TOWN OF ROSS COMMUNITY PROFILE

MARIN COUNTY MULTI-JURISDICTIONAL HAZARD MITIGATION PLAN 2023

TOWN OF ROSS

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ACKNOWLEDGEMENTS

The Town of Ross and Preparative Consulting would like to thank those collaborators and partners who participated in the planning and development of this document.

The official Marin County hazard mitigation Steering Committee provided the oversight and dedication to this project that was required and without their commitment; this project would not be possible.

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

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SECTION 1.0: INTRODUCTION

1.1 INTRODUCTION

The Town of Ross Community Profile has been prepared in conjunction with the Marin County Multi-Jurisdictional Hazard Mitigation Plan (MJHMP), establishing an inter-jurisdictional process for the development and implementation of effective hazard mitigation strategies in association with identified hazards that pose real or potential threats to the Town of Ross.

1.2 PLANNING PROCESS

The majority of the Marin County OA is unincorporated sparsely populated rural and protected lands. Most of the 262,000 county population, both incorporated and unincorporated, is concentrated in the Eastern portion of the county. There are a total of 11 incorporated jurisdictions within Marin County. The Marin County OA MJHMP Steering Committee and broader Planning Team approached the development of the Marin County OA MJHMP and the associated jurisdictional and district profiles from a coordinated and collaborative planning and public engagement unity of effort.

The Steering Committee felt a unified effort, led by the County Office of Emergency Management (OEM), would be the most effective approach for this planning process. This approach allowed the small jurisdictions and districts with limited staffing and resources to take advantage of the combined efforts of the County and other jurisdictions to reach a broader segment of each of their own populations and do so in a way to ensure greater equity and inclusion of the public in this planning process. Extensive and coordinated public outreach was done involving all participating jurisdictions and districts with an eye towards equity, inclusion, openness, accessibility, and ensuring they meet the population where they live, work, or recreate to provide the public convenience of access and ease of participation in this planning process.

The Marin County OA is very different from most California Counties in that the populated portion of the County where the jurisdictions and district's planning areas are located has the same climate, similar topography, and are exposed to many of the same hazards. Only three jurisdictions, Larkspur, Ross, and San Anselmo, are not coastal jurisdictions and are not impacted by Tsunami or Sea Level Rise.

This unity of effort approach allowed the Steering Committee to establish a more robust Planning Team representing local, countywide, regional, state, and federal stakeholders servicing the Marin County OA planning area. These stakeholders were in a unique position to provide informed and specific information and recommendations on hazard mitigation goals and actions, as well as population needs and social vulnerability for each of the jurisdictional and district planning areas. This united effort allowed the planning team to attend fewer meetings than they would have been required to attend if they were required to attend separate meetings for each participating jurisdiction and district. The reduced number of meetings allowed the planning team the opportunity and time to provide more detailed and thoughtful contributions to the planning effort.

In addition to providing representation on the coordinated Marin County Multi-Jurisdictional Hazard Mitigation Plan Steering Committee, the Town of Ross involved additional internal planning team to support the broader planning process. The Town of Ross jurisdictional

representatives for the coordinated Marin County Multi-Jurisdictional Hazard Mitigation Plans Steering Committee and the Planning Team Members are represented below.

1.2.1 Steering Committee Members (Jurisdictional Representatives)

Primary Point of Contact
Richard Simonitch, Director of Public Works
Telephone: (415) 453-1453 ext. 115
Email: rsimonitch@townofross.org

Alternate Point of Contact
Roberta Feliciano
(415) 453-1453 ext. 121
Email: rfaliciano@townofross.org

This annex was developed by the primary point of contact with assistance from the members of the local mitigation planning team listed in Table 1 and Table 2.

Table 1: Local Hazard Mitigation Planning Team Members

Jurisdiction	Name	Title/ Department	Phone	Email
Ross	Richard Simonitch	Public Works Director	415-453-1453 ext. 115	rsimonitch@townofross.org
Ross	Roberta Feliciano	Planning	415-453-1453 ext. 121	rfeliciano@townofross.org
Ross	Christa Johnson	Administration	415-453-1454 ext. 107	cjohnson@townofross.org
Ross	Ralph Pata	Ross Police Department	415-453-1453 ext. 101	rpata@townofross.org

Table 1: Local Hazard Mitigation Planning Team Members

This 2023 Marin County Operational Area (OA) MJHMP is a comprehensive update of the 2018 Marin County OA MJHMP. The planning area and participating jurisdictions and organizations were defined to consist of unincorporated Marin County, five special districts, and the eleven incorporated jurisdictions to include the Town of Ross. All participating jurisdictions are within the geographical boundary of Marin County and have jurisdictional authority within this planning area.

The Steering Committee led the planning process based on the contribution and input from the whole community stakeholders who identified the community's concerns, values, and priorities. The Steering Committee met and reviewed the mitigation recommendations and strategies identified within this plan. Each participating local jurisdiction established a mechanism for the development and implementation of jurisdictional mitigation projects, as identified within this plan and associated locally specific supporting documents. As deemed necessary and appropriate, participating jurisdictions will organize local mitigation groups to facilitate and administer internal activities.

The Steering Committee assisted with the planning process in the following ways:

- Attending and participating in the Steering Committee meetings.
- Identification of potential mitigation actions.
- Updating the status of mitigation actions from the 2018 Marin County OA MJHMP.
- Collecting and providing other requested data (as available).

- Making decisions on plan process and content.
- Reviewing and providing comments on plan drafts; including annexes.
- Informing the public, local officials, and other interested stakeholders about the planning process and providing opportunity for them to be involved and provide comment.
- Coordinating, and participating in the public input process.
- Coordinating the formal adoption of the plan by the governing boards.

1.2.2 Steering Committee Planning Process

The Steering Committee met monthly to develop the plan. Email notifications were sent out to each Steering Committee member to solicit their participation in the Steering Committee meetings. The meetings were conducted using a Zoom platform videoconferencing. Meeting attendees signed in using the chat feature to record their attendance.

The Steering Committee agreed to make and pass plan-based general policy recommendations by a vote of a simple majority of those members present. The Steering Committee will also seek input on future hazard mitigation programs and strategies from the mitigation planning team by focusing on the following:

- Identify new hazard mitigation strategies to be pursued on a state and regional basis and review the progress and implementation of those programs already identified.
- Review the progress of the Hazard Mitigation program and bring forth community input on new strategies.
- Coordinate with and support the efforts of the Marin County OEM to promote and identify resources and grant money for implementation of recommended hazard mitigation Strategies within local jurisdictions and participating public agencies.

During the planning process, the Steering Committee communicated through videoconferencing, face-to-face meetings, email, telephone conversations, and through the County website. The County website included information for all stakeholders on the MJHMP update process. Hannah Tarling of the Marin County Office of Emergency Management and Preparative Consulting established a Microsoft 365 SharePoint folder which allowed the Steering Committee members and Marin OEM and Preparative Consulting to share planning documents and provide a format for the planning partners to submit completed documents and access other planning related documents and forms. Draft documents were also posted on this platform and the Marin County OES website so that the Steering Committee members and the public could easily access and review them.

1.2.3 Coordination with Stakeholders and Agencies

Opportunities for involvement in the planning process must be provided to neighboring communities, local and regional agencies involved in hazard mitigation, agencies with authority to regulate development, businesses, academia, and other private and nonprofit interests (44 CFR, Section 201.6(b)(2)).

Early in the planning process, the Marin County and Town of Ross Steering Committee reached out to the following Local and Regional Agencies involved in hazard mitigation activities to invite them to participate in this planning process as a member of the Planning Team. These individuals work with Marin County and the Town of Ross communities and could provide subject matter expertise and relevant information to the planning process

regarding the community history, hazard risk, vulnerability, and impact, mitigations efforts, community needs, demographics, and social vulnerability, economic concerns, ecology, and other community services and needs.

The Marin County and Town of Ross Steering also determined that data collection, risk assessment analyses, mitigation strategy development, and plan approval would be greatly enhanced by inviting other local, state and federal agencies and organizations to participate in the process. Based on their involvement in hazard mitigation planning, their landowner status in the County, the Town of Ross and/or their interest as a neighboring jurisdiction, representatives from the following groups were invited to participate on the Planning Team:

Eighty-five planning partners participated in this update, as listed in Table 2.

Table 2: 2023 MJHMP Planning Team Members

No.	Agency	Point of Contact	Title
1	Belvedere	Laurie Nilsen	Emergency Svs, Coord.
2	Belvedere	Rebecca Markwick	Planning Director
3	Belvedere	Samie Malakiman	Associate Planner
4	Bolinas Com. PUD	Jennifer Blackman	General Manager
5	Bolinas Fire Protection Dist.	Stephen Marcotte	Asst. Fire Chief
6	Central Marin Fire District	Matt Cobb	Battalion Chief/Fire
7	Central Marin Fire District	Ezra Colman	Battalion Chief/Fire
8	Central Marin Fire District	Rubin Martin	Fire Chief
9	Corte Madera	RJ Suokko	Director of Public Works
10	Corte Madera	Chris Good	Senior Civil Engineer
11	Sanitary District No. 2	RJ Suokko	Public Works Director
12	Fairfax	Loren Umbertis	Public Works Director
13	Fairfax	Mark Lockaby	Building Official
14	Larkspur	Dan Schwarz	City Manager
15	Larkspur	Julian Skinner	Public Works Director/ City Engineer
16	Larkspur	Robert Quinn	Public Works Superintendent
17	Las Gallinas Valley Sanitary District	Dale McDonald	Administrative Services Mgr.
18	Las Gallinas Valley Sanitary District	Greg Pease	Safety Manager
19	Marin County	Steven Torrence	OEM Director
20	Marin County	Hannah Tarling	Emergency Management Coordinator
21	Marin County	Chris Reilly	OEM Project Manager
22	Marin County	Woody Baker-Cohn	Senior Emergency Management Coordinator
23	Marin County	Leslie Lacko	Community Development Agency
24	Marin County	Hannah Lee	Senior Civil Engineer
25	Marin County	Felix Meneau	Project Mgr./ FCWCD
26	Marin County	Julia Elkin	Department of Public Works
27	Marin County	Beb Skye	Department of Public Works
28	Marin County	Scott Alber	Battalion Chief, Marin County Fire Dept.
29	Marin County	Lisa Santora	Deputy Public Health Officer, Marin Health & Human Services
30	Marin County	Koblick, Kathleen	Marin Health & Human Services

Table 2: 2023 MJHMP Planning Team Members			
No.	**Agency**	**Point of Contact**	**Title**
31	Marin County	Amber Davis	Public Health Preparedness
32	Mill Valley	Patrick Kelly	Department of Public Works
33	Mill Valley	Ahmed A Aly	Project Manager
34	Mill Valley	Jared Barrilleaux	Deputy Director of Engineering
35	Mill Valley	Daisy Allen	Senior Planner
36	Southern Marin Fire District	Tom Welch	Deputy Chief/South Marin Fire Dist.
37	Southern Marin Fire District	Marshall Nau	Fire Marshall/South Marin Fire Dist.
38	North Marin Water District	Eric Miller	Asst. General Manager
39	North Marin Water District	Tim Fuette	Senior Engineer
40	Novato	David Dammuller	Engineering Services Mgr.
41	Novato	Dave Jeffries	Consultant/JPSC
42	Ross	Richard Simonitch	Public Works Director
43	San Anselmo	Sean Condry	Public Works & Building Director
44	San Anselmo	Erica Freeman	Building Official
45	San Anselmo	Scott Schneider	Asst. PW Director
46	San Rafael	Quinn Gardner	Deputy Emergency Services Coord.
47	San Rafael	Cory Bytof	Sustainability
48	San Rafael	Joanna Kwok	Senior Civil Engineer
49	San Rafael	Kate Hagemann	Climate Adaptation & Resilience Planner
50	Sausalito	Andrew Davidson	Senior Engineer/ DPW
51	Sausalito	Kevin McGowan	Director of Public Works
52	Sausalito	Brandon Phipps	Planning Director
53	Tiburon	Sam Bonifacio	Assistant Planner
54	Tiburon	Dina Tasini	Director of Community Development
55	Tiburon	Laurie Nilsen	Emergency Svs, Coord.
Special Districts & Partner Agencies			
56	County of Marin Disability Access Program	Laney Davidson	Disability Access Manager/ ADA Coordinator
57	County of Marin Disability Access Program	Peter Mendoza	Disability Access Manager/ ADA Coordinator
58	Emergency Medical Services	Chris Le Baudour	EMS Authority
59	Fire Departments	Jason Weber	Fire Chiefs
60	Golden Gate Bridge, Highway & Transportation District	Daniel Rodriguez	Security, Emergency Management Specialist
61	Golden Gate Bridge, Highway & Transportation District	Dennis Mulligan	General Manager & CEO,
62	Marin City Climate Resilience and Health Justice	Terrie Green	Executive Director
63	Marin Center for Independent Living	Peter Mendoza	Director of Advocacy and Special Projects
64	Marin City Community Services District	Juanita Edwards	Interim General Manager

Table 2: 2023 MJHMP Planning Team Members			
No.	**Agency**	**Point of Contact**	**Title**
65	Marin County Community Development Agency	Leslie Lacko	Community Development Agency
66	Marin County Flood Control & Water Conservation District	Garry Lion	Advisory Board Member
67	Marin County Office of Education	Michael Grant	Director, Marin County Office of Education
68	Marin County Parks	Max Korten	General Manager and Director
69	PG&E	Mark Van Gorder	Government Affairs, North Bay
70	PG&E	Ron Karlen	PG&E Public Safety Specialist
71	Sonoma Marin Area Rail Transit (SMART)	Jennifer McGill	Chief of Police
72	Transportation Authority of Marin (TAM)	Anne Richmond	Executive Director
73	Willow Creek School	Itoco Garcia	Superintendent
State Partners			
74	Cal OES - ESC	Sarah Finnigan	Cal OES Emergency Services Coordinator
75	Cal OES, Division of Safety of Dams	Danielle Jessup	Coordinator/ Dam Safety Planning Division
76	California Department of Public Health	Svetlana Smorodinsky	Disaster Epidemiologist/ Environmental & Occupational Emergency Preparedness Team
77	California Department of Public Health	Patrice Chamberlain	Health Program Specialist II
78	California Department of Water Resources	Julia Ekstrom, PhD	Supervisor, Urban Unit Water Use Efficiency Branch
79	Caltrans	Trang Hoang	Senior Transportation Engr/ Office of Advance Planning
80	Caltrans	Markus Lansdowne	Caltrans D4 Emergency Coordinator
Federal Partners			
81	Army Corps of Engineers	Jessica Ludy	Flood Risk Management, Equity, and Environmental Justice
82	National Park Service	Stephen Kasierski	OneTam
83	US Coast Guard	LT Tony Solares	Sector SF Waterways Safety Branch
84	US Coast Guard	MST1 Brandon M. Ward	Emergency Management Specialist
85	US Coast Guard	LT William K. Harris	USCG SEC San Francisco

Table 2: 2023 MJHMP Planning Team Members

Several opportunities were provided for the groups listed above to participate in the Town of Ross's planning process.At the beginning of the planning process, invitations were extended to these groups to actively participate on the Planning Team. Participants from these groups assisted in the process by attending several videoconferencing meetings where hazard vulnerability and risk were discussed along with hazard mitigation strategies and actions. Planning Team members provided data and other applicable information directly as requested in meetings, emails, telephone calls, videoconferencing, worksheets, or through data contained on their websites or as maintained by their offices. This information was used to develop hazard vulnerability and risk profiles along with mitigation actions.

These key agencies, organizations, and advisory groups received meeting announcements, agendas, and minutes by e-mail throughout the plan update process. They supported the effort by attending meetings or providing feedback on issues. All the agencies were provided with an opportunity to comment on this plan update and were provided with a copy of the plan to review and offer edits and revisions. They were also provided access to the Marin County OEM hazard mitigation plan website to review all planning documents and hazard mapping tools.

Each was sent an e-mail message informing them that draft portions of the plan were available for review. In addition, the complete draft plan was sent to the California Governor's Office of Emergency Services (Cal OES) and FEMA Region IX for a pre-adoption review to ensure program compliance.

In addition, through the public meetings conducted at the beginning of the planning process, members of the planning team, the public, and other key stakeholders were invited to participate in the planning process through public outreach activities.

Further as part of the public outreach process, all planning areas engaged in public outreach and education by providing information on their website or though press releases directing the public to the main Marin County OEM website that provided coordinated and detailed public information of the planning process and how the public could participate. All planning areas were invited to attend the public meetings and to review and comment on the plan prior to submittal to Cal OES and FEMA. Additional public outreach action is detailed in the 1.2.4 PUBLIC ENGAGEMENT section of this annex.

The following planning meetings were held with the planning team:

Table 3: Town of Ross & Marin County MJHMP Planning Meetings

No.	Date	Attendees	Meeting	Planning Meeting Objectives
1	10/26/22	Steering Committee	Project Overview Meeting	• Plan Overview – Steps and Timeline • Planning Process • Steering Committee Role
2	11/9/22	Steering Committee	Steering Committee Kickoff Meeting	• Hazard Mitigation and Emergency Management Overview • Plan Overview – Steps and Timeline • Community Overview • Planning Process • Hazard Identification and Risk Assessment • Stakeholders and Planning Team Identification
3	12/6/22	Steering Committee, Planning Team	Planning Team Kickoff Meeting	• Hazard Mitigation and Emergency Management Overview • Plan Overview – Steps and Timeline • Community Overview • Planning Process

Table 3: Town of Ross & Marin County MJHMP Planning Meetings				
No.	**Date**	**Attendees**	**Meeting**	**Planning Meeting Objectives**
				• Hazard Identification and Risk Assessment
4	02/07/23	Steering Committee	Steering Committee Hazard Profile Meeting	• Jurisdictional Letter of Commitment • Identify Planning Team Members • Hazard Risk Ranking Worksheets • Jurisdictional Profiles • Jurisdictional/ District Capability Assessment • 2018 Hazard Mitigation Project Status Update
5	03/07/23	Steering Committee/ Planning Team	Planning Team Public Outreach Strategy Meeting	• Planning Goals and Objectives • Hazard Risk Ranking Worksheets • Jurisdictional Profiles • Jurisdictional/ District Capability Assessment • 2018 Hazard Mitigation Project Status Update • Public Outreach Strategy
6	04/04/23	Steering Committee	Steering Committee Meeting	• HMGP (DR-4683) Funding Timeline • Public Outreach • Planning Goals and Objectives • Jurisdictional Hazard Vulnerability Maps • Jurisdictional Profiles • Jurisdictional/ District Capability Assessment • 2018 Hazard Mitigation Project Status Update
7	04/13/23	General Public, Steering Committee, Planning Team	Public Outreach Town Hall Meeting #1 (In-person and virtual on Zoom) Thursday, 6:00 pm to 7:30 pm Marin County BOS Chambers	• Meeting translated live in Spanish with 29 language subtitle capability for virtual participants. • Meeting also interpreted in American Sign Language • Meeting recorded and posted on Hazard Mitigation website. • Hazard Mitigation and Emergency Management Overview • Planning Process • Hazard Identification and Risk Assessment • Planning Goals and Objectives • Hazard Mitigation Projects • Community Input

Table 3: Town of Ross & Marin County MJHMP Planning Meetings				
No.	**Date**	**Attendees**	**Meeting**	**Planning Meeting Objectives**
8	04/29/23	General Public, Steering Committee, Planning Team	Public Outreach Town Hall Meeting #2 (In-person and virtual on Zoom) Saturday, 10:00 am to 11:30 am Marin County Health and Wellness Center	• Meeting translated live in Spanish with 29 language subtitle capability for virtual participants. • Meeting also interpreted in American Sign Language • Meeting recorded and posted on Hazard Mitigation website. • Hazard Mitigation and Emergency Management Overview • Planning Process • Hazard Identification and Risk Assessment • Planning Goals and Objectives • Hazard Mitigation Projects • Community Input
9	05/31/23	Steering Committee	Steering Committee Hazard Ranking Meeting	• HMGP (DR-4683) Funding Timeline • Public Outreach Status • Jurisdictional Hazard Vulnerability Maps • OEM Overview of Hazard Maps and Marin Maps • Marin Co. MJHMP Risk Assessment Tool Overview • 2018 Hazard Mitigation Project Status Update • Hazard Working Groups
10	06/27/23	Steering Committee, Planning Team	Marin County Planning Team Meeting	• HMGP (DR-4683) & BRIC Grant Funding Timeline • Public Outreach Status • Jurisdictional Hazard Risk Assessment Tool • OEM Overview of Hazard Maps and Marin Maps • Marin County Hazards over the Last 5-Years • 2018 Hazard Mitigation Project Status Update • 2023 Hazard Mitigation Projects/Capital Improvement Projects • Hazard Working Groups
11	07/01/23-09/01/23	Steering Committee Members	Steering Committee Members Plan	• Individual phone or conference calls with planning jurisdictions and districts to answer specific

Table 3: Town of Ross & Marin County MJHMP Planning Meetings				
No.	**Date**	**Attendees**	**Meeting**	**Planning Meeting Objectives**
			Development Sessions	questions and assist them in developing their profile annex.
12	11/27/23	Steering Committee, Planning Team	Marin County Planning Team Meeting	• Presentation and review of the Draft Marin County OA MJHMP and Jurisdictional/District Annexes
13	11/28/23	General Public	Public Outreach Presentation on Marin County Office of Emergency Management Website	• Presentation and review of the Draft Marin County OA MJHMP and Jurisdictional/District Annexes. • Opportunity for public comment and questions and answers.

Table 3: Town of Ross & Marin County MJHMP Planning Meetings

1.2.4 PUBLIC ENGAGEMENT

Early discussions with the Marin County OEM established the initial plan for public engagement to ensure a meaningful and inclusive public process with a focus on equity and accessible to the whole community. The Public Outreach efforts mirrored the Planning Team approach with a unified effort, led by the County OEM, involving all participating jurisdictions and districts. Public outreach for this plan update began at the beginning of the plan development process with a detailed press release informing the community of the purpose of the hazard mitigation planning process for the Marin County OA planning area and to invite the public to participate in the process.

Public involvement activities for this plan update were conducted by the County and all participating jurisdictions and districts and included press releases; website postings; a community survey; stakeholder and public meetings; and the collection of public and stakeholder comments on the draft plan which was posted on the County website. Information provided to the public included an overview of the mitigation status and successes resulting from implementation of the 2018 plan as well as information on the processes, new risk assessment data, and proposed mitigation strategies for the plan update.

Equity and Whole Community Approach

The Marin County OEM and the Steering Committee prioritized equity and engagement of the whole community in the development of the Marin County OA MJHMP by establishing a framework with key actions for each step of the planning process. Elements of the equity approach included:

Engaging hard-to-reach populations

This effort was to ensure the greatest equity and access to the public to enable participation in the process. The Marin County OEM outreach strategy is to “meet people where they are.” The Town Hall meetings were conducted at different familiar locations within the county where people could easily access them and were conducted on both a weekday and weekend, and in the evening and during the daytime. The meetings were offered in-person with a virtual broadcast using Zoom videoconferencing and streamed live on Marin County OEM Facebook

account. After the meeting, Marin County OEM uploaded the recorded meeting to their website to allow the public on demand access to the meeting.

Translation and Interpretation Services

The survey and outreach materials were provided in both English and Spanish to improve accessibility among populations with limited English proficiency. The website uses Google Translate for accessibility in multiple languages. Interpretation services were offered for both town hall meetings. Each town hall meeting included live Spanish translation and subtitles, Live American Sign Language (ASL/CDI) interpretation, the ability for the Zoom videoconferencing attendee to activate subtitles in 29 different languages, and vision accessible PowerPoint slide.

Three stakeholder and public meetings were held, two at the beginning of the plan development process and one prior to finalizing the updated plan. Where appropriate, stakeholder and public comments and recommendations were incorporated into the final plan, including the sections that address mitigation goals and strategies. Specifically, public comments were obtained during the plan development process and prior to plan finalization.

All press releases and website postings are on file with the Marin County OEM. Public meetings were advertised in a variety of ways to maximize outreach efforts to both targeted groups and to the public at large. Advertisement mechanisms for these meetings and for involvement in the overall MJHMP development process include:

- Development and publishing of an MJHMP public outreach article
- Providing press releases to local newspapers and radio stations
- Posting meeting announcements on the local County MJHMP website
- Email to established email lists
- Personal phone calls

The public outreach activities were conducted with participation from and on behalf of all jurisdictions participating in this plan.

The Steering Committee has made the commitment to periodically bring this plan before the public through public meetings and community posting so that citizens may make input as strategies and implementation actions change. Public meetings will continue to be held twice a year after the first and third MJHMP meetings. Public meetings will continue to be stand-alone meetings but may also follow a council meeting or other official government meeting. The public will continue to be invited to public meetings via social media messaging, newspaper invitations, and through the website for each jurisdiction participating in the plan. Each jurisdiction is responsible for assuring that their citizenry is informed when deemed appropriate by the Steering Committee.

WEBSITE

At the beginning of the plan update process, Marin County OEM established a hazard mitigation website https://emergency.marincounty.org/pages/lhmp on behalf of all the planning areas to ensure consistent messaging and information, to keep the public posted on plan development milestones, and to solicit relevant input. The website also provided information on signing up for Alert Marin, provided detailed information about the hazard mitigation process and plan

development, provided a URL and QR code link to the survey in both English and Spanish, and provided information about upcoming town hall meetings. (See Figure 1)

The site's address was publicized in all press releases, surveys and public town hall meetings. The Town of Ross also established a link on their own agency website. Information on the plan development process, the Steering Committee, a link to the Hazard Mitigation survey, and drafts of the plan were made available to the public on the site. Marin County intends to keep a website active after the plan's completion to keep the public informed about successful mitigation projects and future plan updates.

Figure 1: Marin County OEM MJHMP Website

PUBLIC MEETINGS

Two separate Marin County MJHMP Public Town Hall Meeting were conducted at different locations within the County, on different days of the week and during different times of the day. This effort was to ensure the greatest equity and access by the public to enable participation in the process. The Marin County OEM outreach strategy is to "meet people where they are." Each Town Hall Meeting included, live Spanish translation and subtitles, Live American Sign Language (ASL/CDI) interpretation, the ability for the Zoom videoconferencing attendee to activate subtitles in to 28 different languages, and vision accessible PowerPoint slide.

The first Town Hall Meeting was conducted on Thursday, April 13, 2023, from 6:00 pm to 7:30 pm, at the Marin County Board of Supervisors Chambers, Marin County Civic Center, 3501 Civic Center Drive, Room #330 San Rafael, CA 94903. The in-person meeting was also broadcast virtually using Zoom videoconferencing and streamed live on Marin County OEM Facebook account. Each of the jurisdictions participating in the MJHMP released a Press Release on their respective websites announcing the Public Town Hall Meeting and providing the date, time, and URL link to the Zoom Meeting for the public to log in and attend the Zoom Meeting. Marin County OEM also posted a notice for the Public Town Hall Meeting

on their Facebook account. At the conclusion of the presentation, a question and answer session was held to answer questions from the attendees.

The second Town Hall Meeting was conducted on Saturday, April 29, 2023, from 10:00 am to 11:30 am, at the Marin County Health and Wellness Center, 3240 Kerner Ave. Rooms #109 and #110 San Rafael, CA. 94903. The meeting followed the same format as the first and hosted the same access level of equity and accessibility.

The Marin County MJHMP Public Town Hall Meeting was recorded and downloaded from Zoom and made available to all of the jurisdictions and districts to place on their websites and local Access TV for the public to view.

Meeting participants were also invited to complete the Hazard Mitigation Survey and were provide the URL link to the Survey Monkey website to complete the survey.

Figure 2: Marin County OEM MJHMP Public Town Hall Meeting

SOCIAL MEDIA

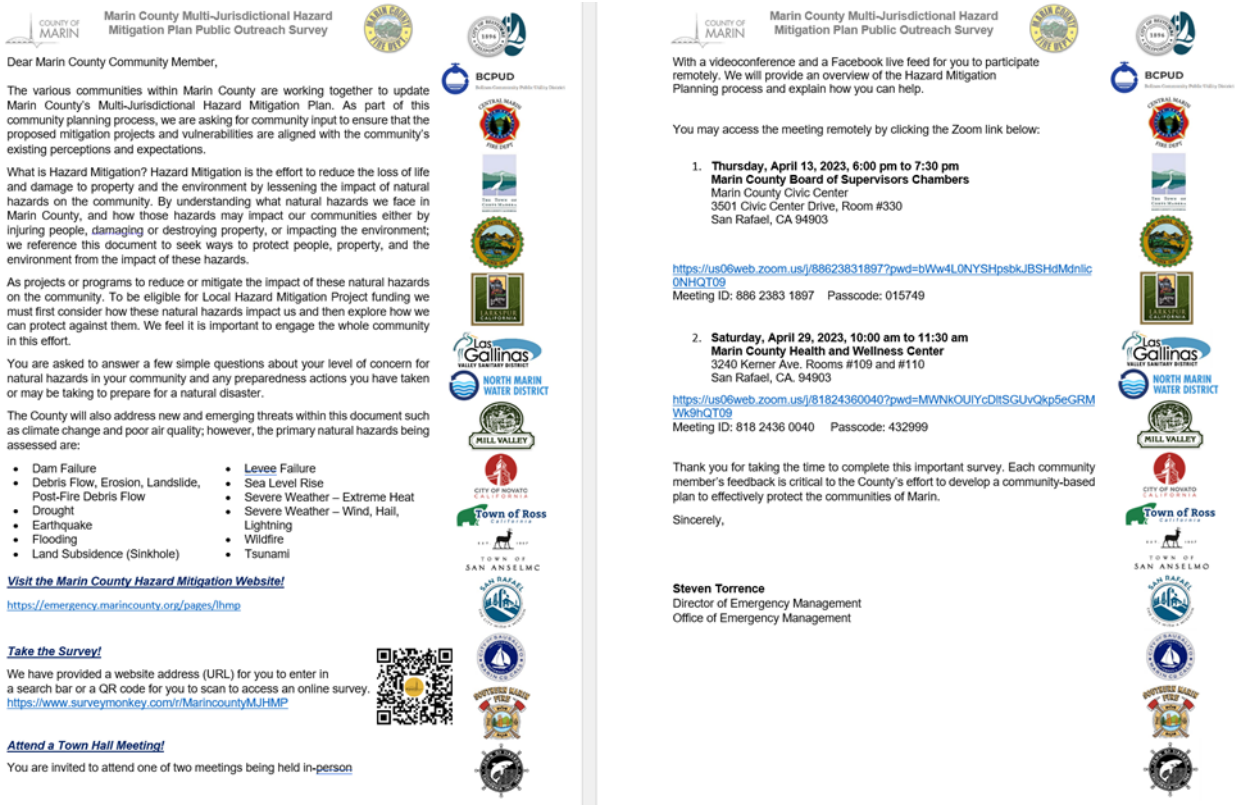
Marin County and its participating jurisdictions utilized several forms of social media to reach residents and customers. Information about the Hazard Mitigation Planning process was communicated to the public via Facebook, Twitter, and local access TV. Residents and customers were invited to complete the Hazard Mitigation Plan survey which was accessible via an attached URL or QR Code and provide feedback on potential hazard mitigation projects or programs.

The results of the survey were provided to each of the planning partners and used to support the jurisdictional annex process. Each planning partner was able to use the survey results to help identify actions as follows:

- Gauge the public's perception of risk and identify what citizens are concerned about.
- Identify the best ways to communicate with the public.
- Determine the level of public support for different mitigation strategies.
- Understand the public's willingness to invest in hazard mitigation.

PRESS RELEASES

Press releases were distributed over the course of the plan's development as key milestones were achieved and prior to each Marin County MJHMP Public Town Hall Meeting. All press releases were made available to the community in both English and Spanish. The Town of Ross issued a press release in their monthly newsletter in November, 2023.



Marin County Multi-Jurisdictional Hazard Mitigation Plan Public Outreach Survey

Dear Marin County Community Member,

The various communities within Marin County are working together to update Marin County's Multi-Jurisdictional Hazard Mitigation Plan. As part of this community planning process, we are asking for community input to ensure that the proposed mitigation projects and vulnerabilities are aligned with the community's existing perceptions and expectations.

What is Hazard Mitigation? Hazard Mitigation is the effort to reduce the loss of life and damage to property and the environment by lessening the impact of natural hazards on the community. By understanding what natural hazards we face in Marin County, and how those hazards may impact our communities either by injuring people, damaging or destroying property, or impacting the environment; we reference this document to seek ways to protect people, property, and the environment from the impact of these hazards.

As projects or programs to reduce or mitigate the impact of these natural hazards on the community. To be eligible for Local Hazard Mitigation Project funding we must first consider how these natural hazards impact us and then explore how we can protect against them. We feel it is important to engage the whole community in this effort.

You are asked to answer a few simple questions about your level of concern for natural hazards in your community and any preparedness actions you have taken or may be taking to prepare for a natural disaster.

The County will also address new and emerging threats within this document such as climate change and poor air quality; however, the primary natural hazards being assessed are:

- Dam Failure
- Debris Flow, Erosion, Landslide, Post-Fire Debris Flow
- Drought
- Earthquake
- Flooding
- Land Subsidence (Sinkhole)
- Levee Failure
- Sea Level Rise
- Severe Weather – Extreme Heat
- Severe Weather – Wind, Hail, Lightning
- Wildfire
- Tsunami

Visit the Marin County Hazard Mitigation Website!

https://emergency.marincounty.org/pages/lhmp

Take the Survey!

We have provided a website address (URL) for you to enter in a search bar or a QR code for you to scan to access an online survey. https://www.surveymonkey.com/r/MarincountyMJHMP

Attend a Town Hall Meeting!

You are invited to attend one of two meetings being held in-person

Marin County Multi-Jurisdictional Hazard Mitigation Plan Public Outreach Survey

With a videoconference and a Facebook live feed for you to participate remotely. We will provide an overview of the Hazard Mitigation Planning process and explain how you can help.

You may access the meeting remotely by clicking the Zoom link below:

1. **Thursday, April 13, 2023, 6:00 pm to 7:30 pm**
   Marin County Board of Supervisors Chambers
   Marin County Civic Center
   3501 Civic Center Drive, Room #330
   San Rafael, CA 94903

https://us06web.zoom.us/j/88623831897?pwd=bWw4L0NYSHpsbkJBSHdMdnlic0NHQT09
Meeting ID: 886 2383 1897 Passcode: 015749

2. **Saturday, April 29, 2023, 10:00 am to 11:30 am**
   Marin County Health and Wellness Center
   3240 Kerner Ave. Rooms #109 and #110
   San Rafael, CA. 94903

https://us06web.zoom.us/j/81824360040?pwd=MWNkOUlYcDltSGUvQkp5eGRMWk9hQT09
Meeting ID: 818 2436 0040 Passcode: 432999

Thank you for taking the time to complete this important survey. Each community member's feedback is critical to the County's effort to develop a community-based plan to effectively protect the communities of Marin.

Sincerely,

Steven Torrence
Director of Emergency Management
Office of Emergency Management

Figure 3: Hazard Mitigation Plan Public Outreach Press Release

SURVEY

A hazard mitigation plan survey (see Figure 4) was developed by the Steering Committee and made available to the public in both English and Spanish. The survey was used to gauge household preparedness for natural hazards and the level of knowledge of tools and techniques that assist in reducing risk and loss from natural hazards. This survey was designed to help identify areas vulnerable to one or more natural hazards. The answers to its ten questions helped guide the Steering Committee in defining our hazards, and selecting goals, objectives, and mitigation strategies. The survey was available on the hazard mitigation plan website, advertised in press releases, and at town hall meetings. Finally, the survey and the process of public input was advertised throughout the course of the planning process. The survey was available to the public on March 13, 2023, and closed on June 12, 2023. At the conclusion of the planning process 293 surveys were completed by the public.

Public Comments Considered by the Planning Team

The Planning Team used the following information gathered from the Public Outreach Survey to inform decisions regarding hazard mitigation strategies, actions, and priorities.

- Climate Change, Wildfire, and Drought were the top hazards of concern for the public.
- Text messages, mail, and the County website were the preferred methods for receiving hazard mitigation information.
- 48% of respondents expressed that they were “Very Much” concerned and 31% were “Moderately” concerned that a natural disaster could impact their home or place of residence.
- 85% of respondents own their own home.
- 99% of respondents have access to the internet.

