-02-2020, NC-03-2020**
WF-22	Victim	PPRO - Property Protection , PE&A - Public Education & Awareness	**American Canyon**	There are 2 parcels in the high wildfire intensity zone and 4 in the moderate wildfire intensity zone.	**AC-03-2013**
WF-23	Victim	PE&A - Public Education & Awareness , SP - Structural Projects	**American Canyon**	Legacy High School is in a high wildfire intensity zone.	**AC-03-2013**

Problem No.	Area of Concern	Mitigation Alternatives	Primary	Problem Description	Related MA
WF-34	Threat	SP - Structural Projects , PRV - Prevention , PPRO - Property Protection , ES - Emergency Services	**American Canyon**	The American Canyon Water Treatment Plant is in high wildfire intensity zone.	**AC-03-2013**
WF-27	Threat	PE&A - Public Education & Awareness , SP - Structural Projects	**Calistoga**	The City of St. Calistoga has significant areas that are within the Wildland Urban Interface (WUI)	**CL-03-2013, CL-05-2013, CL-06-2013, NC-02-2020, NC-03-2020**
WF-32	Victim	PE&A - Public Education & Awareness , PPRO - Property Protection , ES - Emergency Services	**Calistoga**	There are approx. 306 people living in a Very High Wildfire Intensity Zone within the City of St. Calistoga.	**CL-05-2013, NC-02-2020, NC-03-2020**
WF-33	Impact	PRV - Prevention , PPRO - Property Protection , SP - Structural Projects	**Calistoga**	Potential wildfire impacts to the City of Calistoga include smoke, power failures, and potential loss of life, property, and infrastructure.	**CL-05-2013, CL-14-2020**
WF-01	Threat	ES - Emergency Services , SP - Structural Projects , PRV - Prevention	**County Unincorporated**	Angwin has a single narrow, winding road traversing Howell Mountain from the Napa Valley to Pope Valley, providing the vehicular access to and from Angwin for emergency equipment and personnel and evacuation of people and animals. Only two other roads extend to valley floors from the Angwin area Ink Grade on the eastern side and Old Howell Mountain Road on the western side.	**NC-58-2020**
WF-02	Victim	PE&A - Public Education & Awareness	**County Unincorporated**	2 Childcare centers are located in the Very High Wildfire Risk Area in Sanitarium area of Unincorporated County.	**NC-44-2020**
WF-03	Threat	PE&A - Public Education & Awareness	**County Unincorporated**	The primary cause for fires within the Sonoma-Lake-Napa Unit is human related.	**NC-08-2013, NC-55-2020**
WF-04	Impact	PRV - Prevention , PPRO - Property Protection	**County Unincorporated**	Ingress and egress enhancements of public roads with shaded fuel breaks and fuel reduction is needed.	**NC-58-2020**
WF-05	Threat	PPRO - Property Protection	**County Unincorporated**	Roadside treatment is needed on Howell Mountain Rd (Edgemont Ln/ Viewridge Dr to College Ave).	**NC-45-2020, NC-49-2020**
WF-06	Threat	PPRO - Property Protection	**County Unincorporated**	Vegetation management is needed 1.) northwest of Westgate above Canyon Crest at Silverado Country Club and 2.) canyon between Atlas Peak Rd and Old Soda Springs Rd.	**NC-45-2020, NC-49-2020**

Problem No.	Area of Concern	Mitigation Alternatives	Primary	Problem Description	Related MA
WF-07	Threat	PPRO - Property Protection	**County Unincorporated**	There is flammable brush on the hillsides below homes on the east side of the Berryessa Highlands community. A shaded fuel break is needed.	**NC-45-2020, NC-49-2020**
WF-08	Threat	PPRO - Property Protection	**County Unincorporated**	The Northern Greenbelt area is undeveloped, unpopulated woodland with high fuel and high risk of wildfire occurrence. It is also difficult to access.	**NC-45-2020, NC-49-2020**
WF-09	Threat	PPRO - Property Protection	**County Unincorporated**	The west side of Crestmont slope is in need of a shaded fuel break to protect community and cultural value.	**NC-45-2020, NC-49-2020**
WF-10	Threat	PPRO - Property Protection	**County Unincorporated**	Thinning is needed around the Old Ridge Road shaded fuel break.	**NC-45-2020, NC-49-2020**
WF-11	Impact	PRV - Prevention , ES - Emergency Services	**County Unincorporated**	Not all address markers are compliant. Reflective number signs are needed on all homes and at the road.	**NC-53-2020**
WF-12	Victim	PE&A - Public Education & Awareness , PPRO - Property Protection	**County Unincorporated**	There are approx. 64 people living in a very high wildfire intensity zone south of Wild Horse Valley Rd and east/north of Green Valley Rd.	**NC-02-2020, NC-03-2020, NC-04-2013, NC-05-2013**
WF-13	Victim	PE&A - Public Education & Awareness , PPRO - Property Protection	**County Unincorporated**	There are approx. 3,000 people living in the very high wildfire intensity zone northeast of Napa (bound by Silverado Trail, Sage Canyon Rd and Monticello Rd).	**NC-02-2020, NC-03-2020, NC-04-2013, NC-05-2013**
WF-14	Victim	PE&A - Public Education & Awareness , PPRO - Property Protection	**County Unincorporated**	There are approx. 1,100 people living in a very high wildfire intensity zone west of Yountville.	**NC-02-2020, NC-03-2020, NC-04-2013, NC-05-2013**
WF-15	Victim	PE&A - Public Education & Awareness , PPRO - Property Protection	**County Unincorporated**	There are approx. 200 people living in a very high wildfire intensity zone on either side of Capell Valley Rd between Knoxville Rd and Monticello Rd.	**NC-02-2020, NC-03-2020, NC-04-2013, NC-05-2013**
WF-16	Victim	PE&A - Public Education & Awareness , PPRO - Property Protection	**County Unincorporated**	There are approx. 2,500 people living in the very high wildfire intensity zone surrounding Angwin and Sanitarium.	**NC-02-2020, NC-03-2020, NC-04-2013, NC-05-2013**
WF-17	Victim	PE&A - Public Education & Awareness , PPRO - Property Protection	**County Unincorporated**	There are approx. 500 people live in the very high wildfire intensity zone south/ southwest of Calistoga.	**NC-02-2020, NC-03-2020, NC-04-2013, NC-05-2013**
WF-18	Victim	PE&A - Public Education & Awareness , PPRO - Property Protection	**County Unincorporated**	There are approx. 200 people live in the very high wildfire intensity zone near the northern border of the County.	**NC-02-2020, NC-03-2020, NC-04-2013, NC-05-2013**

Problem No.	Area of Concern	Mitigation Alternatives	Primary	Problem Description	Related MA
WF-19	Victim	PE&A - Public Education & Awareness , PPRO - Property Protection	**County Unincorporated**	Pope Valley Fire Station- Station 222 is located in a very high wildfire intensity zone.	**NC-07-2013**
WF-20	Threat	PE&A - Public Education & Awareness , PPRO - Property Protection , ES - Emergency Services	**County Unincorporated**	The major wildland fire hazard risks for residential development are in the County's hilly areas characterized by steep slopes, poor fire suppression delivery access, inadequate water supply and highly flammable vegetation.	**NC-04-2013, NC-05-2013, NC-55-2020**
WF-30	Impact	PE&A - Public Education & Awareness , SP - Structural Projects	**County Unincorporated**	Firesafe Councils need greater financial capacity to support coordination, education and outreach.	**NC-06-2013, NC-08-2013**
WF-31	Impact	PRV - Prevention , PPRO - Property Protection , SP - Structural Projects	**County Unincorporated**	Prescribed burning is challenging because of Bay Area Air Quality Regulations.	**NC-19-2020**
WF-50	Impact	PRV - Prevention , PPRO - Property Protection , PE&A - Public Education & Awareness , ES - Emergency Services	**Howell Mountain MWC**	Wildfires could cause damages to Treatment Plant, Infrastructure and other facilities needed to provide water to residents and for fire-fighting purposes.	**HM-04-2020**
WF-51	Impact	PRV - Prevention , PPRO - Property Protection , PE&A - Public Education & Awareness , NRP - Natural Resource Protection	**Howell Mountain MWC**	Wildfires can affect water quality.	**HM-06-2020**
WF-52	Impact	PRV - Prevention , PE&A - Public Education & Awareness , ES - Emergency Services	**Howell Mountain MWC**	Wildfires could impact evacuation routes from HMMWC facilities.	**HM-05-2020**
WF-53	Impact	PRV - Prevention , PE&A - Public Education & Awareness , ES - Emergency Services	**Howell Mountain MWC**	Wildfires could impact communications systems such as knocking out cell towers.	**HM-05-2020**
WF-54	Impact	PRV - Prevention , PPRO - Property Protection , ES - Emergency Services	**Howell Mountain MWC**	Wildfires could impact access to the HMMWC water treatment plant.	**HM-02-2020**
WF-55	Vicitm	PRV - Prevention , PE&A - Public Education & Awareness	**Howell Mountain MWC**	Wildfire could impact water supplies for 400 HMMWC customers by limiting or disrupting service and also lack of water resources to fight the fires.	**HM-04-2020**

Problem No.	Area of Concern	Mitigation Alternatives	Primary	Problem Description	Related MA
WF-26	Victim	PE&A - Public Education & Awareness , SP - Structural Projects	**Napa COE**	The County Office Main Building is in a moderate wildfire intensity zone.	**NC-07-2013**
WF-29	Threat	PE&A - Public Education & Awareness , SP - Structural Projects	**Napa Valley College**	Portions of Napa Valley College are within the Wildland Urban Interface (WUI)	**NC-07-2013**
WF-35	Impact	PE&A - Public Education & Awareness , PPRO - Property Protection	**St. Helena**	Smoke: Thick possibly toxic smoke causing breathing and health issues. Hospitals and medical facilities stressed.	**SH-02-2020**
WF-36	Impact	PE&A - Public Education & Awareness , SP - Structural Projects	**St. Helena**	Damaged / Destroyed structures and vineyards: Displaced residents needing shelter, food and water. Businesses unable to open; economic impact to business and employees. Tourism impacted.	**SH-03-2020**
WF-37	Impact	PE&A - Public Education & Awareness	**St. Helena**	Traffic congestion: Civilians leaving area create traffic jams on all roads.	**SH-05-2020**
WF-38	Impact	PE&A - Public Education & Awareness	**St. Helena**	Looting: Evacuated areas subject to looting.	**SH-06-2020**
WF-39	Impact	PE&A - Public Education & Awareness , SP - Structural Projects	**St. Helena**	Public safety and city staff; Work long hours, strain on family. Homes may be threatened.	**SH-06-2020**
WF-40	Impact	SP - Structural Projects , PRV - Prevention	**St. Helena**	Power outages caused by wildfire.	**SH-07-2020**
WF-41	Victim	PE&A - Public Education & Awareness , SP - Structural Projects	**St. Helena**	Possible loss of home and health issues from wildfire for City residents.	**SH-02-2020, SH-03-2020, SH-08-2020**
WF-42	Victim	PE&A - Public Education & Awareness , SP - Structural Projects	**St. Helena**	Tourists would need to evacuate the area in event of a wildfire.	**SH-02-2020, SH-06-2020**
WF-43	Victim	PE&A - Public Education & Awareness , SP - Structural Projects	**St. Helena**	Businesses; Destroyed/damaged property, loss of income.	**SH-03-2020, SH-05-2020**
WF-44	Victim	PE&A - Public Education & Awareness , SP - Structural Projects	**St. Helena**	Schools and students: Closure impacting education. Possible school destroyed. Relocation possible.	**SH-09-2020**
WF-45	Victim	PE&A - Public Education & Awareness , SP - Structural Projects	**St. Helena**	Seniors in Silverado Orchards, Woodbridge Village, and Vineyard Valley	**SH-08-2020**

Problem No.	Area of Concern	Mitigation Alternatives	Primary	Problem Description	Related MA
WF-46	Threat	PE&A - Public Education & Awareness , SP - Structural Projects	**St. Helena**	The City of St. Helena has significant areas that are within the Wildland Urban Interface (WUI)	**SH-03-2020, SH-05-2020**
WF-47	Threat	PE&A - Public Education & Awareness , SP - Structural Projects	**St. Helena**	Arsonists causing wildfire.	**NC-08-2013, SH-11-2020**
WF-48	Threat	PE&A - Public Education & Awareness , SP - Structural Projects	**St. Helena**	Human factor: Controlled burns, Barbeques, etc. leading to greater wildfire.	**SH-10-2020**
WF-49	Threat	PE&A - Public Education & Awareness , SP - Structural Projects	**St. Helena**	Increased fuel due to wet winter.	**SH-10-2020**

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4.5.2 Earthquake Hazard Profile

Earthquake is the sudden shaking of the ground caused by the passage of seismic waves through Earth's rocks. Seismic waves are produced when some form of energy stored in Earth's crust is suddenly released, usually when masses of rock straining against one another suddenly fracture and "slip." Earthquakes associated with this type of energy release are called tectonic earthquakes. The energy also can be released by elastic strain, gravity, chemical reactions, or even the motion of massive bodies. Earthquakes occur most often along geologic *faults*, narrow zones where rock masses move in relation to one another.

Earthquakes have different properties depending on the type of fault that causes them. See Figure 4-15. The usual fault model has a "strike" (that is, the direction from north taken by a horizontal line in the fault plane) and a "dip" (the angle from the horizontal shown by the steepest slope in the fault). The lower wall of an inclined fault is called the footwall. Lying over the footwall is the hanging wall. When rock masses slip past each other parallel to the strike, the movement is known as strike-slip faulting. Movement parallel to the dip is called dip-slip faulting. In dip-slip faults, if the hanging-wall block moves downward relative to the footwall block, it is called "normal" faulting; the opposite motion, with the hanging wall moving upward relative to the footwall, produces reverse or thrust faulting.

As a fault rupture progresses along or up the fault, rock masses are flung in opposite directions and thus spring back to a position where there is less strain.

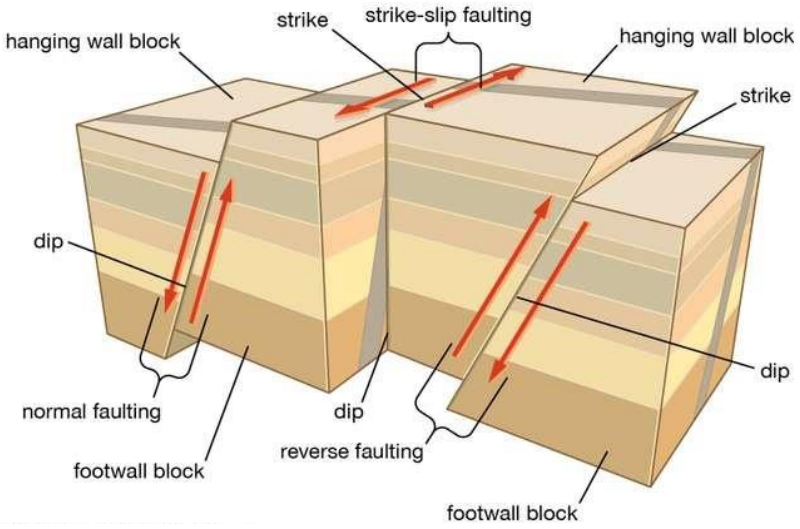

Figure 4-15: Earthquake Faulting

Soil Liquefaction

Soil liquefaction is a phenomenon in which the strength and stiffness of a soil is reduced by earthquake shaking or other rapid loading. Soil liquefaction and related phenomena have been responsible for tremendous amounts of damage in historical earthquakes around the world. Soil liquefaction occurs when material that is ordinarily a solid behaves like a liquid. Saturated or partially-saturated soil substantially loses strength and stiffness in response to an applied stress such as shaking during an earthquake or other sudden change in stress condition. The phenomenon is most often observed in saturated, loose, low-density or uncompacted, sandy soils. Loose sand has a tendency to compress when a load is applied. Dense sands, by contrast, tend to expand in volume or 'dilate'. If the soil is saturated by water, which often occurs when soil is below the water table or sea level, then water fills the pore spaces between soil grains.

Artificial induction

Earthquakes are sometimes caused by human activities, including the injection of fluids into deep wells, pumping of ground water, the excavation of mines, and the filling of large reservoirs. In fluid injection, the slip is thought to be induced by premature release of elastic strain, as in the case of tectonic earthquakes, after fault surfaces are lubricated by the liquid.

Earthquake Classifications

Earthquakes are typically classified in one of two ways: by the amount of energy released, measured as **magnitude**; or by the impact on people and structures, measured as **intensity**.

Magnitude

The most common method for measuring earthquakes is magnitude, which measures the strength of earthquakes. While majority of scientists currently use either the Mw Scale or Modified Mercalli Intensity (MMI) Scale to measure an earthquake, the Richter scale is the most well-known measurement for earthquake magnitude. The magnitude of an earthquake is related to the total area of the fault that ruptured, as well as the amount of offset (displacement) across the fault. As shown in Table 4-13, there are seven earthquake magnitude classes, ranging from great to micro. A magnitude class of great can cause tremendous damage to infrastructure, compared to a micro class, which results in minor damage to infrastructure.

Earthquake Magnitude Classes		
Magnitude Class	**Magnitude Range (M = Magnitude)**	**Description**
Great	M > 8	Tremendous damage
Major	7 <= M < 7.9	Widespread heavy damage
Strong	6 <= M < 6.9	Severe damage
Moderate	5 <= M < 5.9	Considerable damage
Light	4 <= M < 4.9	Moderate damage
Minor	3 <= M < 3.9	Rarely causes damage.
Micro	M < 3	Minor damage

Table 4-13: Moment Magnitude Scale

Intensity

The effects of an earthquake in a particular location are measured by intensity. Earthquake intensity decreases with increasing distance from the epicenter of the earthquake. The Modified Mercalli Intensity value assigned to a specific site after an earthquake has a more meaningful measure of severity to the nonscientist than the magnitude because intensity refers to the effects experienced at that place.

The **lower** numbers of the intensity scale generally deal with the manner in which the earthquake is felt by people. The **higher** numbers of the scale are based on observed structural damage. Structural engineers usually contribute information for assigning intensity values of VIII or above. Table 4-14 is an abbreviated description of the levels of Modified Mercalli intensity.

Table 4-14: Modified Mercalli Intensity Level Descriptions

Intensity	Shaking	Description/Damage
I	Not felt	Not felt except by a very few under especially favorable conditions.
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 similar to the passing of a truck. Duration estimated.
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, windows broken. Unstable objects overturned. Pendulum clocks may stop.
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.
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 great in substantial buildings, with partial collapse. Buildings shifted off foundations.
X	Extreme	Some well-built wooden structures destroyed; most masonry and frame structures destroyed with foundations. Rails bent.

Source: USGS, Abridged from The Severity of an Earthquake, USGS General Interest Publication 1989-288-913

Ground Motion

Earthquake hazard assessment is also based on expected ground motion. This involves determining the annual probability that certain ground motion accelerations will be exceeded, then summing the annual probabilities over the time period of interest. The most commonly-mapped ground motion parameters are the horizontal and vertical peak ground accelerations (PGA) for a given soil or rock type. Instruments called accelerographs record levels of ground motion due to earthquakes at stations throughout a region. These readings are recorded by state and federal agencies that monitor and predict seismic activity.

Maps of PGA values form the basis of seismic zone maps that are included in building codes such as the International Building Code. Building codes that include seismic provisions specify the horizontal force due to lateral acceleration that a building should be able to withstand during an earthquake. PGA values are directly related to these lateral forces that could damage "short period structures" such as single-family dwellings. Longer-period response components determine the lateral forces that damage larger structures with longer natural periods such as apartment buildings, factories, high-rises, bridges. Table 4-15 lists damage potential and perceived shaking by PGA factors, compared to the Mercalli scale.

Table 4-15: Modified Mercalli Scale and Peak Ground Acceleration

		Potential Structure Damage		Estimated PGA
Modified Mercalli Scale	Perceived Shaking	Resistant Buildings	Vulnerable Buildings	(%g)
I	Not Felt	None	None	<0.17%
II-III	Weak	None	None	0.17% - 1.4%
IV	Light	None	None	1.4% - 3.9%
V	Moderate	Very Light	Light	3.9% - 9.2%
VI	Strong	Light	Moderate	9.2% - 18%
VII	Very Strong	Moderate	Moderate/Heavy	18% - 34%
VIII	Severe	Moderate/Heavy	Heavy	34% - 65%
IX	Violent	Heavy	Very Heavy	65% - 124%
X - XII	Extreme	Very Heavy	Very Heavy	>124%
Note: PGA measured in percent of g, where g is the acceleration of gravity				

Sources: USGS, 2008; USGS, 2010

4.5.2.1 Policies, Plans, and Regulatory Environment

Alquist-Priolo Earthquake Fault Zoning Act and Seismic Hazards Mapping Act (1972)

The 1971 San Fernando Earthquake resulted in the destruction of numerous structures built across its path. This led to passage of the Alquist-Priolo Earthquake Fault Zoning Act in 1972. This Act prohibits the

construction of buildings for human occupancy across active faults in the State of California. Similarly, extensive damage caused by ground failures during the 1989 Loma Prieta Earthquake focused attention on decreasing the impacts of landslides and soil liquefaction. This led to the creation of the Seismic Hazards Mapping Act, which increases construction standards at locations where ground failures are probable during earthquakes.

2016 California Building Standards Code

The 2016 California Building Code, adopted by Napa County, includes materials requirements, construction methods, and maintenance standards for earthquake protection and resiliency.

Napa County General Plan

The 2008 Napa County General Plan includes the following goals and policies to mitigate the effects of earthquake:

> **Goal SAF-2 (Safety):** To the extent reasonable, protect residents and businesses in the unincorporated area from hazards created by earthquakes, landslides, and other geologic hazards.
>
> **Policy SAF-8:** Consistent with County ordinances, require a geotechnical study for new projects and modifications of existing projects or structures located in or near known geologic hazard areas, and restrict new development atop or astride identified active seismic faults in order to prevent catastrophic damage caused by movement along the fault. Geologic studies shall identify site design (such as setbacks from active faults and avoidance of on-site soil-geologic conditions that could become unstable or fail during a seismic event) and structural measures to prevent injury, death and catastrophic damage to structures and infrastructure improvements (such as pipelines, roadways and water surface impoundments not subject to regulation by the Division of Safety of Dams of the California Department of Water Resources) from seismic events or failure from other natural circumstances.
>
> - **Action Item SAF-8.1:** The County's seismic fault maps shall be reviewed regularly to ensure that they reflect the latest information available.
> - **Action Item SAF-8.2:** Updated maps should be made available to the public at County offices, on the County's Web site, and through other appropriate channels.
>
> **Policy SAF-43:** Consistent with state and federal requirements, critical facilities should be provided with additional earthquake resistance and damage control to allow such facilities to remain operative after a disaster.
>
> **Policy CC-29 (Community Character):** Significant historic resources that are damaged by flood, fire, neglect, earthquake, or other natural disaster should be carefully evaluated by a structural engineer with preservation experience before they are determined to be beyond repair and destroyed.

Seismic Retrofit Ordinances

Communities in the Napa County Operational Area have all adopted Seismic Retrofit ordinances to reinforce all historic buildings. During the last Building & Fire Code, update all jurisdictions in the county adopted a single Countywide Building & Fire Code to streamline permitting and enforcement.

Napa County Code § 18.119.080

Along with the seismic retrofit ordinances, the Napa County Code includes requirements for telecommunications facilities to be constructed to withstand the forces of the "maximum credible earthquake." § 18.119.080.

4.5.2.2 Past Events

Numerous earthquakes have occurred in and near Napa County over the last twenty years. *See* Table 4-16 for earthquake events 4.0 magnitude or greater since 2000. Two large-scale earthquakes in Napa County caused damage, death, and injuries over the last twenty years. In September 2000, Napa County residents experienced a 5.2 earthquake on the West Napa Fault. Damages were estimated at $30-50 million. The August 24, 2014 South Napa earthquake was the largest in the San Francisco Bay Area since the 1989 Loma Prieta earthquake, registering at 6.0 on the moment magnitude scale and with a maximum Mercalli intensity of VIII (Severe). The epicenter of the earthquake was located south of Napa City and northwest of American Canyon on the West Napa Fault. Total damage in the southern Napa Valley and Vallejo areas was in the range of $362 million to $1 billion, with one person killed and 200 injured.

Table 4-16: Earthquakes in Napa County 4.0 Magnitude or Greater Since 2000

Date	Location	Magnitude
1/4/2018	2 km from Berkeley	4.4
5/22/2015	10 km ENE of Yountville	4.1
8/24/2014	South Napa	6.0
8/3/2006	Northern California	4.5
5/8/2005	Northern California	4.1
5/25/2003	Northern California	4.1
9/3/2000	4.8 km SSW of Yountville	5.0

Source: USGS and EarthquakeTrack.com

4.5.2.3 Location

The Alquist-Priolo Act established earthquake fault zones in California. These Alquist-Priolo Earthquake Fault Zones encompass surface traces of active faults that have a potential for future surface fault rupture and are mapped across California. These zones have been established by the State Geologist and indicate

an active fault within the zone. The fault may pose a risk to existing or future structures from a surface fault rupture. Figure 4-16 shows the location of fault zones as well as the underlying quaternary faults[5] near the County.

According to USGS, the most likely faults that are likely to produce strong ground shaking in Napa County include the Northern Hayward/Rodgers Creek in the west, the Maacama in the northwest, the Hunting Creek-Berryessa in the north, the Green Valley in the southeast and the West Napa in the south central. The Concord Green Valley and the West Napa Fault are the only two major faults that pass through County boundaries. (Association of Bay Area Governments, 2014) See Figure 4-16 for locations of regional fault lines.

[5] Quaternary faults are those active faults that have been recognized at the surface and which have evidence of movement in the past 1.6 million years - the duration of the Quaternary Period.

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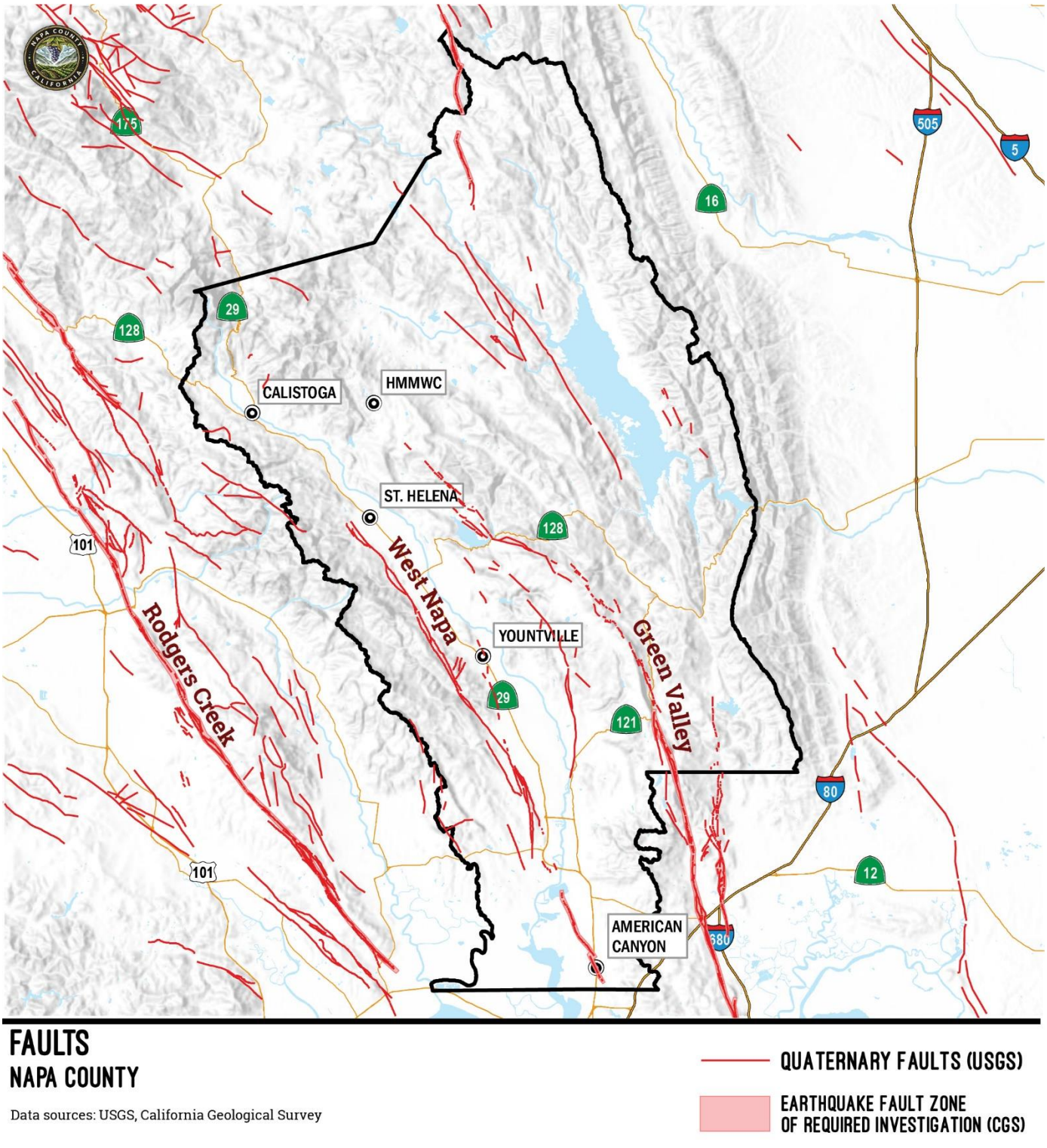

Figure 4-16: Regional Fault Lines

4.5.2.4 Frequency/ Probability of Future Occurrences

According the California State Hazard Mitigation Plan, earthquakes large enough to cause moderate damage to structures—those of Magnitude 5.5 or larger—occur three to four times a year statewide. Strong earthquakes of Magnitude 6 to 6.9 strike on an average of once every two to three years. Major earthquakes of Magnitude 7 to 7.9 occur in California about once every 10 years. The probability of an earthquake occurring in Napa County is likely (between 10 and 100% annual probability).

Probability of earthquake events is based on the approximate location of earthquake faults within and outside the Napa region. The Uniform California Earthquake Rupture Forecast, Version 3 (UCERF3)[6] is a comprehensive model of earthquake occurrence for California. It represents the best available science for authoritative estimates of the magnitude, location, and likelihood of potentially damaging earthquakes in California. According to the USGS's earthquake probability maps, shown in Figure 4-17, the Hunting Creek-Berryessa fault has a 5% chance of producing an earthquake of 6.7 magnitude or greater in the next 30 years, while the Rodgers Creek / Hayward North fault, located just outside county boundaries, has a more than 10% chance.

The combined probability of a major earthquake occuring on one of the major faults passing through Napa County is 63% over the next thirty years. (Association of Bay Area Governments, 2014). Figure 4-18 shows likely shaking intensity in Napa County in any 50-year period from all possible faults. It is an equivalent risk to a 500-year flood event. 10% in 50 years was chosen as it most closely aligns to the levels of shaking the current building code is designed to withstand. The predicted shake intensity map, Figure 4-18, is not intended to be site-specific. Rather, it depicts the general risk within neighborhoods and the relative risk from community to community.

4.5.2.5 Severity

As we know from past events, even a "moderate" earthquake occurring in or near the Napa County region could result in deaths, casualties, property and environmental damage, and disruption of normal services and activities. The severity of the event could be aggravated by collateral emergencies such as fires, hazardous material spills, utility disruptions, landslides, transportation emergencies, and the possible failure of the Napa County dams.

For this plan, a representative magnitude 6.7 West Napa Fault earthquake scenario[7] was used to show possible shake severity in the region in the earthquake vulnerability analysis, modeled after the South Napa Earthquake in 2014. This scenario was chosen from a range of regional, scenario-based shakemaps available from USGS. The shakemap data consist of peak ground velocity, peak ground acceleration, peak

[6] UCERF3 was developed by the 2014 Working Group on California Earthquake Probabilities (WGCEP), a multi-disciplinary collaboration of leading experts in seismology, geology, geodesy, paleoseismology, earthquake physics, and earthquake engineering. The development of UCERF3 involved numerous public meetings and included formal evaluations by five separate review panels. The study was led by the U.S. Geological Survey, the Southern California Earthquake Center, and the California Geological Survey, with partial financial support from the California Earthquake Authority, which is the largest provider of homeowner earthquake insurance in California.

[7] As described in the earthquake definitions in beginning of Section 4.5.2, the severity of an earthquake can be expressed in terms of intensity or magnitude. Intensity represents the observed effects of ground shaking on people, buildings, and natural features.

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spectral accelerations in an earthquake scenario. *See* Figure 4-19 for potential shake intensities for the chosen scenario. If a 6.7 magnitude earthquake were to occur again along the West Napa fault, the County would experience moderate to severe shaking, as shown in and as felt in 2014.

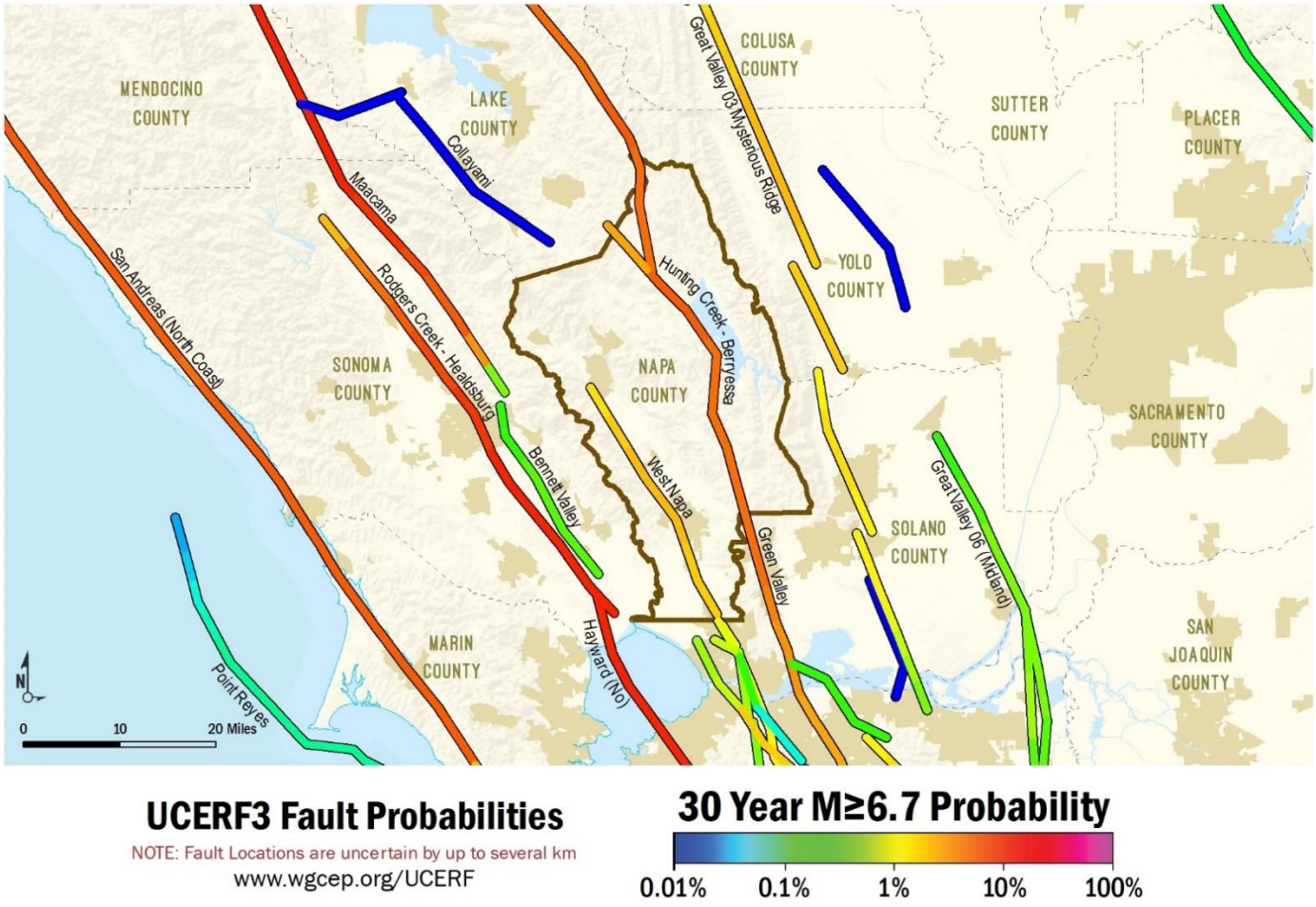


Figure 4-17: Fault Probability Map for Napa County Area

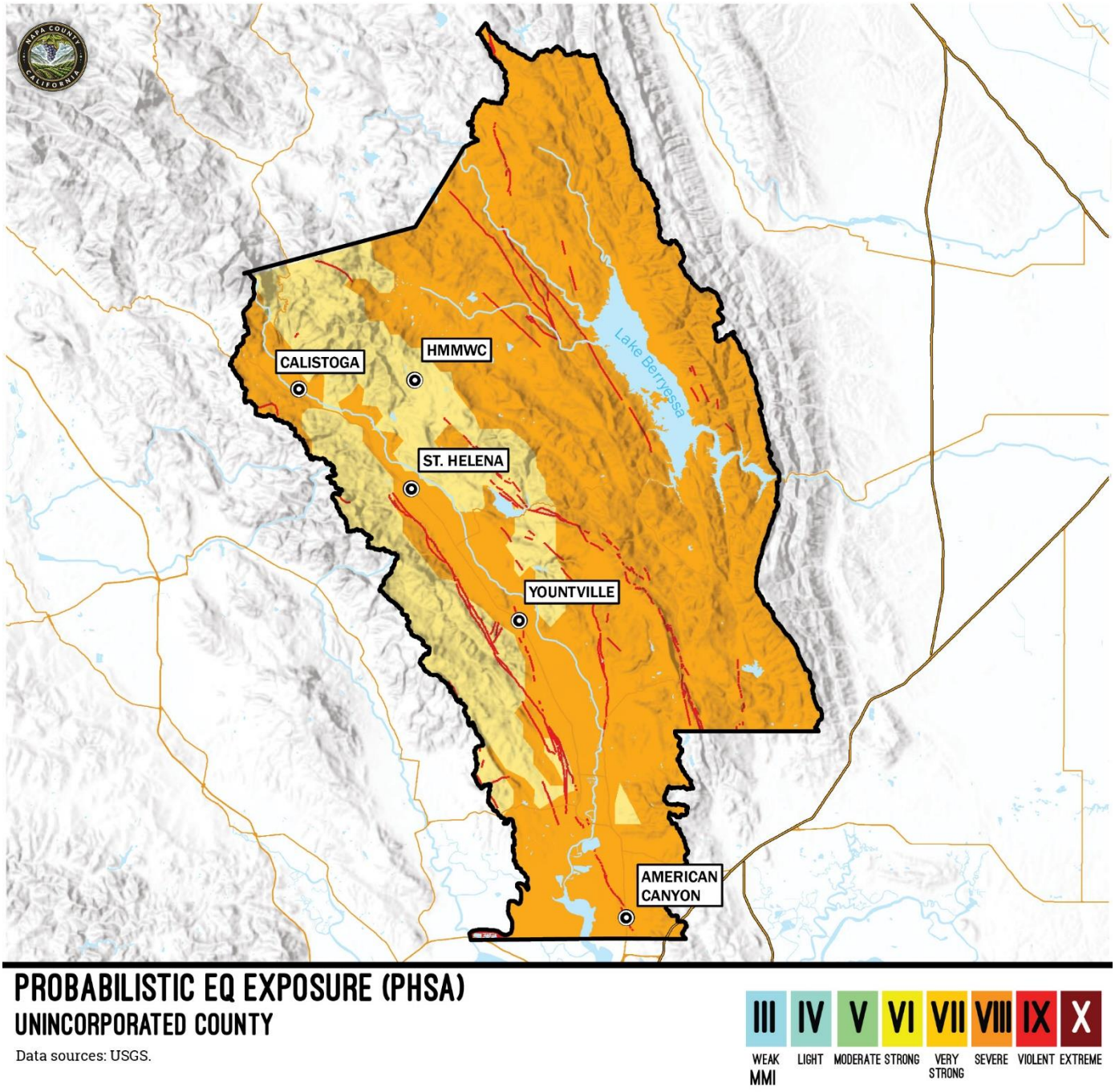


Figure 4-18: Napa County Earthquake Probability

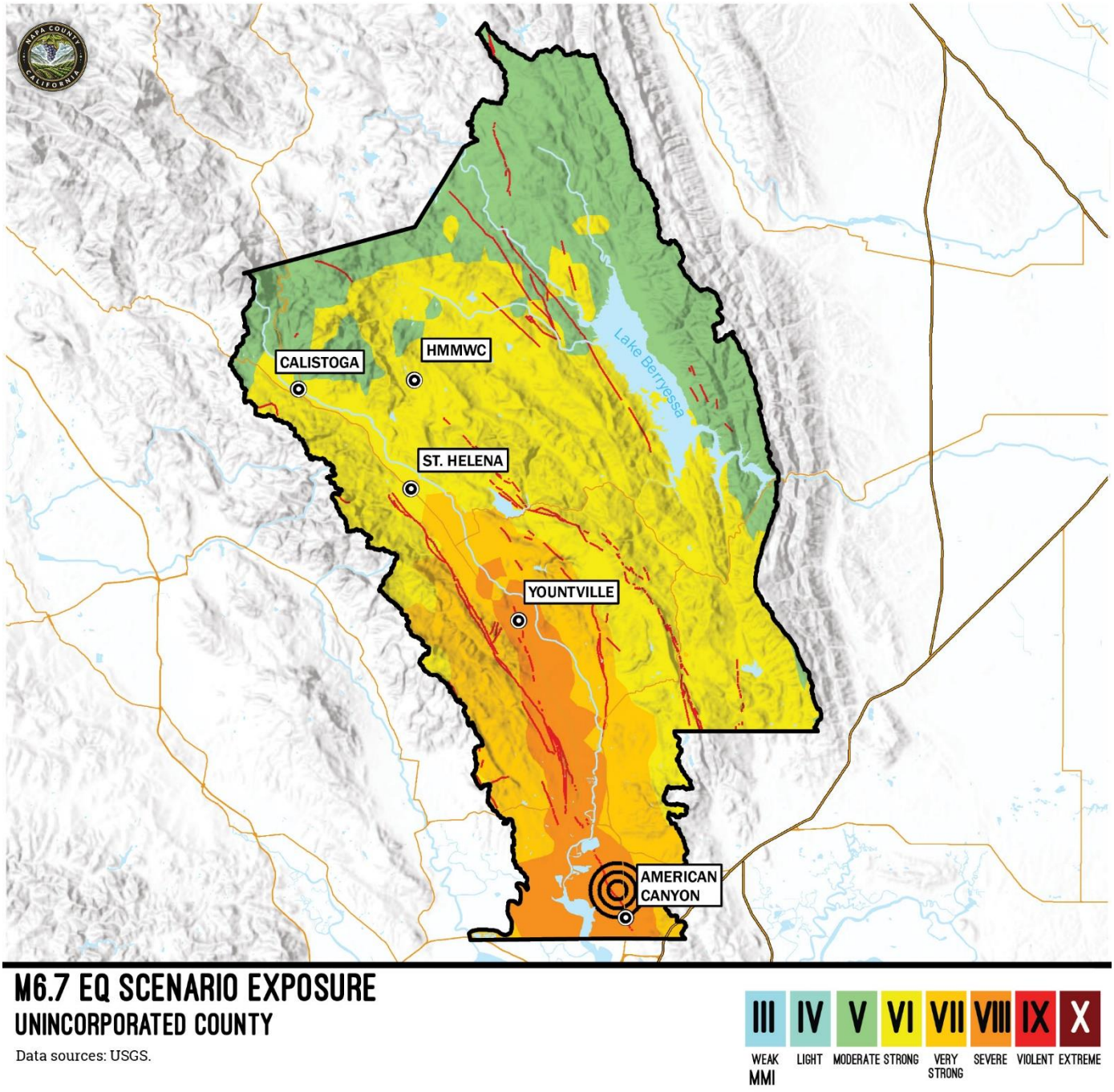


Figure 4-19: Napa County Earthquake West Napa Scenario (M 6.7)

4.5.2.6 Warning Time

There is currently no 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 use the low energy waves that precede major earthquakes. Seconds and minutes of advance warning can allow people and systems to take actions to protect life and property from destructive shaking. Even a few seconds of warning can enable protective actions such as:

- **Public:** Citizens, including schoolchildren, drop, cover, and hold on; turn off stoves, safely stop vehicles.
- **Businesses:** Personnel move to safe locations, automated systems ensure elevator doors open, production lines are shut down, sensitive equipment is placed in a safe mode.
- **Medical services:** Surgeons, dentists, and others stop delicate procedures.
- **Emergency responders:** Open firehouse doors, personnel prepare and prioritize response decisions.
- **Power infrastructure:** Protect power stations and grid facilities from strong shaking.

4.5.2.7 Secondary Hazards

Earthquakes can create the secondary hazards of soil liquefaction and tsunamis, as outlined here. Other hazards can also occur from earthquakes and are profiled in other parts of this Plan, such as dam failure or wildfires.

4.5.2.7.1 Soil liquefaction

Soil liquefaction occurs when seismic waves pass through saturated granular soil, distorting its granular structure, and causing some of the pore spaces between granules to collapse. Pore-water pressure may also increase sufficiently to cause the soil to behave like a fluid for a brief period and cause deformations. Soil liquefaction can cause severe damage to property, including damaging pipes, compromising building foundations, and bucking roads and airport runways. Soil liquefaction problems could be present in areas built on unconsolidated river soils.

4.5.2.7.2 Tsunami

A tsunami is a series of traveling ocean waves of extremely long length, generated by disturbances associated primarily with earthquakes occurring below or near the ocean floor. Subduction zone earthquakes at plate boundaries often cause tsunamis. However, tsunamis can also be generated by submarine landslides, submarine volcanic eruptions, the collapse of volcanic edifices, and, in very rare instances, large meteorite impacts in the ocean.

Tsunamis affect beaches that are open to the ocean, bay mouths, tidal flats, and the shores of large coastal rivers. Tsunami waves can also diffract around land masses. Because tsunamis are not symmetrical, the waves may be much stronger in one direction than another, depending on the nature of the source and the surrounding geography. However, tsunamis do propagate outward from their source, so coasts in the shadow of affected land masses are usually fairly safe.

Tsunamis are rare events, and local mapping from the California Department of Conservation indicates small possible inundation zones at the mouth of the Napa River. For more information, see Cuttings Wharf Quadrangle at https://www.conservation.ca.gov/cgs/tsunami/maps/napa.

4.5.2.8 Earthquake Vulnerability Analysis

Earthquakes are a considerable threat to life and property in Napa County. A moderate to severe seismic incident on any one fault zones in close proximity to the County is expected to cause:

- Extensive property damage, particularly to pre-1930's unreinforced masonry structures,
- Possible fatalities and injuries,
- Damage to water and sewage systems,
- Disruption of communications systems,
- Broken gas mains and petroleum pipelines,
- Disruption of transportation arteries, and
- Competing requests for regional aid resources.

Community needs would quickly exceed the response capability of the County's emergency management organization, requiring mutual assistance from volunteer and private agencies, the Governor's Office of Emergency Services, and the Federal Emergency Support Functions.

In any earthquake, the primary consideration is saving lives. Time and effort must also be given to providing for people's mental health by reuniting families, providing shelter to the displaced persons, and restoring basic needs and services. A major effort will be needed to remove debris and clear roadways, demolish unsafe structures, assist in reestablishing public services and utilities, and provide continuing care and temporary housing for affected citizens.

After any earthquake there will be a loss of income both in private and public sectors. Individuals can lose wages due to businesses inability to function because of damaged goods or facilities. Due to business losses, the County of Napa and the cities in the planning area will lose revenue. Economic recovery from even a minor earthquake is critical.

4.5.2.8.1 Earthquake Exposure

An exposure analysis was conducted to develop earthquake vulnerability data throughout Napa County using the methods outlined in Section 4.4 and 0. To develop earthquake exposure data for the County, asset inventories for people, property, and critical facilities were superimposed with earthquake data from the USGS available through ABAG. USGS provides likely shaking intensity in any 50-year period from all possible faults in Napa County. Figure 4-20 provides the shaking intensity map along with hazard exposure snap shots for information detailed in this Section.

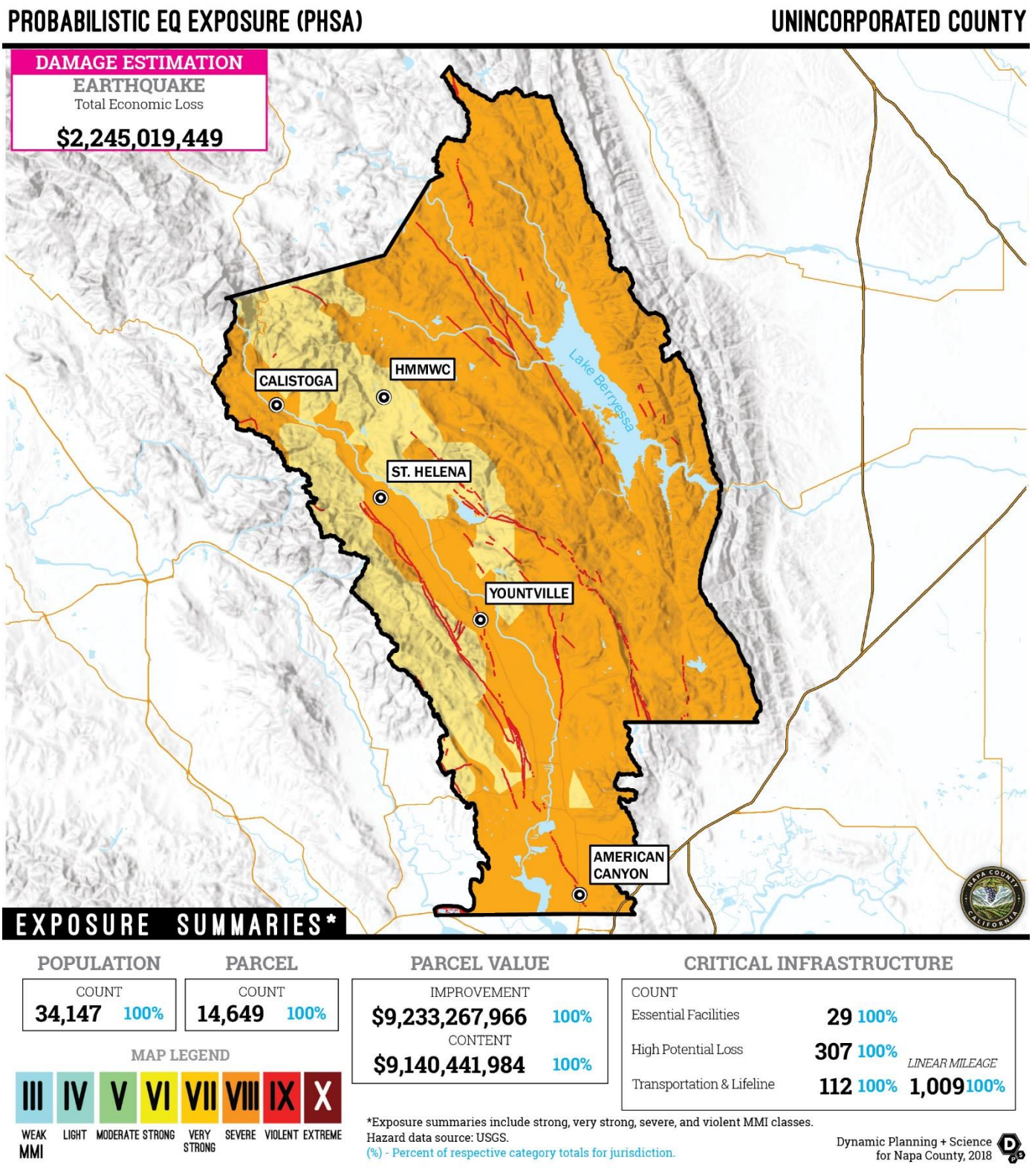


Figure 4-20: Napa County Earthquake Probability Exposure and Snapshot Map

Population

The population exposed to earthquake in the planning area was estimated for 50-year probabilistic shake intensities from USGS. Figure 4-21 and Table 4-17 summarize population exposure results. The entire population of Napa County is potentially exposed to direct and indirect impacts from earthquakes. Approx. 100% of the population of Napa County is in either Very Strong, Severe, or Violent probabilistic shake intensity zones. The degree of exposure depends on many factors, including the age and construction type dwellings, the soil types on which their homes are constructed, and proximity to fault location. Whether directly or indirectly impacted, the entire population will have to deal with the consequences of earthquakes to some degree. Business interruption could keep people from working, road closures could isolate populations, and loss of functions of utilities could impact populations that suffered no direct damage from an event itself.

Population Exposure

Population Count by Exposure to USGS 50-YR Shake Intensities (Unincorporated County)

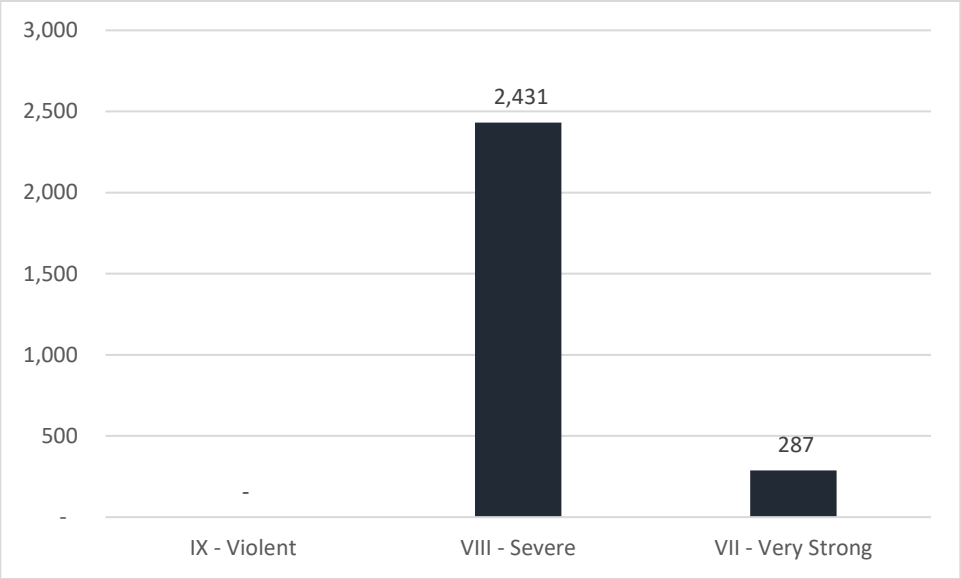


Figure 4-21: Population Exposure to USGS 50-YR Shake Intensities (Unincorporated County)

Table 4-17: Population Exposure to USGS 50-YR Shake Intensities (Unincorporated County)

	Total Population
Unincorporated County	34,147

Shake Severity Zone	Population Count	% of Total
IX - Violent	22	0.06%
VIII - Severe	24,349	71.31%
VII - Very Strong	9,776	28.63%
Total	**34,147**	**100.00%**

Property

An earthquake vulnerability assessment depends on two important factors that must be determined:

(1) the year in which seismic codes were initially adopted and enforced by the jurisdiction having authority, and
(2) the year in which seismic codes were improved and enforced.

These are known as benchmark year. The County adheres to the 2019 California Building Code. Table 4-18 provides a listing of code improvements. Benchmark years are indicated in bold. For reference, Table 4-19 provides the definitions of building types.

Table 4-18: Seismic Benchmark Years

Code Edition	Effective Date	Building Type
(2019 CBC)	January 1, 2020	
(2016 CBC)	January 1, 2017	
(2013 CBC)	January 1, 2014	N/A
(2012 IBC)		
(2010 CBC)	January 1, 2011	N/A
(2009 IBC)		
(2007 CBC)	January 1, 2008	N/A
(2006 IBC)		
(2001 CBC)	November 1, 2002	N/A
(1997 UBC)		
(1998 CBC)	**July 1, 1999**	**W1a, S2, S2a, RM1, PC1, PC1a**
(1997 UBC)		
(1994 UBC)	**January 7, 1996**	**S1, S1a, C1, C2, C2a, RM2**
(1991 UBC)	**November 29, 1992**	**URM**
(1988 UBC)	**April 29, 1990**	**S2 & S2a**
(1985 UBC)	November 8, 1987	N/A
(1982 UBC)	December 9, 1984	N/A
(1979 UBC)	June 21, 1981	N/A
(1976 UBC)	**November 1, 1977**	**W1 and W2**
(1973 UBC)	April 13, 1975	N/A
(1970 UBC)	August 29, 1971	N/A
(1967 UBC)	July 12, 1968	N/A
(1964 UBC)	July 1, 1965	N/A
(1961 UBC)	August 17, 1962	N/A
(1958 UBC)	October 1, 1958	N/A
(1955 UBC)	January 1, 1956	N/A
(1955 UBC)	January 1, 1956	N/A
(1946 UBC)	June 18, 1948	N/A
(1943 UBC)	July 13, 1944	N/A

Code Edition	Effective Date	Building Type
(1940 UBC)	April 4, 1941	N/A
(1937 UBC)	September 10, 1937	N/A
(1930 UBC)	March 20, 1933	N/A

Source: ASCE 41-13. County Building Dept.

Table 4-19: Definitions of FEMA Building Types

FEMA Building Type	Definition
W1	Wood Light Frame
W1A	Wood Light Frame (multi-unit residence)
W2	Wood Frame (commercial and industrial)
S1	Steel Moment Frames
S2	Steel-braced Frames
S3	Steel Light Frames
S4	Steel Frames with concrete shear walls
S5	Steel Frames with infill masonry walls
C1	Concrete Moment Frames
C3	Concrete Frames with infill masonry shear walls
C2	Concrete Shear Walls
PC1	Tilt-Up Concrete shear walls
PC2	Precast Concrete Frames with shear walls
RM1	Reinforced Masonry Walls with flexible diaphragms
RM2	Reinforced Masonry Walls with stiff diaphragms
URM	Unreinforced Masonry Bearing Walls

Building Ages

The California State Building Code Council incorporates significant milestones in building and seismic code requirements that directly affect the structural integrity of development in California. Using these seismic benchmark years, the Steering Committee used county-provided assessor's data to identify the number of parcels by date of construction or improvement. Table 4-20 shows the results of this analysis. The number of parcels does not reflect the number of total housing units, as many multi-family units and attached housing units are reported on one parcel.

Table 4-20: Age of Structures in Napa County

Time Period	No. of County Parcels with Improvements in Period	Significance of Time Frame
Pre-1933	4,167	Before 1933, there were no explicit earthquake requirements in building codes. State law did not require local governments to have building officials or issue building permits.
1933-1940	1,546	Before the first strong motion recording was made in 1940.
1941-1960	10,621	Prior to when the Structural Engineers Association of California published guidelines on earthquake construction in 1960.
1961-1975	10,574	Prior significant improvements to lateral force requirements in 1975.
1976-1994	11,178	Prior to the Uniform Building Code being amended to include provisions for seismic safety in 1994.
1994 - present	10,019	Seismic code is currently enforced.

Soft-Story Buildings

A soft-story building is a multi-story building with one or more floors that are "soft" due to structural design. If a building has a floor that is 70-percent less stiff than the floor above it, it is considered a soft-story building. These floors can be especially dangerous in earthquakes, because they cannot cope with the lateral forces caused by the swaying of the building during a quake. As a result, the soft story may fail, causing what is known as a *soft story collapse*. Soft stories are typically associated with retail spaces and parking garages, often on the lower stories of a building. A soft story collapse can cause the rest of the building to collapse as well, causing serious structural damage that may render the structure totally unusable.

Soft-story collapse is one of the leading causes of earthquake damage to private residences. The level of vulnerability due to this type of construction within the planning area is not currently known. This type of data should be generated to support future earthquake risk assessments.

Property Value Exposure

An inventory of current market values and content value was completed using County Assessor's parcel data. GIS was used to create centroids, or points, to represent the center of each parcel polygon, assumed to be the location of the structure for analysis purposes. The centroids were then superimposed with the USGS probabilistic shaking severity zones to determine the at-risk structures. Table 4-21 reveals the count of at-risk parcels and their associated building and content exposure values to earthquake.

Table 4-21: Parcel Exposure to USGS 50-YR Shake Intensities (Unincorporated County)

	Total Parcels	Total Market Value Exposure ($)	Total Content Value Exposure ($)	Total Value ($)
Unincorporated County	14,654	$ 9,233,654,827	$ 9,140,828,845	$ 18,374,483,672

Shake Severity Zone	Improved Parcel Count	% of Total	Market Value Exposure ($)	Content Value Exposure ($)	Total Exposure ($)	% of Total
IX - Violent	-	-	-	-	-	-
VIII - Severe	11,028	75.3%	$ 6,661,573,653	$ 6,581,971,295	$ 13,243,544,948	72.1%
VII - Very Strong	3,621	24.7%	$ 2,571,694,313	$ 2,558,470,689	$ 5,130,165,002	27.9%
Total	**14,649**	**100.0%**	**$ 9,233,267,966**	**$ 9,140,441,984**	**$ 18,373,709,950**	**100.0%**

Critical Facilities and Infrastructure

Earthquakes pose numerous risks to critical facilities and infrastructure. Seismic risks, or losses, that are likely to result from exposure to seismic hazards include:

- Utility outages.
- Economic losses for repair and replacement of critical facilities, roads, buildings, etc.
- Indirect economic losses such as income lost during downtime resulting from damage public infrastructure.
- 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.

Linear utilities and transportation routes are vulnerable to rupture and damage during and after a significant earthquake event. The cascading impact of a single failure can have affects across multiple systems and utility sectors. Degrading infrastructure systems and future large earthquakes with epicenters near critical regional infrastructure could result in system outages that last weeks for the most reliable systems, and multiple months for others.

All critical facilities in Napa County are exposed to the earthquake hazard. Table 4-22 lists the number of each type of facility in the Violent, Severe, and Very Severe USGS 50-YR probabilistic shake severity zones within the County.

Table 4-22: Critical Facility Exposure to USGS 50-YR Probabilistic Shake Intensities (Uninc. Co.)

Critical Infrastructure - Earthquake Probability (PHSA)			
Infrastructure Type	IX - Violent	VIII - Severe	VII - Very Strong
Essential Facility	-	23	6
EOC	-	1	-
Fire Station	-	17	5
Hospital	-	-	1
Police Station	-	5	-
High Potential Loss	-	252	55
Adult Residential Care	-	4	-
Child Care - Licensed	-	5	4
Church	-	13	3
Communication Tower	-	15	11
Dam	-	42	9
Family Child Care Home	-	-	-
Farm Worker Housing	-	2	2
Historic Building	-	11	1
Home Care Organization	-	-	-
*Insured Asset	-	113	5
Library	-	3	1
Mobile Home Park	-	6	1
NCFCWCD Asset	-	1	-
Residential Elder Care Facility	-	3	4
School	-	8	5
Rain Gauges	-	20	9
Water Treatment Plant	-	6	-
Transportation and Lifeline	-	93	19
Airport	-	4	1
Bridge	-	76	18
NG Station	-	2	-
Power Plant	-	5	-
Substation	-	6	-
Hazmat	-	2	1
Landfill	-	2	1
Grand Total	**-**	**370**	**81**

**Insured Assets are broken into sub categories, main assets such as Airports are attributed to their appropriate categories.*

HazMat Fixed Facilities

Earthquakes can produce hazardous materials (HazMat) threats at very high levels. Depending on the year of build and construction of each facility containing HazMat, the earthquake-initiated hazardous material release (EIHR) potential will vary. HazMat contained within masonry or concrete structures built before certain benchmark years may be particularly vulnerability.

Utilities

Linear utilities and transportation infrastructure would likely suffer considerable damage in the event of an earthquake. Due to the amount of infrastructure and sensitivity of utility data, linear utilities are difficult to analyze without further investigating individual system components. Table 4-23 provides best available linear utility data; it should be assumed that these systems are exposed to breakage and failure.

Table 4-23: Lifeline Exposure USGS 50-YR Probabilistic Shake Intensities (Uninc. Co.)

Linear Asset (miles) - Earthquake Probability (PHSA)			
Infrastructure Type (Linear)	IX - Violent	VIII - Severe	VII - Very Strong
Levee	1.94	100.93	-
Levee Centerline	-	-	-
Levee Flood Wall	-	-	-
NG Pipeline	-	39.99	1.80
Railroad	-	22.61	-
Street	1.53	543.74	190.42
4WD trail	-	-	0.62
Alley	-	-	-
Cul-de-sac	-	0.61	0.15
Driveway	-	22.56	8.46
Interstate	-	4.54	-
Local road	0.42	37.83	40.96
Local road, major	-	258.30	85.16
Primary highway	-	34.44	9.31
Ramp	-	1.82	0.05
Road, parking area	-	0.95	-
Service road	-	0.10	-
State/county highway	1.08	181.05	43.73
Thoroughfare, major	0.04	1.53	1.98
Traffic circle	-	-	-
Transmission Line	2.10	62.75	41.38
Grand Total	**5.57**	**770.03**	**233.60**

Water Supply Utilities

Water availability and distribution for supporting life and treating the sick and the injured are of major concern to Napa County. The three reservoirs in Napa are on solid ground and are expected to be usable after a major earthquake, but Lake Hennessey may be inaccessible due to damage to the pipelines that distribute potable water. Napa is connected to the State Water Project at Jameson Canyon and has a tertiary source in Milliken Dam water treatment facility. Any one of these three facilities remaining in operation is able to supply the emergency potable water needs to the City of Napa and its immediately contiguous County areas, if the distribution system can be repaired.

There are three water reservoirs within the City of Napa that have all been recently retrograded and covered, and one reservoir in the City of St Helena. If the reservoirs and water tanks remain intact, they will likely provide ample potable water to meet demands during the time the water treatment stations are being repaired. However, water tanks in some participating jurisdictions have low survivability; potable water will most likely have to be supplied.

Natural Gas Utilities

Several common characteristics of earthquakes and their impacts on natural gas safety are:

- Earthquake ground shaking will generally lead to substantially more instances of building damage than fire ignitions.
- Ground motions that are sufficient enough to damage buildings are the most likely to impact utility and customer gas systems and create a potential for gas-related fire ignitions.
- The number of post-earthquake fire ignitions related to natural gas can be expected to be 20% to 50% of the total post-earthquake fire ignitions.
- The consequences of post-earthquake fire ignitions for residential gas customers are largely financial. A fire ignition only becomes a life safety concern when inhabitants are unable to exit the building following earthquakes. Experience in past earthquakes indicates that egress from earthquake damaged single-family homes is generally possible because of the limited structure height, low numbers of occupants, and multiple direct escape paths through doors and windows.
- The potential life safety dangers from post-earthquake fires are considerably more serious in seismically vulnerable apartment or condominium buildings since they provide a greater chance for damaging the structure and trapping the occupants.

Pacific Gas and Electric Company (PG&E), Napa County's natural gas utility, is responsible for designing, constructing, maintaining, and operating the natural gas system safely and efficiently. This includes all the facilities used in the delivery of gas to any customer up to and including the point of delivery to the customers' gas piping system.

Gas customers and Napa County residents are responsible for using gas safely on their property and within their buildings and other facilities. Customers meet this responsibility by maintaining their gas appliances in good working condition, assuring that only qualified individuals are engaged to modify or maintain their gas service and facility piping, and knowing what to do before and after earthquakes to maintain the safe operation of their natural gas service.

The following conditions, when combined, pose the greatest risk for post-earthquake fire damage:

1. Buildings are unoccupied and individuals are not present to mitigate damage to gas systems or control small fires.
2. High building density or dense, fire-prone vegetation.
3. High wind and low humidity weather conditions.
4. Damage to water systems that severely limits firefighting capabilities.
5. Reduced responsiveness of firefighting resulting from impaired communications, numerous requests for assistance, direct damage to fire stations, restricted access because of traffic congestion and damaged roadways, and delays in mutual aid from neighboring fire districts.

Telecommunication

Telecommunication systems will be affected by system failure, overloads, loss of electrical power and possible failure of some alternate power systems. Immediately following an event, numerous failures will occur, compounded by system use overloads. This will likely disable up to 80% of the telephone system for one day. County UHF/VHF and microwave radio systems are expected to operate at 40% effectiveness the first 12 hours following an earthquake, increase to 50% for the second 12 hours then begin to slowly decline to approximately 40% within 36 hours.

Microwaves systems will likely be 30% or less effective following a major earthquake. Damage to natural gas facilities serving the Napa communities will consist primarily of isolated breaks in major transmission lines. Breaks in mains and individual service connections within the distribution system will be significant, particularly near the fault zones, especially in the cities of American Canyon and Napa. These many leaks pose a fire threat in these susceptible areas of intense ground shaking and/or poor ground near the shoreline. Breaks in the system will affect large portions of the County and restoration of natural gas service could be significantly delayed.

Public Schools

The Field Act was enacted on April 10, 1933, one month after the Long Beach Earthquake in which many schools were destroyed or suffered major damage. Public school construction has been governed by the Field Act since 1933 and enforced by the Division of the State Architect. In any community, public schools

constructed under the Field Act after 1978 are likely to be among the safest buildings in which to experience a major earthquake. The Field Act requires:

- School building construction plans to be prepared by qualified California licensed structural engineers and architects;
- Designs and plans to be checked by the Division of the State Architect (DSA) for compliance with the Field Act before a contract for construction can be awarded;
- Qualified inspectors, independent of the contractors and hired by the school districts, to continuously inspect construction and verify full compliance with plans;
- The responsible architects and/or structural engineers to observe the construction periodically and prepare changes to plans (if needed) subject to approval by DSA;
- Architects, engineers, inspectors and contractors to file reports, under penalty of perjury, to verify compliance of the construction with the approved plans emphasizing the importance of testing and inspections to achieve seismically safe construction. Any person who violates the provisions or makes any false statement in any verification report or affidavit required pursuant to the Act, is guilty of a felony.

Private schools are not subject to the Field Act and fall solely under the jurisdiction of the local building departments and their requirements. Private schools are covered under the Private Schools Building Act of 1986, with the legislative intent that children attending private schools be afforded life safety protection similar to that of children attending public schools.

In the late 1960s (Section 15516, Appendix X, Education Code, 1968) regulations were put in place to have pre-Field Act (1933) buildings retrofitted, removed from school use or demolished. The Field Act also prohibits use of unreinforced masonry buildings as school buildings. Seismic building standards in general were greatly strengthened after significant damage to buildings was observed, especially in the 1971 San Fernando earthquake. The Field Act regulations in place since 1978 are considered adequate for most public school buildings in most cases.

Transportation

Significant damage is expected on the road systems with Napa County following an earthquake. State Highway 12 is expected to be impassable from Cordelia to the Highway 29 Intersection. Interstate 80 could suffer severe surface distortion in the Fairfield and Vacaville areas, as well as damage to its numerous bridges and viaducts in the greater Bay Area. Highway 128 is subject to landslides both up valley toward Geyserville and in the hills around Lake Berryessa. Highway 29 leaving the County to the north is subject to landslides and debris flows to the south where it crosses over old bay mud and fills areas and is subject to soil liquefaction and surface distortion. Any combination of failures of these main highways could isolate the County for up to 72 hours with complete road restoration taking perhaps several weeks. Vehicular traffic will be limited on the foothill roads due to potential and actual landslides. (Napa County Operational Area Hazard Mitigation Plan 2013 Update, 2013)

Soil liquefaction problems could cause the closure of several roads in American Canyon and areas of other cities built on unconsolidated river soils. (Napa County Operational Area Hazard Mitigation Plan 2013 Update, 2013).

4.5.2.8.2 Damage Estimation

Table 4-29 shows the results for parcel damage potentials and average economic loss for each building category type for the County Unincorporated Parcels.

HAZUS Earthquake damage data was generated using a Level 2 HAZUS-MH 4.2 analysis. HAZUS is a FEMA software product that uses a GIS to analyze multiple factors influencing earthquake damage estimates including peak ground velocity (PGV), peak ground acceleration (PGA) and soil of a given scenario and geographic area. Once the location and size of a hypothetical earthquake is identified, HAZUS-MH software estimates the intensity of the ground shaking, the number of buildings damaged, the number of casualties, the damage to transportation systems and utilities, the number of people displaced from their homes, and the estimated cost of repair and clean up.

The parcel data defined in Section 4.4 was imported into HAZUS as User Defined Facilities (UDF) serving as the basis for replacement and content cost as well as associated damage estimation and loss. The scenarios used for the Napa County HAZUS analysis was the West Napa (M 6.7).

To understand building damage, damage outputs from Hazus are categorized into slight, moderate, and extensive damage. Ranges of damage are used to provide the user with an understanding of the building's physical condition. Table 4-24 provides a physical description of each damage state. Figure 4-20 provides a snapshot of earthquake damage estimation for the Counties physical assets.

Government Owned Assets

County assessor data does not include detailed information for tax exempt structures, such as federal and local government buildings. These data were added through the development of GIS data by utilizing insurance schedule tables for each municipality's insured assets.

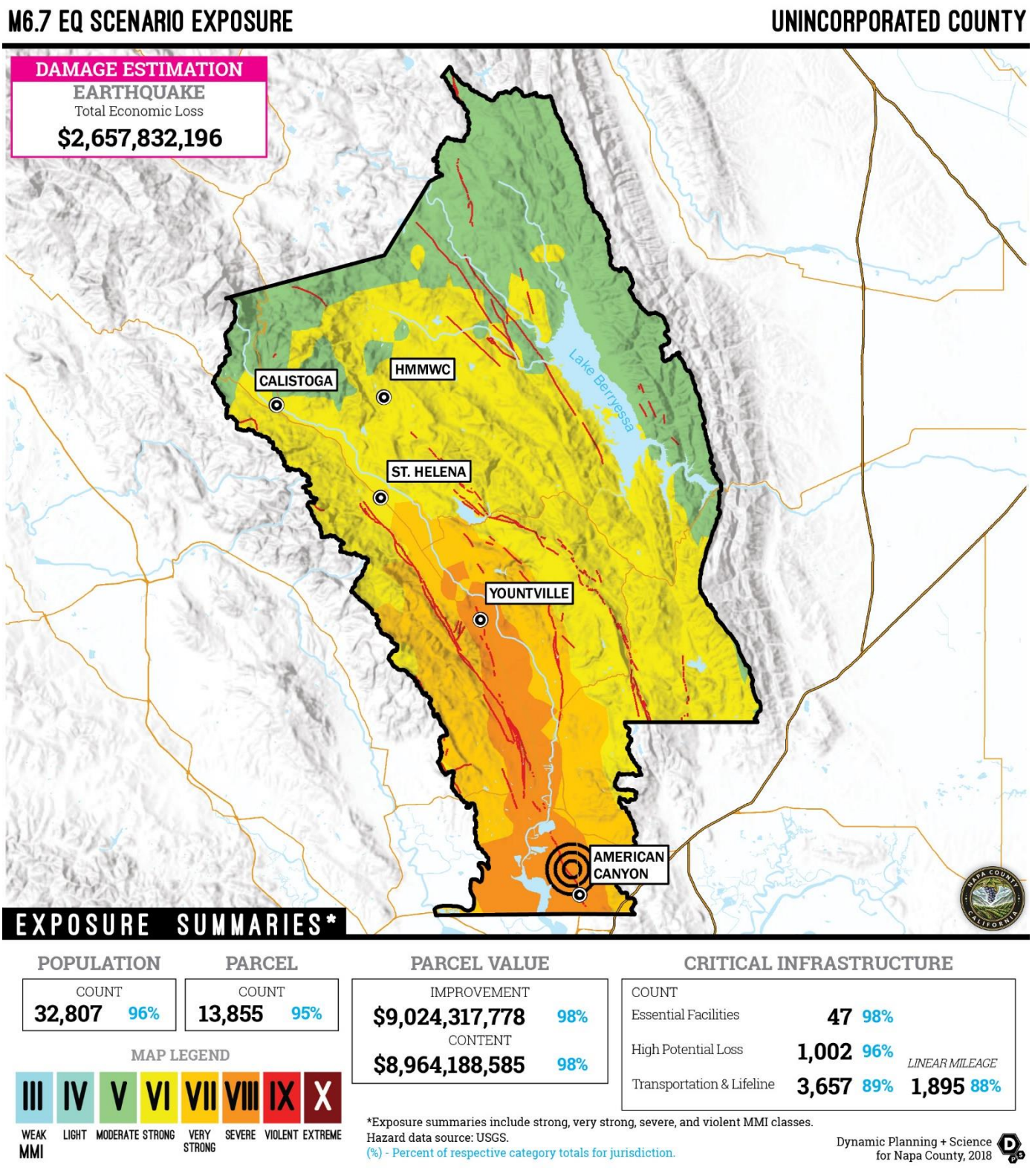


Figure 4-22: Napa County Earthquake Probability Exposure and Snapshot Map

Table 4-24: Hazus Building Damage Descriptions

Damage State	Damage Description
Slight	Small plaster cracks at corners of door and window openings and wall/ceiling intersections; small cracks in masonry chimneys and masonry veneers. Small cracks are assumed to be visible with a maximum width of less than 1/8 inch (cracks wider than 1/8 inch are referred to as "large" cracks).
Moderate	Large plaster or gypsum-board cracks at corners of door and window openings; small diagonal cracks across shear wall panels exhibited by small cracks in stucco and gypsum wall panels; large cracks in brick chimneys; toppling of tall masonry chimneys.
Extensive	Large diagonal cracks across shear wall panels or large cracks at plywood joints; permanent lateral movement of floors and roof; toppling of most brick chimneys; cracks in foundations; splitting of wood sill plates and/or slippage of structure over foundations.
Complete	Structure may have large permanent lateral displacement or be in imminent danger of collapse due to cripple wall failure or failure of the lateral load resisting system; some structures may slip and fall off the foundation; large foundation cracks. Three percent of the total area of buildings with Complete damage is expected to be collapsed, on average.

While there are several limitations to the FEMA Hazus earthquake models, it does allow for potential loss estimation for each building construction category. County wide loss estimation results are summarized by building category type in Table 4-25 and Figure 4-23 for the West Napa 6.7 magnitude earthquake scenario. It is important to understand that the Hazus loss estimation values for earthquake are categorized in exceedance values. From reviewing Table 4-25, one can infer the probability of structures exceeding extensive damage is relatively low. However, if damage were to occur, the economic loss is averaged and summarized for each building type defined in the software. Damage estimates as a result of West Napa EQ scenario are approximately $2.7 billion, or 5.2% percent of the total modeled value improvements within the County.

Important to note: Loss estimation is worst case scenario. Loss estimation does not include damage to transportation routes, infrastructure, and other public and private utilities located throughout the County. An important concept in loss data is the "probability" of damage to exceed a certain degree. It is unlikely that buildings in County would receive "extensive" damage from earthquake shaking. Residential occupancy types are more likely to receive damage than any building occupancy category.