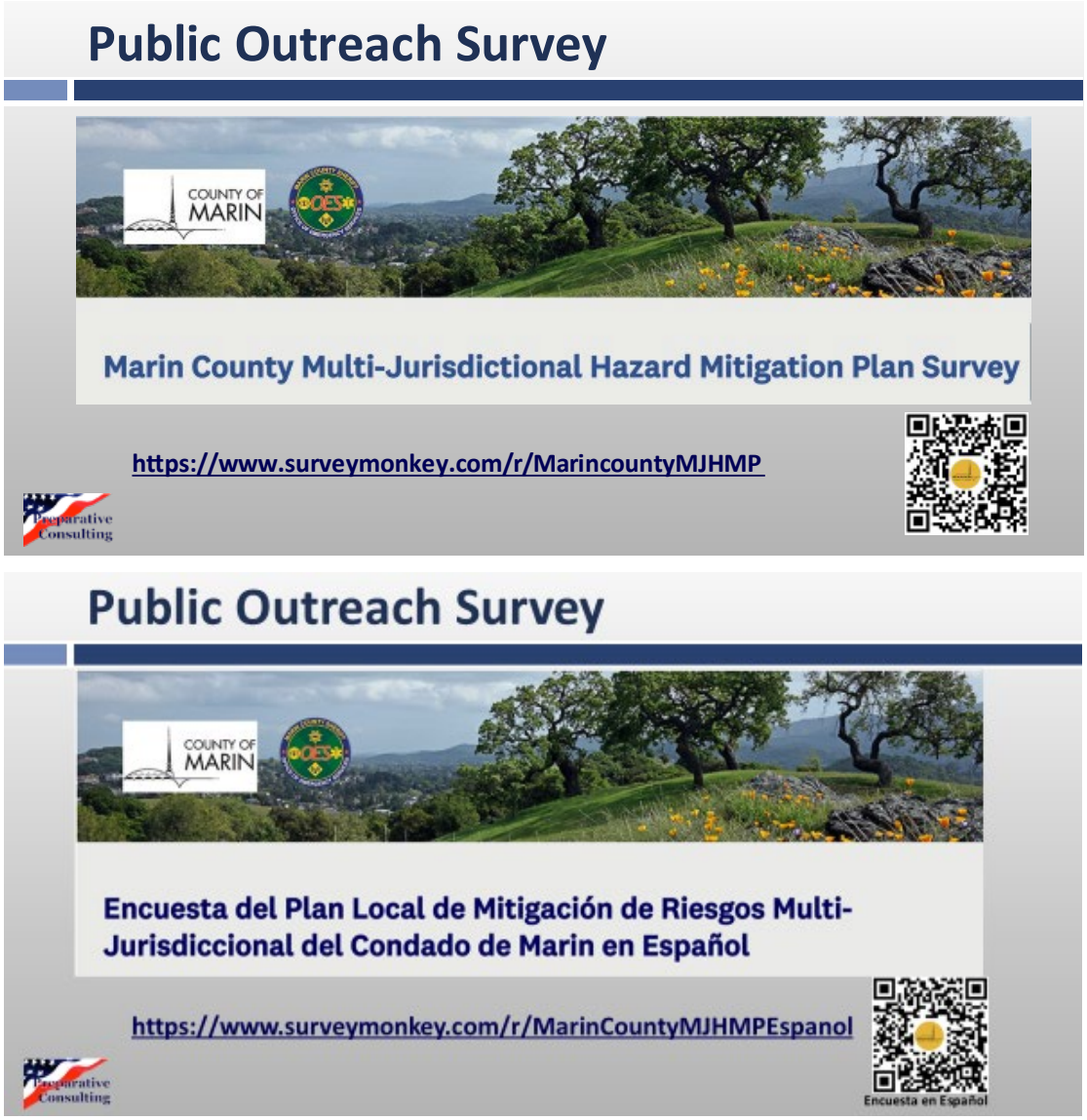


Figure 4: Hazard Mitigation Plan Survey

PUBLIC COMMENT ON THE PLAN

To solicit public feedback on the draft plan, Marin OEM engaged in a multi-faceted approach intended to reach as many Marin residents as possible, including members of the community who are under-served and under-represented. All members of the community had the opportunity to provide initial comments on the plan during a two-week period from Wednesday, December 4, 2023, to Wednesday, December 18, 2023. Although the initial comment period was listed as two weeks, the public could submit comments indefinitely via the County's website to support the County's continuous improvement efforts. The base plan, as well as city, town and special district annexes, were available for download on emergency.marincounty.org (include photos). The website additionally asked for feedback in a survey in English and Spanish (include photos), the survey was designed to establish where that person lives or works, their top hazards of concern, elicit feedback on the plan and offer a place for them to share projects to reduce risk in their community. The survey collected responses from the community in English and in Spanish.

The website and survey were shared through traditional and social media (photos) The Marin Independent Journal (Marin IJ) used the press release to write an article (hopefully; include photos). Social media accounts were updated four times with an initial ask, two reminders, and a closing announcement. The Marin OEM Public Information Officer coordinated with the Marin County Public Information Officers (MAPIO) working group to distribute information to partner jurisdictions (city, town, and special districts) to share this information on their social media sites and with the communities in the area.

To reach those who may not be engaged digitally, the planning team worked with Marin County Community Response Teams, (CRTs are a collaboration of non-profit organizations supporting underrepresented communities in four zones) to conduct outreach with half-sheet flyers in English and Spanish to share in the 4 CRT zones (southern Marin, north Marin, west Marin, San Rafael). These half sheets were also shared county-wide at libraries, including in areas not covered by CRTs, like at the Fairfax library. CRTs are designed to reach Marin's traditionally underserved and underrepresented communities, so by conducting outreach through this method, we were able to inform residents who may not have been engaged otherwise, including residents in Marin City, West Marin, and the Canal District of San Rafael.

After December 18, 2023, the various participating jurisdiction and district profiles remained on the Marin County OEM website for public comments. The Town of Ross had an additional 14-day comment period for the Town of Ross Community Profile where their profile was posted on the Town website for final public comment from January 29 – February 5, 2024.

The 14-day public comment period gave the public an opportunity to comment on the draft plan update prior to the plan's submittal to Cal OES. Comments received on the draft plan are available upon request. All comments were reviewed by the planning team and incorporated into the draft plan as appropriate.

Public Comments Considered by the Planning Team

The Marin County OEM posted the draft Hazard Mitigation Plan and hazard mitigation actions on their website and solicited public comments on the content. The Town of Ross

distributed press releases directing the community to the Marin County OEM website to review the draft plans. The Planning Team gathered public comments and information on the Marin County OEM website regarding proposed and current Hazard Mitigation Actions. The Planning Team used the comments and suggestions to inform decisions regarding hazard mitigation strategies, actions, and priorities. Most comments included ideas for hazard mitigation projects and comments on the effectiveness of current mitigation projects. These comments were used to revise the proposed hazard mitigation actions which resulted in the final list of hazard mitigation actions listed in 3.5 Hazard Mitigation Actions.

1.3 Overview and History

Prior to 1800, the Coast Miwok Indians lived and were sustained for thousands of years by the land that is now called Ross Valley. The Coast Miwok revered the land, plants and animals of the Ross Valley through tribal cultural beliefs and practices. European diseases eventually decimated the Indian population. The settlement in 1817 of Mission San Raphael, with its vast land holding, also resulted in further incursions into areas occupied by the Coast Miwok Indians.

After the Mexican Revolution of 1821, the “land grant” system of parceling out land gave rise to what we now know as Marin County. Ross was originally part of an 8,877-acre Mexican land grant to Juan B.R. Cooper in 1840 known as Ranch Punta de Quentin Canada de San Anselmo. The Town of Ross itself was named in honor of James Ross, who purchased the land in 1857 for $50,000. Ross built his home on Redwood Drive and moved there with his wife and three children. When James Ross died in 1862 his wife, Annie Ross, was forced to sell a portion of James Ross’ larger land holdings to pay each of their daughters $10,000. The 297 acres she had remaining make up part of the Town of Ross today.

The Town of Ross was incorporated as a town in 1908. The Town of Ross had an estimated population of 2,338 in 2020, with 880 housing units in the Town. The Town has a total area of 1.556 square miles. The median income for a household in the Town is $250,000 and the per capita income for the Town is $128,126. Approximately 0 percent of families and 3.5 percent of the population is below the poverty line (2020 data, U.S. Census Bureau/ 2021 American Community Survey).

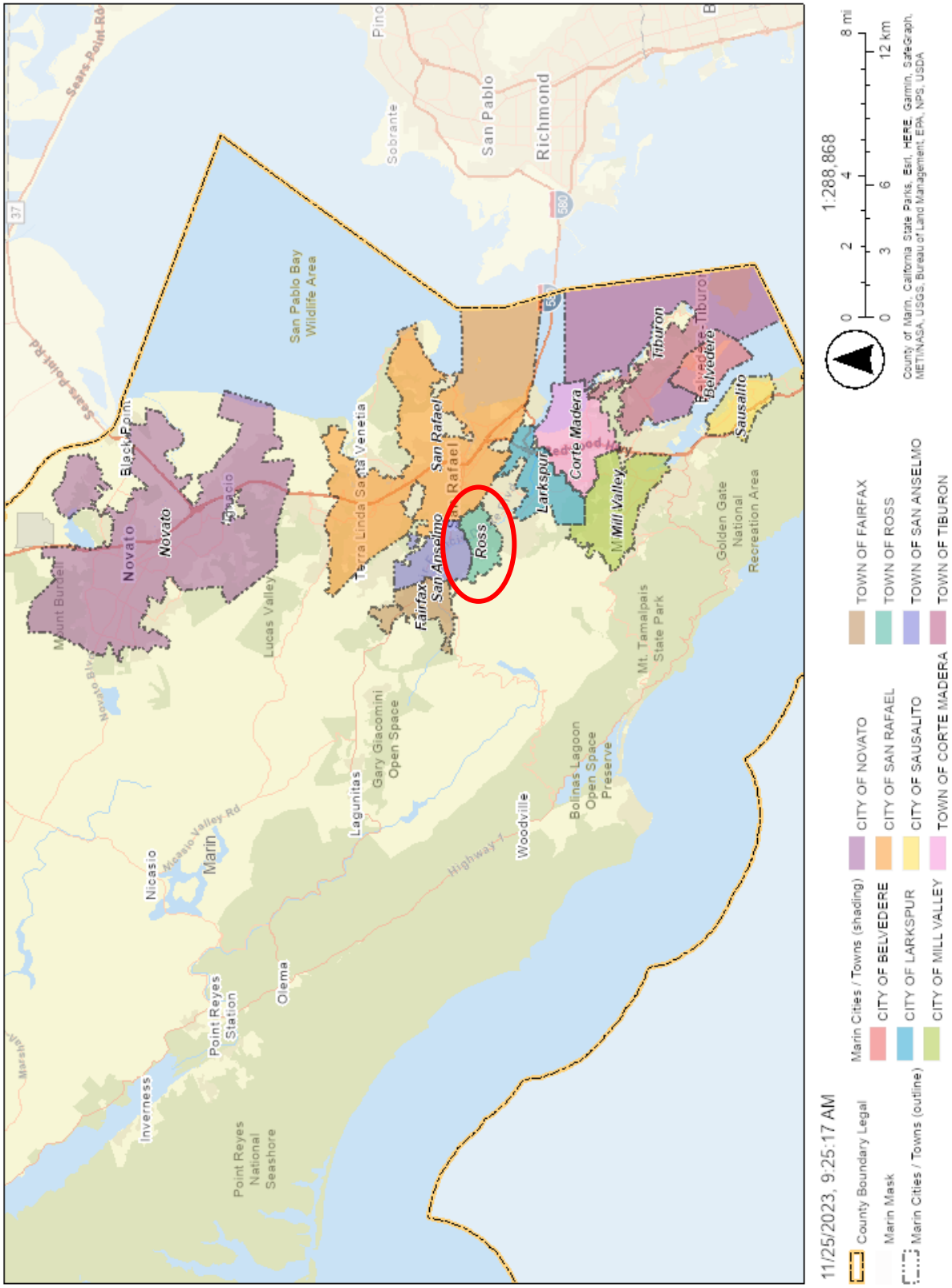


Figure 5: Map of the Town of Ross within Marin County
Source: Marin County OEM

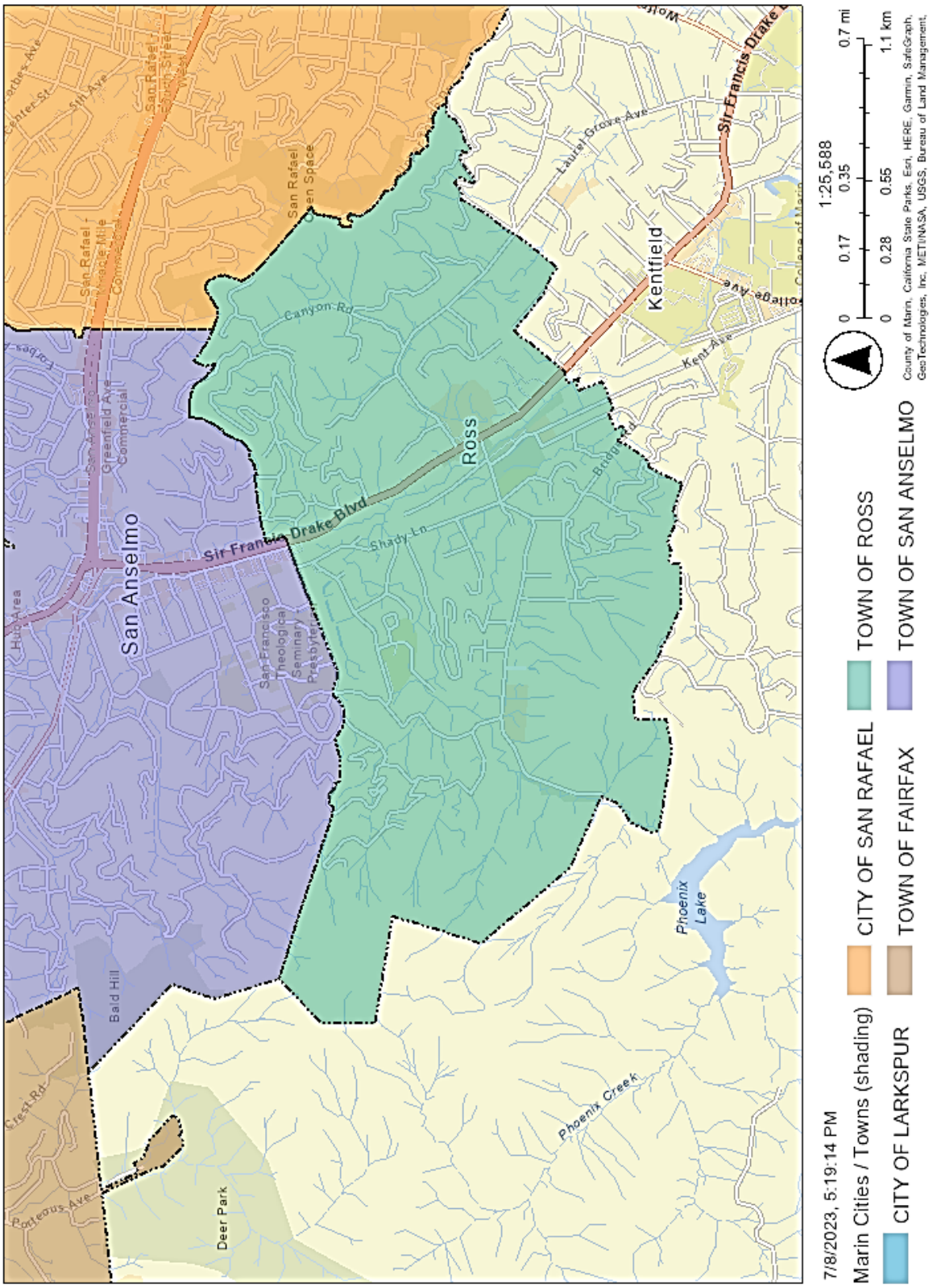


Figure 6: Map of the Town of Ross
Source: Marin County OEM

1.4 GOVERNMENT

The Town of Ross is a general law city which was incorporated in 1908. The Town provides for all municipal services other than non-storm drain related utilities and fire protection services. In 2012 the Town of Ross voted to consolidate with Ross Valley Fire Department, joining San Anselmo, Fairfax, and Sleepy Hollow to provide fire protection to Town of Ross. In 2012, Ross Valley Fire Department's Board of Directors voted to consolidate fire services with the Town of Ross, incorporating the Town of Ross fire station 18 into the Ross Valley Fire Department.

The Ross Police Department provides 24-hour law enforcement services to the Town of Ross. The importance of community involvement and interaction is stressed at every level of the Department.

Ross has a Council/Manager form of government. The five members of the Town Council are elected to staggered four-year terms. The Town Council appoints a Town Manager to manage and direct the day-to-day operations of the Town. The Town consists of 6 departments: Administration (including finance and human resources), Building, Planning, Police, Public Works, and Recreation.

The City Council assumes responsibility for the adoption of this plan; and the Town Manager will oversee its implementation.

1.5 WEATHER AND CLIMATE

The Town of Ross lies 36 feet above sea level. In Ross, the summers are long, comfortable, arid, and mostly clear and the winters are short, cold, wet, and partly cloudy. Over the course of the year, the temperature typically varies from 43°F to 71°F and is rarely below 36°F or above 84°F. The difference in precipitation between the driest month and the wettest month is 5 inches. The annual rainfall is 18 inches. The month of highest relative humidity is February (79.60 %). The month with the lowest relative humidity is June (69.59 %). The month which sees the most rainfall is January. The driest month of the year is July.

	January	February	March	April	May	June	July	August	September	October	November	December
Avg. Temperature °C (°F)	9.3 °C (48.7) °F	9.8 °C (49.7) °F	10.9 °C (51.6) °F	11.8 °C (53.2) °F	13.6 °C (56.5) °F	15.6 °C (60.2) °F	16 °C (60.8) °F	16.4 °C (61.4) °F	16.4 °C (61.5) °F	15 °C (58.9) °F	11.9 °C (53.5) °F	9.5 °C (49) °F
Min. Temperature °C (°F)	6.3 °C (43.4) °F	6.9 °C (44.4) °F	7.8 °C (46.1) °F	8.5 °C (47.4) °F	10.1 °C (50.2) °F	11.7 °C (53) °F	12.3 °C (54.2) °F	12.9 °C (55.2) °F	12.6 °C (54.7) °F	11.5 °C (52.7) °F	8.9 °C (48) °F	6.8 °C (44.2) °F
Max. Temperature °C (°F)	13.3 °C (56) °F	13.9 °C (57) °F	15.1 °C (59.2) °F	16.2 °C (61.2) °F	18.3 °C (64.9) °F	20.9 °C (69.6) °F	21.2 °C (70.2) °F	21.5 °C (70.8) °F	21.9 °C (71.4) °F	20 °C (68.1) °F	16.2 °C (61.2) °F	13.1 °C (55.7) °F
Precipitation / Rainfall mm (in)	118 (4)	124 (4)	88 (3)	41 (1)	22 (0)	5 (0)	1 (0)	2 (0)	2 (0)	25 (0)	58 (2)	114 (4)
Humidity(%)	78%	80%	78%	72%	71%	70%	75%	76%	73%	72%	75%	77%
Rainy days (d)	8	7	6	4	3	1	0	0	0	2	5	7
avg. Sun hours (hours)	5.7	6.4	7.8	9.4	10.0	10.6	9.3	8.5	8.7	7.8	6.7	5.6

Figure 7: The Town of Ross Precipitation and Monthly Temperatures
Source: En.Climate-Data.org

1.6 DEMOGRAPHICS

The California Department of Finance shows an overall estimated decrease in the population of Marin County and the Town of Ross since the last plan update in 2018. Of the total estimated 257,135 residents of Marin County in 2022 based on the 2020 U.S. Census Survey, 190,148 residents live in the incorporated county and 66,987 residents live in the unincorporated county.

The Town of Ross had an estimated population of 10,104 in the 2018 plan. 2020 U.S. Census Survey estimated the Town's population at 10,222. However, revised estimates for 2022 estimate the population to decrease to 10,028 population.

Table 4: Town of Ross Estimated Jurisdictional Population				
Jurisdiction	Population 2022 (Estimate)	Population 2020	Population 2018 (Estimate)	Percent Change 2018-2022
Marin County	257,135	262,321	262,179	-1.92%
Town of Ross	2,301	2,338	2,566	-10.33%

Table 4: Town of Ross Estimated Jurisdictional Population
Source: California Department of Finance

According to the U.S. Census, the population of The Town of Ross is 12,338 as of 2020. Between 2018-2020, the City's growth rate increased at an average annual rate of 10.33%, lower than the historic twenty-year average growth rate of 3.2%. Table 5 shows the population growth comparison of the State of California, County of Marin and the Town of Ross between 2010 - 2020.

Table 5: Population Change of The Town of Ross				
Jurisdiction	Total Population		Change, 2010-2020	
	April 1, 2010	April 1, 2020	Number	Percent
California	37,253,956	39,538,223	2,284,267	6.1%
Marin County	252,409	262,321	9,912	3.9%
Ross, town	2,566	2,338	228	-10.33%

Table 5: Population Change of The Town of Ross
Source: Town of Ross Housing Element, US Census Bureau, California Department of Finance

Table 6 lists the various languages spoken in the Town of Ross.

Table 6: Languages Spoken in Ross	
Primary Language Spoken	% of Population
English only	96.2%
Spanish	1.0%
Other Indo-European languages	2.5%
Asian and Pacific Islander languages	0.3%
Other languages	0.0%

Table 6: Languages Spoken in Ross
Source: US Census Bureau (2020)

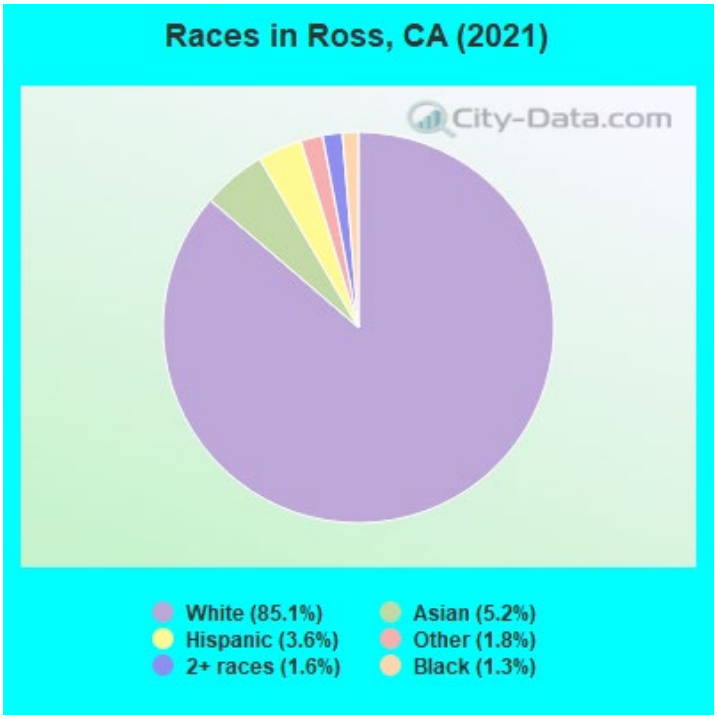


Figure 8: Races in Ross
Source: City-Data.com

Table 7: Marin County Jurisdictional Housing Stock							
2022 and 2018							
Year		Total Units	Single Family		Multi-Family		Mobile Homes
			Detached	Attached	2 to 4	5 plus	
California							
2022	Number	14,583,998	8,341,577	1,010,851	1,168,669	3,500,674	562,223
	Percent	100.0%	57.2%	6.9%	8.0%	24.0%	3.9%
2018	Number	14,157,502	8,160,864	985,926	1,129,761	3,318,946	562,005
	Percent	100.0%	57.6%	7.0%	8.0%	23.4%	4.0%
Marin County							
2022	Number	111,879	68,004	11,314	8,524	22,013	1,984
	Percent	100.0%	60.8%	10.1%	7.6%	19.7%	1.8%
2018	Number	112,294	68,697	11,318	8,307	21,986	1,986
	Percent	100.0%	61.2%	10.1%	7.4%	19.6%	1.8%
Town of Ross							
2022	Number	882	817	17	23	25	0
	Percent	100.00%	92.63%	2.08%	135.29%	108.70%	0.00%
2018	Number	892	831	16	19	26	0
	Percent	100.00%	93.16%	1.93%	118.75%	136.84%	0.00%

Table 7: Marin County Jurisdictional Housing Stock
Source: California Department of Finance

Figure 9: Town of Ross Land Use Map
Source: Town of Ross General Plan

1.7 Social Vulnerability and Risk

The California Governor's Office of Emergency Services (Cal OES) has initiated the "Prepare California" grant program focused on building community resilience amongst vulnerable individuals living in the areas of the state most susceptible to natural disasters. The Prepare California Initiative is aimed at reducing long-term risks from natural disasters by investing in local capacity building and mitigation projects designed to protect communities.

Prepare California leverages funds approved in Governor Gavin Newsom's 2021-22 State Budget and is designed to unlock federal matching funds for community mitigation projects that vulnerable communities would otherwise be unable to access. This program is intended for communities that are the most socially vulnerable and at the highest risk for future natural hazard events. The state identified communities by prioritizing California census tracts according to their estimated hazard exposures and social vulnerability.

The National Risk Index is a dataset and online tool to help illustrate the United States communities most at risk for 18 natural hazards: Avalanche, Coastal Flooding, Cold Wave, Drought, Earthquake, Hail, Heat Wave, Hurricane, Ice Storm, Landslide, Lightning, Riverine Flooding, Strong Wind, Tornado, Tsunami, Volcanic Activity, Wildfire, and Winter Weather.

For purposes of this plan the following National Risk Index (NRI) hazards are profiled in support of eight of the twelve Marin County MJHMP Hazards. NRI data was not available for Dam Failure, Land Subsidence, Levee Failure, or Sea Level Rise.

Table 8: NRI Hazards and Marin County MJHMP Hazards	
NRI Hazards	Marin County MJHMP Hazards
Earthquake	Earthquake
Riverine Flooding	Flooding
Coastal Flooding	Flooding
Wildfire	Wildfire
Landslide	Debris Flow
Drought	Drought
Heat Wave	Severe Weather -Extreme Heat
Tsunami	Tsunami
Strong Wind	Severe Weather – Wind, Tornado

Table 8: NRI Hazards and Marin County MJHMP Hazards
Source: FEMA National Risk Index 2023

The National Risk Index leverages available source data for Expected Annual Loss due to these 18 hazard types, Social Vulnerability, and Community Resilience to develop a baseline relative risk measurement for each United States county and Census tract. These measurements are calculated using average past conditions, but they cannot be used to predict future outcomes for a community. The National Risk Index is intended to fill gaps in available data and analyses to better inform federal, state, local, tribal, and territorial decision makers as they develop risk reduction strategies.

Calculating the Risk Index

Risk Index scores are calculated using an equation that combines scores for Expected Annual Loss due to natural hazards, Social Vulnerability and Community Resilience:
Risk Index = Expected Annual Loss × Social Vulnerability ÷ Community Resilience

Hazard Type Risk Index

Hazard type Risk Index scores are calculated using data for only a single hazard type, and reflect a community's Expected Annual Loss value, community risk factors, and the adjustment factor used to calculate the risk value.

Table 9 illustrates the NRI Hazard Type Risk Index for Ross Census Tract 1181.00.

Table 9: NRI Hazard Type Risk Index for Ross Census Tract 1181.00

Hazard Type	EAL Value	Social Vulnerability	Community Resilience	CRF	Risk Value	Score
Earthquake	$1,147,502	Very Low	Very High	0.73	$838,311	89.9
Riverine Flooding	$423,455	Very Low	Very High	0.73	$309,356	94.3
Coastal Flooding	$0	Very Low	Very High	0.73	$0	0
Heat Wave	$3,653	Very Low	Very High	0.73	$2,669	31.1
Landslide	$2,353	Very Low	Very High	0.73	$1,719	73.5
Wildfire	$15,170	Very Low	Very High	0.73	$11,082	84.3
Tsunami	$0	Very Low	Very High	0.73	$0	0
Strong Wind	$141	Very Low	Very High	0.73	$103	4.7
Drought	$0	Very Low	Very High	0.73	$0	0

Table 9: NRI Hazard Type Risk Index for Ross Census Tract 1181.00
Source: FEMA National Risk Index 2023

Social groups in Census tract 06041118100 have a Very Low susceptibility to the adverse impacts of natural hazards when compared to the rest of the U.S.

Figure 10 illustrates the Social Vulnerability Map for Ross Census Tract 1181.00.

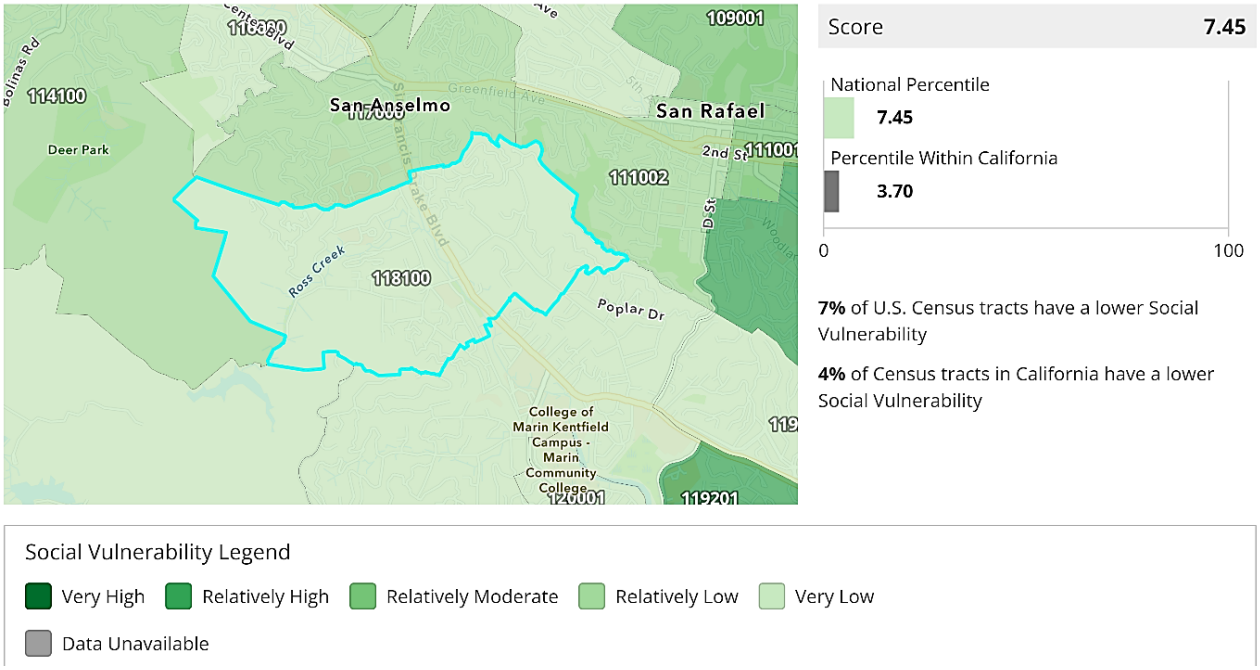


Figure 10: Town of Ross Social Vulnerability Map Census Tract 1181.00
Source: FEMA National Risk Index 2023

Most socially vulnerable residents in Marin County reside in parts of Novato, parts of San Rafael, including in and around the Canal District, the Greenbrae neighborhood of Larkspur, and the unincorporated areas of Marin City and Santa Venetia. This aligns with what the County knows about Marin residents. However, discrepancy lies in the western, more rural area of the county. West Marin is comprised of seven villages, and other populated areas, that are distanced from the centralized resources in the eastern part of the county. At three local elementary school in West Marin (2022-2023 school year), students eligible for free and reduced lunch program are, 62%, 41%, and 52%, a reflection of the financial capacity of local families. West Marin is home to many farms that may employ and house underrecognized workers that may not have taken part in a census survey, what the SVI is calculated from. In the fourth quarter of FY 2021/22 the bus routes traveling to West Marin (Rural Routes) were the only service category to have increased in ridership since pre-COVID (increase 0.1%; Marin Transit, 2022) showing the reliance of West Marin residents on public transportation; however, this data continues to adjust based upon the increase in alternate methods of mass transportation. Considering this, the County of Marin acknowledges that unique social factors in West Marin require different approaches than other parts of the County.

The Town of Ross has a “Very Low” Social Vulnerability rating. The median income for a household in the Town is $250,000 and the per capita income for the Town is $128,126. Approximately 0 percent of families and 3.5 percent of the population is below the poverty line (2020 data, U.S. Census Bureau/ 2021 American Community Survey).

1.8 ECONOMY AND TAX BASE

The Town of Ross is Marin County's primary retail, service, and commercial center. Table 10 shows income by household in The Town of Ross as of 2019.

Table 10: Household Income for The Town of Ross as of 2019		
Household Income	Number	Percent
Total Households	852	-
Less than $10,000	0	0.0
$10,000 to $14,999	36	4.2
$15,000 to $24,999	4	0.5
$25,000 to $34,999	0	0.0
$35,000 to $49,999	37	4.3
$50,000 to $74,999	46	5.4
$75,000 to $99,999	46	5.4
$100,000 to $149,999	101	11.9
$150,000 to $199,999	46	5.4
$200,000 or more	536	62.9
Median household income (dollars)	$250,000	
Mean household income (dollars)	$363,130	

Table 10: Household Income for The Town of Ross as of 2019
Source: US Census Bureau American Community Survey 2019 Estimates

Table 11 shows the percentage of people in The Town of Ross over the age of 16 employed by industry.

Table 11: Town of Ross Civilian Employed Population 16 years+ by Industry		
Industry	Estimated Employed	Percent
Civilian employed population 16 years and over	1503	-
Agriculture, forestry, fishing and hunting, and mining	9	0.60 %
Construction	124	8.25%
Manufacturing	128	8.52%
Wholesale trade	0	0%
Retail trade	249	16.57%
Transportation and warehousing, and utilities	33	2.20%
Information	0	0
Finance and insurance, and real estate and rental and leasing	45	2.99%
Professional, scientific, and management, and administrative and waste management services	130	8.65%
Educational services, and health care and social assistance	388	25.81%

Arts, entertainment, and recreation, and accommodation and food services	221	14.70%
Other services, except public administration	45	2.99%
Public administration	131	8.72%

Table 11: Town of Ross Civilian Employed Population 16 years+ by Industry
Source: US Census Bureau American Community Survey 2021 Estimates

1.9 CRITICAL FACILITIES

The following list of facilities has been determined to be critical to the ability of the Town of Ross to fulfill the requirements of its mission during an emergency:

Table 12: Town of Ross Critical Facilities					
	Category	Name	Address	Fire Severity Zone	Flood Zone
Critical Facilities					
1.	Fire	Ross Valley Fire District Station 18	33 Sir Francis Drake Boulevard, Ross, CA 94957	Moderate	AE/X
2.	Law	Ross Police Department	33 Sir Francis Drake Boulevard, Ross, CA 94957	Moderate	X
3.	Local Government	Ross Town Hall	31 Sir Francis Drake Blvd. Ross, CA 94957	Moderate	X
4.	Health / Medical EMS	Ross Valley Paramedic Authority	33 Sir Francis Drake Blvd. Ross, CA 94957	Moderate	AE/X
5.	Health / Medical	Cedars Of Marin Ross Campus	115 Upper Rd, Ross, CA 94957	High	X
6.	School	Ross School K-8	9 Lagunitas Rd. Ross, CA 94957	High	AE
7.	School	Branson High School	39 Fernhill Avenue, Ross, CA 94957	High	X

Table 12: Town of Ross Critical Facilities
Source: Town of Ross

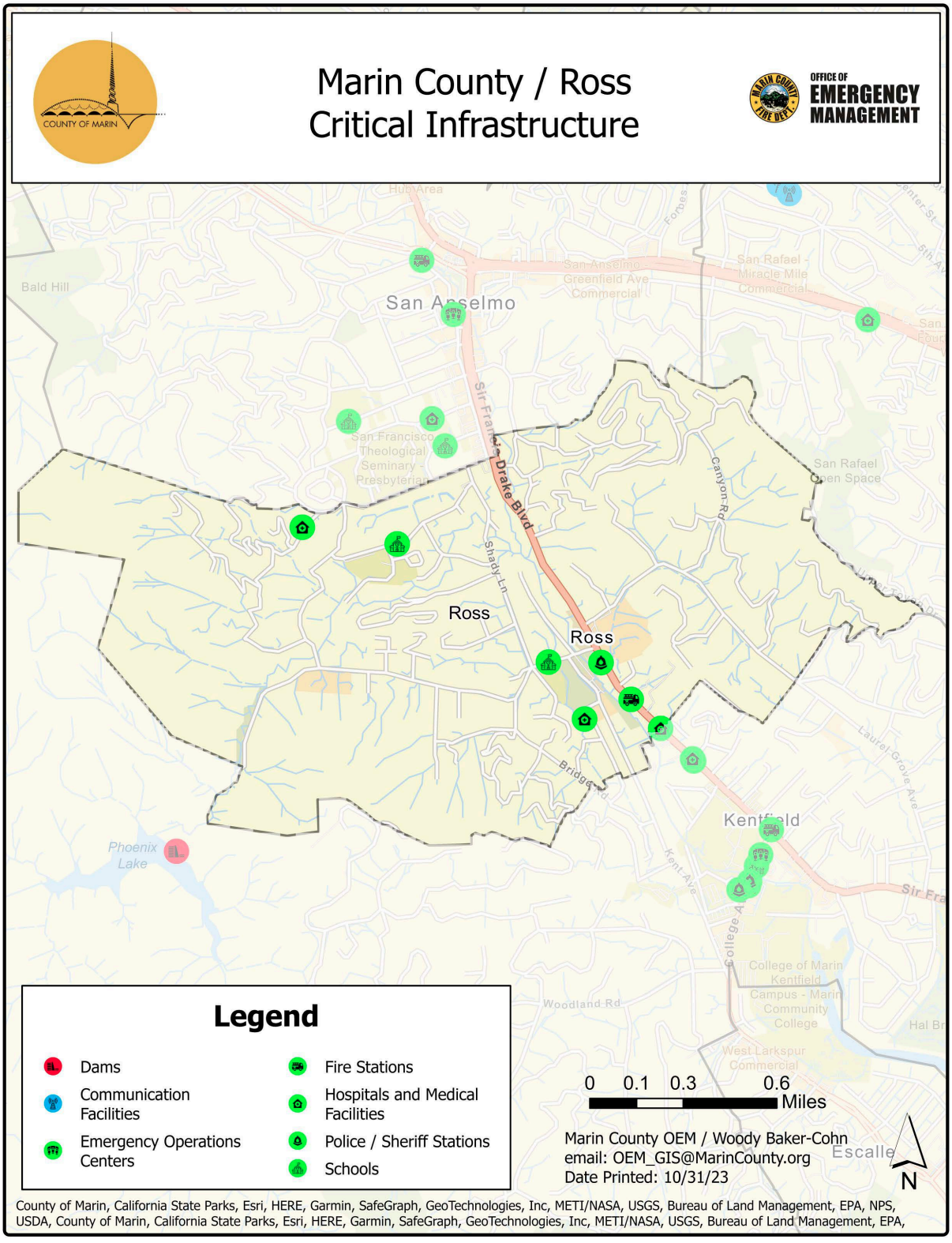


Figure 11: Town of Ross Critical Facilities
Source: Marin County OEM

1.10 HISTORICAL PROPERTIES

The Town of Ross has one registered historically significant homes, public buildings, or landmarks. To inventory these resources, the HMPC collected information from a number of sources:

- California Department of Parks and Recreation Office of Historic Preservation (OHP) is responsible for the administration of federally and state mandated historic preservation programs to further the identification, evaluation, registration, and protection of California's irreplaceable archaeological and historical resources. OHP administers the National Register of Historic Places, the California Register of Historical Resources, California Historical Landmarks, and the California Points of Historical Interest programs.
- Town of Ross website.

As defined by the National Environmental Policy Act (NEPA), any property over 50 years of age is considered a potential historic resource and is potentially eligible for the National or California Register. Thus, in the event that the property is to be altered, or has been altered, as the result of a major federal action, the property must be evaluated under the guidelines set forth by NEPA. Structural mitigation projects are considered alterations for the purpose of this regulation. Similar regulations exist for buildings under the California Environmental Quality Act (CEQA)

Table 13: Historic Sites in Marin County

Name/Landmark State Plaque Number	National Register (NR)	State Landmark	California Register	Date Listed (NR)	Jurisdiction
Marin Art and Garden Center	X			6/6/2022	Ross

Table 13: Historic Sites in The Town of Ross
Source: California Office of Historic Preservation and the National Register of Historic Places

SECTION 2.0: HAZARD IDENTIFICATION AND RISK ASSESSMENT

The Town of Ross identified hazards that affect the city and developed natural hazard profiles based upon the countywide risk assessment, past events and their impacts. Figure 12 shows the top hazards that the Jurisdiction is at risk from according to the hazard mitigation Steering Committee.

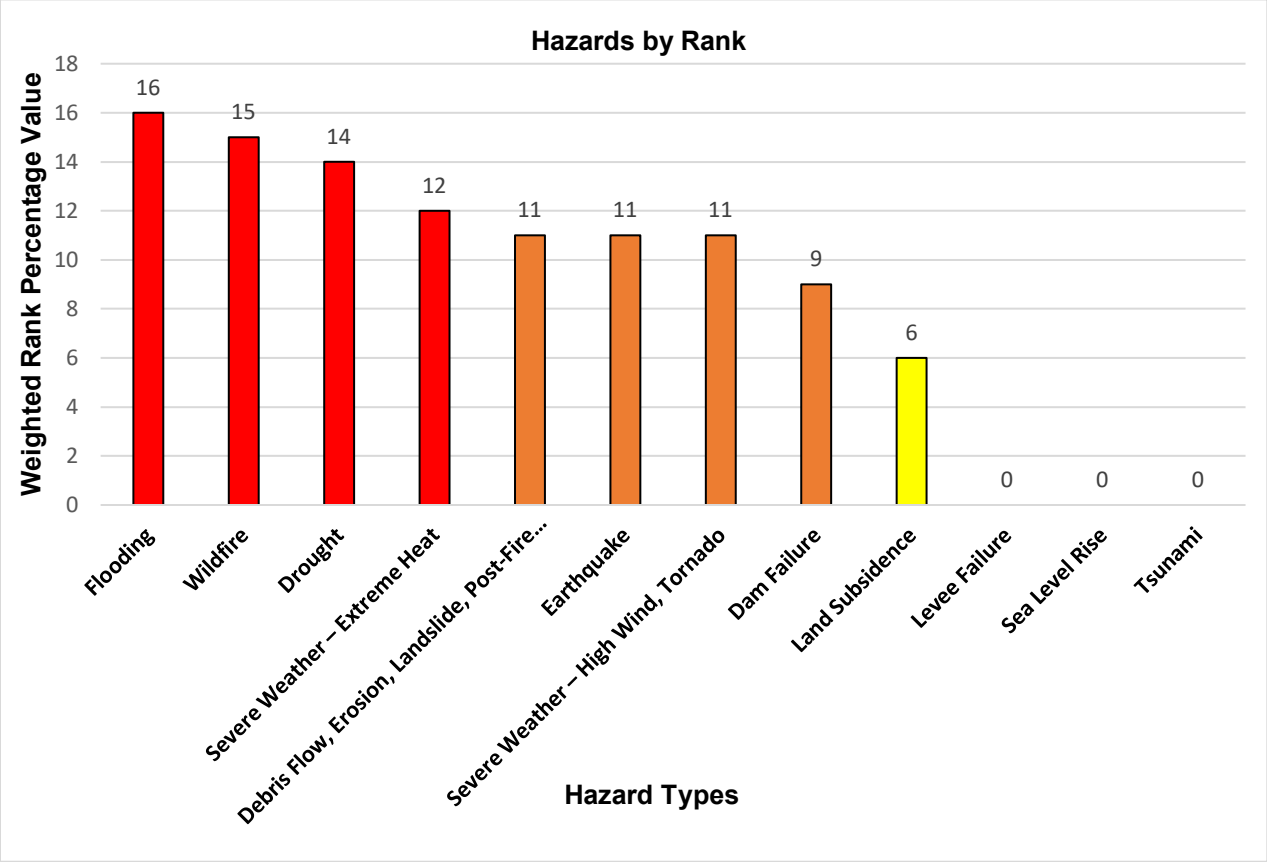


Figure 12: Town of Ross Risk Assessment – Planning Team Top Hazards

Figure 13: Risk Rank Categorization	
Risk Level	**Risk Numerical Score**
High Risk	**12 - 16**
Serious Risk	**8 - 11**
Moderate Risk	**4 - 7**
Low Risk	**1 - 3**

Figure 13: Hazard Risk Categorization

Each Marin County MJHMP participating jurisdiction and organization reviewed and approved the Top Hazards identified by the Planning Team. Each participating jurisdiction and organization then completed a more complex assessment tool to further develop their hazard assessment and prioritization.

The planning process used the available FEMA tools to evaluate all the possible threats faced. The primary tool selected was the Hazard Assessment and Prioritization Tool. This matrix allowed the participating jurisdiction or organization to assess their own level of vulnerability and mitigation capability. Each participating Jurisdiction and organization assessed the top hazards for:

- Probability/ Likelihood of Future Events
- Geographic Extent
- Magnitude/ Severity
- Climate Change Influence
- Significance

Probability/ Likelihood of Future Events

- **Unlikely:** Occurs in intervals greater than 100 years - Less than 1% probability of occurrence in the next year or a recurrence interval greater than 100 years.
- **Occasional:** Occurring every 11 to 100 years - 1-10% probability of occurrence in the next year or a recurrence interval of 11 to 100 years.
- **Likely:** Occurring every 1 to 10 years - 10-90% probability of occurrence in the next year or recurrence interval of 1 to 10 years.
- **Highly Likely:** Occurring almost every year - 90-100% probability of occurrence in the next year or a recurrence interval of less than 1 year.

Geographic Extent

- **Negligible:** Less than 10% of the planning area
- **Limited:** 10-25% of the planning area
- **Significant:** 25-75% of planning area
- **Extensive:** 75-100% of planning area

Magnitude/ Severity

- **Weak:** Limited classification on scientific scale, slow speed of onset or short duration of event, resulting in little to no damage.
- **Moderate:** Moderate classification on scientific scale, moderate speed of onset or moderate duration of event, resulting in some damage and loss of services for days.
- **Severe:** Severe classification on scientific scale, fast speed of onset or long duration of event, resulting in devastating damage and loss of services for weeks or months.
- **Extreme:** Extreme classification on scientific scale, immediate onset or extended duration of event, resulting in catastrophic damage and uninhabitable conditions.

Table 14: Select Hazards Magnitude and Severity Scale					
Hazard	**Scale/Index**	**Weak**	**Moderate**	**Severe**	**Extreme**
Drought	Palmer Drought Severity Index	+1.99 to -1.99	-2.00 to -2.99	-3.00 to -3.99	-4.00 and below
Earthquake	Modified Mercalli	I to IV	V to VII	VIII	IX to XII
	Richter Magnitude	2,3	4,5	6	7,8
Tornado	Fujita Tornado Damage Scale	FO	F1, F2	F3	F4, F5

Table 14: Select Hazards Magnitude/ Severity Scale or Index

Climate Change Influence

- **Low:** Minimal potential impact
- **Medium:** Moderate potential impact
- **High:** Widespread potential impact

Significance

- **Low:** Minimal potential impact - Two or more criteria fall in lower classifications, or the event has a minimal impact on the planning area. This rating is sometimes used for hazards with a minimal or unknown record of occurrences or for hazards with minimal mitigation potential.
- **Medium:** Moderate potential impact - The criteria fall mostly in the middle ranges of classifications and the event's impacts on the planning area are noticeable but not devastating. This rating is sometimes used for hazards with a high extent rating but very low probability rating.
- **High:** Widespread potential impact - The criteria consistently fall in the high classifications and the event is likely/highly likely to occur with.

2.1 CLIMATE CHANGE

The County of Marin and associated jurisdictions profiled jointly recognize that the earth's climate is forcibly being augmented due to humans' reliance on fossil fuels and non-natural resources which pose negative impacts on the earth's climate. Reliance on fossil fuels and non-natural products results in the climate shifting to include unseasonable temperatures, more frequent and intense storms, prolonged heat and cold events, and a greater reliance on technological advancements to maintain the wellbeing of community members and balance of the environment. The forced adaptation to climatic shifts is necessary for the County and jurisdictions to understand and include with these assessments.

Locally to Marin, drought and rain events have already had devastating impacts to critical infrastructure, agriculture, and water resources; and globally, unseasonable temperatures have been identified as the cause for enhanced wildfires, severe droughts, ice sheets and glaciers disappearing, and persons emigrating from their countries due to a lack of sustainable, local resources. Melting land ice contributes additional water to the oceans and as ocean temperatures rise the water expands, both of which contribute to increase rates of sea level rise. Marin is bordered on the west by the Pacific Ocean and on the east by San Francisco Bay, making it particularly vulnerable to flooding and erosion caused by sea level rise.

The cause of current climate change is largely human activity, burning fossil fuels, natural gas, oil, and coal. Burning these materials releases greenhouse gases into Earth's atmosphere. Greenhouse gases trap heat from the sun's rays inside the atmosphere causing Earth's average temperature to rise. This rise in the planet's temperature was formerly called, "global warming", but climate change has shown to include both intense heat and cold shifts. The warming of the planet impacts local and regional climates. Throughout Earth's history, climate has continually changed; however, when occurring naturally, this is a slower process that has taken place over hundreds and thousands of years. The human influenced climate change that is happening now is occurring at an abnormally faster rate with devastating results.

GLOBAL OBSERVED AND PROJECTED IMPACTS AND RISKS
Source: Intergovernmental Panel on Climate Change, Headline Statements from the Summary for Policymakers, 2022

- Human-induced climate change, including more frequent and intense extreme events, has caused widespread adverse impacts and related losses and damages to nature and people, beyond natural climate variability.
- Global warming, reaching 1.5°C in the near-term, would cause unavoidable increases in multiple climate hazards and present multiple risks to ecosystems and humans.
- Beyond 2040 and depending on the level of global warming, climate change will lead to numerous risks to natural and human systems.
- The magnitude and rate of climate change and associated risks depend strongly on near-term mitigation and adaptation actions, and projected adverse impacts and related losses and damages escalate with every increment of global warming.
- Multiple climate hazards will occur simultaneously, and multiple climatic and non-climatic risks will interact, resulting in compounding overall risk and risks cascading across sectors and regions.

FUTURE TRENDS/ IMPACTS
Source: Study Confirms Climate Models are Getting Future Warming Projections Right – Climate Change: Vital Signs of the Planet (nasa.gov)

Global Warming

- If global warming transiently exceeds 1.5°C in the coming decades or later, then many human and natural systems will face additional severe risks.
- An estimated 60% of today's methane emissions are the result of human activities. The largest sources of methane are agriculture, fossil fuels, and decomposition of landfill waste.
- The concentration of methane in the atmosphere has more than doubled over the past 200 years. Scientists estimate that this increase is responsible for 20 to 30% of climate warming since the Industrial Revolution (which began in 1750).
- According to the most recent National Climate Assessment, droughts in the Southwest and heat waves (periods of abnormally hot weather lasting days to weeks) are projected to become more intense, and cold waves less intense and less frequent.
- The last eight years have been the hottest years on record for the globe.

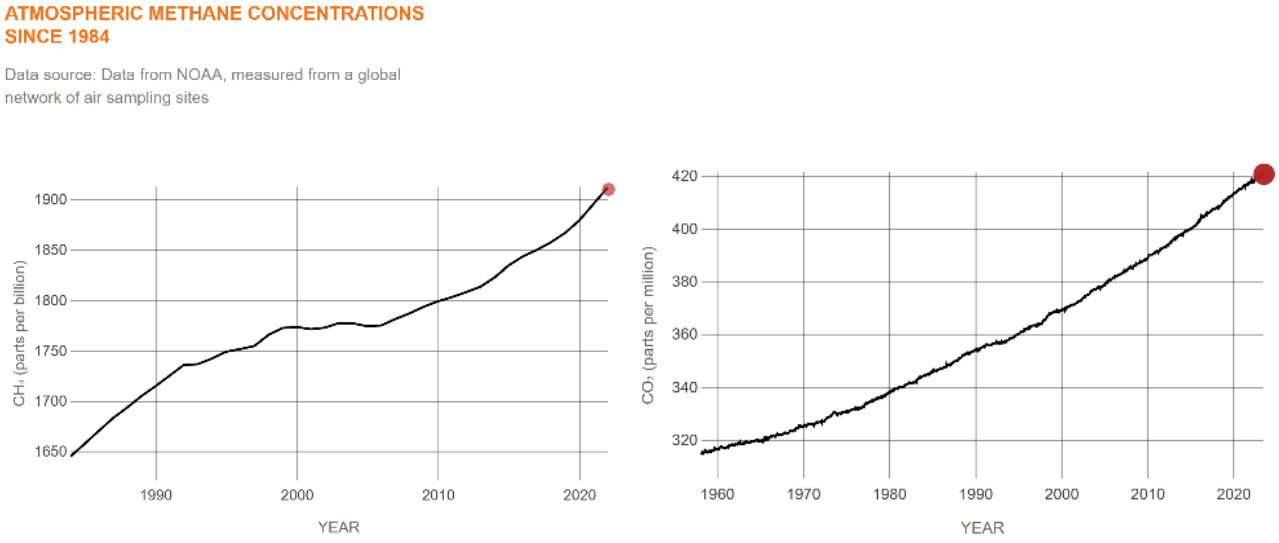


Figure 14: NASA Global Temperature Change CO2 Gas
Source: NASA Global Climate Change, 2022

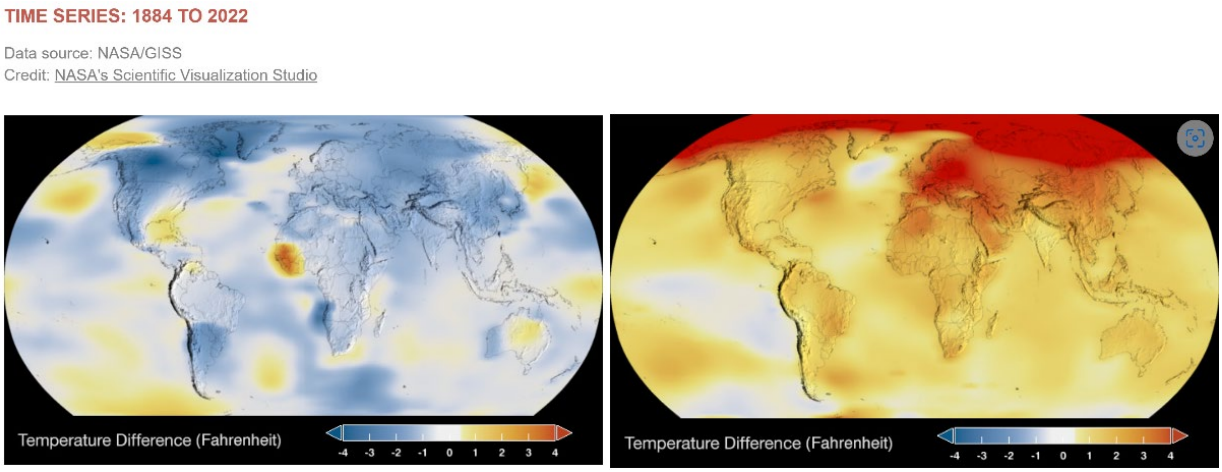


Figure 15: NASA Global Temperature Change 1884 to 2022
Source: NASA Global Climate Change, 2022

Drought

- A NASA-led study in 2022 concluded that the 22-year-long megadrought in southwestern US was the driest the territory had experienced in at least 1,200 years and was expected to persist through at least 2022.

Sea Level Rise

- Global sea levels are rising as a result of human-caused global warming, with recent rates being unprecedented over the past 2,500-plus years.
- U.S. Sea Level Likely to Rise 1 to 6.6 Feet by 2100.

- Global sea level has risen about 8 inches (0.2 meters) since reliable record-keeping began in 1880. By 2100, scientists project that it will rise at least another foot (0.3 meters), but possibly as high as 6.6 feet (2 meters) in a high-emissions scenario.
- Sea ice cover in the Arctic Ocean is expected to continue decreasing, and the Arctic Ocean will very likely become essentially ice-free in late summer if current projections hold. This change is expected to occur before mid-century.
- An indicator of changes in the Arctic sea ice minimum over time. Arctic sea ice extent both affects and is affected by global climate change.

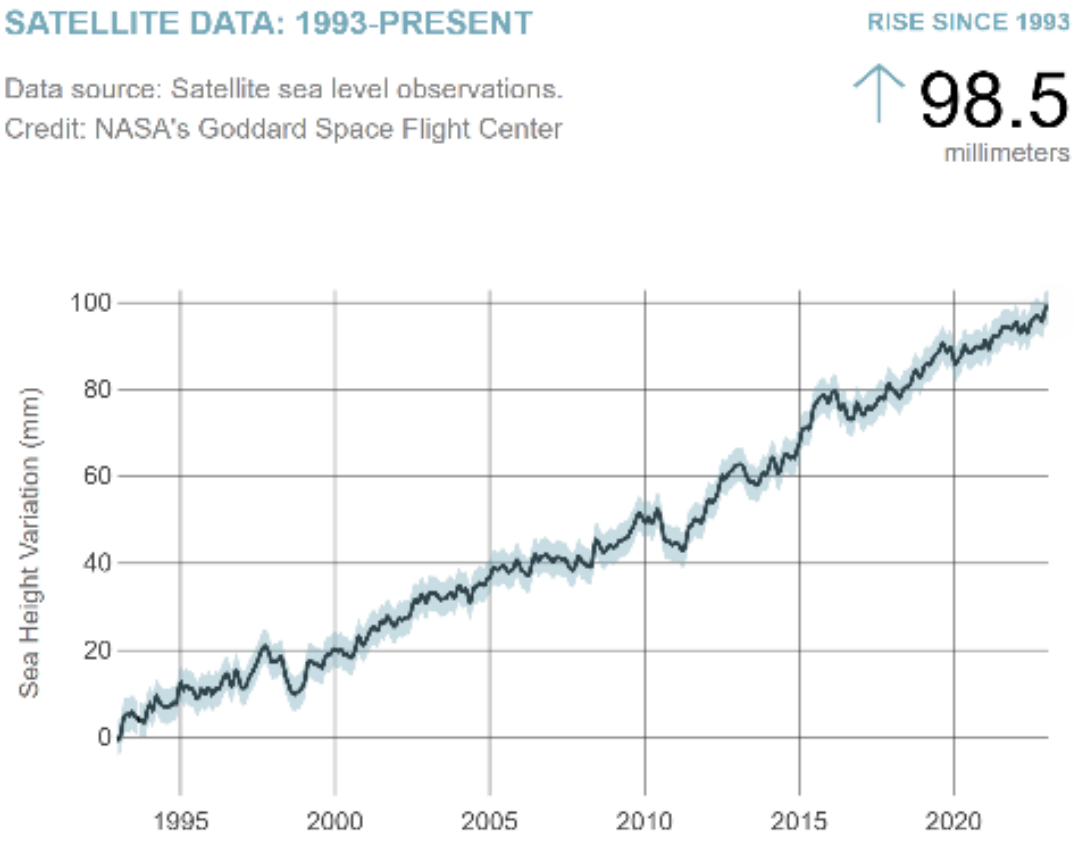


Figure 16: NASA Global Temperature Change Sea Level
Source: NASA Global Climate Change, 2022

Wildfire

- Warming temperatures have extended and intensified wildfire season in the West, where long-term drought in the region has heightened the risk of fires.
- Scientists estimate that human-caused climate change has already doubled the area of forest burned in recent decades. By around 2050, the amount of land consumed by wildfires in Western states is projected to further increase by two to six times.
- Even in traditionally rainy regions like the Southeast, wildfires are projected to increase by about 30%.

Flooding (Precipitation)

- Climate change is having an uneven effect on precipitation (rain and snow) in the United States, with some locations experiencing increased precipitation and flooding, while others suffer from drought.
- On average, more winter and spring precipitation is projected for the northern United States, and less for the Southwest, over this century.
- Projections of future climate over the U.S. suggest that the recent trend toward increased heavy precipitation events will continue. This means that while it may rain less frequently in some regions (such as the Southwest), when it does rain, heavy downpours will be more common.

Extreme Cold

- The length of the frost-free season, and the corresponding growing season, has been increasing since the 1980s, with the largest increases occurring in the western United States.

According to the California Natural Resource Agency (CNRA), climate change is already affecting California and is projected to continue to do so well into the foreseeable future. Current and projected changes include increased temperatures, sea level rise, a reduced winter snowpack, altered precipitation patterns, and more frequent storm events. Over the long term, reducing greenhouse gases can help make these changes less severe, but the changes cannot be avoided entirely. Unavoidable climate impacts result in a variety of secondary consequences including detrimental impacts on human health and safety, economic continuity, ecosystem integrity and provision of basic services. Climate change is being profiled in the 2023 Marin County OA MJHMP as a standalone hazard while addressing each of the other natural hazards. The Marin County OA is considering climate change issues when identifying future mitigation actions.

California is experiencing a climate crisis that is increasingly taking a toll on the health and well-being of its people and on its unique and diverse ecosystems. Every Californian has suffered from the effects of record high temperatures, dry winters, prolonged drought, and proliferating wildfires in recent years. California's biodiversity is threatened as alterations to habitat conditions brought about by a changing climate are occurring at a pace that could overwhelm the ability of plant and animal species to adapt.

Indicators of Climate Change in California
Source: 2022 Report: Indicators of Climate Change in California | OEHHA

- Since 1895, annual average air temperatures in California have increased by about 2.5 degrees Fahrenheit (°F). Warming occurred at a faster rate beginning in the 1980s.
- Recent years have been especially warm: Eight of the ten warmest years on record occurred between 2012 and 2022; 2014 was the warmest year on record.
- Of all the Western states, California endured the hottest temperatures for the longest time, driving the average statewide temperature to the second warmest over the past 128 years.
- Extreme heat ranks among the deadliest of all climate-driven hazards in California, with physical, social, political, and economic factors effecting the capacity of individuals,

workers, and communities to adapt, and with the most severe impacts often on communities who experience the greatest social and health inequities.

- Glaciers have essentially disappeared from the Trinity Alps in Northern California
- In 2020, wildfire smoke plumes were present in each county for at least 46 days.
- The 2022 fire season saw more fires than the previous fire season along with continued extreme drought and heat conditions.
- The drought, begun in 2019, was the third statewide drought declared in California since 2000.
- This drought has been marked by extreme swings; the state received record-breaking amounts of precipitation in October and December 2021 that were offset by the driest January, February, and March 2022 dating back more than 100 years. The year 2023 opened with California simultaneously managing both drought and flood emergencies.
- A series of storms in late December 2022 and early January 2023 broke rural levees, disrupted power, flooded roads, downed trees, and eroded coastal land.
- Sea level rise accelerates coastal erosion, worsens coastal flooding during large storms and peak tidal events, and impacts important infrastructure positioned along our state's 1,100-mile coast.
- The western drought which impacted all of California and the western United States was nearly lifted due to unseasonably heavy rains in late 2022 and early 2023.

The graph below shows the relative change, in millimeters, in sea levels at Crescent City (1933-2020), San Francisco (1900-2020), and La Jolla (1925-2020).

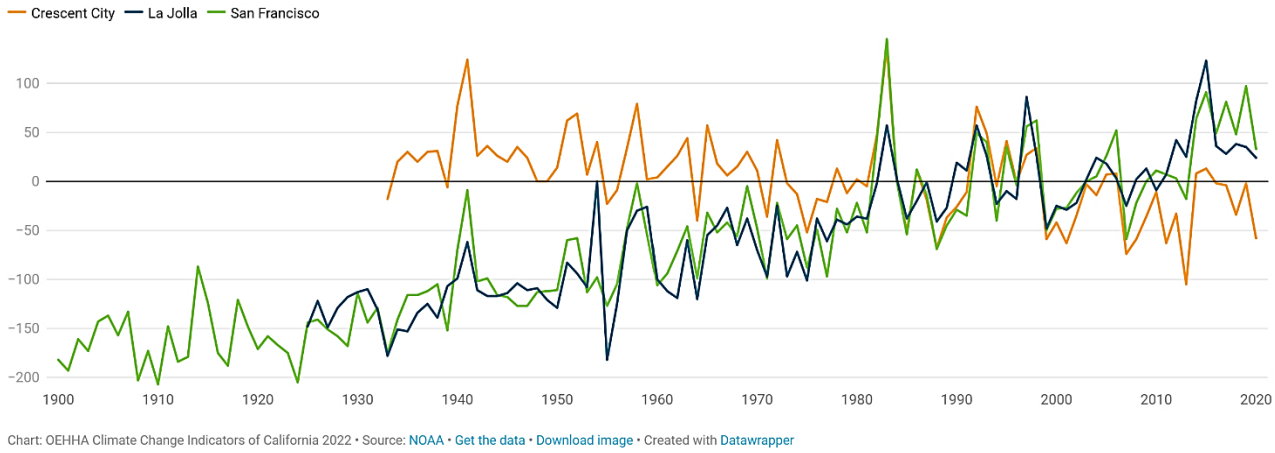


Figure 17: Annual Mean Sea Level Trends
Source: 2022 Report: Indicators of Climate Change in California | OEHHA

Climate Change in the Marin County Operational Area

Climate change is already having significant impacts across California. Temperatures are warming, heat waves are more frequent, and precipitation has become increasingly variable. Climate change will continue to alter Marin County OA ecosystems as a result of rising temperatures, changes in precipitation, and sea level rise, which will increase the severity and occurrence of natural hazards across the Marin County OA well into the future. Coastal cooling processes that keep temperatures down, such as fog, will continue to decrease. Rising temperatures will exacerbate drought conditions and raise the potential for significant wildfires and associated smoke as vegetation becomes drier and tree mortality increases. Forested woodlands that play a major role in carbon reduction will gradually transition into chaparral and shrublands. There will be more extreme storms and weather events, including expanded heat waves and increased rain events with changes in precipitation. Significant rain events will lead to an increase in flooding and the potential for severe landslides. Shoreline communities will become inundated with sea level rise, storm surge, and high tide events. Marshlands and wetlands that act as natural storm barriers will disappear as they transition into open water. Notable impacts from climate change that are already evident in the Marin County OA and surrounding region as identified in a 2020 Marin County Civil Grand Jury Report include:

- From 1895-2018, the average temperature in Marin County increased by 2.3 degrees Fahrenheit.
- Over the past century, sea level rise in the San Francisco Bay Area rose by eight inches and has accelerated rapidly since 2011.
- The threat of wildfires in 2019 was so severe that Pacific Gas and Electric shut off electric power to the County for multiple days.

Climate change will continue to affect homes, businesses, infrastructure, utilities, transportation systems and agriculture across the Marin County OA. The risk to socially vulnerable populations will increase as they feel the immediate impacts of climate change more significantly and are less able to adapt to climate change and recover from its impacts.

The Marin County OA has adopted numerous planning initiatives and mitigation measures to help combat the effects of climate change across the OA. The Marin Climate Energy Partnership (MCEP), which is a partnership program of Marin County jurisdictions, the County, and Marin County regional agencies, adapted a model Climate Action Plan (CAP) that is intended to support countywide implementation efforts and is currently being used to update additional climate action plans for other jurisdictions in Marin County. The CAP supports the Climate Action Plan for the unincorporated County, which was completed in 2020. The MCEP also collects data and report on progress in meeting each County jurisdictions' individual greenhouse gas emission targets. In June 2023, the County published the Greenhouse Gas Inventory for Unincorporated Community Emissions for the Year 2021. Marin County OA jurisdictions have already met their greenhouse reduction goals for 2020 and are about halfway to meeting the statewide goal to reduce emissions 40% below 1990 levels by the year 2030. Marin County also formed a Sea Level Marin Adaptation Response Team in 2018 and had a Sea Level Rise Vulnerability Assessment and associated Adaptation Report completed for the County and each of its jurisdictions in 2017 as part of their Bay Waterfront Adaptation and Vulnerability Evaluation. Additional Marin County OA climate change mitigation initiatives

include Marin Clean Energy, Electrify Marin, the Marin Solar Project, the Marin Energy Watch Partnership, Resilient Neighborhoods, and Drawdown: Marin.

2.2 HAZARDS

Of the hazards profiled in the Marin County MJHMP, those noted in the table are specific for the Town of Ross as per the planning team.

Table 15: Hazard Risk Assessment

Hazard	Probability/ Likelihood of Future Events	Geographic Extent	Magnitude/ Severity	Climate Change Influence	Significance	Risk Score
Dam Failure	Unlikely	Limited	Severe	Low	Medium	**9.00**
Debris Flow	Occasional	Significant	Moderate	Medium	Medium	**11.00**
Drought	Likely	Extensive	Moderate	Medium	High	**14.00**
Earthquake	Likely	Significant	Severe	None	Medium	**11.00**
Flooding	Highly Likely	Significant	Severe	High	High	**16.00**
Land Subsidence (Sinkhole)	Unlikely	Limited	Weak	Low	Low	**6.00**
Severe Weather – Extreme Heat	Likely	Significant	Moderate	Medium	Medium	**12.00**
Severe Weather – Wind, Tornado	Occasional	Significant	Moderate	Medium	Medium	**11.00**
Wildfire	Likely	Extensive	Severe	Medium	High	**15.00**

Table 15: Hazard Risk Assessment
Source: Town of Ross

Omitted Hazards

Levee Failure: Ross does not have any levees and would not experience a levee failure.

Sea Level Rise and Tsunami: Ross is not located along a coastline and is not in a tsunami inundation zone. The Town would not experience impacts associated with sea level rise or a tsunami.

Table 16: County of Marin Hazard Risk Assessment						
Hazard	Probability/ Likelihood of Future Events	Geographic Extent	Magnitude/ Severity	Climate Change Influence	Significance	Risk Score
Dam Failure	Unlikely	Negligible	Extreme	Low	Medium	**9.00**
Debris Flow	Occasional	Extensive	Severe	Medium	Medium	**13.00**
Drought	Highly Likely	Extensive	Moderate	High	High	**16.00**
Earthquake	Highly Likely	Extensive	Extreme	None	High	**15.00**
Flooding	Highly Likely	Limited	Severe	High	Medium	**14.00**
Land Subsidence	Occasional	Limited	Moderate	Medium	Medium	**10.00**
Levee Failure	Unlikely	Negligible	Moderate	Medium	High	**9.00**
Sea Level Rise	Highly Likely	Limited	Extreme	High	High	**16.00**
Severe Weather – Extreme Heat	Highly Likely	Extensive	Moderate	High	Medium	**15.00**
Severe Weather – Wind, Tornado	Highly Likely	Extensive	Moderate	High	Medium	**15.00**
Tsunami	Highly Likely	Limited	Extreme	Medium	High	**15.00**
Wildfire	Highly Likely	Significant	Severe	High	High	**16.00**

Table 16: Hazard Risk Assessment
Source: Marin County

2.2.1 DAM FAILURE

Dams are manmade structures built for a variety of uses including flood protection, power generation, agriculture, water supply, and recreation. When dams are constructed for flood protection, they are usually engineered to withstand a flood with a computed risk of occurrence. For example, a dam may be designed to contain a flood at a location on a stream that has a certain probability of occurring in any one year. If prolonged periods of rainfall and flooding occur that exceed the design requirements, that structure may be overtopped and fail. Overtopping is the primary cause of earthen dam failure in the United States.

Dam failure is the uncontrolled release of impounded water from behind a dam. Flooding, earthquakes, blockages, landslides, lack of maintenance, improper operation, poor construction, vandalism, and terrorism can all cause a dam to fail. Dam failure causes downstream flooding that can affect life and property. Dam failures can result from any one or a combination of the following causes:

- Earthquake
- Inadequate spillway capacity resulting in excess overtopping flows
- Internal erosion caused by embankment or foundation leakage, or piping or rodent activity
- Improper design

- Improper maintenance
- Negligent operation
- Failure of upstream dams on the same waterway

Water released by a failed dam generates tremendous energy and can cause a flood that is catastrophic to life and property. A catastrophic dam failure could challenge local response capabilities and require evacuations to save lives. Impacts to life safety will depend on the warning time and the resources available to notify and evacuate the public. Major loss of life could result as well as potentially catastrophic effects to roads, bridges, and homes. Electric generating facilities and transmission lines could also be damaged and affect life support systems in communities outside the immediate hazard area. Associated water supply, water quality and health concerns could also be an issue. Factors that influence the potential severity of a full or partial dam failure are the amount of water impounded; the density, type, and value of development and infrastructure located downstream; and the speed of failure.