Table 4-25: Estimated Loss Estimations for West Napa EQ Scenario M 6.7

Building Type	Average of Potential Damage to Exceed "Slight"	Average of Potential Damage to Exceed "Moderate"	Average of Potential Damage to Exceed "Extensive"	Average Economic Loss for Each Building Category	Sum of Economic Loss	Proportion of Loss (%)
Agriculture	57%	36%	15%	$ 94,788	$ 799,534,676	29%
Commercial	57%	37%	17%	$ 257,125	$ 151,703,768	6%
*Education	0%	0%	0%	$ -	$ -	0%
Emergency	54%	32%	12%	$ 1,882,755	$ 45,186,113	2%
Government	65%	45%	20%	$ 696,841	$ 89,892,530	3%
Industrial	72%	52%	27%	$ 936,928	$ 895,702,693	33%
Residential	64%	41%	17%	$ 165,446	$ 746,822,112	27%
Total					**$ 2,728,841,892**	

Note: Total Inventory Values
1 - Building Replacement Costs = $9,285,805,365
2 - Content Replacement Costs = $9,141,116,978
3 - Total Value = $18,426,922,343
**School values are not present in parcel roll (tax exempt) and Individual School districts are non-participating outside of NVC and NCOE.*

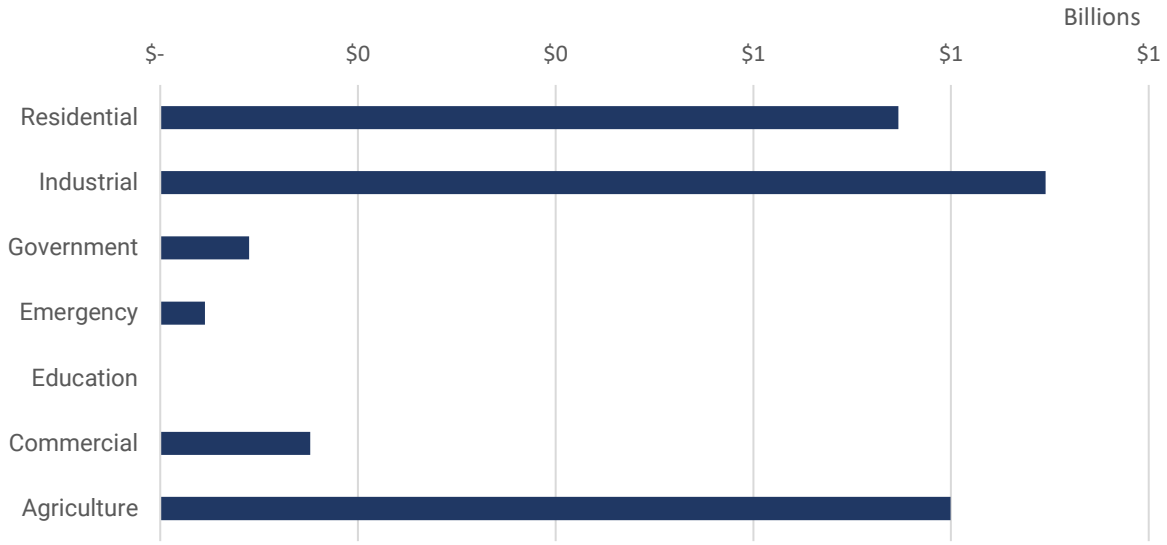


Figure 4-23: Estimated Economic Loss by Occupancy Type

4.5.2.8.3 Critical Facility Level of Damage

HAZUS-MH 4.2 was used to estimate the loss potential to county facilities exposed to the 6.7 magnitude West Napa earthquake scenario. HAZUS-MH reports the damage potential and loss potential from a given earthquake scenario in four categories: slight damage, moderate damage, extensive damage, and economic loss. Economic loss consists of estimations on the cost of repair and replacement to damaged or destroyed buildings and contents, relocation expenses, capital-related income, wage losses, and rental income losses.

County insurance data was obtained and formatted for use in HAZUS for a detailed damage estimation. This dataset has additional information including number of floors, building value, content value, and construction type that greatly enhances results from default Hazus database.

The results shown in summarizes essential facility and high potential loss facilities with county insurance holding data.

Table 4-26: Loss Estimations for West Napa EQ Scenario M 6.7

Insured Asset - West Napa Estimates	Building Replacement Value	Insured Content Value	Estimated Economic Loss
Corp Yard			
Building #3 - Maintenance, Napa Corporate Yard	$0	$50,000	$0
Fleet Maintainence, Corporation Yard	$0	$1,242,127	$1
Office/Storage Building, Calistoga Corporate Yard	$214,340	$33,610	$78,695
Equipment Port, Calistoga Corporate Yard	$64,874	$67,221	$23,818
Office/Storage Building, Yountville Corporate Yard	$302,730	$67,221	$46,790
Metal Shed, Yountville Corporate Yard	$275,535	$33,610	$42,587
Weights And Measures Building, Yountville Corporate Yard	$139,685	$95,456	$40,602
Storage Shed, Yountville Corporate Yard	$112,167	$168,053	$29,200
Ag Block Building, Yountville Corporate Yard	$84,760	$20,166	$24,637
Fuel Island, Yountville Corporate Yard	$180,636	$336,108	$27,919
Water Pump Building, Yountville Corporate Yard	$6,500	$12,099	$1,889
Metal Container, Yountville Corporate Yard	$10,969	$13,444	$1,695
Office/Storage, Spanish Flat Corporate Yard	$119,653	$89,353	$3,824
Fuel Island, Spanish Flat Corporate Yard	$156,003	$15,496	$4,986
Metal Storage Building, Spanish Flat Corporate Yard	$69,048	$63,599	$2,415
Fire			
Carnaros/Ed Is VFD, Carneros/Ed Is VFD	$240,429	$73,945	$39,204
American Canyon Fire Dept	$5,156	$17,298	$1,418
Fire Station, Greenwood Ranch Fire Station	$1,741,060	$176,281	$559,681
Storage Shed, Greenwood Ranch Fire Station	$12,887	$5,303	$6,379

Insured Asset - West Napa Estimates	Building Replacement Value	Insured Content Value	Estimated Economic Loss
Carneros/Ed Is VFD	$80,996	$4,029	$39,652
City Of Napa Fire Dept, Napa Fire Dept	$6,058	$10,034	$1,447
Gordon Valley VFD	$411,459	$59,153	$16,142
Cdf/Cofire, Napa Station	$0	$103,329	$0
Station A, Dry Creek-Lokoya VFD	$72,255	$0	$10,576
Fire Station 12, Yountville Fire Station/Sheriff Office	$1,873,280	$272,122	$691,634
Dry Creek-Lokoya VFD	$238,607	$100,830	$48,342
Soda Canyon VFD	$135,150	$88,733	$14,612
Fire Department, Capell Valley VFD	$125,131	$80,664	$5,691
Rutherford VFD	$240,378	$44,071	$21,245
Volunteer Fire Dept, Rutherford VFD Satellite Bldg	$274,829	$50,393	$63,843
Capell Valley Fire Station - Station 214	$471,780	$55,388	$16,526
Deer Park VFD	$354,427	$58,611	$31,668
Napa County Fire/Calif Dept Of Forestry, Napa Fire Dept/Ca Dept Of Forestry	$5,156	$10,034	$194
Angwin VFD	$640,690	$123,396	$19,740
Storage, Angwin VFD	$137,289	$26,431	$4,230
Pope Valley VFD	$475,462	$73,945	$13,218
Pope Valley Fire Station - Station 222	$471,780	$55,388	$10,846
Health Care			
H&Hs - Clinic Ole, Community Health Clinic Ole	$0	$3,728	$0
Contents - Leased Location, Mental Health	$0	$398,093	$1
Building A - Fiscal Operations, Health And Human Services	$685,906	$138,091	$163,788
Building B - Administration, Health And Human Services	$1,285,840	$270,088	$417,152
Building C - Office/Classroom, Health And Human Services	$651,950	$130,661	$155,679
Building D - Adult Services, Health And Human Services	$1,155,650	$254,453	$374,916
Building E - Adult Services, Health And Human Services	$445,695	$86,307	$106,428
Building F - Next Step, Health And Human Services	$566,492	$116,770	$135,273
Health And Human Services, Building "G"/Public Health Dept"	$1,480,410	$605,867	$480,275
Health And Human Services, Building "H"/Childen'S Protective Services"	$1,503,790	$496,195	$487,860
Health And Human Services, Building "J"/Recovery Alcohol & Drug Services"	$347,731	$142,093	$83,035
Health And Human Services, Building K - Office Building	$3,340,390	$831,797	$1,665,118
Maintenance Building, Health And Human Services	$45,365	$21,199	$10,833
Office, Health & Human Services Campus	$0	$152,832	$0
H&Hs - Hope Center, Community Action Napa Valley (Canv)	$0	$11,760	$0
Contents - Leased Location, Hhs - Community House	$0	$67,540	$0

Insured Asset - West Napa Estimates	Building Replacement Value	Insured Content Value	Estimated Economic Loss
H&Hs - Clinic Ole, Nv Vintners (Jhl)	$0	$9,792	$0
Lot			
Napa Valley Community Housing, 1.21 Acre Land	$1,603,970	$0	$870,202
Vacant, 0.27 Acres Unit 323 - Lb Estates Unit No. 2	$98,025	$0	$1,889
Misc			
Ag Comm - Gwss, F&F Soscol	$0	$76,479	$0
Ag Comm - Us Coop, F&F Soscol	$0	$377,313	$0
Contents - Leased Location, Property-Records Management	$0	$199,803	$0
Lafco, Robert Louis Stevenson Association	$0	$50,850	$0
Leased Printers And Copiers Throughout County, Leased Copiers And Printers	$0	$990,621	$0
Two Leased Portables	$143,727	$0	$24,957
Office			
Offices, Carithers Building	$10,820,700	$2,089,930	$5,870,555
Administration Building	$12,481,400	$2,938,960	$7,445,280
Offices Some Leased To Others, Imperial Way Offices-Information Technology	$3,118,910	$530,438	$1,394,933
Offices Some Leased To Others, County Offices- Health & Human Services	$0	$408,904	$0
Offices Some Leased To Others, County Offices	$0	$13,444	$0
Parking Garage			
Fifth Street Parking Garage	$18,740,900	$0	$10,525,452
Residence			
Trailers, Ge - Landlord	$251,816	$347,249	$60,131
Residential, Solano Ave. Adult Resource Center	$506,327	$0	$124,349
Residential, Residential Treatment	$607,664	$0	$168,912
Library			
Contents - Leased Location, American Canyon Library	$0	$936,604	$0
Library, Main Library	$8,620,270	$7,312,960	$5,427,322
Leased Space, Town Of Yountville Library	$0	$197,952	$0
Library, Calistoga Library	$478,137	$294,987	$12,513
Equipment			
Replacement Cost, Vehicles	$0	$0	$1
Replacement Cost, Contractor'S Equipment	$0	$0	$0
Airport			
2000 Airport Rd.	$19,812,400	$0	$12,466,557
Terminal Building, Airport Terminal	$2,093,890	$219,503	$1,251,979
Hangar			

Insured Asset - West Napa Estimates	Building Replacement Value	Insured Content Value	Estimated Economic Loss
Hangar, "T" Hangar 7-12"	$230,802	$0	$96,909
Hangar, "T" Hangar 13-24"	$488,807	$0	$325,501
Hangar, "T" Hangar 25-36"	$546,039	$0	$363,613
Hangar, "T" Hangar 37-44"	$476,723	$0	$317,455
Hangar, "T" Hangar 45-54"	$702,863	$0	$468,044
Hangar, Hangar 55	$174,437	$0	$116,159
Hangar, "T" Hangar 60-83"	$1,088,860	$0	$725,083
Hangar, "T" Hangar 84-93"	$571,712	$0	$380,709
Hangar, "T" Hangar 94-104"	$617,422	$0	$411,148
Hangar, "T" Hangar 105-127"	$1,088,860	$0	$725,083
Hangar, Hangar C1-C8	$1,055,150	$0	$702,635
Hangar, Silverado Hangar	$898,965	$0	$598,630
Police			
Offices And Storage, Sheriff Facility	$19,824,200	$3,088,340	$9,812,583
Jail, Juvenile Justice Center	$22,691,800	$635,038	$12,291,467
Exercise Yard, Juvenile Justice Center	$1,185,400	$0	$283,062
Jail, Hall Of Justice	$34,098,900	$6,418,610	$21,468,668
Sheriff Department Leased Vehicles	$0	$0	$1
Boat Launch			
Boat Launch, Cuttings Wharf Boat Launch	$358,331	$0	$207,205
Gazebo, Cuttings Wharf Boat Launch	$14,500	$0	$2,811
Storage			
Elections - Storage, Napa Livermore Properties (Jhl)	$0	$82,144	$0
Storage Building And Fuel Valet, Storage Building	$12,613	$4,407	$3,483
Lab			
Building 2, Mylan/Dey Labs Site	$10,181,400	$48,333	$4,488,878
Warehouse Space, Mylan/Dey Lab Site	$5,436,780	$0	$2,397,022
Building 4, Mylan/Dey Lab Site	$6,966,230	$33,511	$3,071,341
Building 1, Mylan/Dey Labs Site	$15,975,400	$37,055	$8,474,630
Homeless Shelter			
Shelter, Homeless Shelter	$4,444,000	$225,276	$2,827,540
Animal Shelter			
Kennels, Animal Shelter	$3,012,520	$111,988	$1,726,777
Child Care			
Child Care Center, Health And Human Services	$802,845	$189,161	$191,711
Communication Tower			

Insured Asset - West Napa Estimates	Building Replacement Value	Insured Content Value	Estimated Economic Loss
Radio Tower	$87,033	$239,107	$24,663
Generator Building, Radio Tower	$18,062	$21,174	$2,754
Communications Center, Mt. Vaca Communications Center	$10,788	$41,004	$719
Communications Tower, Berryesa Peak	$0	$106,747	$0
Historic			
Courhouse, Historic Courthouse	$13,287,400	$0	$8,365,747
Flood Control District			
Flood Control Dist	$0	$276,093	$0
River Ranch Center			
Apartments, River Ranch Center	$504,891	$0	$198,160
Dorm, River Ranch Center	$1,567,176	$0	$615,085
Cafeteria, River Ranch Center	$1,028,000	$0	$403,469
Well Pump House Tanks, River Ranch Center	$86,978	$0	$34,137
Mondavi Center			
Manager'S Dwelling, Mondavi Center	$211,283	$0	$40,019
Dormitory-Dining Hall, Mondavi Center	$1,940,350	$0	$752,177
Pump Hse Tanks, Mondavi Center	$69,999	$0	$39,453
Cemetery			
Cemetery, Monticello Cemetery	$30,101	$0	$2,251
Calistoga Center			
Cafeteria, Calistoga Center	$360,268	$0	$24,732
Caretakers House, Calistoga Center	$602,570	$0	$19,144
Dormitories, Calistoga Center	$636,163	$0	$20,211
Storage, Calistoga Center	$5,616	$0	$178
Fair			
Grandstand #1, County Fairgrounds	$1,061,760	$246,726	$39,604
Grandstand #2, County Fairgrounds	$1,034,560	$0	$38,589
Pavilion Building, County Fairgrounds	$754,140	$0	$40,188
Tubbs/ Fairgrnds, Office/Exhibit Hall	$2,872,840	$0	$153,094
New Maintenance Building, County Fairgrounds	$475,305	$0	$17,729
Main Building (Cropp), County Fairgrounds	$246,322	$0	$9,188
Ticket Booth, County Fairgrounds	$14,865	$0	$389
Ticket Booth And Concession, County Fairgrounds	$89,903	$0	$2,353
Restroom #1 - Grandstand, County Fairgrounds	$95,243	$0	$2,493
Restroom #2 - Grandstand, County Fairgrounds	$95,243	$0	$2,493
Rental Office, County Fairgrounds	$199,552	$0	$5,222

Insured Asset - West Napa Estimates	Building Replacement Value	Insured Content Value	Estimated Economic Loss
Floodlights, County Fairgrounds	$197,056	$0	$5,157
Pro Shop, County Fairgrounds	$456,010	$0	$11,934
Livestock Bldgg/Arena, County Fairgrounds	$492,645	$217,439	$15,701
Old Dwelling, County Fairgrounds	$134,503	$0	$3,520
1991 Dwelling, County Fairgrounds	$248,351	$0	$6,499
Livestock Office, County Fairgrounds	$168,566	$0	$8,983
Racetrack Concession/Restroom, County Fairgrounds	$117,866	$0	$6,281
Fiesta Center, County Fairgrounds	$67,314	$0	$2,511
Rv Park Restroom, County Fairgrounds	$118,718	$0	$6,326
Rv Park Pavilion, County Fairgrounds	$23,964	$0	$894
Grand Total	**$262,995,477**	**$36,542,357**	**$135,070,927**

4.5.2.9 Future Trends in Development

Land use in the planning area will be directed by general plans adopted under California's General Planning Law. The safety elements of the general plans establish standards and plans for the protection of the community from hazards. The information in this plan provides the participating partners a tool to ensure that there is no increase in exposure in areas of high seismic risk. Development in the planning area will be regulated through building standards and performance measures so that the degree of risk will be reduced. The geologic hazard portions of the planning area are heavily regulated under California's General Planning Law. The International Building Code establishes provisions to address seismic risk.

4.5.2.10 Earthquake Hazard Problem Statements:

As part of the mitigation action identification process, the Planning Committee for each jurisdiction identified issues and weaknesses (aka problem statements) for their respective facilities based on the risk assessment and vulnerability analysis, utilizing the RAMP mapping tool and earthquake data. Earthquake problem statements for all participating jurisdictions are listed in Table 4-27.

Identifying these common issues and weaknesses assists the Planning Committee in understanding the realm of resources needed for mitigation. The goal is to have at least one mitigation action for every problem statement. See Table 5-6 for a full list of mitigation actions and the corresponding problem statements that they address. Each problem statement is coded with a problem number for cross-referencing between Table 4-27 and Table 5-6.

Table 4-27 Earthquake Problem Statements

Problem No.	Area of Concern	Mitigation Alternatives	Primary	Problem Description	Related MA
EQ-14	Victim	PE&A - Public Education & Awareness	**American Canyon**	Approx. 18,000 people live in a severe earthquake probability zone in American Canyon.	**AC-05-2013**
EQ-15	Victim	SP - Structural Projects , PRV - Prevention , PE&A - Public Education & Awareness	**American Canyon**	Approx. 6,691 parcels (almost $2 billion in content value) within American Canyon are in a severe earthquake probability zone.	**AC-05-2013**
EQ-16	Victim	SP - Structural Projects , PRV - Prevention , PE&A - Public Education & Awareness	**American Canyon**	79 critical infrastructure features (including 15 adult residential facilities and 12 family child care homes) are located in a severe earthquake probability zone in American Canyon.	**AC-05-2013**
EQ-24	Threat	SP - Structural Projects , PRV - Prevention , PPRO - Property Protection	**American Canyon**	Water distribution system (mains, etc.) in American Canyon is vulnerable to a severe earthquake.	**AC-06-2020**
EQ-25	Threat	SP - Structural Projects , PRV - Prevention , PPRO - Property Protection	**American Canyon**	Other public utilities (gas mains etc.), including major gas supply pipelines are present throughout American Canyon and are vulnerable to a severe earthquake.	**AC-06-2020**
EQ-11	Victim	PPRO - Property Protection , ES - Emergency Services & PE&A - Public Education & Awareness	**Calistoga**	Approx. 5,000 people live in an area with server earthquake probability within the City of Calistoga.	**CL-12-2020, CL-13-2020**
EQ-12	Victim	PPRO - Property Protection , ES - Emergency Services & PE&A - Public Education & Awareness	**Calistoga**	There are 90 Critical Infrastructure Facilities that are susceptible to a severe earthquake within the City of Calistoga.	**CL-12-2020**
EQ-26	Impact	PRV - Prevention , PPRO - Property Protection , PE&A - Public Education & Awareness , SP - Structural Projects	**Calistoga**	The City of Calistoga's water supply and other infrastructure could be critically impacted by a major earthquake.	**CL-12-2020**
EQ-27	Threat	PRV - Prevention , PPRO - Property Protection , PE&A - Public Education & Awareness , SP - Structural Projects	**Calistoga**	A major earthquake poses a significant threat to the City of Calistoga and its surroundings.	**CL-13-2020**

Problem No.	Area of Concern	Mitigation Alternatives	Primary	Problem Description	Related MA
EQ-01	Threat	SP - Structural Projects	**County Unincorporated**	Public Safety buildings/ infrastructure need to be retrofitted to withstand earthquakes.	**NC-09-2013, NC-52-2020**
EQ-02	Threat	PPRO - Property Protection , SP - Structural Projects	**County Unincorporated**	The 2014 South Napa earthquake highlighted the vulnerability of water and wastewater systems to earthquake-related ground failure, the additional fire hazards that earthquake-related water-system failures can pose, and the fiscal challenges that public agencies face in improving the seismic resiliency of these systems, both pre- and post-earthquake.	**NC-52-2020**
EQ-03	Victim	PPRO - Property Protection , PE&A - Public Education & Awareness	**County Unincorporated**	Retrofitting was not a well-understood concept for all but the most construction-savvy homeowners. A specific aspect of homeowner confusion about retrofitting is the type of retrofit work that has been done and what sorts of damage each kind of retrofit work is likely to prevent. Homeowners had a spectrum of views about retrofitting, starting with broad general positive feelings but split opinions on whether or not a retrofit would be helpful or worth it.	**NC-10-2013, NC-51-2020**
EQ-04	Victim	PPRO - Property Protection , PE&A - Public Education & Awareness	**County Unincorporated**	There are many perceived difficulties with earthquake insurance, most notably: Lack of affordability; Unattractive terms (i.e., deductibles too high, premiums too high); Beliefs that it wouldn't cover the types and levels of losses they are likely to experience or would only pay off for the most extreme levels of damage. Evidence in this study points to owners having generally low levels of knowledge about earthquake insurance and the many kinds of options now available.	**NC-10-2013**
EQ-05	Impact	PRV - Prevention , PE&A - Public Education & Awareness , ES - Emergency Services	**County Unincorporated**	The South Napa earthquake identified some critical gaps in mapping coverage and guidance that affected the abilities of city, county, and State agencies to identify and map seismic hazard zones and mitigate seismic hazards to protect public health and safety in accordance with the provisions of the Seismic Hazard Mapping Act of 1990.	**NC-52-2020**

Problem No.	Area of Concern	Mitigation Alternatives	Primary	Problem Description	Related MA
EQ-06	Threat	PRV - Prevention , PE&A - Public Education & Awareness , ES - Emergency Services	**County Unincorporated**	The South Napa earthquake highlighted the vulnerability of natural gas transmission and distributions systems to earthquake-related ground failure.	**NC-52-2020**
EQ-07	Impact	PPRO - Property Protection , PE&A - Public Education & Awareness	**County Unincorporated**	Deaths and injuries sustained in the South Napa earthquake point to continuing gaps in public awareness and education on earthquake safety and preparedness.	**NC-09-2013, NC-10-2013, NC-51-2020**
EQ-08	Impact	PPRO - Property Protection , PE&A - Public Education & Awareness	**County Unincorporated**	The 2014 South Napa earthquake highlighted significant gaps in earthquake insurance coverage for both homeowners and businesses, and the need to improve both the affordability and terms of insurance coverage and plan for housing and business recovery funding needs ahead of a major urban earthquake in the state.	**NC-10-2013, NC-51-2020**
EQ-09	Impact	ES - Emergency Services , SP - Structural Projects , PRV - Prevention	**County Unincorporated**	The 2014 earthquake highlighted significant gaps in contingency planning at many key government and critical facility operations.	**NC-09-2013, NC-52-2020**
EQ-10	Impact	ES - Emergency Services , SP - Structural Projects , PRV - Prevention	**County Unincorporated**	More pre-disaster planning and training for post-disaster recovery is needed at both the State and local levels.	**NC-52-2020, NC-54-2020**
EQ-22	Threat	ES - Emergency Services , SP - Structural Projects	**County Unincorporated**	Earthquakes can damage fire mitigation infrastructure.	**NC-52-2020**
EQ-23	Threat	SP - Structural Projects , PRV - Prevention , PPRO - Property Protection , ES - Emergency Services	**County Unincorporated**	Communication infrastructure on Oat Hill is at risk to a severe earthquake event (communication building, repeaters, communication equipment). Communication infrastructure is for county-wide use, Law, Fire & Public Works and could impact greater communication system.	**NC-09-2013**
EQ-50	Impact	PPRO - Property Protection	**Howell Mountain MWC**	Infrastructure failure due to significant earthquake damage such as damage to pipelines, treatment plants, and storage tanks.	**HM-01-2020**
EQ-51	Impact	PRV - Prevention , PE&A - Public Education &	**Howell Mountain MWC**	Dam stability could be impacted by a severe earthquake.	**HM-01-2020, HM-07-2020**

Problem No.	Area of Concern	Mitigation Alternatives	Primary	Problem Description	Related MA
		Awareness , SP - Structural Projects			
EQ-52	Impact	PRV - Prevention , ES - Emergency Services	**Howell Mountain MWC**	Access roads to water treatment plant facility could be impacted by a severe earthquake.	**HM-05-2020**
EQ-53	Impact	PRV - Prevention , ES - Emergency Services	**Howell Mountain MWC**	Cell phone towers could be damaged or knocked out completely due to a severe earthquake.	**HM-02-2020**
EQ-54	Victim	PE&A - Public Education & Awareness	**Howell Mountain MWC**	There are 400 HMMWC customers who could be impacted by a severe earthquake.	**HM-01-2020**
EQ-55	Threat	PRV - Prevention , PPRO - Property Protection , PE&A - Public Education & Awareness	**Howell Mountain MWC**	HMMWC customers could be cut off from water supplies or not have access to properly treated water.	**HM-06-2020**
EQ-56	Threat	PRV - Prevention , PE&A - Public Education & Awareness	**Howell Mountain MWC**	A severe earthquake could cause dam failure which may result in loss of life and property.	**HM-06-2020**
EQ-57	Threat	PRV - Prevention , PPRO - Property Protection , PE&A - Public Education & Awareness	**Howell Mountain MWC**	Facility operators may not have access to operate facilities due to potential access issues caused by a severe earthquake.	**HM-07-2020**
EQ-58	Threat	PRV - Prevention , PE&A - Public Education & Awareness , ES - Emergency Services	**Howell Mountain MWC**	Warning signals/alarms from the treatment plant will not function if there is no cell phone service due to a severe earthquake.	**HM-02-2020, HM-05-2020**
EQ-20	Threat	SP - Structural Projects , PE&A - Public Education & Awareness	**Napa COE**	The County Office Main Building is in a severe earthquake hazard zone.	**NCOE-02-2020**
EQ-21	Threat	PE&A - Public Education & Awareness	**Napa Valley College**	Some buildings were constructed in the 1960s. Lower tier of campus has potentially different soil.	**NVC-05-2013, NVC-02-2020**
EQ-28	Impact	PRV - Prevention , PPRO - Property Protection , PE&A - Public Education & Awareness , SP - Structural Projects	**Napa Valley College**	Napa Valley College could potentially be impacted by casualties, property damage, business interruption, financial Loss, and environmental contamination by a major earthquake.	**NVC-05-2013, NVC-02-2020**
EQ-29	Victim	PE&A - Public Education & Awareness , ES - Emergency Services	**Napa Valley College**	Napa Valley College has a population that is vulnerable to earthquakes (Students and Staff, Community Visitors). Current staff is 186 and current enrollment is 6,348	**NVC-02-2020, NVC-05-2013**

Problem No.	Area of Concern	Mitigation Alternatives	Primary	Problem Description	Related MA
				(https://www.communitycollegereview.com/napa-valley-college-profile).	
EQ-30	Threat	SP - Structural Projects , PRV - Prevention , PPRO - Property Protection , ES - Emergency Services	**Napa Valley College**	Building codes related to earthquake risk might be outdated or need updating.	**NC-54-2020, NVC-04-2020**
EQ-13	Victim	PPRO - Property Protection , ES - Emergency Services & PE&A - Public Education & Awareness	**St. Helena**	Approx. 5,000 people live in an area with server earthquake probability within the City of St. Helena.	**SH-14-2020**
EQ-32	Impact	PPRO - Property Protection , ES - Emergency Services	**St. Helena**	Damaged / Destroyed structures. Displaced residents needing shelter, food and water. Businesses unable to open; economic impact to business and employees. Tourism impacted.	**SH-14-2020**
EQ-33	Impact	ES - Emergency Services	**St. Helena**	Traffic congestion: Civilians leaving area create traffic jams on all roads. Local bridge failure.	**SH-06-2020**
EQ-34	Impact	PE&A - Public Education & Awareness	**St. Helena**	Looting: Evacuated areas subject to looting.	**SH-06-2020**
EQ-35	Impact	ES - Emergency Services	**St. Helena**	Public safety and city staff; Work long hours, strain on family. Homes may be threatened or destroyed.	**SH-12-2020**
EQ-37	Impact	PPRO - Property Protection , ES - Emergency Services	**St. Helena**	Power outages caused by earthquake.	**SH-07-2020**
EQ-38	Impact	PE&A - Public Education & Awareness	**St. Helena**	Seniors in Vineyard Valley, Woodbridge Village, and Silverado Orchards.	**SH-14-2020**
EQ-39	Impact	PE&A - Public Education & Awareness	**St. Helena**	Lack of Civilian Preparedness; 3-5 day supplies on hand.	**SH-14-2020**

4.5.3 Flood Hazard Profile

Flooding is one of the three primary hazards in California, along with earthquake and wildfire, and statewide represents the second most destructive source of hazard, vulnerability, and risk. (Cal OES, 2018, 375) Flooding a priority hazard for Napa County as well.

In Napa County, a flood occurs when the existing channel of a stream, river, canyon, or other water course cannot contain excess runoff from rainfall or snowmelt, resulting in overflow on to adjacent lands. Flooding may also occur due to high tides and wind.

Connections between a river and its floodplain are most apparent during and after major flood events. A floodplain is the area adjacent to a river, creek or lake that becomes inundated during a flood. Floodplains may be broad, as when a river crosses an extensive flat landscape, or narrow, as when a river is confined in a canyon. These areas form a complex physical and biological system that supports a variety of natural resources and provides natural flood and erosion control. When a river is separated from its floodplain with levees and other flood control facilities, its natural, built-in benefits can be lost, altered, or significantly reduced.

Flood reduction, prevention, and mitigation are a major challenge to Napa County residents and floodplain managers alike. Napa County is almost entirely contained within the Napa River Watershed. Many areas of Napa County are at risk of flooding, especially low-lying properties near the Napa River and its feeder streams, as this section explores in further depth.

Floodplain Definitions

100-YR Floodplain

The boundaries of the floodplain coincide with an annual risk of 1% and are a FEMA study Product consisting of both floodway and flood fringe.

500-YR Floodplain

The boundaries of the floodplain coincide with an annual risk of 0.2% and are a FEMA study product. The 500-YR floodplain includes the 100-YR.

Floodway

This includes the channel of the tributary and the land adjacent to it. This zone needs to remain free from obstruction so the 100-YR floodplain can be conveyed downstream.

Flood Fringe

This is the remaining portion of the 100-YR floodplain (sans Floodway). This zone can be obstructed or developed if criteria are met.

Special Flood Hazard Area (SFHA)

An area having special flood, mudflow or flood-related erosion hazards and shown on a Flood Insurance Rate Map (FIRM). The SFHA is the area where the National Flood Insurance Program's (NFIP) floodplain management regulations must be enforced.

4.5.3.1 Policies, Plans, and Regulatory Environment

National Flood Insurance Program (NFIP)

The NFIP makes federally-backed flood insurance available to homeowners, renters, and business owners in participating communities. For most participating communities, FEMA has prepared a detailed Flood Insurance Study (FIS). The study presents water surface elevations for floods of various magnitudes, including the 1-percent annual chance flood (the 100-year flood) and the 0.2-percent annual chance flood (the 500-year flood).

Base flood elevations and the boundaries of the 100- and 500-year floodplains are shown on Flood Insurance Rate Maps (FIRMs), which are the principle tool for identifying the extent and location of the flood hazard. FIRMs also designate and display the floodway which is the channel of the river or stream and adjacent land that must remain free from obstruction so that the 100-year flood can be conveyed downstream. FIRMs are the most detailed and consistent data source available, and for many communities they represent the minimum area of oversight under their floodplain management program. The most recent countywide FIRM was completed August 3rd, 2016 and is a digital flood insurance rate map (DFIRM).

Participants in the NFIP must, at a minimum, regulate development in floodplain areas in accordance with NFIP criteria. Before issuing a permit to build in a floodplain, participating jurisdictions must ensure that three criteria are met:

- New buildings and those undergoing substantial improvements must, at a minimum, be elevated to protect against damage by the 100-YR flood;
- New floodplain development must not aggravate existing flood problems or increase damage to other properties; and
- New floodplain development must exercise a reasonable and prudent effort to reduce its adverse impacts on threatened salmonid species.

Napa County entered the NFIP on February 1st, 1980. Structures permitted or built in the County before then are called "pre-FIRM" structures, and structures built afterwards are called "post-FIRM." Post-FIRM properties are eligible for reduced flood insurance rates. Such structures are less vulnerable to flooding since they were constructed after regulations and codes were adopted to decrease vulnerability. Pre-FIRM properties are more vulnerable to flooding because they do not meet code or are located in hazardous areas. The insurance rate is different for the two types of structures.

All 5 incorporated cities in Napa County participate in the NFIP. The County and cities are currently in good standing with all provisions of the NFIP. Compliance is monitored by FEMA regional staff and by the California Department of Water Resources under a contract with FEMA. Maintaining compliance under the NFIP is an important component of flood risk reduction. All planning partners that participate in the NFIP have identified initiatives to maintain their compliance and good standing.

Community Rating System (CRS)

The CRS is a voluntary program within the NFIP that encourages floodplain management activities that exceed the minimum NFIP requirements. Flood insurance premiums are discounted to reflect the reduced flood risk resulting from community actions that meet the three goals of the CRS: 1) reduce flood losses, 2) facilitate accurate insurance rating, and 3) promote awareness of flood insurance.

For participating communities, flood insurance premium rates are discounted in increments of 5 percent according to the community's classification. For example, a Class 1 community would receive a 45 percent premium discount, and a Class 9 community would receive a 5 percent discount. Class 10 communities are those that do not participate in the CRS; they receive no discount. The CRS classes for local communities are based on 18 creditable activities related to public information, mapping and regulations, flood damage reduction, and flood preparedness.

CRS activities can help to save lives and reduce property damage. Communities participating in the CRS represent a significant portion of the nation's flood risk; over 66 percent of the NFIP's policy base are communities in the CRS. Communities receiving premium discounts through the CRS range from small to large and represent a broad mixture of flood risks, including both coastal and riverine flood risks. Table 4-28 lists NFIP and CRS statistics for the County, which shows 375 flood insurance claims paid since February 1, 1980 for a total of $7,127,976.

Table 4-28: Flood Insurance Statistics for Napa County

NFIP and CRS Status & Information	
Napa County	
NFIP Status	Participating since 2/1/1980
CRS Class	7
Policies in Force	604
Policies in SFHA	420
Policies in non-SFHA	184
Total Claims Paid	375
Paid Losses	$ 7,127,976
Repetitive Loss Properties	33*
Severe Repetitive Loss Properties	6
Repetitive Loss Payment by NFIP on Building	$2,578,028
Repetitive Loss Payment by NFIP on Contents	$718,251

Note: The Privacy Act of 1974 (5 U.S.C. 522a) restricts the release of certain types of data to the public. Flood insurance policy and claims data are included in the list of restricted information. FEMA can only release such data to state and local governments, and only if the data are used for floodplain management, mitigation, or research purposes. Therefore, this plan does not identify the repetitive loss properties or include claims data for any individual property.

** According to FEMA data, 4 RL properties assigned to local participating jurisdictions are in the unincorporated County.*

Napa County Flood Control and Water Conservation District

The Napa County Flood Control and Water Conservation District (NCFCWCD) was established by the California State Legislature in 1951. Napa County supported District formation to create a separate government entity responsible for developing and managing domestic water supplies and managing flood and storm waters in Napa County. The District participates in government programs and joint-use activities to augment and enhance local water supplies and obtain federal and state assistance to finance flood risk management projects.

Since its formation, NCFCWCD has developed two principal and distinct service activities: water conservation and flood control. The District's water conservation services primarily involve administering contracts with the State of California and the United States Bureau of Reclamation for annual water supply entitlements from the State Water Project and the Solano Project, respectively. As part of its administrative duties, the District subcontracts its imported water supply entitlements to cities and special districts throughout Napa County.

The District's flood management services focus on managing and coordinating projects intended to protect local communities from inundation by maintaining and clearing tributary channels and sponsoring capital improvements. This includes implementing the voter-approved "Napa River/Napa Creek Flood Protection Project," which includes projects to protect the City of Napa from a 100-year flood.

Prior to NCFCWCD's formation, organized flood control activities in Napa County were primarily the responsibilities of local jurisdictions. However, in 1938, the United States Congress passed legislation authorizing and funding the Army Corps of Engineers (USACE) to study flood-hazard waterways throughout the nation for the purpose of developing and implementing protection plans. The Napa River, on record as having severely flooded more than a dozen times, was among the subjects studied. (County, 2016)

Napa County General Plan

The 2008 Napa County General Plan includes the following goals and policies in the Safety Element to mitigate the effects of flood:

> **Goal SAF-4:** To protect residents and businesses from hazards caused by flooding.
>
> **Policy SAF-23:** New construction in flood plains shall be evaluated and placed above the established flood elevation or flood-proofed to minimize the risks of flooding and provide protection to the same level as required under County's Floodplain Management Ordinance.
>
> **Policy SAF-24:** The County recognizes that agricultural open space also serves a valuable purpose in promoting safety, and that maintaining areas subject to flooding in agricultural or open space uses minimizes the impacts of flooding on homes and businesses.

HMP submitted 08.11.2020

Policy SAF-25: The review of new proposed projects in a floodway as mapped on the County's Flood Insurance Rate Maps (FIRM)3 (Figure SAF-3) shall include an evaluation of the potential flood impacts that may result from the project. This review shall be conducted in accordance with the County's FEMA approved Flood Plain Management Ordinance, incorporated herein by reference, and at minimum include an evaluation of the project's potential to affect flood levels on the Napa River; the County shall seek to mitigate any such effects to ensure that freeboard on the Napa River in the area of the Napa River Flood Protection Project is maintained.

Policy SAF-26: Development proposals shall be reviewed with reference to the dam failure inundation maps in order to determine evacuation routes.

Policy SAF-27: Dam and levee maintenance is considered by the County to be the responsibility of the owner/operator of each dam and/or levee. The County will support other agencies in their efforts to ensure that proper maintenance and repairs are accomplished.

Flood protection for development in Napa County Code, § 16.04

The Napa County Code addresses flooding through regulation of land use activities (§ 16.04). Regulations include prohibiting land uses that could result in increases erosion and flooding; requiring flood protection at initial construction; limiting the alternation of natural floodplains and stream channels during construction; and avoiding constructing barriers that could unnaturally divert floodwaters or increase flood hazards. The regulations also include development restrictions for the protection of riparian areas.

Drainage and flood control facilities in Napa County Code, § 17.36

Napa County Code outlines requirements for drainage and flood control facilities and flood control protection for new development, based on the size of development. Drainage facilities should be designed to capture projected runoff from a storm with a frequency of one in one hundred years, and must be approved by the County before installation. Similar requirements are in place for improvement plans for flood control facilities.

4.5.3.2 Floodplain Ecosystems

Floodplains can support ecosystems that are rich in quantity and diversity of plant and animal species. A floodplain can contain 100 or even 1000 times as many species as a river. Wetting of the floodplain soil releases an immediate surge of nutrients left over from the last flood and resulting from the rapid decomposition of organic matter that has accumulated since then. Microscopic organisms thrive and larger species enter a rapid breeding cycle. Opportunistic feeders, particularly birds, move in to take advantage. The production of nutrients peaks and falls away quickly; however, the surge of new growth endures for some time. This makes floodplains particularly valuable for agriculture. Species growing in floodplains are markedly different from those that grow outside floodplains. For instance, trees in

floodplains and riparian areas tend to be very tolerant of root disturbance and very quick-growing compared to non-riparian trees.

Floodplains that are undisturbed, or have been restored to a natural state, provide many benefits to both human and natural systems. In their natural vegetative state, undisturbed floodplains provide the following benefits:

- Slows the rate at which incoming surface runoff reaches the main body of water, slowing down the impact of flood events.
- Maintains water quality by allowing surface runoff to drop sediment into the natural soil, preventing it from depositing in streams and rivers.
- Recharges groundwater. The slowing of runoff allows additional time for the runoff to recharge existing groundwater aquifers.
- Provides habitat for large and diverse populations of plants and animals.

Floodplains are often compromised by human development. Because they border water bodies, floodplains have historically been popular sites to establish settlements. Human activities tend to concentrate in floodplains because water is readily available; land is fertile and suitable for farming; transportation by water is easily accessible; and land is flatter and easier to develop. But human activity in floodplains frequently interferes with the natural function of floodplains. It can affect the distribution and timing of drainage, thereby increasing flood problems. Human development can create local flooding problems by altering or confining drainage channels. This increases flood potential in two ways: it reduces the stream's capacity to contain flows, and it increases flow rates or velocities downstream during all stages of a flood event. Human activities can interface effectively with a floodplain as long as steps are taken to mitigate the activities' adverse impacts on floodplain functions.

Many areas in Napa County that provide natural floodplain functions are designated wetlands, open space, and federal land. Figure 4-24 displays areas within the SFHA that are designated as wetlands, existing vacant land, and existing federal land in Napa County. These areas are either protected from development or would need to comply with NFIP requirements in order to be developed. In their current state, these areas prevent future flood loss and provide benefits the surrounding ecosystem.

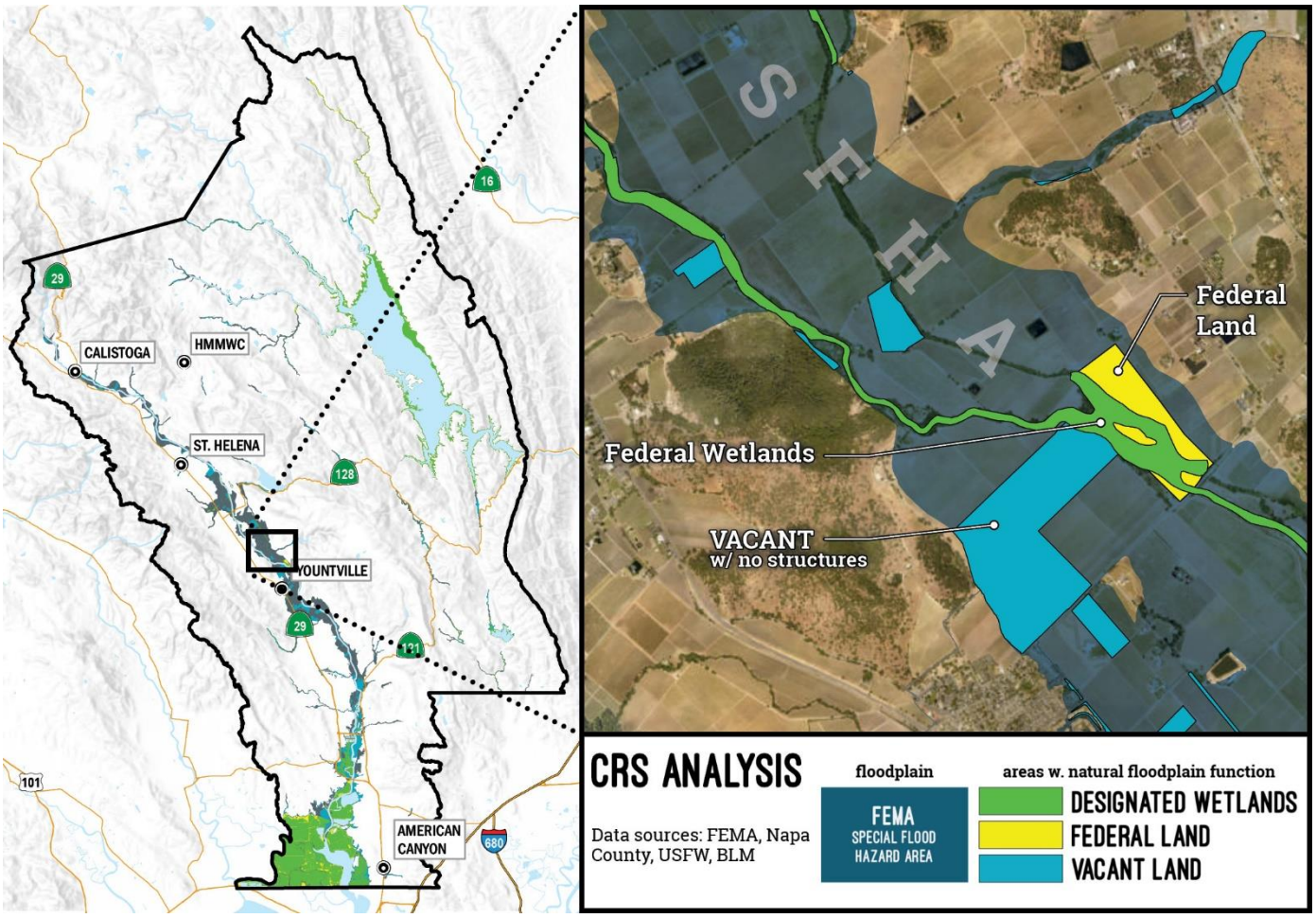


Figure 4-24 Areas Providing Natural Floodplain Functions in Napa County

4.5.3.3 Major Flood Events

Streamflow of flood-producing magnitude is the result of storms causing precipitation over the entire Napa River basin for periods in excess of approximately 12 hours. The most intense periods of rainfall typically occur in December, January and February. (FEMA, 2016) The floor of Napa Valley has been subject to frequent flooding, resulting in severe damage to agriculture and urban development.

Many damaging floods have been recorded since 1862. The most recent flood in February 1986 had an estimated recurrence interval of 50 years. All lands adjacent to the Napa River are subject to flooding. Damages throughout Napa County resulting from the 1986 flooding were estimated to be approximately $100 million. The devastating flood left 3 people dead, 27 injured, 250 homes destroyed, and another 2,500 residences damaged countywide. Other floods that have caused great damage in the Napa River watershed occurred in 1940, 1941, 1942, 1950, 1952, 1955, 1958, 1960, 1963, 1965, 1967, 1973, 1978, 1982, and 1983. Further damage-causing floods occurred in 1986, 1997, and 2005. (FEMA, 2016)

Table 4-29 shows the flood events that took place in Napa County since the year 2000. The most damaging flood event during this time period occurred on January 1st, 2006. Major flooding continued into the early hours of January 1st, before the Napa River finally fell below flood stage and the water receded. Flooding was severe in downtown City of Napa from the Napa Creek and the City and Parks Department was hit with $6 million in damage alone. The City of Napa had 600 homes with moderate damage, and 150 damaged businesses with costs of at least $70 million. (NOAA, 2019)

Table 4-29: Napa County Flood Events Since 2000

Date	Type of Event	Property Damage	Crop Damage
2/20/2017	Flood	0	0
2/9/2017	Flash Flood	0	0
2/7/2017	Flash Flood	0	0
1/10/2017	Flood/ Flash Flood	0	0
1/8/2017	Flood	0	0
1/3/2017	Flood	0	0
12/15/2016	Flood	0	0
12/6/2015	Flood	0	0
12/11/2014	Flood	$1,000	0
12/23/2012	Flood	$1,000	0
11/30/2012	Flood	$500	0
10/13/2009	Flood	$10,000	0
1/1/2006	Flood	$115,000,000	$32,500,000
12/31/2005	Flood	0	0
1/1/2004	Flash Flood	0	0
12/16/2002	Flash Flood	0	0
12/13/2002	Flash Flood	0	0

Source: NOAA Storm Events Database

4.5.3.4 Location and Exposure

Flooding in Napa County routinely develops from north to south. Figure 4-25 shows the location of flood hazard zones in Napa County, which are mainly focused around the Napa River. Although the Napa River is the main drainage for the surrounding watershed, and the Napa River/Napa Creek Flood Protection Project will prevent catastrophic flooding along the river's banks, there remains a significant threat of flooding along the many feeder streams in the Napa River watershed.

Garnett Creek is the uncontrolled headwaters of the Napa River in the northwest end of the valley. Numerous low-lying properties and two bridges are subject to damage along its length. On the west side of the watershed, Sulphur Creek, Dry Creek, Hopper Creek, Redwood Creek, Napa Creek and Browns Valley Creek all contribute substantial runoff to the Napa River drainage during the wet season. All these creeks bisect developed area and are crossed by late 19th and early 20th century bridges with low approaches and low stream clearance.

On the east side, Conn Creek, Rector Creek, and Milliken Creek all have similar characteristics. The desirability of creek-side real estate as a residential location has moved residents into the high-water zones of all these creeks. Historic land use polices of development in Napa County did little to preclude development in these areas and even today control of the riparian corridors by government is still very controversial.

Mitigation can lessen the threat to these residents and local infrastructure. Opportunities include improving bridge approaches, elevating homes in the floodplain, vegetation and streambed management, and land use practices.

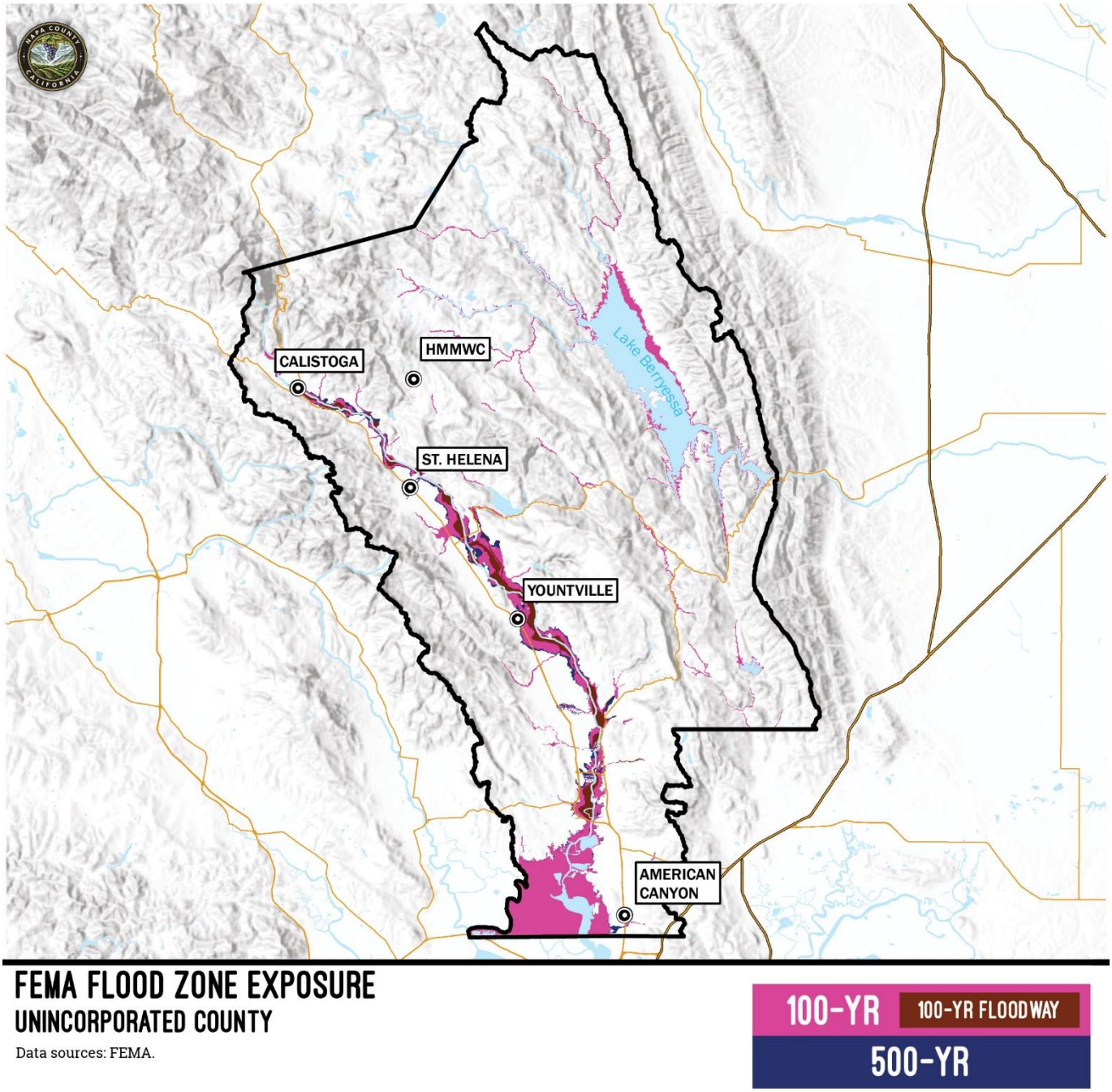


Figure 4-25: FEMA Flood Zone Exposure Map

4.5.3.4.1 Flood Awareness Zones

Flood Awareness Zones have been developed by California DWR to map areas of additional flood threat throughout the state. The intent of the Awareness Floodplain Mapping project is to identify all pertinent flood hazard areas for areas that are not mapped under the Federal Agency Management Agency's (FEMA) National Flood Insurance Program (NFIP) and to provide the community and residents an additional tool in understanding potential flood hazards currently not mapped as a regulated floodplain. The awareness maps identify the 100-YR flood hazard areas using approximate assessment procedures. These floodplains are shown simply as flood prone areas without specific depths and other flood hazard data. Flood awareness zones for Napa County are shown in the repetitive loss area maps if present.

4.5.3.5 Repetitive Loss Areas (RL)

A repetitive loss area (RL) is an area where multiple properties exist in close proximity to each other and that have experienced repetitive losses from flooding. **RL property** is a FEMA designation, defined as an insured property that has made two or more claims of more than $1,000 in any rolling 10-year period since 1978. The term "rolling 10-year period" means that a claim of $1,000 can be made in 1991 and another claim for $2,500 in 2000; or one claim in 2001 and another in 2007, as long as both qualifying claims happen within 10 years of each other. Claims must be at least 10 days apart but within 10 years of each other. RL properties may be classified as a Severe Repetitive Loss property under certain conditions. A Severe Repetitive Loss property (SRL) has had four or more claims of at least $5,000, or at least two claims that cumulatively exceed the buildings reported value. A property that sustains repetitive flooding may or may not be on Napa County's RL property list for a number of reasons:

- Not everyone is required to carry flood insurance.
- Owners who have completed the terms of the mortgage or who purchased their property outright may not choose to carry flood insurance and instead bear the costs of recovery on their own.
- The owner of a flooded property that does carry flood insurance may choose not to file a claim.
- Even insured properties that are flooded regularly with filed claims may not meet the $1,000 minimum threshold to be recognized as an RL property.
- The owner adopted mitigation measures that reduce the impact of flooding on the structure, removing it from the RL threat and the RL list (in accordance with FEMA's mitigation reporting requirements).

Many jurisdictions are required to address only the individual properties on the updated FEMA RL list. A property appears on FEMA's RL inventory because the structure had flood insurance and received two or more claims. These properties are representative of the community's overall repetitive flooding problem, but do not include all damage.

Extensive FEMA NFIP databases are used to track claims for every participating community, including unincorporated Napa County. Currently, unincorporated portions of Napa County contain 33 RL properties under their jurisdictional umbrella. The total dollar amount of claims paid to date by the NFIP for RL

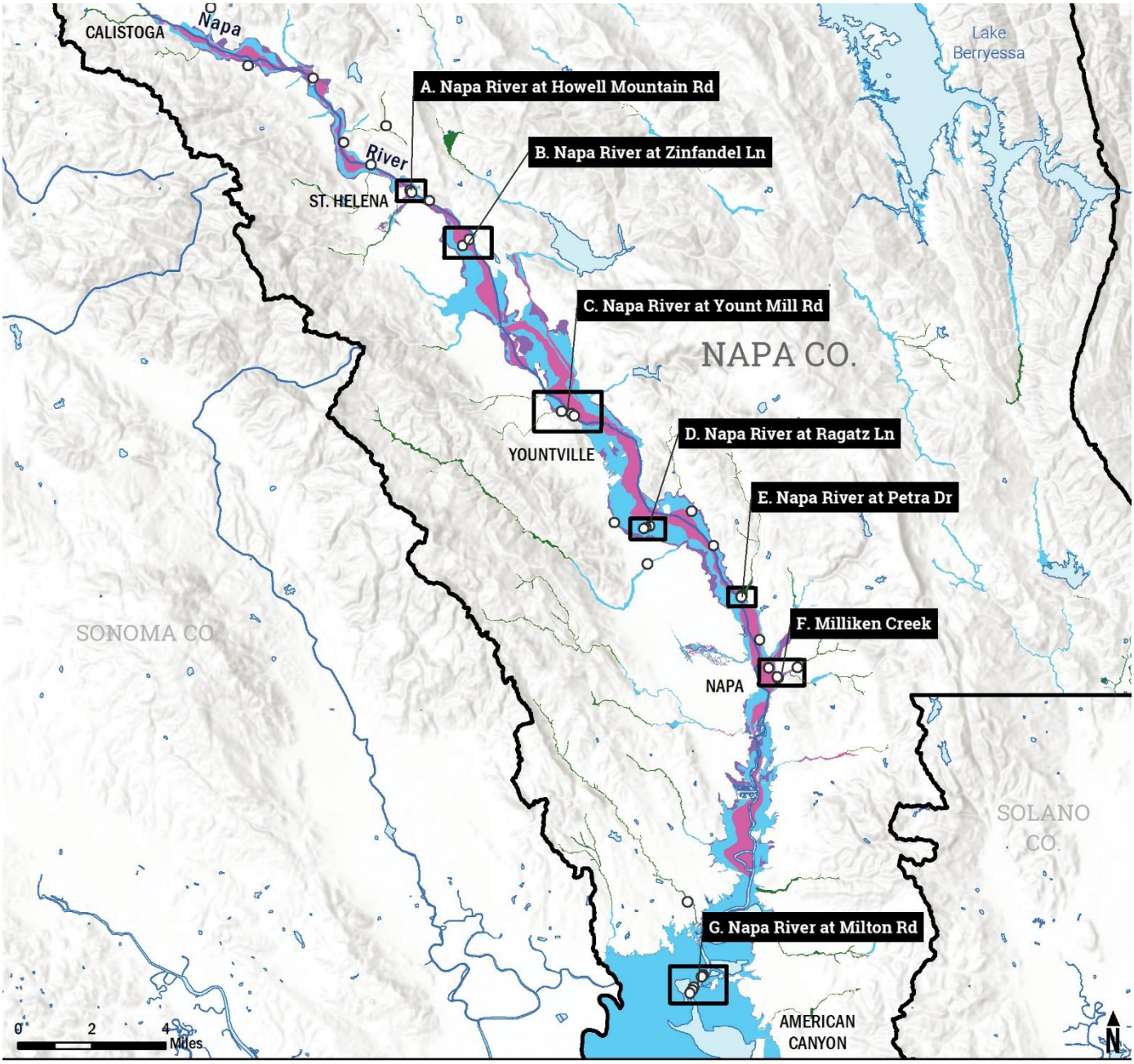
properties is $2,578,028 of structural and $718,251 content claims. Together, the total claims paid by the NFIP are $3,296,280 for the unincorporated areas of the County.

A property does not have to be currently carrying a flood insurance policy to be considered a RL or SRL property. Often homes in communities are not carrying flood insurance but are still on the community's repetitive loss list. The "repetitive loss" designation follows a property from owner to owner; from insurance policy to no insurance policy, and even after the property has been mitigated. Having an insurance policy and making claims that fall into the repetitive loss criteria will put a property on the RL list. Even after the policy on a property has lapsed or been terminated, the property will remain on Napa County's RL list.

The Privacy Act of 1974 (5 U.S.C. 522a) restricts the release of certain types of data to the public. Flood insurance policy and claims data are included in the list of restricted information. FEMA can only release such data to state and local governments, and only if the data are used for floodplain management, mitigation, or research purposes. Therefore, this plan does not identify the repetitive loss properties or include claims data for any individual property. Figure 4-26 shows the repetitive loss areas in Napa County. Loss statistics by jurisdiction are presented in Table 4-30.

Table 4-30: NFIP Loss Statistics for Napa County from 1/1/1978 to 11/14/2018

Community Name	Total Losses	Closed Losses	Open Losses	Closed Without Pay (CWOP) Losses	Total Payments
City of American Canyon	0	N/A	N/A	N/A	$ 0
City of Calistoga	15	N/A	N/A	N/A	$43,435
Napa County	375	N/A	N/A	N/A	$7,127,976
City of Napa	870	N/A	N/A	N/A	$20,489,632
City of St. Helena	50	N/A	N/A	N/A	$1,733,691
Town of Yountville	23	N/A	N/A	N/A	$132,927



NAPA COUNTY - REPETITIVE LOSS AREAS

- Repetitive Loss Property
- Repetitive Loss Area

FEMA Flood Zones
- Floodway
- Flood Fringe
- 500-YR
- Flood Awareness Zone

FEMA REPETITIVE LOSS DATA SUMMARY

PROPERTY COUNT:	37	BUILDING PAYOUTS:	$2,578,028
LOSSES:	114	CONTENT PAYOUTS:	$718,251
AVERAGE PAYOUT:	$28,581	TOTAL PAID:	$3,296,280

Figure 4-26 Repetitive Loss Areas

4.5.3.5.1 Napa River at Howell Mountain Road (RL Area A)

This repetitive loss area is made up of two properties near the intersection of Howell Mountain Rd. and Silverado Trail, shown in Figure 4-27 below. Repetitive losses in this area is attributed to the Napa River special flood hazard area (SFHA). Both of the repetitive loss properties in this area are located in the floodway.

Other contributing factors to repetitive loss in this area include sheet flow runoff from neighboring agricultural land and the low-lying nature of structures on these properties. Over $300k has been paid out in 7 insurance claims collectively to these properties.

4.5.3.5.2 Napa River at Zinfandel Lane (RL Area B)

This area consists of two repetitive loss properties located on Zinfandel Lane, west of the Napa River, shown in Figure 4-28 below. Both properties are located within in the floodway of the Napa River in a SFHA. Other contributing factors to flooding in this area include sheet flow runoff from surrounding agricultural land and inadequate storm drain facilities. Four insurance claims have been filed for this area totaling $174,994.

4.5.3.5.3 Napa River at Petra Drive (RL Area E)

Petra Drive is a single-family residential subdivision located just east of the Napa River. Roughly half of the subdivision is in the SFHA. This area consists of four repetitive loss properties that are located directly in the floodway, shown in Figure 4-29 below. The low-lying nature of these properties in close proximity to the Napa River contributes to repeated flooding in the area. Fifteen insurance claims have been made in this area for a total of $604,400.

4.5.3.5.4 Napa River at Yount Mill Road (RL Area C)

Yount Mill Road is situated on the banks of the Napa River, just north of the Town of Yountville. This area consists of three properties located on the western banks of the Napa River, shown in Figure 4-30. Repetitive loss in this area is attributed to the presence of the SFHA, as two of these properties are located in the floodway and one of the properties is located in the 500-year flood zone. The low-lying nature of these properties also contributes to their repetitive losses. Flooding in and around the Town of Yountville has been attributed the inability of existing storm drainage facilities to drain ponded floodwater, which is contributor to flooding in this area.

4.5.3.5.5 Milliken Creek (RL Area F)

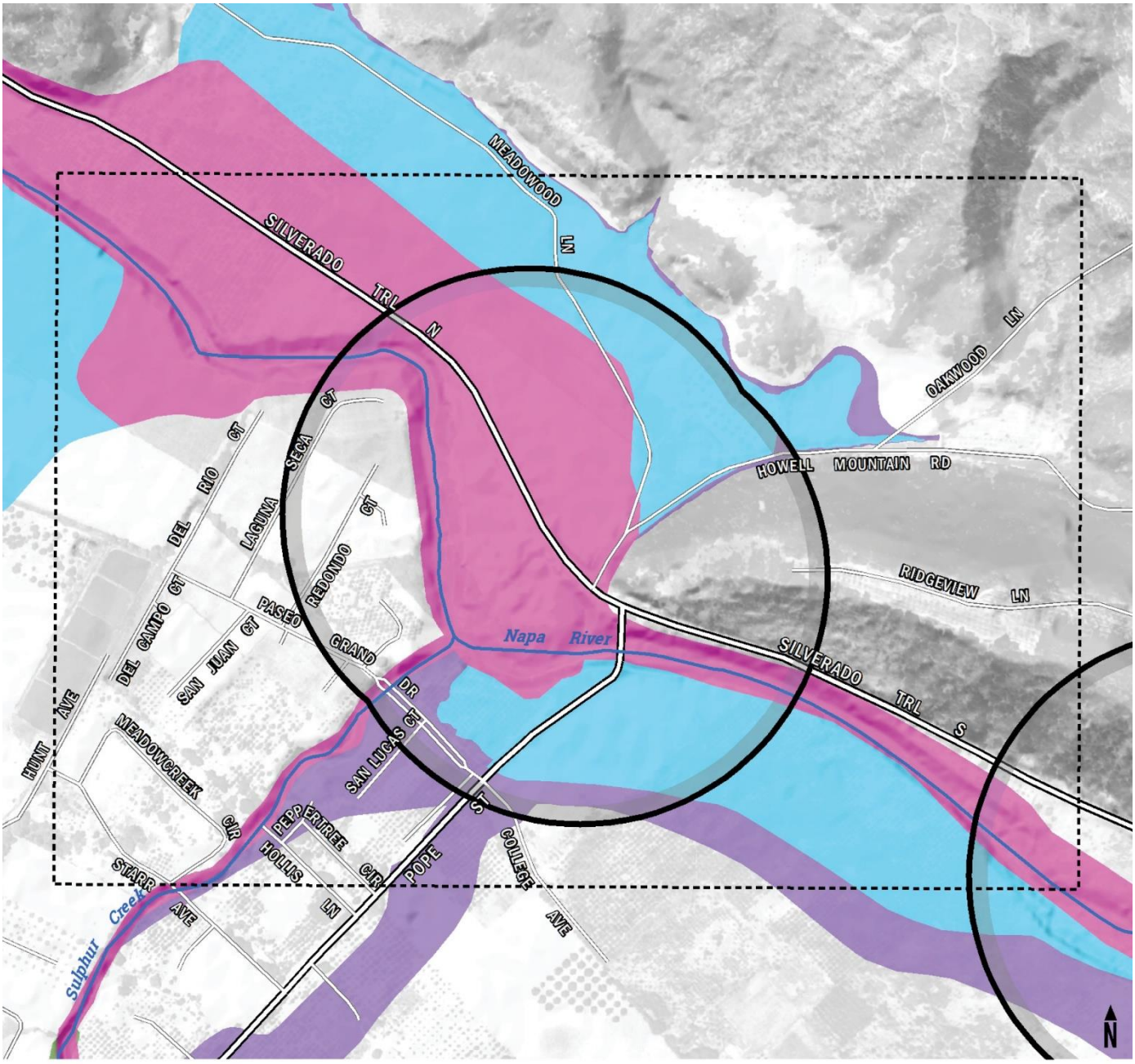
The Milliken Creek repetitive loss area consists of four properties situated near the confluence of Milliken Creek and the Napa River. Figure 4-31 displays the location of these properties in relation to the SFHA along with insurance claims that have been paid for them. Repetitive loss to these properties is caused by their inclusion in and proximity to the floodway and 100-year flood zone. Over $500,000 has been paid over 14 insurance claims for properties in this area.

4.5.3.5.6 Napa River at Ragatz Lane (RL Area D)

Ragatz Lane is situated east of State Highway 29 along an irrigation canal that feeds into the Napa River. The entire length of Ragatz Ln is located within 100-year flood zone, including the three repetitive loss properties that make up this repetitive loss area. Sheet flow runoff from surrounding agricultural land and the low-lying nature of these properties also contribute to flooding in the area. Figure 4-32 displays the location of these properties along Ragatz Lane and displays statistics for insurance claims in the area.

4.5.3.5.7 Napa River at Milton Road (RL Area G)

The Milton Road repetitive loss area consists of five properties in a subdivision located on the banks of the Napa River in the southern extent of Napa County. This subdivision is located on Edgerley Island where the Napa River begins to flow into San Pablo Bay. This area of Edgerley Island is located in the 100-year flood zone. Flooding in this area is influenced not only by the conditions of the Napa River but also by tidal shifts of nearby San Pablo Bay. Figure 4-33 shows the location of these properties along Milton Road and displays loss statistics for the area. A total of $69,397 has been paid over thirteen insurance claims in this area.



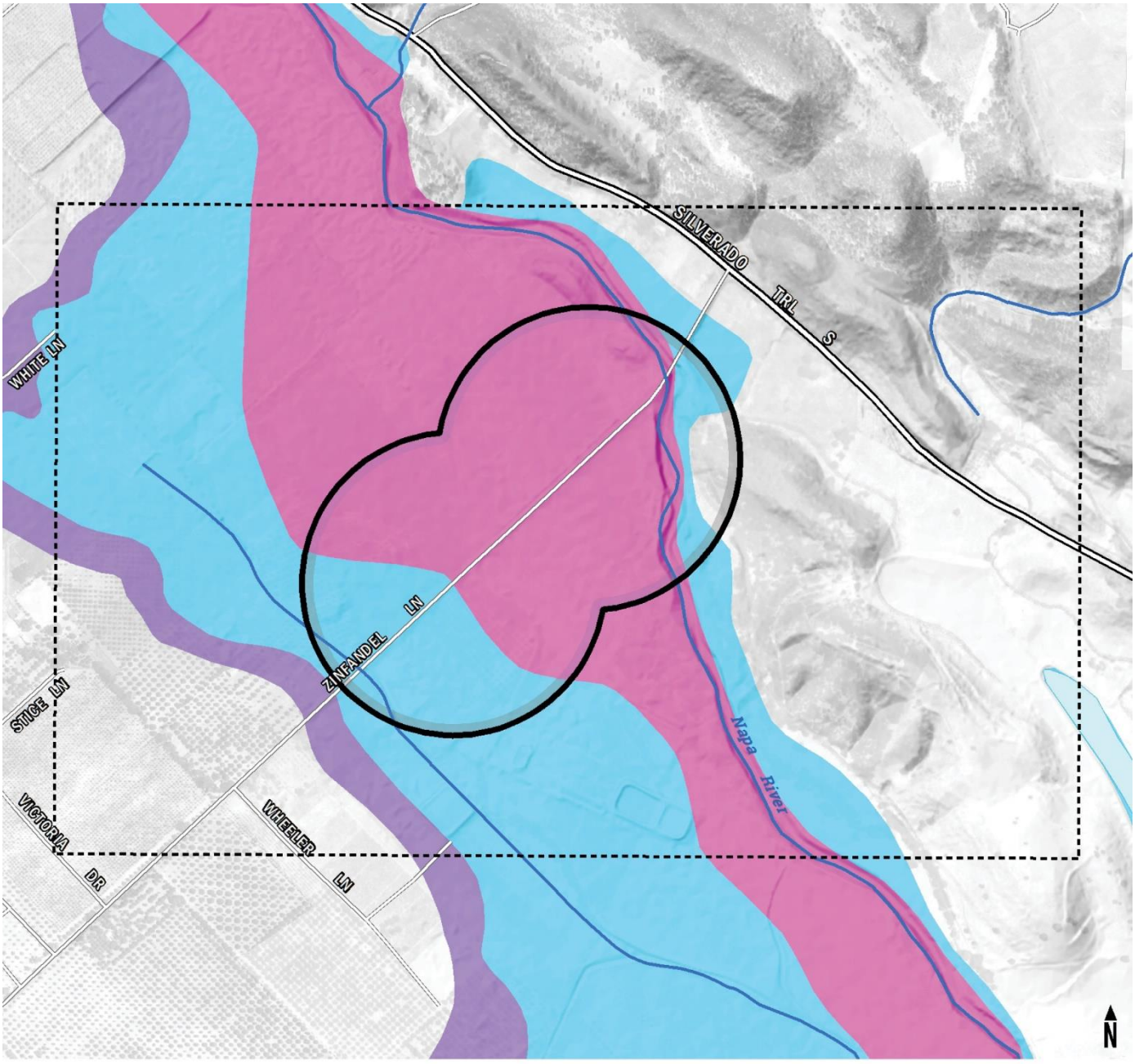
REPETITIVE LOSS AREA - A. NAPA RIVER AT HOWELL MOUNTAIN RD

FEMA Flood Zones
- Repetitive Loss Area
- Repetitive Loss Property (Approx.)
- Floodway
- Flood Fringe
- 500-YR
- Flood Awareness Zone

FEMA REPETITIVE LOSS DATA SUMMARY

PROPERTY COUNT:	2	BUILDING PAYOUTS:	$198,800
LOSSES:	7	CONTENT PAYOUTS:	$127,635
AVERAGE PAYOUT:	$35,753	TOTAL PAID:	$326,435

Figure 4-27 Howell Mountain Rd. Repetitive Loss Area



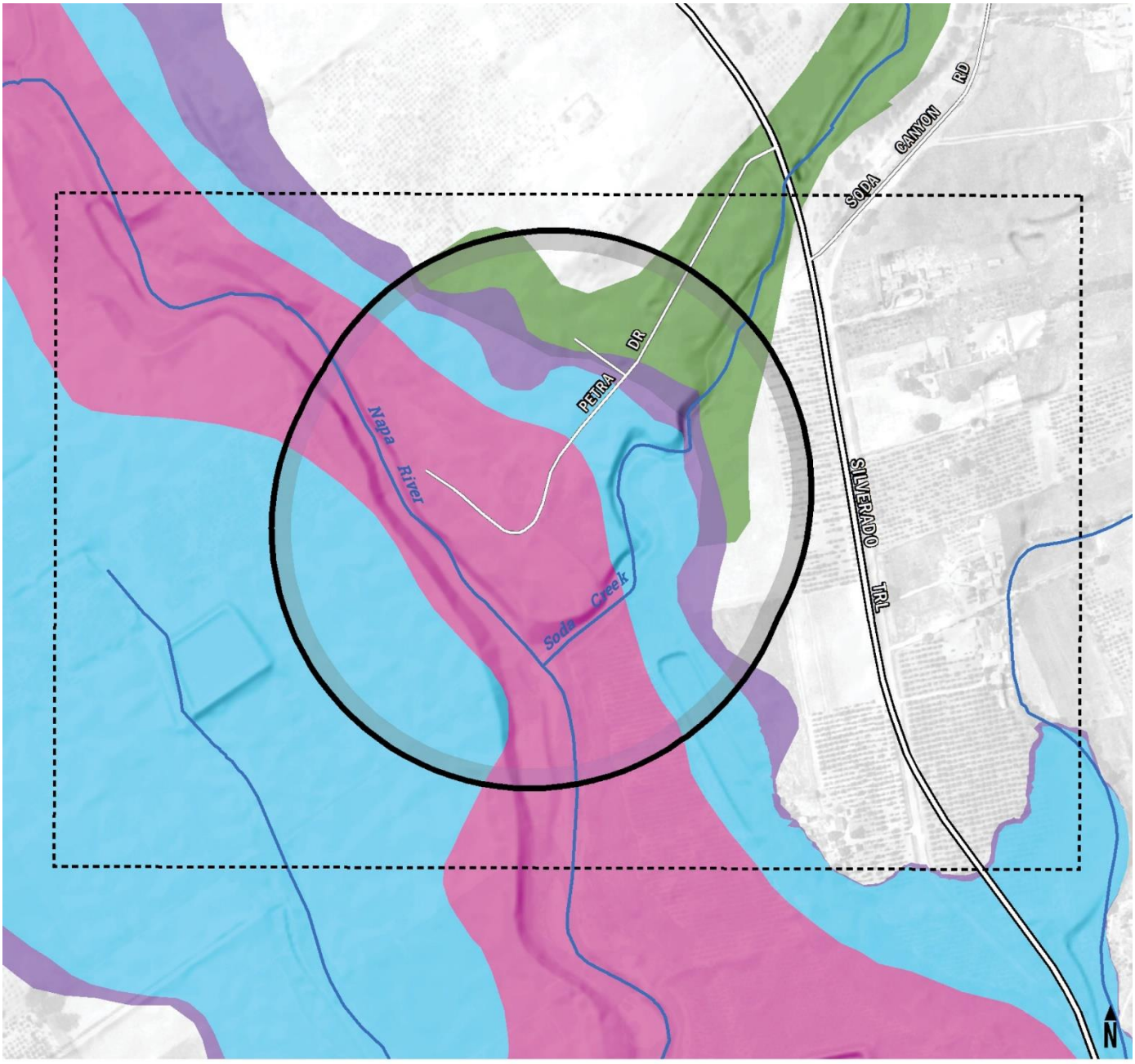
REPETITIVE LOSS AREA - B. NAPA RIVER AT ZINFANDEL LN

Repetitive Loss Area
Repetitive Loss Property (Approx.)
FEMA Flood Zones
Floodway
Flood Fringe
500-YR
Flood Awareness Zone

FEMA REPETITIVE LOSS DATA SUMMARY

PROPERTY COUNT:	2	BUILDING PAYOUTS:	$165,190
LOSSES:	4	CONTENT PAYOUTS:	$9,804
AVERAGE PAYOUT:	$43,749	TOTAL PAID:	$174,994

Figure 4-28 Zinfandel Ln Repetitive Loss Area



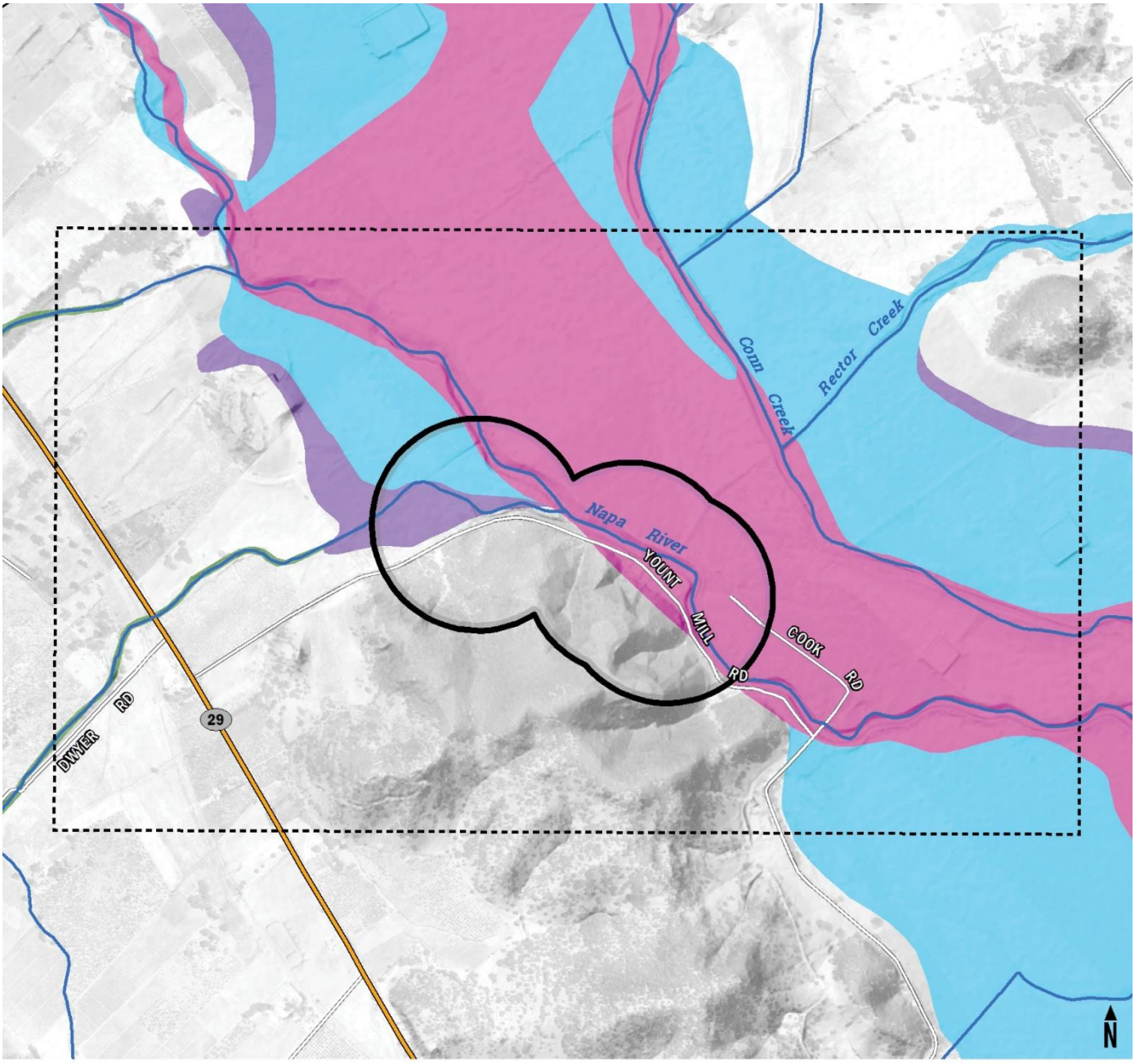
REPETITIVE LOSS AREA - E. NAPA RIVER AT PETRA DR

FEMA Flood Zones
- Repetitive Loss Area
- Repetitive Loss Property (Approx.)
- Floodway
- Flood Fringe
- 500-YR
- Flood Awareness Zone

FEMA REPETITIVE LOSS DATA SUMMARY

PROPERTY COUNT:	4	BUILDING PAYOUTS:	$503,767
LOSSES:	15	CONTENT PAYOUTS:	$100,633
AVERAGE PAYOUT:	$47,385	TOTAL PAID:	$604,400

Figure 4-29 Petra Dr. Repetitive Loss Area



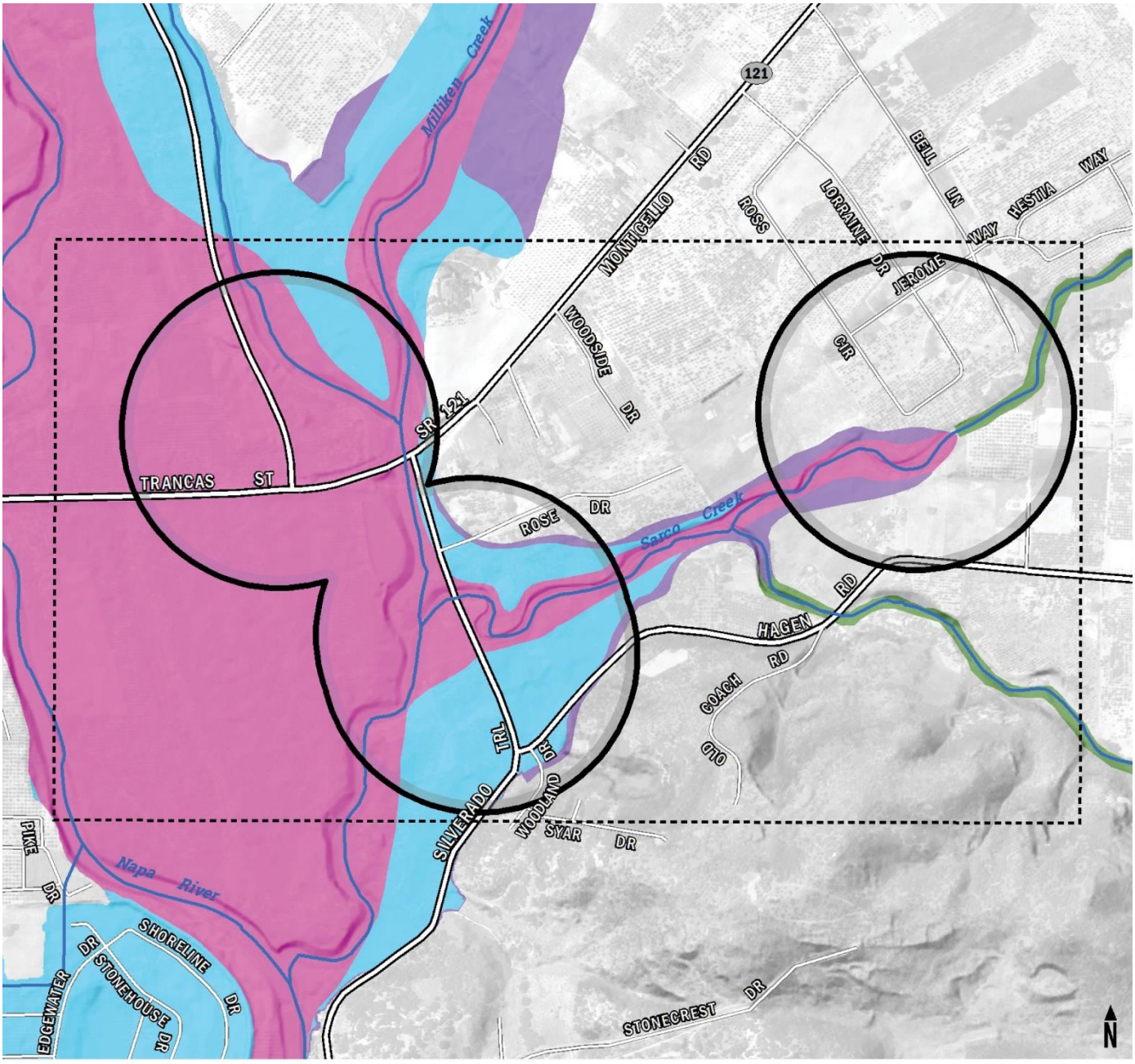
REPETITIVE LOSS AREA - C. NAPA RIVER AT YOUNT MILL RD

Repetitive Loss Area
Repetitive Loss Property (Approx.)
FEMA Flood Zones
Floodway
Flood Fringe
500-YR
Flood Awareness Zone

FEMA REPETITIVE LOSS DATA SUMMARY

PROPERTY COUNT:	3	BUILDING PAYOUTS:	$255,135
LOSSES:	15	CONTENT PAYOUTS:	$49,497
AVERAGE PAYOUT:	$16,172	TOTAL PAID:	$304,631

Figure 4-30 Yount Mill Rd. Repetitive Loss Area



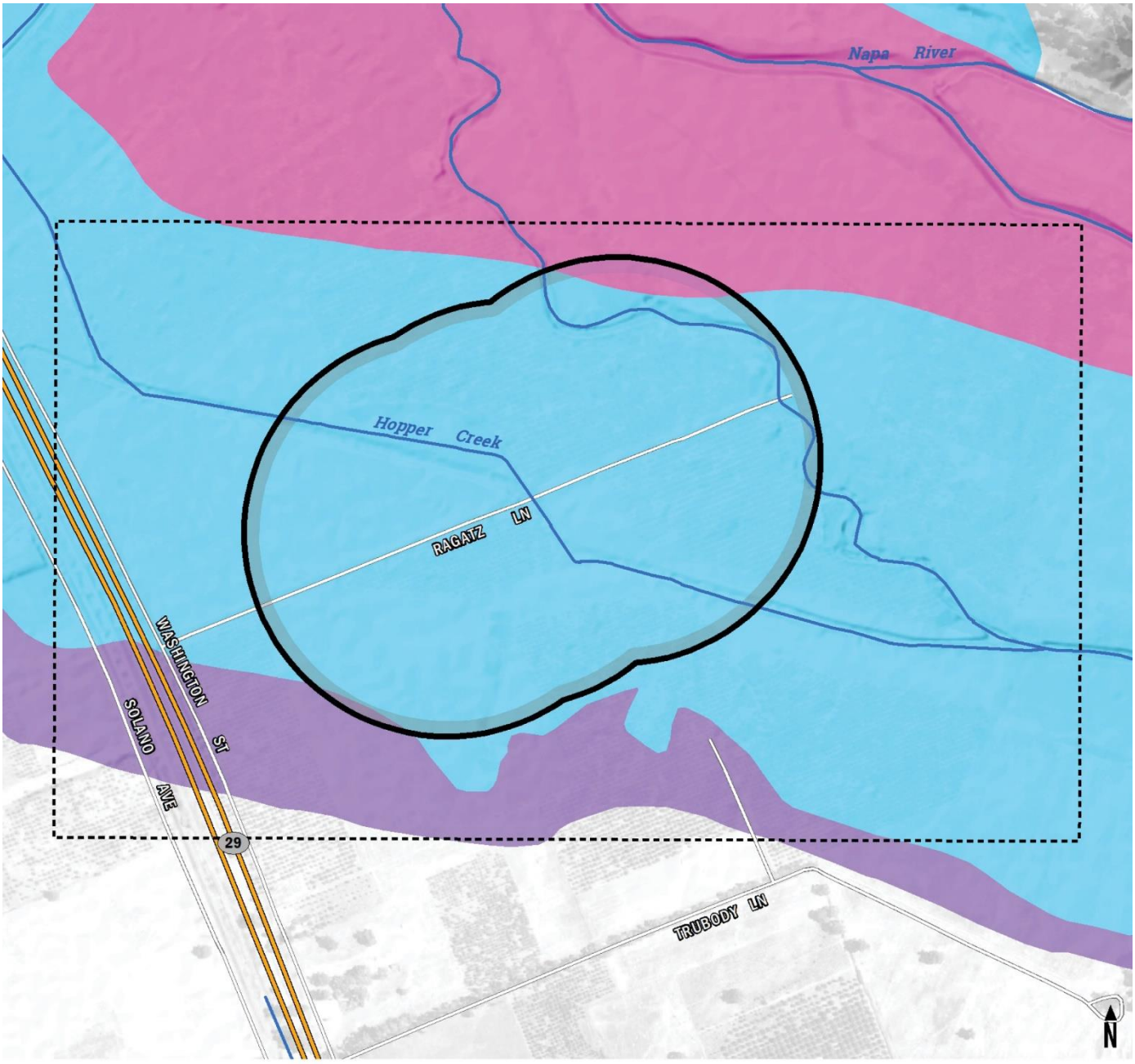
REPETITIVE LOSS AREA - F. MILLIKEN CREEK

Repetitive Loss Area
Repetitive Loss Property (Approx.)
FEMA Flood Zones
Floodway
Flood Fringe
500-YR
Flood Awareness Zone

FEMA REPETITIVE LOSS DATA SUMMARY

PROPERTY COUNT:	4	BUILDING PAYOUTS:	$440,128
LOSSES:	14	CONTENT PAYOUTS:	$132,756
AVERAGE PAYOUT:	$45,497	TOTAL PAID:	$572,884

Figure 4-31 Milliken Creek Repetitive Loss Area



REPETITIVE LOSS AREA - D. NAPA RIVER AT RAGATZ LN

Repetitive Loss Area
Repetitive Loss Property (Approx.)
FEMA Flood Zones
Floodway
Flood Fringe
500-YR
Flood Awareness Zone

FEMA REPETITIVE LOSS DATA SUMMARY

PROPERTY COUNT:	3	BUILDING PAYOUTS:	$148,837
LOSSES:	10	CONTENT PAYOUTS:	$43,163
AVERAGE PAYOUT:	$22,967	TOTAL PAID:	$192,001

Figure 4-32 Ragatz Ln. Repetitive Loss Area

REPETITIVE LOSS AREA - G. NAPA RIVER AT MILTON RD

Repetitive Loss Area
Repetitive Loss Property (Approx.)
FEMA Flood Zones
Floodway
Flood Fringe
500-YR
Flood Awareness Zone

FEMA REPETITIVE LOSS DATA SUMMARY

PROPERTY COUNT:	5	BUILDING PAYOUTS:	$47,976
LOSSES:	13	CONTENT PAYOUTS:	$21,421
AVERAGE PAYOUT:	$5,661	TOTAL PAID:	$69,397

Figure 4-33 Milton Rd. Repetitive Loss Area

4.5.3.6 Measuring Frequency and Severity

The frequency and severity of flooding are measured using a discharge probability, a statistical tool which defines the probability that a certain river discharge or flow level will be equaled or exceeded within a given year. Flood studies use historical records to determine the probability of occurrence for the different discharge levels. The flood frequency equals 100 divided by the discharge probability. For example, the 100-YR discharge has a 1-percent chance of being equaled or exceeded in any given year. The "annual flood" is the greatest flood event expected to occur in a typical year. These measurements reflect statistical averages only; it is possible for two or more floods with a 100-YR or higher recurrence interval to occur in a short time period. The same flood can have different recurrence intervals at different points on a river.