In general, there are three types of dams: concrete arch or hydraulic fill, earth and rockfill, and concrete gravity. Each type of dam has different failure characteristics. A concrete arch or hydraulic fill dam can fail almost instantaneously, where the flood wave builds up rapidly to a peak then gradually declines. An earth-rockfill dam fails gradually due to erosion of the breach, where a flood wave will build gradually to a peak and then decline until the reservoir is empty. A concrete gravity dam can fail instantaneously or gradually with a corresponding buildup and decline of the flood wave.

The California Department of Water Resources (DWR) Division of Safety of Dams (DSOD) has jurisdiction over impoundments that meet certain capacity and height criteria. Embankments that are less than six feet high and impoundments that can store less than 15 acre-feet are non-jurisdictional. Additionally, dams that are less than 25 feet high can impound up to 50 acre-feet without being jurisdictional. The Cal DWR DSOD assigns hazard ratings to large dams within the State. The following two factors are considered when assigning hazard ratings: existing land use and land use controls (zoning) downstream of the dam. Dams are classified in three categories that identify the potential hazard to life and property:

- **High hazard** indicates that a failure would most probably result in the loss of life
- **Significant hazard** indicates that a failure could result in appreciable property damage
- **Low hazard** indicates that failure would result in only minimal property damage and loss of life is unlikely

Since 1929, the state has supervised all non-federal dams in California to prevent failure for the purpose of safeguarding life and protecting property. Supervision is carried out through the state's Dam Safety Program under the jurisdiction of DWR. The legislation requiring state supervision was passed in response to the St. Francis Dam failure and concerns about the potential risks to the general populace from a number of water storage dams. The law requires:

- Examination and approval or repair of dams completed prior to August 14, 1929, the effective date of the statute.
- Approval of plans and specifications for and supervision of construction of new dams and the enlargement, alteration, repair, or removal of existing dams.
- Supervision of maintenance and operation of all dams under the state's jurisdiction.

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

Dams and reservoirs subject to state supervision are defined in California Water Code §6002 through §6004, with exemptions defined in §6004 and §6025. In administering the Dam Safety Program, DWR must comply with the provisions of the California Environmental Quality Act (CEQA). As such, all formal dam approval and revocation actions must be preceded by appropriate environmental documentation.

In 1972, Congress moved to reduce the hazards from the 28,000 non-federal dams in the country by passing Public Law 92-367, the National Dam Inspection Act. With the passage of this law, Congress authorized the U.S. Army Corps of Engineers (USACE) to inventory dams located in the United States. The action was spurred by two disastrous earthen dam failures during the year, in West Virginia and South Dakota, which caused a total of 300 deaths.

The Water Resources Development Act of 1986 (P.L 99-662) authorized USACE to maintain and periodically publish an updated National Inventory of Dams (NID). The Water Resources Development Act of 1996 (P.L. 104-303), Section 215, re-authorized periodic updates of the NID by USACE.

While there are no dams located within Ross, the Town could be impacted by a failure of the Phoenix Lake Dam in unincorporated Marin County. The Phoenix Lake Dam and Phoenix Lake are located directly adjacent to the western border of Ross (see Figure 18). The dam has storage of 612-acre feet of water that could be released down Ross Creek in the event of a full sunny-day dam failure. Water could extend out 500 feet on both sides of Ross Creek for about five miles at a depth up to thirty feet in some areas before it dumps into Corte Madera Creek. Dozens of homes lie in this area and could be susceptible to flooding. Flooding could continue north along San Anselmo Creek and south along Corte Madera Creek, extending the entire length of Sir Francis Drake Boulevard within the Town and through the downtown area. Flooding could extend out 1,000 feet along the west side and 500 feet along the east side of Anselmo and Corte Madera Creeks, flooding hundreds of homes, the Ross Fire Station, the Ross Police Station, the Ross Town Hall, the Ross Grammar School, all of the designated shelters in Ross, and most of the main commercial area of Ross in two to ten feet of water approximately 10-20 minutes after the dam fails.

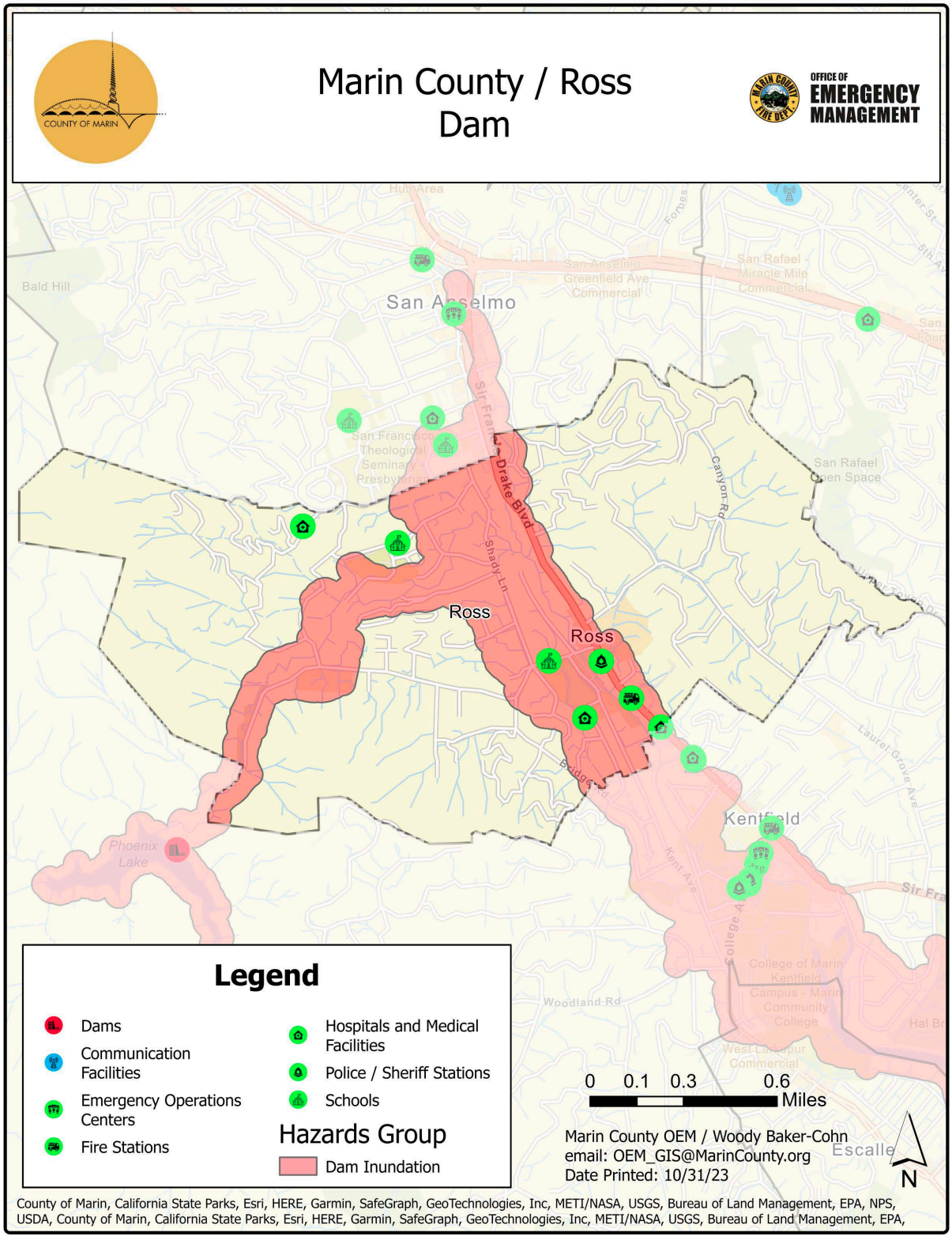


Figure 18: Town of Ross Dam Inundation Critical Facilities and Infrastructure
Source: Marin County OEM

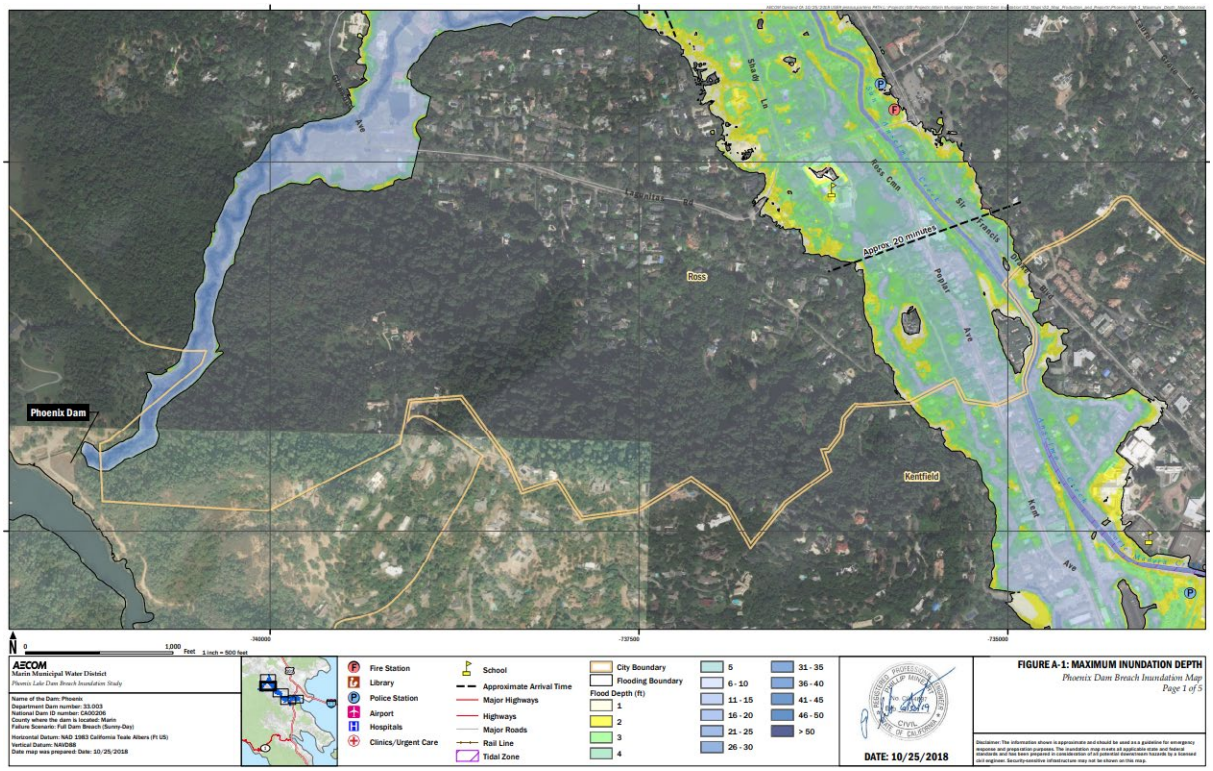


Figure 19: Phoenix Lake Dam Inundation Area – Ross South
Source: California Department of Water Resources

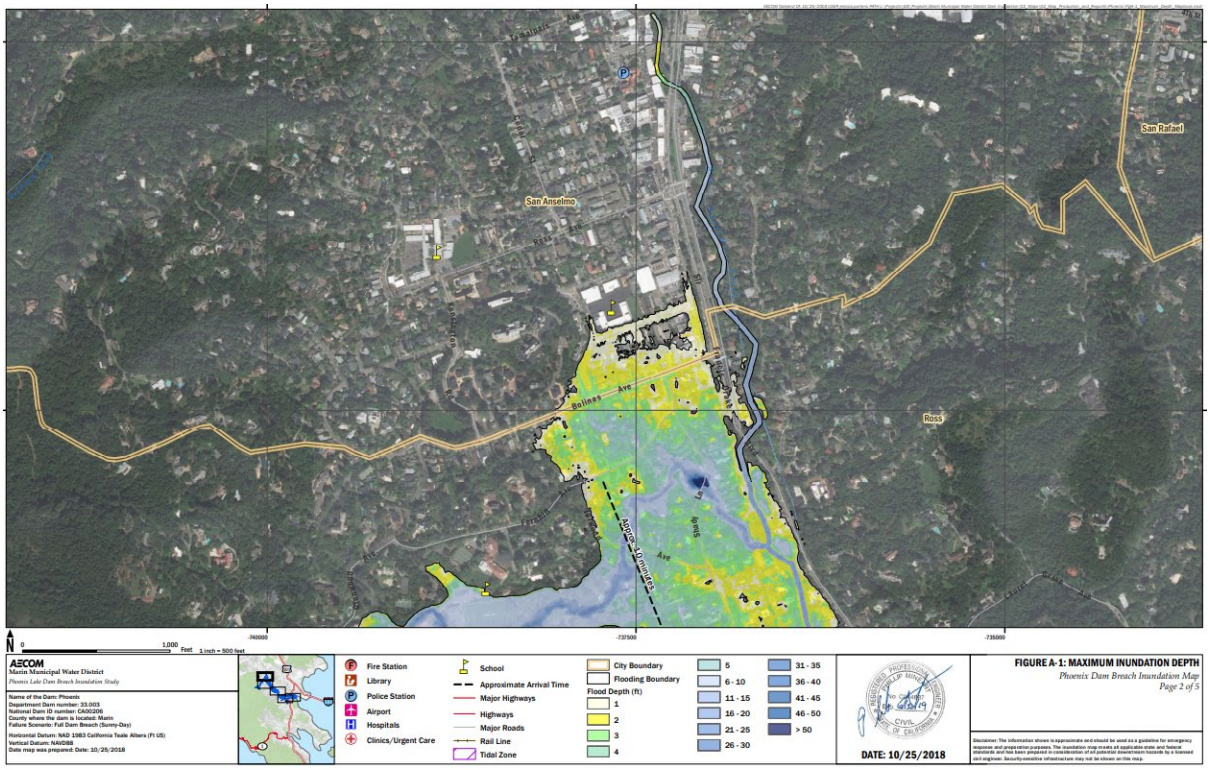


Figure 20: Phoenix Lake Dam Inundation Area – Ross North
Source: California Department of Water Resources

There is no record of a failure of any regulated dam located in the Marin County OA. On December 29, 2022, Phoenix Lake hit capacity after recent rains and the dam saw some spillover with no impacts.

Climate Change and Future Development Considerations

Most dams in the United States are aging and are at significant risk from increased storm events as a result of climate change. The average dam age in the United States is 60 years, and more than 8,000 dams in the United States including the Phoenix Lake Dam are over 90 years old. More than 200 U.S. dams have failed in bad weather since 2000. As the climate warms, rain events are predicted to become more intense. An increase in rainfall and runoff as a result of climate change will increase the potential for higher water levels in reservoirs across the Marin County OA, placing increased stress on its dams and increasing the potential for a dam failure. As development increases in the populated areas of the Marin County OA downstream of its dams, particularly in the inundation area of the Phoenix Lake Dam, the potential for significant impacts to residents and infrastructure will only increase. This area includes part of Ross. Future development along Corte Madera Creek and Ross Creek could expose additional people and structures to risk of a dam failure.

2.2.2 Debris Flows

For the purposes of the Marin County OA MJHMP, debris flows are classified as landslides (including rockslides) and mud flows.

A landside is the breaking away and gravity-driven downward movement of hill slope materials, which can travel at speeds ranging from fractions of an inch per year to tens of miles per hour depending on the slope steepness and water content of the rock/soil mass. Landslides range from the size of an automobile to a mile or more in length and width and, due to their sheer weight and speed, can cause serious damage and loss of life. The rate of a landslide is affected by the type and extent of vegetation, slope angle, degree of water saturation, strength of the rocks, and the mass and thickness of the deposit. Some of the natural causes of this instability are earthquakes, weak materials, stream and coastal erosion, and heavy rainfall. In addition, certain human activities tend to make the earth materials less stable and increase the chance of ground failure. These activities include extensive irrigation, poor drainage or groundwater withdrawal, removal of stabilizing vegetation and over-steepening of slopes by undercutting them or overloading them with artificial fill. These activities can cause slope failure, which normally produce landslides.

Landslide material types are often broadly categorized as either rock or soil, or a combination of the two for complex movements. Rock refers to hard or firm bedrock that was intact and in place prior to slope movement. Soil, either residual or transported material, means unconsolidated particles. The distinction between rock and soil is most often based on interpretation of geomorphic characteristics within landslide deposits, but can also be inferred from geologic characteristics of the parent material described on maps or in the field. Landslide movements are also based on the geomorphic expression of the landslide deposit and source area, and are categorized as falls, topples, spreads, slides, or flows. Falls are masses of soil or rock that dislodge from steep slopes and free fall. Topples move by the forward pivoting of a mass around an axis below the displaced mass. Lateral spreads move by horizontal extension and shear or tensile fractures. Slides displace masses of material along one or more discrete planes and can either be rotational or transitional. Flows mobilize as a deforming, viscous mass without

a discrete failure plane.

Natural conditions that contribute to landslide include the following:

- Degree of slope
- Water (heavy rain, river flows, or wave action)
- Unconsolidated soil or soft rock and sediments
- Lack of vegetation (no stabilizing root structure)
- Previous wildfires and other forest disturbances
- Earthquake

In addition, many human activities tend to make the earth materials less stable and, thus, increase the chance of ground movement. Human activities contribute to soil instability through grading of steep slopes or overloading them with artificial fill, by extensive irrigation, construction of impermeable surfaces, excessive groundwater withdrawal, and removal of stabilizing vegetation.

Another hazard related to landslide and erosion is the fall of a detached mass of rock from a cliff or down a very steep slope (rockfall). Weathering and decomposition of geological materials produce conditions favorable to rockfalls. Other causes include ice wedging, root growth, or ground shaking (earthquake). Destructive landslides and rockfalls usually occur very suddenly with little or no warning time and are short in duration.

Landslides can cause high mortality and injuries from rapidly flowing water and debris. The most common cause of death in a landslide is trauma or suffocation by entrapment. Broken power, water, gas or sewage pipes can also result in injury or illness in the population affected, such as water-borne diseases, electrocution or lacerations from falling debris. People affected by landslides can also have short- and long-term mental health effects due to loss of family, property, livestock or crops. Landslides can also greatly impact the health system and essential services, such as water, electricity or communication lines.

Landslide susceptibly can be characterized by looking at both slope class and rock strength. Landslide susceptibility classes express the generalization that on very low slopes, landslide susceptibility is low even in weak rock, and that landslide susceptibility increases with slope and in weaker rocks. Very high landslide susceptibility includes very steep slopes in hard rocks and moderate to very steep slopes in weak rocks. Figure 21 shows landslide susceptibility classes.

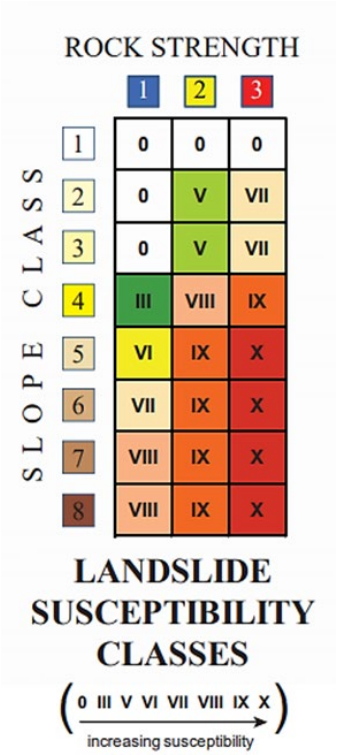


Figure 21: Landslide Susceptibility Classes
Source: USGS

A mud flow is a general term for a mass-movement landform and process characterized by a flowing mass of fine-grained earth material with a high degree of fluidity. Heavy rainfall, snowmelt, or high levels of groundwater flowing through cracked bedrock may trigger a movement of soil or sediments. Floods and debris flows may also occur when strong rains on hill or mountain slopes cause extensive erosion and/or what is known as "channel scour". Some broad mud flows are rather viscous and therefore slow; others begin very quickly and continue like an avalanche. Mud flows are composed of at least 50% silt and clay-sized materials and up to 30% water.

The point where a muddy material begins to flow depends on its grain size and the water content. Fine grainy material or soil has a smaller friction angle than a coarse sediment or a debris flow, but falling rock pieces can trigger a material flow, too. When a mud flow occurs it is given four named areas, the 'main scarp', in bigger mud flows the 'upper and lower shelves', and the 'toe'. See Figure 22 for the typical areas of a mud flow, with shelves (right) and without (left). The main scarp will be the original area of incidence, the toe is the last affected area(s). The upper and lower shelves are located wherever there is a large dip (due to mountain or natural drop) in the mud flow's path. A mud flow can have many shelves.

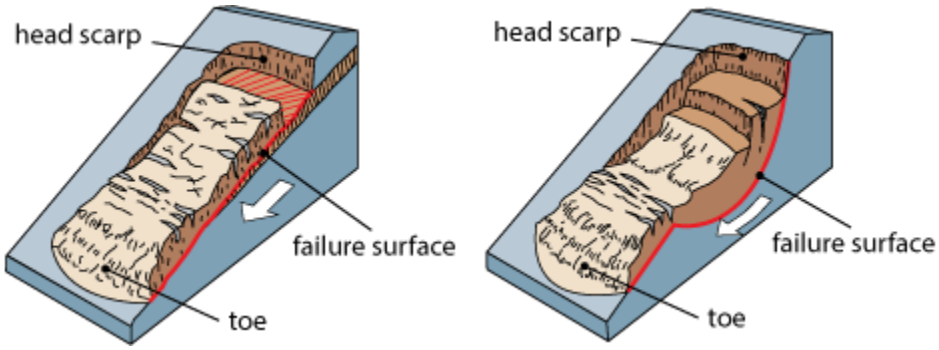


Figure 22: Mud Flow Areas
Source: Washington Department of Natural Resources

If large enough, mud flows can devastate villages and country-sides. Mud flows are common in mountain areas prone to wildfire, where they have destroyed many homes built on hillsides without sufficient support after fires destroy vegetation holding the land. The area most generally recognized as being at risk of a dangerous mud flow are:

- Areas where wildfires or human modification of the land have destroyed vegetation
- Areas where landslides have occurred before
- Steep slopes and areas at the bottom of slopes or canyons
- Slopes that have been altered for construction of buildings and roads
- Channels along streams and rivers
  Areas where surface runoff is directed

A landslide in Ross would most likely occur on the western and eastern sides of the Town where the terrain is steeper and is more susceptible to movement of hill slope materials. This area of Ross is primarily residential and consists of numerous winding streets and hillside homes that could be damaged or destroyed by a landslide. A school and medical facility also lie in this area.

Most of the downtown area of Ross, including the entirety of its main thoroughfare San Francis Drake Boulevard lie outside a landslide susceptibility area.

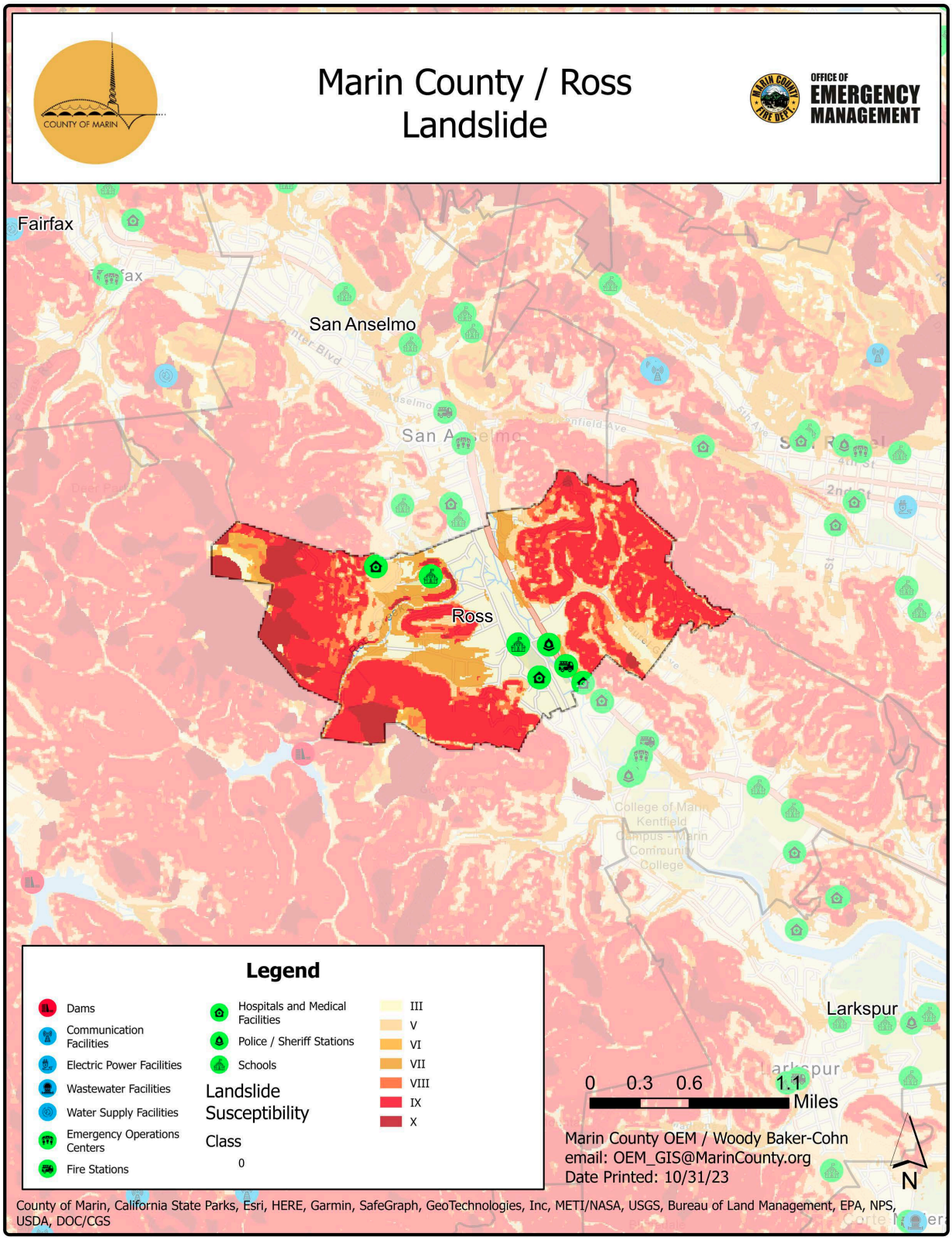


Figure 23: Town of Ross Debris Flow Critical Facilities and Infrastructure
Source: Marin County OEM

A landslide having major impacts on any of the roads in this area could affect the ability of residents to reach their homes. An earthquake has the potential to cause landslides throughout this area. A wildfire and subsequent rain event in any of the open space to the east and west of Ross, including Bald Hill Open Space Preserve, Ross Open Space Preserve and the West End San Rafael Open Space Preserve, could potentially contribute to significant debris flows in Ross. Ross Creek flows from Phoenix Lake directly into Ross and could potentially contribute to a debris flow that could impact bridges, residences and other structures in the Town, affecting ingress and egress to residential areas.

On 1/3-5/1982, a severe storm caused numerous landslides in Ross, destroying several homes. It is not uncommon for the Town of Ross to experience some type of minor mud or debris flow within the steep terrain areas during major storm or "atmospheric river" events. These flows usually have some type of impact on emergency access to residents by closing down the public and private roadways.

There have been no recorded debris flows in Ross since the last plan update.

Climate Change and Future Development Considerations

Extreme storm events and more frequent wildfires as a result of climate change have the potential to increase the amount and severity of landslides, including disastrous debris flows. Climate change is leading to more volatile precipitation patterns around the world with very dry stretches punctuated by storms that drop large amounts of rain in a short amount of time. Landslides in wetter regions of California, including the Marin County OA, move on average faster and farther downhill during rainy periods compared to drought years, according to a 2022 study by the American Geophysical Union (AGU)[1], showing the increased potential for landslides in the Marin County OA in rainy years. As development increases in the numerous canyons and around the many open spaces of the Marin County OA, the potential for significant impacts from a landslide and/or mudflow increases. Further development of the residential areas of Ross that have a higher landslide susceptibility will expose more people and property to landslide risk. With increased wildfire potential as a result of climate change, more residents in Ross could be susceptible to post-fire debris flows. This includes areas around Ross Creek and Corte Madera Creek, including its numerous tributaries. Future development should take into account the movement of mud and debris in waterways after a major rain event. Adequate space adjacent to susceptible waterways should be maintained free of development to allow for the passage of mud and debris, and catchment basins should be built in these areas to help capture any excess mud and debris.

2.2.3 DROUGHT

A drought is a deficiency in precipitation over an extended period, usually a season or more, resulting in a water shortage causing adverse impacts on vegetation, animals, and/or people. It is a normal recurrent feature of climate that occurs in virtually all climate zones, from very wet to very dry. Drought is a temporary aberration from normal climatic conditions and can thus vary significantly from one region to another. Droughts occur slowly, over a multi-year period, and it is often not obvious or easy to quantify when a drought begins and ends. Drought is a complex

[1] Landslide Sensitivity and Response to Precipitation Changes in Wet and Dry Climates. https://agupubs.onlinelibrary.wiley.com/doi/10.1029/2022GL099499

issue involving many factors—it occurs when a normal amount of moisture is not available to satisfy an area's usual water-consuming activities.

There are several types of drought which can often be defined regionally based on their effects:

- Meteorological drought is usually defined by a period of below average water supply, based on the degree of dryness (in comparison to normal or average) and the duration of the dry period. Drought onset generally occurs with a meteorological drought.
- Agricultural drought occurs when there is an inadequate water supply to meet the needs of the state's crops and other agricultural operations such as livestock. Agricultural drought links various characteristics of meteorological (or hydrological) drought to agricultural impacts, focusing on precipitation shortages, soil water deficits, reduced ground water or reservoir levels needed for irrigation.
- Hydrological drought is defined as deficiencies in surface and subsurface water supplies. It is generally measured as stream flow, snowpack, and as lake, reservoir, and groundwater levels. Hydrological drought usually occurs following periods of extended precipitation shortfalls.
- Socioeconomic drought occurs when a drought impacts health, well-being, and quality of life, or when a drought starts to have an adverse economic impact on a region.

Drought can occur in all areas of Ross, though it's effects would be most felt in the mountainous areas to the east and west where the risk of wildfire would increase. Dry trees in public spaces like Ross's Bald Hill Open Space Preserve, the Ross Open Space Preserve and the West End San Rafael Open Space Preserve can become a safety hazard to the public due to falling limbs or the toppling of the tree itself.

Climate Change and Future Development Considerations

Climate change increases the odds of worsening drought. Warmer temperatures enhance evaporation, which reduces surface water and dries out soils and vegetation. This makes periods with low precipitation in the summer drier than they would be in cooler conditions. Climate also alters the timing of water availability as warmer winter temperatures cause less precipitation to fall. During droughts, communities in the Marin County OA including Ross may have limited access to water for household use, including drinking, cooking, cleaning, and watering plants, as well as for agriculture, transportation, and power generation. Drought may lead to higher water costs, rationing, or even the decimation of important water sources like wells in the Marin County OA. As more people move into the Marin County OA and the Ross, additional strain will be placed on the OA's water supply. Drought can affect livestock and crops in the Marin County OA, impacting its economy. Drought can increase the occurrence and severity of wildfires and tree mortality in the Marin County OA including in the open spaces in and around Ross. Impacts to residents and infrastructure from wildfire as a result of drought will increase as more development occurs in the mountainous areas of the Marin County OA including Ross where wildfires are more likely to occur. Future development in this area and in the mountainous areas of Ross could expose people to drier summer conditions that could increase their vulnerability to wildfire. Drought also increases the amount of carbon dioxide in the atmosphere, including by decreasing land productivity, which reduces the amount of vegetation storing carbon dioxide. In addition, increases in drought-related wildfire and soil erosion can release carbon dioxide sequestered in trees and plants back into the atmosphere.

This will only worsen climate change for the Marin County OA into the future. When considering future development, the Marin County OA including Ross can help prepare for both future droughts and climate change by practicing and promoting water conservation and enhancing water efficiency throughout landscapes, city plans, and water infrastructure. The Marin County OA can also identify alternative water supplies, create drought emergency plans, and encourage farmers to plant drought-resistant crops.

2.2.4 EARTHQUAKE

Earthquakes are sudden rolling or shaking events caused by movement under the earth's surface. Earthquakes happen along cracks in the earth's surface, called fault lines, and can be felt over large areas, although they usually last less than one minute.

The amount of energy released during an earthquake is usually expressed as a magnitude and is currently measured by seismologists on the Moment Magnitude (Mw Scale). The Mw Scale was developed to succeed the previously used Richter Scale and is measured on a scale of zero to ten with increasing values reflecting increasing intensity.

The other commonly used measure of earthquake severity is intensity, which is an expression of the amount of shaking at any given location on the ground service. Intensity is most commonly measured on the Modified Mercalli Intensity (MMI) Scale (see Figure 24).

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.

Figure 24: Modified Mercalli Intensity Scale
Source: USGS

Figure 25 gives intensities (measured on the MMI scale) that are typically observed at locations near the epicenter or earthquakes of different magnitudes.

Richter Magnitude Scale	Typical Maximum Modified Mercalli Intensity Scale
1.0 – 2.9	I
3.0 – 3.9	II – III
4.0 – 4.9	IV – V
5.0 – 5.9	VI – VII
6.0 – 6.9	VII – IX
7.0 or higher	VIII or higher

Figure 25: Mercalli Scale vs. Magnitude
Source: USGS

The extent of ground shaking also depends in large part on how soft the underlying soil is. Soft soils amplify ground shaking (see Figure 26). This was observed during the 1989 Loma Prieta Earthquake when the most significant damages experienced in San Francisco were in the Marina District, which was built on fill.

Soil type A	Vs > 1500 m/sec	Includes unweathered intrusive igneous rock. Occurs infrequently in the bay area. We consider it with type B (both A and B are represented by the color blue on the map). Soil types A and B do not contribute greatly to shaking amplification.
Soil type B	1500 m/sec > Vs > 750 m/sec	Includes volcanics, most Mesozoic bedrock, and some Franciscan bedrock. (Mesozoic rocks are between 245 and 64 million years old. The Franciscan Complex is a Mesozoic unit that is common in the Bay Area.)
Soil Type C	750 m/sec > Vs > 350 m/sec	Includes some Quaternary (less than 1.8 million years old) sands, sandstones and mudstones, some Upper Tertiary (1.8 to 24 million years old) sandstones, mudstones and limestone, some Lower Tertiary (24 to 64 million years old) mudstones and sandstones, and Franciscan melange and serpentinite.
Soil Type D	350 m/sec > Vs > 200 m/sec	Includes some Quaternary muds, sands, gravels, silts and mud. Significant amplification of shaking by these soils is generally expected.
Soil Type E	200 m/sec > Vs	Includes water-saturated mud and artificial fill. The strongest amplification of shaking due is expected for this soil type.

Figure 26: Soil Types
Source: USGS

An earthquake fault is defined as “a fracture or fracture zone in the earth’s crust along which there has been displacement of the sides relative to one another.” For the purpose of planning there are two types of faults, active and inactive. Active faults have experienced displacement in historic time, suggesting that future displacement may be expected. Inactive faults show no evidence of movement in recent geologic time, suggesting that these faults are dormant.

Two types of fault movement represent possible hazards to structures in the immediate vicinity of the fault: fault creep and sudden fault displacement. Fault creep, a slow movement of one side of a fault relative to the other, can cause cracking and buckling of sidewalks and foundations even without perceptible ground shaking. Sudden fault displacement occurs during an earthquake event and may result in the collapse of buildings or other structures that are found along the fault zone when fault displacement exceeds an inch or two. The only protection against damage caused directly by fault displacement is to prohibit construction in the fault zone.

Earthquake Shake Intensity

The colors on Figures 27 and 28 represent the level of ground shaking intensity of a potential future earthquake. The result is expressed as the level of ground shaking (**expressed as a percentage of gravity**) that on average occurs every 500 years.

This map shows the expected relative intensity of ground shaking and damage in California from anticipated future earthquakes. The shaking potential is calculated as the level of ground motion that has a 2% chance of being exceeded in 50 years, which is the same as the level of ground-shaking with about a 2500 year average repeat time. The relatively long-period (1.0 second) earthquake shaking is shown here. Long period-shaking affects tall, relatively flexible buildings, but also correlates well with overall earthquake damage.

Earthquake Shaking Potential Maps for California depict expected intermediate period (1s or 1hz) ground motions with 2% exceedance probability in 50 years.

An earthquake could occur anywhere in and around Ross due to the number of active faults within and near Marin County.

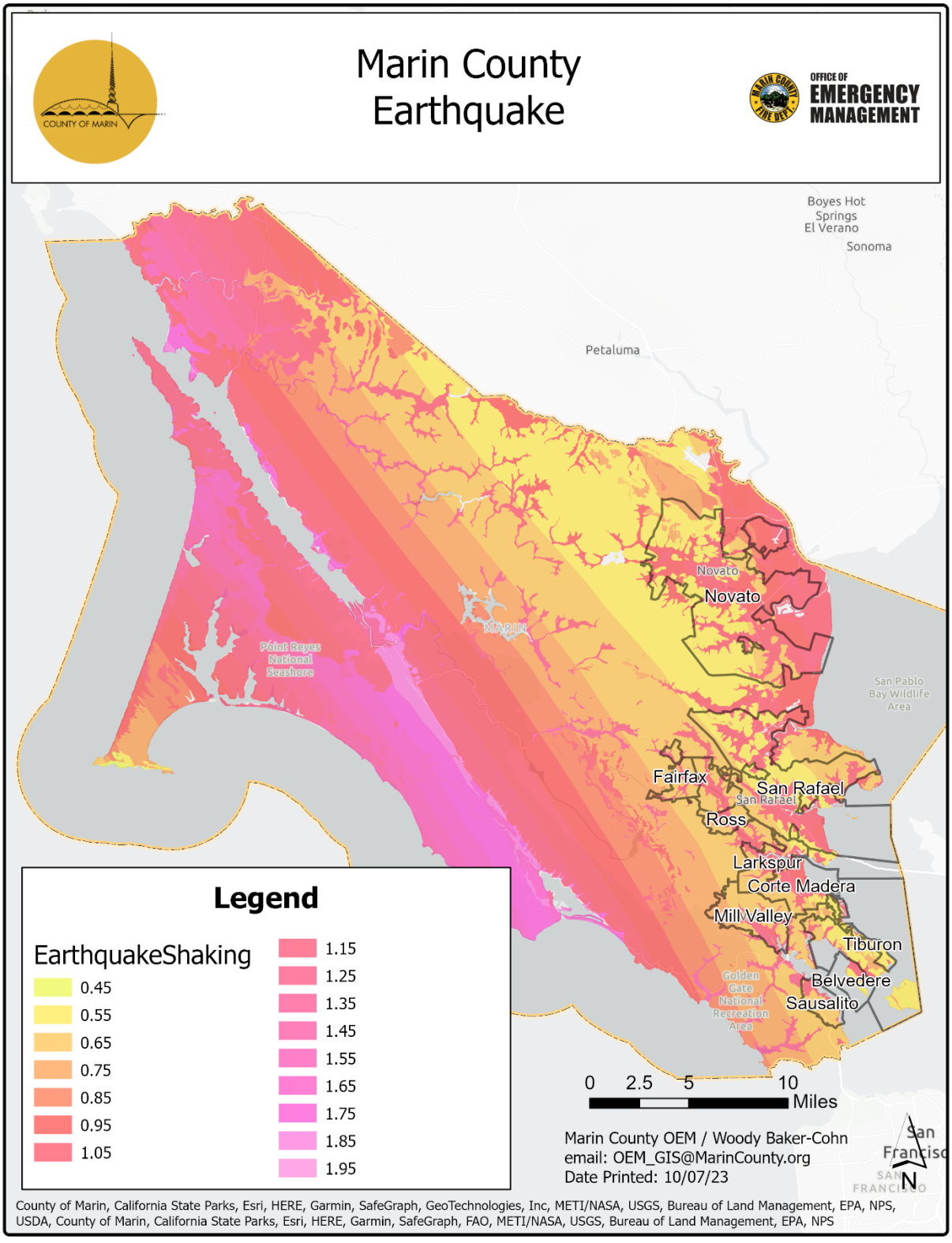


Figure 27: Marin County Earthquake Impact and Fault Lines
Source: Marin County OEM

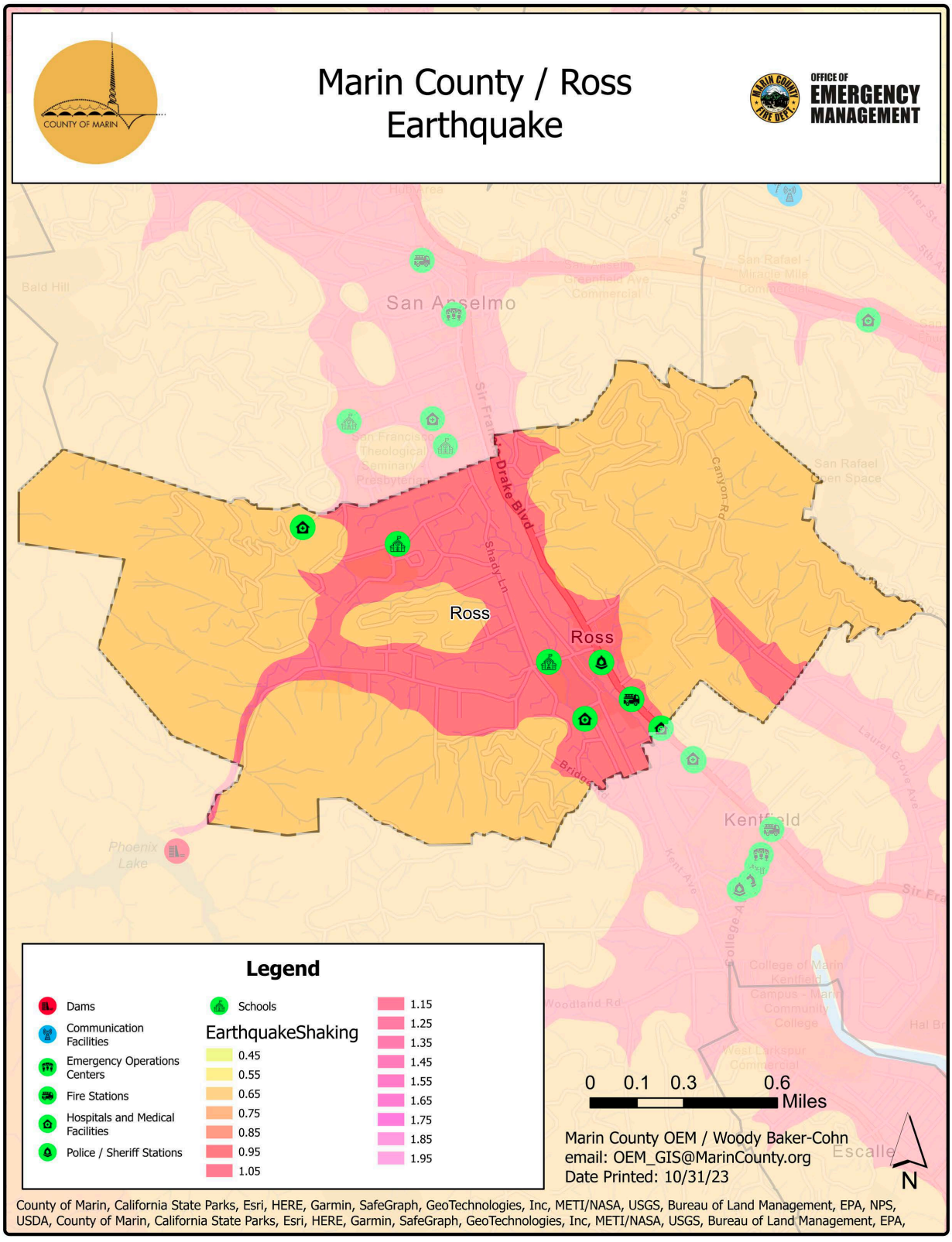


Figure 28: Town of Ross Earthquake Critical Facilities and Infrastructure
Source: Marin County OEM

Ross is near several active faults that have the potential to cause earthquakes that would be a hazard for the Town. The San Andreas Fault runs north and south in the western side of Marin County, approximately 8 miles southwest from Ross. The San Andreas Fault is considered capable of generating a magnitude 8.0 earthquake. The northern section of the Hayward fault is less than 10 miles northeast of Ross. The entire Hayward fault may generate magnitude 7.2 and 7.4 earthquakes. The Rodgers Creek fault is less than fifteen miles northeast of Ross and may generate a magnitude 7.0 earthquake. The San Gregorio fault is less than 10 miles south of Ross and may generate a magnitude 7.3 earthquake. Areas in Town, primarily the low-lying areas adjacent to the Town creeks, have a “moderate” liquefaction susceptibility and could be more susceptible to an earthquake. The Ross Fire Station, Ross Police Station and Ross Town Hall lie along Corte Madera Creek and could be vulnerable to an earthquake.

Additional vulnerable structures in town include bridges and older buildings that have not undergone major seismic retrofitting. Utility infrastructure throughout the Town could be impacted by an earthquake. Approximately half of the residences in Ross, all of the commercial buildings, two churches, the public grade school, and public facilities (including the town hall, post office, police and fire stations) are within the strong shaking and moderate liquefaction hazard areas. There are approximately 20 residential units in the least stable hillside areas, with approximately two dozed residences down slope of the least stable areas. It is estimated that half of the structures in Ross were built prior to 1940. Some of these structures have been retrofitted with modern foundations. Typical damage to pre-1940 single-family homes include the wood frame coming off its foundation, racking of the cripple walls, the foundation itself cracking, or the chimney breaking at the roof line. A typical problem with houses built during this era is the connection between the wood frame and the foundation. These houses often lack steel bolts or any other type of "tie-down" between the foundation and the wood frame. Since these houses were built before the widespread use of plywood, they also typically lack appropriate shear reinforcing of the cripple walls (the walls between the top of the foundation and the floor diaphragm). Finally, steel reinforcing is often not found in the foundation of these houses or their chimneys. Some of these older houses may have brick foundations with weakly cemented joints. The post-1940 house accounts for the remainder of the Ross housing stock. Typical building damage to post-1940 houses does not present widespread problems with foundation anchorage and foundation reinforcing. However, there often is a lack of proper reinforcement of the masonry chimneys. A significant number of post-1940 dwellings may suffer some type of chimney damage. The second major source of damage is damage (or even collapse) of garages with living area above in two-story or split-level homes due to long spans over the garages.

Strong shaking conditions could damage masonry that is not reinforced or not designed to resist lateral forces, cause chimneys to fall, and move frame houses on their foundations if not bolted down. A major earthquake event could result in deaths, injuries, property and environmental damage, and disruption of normal government and community services. Hospitals outside of the Town may be impacted by an earthquake. Telephone systems could be affected by system failure, overloads and loss of electrical power. Natural gas leaks pose a fire threat and breaks in the system could affect service to the Town. Water sources could be compromised due to damage to treatment plants, pump stations and/or the pipelines that distribute potable water. Liquefaction-related damage to water supply pipelines could impair fire suppression, leaving the Town vulnerable to a large fire. Sewage collection systems throughout Marin County may sustain widespread damage if ground movement damages mains or pipelines. Electricity may be interrupted. Landslides may occur. Bridges and roads may be closed because of damage. An earthquake may also result in dam failure. Liquefaction of creeks during the winter storm

season could exacerbate flood hazards. The Town may experience road closures from liquefaction, earthquake-triggered landslides, shaking damage to bridges as well as indirect causes of closures such as building damage, hazmat releases, and utility pipeline breaks and fallen trees. The Town of Ross will be affected by the regional impacts of regional transportation disruption, particularly closure of the Golden Gate Bridge. Earthquakes could also cause landslides in the western areas of Ross with steeper terrain, causing damage to homes and roads as a result of shifting soils.

Ross hasn't yet experienced a significant earthquake. Marin County was sparsely populated at the time of the 1906 San Francisco Earthquake, and the effects across the County were relatively minimal. Likewise, the 1989 Loma Prieta Earthquake caused minimal impacts across Marin County as the epicenter of the quake was further south in Santa Cruz County. Smaller earthquakes with minimal to no impacts are routinely felt in Ross.

Climate Change and Future Development Considerations

There is no direct link between climate change and seismic activity that could impact the Marin County OA including Ross, so climate change is not expected to cause any changes to the frequency or intensity of seismic shaking. According to a 2018 study by the Institute of Physics (IOP)[2], climate change could result in "isostatic rebounds," or a sudden upward movement of the crust because of reduced downward weight caused by glaciers. As glaciers are known to melt when overall global temperatures increase, climate change could indirectly lead to an increase in seismicity in the Marin County OA including Ross. Climate change could also impact earthquakes felt in the Marin County OA as droughts can further deteriorate existing fault lines and pumping groundwater can put further pressure on the earth's crust. Future development in the populated areas of Marin County OA where seismic shaking and subsidence are more prevalent could exacerbate the impacts of an earthquake. This includes the lowlands of Ross downtown and along its creek beds, where the risk of subsidence and subsequent earthquake shaking are higher. Future development in these areas could expose more people and infrastructure to earthquake shaking as a result of climate change.

2.2.5 FLOODING

Flooding is the rising and overflowing of a body of water onto normally dry land. Floods are among the costliest natural disasters in terms of human hardship and economic loss nationwide. The area adjacent to a channel is the floodplain. Floodplains are illustrated on inundation maps, which show areas of potential flooding and water depths. In its common usage, the floodplain most often refers to that area that is inundated by the 100-year flood, the flood that has a one percent chance in any given year of being equaled or exceeded. The 100-year flood is the national minimum standard to which communities regulate their floodplains through the National Flood Insurance Program. The 200-year flood is one that has 0.5% chance of being equaled or exceeded each year. The 500-year flood is the flood that has a 0.2 percent chance of being equaled or exceeded in any given year. The potential for flooding can change and increase through various land use changes and changes to land surface, which result in a change to the floodplain. A change in environment can create localized flooding problems inside and outside of natural floodplains by altering or confining natural drainage channels. These changes are most often created by human activity such as construction of bridges or channels. In areas

[2] An Enhanced Seismic Activity Observed Due to Climate Change: Preliminary Results from Alaska. https://iopscience.iop.org/article/10.1088/1755-1315/167/1/012018

where flow contains high sediment load, such as Easkoot Creek in Stinson Beach (due to an active landslide upstream), the flow carrying capacity of the channel may be reduced dramatically during a single flood event. Coastal floodplains may also change over time as waves and currents alter the coastline (especially wetlands) and sea levels rise.

Flooding can occur in several ways:

Riverine flooding – Riverine flooding, defined as when a watercourse exceeds its "bank-full" capacity, generally resulting from prolonged rainfall, or rainfall that is combined with snowmelt and/or already saturated soils from previous rain events. This type of flood occurs in river systems whose tributaries may drain large geographic areas and include one or more independent river basins. The onset and duration of riverine floods may vary from a few hours to many days and is often characterized by high peak flows combined with a large volume of runoff. Factors that directly affect the amount of flood runoff include precipitation amount, intensity of rainfall and distribution of overland flow, the amount of soil moisture, seasonal variation in vegetation, snow depth, and water-resistance of the surface due to urbanization and geomorphology. In the Marin County OA, riverine flooding can occur anytime from November through April and is largely caused by intense and continued rains, sometimes combined with snowmelt, increased discharges from upstream dams, and intense flow from tributary streams. These intense storms can overwhelm the local waterways as well as the integrity of flood control structures such as culverts and bridges. Flooding is more severe when antecedent rainfall has resulted in saturated soil conditions. The warning time associated with slow rise riverine floods assists in life and property protection.

Flash flooding – Flash flooding describes localized floods of great volume and short duration. This type of flood usually results from a heavy rainfall on a relatively small drainage area. Precipitation of this sort usually occurs in the winter and spring. Flash floods often require immediate evacuation within the hour and thus early threat identification and warning is critical for saving lives.

Localized/Stormwater flooding – Localized flooding problems are often caused by flash flooding, severe weather, or an unusual amount of intense rainfall. Flooding from these intense weather events usually occurs in areas experiencing an increase in runoff from impervious surfaces associated with development and urbanization as well as inadequate storm drainage systems.

Tidal flooding – Tidal flooding develops when high tides exceed either the top of bank elevation of tidal sloughs and channels, or the crest of bay levees. An especially high tide event that occurs during alignment of the gravitational pull between the sun and the moon, causing tidal water levels to rise to higher-than normal levels. King tides are normal, predictable events that occur semi-annually during winter months. Typically storms in which high tides coincide with peak stormwater flow may be damaging to municipal infrastructure and private property.

The area is also at risk of flooding resulting from levee failures and dam failures. Dam failure flooding is discussed separately in the Dam Failure Section of this document; levee failure flooding is discussed separately in the Levee Failure Section of this document. Regardless of the type of flood, the cause is often the result of severe weather and excessive rainfall, either in the flood area or upstream reach.

A weather pattern called the “Atmospheric River” contributes to the flooding potential of the area. An Atmospheric River brings warm air and rain to the West. A relatively common weather pattern brings southwest winds to the Pacific Northwest or California, along with warm, moist air. The moisture sometimes produces many days of heavy rain, which can cause soil saturation, extensive flooding and other impacts such as landslides. The warm air also can melt the snowpack in the mountains, which further aggravates the flooding potential. In the colder parts of the year, the warm air can be cooled enough to produce heavy, upslope snow as it rises into the higher elevations of the Sierra Nevada or Cascades. Forecasters and others on the West Coast often used to refer to this warm, moist air as the “Pineapple Express” because it comes from around Hawaii where pineapples are grown. A diagram of an atmospheric river event is shown in Figure 29.

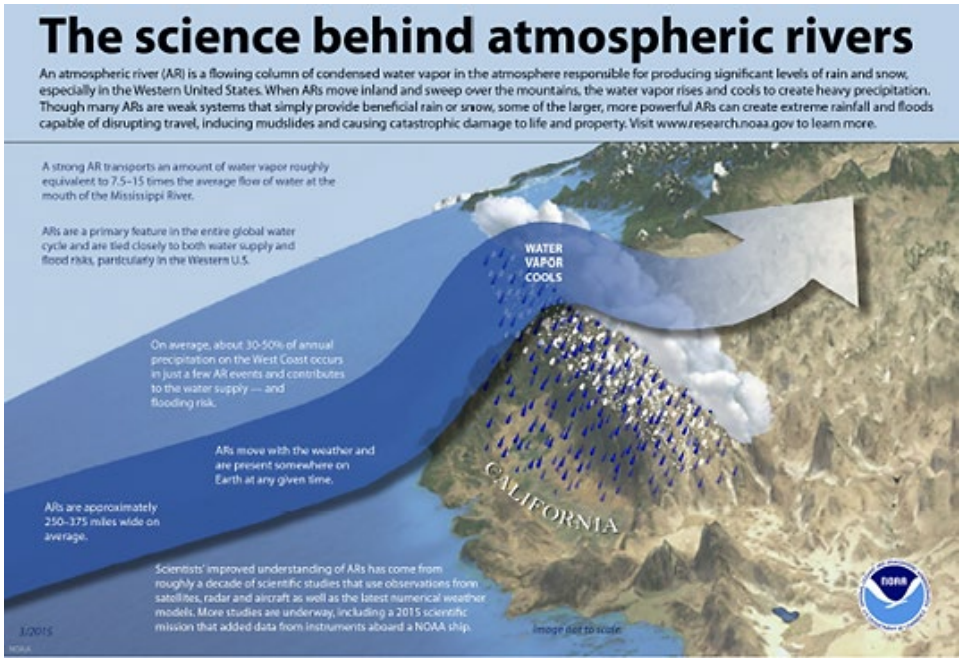


Figure 29: Diagram of an Atmospheric River Event
Source: NOAA

The Marin County OA is susceptible to various types of flood events. In coastal areas, flooding may occur when strong winds or tides result in a surge of seawater into areas that are above the normal high tide line. Other types of flooding in Marin include isolated ponding and stormwater overflow. Isolated ponding is when pools form on the ground and can occur in any area that doesn’t drain effectively – for example, in a natural depression in the landscape. Stormwater overflow is when storm drains back up. Stormwater drainage systems quickly convey rainwater through underground culverts (pipes) to creeks and the Bay. When the storm drains are obstructed or broken or when the water bodies to which they lead are already full, water backs up onto the streets and into the riparian area surrounding the drainage way. Although stormwater overflow and isolated ponding also occur throughout the County, the effects are typically not widespread or significantly damaging.

Ross Valley (where the Town of Ross is located) is naturally prone to flooding by its location, geologic and geomorphic setting: rainfall can be intense, soils are shallow with limited absorption capacity, slopes are steep, stream channels are entrenched and in many places narrow with relatively little storage capacity. The watershed has been altered from its natural

condition and many sections of creeks and streams have been placed in culverts and the natural pattern of runoff has been changed. During prolonged and heavy storms the watershed can become saturated. If rainfall is sufficiently intense, heavy runoff can result in high flows exceeding the capacity of the creek in places where conveyance is constrained. Floodwaters escape the creek capacity and breech the creek bank in downtown San Anselmo, north of the Town, and above the Lagunitas Bridge in the Town of Ross.

Flooding in Ross generally results from creek flooding along Anselmo and Corte Madera Creeks. Ross is not located along the Coast and would not experience coastal flooding. Local flooding in Ross is exacerbated where the storm water drainage network has inadequate capacity for peak flows, primarily when combined with high flows at the outfalls to Corte Madera Creek.

The 100-year floodplain extends primarily west of Anselmo and Corte Madera Creeks up to 1,000 feet in some areas and extending across the main throughfare Sir Francis Drake Boulevard in the northern area of town along the border with San Anselmo. The 500-year floodplain occurs primarily along the 100-year floodplain fringe and in the southeastern area of the Town east of Corte Madera Creek and along Sir Francis Drake Boulevard. There are dozens of homes, the Ross Grammar School, and most of the downtown commercial area of Ross that lie in the 100-year floodplain. The Ross Fire Station, the Ross Police Station and the Ross Town Hall along with numerous homes and businesses and sections of Sir Francis Drake Boulevard are all located adjacent to Corte Madera Creek and just lie in the 500-year floodplain just outside the Special Flood Hazard Area AE designation, (per the 2016 FIRM Map updates). The Town built the structures in the 1920s, prior to the FIRM and Town floodplain development regulations. The buildings have experienced water damage from flooding and are inaccessible during major flood events. Town electrical equipment is on poles and elevated from floodwaters, although the electrical service may be interrupted by trees falling on power lines and other problems associated with storms. Pipelines, as underground lines, should not be impacted by flooding. The main Town thoroughfares are inaccessible during flood events. Medical facilities are located outside of the Ross Town limits but may be inaccessible for some residents due to impassible roads.

Floods in the Town of Ross develop rapidly, generally within 24 to 36 hours after the beginning of the flood-producing storm but are short in duration. Flood conditions usually subside within 24 hours. In 1982, flood depths of 4 to 5 feet were reported. Floods in Ross usually occur during large storm events. High winds and mudslides compound the flood problems from the flood hazard. A U.S. Army Corps of Engineers report noted that the total storm damage was far greater than flood damage during the flood of 1982. 11 Local counties were declared Major Disaster Areas. Typical winter peak discharges have been measured below 3,500 cubic feet per second (cfs). The two most severe foods occurred in the winters of 1982 and 2005, with peak discharges of approximately 7,200 cfs and 6,800 cfs, respectively.

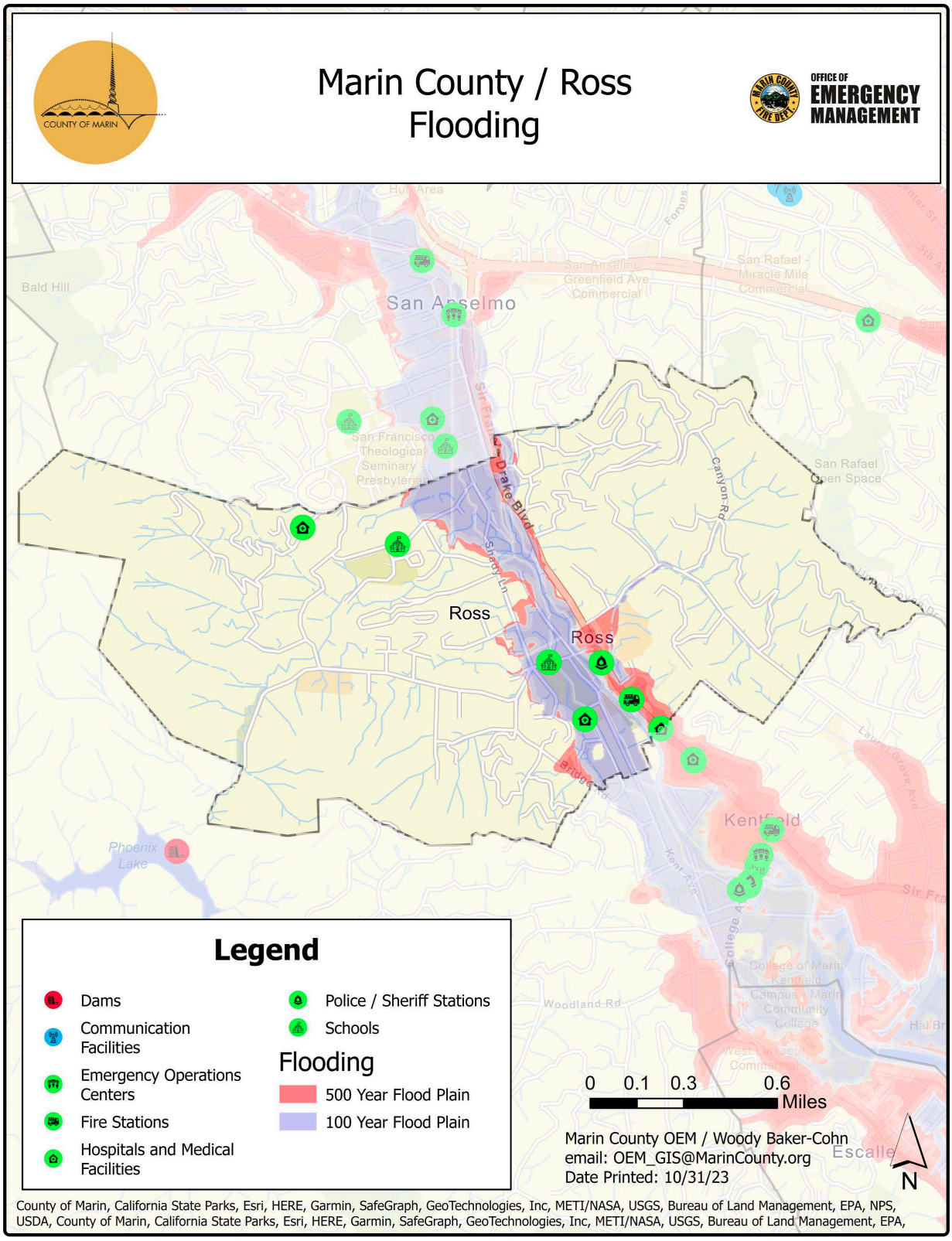


Figure 30: Town of Ross Flooding Critical Facilities and Infrastructure
Source: Marin County OEM

Numerous businesses, residential neighborhoods, schools, churches, community centers, roads, and other critical facilities lie in this area and are susceptible to flooding. Table 17 shows the number of Town of Ross critical facilities by flood zone.

Table 17: Town of Ross Critical Facilities by Flood Zone				
	Category	Name	Address	Flood Zone
Critical Facilities				
1.	Fire	Ross Valley Fire District Station 18	33 Sir Francis Drake Boulevard, Ross, CA 94957	X/AE
2.	Law	Ross Police Department	33 Sir Francis Drake Boulevard, Ross, CA 94957	X/AE
3.	Local Government	Ross Town Hall	31 Sir Francis Drake Blvd. Ross, CA 94957	X/AE
4.	Health / Medical EMS	Ross Valley Paramedic Authority	33 Sir Francis Drake Blvd. Ross, CA 94957	X/AE
5.	Health / Medical	Cedars Of Marin Ross Campus	115 Upper Rd, Ross, CA 94957	X
6.	School	Ross School K-8	9 Lagunitas Rd. Ross, CXA 94957	AE
7.	School	Branson High School	39 Fernhill Avenue, Ross, CA 94957	X

Table 17: Town of Ross Critical Facilities in the Flood Zones
Source: Marin County/FEMA DFIRM

Floodwaters can be deep enough to drown people and move fast enough to sweep people and vehicles away, lift buildings off foundations, and carry debris that smashes into buildings and other property. Flood waters can cause significant erosion which can lead to slope instability, severely damaging transportation and utility infrastructure by undermining foundations or washing away pavement. If water levels rise high enough to get inside buildings, flooding can cause extensive damage to personal property and the structure itself. Flood events that develop very quickly are especially dangerous because there may be little advance warning. A failure of the Phoenix Lake Dam or a breach and/or overtopping of the levees along Ross Creek could contribute to flooding in the lowland areas of Ross.

Ross has experienced three 100-year storms in the past decades (1982, 1986 and 2006). Prior to establishment of the USGS stream flow gauging station in Ross on Corte Madera Creek in February 1951, flooding was reported in calendar years 1914, 1925, 1937, and 1942. Since the Ross gage has been in operation, flood flows have been recorded in 1951, 1955, 1958, 1967, 1969, 1970, 1982, 1983, 1986, 1994 (flooding was reported, but the stream flow gage was not in operation), and 2005. The flood in December 2005 - January 2006, was a federally declared disaster DR-1628.

On 10/24/2021, a bomb cyclone caused Corte Madera Creek to crest. Flood sirens were activated in Ross but no major flooding occurred.

On 1/10/2017, a moderate storm flooded Sir Francis Drake Boulevard, closing it between College Avenue and Lagunitas Road in Kentfield and Ross. Flooding threatened several buildings. A flash flood warning was issued, and the flood alarm was sounded in Ross. The downtown area was prepared for evacuation, but the flooding threat at Corte Madera Creek eased.

On New Year's Eve 2005/2006, a significant storm caused flooding in Ross. Water 3 feet deep ran down Sir Francis Drake Boulevard and blew down a huge wooden gate across the entrance to a home. Swimming pools filled with mud, and standing water filled the lawn in front of the Ross Town Hall. The flood crested at 22.5 feet in Corte Madera Creek, 3.5 feet above flood stage.

In January 1982, several homes in Ross were destroyed in a flood during a major winter storm. Neighboring San Anselmo was under almost six feet of water.

On 2/10-2/11/1925 a severe storm caused flooding damage in the commercial area of Ross. Numerous residences along Sylvan Lane, Poplar Avenue and Redwood Drive suffered water damage.

Figure 31: Ross Flooding - 1925
Source: Marin History Museum

There have been no major flooding events in Ross since the last plan update.

Climate Change and Future Development Considerations

Climate change is expected to affect California's precipitation patterns, which are likely to influence future flood events. A 2017 study[3] found that the number of very intense precipitation days in California is projected to more than double by the end of the century, increasing 117 percent, making it likely that flood events will become more frequent in the Marin County OA including Ross. Climate change is expected to alter rainfall patterns in Northern California, including the Marin County OA. As the climate warms, rain events are predicted to become more intense. The Marin County OA including Ross will likely experience more rain inundation events that lead to flooding and increase the potential threat of dam and levee failure, tree mortality, and other potential hazards. Future development in these areas will expose more people and infrastructure to the effects of flooding. Development along Corte Madera Creek including the downtown area would expose more people, structures and infrastructure including major roads to creek flooding as a result of climate change.

[3] Precipitation in a Warming World: Assessing Projected Hydro-Climate Changes in California and other Mediterranean Regions. https://www.nature.com/articles/s41598-017-11285-y

2.2.6 LAND SUBSIDENCE/SINKHOLES

Land subsidence is a gradual settling or sudden sinking of the Earth's surface owing to subsurface movement of earth materials. The principal causes are aquifer-system compaction, drainage of organic soils through groundwater pumping, underground mining, hydro-compaction, natural compaction, sinkholes, and thawing permafrost. More than 80 percent of the identified subsidence in the United States is a consequence of underground water exploitation. The increasing development of land and water resources threatens to exacerbate existing land-subsidence problems and initiate new ones.

Sinkholes can form in three primary ways. Dissolution sinkholes form when dissolution of the limestone or dolomite is most intensive where the water first contacts the rock surface. Aggressive dissolution also occurs where flow is focused in preexisting openings in the rock, such as along joints, fractures, and bedding planes, and in the zone of water-table fluctuation where groundwater is in contact with the atmosphere. See Figure 32 for a picture and description of how dissolution sinkholes form.

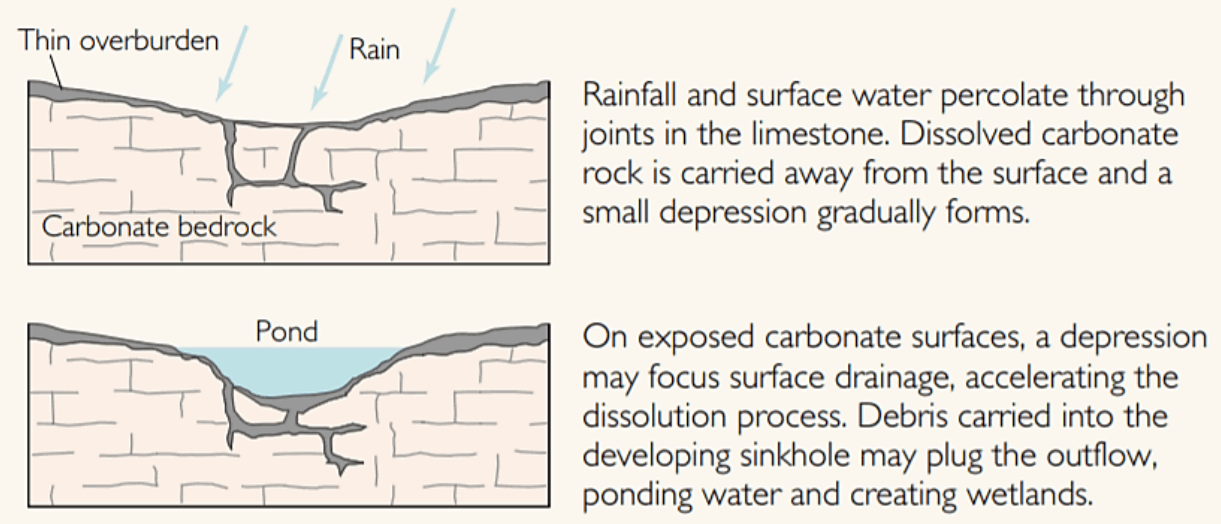


Figure 32: Dissolution Sinkhole Formation
Source: USGS

Cover-subsidence sinkholes tend to develop gradually where the covering sediments are permeable and contain sand. In areas where cover material is thicker, or sediments contain more clay, cover-subsidence sinkholes are relatively uncommon, are smaller, and may go undetected for long periods. See Figure 33 for a picture and description of how cover-subsidence sinkholes form.

Subsidence can also occur in bay mud areas which are prevalent around San Francisco Bay. Bay Mud, which has very little strength, can move and shift over long periods of time and is also affected by other natural events such as earthquakes, storm activities, water pressure and composition. Older construction of buildings placed on fill material on Bay Mud are susceptible to differential settlement which affects the service life of the structures as well as utilities, roadways and other infrastructure that supports these areas. The Marinship area and other low elevation areas built on bay mud have experienced significant differential settlement over time.