The extent of flooding associated with a 1-percent annual probability of occurrence (the base flood or 100-YR flood) is used as the regulatory boundary by many agencies. Also referred to as the special flood hazard area (SFHA), this boundary is a convenient tool for assessing vulnerability and risk in flood-prone communities. Many communities have maps that show the extent and likely depth of flooding for the base flood. Corresponding water-surface elevations describe the elevation of water that will result from a given discharge level, which is one of the most important factors used in estimating flood damage.

4.5.3.7 Frequency/ Probability of Future Occurrences

Napa County will experience flooding in the future, with the probability of flooding in Napa County between 10 and 100% annually.

Winter storms saturate soils in Napa County during the months of November through April. Napa County experiences "Atmospheric River Storms" that can deliver over 1" rain per hour over extended time frames. That event produces local tributary streams and the Napa River flooding. The 100-year flood is calculated to be the level of flood water expected to be equaled or exceeded every 100 years on. The term is used to describe an event that has a 1-in-100 chance of happening in any given year. In reality, there is a 65% chance that there will be a 100-year flood in 100 years. Likewise, a 50-year flood has a 2% chance of happening in any given year, and there's a 4% chance of a 25-year flood every year. Calculations are based on less than a hundred years of flood records. The Napa River Flood Project is being constructed to protect the community from this 100-year event, which would be a larger flood than the 1986, 1995, or the 2005 flood events.

4.5.3.8 Severity

The main factors affecting flood damage are water depth and velocity. Deeper and faster flood flows can cause more damage. Shallow flooding with high velocities can cause as much damage as deep flooding with slow velocity. This is especially true when a channel migrates over a broad floodplain, redirecting high velocity flows and transporting debris and sediment. Flood severity is often evaluated by examining peak discharges; Table 4-31 lists peak flows used by FEMA to map the floodplains of Napa County.

Table 4-31: Summary of Discharges in Napa County

Flooding Source/Location	Drainage sq. Miles	Peak Discharge (cubic feet/second)			
		10-percent	2-percent	1-percent	0.2-percent
Blossom Creek					
At confluence with Napa River	3.4	1,000	N/A	1,700	2,000
Cyrus Creek					
At confluence with Napa River	2.9	900	N/A	1,500	1,900
Garnett Creek					
At confluence with Napa River	6.9	1,900	N/A	3,200	3,900
Napa Creek					
At mouth	14.9	*	*	4,300	*
At the City of Napa corporate limits	14.9	2,200	*	3,500	4,500
Napa River					
Upstream of Bull Island	324	25,500	38,900	45,200	69,000
Upstream of Imola Avenue	300	26,770	39,200	44,390	53,450
Upstream of confluence of Tulucay Creek	*	25,810	38,010	42,720	51,260
Upstream of confluence of Napa Creek	*	20,040	35,600	40,100	48,300
Upstream of Trancas Street	*	22,750	33,430	39,000	44,540
Near the City of Napa (Oak Knoll Avenue)	281	18,500	*	33,000	46,000
Upstream of Oak Knoll Avenue	218	18,400	28,100	32,700	50,300
Near the City of St. Helena (Zinfandel Lane)	81.4	13,000	*	21,000	25,000
At Dunweal lane	23	7,800	N/A	12,500	15,000
At State Highway 29	21.6	7,400	N/A	12,000	14,500
At upstream corporate limits	5.4	3,300	N/A	5,100	6,400
Salvador Creek					
At confluence with Napa River	*	*	*	3,910	*
At Big Branch Road	1.8	*	*	3,213	*
Sulphur Creek					
At confluence with Napa River to Sulphur Creek Tributary	9.2	*	*	3,330[8]	*
Upstream of Sulphur Creek Tributary	7.6	*	*	3,110	*
Sulphur Creek Tributary					
At confluence with Sulphur Creek	1.1	*	*	500	*
Tulucay Creek					
At Soscol Avenue	*	2,880	*	4,530	5,500
Upstream of Camille Creek	*	2,050	*	3,250	4,050

** Data not available*

Source: Table 5 Summary of Discharges from FEMA FIS Text, 2011

[8] Flow rate reduction due to capacity restriction

4.5.3.9 Warning Time

The type and rate of flooding experienced in Napa County varies. In general, warning times for floods can be between 24 and 48 hours to prepare communities to reduce flood damages Seasonal notification for flooding can enhance awareness for citizens at risk, and, when communicated effectively, advance notification can reach target audiences on a large scale

Napa County maintains a storm watch program that serves as flood surveillance and an early warning system. The Napa Valley Regional Rainfall and Stream Monitoring System is a real-time rainfall and river-stream data network that relies on data from automated stream gages in rivers and streams throughout Napa County. The Napa County Flood Control and Water Conservation District is responsible for maintaining that data network which provides current and historical rainfall, river, and stream level monitoring data. Napa County coordinates with the National Weather Service in Reno, NV and the California Department of Water Resources for flood forecasting for the Napa River.

4.5.3.9.1 DWR Awareness Zones Notification

The Flood Risk Notification Program (FRN Program) is part of the Department of Water Resources' (DWR) FloodSAFE California Initiative. The program's key goal is to increase flood risk awareness by effectively communicating that risk to individual property owners, the public, and local, state, and federal agencies. This includes encouraging people to understand the levee system that protects them; be prepared and aware of their flood risk; and take appropriate actions before, during, and after flooding to protect themselves, minimize damage to their property or personal possessions, and facilitate recovery.

To achieve this goal, the FRN Program:

- sends out an annual notice to property owners whose property is at risk of flooding,
- maintains accurate Levee Flood Protection Zone (LFPZ) maps and an associated parcel information database (note: these maps are different from Federal Emergency Management Agency regulatory maps),
- provides people with useful ways to assess risk and reduce flood loss,
- establishes outreach and educational projects with public involvement,
- expands its interactive Flood Risk Notification website, and
- collaborates with federal agencies, local agencies, and communities.

In September 2010, DWR provided the first annual written notice of flood risks to each landowner whose property is protected by State Plan of Flood Control levees and is within an LFPZ. The notice informs recipients of their property's potential flood risks and potential sources of flooding and offers flood emergency planning and preparedness tips. It encourages recipients to take preventative actions such as purchasing flood insurance, elevating or "floodproofing" their buildings, and preventing blockage of channels, drains, and ditches.

4.5.3.10 Secondary Hazards

The most problematic secondary hazard for flooding is bank erosion, which in some cases can be more harmful than actual flooding. Flooding is also responsible for landslides when high flows over-saturate soils on steep slopes and cause them to fail. Hazardous materials spills are a secondary hazard of flooding if storage tanks rupture and spill into streams or storm sewers.

It is also recognized that wildland fires within a watershed can exacerbate the flood hazard by virtue of increased rate and volume of runoff and attendant erosion and sediment discharge.

4.5.3.11 Climate Change Impacts

Climate change is projected to expose 13,000 additional acres to 100-year flood risk. While most of these areas are undeveloped, some developed areas are at risk and should be accounted for in future plans.

The County is not extremely vulnerable to sea-level rise, with less than one percent of the County's total population considered at risk. Considering a 100-year flood event, a 1.5 m rise in sea-level and other hydrodynamical factors, most of the land at increased risk for flooding is undeveloped. A small portion of critical infrastructure, such as roads, railways, hospitals, emergency facilities, and properties in the southwestern portion of the County and in areas along the Napa River, including parts of downtown City of Napa, could become vulnerable. American Canyon Power Plant and the Napa Sanitation District Wastewater Treatment Plant could also become vulnerable. (Napa County Climate Action Plan, 2018)

4.5.3.12 Flood Vulnerability Analysis

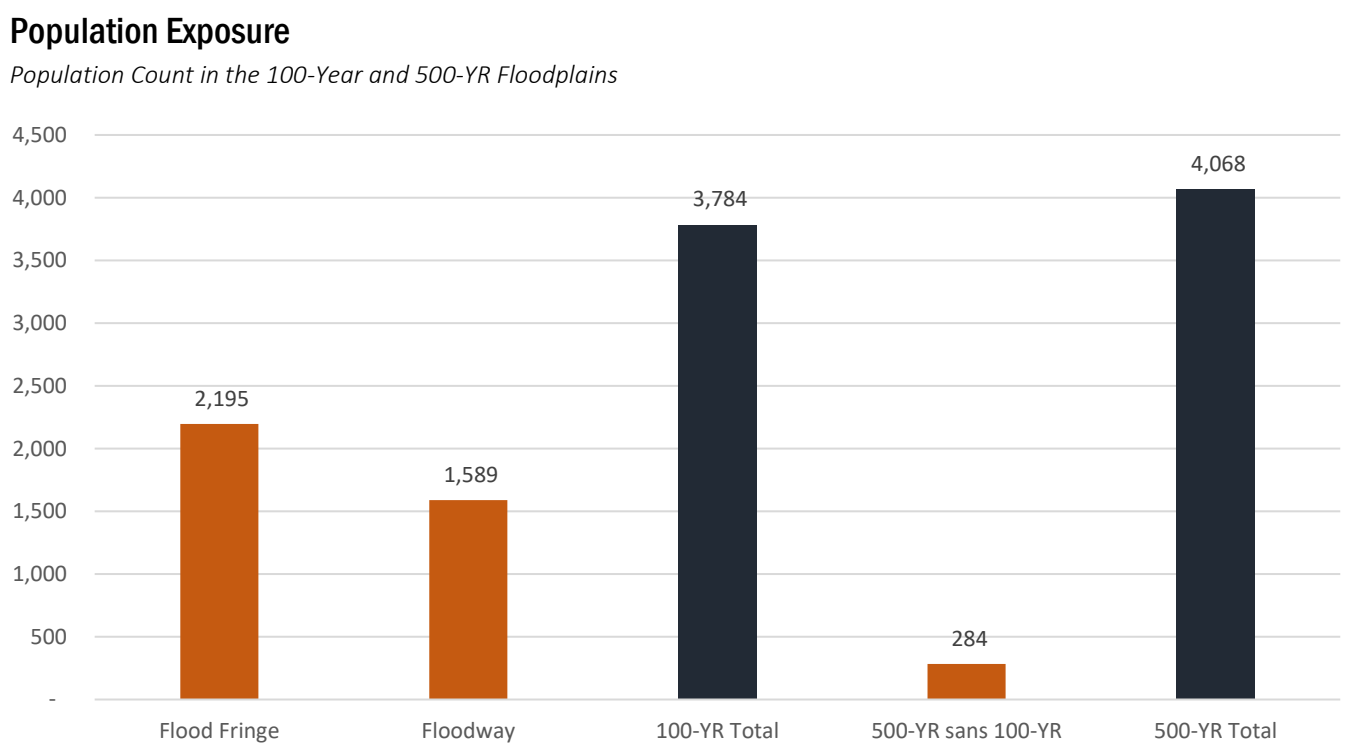
Both an exposure analysis and HAZUS loss estimation analysis were conducted to develop the flood vulnerability analysis for Napa County. Flood exposure numbers were generated using the inventories outline in Section 4.5.3.12.3. County inventories were overlaid with FEMA delineated flood plains to determine exposure. These risk assessment exposure analysis values do not include HAZUS-generated results.

HAZUS flood vulnerability data was generated using a Level 2 HAZUS-MH 4.2 analysis. HAZUS is a FEMA software product that uses a GIS to analyze 100-year depth grids derived from FEMA 100-year "A" zones with Base Flood Elevations (BFE) to estimate loss. Parcel data defined in Section 4.5.3.12.3 was imported into HAZUS as User Defined Facilities (UDF), and serves as the basis for replacement and content cost estimations as well as associated loss. HAZUS results are not included in the snapshot and are explicitly labeled in the charts and tables of this document. Where flood vulnerability is mentioned absent of HAZUS, exposure analysis figures are used.

4.5.3.12.1 Population

Population counts of those living in the floodplain were generated by analyzing County assessor and parcel data that intersect with the 100-YR and 500-year floodplains identified on FIRMs. Using GIS, U.S. Census Bureau information was used to intersect the floodplain and an estimate of population was calculated by weighting the population within each census block and track with the percentage of flood risk area. Using this approach, it was estimated that the total exposed population is 3,785 within the 100-YR floodplain and 4,068 within the 500-YR floodplain, as shown in Figure 4-44 and Table 4-32.

Figure 4-34: Population Exposure to Flood (Unincorporated County)



FEMA FLOOD ZONE EXPOSURE

UNINCORPORATED COUNTY

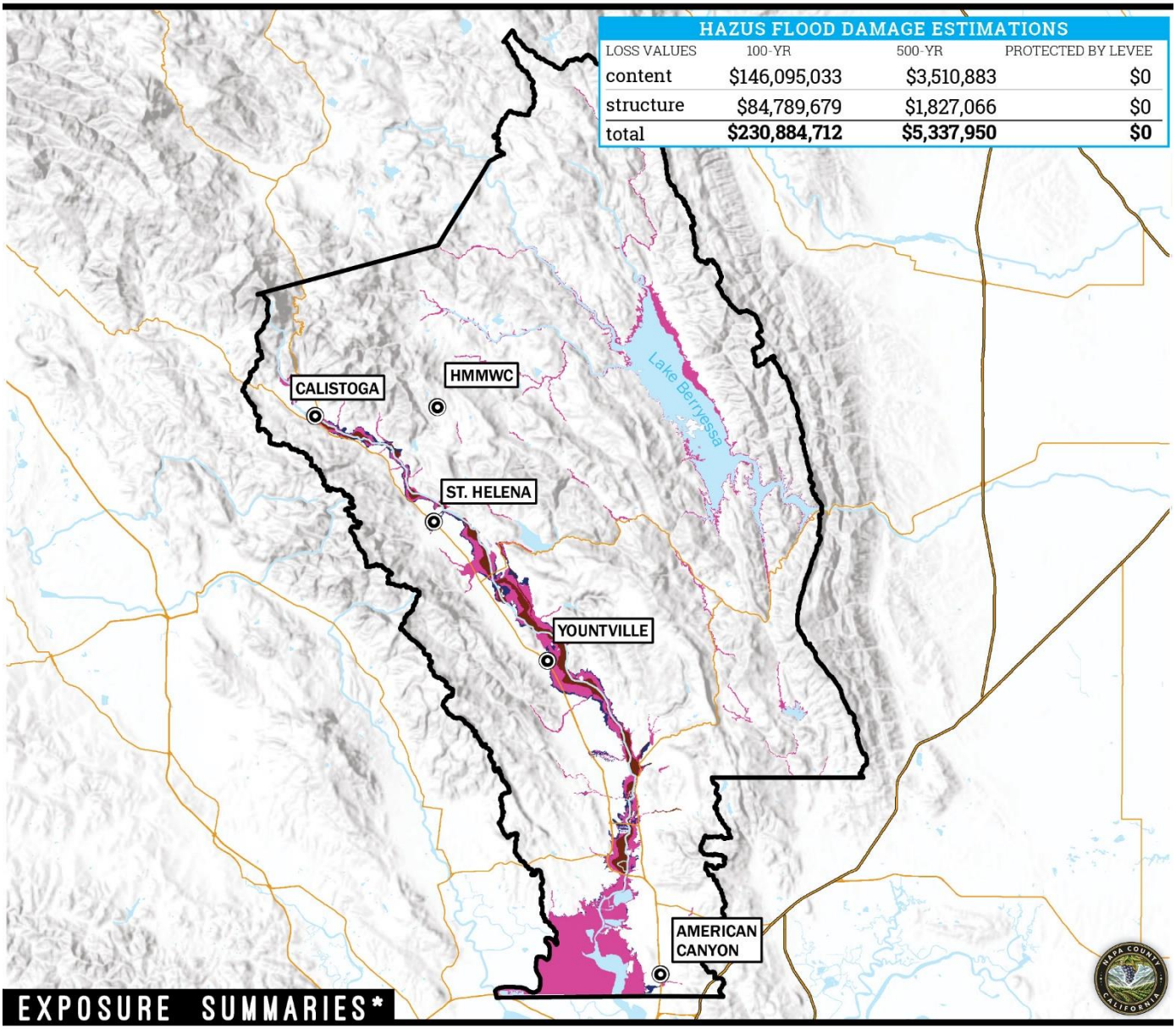


Figure 4-35: FEMA Flood Zone Exposure and Snapshot Map

Table 4-32: Summary Population Exposure to Flood (Unincorporated County)

	Total Population
Unincorporated County	34,147

Flood Hazard Zone	Population Count	% of Total
Flood Fringe	2,195	*6.43%*
Floodway	1,589	*4.65%*
100-YR Total	3,784	*11.08%*
500-YR sans 100-YR	284	*0.83%*
500-YR Total	4,068	*11.91%*

4.5.3.12.2 Structures and Parcel Value

Table 4-33 summarizes the number of parcels in the floodplain. GIS models determined that there are 904 parcels within the 100-year floodplain (674 in the flood fringe and 230 in the floodway) and 1,076 in the 500-year floodplain. This methodology also estimated nearly $1.4 billion worth of market value and content exposure to the 100-year flood, representing 7.6 percent of the total assessed value of the planning area, and close to $1.7 billion worth of market value and content exposure to the 500-year flood, representing 9.2 percent of the total assessed value.

Table 4-33: Parcels Exposed to NFIP Flood Zones (Unincorporated County)

	Total Parcels	Total Market Value ($)	Total Content Value ($)	Total Value ($)
Unincorporated County	14,654	$ 9,233,654,827	$ 9,140,828,845	$ 18,374,483,672

Flood Hazard Zone	Parcel Count	% of Total	Market Value Exposure ($)	Content Value Exposure ($)	Total Exposure ($)	% of Total
Flood Fringe	689	*4.7%*	$ 495,655,777	$ 467,850,751	$ 963,506,528	*5.2%*
Floodway	231	*1.6%*	$ 204,450,026	$ 224,603,423	$ 429,053,449	*2.3%*
100-YR Total	**920**	**6.3%**	**$ 700,105,803**	**$ 692,454,174**	**$ 1,392,559,977**	**7.6%**
500-YR sans 100-YR	176	*1.2%*	$ 149,070,821	$ 155,690,209	$ 304,761,030	*1.7%*
500-YR Total	**1,096**	**7.5%**	**$ 849,176,624**	**$ 848,144,383**	**$ 1,697,321,007**	**9.2%**

Note: The table above does not display loss estimation results; the table exhibits total value at risk based upon the hazard overlay and Napa County Assessor data.

4.5.3.12.3 Damage Estimation

HAZUS-MH calculates losses to structures from flooding by analyzing the depth of flooding and type of structure. Using historical flood insurance claim data, HAZUS-MH estimates the percentage of damage to structures and their contents by applying established damage functions to an inventory. For this analysis, all non-vacant parcels with current market values were used instead of the default inventory data provided

with HAZUS-MH. The analysis is summarized in Table 4-34 for the 100-year and 500-year flood events. It is estimated that there could be up to $228.4 million of total flood loss from a 100-year flood event in the planning area and $5.3 million of flood loss from a 500-year flood event. This represents 1.24% of the total value exposed to the 100-year flood and .03% of the total value exposed to the 500-year event. Table 4-35 and Figure 4-36 shows the 100-year flood loss estimation (based on depth) in NFIP flood zones by occupancy type. Table 4-36 and Figure 4-37 shows the 500-year flood loss estimation (based on depth) in NFIP flood zones by occupancy type.

Table 4-34: Flood Loss Estimation (Based on Depth)– HAZUS (Uninc. Co.)

Building Type	Building Damage ($)	Content Damage ($)	Total Damage ($)	Total Estimated Damage (% of total value)
100-YR	$ 82,666,350	$ 145,765,959	$ 228,432,309	1.24%
500-YR	$ 1,827,066	$ 3,510,883	$ 5,337,950	0.03%

Table 4-35: 100-YR Flood Loss Estimation (Based on Depth) by Occupancy Type (Uninc Co)

Building Type	Building Damage ($)	Building Damage (% of total lossl)	Content Damage ($)	Content Damage (% of total loss)	Total Damage ($)	Proportion of Loss (%)
Agriculture	$ 28,854,031	12.6%	$ 88,784,784	38.9%	$ 117,638,815	51%
Commercial	$ 85,886	0.0%	$ 240,999	0.1%	$ 326,885	0%
*Education	$ -	0.0%	$ -	0.0%	$ -	0%
Emergency	$ 31,192	0.0%	$ 44,269	0.0%	$75,461	0%
Government	$ -	0.0%	$ 1,922	0.0%	$ 1,922	0%
Industrial	$ 13,332,843	5.8%	$ 45,284,440	19.8%	$ 58,617,284	26%
Residential	$ 40,362,398	17.7%	$ 11,409,545	5.0%	$ 51,771,943	23%
Total	**$ 82,666,350**	**36%**	**$ 145,765,959**	**64%**	**$ 228,432,309**	

Note: Total Inventory Values
1 - Building Replacement Costs = $9,285,805,365.00
2 - Content Replacement Costs = $9,141,116,978.00
3 - Total Value = $18,426,922,343.00
**School values are not present in parcel roll (tax exempt) and Individual School districts are non-participating outside of NVC and NCOE.*

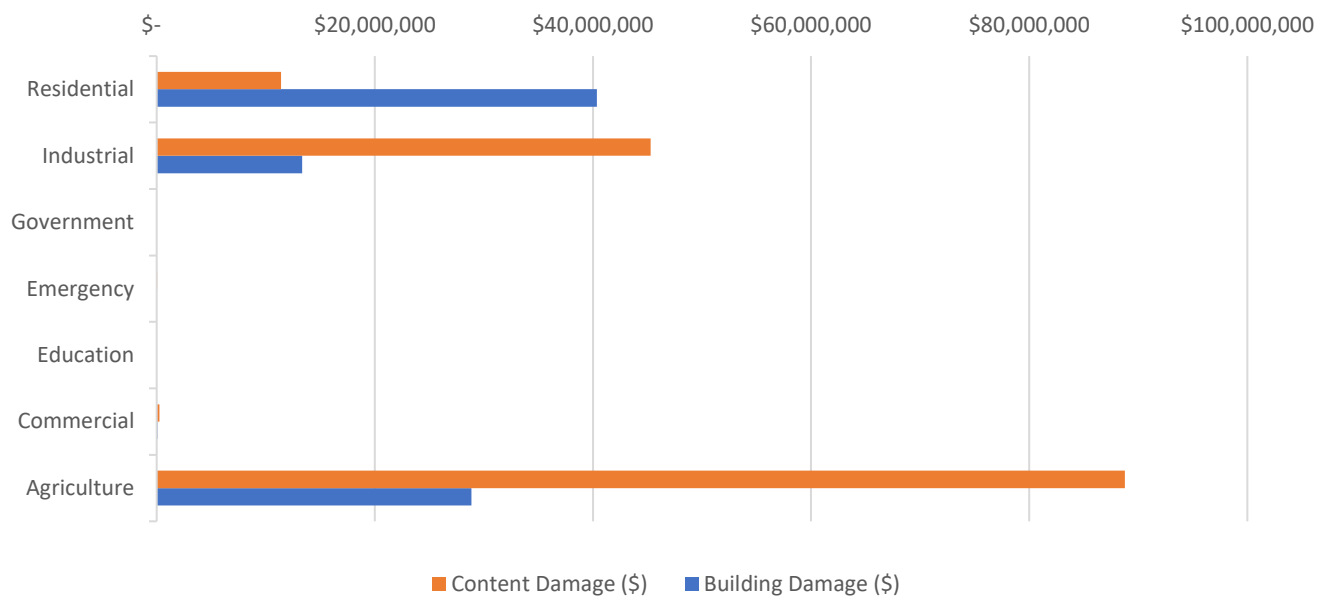


Figure 4-36: 100-YR Flood Loss Estimation by Occupancy (Unincorporated County)

Table 4-36 and Figure 4-37 depict loss estimations for the area inundated in a 500-year flood beyond the extents of the 100-year flood.

Table 4-36: 500-YR Flood Loss Estimation (Based on Depth) by Occupancy Type (Uninc. Co.)

Building Type	Building Damage ($)	Building Damage (% of total lossl)	Content Damage ($)	Content Damage (% of total loss)	Total Damage ($)	Proportion of Loss (%)
Agriculture	$ 933,363	17.5%	$ 2,903,920	54.4%	$ 3,837,283	72%
Commercial	$ -	0.0%	$ -	0.0%	$ -	0%
Education	$ -	0.0%	$ -	0.0%	$ -	0%
Emergency	$ -	0.0%	$ -	0.0%	$ -	0%
Government	$ -	0.0%	$ -	0.0%	$ -	0%
Industrial	$ -	0.0%	$ 314,376	5.9%	$ 314,376	6%
Residential	$ 893,703	16.7%	$ 292,587	5.5%	$ 1,186,290	22%
Total	**$1,827,066**	**34%**	**$3,510,883**	**66%**	**$5,337,950**	

Note: Total Inventory Values
1 - Building Replacement Costs = $9,285,805,365.00
2 - Content Replacement Costs = $9,141,116,978.00
3 - Total Value = $18,426,922,343.00
**School values are not present in parcel roll (tax exempt) and Individual School districts are non-participating outside of NVC and NCOE.*

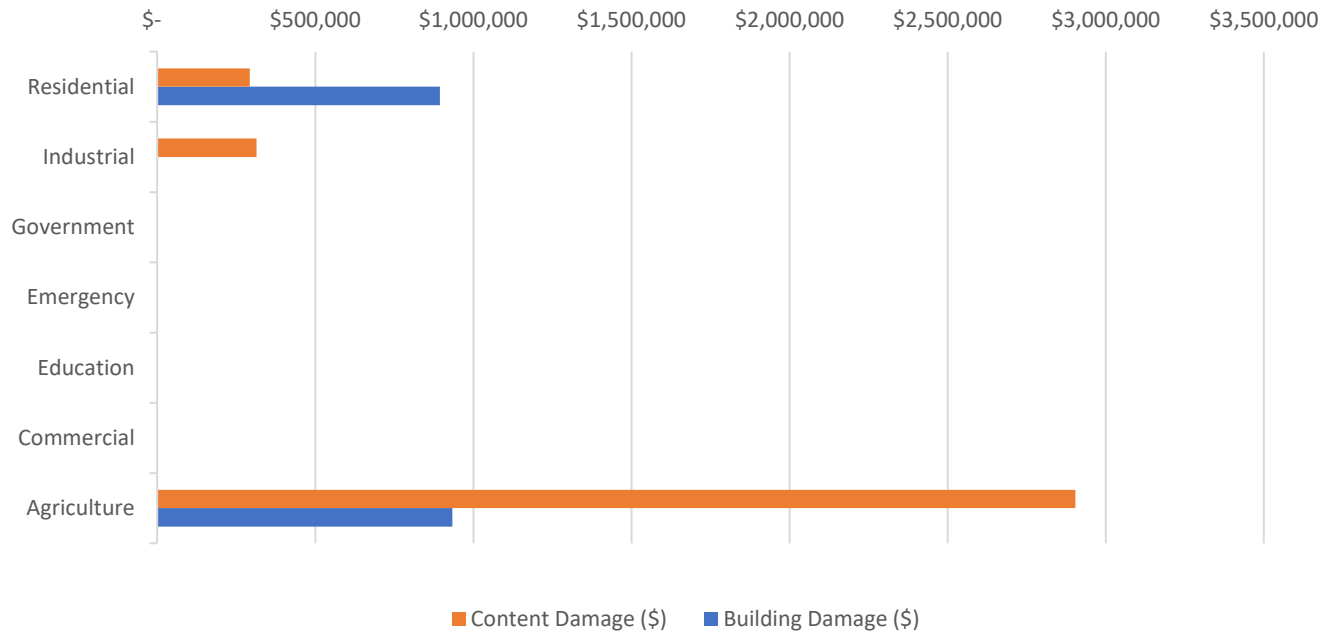


Figure 4-37: 500-YR Loss Estimation by Occupancy (Unincorporated County)

4.5.3.12.4 Critical Facilities and Infrastructure

Table 4-37 summarizes the critical facilities and infrastructure in the flood fringe, floodway, and 100-year and 500-year floodplains of Napa County. Details are provided in the following sections.

Table 4-37: Critical Facility Points in the Floodplain

Infrastructure Type	Flood Fringe	Floodway	100-YR Total	500-YR sans 100-YR	500-YR Total
Essential Facility	2	-	2	1	3
EOC	-	-	-	-	-
Fire Station	2	-	2	-	2
Hospital	-	-	-	-	-
Police Station	-	-	-	1	1
High Potential Loss	13	9	22	18	40
Adult Residential Care	-	-	-	-	-
Child Care - Licensed	-	-	-	-	-
Church	1	-	1	-	1
Communication Tower	1	-	1	-	1
Dam	-	-	-	-	-
Family Child Care Home	-	-	-	-	-

Farm Worker Housing	2	-	2	-	2
Historic Building	-	-	-	-	-
Home Care Organization	-	-	-	-	-
*Insured Asset	2	5	7	17	24
Library	-	-	-	1	1
Mobile Home Park	-	-	-	-	-
NCFCWCD Asset	-	-	-	-	-
Residential Elder Care Facility	-	-	-	-	-
School	-	-	-	-	-
Rain Gauges	6	4	10	-	10
Water Treatment Plant	1	-	1	-	1
Transportation and Lifeline	33	23	56	1	57
Airport	-	-	-	-	-
Bridge	33	23	56	-	56
NG Station	-	-	-	-	-
Power Plant	-	-	-	1	1
Substation	-	-	-	-	-
Hazmat	-	-	-	-	-
Landfill	-	-	-	-	-
Grand Total	**48**	**32**	**80**	**20**	**100**

4.5.3.12.5 Critical Facilities Damage Estimates

HAZUS-MH 4.2 was used to estimate the flood loss potential to critical facilities exposed to the flood risk. Using depth/damage function curves to estimate the percent of damage to the building and contents of critical facilities. The data source used in this analysis is different than the data shown in the exposure analysis portrayed in Table 4-37. County and other participating jurisdiction insurance data was obtained and formatted for use in HAZUS for a detailed damage estimation. This combined government dataset has additional information including number of floors, building value, content value, and construction type that greatly enhances HAZUS results. Table 4-38 summarizes Hazus loss results for essential County facilities located within the 100-YR flood hazard areas.

Table 4-38: County Insurance Holdings with Hazus 100-YR Flood Damage Estimates

Insured Asset - 100YR Exposure	Building Replacement Value	Insured Content Value	Estimated Building Loss	Estimated Content Loss	Total Estimated Loss
Corp Yard					
Building #3 - Maintenance, Napa Corporate Yard	$0	$50,000	$0	$1,922	$1,922
Fire					
Carnaros /Ed Is VFD	$240,429	$73,945	$31,192	$44,269	$75,461
Misc					
Ag Comm - Gwss, F&F Soscol	$0	$76,479	$0	$0	$0
Ag Comm - Us Coop, F&F Soscol	$0	$377,313	$0	$0	$0
Grand Total	**$240,429**	**$577,737**	**$31,192**	**$46,191**	**$77,383**

4.5.3.12.6 Linear Utilities

It is important to determine who may be at risk if infrastructure is damaged by flooding. Roads or railroads that are blocked or damaged can isolate residents and can prevent access throughout the county, including for emergency service providers needing to get to vulnerable populations or to make repairs. Bridges washed out or blocked by floods or debris also can cause isolation. Water and sewer systems can be flooded or backed up, causing health problems. Underground utilities can be damaged. Levees can fail or be overtopped, inundating the land that they protect. Table 4-39 shows critical facilities (linear) in the floodplain.

Table 4-39: Lifelines in the Floodplain (Unincorporated County)

Linear Asset - Flood Risk Exposure (miles)					
Infrastructure Type (linear)	Flood Fringe	Floodway	100-YR Total	500-YR sans 100-YR	500-YR Total
Levee	94.68	6.32	101.01	0.49	101.50
Levee Centerline	-	-	-	-	-
Levee Flood Wall	-	-	-	-	-
NG Pipeline	3.43	0.59	4.02	0.63	4.65
Railroad	4.53	-	4.53	0.50	5.03
Street	44.61	8.70	53.31	6.99	60.30
4WD trail	-	-	-	-	-
Alley	-	-	-	-	-
Cul-de-sac	-	-	-	-	-
Driveway	0.90	0.64	1.53	0.08	1.62
Interstate	1.07	-	1.07	0.08	1.15
Local road	2.56	0.11	2.67	0.14	2.81

Linear Asset - Flood Risk Exposure (miles)					
Infrastructure Type (linear)	Flood Fringe	Floodway	100-YR Total	500-YR sans 100-YR	500-YR Total
Local road, major	21.93	3.61	25.54	2.99	28.53
Primary highway	3.49	-	3.49	0.88	4.36
Ramp	0.03	0.10	0.13	-	0.13
Road, parking area	0.06	-	0.06	0.14	0.20
Service road	-	-	-	-	-
State/county highway	14.35	4.25	18.60	2.68	21.28
Thoroughfare, major	0.22	-	0.22	-	0.22
Traffic circle	-	-	-	-	-
Transmission Line	7.21	1.33	8.54	0.96	9.50
Grand Total	**154.46**	**16.95**	**171.41**	**9.58**	**180.98**

Roads

The following major roads in Napa County pass through the 100-year floodplain and thus are exposed to flooding:

- State HWY 29
- State HWY 128
- Silverado Trail
- Yount Street
- Trancas Street
- Zinfandel Lane
- Deer Park Road
- Sage Canyon Road
- Solano Avenue

Bridges

Flooding events can significantly impact road bridges. These are important because often they provide the only ingress and egress to some neighborhoods. An analysis showed that there are 56 bridges that are in or cross over the 100-year floodplain and no bridges in or crossing the 500-year floodplain.

Water and Sewer Infrastructure

Water and sewer systems can be affected by flooding. Floodwaters can back up drainage systems, causing localized flooding. Culverts can be blocked by debris from flood events, also causing localized urban flooding. Floodwaters can get into drinking water supplies, causing contamination. Sewer systems can be backed up, causing wastewater to spill into homes, neighborhoods, rivers and streams.

Levees

Levees have been built in Napa County to protect areas from the 100-year flood event. Levees and flood control channels have been built along the Napa River to protect surrounding agricultural areas and populated parts of the County from the 100-year flood event.

4.5.3.13 Future Trends in Development

Levees and structures have been built to protect the County from a 100-year flood event, and the Napa River Flood Control Project provides higher level of flood protection. The County currently can better address effects associated with future sea-level rise and other hydrodynamic factors that would increase the risk of flooding. (Napa County Climate Action Plan, 2018)

The U.S. Natural Resources Conservation Service (NRCS) has completed numerous small projects in the area and has others, including a project on Napa Creek, under consideration. Conn Creek, with a water-storage dam upstream, is well-controlled by dikes in the lower reaches. The Napa River is only traversed by discontinuous dikes, except for the tidal reaches.

The County and its planning partners are equipped to handle future growth within flood hazard areas. As a flood protection measure in Napa County, all developers are required to upgrade channels as far upstream and downstream as is necessary to convey the 1-percent annual chance flood without flooding their developments. As a result of this requirement, a few improvements have been made on short sections of Salvador Creek and American Canyon Creek. (FEMA, 2016)

All municipal planning partners have General Plans that address frequently flooded areas in their Safety Elements. All partners have committed to linking their General Plans to this MJHMP. This will create an opportunity for wise land use decisions as future growth impacts flood hazard areas.

4.5.3.14 Flood Hazard Problem Statements

As part of the mitigation action identification process, the Planning Committee for each jurisdiction identified issues and weaknesses, or problem statements, for their respective facilities based on the risk assessment and vulnerability analysis, utilizing the RAMP mapping tool and flood data. Flood problem statements for all participating jurisdictions are listed in Table 4-40.

Identifying these common issues and weaknesses assists the Planning Committee in understanding the realm of resources needed for mitigation. The goal is to have at least one mitigation action for every problem statement. See Table 5-6 for a full list of mitigation actions and the corresponding problem statements that they address. Each problem statement is coded with a problem number for cross-referencing between Table 4-40 and Table 5-6.

Table 4-40 Flood Problem Statements

Problem No.	Area of Concern	Mitigation Alternatives	Primary	Problem Description	Related MA
FL-27	Victim	PE&A - Public Education & Awareness , SP - Structural Projects	**American Canyon**	There are Approx. 1000 people living within the 500 Year Floodplain in the City of American Canyon.	**AC-07-2020, AC-07-2020**
FL-30	Victim	PE&A - Public Education & Awareness , SP - Structural Projects	**American Canyon**	There are 159 parcels within the 500 Year Floodplain in the City of American Canyon.	**AC-01-2013**
FL-31	Victim	PE&A - Public Education & Awareness , SP - Structural Projects	**American Canyon**	There are 68 parcels and approx. 280 residents within the 100 Year Floodplain in the City of American Canyon. Most of the at risk population is within the American Canyon Mobile Home Park.	**AC-01-2013**
FL-32	Victim	PE&A - Public Education & Awareness , SP - Structural Projects	**American Canyon**	There are 10 Critical Infrastructure Facilities in the 500 Year Flood Plain within the City of American Canyon.	**AC-07-2020**
FL-08	Victim	PRV - Prevention , PPRO - Property Protection , ES - Emergency Services	**Calistoga**	Approx. 800 people live in the 100 Year Flood Plain within the City of Calistoga.	**CL-01-2013, CL-11-2020**
FL-09	Victim	PRV - Prevention , PPRO - Property Protection , ES - Emergency Services	**Calistoga**	Approx. 100 people live in the 500 Year Flood Plain within the City of Calistoga.	**CL-01-2013, CL-11-2020**
FL-12	Victim	PRV - Prevention , PPRO - Property Protection , ES - Emergency Services , PE&A - Public Education & Awareness	**Calistoga**	There are 18 Critical Infrastructure Facilities in the 100 Year Flood Plain within the City of Calistoga	**CL-01-2013, CL-11-2020**
FL-33	Impact	PRV - Prevention , PPRO - Property Protection , PE&A - Public Education & Awareness , SP - Structural Projects	**Calistoga**	A severe flood event could disable or damage utilities and potentially impact the City of Calistoga's water supply.	**CL-10-2013**
FL-34	Threat	PRV - Prevention , PPRO - Property Protection , PE&A - Public Education & Awareness , SP - Structural Projects	**Calistoga**	Prolonged periods of heavy rain could lead to a flood event that threatens lives, property, and critical infrastructure.	**CL-10-2013**

Problem No.	Area of Concern	Mitigation Alternatives	Primary	Problem Description	Related MA
FL-01	Victim	SP - Structural Projects , PE&A - Public Education & Awareness , ES - Emergency Services	**County Unincorporated**	Napa County owns 3 farmworker centers in the Ag Preserve and all three are located within a flood zone. There are 60 people at each center for a total of 180 people. They are low-income and not able to check into a local hotel.	**NC-39-2020**
FL-10	Victim	PRV - Prevention , PPRO - Property Protection , ES - Emergency Services	**County Unincorporated**	Calistoga Elementary School is within the 100 Year Flood Plain and within a Dam Inundation Zone.	**NC-30-2020, NC-34-2020, NC-35-2020, NC-36-2020**
FL-24	Victim	PE&A - Public Education & Awareness , SP - Structural Projects	**County Unincorporated**	The County zoning and floodplain regulations and ordinances need to be updated on a regular basis to reflect changes in development, population increases, and other factors that could affect flooding in the County.	**NC-33-2020**
FL-26	Victim	PE&A - Public Education & Awareness , SP - Structural Projects	**County Unincorporated**	There are 34 RL properties in the unincorporated areas of Napa County with total loss claims at $2,781,788.32.	**NC-01-2013, NC-31-2020, NC-47-2020**
FL-37	Threat	SP - Structural Projects , PRV - Prevention , PPRO - Property Protection , ES - Emergency Services	**County Unincorporated**	Residents and business owners in the County might not be aware of natural hazards and the potential risks associated with them.	**NC-32-2020**
FL-40	Threat	SP - Structural Projects , PRV - Prevention , PPRO - Property Protection , ES - Emergency Services	**County Unincorporated**	Infrastructure such as roads and culverts located in the floodplain can be inundated and damaged or destroyed during flood events.	**NC-37-2020, NC-38-2020, NC-46-2020**
FL-41	Threat	SP - Structural Projects , PRV - Prevention , PPRO - Property Protection , ES - Emergency Services	**County Unincorporated**	Stormwater management can affect flood storage capacity.	**NC-48-2020, NC-50-2020**
FL-57	Threat	PRV - Prevention , NRP - Natural Resource Protection	**Howell Mountain MWC**	Chemical Contamination	**HM-06-2020**
FL-58	Threat	PRV - Prevention , NRP - Natural Resource Protection	**Howell Mountain MWC**	Environmental Stability/Wildlife Habitat Destroyed.	**HM-06-2020**
FL-02	Impact	SP - Structural Projects	**Napa Flood Control & Water District**	Storm water infrastructure capacity needs to be evaluated and improved for high intensity rainfall events.	**NC-01-2013, NFC-01-2013, NFC-02-2013, NFC-03-2013, NFC-04-2013, NFC-05-2020**

Problem No.	Area of Concern	Mitigation Alternatives	Primary	Problem Description	Related MA
FL-03	Impact	PPRO - Property Protection	**Napa Flood Control & Water District**	Many flood prone residential structures do not receive direct protection from the Measure 'A' Flood Project.	**NC-31-2020, NFC-01-2013, NFC-02-2013, NFC-05-2020**
FL-04	Impact	NRP - Natural Resource Protection	**Napa Flood Control & Water District**	Annual restoration efforts are needed along the Napa River.	**NFC-04-2013, NFC-07-2020, NFC-08-2020**
FL-05	Impact	SP - Structural Projects	**Napa Flood Control & Water District**	Storm water channels need to be routinely inspected in order to reduce the possibility of localized flooding.	**NFC-05-2020**
FL-06	Threat	PRV - Prevention , NRP - Natural Resource Protection	**Napa Flood Control & Water District**	Invasive exotic weeds rapidly invade stream channels, often growing aggressively to the exclusion of other riparian species, and can significantly reduce channel capacity. Managing invasive vegetation is a continuous, routine, and on-going activity of the District's stream maintenance program.	**NFC-05-2020, NFC-06-2020**
FL-35	Impact	PRV - Prevention , PPRO - Property Protection , PE&A - Public Education & Awareness , SP - Structural Projects	**Napa Valley College**	Napa Valley College could be impacted by casualties, property damage, business interruption, financial loss, environmental contamination during a flood event.	**NC-32-2020, NVC-01-2013, NVC-03-2013, NVC-07-2020**
FL-36	Threat	PRV - Prevention , PPRO - Property Protection , NRP - Natural Resource Protection , SP - Structural Projects	**Napa Valley College**	Half of campus (buildings and property) could be under water during a flood event at either Napa Valley College Campus (City of Napa or St. Helena).	**NC-32-2020, NVC-01-2013, NVC-03-2013, NVC-07-2020**
FL-15	Victim	PRV - Prevention , PPRO - Property Protection , ES - Emergency Services , PE&A - Public Education & Awareness	**St. Helena**	There are approx. 500 people living within the 100 Year Floodplain in the City of St. Helena	**NC-31-2020, SH-04-2020**
FL-16	Victim	PRV - Prevention , PPRO - Property Protection , ES - Emergency Services , PE&A - Public Education & Awareness	**St. Helena**	There are approx. 200 people living within the 500 Year Floodplain in the City of St. Helena	**NC-31-2020**
FL-25	Victim	PE&A - Public Education & Awareness , SP - Structural Projects	**St. Helena**	St. Helena has one RL property that has two loss claims for a total paid claims amount of $121, 129.32 located at 222 Pope Street.	**SH-01-2020, SH-04-2020**

Problem No.	Area of Concern	Mitigation Alternatives	Primary	Problem Description	Related MA
FL-42	Impact	PE&A - Public Education & Awareness , PPRO - Property Protection	**St. Helena**	Damaged / Destroyed structures and vineyards: Displaced residents needing shelter, food and water. Businesses unable to open; economic impact to business and employees. Tourism impacted.	**SH-01-2020**
FL-43	Impact	PE&A - Public Education & Awareness	**St. Helena**	Traffic congestion: Civilians leaving area create traffic jams on all roads	**SH-06-2020**
FL-44	Impact	PE&A - Public Education & Awareness	**St. Helena**	Looting: Evacuated areas subject to looting	**SH-06-2020**
FL-45	Impact	PE&A - Public Education & Awareness	**St. Helena**	Public safety and city staff; Work long hours, strain on family. Homes may be threatened.	**SH-12-2020**
FL-46	Impact	PRV - Prevention	**St. Helena**	Pratt and Pope Street bridges in St. Helena damaged or water flow blocked by debris.	**SH-13-2020**
FL-47	Impact	PE&A - Public Education & Awareness	**St. Helena**	Evacuation and shelter of impacted people.	**SH-06-2020**

4.5.4 Severe Weather Hazard Profile

Severe weather refers to any dangerous meteorological phenomena with the potential to cause damage, serious social disruption, or loss of human life. It includes thunderstorms, downbursts, tornadoes, waterspouts, snowstorms, ice storms, and dust storms.

Severe weather events can be categorized into two groups: those that form over wide geographic areas are classified as general severe weather; those with a more limited geographic area are classified as localized severe weather. Severe weather, technically, is not the same as extreme weather, which refers to unusual weather events at the extremes of the historical distribution for a given area.

The MJHMP Planning Committee identified four types of severe weather events typically impact Napa County:

- high wind,
- winter weather,
- hail, and
- high heat.

Thunderstorms are not highlighted as a severe weather hazard on their own, as the primary impact of thunderstorms is the potential spread of wildfire, which is described in detail in Section 4.5.1.

The following are characteristics of severe weather events that can occur in Napa County:

High Wind

Damaging winds are classified as those exceeding 60 mph. Damage from such winds accounts for half of all severe weather reports in the lower 48 states and is more common than damage from tornadoes. Wind speeds can reach up to 100 mph and can produce a damage path extending for hundreds of miles. There are seven types of damaging winds:

- **Straight-line winds**—Any thunderstorm wind that is not associated with rotation; this term is used primarily to differentiate from tornado winds. Most thunderstorms produce some straight-line winds as a result of outflow generated by the thunderstorm downdraft.
- **Downdrafts**—A small-scale column of air that rapidly sinks toward the ground.
- **Downbursts**—A strong downdraft with horizontal dimensions larger than 2.5 miles resulting in an outward burst or damaging winds on or near the ground. Downburst winds may begin as a microburst and spread out over a wider area, sometimes producing damage similar to a strong tornado. Although usually associated with thunderstorms, downbursts can occur with showers too weak to produce thunder.

- **Microbursts**—A small concentrated downburst that produces an outward burst of damaging winds at the surface. Microbursts are generally less than 2.5 miles across and short-lived, lasting only 5 to 10 minutes, with maximum wind speeds up to 168 mph. There are both wet and dry microbursts:. A wet microburst is accompanied by heavy precipitation. Dry microbursts, common in places like the high plains and the intermountain west, occur with little or no precipitation reaching the ground.

- **Gust front**—A gust front is the leading edge of rain-cooled air that clashes with warmer thunderstorm inflow. Gust fronts are characterized by a wind shift, temperature drop, and gusty winds out ahead of a thunderstorm. Sometimes the winds push up air above them, forming a shelf cloud or detached roll cloud.

- **Derecho**—A derecho is a widespread thunderstorm wind caused when new thunderstorms form along the leading edge of the boundary formed by horizontal spreading of thunderstorm-cooled air. The word "derecho" is of Spanish origin and means "straight ahead." Thunderstorms feed on the boundary and continue to reproduce. Derechos typically occur in summer when complexes of thunderstorms form over plains, producing heavy rain and severe wind. The damaging winds can last a long time and cover a large area.

- **Bow Echo**—A bow echo is a linear wind front bent outward in a bow shape. Damaging straight-line winds often occur near the center of a bow echo. Bow echoes can be 200 miles long, last for several hours, and produce extensive wind damage at the ground.

Winter Weather / Freeze Events

Winter weather in Napa County usually consists of heavy rains from November to April and occasional frost events. These heavy rain storms ('Atmospheric River Storms') can deliver over 1" rain per hour over extended time frames and saturate soils. For more information on flooding events caused by heavy rain storms, please refer to the Flood Hazard profile in 4.5.3.

Late or early freeze events can have a devastating effect on agriculture and the economy of the region. Freeze events are becoming less exceptional as extreme weather conditions become more common due to climate change. See Section 4.5.6.2, Extreme Weather Conditions Section in the Climate Change Hazard Profile.

Hail

Hail occurs when updrafts in thunderstorms carry raindrops upward into extremely cold areas of the atmosphere where they freeze into ice. Super-cooled water may accumulate on frozen particles near the backside of a storm as they are pushed forward across and above the updraft by the prevailing winds near the top of the storm. Eventually, the hailstones encounter downdraft air and fall to the ground.

Hailstones grow two ways: by wet growth or dry growth. In wet growth, a tiny piece of ice is in an area where the air temperature is below freezing, but not super cold. When the tiny piece of ice collides with a

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super-cooled drop, the water does not freeze on the ice immediately. Instead, liquid water spreads across tumbling hailstones and slowly freezes. Since the process is slow, air bubbles can escape, resulting in a layer of clear ice. Dry-growth hailstones grow when the air temperature is well below freezing, and the water droplet freezes immediately as it collides with the ice particle. The air bubbles are "frozen" in place, leaving cloudy ice.

Hailstones can have layers like an onion if they travel up and down in an updraft, or they can have few or no layers if they are "balanced" in an updraft. One can tell how many times a hailstone traveled to the top of the storm by counting its layers. Hailstones can begin to melt and then re-freeze together, forming large, irregularly-shaped, damaging hail.

High Heat / Heat Waves

Heat waves are periods of abnormally hot weather lasting days to weeks. The number of heat waves has been increasing in recent years across the Country and locally. Climate change will continue to cause extreme heat events more often. Studies show that by the end of this century, the number of days with temperatures reaching 100°F or more is projected to increase dramatically across the United States as a result of climate change. What the public now considers to be an exceptional event could become routine across much of the country. As temperatures rise and extreme heat events become longer, more severe, and more frequent, experts expect to see more health problems and deaths caused by heat. (Prevention).

According to information provided by FEMA, extreme 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—not lightning, hurricanes, tornados, floods, or earthquakes—takes a greater toll. (National Weather Service, 2020) In 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. (Disasters Are Us, n.d.)

4.5.4.1 Policies, Plans, and Regulatory Environment

There are very few formal regulations that pertain directly to severe weather events. The International Building Code, adopted by the participating jurisdictions, is generally adequate to properly address development impacts from severe weather events.

4.5.4.2 Past Events

The most common severe weather event is high wind. Since 2000, the North Bay region including Napa County has experienced more than 300 high wind events in 92 days, and accounts for 3 deaths, 5 injuries, and $3.25 million in property damage in that time period.

Winter weather, hail, and high heat events are summarized in Table 4-41, as recorded by the National Oceanic and Atmospheric Administration (NOAA).

Table 4-41. Winter, Hail, and High Heat Events in Napa County, 2000-present

Date	Type	Deaths	Injuries	Property Damage	Crop Damage
1/16/2013	Extreme Cold/wind Chill	0	0	0.00K	0.00K
4/8/2017	Extreme Cold/wind Chill	0	0	0.00K	0.00K
1/6/2007	Frost/freeze	0	0	0.00K	3.000M
12/16/2008	Frost/freeze	0	0	20.00K	0.00K
1/4/2011	Frost/freeze	0	0	40.00K	0.00K
10/31/2019	Frost/freeze	0	0	0.00K	0.00K
10/31/2019	Frost/freeze	0	0	0.00K	0.00K
11/28/2019	Frost/freeze	0	0	0.00K	0.00K
11/28/2019	Frost/freeze	0	0	0.00K	0.00K
11/29/2019	Frost/freeze	0	0	0.00K	0.00K
11/29/2019	Frost/freeze	0	0	0.00K	0.00K
6/8/2004	Hail	0	0	0.00K	0.00K
10/26/2004	Hail	0	0	0.00K	0.00K
9/26/2014	Hail	0	0	0.00K	0.50K
6/11/2017	Hail	0	0	0.00K	0.00K
7/21/2006	Heat	1	0	0.00K	0.00K
7/21/2006	Heat	0	0	0.00K	0.00K
5/17/2009	Heat	0	0	0.00K	0.00K
5/17/2009	Heat	0	0	0.00K	0.00K
9/25/2019	Heat	0	0	0.00K	0.00K
1/1/2011	Heavy Snow	0	0	0.00K	0.00K

Source: NOAA Storm Events Database for Napa County, including the North Bay Interior and North Bay Mountain Zones: https://www.ncdc.noaa.gov/stormevents/

4.5.4.3 Location

Severe weather events have the potential to happen anywhere in the planning area. Communities in low-lying areas next to streams or lakes are more susceptible to flooding. Wind events are most damaging to areas that are heavily wooded. Figure 4-38, Figure 4-39, Figure 4-40, and Figure 4-41 show the distribution of average weather conditions in Napa County. The classes of wind power density shown in Figure 4-41 are explained in Table 4-42.

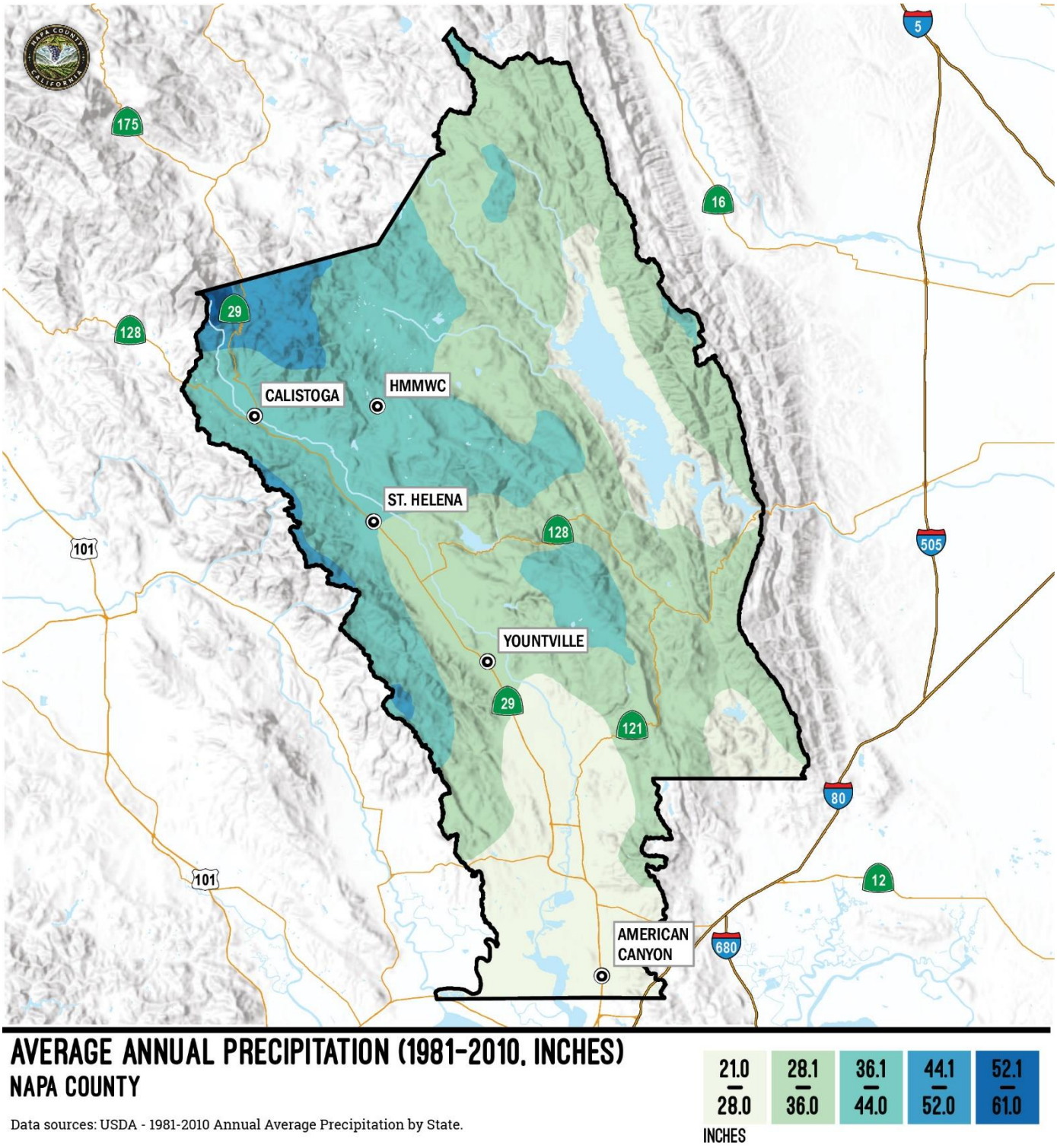

Figure 4-38: Average Annual Precipitation

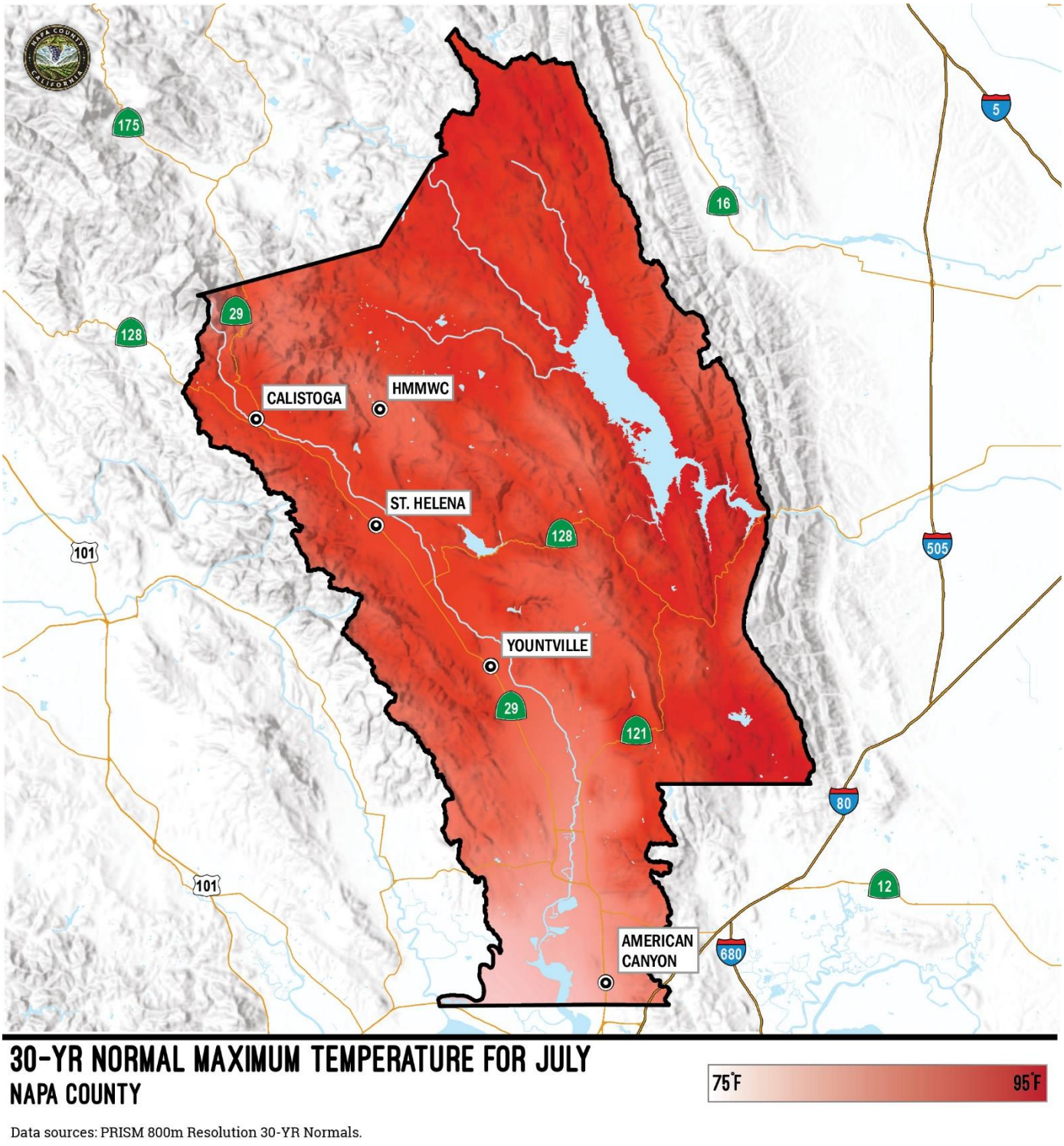

Figure 4-39: 30-YR Normal Maximum Temperature for July

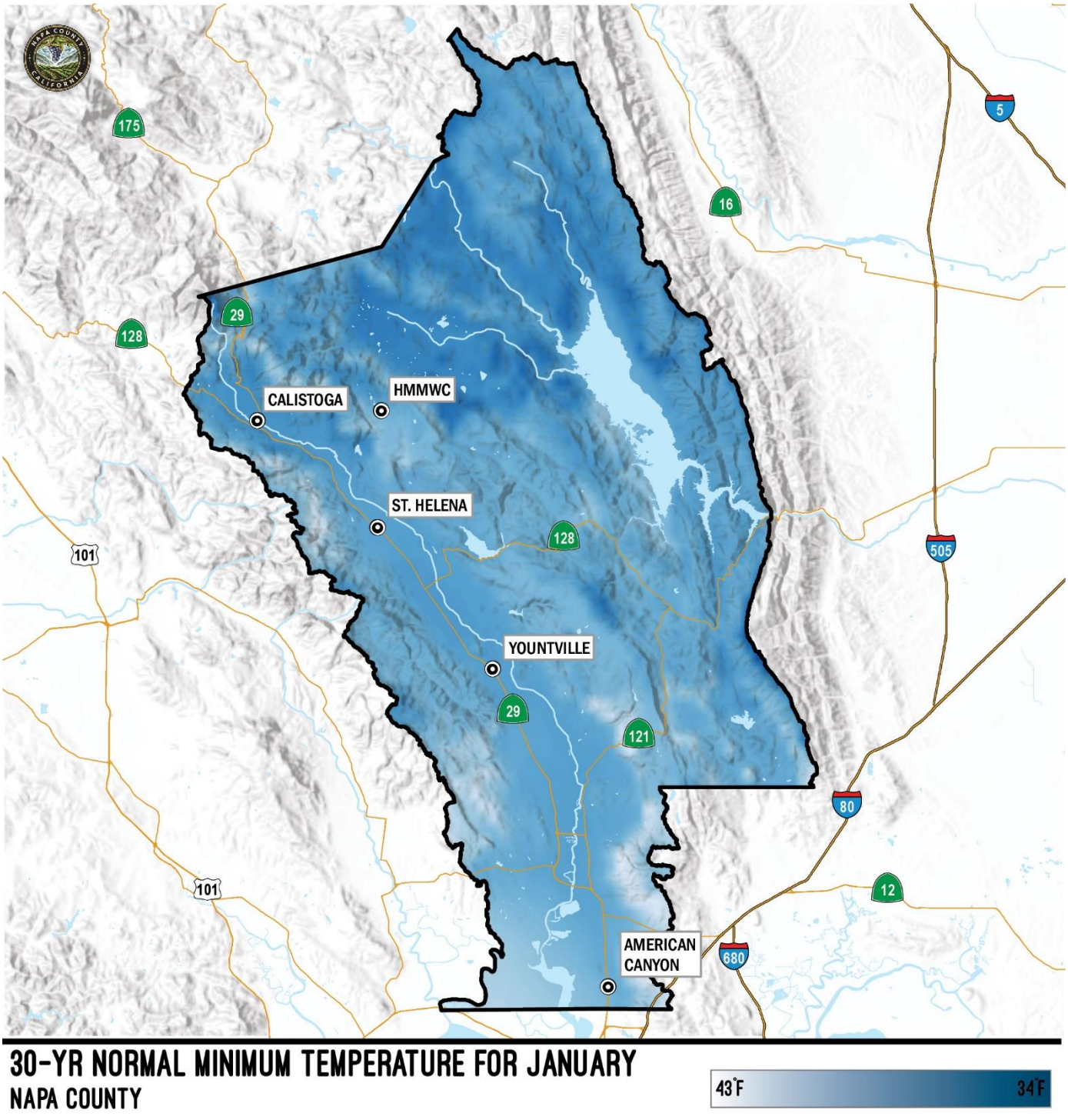

Figure 4-40: Napa County 30-YR Normal Minimum Temperature for January

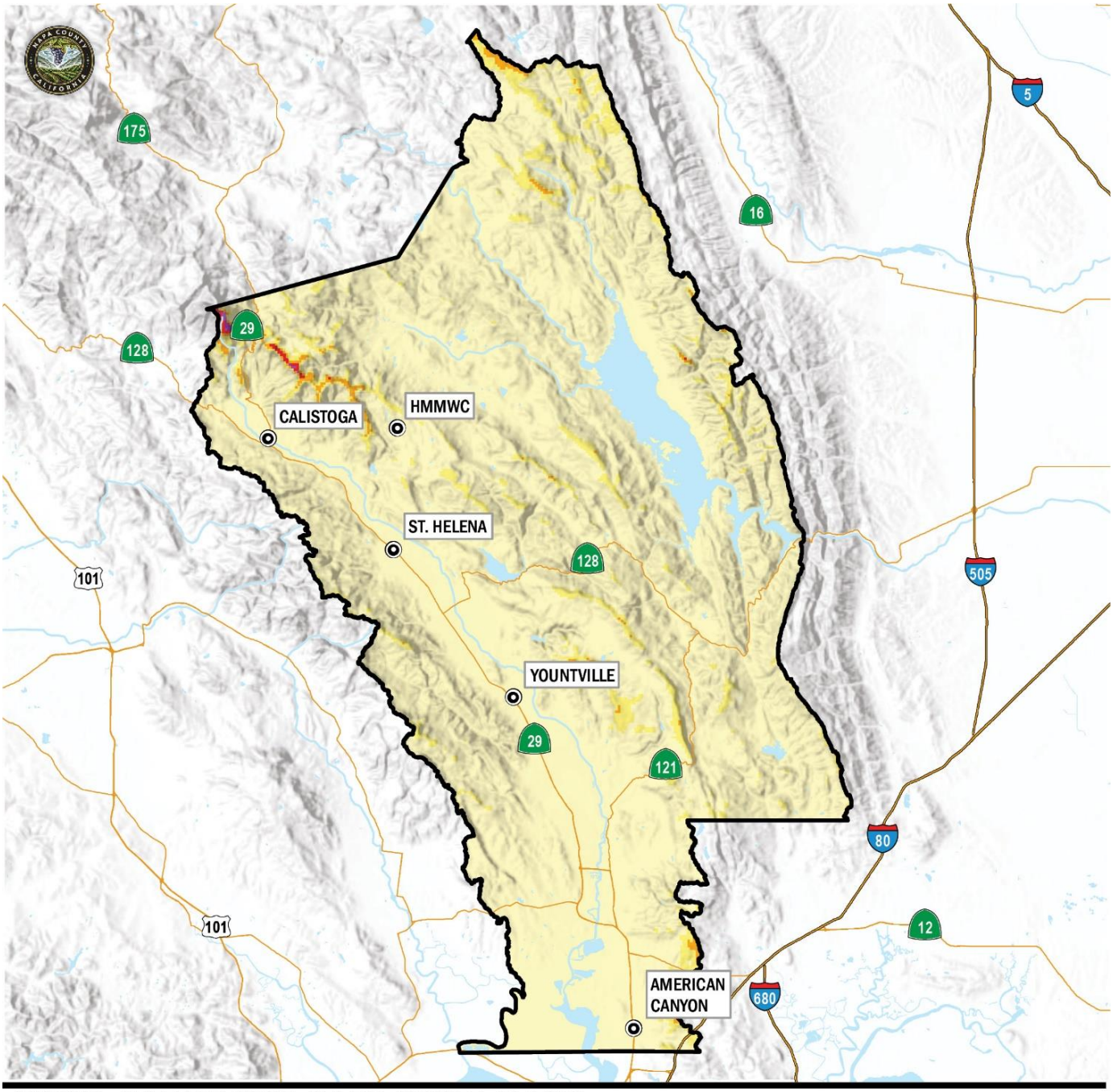

Figure 4-41: Napa County Annual Average Wind Speed (Power Class)

Table 4-42: Classes of Wind Power Density at 10 m and 50 m[a]

Wind Power Class	10 m (33 ft)		50 m (164 ft)	
	Wind Power Density (W/m2)	Speed[b] m/s (mph)	Wind Power Density (W/m2)	Speed[b] m/s (mph)
1	0	0	0	
	100	4.4 (9.8)	200	5.6 (12.5)
2	150	5.1 (11.5)	300	6.4 (14.3)
3	200	5.6 (12.5)	400	7.0 (15.7)
4	250	6.0 (13.4)	500	7.5 (16.8)
5	300	6.4 (14.3)	600	8.0 (17.9)
6	400	7.0 (15.7)	800	8.8 (19.7)
7	1000	9.4 (21.1)	2000	11.9 (26.6)

[a] Vertical extrapolation of wind speed based on the 1/7 power law.
[b] Mean wind speed is based on Rayleigh speed distribution of equivalent mean wind power density. Wind speed is for standard sea-level conditions. To maintain the same power density, speed increases 3%/1000 m (5%/5000 ft) elevation.

NOTE: Each wind power class should span two power densities. For example, Wind Power Class = 3 represents the Wind Power Density range between 150 W/m2 and 200 W/m2. The offset cells in the first column attempt to illustrate this concept.

4.5.4.4 Frequency/ Probability of Future Events

Severe weather events for Napa County since the year 2000, as shown in in Table 4-41, are most often related to heavy rain. Heavy rain events since the year 2000 have caused a total of $105,000 worth of property damage in Napa County.

4.5.4.5 Severity & Extent

The most common problems associated with severe storms are immobility and loss of utilities. Fatalities are uncommon, but can occur. Roads may become impassable due to flooding, downed trees, ice or snow, or a landslide. Crops can be damaged by below-freezing temperatures. Power lines may be downed due to high winds or ice accumulation, and services such as water or phone may not be able to operate without power. Lightning can cause severe damage and injury. Northern California experiences lightning caused wildfires every summer.

Windstorms can be a problem in the planning area and could cause damage to utilities. The predicted wind speed given in wind warnings issued by the National Weather Service is for a one-minute average; gusts may be 25 to 30 percent higher.

Hail events can occur anywhere in Napa County. Since 2000, events have occurred in Yountville, City of Napa, and Calistoga, with hail size ranging from .25 to .75 inches.

High heat events can occur throughout Napa County, and are projected to worsen with climate change. In 2019, the central part of the County that includes the City of Napa broke a 1904 record for the hottest recorded temperature; it was 102 degrees Fahrenheit at the Napa State Hospital. (Courtney, 2019)

4.5.4.6 Warning Time

Meteorologists can often predict the likelihood of a severe storm. This can give several days of warning time. However, meteorologists cannot predict the exact time of onset or severity of the storm. Some storms may come on more quickly and have only a few hours of warning time.

The Napa County Emergency Services Department uses the Integrated Public Alert and Warning System (IPAWS) to provide the public with life-saving information quickly.