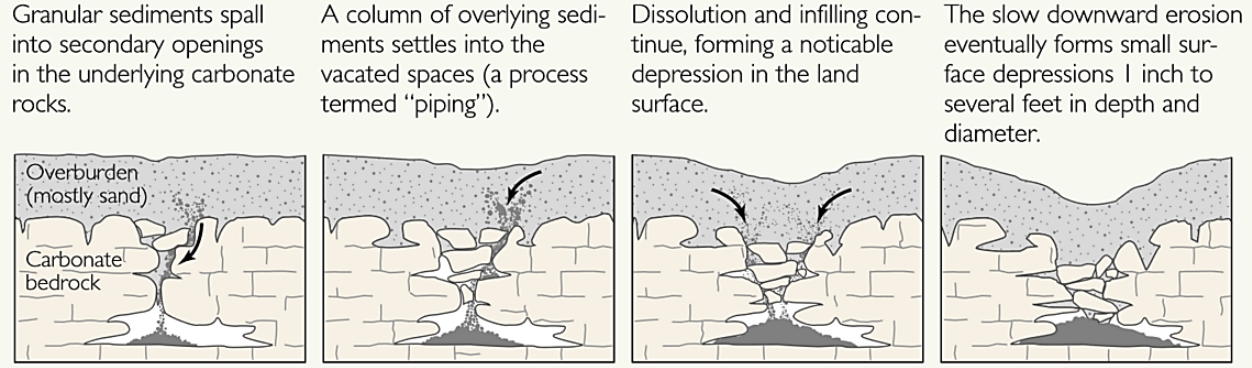


Figure 33: Cover-Subsidence Sinkhole Formation
Source: USGS

Cover-collapse sinkholes may develop abruptly over a period of hours and cause catastrophic damages. They occur where the covering sediments contain a significant amount of clay. Over time, surface drainage, erosion, and deposition of sediment transform the steep-walled sinkhole into a shallower bowl-shaped depression. See Figure 34 for a picture and description of how cover-collapse sinkholes form.

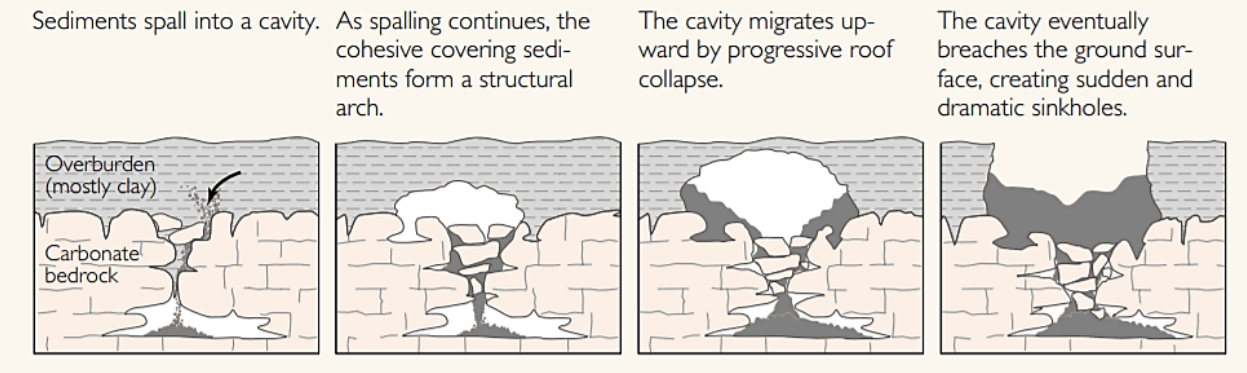


Figure 34: Cover-Collapse Sinkhole Formation
Source: USGS

New sinkholes have been correlated to land-use practices, especially from groundwater pumping and from construction and development practices that cause land subsidence. Sinkholes can also form when natural water-drainage patterns are changed, and new water-diversion systems are developed. Some sinkholes form when the land surface is changed, such as when industrial and runoff-storage ponds are created. The substantial weight of the new material can trigger an underground collapse of supporting material, thus causing a sinkhole.

The overburden sediments that cover buried cavities in the aquifer systems are delicately balanced by groundwater fluid pressure. The water below ground helps to keep the surface soil in place. Groundwater pumping for urban water supply and for irrigation can produce new sinkholes in sinkhole-prone areas. If pumping results in a lowering of groundwater levels, then underground structural failure, and thus, sinkholes, can occur.

Land subsidence and sinkholes would most likely occur in the central lowland areas of Ross along Corte Madera Creek where the ground is more porous. This includes the primary

commercial area of town along Sir Francis Drake Boulevard where there are numerous residences and critical facilities. Land subsidence could have numerous impacts for Ross, including the settling of businesses and homes as well as the shifting of roadways and utility infrastructure that run through the Town.

On 1/4/2023, a five by eight-foot sinkhole opened outside a residence on Shady Lane during a period of heavy rain. There was concern that the sinkhole would compromise the structure of Shady Lane and Norwood Avenue but no further damage occurred.

Climate Change and Future Development Considerations

Climate change could indirectly influence land subsidence as more severe and prolonged periods of drought may encourage more groundwater withdrawals. The rate of land subsidence could increase across the Marin County OA including the lowland areas of Ross as a result of climate change. The impacts of land subsidence on infrastructure, including roads and underground utilities, in Ross could increase with future development in the lowland populated areas of the city, particularly the downtown area, where land subsidence is more likely to occur.

2.2.8 Severe Weather – Extreme Heat

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. A heat wave is an extended period of extreme heat, often with high humidity. When relative humidity is factored in, the temperature can feel much hotter as reflected in the Heat Index (see Figure 35):

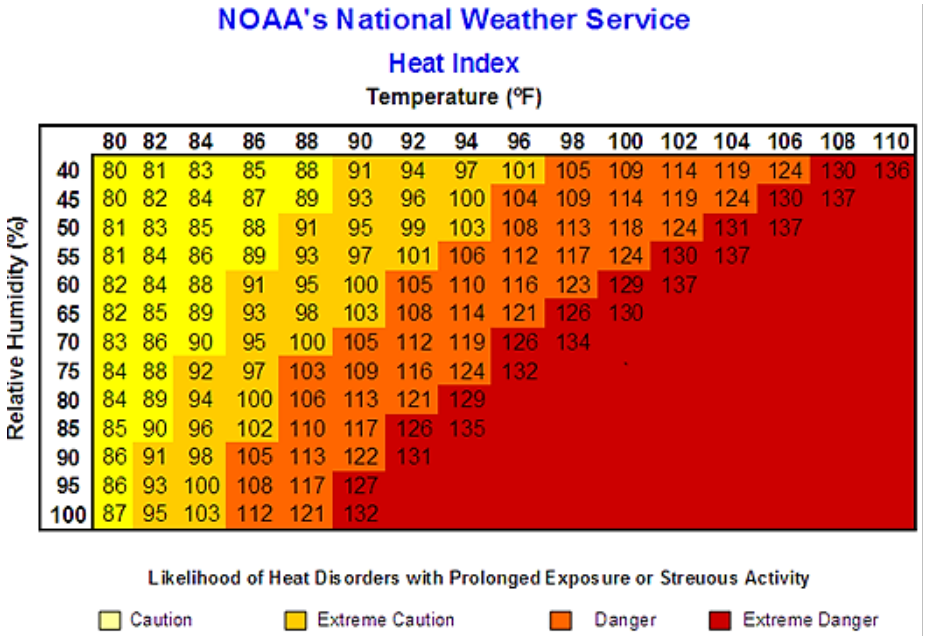


Figure 35: Heat Index
Source: NOAA

Heat kills by taxing the human body beyond its abilities. In a normal year, about 1,300 Americans succumb to the demands of summer heat. Heat is the leading weather-related cause of mortalities in the US. In 2006, California reported a high of 204 heat related deaths, with 98 reported in 2017 and 93 deaths reported in 2018.

Extreme heat has the potential to impact all areas of Mill Valley and would be felt more in areas where there is a widespread presence of concrete and asphalt, which stores heat longer. This includes most of the downtown and commercial area of the city between Miller Avenue and E. Blithedale Avenue. There are dozens of residences in this area. Heat waves can cause power outages and can sicken people who are exposed to high temperatures too long, particularly infants and the elderly.

In September 2022 Marin County and the Town of Ross experienced an Extreme Heat Event with temperatures exceeding 95 degrees. Because of the high percentage of elderly residents in Ross, extreme heat emergency awareness is and response planning is an integral part of the town's local emergency response plan.

Climate Change and Future Development Considerations

The primary effect of climate change is warmer average temperatures. The annual average daily high temperatures in California are expected to rise by 2.7°F by 2040, 5.8°F by 2070, and 8.8°F by 2100 compared to observed and modeled historical conditions. At the current rate, annual average temperatures in the Marin County OA region and Bay Area will likely increase by approximately 4.4 degrees by 2050 and 7.2 degree by the end of the century unless significant efforts are made to reduce greenhouse emotions according to California's latest climate change assessment.

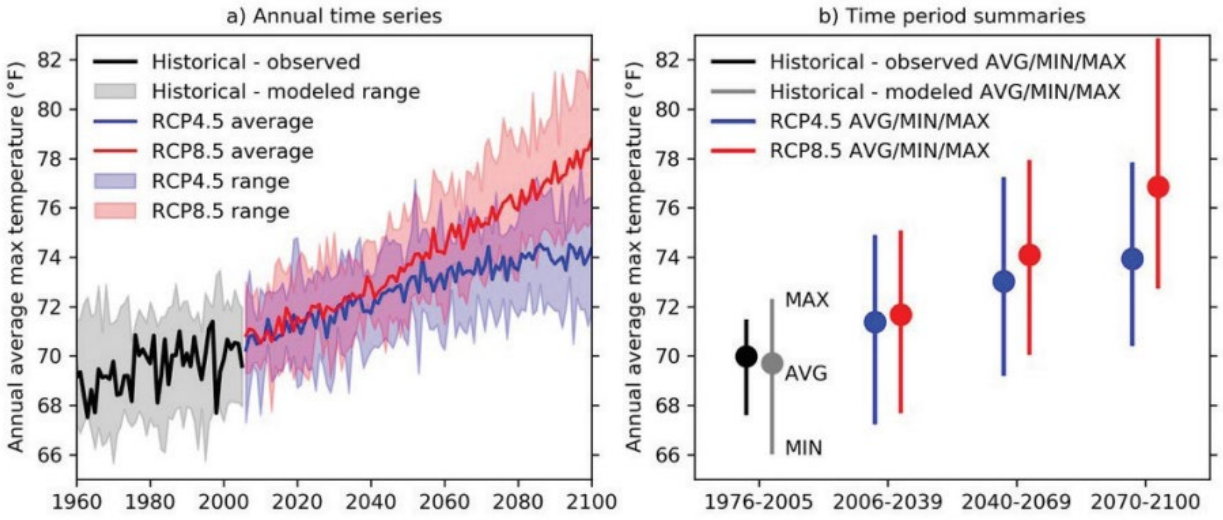


Figure 36: Annual Average Temperatures in the San Francisco Bay Area, 2000-2100
Source: California Climate Change Assessment (Fourth Edition)

As climate change accelerates in the 21st century, it is anticipated that extreme heat events will become more frequent and intense across the Marin County OA including in Ross. There will be increased residential and business needs for cooling and addressing heat-related issues. These effects would primarily be felt in the lowland areas of Ross where heat builds in developed areas. Heat waves also tax the energy grid. Future development in the Marin County OA including Ross could exacerbate the impacts from heat related events, particularly in electricity provision and water delivery. Increased temperatures will also lead to an increase in the occurrence and severity of wildfires across the Marin County OA including Ross as conditions become hotter and drier. These effects will primarily be felt in the mountainous areas of Ross where hotter and drier conditions are more apt to lead to wildfires. Future development

near the many open spaces around Ross could expose more people and infrastructure to the threat of a major wildfire as a result of increasing temperatures.

2.2.9 Severe Weather – High Wind & Tornado

High Wind

High wind is defined as a one-minute average of surface winds 40 miles per hour or greater lasting for one hour or longer, or winds gusting to 58 miles per hour or greater regardless of duration that are either expected or observed over land. These winds may occur as part of a seasonal climate pattern or in relation to other severe weather events such as thunderstorms. The Beaufort scale is an empirical measure that relates wind speed to observed conditions on land and is a common measure of wind intensity (see Figure 37).

Beaufort number	Description	Wind speed		Land conditions
		kts	km/h	
0	Calm	< 1	< 1	Calm. Smoke rises vertically.
1	Light air	1 – 2	1 – 5	Wind motion visible in smoke.
2	Light breeze	3 – 6	6 – 11	Wind felt on exposed skin. Leaves rustle.
3	Gentle breeze	7 – 10	12 – 19	Leaves and smaller twigs in constant motion.
4	Moderate breeze	11 – 15	20 – 28	Dust and loose paper raised. Small branches begin to move.
5	Fresh breeze	16 – 20	29 – 38	Branches of a moderate size move. Small trees begin to sway.
6	Strong breeze	21 – 26	39 – 49	Large branches in motion. Whistling heard in overhead wires. Umbrella use becomes difficult. Empty plastic garbage cans tip over.
7	High wind, Moderate gale, Near gale	27 – 33	50 – 61	Whole trees in motion. Effort needed to walk against the wind. Swaying of skyscrapers may be felt, especially by people on upper floors.
8	Gale, Fresh gale	34 – 40	62 – 74	Some twigs broken from trees. Cars veer on road. Progress on foot is seriously impeded.
9	Strong gale	41 – 47	75 – 88	Some branches break off trees, and some small trees blow over. Construction/temporary signs and barricades blow over. Damage to circus tents and canopies.
10	Storm, Whole gale	48 – 55	89 – 102	Trees are broken off or uprooted, saplings bent and deformed. Poorly attached asphalt shingles and shingles in poor condition peel off roofs.
11	Violent storm	56 – 63	103 – 117	Widespread vegetation damage. Many roofing surfaces are damaged; asphalt tiles that have curled up and/or fractured due to age may break away completely.
12	Hurricane	≥ 64	≥ 118	Very widespread damage to vegetation. Some windows may break; mobile homes and poorly constructed sheds and barns are damaged. Debris may be hurled about.

Figure 37: Beaufort Wind Scale
Source: NOAA

Windstorms in the Marin County OA are typically straight-line winds. Straight-line winds are generally any thunderstorm wind that is not associated with rotation (i.e., is not a tornado). It is these winds, which can exceed 100 mph, which represent the most common type of severe weather and are responsible for most wind damage related to thunderstorms.

Tornado

Tornadoes are rotating columns of air marked by a funnel-shaped downward extension of a cumulonimbus cloud whirling at destructive speeds of up to 300 mph, usually accompanying a thunderstorm. Tornadoes are the most powerful storms that exist, and damage paths can be in excess of one mile wide and 50 miles long. The Enhanced Fujita Scale (see Figure 38) is commonly used to rate the intensity of tornadoes in the United States based on the damages that they cause.

Enhanced Fujita Scale	
EF-0	65-85 mph winds
EF-1	86-110 mph winds
EF-2	111-135 mph winds
EF-3	136-165 mph winds
EF-4	166-200 mph winds
EF-5	>200 mph winds

Figure 38: Enhanced Fujita Scale
Source: NOAA

Tornadic waterspouts are tornadoes that form over water or move from land to water. They have the same characteristics as a land tornado. They are associated with severe thunderstorms, and are often accompanied by high winds and seas, large hail, and frequent dangerous lightning.

Figure 39: Waterspout Formation
Source: MarineInsights

All of Ross is susceptible to storms and damage from wind and tornadoes, as most of the Town has tree cover. Drought can increase the susceptibility of trees toppling over in a high wind event. Fallen trees could damage homes and other facilities. Power lines could be impacted by fallen trees and wind, causing power outages. Roadways could also become blocked by fallen trees, affecting the ability of residents to reach their homes.

While Ross has experienced winter storms, there have been no wind events that have caused major damage. Ross has never experienced a tornado.

Climate Change and Future Development Considerations

It is anticipated that the atmospheric rivers that deliver storms to Northern California may intensify because of climate change. This increase in storm intensity may bring more intense winds and potential tornados to Northern California, including the Marin County OA and Ross. Significant wind events and tornados can topple trees, particularly those that may be saturated, or drought stressed as a result of climate change. An increase in fallen trees in Ross as a result of increased storms due to climate change can lead to an increase in power outages. Future development in any of the forested areas of Ross with high tree cover including in the eastern and western mountainous residential areas will increase the effects of severe wind events.

2.2.10 WILDFIRE

A wildfire is a fire that occurs in an area of combustible vegetation. The three conditions necessary for a wildfire to burn are fuel, heat, and oxygen. Fuel is any flammable material that can burn, including vegetation, structures, and cars. The more fuel that exists and the drier that fuel is, the more intense the fire can be. Wildfires can be started naturally through lightning or combustion or can be set by humans. There are many sources of human-caused wildfires including arson, power lines, a burning campfire, an idling vehicle, trains, and escaped controlled burns. On average, four out of five wildfires are started by humans. Uncontrolled wildfires fueled by wind and weather can burn acres of land and everything in their path in mere minutes and can reach speeds up to 15 miles per hour or faster depending upon wind speed and ember distribution. On average, more than 100,000 wildfires burn 4 to 5 million acres of land in the United States every year. Although wildfires can occur in any state, they are most common in the Western states including California where heat, drought, and thunderstorms create perfect wildfire conditions.

Wildfires are of primary concern when they occur in the Wildland Urban Interface (WUI), which is defined as areas where homes are built near or among lands prone to wildfire. Even relatively small acreage fires may result in disastrous damages. Most structures in the WUI are not destroyed from direct flame impingement, but from embers carried by wind. The damages can be widely varying, but are primarily reported as damage to infrastructure, built environment, and injuries to people.

The pattern of increased damages is directly related to increased urban spread into historical forested areas that have wildfire as part of the natural ecosystem and climate change. Many WUI fire areas have long histories of wildland fires that burned only vegetation in the past. However, with new development, a wildland fire following a historical pattern may now burn these newly developed areas. WUI fires can occur where there is a distinct boundary between the built and natural areas or where development or infrastructure has encroached or is intermixed in the natural area. WUI fires may include fires that occur in remote areas that have critical infrastructure easements through them, including electrical transmission towers, railroads, water reservoirs, communications relay sites or other infrastructure assets.

Consequently, wildland fires that burn in natural settings with little or no development are part of a natural ecological cycle and may actually be beneficial to the landscape. Century old policies of fire exclusion and aggressive suppression have given way to better understanding of the importance fire plays in the natural cycle of certain forest types.

Warning times are usually adequate to ensure public safety, provided that evacuation recommendations and orders are heeded in a timely manner. While in most cases wildfires are contained within a week or two of outbreak, in certain cases, they have been known to burn for months, or until they are completely extinguished by fall rains.

Wildfire poses the greatest risk to human life and property in the Marin County OA's densely populated WUI, which holds an estimated 69,000 living units. The Marin County OA is home to 23 communities listed on CAL FIRE's Communities at Risk list, with approximately 80% of the total land area in the county designated as having moderate to very high fire hazard severity ratings. The county has a long fire history with many large fires over the past decades, several of which have occurred in the WUI. To compound the issue, national fire suppression policies and practices have contributed to the continuous growth (and overgrowth) of vegetation

resulting in dangerously high fuel loads. The Community Wildfire Protection Plan (CWPP) provides a scientifically based assessment of wildfire threat in the WUI of the Marin County OA.

Fire protection in California is the responsibility of either the federal, state, or local government depending upon the location of the incident. On federally owned land, or federal responsibility areas (FRA), fire protection is provided by the federal government, and or in partnership with local agreements. In state responsibility areas (SRA), CAL FIRE typically provides fire protection. However, in some counties CAL FIRE contracts with county fire departments to provide protection of the SRA – this is the case in the Marin County OA, where CAL FIRE contracts with Marin County Fire Department (MCFD). Local responsibility areas (LRA) include incorporated cities and cultivated agriculture lands, and fire protection is typically provided by city fire departments, fire protection districts, counties, and by CAL FIRE under contract to local government.

CAL FIRE contracts with MCFD to provide wildland fire protection and associated fire prevention activities for lands designated by the State Board of Forestry as SRA. The MCFD is responsible for the protection of approximately 200,000 acres of SRA within the county and is the primary agency that handles wildland fires. MCFD also provides similar protection services to approximately 100,000 acres of FRA in the Golden Gate National Recreation Area (GGNRA), the Muir Woods National Monument, and the Point Reyes National Seashore.

Figure 40 indicates the federal responsibility areas, state responsibility areas and local responsibility areas in the Marin County OA.

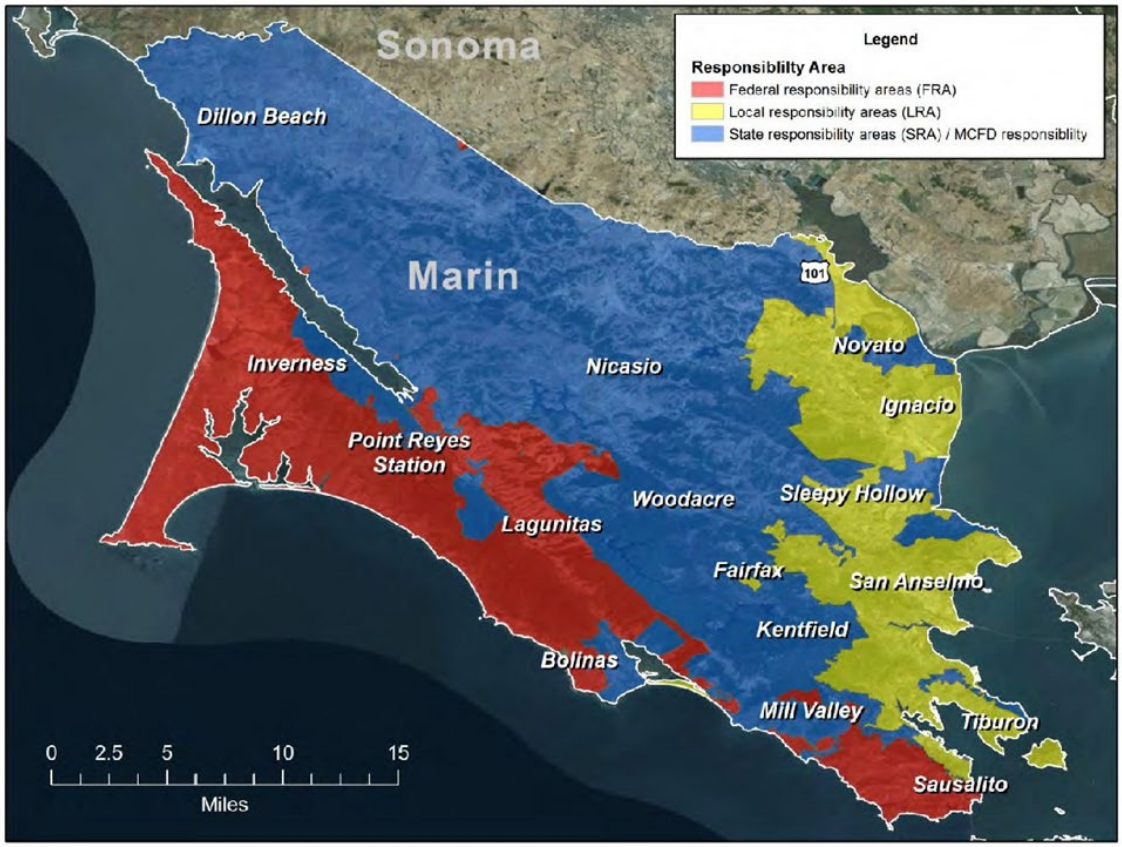


Figure 40: Federal, State and Local Responsibility Areas in the Marin County OA
Source: Marin Community Wildfire Protection Plan

The mix of weather, diverse vegetation and fuel characteristics, complex topography, and land use and development patterns in the Marin County OA are important contributors to the fire environment. The MCFD Woodacre Emergency Command Center (ECC) currently manages the data from four Remote Automated Weather Stations (RAWS) for predicting fire danger utilizing the National Fire Danger Rating System (NFDRS) during the fire season. The RAWS are located in Woodacre, Middle Peak, Barnabe, Big Rock and a new station will be coming online in Novato.

The Marin County OA is bounded by the cool waters of the Pacific Ocean to the west, the San Francisco and Richardson Bays to the southeast, the San Pablo Bay to the east, and Sonoma County agricultural lands to the north. The combination of these large bodies of water, location in the mid-latitudes, and the persistent high pressure over the eastern Pacific Ocean results in several micro-climates. Weather in the OA consists of warm, dry summers and cool, wet winters. The climate in early fall and late spring is generally similar to the summer, and late fall is similar to winter. Spring is generally cool, but not as wet as the winter. While these general weather conditions are fairly representative of the typical Marin County OA weather, complex topography, annual variability of weather patterns, and less frequent and transient weather patterns are important to fire conditions.

In the late spring through early fall, the combination of frequent and strong high-pressure systems (known as the Pacific High) over California combined with the cool waters of the ocean/bays results in persistent fog and low clouds along the coast (including over the southern Marin County OA near the San Francisco Bay) with winds. The fog often penetrates into the inland valleys of the northern and central Marin County OA, especially during overnight hours. At the coastline, mist from fog can keep the land surfaces modestly moist while inland land surfaces above the fog or inversion are often very dry.

The Pacific High that persists from late spring through early fall over the eastern Pacific, combined with a thermal low pressure over the Central Valley of California, results in an almost continuous sea breeze. These winds usher in cool and moist air and can be strong at times (15 to 25 mph), especially over the ridge tops and through northwest to southeast lying valleys, including San Geronimo/Ross, Hicks, Lucas Valleys, and Mill Valley and the Marin Headlands. These westerly winds are usually highest in the afternoon, decrease in the evening, and are light overnight before increasing again in the late morning/early afternoon.

Occasionally in the summer and more often in the fall, the Pacific High moves inland and centers over Oregon and Idaho, while low pressure moves from the Central Valley of California to southern California and Arizona. The resulting north-to-south pressure gradient can be strong enough to retard the typical sea breeze and can even result in winds blowing from the land to the ocean (offshore winds). As the offshore winds move air from the Central Valley to the coastal areas of California, the air descends and compresses, which greatly warms and dries the air. Under these “Diablo” wind conditions, temperatures in the Marin County OA can reach 100°F in the inland areas and even 80°F at the coast, and relative humidity can be very low. In addition, wind speeds can be high (20 to 40 mph), gusty and are often much faster over the mountains and ridge tops such as Mt. Tamalpais, Loma Alta, Marin Headlands and Mt. Burdell compared to low-lying areas. Wind speeds can be high over the ridges and mountains at all times of day under this “offshore” wind pattern and are often much slower or even calm at night in low-lying areas because nighttime cooling decouples the aloft winds from the surface winds. It

is during these Diablo wind events that there is a high potential for large, wind-driven fires should there be an ignition. Historically, the largest and most destructive fires have occurred during these offshore (also known as Foehn) wind events including the Angel Island and the Vision fires which were located in West Marin.

A few times per year in the summer and early fall, monsoonal flow from Mexico may bring in moist and unstable air over central and northern California, which can result in thunderstorms with or without precipitation. With the otherwise dry summer conditions, lightning from this type of weather pattern can ignite fires. These monsoonal flow patterns are usually only one to two-day events.

Beginning in late November and lasting through the end of March, the Pacific High moves south and weakens, allowing storms that originate in the Gulf of Alaska to move over California.

These storms bring precipitation and, at times, strong winds out of the south. Each storm usually results in one fourth inch to several inches of rain over a day or so. Near Mt. Tamalpais, rainfall amounts are enhanced by orographic lifting, resulting in higher rain amounts in the Kentfield and Fairfax areas compared to the rest of the county. Typically, after the first rain in November, the cool weather and occasional storm keeps the ground wet through late Spring. However, in some years, significant rain does not occur until later in the year (e.g., early-to-late December) and there can be several weeks without any storms and rain. During storms, temperatures are usually mild.

When there are no storms over California, a land-breeze typically forms (i.e., winds blowing from the Central Valley to the Pacific Ocean). These winds can reach 30 mph, and travel through the southeast to northwest lying valleys, over low-lying ridges such as the Marin Headlands, and through the Golden Gate. These winds are usually highest in the mid-morning hours and decrease in the afternoon as the Central Valley warms during the day. The winds are associated with cold and modestly moist air.

In late February/early March through late April, the Pacific High strengthens and moves north, and storms impacting the county become less frequent. During this time of year there is often a low-pressure area over the desert in southwest California. The combination of the Pacific High to the north and low-pressure to the southwest results in strong winds blowing from the northwest to the southeast. Like the sea breeze, these winds bring in cool, moist air and are usually highest in the afternoon hours. Because of winter and spring rains, the land is wet and there is little danger of wildland fire despite the strong winds and only occasional precipitation. There is often little coastal fog this time of year.

Vegetation, which is also known as fuel, plays a major role in fire behavior and potential fire hazards. A fuel's composition, including moisture level, chemical make-up, and density, determines its degree of flammability. Of these, fuel moisture level is the most important consideration. Generally, live trees contain a great deal of moisture while dead logs contain very little. The moisture content and distribution of fuels define how quickly a fire can spread and how intense or hot it may become. High moisture content will slow the burning process since heat from the fire must first eliminate moisture.

In addition to moisture, a fuel's chemical makeup determines how readily it will burn. Some plants, shrubs, and trees such as chamise and eucalyptus (both present in the Marin County

OA) contain oils or resins that promote combustion, causing them to burn more easily, quickly, and intensely.

Finally, the density of a fuel influences its flammability; when fuels are close together but not too dense, they will ignite each other, causing the fuel to spread readily. However, if fuels are so close that air cannot circulate easily, the fuel will not burn freely.

The Marin County OA has extensive topographic diversity that supports a variety of vegetation types. Marin County's OA has significant changes in topography with steep vegetated slopes which can also add to the ability of the fuel to further expand a wildfire.

Environmental factors, such as temperature, precipitation, soil type, aspect, slope, and land use history, all help determine the existing vegetation at any given location. In the central and eastern parts of the county, north facing slopes are usually densely wooded from lower elevations to ridge peaks with a mixture of mostly hardwood tree species such as coast live oak, California bay, Pacific madrone, and other oak species. Marshlands are also present throughout the county; once ignited marsh fires can be difficult to contain and extinguish.

Grasslands with a mixture of native and nonnative annual and perennial plant species occur most often in the northern and western parts of the county due to a combination of soil type, lower rainfall, and a long history of ranching. The southern and western facing slopes tend to have a higher percentage of grasslands, which in turn have the potential to experience higher rates of fire spread. Grassland fires are dangerous even without extreme fire weather scenarios due to the rapid rate of fire spread; in some cases, fires spread so quickly that large areas can burn before response resources are able to arrive.

In the west portion of the county closer to the coast, where precipitation is higher and marine influence is greater, most areas are densely forested with conifer species (i.e., Bishop pine, Douglas-fir, and coast redwood) and associated hardwood species. Chaparral vegetation also occurs in parts of the county, especially on steeper south and west facing slopes. This mix of densely forested areas mixed with chaparral results in higher fuel loads and potentially higher fire intensity. Expansion of the residential community into areas of heavier vegetation has resulted in homes existing in close proximity to dense natural foliage; these homes are often completely surrounded by highly combustible or tall vegetation, increasing the potential that wildland fires could impact them.

As part of the development of the Marin Community Wildfire Protection Plan (CWPP), an updated vegetation map layer was created using the most recent vegetation information available from a variety of state and local data sources.

Vegetation distribution in the Marin County OA is characterized by approximately 20 different types of vegetation which have been classified into 15 fire behavior fuel models.

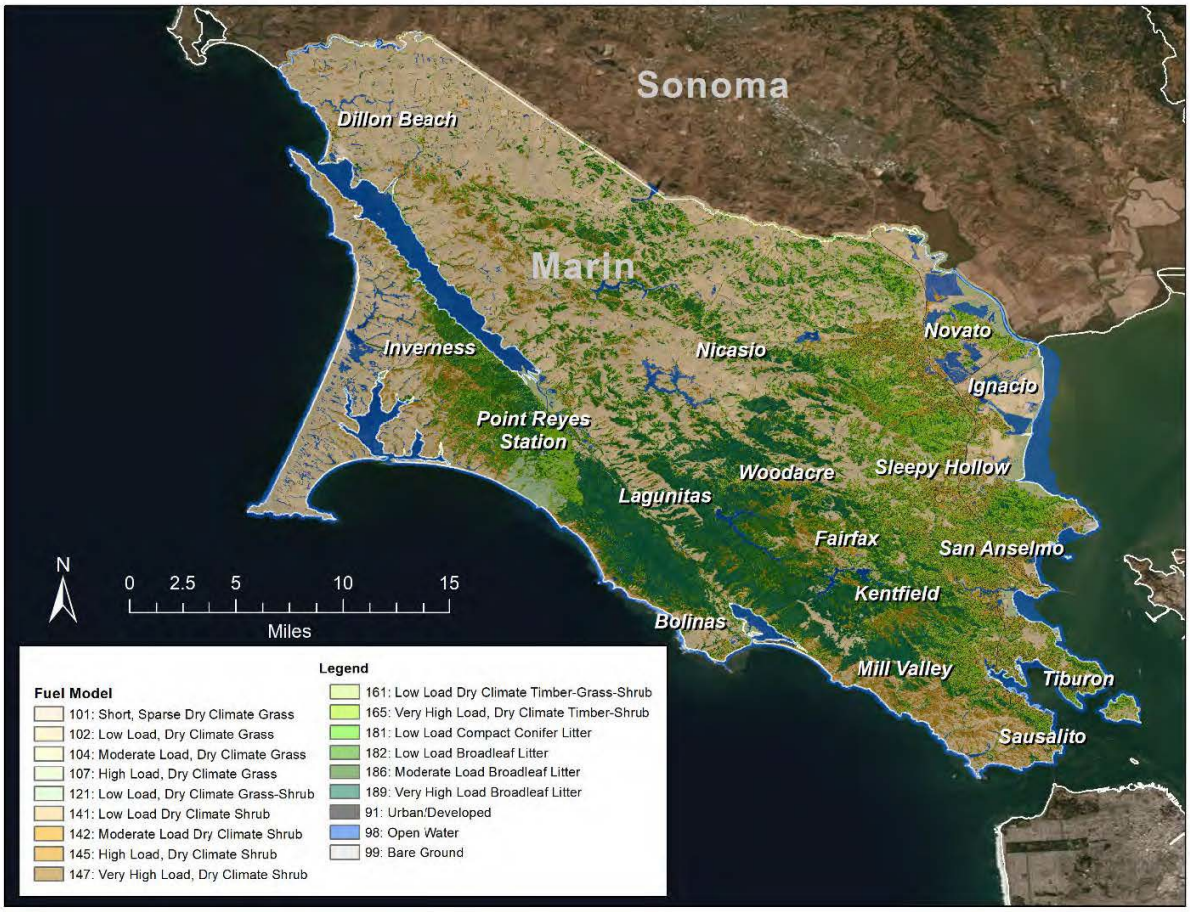


Figure 41: Fuel Model Map for the Marin County OA
Source: Unknown

Insect infestations and plant diseases, such as California oak mortality syndrome (sudden oak death), are increasing and threaten to change the structure and overall health of native plant communities in Marin County. Sudden oak death has no known cure and is the biggest concern; this syndrome is caused by the fungus-like Phytophthora ramorum, which has led to widespread mortality of several tree species in California since the mid-1990s; the tanoak (Lithocarpus densiflorus) in particular appears to have little or no resistance to the disease. Sudden oak death has resulted in stands of essentially dead trees with very low fuel moistures.

Studies examining the impacts of sudden oak death on fire behavior indicate that while predicted surface fire behavior in sudden oak death stands seems to conform to a common fuel model already in use for hardwood stands, the very low moisture content of dead tanoak leaves may lead to crown ignitions more often during fires of “normal” intensity.

Two other plant diseases prevalent in the Marin County OA are pitch canker (which affects conifers such as Bishop pine and other pine species), and madrone twig dieback (which affects Pacific madrones). Pitch canker is caused by the fungus Fusarium circinatum (F. subglutinans, F. sp. pini), which enters the tree through wounds caused by insects. While some trees do recover, most infected trees are eventually killed by the fungus. Management of this disease largely focuses on containment to reduce the fungus spreading to other trees. Pitch canker is a particular issue in the NPS lands of Pt. Reyes National Seashore, where many acres of young

Bishop Pines that were seeded on the Inverness Ridge by the Mount Vision Fire of 1995 have been infected.

These dead and dying trees have created large swaths of land with dense and dry fuel loads. Madrone twig dieback is caused by the native fungus Botryosphaeria dothidea and appears to be getting worse throughout the county due to drought effects on Pacific madrones. Three additional threats to trees common to the Marin County OA include:

- Bark and ambrosia beetles (Monarthrum dentiger and monarthrum scutellare), which target oak and tanoak trees. Sudden oak death may be exacerbating the effects of beetle infestations which prey on trees already weakened by this disease.
- Root rot, caused by oak root fungus (Armillaria mellea), is primarily associated with oaks and other hardwoods but also attacks conifers. These fungal infestations cause canopy thinning and branch dieback and can kill mature trees. As with the beetle infestations, sudden oak death may be exacerbating the effects of root rot fungus in the county forests.
- Velvet-top fungus (Phaeolus schweinitzii) is a root rot fungus affecting Douglas-fir and other conifers, with the infection typically occurring through a wound.