4.5.4.7 Secondary Hazards

The most significant secondary hazards associated with severe local storms are floods, falling and downed trees, landslides, downed power lines, and wildfire. Heavy rain can overwhelm both natural and man-made drainage systems, causing overflow and property destruction. Landslides occur when the soil on slopes becomes oversaturated and fails. Landslides are further outlined as slope failure in Section 4.5.7, while flooding is analyzed in Section 4.5.3.

4.5.4.8 Severe Weather Vulnerability Analysis

4.5.4.8.1 Population

It can be assumed that the entire planning area is exposed to some extent to severe weather events. Certain areas are more exposed due to geographic location and local weather patterns. Populations living at higher elevations with large stands of trees or power lines may be more susceptible to wind damage and black out, while populations in low-lying areas are at risk for possible flooding.

Vulnerable populations such as the elderly, low income or linguistically isolated populations, people with life-threatening illnesses, and residents living in areas that are isolated from major roads. Power outages can be life threatening to those dependent on electricity for life support. Isolation of these populations is a significant concern. These populations face isolation and exposure during severe weather events and could suffer more secondary effects of the hazard.

4.5.4.8.2 Property

All property is vulnerable during severe weather events, but properties in poor condition or in particularly vulnerable locations may risk the most damage. Those in higher elevations and on ridges may be more prone to wind damage. Those that are located under or near overhead lines or near large trees may be vulnerable to falling ice or may be damaged in the event of a collapse. Crops may be damaged by frost, especially in February when the first stages of vine growth are occurring, and plants are more susceptible to damage.

4.5.4.8.3 Critical Facilities and Infrastructure

All critical facilities exposed to flooding are also likely exposed to severe weather. Additional facilities on higher ground may also be exposed to wind damage or damage from falling trees. The most common problems associated with severe weather are loss of utilities. Downed power lines can cause blackouts, leaving large areas isolated. Phone, water, and sewer systems may not function. Roads may become impassable due to ice or snow or from secondary hazards such as landslides.

4.5.4.8.4 Lifelines

Loss of roads or power and communication lines are the primary transportation failures resulting from severe weather, mostly associated with secondary hazards. Landslides caused by heavy prolonged rains can block roads. High winds can cause significant damage to trees and power lines, blocking roads with debris, incapacitating transportation, isolating population, and disrupting ingress and egress. Snowstorms in higher elevations can significantly impact the transportation system and the availability of public safety services. Of particular concern are roads providing access to isolated areas and to vulnerable populations.

Prolonged obstruction of major routes due to landslides, snow, debris or floodwaters can disrupt the shipment of goods and other commerce. Large, prolonged storms can have negative economic impacts for an entire region.

Severe windstorms, downed trees, and ice can create serious impacts on power and above-ground communication lines. Freezing of power and communication lines can cause them to break, disrupting electricity and communication. Loss of electricity and phone connection would leave certain populations isolated because residents would be unable to call for assistance.

4.5.4.8.5 Future Trends in Development

All future development will be affected by severe storms. The ability to withstand impacts lies in sound land use practices and consistent enforcement of codes and regulations for new construction. The participating jurisdictions have adopted the International Building Code in response to California mandates. This code is equipped to deal with the impacts of severe weather events. Land use policies identified in general plans within the planning area also address many of the secondary impacts, such as

flood and landslide, of the severe weather hazard. With these tools, the participating jurisdictions are well equipped to deal with future growth and the associated impacts of severe weather.

4.5.4.8.6 Severe Weather Hazard Problem Statements

As part of the mitigation action identification process, the Planning Committee for each jurisdiction identified issues and weaknesses (aka problem statements) for their respective facilities based on the risk assessment and vulnerability analysis, utilizing the RAMP mapping tool and severe weather data. Severe weather problem statements for all participating jurisdictions are listed in Table 4-43.

Identifying these common issues and weaknesses assists the Planning Committee in understanding the realm of resources needed for mitigation. The goal is to have at least one mitigation action for every problem statement. See Table 5-6 for a full list of mitigation actions and the corresponding problem statements that they address. Each problem statement is coded with a problem number for cross-referencing between Table 4-43 and Table 5-6.

Table 4-43 Severe Weather Problem Statements

Problem No.	Area of Concern	Mitigation Alternatives	Primary	Problem Description	Related MA
SW-02	Threat	PRV - Prevention	**American Canyon**	Heavy rains during winter months could cause flooding (but not as severe as the northern parts of the valley).	**NC-12-2020, NC-13-2020, NC-14-2020**
SW-04	Threat	SP - Structural Projects, PE&A - Public Education & Awareness	**Calistoga**	Heavy rains during winter months could cause flooding within the City of Calistoga.	**NC-12-2020, NC-13-2020, NC-14-2020**
SW-06	Threat	PRV - Prevention , NRP - Natural Resource Protection , PPRO - Property Protection , PE&A - Public Education & Awareness	**Calistoga**	Winds associated with severe weather could spark or exacerbate wildfire conditions within the City of Calistoga.	**CL-02-2020**
SW-07	Threat	PRV - Prevention , NRP - Natural Resource Protection , PPRO - Property Protection , PE&A - Public Education & Awareness	**Calistoga**	Severe winds could damage electrical infrastructure and lead to downed trees within the City of Calistoga.	**CL-02-2020, CL-07-2020**
SW-03	Threat	PRV - Prevention , NRP - Natural Resource Protection , PE&A - Public Education & Awareness	**County Unincorporated**	Heavy rains during winter months could cause flooding. Heavy winds could cause wildfires.	**NC-12-2020, NC-13-2020, NC-14-2020, NC-11-2020**

Problem No.	Area of Concern	Mitigation Alternatives	Primary	Problem Description	Related MA
SW-01	Threat	SP - Structural Projects	**Napa Flood Control & Water District**	Heavy rains during winter months could cause flooding.	**NC-12-2020, NC-13-2020, NC-14-2020, NC-11-2020**
SW-05	Threat	SP - Structural Projects , PE&A - Public Education & Awareness	**Napa Valley College**	Heavy rains during winter months could become localized flooding (but would be minimal).	**NC-12-2020, NC-13-2020, NC-14-2020**
SW-08	Impact	PRV - Prevention , NRP - Natural Resource Protection , PPRO - Property Protection , PE&A - Public Education & Awareness	**Napa Valley College**	Napa Valley College could be impacted by property damage, financial loss, and environmental contamination during severe weather events.	**NC-11-2020**
SW-09	Victim	PRV - Prevention , ES - Emergency Services , PPRO - Property Protection , PE&A - Public Education & Awareness	**Napa Valley College**	Napa Valley College has a population that is vulnerable to severe weather events.	**NC-12-2020, NC-13-2020, NC-14-2020, NC-11-2020**

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4.5.5 Drought Hazard Profile

California's water resources have been stressed by periodic drought cycles and, in some places, overuse, creating the need for unprecedented restrictions in water diversions from the Sacramento-San Joaquin Delta in recent years. Climate change is expected to increase drought and extreme weather. While the duration of drought is always in question, it is certain that California and Napa County will continue to be impacted by drought. (California Drought Contingency Plan, 2013)

4.5.5.1 Drought in California

Drought has impacted almost every county in California at one time or another, causing more than $2.6 million in damage. Droughts exceeding three years are relatively rare in northern California, the source of much of the state's water supply. The 1929-1934 drought established the criteria commonly used in designing storage capacity and yield for large northern California reservoirs. The driest single year in California's measured hydrologic history was 1977.

Past experience shows that drought impacts in California are felt first by those most dependent on annual rainfall: agencies fighting wildfires, ranchers engaged in dryland grazing, rural residents relying on wells in low-yield rock formations, or small water systems lacking a reliable water source.

Most of California's precipitation comes from storms moving across the Pacific Ocean. The path followed by the storms is determined by the position of an atmospheric high-pressure belt that normally shifts southward during the winter, allowing low pressure systems to move into the state. On average, 75 percent of California's annual precipitation occurs between November and March, with 50 percent occurring between December and February. If a persistent Pacific high-pressure zone takes hold over California mid-winter, the water year tends to be dry .

A typical water year produces about 100 inches of rainfall over the North Coast, 50 inches of precipitation (combination of rain and snow) over the Northern Sierra, 18 inches in the Sacramento area, and 15 inches in the Los Angeles area. In extremely dry years, these annual totals can fall to as little as one half, or even one third of these amounts.

Napa County and other public agencies have been monitoring local groundwater resources since the mid 1900s. Based on recent studies and bi-annual monitoring of groundwater levels in over 100 volunteered wells, level trends in the Napa Valley Sub-basins of the Napa-Sonoma Valley Groundwater Basin are stable in the majority of wells with long-term records. Although some wells show a response to drought conditions, levels in recent drought years are generally higher than those during the 1976 to 1977 drought. Elsewhere in the County long-term groundwater level records are more limited, with the exception of the Milliken-Sarco-Tulucay (MST) Subarea. Groundwater level declines observed in the MST Subarea as early as the 1960s and 1970s have stabilized since about 2008. The observation that groundwater level responses differ within the MST Subarea and even within the north, central, and southern sections of this subarea

indicate that localized conditions, whether geologic or anthropogenic in nature, might be the primary influence on conditions in the subarea. (What is Known About Groundwater, n.d.)

4.5.5.2 Policies, Plans, and Regulatory Environment

2018 Napa County Climate Action Plan

The Climate Action Plan (CAP) provides a comprehensive roadmap to address the challenges of climate change in unincorporated Napa County. The following measures support the County's drought mitigation efforts:

Measure WA-1: Amend or revise water conservation regulations for landscape design.

The County will consider expanding its existing water conservation ordinance (Chapter 18.118) to include homeowner-provided landscaping projects, as currently they are exempted. Other potential amendments can include minimum drought tolerant plant species and cash-for-grass turf rebates.

Measure WA-2: Adopt a new water conservation ordinance for commercial and residential land uses limiting outdoor watering.

The County will adopt a new water conservation ordinance for commercial and residential land uses that focuses on limiting on-site outdoor and indoor water use. Requirements include:

- limiting outdoor watering to 2 days per week and having written violations for the first offense and increasing fines for each offence thereafter, waiving a second offense fee after an offender attends a 2-hour water conservation seminar;
- staggering allowable watering days on an address-number basis (e.g., even address numbers can only water on Tuesday and Saturday);
- banning most lawn and landscape watering on consecutive days and irrigation within 48 hours of measurable rainfall, similar to the City of Napa's water conservation ordinance;
- banning outdoor car washing on certain days of the week; and
- providing educational material for residents and businesses on water conservation tips.

Measure WA-3: Expedite and/or reduce permit fees associated with water conservation installations in existing facilities.

Measure WA-4: Require water audits for large new commercial or industrial projects and significant expansions of existing facilities.

Napa County Drought Tolerant Landscaping Requirements

Numerous County Ordinances require drought tolerant plantings, including the following:

- Commercial Limited District- All required landscaping shall be irrigated and permanently maintained and shall include drought-tolerant plantings to maximum extent feasible. § 18.28.050
- Marine Commercial District- All required landscaping shall be irrigated and permanently maintained. Landscaping shall be limited to drought-tolerant plantings to the maximum extent feasible. § 18.34.050
- Public Lands District- In the selection of new plant materials, preference shall be given to native and drought-tolerant species, and to species which are hardy, long-lived, and require little maintenance. § 18.50.060
- Commercial Neighborhood District- All required landscaping shall be irrigated and permanently maintained by the owner, lessee or occupant and shall include drought-tolerant plantings to the maximum extent feasible. § 18.32.060
- General Industrial Zoning District- In the selection of new plant materials, preference shall be given to native and drought-tolerant species, and to species which are hardy, long-lived, and require little maintenance. Landscaping material shall also be consistent with any applicable approved master landscape plan. § 18.44.110
- Conservation Regulations- Plant materials shall be drought-tolerant and compatible with the existing habitat area in which the project is located. § 18.108.100

Statewide Emergency Water Conservation Regulations

In 2016, the State Water Resources Control Board (Water Board) adjusted emergency water conservation regulations indefinitely in recognition of the differing water supply conditions and ongoing drought across the state. Executive Order B-37-16 Making Water Conservation a California Way of Life updates temporary emergency water restrictions and transitions to permanent, long-term improvements in water use by:

- Use water more wisely
- Eliminate water waste
- Strengthen local drought resilience
- Improve agricultural water use efficiency and drought planning

The Executive Order can be read in its entirety at:
http://www.tehamacountypublicworks.ca.gov/Flood/drought/exec%20order%20b-37-16.pdf

California Sustainable Groundwater Management Act

On September 16, 2014, Governor Brown signed into law a package of bills (SB1168, AB1739 and SB1319) collectively called the Sustainable Groundwater Management Act (SGMA). SGMA requires governments and water agencies of high and medium priority basins to halt overdraft and bring groundwater basins into balanced levels of pumping and recharge. There is one high priority basin (Napa Valley) and one medium priority basin (Napa- Sonoma Lowlands) in the County. Under SGMA, these basins should reach sustainability within 20 years of implementing their sustainability plans. For critically over-drafted basins, that will be 2040. For the remaining high and medium priority basins, 2042 is the deadline.

Executive Order B-37-16

In May 2016, Governor Brown issued Executive Order B-37-16 that included, among other directives, drought hazard and planning related actions. Directive #10 specified that, "For areas not covered by a Water Shortage Contingency Plan, the Department shall work with counties to facilitate improved drought planning for small water suppliers and rural communities." All of the Napa Valley governments, including Napa County, are working towards completing a new regional study.

California Water Plan

The California Water Plan presents strategic plan elements including a vision, mission, goals, guiding principles, and recommendations for current water conditions, challenges, and activities. The plan includes future uncertainties and climate change impacts, scenarios for 2050, and a roadmap for improving data and analytical tools needed for integrated water management and sustainability. The California Water Plan was updated most recently in 2018. See: https://water.ca.gov/Programs/California-Water-Plan.

4.5.5.3 Past Events

California experienced massive changes over the course of the twentieth century as evidenced by dramatic population increases and land use conversion. (Cal. Dep't of Water Resources, 2015) The California Department of Water Resources has state hydrologic data back to the early 1900s. The hydrologic data show multi-year droughts from 1912 to 1913, 1918 to 1920, 1922 to 1924, 2007-2009, and 2014 to 2017.

The most recent major drought in California spanned 2014-2017. With California facing water shortfalls in the driest year in recorded state history, California State Governor Jerry Brown, declared a drought state of emergency on January 17, 2014. In the State of Emergency declaration, Governor Brown directed state officials to assist farmers and communities that are economically impacted by dry conditions and to ensure the state can respond if Californians face drinking water shortages. The Governor also directed state agencies to use less water and hire more firefighters and initiated a greatly expanded water conservation public awareness campaign. On April 17, 2017, Brown issued Executive Order B-40-17, officially ending the drought state of emergency in all California counties except Fresno, Kings, Tulare, and Tuolumne.

The National Drought Monitor provides drought data and maps nationally and on a localized scale. The National Drought Monitor is the product of eleven agencies, from the NDMC, NOAA and USDA, and is available at http://droughtmonitor.unl.edu/. Figure 4-42 depicts the U.S. Drought Monitor conditions in California for both December 2017 and December 2018. In December 2017, as the declared drought ended in California, Napa County did not experience any drought conditions. One year later, however, the County already experienced abnormally dry to moderate drought conditions again.

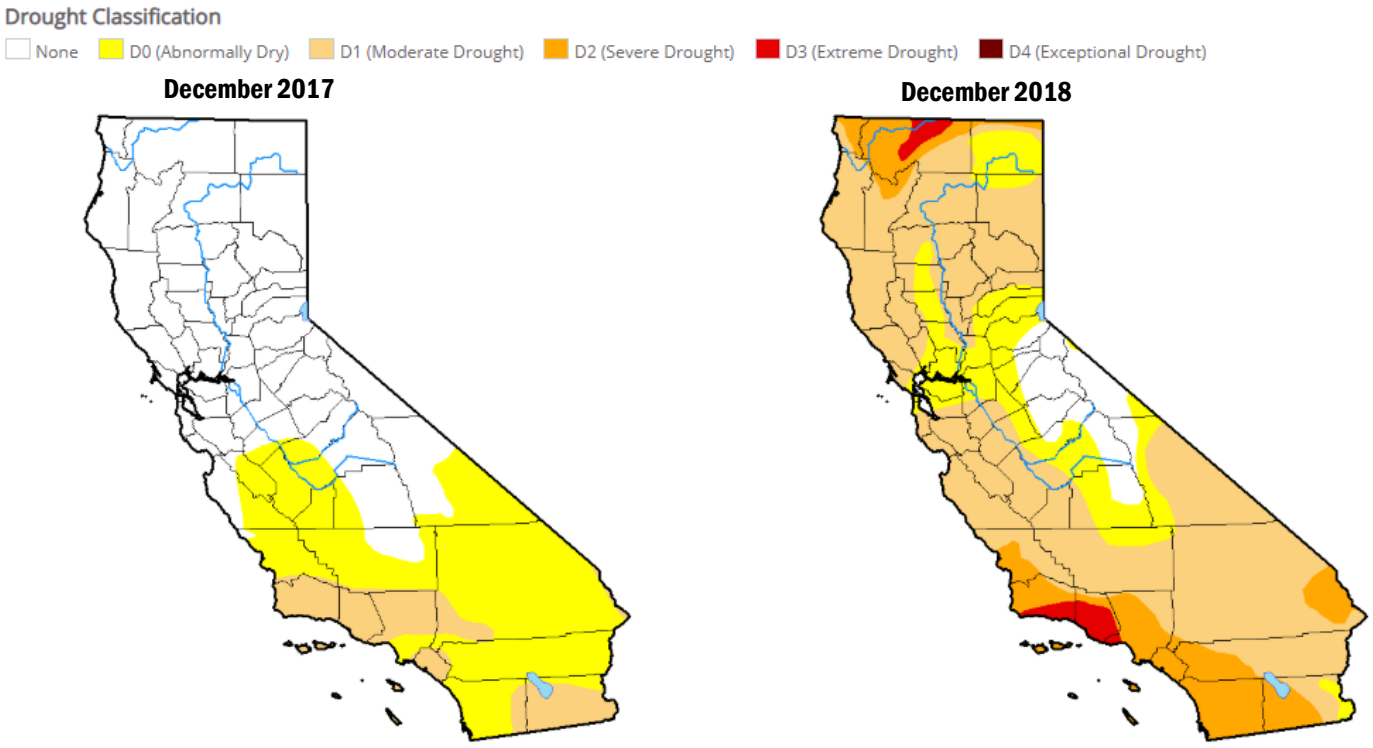

Figure 4-42: California Drought Conditions Last Year (2017) vs. Current Year (2018)

4.5.5.4 Location

Drought is one of the few hazards with the potential to directly or indirectly impact the entire population of Napa County, be it from water restrictions, higher water and food prices, reduced air or water quality, or restricted access to recreational areas. No portion of the County is immune from drought conditions. Lack of winter snowfall in the mountains can eventually lead to agricultural impacts due to decreased stream flows. Droughts of just a few weeks during critical periods of plant development can have disastrous effects on agriculture production. Reduced reservoir storage from decreased runoff in the mountains can lead to water shortages. Droughts that occur in populated areas may not have direct effects to the residents but may increase the threat of wildfire in the wildland urban interface areas.

4.5.5.5 Frequency/Probability of Future Occurrences

Currently there is no data on the probability of drought akin to data for predicting earthquakes or flood probability. Empirical studies conducted over the past century have shown that meteorological drought is never the result of a single cause. It is the result of many causes, often synergistic in nature; these include global weather patterns that produce persistent, upper-level high-pressure systems along the West Coast with warm, dry air resulting in less precipitation.

According to the results of the risk factor exercises for the participating jurisdictions, the probability of drought occurring in Napa County is likely (between 10 and 100% annual probability).

4.5.5.6 Severity

The severity of a drought depends on the degree of moisture deficiency, the duration, and the size and location of the affected area. The longer the duration of the drought and the larger the area impacted, the more severe the potential impacts. Droughts are not usually associated with direct impacts on people or property, but they can have significant impacts on agriculture, which can impact people indirectly.

The agricultural sector clearly demonstrates the site-specific nature of drought impacts. Agricultural drought impacts are normally felt earliest by those relying on unmanaged water supplies: entities carrying out dryland grazing and non-irrigated crop production, usually grain crops. Impacts to irrigated agriculture depend on the source and nature of the irrigation water supply, whether it be local groundwater, local surface water, or imported surface water, and any water rights or contractual provisions that may be associated with the source. The extent to which producers may mitigate water shortage impacts depends on multiple factors but is heavily influenced by economic considerations. Factors involved in making decisions about mitigating irrigation water shortages include availability and costs of pumping groundwater, price of alternative surface water sources, capital investments associated with maintaining permanent plantings, and status of international crop markets. (California Drought Contingency Plan, 2013)

Drought could have a devastating impact on the wine industry as well as the economy. The local wine industry and related businesses provides an annual economic impact of more than $9.4 billion locally and nearly $34 billion in the United States. The industry also creates 44,000 jobs in Napa County and nearly 190,000 nationwide. (Napa Valley Vintners)

Unlike most disasters, droughts normally occur slowly but last a long time. On average, the nationwide annual impacts of drought are greater than the impacts of any other natural hazard. They are estimated to be between $6 billion and $8 billion annually in the United States and occur primarily in the agriculture, transportation, recreation and tourism, forestry, and energy sectors. Social and environmental impacts are also significant, although it is difficult to put a precise cost on these impacts.

Drought eventually affects groundwater sources but generally not as quickly as surface water supplies; 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. Much of the flow in streams comes from groundwater, especially during the summer when there is less precipitation and after snowmelt ends. Reduced groundwater levels mean that even less water will enter streams when steam flows are lowest.

A drought directly or indirectly impacts all people in affected areas. A drought can result in farmers not being able to plant crops or the failure of planted crops. This results in loss of work for farm workers and those in food processing and wine making jobs. Other water-dependent industries are commonly forced to shut down all or a portion of their facilities, resulting in further layoffs. A drought can harm recreational

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companies that use water (e.g., swimming pools, water parks, and river rafting companies) as well as landscape and nursery businesses because people will not invest in new plants if water is not available to sustain them.

4.5.5.7 Warning Time

Droughts are climatic patterns that occur over long periods of time. 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.

Scientists at this time do not know how to predict drought more than a month in advance for most locations. Predicting drought depends on the ability to forecast precipitation and temperature. Anomalies of precipitation and temperature may last from several months to several decades. How long they last depends on interactions between the atmosphere and the oceans, soil moisture and land surface processes, topography, internal dynamics, and the accumulated influence of weather systems on the global scale.

4.5.5.8 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.

4.5.5.9 Drought Vulnerability Analysis

All people, property, and environments in the Napa County planning area would be exposed to some degree to the impacts of moderate to extreme drought conditions.

Drought produces a complex web of impacts that spans many sectors of the economy and reaches well beyond the area experiencing physical drought. This complexity exists because water is integral to the ability to produce goods and provide services. Drought vulnerability of an activity usually depends on its water demand, how the demand is met, and what water supplies are available to meet the demand. California's 2018 Water Plan indicates that water demand in the state will continue to increase.

4.5.5.9.1 Population

The residents of the county rely on healthy watersheds to provide adequate water for domestic and agricultural purposes as well as to support the existence, use, and enjoyment of natural resources. Although the county has grown, it has grown relatively slowly, particularly compared to the other counties in the Bay Area. Napa County remains relatively small in terms of population as compared to other Bay Area counties. Based on regional trends, the Association of Bay Area Governments (ABAG) projects that Napa County will add 19,800 new residents between 2005 and 2030, and that 2,700 of those will reside within the unincorporated area (Napa County General Plan, 2008)

No significant life or health impacts are anticipated as a result of drought within the planning area.

4.5.5.9.2 Property

During drought years, property owners with shallow wells can be impacted by drought with increased demand on groundwater resources. Surface water supplies are often lower, which can reduce available supplies and increase cost. This sometimes encourages growers who historically used surface water to switch to groundwater, which has a permanent impact on the amount of users using groundwater.

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 also have significant impacts on landscapes, which could cause a financial burden to property owners. However, these impacts are not considered critical in planning for impacts from the drought hazard.

Well into the future, Napa County will be a place where agriculture is the primary land use, where a vast majority of the county is open space, and where residential and employment growth is concentrated in the incorporated cities and town and existing urbanized areas of the county. (Napa County General Plan, 2008). Drought can impact these important values in Napa County along with specific drought impacts to residents.

4.5.5.9.3 Critical Facilities

Critical facilities, as defined for this plan, will continue to be operational during a drought. Critical facility elements such as landscaping may not be maintained due to limited resources, but the risk to the planning area's critical facilities inventory will be largely aesthetic. For example, when water conservation measures are in place, landscaped areas will not be watered and may die. These aesthetic impacts are not considered significant.

4.5.5.10 Future Trends in Development

The County has several water conservation programs, including rebates for appliances and free-water saving devices for residents, that are helping to combat drought and other water supply issues, but the County is still currently vulnerable to water supply issues because of drought and other factors. The County will face challenges in providing sufficient water supplies in the future due to climate change effects, coupled with an increasing population (i.e., mostly in the incorporated areas) and increasing water demand. While the County has already taken steps towards achieving long-term groundwater sustainability, there is still a possibility that water supply availability may change in the future and will need to be further addressed. The Napa County Climate Action Plan provides recommended changes to the Napa County Code and other steps to conserve water and develop drought-tolerant landscapes. (Napa County Climate Action Plan, 2018)

Each participating jurisdiction has an established General Plan that includes policies directing land use and dealing with issues of water supply and the protection of water resources. These plans provide the

capability at the local level to protect future development from the impacts of drought. All participating jurisdictions reviewed their general plans as part of their hazard mitigation capability assessments. Deficiencies identified by these reviews can be identified as mitigation actions to increase the capability to deal with future trends in development.

In an effort to conserve water, Napa County promotes various conservation rebates from the Department of Water Resources (DWR) and other organizations. These rebates include the Save Our Water Rebate (turf removal at single-family residences), toilet rebates for homes and businesses in the Berryessa Watershed, the Bay Area Residential High-Efficiency Clothes Washer Rebate Program, water bill rebates, and water wise landscaping.

4.5.5.11 Drought and Climate Change Impacts

The long-term effects of climate change on regional water resources are unknown, but global water resources are already experiencing the following stresses without climate change:

- Growing populations
- Increased competition for available water
- Poor water quality
- Environmental claims
- Uncertain reserved water rights
- Groundwater overdraft
- Aging urban water infrastructure

With a warmer climate, droughts could increase in severity, frequency, and duration. According to the UC Davis Center for Watershed Sciences, water shortages in 2016 were projected to cost the agricultural industry a total of $550 million in direct costs and 1,815 in lost jobs. More frequent extreme events such as droughts could end up being more cause for concern than the long-term change in temperature and precipitation averages.

4.5.5.12 Drought Hazard Problem Statements

As part of the mitigation action identification process, each participating jurisdiction's Planning Committee identified issues and/or weaknesses (aka problem statements) for their respective facilities based on the risk assessment and vulnerability analysis, utilizing the RAMP mapping tool and historic flood data. Drought hazard problem statements are listed in Table 4-44.

Identifying these common issues and weaknesses assists the Planning Committee in understand the realm of resources needed for mitigation. The goal is to have at least one mitigation action for every problem statement. Projects or actions have been developed to mitigate each problem identified. See Table 5-6 for a full list of mitigation actions and corresponding problem statements that they address. Each problem statement is coded with a problem number for cross-referencing between Table 4-44 and Table 5-6.

Table 4-44 Drought Problem Statements

Problem No.	Area of Concern	Mitigation Alternatives	Primary	Problem Description	Related MA
DR-02	Threat	NRP - Natural Resource Protection	**American Canyon**	The City of American Canyon is without a local reservoir and has a limited water supply. Most of the City's water is imported from the State Water Project and the amount available each year varies depending on how much snow or rain is received in the Sierra Tahoe Mountains. An increase in demand due to new construction could raise prices for current customers.	**AC-02-2020, NC-17-2020**
DR-06	Impact	NRP - Natural Resource Protection , PE&A - Public Education & Awareness	**Calistoga**	The economy, agriculture, and water supply in the City of Calistoga could all be severely impacted by a major drought.	**NC-17-2020**
DR-07	Threat	NRP - Natural Resource Protection , PE&A - Public Education & Awareness	**Calistoga**	Drought increases the likelihood of wildfire associated threats to the City of Calistoga.	**CL-04-2020**
DR-08	Threat	NRP - Natural Resource Protection , PE&A - Public Education & Awareness	**Calistoga**	Drought has the potential to severely threaten the agricultural and tourism based economy, and the City's water supply.	**CL-09-2020**
DR-01	Impact	NRP - Natural Resource Protection	**County Unincorporated**	Climate change effects will result in variable water supplies and an increased need to preserve water quantity and quality in Napa County.	**NC-16-2020, NC-17-2020, NC-18-2020**
DR-50	Impact	PRV - Prevention , PE&A - Public Education & Awareness , SP - Structural Projects	**Howell Mountain MWC**	Severe drought could lead to water supply and delivery issues.	**HM-03-2020**
DR-51	Impact	PRV - Prevention , PE&A - Public Education & Awareness , NRP - Natural Resource Protection , SP - Structural Projects	**Howell Mountain MWC**	Severe drought could affect water quality.	**HM-06-2020**

Problem No.	Area of Concern	Mitigation Alternatives	Primary	Problem Description	Related MA
DR-52	Impact	PRV - Prevention , PE&A - Public Education & Awareness , NRP - Natural Resource Protection	**Howell Mountain MWC**	A severe drought would result in drier fuels which could create increased wildfire risk.	**HM-04-2020**
DR-53	Victim	PRV - Prevention , PE&A - Public Education & Awareness , NRP - Natural Resource Protection	**Howell Mountain MWC**	The water supply for the entire community of Angwin would be impacted by severe drought.	**HM-03-2020, HM-04-2020**
DR-54	Impact	PRV - Prevention , PPRO - Property Protection , PE&A - Public Education & Awareness , NRP - Natural Resource Protection	**Howell Mountain MWC**	Lack of water due to drought could impede fire fighting capabilities in the community of Angwin.	**HM-04-2020**
DR-55	Victim	PRV - Prevention , PE&A - Public Education & Awareness	**Howell Mountain MWC**	Severe drought would affect the HMMWC company customers.	**HM-03-2020**
DR-04	Impact	PRV - Prevention , NRP - Natural Resource Protection	**Napa COE**	Water for restrooms and drinking water in Napa County Office of Education facilities could become an issue if water needs to be rationed.	**NC-17-2020, NCOE-01-2020**
DR-09	Impact	PE&A - Public Education & Awareness	**St. Helena**	Lack of information for residents on water rationing.	**SH-15-2020**
DR-10	Impact	PE&A - Public Education & Awareness	**St. Helena**	Increased fire danger due to dry conditions.	**SH-16-2020**

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4.5.6 Climate Change Hazard Profile

Climate change refers to any distinct change in measures of climate lasting for a long period of time, more specifically major changes in temperature, rainfall, snow, or wind patterns. Climate change may be limited to a specific region or may occur across the whole Earth. Climate change may result from:

- Natural factors, such as changes in the Sun's energy or slow changes in the Earth's orbit around the Sun;
- Natural processes within the climate system, such as changes in ocean circulation, or
- Human activities that change the atmosphere's make-up, and the land surface, such as burning fossil fuels, cutting down forests, planting trees, or building developments in cities and suburbs.

The effects of climate change are varied and include warmer and more varied weather patterns, melting ice caps, and poor air quality, for example. As a result, climate change will likely worsen a number of natural hazards including wildfires, floods, drought, severe weather, and levee failure. Sea level rise, a direct result of climate change and related to flooding, affects communities in the San Francisco Bay Area. Sea level rise has the potential to inundate homes, businesses, and infrastructure located near the shorelines, as well as cause erosion of coastal lands over time.

The 2018 California State Hazard Mitigation Plan states that California is already experiencing the impacts of climate change, including prolonged drought, increased coastal flooding and erosion, and tree mortality. The state has also seen increased average temperatures, more extreme heat days, fewer cold nights, a lengthening of the growing season, shifts in the water cycle with less winter precipitation falling as snow, and both snowmelt and rainwater running off sooner in the year. The intensity of extreme weather events is also increasing. Extreme weather events and resulting hazards, such as heat waves, wildfires, droughts, and floods are already being experienced. (CalOES, 2018)

4.5.6.1 Sea Level Rise

Another outcome of global climate change is sea-level rise. The sea level rose during the 20th century, and observations and projections suggest that it will rise at a higher rate during the 21st century. Rising seas increase the risk of coastal flooding, storm surge inundation, coastal erosion and shoreline retreat, and wetland loss. The cities and infrastructure that line many coasts are already vulnerable to damage from storms, which is likely to increase as sea level continues to rise and inundate areas further inland.

Globally, sea level is rising primarily because global temperatures are rising, causing ocean water to expand and land ice to melt. However, sea-level rise varies from place to place. Sea-level rise along the Pacific coast depends on the global mean sea-level rise and also on regional factors, such as ocean and atmospheric circulation patterns in the northern Pacific Ocean, gravitational and deformational effects of land ice mass changes, and tectonics along the coast. The comparative importance of these factors determines whether local sea level is higher or lower than the global mean, and how fast it is changing,

which has enormous implications for coastal planning. (Sea-Level Rise for the Coasts of California, Oregon, and Washington, 2012) Areas exposed to sea level rise are depicted in Figure 4-43.

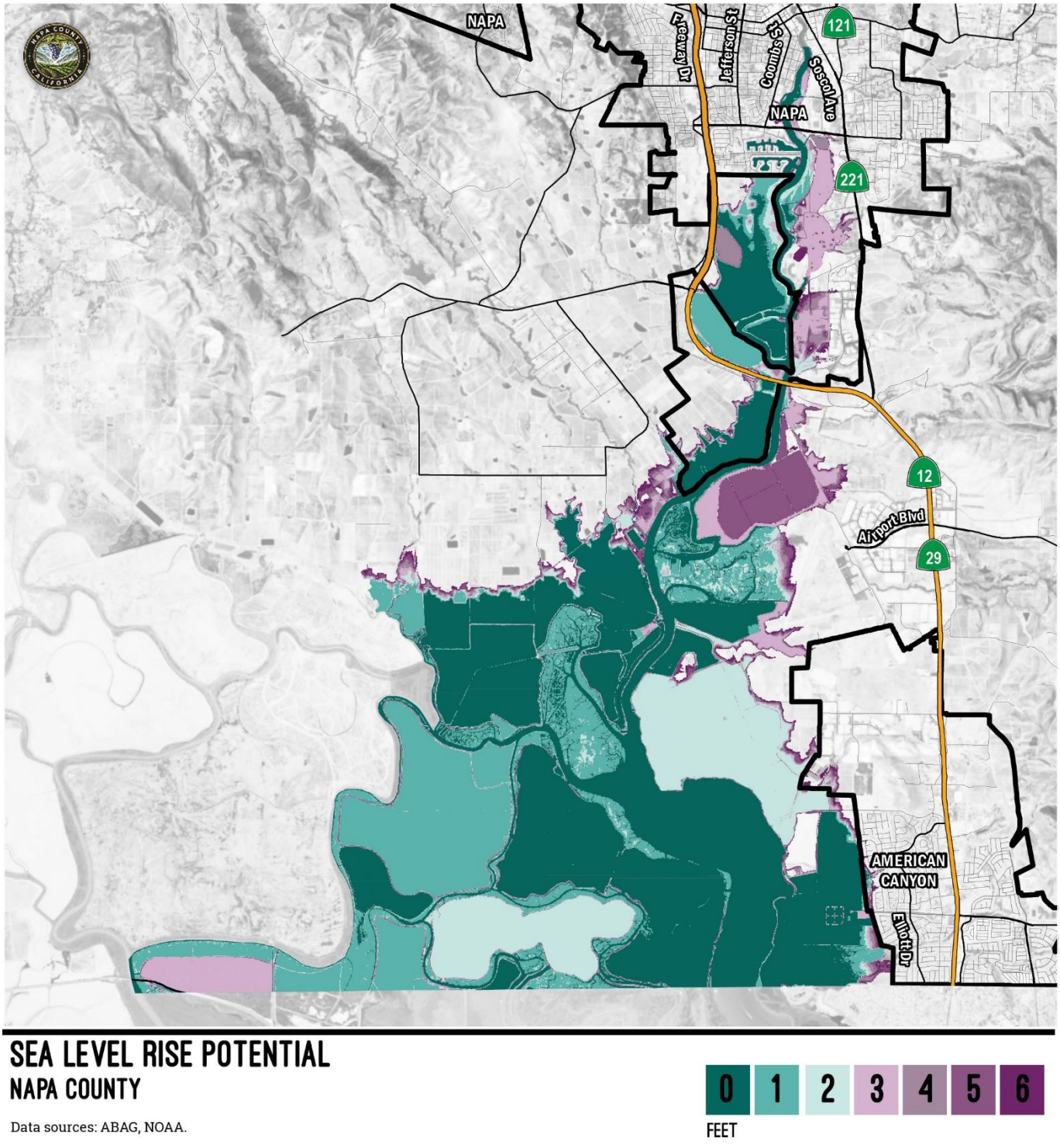

Figure 4-43: Sea Level Rise Potential

4.5.6.2 Extreme Weather Conditions

As the world has warmed, that warming has triggered many other changes to the Earth's climate. Changes in extreme weather and climate events, such as heat waves and droughts, are the primary way that most people experience climate change. Human-induced climate change has already increased the number and strength of these extreme events. Over the last 50 years, much of the U.S. has seen increases in prolonged periods of excessively high temperatures, heavy downpours, and in some regions, severe floods and droughts. (National Climate Assessment, 2014)

Extended frost threat is another result of climate change. In February 2018, grape growers prepared for extended frost threat, while coping with a lack of rainfall during what are typically the wettest months of the year. As climate change continues, bud break, or the appearance of shoots that will eventually yield grapes, will begin sooner, leaving the delicate new growth exposed to the hazards of frost and rain for a longer stretch of the growing season. (Lutz, 2018)

4.5.6.3 Policies, Plans, and Regulatory Environment

Successful efforts to address the challenges of climate change begin at the local level and include the implementation of environmentally sustainable practices designed to meet present and future energy needs.

Napa County 2018 Climate Action Plan

The Climate Action Plan (CAP) provides a comprehensive roadmap to address the challenges of climate change in unincorporated Napa County. Acting on climate change means reducing greenhouse gas (GHG) emissions from local sources and helping the community to adapt to climate change and improve its resilience over the long term.

In 2016, Senate Bill (SB) 32 was signed into law, which established a new statewide mid-term target of 40 percent below 1990 levels by 2030. This target aligns with those of leading international governments such as the 29-nation European Union, which adopted the same target in October 2014. The new 2030 target places California on a trajectory towards meeting its longer-term goal to reduce emissions to 80 percent below 1990 levels by 2050.

The CAP aims to achieve the following local community-wide GHG reduction targets for 2020 and 2030, and a longer-term goal for 2050:

- 2 percent below 2014 levels by 2020;
- 40 percent below 2014 levels by 2030; and
- 77 percent below 2014 levels by 2050.

Napa County General Plan

The 2008 Napa County General Plan Update was revised to address the new subject of global climate change, including the following goals and policies:

Goal for Conservation (CON)-15: Reduce emissions of local greenhouse gases that contribute to climate change.

> **Policy CON-65:** The County will support efforts to reduce and offset greenhouse gas (GHG) emissions and strive to maintain and enhance the County's current level of carbon sequestration functions through the following measures:
>
> - Study the County's natural, agricultural, and urban ecosystems to determine their value as carbon sequesters and how they may potentially increase.
> - Preserve and enhance the values of Napa County's plant life as carbon sequestration systems to recycle greenhouse gases.
> - Perpetuate policies in support of urban-centered growth and agricultural preservation preventing sprawl.
> - Perpetuate policies in support of alternative modes of transportation, including transit, paratransit, walking, and biking.
> - Consider GHG emissions in the review of discretionary projects. Consideration may include an inventory of GHG emissions produced by the traffic expected to be generated by the project, any changes in carbon sequestration capacities caused by the project, and anticipated fuel needs generated by building heating, cooling, lighting systems, manufacturing, or commercial activities on the premises. Projects shall consider methods to reduce GHG emissions and incorporate permanent and verifiable emission offsets.
> - Establish partnerships with experts, trade associations, non-governmental associations, and community and business leaders to support and participate in programs related to global climate change.
>
> **Policy CON-73:** The County will monitor the ecological effects of climate change in Napa County over time, including sea level rise, effects on water resources, local microclimates, native vegetation, agriculture, and the economy. Consistent with the principle of adaptive management, the County will adapt policies and operations to address identified effects as feasible.

2016 California Green Building Standards

The County has adopted the 2016 California Green Building Standards, also known as CALGreen Code. CALGreen Code establishes regulations for green building, nonresidential and residential buildings. Topics covered in the regulations include planning and design, energy efficiency, water efficiency and conservation, material conservation and resource efficiency and environmental quality. The code also includes voluntary measures for residential, nonresidential and health facilities.

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California Sustainable Communities and Climate Protection Act of 2008

The Sustainable Communities and Climate Protection Act of 2008 (Sustainable Communities Act, SB 375, Chapter 728, Statutes of 2008) looks to reduce GHG emissions through coordinated transportation and land use planning with the goal of more sustainable communities. Regional targets are established for GHG emissions reductions from passenger vehicle use by the sustainable communities strategy (SCS) established by each metropolitan planning organization (MPO). The SCS is an integral part of regional transportation plans (RTP) and contains land use, housing, and transportation strategies to meet GHG reductions targets.

SB 375 also supports state requirements that a City or County General Plan contains a Safety Element in addition to a Hazard Mitigation Plan. AB 2140 also requires a vulnerability assessment, adaptation goals, policies and objectives, and a set of feasible implementation measures.

California Adaptation Planning Guide (APG)

California has been taking action to address climate change for over 20 years, focusing on both greenhouse gas emissions reduction and adaptation. The California Adaptation Planning Guide (APG) provides guidance and support for communities addressing the unavoidable consequences of climate change.

4.5.6.4 Past Events

Climate change has never been directly responsible for any declared disasters. Past flooding, wildfire, levee failure, and drought disasters may have been exacerbated by climate change, but it is difficult to make direct connections to individual disasters. In addition, unlike earthquake and floods that occur over a finite time period, climate change is an on-going hazard, and many communities are already experiencing the effects. Other effects may not be seriously experienced for decades or may be avoided altogether by mitigation actions taken today.

Historic records from the San Francisco tidal gage, CA Station ID: 9414290, show that the sea level in the San Francisco Bay has risen eight inches from 1897 to 2006. Similarly, water level measurements from the tidal gage at Port Chicago, CA Station ID: 9415144, show an increase in mean sea level of 2.08 millimeters a year, which is equivalent to a change of 8.6 inches in 100 years.

According to the 2010 Association of Bay Area Governments Hazard Mitigation Plan, freezing conditions caused emergency conditions in the region in 1970, 1972, 1973, 1990, and 2007.

4.5.6.5 Location

The effects of climate change are not limited by geographical borders. Napa County, the State of California, the United States, and the rest of the world are all at risk of climate change. As such, the entire County is at risk to the effects of climate change.

4.5.6.6 Frequency/ Probability of Future Occurrences

In terms of how likely and quickly impacts will occur, temperature related impacts are the most likely near-term climate change exposure facing the County and should be addressed and prioritized in future adaptation planning efforts. While sea-level rise has a high certainty rating and is already occurring, its onset is not expected to occur until closer to the end of the century in terms of changes in areas already vulnerable to flooding or causing permanent inundation in tidally-influenced areas of the County. Addressing increases in flooding and wildfire risk have mid-term onsets and should be prioritized accordingly. (Napa County Climate Action Plan, 2018)

According to the 2010 Association of Bay Area Governments Hazard Mitigation Plan, climate change is one of the few natural hazards where the probability of occurrence is influenced by human action. In addition, unlike earthquake and floods that occur over a finite time period, climate change is an on-going hazard.

The 2009 California Climate Adaptation Strategy delineated how climate change may impact and exacerbate natural hazards in the future, including wildfires, extreme heat, floods, drought, and levee failure:

- Climate change is expected to lead to increases in the frequency, intensity, and duration of extreme heat events and heat waves in Napa County and the rest of California, which are likely to increase the risk of mortality and morbidity due to heat-related illness and exacerbation of existing chronic health conditions. Those most at risk and vulnerable to climate-related illness are the elderly, individuals with chronic conditions such as heart and lung disease, diabetes, and mental illnesses, infants, the socially or economically disadvantaged, and those who work outdoors.
- Higher temperatures will melt the Sierra snowpack earlier and drive the snowline higher, resulting in less snowpack to supply water to California users.
- Droughts are likely to become more frequent and persistent in the 21st century.
- Intense rainfall events, periodically ones with larger than historical runoff, will continue to affect California with more frequent and/or more extensive flooding.
- Storms and snowmelt may coincide and produce higher winter runoff from the landward side, while accelerating sea-level rise will produce higher storm surges during coastal storms. Together, these changes will increase the probability of levee and dam failures in the Sacramento-San Joaquin Delta.

Warmer weather, reduced snowpack, and earlier snowmelt can be expected to increase wildfire through fuel hazards and ignition risks. These changes can also increase plant moisture stress and insect populations, both of which affect forest health and reduce forest resilience to wildfires. An increase in wildfire intensity and extent will increase public safety risks, property damage, fire suppression and emergency response costs to government, watershed and water quality impacts, vegetation conversions, and habitat fragmentation.

4.5.6.7 Severity

The State of California has been taking action to address climate change for over 20 years, focusing on both greenhouse gas emissions reduction and adaptation. The California Adaptation Planning Guide (APG) provides guidance and support for communities addressing the unavoidable consequences of climate change.

Based on specific factors, 11 climate impact regions were identified based on factors particularly relevant to the region. As illustrated in Figure 4-44, Napa County is located in the Bay Area.

The Bay Area is a heavily urbanized region (over 7 million people). The predominant feature of this region is San Francisco Bay and the miles of shoreline, both on the Pacific coast and along the bay, extending north to Sonoma County, inland to the Delta, and south to San Jose. The urbanized areas are concentrated primarily around the bay. To the north and south, the region is characterized by low coastal mountains.

Communities in the Bay Area should consider evaluating the following climate change impacts:

- Increased temperatures
- Reduced precipitation
- Sea level rise – coastal inundation and erosion
- Public health – heat and air pollution
- Reduced agricultural productivity (e.g., wine grapes)
- Inland flooding
- Reduced tourism (Addressing Climate Change Adaptation in Regional Transportation Plans , 2013)

The California Adaptation Planning Guide has calculated projections for changes in temperature, precipitation, sea level rise, heat waves, and wildfire risk in the Bay Area Region, as shown in Table 4-45. Hotter, drier conditions are expected to exist in the Bay Area Region, increasing the risk for other natural hazards.

The California Adaptation Planning Guide has calculated projections for changes in temperature, precipitation, sea level rise, heat waves, and wildfire risk in the Bay Area Region, as shown in Table 4-45. Hotter, drier conditions are expected to exist in the Bay Area Region, increasing the risk for other natural hazards.

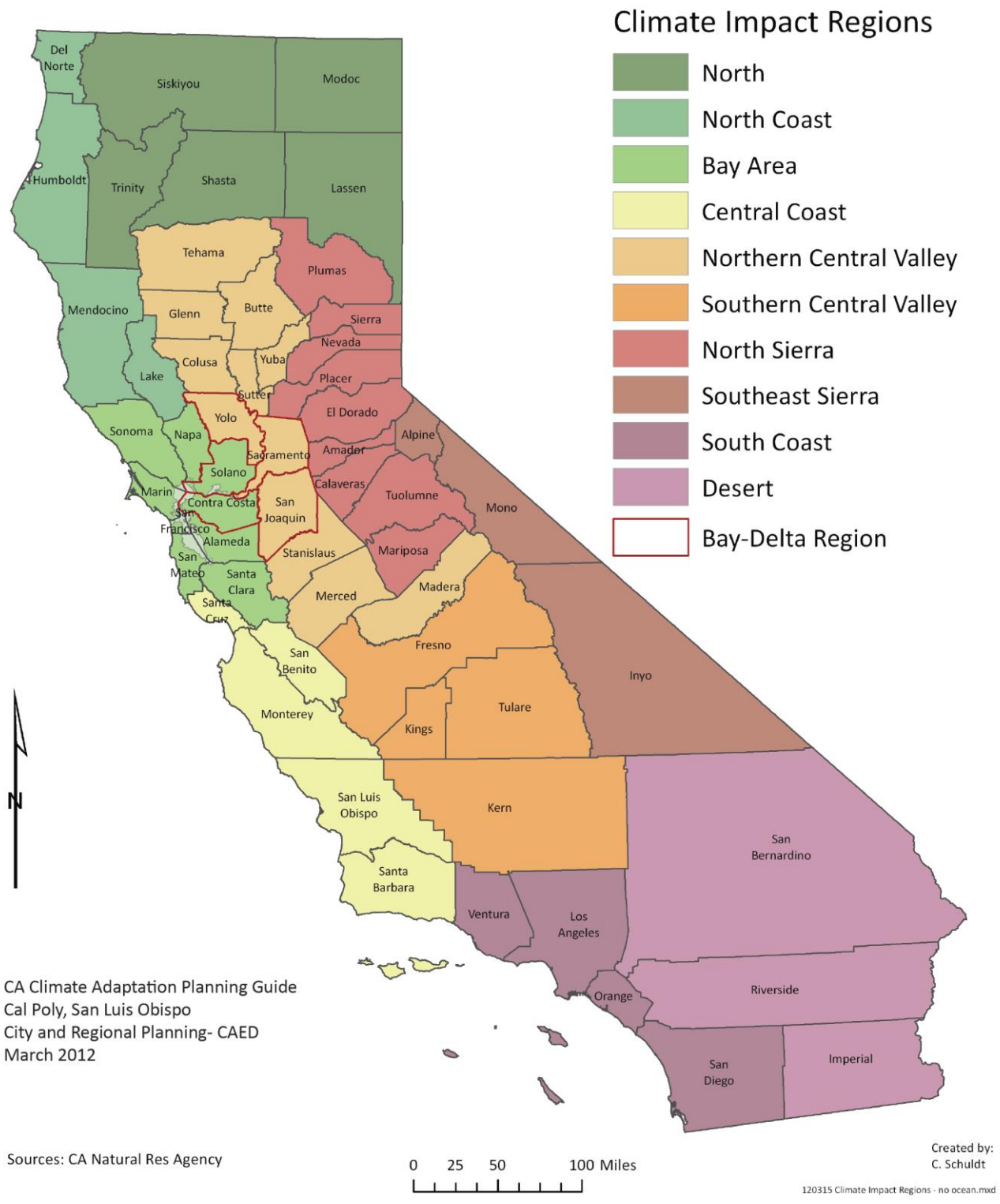


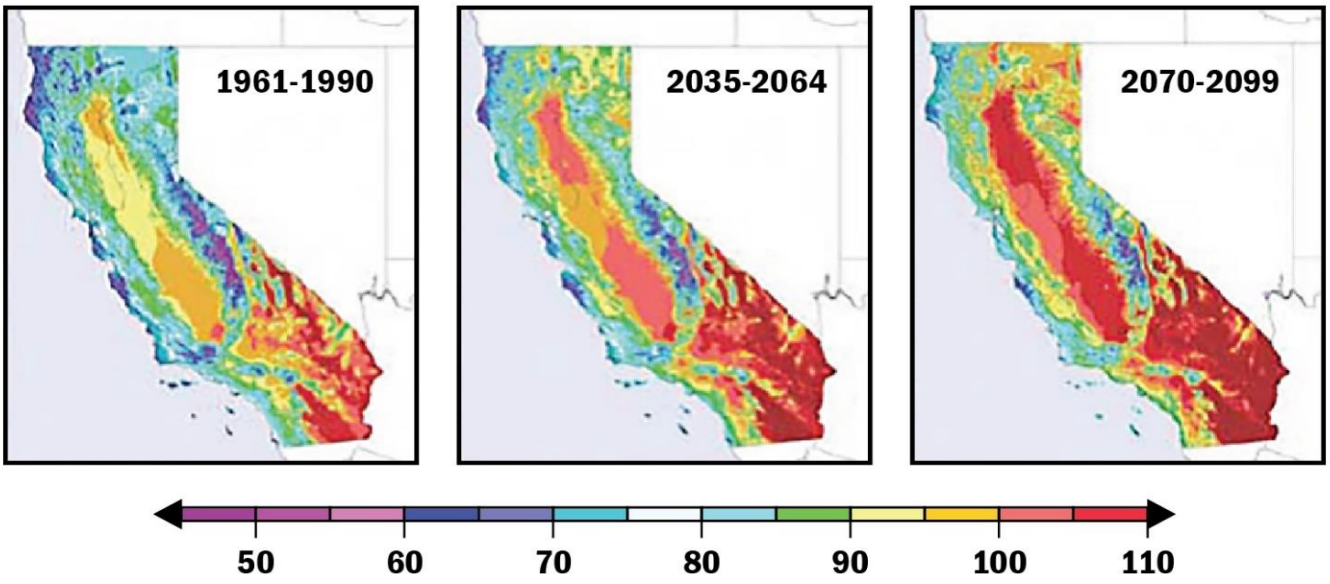
Figure 4-44: Climate Impact Regions

Table 4-45: Summary of Cal-Adapt Climate Projections for the Bay Area Region

Effect	Ranges
Temperature Change, 1990-2100	January: 4°F to 5°F increase in average temperatures July: 5°F to 6°F increase in average temperatures (Modeled high temperatures – average of all models; high carbon emissions scenario)
Precipitation	Precipitation varies widely in this region, with annual totals over 40 inches in northern Sonoma County to roughly 15 inches in the eastern portions of Solano and Contra Costa counties. A moderate decline in annual rainfall, 1 to 3 inches by 2050 and 4 to 5 inches by 2090, is projected throughout the region. (CCSM3 climate model; high carbon emissions scenario)
Sea Level Rise	By 2100, sea levels may rise up to 55 inches, posing considerable threats to coastal areas and particularly to low-lying areas adjacent to San Francisco Bay. The number of acres vulnerable to flooding is expected to increase 20 to 30 percent in most parts of the Bay Area, with some areas projected for increases over 40 percent. Coastal areas are estimated to experience an increase of approximately 15 percent in the acreage vulnerable to flooding.
Heat Wave	Along the coast, particularly to the south, heat wave is defined as five days over 72°F to 77°F; in other areas the threshold is in the mid- to upper 90s. Over most of the region a limited increase in the number of heat waves is expected by 2050 with only the eastern areas expecting more than one or two more per year. By 2100, between six and 10 more heat waves can be expected per year.
Wildfire Risk	There is little change in projected fire risk in this region, save for the slight increases expected in western Marin County. (GFDL climate model; high carbon emissions scenario)

Source: [Public Interest Energy Research, 2011. Cal-Adapt. Retrieved from http://cal-adapt.org]

Figure 4-45: California Historical and Projected Temperature Increases - 1961 to 2099



Source: Dan Cayan; California Climate Adaptation Strategy

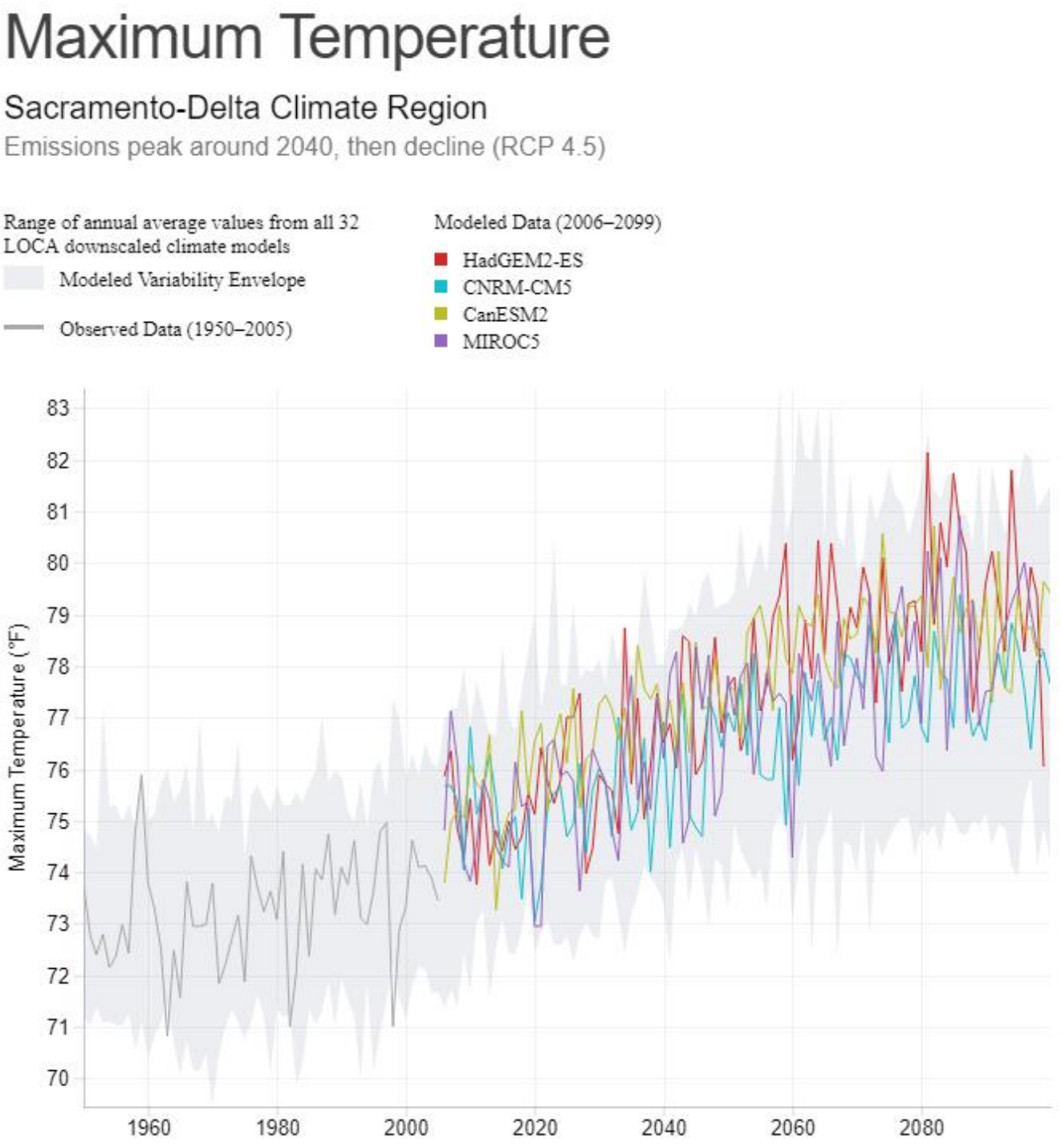
Overall temperatures are projected to rise substantially throughout this century. Table 4-46 shows annual averages of observed and projected Maximum Temperature values for the Sacramento-Delta Climate Region under the RCP 4.5 emissions scenario. These projections differ depending on the time of year and the type of measurement (highs vs. lows), all of which have different potential effects to the County's ecosystem health, agricultural production, water use and availability, and energy demand.

On average, the projections show little change in total annual precipitation in California. Furthermore, among several models, precipitation projections do not show a consistent trend during the next century. The Mediterranean seasonal precipitation pattern is expected to continue, with most precipitation falling during winter from North Pacific storms. However, even modest changes would have a significant impact because California ecosystems are conditioned to historical precipitation levels and water resources are nearly fully utilized. (Cal-Adapt, 2018)

4.5.6.8 Warning Time

As this section as described, many existing hazards could be intensified as a result of climate change, decreasing warning times and exacerbating impacts. Warning times are discussed under the various other hazards. Other climate change impacts are more long-term; scientists have a high confidence in predicting the rise in global temperatures and have reached a consensus on the future impacts of climate change and the time frame in which they will occur.

Table 4-46: Maximum Temperatures in the Sacramento-Delta Climate Region



Source: cal-adapt.org

4.5.6.9 Secondary Hazards

Secondary hazards of climate change include flood, severe weather, drought, wildfire, sea level rise, extreme heat, and heavy rain events. Climate change will increase the frequency at which extreme weather events occur. Secondary hazards of climate change that will have the greatest impact on Napa County include flood, drought, and severe weather. Many of these impacts are discussed in other hazard profiles.

4.5.6.10 Vulnerability Assessment

This section outlines vulnerabilities of Napa County to impacts from climate change and focuses on sea level rise in particular, as many of the other impacts are secondary and outlined in other hazard profiles.

4.5.6.10.1 Population

With approximately 17% of the County's population over the age of 65 and 33% of Hispanic or Latino origin, projected climate change exposures have the potential to leave sensitive populations in the County especially vulnerable to increased risk.

Higher frequency of extreme heat conditions can cause serious public health impacts, increasing the risk of conditions directly related to heat such as heat stroke and dehydration. Older adults, particularly seniors, are more likely to experience respiratory and/or cardiovascular health complications than younger individuals. Approximately 24,000 residents of the County are elderly, which are more likely to live alone with limited mobility, all of which can exacerbate health risks associated with extreme heat.

The County has a large Hispanic population, many of which are low-income agricultural workers that speak primarily Spanish. The majority of the County's large agricultural job base is of Hispanic origin. Heat stress can seriously affect those working outside, by reducing overall productivity and in extreme exposures could lead to illness, disability, or death. The portion of the County's Hispanic population that is low-income and that speak primarily Spanish are especially vulnerable and would be impacted by a flood event associated with sea-level rise. Renters are also more vulnerable, as they are less likely to reinforce buildings and buy insurance because the decision to make major home improvements typically lies with the property owner. Additionally, disaster recovery services have often targeted homeowners, to the disadvantage of renters. (Napa County Climate Action Plan, 2018)

Less than one percent of the County's population is considered at risk and vulnerable to sea-level rise. As sea levels rise, the area and the number of people at risk because of flooding will also rise. Factors that increase vulnerability to the adverse impacts of flood events associated with sea-level rise include access to preparedness information, transportation, healthcare, and insurance. Key demographics associated with these vulnerabilities include income, race, linguistic isolation (i.e., non-English speaking), and residential tenure (CEC 2012:8). Language ability is an important factor in assessing vulnerability as emergency response crews may be unable to communicate with non-English speakers.

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4.5.6.10.2 Property

The southwestern portion of the County includes the mouth of the Napa River, which forms a tidal estuary that drains into San Pablo Bay. Because several physical structures (i.e., levees) are currently in place to protect against a 100-year flood event, approximately 36 acres in the County are currently at risk for flooding. Taking a 1.5 m rise in sea level into account, along with other storm factors, it is projected that an additional 13,000 acres could be inundated by a 100-year flood event. Figure Figure 4-46 depicts sea level rise and estimated exposures.

The majority of area that is at risk is currently undeveloped or used for agricultural purposes. Specific areas along the Napa River that could become vulnerable include Buchli, Cuttings Wharf, Thompson, and Imola, along with areas further north along the Napa River, including some industrial uses, wineries, and parts of Downtown Napa (i.e., up to 3rd Street and portions east of State- Route 29). The Milton Road/Edgerly Island area could be lost in its entirety if the privately-owned levy system were to fail. Additional portions of Thompson, Middleton, and American Canyon also have some flood-prone low-lying areas that would become more vulnerable to flooding because of sea-level rise. While the Napa County Airport itself is not at immediate risk for inundation from coastal flooding due to 1.5 m of sea-level rise, adjacent areas to the west are at increased risk of flooding due to sea-level rise. (Napa County Climate Action Plan, 2018)

Climate change could significantly impact the agricultural and wine industries, which are large drivers of the County's economy. Specifically, the wine industry in Napa, which produces an average of 4 percent of California's wine grape harvest, currently has 475 wineries, producing more than 49.7 million cases of wines totaling over $4.5 billion dollars in sales. (Napa Valley Vintners)

Increases in temperature and changes in precipitation and soil moisture could impact the growing of wine grapes by causing late or irregular blooming and affecting yields. (Napa County Climate Action Plan, 2018) The increased likelihood of extreme floods could lead to the destruction of crops, erosion of topsoil, and deposits of debris and sediment on crop lands. Conversely, as average temperatures increase with climate change, agricultural demand for water could intensify under extreme heat conditions, under which water evaporates faster and plants need more water to move through their circulatory systems to stay cool. More specifically, attempts to maintain wine grape productivity and quality in the face of warming may be associated with increased water use for irrigation, a change to different varietals of grapes, and to cool grapes through misting or sprinkling. As noted earlier, increased average temperatures and changes in timing and amounts of precipitation could affect local aquifer recharge for groundwater supplies in the future, which could in turn affect water supplies for agricultural uses.

HMP submitted 08.11.2020

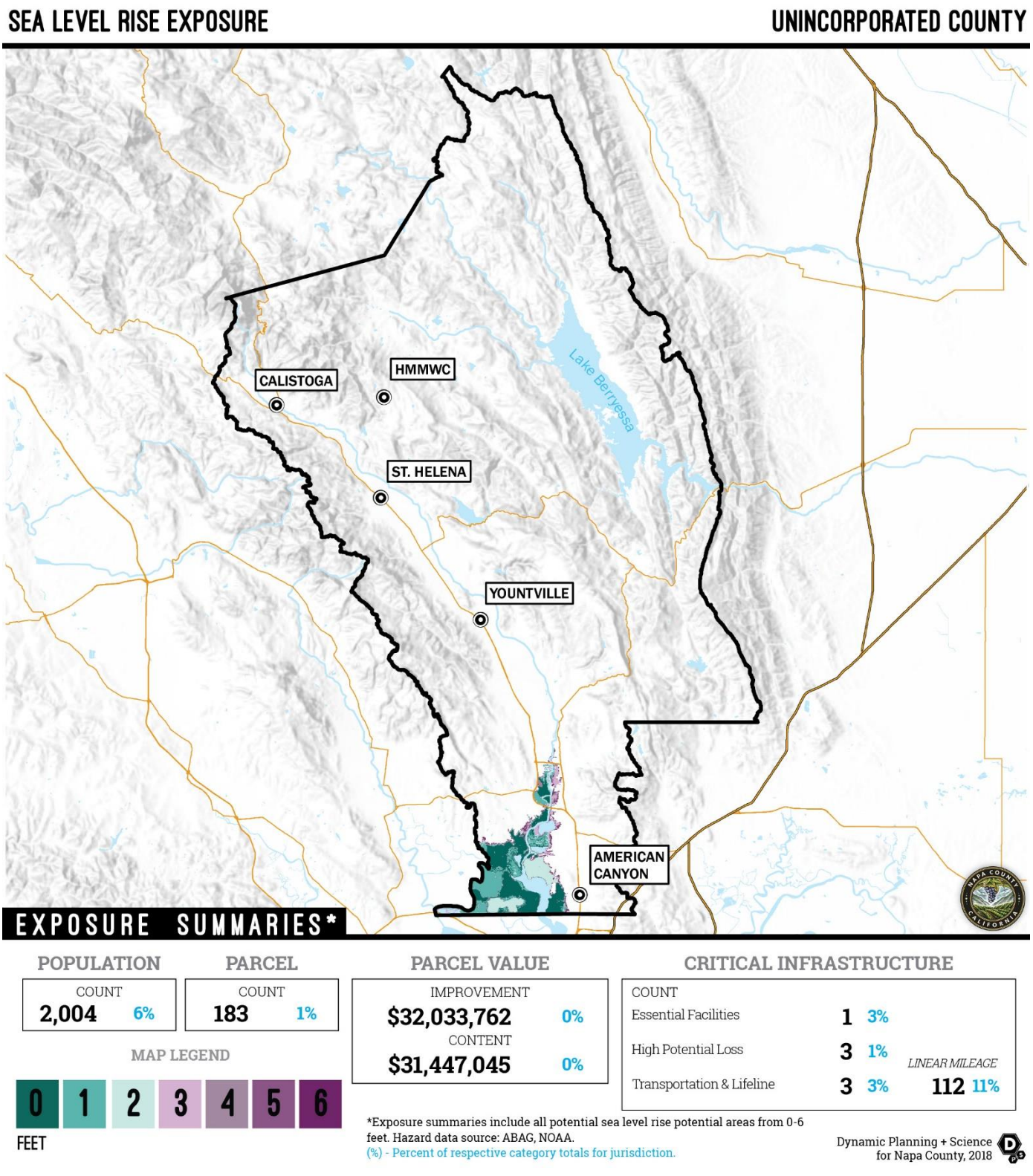

Figure 4-46. Sea Level Rise Vulnerability and Exposure Snapshot

4.5.6.10.3 Agriculture and Wine Industries

4.5.6.10.4 Critical Facilities

Some critical infrastructure (i.e., roads, hospitals, schools, emergency facilities, and properties) are at increased risk of coastal flooding in the County. For example, the American Canyon Power Plant and the Napa Sanitation District Wastewater Treatment Plant could become vulnerable to a 100-year flood event with 1.4 meters (m) of sea-level rise. (Napa County Climate Action Plan, 2018) Those critical facilities are summarized in the snapshot of sea level rise in Figure 4-46.

4.5.6.11 Future Trends in Development

The County is committed to continuing efforts to address and reduce existing climate-related risks and future impacts on a holistic and programmatic level. With several ordinances and programs that cover a range of climate exposures and related impacts, the County is well equipped to handle current issues of extreme heat events and water supply issues, but could still likely face increasing challenges as projected changes occur.

The County has practices and organizations in place that help address future issues of sustainability and climate adaptation. Sustainable Napa County educates the public and fosters collaboration for longer-term environmental sustainability, and through that and other collaboration, the County is finding ways to change behaviors and practices now. The County also supports the Napa Green Certification program, which aims to reduce solid waste generation, water use, and wastewater generation, promoting sustainable agricultural practices. Furthermore, by adopting the Green Building Standards Code, the County is setting a precedent for reduced energy use, building with more sustainable materials, and employing better water conservation tactics. The County also recently joined Marin Clean Energy (MCE), which allows users to purchase more renewable energy options. These efforts, however, need to be expanded and applied on a much larger scale, along with mitigations actions identified in this Plan, to address future changes attributed to climate change.

4.5.6.12 Climate Change Hazard Problem Statements

As part of the mitigation action identification process, each participating jurisdiction's Planning Committee identified issues and/or weaknesses (aka problem statements) for their respective facilities based on the risk assessment and vulnerability analysis, utilizing the RAMP mapping tool and historic flood data. Climate change hazard problem statements are listed in Table 4-47.

Identifying these common issues and weaknesses assists the Planning Committee in understand the realm of resources needed for mitigation. The goal is to have at least one mitigation action for every problem statement. Projects or actions have been developed to mitigate each problem identified. See Table 5-6 for a full list of mitigation actions and corresponding problem statements that they address. Each problem statement is coded with a problem number for cross-referencing between Table 4-47 and Table 5-6.

Table 4-47 Climate Change Problem Statements

Problem No.	Area of Concern	Mitigation Alternatives	Primary	Problem Description	Related MA
CC-16	Threat	PPRO - Property Protection	**American Canyon**	Sea Level Rise could affect American Canyon Critical Facilities include the Waste Water Treatment Plant, Public Works Yard and a pump stations located along Wetlands Edge Rd.	**AC-04-2020**
CC-13	Impact	PRV - Prevention , PE&A - Public Education & Awareness , ES - Emergency Services , SP - Structural Projects	**Calistoga**	Increased wildfire and decreased air quality will have economic, physical, and health impacts on the City of Calistoga.	**CL-08-2020**
CC-15	Threat	PRV - Prevention , PE&A - Public Education & Awareness , NRP - Natural Resource Protection , ES - Emergency Services , SP - Structural Projects	**Calistoga**	Increased drought, an expanded wildfire season, and potential for heavy rain events (extreme weather) all have the potential to severely threaten the City of Calistoga and its surroundings.	**CL-08-2020**
CC-01	Impact	PE&A - Public Education & Awareness	**County Unincorporated**	A warmer climate will affect the agriculture and wine industries. Research on these effects should be supported and monitored.	**NC-27-2020**
CC-02	Victim	PE&A - Public Education & Awareness	**County Unincorporated**	The County has a large farmworker population, many of which are low-income workers who are at risk of heat-related illnesses.	**NC-24-2020**
CC-03	Threat	PRV - Prevention	**County Unincorporated**	Capital Improvement Plans for critical infrastructure don't address the effects of future sea-level rise and associated hazards in potentially affected areas.	**NC-20-2020, NC-21-2020**
CC-04	Impact	PE&A - Public Education & Awareness	**County Unincorporated**	Due to warming temperatures, bud break may begin sooner, leaving delicate new growth on grape vines vulnerable to frost for a longer stretch of the growing season.	**NC-27-2020**
CC-05	Threat	PPRO - Property Protection	**County Unincorporated**	Some critical infrastructure (i.e., roads, hospitals, schools, emergency facilities, and properties) are at risk to SLR in the County, including American Canyon Sewer Plant and the Napa Sanitation District Wastewater Treatment Plant are vulnerable to a 100-year flood event with a 1.4 m sea-level rise (CEC 2012:23).	**NC-20-2020, NC-21-2020**

Problem No.	Area of Concern	Mitigation Alternatives	Primary	Problem Description	Related MA
CC-06	Threat	PRV - Prevention , PPRO - Property Protection , NRP - Natural Resource Protection	**County Unincorporated**	Taking a 1.5 m rise in sea level into account, along with other storm factors, the tool projects an additional 13,000 acres would inundated by a 100-year flood event. Most of the area that is at risk is currently undeveloped or used for agricultural purposes. Specific areas along the Napa River include Buchli, Cuttings Wharf, and Imola, along with areas further north along the Napa River, including some industrial uses, wineries, and parts of Downtown Napa (i.e., up to 3rd Street and portions east of State-Route 29).	**NC-20-2020, NC-21-2020**
CC-07	Victim	PE&A - Public Education & Awareness	**County Unincorporated**	Approximately 17 percent of the County's population are elderly, which are more likely to live alone with limited mobility, all of which can exacerbate the risk of extreme heat (Census 2014).	**NC-25-2020, NC-26-2020**
CC-08	Threat	PE&A - Public Education & Awareness	**County Unincorporated**	Increases in temperature, along with the frequency of extreme heat events and heat waves, can also affect the agriculture industry, which is a large driver of the County's economy. The significant, overall outcome of warming is the likely reduction in yield of some of California's most valuable specialty crops (CNRA 2014: 21)	**NC-27-2020**
CC-09	Threat	PE&A - Public Education & Awareness	**County Unincorporated**	Higher temperatures could also threaten the County's (PG&E) energy system, by increasing consumer energy demand and affecting the facilities themselves	**NC-25-2020, NC-26-2020**
CC-10	Threat	PRV - Prevention , NRP - Natural Resource Protection , PE&A - Public Education & Awareness	**County Unincorporated**	Increased average temperatures along with local and regional changes in precipitation and timing of runoff in local watersheds, could affect both surface and groundwater supplies in the County.	**NC-22-2020, NC-23-2020, NC-28-2020, NC-29-2020**
CC-14	Threat	ES - Emergency Services , PRV - Prevention , SP - Structural Projects , PPRO - Property Protection	**County Unincorporated**	The County is already considered to be an area that is at high-risk for wildfires (Napa County 2013:77). Increased temperatures and changes in precipitation patterns associated with climate change are expected to increase the risk of wildfire in the County by approximately 10 to 20 percent by the end of the century. This increase could cause additional threats to the County and has the potential to affect emergency services, roads, water supplies to residents, housing access, and quality of life.	**NC-11-2020, NC-15-2020**

Problem No.	Area of Concern	Mitigation Alternatives	Primary	Problem Description	Related MA
CC-50	Impact	PRV - Prevention , NRP - Natural Resource Protection	**Howell Mountain MWC**	Increased sediment in lakes (which would require dredging/meaning less volume in lakes).	**HM-08-2020**
CC-51	Impact	PRV - Prevention , NRP - Natural Resource Protection	**Howell Mountain MWC**	Potential for Flooding in Inundation Zone and Watershed Damage	**HM-08-2020**
CC-52	Impact	PRV - Prevention , PPRO - Property Protection	**Howell Mountain MWC**	Damages to Infrastructure/Pipelines/Treatment Plant	**HM-06-2020**
CC-53	Victim	PRV - Prevention , PPRO - Property Protection , PE&A - Public Education & Awareness , NRP - Natural Resource Protection	**Howell Mountain MWC**	HMMWC has 400 customers plus the entire community of Angwin that will be affected by Climate Change.	**HM-08-2020**
CC-54	Threat	PRV - Prevention , PPRO - Property Protection , PE&A - Public Education & Awareness , NRP - Natural Resource Protection	**Howell Mountain MWC**	Water Supplies/Quality (Increased Drought Probability) (See Drought Areas of Concern)	**HM-06-2020**
CC-55	Threat	PRV - Prevention , PPRO - Property Protection , PE&A - Public Education & Awareness , NRP - Natural Resource Protection	**Howell Mountain MWC**	Increased heavy rain events (extreme weather)/100 Yr Flood Event (See Flooding Areas of Concern)	**HM-08-2020**
CC-56	Threat	PRV - Prevention , PPRO - Property Protection , PE&A - Public Education & Awareness , NRP - Natural Resource Protection	**Howell Mountain MWC**	Increased fuels for WF and increased wildfire probability. (See Wild Fire Areas of Concern)	**HM-07-2020**
CC-12	Victim	PE&A - Public Education & Awareness	**Yountville**	Climate change is expected to bring changing and extreme weather and more frequent and intense extreme heat days and longer heat waves. In Yountville, where there is already a large senior population that is expected to grow by nearly 60% by 2040, heat-related illness is of significant concern.	**NC-25-2020, NC-26-2020**

4.5.7 Slope Failure Hazard Profile

Landslides, mudflow, debris flow, and rockfall, collectively known as slope failure, may cause damage across the County. They rarely present a threat to human life, but most often result in a disruption of everyday services, including emergency response capabilities. Landslides can block transportation routes, dam creeks and drainages, and contaminate water supplies. When these hazards affect transportation routes, they are frequently expensive to clean-up and can have significant economic impacts to the County.

4.5.7.1 Types of slope failure

For this update, three types of slope failure (Landslide, Debris Flow, and Rockfall) were identified as concerns to the County and are briefly described below.

4.5.7.1.1 Landslide

Landslides are classified into many different types based on form and type of movement. They range from slow moving rotational slumps and earth flows, which can slowly distress structures but are less threatening to personal safety, to fast-moving rock avalanches and debris flows that are a serious threat to structures and have been responsible for most fatalities during landslide events. Many large landslides are complex and a combination of more than one landslide type. (CalOES, 2018)

Landslides are usually the result of rain-saturated soils. Landslides generated by the El Niño storms of 1992 and 1998 illustrated the hazards to life and property posed by debris flows and landslides. (Napa County General Plan, 2008)

4.5.7.1.2 Mudflow/Debris Flow

When slope material becomes saturated with water, a debris flow may develop. According to NOAA, debris flow is the most common type of slope failure in Napa County. From a geologic perspective, there are generally two types of debris flows:

> Debris Flows Related to Shallow Landslides occurs on hillslope due to soil failure in which soil liquefies and runs downhill. This type of debris flow generally results from a shallow landslide (less than 10 to 15 feet deep) and has a discrete initiation zone depositional area. Shallow landslides tend to occur in winter but are most likely after prolonged periods of heavy rainfall when soil materials are saturated. Debris flows are typically more dangerous because they are fast moving, causing both property damage and loss of life.
>
> Post-Wildfire Debris Flows is a result of post-fire conditions, where burned soil surfaces enhance rainfall runoff that concentrates in a channel and picks up debris as it moves. The post-fire debris flow has a less discrete initiation zone but is similar to a debris flow derived from

hillslopes in that it may result in inundation and a detrimental impact on lives and property within its zone of runout and deposition. It can result in downstream flooding.

An example of a catastrophic post-fire debris flow is the event that occurred in Santa Barbara County on January 9, 2018, when, after the Thomas Fire, numerous canyons deposited debris flows onto urbanized alluvial fans in Montecito and Carpinteria. (CalOES, 2018)

4.5.7.1.3 Rockfall

Rockfalls are the falling of a newly detached mass of rock from a cliff or rock outcrop or a loose rock that erodes out of unconsolidated debris on a hillside and rolls or falls down a very steep slope. Over-steepened slopes such as at roadcuts or in glaciated terrain are susceptible to rockfall due to the steep slopes that are not highly vegetated or benched, which can help attenuate rockfall. Rock outcrops that are highly fractured and/or undercut by weaker rock layers are also susceptible to rockfall.

4.5.7.2 Policies, Plans, and Regulatory Environment

Napa County General Plan

The 2008 Napa County General Plan includes the following goals and policies to mitigate slope failure:

Goal SAF-2 (Safety): To the extent reasonable, protect residents and businesses in the unincorporated area from hazards created by earthquakes, landslides, and other geologic hazards.

Policy SAF-3: The County shall evaluate potential safety hazards when considering General Plan Amendments, rezonings, or other project approvals (including but not limited to new residential developments, roads or highways, and all structures proposed to be open to the public and serving 50 persons or more) in areas characterized by:

- Slopes over 15 percent,
- Identified landslides,
- Floodplains,
- Medium or high fire hazard severity,
- Former marshlands, or
- Fault zones.

Policy SAF-9: As part of the review and approval of development and public works projects, planting of vegetation on unstable slopes shall be incorporated into project designs when this technique will protect structures at lower elevations and minimize the potential for erosion or landslides. Native plants should be considered for this purpose, since they can reduce the need for supplemental watering which can promote earth movement.

Policy SAF-10: No extensive grading shall be permitted on slopes over 15 percent where landslides or other geologic hazards are present unless the hazard(s) are eliminated or reduced to a safe level.

Policy SAF-11: Newly created hillside parcels shall be large enough to provide flexibility in finding a stable buildable site and driveway location.

Policy SAF-12: The County shall not accept dedication of roads (a) on or jeopardized by landslides, (b) in hilly areas, or (c) in areas subject to soil liquefaction, subsidence, or settlement, which, in the opinion of the Public Works Department, would require an excessive degree of maintenance and repair costs.

Napa County Code § 18.108

Napa County Code includes regulations prohibits construction, improvement, grading, earthmoving activity or vegetation removal associated with the development or use of land in areas characterized by steep slopes, high erosion potential, unstable soils, combustible vegetation and other sensitive environmental resource areas.

4.5.7.3 Past Events

According to NOAA, the most common type of slope failure in Napa County is debris flow, which typically occurs during winter months. Table 4-48 lists the slope failure events that took place in the County since the year 2000.

Table 4-48: Slope Failure Events in Napa County Since 2000

Date	Type of Event	Deaths	Injuries	Property Damage	Crop Damage
4/1/2006	Debris Flow	1	0	$14.4 million	$20 million
4/2/2006	Debris Flow	0	0	$11.5 million	None reported
1/6/2016	Debris Flow	0	0	None reported	None reported
10/28/2016	Debris Flow	0	0	None reported	None reported
1/3/2017	Debris Flow	0	0	None reported	None reported
1/18/2017	Debris Flow	0	0	None reported	None reported
1/22/2017	Debris Flow	0	0	None reported	None reported
2/7/2017	Debris Flow	0	0	None reported	None reported
2/20/2017	Debris Flow	0	0	None reported	None reported
1/8/2018	Debris Flow	0	0	None reported	None reported

Source: NOAA Storm Events Database

4.5.7.4 Location

The best available predictor of where movement of slides and earth flows might occur is the location of past movements. Past landslides can be recognized by their distinctive topographic shapes, which can remain in place for thousands of years. Most landslides recognizable in this fashion range from a few acres to several square miles. Most show no evidence of recent movement and are not currently active. A small proportion of them may become active in any given year, with movements concentrated within all or part of the landslide masses or around their edges.

Recognizing ancient dormant mass movement sites is important to identify current areas susceptible to flows and slides, because they can be reactivated by earthquakes or by exceptionally wet weather. Those ancient scars also consist of broken materials, frequently involve disruption of groundwater flow, and are vulnerable to construction-triggered sliding.

Figure 4-47 shows low, moderate, and high landslide susceptibility in Napa County. Most of the high susceptibility areas are in the hilly regions bordering the Napa Valley. This map should be used with caution, however, as site-specific conditions can make some locations in low to moderate instability areas highly unstable and some high instability locations more stable.

4.5.7.5 Frequency/ Probability of Future Occurrences

Landslides are most frequently triggered in periods of high rainfall (November- April in Napa County). The hazard is greatest in steeply-sloped areas, although slides may occur on slopes of 15 percent or less if the conditions are right. Slope steepness and underlying soils are the most important factors affecting the landslide hazard. However, surface and subsurface drainage patterns also affect the landslide hazard, and vegetation removal can increase the likelihood of a landslide. (Association of Bay Area Governments, 2018)

Landslides are often triggered by other natural hazards such as earthquakes, heavy rain, floods, or wildfires, so landslide frequency is often related to the frequency of these other hazards. The probability of slope failure occurring in Napa County is likely (between 10 and 100% annual probability).

4.5.7.6 Severity

Losses from landslides are typically lower than associated flooding. However, in the El Nino storms of early 1998, USGS documented approximately $150 million in losses due to approximately 300 landslides that occurred in the Bay Area and Santa Cruz County. The landslides ranged in size from a 25 meter failure of engineered material to a reactivation of the massive (13 million meter) Mission Peak earthflow complex in Alameda County. (Ass'n of Bay Area Governments, 2011)

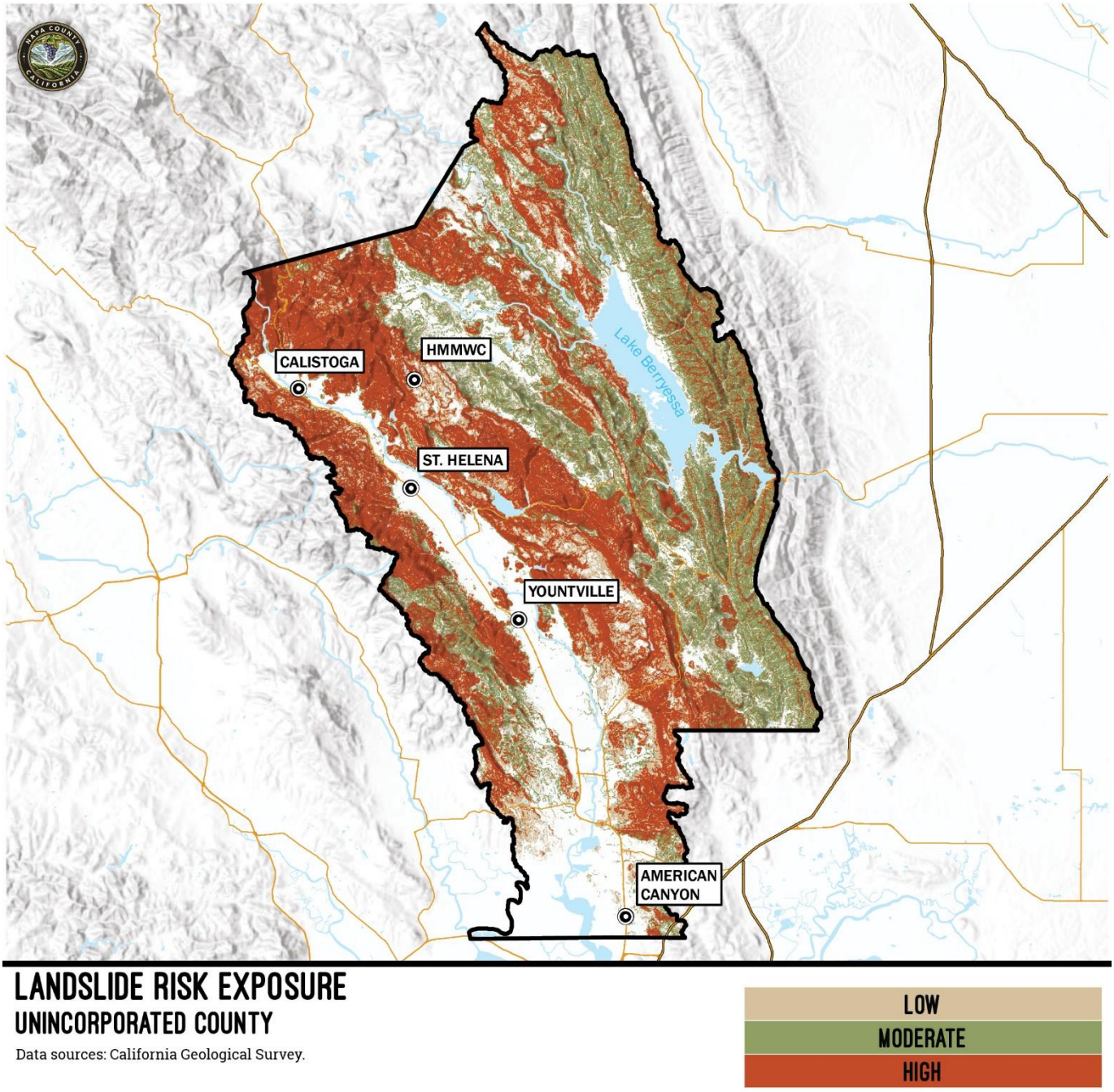

Figure 4-47: Napa County Landslide Susceptibility

4.5.7.7 Warning Time

Some geologic hazards occur slowly but can have significant property or health consequences, like erosion and some forms of slope movement or land sliding. The identification of those hazards generally takes site-specific analysis to determine if the site soils and geology are susceptible to these hazards and what mitigation is most relevant and prudent for a site. For these types of hazards, warning time is long.

For other hazards, such as debris flows, rockfall, and landslides, warning time is often very short and may not occur at all. Identifying areas where these events are known have occurred, or which have ideal characteristics for these hazards to occur, could help with hazard preparedness when triggering-type events like intense rainfall occur. This identification won't reduce the warning time, but it will make proactive response to potential triggering events more effective.

4.5.7.8 Secondary Hazards

There are some hazards that can trigger or exacerbate slope failure. Flooding, for example, can undercut the toe of a slope which can remove the support for the slope and cause a landslide or rockfall. Wildfires create an immediate hazard of their own and create long-term impacts by altering the soil structure, impeding its ability to absorb moisture, and destroying vegetation that binds the soil with roots and absorbs rainfall and runoff with foliage. Post-wildfire, even small rainfall events can create devastating mudflows, debris flows, and landslides. Areas that are mapped currently as low to moderate risk of these hazards may have high risk after a wildfire.

4.5.7.9 Landslide Vulnerability Assessment

Figure 4-49 displays landslide susceptibility for population and infrastructure in Napa County.

4.5.7.9.1 Population

An estimated 19,942 persons, or 58% of the County population, are exposed to slope failure areas, as shown in Figure 4-48 and Table 4-49 below. Population estimates within slope failure areas were generated by analyzing County assessor and parcel data that intersect with landslide hazard areas identified by CGS and avalanche hazards developed by the planning team. Using GIS, U.S. Census Bureau information was used to intersect slope failure hazards an estimate of population was calculated by weighting the population within each census block and track with the percentage of slope hazard areas.

Population Exposure

Population Exposure to Landslide Susceptibility

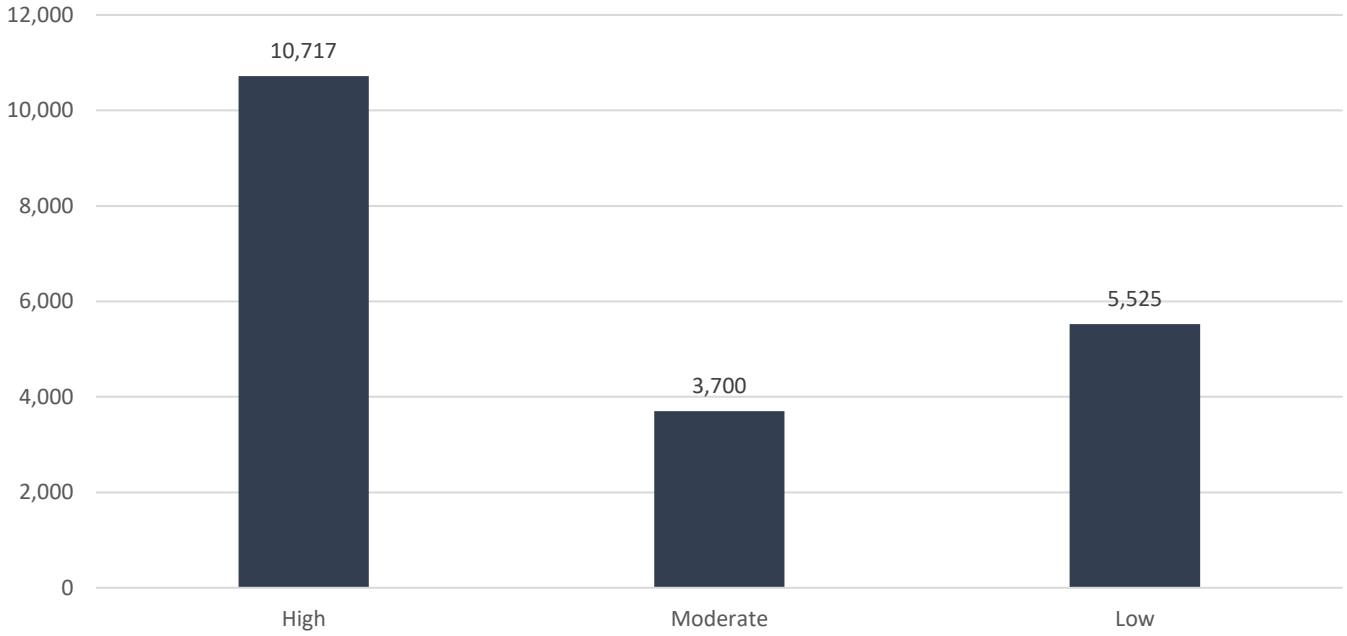

Figure 4-48: Population Exposure to Landslide Susceptibility (Unincorporated County)

Table 4-49: Population Exposure to Landslide Susceptibility

	Total Population
Unincorporated County	34,147

Landslide Susceptibility	Population Count	% of Total
High	10,717	*31.39%*
Moderate	3,700	*10.84%*
Low	5,525	*16.18%*
Total	**19,942**	**58.40%**

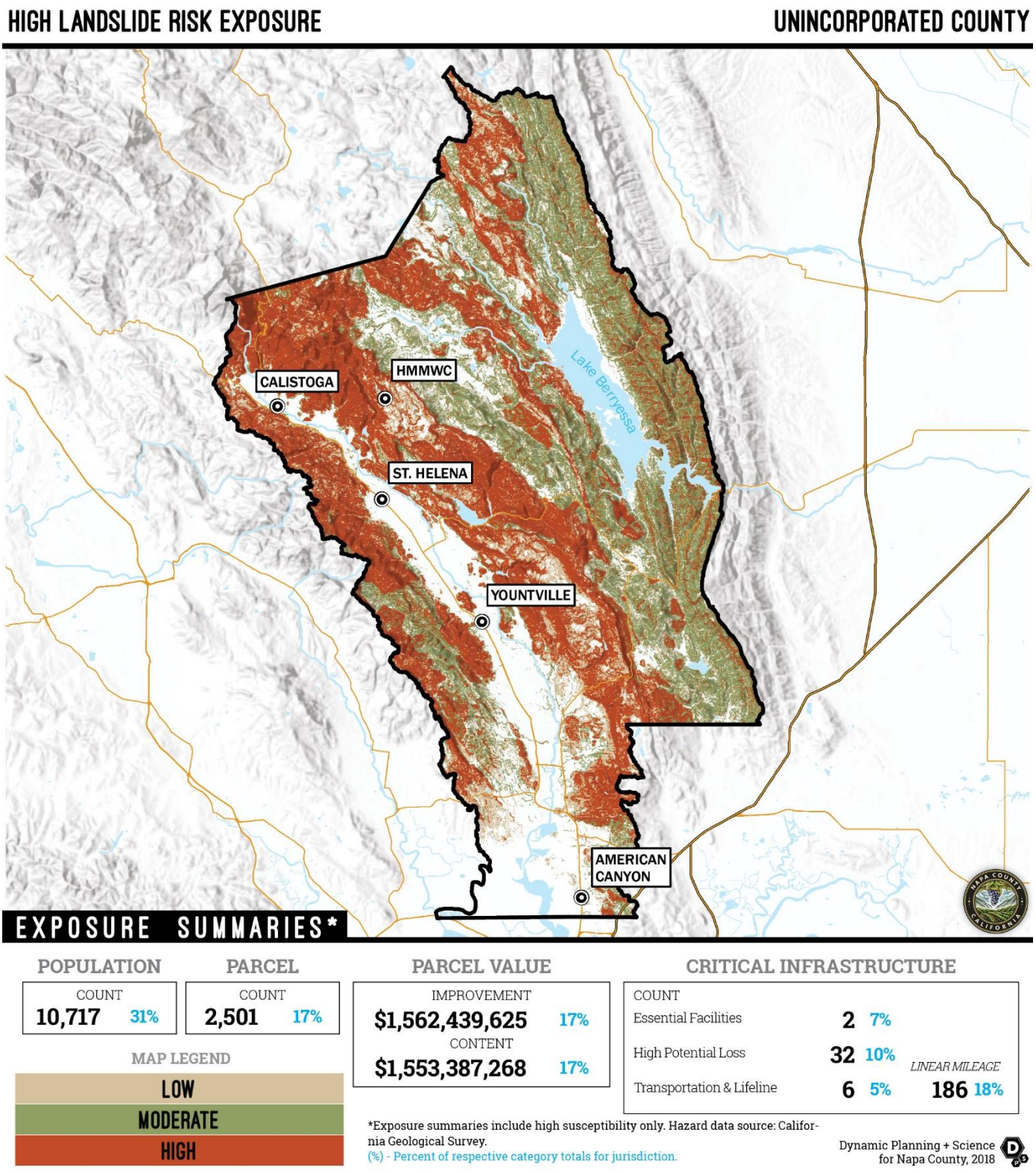

Figure 4-49: Landslide Vulnerability Snapshot

4.5.7.9.2 Property

Table 4-50 shows the number of parcels, market value exposure and content value exposure in the steep-slope risk areas. The predominant zoning classes in cities are single-family, vacant and manufactured homes.

Table 4-50: Property Value Exposed to Landslides.

	Total Parcels	Total Market Value ($)	Total Content Value ($)	Total Value ($)
Unincorporated County	14,654	$ 9,233,654,827	$ 9,140,828,845	$ 18,374,483,672

Landslide Susceptibility	Parcel Count	% of Total	Market Value Exposure ($)	Content Value Exposure ($)	Total Exposure ($)	% of Total
High	2,501	*17.1%*	$ 1,562,439,625	$ 1,553,387,268	$ 3,115,826,893	*17.0%*
Moderate	1,965	*13.4%*	$ 811,523,968	$ 802,991,416	$ 1,614,515,384	*8.8%*
Low	3,302	*22.5%*	$ 2,068,040,359	$ 1,995,435,761	$ 4,063,476,120	*22.1%*
Total	**7,768**	**53%**	**$ 4,442,003,952**	**$ 4,351,814,445**	**$ 8,793,818,397**	**47.9%**

4.5.7.9.3 Critical Facilities and Infrastructure

40 critical facilities were identified as being exposed to the landslide hazard to some degree. Several types of infrastructure are exposed to mass movements, including transportation, water, sewer, and power infrastructure. At this time, all infrastructure and transportation corridors identified as exposed to the landslide hazard are considered vulnerable until more information becomes available. Table 4-51 and Table 4-52 summarize the critical facilities exposed to the slope failure hazard.

Table 4-51: Critical Facility Points with Slope Failure Hazard Risk (Unincorporated County)

Critical Infrastructure - Landslide Susceptibility			
Infrastructure Type	High	Moderate	Low
Essential Facility	2	4	3
EOC	-	-	-
Fire Station	1	4	2
Hospital	1	-	-
Police Station	-	-	1
High Potential Loss	32	30	45
Adult Residential Care	-	-	-
Child Care - Licensed	-	2	-
Church	3	1	5
Communication Tower	10	1	8
Dam	9	9	8
Family Child Care Home	-	-	-
Farm Worker Housing	-	1	-

Critical Infrastructure - Landslide Susceptibility			
Infrastructure Type	High	Moderate	Low
Historic Building	2	1	2
Home Care Organization	-	-	-
*Insured Asset	2	5	12
Library	-	-	1
Mobile Home Park	-	1	-
NCFCWCD Asset	-	-	-
Residential Elder Care Facility	-	1	2
School	-	2	1
Rain Gauges	5	6	4
Water Treatment Plant	1	-	2
Transportation and Lifeline	6	31	5
Airport	-	1	1
Bridge	1	29	1
NG Station	-	-	1
Power Plant	3	-	-
Substation	2	1	2
Hazmat	1	1	-
Landfill	1	1	-
Grand Total	**41**	**66**	**53**

**Insured Assets are broken into sub-categories, main assets such as Airports are attributed to their appropriate categories.*

Table 4-52: Critical Facilities (Linear) with Slope Failure Hazard Risk (Unincorporated County)

Linear Asset (miles) - Landslide Susceptibility			
Infrastructure Type (Linear)	High	Moderate	Low
Levee	0.10	1.07	0.00
Levee Centerline	-	-	-
Levee Flood Wall	-	-	-
NG Pipeline	0.59	4.84	4.96
Railroad	0.09	0.84	0.22
Street	139.97	124.93	151.88
4WD trail	-	0.17	0.24
Alley	-	-	-
Cul-de-sac	0.15	0.02	0.33
Driveway	5.96	3.64	7.05
Interstate	0.79	0.74	0.38

Linear Asset (miles) - Landslide Susceptibility			
Infrastructure Type (Linear)	High	Moderate	Low
Local road	21.93	15.93	18.54
Local road, major	62.73	46.95	77.33
Primary highway	7.13	4.22	5.25
Ramp	0.02	0.38	0.20
Road, parking area	-	0.04	0.00
Service road	0.02	0.03	0.03
State/county highway	40.67	51.63	42.28
Thoroughfare, major	0.56	1.17	0.24
Traffic circle	-	-	-
Transmission Line	45.23	15.46	17.09
Grand Total	**185.98**	**147.14**	**174.15**

4.5.7.9.4 Lifelines

A significant amount of linear infrastructure (or lifelines) can be exposed to mass movements:

- **Roads**—Access to major roads is crucial to life-safety, response, and recovery operations after a disaster event. Landslides can block egress and ingress on roads, causing isolation for neighborhoods, traffic problems, and delays for public and private transportation. This can result in economic losses for businesses.
- **Bridges**—Landslides can significantly impact bridges, by knocking out bridge abutments or significantly weaken the soil supporting them.
- **Power Lines**—Power lines are generally elevated above steep slopes, but the towers supporting them can be subject to landslides. A landslide could trigger failure of the soil underneath a tower, causing it to collapse and rip down the lines. Power and communication failures due to landslides can create problems for vulnerable populations and businesses.

4.5.7.10 Future Trends in Development

Napa County is equipped to handle future growth within landslide hazard areas. The 2008 Napa County General Plan addresses development in areas susceptible to slope failure.

4.5.7.11 Slope Failure Hazard Problem Statements

As part of the mitigation action identification process, each participating jurisdiction's Planning Committee identified issues and/or weaknesses (aka problem statements) for their respective facilities

based on the risk assessment and vulnerability analysis, utilizing the RAMP mapping tool and historic flood data. Slope failure hazard problem statements are listed in Table 4-53. Identifying these common issues and weaknesses assists the Planning Committee in understand the realm of resources needed for mitigation. The goal is to have at least one mitigation action for every problem statement. Projects or actions have been developed to mitigate each problem identified. See Table 5-6 for a full list of mitigation actions and corresponding problem statements that they address. Each problem statement is coded with a problem number for cross-referencing between Table 4-53 and Table 5-6.

Table 4-53 Slope Failure Problem Statements

Problem No.	Area of Concern	Mitigation Alternatives	Primary	Problem Description	Related MA
SF-01	Threat	PRV - Prevention , PE&A - Public Education & Awareness	**County Unincorporated**	The probability of slope failure occurring in Napa County is likely (between 10 and 100% annual probability). Maps of slope stability issue areas are needed.	**NC-41-2020**
SF-02	Victim	SP - Structural Projects	**County Unincorporated**	The Angwin VFD Storage is in a moderate landslide area.	**NC-42-2020**

4.5.8 Agricultural Disaster Hazard Profile

California agriculture and forests are at risk from pests and diseases that, under certain conditions, can cause severe economic, environmental, or physical harm. Table 4-54 identifies pests and diseases of concern. Agricultural disasters could also occur due to severe weather such as severe heat and freeze events. Those hazards are covered in under Severe Weather, Section 4.5.4. Drought, another potential agricultural hazard, is discussed in Section 0.

Agriculture pests and diseases can result in economic and human health disasters. For example, insect pest hazards can have a major economic impact on farmers, farm workers, packers, and shippers of agricultural products. They can also cause significant increases in food prices for consumers due to shortages. In addition, insect pests and diseases such as bark beetles, Sudden Oak Death, and Pitch Canker in trees can destroy large expanses of forest and woodland, increasing the fuel load and contributing to greater fire risk. (CalOES, 2018)

Table 4-54: California Agriculture Pests and Diseases

Dangerous To	Pests and Diseases
Crops and other plants	Asian citrus psyllid/-Huanglong Bing (HLB) disease, Caribbean fruit fly, glassy-winged sharp shooter/Pierce's Disease, European Grapevine Moth, Guava fruit fly, Gypsy moth, Japanese beetle, Mediterranean fruit fly, Melon fruit fly, Mexican fruit fly, Olive fruit fly, oriental fruit fly, bark beetle
Trees	Polyphagous shot hole borers, Bark beetle, Gold spotted oak borer, Sudden oak death (*Phythothora ramorum*), Pitch canker, Emerald ash borer, Asian longhorn beetle
Livestock or poultry	Foot and Mouth Disease, Highly Pathogenic Avian Influenzas (H5 & H7), Exotic Newcastle Disease
Humans	Africanized honeybee, mosquito
All	Red imported fire ant, Bovine Spongeform Encephalopathy, zoonotic animal viruses

Sources: cdfa.ca.gov/PHPPS/pdep/target_pests.html and cdfa.ca.gov/ahfss/Animal_Health/pdfs/CA_Reportable_Disease_List_Poster.pdf

4.5.8.1 Policies, Plans, and Regulatory Environment

The California Department of Food and Agriculture (CDFA) has extensive responsibilities for protecting the food supply, including protecting and responding to the invasion of plant diseases and pests. CDFA administers the statewide programs to address crop health and pest prevention and administers grant programs regarding the same. This includes the statewide exterior exclusion program, border protection

stations, pest detection and emergency projects, trapping, interior exclusion quarantine programs, and Integrated Pest Control weed eradication and biological control programs.

The CDFA also administers programs to address the prevention, detection, immediate containment, and eradication of emergency animal diseases. Some animal diseases have human health implications, and all affect production and marketability of livestock and poultry. Therefore, addressing animal disease contributes to a solid foundation for economic prosperity while decreasing human health. Activities to achieve these goals include outreach and educational services, routine disease surveillance and disease investigations to detect the introduction and spread of injurious animal pests and diseases, and, when necessary, implementation of animal quarantine to control the spread of disease.

The California Conservation Corps assists in mitigating the impacts of insect pests by providing human resources to assist in state and local eradication efforts, including surveying private yards and business landscapes to detect the Glassy Winged Sharpshooter, striping citrus fruit infected by the Mexican Fruitfly, and helping eradicate the Exotic Newcastle Disease by cleaning and disinfecting backyards.

California county-level agriculture commissioners are charged with the protection of California agriculture, the environment, and the public's health and safety. These goals are accomplished through the management of programs that combine public outreach, industry, education, and enforcement actions. County-level agricultural commissioners carry out the following programs to accomplish these aims: Pest Exclusion, Pest Detection, Pest Eradication, Pest Management, Pesticide Enforcement, Seed Certification, Nursery Inspection, Fruits, Nuts and Vegetable Standardization, Egg Inspection, Apiary Inspection, and Crop Statistics.

CDFA licenses the agricultural commissioners and maintains a liaison office to ensure close coordination with the commissioners individually and as a group. (CalOES, 2018)

Invasive Species Council of California

The Invasive Species Council of California (ISCC) was established in 2009 to provide leadership and authority in state government regarding invasive species, with its primary goals being to guide efforts to keep invasive species out of the state and to eradicate incipient populations of undesirable species. ISCC is an inter-agency council chaired by the Secretary of the California Department of Food and Agriculture with members from the California Natural Resources Agency, the California Environmental Protection Agency, the California Business, Transportation and Housing Agency, the California Health and Human Services Agency, and Cal OES. The ISCC has appointed a California Invasive Species Advisory Committee (CISAC) primarily tasked with making recommendations to develop and prioritize an Invasive Species Action Plan. For more information regarding the ISCC and the CISAC, visit: http://www.iscc.ca.gov/.

Napa County Code § 3.54

Napa County has designated a Winegrape Pest And Disease Control District, which levies assessments on properties containing one or more planted vineyard acres within the District to assist in the funding of

inspection, detection, prevention, and education of Pierce's disease, with the goal of preventing the spread of Pierce's disease by the glassy-winged sharpshooter.

4.5.8.2 Past Events

Several disasters in the Bay Area in the last few decades are related to agricultural insect infestation. For example, Contra Costa and San Mateo counties were declared disasters in the 1981 Mediterranean fruit fly infestation, and Santa Clara County was declared disasters in the 1989 Mediterranean fruit fly infestation. (Ass'n of Bay Area Governments, 2011)

Extreme and widespread drought has also been declared in Napa County. For a list of drought declarations in the County, refer to Section 4.5.5.3.

4.5.8.3 Location

Napa County's Agricultural Preserve, established in 1968, has helped maintain the region's beauty and rural agricultural environment because of the. The Ag Preserve consists of the valley floor in unincorporated areas between Napa and Calistoga and was the first of its kind in the nation. The initial Ag Preserve protected 26,000 acres of farmland between the cities of Napa and Calistoga and has since grown to 31,609 acres. It is important to note that no land has ever been taken from the preserve.

Napa County has over 500,000 acres, with 90% designated as Agriculture, Watershed, and Open Space and 10% of that (46,189 acres) in winegrape production. (Napa Dep't of Ag./ Sealer of Weights & Measures, 2017)

4.5.8.4 Frequency/ Probability of Future Occurrences

Future occurrences of pest infestations depend largely on the entrance of diseased plants or animals into Napa County. All incoming plant shipments and other host material originating from known areas of pest or disease infestations are thoroughly inspected to help protect Napa County. The introduction of Glassy-winged Sharpshooter (GWSS), for example, is still a potential threat to the health of grapevines. GWSS can spread Xylella fastidiosa, the pathogen which causes the deadly Pierce's Disease.

Out-of-state shipments may contain pests or diseases of economic importance, such as the Gypsy Moth (GM) and Sudden Oak Death (SOD). The state agricultural border stations notify us of incoming shipments. When a shipment arrives, it is inspected for pests, general cleanliness, and compliance with all applicable federal, state, and county regulations.

Napa County's insect trapping program monitors for invasive pests that can cause potentially devastating crop, forest, and ornamental plant damage. If left unchecked, these pests can cause millions of dollars of damage to agriculture and trigger an increase in pesticide usage within the county. Napa County pest detection trappers place traps throughout the county using species-specific pheromones, food lures or

visual attractors to detect insects of quarantine significance. At the first sign of an invasive pest, actions are taken to ensure that the population does not become established. (Napa Dep't of Ag./ Sealer of Weights & Measures, 2017)

4.5.8.5 Severity

A significant exotic pest infestation could affect everyone in the county, through the loss of markets for farm products, increased pesticide usage and production costs. (Pests & Diseases, n.d.) If left unchecked, these pests can cause millions of dollars of damage to agriculture and trigger an increase in pesticide usage within the county. The Napa County Agricultural Commissioner's Office is concerned about the introduction of new, exotic and destructive organisms. (Napa Dep't of Ag./ Sealer of Weights & Measures, 2017) The local wine industry and related businesses provide an annual economic impact of more than $9.4 billion locally and nearly $34 billion in the U.S. The industry also creates 44,000 jobs in Napa County and nearly 190,000 nationwide. (Vintners)

4.5.8.6 Warning Time

Identifying the presence of insects and pests in agricultural lands is the most important step in warning for an agriculture disaster. Once identified, preventing the insects and pests from establishing a population is critical. Communication between farmers to warn each other of the presence of invasive pests and insects so that appropriate measures can be taken to prevent them from establishing a population and negatively impacting crops.

4.5.8.7 Secondary Hazards

The most significant secondary hazard associated with an agriculture disaster is wildfire. Severe infestation of pests and disease in agricultural lands can cause crops to die, creating increased fuel for wildfire. Agricultural lands are open areas with a mix of grasses, shrubs, trees, and crops that, if dried out or dead, could easily ignite and either start or contribute to a wildfire.

4.5.8.8 Agricultural Disaster Vulnerability Assessment

Agricultural pests and diseases are an economic hazard and, in some cases, a hazard to human health. Mitigation for pests and diseases should include an integrated pest management strategy. (CalOES, 2018)

4.5.8.8.1 Population

Agricultural disasters pose a serious threat to the local economy and populations directly employed by the agriculture industry. Napa County's agricultural production value was over a billion dollars in 2018 for the first time. The agricultural industry is projected to continue to grow and bring more jobs to the County in the future. An agricultural disaster has the potential to greatly impact the Napa County economy, people employed in the agriculture industry, and their families.

An agriculture disaster can also pose threat to human health. Mosquitos carry harmful disease and can transmit diseases to the population. The Africanized honeybee also presents a threat to the population, not because of their sting but because of their aggressive response to a disturbance. They Africanized honeybee will swarm and attach for long periods in the event of a disturbance to their nests.

Figure 4-50 Napa County Wine Field

Photo Source: https://www.wearelatinlive.com/article/4862/in-napa-mexican-americans-have-gone-from-migrant-workers-to-vineyard-owners-here-are-10-latino-owned-wineries-to-visit

4.5.8.8.2 Critical Facilities

Critical facilities, as defined in this plan, will not be affected by an agriculture disaster. However, the secondary hazard of wildfire could pose a significant threat to critical facilities throughout the County, depending on size and severity.

4.5.8.9 Climate Change and Ag Disasters

California farmers contend with a wide range of crop-damaging pests and pathogens. Continued climate change is likely to alter the abundance and types of many pests, lengthen pests' breeding season, and increase pathogen growth rates. For example, the pink bollworm, a common pest of cotton crops, is currently a problem only in southern desert valleys because it cannot survive winter frosts elsewhere in the state. However, if winter temperatures rise 3 to 4.5 degrees Fahrenheit (°F), the pink bollworm's range would likely expand northward, which could lead to substantial economic and ecological consequences for the state.

According to a 2012 California Energy Commission report "Vulnerability and Adaptation to Climate Change in California Agriculture", change in climate can directly impact crop growth through new temperature patterns and northward shifts of pests and disease. Additionally, longer growing seasons will possibly enable pest species to complete more reproductive cycles, which can increase severity of infestations.

Temperature is not the only climatic influence on pests. For example, some insects are unable to cope in extreme drought, while others cannot survive in extremely wet conditions. Furthermore, while warming speeds up the lifecycles of many insects, suggesting that pest problems could increase. Some insects may grow more slowly as elevated carbon dioxide levels decrease the protein content of the leaves on which they feed. (CalOES, 2018)

4.5.8.10 Future Trends in Development

Possible future strategies to address influences on insect pests and diseases might include:

- Inventory and monitor invasive species that threaten crops
- Downscale climate change data to allow informed decisions on biodiversity planning by farmers and rural communities
- Strengthen the dissemination of knowledge, appropriate technologies, and tools to improve management practices related to agricultural biodiversity and ecosystem services

The above strategies were derived from Food and Agriculture Organization of the United Nations, Climate Change for Food and Agriculture, Technical Background Document from the Expert Consultation, 2008, available at: http://www.fao.org/uploads/media/FAO_2008a_climate_change_and_biodiversity_02.pdf.

The County also controls development and the spread of pests through the Winegrape Pest And Disease Control District, and will continue to partner with vintners, farmers, state agencies, and educational extensions to combat the spread of pests or diseases.

4.5.8.11 Agricultural Disaster Hazard Problem Statements

As part of the mitigation action identification process, each participating jurisdiction's Planning Committee identified issues and/or weaknesses (aka problem statements) for their respective facilities based on the risk assessment and vulnerability analysis, utilizing the RAMP mapping tool and historic flood data. Agricultural disaster hazard problem statements are listed in Table 4-55.

Identifying these common issues and weaknesses assists the Planning Committee in understand the realm of resources needed for mitigation. The goal is to have at least one mitigation action for every problem statement. Projects or actions have been developed to mitigate each problem identified. See Table 5-6 for a full list of mitigation actions and corresponding problem statements that they address. Each problem statement is coded with a problem number for cross-referencing between Table 4-55 and Table 5-6.

Table 4-55 Ag Disaster Problem Statements

Problem No.	Area of Concern	Mitigation Alternatives	Primary	Problem Description	Related MA
AG-01	Threat	PE&A - Public Education & Awareness	**County Unincorporated**	Continued climate change is likely to alter the abundance and types of many pests, lengthen pests breeding season, and increase pathogen growth rates.	**NC-27-2020, NC-56-2020, NC-57-2020**
AG-02	Impact	PE&A - Public Education & Awareness , PPRO - Property Protection , PRV - Prevention	**County Unincorporated**	The local ag industry in Napa County is a main driver of the local economy, so an ag disaster could adversely impact the local economy.	**NC-27-2020, NC-57-2020**

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4.5.9 Dam Failure Hazard Profile

Dam failures in the United States typically occur in one of four ways:

- Overtopping of the primary dam structure, which accounts for 34 percent of all dam failures, can occur due to inadequate spillway design, settlement of the dam crest, blockage of spillways, and other factors.
- Foundation defects due to differential settlement, slides, slope instability, uplift pressures, and foundation seepage can also cause dam failure. These account for 30 percent of all dam failures.
- Failure due to piping and seepage accounts for 20 percent of all failures. These are caused by internal erosion due to piping and seepage, erosion along hydraulic structures such as spillways, erosion due to animal burrows, and cracks in the dam structure.
- Failure due to problems with conduits and valves, typically caused by the piping of embankment material into conduits through joints or cracks, constitutes 10 percent of all failures.

Many dam failures in the United States have been secondary results of other disasters, such as earthquakes, landslides, extreme storms, massive snowmelt, equipment malfunction, structural damage, foundation failures, and sabotage. Poor construction, lack of maintenance and repair, and deficient operational procedures are preventable or correctable by a program of regular inspections. Terrorism and vandalism are serious concerns that all operators of public facilities must plan for; these threats are under continuous review by public safety agencies.

4.5.9.1 Policies, Plans, and Regulatory Environment

The potential for catastrophic flooding due to dam failures led to passage of the 1972 National Dam Safety Act, Public Law 92-367. The National Dam Safety Program requires a periodic engineering analysis of every major dam in the country. The goal of this FEMA-monitored effort is to identify and mitigate the risk of dam failure so as to protect the public lives and property.

Federal Energy Regulatory Commission Dam Safety Program

The Federal Energy Regulatory Commission (FERC) has the largest dam safety program in the United States. The FERC cooperates with a large number of federal and state agencies to ensure and promote dam safety and, more recently, homeland security. There are 3,036 dams that are part of regulated hydroelectric projects in the FERC program. Two-thirds of these are more than 50 years old. As dams age, concern about their safety and integrity grows, so oversight and regular inspection are important. FERC staff inspects hydroelectric projects on an unscheduled basis to investigate the following:

- Potential dam safety problems
- Complaints about constructing and operating a project

- Safety concerns related to natural disasters
- Issues concerning compliance with the terms and conditions of a license.

Every five years, an independent consulting engineer, approved by the FERC, must inspect and evaluate projects with dams higher than 10 meters (32.8 feet), or with a total storage capacity of more than 2,000 acre-feet.

FERC staff monitors and evaluates seismic research in geographic areas where there are concerns about seismic activity. This information is applied in investigating and performing structural analyses of hydroelectric projects in these areas. FERC staff also evaluates the effects of potential and actual large floods on the safety of dams. During and following floods, FERC staff visits dams and licensed projects, determines the extent of damage, if any, and directs any necessary studies or remedial measures the licensee must undertake. The FERC publication *Engineering Guidelines for the Evaluation of Hydropower Projects* guides the FERC engineering staff and licensees in evaluating dam safety. The publication is frequently revised to reflect current information and methodologies.

The FERC requires licensees to prepare emergency action plans and conducts training sessions on how to develop and test these plans. The plans outline an early warning system if there is an actual or potential sudden release of water from a dam due to failure. The plans include operational procedures that may be used, such as reducing reservoir levels and reducing downstream flows, as well as procedures for notifying affected residents and agencies responsible for emergency management. These plans are frequently updated and tested to ensure that everyone knows what to do in emergency situations.

U.S. Army Corps of Engineers Dam Safety Program

The U.S. Army Corps of Engineers ("Corps") is responsible for safety inspections of some federal and non-federal dams in the United States that meet the size and storage limitations specified in the National Dam Safety Act. The Corps has inventoried such dams and surveyed each state and federal agency's capabilities, practices, and regulations regarding design, construction, operation, and maintenance of the dams. The Corps develops guidelines for inspection and evaluation of dam safety.

California Division of Safety of Dams

California's Division of Safety of Dams, a division of the Department of Water Resources, monitors the dam safety program at the state level. When a new dam is proposed, Division staff inspects the site. The Division reviews dam applications and building plans to ensure that the dam is designed to meet minimum requirements and that the design is appropriate for known geologic conditions. It also inspects construction to ensure that the work is done in accordance with the approved plans. The Division inspects constructed dams on an annual basis to ensure that it is performing as intended and is not developing problems. Roughly a third of these inspections include in-depth instrumentation reviews. The Division periodically reviews the stability of dams and their major appurtenances in light of improved design

approaches and requirements, as well as new findings regarding earthquake hazards and hydrologic estimates in California. (Cal. Dep't of Water Resources, 2019)

Senate Bill 92: Dam Safety

Senate Bill 92 was signed into law on June 27th, 2017 and it provides new requirements focused on dam safety. Specifically, it requires dam owners to submit inundation maps to the Department of Water Resources. After they have been approved, the dam owner must then submit an emergency action plan (EAP) to Cal OES. These need to be approved by Cal OES, and resubmitted every 10 years. (California Office of Emergency Services, 2020)

Napa County General Plan

The 2008 Napa County General Plan includes the following goals and policies to mitigate dam failure:

> **Policy SAF-26:** Development proposals shall be reviewed with reference to the dam failure inundation maps in order to determine evacuation routes.
>
> **Policy SAF-27:** Dam and levee maintenance is considered by the County to be the responsibility of the owner/operator of each dam and/or levee. The County will support other agencies in their efforts to ensure that proper maintenance and repairs are accomplished.

4.5.9.2 Past Events

No dams have failed in Napa County to date. As the risk assessment for Napa County illustrates, the chances of a dam failure area low, but the consequences of such are quite severe.

The most recent concerning dam failure in California was the 2017 collapse of a spillway on the Oroville Dam in Butte County, California. Oroville Dam is the largest facility within the State Water Project in California; the dam stores 3.5 million acre feet of water, and serves as important flood control for the Feather River. In 2017, after substantial runoff from the Sierra Nevadas, Lake Oroville was full and the spillway was opened to release extra water downstream. "Spillways" are dam safety features that allow water to overtop the dam if the reservoir fills too quickly. Spillway overflow events, often

Figure 4-51. Oroville Dam Spillway after 2017 failure.

Source: https://www.watereducation.org/aquapedia/oroville-dam

referred to as "design failures," result in increased discharges downstream and increased flooding potential.

The force of the release gouged a large crater in the concrete spillway and required the California Department of Water Resources (DWR) to halt water releases via that conduit. The high lake level then created fear that erosion would compromise the integrity of the auxiliary spillway and flood the city of Oroville and surrounding communities. Thousands were evacuated, and eventually runoff receded without further issue. Ultimately, an independent analysis concluded that poor design and construction and inadequate state oversight contributed to the collapse of the concrete spillway. (Water Education Foundation, 2020)

The Oroville Dam spillway failure triggered inspection of 93 dam spillways across California throught the new Spillway Re-evaluation Program, including three in Napa County: Conn Creek, Bell Canyon, Lake Curry, and Rector Creek dams. (Cal. Dep't of Water Resources, 2019)

4.5.9.3 Location

According to California Department of Water Resources Division of Dam Safety, there are 57 dams in Napa County, shown in Table 4-56. Figure 4-52 shows inundation zones for the dams in Napa County. Areas of the County most threatened by dam inundation are those along the Napa River corridor, including the cities of St. Helena, Yountville, and Napa.

Table 4-56: Dams in Napa County

Dam Number	Dam Name	Owner Name	Year Built
2419.000	Angwin	Union Public Utility District	1983
5413.000	Araujo Reservoir No. 1	Kerwin Estate, LLC	1950
5413.002	Araujo Reservoir No. 2	Kerwin Estate, LLC	1950
2410.000	B J Robinson	Private Entity	1957
7000.012	Bassett Brown	Brown Estate Vineyards	1990
16.003	Bell Canyon	City of Saint Helena	1959
2416.000	Blanchard-Offner	Private Entity	1963
1419.000	Burns	M.V.P. Vineyards, LLC	1956
1.005	Camille, Lake	Napa State Hospital	1880
2417.000	Circle S	Circle S. Ranch, LLC	1979
7.003	Conn Creek	City of Napa	1946
410.000	Crystal	Private Entity	1952
1411.000	Cynthia, Lake	Krupp Brothers Vineyard	1955
1416.000	Davis	Private Entity	1955
3414.000	Deer Creek	Juliana Mutual Water Company	1980
413.005	Deer Lake	Howell Mountain Mutual Water Company	1958

Dam Number	Dam Name	Owner Name	Year Built
3414.003	Dick Week	Juliana Mutual Water Company	1955
414.000	Duval	Private Entity	1940
392.006	Eaton H. Magoon Lake	Langtry Farms, LLC	1965
2415.000	Foss Valley	Atlas Peak Vineyards	1988
3414.007	Hardester North	Juliana Mutual Water Company	2003
4415.000	Heitz	Heitz Wine Cellars	1991
413.004	Henne	Howell Mountain Mutual Water Company	1959
5414.000	Hestan Vineyards Dam	Private Entity	n/a
4416.000	Hudson Vineyards	Hudson Vineyards	1983
4418.000	Jamieson Vineyards	Boisset Family Estates	n/a
83.000	Kimball Creek	City of Calistoga	1939
415.000	La Herradura	L.P.R.P. Legacy Trust	1948
1414.000	La Verne, Lake	Private Entity	1956
14.000	Lake Curry	City of Vallejo	1926
419.002	Leticia, Lake	Private Entity	1960
2412.000	Linda Vista	Private Entity	1959
3414.004	Long Valley West No. 2	Juliana Mutual Water Company	1982
3414.005	Lower Twin Lake	Juliana Mutual Water Company	1985
1.006	Marie, Lake	Napa State Hospital	1908
411.000	Maxville	Maxville Lake Winery	1953
3413.000	Metcalf	Skalli Corporation	1974
7.000	Milliken	City of Napa	1924
5411.000	Montana Lake	Private Entity	2009
3417.000	Morgan	Private Entity	n/a
416.000	Moskowite	Private Entity	1955
392.007	Napa Valley Lake	Langtry Farms, LLC	1990
1418.000	Naz Lake	Huneeus-Chantre Properties	1955
1410.000	Olson	Private Entity	1955
413.006	Orville	Howell Mountain Mutual Water Company	1959
1.021	Rector Creek	California Department of Veteran Affairs	1946
1413.000	Robert L. Matheson	Sage Canyon, LLC	1954
417.000	Scotts Canyon	Private Entity	1948
16.002	St. Helena Lower	City of Saint Helena	1878
4419.000	Turkey Ranch	The Hess Collection Winery	1999
3414.006	Upper Twin Lake	Juliana Mutual Water Company	1987
2413.002	Usibelli No 2	Usibelli Coal Mine, Inc.	1973
5412.000	Veeder Hills Dam	The Hess Collection Winery	n/a
1.014	Veterans Home	California Department of Veteran Affairs	1908

Dam Number	Dam Name	Owner Name	Year Built
419.000	William, Lake	Private Entity	1960
3419.002	Willow Lake #1	C. Mondavi and Son, Inc.	2004
1412.000	Wine Lake	Private Entity	1953

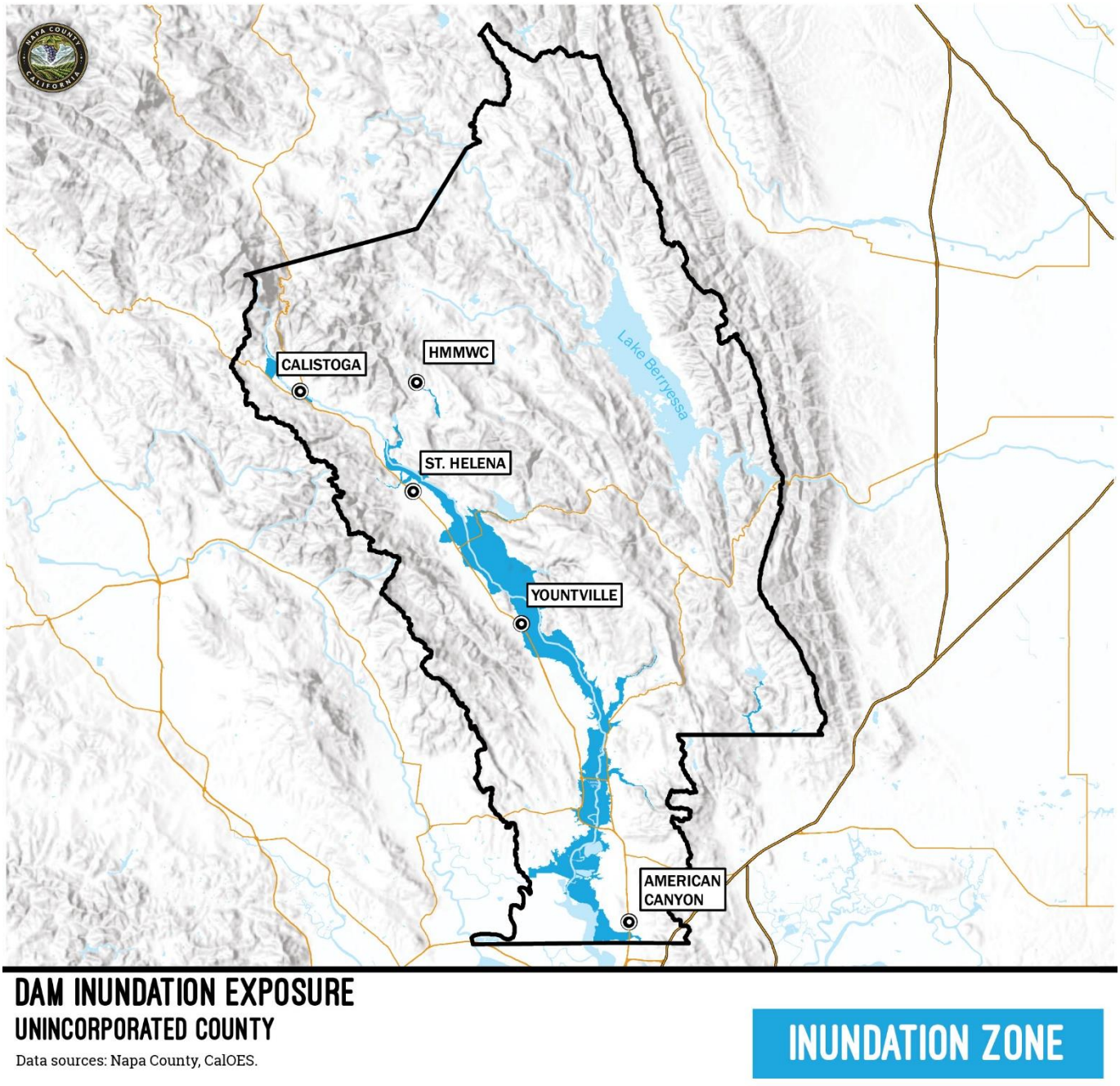

Figure 4-52: Napa County Dam Inundation Exposure and Snapshot Map

4.5.9.4 Severity

Dam failure can be catastrophic to all life and property downstream. FEMA developed the classification system shown in Table 4-57 for potential dam failures. This hazard potential classification system categorizes dams based on the probable loss of human life and the impacts on economic, environmental, and lifeline interests. Improbable loss of life exists where persons are only temporarily in the potential inundation area. For instance, this hazard potential classification system does not contemplate the improbable loss of life of the occasional recreational user of the river and downstream lands, passer-by, or non-overnight outdoor user of downstream lands. In any classification system, all possibilities cannot be defined. High usage areas of any type should be considered appropriately. Judgment and common sense must ultimately be a part of any decision on classification. Further, no allowances for evacuation or other emergency actions by the population should be considered because emergency procedures should not be a substitute for appropriate design, construction, and maintenance of dam structures.

4.5.9.5 Frequency/ Probability of Future Occurrences

The probability of any type of dam failure is low in today's regulatory and dam safety oversight environment. Dam failure events usually coincide with events such as earthquakes, landslides, and excessive rainfall and snowmelt

Table 4-57: FEMA Hazard Potential Classification

Hazard Potential Classification	Loss of Human Life	Economic, Environmental, Lifeline Losses
Low	None expected	Low and generally limited to owner
Significant	None expected	Yes
High	Probable. One or more expected	Yes (but not necessary for this classification)

Source: Federal Guidelines for Dam Safety- Hazard Potential Classification Systems for Dams, April 2004

4.5.9.6 Warning Time

Warning time for dam failure depends on the cause of failure. In an event of extreme precipitation or massive snowmelt, evacuations can be planned with sufficient time. In the event of a structural failure due to earthquake, there may be no warning time. A dam's structural type also affects warning time. Earthen dams do not tend to fail instantaneously. Once a breach is initiated, discharging water erodes the breach until the reservoir water is depleted, or the breach resists further erosion. Concrete gravity dams also tend to have an initial partial breach. The time of breach formation ranges from a few minutes to a few hours. Several participating jurisdictions have established protocols in their emergency operations plans for warning and response to imminent dam failure within the flood warning . These protocols are tied to emergency action plans created by the dam owner.

Developing Emergency Action Plans (EAPs) for all high and significant hazard potential dams for Napa County is critical to reducing the risks of loss of life and property damage from dam failures. EAPs have been developed for dams of interest in this HMP. The EAP contains procedures and information to assist the dam owner in issuing early warning and notification messages to emergency management authorities. The EAP also contains inundation maps to identify the areas subject to flooding in the unlikely event of dam failure.

EAPs are critical in identifying areas downstream from dams requiring warning and evacuation in the event of dam failure. Documented cases have demonstrated that warning and evacuation time for EAPs can dramatically influence the loss of life. Loss of life can vary from 0.02 percent of the persons-at-risk when the warning time is 90 minutes to 50 percent when less than 15 minutes, (Graham, 1988) Costa reported that the average number of fatalities per dam failure is 19 times greater when there is little to no warning. (U.S. Geological Survey, 1985) Dam breach inundation studies usually assume one of two failure scenarios:

- Flows from a dam failure during "fair weather" or "sunny day" conditions with the reservoir at the normal pool level and receiving normal inflow (usually insignificant). A fair weather failure is generally considered to have the most potential for loss of human life, primarily due to the element of surprise.
- Flows from a dam failure during flood conditions or the inflow design flood. Failure during flood conditions is considered to show the upper limit of inundation and to have less potential for loss of human life because the downstream population is "on alert." The flood conditions scenario is more expensive to analyze due to the additional cost for the necessary watershed and spillway studies.

Inundation mapping shows a continuous "line of inundation" identifying the area potentially at risk in event of dam failure. It starts at the dam and continues downstream to a point where the breach flood no longer poses a risk to life and property damage, such as a large river or reservoir with the capacity of storing the flood waters. The need to consider the "domino effect" should be made on a case-by-case basis if the assumed failure of a dam would cause the failure of any downstream dams.

Important to Note: EAPs are not publicly available but are on file at the Napa County Office of Emergency Services or with individual dam owners and California DWR. Information provided on flooding conditions at downstream locations will include:

- Distance downstream
- Arrival time of leading edge of flood wave
- Peak flow depth, incremental rise, or water surface elevation (as appropriate)
- Peak velocity

4.5.9.7 Secondary Hazards

Dam failure can cause severe downstream flooding, depending on the magnitude of the failure. Other potential secondary hazards of dam failure are landslides around the reservoir perimeter, bank erosion on the rivers, and destruction of downstream habitat.

4.5.9.8 Dam Failure Vulnerability Assessment

The primary danger associated with dam failure is high velocity flooding downstream of the dam and limited warning times for evacuation. Vulnerability varies by community and depends on the particular dam profile and the nature and extent of the failure. Vulnerable populations are present directly below the dam, and may include those incapable of escaping the area within the allowable time frame. This population includes the elderly and young who may be unable to self-evacuate from the inundation area. The vulnerable population also includes those who would not have adequate warning from a television or radio emergency warning system. Dam inundation zones created by Cal OES were used in conjunction with the inventory listed in Table 4-56 to develop at risk populations and loss estimations for dam failure.

4.5.9.8.1 Population

Vulnerable populations are all populations downstream from dam failures that are incapable of escaping the area within the allowable time frame. This population includes the elderly and young who may be unable to get themselves out of the inundation area. The vulnerable population also includes those who would not have adequate warning from a television, radio emergency warning system, have not registered with reverse 911, or do not have cell phones that can receive amber alerts. The potential for loss of life is affected by the capacity and number of evacuation routes available to populations living in areas of potential inundation. The entire population in a dam failure inundation zone is exposed to the risk of a dam failure. The estimated population exposed to dam inundation is summarized in Figure 4-50 and Table 4-58.

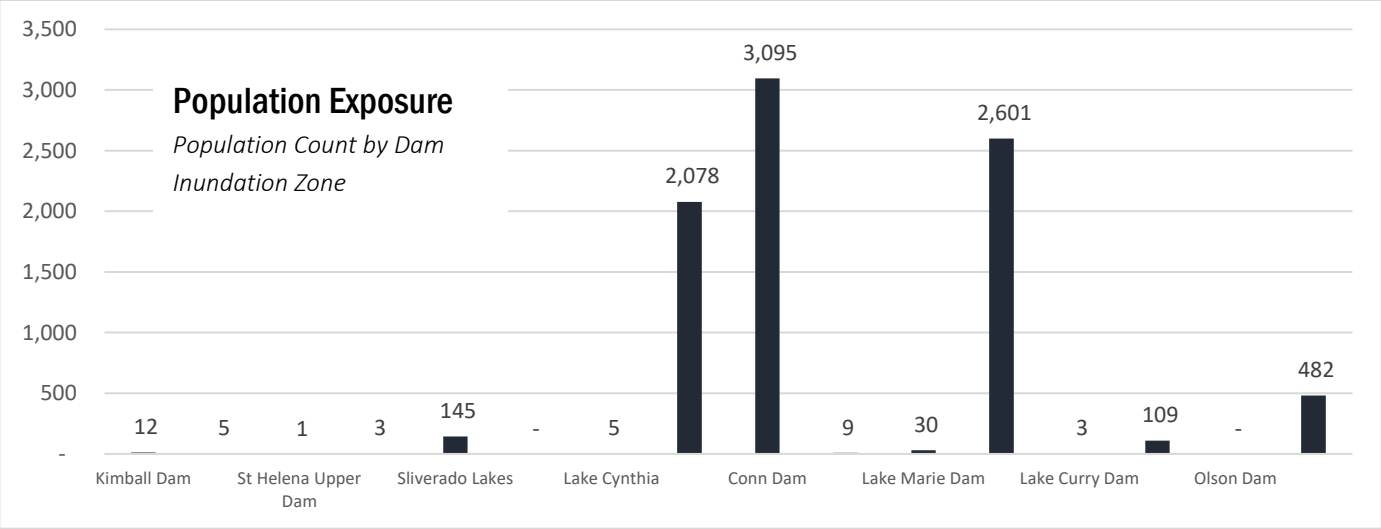

Figure 4-53 Population Exposure to Dam Failure (Unincorporated County)

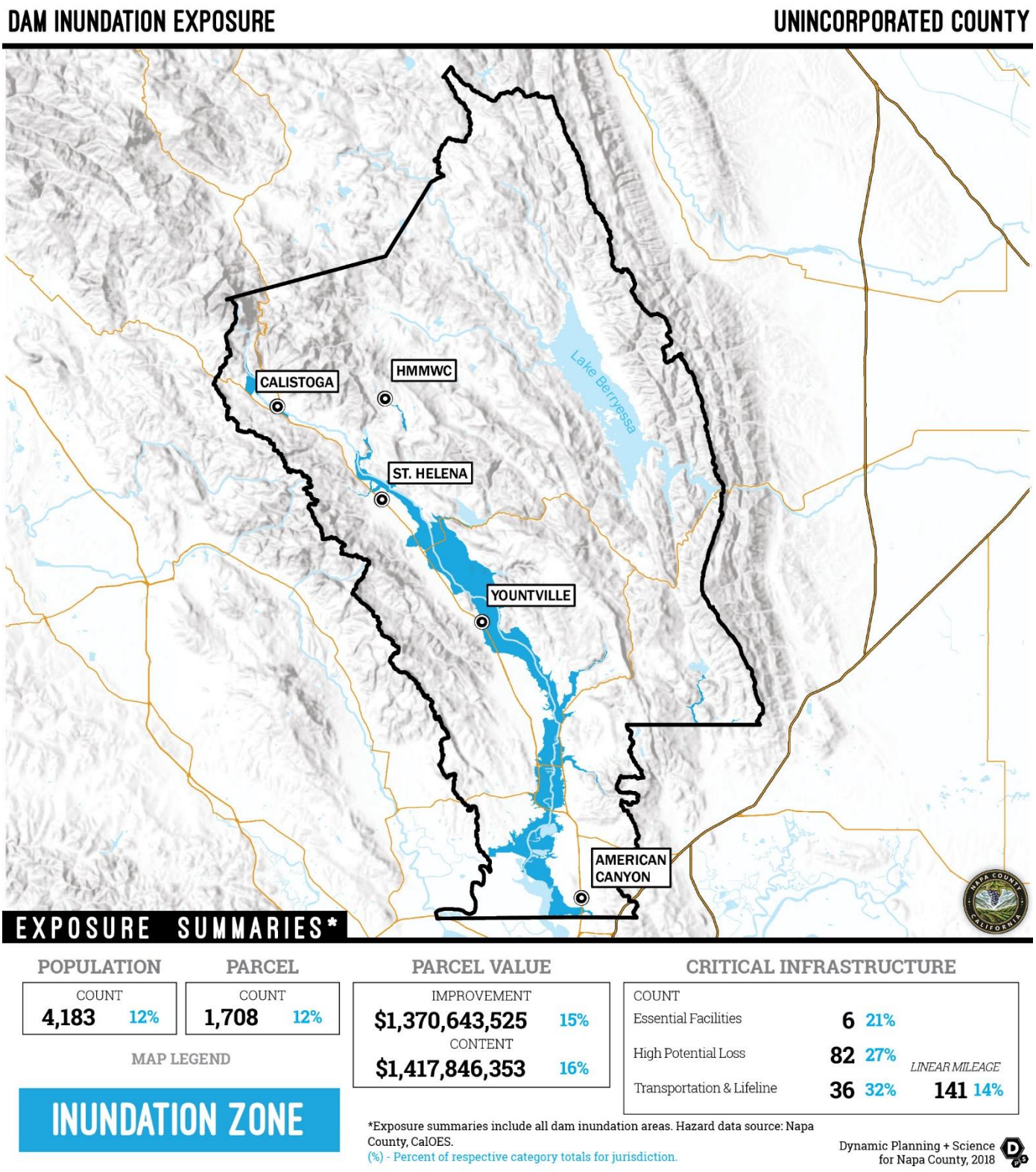

Figure 4-54: Dam Failure Vulnerability Snapshot

Table 4-58: Population Exposure to Dam Failure (Unincorporated County)

	Total Population
Unincorporated County	34,147

Dam Inundation Zone	Population Count	% of Total
Kimball Dam	12	*0.04%*
Kimball Dam Overflow Pond	5	*0.01%*
St Helena Upper Dam	1	*0.00%*
St Helena Lower Dam	3	*0.01%*
Sliverado Lakes	145	*0.42%*
Monticello Dam	-	*0.00%*
Lake Cynthia	5	*0.01%*
Milliken Dam	2,078	*6.09%*
Conn Dam	3,095	*9.06%*
Lake Camille Dam	9	*0.03%*
Lake Marie Dam	30	*0.09%*
Rector Creek Dam	2,601	*7.62%*
Lake Curry Dam	3	*0.01%*
Summit Reservoir	109	*0.32%*
Olson Dam	-	*0.00%*
Bell Canyon Dam	482	*1.41%*
Total*	**4,183**	**12.25%**

4.5.9.8.2 Property

Vulnerable properties are those closest to the dam inundation area. These properties would experience the largest, most destructive surge of water. Low-lying areas where water would collect are also vulnerable. Transportation routes are vulnerable to dam inundation and have the potential to be wiped out, creating isolation issues. This includes all roads, railroads, and bridges in the path of the dam inundation. Those most vulnerable are already in poor condition and would not be able to withstand a large water surge. Utilities such as overhead power, cable, and phone lines could also be vulnerable. Loss of these utilities could create additional isolation issues for the inundation areas. Table 4-59 below displays parcel values at risk from dam inundation.

Table 4-59: Parcel Values at Risk from Dam Inundation (Unincorporated County)

	Total Parcels	Total Market Value ($)	Total Content Value ($)	Total Value ($)
Unincorporated County	14,654	$ 9,233,654,827	$ 9,140,828,845	$ 18,374,483,672

Dam Inundation Zone	Parcel Count	% of Total	Market Value Exposure ($)	Content Value Exposure ($)	Total Exposure ($)	% of Total
Kimball Dam	25	0.2%	$ 16,237,677.00	$ 10,822,797.00	$ 27,060,474.00	0.15%
Kimball Dam Overflow Pond	29	0.2%	$ 21,368,120.00	$ 24,163,359.00	$ 45,531,479.00	0.25%
St Helena Upper Dam	-	0.0%	$ -	$ -	$ -	0.00%
St Helena Lower Dam	-	0.0%	$ -	$ -	$ -	0.00%
Sliverado Lakes	55	0.4%	$ 7,629,638.00	$ 6,262,073.00	$ 13,891,711.00	0.08%
Monticello Dam	-	0.0%	$ -	$ -	$ -	0.00%
Lake Cynthia	9	0.1%	$ 10,344,931.00	$ 14,138,482.00	$ 24,483,413.00	0.13%
Milliken Dam	539	3.7%	$139,756,680.00	$ 88,026,526.00	$ 227,783,206.00	1.24%
Conn Dam	890	6.1%	$858,757,832.00	$ 911,570,315.00	$ 1,770,328,147.00	9.63%
Lake Camille Dam	1	0.0%	$ 4,703,930.00	$ 1.00	$ 4,703,931.00	0.03%
Lake Marie Dam	2	0.0%	$ 9,118,356.00	$ 684,865.00	$ 9,803,221.00	0.05%
Rector Creek Dam	607	4.1%	$534,766,863.00	$ 572,581,794.00	$ 1,107,348,657.00	6.03%
Lake Curry Dam	14	0.1%	$ 3,172,003.00	$ 2,471,094.00	$ 5,643,097.00	0.03%
Summit Reservoir	-	0.0%	$ -	$ -	$ -	0.00%
Olson Dam	-	0.0%	$ -	$ -	$ -	0.00%
Bell Canyon Dam	243	1.7%	$298,820,560.00	$ 327,183,730.00	$ 626,004,290.00	3.41%
Dam Inundation Area*	**1,708**	**11.7%**	**$ 1,370,643,525**	**$ 1,417,846,353**	**$ 2,788,489,878**	**15.2%**

**totals are not equal to sum of all dam inundation zones due to dissolved overlapping inundation areas.*

4.5.9.8.3 Critical Facilities & Lifelines

Low-lying areas are vulnerable to dam inundation, especially transportation routes. This includes all roads, railroads, and bridges in the flow path of water. The most vulnerable critical facilities are those in poor condition that would have difficulty withstanding a large surge of water. Utilities such as overhead power lines and communication lines could also be vulnerable. Loss of these utilities could create additional compounding issues for emergency management officials attempting to conduct evacuation and response actions. GIS analysis determined that 431 of the planning area's critical facilities and infrastructure points are in a mapped dam inundation area, as summarized in Table 4-60 and Table 4-61.

Table 4-60: Critical Infrastructure Points in Dam Inundation Zones (Unincorporated County)

Infrastructure Type	TOTAL FEATURE COUNT	Kimball Dam	Kimball Dam Overflow	St Helena Upper Dam	St Helena Lower Dam	Sliverado Lakes	Monticello Dam	Lake Cynthia	Milliken Dam	Conn Dam	Lake Camille Dam	Lake Marie Dam	Rector Creek Dam	Lake Curry Dam	Summit Reservoir	Olson Dam	Bell Canyon Dam
Essential Facility	6	-	-	-	-	-	-	-	2	5	-	-	3	-	-	-	-
EOC	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Fire Station	4	-	-	-	-	-	-	-	1	3	-	-	2	-	-	-	-
Hospital	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Police Station	2	-	-	-	-	-	-	-	1	2	-	-	1	-	-	-	-
High Potential Loss	82	1	-	-	-	-	1	-	29	62	3	8	39	-	-	-	6
Adult Residential Care	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Child Care - Licensed	3	-	-	-	-	-	-	-	-	1	1	2	-	-	-	-	-
Church	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Communication Tower	1	-	-	-	-	-	-	-	1	1	-	-	-	-	-	-	-
Dam	7	1	-	-	-	-	1	-	-	3	-	1	-	-	-	-	-
Family Child Care Home	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Farm Worker Housing	1	-	-	-	-	-	-	-	-	1	-	-	1	-	-	-	1
Historic Building	2	-	-	-	-	-	-	-	-	2	-	-	1	-	-	-	-
Home Care Organization	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
*Insured Asset	51	-	-	-	-	-	-	-	25	48	1	1	29	-	-	-	-
Library	2	-	-	-	-	-	-	-	-	1	-	-	2	-	-	-	-
Mobile Home Park	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1
NCFCWCD Asset	1	-	-	-	-	-	-	-	1	1	-	-	1	-	-	-	-
Residential Elder Care Facility	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1
School	6	-	-	-	-	-	-	-	-	-	1	4	-	-	-	-	-
Rain Gauges	4	-	-	-	-	-	-	-	1	3	-	-	3	-	-	-	3
Water Treatment Plant	2	-	-	-	-	-	-	-	1	1	-	-	2	-	-	-	-
Transportation and Lifeline	36	1	-	-	-	-	3	1	5	20	-	-	15	1	2	-	14
Airport	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Bridge	31	1	-	-	-	-	-	1	5	20	-	-	15	1	-	-	14
NG Station	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Power Plant	5	-	-	-	-	-	3	-	-	-	-	-	-	-	2	-	-
Substation	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Hazmat	1	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-
Landfill	1	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-
Grand Total	125	2	-	-	-	-	4	1	36	87	3	8	57	1	3	-	20

**Insured Assets are broken into sub-categories, main assets such as Airports are attributed to their appropriate categories.*

Table 4-61: Miles of Critical Infrastructure in Dam Inundation Zones (Uninc. Co.)

Infrastructure Type (linear)	TOTAL DAM EXPOSURE	Kimball Dam	Kimball Dam Overflow	St Helena Upper Dam	St Helena Lower Dam	Sliverado Lakes	Monticello Dam	Lake Cynthia	Milliken Dam	Conn Dam	Lake Camille Dam	Lake Marie Dam	Rector Creek Dam	Lake Curry Dam	Summit Reservoir	Olson Dam	Bell Canyon Dam
Levee	51.25	-	-	-	-	-	-	-	24.5	30.6	-	-	42.2	-	4.0	-	3.3
Levee Centerline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Levee Flood Wall	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
NG Pipeline	5.49	-	-	-	-	-	-	-	2.0	5.5	-	-	2.9	-	-	-	-
Railroad	6.76	-	-	-	-	-	-	-	3.3	6.7	-	-	4.2	-	-	-	-
Street	66.61	1.3	1.5	0.0	-	2.2	0.1	0.3	10.6	42.4	0.1	0.3	27.0	1.8	0.6	-	11.0
4WD trail	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Alley	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Cul-de-sac	0.09	-	-	-	-	-	-	-	-	0.1	-	-	-	-	-	-	-
Driveway	2.56	-	-	-	-	-	-	-	0.1	1.7	-	-	1.4	0.0	-	-	0.3
Interstate	1.84	-	-	-	-	-	-	-	1.3	1.8	-	-	-	-	-	-	-
Local road	4.03	-	0.0	-	-	0.7	-	-	0.1	0.8	-	-	1.6	0.9	-	-	0.3
Local road, major	34.17	0.9	1.0	-	-	1.3	0.1	0.1	7.4	19.6	0.1	0.3	11.6	0.9	0.6	-	7.1
Primary highway	4.79	-	0.4	-	-	-	-	-	0.0	4.4	-	-	2.7	-	-	-	-
Ramp	0.19	-	-	-	-	-	-	-	0.1	0.2	-	-	0.1	-	-	-	-
Road, parking area	0.14	-	-	-	-	-	-	-	0.1	0.1	-	-	-	-	-	-	-
Service road	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
State/county highway	18.75	0.4	0.1	0.0	-	0.3	-	0.2	1.4	13.6	-	-	9.6	-	-	-	3.3
Thoroughfare, major	0.06	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.1
Traffic circle	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Transmission Line	10.53	-	-	-	-	-	-	0.0	1.1	7.5	-	-	4.6	-	1.6	-	0.3
Grand Total	**196.74**	**1.3**	**1.5**	**0.0**	**-**	**2.2**	**0.1**	**0.3**	**41.3**	**92.7**	**0.1**	**0.3**	**80.9**	**1.8**	**6.2**	**-**	**14.7**

4.5.9.9 Future Trends in Development

Flooding due to a dam failure event is likely to exceed the special flood hazard areas regulated through local floodplain ordinances. The County and participating jurisdictions should consider the dam failure hazard when permitting development in mapped dam inundation zones and downstream of high hazard and significant hazard dams in the County. Low hazard dams could become significant or high hazard dams if development occurs below them.

4.5.9.10 Dam Failure Hazard Problem Statements

As part of the mitigation action identification process, each participating jurisdiction's Planning Committee identified issues and/or weaknesses (aka problem statements) for their respective facilities based on the risk assessment and vulnerability analysis, utilizing the RAMP mapping tool and historic flood data. Dam failure hazard problem statements are listed in Table 4-62.

Identifying these common issues and weaknesses assists the Planning Committee in understand the realm of resources needed for mitigation. The goal is to have at least one mitigation action for every problem statement. Projects or actions have been developed to mitigate each problem identified. See Table 5-6 for a full list of mitigation actions and corresponding problem statements that they address. Each problem statement is coded with a problem number for cross-referencing between Table 4-62 and Table 5-6.

Table 4-62 Dam Failure Problem Statements

Problem No.	Area of Concern	Mitigation Alternatives	Primary	Problem Description	Related MA
DF-28	Victim	PE&A - Public Education & Awareness , SP - Structural Projects	**American Canyon**	Approx. 1600 people that live within a Dam Inundation Zone in the City of American Canyon.	**AC-07-2020, NC-34-2020, NC-35-2020, NC-36-2020**
DF-29	Victim	PE&A - Public Education & Awareness , SP - Structural Projects	**American Canyon**	There are 956 parcels within a Dam Inundation Zone in the City of American Canyon.	**AC-07-2020, NC-34-2020, NC-35-2020, NC-36-2020**
DF-07	Victim	PRV - Prevention , PPRO - Property Protection , ES - Emergency Services	**Calistoga**	Approx. 700 people that live within a Dam Inundation Zone in the City of Calistoga.	**NC-34-2020, NC-35-2020, NC-36-2020**
DF-13	Victim	PRV - Prevention , PPRO - Property Protection , ES - Emergency Services , PE&A - Public Education & Awareness	**Calistoga**	There are 12 Critical Infrastructure Facilities in a Dam Inundation Zone within the City of Calistoga	**NC-34-2020, NC-35-2020, NC-36-2020**
DF-11	Victim	PRV - Prevention , PPRO - Property Protection , ES - Emergency Services , PE&A - Public Education & Awareness	**County Unincorporated**	Pacific Union College is in a dam inundation zone.	**NC-30-2020, NC-34-2020, NC-35-2020, NC-36-2020**
DF-50	Impact	PRV - Prevention , PE&A - Public Education & Awareness , NRP - Natural Resource Protection	**Howell Mountain MWC**	Cascading effect of Dam failure in the HMMWC.	**HM-07-2020**

Problem No.	Area of Concern	Mitigation Alternatives	Primary	Problem Description	Related MA
DF-51	Impact	PRV - Prevention , PPRO - Property Protection , PE&A - Public Education & Awareness	**Howell Mountain MWC**	Major Flooding in Inundation Zone (Loss of Life and Property)	**HM-08-2020**
DF-52	Impact	PRV - Prevention , PPRO - Property Protection , NRP - Natural Resource Protection	**Howell Mountain MWC**	Treatment Plant in Inundation Zone (Loss of ability to provide water.)	**HM-07-2020**
DF-53	Impact	PRV - Prevention , PE&A - Public Education & Awareness , ES - Emergency Services	**Howell Mountain MWC**	Evacuation Route in Inundation Zone.	**HM-05-2020**
DF-54	Victim	PRV - Prevention , PPRO - Property Protection , PE&A - Public Education & Awareness	**Howell Mountain MWC**	Residents; Employees, Winery Visitors, Neighbors in Inundation Zone.	**HM-05-2020**
DF-55	Victim	PRV - Prevention , PPRO - Property Protection	**Howell Mountain MWC**	Volunteer Fire Department in Inudunation Zone; Market/Store in Inundation Zone; Pacific Union College in Inundation Zone.	**HM-08-2020**
DF-56	Victim	PRV - Prevention , PPRO - Property Protection , PE&A - Public Education & Awareness	**Howell Mountain MWC**	400 Customers in Inundation Zone.	**HM-06-2020**
DF-23	Victim	PE&A - Public Education & Awareness , SP - Structural Projects	**Napa COE**	The County Office Main Building is in a dam inundation zone.	**NC-34-2020, NC-35-2020, NC-36-2020**
DF-17	Victim	PRV - Prevention , PPRO - Property Protection , ES - Emergency Services , PE&A - Public Education & Awareness	**Napa Valley College**	Napa Valley College is in a Dam Inundation Zone.	**NC-34-2020, NC-35-2020, NC-36-2020, NVC-07-2020**
DF-14	Victim	PRV - Prevention , PPRO - Property Protection , ES - Emergency Services , PE&A - Public Education & Awareness	**St. Helena**	There are 1400 people living within a Dam Inundation Zone in the City of St. Helena	**NC-30-2020, NC-35-2020**

Problem No.	Area of Concern	Mitigation Alternatives	Primary	Problem Description	Related MA
DF-19	Victim	PE&A - Public Education & Awareness , ES - Emergency Services , PPRO - Property Protection	**Yountville**	Approx. 1,000 people are living in a floodplain or dam inundation zone (Rector Creek Dam).	**NC-34-2020, NC-35-2020, NC-36-2020, YV-02-2020**
DF-20	Victim	SP - Structural Projects	**Yountville**	16 critical facilities are in a dam inundation zone (Rector Creek Dam) and 3 are in the 100-YR floodplain.	**NC-34-2020, NC-35-2020, NC-36-2020, YV-02-2020**

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4.5.10 Pandemic Disease Hazard Profile

The U.S. Center for Disease Control defines an outbreak as the occurrence of more cases of disease than normally expected within a specific place or group of people over a given period of time. An ***epidemic*** is a localized outbreak that spreads rapidly and affects many people or animals in a community. A ***pandemic*** is an epidemic that occurs worldwide or over a very large area and affects a large number of people or animals. The following are the most common types of pandemic diseases in the planning area:

Influenzas

The flu can cause mild to severe illness, and at times can lead to death. Anyone can get sick with the flu, but some people are at a higher risk of flu-related complications if they get sick. This includes older and younger people and people with certain chronic medical conditions.

West Nile Virus

West Nile virus (WNV) is a mosquito-borne disease that is common in Africa, west Asia, the Middle East, and more recently, North America. Human infection with WNV may result in serious illness. Experts believe WNV is established as a seasonal epidemic in North America that flares up in the summer and continues into the fall.

Hepatitis C

Hepatitis C is a liver disease caused by the Hepatitis C virus (HCV), which is found in the blood of persons who have this disease. HCV is spread by contact with the blood of an infected person.

Lyme Disease

Lyme disease is an infectious disease caused by a bacterium known as a spirochete. People get Lyme disease when a tick infected with the Lyme disease bacterium attaches and feeds on them. Lyme disease was first recognized in the northeastern United States in the 1970s. Lyme disease has been reported from many areas of the country, including California.

Measles

Measles is a childhood infection caused by a virus. Once quite common, measles can now almost always be prevented with a vaccine.

Also called rubeola, measles can be serious and even fatal for small children. While death rates have been falling worldwide as more children receive the measles vaccine, the disease still kills more than 100,000 people a year, most under the age of 5.