Topography characterizes the land surface features of an area in terms of elevation, aspect, and slope. Aspect is the compass direction that a slope faces, which can have a strong influence on surface temperature, and more importantly on fuel moistures. Both elevation and aspect play an important role in the type of vegetation present, the length of the growing season, and the amount of sunlight absorbed by vegetation. Generally, southern aspects receive more solar radiation than northern aspects; the result is that soil and vegetation on southern aspects is warmer and dryer than soil and vegetation on northern aspects. Slope is a measure of land steepness and can significantly influence fire behavior as fire tends to spread more rapidly on steeper slopes. For example, as slope increases from 20 – 40%, flame heights can double and rates of fire spread can increase fourfold; from 40 – 60%, flame heights can become three times higher and rates of spread can increase eightfold.

The Marin County OA is topographically diverse, with rolling hills, valleys and ridges that trend from northwest to southeast. Elevation throughout the county varies considerably, with Mt. Tamalpais' peak resting at 2,574 feet above sea level and many communities at or near sea level. Correspondingly, there is considerable diversity in slope percentages. The San Geronimo Valley slopes run from level (in the valley itself) to near 70%. Mt. Barnabe has slopes that run from 20 to70%, and Throckmorton ridge has slopes that range in steepness from 40 – 100%. These slope changes can make fighting fires extremely difficult.

In the WUI where natural fuels and structure fuels are intermixed, fire behavior is complex and difficult to predict. Research based on modeling, observations, and case studies in the WUI indicates that structure ignitability during wildland fires depends largely on the characteristics and building materials of the home and its immediate surroundings.

The dispersion of burning embers from wildfires is the most likely cause of home ignitions. When embers land near or on a structure, they can ignite near-by vegetation or accumulated debris on the roof or in the gutter. Embers can also enter the structure through openings such as an open window or vent and could ignite the interior of the structure or debris in the attic.

Wildfire can further ignite structures through direct flame contact and/or radiant heat. For this reason, it is important that structures and property in the WUI are less prone to ignition by ember dispersion, direct flame contact, and radiant heat.

Public Safety Power Shutoff (PSPS) Events

As a result of the 2017 Northern California Wildfires, the 2018 Camp Fire in Butte County and other wildfires caused by power line infrastructure, Pacific Gas & Electric (PG&E) began initiating Public Safety Power Shutoff (PSPS) events in their service areas (including Marin County) to help prevent the start of future wildfires. PG&E will initiate a PSPS if conditions indicate potentially dangerous weather conditions in fire-prone areas due to strong winds, low humidity, and dry vegetation. During these events, PG&E will proactively turn off power in high fire risk areas to reduce the threat of wildfires. The most likely electric lines to be considered for a public safety power outage will be those that pass through areas that have been designated by the California Public Utilities Commission (CPUC) High Fire-Threat District at elevated (Tier 2) or extreme risk (Tier 3) for wildfire. Customers outside of these areas could have their power shut off, though, if their community relies upon a line that passes through a high fire-threat area or an area experiencing severe weather. PG&E will consider numerous factors and analyze historical data to help predict the likelihood of a wildfire occurring, and closely monitoring weather watch alerts from the National Weather Service (NWS). These factors generally include, but are not limited to:

- A Red Flag Warning declared by the National Weather Service
- Low humidity levels, generally 20 percent and below
- Forecasted sustained winds generally above 25 mph and wind gusts in excess of approximately 45 mph, depending on location and site-specific conditions such as temperature, terrain and local climate
- Condition of dry material on the ground and live vegetation (moisture content)
- On-the-ground, real-time observations from PG&E's Wildfire Safety Operations Center and field crews

Pacific Gas & Electric Company (PG&E) operates a total of 1,179 miles of overhead electricity transmission and distribution lines in the Marin County OA. Overhead electricity lines and poles can be damaged or downed under severe weather conditions, particularly severe wind conditions, which increases the potential for wildfire ignition. 52 percent of PG&E’s overhead distribution lines and 41 percent of its overhead transmission lines are located in CPUC-identified High-Fire Threat Districts subject to elevated or extreme fire risk. PG&E is currently planning and implementing safety measures to prevent wildfires and reduce the impacts of Public Safety Power Shutoff (PSPS) events on communities in the Marin County OA and throughout California.

In October 2019 Marin County and the Town of Ross experienced two PSPS events.

These measures include installing weather stations; installing high-definition cameras; installing sectionalizing devices on its overhead lines to separate the grid into smaller sections; hardening the system by installing stronger power poles, covering lines, and undergrounding lines in targeted areas; creating temporary microgrids to provide electricity during PSPS events; and enhancing existing vegetation management activities. From 2018 to July 2021, PG&E hardened three miles of overhead lines, installed 68 transmission and distribution sectionalizing devices,

completed enhanced vegetation management on approximately 51 of overhead line miles, installed 28 weather stations, and installed 12 high-definition cameras in the Marin County OA. PG&E has also begun undergrounding several overhead transmission lines throughout California.

A wildfire in Ross would most likely occur on the western and eastern side of town where there are numerous open spaces and forested terrain. The hillsides and canyons carry the potential of high fire danger. A major wildlife could also descend on Ross from the foothills of Mount Tamalpais to the west, which lie in a Very High FHSZ. The potential of wild land fire is an extreme risk to all areas within the Town, not just hillside areas. Most of Ross lies in a FHSZ and could be susceptible to a wildfire. The middle of Ross, including hundreds of residences, the commercial town center and the Ross Grammar School lie in a high FHSZ. The east and west sides of town lie in a moderate FHSZ and includes dozens of residences, the Ross Fire Station, the Ross Police Station, the Ross City Hall and several medical facilities. Many residences in the high wildfire threat areas were built prior to code changes and have wood shingle siding and some have wood shake roofs. Residences may be surrounded by flammable vegetation. Certain areas of the Town have water pressure and water flow that do not meet current standards. Access to adjacent open space areas and the hillside and canyon areas is limited by few access routes and narrow roads. There is limited water availability, water pressure, and water flow in certain areas within the Town. The wildland fire hazard is caused by a combination of factors including hillside terrain, highly flammable vegetation and forest, long summers, and human activity. There are heavy fuel loads. Many homes have been built on steep slopes with vegetation in close proximity.

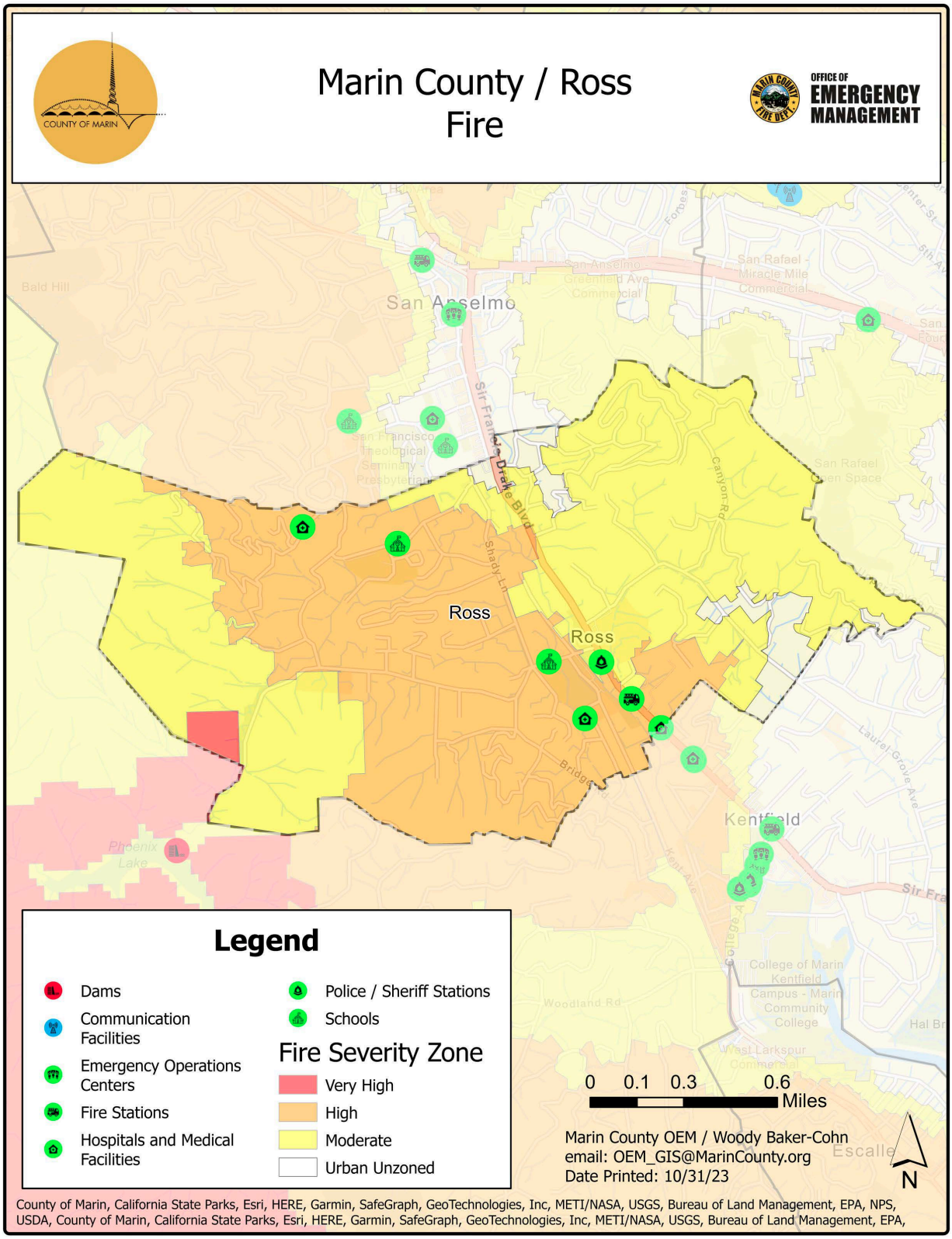


Figure 42: Town of Ross Wildfire Critical Facilities and Infrastructure
Source: Marin County OEM

Wildfires can cause short-term and long-term disruption to the Ross. Fires may result in deaths and injuries and can destroy buildings and infrastructure. Additional costs associated with the loss of homes to wildland fire include disruption of utilities, transportation, and other public services. Although the physical damages and casualties arising from wildfires may be severe, it is important to recognize that they also cause significant economic impacts by resulting in a loss of function of buildings and infrastructure. In large wildfire events, the economic impact of this loss of services may be comparable to the economic impact of physical damages to the Town. Economic impacts of loss of transportation and utility services may include traffic delays/detours from road and bridge closures and loss of electric power, potable water, and wastewater services. Wildfires can also cause major damage to power lines needed to distribute electricity to operate facilities. High intensity wildfires can also have substantial effects on watersheds through loss of vegetation and soil erosion, which may impact the Town by changing runoff patterns, reducing water storage capacity of Phoenix Lake, and degrading water quality through sedimentation and contamination.

All of Ross could be impacted by a Public Safety Power Shutoff (PSPS) event and/or suffer poor air quality from smoke as a result of a wildfire in Marin County or the surrounding region. As wildland areas around Ross become drier due to climate change, the risk of a wildfire occurring and impacting the Town will continue to increase. Brush fires in the Town may increase over time as parks and other open spaces experience drier conditions.

Ross has never experienced a major wildfire.

Climate Change and Future Development Considerations

Climate change can lead to an increase in wildfire events. Climate change has been a key factor in increasing the risk and extent of wildfires in the western United States. Changes in climate create warmer, drier conditions. Increased drought, and a longer fire season are boosting these increases in wildfire risk.

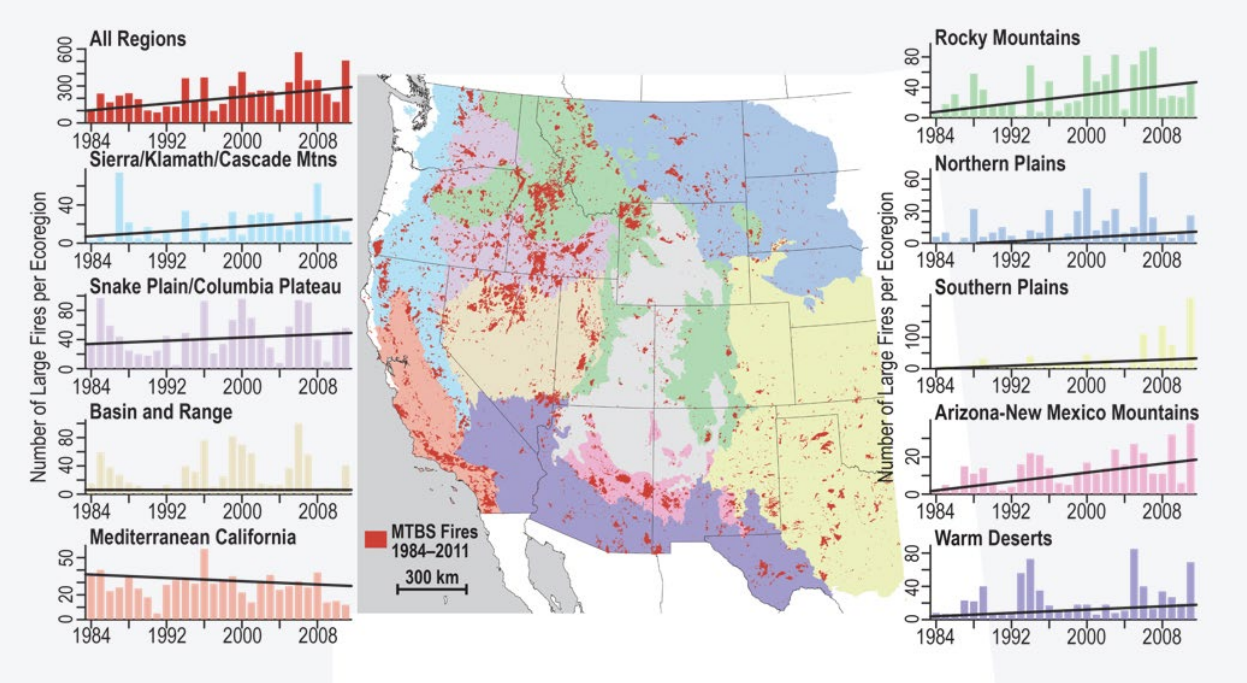


Figure 43: Trends in the Annual Number of Large Wildfires in the United States
Source: Fourth Climate Change Assessment, 01/04/23

As summer conditions in Northern California become hotter and drier due to climate change, the occurrence and severity of wildfires will only increase. The Marin County OA including Ross is particularly susceptible to these future impacts of climate change on wildfire, as the OA's climate has generally been wet enough historically to avoid major wildfires. Extreme heat events and high wind events could cause electrical systems to become overloaded and fail, sparking wildfires. An increase in wildfires as a result of climate change could lead to more significantly burned areas that could contribute to debris flows after a significant storm event, particularly in the open space areas around Ross. Future development in the WUI throughout Ross will expose more people and property to the impacts of a potentially significant wildfire. The growing number of people in the Ross WUI can increase risk to life, property and public health as a result of a wildfire.

SECTION 3.0: MITIGATION STRATEGY

3.1 CHANGES IN DEVELOPMENT

Marin County is a county located in the northwestern San Francisco Bay Area. As of the 2020 census, the population was 262,231. Its county seat and largest city is San Rafael. Marin County is across the Golden Gate Bridge from San Francisco, and is included in the San Francisco–Oakland–Berkeley, CA Metropolitan Statistical Area.

Located in the scenic Ross Valley amid wooded hillsides and meandering creeks, the Town of Ross is a quiet residential community that takes pride in its historic character, small-town charm, tree-lined streets, and excellent school system. Existing residential development in Ross numbers approximately 880 homes. These are predominantly single-family residences, with some guest houses and accessory dwelling units on single-family properties, and some apartment units located above retail in the downtown commercial area. The beauty of the natural landscape helps define the character of the community, but it also presents risk of natural hazards that limit the potential for new housing, including steep topography and areas of landslide hazard in the hills and risk of flooding and liquefaction on much of the valley floor. The existing housing stock in Ross is predominantly single-family homes. In 2020, 94.6 percent of homes were single family (833 single family detached units, 17 percent single family attached units) and 5.4 percent were multifamily [23 small multifamily units (2-4 units) and 26 medium or large multifamily units (5 or more units). There has been no multi-family development since 2015; however, the Town has seen marked interest in accessory dwelling units in recent years.

According to the U.S. Census, Ross' population increased by 9.5 percent between 2000 and 2020, rising from 2,341 in 2000 to 2,550 in 2020, which is a rate higher than Marin County (5.4 percent). The Department of Finance estimates that in 2022, the Town of Ross had a population of 2,301 residents. This decline in population is consistent with DOF projections for Marin County.

Ross's Regional Housing Needs Assessment (RHNA) allocation for the 2023-31 planning period has been determined by ABAG to be 111 housing units, including 34 units for very low-income households, 20 units for low-income households, 16 units for moderate-income households, and 41 units for above moderate-income households.

Table 18: Town of Ross Future Growth Areas

	Development	# of Units	# of Parcels	Project Date[1]	Acres	Fire Severity Zone	Flood Zone
1	**Berg/Bingo** Between 7 and 25 Upper Rd	6	1	unknown	40	Moderate	N
2	**Branson School** 39 Fernhill Ave	10	4	unknown	15	High	N
3	**11WH** At the end of unnamed road west of Chestnut Ave and Hillside Ave intersection, south of 24 Chestnut Ave	2		unknown	8	High	N
4	**Pomeroy** North of 14 Bellagio Rd and South of 78 Baywood Ave	1		unknown	2.5	Moderate	N
5	**Civic Center** 33 Sir Francis Drake Blvd	9		unknown	2.4	High	X

6	**Badalamenti** 27 Ross Common	4		unknown	.22	High	X
7	**Bellagio** 0 Bellagio Road (at the intersection of Bellagio Rd and Canyon Rd)	2		unknown	2.63	Moderate	N
8	**Siebel** Between 36 Glenwood Ave and 81 Fernhill Ave	1		unknown	1	High	N
	Other	25	25	unknown	20	High	X
	Various ADU's	80	80	continuous	N/A	High	X
	Total	**140**	**110**		**91.5**		

Table 18: Town of Ross Future Growth Areas
Source: Town of Ross

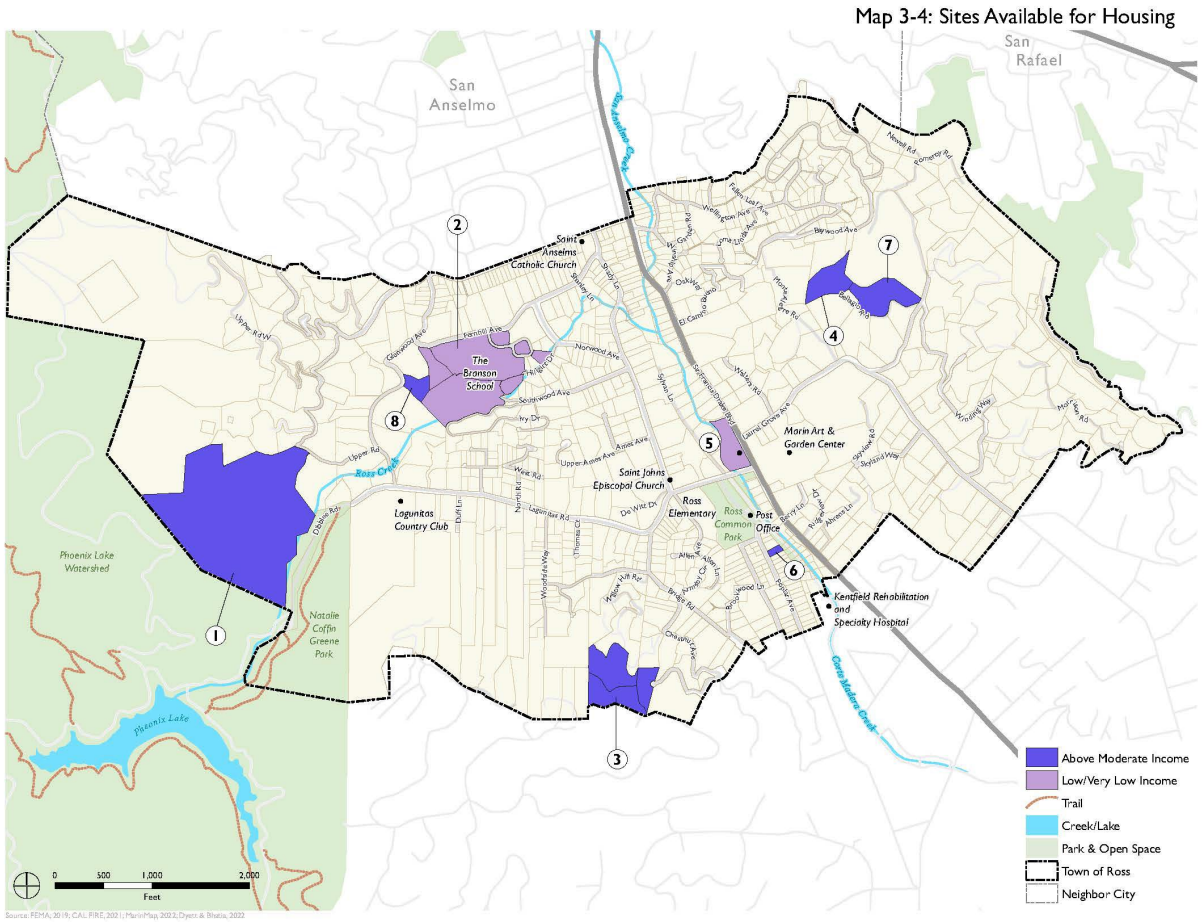


Figure 44: Town of Ross Future Growth Areas
Source: Town of Ross 2023- 2331 Housing Element

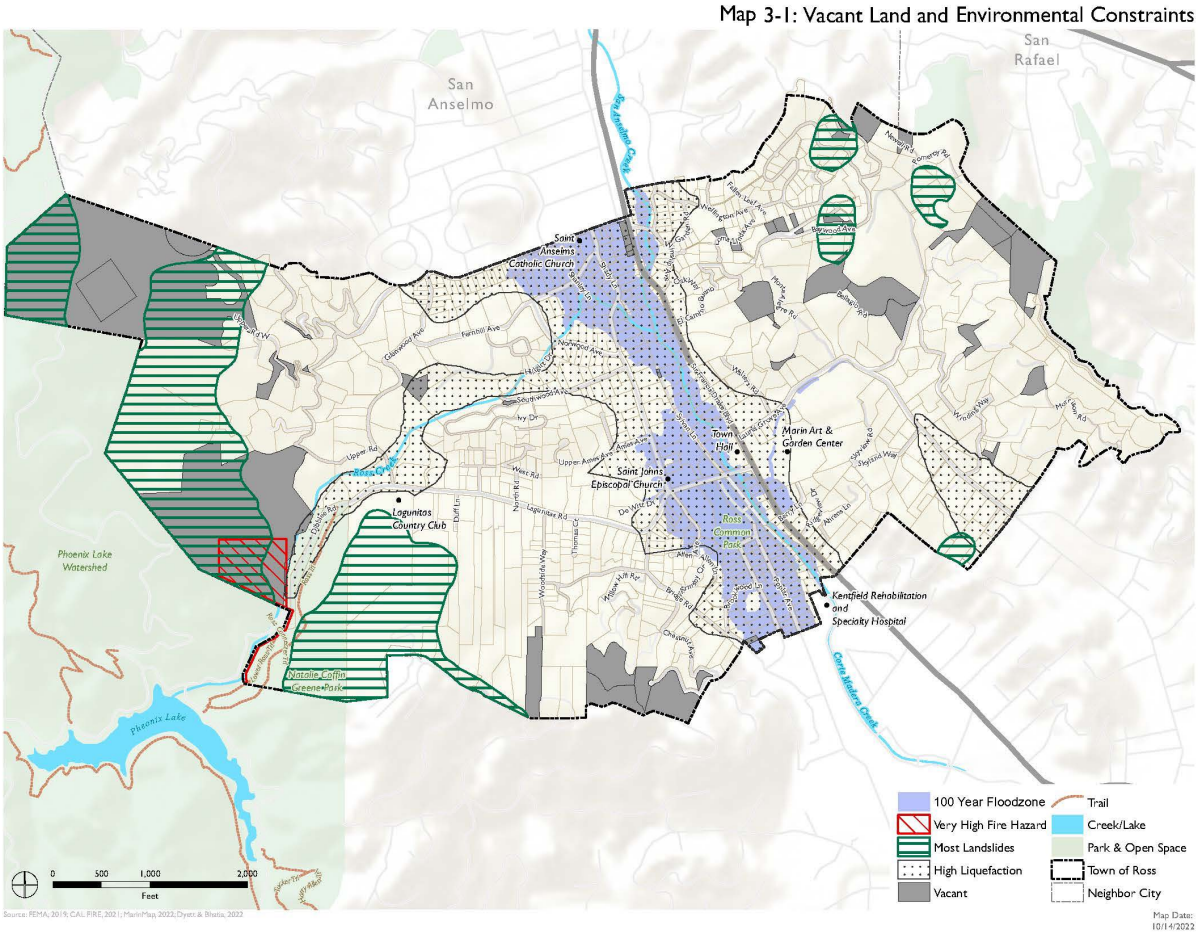


Figure 45: Town of Ross Hazard Zones
Source: Town of Ross 2023 – 2031 Housing Element

3.2 CAPABILITY ASSESSMENT

The overall priorities in the Town of Ross have not changed since the 2018 MJHMP update. However, the strategies in which to support the overall town priorities have changed and are reflected in the sections below. There were many projects that were either ongoing day-to-day business activities or were response related that were completed or deleted from the 2018 MJHMP project list and not carried over to this plan update. Several actions were completed, and new projects were added to coincide with the changes in priorities, progress in local mitigation efforts and changes in development.

Capabilities are the programs and polices currently in use to reduce hazard impacts or that could be used to implement hazard mitigation activities. The capability assessment identifies the local planning mechanisms where information from the 2018 MJHMP is incorporated and where updated hazard mitigation information from this 2023 MJHMP will be incorporated once approved. The 2018 capability assessments have been successfully incorporated into the Town of Ross General Plan to include the Public Safety Element, Land Use Element, and Housing Element and the 2023 capability assessments will also be incorporated into the General Plan and these Elements. The capability assessment is divided into four sections: regulatory, administrative and technical, fiscal, and outreach and partnerships.

3.2.1 REGULATORY CAPABILITIES

The legal and regulatory capabilities include existing ordinances and codes that affect the Town's physical or built environment. Examples of legal and/or regulatory capabilities can include: a jurisdiction's building codes, zoning ordinances, subdivision ordnances, special purpose ordinances, growth management ordinances, site plan review, general plans, capital improvement plans, economic development plans, emergency response plans, and real estate disclosure plans. The table below lists regulatory mitigation capabilities, including planning and land management tools, typically used by local jurisdictions to implement hazard mitigation activities and indicates those that are in place.

Opportunities for Enhancement

The 2023 Marin County OA MJHMP update provided the Town of Ross an opportunity to review and update the capabilities currently in place to mitigate hazards. This also provided an opportunity to identify where capabilities could be improved or enhanced. Specific opportunities could include:

- **Continuity of Operations Plan**: The Town would benefit from the development of a Continuity of Operations Plan to enhance resiliency and develop response and contingency plans for the risk and vulnerability of the Town to the hazards identified in the Hazard Mitigation Plan.
- **Community Wildfire Protection Plan:** The Town plans to take an active role in mitigation actions to enhance wildfire protection.
- **Emergency Manager:** The Town will consider identifying staff to provide emergency management or disaster preparedness duties as a collateral role.
- **StormReady certification and Firewise Communities certification:** The town will consider participation in these programs.

Table 19: Legal and Regulatory Capabilities

Plans	Yes/No Latest Update	Does the plan/program address hazards? Does the plan identify projects to include in the mitigation strategy? Can the plan be used to implement mitigation actions?
General Plan	Y 2010	The General Plan outlines long-term direction for development and policy. The Protecting Community Health and Safety, and Preparing for Emergencies Element includes a discussion of fire and hazardous materials; and importantly includes a section on Emergency Preparedness. The Protecting Creek Habitat and Reducing Flooding Hazards Element addresses flooding and watershed hazards. The plan can be used to implement mitigation actions.
Strategic Plan	N	
Capital Improvements Plan	Y 2022	The Capital Improvement Plan provides an annual 5-year forecast of capital infrastructure expenditures for roadways, drainage, and Town facilities. Recent projects include seismic upgrades to the Town Hall and flood protection projects along Bolinas Avenue. The plan can be

		used to provide funding for mitigation measures.
Economic Development Plan	N	
Local Emergency Operations Plan	Y 2021	The E0P addresses the Town's planned response to extraordinary emergency situations associated with natural, technological, and human caused emergencies or disasters within or affecting the Town of Ross. The plan can be used to implement mitigation actions.
Continuity of Operations Plan	N	
Flood Mitigation Plan (FMP)	N	
Engineering Studies for Streams	Y 2019	In conjunction with the Town's Winship Bridge replacement project and local projects implemented by Marin County Flood Control, the Town of Ross receives continuous updates to the latest hydraulic methodology for the Corte Madera Creek floodplain from the Marin County Flood Control District.
Open Space Management Plan	N	
Regional Transportation Plan (RTP)	Y 2018	The Town participated in the Marin County Traffic Safety Plan systemic safety analysis.
Stormwater Management Plan/Program	Y 2022	The Town partners with the Marin County Stormwater Pollution Prevention Program (MCSTOPPP) to manage stormwater runoff caused by construction activities.
Community Wildfire Protection Plan	Y 2020	Ross is a member agency of the Marin Community Wildfire Protection Plan
Other special plans (e.g., brownfields redevelopment, disaster recovery, coastal zone management, climate change adaptation)	N	
Building Code, Permitting, and Inspections	Y/N	Are codes adequately enforced?
Building Code	Y 2023	Code violations are digitally tracked with the permitting software TRAKiT and adequately enforced.
Building Code Effectiveness Grading Schedule (BCEGS) Score	N	
Fire department ISO rating:	N	
Site plan review requirements	Y 2021	Site plan review checklist for projects in a flood zone are reviewed biannually for compliance with FEMA CRS program
Land Use Planning and Ordinances	Y/N	Is the ordinance an effective measure for reducing hazard impacts? Is the ordinance adequately administered and enforced?
Municipal Code	Y	The Muni Code includes several sections that address hazard mitigation. The Town adopts the current California Building Code which applies to all construction activity

		within the Town boundaries. The California Building Code is comprised of 11 parts that incorporate public health, safety, energy, green building and access standards used in the design and construction of all buildings. The new code provisions will allow the Town to utilize the latest technologies, advances in construction standards and seismic design for the use in new residential and commercial construction and in remodels.
Zoning ordinance	Y	The Zoning Ordinance implements the General Plan by establishing specific regulations for development. It includes standards for where development can be located, how buildings must be sized, shaped, and positioned, and what types of activities can occur in an area. Mitigation actions that pertain to new or substantially redeveloped buildings can be adopted into the Zoning Ordinance.
Subdivision ordinance	Y	New subdivisions & structures require compliance with NFIP and CRS programs
Floodplain ordinance	Y 2021	Recently updated for flood protection standards above FEMA/NFIP minimum requirements.
Natural hazard specific ordinance (stormwater, steep slope, wildfire)	Y	Hillside/Hazard lot ordinance in place, updated in 2018. Entire Town is subject to WUI hardening.
Flood insurance rate maps	Y	Current and historic FIRM maps and riverine studies kept on file.
Elevation Certificates	Y	FEMA requires annual review of Town-issued Elevation certificates to maintain CRS rating. EC's are required prior to foundation pour and on project completion.
Acquisition of land for open space and public recreation uses	N	
Erosion or sediment control program	Y	Coordinated through MCSTOPPP and Towns small MS4 General storm water permit.

Table 19: Town of Ross Legal and Regulatory Capabilities
Source: Town of Ross

Town of Ross General Plan or Master Plan

California Government Code 65300 requires that every City and County in the state have a General Plan. The Town of Ross General Plan, adopted in 2007, was prepared over a one year period that included an extensive public review process. The General Plan is the most important policy and planning document in the Town and is used by virtually every department. The General Plan is the Town's statement of its vision for the future. The General Plan contains policies covering every aspect of the Town: land use (how land can be developed), circulation, noise, air quality, housing, open space and conservation, and health and safety.

Town of Ross specific goals and policies related to mitigation of natural hazards are as follows:

Table 20: Town of Ross General Plan	
Goal/Policy/ Program	**Explanation**
Land Use Element	
Goal 8	**A Beautiful, Safe and Close-Knit Community**
Policy 8.1	Establish land use categories, densities, and intensities of land use, as depicted on the Land Use Plan, that support the vision and goals of the Ross General Plan.
Policy 8.7	Ensure the safety, proper construction and maintenance of buildings, property and neighborhoods through enforcement of codes, public education and cooperation with other public agencies.
Conservation and Open Space Element	
Goal 1	**An Abundance of Green and Healthy Natural Systems**
Policy 1.5	Execute the Open Space Plan for land in public and private ownership, including existing and future parcels.
Policy 1.4	Maximize the amount of land retained in its natural state. Wherever possible, residential development should be designed to preserve, protect and restore native site vegetation and habitat. In addition, where possible and appropriate, invasive vegetation should be removed.
Public Safety - Assuring the Health and Safety of the Community	
Goal 5	**Protecting Community Health and Safety, and Preparing for Emergencies**
Policy 5.1	Location of Future Development. Development will only be permitted in areas where risks to residents can be adequately mitigated.
Policy 5.2	Geologic Review Procedures. At the time a development is proposed, Ross geologic and slope stability maps should be reviewed to assess potential geologic hazards. In addition, suitability for development must be based on site-specific geotechnical investigations.
Policy 5.3	Fire Resistant Design. Buildings should be designed to be fire defensive. Designs should minimize risk of fire by a combination of factors including, but not limited to, the use of fire-resistant building materials, fire sprinklers, noncombustible roofing and defensible landscaping space.
Policy 5.4	Maintenance and Landscaping for Fire Safety. Ensure that appropriate fire safety and landscaping practices are used to minimize fire danger, especially in steeper areas. Due to the high fire hazard in the steeper areas of Town, special planting and maintenance programs will be required to reduce fire hazards in the hills and wildland areas, including removal of invasive non-native vegetation such as broom, acacia and eucalyptus.
Policy 5.5	Fire Safety in New Development. New construction will adhere to all safety standards contained in the Building and Fire Code. Hazards to life and property shall be minimized by such measures as fire preventive site design, fire resistant landscaping and building materials, and the use of fire suppression techniques and resources.
Policy 5.11	Hazardous Materials Storage and Disposal. Require the proper use, storage, and disposal of hazardous materials to prevent leakage, contamination, potential explosions, fires or the escape of harmful gases, and to prevent individually innocuous materials from combining to form hazardous substances, especially at the time of disposal.
Policy 5.12	Access for Emergency Vehicles. New construction shall be denied unless designed to provide adequate access for emergency vehicles, particularly fire fighting equipment.
Policy 5.13	Town Responsibilities for Emergency Preparation and Response. Undertake emergency preparedness planning in cooperation with other public agencies and

Table 20: Town of Ross General Plan	
Goal/Policy/ Program	**Explanation**
	local organizations. Publicize emergency plans, provide information on disaster preparedness to residents and businesses, and continue essential Town emergency public services during natural disasters.
Goal 6	**Protecting Creek Habitat and Reducing Flooding Hazards**
Policy 6.1	Flood Protection in New Development. All new construction and substantial remodels within the 100-year floodplain must comply with the Town's floodplain regulations.
Policy 6.2	Flood Control Improvements. The Town supports the construction of flood control improvements consistent with the natural environment, the design character of the Town of Ross and the safety and protection of persons and property.
Policy 6.3	Ross Valley Flood and Watershed Protection. The Town will work with other jurisdictions within the Ross Valley watershed to develop a comprehensive approach to flood protection and resource preservation strategies.
Policy 6.4	Runoff and Drainage. Stormwater runoff should be maintained in its natural path. Water should not be concentrated and flow onto adjacent property. Instead, runoff should be directed toward storm drains or, preferably to other areas where it can be retained, detained, and/or absorbed into the ground.
Policy 6.5	Permeable Surfaces. To the greatest extent possible, development should use permeable surfaces and other techniques to minimize runoff into underground drain systems and to allow water to percolate into the ground. Landscaped areas should be designed to provide potential runoff absorption and infiltration.
Policy 6.6	Creek and Drainageway Setbacks, Maintenance and Restoration. Keep development away from creeks and drainageways. Setbacks from creeks shall be maximized to protect riparian areas and to protect residents from flooding and other hazards. Encourage restoration of runoff areas, to include but not be limited to such actions as sloping banks, providing native vegetation, protecting habitat, etc., and work with property owners to identify means of keeping debris from blocking drainageways.
Policy 6.7	Riparian Vegetation. Protect existing creek and riparian vegetation and encourage the use of native species during creek restoration. Assure that modification of natural channels is done in a manner that retains and protects creekside vegetation, integrates fish passage and includes habitat restoration in its natural state.
Public Facilities Element	
Goal 9	Excellence of Community Stewardship
Policy 9.2	Maintain facilities and staffing to support general government, public works, fire protection and police services that are responsive to local needs. Use the design and development review process to minimize increases in service needs resulting from new development.