As a result of high vaccination rates in general, measles hasn't been widespread in the United States for more than a decade. The United States averaged about 60 cases of measles a year from 2000 to 2010, but the average number of cases jumped to 205 a year in recent years. Most of these cases originate outside the country and occurred in people who were unvaccinated or who didn't know whether or not they had been vaccinated.

Rabies

Rabies is a viral infection transmitted in the saliva of infected mammals. Common modes of rabies virus transmissions are through bites and contact with saliva of an infected host. Other various routes of transmission include contamination of mucous membranes, aerosol transmission, and corneal transplantations. Any penetration of the skin by teeth regardless of location, represents a potential risk of rabies transmission. The rabies virus infects the central nervous system, causing encephalopathy and ultimately death.

4.5.10.1 Policies, Plans, and Regulatory Environment

The U.S. Department of Health and Human Services has statutory responsibility for preventing the introduction, transmission, and spread of communicable diseases in the United States. Under its delegated authority, the Division of Global Migration and Quarantine works to fulfill this responsibility through a variety of activities, including:

- the operation of Quarantine Stations at ports of entry,
- establishment of standards for medical examination of persons destined for the United States, and
- administration of interstate and foreign quarantine regulations, which govern the international and interstate movement of persons, animals, and cargo.

The legal foundation for these activities is found in Titles 8 and 42 of the U.S. Code and relevant supporting regulations.

Napa County Mosquito Abatement District

Napa County Mosquito Abatement District (NCMAD) has been controlling mosquito populations for the citizens of Napa County since 1925. The Board of Trustees comprises representatives from each incorporated City and the County and governs the District. There are currently eight employees who are responsible for controlling mosquitoes throughout the County.

NCMAD works closely with other public agencies, park districts, and wineries to provide an effective and environmentally-sound mosquito control program. The District also works with planning agencies to minimize mosquito production in wetland restoration and enhancement projects.

4.5.10.2 Past Events

Lyme disease is present in Napa County. There have been 22 diagnosed cases between 2000 and 2015. Rocky Mountain Spotted Fever is also present in Napa County. There was one case reported by the California Department of Health Services in 2000. (Napa County Mosquito Abatement District, 2019) In 2009, the H1N1 flu pandemic was declared a disaster in the Bay Area to facilitate federal funds for local health department activities. (Ass'n of Bay Area Governments, 2011)

4.5.10.3 Location

The entire planning area is susceptible to human health hazards discussed in this profile. Some hazards such as West Nile Virus can have a geographic presence within the planning area. Others may be transported into the County, such as through residents and visitors who travel extensively. This makes it difficult to map the extent and location of these hazards in comparison to other hazards such as flooding, dam failure, or wildfire.

4.5.10.4 Frequency/ Probability of Future Occurrences

The San Francisco Bay Area has a high probability of a naturally-occurring, mild to moderate pandemic. People in the Bay Area travel more internationally and come into contact with many people on a daily basis. (San Francisco Department of Emergency Management, 2019)

In California, mosquitoes are monitored and controlled primarily to reduce cases of West Nile Virus, malaria, encephalitis, dog heartworm, and sensitivity to bites. With the exception of recent West Nile Virus cases, human mosquito-borne diseases have declined significantly in California since the creation of mosquito and vector control agencies like NCMAD. Residents should be aware that West Nile Virus, dog heartworm, and encephalitis viruses are still present in Napa County. (Napa County Mosquito Abatement District, 2019)

4.5.10.5 Severity

A communicable disease could affect many people, causing mild illness, hospitalization, or in rare cases, death. (San Francisco Department of Emergency Management, 2019)

4.5.10.6 Secondary Hazards

Human health hazards are not like natural hazards such as earthquakes, floods, or fires that have measurable secondary impacts. This is due primarily to that fact that human health hazards do not impact general building stock or critical facilities and infrastructure as other hazards do. The largest secondary impact caused by human health hazards would be economic. Large outbreaks of any human health hazard could reduce the workforce significantly for long periods of time while the infected population recovers from the impacts of the disease. Hospitals and health care providers could be overwhelmed.

4.5.10.7 Pandemic Disease Vulnerability Assessment

4.5.10.7.1 Population

All citizens in the Napa County planning area could be susceptible to the human health hazards discussed in this profile. A large outbreak or epidemic of a communicable disease could have devastating effects on the population. The introduction of a disease such as the plague or influenza could rapidly impact those most at-risk (children, the elderly and those already affected by health issues).

4.5.10.7.2 Property

None of the health hazards addressed in this profile are considered to have any measurable impact on the built environment in the planning area.

4.5.10.7.3 Critical Facilities and Infrastructure

None of the health hazards addressed in this profile are considered to have any measurable impact on critical facilities in the planning area. However, healthcare facilities (and veterinary clinics) are prepared for pandemic disease hazards. Emergency management planning incorporates all disciplines responding to an event, (fire agencies, law enforcement, first responder ground and air ambulance agencies, public health, mental and spiritual health). Planning includes identifying shelters, alternate treatment facilities, isolation capacity, and methods to immediately expand physical and human resources.

4.5.10.8 Future Trends in Development

The economic impact of a human health hazard could be localized to a single population or could be significant, depending on the number of cases and available resources to care for those affected. Other financial impacts are absorbed or managed by the organization affected. For example, healthcare facilities and veterinary offices train their personnel at their own cost. As more people visit Napa County or move into the area, the potential for a pandemic disease outbreak rises. Urban areas in particular will become more vulnerable as density increases and illnesses or contamination spread more rapidly.

4.5.10.9 Pandemic Disease Hazard Problem Statements

As part of the mitigation action identification process, each participating jurisdiction's Planning Committee identified issues and/or weaknesses (aka problem statements) for their respective facilities based on the risk assessment and vulnerability analysis, utilizing the RAMP mapping tool and historic flood data. Pandemic disease hazard problem statements are listed in Table 4-63.

Identifying these common issues and weaknesses assists the Planning Committee in understand the realm of resources needed for mitigation. The goal is to have at least one mitigation action for every problem statement. Projects or actions have been developed to mitigate each problem identified. See Table

5-6 for a full list of mitigation actions and corresponding problem statements that they address. Each problem statement is coded with a problem number for cross-referencing Table 4-63 and Table 5-6.

Table 4-63 Pandemic Disease Problem Statements

Problem No.	Area of Concern	Mitigation Alternatives	Primary	Problem Description	Related MA
PD-01	Victim	PE&A - Public Education & Awareness	**County Unincorporated**	Napa County residents and visitors who travel extensively can become exposed to pandemic disease while abroad and bring the hazard back with them.	NC-40-2020
PD-02	Victim	PE&A - Public Education & Awareness	**County Unincorporated**	Some people, such as older people, young children, pregnant women and people with certain health conditions (such as asthma, diabetes, or heart disease), are at increased risk for serious complications from seasonal flu illness.	NC-43-2020
PD-03	Threat	ES - Emergency Services	**County Unincorporated**	Insufficient hospital capacity for widespread disease.	NC-40-2020

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Section 5. Mitigation Strategy

The mitigation strategy is the guidebook to future hazard mitigation administration for the County and all other participating jurisdictions, capturing the key outcomes of the MJHMP planning process. The mitigation strategy is intended to reduce vulnerabilities outlined in the previous section with a prescription of policies and physical projects. These mitigation actions should be compatible with existing planning mechanisms, and should outline specific roles and resources for implementation success. The Planning Committee conducted the hazard mitigation planning process through a typical problem-solving methodology, as did the Steering Committees for each participating jurisdiction :

- Estimate the impacts (*See* Vulnerability Assessment);
- Describe the problem (*See* Problem Statements);
- Assess what resources exist to lessen impacts and problem (*See* Capability Assessment,);
- Develop Goals and Objectives to address the problems (*See* Goals and Objectives); and
- Determine what can be done and develop actions that are appropriate for the community (*See* Mitigation Action Matrix).

5.1 Mitigation Alternatives

During Planning Committee Meeting #4 on March 14th, 2018, the MJHMP Planning Committee developed and reviewed mitigation actions with a wide range of alternatives, using FEMA's six broad categories of mitigation alternatives described below. The MJHMP Planning Committee considered many mitigation alternatives for implementation under each mitigation category, both county-wide and for individual participating jurisdictions.

PREVENTION (PRV):

Preventative activities keep hazard problems from getting worse and typically are administered through government programs or regulations addressing building and land development. Preventative actions are particularly effective in reducing a community's future vulnerability in areas where development has not occurred, or capital improvements have not yet been substantial. Examples of preventative activities include:

- Planning and zoning ordinances;
- Building codes;
- Open space preservation;
- Floodplain regulations;
- Stormwater management regulations;
- Drainage system maintenance;
- Capital improvements programming; and
- Riverine or fault zone setbacks.

PRV ALTERNATIVES:

- Establish ingress/ egress standards for future development.
- Enhance the County's GIS database and capabilities related to hazards information.
- Assist dam owners in updating their Emergency Action Plans.
- Maintain detention basins.
- Conduct detailed study and mapping of floodplains for Napa River and its tributaries, targeting problematic floodplains.
- Update and distribute wildfire risk mapping for Napa County.
- Restrict new development in dam inundation zones.
- Amend or revise water conservation regulations for landscape design for commercial and residential development with the goal of limiting outdoor watering.

PROPERTY PROTECTION (PPRO):

Property protection measures involve the modification of existing buildings and structures to help them better withstand the forces of a hazard, or removal of the structures from hazardous locations. Examples include:

- Building elevation;
- Critical facilities protection;
- Retrofitting (e.g., seismic design techniques, etc.);
- Safe rooms, shutters, shatter resistant glass; and
- Insurance.

PPRO ALTERNATIVES:

1. Continue the Napa County Fire Department free community chipping to all Napa County residents who live in a designated fire hazard zone.
2. Continue to work with the Napa Communities Firewise Foundation and local Fire Safe Councils to conduct mitigation projects with homeowners. Provide homeowners easily accessible resources for mitigating the risk of wildfire around their homes.
3. Implement additional fuel reduction projects.
4. Remove existing structures from flood areas whenever and to the greatest extent possible; Relocate farm work centers from flood risk areas.
5. Encourage privately owned critical facilities (e.g. Churches, Hotels, other gathering facilities) to evaluate the ability of the buildings to withstand earthquakes and to address any deficiencies identified.
6. Identify and harden critical lifeline systems (i.e., critical public services such as utilities and roads) to meet "Seismic Design Guidelines and Standards for Lifelines" or equivalent standards such as American Lifelines Alliance (ALA) guidance.
7. Increase participation in NFIP.
8. Review construction plans for all bridges to determine their susceptibility to collapse and retrofitting problem bridges.
9. Use flexible piping when extending water, sewer, or natural gas service.

10. Strengthening and retrofitting non-reinforced masonry buildings and non-ductile concrete facilities that are particularly vulnerable to ground shaking
11. Install shutoff valves and emergency connector hoses where water mains cross fault lines.
12. Continue to incentivize drought-tolerant landscape design.

PUBLIC EDUCATION AND AWARENESS (PE&A):

Public education and awareness activities advise students, staff, parents, nearby residents, and elected officials about hazards, hazardous areas, and mitigation techniques they can use to protect themselves and their property. Measures to educate and inform the public include:

- Outreach projects including neighborhood and community outreach;
- Speaker series / demonstration events;
- Hazard mapping;
- Real estate disclosures;
- Materials library;
- School children educational programs; and
- Hazard expositions.

PE&A ALTERNATIVES:

1. Continue to work with the Napa Communities Firewise Foundation and local Fire Safe Councils educating homeowners on reducing the risk of wildfire on their property, including understanding their wildfire risk, free site visits, and community chipping program.
2. Distribute public education materials relating to natural hazards as well as emergency notifications in both English and Spanish.
3. Partner with Watershed Information and Conservation Council in their public education campaign (in English and Spanish) that encourages water conservation during both drought and non-drought years.
4. Encourage businesses to build financial reserves as part of economic development.
5. Improve floodplain management, earthquake preparedness, wildfire mitigation and preparedness, and other information on participating jurisdiction's websites.
6. Distribute National Flood Insurance Program and floodplain development information in County libraries for access by the public
7. Focus a public education program around neighborhoods with egress/ingress issues and narrow roads.
8. Improve interactive hazard mapping resources available to public.
9. Develop a public information campaign on 72-hour kits.
10. Develop a "Natural Hazard Awareness Week" campaign and conduct corresponding outreach to the community and all interested parties.
11. Conduct outreach to builders, architects, engineers and inspectors about building susceptibility to earthquakes and proper design and building requirements.
12. Educate on the importance of drought-tolerant landscaping, low flow indoor fixtures, and other water savings techniques to better withstand periods of drought.
13. Partner with local organizations such as the Watershed Information and Conservation Council and Napa County Resource Conservation District to education farmers on soil and water conservation practices.
14. Offer agricultural disaster training and networking opportunities for farmers and ag regulatory agencies.

NATURAL RESOURCE PROTECTION (NRP):

Natural resource protection activities reduce the impact of natural hazards by preserving or restoring natural areas and their protective functions. Such areas include floodplains, wetlands, steep slopes, and sand dunes. Parks, recreation, or conservation agencies and organizations often implement these protective measures. Examples include:

- Floodplain protection
- Watershed management;
- Vegetation management (e.g., fire resistant landscaping, fuel breaks, etc.);
- Erosion and sediment control;
- Wetland and habitat preservation and restoration;

NRP ALTERNATIVES:

1. Continue to implement the Napa River Flood Management Plan, Stream Maintenance Program Manual,
2. Protect and restore wetlands, riparian areas, and natural buffers to sea level rise, in particular continuing to implement Napa River restoration.
3. Continue to implement the Napa Countywide Stormwater Program.
4. Complete vegetation management projects as prescribed in Community Wildfire Protection Plans.
5. Encourage and incentivize drought-tolerant landscape design.
6. Establish a priority list of slope failure locations and implement slope stabilization projects in the highest risk areas.
7. Preserve Floodplains and areas at risk for sea level rise as Open Space.

EMERGENCY SERVICES (ES):

Although not typically considered a "mitigation" technique, emergency service measures do minimize the impact of a hazard event on people and property. These commonly are actions taken immediately prior to, during, or in response to a hazard event. Examples include:

- Warning systems;
- Construction of evacuation routes;
- Sandbag staging for flood protection; and
- Installing temporary shutters on buildings for wind protection.

ES ALTERNATIVES:

1. Construct/Install back up power generators for fire stations, pump houses, emergency shelters and cooling centers.

2. Develop website for vulnerable population to register information such as where he or she lives, medications, restrictions, etc. Map registrants or tie information to Nixel alert system
3. Focus capital improvements on evacuation or emergency access routes needing attention.
4. Increase the capacity of existing hospitals through retrofits or upgrades such as isolation wings.
5. Construct or improve egress for wildfire emergencies in wilderness-urban interface (WUI) areas.

STRUCTURAL PROJECTS (SP):

Structural mitigation projects are intended to lessen the impact of a hazard by modifying the environmental natural progression of the hazard event through construction. They are usually designed by engineers and managed or maintained by public works staff. Examples include:

- Stormwater diversions / detention / retention infrastructure;
- Utility Upgrades
- Seismic Retrofits

SP ALTERNATIVES:

1. Continue the Napa River restoration projects.
2. Improve water supply and delivery systems to be more resilient during times of drought.
3. Construct and develop alternative water supplies to augment single sources of water delivery.
4. Construct rainwater catchment systems to recharge groundwater in government ROWs.
5. Install water monitoring devices and drought-tolerant landscaping on government-owned facilities.
6. Improve stormwater drainage capacity; construct / improve stormwater basins County-wide to accomplish 100-YR protection .
7. Conduct regular maintenance for drainage systems and flood control structures.
8. Construct, install and maintain warning gauges on local dams as the opportunity or need arises.
9. Create an inventory and establish a priority list for culvert replacement that takes into account fish passage, flood depth reduction and future losses avoided.
10. Retrofit critical care facilities with enhanced HVAC and isolation areas.
11. Construct a slope stabilization project to protect the Angwin VFD storage facility.

5.2 Identifying the Problem

As part of the mitigation action identification process, the MJHMP Planning Committee identified the areas of concern and potential impacts of each of the identified hazards on the community. Developing these "problem statements" for areas of concern, which describe the nature of the consequences or effects of a hazard occurrence on the community and its assets, ensures the identified mitigation actions are tailored to the specific problems created by various hazard scenarios and are specific to each participating jurisdiction. Each jurisdiction's problem statements are available as part of the Mitigation Action Support Tool (MAST), which is summarized on Table 3-5 and available on mitigatehazards.com, and also summarized in individual participating jurisdictions in Volume 2 of this Plan.

HMP submitted 08.11.2020

See Section 5.5 for related County Wide mitigation actions, or related mitigation actions for each participating jurisdiction in Volume 2 of this plan.

5.3 Capabilities and Opportunities to Expand, Improve, & Integrate HMP

The mitigation strategy assesses Napa County's planning and regulatory, administrative, technical, financial, educational, and outreach capabilities to augment known issues and weaknesses from identified natural hazards. Volume 2 of this HMP includes a capabilities assessment for each participating jurisdiction as part of their annexes.

For more information on the regulatory environment surrounding each hazard, see hazard-specific sections of Section 4.5.

5.3.1 Planning and Regulatory Mitigation Capabilities

The information in Table 5-1 is used to align mitigation actions with existing planning and regulatory capabilities and existing opportunities to improve or expand upon those existing capabilities, and where opportunities exist to integrate this HMP into future planning policies or processes. Planning and regulatory tools typically used by local jurisdictions to implement hazard mitigation activities are building codes, zoning regulations, floodplain management policies, and other municipal planning documents.

The initial planning and regulatory mitigation capabilities table explores various local planning mechanisms, and includes a deeper dive into the following questions:

- Is the existing planning or regulatory mechanism present?
- Is there an opportunity to incorporate this 2020 HMP Update into the planning or regulatory mechanism? Has the previous HMP been integrated?
- Is there an opportunity to expand or improve upon the existing planning or regulatory mechanism?

The capabilities and evaluation is easily-digestible and based on color coding to indicate which policies and plans are adequate, need improvement or in which the HMP could be integrated, as described by the table to the right.

Table 5-1: Napa County Planning and Regulatory Mitigation Capabilities

LEGEND

Green	(Yes) Currently in use or present. Used widely for mitigation. Resources present to expand.
Yellow	(Sort of) Seldomly used or limited presence. Limited use in mitigation planning. Limited resources.
Orange	(No) Not present or available. Not used in mitigation planning. No ability to expand.

Plans / Programs / Regulation	Status	HMP Integration	Resources to Expand	Notes
Construction and Future Development Regulations				
Building Codes				Updated in 2019, referenced in 2020 HMP
BCEGS Rating				Rating of 3
Public Protection (ISO Class)				Class 6
Site Plan Review Requirements				Environmental Review (Ch. 17.10); Water Conservation for Landscape Design (Ch. 18.118); Improvement sntds include, but not limited to, Flood Control Req's (Ch. 17.36.030), Fire Protection Requirements (17.36.090), and Groundwater Conservation (17.59.010)
Zoning Ordinance				Ag. Watershed District (Ch. 18.20) protects "agriculture, watersheds and floodplain tributaries from fire, pollution and erosion." Conservation Regulations (Ch. 18.108) to protect from excessive soil loss and water quality/ quantity issues; Groundwater Conservation (Ch. 18.141)
Hazard-Specific Ordinance				Fire Protection (Ch. 3.24; Fire Hazard Abatement (Ch. 3.86); Floodplain Ordinance (Ch. 16.04); Stormwater Mgmt (Ch. 16.28); Western Grapeleaf Skeletonizer Control Regulation (Ch. 8.40)
Growth Management Ordinance				Growth Management System part of GP (Ag. Preservation and Land Use Elements); Implemented by Housing Allocation Program in County Code (Ch. 8.02)
Hazard Reduction Programs (Annually Conducted)				
Capital Improvements Program (CIP) or Plan				Revised CIP expected 2021
Erosion/Sediment Control Program				Required by the State Water Resources Control Board

Plans / Programs / Regulation	Status	HMP Integration	Resources to Expand	Notes
Hazard-Related Public Outreach Program				See Education and Outreach Resource Capabilities
Stormwater Management Program (Annual Inspections)				
Seismic Safety Program (Building Safety)				Statewide
Earthquake Modernization Plan (Non-structural)				
Hazard Plans				
Community Wildfire Protection Plan (CWPP)				County-wide CWPP in development
Comprehensive, Master, or General Plan				2008, Will not be updated for some time.
Floodplain Management Plan				Napa River Flood Management Plan
Stormwater Management Plan				Up to date
Emergency Operations Plan				EOP Updated in 2020
Climate Action Plan				CAP Updated in 2019
Drought Contingency Plan				Napa Valley Drought Contingency Plan includes County
Ground Water Management Planning / Plans				Napa County Groundwater Sustainability Agency Implements the local Groundwater Sustainability Plan
National Flood Protection Program (NFIP)				
Floodplain Management Regulations				Meets minimum standards.
Flood Insurance Education and Technical Assist.				
Flood Hazard Mapping / Re-Mapping				
Community Rating System (CRS)				Class 7

5.3.1.1 Administrative and Technical Capabilities

Table 5-2: Administrative and Technical Capabilities

LEGEND	
Green	(Yes), good, strong, good opportunity or ability or is completed.
Yellow	(Somewhat) Needs improvement or moderate opportunity or ability.
Orange	(No) limited opportunity or resources to expanded position.

Administrative and Technical	Status	Notes or opportunities to expand?
Community Planning and Development Services:		
Community Planner		Planning, Building & Environmental Services
Civil Engineer		Engineering Division
Building Code Official		Building Division
Floodplain Administrator		Not in house.
Fire Marshal		County Fire Department
Resiliency Planner		
Transportation Planner		
Warning Systems/ Services		
General		Integrated Public Alert and Warning System
Flood		Depend upon County Stream Gauges; NIXLE
Wildfire		NIXLE
Geological Hazards		
Other		
GIS Specialist and Capability		Multiple
Emergency Manager		Office of Emergency Services
Full-Time Building Official		
Grant Manager, Writer, or Specialist		

5.3.1.2 Financial Capabilities

Table 5-3: Fiscal Capabilities Summary

LEGEND	
Green	(Yes), good, strong, good opportunity or ability or is completed.
Yellow	(Somewhat) Needs improvement or moderate opportunity or ability.
Orange	(No) or not functioning as envisioned; limited opportunity or ability.

Financial Resource	Status	Notes or opportunities to expand
Levy for Specific Purposes with Voter Approval		
Utilities Fees		
Development Impact Fee		Planning, Building & Environmental Services
General Obligation Bonds to Incur Debt	Not applicable	
Special Tax Bonds to Incur Debt		
Withheld Spending in Hazard-Prone Areas		
Stormwater Service Fees		
Capital Improvement Project Funding		

5.3.1.3 Education and Outreach

Table 5-4: Education / Outreach Capabilities Summary

LEGEND	
Green	(Yes), good, strong, good opportunity or ability or is completed.
Yellow	(Somewhat) Needs improvement or moderate opportunity or ability.
Orange	(No) or not functioning as envisioned; limited opportunity or ability.

Education/ Outreach Resources	Status	Notes and opportunities to expand
Website Dedicated to Hazard Topics		Napa County Emergency Services
Dedicated Social Media		
Hazard Info. Avail. at Library/ Planning Desk		
Annual Public Safety Events		
Ability to Field Public Tech. Assistance Requests		
Public Safety Newsletters or Printed Outreach		
Fire Safe Councils		Napa Firewise Council and 12 Fire Safe Councils, most of which have NFPA's Firewise status.
Resource Conservation Districts		Napa County RCD
Land Trusts		California Rangeland Trust, Center for Natural Lands Management, Land Trust of Napa County, Rock Mountain Elk Foundation, Save the Redwoods League, The Nature Conservancy, The Trust for Public Land, Wilderness Land Trust, Western Rivers Conservancy, Wildlife Heritage Foundation
Other		Yes: Napa/ Solano Builders Exchange, Wine Industry Stakeholder Group, Land Use Stakeholders Group, Napa County Water Information & Conservation Council (WICC)

5.3.2 Federal and State Funding Opportunities

Table 5-5 is a list of available funding sources from state and federal agencies. This includes the FEMA Hazard Mitigation Assistance grant program, which is described in more detail in Section 6.3.5. This list serves as a resource and is not exclusive.

Table 5-5 Federal and State Funding Opportunities

Agency / Grant Name	Potential Programs/Grants
FEMA Hazard Mitigation Assistance Grants	See Section 6.3.5 for FEMA/ HMA grant details. For more information on current grants visit https://www.fema.gov/hazard-mitigation-assistance ▪ Hazard Mitigation Grant Program (HMGP): https://www.fema.gov/hazard-mitigation-grant-program ▪ Pre-Disaster Mitigation Program (PDM): https://www.fema.gov/pre-disaster-mitigation-grant-program ▪ Flood Mitigation Assistance Grant Program (FMA): https://www.fema.gov/flood-mitigation-assistance-grant-program
FEMA other grant programs	Including: ▪ Assistance to Firefighters Grant Program. Assistance to Firefighters Grants, Fire Prevention & Safety, and Staffing for Adequate Fire and Emergency Response. https://www.fema.gov/welcome-assistance-firefighters-grant-program ▪ Emergency Management Performance Grants (EMPG). Good for Equipment, Back Up Generators, Etc. https://www.fema.gov/emergency-management-performance-grant-program ▪ Regional Catastrophic Preparedness Grant Program (RCPGP). Housing and Logistics and Supply Chain Management, encouraging innovative regional solutions to issues related to catastrophic incidents, and building on existing regional efforts. https://www.fema.gov/regional-catastrophic-preparedness-grant-program
U.S. Dept. of Energy / Energy Efficiency and Conservation Block Grant Program	Provides funding for weatherization of structures and development of building codes/ordinances to ensure energy efficiency and restoration of older homes. https://www.energy.gov/eere/wipo/energy-efficiency-and-conservation-block-grant-program
State and County Community Development Dept. Block Grants (CDBG)	Through Cal. Dept. of Housing and Community Development Dept. (HCD) Programs Include: ▪ Community Development (CD) ▪ Economic Development (ED) ▪ Disaster Recovery Initiative (DRI) ▪ Neighborhood Stabilization Program (NSP) https://www.hcd.ca.gov/grants-funding/active-funding/cdbg.shtml

Agency / Grant Name	Potential Programs/Grants
Cal OES **Proposition 1B Grants Programs**	The Highway Safety, Traffic Reduction, Air Quality and Port Security Bond Act of 2006, approved by the voters as Proposition 1B at the November 7, 2006 general election, authorizes the issuance of nineteen billion nine hundred twenty five million dollars ($19,925,000,000) in general obligation bonds for specified purposes, including grants for transit system safety, security, and disaster response projects. http://www.caloes.ca.gov/cal-oes-divisions/grants-management/homeland-security-prop-1b-grant-programs/proposition-1b-grant
California Proposition 1: the Water Bond (AB 1471)	Authorize $7.545 billion in general obligation bonds for state water supply infrastructure projects, such as public water system improvements, surface and groundwater storage, drinking water protection, water recycling and advanced water treatment technology, water supply management and conveyance, wastewater treatment, drought relief, emergency water supplies, and ecosystem and watershed protection and restoration. The State Water Resources Control Board (State Water Board) will administer Proposition 1 funds for five programs. The estimated implementation schedule for each is outlined in Five Categories: ▪ Small Community Wastewater ▪ Water Recycling ▪ Drinking Water ▪ Stormwater ▪ Groundwater Sustainability http://www.waterboards.ca.gov/water_issues/programs/grants_loans/proposition1.shtml
Assistance to Firefighters Grant Program (AFG); Fire Prevention and Safety (FP&S)	The primary goal of the FP&S Grants is to enhance the safety of the public and firefighters with respect to fire and fire-related hazards. The Grant Programs Directorate administers the FP&S Grants as part of the AFG Program. FP&S Grants are offered to support projects in two activity areas: 1). Fire Prevention and Safety (FP&S) Activity Activities designed to reach high-risk target groups and mitigate the incidence of death and injuries caused by fire and fire-related hazards. 2). Research and Development (R&D) Activity To learn more about how to prepare to apply for a project under this activity, please see the FP&S Research and Development Grant Application Get Ready Guide. https://www.fema.gov/fire-prevention-safety-grants
California Housing and Community Development (HCD) Emergency Solutions Grant (ESG) Program	To fund projects that serve homeless individuals and families with supportive services, emergency shelter/transitional housing, assisting persons at risk of becoming homeless with homelessness prevention assistance, and providing permanent housing to the homeless population. The Homeless Emergency Assistance and Rapid Transition to Housing (HEARTH) Act of 2009 places new emphasis on assisting people to quickly

Agency / Grant Name	Potential Programs/Grants
	regain stability in permanent housing after experiencing a housing crisis and/or homelessness. http://www.hcd.ca.gov/fa/esg/index.html
CalTrans Division of Local Assistance / Safe Routes to School Program	California Dept. of Transportation. Federal funding administered via Caltrans. Local 10% match is the minimum requirement. http://www.dot.ca.gov/hq/LocalPrograms/saferoutes/saferoutes.htm
Property Assessed Clean Energy (PACE) Programs	PACE financing allows property owners to fund energy efficiency, water efficiency and renewable energy projects with little or no up-front costs. With PACE, residential and commercial property owners living within a participating district can finance up to 100% of their project and pay it back over time as a voluntary property tax assessment through their existing property tax bill.
HazMat Emergency Preparedness Grant	The purpose of this grant program is to increase effectiveness in safely and efficiently handling hazardous materials accidents and incidents; enhance implementation of the Emergency Planning and Community Right-to-Know Act of 1986 (EPCRA); and encourage a comprehensive approach to emergency training and planning by incorporating the unique challenges of responses to transportation situations. http://www.caloes.ca.gov/cal-oes-divisions/fire-rescue/hazardous-materials/hazmat-emergency-preparedness-grant
CERT Program Manager Course	The purpose of this Community Emergency Response Team (CERT) Program Manager course is to prepare CERT Program Managers for the tasks required to establish and sustain an active local CERT program. http://www.californiavolunteers.org/index.php/CERT/PM/
California Residential Mitigation Program	The California Residential Mitigation Program (CRMP) was established to carry out mitigation programs to assist California homeowners who wish to seismically retrofit their houses. http://www.californiaresidentialmitigationprogram.com/
Earthquake Brace + Bolt (EBB)	EBB, part of the California Residential Mitigation Program, was developed to help homeowners lessen the potential for damage to their houses during an earthquake by offering eligible homeowners up to a $3,000 incentive to seismically retrofit their homes. https://www.earthquakebracebolt.com/

Agency / Grant Name	Potential Programs/Grants
California Air Resources Board Air Pollution Incentives, Grants and Credit Programs	These programs have hundreds of millions of dollars in grants available over the next several years to reduce emissions from on- and off-road vehicles and equipment. https://www.arb.ca.gov/ba/fininfo.htm
California Department of Water Resources Grants and Loans	https://water.ca.gov/Work-With-Us/Grants-And-Loans Agency offers a variety of grants and loans related to integrated regional water management, flood mitigation, water conservation and efficiency, environmental restoration, groundwater, water quality, and water supply.
US Bureau of Reclamation WaterSMART Grants	Annual funding available for: ▪ Water Reclamation and Reuse funding ▪ Drought Resiliency Project funding ▪ Water and Energy Efficiency Grant funding https://www.usbr.gov/watersmart/

5.3.3 Expanding and Improving Existing Policies and Programs

The planning, regulatory, financial, and educations capabilities assessment presents an opportunity for the County to examine what capabilities it does not currently have and where it makes the most sense to expand and improve upon those capabilities in the future. This assessment effort shaped mitigation actions for all hazards and for specific hazards that focus on expanding and improving existing policies and programs. The expansions and improvements were based upon identified vulnerabilities specific to each jurisdiction. See tables at the end of each hazard profile in Section 4.5 for identified vulnerabilities. See mitigation actions in Table 5-6 that relate to policy and program improvements identified by the County.

5.4 Mitigation Goals

Hazard mitigation plans must identify goals for reducing long-term vulnerabilities to identified hazards (44 C.F.R. § 201.6(c)(3)(i)). The steering committee established a set of goals for this plan, based on data from the preliminary risk assessment and the results of the public involvement strategy.

Goals discussed in this section describe what actions should occur. Specific, measurable mitigation actions explain how to accomplish the goals. The goals and actions form the basis for the development of the Mitigation Action Strategy and specific mitigation projects. The process consists of 1) setting goals, 2) considering mitigation alternatives, 3) identifying strategies or "actions", and 4) developing a prioritized action plan resulting in a mitigation strategy.

The goals, objectives and mitigation actions in this plan all support each other. Objectives were selected that met multiple goals. Actions were prioritized based on their ability to achieve multiple objectives. A mitigation strategy is considered effective based on how well the goals of the strategy are achieved. The following are the goals for this plan:

Goal 1: Reduce deaths, injuries and structural damage through the use of planning, regulations and preventative measures.

Goal 2: Reduce deaths, injuries and structural damage through the use of public education and awareness programs.

Goal 3: Reduce deaths, injuries and structural damage through the use of natural resource/ systems protection.

Goal 4: Reduce deaths, injuries and structural damage through the use of structural/ infrastructure projects.

Goal 5: Reduce deaths, injuries and structural damage through the use of emergency services in relation to natural hazards.

5.5 County Wide Mitigation Actions

Mitigation actions were developed based upon planning committee priorities, risk assessment results, and mitigation alternatives. Most importantly, the newly developed mitigation actions acknowledge updated risk assessment information outlined in Section 4.

Mitigation actions are available on MAST linked through mitigatehazards.com; the format allows for regular updating and easy sorting by jurisdiction and hazard. Figure 5-1 illustrates the mitigation actions entered through MAST.

Table 5-6 establishes mitigation actions for the County and Participating Jurisdictions. Each participating jurisdiction developed mitigation actions specifically tailored to their vulnerabilities and capabilities. Those mitigation actions are available as part of the planning process library, which is summarized on Table 3-5 available on the Mitigation Action Application, and available for each individual participating jurisdiction in Volume 2 of this Plan.

Some mitigation actions support ongoing activities of participating jurisdictions, while other actions are intended to be completed when funding is available. All mitigation actions will be reviewed annually.

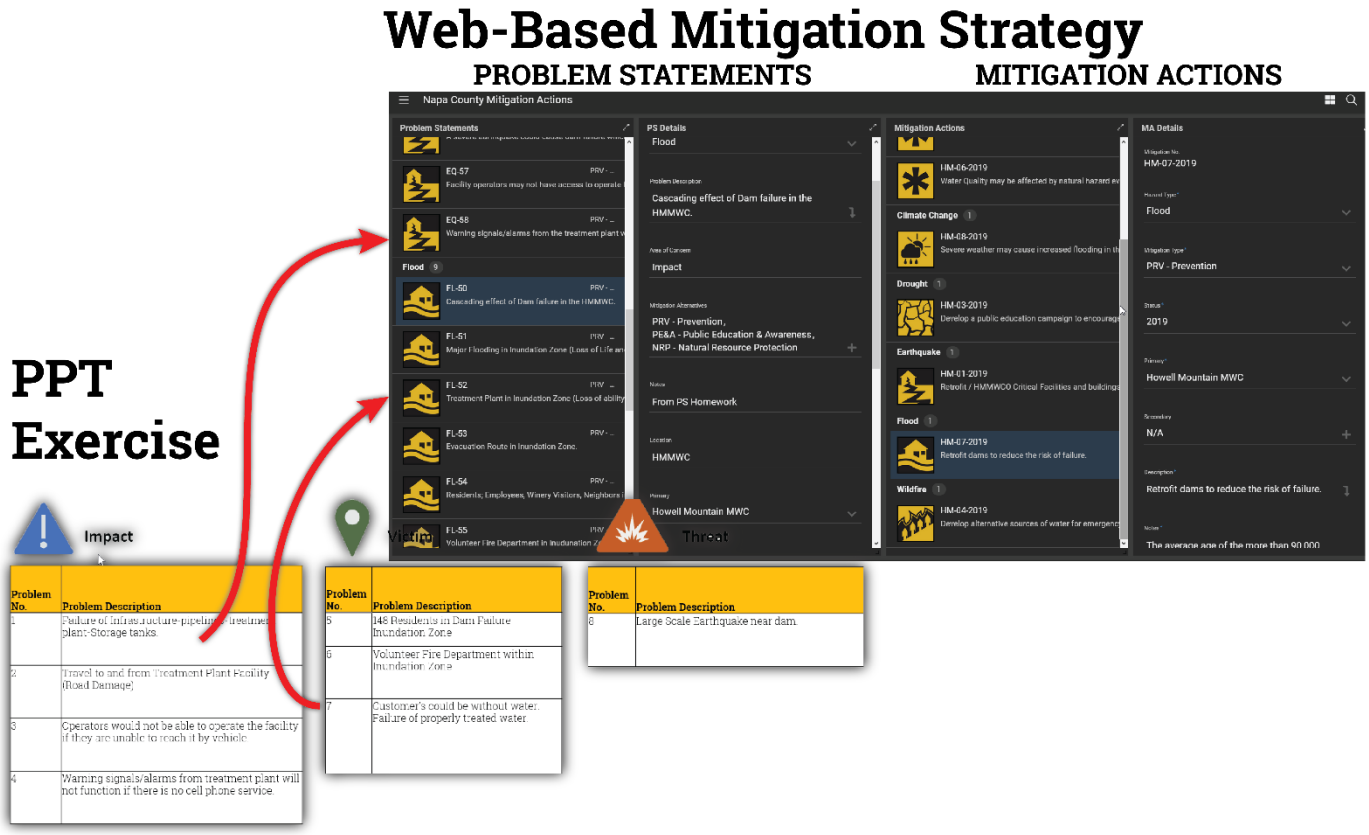

Figure 5-1: Mitigation Action Application

5.5.1 Prioritization of Mitigation Actions

Implementing the identified mitigation can be overwhelming for any local jurisdiction or district, especially with limited staffing and fiscal resources; prioritizing the identified mitigation actions can help greatly with this. To ensure this MJ HMP realistically reflects available resources, mitigation actions are prioritized by considering benefit cost review, public input, and MJHMP Planning Committee agreement.

5.5.1.1 Cost/ Benefit Review

The action plan must be prioritized according to a benefit/cost analysis of the proposed projects and their associated costs (44 C.F.R. §2 01.6(c)(3)(iii)). The benefits of proposed projects were weighed against estimated costs as part of the project prioritization process. This review does not meet FEMA Hazard Mitigation Grant Program (HMGP) and Pre-Disaster Mitigation (PDM) grant program requirements. A less formal, less costly approach was used because some projects may not be implemented for up to 10 years, and associated costs and benefits could change dramatically in that time. Parameters were established for assigning subjective ratings (high, medium, and low) to the costs and benefits of these projects. Cost ratings were defined as follows:

- **High**—Existing funding will not cover the cost of the project; implementation would require new revenue through an alternative source (for example, bonds, grants, and fee increases).
- **Medium**—The project could be implemented with existing funding but would require a re-apportionment of the budget or a budget amendment, or the cost of the project would have to be spread over multiple years.
- **Low**—The project could be funded under the existing budget. The project is part of or can be part of an ongoing existing program.

Benefit ratings were defined as follows:

- **High**—Project will provide an immediate reduction of risk exposure for life and property.
- **Medium**—Project will have a long-term impact on the reduction of risk exposure for life and property, or project will not provide an immediate reduction in the risk exposure for property.
- **Low**—Long-term benefits of the project are difficult to quantify in the short term.

Using this approach, projects with positive benefit versus cost ratios (such as high over high, high over medium, medium over low, etc.) are considered cost-beneficial and are prioritized accordingly. For many of the strategies identified in this action plan, the partners may seek financial assistance under the HMGP or PDM programs, both of which require detailed benefit/cost analyses. These analyses will be performed on projects at the time of application using the FEMA benefit-cost model. For projects not seeking financial assistance from grant programs that require detailed analysis, the partners reserve the right to define "benefits" according to parameters that meet the goals and objectives of this HMP.

5.5.1.2 Public Input

An 8-question community survey was distributed to the public, yielding 973 survey responses and useful insight into the community's perception of natural hazards affecting Napa County. Specific question responses heavily influenced the prioritization of mitigation actions, including:

- 72.3% of participants believe their property is at risk from a natural hazard disaster.
- 75% of respondents have experienced earthquakes, 47% experienced wildfire, and 38% experienced drought. Only 7% of respondents (or someone in their household) had not experiences a natural hazard.
- 48% of participants considered the risk of naturally occurring hazards when choosing their home.
- 58% of respondents felt they were well-informed about the dangers of natural hazards, while 32% felt somewhat informed and 10% felt not informed.
- When asked what incentives would encourage additional home protection from possible natural hazards, the top responses were insurance premium discounts (61%), rebate programs or reimbursement of upfront costs (57%), and building permit fee waivers (48%).
- Respondents indicated top mitigation projects that local government agencies should focus on:
    - Retrofit and strengthen essential facilities (75%)
    - Replace inadequate or vulnerable bridges and roadways (64%)
    - Retrofit or upgrade drainage systems (63%)
    - Work on improving damage resistance of utilities (59%)
    - Ensure emergency shelters, the Emergency Operations Center, and communication towns have backup power generators (55%)

The complete survey results can be found in Appendix B.

5.5.2 Mitigation Action Plan

Table 5-6 lists each mitigation action for the unincorporated County. Each participating jurisdiction developed unique mitigation actions as well, targeted at their own unique priorities and vulnerabilities; these are available on MAST and in Vol. 2 of this MJHMP. Each mitigation action identifies the responsible party, time frame, potential funding source, implementation steps and resources needed to implement these priority mitigation actions. As a living document, hazard problem statements and mitigation activities will be updated through MAST.

The detail provided in MAST and captured in Table 5-6 meets the regulatory requirements of FEMA and DMA 2000.

The actions detailed in Table 5-6 and MAST contain both new action items developed for this Plan Update as well as old actions that were yet to be completed from the 2013 Plan. The action numbers indicate whether the action is new or from the 2013 plan. A sample of the action number nomenclature is presented in Figure 5-2.

Table 2-2, What's New, contains the details for each 2013 mitigation action and indicates whether a given action item has been completed, deleted, or deferred.

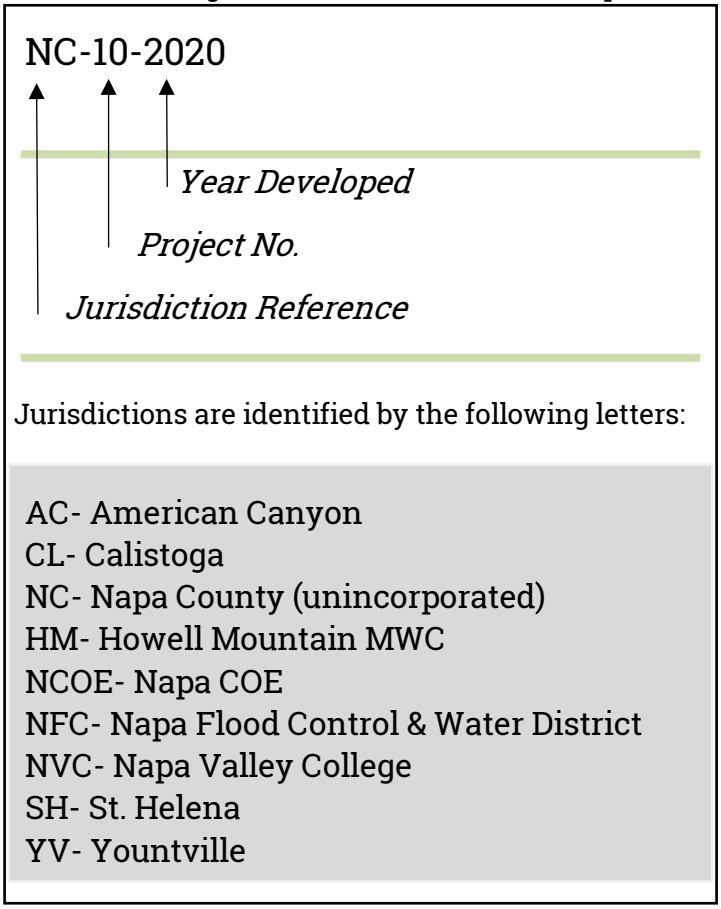

Figure 5-2: Mitigation Action Number Key

Important to note: The Planning Committee realizes that new needs and priorities may arise as a result of a disaster or other circumstances and reserves the right to support new actions and edit existing actions as necessary as long as they conform to the overall goals of the plan.

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Table 5-6: County Wide Mitigation Action Tracker

Mitigation No.	Hazard Type	Mitigation Type	Status	Primary	Description	Responsible Party	Time Frame	Estimated Capital Costs	Estimated Maintenance Costs	Potential Funding Sources	Priority	Related Problem Statements
NC-56-2020	Ag Disaster	PE&A - Public Education & Awareness	2020	**County Unincorporated**	Allow disaster management issues within the agricultural sector to be addressed at more localized levels.	Napa County Ag Commissioner	1-3 Years	25,000	5,000 Annually	Existing County Funds	Medium	**AG-01**
NC-57-2020	Ag Disaster	PE&A - Public Education & Awareness	2020	**County Unincorporated**	Offer agricultural disaster training and networking opportunities for farmers and ag regulatory agencies.	County Ag. Commissioner	1-3 Years	25,000	5,000 Annually	Existing County Funds	Medium	**AG-01, AG-02**
CL-14-2020	All Hazard	ES - Emergency Services	2020	**Calistoga**	Develop microgrids to provide emergency power during natural disasters.	City of Calistoga	3-5 Years	unknown	unknown	General Fund/Grants	High	**WF-33**
NC-09-2013	All Hazard	PPRO - Property Protection	2020	**County Unincorporated**	Hardening and building redundant (power and other) capability into Public Safety buildings.	Napa County OES/Risk Management	5-10 Years	$1,000,000.00	20,000 Annually	Federal Grant Funds	Medium	**EQ-09, EQ-01, EQ-17, EQ-07, EQ-23**
NC-11-2020	All Hazard	PPRO - Property Protection	2020	**County Unincorporated**	Construct/Install back up power generators for fire stations, pump houses, emergency shelters and cooling centers.	Napa County Fire	1-3 Years	1,500,000	5,000 Annually	Federal Grant Funds	High	**CC-14, SW-01, SW-03, SW-08, SW-09**
NC-32-2020	All Hazard	PE&A - Public Education & Awareness	2020	**County Unincorporated**	Develop a "Natural Hazard Awareness Week" campaign and conduct corresponding outreach to the community and all interested parties. Activities will focus on flooding and other natural hazards, including associated hazard functions, governing laws/regulations, mitigation strategies and precautions. Outreach will also be conducted throughout the year, wherever possible.	Napa County OES	1-3 Years	80,000	10,000 Annually	Existing County Funds	High	**FL-35, FL-36, FL-37**
SH-06-2020	All Hazard	PE&A - Public Education & Awareness	2020	**St. Helena**	Inform residents and tourists of shelter locations and evacuation routes and procedures for storing or taking valued items before large scale evacuations.	St. Helena Police Dept.	Ongoing	Unknown	Unknown	Unknown	High	**WF-38, WF-39, WF-42, FL-47, FL-44, FL-43, EQ-34, EQ-33**
SH-07-2020	All Hazard	SP - Structural Projects	2020	**St. Helena**	Develop microgrids to provide emergency power during natural disasters.	St. Helena Public Works Dept.	3-5 Years	Unknown	Unknown	Bonds, grants, fee increases	Medium	**WF-40, EQ-37**
SH-12-2020	All Hazard	PE&A - Public Education & Awareness	2020	**St. Helena**	Provide hazard mitigation information (e.g. ways to reduce risk) to first responders living within hazard-prone areas.	St. Helena	Ongoing	Unknown	Unknown	Existing budget, grants	Medium	**FL-45, EQ-35**
AC-04-2020	Climate Change	PPRO - Property Protection	2020	**American Canyon**	Plan for and construct sea level rise protection for American Canyon Critical Infrastructure such as Public Works Yard, Sewer Treatment Plant, and Pump Station.	City Planners	Ongoing	Unknown	Unknown	FEMA; http://www.resilientbayarea.org/grand-bayway	Medium	**CC-16**
CL-08-2020	Climate Change	PRV - Prevention	2020	**Calistoga**	Map and identify locations and implement fuel reduction projects in high risk areas in the City such as the areas west of Highway 128.	City of Calistoga	Ongoing	unknown	unknown	Existing department budgets	High	**CC-13, CC-15**

Mitigation No.	Hazard Type	Mitigation Type	Status	Primary	Description	Responsible Party	Time Frame	Estimated Capital Costs	Estimated Maintenance Costs	Potential Funding Sources	Priority	Related Problem Statements
NC-20-2020	Climate Change	PPRO - Property Protection	2020	**County Unincorporated**	Support ongoing analysis of sea-level rise data.	Napa County	1-3 Years	50,000	10,000 Annually	Existing County Funds	Medium	**CC-03, CC-05, CC-06**
NC-21-2020	Climate Change	PPRO - Property Protection	2020	**County Unincorporated**	Create a comprehensive outreach strategy that informs residents in potentially affected areas of County efforts to protect and increase community resiliency to sea-level rise.	Napa County	1-3 Years	25,000	5,000 Annually	Existing County Funds/Grants	Medium	**CC-03, CC-05, CC-06**
NC-24-2020	Climate Change	PRV - Prevention	2020	**County Unincorporated**	Construct or identify existing locations for cooling centers near farmworker populations.	Napa County Ag Commissioner Office	1-3 Years	$25,000	$10,000 per year	Mitigation Funds	Medium	**CC-02**
NC-25-2020	Climate Change	SP - Structural Projects	2020	**County Unincorporated**	Develop air conditioning replacement/reimbursement program for low income and elderly residents.	Napa County	1-3 Years	250,000	10,000 Annually	Grants/Bonds/Fee Increases	High	**CC-07, CC-09, CC-12**
NC-27-2020	Climate Change	NRP - Natural Resource Protection	2020	**County Unincorporated**	Support risk assessments in relation to warmer climate on the agriculture and wine industries.	Napa County Ag Dept	1-3 Years	25,000	5,000 Annually	Existing County Funding/Grants	Medium	**CC-01, CC-04, CC-08, AG-01, AG-02**
NC-28-2020	Climate Change	NRP - Natural Resource Protection	2020	**County Unincorporated**	Construct and develop alternative water supplies to augment single sources of water delivery.	Napa County	3-5 Years	1,000,000	50,000	Grants/Bonds/Fee Increases	High	**CC-10**
NC-29-2020	Climate Change	NRP - Natural Resource Protection	2020	**County Unincorporated**	Construct rainwater catchment systems to recharge groundwater in government ROWs.	Napa County Flood Control	5-10 Years	1,000,000	50,000	Grants/Bonds/Fee Increases	Low	**CC-10**
AC-02-2020	Drought	PRV - Prevention	2020	**American Canyon**	Require mandatory water conservation measures during drought emergencies.	City Water	Ongoing	Unknown	Unknown	Existing Budget, grants	High	**DR-02**
CL-04-2020	Drought	PRV - Prevention	2020	**Calistoga**	During Drought conditions increase fuel reduction in parks and open space areas.	Public Works	Annually	unknown	unknown	General Fund/Grants	High	**DR-07**
CL-09-2020	Drought	SP - Structural Projects	2020	**Calistoga**	Augment City water supply systems with supply contingency projects for Drought years, such as increasing water supply and treatment capacity of Kimball Reservoir. Contingency planning/projects will include provisions for ag sector.	City of Calistoga	5-10 Years	unknown	unknown	Water Enterprise/General Fund/Impact Fees/Grants	High	**DR-08**
NC-16-2020	Drought	PE&A - Public Education & Awareness	2020	**County Unincorporated**	Develop a public education campaign to encourage water conservation during drought.	Napa County	3-5 Years	25,000	5,000	Existing County Budget/Grants	Medium	**DR-01**
NC-17-2020	Drought	SP - Structural Projects	2020	**County Unincorporated**	Install water monitoring devices on government-owned facilities.	Napa County	5-10 Years	1,000,000	50,000	Grants/Bonds/Fee Increases	High	**DR-01, DR-02, DR-06, DR-04**
NC-18-2020	Drought	SP - Structural Projects	2020	**County Unincorporated**	Install drought tolerant landscaping at government-owned facilities.	Napa County	3-5 Years	250,000	25,000	Grants/Bonds/Fee Increases	Low	**DR-01**

Mitigation No.	Hazard Type	Mitigation Type	Status	Primary	Description	Responsible Party	Time Frame	Estimated Capital Costs	Estimated Maintenance Costs	Potential Funding Sources	Priority	Related Problem Statements
NC-22-2020	Drought	PRV - Prevention	2020	**County Unincorporated**	Amend or revise water conservation regulations for landscape design.	Napa County	1-3 Years	50,000	10,000 Annually	Existing County Budget/Grants	Medium	**CC-10**
NC-23-2020	Drought	NRP - Natural Resource Protection	2020	**County Unincorporated**	Adopt a new water conservation ordinance for commercial and residential land uses limiting outdoor watering.	Napa County	1-3 Years	50,000	10,000 Annually	Existing County Funds/Grants	Medium	**CC-10**
NCOE-01-2020	Drought	PRV - Prevention	2020	**Napa COE**	Retrofit water supply systems in order to improve water supply and delivery and conserve water.	Napa COE	5-10 Years	Unknown	Unknown	Bonds, grants, fee increases	High	**DR-04**
SH-15-2020	Drought	NRP - Natural Resource Protection	2020	**St. Helena**	Develop landscape planting procedures and planting plans for residents and business wishing to reduce water usage through landscape design.	City of St. Helena	Ongoing	Unknown	Unknown	Existing budget, grants	High	**DR-09**
SH-16-2020	Drought	PRV - Prevention	2020	**St. Helena**	During drought conditions increase fuel reduction in parks and open space areas.	St. Helena Fire Department	Ongoing	Unknown	Unknown	Existing budget, grants	High	**DR-10**
YV-01-2020	Drought	PE&A - Public Education & Awareness	2020	**Yountville**	Increase engagement between the fire and drought communities.	Town Staff and Public Safety	Ongoing	Unknown	Unknown	General Fund and grants if available	Medium	**DR-03**
AC-05-2013	Earthquake	SP - Structural Projects	2020	**American Canyon**	Develop a public outreach program for mitigation of earthquake risk for residents of American Canyon proper.	City of American Canyon	Ongoing	$25,000.00	Unknown	Federal Grants, General Funds, Public Education, Fire District, and County	High	**EQ-14, EQ-15, EQ-16**
AC-06-2020	Earthquake	SP - Structural Projects	2020	**American Canyon**	Retrofit critical facilities that are vulnerable to extreme and violent shaking.	City of American Canyon	5-10 Years	Unknown	Unknown	Bonds, grants, fee increases	High	**EQ-24, EQ-25**
CL-12-2020	Earthquake	PPRO - Property Protection	2020	**Calistoga**	Retrofit critical facilities that are vulnerable to failure during extreme and violent shaking.	City of Calistoga	5-10 Years	unknown	unknown	General Fund/Grants	High	**EQ-11, EQ-12, EQ-26**
CL-13-2020	Earthquake	PE&A - Public Education & Awareness	2020	**Calistoga**	Develop a public outreach program for mitigation of earthquake risk for residents of Calistoga proper.	City of Calistoga	1-3 Years	unknown	unknown	unknown	High	**EQ-11, EQ-27**
NC-10-2013	Earthquake	PE&A - Public Education & Awareness	2013 (Ongoing)	**County Unincorporated**	Earthquake month public education program. Develop a comprehensive public outreach program for earthquake risk reduction for Napa County Residents.	Napa County OES	1-3 Years	50,000	5,000	Federal Grants, General Funds, Public Education, Fire District, and County	High	**EQ-03, EQ-07, EQ-08, EQ-04**
NC-51-2020	Earthquake	PE&A - Public Education & Awareness	2020	**County Unincorporated**	Encourage privately owned critical facilities (e.g. churches, hotels, other gathering facilities) to evaluate the ability of the buildings to withstand earthquakes and to address any deficiencies identified.	Napa County	1-3 Years	100,000	20,000 Annually	Grants/Bonds/Fee Increases	High	**EQ-03, EQ-07, EQ-08**

Mitigation No.	Hazard Type	Mitigation Type	Status	Primary	Description	Responsible Party	Time Frame	Estimated Capital Costs	Estimated Maintenance Costs	Potential Funding Sources	Priority	Related Problem Statements
NC-52-2020	Earthquake	SP - Structural Projects	2020	**County Unincorporated**	Retrofit / Harden County-owned critical facilities and buildings and their ability to withstand earthquakes.	Napa County	5-10 Years	3,000,000	100,000 Annually	Bonds, grants, increased fees.	High	**EQ-01, EQ-02, EQ-06, EQ-22, EQ-05, EQ-09, EQ-10**
NC-54-2020	Earthquake	PPRO - Property Protection	2020	**County Unincorporated**	Adopt and enforce updated building codes to reduce earthquake damage to structures.	Napa County	1-3 Years	50,000	10,000 Annually	Existing County Funds/Grants	High	**EQ-30, EQ-9, EQ-10**
NCOE-02-2020	Earthquake	PRV - Prevention	2020	**Napa COE**	Retrofit / Harden Main Office to withstand extreme and violent earthquakes.	Napa COE	5-10 Years	Unknown	Unknown	Bonds, grants, fee increases	High	**EQ-20**
NVC-02-2020	Earthquake	PE&A - Public Education & Awareness	2020	**Napa Valley College**	Encourage communities and constituents to participate in the Great California ShakeOut. Continue staff EOC and emergency messaging training.	NVC Emergency Response Committee	Ongoing	Undetermined	Undetermined	General Funds/Grants	Medium	**EQ-29, EQ-21, EQ-28**
NVC-04-2020	Earthquake	PRV - Prevention	2020	**Napa Valley College**	Design and construct new critical facilities to higher than the minimum seismic standards required by building codes, especially for facilities that may serve as emergency shelters or their public infrastructure.	CA Community College Chancellor's Office	5-10 Years	Unknown	Unknown	Bonds/Grants	Medium	**EQ-30**
NVC-05-2013	Earthquake	PPRO - Property Protection	2020	**Napa Valley College**	Research geological soil makeup of lower tier of campus to determine if additional structural mitigation steps are necessary.	Napa Valley College	1-3 Years	N/A	N/A	N/A or General Fund	Medium	**EQ-21, EQ-28, EQ-29**
SH-14-2020	Earthquake	PE&A - Public Education & Awareness	2020	**St. Helena**	Develop resource kits for mitigation of earthquake risk for residents of St. Helena proper. This includes targeted outreach and project development for adult care providers, private schools and other gathering facilities.	Planning Department	1-3 Years	Unknown	Unknown	Existing budget, grants	High	**EQ-32, EQ-38, EQ-39, EQ-13**
YV-06-2020	Earthquake	PE&A - Public Education & Awareness	2020	**Yountville**	Earthquake month public education program	Town Staff and Public Safety	Annually	$25,000	$25,000	General Fund and grant funding if available	High	**EQ-17, EQ-18, EQ-19**
AC-01-2013	Flood	PPRO - Property Protection	2013 (Ongoing)	**American Canyon**	Elevate 100 of the most flood prone residential structures along areas not receiving direct protection from Measure "A" Flood Project. Provide flood mitigation resource (e.g. ways to reduce flood risk) to residents within the American Canyon Mobile Home Park (68 parcels).	American Canyon Public Works	5-10 Years	$5,000,000.00	Unknown	City Capital Budget Grants; Federal Grants	High	**FL-31, FL-30**
AC-07-2020	Flood	PRV - Prevention	2020	**American Canyon**	Inform American Canyon residents and in-home Adult Care providers of possible flooding during "major" flood events.	City of American Canyon	Ongoing	Unknown	Unknown	Existing budget or grants	High	**DF-28, DF-29, FL-27, FL-27, FL-32**
CL-01-2013	Flood	PPRO - Property Protection	2020	**Calistoga**	Implement localized flood reduction projects or flood-proof 100 of the most flood-prone residential structures along with areas "not" receiving direct protection from Measure "A" Flood Project in the City of Calistoga.	City of Calistoga	3-5 Years	$5,000,000.00	Unknown	City Capital Budget Grants; Federal Grants	High	**FL-08, FL-09, FL-12**

Mitigation No.	Hazard Type	Mitigation Type	Status	Primary	Description	Responsible Party	Time Frame	Estimated Capital Costs	Estimated Maintenance Costs	Potential Funding Sources	Priority	Related Problem Statements
CL-10-2013	Flood	PPRO - Property Protection	2020	**Calistoga**	Routinely inspect and maintain storm water inlets and outfalls for debris and obstructions, sand & gravel build-up, and structural damage or vandalism.	City of Calistoga	Annually	$30,000.00	100,000	Local Jurisdictions Annual Budget, General Fund, Local Funding	High	**FL-33, FL-34**
CL-11-2020	Flood	SP - Structural Projects	2020	**Calistoga**	Develop a localized remap of the floodplain, flood projects, or flood-proofing for Critical Facilities within the City. Specifically north of Lincoln Avenue.	City of Calistoga	3-5 Years	unknown	unknown	General Fund/Grants	High	**FL-08, FL-09, FL-12**
NC-01-2013	Flood	PPRO - Property Protection	2013 (Changed /Edited)	**County Unincorporated**	Mitigate flood risk for flood-prone residential structures along areas not receiving direct protection from Measure "A" Flood Project.	Napa County Planning & Building	3-5 Years	$5,000,000.00	Unknown	City Capital Budget Grants; Federal Grants	High	**FL-02, FL-26**
NC-30-2020	Flood	PE&A - Public Education & Awareness	2020	**County Unincorporated**	Develop a public outreach program that informs property owners located in the dam or levee inundation areas about voluntary flood insurance (preferred risk policies).	Napa County	1-3 Years	40,000	Unknown	Existing Budget; Grants	High	**DF-11, DF-14, FL-10**
NC-31-2020	Flood	PPRO - Property Protection	2020	**County Unincorporated**	Increase participation in the NFIP.	Napa OES	1-3 Years	25,000	Unknown	Existing budget; grants	High	**FL-03, FL-26, FL-15, FL-16**
NC-33-2020	Flood	NRP - Natural Resource Protection	2020	**County Unincorporated**	Draft stream channel ordinance that would place responsibility for maintenance on the property owner and give Napa enforcement power.	County	5-10 Years	Unknown	Unknown	Bonds, grants, fee increases	Low	**FL-24**
NC-34-2020	Flood	PPRO - Property Protection	2020	**County Unincorporated**	Construct, install and maintain warning gauges on local dams as the opportunity or need arises.	Napa OES	3-5 Years	1,500,000	Unknown	Bonds, grants, fee increases	Medium	**DF-07, DF-11, DF-13, DF-17, DF-19, DF-20, DF-23, DF-28, DF-29, FL-10, FL-18**
NC-35-2020	Flood	PPRO - Property Protection	2020	**County Unincorporated**	Improve risk assessments for dams located within the county.	Napa County	1-3 Years	20,000	5,000	Existing budget	Medium	**DF-07, DF-11, DF-13, DF-14, DF-17, DF-19, DF-20, DF-23, DF-28, DF-29, FL-10, FL-18**
NC-37-2020	Flood	PPRO - Property Protection	2020	**County Unincorporated**	Complete an inventory of all publicly-owned stormwater facilities.	Napa County Flood Control & Water Resources District	1-3 Years	Unknown	Unknown	Existing budget, grants, bonds, fee increases	Low	**FL-40**
NC-38-2020	Flood	PPRO - Property Protection	2020	**County Unincorporated**	Create an inventory and establish a priority list for culvert replacement that takes into account fish passage, flood depth reduction, and future losses avoided.	Napa Flood Control & Water Resources District.	3-5 Years	Unknown	Unknown	Existing budget, grants, bonds, fee increases	Low	**FL-40**
NC-39-2020	Flood	PPRO - Property Protection	2020	**County Unincorporated**	Relocate farmwork centers from flood risk areas.	Napa County	3-5 Years	Unknown	Unknown	Bonds, grants, fee increases	Medium	**FL-01**

Mitigation No.	Hazard Type	Mitigation Type	Status	Primary	Description	Responsible Party	Time Frame	Estimated Capital Costs	Estimated Maintenance Costs	Potential Funding Sources	Priority	Related Problem Statements
NC-46-2020	Flood	SP - Structural Projects	2020	**County Unincorporated**	Elevate and or retrofit bridges, culverts to allow proper stormwater / 100-YR flows.	Napa County Public Works	5-10 Years	Unknown	Unknown	Bonds, grants, fee increases	Medium	**FL-40**
NC-47-2020	Flood	PPRO - Property Protection	2020	**County Unincorporated**	Mitigate flood risk to NFIP repetitive loss properties.	Napa County	Annually	Unknown	Unknown	Existing budget, grants, bonds, fee increases	High	**FL-26**
NC-48-2020	Flood	PPRO - Property Protection	2020	**County Unincorporated**	Construct / improve stormwater basins County-wide to accomplish 100-YR protection .	Napa County Flood Control & Water Resources	3-5 Years	Unknown	Unknown	Bonds, grants, fee increases	Medium	**FL-41**
NC-50-2020	Flood	PPRO - Property Protection	2020	**County Unincorporated**	Adopt higher regulatory standards (including but not limited to freeboard, comp storage, lower substantial damage thresholds, setbacks and fill restrictions) as means to reduce future flood risk and support a no-adverse-impact philosophy of floodplain management.	Napa County	1-3 Years	Unknown	Unknown	Existing Budget, grants, bonds, fee increases	Medium	**FL-41**
NFC-01-2013	Flood	ES - Emergency Services	2013 (Changed /Edited)	**Napa Flood Control & Water District**	Maintain Countywide Storm Watch System	Napa County Flood Control District	Annually	$80,000.00	30000	Napa County Watershed Assessment	High	**FL-02, FL-03**
NFC-02-2013	Flood	ES - Emergency Services	2013 (Changed /Edited)	**Napa Flood Control & Water District**	Completion of the Measure "A" Flood Control Project	Napa County Flood Control District	5-10 Years	$100,000,000	$100,000 annually	County sales tax/federal funding	High	**FL-02, FL-03**
NFC-03-2013	Flood	PRV - Prevention	2013 (Ongoing)	**Napa Flood Control & Water District**	Routinely inspect storm water channels for vegetation build up or encroachment, trash and debris, silt and gravel build up, and erosion or bank failure and maintain said channels permitted by California Department of Fish and Wildlife.	Napa County Flood Control District	Annually	N/A	$200,000 local funding	Local watershed assessment/federal funding needed	High	**FL-02**
NFC-04-2013	Flood	NRP - Natural Resource Protection	2013 (Ongoing)	**Napa Flood Control & Water District**	Secure grant funding to develop and implement a river restoration program that would reduce flood damages and increase environmental quality on the river, maintain fish habitat, decrease impediment to drainage by preventing silt build-up and loss of stream bed capacity.	Napa County	5-10 Years	$23,000,000	$200,000 annually	State and Federal grants	High	**FL-02, FL-04**
NVC-01-2013	Flood	PPRO - Property Protection	2013 (Ongoing)	**Napa Valley College**	Routinely inspect storm water channels an inlets for vegetation build up or encroachment, trash and debris, silt and gravel build up, and erosion or bank failure and maintain said channels permitted by California Department of Fish and Game.	Napa Valley College	Ongoing	Unknown	Undetermined	Local watershed assessment/federal funding needed/mosquito abatement district	Medium	**FL-35, FL-36**
SH-01-2020	Flood	PPRO - Property Protection	2020	**St. Helena**	Provide flood protection resources to residents on the Napa River to reduce flood losses. Resources could include technical, education and grant application assistance for floodproofing properties.	St. Helena	Ongoing	Unknown	Unknown	Existing budget, grants	High	**FL-25, FL-42**

Mitigation No.	Hazard Type	Mitigation Type	Status	Primary	Description	Responsible Party	Time Frame	Estimated Capital Costs	Estimated Maintenance Costs	Potential Funding Sources	Priority	Related Problem Statements
SH-04-2020	Flood	PPRO - Property Protection	2020	**St. Helena**	Provide flood mitigation resources (e.g. ways to reduce flood risk) to residents within the Vineyard Valley Mobile Home Park.	City of St. Helena	Ongoing	Unknown	Unknown	Existing budget, grants	High	**FL-15, FL-25**
SH-13-2020	Flood	SP - Structural Projects	2020	**St. Helena**	Improve stormwater drainage system capacity and maintenance for Pratt and Pope Street bridges in St. Helena.	City of St. Helena	5-10 Years	Unknown	Unknown	Bonds, grants, fee increases	High	**FL-46**
YV-02-2020	Flood	PE&A - Public Education & Awareness	2020	**Yountville**	Develop evacuation plans for communities and residents downstream from the Rector Creek Dam.	OES, Veterans Home/State, and Town Staff	Annually	$25,000	$25,000	General fund revenue and potential grant funding	High	**DF-19, DF-20**
YV-03-2020	Flood	PPRO - Property Protection	2020	**Yountville**	Identify properties that are potential candidates for elevation, relocation or buyout based on an evaluation of flood risks, project feasibility, and planned flood risk reduction capital projects.	Town Staff	Annually	TBD likely over $12 million	$25,000	General Fund and grant funding	High	**FL-22**
YV-04-2020	Flood	PPRO - Property Protection	2020	**Yountville**	Secure grant funding to develop and implement river restoration program that would reduce flood damages and increase environmental quality on the river, maintain fish habitat, decrease impediment to drainage by preventing silt build up and loss of stream bed capacity.	Town Staff and contracted consultants	5-10 Years	TBD	TBD	General fund and potential grant funding	Medium	**FL-21**
YV-07-2020	Flood	PRV - Prevention	2020	**Yountville**	Invest in flood prediction and forecast modeling to support all facets of the Napa County floodplain management program, including, but not limited to, flood hazard identification, flood threat recognition in support of flood notification programs, climate change adaptation, and risk assessment.	Town Staff and contractors	5-10 Years	TBD	TBD	General Fund and grant funds	Low	**FL-18**
YV-08-2020	Flood	PE&A - Public Education & Awareness	2020	**Yountville**	Enhance the existing flood notification program to achieve real-time flood threat recognition capability.	Town Staff	3-5 Years	TBD	TBD	General Fund and grant funding	Medium	**FL-18**
NC-40-2020	Pandemic	ES - Emergency Services	2020	**County Unincorporated**	Increase the capacity of existing hospitals through retrofits or upgrades such as isolation wings.	HHSA	3-5 Years	3,000,000	50,000 Annually	Grants/Bonds/Fee Increases	Medium	**PD-03, PD-01**
NC-43-2020	Pandemic	SP - Structural Projects	2020	**County Unincorporated**	Retrofit critical care facilities with enhanced HVAC and isolation areas.	HHSA	3-5 Years	3,000,000	50,000	Grants/Bonds/Fee Increases	High	**PD-02**
CL-02-2020	Severe Weather	PRV - Prevention	2020	**Calistoga**	Establish tree pruning / removal standards for above ground utilities lines within City limits.	City of Calistoga	1-3 Years	unknown	unknown	Existing department budgets	High	**SW-06, SW-07**
CL-07-2020	Severe Weather	ES - Emergency Services	2020	**Calistoga**	Identify schools that have been designated as emergency shelters by the Red Cross within City Limits and ensure they have sufficient back up power generators.	City of Calistoga	1-3 Years	unknown	unknown	Grants	High	**SW-07**

Mitigation No.	Hazard Type	Mitigation Type	Status	Primary	Description	Responsible Party	Time Frame	Estimated Capital Costs	Estimated Maintenance Costs	Potential Funding Sources	Priority	Related Problem Statements
NC-12-2020	Severe Weather	PE&A - Public Education & Awareness	2020	**County Unincorporated**	Organize outreach to vulnerable populations, including establishing and promoting accessible shelters in the community.	HHSA	1-3 Years	40,000	5000	Existing County Funds/Grants	High	**SW-01, SW-02, SW-03, SW-04, SW-05, SW-09**
NC-13-2020	Severe Weather	PE&A - Public Education & Awareness	2020	**County Unincorporated**	Develop a public information campaign on 72-hour kits.	County OES/PIO	1-3 Years	20,000	5000	General Fund	Medium	**SW-01, SW-02, SW-03, SW-04, SW-05, SW-09**
NC-15-2020	Severe Weather	SP - Structural Projects	2020	**County Unincorporated**	Procure backup generators in the event that public meeting spaces such as community centers or town halls will be used as Emergency Command Centers. Perform regular maintenance on generators at water treatment plants.	Napa County	3-5 Years	1,500,000	5,000 Annually	Federal Grant Funds	High	**CC-14**
NC-41-2020	Slope Failure	PPRO - Property Protection	2020	**County Unincorporated**	Establish a priority list of slope failure locations and implement slope stabilization projects in the highest risk areas.	Napa County Survey Crews/Geologists	5-10 Years	100,000	5,000 Annually	Existing County Funds/Grants	Low	**SF-01**
NC-42-2020	Slope Failure	PPRO - Property Protection	2020	**County Unincorporated**	Construct a slope stabilization project to protect the Angwin VFD storage facility.	Napa County Fire	3-5 Years	150,000	5,000	Existing County Funds/Grants	Medium	**SF-02**
AC-03-2013	Wildfire	PRV - Prevention	2013 (Ongoing)	**American Canyon**	Maintain and Further Develop the Fuel Reduction Program to include provisions for Legacy High School fuel breaks.	American Canyon Fire Protection District	Ongoing	Unknown	N/A	ACFPD General Fund, Fire Prevention Grant Programs, Cost Recovery Fees	Extreme	**WF-21, WF-22, WF-23, WF-34**
CL-03-2013	Wildfire	SP - Structural Projects	2020	**Calistoga**	Retrofit Critical Public Safety Infrastructure.	City of Calistoga	5-10 Years	unknown	unknown	General Fund/Grants	Extreme	**WF-27**
CL-05-2013	Wildfire	SP - Structural Projects	2013 (Ongoing)	**Calistoga**	Revise the General Plan Safety Element with lessons learned from to include new information from HMP and Fire-wise programs and analysis.	City of Calistoga	1-3 Years	$50,000.00	unknown	General Fund	Extreme	**WF-27, WF-32, WF-33**
CL-06-2013	Wildfire	PRV - Prevention	2020	**Calistoga**	Focus on human causes of ignition and address the problem through education and enforcement actions. Develop "mitigation" resources for residents in high hazard areas including incentives for fuel reduction and building material retrofits.	City of Calistoga	Ongoing	unknown	unknown	General Fund	Extreme	**WF-27**
NC-02-2020	Wildfire	PPRO - Property Protection	2020	**County Unincorporated**	Fund / augment chipper program equipment and resources.	Napa County Fire/Firewise	1-3 Years	50,000	10,000 Annually	CalFire Community Fire Prevention Grants/Fire Mitigation Grants/California Fire Safe Council	Medium	**WF-27, WF-28, WF-12, WF-13, WF-14, WF-15, WF-16, WF-17, WF-18, WF-21, WF-24, WF-32**
NC-03-2020	Wildfire	PPRO - Property Protection	2020	**County Unincorporated**	Continue technical and financial assistance to private property owners to implement fuel reduction projects.	Napa County Fire	Annually	50,000	10,000 Annually	CalFire Community Fire Prevention Grants/Fire Mitigation Grants/California Fire Safe Council	High	**WF-27, WF-28, WF-12, WF-13, WF-14, WF-15, WF-16, WF-17, WF-18, WF-21, WF-24, WF-32**

Mitigation No.	Hazard Type	Mitigation Type	Status	Primary	Description	Responsible Party	Time Frame	Estimated Capital Costs	Estimated Maintenance Costs	Potential Funding Sources	Priority	Related Problem Statements
NC-04-2013	Wildfire	PE&A - Public Education & Awareness	2013 (Ongoing)	**County Unincorporated**	Develop & conduct a Defensible Space community education program.	Napa County Fire	Annually	25,000	5,000 Annually	Napa County Fire Department/Fire Mitigation Grants	High	**WF-12, WF-13, WF-14, WF-15, WF-16, WF-17, WF-18, WF-20**
NC-05-2013	Wildfire	PPRO - Property Protection	2013 (Ongoing)	**County Unincorporated**	Draft & promulgate Defensible Space Ordinance.	Napa County Fire - Fire Prevention Office	Annually	N/A	Staff Work as necessary	N/A	High	**WF-12, WF-13, WF-14, WF-15, WF-16, WF-17, WF-18, WF-20**
NC-06-2013	Wildfire	PE&A - Public Education & Awareness	2013 (Ongoing)	**County Unincorporated**	Foster & form neighborhood based Firewise Councils through grant writing.	Napa County OES	Annually	25,000	Included in annual costs	Grants	High	**WF-30**
NC-07-2013	Wildfire	PPRO - Property Protection	2013 (Ongoing)	**County Unincorporated**	Retrofit critical public safety infrastructure with fire resistant materials and or create defensible space around structures.	Napa County Fire	5-10 Years	200,000	20,000	General Funds/Grants	High	**WF-19, WF-26, WF-29**
NC-08-2013	Wildfire	PRV - Prevention	2013 (Ongoing)	**County Unincorporated**	Focus on human causes of ignition and address the problem through education and enforcement actions, to include vigorous investigation and prosecution of arson.	Napa County Fire	3-5 Years	50,000	10,000 Annually	General Fund	High	**WF-03, WF-30, WF-47**
NC-19-2020	Wildfire	PPRO - Property Protection	2020	**County Unincorporated**	Conduct prescribed burns as part of wildfire mitigation strategy.	Napa County	3-5 Years	100,000	20,000 Annually	Napa County Fire Department/Fire Mitigation Grants	Medium	**WF-31**
NC-44-2020	Wildfire	PPRO - Property Protection	2020	**County Unincorporated**	Retrofit care facilities (adult care, child care) with fire-resistant materials and or create defensible space around structures.	Napa County Fire	3-5 Years	50,000	10,000 Annually	Fire Mitigation Grants	High	**WF-02**
NC-45-2020	Wildfire	PPRO - Property Protection	2020	**County Unincorporated**	Complete vegetation management projects as prescribed in CWPPs.	Napa County Fire	Annually	200,000	50,000 Annually	CalFire Community Fire Prevention Grants/Fire Mitigation Grants/California Fire Safe Council/ Cal. Consv. Corps/ General Fund	High	**WF-05, WF-06, WF-07, WF-08, WF-09, WF-10**
NC-49-2020	Wildfire	PPRO - Property Protection	2020	**County Unincorporated**	Construct shaded fuel breaks and complete roadside treatment projects as prescribed in CWPPs.	Napa County Fire Department	Annually	750,000	50,000 Annually	CAL FIRE/ California Fire Safe Council/ California Conservation Corps/ Napa County General Fund	High	**WF-05, WF-06, WF-07, WF-08, WF-09, WF-10**
NC-53-2020	Wildfire	ES - Emergency Services	2020	**County Unincorporated**	Install proper addressing in rural areas to assist in wildfire emergencies.	Napa County Fire	1-3 Years	25,000	5,000 Annually	Existing County Funds/Grants	Medium	**WF-11**
NC-55-2020	Wildfire	SP - Structural Projects	2020	**County Unincorporated**	Work with utility providers to move above ground lines underground.	PG&E	5-10 Years	1,500,000	250,000 Annually	Fire Mitigation Grants	High	**WF-20, WF-03**
NC-58-2020	Wildfire	ES - Emergency Services	2020	**County Unincorporated**	Construct or improve egress for wildfire emergencies in wildland urban interface (WUI) areas.	Napa County Fire	5-10 Years	50,000	10,000 Annually	CalFire/Napa Firewise/California Fire Safe Council	High	**WF-01, WF-04**

Mitigation No.	Hazard Type	Mitigation Type	Status	Primary	Description	Responsible Party	Time Frame	Estimated Capital Costs	Estimated Maintenance Costs	Potential Funding Sources	Priority	Related Problem Statements
SH-02-2020	Wildfire	PPRO - Property Protection	2020	**St. Helena**	Provide smoke/air quality mitigation measures for Critical Facility Air Intakes.	St. Helena Public Works Dept.	1-3 Years	Unknown	Unknown	Bonds, grants, fee increases	Extreme	**WF-35, WF-41, WF-42**
SH-03-2020	Wildfire	PPRO - Property Protection	2020	**St. Helena**	Implement fuel reduction projects to reduce impacts to homes and businesses.	St. Helena Public Works Dept.	Ongoing	Unknown	Unknown	Existing budget, grants	Extreme	**WF-36, WF-41, WF-43, WF-46**
SH-05-2020	Wildfire	SP - Structural Projects	2020	**St. Helena**	Retrofit At-Risk Structures with Ignition-Resistant Materials or Require or Encourage Fire-Resistant Construction Techniques.	St. Helena Public Works Dept.	Ongoing	Unknown	Unknown	Exisitng budgets, grants	Extreme	**WF-37, WF-43, WF-46**
SH-08-2020	Wildfire	PE&A - Public Education & Awareness	2020	**St. Helena**	Develop and or share outreach material on air quality mitigation measures for residents before wildfire season.	St. Helena , Public Works Dept.	Annually	10,000	2,500	Existing budget, grants	Extreme	**WF-41, WF-45**
SH-09-2020	Wildfire	SP - Structural Projects	2020	**St. Helena**	Implement fuel reduction/building retrofit projects to limit combustibility to school facilities.	St. Helena , Public Works and Building Dept.	Ongoing	Unknown	Unknown	Bonds, grants, fee increases	Extreme	**WF-44**
SH-10-2020	Wildfire	PE&A - Public Education & Awareness	2020	**St. Helena**	Develop Public awareness information for wildfire season related to flame/sparking equipment.	St. Helena Public Works Dept.	Ongoing	10,000	2,500	Existing budget, grants	Extreme	**WF-48, WF-49**
YV-05-2020	Wildfire	PE&A - Public Education & Awareness	2020	**Yountville**	Work with local agencies to develop evacuation plans and provide education and outreach to populations vulnerable to wildfire.	Town Staff, Public Safety, and Cal Veterans Home	Annually	$25,000	$25,000	Town General Fund and grant funding	High	**WF-24, WF-25**
NVC-07-2020	Flood	PPRO - Property Protection	2020	**Napa Valley College**	Storm water collection location check valves	Napa Valley College	3-5 Years	Unknown	Unknown	Grants/Bonds	Medium	**DF-17, FL-35, FL-36**
HM-01-2020	Earthquake	PPRO - Property Protection	2020	**Howell Mountain MWC**	Retrofit / HMMWCO Critical Facilities and buildings and their ability to withstand earthquakes.	HMMWC	3-5 Years	Unknown	Unknown	Grants, bonds, fee increases	High	**EQ-50, EQ-51, EQ-54**
HM-02-2020	All Hazard	PE&A - Public Education & Awareness	2020	**Howell Mountain MWC**	Construct/Install back up power generators or alternative communication systems to mitigate the potential for power outages or loss of cell service during emergencies.	HMMWC	3-5 Years	Unknown	Unknown	Exisitng budget, bonds, grants, or fee increases	High	**EQ-58, EQ-53, WF-54**
HM-03-2020	Drought	PE&A - Public Education & Awareness	2020	**Howell Mountain MWC**	Develop a public education campaign to encourage water conservation during drought.	HMMWC	Annually	Unknown	Unknown	Existing budget, grants	Medium	**DR-50, DR-53, DR-55**
HM-04-2020	Wildfire	PPRO - Property Protection	2020	**Howell Mountain MWC**	Develop alternative sources of water for emergency supply purposes such as for fighting wildfires.	HMMWC	1-3 Years	Unknown	Unknown	Bonds, Grants, Fee Increases	High	**WF-50, WF-55, DR-53, DR-52, DR-54**
HM-05-2020	All Hazard	NRP - Natural Resource Protection	2020	**Howell Mountain MWC**	Develop alternate access and evacuation routes to ensure critical facilities are accessible during emergencies.	HMMWC	5-10 Years	Unkown	Unknown	Bonds, grants, fee increases	High	**DF-53, DF-54, EQ-52, EQ-58, WF-52, WF-53**

Mitigation No.	Hazard Type	Mitigation Type	Status	Primary	Description	Responsible Party	Time Frame	Estimated Capital Costs	Estimated Maintenance Costs	Potential Funding Sources	Priority	Related Problem Statements
HM-06-2020	All Hazard	NRP - Natural Resource Protection	2020	**Howell Mountain MWC**	Water Quality may be affected by natural hazard events.	HMMWC	1-3 Years	Unknown	Unknown	Existing budget, grants, fee increases	High	**DF-56, EQ-56, DR-51, WF-51, CC-54, CC-52, EQ-55, FL-57, FL-58**
HM-07-2020	Flood	PRV - Prevention	2020	**Howell Mountain MWC**	Retrofit dams to reduce the risk of failure.	HMMWC	3-5 Years	Unknown	Unknown	Bonds, grants, fee increases	Extreme	**DF-50, DF-52, EQ-51, EQ-57, CC-56**
HM-08-2020	Climate Change	NRP - Natural Resource Protection	2020	**Howell Mountain MWC**	Severe weather may cause increased flooding in the District.	HMMWC	3-5 Years	Unknown	Unknown	Existing budget, bonds, grants, fee increases	High	**DF-51, DF-55, CC-55, CC-51, CC-50, CC-53**

Note: As a living document, project descriptions and actions in the tables above will be modified to reflect current conditions over time in MAST.

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Section 6. Plan Implementation and Maintenance

It is important that this plan becomes a usable, used tool for all participating jurisdictions to ensure reductions in possible damage from a natural hazard event. This section discusses adopting, implementing, monitoring, evaluating, and updating the MJHMP, which should help ensure that the MJHMP remains relevant. This section describes incorporation of the MJHMP into existing planning mechanisms, and how the jurisdictions will continue to engage the public.

6.1 Plan Adoption

To comply with DMA 2000, the Napa County Board of County Commissioners (BOCC) has officially adopted the Napa County Multi-Jurisdictional Hazard Mitigation Plan. The adoption of the MJHMP recognizes the County's commitment to reducing the impacts of natural hazards within the County. A copy of the MJHMP adoption resolution is included immediately following the Executive Summary.

6.2 Plan Implementation

Over time, implementation strategies for mitigation actions will become more detailed. MAST will be extremely useful to plan for updates to this MJHMP and to update individual mitigation actions as implemented or revised. In conjunction with the progress report processes, implementation strategy worksheets will be extremely useful as a plan of record tool for updates. Each implementation strategy worksheet provides individual steps and resources need to complete each priority mitigation action. The following are considerations for developing future implementation strategies:

- **Use processes that already exist.** Take advantage of tools and procedures identified in the capability assessment in Section 5.3. Using planning mechanisms already in use and familiar to participating jurisdictions will give the planning implementation phase a strong initial boost.
- **Updated work plans, policies, or procedure.** Incorporating hazard mitigation concepts and activities can help integrate the HMP into daily operations. These changes can include how major development projects and subdivision reviews are addressed in hazard prone areas or ensure that hazard mitigation concerns are considered in the approval of major capital improvement projects.
- **Job descriptions.** working with department or agency heads to revise job descriptions of government staff to include mitigation-related duties, including designating a "mitigation lead" within a department, can further institutionalize hazard mitigation with little financial expenditure or programmatic overhaul.

6.2.1 Steering Committee

The steering committee oversaw the development of the plan and made recommendations on key elements of the plan, including the maintenance strategy. The steering committee recommended that an oversight committee, referred to herein as the MJHMP Steering Committee, should have an active role in

the plan maintenance strategy. Therefore, it is recommended that the MJHMP Steering Committee become involved in key elements of the plan maintenance strategy. The new MJHMP Steering Committee should strive to include representation from the planning partners, as well as other stakeholders in the planning area.

The new MJHMP Steering Committee will review the annual progress report and provide input to the Napa County Emergency Manager on possible improvements or action steps to be considered at the next update. Keeping this new MJHMP Steering Committee intact will also jump start future updates. Completion of a progress report is the responsibility of each participating jurisdiction, not the responsibility of the steering committee. It will simply be the MJHMP Steering Committee's role to review the progress report in an effort to identify issues needing to be addressed by future plans.

6.3 Monitoring, Evaluating and Updating the MJHMP

This section describes the schedule and process for monitoring, evaluating, and updating the MJHMP.

6.3.1 Schedule

Monitoring the progress of the mitigation actions will be ongoing throughout the five-year period between the adoption of the MJHMP and the next update effort. The newly-formed MJHMP Steering Committee will meet biannually to monitor the implementation of mitigation actions and develop updates as necessary.

The MJHMP will be updated every five years, as required by DMA 2000. The update process will begin at least one year prior to the expiration of the MJHMP. However, should a significant disaster occur within the County, the MJHMP Steering Committee will reconvene within 30 days of the disaster to review and update the MJHMP as appropriate. The Board of County Commissioners will adopt written updates to the MJHMP as a DMA 2000 requirement.

6.3.2 Mitigation Action Support Tool (MAST) Updates

Hazard problem statements and mitigation activities will be updated through a web interface application developed specifically for Napa County, available on project website, http://mitigatehazards.com/napa-county-mjhmp), to ensure this MJHMP stays a living document.

MAST is a web-based interactive tool that enables multiple users to search, view, enter, and update mitigation actions, ideas or projects, and other information. MAST provides participating jurisdiction staff and plan reviewers (Cal OES/FEMA) access to valuable mitigation information that can be leveraged by future planning or other risk reduction efforts. Users can update the status of their mitigation projects throughout the planning lifecycle and this web-based tool will improve participating jurisdiction's ability to apply for FEMA's Hazard Mitigation Assistance (HMA) grant programs including the initial grant application processes through Cal OES.

HMP submitted 08.11.2020

6.3.3 Process

The MJHMP Steering Committee will coordinate with responsible agencies/organizations identified for each mitigation action. These responsible agencies/organizations will monitor and evaluate the progress made on the implementation of mitigation actions and report to the MJHMP Steering Committee on an annual basis. These responsible departments will assess the effectiveness of the mitigation actions and modify them as appropriate. MAST will assist mitigation project managers in reporting on the status and assessing the effectiveness of the mitigation actions. Most updates to the HMP will occur easily through MAST.

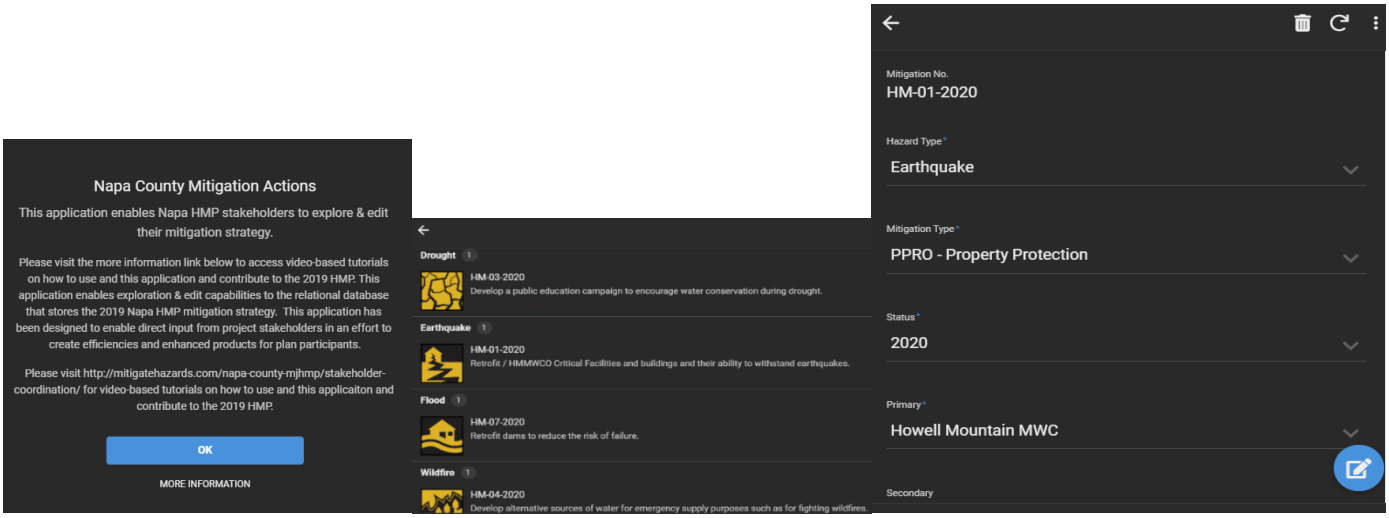

Figure 6-1: Diagram of MAST Viewing Details

Information from the mitigation leads within responsible departments will be used to monitor mitigation actions and annual evaluation of the MJHMP. The following questions will be considered in evaluating MJHMP effectiveness:

- Has the nature or magnitude of hazards affecting the County and other jurisdictions changed?
- Are there new hazards that have the potential to impact the County and other jurisdictions?
- Do the identified goals and actions address current and expected conditions?
- Have mitigation actions been implemented or completed?
- Has the implementation of identified mitigation actions resulted in expected outcomes?
- Are current resources adequate to implement the MJHMP?
- Should additional local resources be committed to address identified hazards?

Future updates to the MJHMP will account for any new hazard vulnerabilities, special circumstances, or new information that becomes available. Issues that arise or updates made during monitoring and

evaluating the MJHMP will be incorporated into the next update of the MJHMP in 2024. The questions identified above would remain valid during the preparation of the 2025 update.

6.3.4 Continuing Public Involvement

During the five-year update cycle, County staff will involve the public through public workshops and meetings. Information on upcoming public events related to the MJHMP or solicitation for comments will be announced via newspapers, mailings, and on the County MJHMP website (mitigatehazards.com/napa-county-mjhmp/). An electronic copy of the current MJHMP document will be accessible through the County website as well as at the County Courthouse in the City of Napa. The MJHMP Planning Committee will, as much as practicable, incorporate the following concepts into its public outreach strategy to ensure continued public involvement in the MJHMP planning process:

- Work with public service clubs, i.e., Greater Napa Valley Lions Club, Napa County Library.
- Collaborate with faith-based organizations, i.e., Calistoga Baptist Church, Saint Helena Catholic Church, Napa Valley Center for Spiritual Living, etc.
- Create story ideas for media outlets, such as newspapers, local radio, and TV
- Distribute emails and postcards/mailers to County/ City/ Town residents about hazard mitigation updates
- Post meeting announcements at City Halls, community centers, coffee houses, grocery stores, etc.
- Educate and collaborate with insurance companies.
- Participate in other existing local community meetings, i.e., Yountville International Short Film Festival, Calistoga Farmers' Market, Arts in April, etc.
- Distribute information through K-12 schools
- Continue to use the County website as a distribution point of hazard mitigation information

6.3.5 HMA Monitoring

FEMA's Hazard Mitigation Assistance (HMA) Program is the catalyst that drives increased understanding and supports proactive community action to reduce losses from natural hazards. To support this vision, FEMA funds three grant programs under HMA. The three programs are the Hazard Mitigation Grant Program (HMGP), the Flood Mitigation Assistance (FMA) Program, and the Pre-Disaster Mitigation (PDM) Program.

- **HMGP** assists in implementing long-term hazard mitigation planning and projects following a Presidential major disaster declaration
- **PDM** provides funds for hazard mitigation planning and projects on an annual basis
- **FMA** provides funds for planning and projects to reduce or eliminate risk of flood damage to buildings that are insured under the National Flood Insurance Program (NFIP) on an annual basis.

HMGP funding is generally 15% of the total amount of Federal assistance provided to a State, Territory, or federally-recognized tribe following a major disaster declaration. PDM and FMA funding depends on the amount congress appropriates each year for those programs. The HMGP supports cost-effective post-disaster projects and is the longest running mitigation program among FEMA's three grant programs. A 2017 study by the National Institute of Building Sciences' (NIBS) Multihazard Mitigation Council have shown that every federal dollar spent on mitigation saves six dollars in response and recovery costs.

MAST will be extremely useful in applying for Cal OES funding. Plan maintenance will be primarily done through MAST. Figure 6-2 demonstrates how MAST information will translate into Cal OES NOIs and grant Sub application requests.

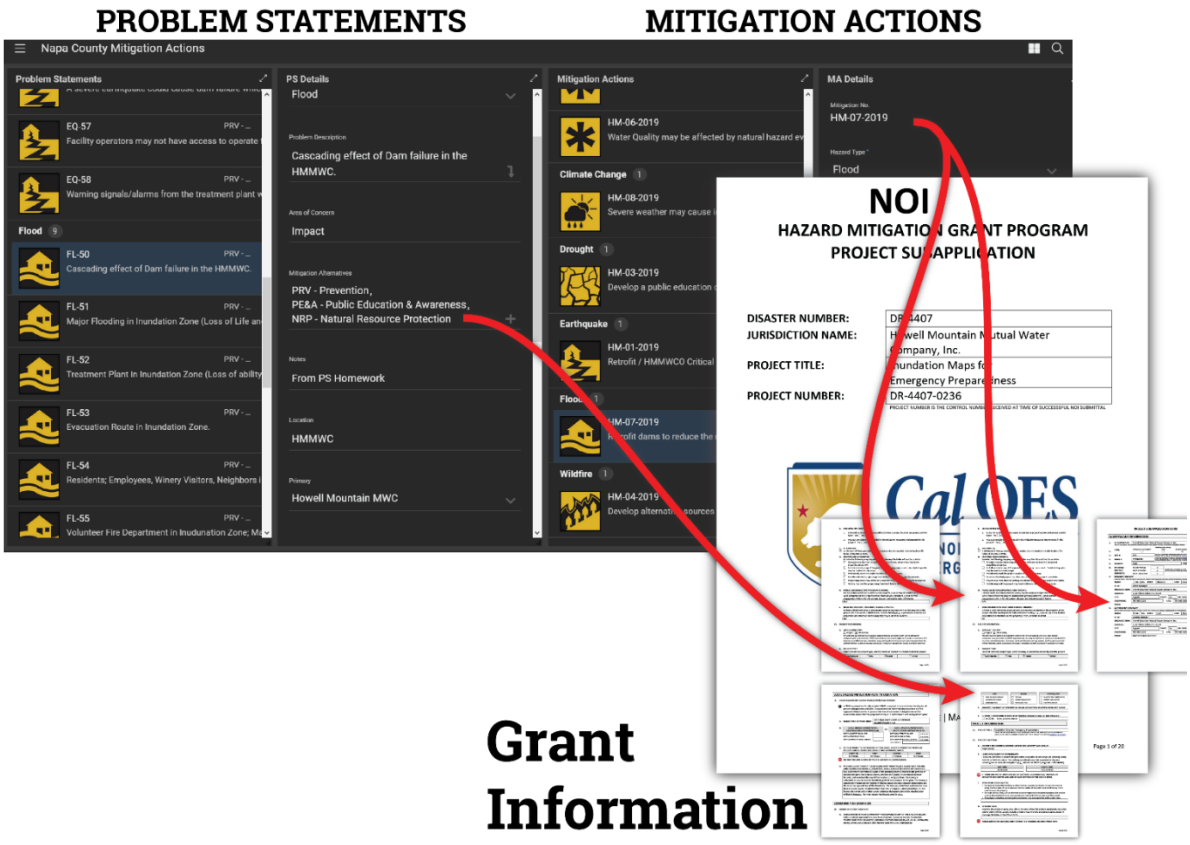

Figure 6-2: MAST and Cal OES Grant Applications

Following a disaster, California Office of Emergency Services (Cal OES) and local Napa County officials in a joint effort with FEMA will perform Preliminary Damage Assessments (PDA) of the areas that sustained damage. Cal OES submits, through the FEMA Regional Office, the information collected along with a damage estimate to request a declaration from the President. A Presidential Major Disaster Declaration

provides for the availability of HMGP funds at the request of a state's Governor in eligible communities within a state, tribe, or territory. Figure 6-3 shows.

Figure 6-3 shows a timeline of how projects should be developed and administered by local government and FEMA under the HMGP program. HMGP grant recipients will have 36 months from the close of the application period to complete projects.

Figure 6-3: HMGP Timeline

For More information on HMGP project development process visit:
www.fema.gov/hazard-mitigation-grant-program-guide-state/local-governments

6.3.6 Incorporation into Other Planning Mechanisms

For the HMP to be successful, the recommendations and underlying principles of the MJHMP should be incorporated into community planning and development such as capital improvement budgeting, building and zoning codes, general plans and regional plans. Integration into a variety of departments at the County and participating jurisdiction level provides an opportunity to network, identify, and highlight mitigation activities and opportunities at all levels of government. It is also important to monitor funding opportunities which can be leveraged to implement the mitigation actions.

Information from this MJHMP can be incorporated into:

- **Napa County and Municipal General Plans:** The MJHMP will provide information that can be incorporated into the Safety, Land Use, and Conservation Elements of General Plans for municipalities and the County as they are updated. Many jurisdictions will update the Safety Element of the General Plan to incorporate the MJHMP in compliance with AB 2140. Specific risk and vulnerability information from the Napa County MJHMP will assist to identify areas where development may be at risk to potential hazards, which in turn can be incorporated into General Plans. For example, jurisdictions may consider instituting a hazard overlay zone that requires additional scrutiny because of close proximity to certain hazards..
- **Building / Development Codes and Zoning Ordinances:** The MJHMP provides information to enable the County and municipalities to make decisions on appropriate building/development codes and ordinances. Appropriate building codes and ordinances can increase resilience against natural disasters. Some County and municipal mitigation actions directly recommend updates or new regulations as mitigation for hazard risks; those mitigation actions indicate priorities for regulatory updates in participating jurisdictions.
- **Community Wildfire Protection Plans (CWPP):** The MJHMP will provide information that can be incorporated into CWPPs and Strategic Fire Plan updates for areas within the County. The MJHMP likewise captured mitigation actions derived from CWPPs.
- **Water/ Flood Management Plans:** The MJHMP will provide information that can be included in updates of the Napa County Groundwater Monitoring Plan, Stormwater Management Plan, the Napa River Flood Management Plan, and other water/ flood management plans. While the process for updating these types of plans will vary by jurisdiction, the flood data developed for the MJHMP can be used in other mechanisms along with exposure and damage estimation information.
- **Planning Mechanisms for Special Districts.** Special districts and other participating jurisdictions likely have specific planning documents that will incorporate elements of the MJHMP as well. These will vary by jurisdiction and are explored more specifically in each Annex Capability Assessment. These include capital improvement plans, maintenance plans, emergency response or operations plans, and other relevant planning documents. Mitigation actions prioritize what plans may need to be updated to reflect this MJHMP information. Valuable information includes exposure and damage estimation and granular spatial footprint information from RAMP.

6.3.7 Planning Integration Processes

With adoption of this plan, Napa County and participating jurisdictions will be responsible for the plan implementation and maintenance. The County and the MJHMP Steering Committee will continue to:

- Act as a forum for hazard mitigation issues;
- Disseminate hazard mitigation ideas and activities to the Napa Valley community;
- Ensure hazard mitigation risk assessments and maps remain a consideration for safety decisionmakers;

- Report on plan progress and recommended changes; and
- Inform and solicit input from the public.

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Appendix A. Analysis Methodology

NAPA COUNTY
OPERATIONAL AREA
HAZARD MITIGATION PLAN

NAPA COUNTY OFFICE OF EMERGENCY SERVICES
1195 THIRD STREET B-20
NAPA, CA 94559

A GIS-based vulnerability assessment was conducted for each of the priority hazards identified by the Planning Committee. Several sources of data are necessary to conduct a vulnerability analysis. This appendix presents an outline of the data inputs, processing steps, and outputs used to create the vulnerability analysis results presented in the Hazard Mitigation Plan. The analysis methodology is presented first, followed by an overview of the analysis data.

A.1. Natural Hazard Exposure

The natural hazard exposure analysis (see C. Natural Hazard Exposure in Figure A- 4) is an inventory of population, parcels, critical facilities, and other assets within each natural hazard area. As shown in Figure A- 1 the presence of a structure inside a natural hazard area (the flood zone in this example) qualifies that structure as exposed to the natural hazard.

Figure A- 1: Hazard Exposure

The total counts of parcels, people, facilities, assets and the sum of values within the planning area which could be exposed to a hazard event is referred to as the "exposure" in this plan. A natural hazards overlay was developed to reflect the combination of many known natural hazard spatial footprints. The spatial overlay method enables summarization of building values, parcel counts, population exposure, and critical facility exposure within a hazard's geographic extents (see C. Natural Hazard Exposure in Figure A- 4). The input data is used to evaluate exposure for earthquakes, landslides, flooding, dam inundation, wildfire and sea level rise.

A.2. Damage Estimation with Hazus

FEMA's Hazus software was implemented to conduct a detailed loss estimation for flood and earthquake. Hazus is a nationally applicable standardized methodology that contains models for estimating potential losses from earthquakes, floods, and hurricanes. Hazus uses Geographic Information Systems (GIS) technology to estimate physical, economic, and social impacts of disasters. For purposes of this planning effort, Hazus was used to generate damage estimations due to possible earthquakes and flooding. The estimated damage and losses provided by the Hazus Software is a "worst case scenario" event and provides

the ability to understand possible widescale damage to buildings and facilities (see D. Hazus Damage Estimations in Figure A- 4).

Hazus calculates damages to flooding based on a depth-damage curve as depicted in Figure A- 2 where the deeper the flooding, especially in relation to the characteristics of the structure subject to flooding, the greater the calculated expected damages. In the hypothetical geography shown in Figure A- 3, even though both structures are exposed to flooding, it is expected that the structure with a first floor height below the depth of flooding will receive significantly more damage than the structure with a first floor height above the expected water depth.

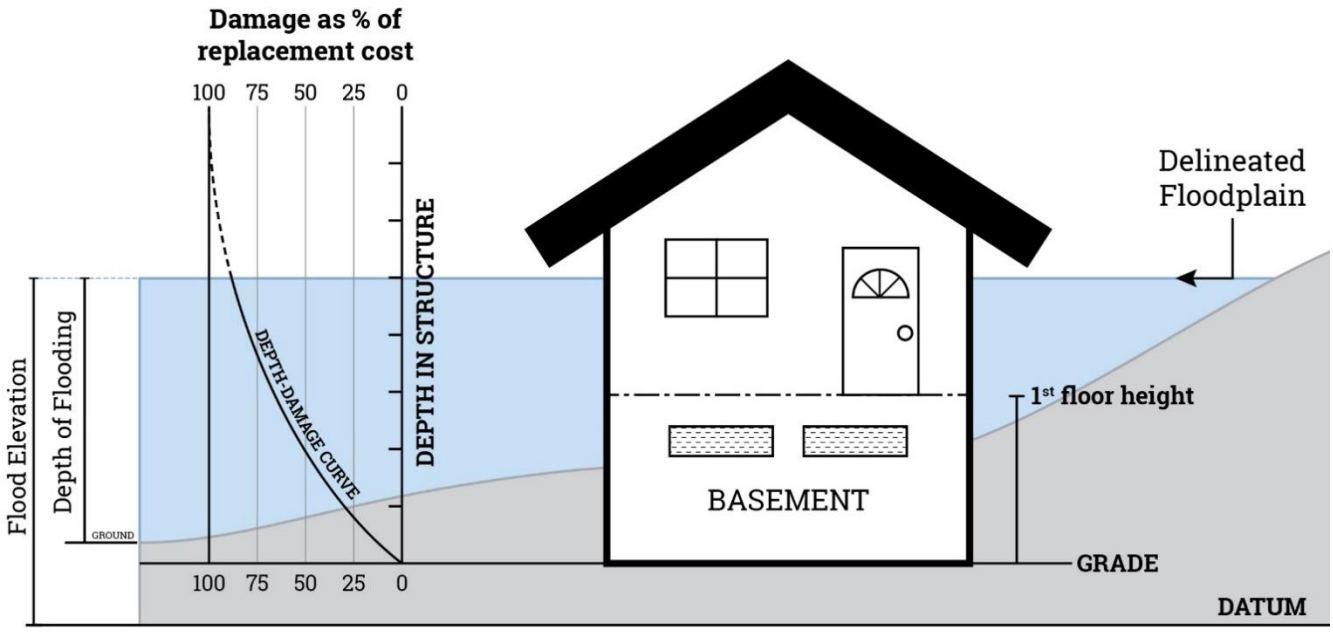

Figure A- 2: Flood Depth and Damage Curves

The countywide parcel roll with detailed information on building characteristics and valuations along with the county's insurance schedule – listing county-owned assets and certain building characteristics and values – were formatted for use as building stock inputs in Hazus. These data served as level 2 inputs to enhance Hazus results and reflect a more accurate damage assessment.

Figure A- 3: Hazus Damage Estimations

Earthquake Parameters – The input parameters for Hazus analysis of Earthquake exposure were twofold. The first scenario run through Hazus was a Probabilistic 100-YR estimate. This type of scenario is complex and utilizes various Earthquake probability layers, for detailed information refer to Hazus user manual documentation on Earthquake analysis. The second scenario run through Hazus was a USGS Shakemap scenario, as described in section A.4.2.2. These scenarios were both used to analyze the exposure to Hazus Inputs as depicted in Figure A- 4.

Flood Parameters – The input parameters for Hazus analysis of Flood exposure included depth grids created with the FEMA Flood Zone data mentioned in section A.4.2.3. 100-YR, 500-YR, and Areas Protected by Levee were all scenarios that were used to analyze the exposure to Hazus inputs as depicted in Figure A- 4.

Hazus is a FEMA product with highly detailed documentation provided on the analysis steps and algorithms performed against the input data and associated scenarios in the process of obtaining loss estimates. The explanation in this appendix section is simplified. Refer to the full documentation and technical manuals from FEMA for greater explanation on Hazus specifics.

It is important to understand the estimated damage to the community is presented as a worst-case scenario for flood and earthquake models.

A.3. Distinguishing Results – Natural Hazard Exposure Analysis vs Hazus Results

Table and chart references throughout the hazard mitigation plan are explicitly called out for Hazus results. There are expected differences in the results between estimations of Natural Hazard overlays and detailed Hazus results. Snapshot tables and Natural Hazard Exposure sections do not contain Hazus estimates.

A.4. Analysis Data

A.4.1. Assets, Value, and Population

A.4.1.1. Parcels

Parcel and address point GIS data supplemented by the county's assessor roll for important attributes such as replacement and content cost estimates (tabular), were used to create a composite data set representing a detailed inventory of building location, values, and construction types countywide. Parcel data composition – Both address point and parcel geometry provided by Napa County GIS were used to create a composite dataset with the best accuracy possible. GIS was used to complete this processing. Attributes such as replacement cost were joined from Napa County Assessor's data to the geometry. In cases where multiple address points fell under one parcel, the values associated for that parcel were divided by the number of address points so as to avoid compound values which result from the joining process. Parcels that had no address points but did have values representative of improvements (buildings) where converted into centroid point locations and merged with the address points for use in analysis. There were a few instances with overlapping polygons in the parcels dataset that required those address points to be removed and centroids used in their place to avoid compounding values.

A.4.1.2. Asset Insurance Schedules

County assessor data does not include detailed information for tax exempt structures, such as federal and local government buildings. These data were added through the development of GIS data by utilizing insurance schedule tables for each municipality's insured assets.

A.4.1.3. Population

Population estimates were derived from 2015 Census American Community Survey (ACS) numbers as applied to census block groups and then processed through GIS modeling in order to break down the proportional population for smaller units of area.

A.4.1.4. Critical Infrastructure

Critical facilities and transportation/lifeline typically include hospitals, fire stations, police stations, storage of critical records, and similar facilities. These data came from a collection of sources including but not limited to: Napa County GIS, Napa County and local jurisdiction insurance data, CDSS, CEC, FCC, HAZUS, USACE, FEMA, and NPS. All data sources have a level of accuracy acceptable for planning purposes. See Table A- 2 for a list of Critical Infrastructure data used in the analysis.

A.4.1.5. Hazus Inputs

Hazus data inputs can be customized in several different ways including hazard scenario data and detailed building data. The planning team conducted a Level 2 analysis utilizing user-defined buildings with refined building characteristic parameters as inputs for the damage estimation calculations. Both countywide building data and government assets were used as inputs in this level 2 analysis. The customized user defined building dataset allows for more accurate results for damage estimation based upon detailed building characteristics.

Note: FEMA's Hazus software utilizes different user defined building information inputs to develop loss estimates depending on the hazard module. The Hazus flood and earthquake modules use fragility curves based upon the user's definition of building characteristics including but not limited to:

- ***Area***
- ***Construction Year***
- ***Construction Type***
- ***Foundation Type***
- ***Number of Stories***
- ***Occupancy Type (Residential, Commercial, etc)***
- ***Building Values (Provided by others)***

A.4.2. Natural Hazard Data

A.4.2.1. Dam Inundation Zones

Dam inundation zone GIS data were provided by Napa County. These represent the estimated flood extent in the event of dam failure for individual dams.

A.4.2.2. Earthquake Shaking

Two GIS datasets were used in Earthquake Hazard analysis. The first is a Probabilistic Seismic Hazard Analysis (PHSA) layer used for the Natural Hazard Exposure analysis. The Probabilistic Scenario processing within Hazus is slightly different and utilizes various HAZUS sourced datasets and calculates exposure based on user parameters. The second is a USGS Shakemap Scenario for a West Napa Epicenter and magnitude of 6.7. This was utilized in both Natural Hazard Exposure and Damage Estimation with HAZUS.

A.4.2.3. Flood Zones

FEMA regulatory flood plain GIS data was used as the basis of the flood hazard. Data with updates up to 1/21/2019 were incorporated into the analysis. The FEMA countywide DFIRM was used for defining flood boundaries and depth grids are included within the flood fringe, floodway, 500-YR, and areas protected by levee.

A.4.3. Methodology Overview

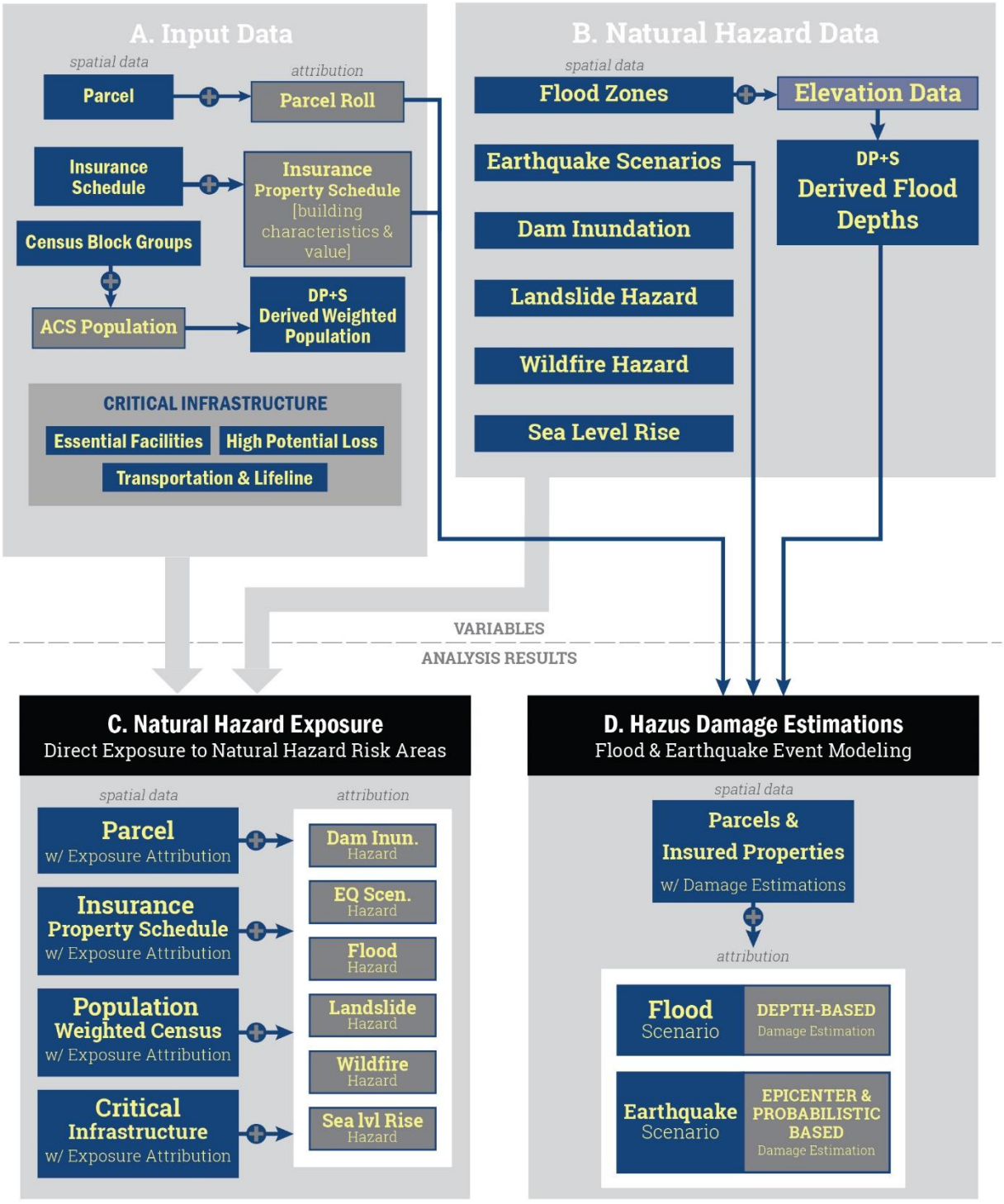

Figure A- 4: Data Analysis Methodology

A.4.3.1. Landslide Susceptibility

GIS layer with geographic boundaries defining the likelihood of deep-seated landslides. Underlying geology and slope angle are used in the creation of this layer by the California Geological Society.

A.4.3.2. Wildfire Hazard Severity

GIS layer provided by CalFire delineating Wildfire Hazard Severity Zones in both State Responsibility Areas (SRAs) and Local Responsibility Areas (LRAs). Fire Hazard Severity Zones in SRA are based on potential fuels, fire weather conditions, and terrain, and represent potential fire hazard exposure to structures and other human infrastructure assets.

A.4.3.3. Sea Level Rise

GIS layer depicting boundaries of estimated sea level rise from 1-6ft above the current Mean Higher High Water conditions. This data is provided by ABAG and NOAA.

A.4.4. Data Dictionary

Table A- 1: Data Dictionary

Data	Source	Description
Parcels		
Parcel Geometry	Napa County GIS	Used for creating centroids on improved parcels that had no address point data
Parcel Roll - Not public version	Napa County Assessors	Tabular data containing parcel information such as value and building features like area
Address Point Locations	Napa County	Used for parcel analysis for parcels that had points available
Population Input Data		
Census Blocks with Population	US Census Bureau	Used for weighted population. Census population numbers from ACS when more recent
Critical Facility Input Data		
ESSENTIAL FACILITIES		
Hospital	HAZUS	Locations of hospitals
Emergency Operations Center	Napa County	Typically one per county, the center of emergency operations
Police	Napa County	Police stations as well as County Sheriff and other law enforcement agency assets of participating jurisdictions
Fire	Napa County	Includes volunteer fire departments
HIGH POTENTIAL LOSS		
School	Napa County	School locations are expensive assets that are often occupied with children but also can be safe and useful shelters
Historic Building	NPS	Historic Building Registry
Historic Site	NPS	Another National Park Service Historic Registry

Data	Source	Description
Child Care Center	CDSS	As defined by California Department of Social Services
Res Elder Care Facility	CDSS	As defined by California Department of Social Services
Res Child Care	CDSS	As defined by California Department of Social Services
Adult Res Facility	CDSS	As defined by California Department of Social Services
Home Care Organization	CDSS	As defined by California Department of Social Services
Foster Family Agency	CDSS	As defined by California Department of Social Services
Family Child Care Home	CDSS	As defined by California Department of Social Services
Church	Napa County	Places of Worship
2013 HMP Plan Data	2013 HMP	Important assets described in 2013 HMP but not present in any current data sources
Insured Assets	Insured Building Tables	Geocoded and QA'ed from tabular insurance data. Provides values and other important attributes for exempt parcels
Water Treatment Facility	Napa County QA Meeting	Includes both water treatment and waste water treatment
Dam	Napa County	Dam locations - does not include all agricultural dams
Farm Worker Camp	Napa County	Temporary housing
Library	Napa County	Public libraries
Mobile Home Park	Napa County	Vulnerable to Natural Hazards
Winery	Napa County	Of economic importance for Napa County
TRANSPORTATION & LIFELINE		
Power Plant	CEC	Includes solar fields and major generators as well as coal fired plants when present
Railroad	Esri	Industrial, commercial or tourist
Wind Turbine	CEC	Wind power generators
Levee	FEMA	Levee locations
Street	Esri	Streets with road sub categories for summaries
Levee Flood Wall	USACE NLD	Levee Floodwall locations
Levee Centerline	USACE NLD	Levee Centerline locations
Swinlet	Napa County	Swinlet locations
Substation	CEC	Power Substations
Culvert	Napa County	Rainwater culverts
Transmission Line	CEC	Power Transmission Lines
NG Pipeline	CEC	Natural Gas Pipeline
NG Station	CEC	Natural Gas Station
Airport	Napa County	Airport locations
Bridge	Napa County	Bridge locations
HAZMAT		
Agricultural Underground Storage	Napa County	Potential environmental health hazard if exposed to natural hazard event
Haz Waste Permit	Napa County	Potential environmental health hazard if exposed to natural hazard event
Holding Tank	Napa County	Potential environmental health hazard if exposed to natural hazard event

Data	Source	Description
Landfill	Napa County	Potential environmental health hazard if exposed to natural hazard event
Underground Storage	Napa County	Potential environmental health hazard if exposed to natural hazard event
Natural Hazard Data		
Landslide Susceptibility	CGS	California Geological Survey provided geospatial landslide susceptibility zones
Wildfire Hazard Severity Zone	Cal Fire	Areas of significant fire hazard based on fuels, terrain, weather, and other relevant factors
Dam Inundation	Napa County	Estimated flood extent of dam failure events
Sea Level Rise	ABAG	Sea level rise areas from 1 to 6 feet
West Napa Earthquake Scenario	USGS	6.7 magnitude scenario associated felt magnitude zones
Earthquake Probabilistic MI (PHSA)	ABAG	Probabilistic Seismic Hazard Analysis
Flood Zones	FEMA	FEMA study flood mapping results

A.4.5. Insured Assets Roll

Table A- 2: Insured Assets Roll

Insured Asset	Number of Buildings	Building Replacement Value	Insured Content Value
Airport	**2**	**$21,906,290**	**$219,503**
2000 Airport Rd.	1	$19,812,400	$0
Terminal Building, Airport Terminal	1	$2,093,890	$219,503
Animal Shelter	**1**	**$3,012,520**	**$111,988**
Kennels, Animal Shelter	1	$3,012,520	$111,988
Baseball Field	**4**	**$405,046**	**$0**
Little League Field Complex Snack Bar, Snack Bar	1	$259,736	$0
Little League Field Complex Judges Stand, Judges Stand	1	$51,776	$0
Little League Field Complex Storage, Storage	1	$10,385	$0
Little League Field Complex Store, Little Lea Stor	1	$83,149	$0
Bleachers	**2**	**$1,934,000**	**$0**
Crane Park, Grandstand	2	$1,934,000	$0
Boat Launch	**2**	**$372,831**	**$0**
Boat Launch, Cuttings Wharf Boat Launch	1	$358,331	$0
Gazebo, Cuttings Wharf Boat Launch	1	$14,500	$0
Calistoga Center	**4**	**$1,604,617**	**$0**

Insured Asset	Number of Buildings	Building Replacement Value	Insured Content Value
Cafeteria, Calistoga Center	1	$360,268	$0
Caretakers House, Calistoga Center	1	$602,570	$0
Dormitories, Calistoga Center	1	$636,163	$0
Storage, Calistoga Center	1	$5,616	$0
Cemetery	**1**	**$30,101**	**$0**
Cemetery, Monticello Cemetery	1	$30,101	$0
Child Care	**1**	**$802,845**	**$189,161**
Child Care Center, Health And Human Services	1	$802,845	$189,161
City Hall	**4**	**$16,364,705**	**$1,453,922**
City Hall	3	$13,324,705	$1,003,865
City Hall/Lyman Park, City Hall	1	$3,040,000	$450,057
College*	**33**	**$557,002,012**	**$0**
100, Napa Valley College	1	$21,581,000	$0
1000, Napa Valley College	1	$6,892,583	$0
1100, Napa Valley College	1	$2,181,000	$0
1200, Napa Valley College	1	$10,278,158	$0
1300, Napa Valley College	1	$6,861,000	$0
1400, Napa Valley College	1	$3,660,000	$0
1500, Napa Valley College	1	$16,050,000	$0
1600, Napa Valley College	1	$3,360,000	$0
1700, Napa Valley College	1	$33,500,000	$0
1800, Napa Valley College	1	$14,443,553	$0
2000, Napa Valley College	1	$6,335,520	$0
3000Abc, Napa Valley College	1	$4,800,000	$0
3000D, Napa Valley College	1	$615,000	$0
3100, Napa Valley College	1	$5,030,000	$0
3200A, Napa Valley College	1	$1,103,000	$0
3200B, Napa Valley College	1	$1,630,000	$0
3200C, Napa Valley College	1	$1,110,000	$0
3300, Napa Valley College	1	$908,000	$0
3500, Napa Valley College	1	$1,738,000	$0
3700, Napa Valley College	1	$5,342,000	$0
3900, Napa Valley College	1	$1,200,000	$0
3950, Napa Valley College	1	$386,000	$0
400, Napa Valley College	1	$12,000,000	$0
4000, Napa Valley College	1	$2,537,000	$0
4090, Napa Valley College	1	$28,750,000	$0
4100, Napa Valley College	1	$1,111,000	$0

Insured Asset	Number of Buildings	Building Replacement Value	Insured Content Value
600, Napa Valley College	1	$46,657,730	$0
800, Napa Valley College	1	$20,647,692	$0
900, Napa Valley College	1	$1,650,800	$0
Ag Lab, Napa Valley College	1	$733,000	$0
Modulars, Napa Valley College	1	$5,500,000	$0
St Helena Campus, Napa Valley College	1	$278,501,006	$0
Various Outbuildings, Napa Valley College	1	$9,908,970	$0
Communication Tower	**9**	**$197,611**	**$642,863**
City Building, Mt. St. Helena Communication Center	1	$0	$21,511
Communications Building #1, Mt. St. Helena Communication Center	1	$18,062	$195,815
Communications Building #2, Mt. St. Helena Communication Center	1	$52,548	$4,061
Communications Center, Cdf St. Helena Communication Center	1	$11,118	$13,444
Communications Center, Mt. Vaca Communications Center	1	$10,788	$41,004
Communications Tower, Berryesa Peak	1	$0	$106,747
Generator Building, Radio Tower	1	$18,062	$21,174
Radio Tower	2	$87,033	$239,107
Community Center	**1**	**$13,391,700**	**$251,986**
Community Center Complex, The Yountville Town Center Complex	1	$13,391,700	$251,986
Corp Yard	**23**	**$4,289,580**	**$2,529,199**
Ag Block Building, Yountville Corporate Yard	1	$84,760	$20,166
Building #3 - Maintenance, Napa Corporate Yard	1	$0	$50,000
Corp Yard	1	$1,261,680	$54,089
Corporation Yard, Locker Building	1	$94,000	$3,676
Corporation Yard, Main Office Building	1	$330,000	$45,639
Corporation Yard, Mechanic Office Building	1	$205,000	$51,050
Corporation Yard, Property In The Open	1	$0	$0
Corporation Yard, Restroom Building	1	$139,000	$2,348
Corporation Yard, Shop Office Building	1	$523,000	$64,834
Equipment Port, Calistoga Corporate Yard	1	$64,874	$67,221
Fleet Maintainence, Corporation Yard	2	$0	$1,242,127
Fuel Island, Spanish Flat Corporate Yard	1	$156,003	$15,496
Fuel Island, Yountville Corporate Yard	1	$180,636	$336,108

Insured Asset	Number of Buildings	Building Replacement Value	Insured Content Value
Metal Container, Yountville Corporate Yard	1	$10,969	$13,444
Metal Shed, Yountville Corporate Yard	1	$275,535	$33,610
Metal Storage Building, Spanish Flat Corporate Yard	1	$69,048	$63,599
Office/Storage Building, Calistoga Corporate Yard	1	$214,340	$33,610
Office/Storage Building, Yountville Corporate Yard	1	$302,730	$67,221
Office/Storage, Spanish Flat Corporate Yard	1	$119,653	$89,353
Storage Shed, Yountville Corporate Yard	1	$112,167	$168,053
Water Pump Building, Yountville Corporate Yard	1	$6,500	$12,099
Weights And Measures Building, Yountville Corporate Yard	1	$139,685	$95,456
Equipment	**8**	**$0**	**$8,294,273**
Contractor/Mobile Equipment (21), Rc - Contractors/Mobile	1	$0	$861,993
Equipment (5), Contractor's Equipment	1	$0	$174,000
Replacement Cost, Contractor's Equipment	1	$0	$0
Replacement Cost, Vehicles	1	$0	$0
Scheduled Low Value Vehicles	1	$0	$2,386,940
Scheduled Mobile & Contractors Equipment	1	$0	$1,505,530
Vehicles (15), Rc Comp & Collision	1	$0	$546,710
Vehicles (33), Rc Comp & Collision	1	$0	$2,819,100
Fair	**21**	**$8,964,726**	**$464,165**
1991 Dwelling, County Fairgrounds	1	$248,351	$0
Fiesta Center, County Fairgrounds	1	$67,314	$0
Floodlights, County Fairgrounds	1	$197,056	$0
Grandstand #1, County Fairgrounds	1	$1,061,760	$246,726
Grandstand #2, County Fairgrounds	1	$1,034,560	$0
Livestock Bldg/Arena, County Fairgrounds	1	$492,645	$217,439
Livestock Office, County Fairgrounds	1	$168,566	$0
Main Building (Crop), County Fairgrounds	1	$246,322	$0
New Maintenance Building, County Fairgrounds	1	$475,305	$0
Old Dwelling, County Fairgrounds	1	$134,503	$0
Pavilion Building, County Fairgrounds	1	$754,140	$0
Pro Shop, County Fairgrounds	1	$456,010	$0

Insured Asset	Number of Buildings	Building Replacement Value	Insured Content Value
Racetrack Concession/Restroom, County Fairgrounds	1	$117,866	$0
Rental Office, County Fairgrounds	1	$199,552	$0
Restroom #1 - Grandstand, County Fairgrounds	1	$95,243	$0
Restroom #2 - Grandstand, County Fairgrounds	1	$95,243	$0
Rv Park Pavilion, County Fairgrounds	1	$23,964	$0
Rv Park Restroom, County Fairgrounds	1	$118,718	$0
Ticket Booth And Concession, County Fairgrounds	1	$89,903	$0
Ticket Booth, County Fairgrounds	1	$14,865	$0
Tubbs/ Fairgrnds, Office/Exhibit Hall	1	$2,872,840	$0
Fire	**26**	**$13,388,614**	**$2,425,558**
American Canyon Fire Dept	1	$5,156	$17,298
Angwin VFD	1	$640,690	$123,396
Calistoga City Fire Dept, Fire Station -	1	$1,594,100	$221,684
Capell Valley Fire Station - Station 214	1	$471,780	$55,388
Carnaros/Ed Is VFD, Carneros/Ed Is VFD	1	$240,429	$73,945
Carneros/Ed Is VFD	1	$80,996	$4,029
Cdf/Cofire, Napa Station	1	$0	$103,329
City Of Napa Fire Dept, Napa Fire Dept	1	$6,058	$10,034
Deer Park VFD	1	$354,427	$58,611
Dry Creek-Lokoya VFD	1	$238,607	$100,830
Fire Department, Capell Valley VFD	1	$125,131	$80,664
Fire Station 12, Yountville Fire Station/Sheriff Office	1	$1,873,280	$272,122
Fire Station, Fire Station #17	1	$3,708,000	$714,496
Fire Station, Greenwood Ranch Fire Station	1	$1,741,060	$176,281
Fire Station, Property In The Open	1	$0	$0
Gordon Valley VFD	1	$411,459	$59,153
Napa County Fire/Calif Dept Of Forestry, Napa Fire Dept/Ca Dept Of Forestry	1	$5,156	$10,034
Pope Valley Fire Station - Station 222	1	$471,780	$55,388
Pope Valley VFD	1	$475,462	$73,945
Rutherford VFD	1	$240,378	$44,071
Soda Canyon VFD	1	$135,150	$88,733
Station A, Dry Creek-Lokoya VFD	1	$72,255	$0
Station B, Dry Creek-Lokoya VFD	1	$72,255	$0
Storage Shed, Greenwood Ranch Fire Station	1	$12,887	$5,303

Insured Asset	Number of Buildings	Building Replacement Value	Insured Content Value
Storage, Angwin VFD	1	$137,289	$26,431
Volunteer Fire Dept, Rutherford VFD Satellite Bldg	1	$274,829	$50,393
Flood Control District	**1**	**$0**	**$276,093**
Flood Control Dist	1	$0	$276,093
Hangar	**12**	**$7,940,640**	**$0**
Hangar, "T" Hangar 105-127"	1	$1,088,860	$0
Hangar, "T" Hangar 13-24"	1	$488,807	$0
Hangar, "T" Hangar 25-36"	1	$546,039	$0
Hangar, "T" Hangar 37-44"	1	$476,723	$0
Hangar, "T" Hangar 45-54"	1	$702,863	$0
Hangar, "T" Hangar 60-83"	1	$1,088,860	$0
Hangar, "T" Hangar 7-12"	1	$230,802	$0
Hangar, "T" Hangar 84-93"	1	$571,712	$0
Hangar, "T" Hangar 94-104"	1	$617,422	$0
Hangar, Hangar 55	1	$174,437	$0
Hangar, Hangar C1-C8	1	$1,055,150	$0
Hangar, Silverado Hangar	1	$898,965	$0
Health	**20**	**$11,509,219**	**$3,737,266**
Building A - Fiscal Operations, Health And Human Services	1	$685,906	$138,091
Building B - Administration, Health And Human Services	1	$1,285,840	$270,088
Building C - Office/Classroom, Health And Human Services	1	$651,950	$130,661
Building D - Adult Services, Health And Human Services	1	$1,155,650	$254,453
Building E - Adult Services, Health And Human Services	1	$445,695	$86,307
Building F - Next Step, Health And Human Services	1	$566,492	$116,770
Contents - Leased Location, Hhs - Community House	1	$0	$67,540
Contents - Leased Location, Mental Health	3	$0	$398,093
H&Hs - Clinic Ole, Community Health Clinic Ole	1	$0	$3,728
H&Hs - Clinic Ole, Nv Vintners (Jhl)	1	$0	$9,792
H&Hs - Hope Center, Community Action Napa Valley (Canv)	1	$0	$11,760
Health And Human Services, Building "G"/Public Health Dept"	1	$1,480,410	$605,867
Health And Human Services, Building "H"/Childen'S Protective Services"	1	$1,503,790	$496,195

Insured Asset	Number of Buildings	Building Replacement Value	Insured Content Value
Health And Human Services, Building "J"/Recovery Alcohol & Drug Services"	1	$347,731	$142,093
Health And Human Services, Building K - Office Building	1	$3,340,390	$831,797
Maintenance Building, Health And Human Services	1	$45,365	$21,199
Office, Health & Human Services Campus	2	$0	$152,832
Historic	**1**	**$13,287,400**	**$0**
Courhouse, Historic Courthouse	1	$13,287,400	$0
Homeless Shelter	**1**	**$4,444,000**	**$225,276**
Shelter, Homeless Shelter	1	$4,444,000	$225,276
HHSA/South Campus	**4**	**$38,559,810**	**$118,899**
Building 1, Mylan/Dey Labs Site	1	$15,975,400	$37,055
Building 2, Mylan/Dey Labs Site	1	$10,181,400	$48,333
Building 4, Mylan/Dey Lab Site	1	$6,966,230	$33,511
Warehouse Space, Mylan/Dey Lab Site	1	$5,436,780	$0
Library	**7**	**$13,757,827**	**$10,617,983**
Contents - Leased Location, American Canyon Library	1	$0	$936,604
Leased Space, Town Of Yountville Library	1	$0	$197,952
Library	2	$4,659,420	$1,875,480
Library, Calistoga Library	1	$478,137	$294,987
Library, Main Library	1	$8,620,270	$7,312,960
Library, Property In The Open	1	$0	$0
Lift Station	**5**	**$353,607**	**$1,955,495**
Crinella Lift Station, Lift Station	1	$167,000	$7,760
Lift Station	1	$146,638	$161,357
Pine Street Lift Station	1	$13,323	$1,516,310
Rancho De Lift Station, Vista Drive Lift Station	1	$13,323	$204,687
School Lift Station - Oak Street, School Lift Station	1	$13,323	$65,381
Lodging	**34**	**$0**	**$0**
Aurora Park Cottages	1	$0	$0
Bear Flag Inn	1	$0	$0
Brannan Cottage Inn	1	$0	$0
Calistoga Hills Resort	1	$0	$0
Calistoga Inn	1	$0	$0
Calistoga Spa Hot Springs Spa	1	$0	$0
Carlin Country Cottages Spa - 16 Rooms	1	$0	$0

Insured Asset	Number of Buildings	Building Replacement Value	Insured Content Value
Casa Lana	1	$0	$0
Chelsea Garden Inn	1	$0	$0
Chien Blanc Lodging	1	$0	$0
Christopher's Arbors	1	$0	$0
Christophers Inn (The Bergson) Inn - 21 Rooms	1	$0	$0
Cottage Grove Inn Inn - 16 Rooms	1	$0	$0
Craftsman Inn	1	$0	$0
Enchanted Cottage	1	$0	$0
Eurospa Inn Inn 12 Rooms	1	$0	$0
Fanny's	1	$0	$0
Golden Haven, Inn 31 Rooms	1	$0	$0
Hideaway Cottages	1	$0	$0
Indian Springs & Lodge Lodge-40 Rooms	1	$0	$0
Lodge At Calistoga (Comfort Inn) , Lodge -55 Rooms	1	$0	$0
Luxe	1	$0	$0
Mt View Hotel Hotel - 33 Rooms	1	$0	$0
Pink Manson, Inn - 6 Rooms	1	$0	$0
Roman Spa Spa-60 Rooms	1	$0	$0
Silver Rose Resort	1	$0	$0
Solage Calistoga, 89 Rooms	1	$0	$0
Stevenson Manor Inn, 34 Rooms	1	$0	$0
Sunbusrt (Calistoga Village Inn And Spa), 41 Room Spa	1	$0	$0
The Chanric Inn Inn -6 Rooms	1	$0	$0
Washington Street Lodging	1	$0	$0
Wayside Inn	1	$0	$0
Wilkinsons Hot Springs Hot Springs - 42 Rooms	1	$0	$0
Wine Way Inn	1	$0	$0
Lot	**6**	**$1,729,258**	**$0**
Crane Park, Property In The Open	1	$0	$0
Miely Park, Property In The Open	1	$0	$0
Napa Valley Community Housing, 1.21 Acre Land	1	$1,603,970	$0
Park And Ride Lot	1	$27,263	$0
Railroad Avenue Building, Property In The Open	1	$0	$0
Vacant, 0.27 Acres Unit 323 - Lb Estates Unit No. 2	1	$98,025	$0
Misc	**13**	**$2,189,727**	**$3,233,481**

Insured Asset	Number of Buildings	Building Replacement Value	Insured Content Value
Ag Comm - Gwss, F&F Soscol	1	$0	$76,479
Ag Comm - Us Coop, F&F Soscol	1	$0	$377,313
Carnegie, Carnegie Building	1	$1,262,000	$95,668
Contents - Leased Location, Property-Records Management	1	$0	$199,803
Crane Park, Bocce Court Building	1	$14,000	$0
Crane Park, Snack Bar Building	1	$94,000	$5,411
Fine Art - Chaos, Sculture	1	$0	$800,000
Fine Art - Public Art Walk, Misc Art Work Throughout Town - Art Walk	1	$0	$533,500
Lafco, Robert Louis Stevenson Association	1	$0	$50,850
Leased Printers And Copiers Throughout County, Leased Copiers And Printers	1	$0	$990,621
Scout Hall	1	$420,000	$0
Signorelli, Signorelli Barn	1	$256,000	$103,836
Two Leased Portables	1	$143,727	$0
Mondavi Center	**3**	**$2,221,632**	**$0**
Dormitory-Dining Hall, Mondavi Center	1	$1,940,350	$0
Manager'S Dwelling, Mondavi Center	1	$211,283	$0
Pump Hse Tanks, Mondavi Center	1	$69,999	$0
Museum	**1**	**$826,138**	**$397,708**
Museum Building & Annex, Museum	1	$826,138	$397,708
Napa County Office of Education	**1**	**$4,414,426**	**$684,864**
Napa County Office Of Education, County Office Main Building	1	$4,414,426	$684,864
Office	**7**	**$27,690,010**	**$6,175,360**
Administration Building	1	$12,481,400	$2,938,960
Crane Park, Headstart Building	1	$284,000	$49,110
Offices Some Leased To Others, County Offices	1	$0	$13,444
Offices Some Leased To Others, County Offices- Health & Human Services	1	$0	$408,904
Offices Some Leased To Others, Imperial Way Offices-Information Technology	1	$3,118,910	$530,438
Offices, Carithers Building	1	$10,820,700	$2,089,930
Railroad Avenue Building, Office Building A	1	$985,000	$144,574
Park	**17**	**$960,001**	**$149,084**
Bedford & Kensington - Playground Equipment, Structure And Equipment	1	$22,504	$0
City Hall/Lyman Park, Gazebo	1	$21,000	$0

Insured Asset	Number of Buildings	Building Replacement Value	Insured Content Value
City Hall/Lyman Park, Property In The Open	1	$0	$0
Community Park 2	1	$5,196	$0
Danrose Sports Court	1	$15,397	$0
Elliott Park, Structure And Equipment	1	$123,163	$0
Kimberly Park, Structure And Equipment	1	$165,054	$0
Lewis Station Park, Property In The Open	1	$0	$0
Linwood Park	1	$0	$149,084
Main Street Park, Structure And Equipment	1	$51,960	$0
Melvin Park	1	$92,835	$0
Montecarlo Park, Structure And Equipment	1	$7,390	$0
Northhampton Park, Structure And Equipment	1	$72,359	$0
Nottingham & Bentley - Playground Equipment, Structure And Equipment	1	$22,504	$0
Shenandoah Park, Equipment And Restrooms	1	$211,764	$0
Silver Oak Park, Structures And Equipment	1	$62,351	$0
Via Bellagio Park, Structure And Equipment	1	$86,524	$0
Parking Garage	**1**	**$18,740,900**	**$0**
Fifth Street Parking Garage	1	$18,740,900	$0
Police	**7**	**$79,286,043**	**$10,356,199**
Exercise Yard, Juvenile Justice Center	1	$1,185,400	$0
Jail, Hall Of Justice	1	$34,098,900	$6,418,610
Jail, Juvenile Justice Center	1	$22,691,800	$635,038
Offices And Storage, Sheriff Facility	1	$19,824,200	$3,088,340
Police Department, Police Dept./Jail	1	$1,478,240	$207,440
Police Dept./Jail, Storage Wood Framed	1	$7,503	$6,771
Sheriff Department Leased Vehicles	1	$0	$0
Pool	**1**	**$4,224,000**	**$519,132**
Community Pool Facility, Pool Facility	1	$4,224,000	$519,132
Post Office	**1**	**$1,174,000**	**$220,923**
Post Office	1	$1,174,000	$220,923
Rec	**4**	**$5,930,823**	**$104,208**
Community Center, Recreation Center	1	$400,470	$38,511
Gym	1	$4,090,040	$48,681
Monhoff Building, Recreation Center	1	$1,020,820	$10,233

Insured Asset	Number of Buildings	Building Replacement Value	Insured Content Value
Recreation Center, Recreation Center/City Council	1	$419,493	$6,783
Residence	**6**	**$2,246,972**	**$399,713**
Residential, Residential Treatment	1	$607,664	$0
Residential, Solano Ave. Adult Resource Center	1	$506,327	$0
Single Family Residence	2	$714,400	$0
Trailers, Ge - Landlord	1	$251,816	$347,249
Single Farm Res ""Lilyville""	1	$166,765	$52,464
Restroom	**8**	**$1,148,797**	**$2,553**
City Hall/Lyman Park, Restroom Building	1	$20,000	$817
Community Park 1, Restrooms	1	$179,354	$0
Crane Park, Restroom Building	1	$15,000	$613
Lewis Station Park, Restroom Building	1	$13,000	$408
Little League Field Complex Restroom, Restroom	1	$39,811	$0
Logvy Park (Parcel #11-410-009), Park Restroom	1	$24,316	$0
Miely Park, Restroom Building	1	$17,000	$715
Shower Bldg K	1	$840,316	$0
River Ranch Center	**5**	**$3,187,045**	**$0**
Apartments, River Ranch Center	1	$504,891	$0
Cafeteria, River Ranch Center	1	$1,028,000	$0
Dorm, River Ranch Center	2	$1,567,176	$0
Well Pump House Tanks, River Ranch Center	1	$86,978	$0
Senior Center	**1**	**$919,041**	**$43,039**
Senior Center	1	$919,041	$43,039
Shop	**4**	**$1,216,785**	**$308,542**
Maintenance	1	$261,857	$112,282
Mechanical, Mechanical L	1	$301,747	$0
Public Works Building, Public Works Garage	1	$536,611	$172,190
Public Works Building, School - Portable Classroom	1	$116,570	$24,070
Skate Park	**1**	**$793,965**	**$0**
Skate Park, Behind Community Center	1	$793,965	$0
Storage	**5**	**$142,284**	**$121,346**
Crane Park, Crane Park Storeroom Building	1	$105,000	$18,276
Elections - Storage, Napa Livermore Properties (Jhl)	1	$0	$82,144

Insured Asset	Number of Buildings	Building Replacement Value	Insured Content Value
Public Works Building, Storage Bldg - Block	1	$11,671	$2,633
Railroad Avenue Building, Storage Building	1	$13,000	$13,886
Storage Building And Fuel Valet, Storage Building	1	$12,613	$4,407
Teen Center	**2**	**$675,000**	**$70,143**
Railroad Avenue Building, Teen Billiards	1	$312,000	$23,279
Railroad Avenue Building, Teen Center (Office)	1	$363,000	$46,864
Water	**68**	**$95,729,655**	**$12,055,925**
Crystal Springs Booster Station, Booster Pump Station	1	$152,000	$17,051
Kimberly Pump Station, Pump Station	1	$197,446	$0
Madrone Booster Station, Booster Pump Station	1	$154,000	$27,873
Meadowood Tanks, Water Tank	3	$390,000	$0
Monitoring Station	1	$5,653	$6,523
Mt. Washington Tank, Water Storage Tank - Coc Project	1	$5,313,840	$0
Oat Hill #1 Water Storage Tank, Water Storage Tank	1	$1,704,850	$0
Oat Hill #2 Water Storage Tank, Water Storage Tank	1	$568,284	$0
Pump Station - Building E, Pump Station	1	$237,799	$0
Pump Station - Green Island, Pump Station	1	$47,003	$0
Pump Station - La Vigne, Pump Station	1	$56,828	$216,844
Pump Station - Oat Hill, Pump Station	1	$49,960	$0
Pump Station - Sunset, Pump Station	1	$66,593	$0
Recycled Water Project, Recycled Water Project - Add Is City Main Address	1	$2,621,360	$0
Recycled Water Tank, Recyled Water Tank	1	$1,558,790	$0
Recyled Water Tank	1	$1,573,920	$0
Sewer Treatment Plant - Control Bldg -, Wastewater Treatment Plant	1	$6,336,710	$137,407
Spring Mountain Booster Station, Booster Pump Station	1	$30,000	$21,339
Spring Mountain Tank Ii, Property In The Open	1	$0	$0
Spring Mountain Tank Ii, Water Tank	1	$2,086,000	$2,756,700
Stone Bridge Well, Control Building	1	$492,000	$122,418
Stone Bridge Well, Property In The Open	1	$0	$0
Stone Bridge Well, Water Tank	1	$125,000	$0

Insured Asset	Number of Buildings	Building Replacement Value	Insured Content Value
Stone Bridge Well, Well I	1	$302,000	$0
Stone Bridge Well, Well Ii	1	$302,000	$0
Tower Road - Pump Station, Pump Station	1	$37,844	$465,887
Treatment Plant - Electrical Service, Treatment Plant	1	$11,658	$0
Various Locations - Water System Throughout Town, Water System	1	$0	$129,189
Wastewater Treatment Plant	1	$10,366	$204,660
Wastewater Treatment Plant, Algal Settling Pond	1	$7,691,000	$0
Wastewater Treatment Plant, High Rate Pond	1	$8,427,000	$0
Wastewater Treatment Plant, Maintenance Building	1	$178,000	$102,100
Wastewater Treatment Plant, Maturation Pond	1	$10,774,000	$0
Wastewater Treatment Plant, Office/Control Building	1	$923,000	$21,543
Wastewater Treatment Plant, Polishing/Storage Pond	1	$1,561,000	$0
Wastewater Treatment Plant, Primary Sedimentation Pond 1A	1	$9,605,000	$0
Wastewater Treatment Plant, Waste - Administration Building	1	$1,258,400	$342,878
Wastewater Treatment Plant, Waste - Bio Filter	1	$3,213,010	$3,938,430
Wastewater Treatment Plant, Waste - Chemical Feed Building	1	$423,810	$68,622
Wastewater Treatment Plant, Waste - Disinfection Station	1	$1,933,180	$312,775
Wastewater Treatment Plant, Waste - Headworks Building	1	$1,400,870	$355,561
Wastewater Treatment Plant, Waste - Process Piping	1	$1,249,350	$0
Wastewater Treatment Plant, Waste - Pump Station	3	$1,218,993	$802,145
Wastewater Treatment Plant, Waste - Aeration Basin	1	$1,430,150	$30,341
Water Storage Tank (2001 Plant Tank), Water Storage Tank	1	$2,617,210	$0
Water Treatment (1976 Conventional Plant), Water Treatment	1	$438,087	$745,421
Water Treatment And Corp Yard And Garage	1	$863,081	$924,224
Water Treatment Facility - 2004 Membrane Plant, Includes Chlorine Storage Area	1	$6,560,270	$0
Water Treatment Plant	1	$2,290,340	$0

Insured Asset	Number of Buildings	Building Replacement Value	Insured Content Value
Water Treatment Plant, Bell Canyon Valve House	1	$242,000	$133,241
Water Treatment Plant, Chemical Storage Tanks	1	$660,000	$0
Water Treatment Plant, Control Building	1	$923,000	$77,494
Water Treatment Plant, Filter Building	1	$510,000	$65,344
Water Treatment Plant, Flocculation/Sedimentation	1	$2,301,000	$0
Water Treatment Plant, High Services Pumps	1	$521,000	$0
Water Treatment Plant, Hypochlorite Storage Building	1	$76,000	$18,480
Water Treatment Plant, Meter And Valve Vault	1	$216,000	$0
Water Treatment Plant, Mobile Home	1	$94,000	$0
Water Treatment Plant, Portable Storage	1	$10,000	$11,435
Water Treatment Plant, Property In The Open	1	$0	$0
Water Treatment Plant, Reclaimed Water Basin	1	$13,000	$0
Water Treatment Plant, Sludge Lagoon I	1	$160,000	$0
Water Treatment Plant, Sludge Lagoon II	1	$160,000	$0
Water Treatment Plant, Water Tank	1	$1,356,000	$0
Grand Total	**389**	**$988,966,203**	**$68,355,850**

*Napa Valley College content values were derived from an occupancy multiplication table of *Building Replacement Value X 1.5* for HAZUS estimates on content loss.

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Appendix B. Process Documentation

NAPA COUNTY
OPERATIONAL AREA
HAZARD MITIGATION PLAN

NAPA COUNTY OFFICE OF EMERGENCY SERVICES
1195 THIRD STREET B-20
NAPA, CA 94559

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Appendix B

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Planning Committee Meeting Documentation.....B1

Public Notice & Press Release Documentation B2

Survey & Results Documentation..... B3

Mitigation Strategy Prioritization Process Documentation B4

Website Documentation B5

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Planning Committee Meeting Documentation

Appendix B.1

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Internal Kick-Off Meeting
Meeting Information & Documentation

This meeting package contains:

Agenda
Sign-Ins
Photos

More information for each meeting throughout the project planning process, including PowerPoint presentation slides, schedule, risk factor explanation, 406 Hazard Mitigation Opportunities (FEMA Brochure) can be found at the project webstie linked below on www.MitigateHazards.com.

MITIGATE HAZARDS
mitigatehazards.com

Napa HMP Project Meetings Page:
http://mitigatehazards.com/napa-county-mjhmp/meetings/

NAPA COUNTY OFFICE OF EMERGENCY SERVICES
NAPA COUNTY MULTI-JURISDICTIONAL HAZARD MITIGATION PLAN

Meeting Agenda

Napa County Multi-Jurisdictional Hazard Mitigation Plan (MJHMP)

Internal Kick-Off Meeting

Monday, October 1, 2018, 9:00 a.m. – 12:00 p.m.

- **Meeting Objectives**
  - SOW Review
  - Expectations from Participating Jurisdictions
    - Requirements (DMA2000 and CRS)
    - Attendance in Meetings
    - Document Reviews
  - Explain DMA vs. CRS Public Outreach Processes
    - Before Planning Process
    - During Planning Process
    - Document Reviews
    - Cont. Outreach for Max. CRS Points
  - Schedule
    - Anticipated Meeting Dates
    - Anticipated Public Outreach (I.e. Canvasing, notices, review times)
  - Data Calls / Data Review

NAPA COUNTY OFFICE OF EMERGENCY SERVICES
NAPA COUNTY MULTI-JURISDICTIONAL HAZARD MITIGATION PLAN

2019 Napa County Multi-Jurisdictional Hazard Mitigation Plan

Kickoff Meeting

Yountville Community Center, 6516 Washington Street
Yountville, CA

October 1, 2018
9:00 AM

NAME	AGENCY	EMAIL	PHONE
Steve Campbell	Calistoga Fire	SCampbell@ci.calistoga.ca.us	707 942-2840
Kris Brenner	Calistoga Fire	KBrenner@ci.calistoga.ca.us	
GLEN E. WEEKS	AMERICAN CANYON FD/CITY	glenw@amcanfire.com	707-310-9091
Maureen Teubert	Dynamic	maureen@dynamicplanning.co	
Kerry Whitney	Napa Co OES	kerry.whitney@countyofnapa.org	(707) 253-4821
Ken Thomas	NAPA CO OES	KEN.THOMAS@countyofnapa.org	707 299-1860
CHARLES RHODES	NAPA FIRE DEPARTMENT	CRHODES@CITYOFNAPA.ORG	(707) 732-3796
JOHN McDOWELL	NAPA COUNTY PLANNING	JOHN.McDOWELL@COUNTYOFNAPA.ORG	(707) 299-1354
STEVE STOGSDILL	YOUNTVILLE	STOGS@yville.com	707 944-8851
MARK PRESTWICH	ST. HELENA	MPRESTWICH@CITYOFSTHELENA.ORG	707-312-0252
Steve Hartwig	American Canyon	shartwig@cityofamericancanyon.org	707-647-4366

PAGE _____ OF _____

Kick-Off Sign In Sheet

HMP submitted 08.11.2020

Kick-Off Photo 1

Kick-Off Photo 2

Planning Committee Meeting #1
Meeting Information & Documentation

This meeting package contains:

Stakeholder Invite
Agenda
Sign-Ins
Photos

More information for each meeting throughout the project planning process, including PowerPoint presentation slides, schedule, risk factor explanation, 406 Hazard Mitigation Opportunities (FEMA Brochure) can be found at the project webstie linked below on www.MitigateHazards.com.

MITIGATE HAZARDS
mitigatehazards.com

Napa HMP Project Meetings Page:
http://mitigatehazards.com/napa-county-mjhmp/meetings/

From: Maureen Tuebert on behalf of Twohey, Kevin
To: Tammy Zamoyski; arossi@napacoe.org; awade@napavalley.edu; Llewellyn, Ashlee; Biermann, Barry; McWhirt, William; bcooper@cityofamericancanyon.org; Henricksen, Brian; crhodes@cityofnapa.org; Carlisle, Chris; Chartley@cityofsthelena.org; Morrison, David; dhight@yville.com; drayner@ci.calistoga.ca.us; DLRyan@SolanoCounty.com; dorothee@napavalleycoad.org; doug@napalandtrust.org; dfeik@ci.calistoga.ca.us; egomez@yville.com; emma.chow@ca.usda.gov; esmithies@cityofsthelena.org; esmith-hagberg@calistogaschools.org; frances@naparcd.org; Veyna, Garrett; Geoff.Belyea@fire.ca.go; glenw@amcanfire.com; InfoAirport; jlarochelle@cityofnapa.org; james.cooper@redcross.org; jtufts@hmesd.org; Sharp, Jeff; Tydingco, Jennifer; jtagliaboschi@yville.com; jcoates@cityofnapa.org; McDowell, John; info@ncrposd.org; jaroncoroni@ucanr.edu; Crawford, Jon; Jonathan.huff@calvet.ca.gov; Relucio, Karen; karnold@napavalley.edu; kburkhart@pvk8.org; Whitney, Kerry; kbreiner@ci.calistoga.ca.us; lena@napalandtrust.org; Fletcher, Lisa; Lois.Husted@stjoe.org; lucas@naparcd.org; spanishflatwd@gmail.com; MPrestwich@cityofsthelena.org; mwilson@sthelenaunified.org; mchristensen@napavalley.edu; matthew.rembold@ah.org; mkirn@ci.calistoga.ca.us; mike@napalandtrust.org; Johnson, Nancy; Housh, Noah; Ortiz, Oscar; Kowta, Pat; pdq9251@gmail.com; Miller, Phillip; pnixon@yville.com; Thomasser, Richard; rmucetti@nvusd.org; info@napafarmbureau.org; sholland@yville.com; sliston@yville.com; Swagner@napacoe.org; sbrassfield@cityofnapa.org; scampbell@ci.calistoga.ca.us; shartwig@cityofamericancanyon.org; publicworks; spotter@cityofnapa.org; srogers@yville.com; Terence@napavalleycf.org; InfoNapaSan; tavreeland@gmail.com; Trent.Schager@dsh.ca.gov; ztusinger@ci.calistoga.ca.u; info@fonr.org; info@mivinsurance.com; info@napaagpreserve.org; info@napagrowers.org; info@napahistory.org; info@sanderjacobs.com; info@sustainablenapacounty.org; k.bjorkman@congressvalleyed.org; LakeSheriffOES@lakecountyca.gov; Library Mailbox; reception3@napavintners.com; Lamborn, Matt; Maureen Tuebert
Subject: FW: 2019 Napa County MJHMP Update Project Coordination Meeting #1
Start: Thursday, November 15, 2018 3:00:00 PM
End: Thursday, November 15, 2018 6:00:00 PM
Location: Yountville Community Center 6516 Washington Street Younville

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Here is the PC#1 Meeting Invite with the list of folks that it was originally sent out to. We also sent out a MailChimp Invite and Meeting Reminder.

-----Original Appointment-----
From: Twohey, Kevin <Kevin.Twohey@countyofnapa.org <mailto:Kevin.Twohey@countyofnapa.org> >
Sent: Wednesday, October 31, 2018 10:01 AM
To: Twohey, Kevin; arossi@napacoe.org <mailto:arossi@napacoe.org> ; awade@napavalley.edu <mailto:awade@napavalley.edu> ; Llewellyn, Ashlee; Biermann, Barry; McWhirt, William; bcooper@cityofamericancanyon.org <mailto:bcooper@cityofamericancanyon.org> ; Henricksen, Brian; crhodes@cityofnapa.org <mailto:crhodes@cityofnapa.org> ; Carlisle, Chris; Chartley@cityofsthelena.org <mailto:Chartley@cityofsthelena.org> ; Morrison, David; dhight@yville.com <mailto:dhight@yville.com> ; drayner@ci.calistoga.ca.us <mailto:drayner@ci.calistoga.ca.us> ; DLRyan@SolanoCounty.com <mailto:DLRyan@SolanoCounty.com> ; dorothee@napavalleycoad.org <mailto:dorothee@napavalleycoad.org> ; doug@napalandtrust.org <mailto:doug@napalandtrust.org> ; dfeik@ci.calistoga.ca.us <mailto:dfeik@ci.calistoga.ca.us> ; egomez@yville.com <mailto:egomez@yville.com> ; emma.chow@ca.usda.gov <mailto:emma.chow@ca.usda.gov> ; esmithies@cityofsthelena.org <mailto:esmithies@cityofsthelena.org> ; esmith-hagberg@calistogaschools.org <mailto:esmith-hagberg@calistogaschools.org> ; frances@naparcd.org <mailto:frances@naparcd.org> ; Veyna, Garrett; Geoff.Belyea@fire.ca.go <mailto:Geoff.Belyea@fire.ca.go> ; glenw@amcanfire.com <mailto:glenw@amcanfire.com> ; InfoAirport; jlarochelle@cityofnapa.org <mailto:jlarochelle@cityofnapa.org> ; james.cooper@redcross.org <mailto:james.cooper@redcross.org> ; jtufts@hmesd.org <mailto:jtufts@hmesd.org> ; Sharp, Jeff; Tydingco, Jennifer; jtagliaboschi@yville.com <mailto:jtagliaboschi@yville.com> ; jcoates@cityofnapa.org <mailto:jcoates@cityofnapa.org> ; McDowell, John; info@ncrposd.org <mailto:info@ncrposd.org> ; jaroncoroni@ucanr.edu <mailto:jaroncoroni@ucanr.edu> ; Crawford, Jon; Jonathan.huff@calvet.ca.gov <mailto:Jonathan.huff@calvet.ca.gov> ; Relucio, Karen; karnold@napavalley.edu <mailto:karnold@napavalley.edu> ; kburkhart@pvk8.org <mailto:kburkhart@pvk8.org> ; Whitney, Kerry; kbreiner@ci.calistoga.ca.us <mailto:kbreiner@ci.calistoga.ca.us> ; lena@napalandtrust.org <mailto:lena@napalandtrust.org> ; Fletcher, Lisa; Lois.Husted@stjoe.org <mailto:Lois.Husted@stjoe.org> ; lucas@naparcd.org <mailto:lucas@naparcd.org> ; spanishflatwd@gmail.com <mailto:spanishflatwd@gmail.com> ; MPrestwich@cityofsthelena.org <mailto:MPrestwich@cityofsthelena.org> ; mwilson@sthelenaunified.org <mailto:mwilson@sthelenaunified.org> ; mchristensen@napavalley.edu <mailto:mchristensen@napavalley.edu> ; matthew.rembold@ah.org <mailto:matthew.rembold@ah.org> ; mkirn@ci.calistoga.ca.us <mailto:mkirn@ci.calistoga.ca.us> ; mike@napalandtrust.org <mailto:mike@napalandtrust.org> ; Johnson, Nancy; Housh, Noah; Ortiz, Oscar; Kowta, Pat; pdq9251@gmail.com <mailto:pdq9251@gmail.com> ; Miller, Phillip; pnixon@yville.com <mailto:pnixon@yville.com> ; Thomasser, Richard; rmucetti@nvusd.org <mailto:rmucetti@nvusd.org> ; info@napafarmbureau.org <mailto:info@napafarmbureau.org> ; sholland@yville.com <mailto:sholland@yville.com> ; sliston@yville.com <mailto:sliston@yville.com> ; Swagner@napacoe.org <mailto:Swagner@napacoe.org> ; sbrassfield@cityofnapa.org <mailto:sbrassfield@cityofnapa.org> ; scampbell@ci.calistoga.ca.us <mailto:scampbell@ci.calistoga.ca.us> ; shartwig@cityofamericancanyon.org <mailto:shartwig@cityofamericancanyon.org> ; publicworks; spotter@cityofnapa.org <mailto:spotter@cityofnapa.org> ; srogers@yville.com <mailto:srogers@yville.com> ; Terence@napavalleycf.org <mailto:Terence@napavalleycf.org> ; InfoNapaSan; tavreeland@gmail.com <mailto:tavreeland@gmail.com> ; Trent.Schager@dsh.ca.gov <mailto:Trent.Schager@dsh.ca.gov> ; ztusinger@ci.calistoga.ca.u <mailto:ztusinger@ci.calistoga.ca.u> ; info@fonr.org <mailto:info@fonr.org> ; info@mivinsurance.com <mailto:info@mivinsurance.com> ; info@napaagpreserve.org <mailto:info@napaagpreserve.org> ; info@napagrowers.org <mailto:info@napagrowers.org> ; info@napahistory.org <mailto:info@napahistory.org> ; info@sanderjacobs.com <mailto:info@sanderjacobs.com> ; info@sustainablenapacounty.org <mailto:info@sustainablenapacounty.org> ; k.bjorkman@congressvalleyed.org <mailto:k.bjorkman@congressvalleyed.org> ; LakeSheriffOES@lakecountyca.gov <mailto:LakeSheriffOES@lakecountyca.gov> ; Library Mailbox; reception3@napavintners.com <mailto:reception3@napavintners.com> ; Lamborn, Matt; Maureen Tuebert
Subject: 2019 Napa County MJHMP Update Project Coordination Meeting #1
When: Thursday, November 15, 2018 2:00 PM-5:00 PM (UTC-08:00) Pacific Time (US & Canada).
Where: Yountville Community Center 6516 Washington Street Younville

You are requested to participate!

Napa County has begun the process to prepare the 2019 update to the Multi-Jurisdictional Hazard Mitigation Plan (MJHMP) and we invite you to

Stakeholder Invitation 1

participate. The MJHMP will serve as a blueprint for reducing property damage and saving lives from the effects of future natural disasters in Napa County. The kick-off meeting will be on Thursday, November 15th, 2018 at 2:00 p.m. at the Yountville Community Center Located at 6516 Washington St, Yountville, CA 94599.

Please respond to this e-mail and advise if you will be participating in this process, and who will be assigned to represent your agency. If you are unable to attend this meeting but still wish to participate in the planning process, additional information regarding future meetings, draft documents for review, and other project milestones will be provided through the website above.

Please keep an eye out for project updates and meetings reminders from me and our planning consultant Dynamic Planning + Science in the weeks to come!

If you have any additional questions, please do not hesitate to contact me at 707-299-1892 or Kevin.Twohey@counyofnapa.org <mailto:Kevin.Twohey@counyofnapa.org> .

Thank you for your time and consideration,

Kevin Twohey

OES Coordinator

Napa County Office of Emergency Services

Stakeholder Invitation 2

NAPA COUNTY OFFICE OF EMERGENCY SERVICES
NAPA COUNTY MULTI-JURISDICTIONAL HAZARD MITIGATION PLAN

Meeting Agenda:

Napa County Hazard Mitigation Plan 2019 Update

Planning Committee Meeting #1

Thursday, November 15th, 2018, 2:00 p.m. – 5:00 p.m.

Meeting Objectives

- Welcome and Introductions
- Background
- Mitigation Planning Defined
- Planning Process Review
- Project Schedule
- Website Review
- FEMA Hazard Mitigation Program
- 2013 Mitigation Plan Review
- Risk Assessment / Community Vulnerability Review
- Risk Factor Exercise
- Mitigation Strategy Exercise
- Next Steps

Project Website: mitigatehazards.com

Project Webpage: napa.mitigatehazards.com

Website Password: Napa2019

Polling Website for Smartphone: www.pollev.com/dynamicplanning

NAPA COUNTY OFFICE OF EMERGENCY SERVICES
NAPA COUNTY MULTI-JURISDICTIONAL HAZARD MITIGATION PLAN

2019 Napa County Multi-Jurisdictional Hazard Mitigation Plan

Project Coordination Meeting #1

Yountville Community Center, 6516 Washington Street
Yountville, CA

Nov. 15, 2018
2:00 PM

NAME	AGENCY	EMAIL	PHONE
AMBER WADE	NAPA VALLEY COLLEGE PD	awade@napavalley.edu	707-333-8291
ZACH TUSINGER	CITY OF CALISTOGA PLANNING	ztusinger@ci.calistoga.ca.us	707-942-2830
JOE PEREZ	SHUSD	JPEREZ@STHELENAUNIFIED.ORG	707 227-2145
BILL MCWHA	Napa Sanitation District	WMcwhat@napasan.com	707-344-7584
ASHLEE LLEWELLYN	Napa County ITS	Ashlee.llewellyn@countyofnapa.com	209 996 3270
Phil Miller	Napa County	Phillip.miller@countyofnapa.org	707-259-8620
Stephanie Proft	City of Napa	sproft@cityofnapa.org	707-258-7840
JUAN ZUNIGA	CITY OF NAPA	jzuniga@cityofnapa.org	707-257-9520
Jesse Ramer	Napa Valley Vintners	jramer@napavintners.org	707 968 4213
Lois Hustedt	QUMC	Lois.Hustedt@stjoe.org	707-252-4411 X2341
GLEN E WEEKS	American Canyon	glenw@amcanfire.com	707-551-0650

PC Meeting1 Sign In 1

HMP submitted 08.11.2020

NAPA COUNTY OFFICE OF EMERGENCY SERVICES
NAPA COUNTY MULTI-JURISDICTIONAL HAZARD MITIGATION PLAN

2019 Napa County Multi-Jurisdictional Hazard Mitigation Plan

Project Coordination Meeting #1

Yountville Community Center, 6516 Washington Street
Yountville, CA

Nov. 15, 2018
2:00 PM

NAME	AGENCY	EMAIL	PHONE
Kevin Twomey	Napa OES	Kevin.Twomey@countyofnapa.org	299-1692
Matthew Russell	Pacific Union College	mrussell@puc.edu	971-404-4907
Charles Rhodes	Napa Fire	CRhodes@cityofnapa.org	707 732 3796
Ken Burkhart	Pope Valley UESD	kburkhart@pvk8.org	7073390586
Brian Henricksen	Napa County EMS Agency	brian.henricksen@countyofnapa.org	707-259-8155
Shaun Vincent	Napa county EMS Agency	michael.vincent@countyofnapa.org	(707) 299-2155
Matt Christensen	Napa Valley College	mchristensen@napavalley.edu	707-256-7580
Matthew Rembol	St Helena Hospital	Rembol Md@sh.org	707 320 3544
Chris Ochs	Calistoga Joint Unified	cochs@calistogaschools.org	707-291-7205
Lisa Fletcher	Napa Co Public Health	Lisa.Fletcher@countyofnapa.org	707-253-4199
JOHN McDOWELL	PLANNING NAPA Co.	JOHN.MCDOWELL@COUNTYOFNAPA.ORG	(707) 299-1354 ~~253-4417~~

PC Meeting1 Sign In 2

HMP submitted 08.11.2020

NAPA COUNTY OFFICE OF EMERGENCY SERVICES
NAPA COUNTY MULTI-JURISDICTIONAL HAZARD MITIGATION PLAN

2019 Napa County Multi-Jurisdictional Hazard Mitigation Plan

Project Coordination Meeting #1

Yountville Community Center, 6516 Washington Street
Yountville, CA

Nov. 15, 2018
2:00 PM

NAME	AGENCY	EMAIL	PHONE
KEN ARNOLD	NAPA VALLEY COLLEGE	KARNOLD@NAPAVALLEY.EDU	256-7770
Jeff Tucker	Napa Sanitation District	jtucker@napasan.com	707-258-6012
Trent Schager	Napa State Hospital FD	trent.schager@dsh.ca.gov	707-253-5316
Kelly Gin	USDA-NRCS	Kelly.Gin@ca.usda.gov	707-252-4189 ext 3114
GEOFF BELYEA	NAPA COUNTY FIRE	GEOFF.BELYEA@FIRE.CA.GOV	707 227 9200
Samantha Holland	Town of Yountville	sholland@yville.com	707-948-2627
Steve Campbell	Calistoga	SCampbell@ci.calistoga.ca.us	942-2840
Debby Fought	Town of YV	dfought@yville.com	7079448851
Karen Reluccio	Napa County HHSA	karen.reluccio@countyofnapa.org	7072534564
Steve Brassfield	City of Napa	sbrassfield@cityofnapa.org	707-257-9593
Anthony Hakkarinen	County of Napa Library	anthony.hakkarinen@countyofnapa.org	2534061

PC Meeting1 Sign In 3

HMP submitted 08.11.2020

NAPA COUNTY OFFICE OF EMERGENCY SERVICES
NAPA COUNTY MULTI-JURISDICTIONAL HAZARD MITIGATION PLAN

2019 Napa County Multi-Jurisdictional Hazard Mitigation Plan

Project Coordination Meeting #1

Yountville Community Center, 6516 Washington Street
Yountville, CA

Nov. 15, 2018
2:00 PM

NAME	AGENCY	EMAIL	PHONE
Joe Tagliaboschi	Town of Yountville	JTagliaboschi@yville.com	339.2956
Oscar Ortiz	American Canyon	OSCAR.ORTIZ@COUNTYOFNAPA.ORG	707 227 2108
Matt Cameron	Co. PBES	matt.cameron@countyofnapa.org	765 ~~2326~~ 2326
Erica Smithies	City of St. Helena	esmithies@cityofsthelena.org	968-2659 / 312-1471
Dylan Feik	City of Calistoga	dfeik@ci.calistoga.ca.us	707 942 2806
Brent Cooper	City of A/C	bcooper@cityofamericancanyon.org	647-4335
Andrew Butler	NCFCWCD	andrew.butler@countyofnapa.org	707-259-8671
Steve Hartwig	City of American Canyon	shartwig@cityofamericancanyon.org	707-647-4366

PC Meeting1 Sign In 4

NAPA COUNTY OFFICE OF EMERGENCY SERVICES
NAPA COUNTY MULTI-JURISDICTIONAL HAZARD MITIGATION PLAN

2019 Napa County Multi-Jurisdictional Hazard Mitigation Plan

Project Coordination Meeting #1

Yountville Community Center, 6516 Washington Street
Yountville, CA

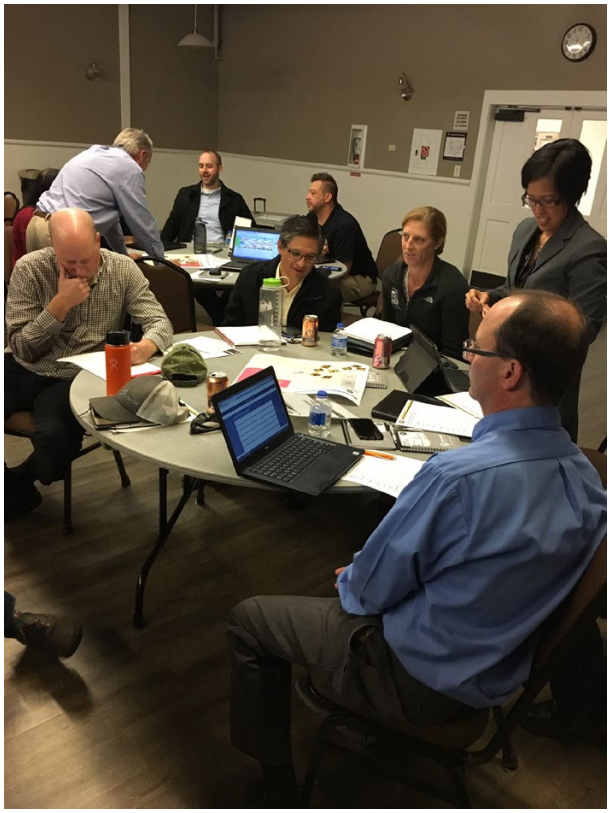
Nov. 15, 2018
2:00 PM

NAME	AGENCY	EMAIL	PHONE
Eddy Gomez	Town of Yountville	egomez@yville.com	512-913-1627
DUSTIN LENO	NAPA CO. AIRPORT	dustin.leno@countyofnapa.org	707-299-1694

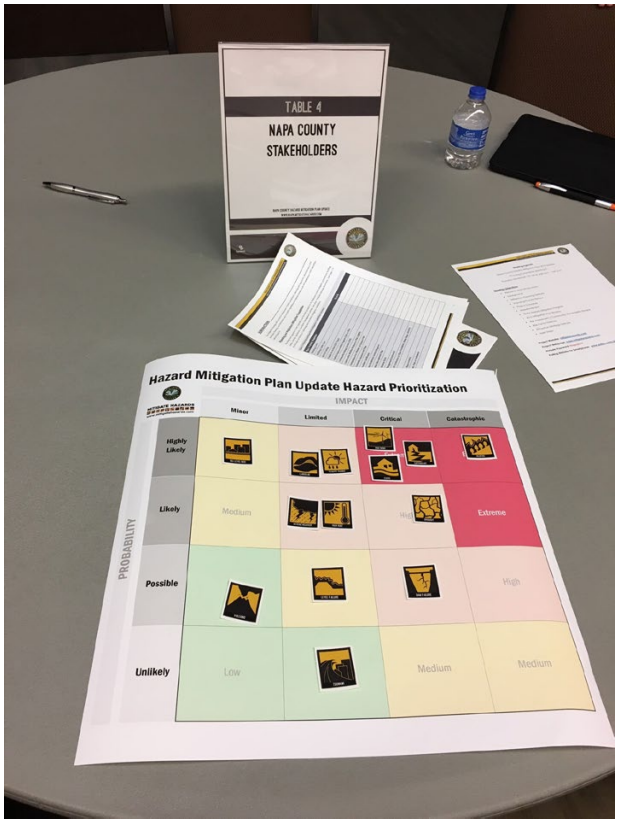
PC Meeting1 Sign In 5

HMP submitted 08.11.2020

PC Meeting 1 Photo 1



PC Meeting 1 Photo 2



PC Meeting 1 Photo 3

Planning Committee Meeting #2
Meeting Information & Documentation

This meeting package contains:

Agenda
Sign-Ins
Photos

More information for each meeting throughout the project planning process, including PowerPoint presentation slides, schedule, risk factor explanation, 406 Hazard Mitigation Opportunities (FEMA Brochure) can be found at the project webstie linked below on www.MitigateHazards.com.

MITIGATE HAZARDS
mitigatehazards.com

Napa HMP Project Meetings Page:
http://mitigatehazards.com/napa-county-mjhmp/meetings/

NAPA COUNTY OFFICE OF EMERGENCY SERVICES
NAPA COUNTY MULTI-JURISDICTIONAL HAZARD MITIGATION PLAN

Meeting Agenda:

Napa County Hazard Mitigation Plan 2019 Update

Planning Committee Meeting #2

Thursday, January 31st, 2019, 11:00 a.m. – 2:00 p.m.

Meeting Objectives

- **Welcome and Introductions [5 min]**
- **Meeting #1 Recap [15 min]**
  - Hazard Priority Outcomes
- **Problem Statement Exercise [1hr 55 min]**
  - Problem Statement Review [10 mins]
  - Mitigation Alternatives Explanation [10 mins]
  - Lunch Service [10 mins]
  - PS Exercise [65 mins]
  - Jurisdictional Reports [20 mins]
- **Mitigation Plan Goals Exercise [30 min]**
- **Jurisdictional Homework Assignments [10 mins]**
  - Goals and Objectives Exercise
  - Prepare for Mitigation Reporting
  - Safe Growth Audit
- **Close-Out [5 min]**

Project Website: mitigatehazards.com

Project Webpage: napa.mitigatehazards.com

Website Password: Napa2019

NAPA COUNTY OFFICE OF EMERGENCY SERVICES
NAPA COUNTY MULTI-JURISDICTIONAL HAZARD MITIGATION PLAN

2019 Napa County Multi-Jurisdictional Hazard Mitigation Plan

Project Coordination Meeting #2

Yountville Community Center, 6516 Washington Street
Yountville, CA

Jan. 31st, 2019
11:00am-2:00pm

NAME	AGENCY	EMAIL	PHONE
Eddy Gomez	Town of Yountville	egomez@yville.com	707-944-5155
Andy Eaman	Napa County PBES	andrew.eamanrau county of napa.org	707 265 2345
Dorothee Stangle	Napa Valley COAD	dorothee@napavalleycoad.org	707-690 0726
Kelli Jurgenson	NVUSD	Kelli@vpsonline.com	707-695-1603
Joe Perez	SHUSD	JPerez@STHELENAUNIFIED.org	707 227-2145
DON RYAN	SOLANO OES	dlryan@solanocounty.com	707 784-1616
Chris Ochs	Calistoga JUSD	cochs@calistogaschools.org	707-291-7205
Lisa Fletcher	Public Health	lisa.fletcher@countyofnapa.org	253-4199
Brent Cooper	City of A.C.	bcooper@cityofamericancanyon.org	647-4335
S. Holland	Town of Yountville	sholland@yville.com	948-2627
JAY GARDNER	NRRD	jay@pjcamas.com	974-3803

PC Meeting2 Sign-In Sheets 1

HMP submitted 08.11.2020

NAPA COUNTY OFFICE OF EMERGENCY SERVICES
NAPA COUNTY MULTI-JURISDICTIONAL HAZARD MITIGATION PLAN

2019 Napa County Multi-Jurisdictional Hazard Mitigation Plan

Project Coordination Meeting #2

Yountville Community Center, 6516 Washington Street
Yountville, CA

Jan. 31st, 2019
11:00am-2:00pm

NAME	AGENCY	EMAIL	PHONE
Bill McWhirter	NapaSan	WMcWhirter@napasan.com	707-258-6000
MATT LAMBSON	NAPA CO.	matt.lamson@countyofnapa.org	707 256 2326
DUSTIN LENO	NAPA CO.	dustin.leno@Countyofnapa.org	707-299-1694
Kelly Gin	USDA - NRCS	Kelly.gin@ca.usda.gov	707-2524189
CHIP BOURIL	4	CHIP.BOURIL@CA.USDA.GOV	707-690-3112
Danis Kreimeier	Napa Co	danis.kreimeier@countyofnapa.org	707 253 4208
NANCY JOHNSON	NAPA CO	nancy.johnson@countyofnapa.org	299-1352
GEOFF BELYEA	NAPA CO FD	GEOFF.BELYEA@FIRE.CA.GOV	707 227 9200
STEVE Hartwig	City of American Canyon	shartwig@cityofamericancanyon.org	707-647-4366
Matthew Rendal	St Helena Hospital	Rendalm@sthosp.org	707 963 6492
Karen Reluar	Napa Co	karen.reluar@countyofnapa.org	707 253 4526

PC Meeting2 Sign-In Sheets 2

HMP submitted 08.11.2020

NAPA COUNTY OFFICE OF EMERGENCY SERVICES
NAPA COUNTY MULTI-JURISDICTIONAL HAZARD MITIGATION PLAN

2019 Napa County Multi-Jurisdictional Hazard Mitigation Plan

Project Coordination Meeting #2

Yountville Community Center, 6516 Washington Street
Yountville, CA

Jan. 31st, 2019
11:00am-2:00pm

NAME	AGENCY	EMAIL	PHONE
Trent Schager	OSH Napa State Fire	trent.schager@dshica.gov	707-253-5816
AMBER WADE	NAPA VALLEY College	awade@napavalley.edu	707-256-7771
Matt Christensen	NVC	mchristensen@napavalley.edu	707-256-7580
Tim Eggers	Napa County Assessor	timothy.eggers@countyofnapa.org	707-253-4456
Joe Tagliaboschi	Town of Yountville	JTagliaboschi@yville.com	9440057
STEVE ROGERS	TOWN OF YOUNTVILLE	srogers@yville.com	944-8851
Lois Husted	QVMC	lois.husted@stjoe.org	707-252-4411 ext 2341
Phil Miller	Napa County	Philip.miller@countyofnapa.org	707-259-8626
Jon Crawford	NAPA SHERIFF	JON.CRAWFORD@COUNTYOFNAPA.ORG	707-253-4205
JEFF JORNER	PACIFIC UNION COLLEGE-EMERGENCY SERVICES	JJORNER@PUC.EDU	707.339.3302
Frances Knapczyk	Napa County Resource Conservation District	frances@naparcd.org	707-690-3124

PC Meeting2 Sign-In Sheets 3

HMP submitted 08.11.2020

NAPA COUNTY OFFICE OF EMERGENCY SERVICES
NAPA COUNTY MULTI-JURISDICTIONAL HAZARD MITIGATION PLAN

2019 Napa County Multi-Jurisdictional Hazard Mitigation Plan

Project Coordination Meeting #2

Yountville Community Center, 6516 Washington Street
Yountville, CA

Jan. 31st, 2019
11:00am-2:00pm

NAME	AGENCY	EMAIL	PHONE
Shaun Vincent	Napa County EMS	michael.vincent@county of napa.org	
Allen Rossi	Napa County Office of Ed.	arossi@napacoe.org	707-333-5450
Kevin Wait	County OES		707 299-1892
Kerry Whitney	County OES		(707) 253-4821
Glen Weeks	American Canyon	glenw@americanfire.com	707 551-0650
Chris Hartley	Saint Helena	Chartley@cityofsthelena.org	707 967-2850
Ashlee Clemens	County of Napa	—	—
Zach Tusinger	Calistoga	—	—
Dylan Feik	Calistoga		
CHARLIE RHODES	NAPA	CRHODES@CITYOFNAPA.ORG	707 732 3796
Ed Halsell	Napa State Hospital	edward.halsell@dsh.ca.gov	

PC Meeting2 Sign-In Sheets 4

HMP submitted 08.11.2020

NAPA COUNTY OFFICE OF EMERGENCY SERVICES
NAPA COUNTY MULTI-JURISDICTIONAL HAZARD MITIGATION PLAN

2019 Napa County Multi-Jurisdictional Hazard Mitigation Plan

Project Coordination Meeting #2

Yountville Community Center, 6516 Washington Street
Yountville, CA

Jan. 31st, 2019
11:00am-2:00pm

NAME	AGENCY	EMAIL	PHONE
Anthony Halstead	County - Library	anthony.halstead@countyofnapa	707253 4061
DEBBY Hight	Town of Yountville	dhight@yville.com	944-8851

PC Meeting2 Sign-In Sheets 5

HMP submitted 08.11.2020

NAPA COUNTY OFFICE OF EMERGENCY SERVICES
NAPA COUNTY MULTI-JURISDICTIONAL HAZARD MITIGATION PLAN

2019 Napa County Multi-Jurisdictional Hazard Mitigation Plan

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Yountville Community Center, 6516 Washington Street
Yountville, CA

Jan. 31st, 2019
11:00am-2:00pm

NAME	AGENCY	EMAIL	PHONE
Andrew Butler	NCFCWCD	andrew.butler@countyofnapa.org	707-259-8671
Chris Carlisle	NAPA SO	chris.carlisle@countyofnapa.org	

PC Meeting2 Sign-In Sheets 6

PC Meeting2 1

PC Meeting2 2

PC Meeting2 3

Planning Committee Meeting #3
Meeting Information & Documentation

This meeting package contains:

Agenda
Sign-Ins
Photos

More information for each meeting throughout the project planning process, including PowerPoint presentation slides, schedule, risk factor explanation, 406 Hazard Mitigation Opportunities (FEMA Brochure) can be found at the project webstie linked below on www.MitigateHazards.com.

MITIGATE HAZARDS
mitigatehazards.com

Napa HMP Project Meetings Page:
http://mitigatehazards.com/napa-county-mjhmp/meetings/

NAPA COUNTY OFFICE OF EMERGENCY SERVICES
NAPA COUNTY MULTI-JURISDICTIONAL HAZARD MITIGATION PLAN

Meeting Agenda:

Napa County Hazard Mitigation Plan 2019 Update

Planning Committee Meeting #3

Thursday, April 11th, 2019, 12:00 p.m. – 2:30 p.m.

Meeting Objectives

- **Welcome and Introductions [5 min]**
- **Meeting #1, #2 Recap [10 min]**
  - Program / Document Intent
  - Mitigation Action Grant Program
- **Outreach Material [10 min]**
  - Surveys
  - Web Content
- **BREAK [10 min]**
- **DRAFT Mitigation Strategy Review [1hr 50 min]**
  - Mitigation Action Planning
  - Mitigation Priority
  - Mitigation Implementation
- **Close-Out [5 min]**

Project Website: mitigatehazards.com

Project Webpage: napa.mitigatehazards.com

Website Password: Napa2019

NAPA COUNTY OFFICE OF EMERGENCY SERVICES
NAPA COUNTY MULTI-JURISDICTIONAL HAZARD MITIGATION PLAN

2019 Napa County Multi-Jurisdictional Hazard Mitigation Plan

Project Coordination Meeting #3

Yountville Community Center, 6516 Washington Street
Yountville, CA

April 11th, 2019
12:00pm-2:30pm

NAME	AGENCY	EMAIL	PHONE
Bill McWhirt	Napa Sanitation	wmcwhirt@napasan.com	707 258-6010
Ashlee Lewerenz	Napa County ITS	—	—
Allen Rossi	Napa County Office of Ed	arossi@napacoe.org	—
Jason Martin	napa county Fire	Jason.martin@fire.ca.gov	707 299-7682
Jennifer Gibbs	NVUSD	jgibb@NVUSD.org	707.337.3219 " 253.6281
Lucas Patzek	Napa RCD	lucas@naparcd.org	707-690-3119
Shannon [illegible]	Napa Co OES	michael.vinay@county of napa.ovs	707 299-2155
GLEN E WEEKS	AMERICAN CANYON	glenn@amcanfire.com	707-310-9091 cell 707-551-0650
Kevin Twomey	Napa OES		
Doris Krueger	Napa Co		
Andrew Butler	NCFCWCD	Abutler@countyofna.org	707-259-8671

PC Meeting3 Sign-In Sheet 1

HMP submitted 08.11.2020

NAPA COUNTY OFFICE OF EMERGENCY SERVICES
NAPA COUNTY MULTI-JURISDICTIONAL HAZARD MITIGATION PLAN

2019 Napa County Multi-Jurisdictional Hazard Mitigation Plan

Project Coordination Meeting #3

Yountville Community Center, 6516 Washington Street
Yountville, CA

April 11th, 2019
12:00pm-2:30pm

NAME	AGENCY	EMAIL	PHONE
CHARLES RHOADES	NAPA FIRE	CRHOADES@CITYOFNAPA.ORG	
Karl Fernandez	Howell Mtn. Mutual Water Co.	hmmwco1@napanet.net	
AMBER WADE	NAPA VALLEY COLLEGE	awade@napavalley.edu	
JOE PEREZ	SHUSD	JPEREZ@STHELENAUNIFIED.ORG	227-2145
JOHN McDOWELL	NAPA COUNTY PBES	JOHN.McDOWELL@COUNTYOFNAPA	(707)299-1354
Phil Miller	Napa County		
Lisa Fletcher	HHSA-PH	on file	on file
Steve Hartwig	City of American Canyon	"	"

PC Meeting3 Sign-In Sheet 2

HMP submitted 08.11.2020

NAPA COUNTY OFFICE OF EMERGENCY SERVICES
NAPA COUNTY MULTI-JURISDICTIONAL HAZARD MITIGATION PLAN

2019 Napa County Multi-Jurisdictional Hazard Mitigation Plan

Project Coordination Meeting #3

Yountville Community Center, 6516 Washington Street
Yountville, CA

April 11th, 2019
12:00pm-2:30pm

NAME	AGENCY	EMAIL	PHONE
Matt Rembold	St. Helena Hospital	Rembold@sh.org	707 963 6492
Shannon Damonte	Howell MTN Mutual water Company	hmmwco@napnet.net	707-965-2205
Christopher Thompson	NCFF	christophermarkt@gmail.com	206 730 9188
Lois Husted	QVMC	lois.husted@stjoe.org	707-252-4461 x2341
Kelly Gin	USDA-NRCS	Kelly.gin@ca.usda.gov	707 252-4189 x 3114
Karen Relucio	Public Health	karen.relucio@countyofnapa.org	7072534526
Eric Smithies	City of St. Helena	esmithies@cityofsthelena.org	707-968-2625

PC Meeting3 Sign-In Sheet 3

HMP submitted 08.11.2020

PC Meeting3 1

PC Meeting3 2

PC Meeting3 3

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Public Notice & Press Release Documentation

Appendix B.2

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Napa County's Hazard Mitigation Plan 2019 Update

Napa County staff and key stakeholders have been working over the last year to develop an update to the hazard mitigation plan that was created in 2013. The goal of the planning effort is to revisit natural hazard information and update to account for changes in population and occurrences of natural disaster in the planning area. This is effort is two-fold; first, it assists in reduction of repetitive damages to community infrastructure, and secondly, the county will maintain eligibility for grants under Federal Emergency Management Agency's (FEMA) Hazard Mitigation Assistance program.

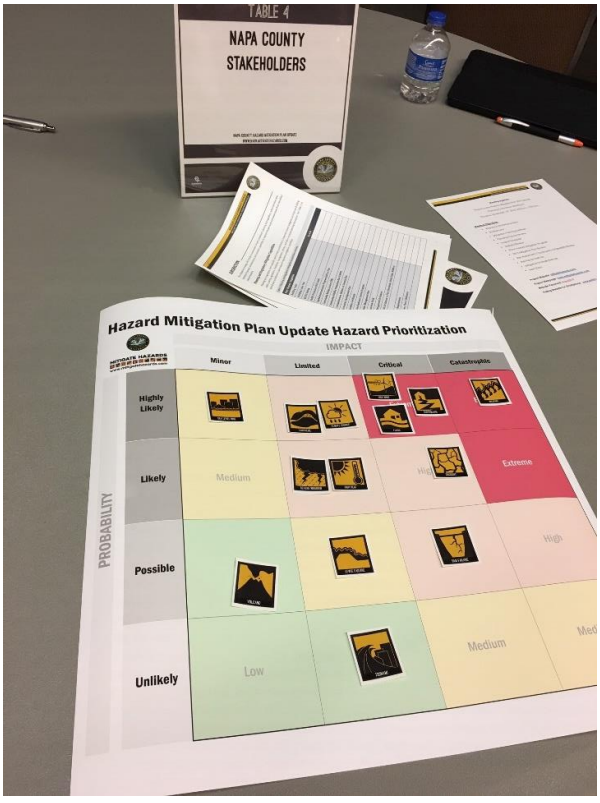
SIDEBAR with Stakeholders: Napa County, Napa County Emergency Management, Delta Napa County Office of Education, City of American Canyon, Town of Yountville, American Canyon Fire Protection District, City of Calistoga, City of Napa, City of St. Helena, Napa Valley College, Napa County Flood Control and Water Resources District, Napa Valley Community Organizations Active in Disaster (COAD), Napa County Public Health, Napa Sanitation, Napa State Hospital Fire Department, Pacific Union College, Napa County Sheriff's Department, Napa County Resource Conservation District, and NRCS.

Napa County MJHMP Press Article 1

The county's hazard mitigation plan provides a formal explanation of prevalent hazards within the county and how hazards may affect communities differently. Most importantly, the mitigation strategy presented in the plan responds to the known vulnerabilities within each community and provides prescriptions or actions to achieve the greatest reduction of natural hazard risk. The end result of this planning effort could result in saved lives, reduced injuries, reduced property damage, and protection for the environment in the event of a natural hazard within the county.

"This will plan will assist the county to receive grant funding for fuel reduction projects or flood control infrastructure and other mitigation measures to reduce damages from natural hazards," said Ethan Mobley, Owner of Dynamic Planning + Science, the consultant hired by Napa County.

Starting in October of 2018, county staff hired consultant Dynamic Planning + Science to initiate the planning effort by mapping hazards across the region and worked to identify people, critical facilities, and property values within each hazard area. This step was the first in a series of tasks to understand the vulnerabilities within the county and update the planning efforts conducted in 2013.



The planning effort includes analysis of natural hazards within unincorporated county areas and the incorporated areas of American Canyon, Calistoga, St. Helena, and Yountville. In addition, the planning effort is assisting the Napa County Flood Control and Water Resources District, Napa County Office of Education, and Napa Valley College to understand vulnerabilities for the communities they service.

Based on the outcomes of the new vulnerability assessment, the county has revisited mitigation strategies and created new mitigation actions to reduce community vulnerabilities. Mitigation actions range from increased public education and awareness efforts to actual structural projects to reduce impacts of hazards. Structural projects could range from flood control infrastructure and bridge replacements to utility upgrades intended to lessen the impacts of natural hazard events.

The County is asking the public to review newly developed plan based upon stakeholder inputs received through a survey. The survey will be used to establish public perceptions on local hazards and mitigation strategies for plan development. Anyone who completes the survey by **April 20th** will be entered into a drawing for a chance to win a variety of donated prizes. The results of this short survey will help the County and participating jurisdictions

prioritize mitigation actions during the next five years and assist County and City officials to establish incentives for mitigation of hazards near your home.

To review the draft plan or take the survey please visit http://mitigatehazards.com/napa-county-mjhmp/

Survey responders will be entered to win a grand prize of a $150 Stihl power tool voucher redeemable at local STIHL Dealers. Power tools are a great way to reduce vegetation around homes for wildfire mitigation and reduce the unwieldy branches that cause damage to property or utility outages during severe storms.

Survey Graphic

Survey Info Napa County Website

Survey & Results Documentation

Appendix B.3

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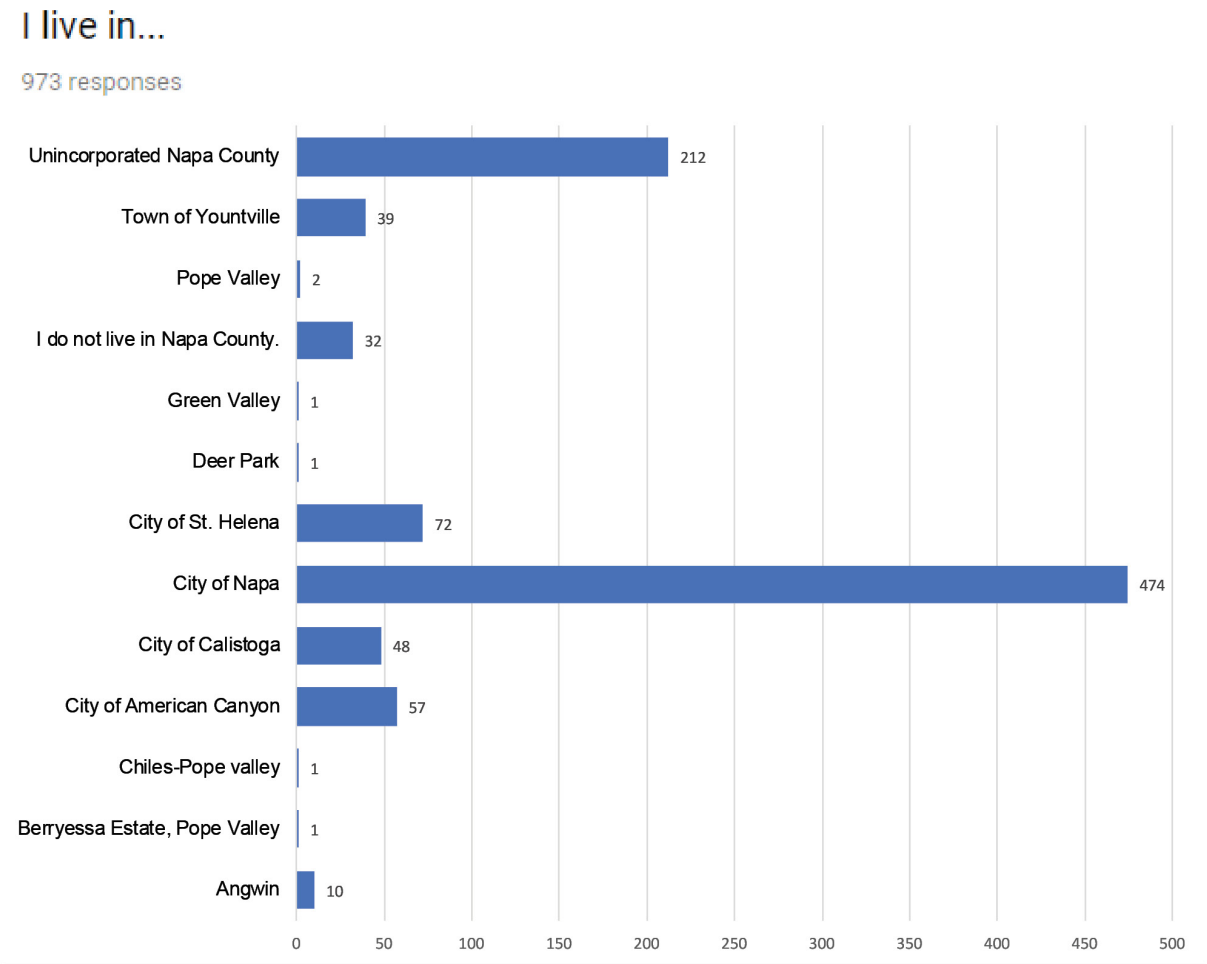
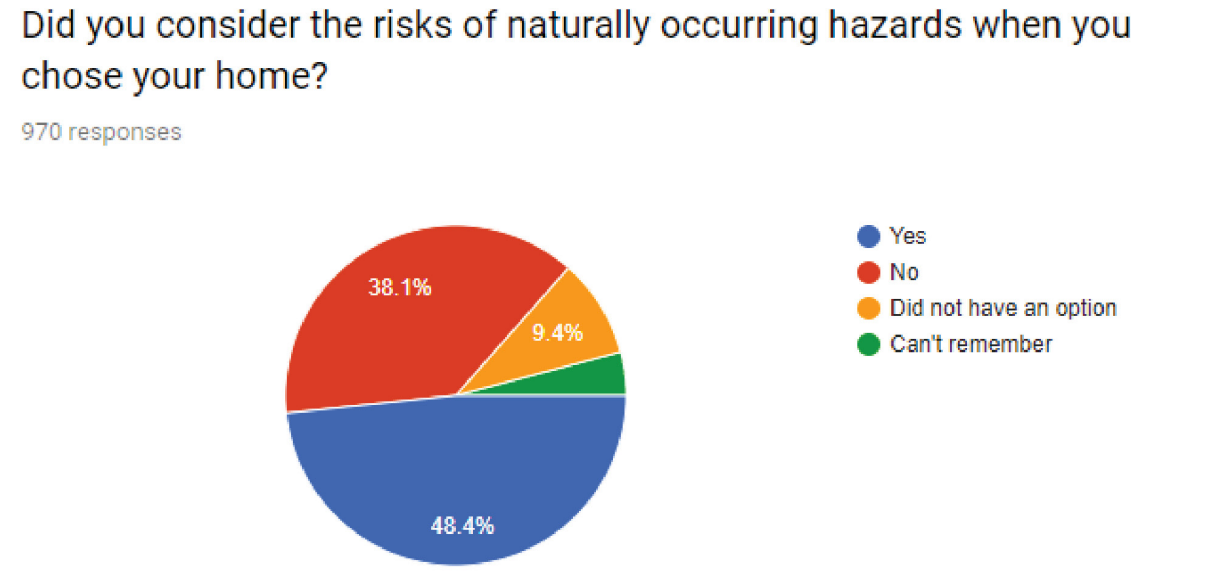
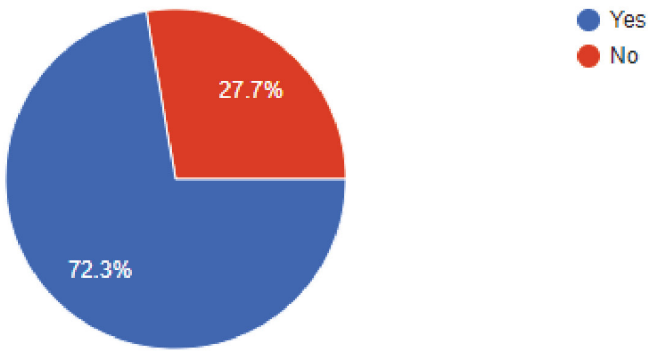




Survey Results 1

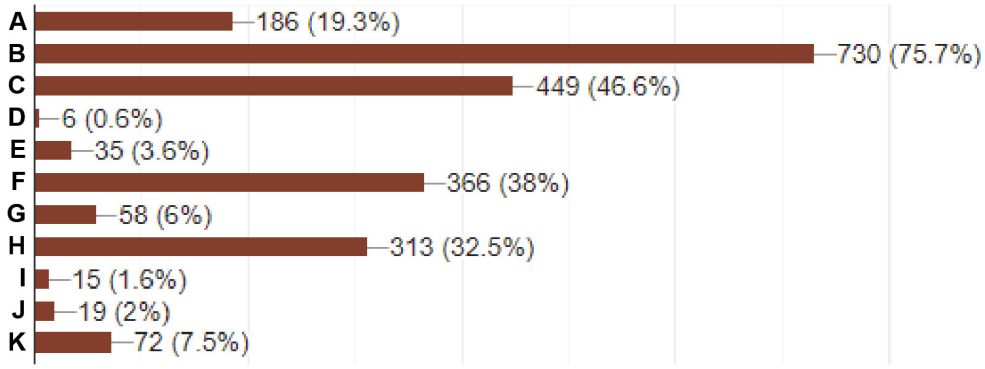
Do you believe your property is at risk from a natural hazard disaster?

973 responses



Which of the following types of hazard events have you or someone in your household experienced at your current home?

964 responses

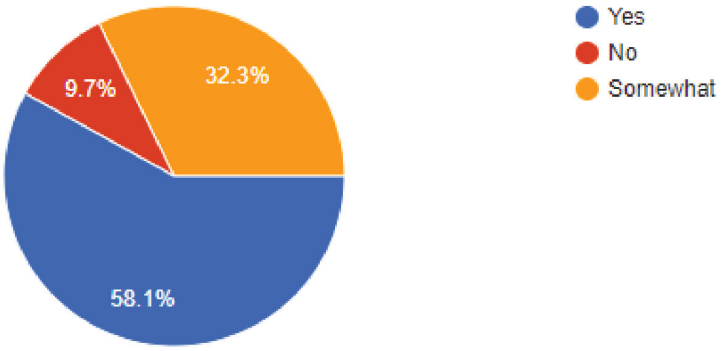


A Flooding
B Earthquake
C Wildfire
D Dam Failure
E Climate Change
F Drought
G Geohazard
H Severe Weather
I Ag Disaster
J Pandemic
K None of the Above

Survey Results 2

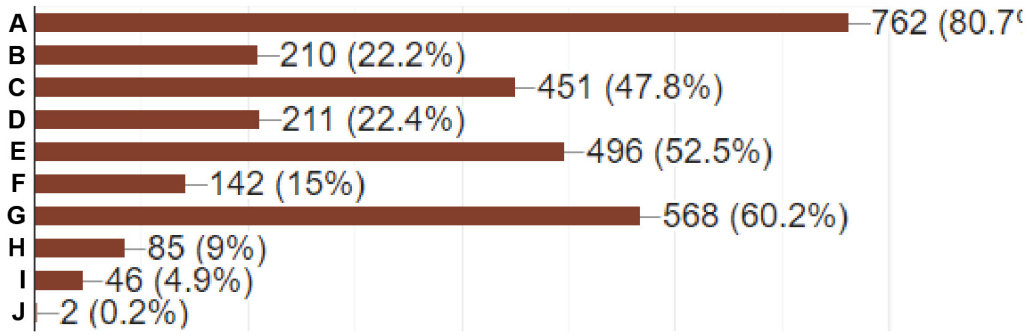
Do you think you are well informed about the dangers of natural hazards in this area?

973 responses



What actions have you taken for your home or property that increase personal safety or reduce risk and injury from potential disasters? (please check all that apply)

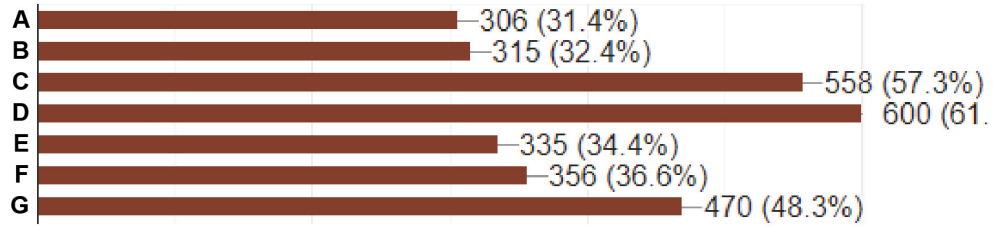
944 responses



A Purchased homeowners / renters insurance polic
B Installed fire resistant siding and roofing for wildfire defense
C Reduced vegetation around home for wildfire defense
D Installed alternate power supply; generators, battery / solar back up
E Installed drought tolerant plants or landscaping
F Flood-proofing measures (elevating furnace, water heaters, electric panels)
G Installed low flow water devices for showers, faucets, and toilets
H Installed basement flood proofing measures (sump pumps, water proof paint / barriers)
I Asked landlord to conduct any of the above mitigation measures

Which of the following incentives would encourage you to protect your home to withstand the impacts of possible natural hazards?

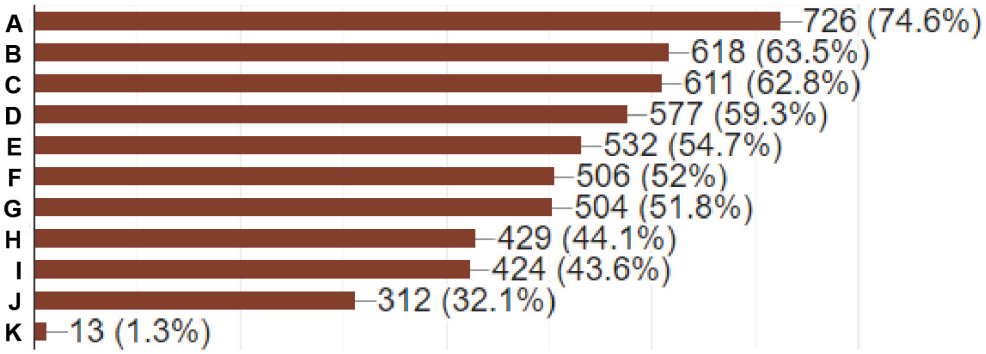
973 responses



- **A** Low Interest home improvement loans
- **B** Home improvement cost-share grants
- **C** "Rebate" programs or reimbursement of upfront costs
- **D** Insurance premium discounts
- **E** Technical assistance; for renters and homeowners
- **F** Labor assistance; for renters and homeowners
- **G** Building Permit Fee Waiver

Which of the following mitigation projects do you believe local government agencies should focus on to reduce disruptions of services and to strengthen the community (please check all that apply)

973 responses



- **A** Retrofit and strengthen essential facilities such as police, fire, emergency medical services, hospitals, schools, etc.
- **B** Replace inadequate or vulnerable bridges and roadways.
- **C** Retrofit or upgrade drainage systems.
- **D** Work on improving the damage resistance of utilities (electricity, communications, water / wastewater facilities, etc.).
- **E** Ensure that emergency shelters, the Emergency Operations Center and communications towers have backup power generators.
- **F** Strengthen codes, ordinances, and plans to require higher hazard risk management standards.
- **G** Provide better information about hazard risk and high-hazard areas.
- **H** Inform property owners of ways they can mitigate damage to their properties.
- **I** Assist vulnerable property owners with securing funding to mitigate impacts to their property(s).
- **J** Replant vegetation after wildfires to prevent landslides and flooding.
- **K** None

Survey Results 4

Mitigation Strategy Prioritization Process Documentation

Appendix B.4

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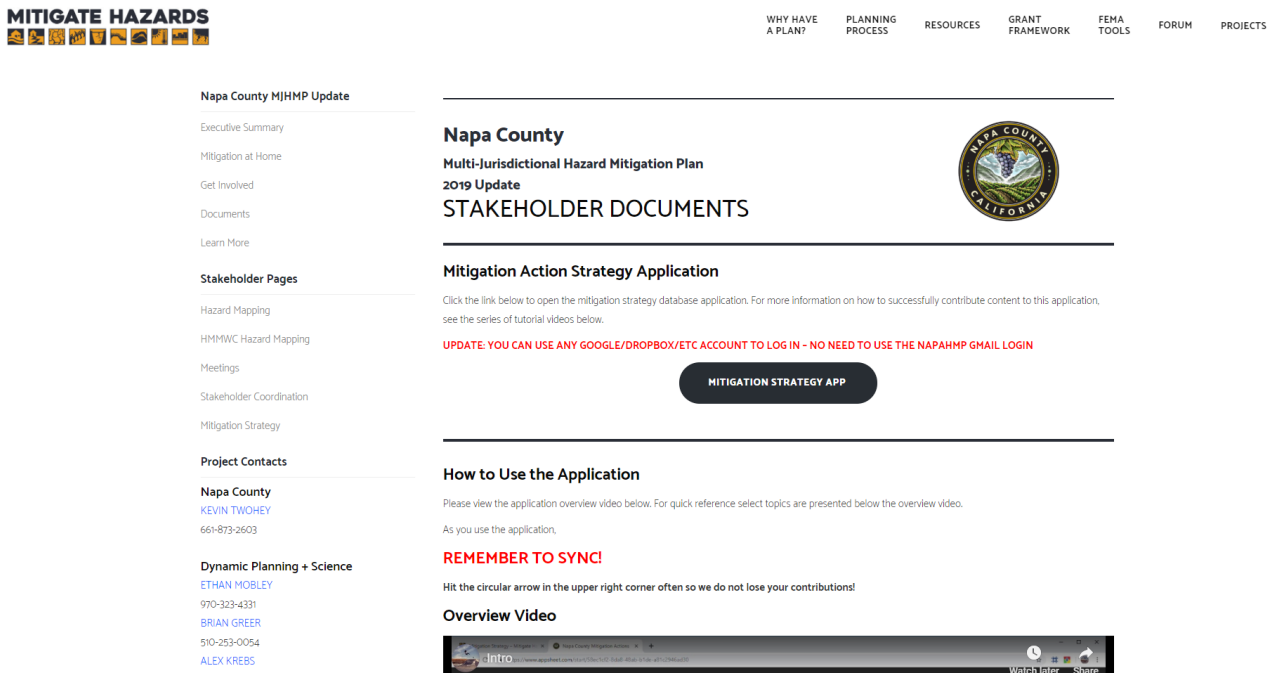
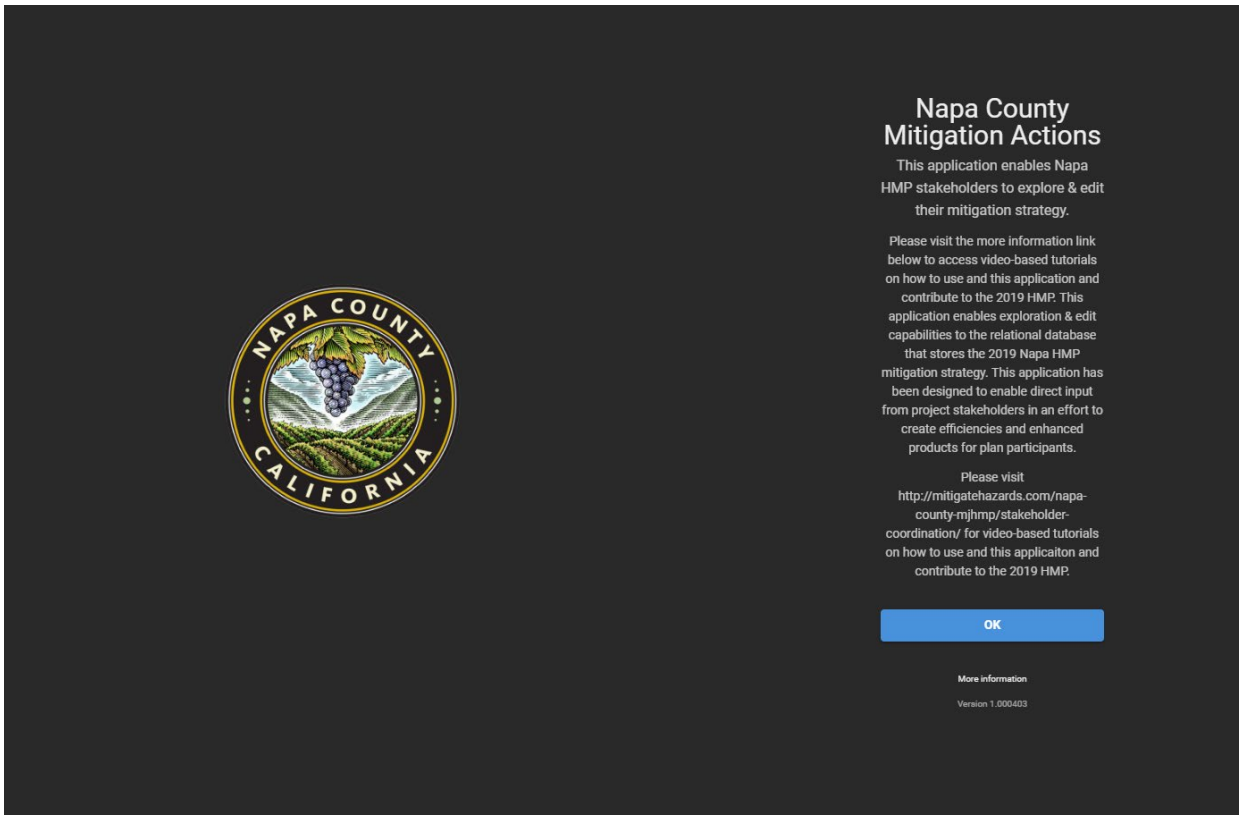
Dynamic Planning + Science developed the Mitigation Strategy Application for the 2019 Napa County MJHMP Update in order to streamline the development and prioritization of Mitigation Actions. Participating Jurisdictions were given access to the app through a web portal. Detailed written instructions and an overview video were also developed. This picture shows the Mitigation Strategy App access page that is housed on mitigatehazards.com.

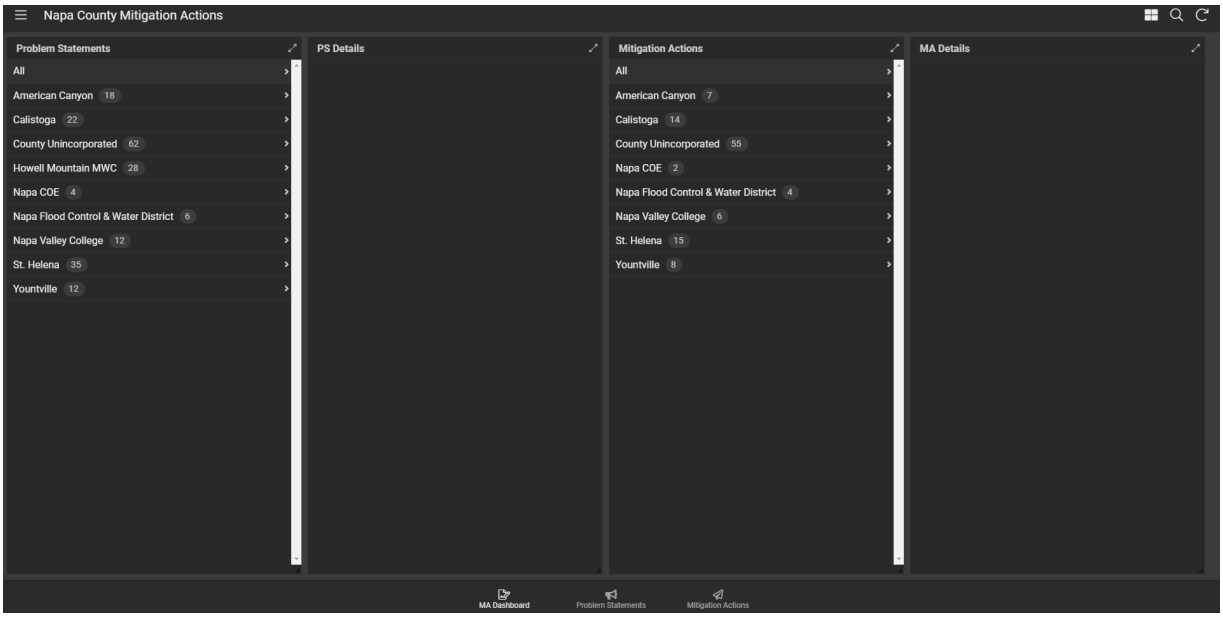


Prioritization Process 1

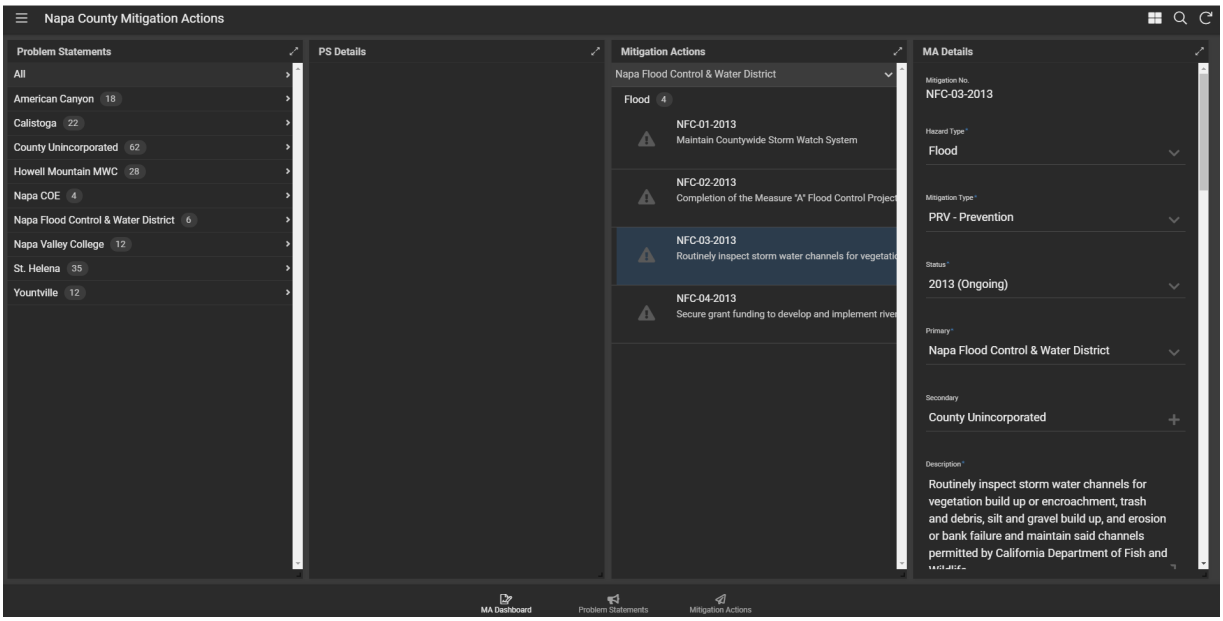
Once the Mitigation Strategy App is launched, users are taken to a landing page that provides background info about the app and directions on additional information about the app. Here is a picture of the landing page:



When a user enters the Mitigation Strategy App, there is a dashboard that has the following fields: Problem Statements, PS Details, Mitigation Actions, MA Details. All the participating jurisdictions are listed and each one has its own problem statements and associated mitigation actions.

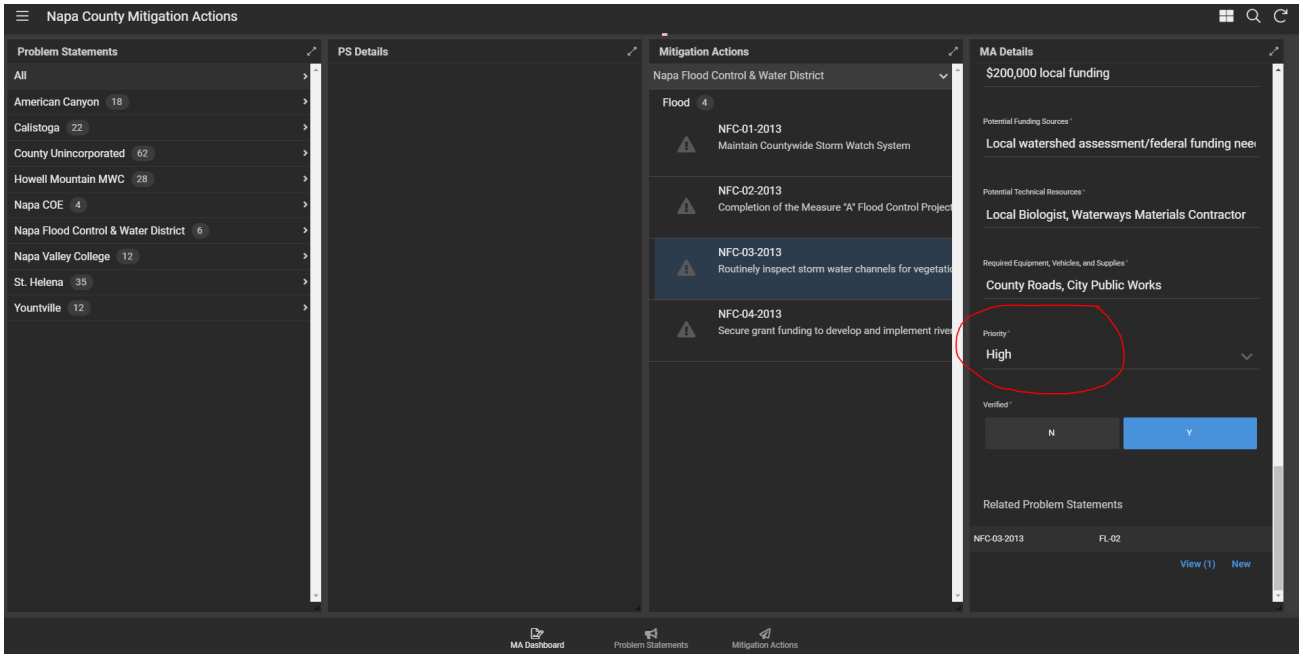


If a user selects its jurisdiction from the list, it will then be taken to either all the problem statements or mitigation actions for their individual jurisdiction. Each problem statement and mitigation action can also be selected which will prompt the app to bring up details for each associated statement or action.



Prioritization Process 3

All the jurisdictions were asked to go review all their associated mitigation actions and assign a priority to each one.



Prioritization Process 4

Website Documentation

Appendix B.5

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MITIGATE HAZARDS

WHY HAVE A PLAN? | PLANNING PROCESS | GRANT FRAMEWORK | FEMA TOOLS | PROJECTS | RESOURCE LINKS

Napa

- Executive Summary
- Mitigation at Home
- Get Involved
- Documents
- Learn More

Napa Stakeholder Pages

- Hazard Mapping
- HMPWC Hazard Mapping
- Meetings
- Stakeholder Coordination
- Mitigation Strategy

Project Contacts

Napa County
KEVIN TWOHEY
707-299-1892
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970-323-4331
BRIAN GREER
510-253-0054
ALEX KREBS
970-422-1213

Napa County

Multi-Jurisdictional Hazard Mitigation Plan
2019 Update

EXECUTIVE SUMMARY

PRINT

Napa County along with each participating jurisdiction will develop an update to the Napa County Operational Area Hazard Mitigation Plan 2013 update to reduce losses resulting from natural disasters. Hazard mitigation is the use of long-term actions to reduce the loss of life, personal injury, and property damage that can result from a disaster. Benefits of mitigation planning include:

- Identifying actions for risk reduction that are agreed upon by stakeholders and the public,
- Focusing resources on the greatest risks and vulnerabilities,
- Building partnerships by involving citizens, organizations, and businesses,
- Increasing education and awareness of threats and hazards, as well as their risks,
- Communicating priorities to State and Federal officials, and
- Aligning risk reduction with other community objectives.

Planning efforts could include capital projects and other pragmatic activities that can mitigate the impacts of hazards. The 2019 MJHMP Update will cover each of the major natural hazards that pose risks to County infrastructure and residents. Recognizing that successful mitigation planning efforts must be communicated and understood by the public, the County approach will include stakeholder participation and input with the use of cutting edge GIS technology to map and update the hazard information for each hazard profiled in the 2019 MJHMP.

Participating Jurisdictions

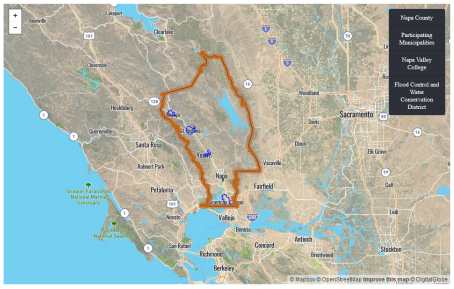
The 2019 MJHMP update will include, at a minimum, the jurisdictions listed below. It is understood that the County also encompasses areas of land controlled by federal and state land management agencies including the California Department of Forest and Fire Protection, Bureau of Land Management, and Bureau of Reclamation as shown in the map below. While the federal government ultimately has jurisdiction in these parts of the County, the Multi-Hazard Mitigation Plan could also be used to document and coordinate mitigation efforts between federal and local jurisdictions. In addition, it will be important to invite organizations such as public and private utility companies to be stakeholders during the update process. The following jurisdictions will meet FEMA guidelines and requirements as a formal participating agency:

Municipalities

- City of American Canyon
- City of Calistoga
- City of St. Helena
- Town of Yountville

Additional Participating Jurisdictions

- Napa County Flood Control and Water Conservation District
- Napa County Office of Education
- Napa Valley College
- Howell Mountain Mutual Water Company



Update Requirements and DMA 2000

A current and approved hazard mitigation plan is a prerequisite for jurisdictions wishing to pursue funding under the Hazard Mitigation Grant Program (HMGP) if a State or Federal disaster should occur. The Robert T. Stafford Act constitutes the statutory authority for most Federal disaster response and recovery activities especially as they pertain to FEMA and FEMA programs.

On October 30, 2000, the Robert T. Stafford Disaster Relief and Emergency Assistance Act was amended by Public Law 106-390 and is referred to as the Disaster Mitigation Act of 2000 (DMA 2000). As a DMA 2000 requirement, the Napa County MJHMP must be updated every five (5) years to remain in compliance with regulations and Federal mitigation grant conditions. Federal regulations require hazard mitigation plans to include a plan for monitoring, evaluating, and updating the hazard mitigation plan. A current and approved hazard mitigation plan is a prerequisite for jurisdictions wishing to pursue funding under the Robert T. Stafford Act.

Floodplain Management Plan

The 2019 MJHMP Update will be compliant with all Community Rating System (CRS) 510 activities and CRS repetitive loss category "C" (50 or more unmitigated repetitive loss properties). Following the 10-step process described in CRS Activity 510 (Floodplain Management Planning) the planning team will develop a more comprehensive plan for flood damage reduction within the multi-hazard mitigation plan update. The Plan will also include additional mapping of Repetitive Loss Properties and aim to increase CRS points for future insurance premium discounts for residents across the County.

Flood Inundation Mapping

The Local Planning Project Management Team will identify areas where Flood Inundation mapping products would be most beneficial for internal emergency response and mitigation planning personal. As part of this effort a series of public outreach maps will be developed to communicate anticipated flood depths in populated areas of the County. Areas of mapping will be determined later through planning team analysis.

Project Funding Information

Napa County is using funding from the County to complete the MJHMP update under the Hazard Mitigation Grant Program (HMGP). The County has contracted with Dynamic Planning + Science (DP+S) to update the County's current Hazard Mitigation Plan. DP+S will provide on-site process facilitation, stakeholder outreach, data collection and analysis, plan writing, and strategy development.

MITIGATE HAZARDS

Welcome to mitigatehazards.com. Please explore our planning process and our open forum. It's your chance to communicate with hazard mitigation experts.
If you are working with Dynamic Planning + Science on a hazard mitigation project, please visit your project's page by choosing your project from the menu at the top or bottom of this page.

Pages

- Why Have a Plan?
- Planning Process
- Grant Framework
- FEMA Tools
- Projects
  - Kern MJHMP
  - Napa County MJHMP
  - SBCUSD HMP
  - Delta County MJHMP
  - Montrose County MJHMP
  - La Plata County HMP
  - San Bernardino County HMP
  - Tehama County MJHMP
  - Vacaville HMP
- Resource Links

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Email
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Executive Summary

MITIGATE HAZARDS

WHY HAVE A PLAN? | PLANNING PROCESS | GRANT FRAMEWORK | FEMA TOOLS | PROJECTS | RESOURCE LINKS

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970-422-1213

Napa County

Multi-Jurisdictional Hazard Mitigation Plan
2019 Update

MITIGATION AT HOME

Perform Mitigation Around Your Home!

Mitigation around your home can better prepare you and your family for an unexpected emergency or disaster incident, and help you recover more quickly. Here are some resources to get you started.

Assess Your Own Risk

Using Cal OES MyHazards, type in your address to asses your risk to natural hazards including earthquakes, flood, fire and tsunami. Learn what you should do to reduce injuries, protect your life and those of others, and reduce damage to your home and property.

Visit Ready.gov to learn about different hazards and how you can prepare your home or business for these events.

Home Mitigation Ideas

Now that you're familiar with the hazards that have the potential to affect your community, check out some of these mitigation techniques that can be performed around your home.

Wildfire Mitigation Ideas

- The Napa Communities Firewise Foundation: Free chipping program, Defensible Space Planning and Preparation Guide and other local mitigation resources.
- California Fire Safe Council: Information on grants/ funding programs and community events.
- CAL FIRE Why 100: Video from CAL Fire with defensible space guidelines for your home.
- CAL FIRE Ready for Wildfire: CAL Fire website for preparing your home for wildfire.
- CAL Fire Ready for Wildfire (Get Ready): CAL Fire tips on defensible space, hardening your home, and fire-resistant landscapes.
- CAL Fire Ready for Wildfire (Prevention): CAL Fire "One Less Spark" wildfire prevention tips for equipment use, debris burning, campfires and more.

Earthquake Mitigation Ideas

- FEMA Earthquake Home Hazard Hunt: FEMA recommendations for reducing earthquake hazards in your home.
- California Earthquake Brace and Bolt Program: California EBB provides $3,000 grants to be used toward a code-compliant seismic retrofit for houses that qualify. Find out more about the program and if your house qualifies.

Flood Mitigation Ideas

- FEMA Flood Mitigation: Tips for preparing your home or workplace, collecting sources of information, developing an emergency communications plan and knowing what to do when a flood is approaching your home or business.
- California Flood Preparedness Tips: Tips on how to divert water away from your home during a flood including sandbag filling and placement.

Severe Weather Mitigation Ideas

- Severe Storm Mitigation: Tips to equip your home with the accessories it will need to survive a storm from the National Association of Home Builders.

Drought Mitigation Ideas

- Water-Wise Gardening: Tips to update your landscaping for drought tolerant plants in Napa County.
- City of Napa Water-Wise Landscaping: Tips and resources for drought tolerant landscaping in Napa.

Create a Plan

Every household should have a disaster plan! Meet with your family members and discuss why you need to prepare for a disaster. Discuss and explain the dangers of the various hazards that may impact your home or your community.

Build an Emergency Kit

An emergency kit is assembled so that in case of an emergency you are prepared ahead of time. It is possible that you will need to survive on your own after an emergency and this kit should have all the basic yet essential items you will need for at least 72 hours. Your kit should contain food and water, items in case there is a power shortage, and other items such as personal hygiene supplies and copies of important documents.

MITIGATE HAZARDS

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Mitigate at home

MITIGATE HAZARDS

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- Hazard Mapping
- HMMWC Hazard Mapping
- Meetings
- Stakeholder Coordination
- Mitigation Strategy

Project Contacts

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ALEX KREBS
970-422-1213

Napa County

Multi-Jurisdictional Hazard Mitigation Plan
2019 Update

GET INVOLVED

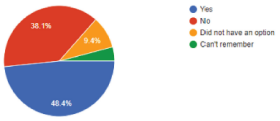
The purpose of hazard mitigation is to reduce or eliminate long-term risk to people and their property from hazards. Napa County developed the Multi-Jurisdictional Hazard Mitigation Plan (MJHMP) update to make the County, its residents and visitors less vulnerable to future hazard events.

Community Survey!

Thank you for participating in our Community Survey! The survey period has closed. We look forward to analyzing the results, and drawing e-mails for prizes. Your opinion matters! The information you provided will help us identify and coordinate projects focused on reducing the risk of injury or damage to property from future hazard events (e.g. wildfires, floods, earthquakes).

Did you consider the risks of naturally occurring hazards when you chose your home?

970 responses



Review the Hazard Mitigation Plan!

Coming soon!

Throughout the planning process, draft sections of the 2019 Napa County Multi- Hazard Mitigation Plan will be made available for review and comment; documents can be found on the "Documents" page.

Discover County Planning Documents

Does your neighborhood have its own Community Wildfire Protection Plan? Do you know where the flood zones are in the County? There are a lot of great resources available to the public and they can all be found here.

Events

Come take the survey in person and get your mitigation questions answered at one of our upcoming events.

Event details coming soon!

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Get Involved

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Napa County

Multi-Jurisdictional Hazard Mitigation Plan
2019 Update
DOCUMENTS

2018-19 Documents:

Coming soon!

Current Hazard Mitigation Plan:

Napa Operational Area Hazard Mitigation Plan 2013 Update

Other Local Planning Documents:

Angwin Community Wildfire Protection Plan
Atlas Peak Fire Reduction Hazard Plan Community Wildfire Protection Plan
The Berryessa Highlands Fire Safe Council Community Wildfire Protection Plan
Lake Berryessa Estates Fire Safe Council Fire Hazard Reduction Plan
The Circle Oaks Homes Association Community Wildfire Protection Plan
Deer Park Community Fire Safe Council Community Wildfire Protection Plan
Gordon Valley Community Wildfire Protection Plan
Soda Canyon Fire Safe Council Community Wildfire Protection Plan
Mt. Veeder Fire Safe Council Community Wildfire Protection Plan

Napa County General Plan

Strategic Fire Plan Sonoma-Lake-Napa Unit 2017
2018 Strategic Fire Plan for California

2018 State of California Multi-Hazard Mitigation Plan Draft
California Drought Contingency Plan

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LEARN MORE

History of the HMP

Napa County's first Hazard Mitigation Plan was adopted in 2004 and was updated in 2013. The 2019 update will be the County's "third" plan update and a demonstration of the County's continuing effort to reduce or eliminate future loss of life and property resulting from natural disasters.

Disasters in Napa County

- 6 Severe Storm
- 5 Fire
- 3 Flood
- 2 Earthquake
- 1 Coastal Storm
- 1 Drought
- 1 Freezing
- 1 Hurricane

There have been 20 declared disasters that have occurred in Napa County since 1953. Click here for more detail including the types of declared disasters and the months and years that they have occurred.

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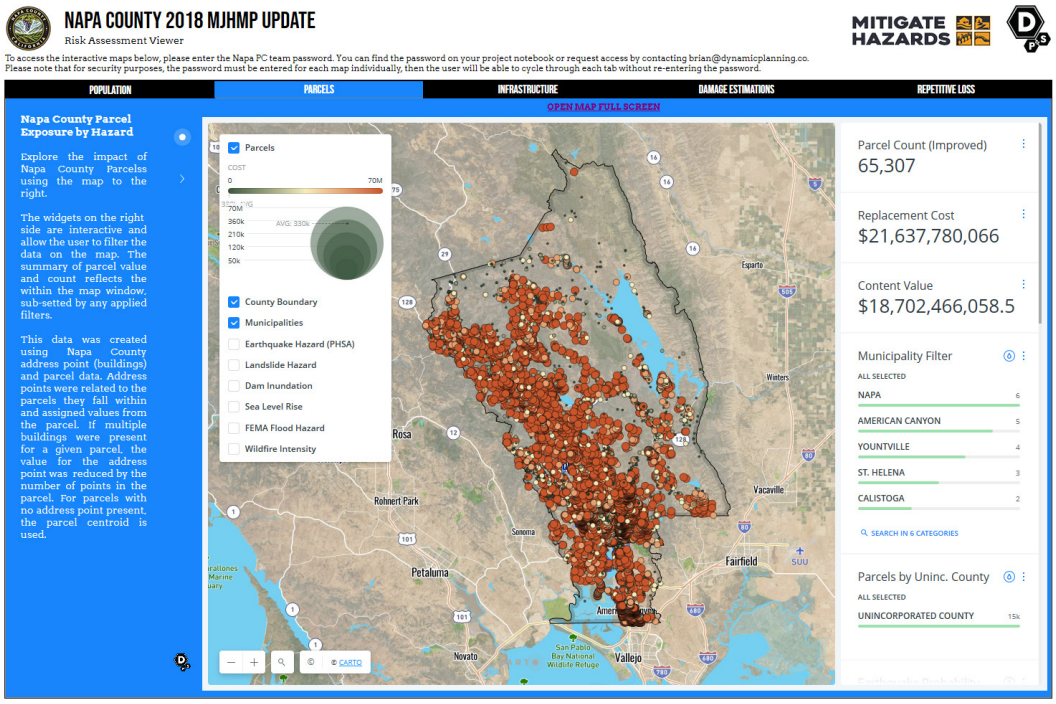
NAPA COUNTY 2018 MJHMP UPDATE
Risk Assessment Viewer
MITIGATE HAZARDS
To access the interactive maps below, please enter the Napa PC team password. You can find the password on your project notebook or request access by contacting brian@dynamicplanning.co.
Please note that for security purposes, the password must be entered for each map individually, then the user will be able to cycle through each tab without re-entering the password.
POPULATION
PARCELS
INFRASTRUCTURE
DAMAGE ESTIMATIONS
REPETITIVE LOSS
OPEN MAP FULL SCREEN
Napa County Parcel Exposure by Hazard
Explore the impact of Napa County Parcels using the map to the right.
The widgets on the right side are interactive and allow the user to filter the data on the map. The summary of parcel value and count reflects the within the map window, sub-setted by any applied filters.
This data was created using Napa County address point (buildings) and parcel data. Address points were related to the parcels they fall within and assigned values from the parcel. If multiple buildings were present for a given parcel, the value for the address point was reduced by the number of points in the parcel. For parcels with no address point present, the parcel centroid is used.
Parcels
COST
County Boundary
Municipalities
Earthquake Hazard (PHSA)
Landslide Hazard
Dam Inundation
Sea Level Rise
FEMA Flood Hazard
Wildfire Intensity
Parcel Count (Improved)
65,307
Replacement Cost
$21,637,780,066
Content Value
$18,702,466,058.5
Municipality Filter
ALL SELECTED
NAPA
AMERICAN CANYON
YOUNTVILLE
ST. HELENA
CALISTOGA
SEARCH IN 6 CATEGORIES
Parcels by Unincorporated County
ALL SELECTED
UNINCORPORATED COUNTY
Petaluma
Rohnert Park
Sonoma
Vacaville
Fairfield
Vallejo
Novato
Esparto
Winters

RAMP