Table 20: Town of Ross General Plan
Source: **Town of Ross** General Plan

3.2.2 Administrative and Technical Capabilities

The administrative and technical capability identifies the Town personnel responsible for activities related to mitigation and loss prevention. Many positions are full time and/or filled by the same person.

Table 21: Administrative and Technical Capabilities

Administrative	Yes/No	Is coordination effective?
Planning Commission	Y	Yes, Town Council acts as Planning Commission, reviewing planning applications for conformance with Town policies, culture, and ordinances.
Administrative Services	Y	Yes. Administrative Services Department handles finance and purchasing, budgeting, risk management, information technology, and business licensing for the community. The department may be responsible for implementing mitigation actions related to the department's scope.
Hazard Mitigation Planning Committee	Y	Yes. The Town participates in the Marin County Multi-Jurisdictional Hazard Mitigation Planning Committee that meets quarterly to review and manage Hazard Mitigation projects and programs.
Maintenance programs to reduce risk (e.g., tree trimming, clearing drainage systems)	Y	Yes. Tree alteration and removal Ordinance updated in 2022 to facilitate removal and limit replanting of fire-prone species
Mutual aid agreements	N	
Technical	Yes/No	Has capability been used to assess/mitigate risk in the past?
Warning systems/services (Reverse 911, outdoor warning signals)	Y	Utilizes the emergency warning systems through the EAS system as their primary warning capability. Utilizes the emergency warning systems through telephone notification utilizing reverse 911.
Hazard data and information	Y	Regional and local GIS database of flood hazards, landslide hazard, fire risk, dam inundation.
Grant writing	N	
Hazus analysis	N	
Staff/Personnel Resources	Yes/No FT/ PT	Is staffing adequate to enforce regulations? Is staff trained on hazards and mitigation? Is coordination between agencies and staff effective?
Chief Building Official	Y/PT	Adequate to enforce regulations
Floodplain Administrator	Y/FT	CFM - Adequate, trained, and effective
Emergency Manager	N	
Community Planner	Y/FT	Adequate, trained, and effective

Civil Engineer	Y/FT	Adequate, trained, and effective
Engineer(s), project manager(s), technical staff, equipment operators, and maintenance and construction staff.	Y/FT	Adequate to enforce regulations
GIS Coordinator	Y/FT	Develops and maintains the General Plan, including the Safety Element. Develops area plans based on the General Plan, to provide more specific guidance for the development of more specific areas. Reviews private development projects and proposed capital improvements projects and other physical projects involving property for consistency and conformity with the General Plan. Adequate, trained, and effective.
Community Development Staff	Y/FT	These departments are responsible for planning and building related activities including issuing permits, conducting environmental review, preparing planning documents, and addressing housing issues. Mitigation activities related to planning and building can be implemented by this department. Public Works Department is responsible for Town-owned infrastructure, including streets, bike lanes and sidewalks, storm drains, traffic signals, and streetlights. Mitigation actions involving new or retrofitted public infrastructure, as well as those related to water conservation, fall within the purview of the Public Works Department. Adequate, trained, and effective
Town Planning, Building, and Public Works Staff	Y/FT	The Town Police Department conducts emergency preparedness activities for the community. Mitigation activities related to emergency preparedness can be implemented by the Police Department. Adequate, trained, and effective
Police Department Staff	Y/FT	The Ross Valley Fire District protects the town from the effects of fire and other hazardous conditions and supports implementation of mitigation actions that reduce the risk of wildfire. Adequate, trained, and effective
Fire Protection District Staff	Y/PT	Adequate to enforce regulations

Table 21: Town of Ross Administrative and Technical Capabilities
Source: **Town of Ross**

3.2.3 FISCAL CAPABILITIES

The fiscal capability assessment shows specific financial and budgetary tools available to the jurisdictions such as community development block grants; capital improvements project funding; authority to levy taxes for specific purposes; fees for water, sewer, gas, or electric services; impact fees for homebuyers or developers for new development; ability to incur debt through general obligations bonds; and withholding spending in hazard-prone areas.

Table 22: Fiscal Capabilities

Financial	Yes/No	Has the funding resource been used in past and for what type of activities? Could the resource be used to fund future mitigation actions?
Capital improvements project funding	Y	Funding has not been used in the past for mitigation, but could possibly fund future mitigation activities.
Authority to levy taxes for specific purposes	Y	Funding has not been used in the past for mitigation but could possibly fund future mitigation activities.
Fees for water, sewer, gas, or electric services	N	
Impact fees for new development	Y	Funding has not been used in the past for mitigation but could possibly fund future mitigation activities.
Storm water utility fee	N	
Incur debt through general obligation bonds and/or special tax bonds	Y	Funding has not been used in the past for mitigation but could possibly fund future mitigation activities.
Incur debt through private activities	N	
Community Development Block Grant	Y	Funding has not been used in the past for mitigation but could possibly fund future mitigation activities.
Other federal funding programs	Y	Funding has not been used in the past for mitigation but could possibly fund future mitigation activities.
State funding programs	Y	Funding has not been used in the past for mitigation but could possibly fund future mitigation activities.

Table 22: Town of Ross Fiscal Capabilities
Source: **Town of Ross**

3.2.4 COMMUNITY OUTREACH

The outreach and partnerships capability assessment shows outreach and public education programs available to the Town of Ross and the Town of Ross partnerships utilized to promote those programs.

Table 23: Town of Ross Community Outreach		
Outreach and Partnerships	Yes/No	Could the program/organization help implement future mitigation activities?
Local citizen groups or non-profit organizations focused on environmental protection, emergency preparedness, access and functional needs populations, etc.	Y	Much of what happens in Town happens at each month's regular Town Council meeting. Since most Town residents don't regularly attend Council meetings, "The Morning After", monthly e-newsletter, was created to fill that void by delivering news highlights delivered by email the day following the Council meeting. The Morning After is the flagship publication of the Town's email list designed to keep residents, business owners, Ross organizations and interested parties up-to-date on Town news and information.
Ongoing public education or information program (e.g., responsible water use, fire safety, household preparedness, environmental education)	Y	The Town website offers detailed Emergency Services information for Wildland fires, Community preparedness, and flooding.
Natural disaster or safety related school programs	N	
StormReady certification		
Firewise Communities certification	Y	Communities in Ross have received Firewise certification.
Community Rating System	Y	Town has a CRS rating of 8 and is in good standing.
Public-private partnership initiatives addressing disaster-related issues	Y	The Get Ready program, developed in Marin County, is a free 2-hour course provided to the community. The course is designed to help residents plan for an emergency with a family plan, evacuation checklist, and strategies to keep residents and their families safe. (https://readymarin.org/get-ready/)

Table 23: Town of Ross Community Outreach
Source: **Town of Ross**

3.2.5 PARTICIPATION IN THE NATIONAL FLOOD INSURANCE PROGRAM

The Town of Ross has participated in the Regular Phase of the NFIP since May 1, 2015. Since then, The Town of Ross has administered floodplain management regulations that meet the minimum requirements of the NFIP. Under that arrangement, residents and businesses paid the same flood insurance premium rates as most other communities in the country.

The Community Rating System (CRS) was created in 1990. The Town of Ross has been in the CRS program since May 1, 2015. The program is designed to recognize floodplain management activities that are above and beyond the NFIP's minimum requirements. CRS is designed to reward a community for implementing public information, mapping, regulatory, loss reduction and/or flood preparedness activities. On a scale of 10 to 1, The Town of Ross is currently ranked Class 8 community, which gives a 10% premium discount to individuals in The Town of Ross Special Flood Hazard Area (SFHA), and a 5% discount to policyholders outside the SFHA.

Presently, The Town of Ross manages its floodplains in compliance with NFIP/CRS requirements and implements a floodplain management program designed to protect the people and property of the County. Floodplain regulations are a critical element in local floodplain management and are a primary component in the Town's participation in the NFIP. Also, the Town's floodplain management activities apply to existing and new development areas, implementing flood protection measures for structures and maintaining drainage systems to help reduce the potential of flooding within the Town.

The Town of Ross will continue to manage their floodplains in continued compliance with the NFIP. An overview of the Town's NFIP status and floodplain management program are discussed in Table 24. Additional information on the Town's CRS program follows.

The activities credited by the CRS program provide direct benefits to Marin County and its residents,

including:

- Enhanced public safety;
- A reduction in damage to property and public infrastructure;
- Avoidance of economic disruption and losses;
- Reduction of human suffering; and
- Protection of the environment.

The activities that Town of Ross implements and receives CRS credits include:

Ross's CRS program as of September , 2021.

Activity 310 – Elevation Certificates: Credit is provided for having written construction certificate management procedures for all new and substantially improved/substantially damaged buildings. (5 points)

Activity 330 – Outreach Projects: Credit is provided for general outreach projects and targeted outreach projects. These projects are disseminated annually. (69 points)

Activity 340 – Hazard Disclosure: Credit is provided for state regulations requiring disclosure of flood hazards. (48 points)

Activity 350 – Flood Protection Information: Documents relating to floodplain management are available in the reference section of the Ross Library. Credit is also provided for floodplain information displayed on the community's website.

(15 points)

Activity 360 – Flood Protection Assistance: Credit is provided for offering one-on- one advice regarding property protection and making site visits before providing advice. The service is publicized annually and records are maintained. (55 points)

Activity 370 – Flood Insurance Promotion: Credit is provided for promoting Flood Insurance Promotion at the Town public library and/or Town website with references to flood insurance and flood protection. The information is publicized annually, and records are maintained. (15 points)

Activity 420 – Open Space Preservation: Credit is provided for preserving approximately 55 percent of the Special Flood Hazard Area (SFHA) as open space, and preserving open space land in a natural state. (121 points)

Activity 430 – Higher Regulatory Standards: Credit is provided for enforcing regulations that require freeboard for new construction and substantial improvement, foundation protection, cumulative substantial improvement, and local drainage protection. Credit is also provided for the enforcement of building codes and Building Code Effectiveness Grading Schedule (BCEGS®) Classification. (209 points)

Activity 440 – Flood Data Maintenance: Credit is provided for maintaining and using additional map data in the day to day management of the floodplain. Credit is also provided for establishing and maintaining a system of benchmarks and maintaining copies of all previous FIRMs and Flood Insurance Study reports. (151 points)

Activity 450 – Stormwater Management: The community enforces regulations for soil and erosion control, and water quality. (31 points)

Section 502 – Repetitive Loss Category: Based on the updates made to the NFIP Report of Repetitive Losses as of October 3, 2022, the Town of Ross, CA has 15 repetitive loss properties and is a Category B community for CRS purposes. All requirements for a Category B community have been met. (No credit points are applicable to this section)

Activity 510 – Floodplain Management Planning: Credit is provided for the Marin County Multi-Jurisdictional Local Hazard Mitigation Plan, adopted on September 17, 2019. A progress report must be submitted on an annual basis. (171 points)

Activity 540 – Drainage System Management: Credit is provided for a drainage system management program and conducting annual inspections of all channels and detention basins and the removal of debris as needed. (191 points)

Activity 630 – Dams: Credit is provided for a State Dam Safety Program. (37 points)

Activity 710 – County Growth Adjustment: All credit in the 400 series is multiplied by the growth rate of the county to account for growth pressures. The growth rate for Marin County, CA is 1.04.

Repetitive Loss Properties

Repetitive loss records are as follows:

- Number of FEMA-identified Repetitive-Loss Properties: 15
- Number of FEMA-identified Severe-Repetitive-Loss Properties: 4
- Number of Repetitive-Loss Properties or Severe-Repetitive-Loss Properties that have been mitigated: 1
- Repetitive Loss Residential Structures: 15
- Repetitive Loss Non-Residential Structures: 0
- Severe Repetitive Loss Residential Structures: 4
- Severe Repetitive Loss Non-Residential Structures: 0

Table 24: Town of Ross NFIP Status

NFIP Topic	Comments
Insurance Summary	
How many NFIP policies are in the community? What is the total premium and coverage?	182 Premium = $291,576 Coverage = $53,019,600
How many claims have been paid in the community? What is the total amount of paid claims? How many of the claims were for substantial damage?	206 Total Paid Losses=$9,483,218 Substantial Damage Claims=Unknown
How many structures are exposed to flood risk within the community? *"flood risk" is defined as the 1% annual chance flood (100-year flood. Numbers are from overlay of FEMA SFHA and building stock data.	219 buildings in sfha
Describe any areas of flood risk with limited NFIP policy coverage	Flood risk caused by failure of municipal storm drains outside of zone ae
Staff Resources	
Is the Community Floodplain Administrator or NFIP Coordinator certified?	Yes
Is floodplain management an auxiliary function?	Yes
Provide an explanation of NFIP administration services (e.g., permit review, GIS, education or outreach, inspections, engineering capability)	Permit review for compliance with floodplain ordinance. Elevation certificate review. Site visits and inspections.
What are the barriers to running an effective NFIP program in the community, if any?	Lack of trained staff
Compliance History	
Is the community in good standing with the NFIP?	Yes
Are there any outstanding compliance issues (i.e., current violations)?	None, as of 2023
When was the most recent Community Assistance Visit (CAV) or Community Assistance Contact (CAC)?	5-year recertification in 2021
Is a CAV or CAC scheduled or needed?	No
Regulation	
When did the community enter the NFIP?	
Are the FIRMs digital or paper?	Both

Do floodplain development regulations meet or exceed FEMA or State minimum requirements? If so, in what ways?	Exceed (bfe +1' for residential buildings, hvac, electrical))
Provide an explanation of the permitting process.	Fpm reviews planning and building permit applications for compliance with floodplain ordinance.
Community Rating System (CRS)	
Does the community participate in CRS?	Yes
What is the community's CRS Class Ranking?	8
What categories and activities provide CRS points and how can the class be improved?	See table above. Increase public outreach, acquire and demolish flood prone structures.
Does the plan include CRS planning requirements	Yes Lhmp + crs activities

Table 24: Town of Ross NFIP Status
Source: FEMA, Town of Ross

3.3 MITIGATION GOALS

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

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

Hazard Risk Prioritization
↓
Mitigation Goals & Objectives
↓
Mitigation Project Identification
↓
Mitigation Project Implementation

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

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

The establishment of hazard mitigation goals represents both individual and collective strategies that have been mutually agreed upon by the Steering Committee and have changed with the 2023 MJHMP update. Objectives were added to Goals 2 and 5. Eventually, these goals have been adopted by Marin County and its participating jurisdictions as the guiding policy behind local hazard mitigation efforts, in conjunction with other associated principles.

Goals were defined for the purpose of this mitigation plan as broad-based public policy statements that:

- Represent basic desires of the community;
- Encompass all aspects of community, public and private;
- Are nonspecific, in that they refer to the quality (not the quantity) of the outcome;
- Are future-oriented, in that they are achievable in the future; and
- A time-independent, in that they are not scheduled events.

Goals are stated without regard to implementation. Implementation cost, schedule, and means are not considered. Goals are defined before considering how to accomplish them so that they are not dependent on the means of achievement. Goal statements form the basis for objectives

and actions that will be used as means to achieve the goals. Objectives define strategies to attain the goals and are more specific and measurable.

Goal 1: Minimize risk and vulnerability of the community to the impacts of natural hazards and protect lives and reduce damages and losses to property, economy, and environment in Marin County.

- Minimize economic and resource impacts and promote long-term viability and sustainability of resources throughout Marin County.
- Minimize impact to both existing and future development.
- Provide protection for public health.
- Prevent and reduce wildfire risk and related losses.

Goal 2: Provide protection for critical facilities, infrastructure, utilities, and services from hazard impacts.

- Incorporate defensible space and reduce hazard vulnerability.
- Develop redundancies in utilities and services.
- Enhance resilience through enhanced construction.

Goal 3: Improve public awareness, education, and preparedness for hazards that threaten our communities.

- Enhance public outreach and participation in the Alert Marin Emergency Notification System.
- Enhance public outreach, education, and preparedness program to include all hazards of concern.
- Increase public knowledge about the risk and vulnerability to identified hazards and their recommended responses to disaster events, including evacuation and sheltering options.
- Provide planning and coordination for "At-Risk" populations.
- Provide planning and coordination for companion animals, livestock, and other animal populations.
- Increase community awareness and participation in hazard mitigation projects and activities.

Goal 4: Increase communities' capabilities to be prepared for, respond to, and recover from a disaster event.

- Improve interagency (local, state, federal) emergency coordination, planning, training, and communication to ensure effective community preparedness, response and recovery.
- Enhance collaboration and coordination of disaster-related plans, exercises, and training with local, state, and federal agencies, neighboring communities, private partners, and volunteers.
- Enhance the use of shared resources/Develop a strong mutual aid support system.
- Create and maintain a fully functional, interoperable radio and communication system with all regional public safety partners.

Goal 5: Maintain FEMA Eligibility/Position the communities for grant funding.

- Review hazard events and ongoing hazard mitigation projects annually.
- Assess the need to pursue or adjust hazard mitigation projects after significant hazard events.

Goal 6: Reduce exposure to High Hazard Dams that pose an unacceptable risk to the public.

- Improve alert and warning systems to provide residents downstream of a High Hazard Dam to receive timely warning to evacuation when threatened by potential or imminent dam failure.
- Enhance overall community preparedness to respond and evacuate a potential or imminent dam failure.
- Increase public awareness of the risk posed by High Hazard Dams and the potential for relocation of housing outside a possible inundation zone.
- Prioritize High Hazard Dam Mitigation projects and programs.

3.4 Status of Previous Mitigation Actions

Table 25 summarizes the actions that were recommended in the previous version of the hazard mitigation plan and their implementation status at the time this update was prepared.

Table 25: Status of Previous Hazard Mitigation Actions

Action Number / Name	Completed	Ongoing	Not Started	Still Relevant	Included in Updated Action Plan
Consider establishing a hazard mitigation fee for building permits to create a hazard mitigation funding source for initiatives or grant cost-share requirements			X	X	X
Consider improvement of currently unused pedestrian rights-of-way/paths as walkways to serve as additional evacuation routes.			X	X	X
Conduct periodic tests of the alerting and warning system.		X		X	X
Develop and enforce a repair and reconstruction ordinance to ensure that damaged buildings are repaired in an appropriate and timely manner and retrofitted concurrently.			X	X	X
Develop post-disaster development and recovery ordinance to facilitate recovery.			X	X	X
Encourage the formation of a community- and neighborhood-based approach to wildfire education and action through local Fire Safe Councils and the Fire Wise Program to take advantage of grant funds currently available to offset costs of specific		X		X	X
Obtain at least three laptop computers for use outside of Police Department should the public safety building be uninhabitable due to hazards.	X				
Obtain propane heaters, stoves and lanterns for emergency use for employees.	X				
Consider expanding residential building reports to include hazard disclosure for known natural hazards in Ross: 1) Special Flood Hazards Areas (designated by FEMA), 2) Areas of Potential Flooding from dam failure inundation, 3) Very High Fire Hazards Severity Zones, 4) Wildland Fire Zones, and 5) Liquefaction and Landslide			X	X	X

Table 25: Status of Previous Hazard Mitigation Actions

Action Number / Name	Completed	Ongoing	Not Started	Still Relevant	Included in Updated Action Plan
Hazards Zones (designated under the Seismic Hazards Mapping Act).					
Improve coordination among the Marin Municipal Water District and the Town so that the Town can better plan for evacuation of areas that could be inundated if the Phoenix Lake Dam fails.		X		X	
Install grates to catch debris.	X				
Work with other Ross Valley jurisdictions to explore and adopt land use regulations to minimize additional runoff, or reduce runoff, within the Ross Valley watershed. (General Plan Program 6.C)	X				
Prepare GIS storm water map of the watershed to determine the water flow and design a culvert system appropriate to the volume and flow of peak runoff. Complete the identification of existing culverts and the need for new ones.	X				
Construct a new 1,400 ft. long, 42-48" diameter reinforced concrete pipe culvert network running under the south gutter line on lower Bolinas Avenue. The culvert would originate with inlets at the Richmond Avenue intersection and outfall to Corte Madera Creek at the Sir Francis Drake Boulevard Bridge, as identified as Measure 4 in the "Final Draft Report: Planning-Level Hydrology and Hydraulics Study for Reducing Street Inundation and Overflow by Stormwater; Bolinas Avenue in Ross and San Anselmo, California," January 25, 2011.	X				
Create bioretention areas at the St. Anselm Church overflow parking lot and the Town's adjacent right of way as identified as Measure 4b in the "Final Draft Report: Planning-Level Hydrology and Hydraulics Study for Reducing Street Inundation and Overflow by Stormwater; Bolinas Avenue in Ross and San Anselmo, California,"			X		
Secure a one-way flap gate at the existing Corte Madera Creek outfall at the Winship Avenue Bridge section as identified as Measure 2j in the "Final Draft Report: Planning- Level Hydrology and Hydraulics Study for Reducing Street Inundation and Overflow by Stormwater; Bolinas Avenue in Ross and San Anselmo, California," January 25, 2011.	X				
When properties that may provide opportunities for drainage improvements are for sale, acquire easements to install drainage improvements, such as between Bolinas Avenue and Fernhill.			X		
Create a building and elevation inventory of structures in the floodplain		X		X	X
Amend Town floodplain management regulations to adopt freeboard regulation to require finished floor to be 18" above the base flood elevation, rather than at the base flood elevation, to protect joists and vents from flood damage. Develop base flood elevation map using historical flood data.			X		**No Longer Relevant**

Table 25: Status of Previous Hazard Mitigation Actions					
Action Number / Name	**Completed**	**Ongoing**	**Not Started**	**Still Relevant**	**Included in Updated Action Plan**
Purchase three pair hip-wader pants, for use by on-duty personnel to reach flooded areas.	X				
Purchase one SUV for use in flooding situations where patrol cars may not be able to operate due to high water.	X				
Continue to provide link to web enabled and publicly accessible County automated system of flood gauges.		X		X	X
Establish and enforce provisions under the creek protection, grading, storm water management, and discharge control ordinances designed to control erosion and Town.		X		X	X
Require geotechnical and soil-hazard investigations be conducted and filed to prevent grading from creating unstable slopes, and that any necessary corrective actions be taken prior to development approval.		X		X	X
Prepare an accurate database of water tanks owned by Marin Municipal Water District and privately owned tanks and swimming pools that are available for fire fighting.			X	X	X
Create a mechanism to enforce provisions of the California Building and Fire Codes and other local codes that require the installation of smoke detectors and fire-extinguishing systems on existing residential buildings by making installation a condition of finalizing a permit for any work valued at over a fixed amount and/or as a condition for the transfer of property.	X				
Require fire sprinklers in all new or substantially remodeled structures.		X			
Prepare Water System (Pressure) Master Plan. Coordinate with the Marin Municipal Water District (MMWD) to evaluate water pressure and water lines to ensure adequate fire protection. Identify locations where improvements are needed and adopt requirements and funding mechanisms in coordination with MMWD to implement these improvements. (General Plan Program 5.A)			X		**No Longer Relevant**
Increase local patrolling during periods of high fire weather.		X		X	X
Monitor weather during times of high fire risk using, for example, weather stations tied into police and fire dispatch centers.		X		X	X
Participate in multi-agency efforts to mitigate fire threat, such as the Hills Emergency Forum (in the East Bay), various FireSafe Council programs, and town/city-utility task forces. Such participation increases a jurisdiction's competitiveness in obtaining grants.		X		X	X

Table 25: Status of Previous Hazard Mitigation Actions
Source: Town of Ross

3.5 HAZARD MITIGATION ACTIONS

The 2023 Marin County MJHMP was revised to reflect progress in local mitigation efforts. Mitigation projects were selected for each hazard and for the Town of Ross based off the hazard risk assessment. The projects are supported by the mitigation goals and objectives, and are ranked using the following criteria; approximate cost, timeframe of completion, whether the project requires City Council regulatory action, and an assumption as to whether or not the project would be subject to CEQA or NEPA requirements. Funding sources are identified for all projects. All projects consider new, future, and existing development. Project worksheets are used by the Planning Team and Steering Committee to describe criteria for each project.

Based on the hazard profiles, threat assessment, capabilities assessment, community survey results, discussions among the Planning Team members, and existing best practices, a set of potential mitigation actions was developed and then evaluated based on the following criteria:

- FEMA requires local governments to evaluate the monetary and non-monetary costs and benefits of potential mitigation actions. Although local governments are not required to assign specific dollar values to each action, they should identify the general size of costs and benefits.
- The Planning Team may elect to include measures with a high cost or low benefits, but such measures should be clearly beneficial to the community and an appropriate use of local resources.

In addition, FEMA directs local governments to consider the following questions as part of the financial analysis:

- What is the frequency and severity of the hazard type to be addressed by the action, and how vulnerable is the community to this hazard?
- What impacts of the hazard will the action reduce or avoid?
- What benefits will the action provide to the community?

The Planning Team also chose to review and revise the potential hazard mitigation actions with consideration for climate impact and social vulnerability. Projects and programs were assessed with consideration of these variables.

Prioritization

As part of the mitigation actions development and review, the Planning Team also prioritized the actions. The prioritization efforts looked at the risks and threats from each hazard; lifesaving, life safety, property protection and lastly environmental protection; financial costs and benefits; technical feasibility; consideration for climate impact, and social vulnerability, and community values. Planning Team members were asked to identify their priority actions using the following criteria.

Implementation priority ratings were assigned as follows:

- **High Priority** - An action that meets multiple objectives, is linked to a high risk hazard, has benefits that exceed costs, and has a potential source of funding. Action can begin within the short term (1 to 5 years).
- **Medium Priority** - An action that meets multiple objectives, is linked to a high or medium risk hazard, has benefits that exceed costs, and is eligible for funding though no

funding has yet been secured for it. Action can begin within the short term (1 to 5 years) once funding is secured.

- **Low Priority** - An action that will mitigate the risk of a hazard, has benefits that do not exceed the costs or are difficult to quantify, has no secured source of funding, and is not eligible for any known grant funding. Action can be completed in the long term (1 to 10 years). Low-priority actions may be eligible for grant funding from programs that have not yet been identified.

Table 26 lists the Current Hazard Mitigation Actions for the Town of Ross.

Table 26: Town of Ross Current Hazard Mitigation Actions

No.	Mitigation Actions	Hazards Mitigated/ Goals Met	Jurisdiction/ Responsible Agency	New, Existing, Completed, Removed	Estimated Cost and Potential Funding Source	Timeline/ Priority	Comments/ Progress
R-1	Prepare and submit an annual Hazard Mitigation plan implementation progress report to the local elected body.	All Hazards 1, 2, 3, 4, 5	Town of Ross	New	Staff time only	December 2023 High	Recommended by CRS activity and this would provide additional incentive to prepare and publish the report on an annual basis
R-2	Enhance and promote community and individual emergency preparedness. MU-15 Develop and Conduct a Household Disaster Preparedness Program. ET-2 Increase awareness of extreme temperatures risk and safety.	All Hazards/ 3, 4, 5	Town of Ross, Marin County, Fire Districts	New	Cost TBD: HMGP, BRIC, Fire Safe Marin, Private Grants	1 - 2 years/ High	Focus on signing residents up for Alert Marin and establish a personal evacuation kit and plan.
R-3	Encourage participation in Alert Marin and other community alert & warning systems to ensure the public is aware of any potential Dam related emergencies or risk.	Dam Failure 1, 2, 3, 4, 5, 6	Marin County, MMWD, & Town of Ross	New	Cost: General Funds	1-5 years/ High	Continue to encourage residents to participate in Alert Marin with an emphasis on properties at risk from dam failure.
R-4	Coordinate with MMWD to develop a Dam-Safety hazard mitigation plan for Ross, including a new section dedicated to climate change, and a discussion of atmospheric rivers and their accelerating potential threats to dam and reservoir safety.	Dam Failure 1, 2, 3, 4, 5, 6	MMWD & Town of Ross	New	Staff time only	December 2024 Medium	Identified in the Grand Jury Report on Dam Safety, June 2023
R-5	Develop and implement an erosion management plan including strict enforcement of 25' creek setback along CMC and Ross Creek for new and substantial remodel permit approval.	Debris Flow 1, 2, 4, 5	Town of Ross	New	Staff Time only	December 2023 Medium	
R-6	Develop a drought communication plan and early warning system to facilitate timely communication of relevant information to officials, decision makers, emergency managers, and the general public.	Drought 1, 2, 3, 4, 5	Town of Ross	New	Staff time only	December 2024 Low	

Table 26: Town of Ross Current Hazard Mitigation Actions							
No.	**Mitigation Actions**	**Hazards Mitigated/ Goals Met**	**Jurisdiction/ Responsible Agency**	**New, Existing, Completed, Removed**	**Estimated Cost and Potential Funding Source**	**Timeline/ Priority**	**Comments/ Progress**
R-7	Using GIS to map hazard areas, at-risk structures, and associated hazards (e.g., liquefaction and landslides) to assess high-risk areas.	Earthquake 1, 2, 4, 5	Town of Ross	New	$15,000 + staff time	December 2024 Low	Need to hire a consultant to supplement staff GIS development.
R-8	Requiring that all critical facilities including emergency operations centers (EOC), police stations, and fire department facilities be located outside of flood-prone areas.	Flooding 1, 2, 4, 5	Town of Ross	New	$1M from facilities fund for new Civic Center project	2027 High	
R-9	Requiring all critical facilities to meet requirements of Executive Order 11988 and be built 1 foot above the 500-year flood elevation.	Flooding 1, 2, 4, 5	Town of Ross	New	$0.5M from facilities fund for new Civic Center project	2027 High	Town will be reconstructing the Civic Center, Admin, and Emergency Services facilities beginning in 2027 (est.)
R-10	Install datalogger in Ross Common well to monitor areas at risk to subsidence by remaining aware of changes in groundwater levels.	Land Subsidence 1, 2, 4, 5	Town of Ross	New	$35,000	December 2024 Low	Will require installing wireless telemetry in at least 1 well.
R-11	Monitor Sea Level Rise impacts to hydraulic grade line in Ross	Sea Level Rise 1, 2, 4, 5	Town of Ross	New	Staff Time only	2028 Low	Long term awareness
R-12	Educate citizens regarding the dangers of extreme heat and the steps they can take to protect themselves when extreme temperatures occur.	Severe Weather – Extreme Heat 1, 2, 4, 5	Town of Ross	New	Staff time only	December 2024 Medium	Town of Ross
R-13	Identifying specific at-risk populations that may be exceptionally vulnerable in the event of long-term power outages.	Severe Weather – Wind, Hail, Lightning 1, 2, 4, 5	Town of Ross	New	Staff time only	Annually Medium	
R-14	Inform the public about proper evacuation procedures.	Wildfire 1, 2, 4, 5	Town of Ross	New	Staff time only	Annually Medium	Work with an OES consultant to develop an SOP for evacuation decision making.
R-15	Vegetation Management Plans (VMP) for development in the Wildland-Urban Interface (WUI) areas.	Wildfire/ 1, 2, 4, 5,	Town of Ross, Marin County, Fire Districts	New	Cost TBD: HMGP, BRIC, Fire Safe Marin, Private Grants	1 - 2 years/ High	This reduces the chance of a wildland fire igniting the structure(s) and reciprocally,

Table 26: Town of Ross Current Hazard Mitigation Actions							
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	WF-9 Implement a Fuels Management Program						wildland ignition from a structure fire.
R-16	Vegetation Management Plan to include the removal of exotic, invasive, and hazardous species and replacing them with native, safer vegetation. WF-9 Implement a Fuels Management Program, ET-1 Reduce Urban Heat.	Wildfire, Severe Weather-Wind, Heat 1, 2, 4, 5,	Town of Ross, Marin County, Fire Districts	New	Cost TBD: HMGP, BRIC, Fire Safe Marin, Private Grants	1 - 2 years/ High	Reduces the chance of a wildland fire igniting the structure(s) and reciprocally, wildland ignition from a structure fire. Supports environmental restoration.
R-17	Coordinate with Marin EOC and educate Ross citizens regarding the dangers of tsunami and inform them of emergency procedures and routes to use should a tsunami warning be issued.	Tsunami 1, 2, 3, 4, 5	Town of Ross	New	Staff time only	Recurring Low	Ross contains a major arterial evacuation route (Sir Francis Drake Boulevard) for coast Tsunami/flooding events.

Table 26: Town of Ross Current Hazard Mitigation Actions

3.6 Progress in Local Mitigation Efforts

This plan has been created as a "living" document with input from the population and professionals within the Town of Ross. Based on the planning meetings and the progress monitored by the steering committee members several mitigation actions were accomplished since the last planning cycle. Table 25 provides a brief description of the progress made in the local mitigation efforts and the plan for those mitigation actions that were not completed or are ongoing.

The planning team for the Town of Ross identified and prioritized the mitigation actions as detailed in Table 26, based on the risk assessment and in accordance with the process outline in Section 3, Mitigation Strategy, of the base plan. Background information and information on how each action will be implemented and administered, such as ideas for implementation, responsible office, potential funding, estimated cost, and timeline are also included. General processes and information on plan implementation and maintenance of this MJHMP by all participating jurisdictions is included in Section 4.0: Plan Review, Evaluation, and Implementation.

3.7 Project Implementation

For hazard mitigation planning, "integration" means that hazard mitigation information is used in other relevant planning mechanisms, such as general planning, capital facilities planning, emergency management, hazard specific planning, and that relevant information from those sources is also used in hazard mitigation. This section identifies where such integration is already in place from the 2018 MJHMP, and where the 2023 MJHMP will be used for further integration.

The planning team for the Town of Ross will maintain this plan and will serve as a lead staff for grant project applications on Town projects selected for application under the Hazard Mitigation Assistance grant programs.

An important implementation mechanism that is highly effective and low-cost is incorporation of the hazard mitigation plan recommendations and their underlying principles into town plans and mechanisms. Where possible the Town of Ross will use existing plans and/or programs to implement hazard mitigation actions. Mitigation is most successful when it is incorporated into the day-to-day functions and priorities of government and development. As described in this plan's capability assessment, the Town of Ross already implements policies and programs to reduce losses to life and property from hazards. This plan builds upon the momentum developed through previous and related planning efforts and mitigation programs and recommends implementing actions, where possible, through these other program mechanisms. These existing mechanisms include Integration opportunities for the 2023 Marin County MJHMP:

Town General Plan - Integrates hazard mitigation through the consideration of hazards most likely to impact the Town. These hazards are considered in the Safety Element, Housing Element and Open Space Element.

Town Emergency Operations Plans – Integrates hazard mitigation through the consideration of the Town's planned response to hazards most likely to impact the Town.

County, City and Town Ordinances - Integrates hazard mitigation through the consideration of plans and policies outlined in the capability assessments in the jurisdictional annexes.

Flood/Storm Water Management/Master Plans - Integrates hazard mitigation through the consideration of strategies to reduce flood risk and storm water management for the protection of life and property.

Community Wildfire Protection Plan - Integrates hazard mitigation through the consideration of strategies to reduce fire hazard and the risk of catastrophic wildfires in the WUI, while promoting the protection and enhancement of the county's economic assets and ecological resources.

The successful implementation of this mitigation strategy will require review of existing plans and programs for coordination and multi-objective opportunities that promote a safe, sustainable community. A few examples of incorporation of the MJHMP into existing planning mechanisms include:

1) As recommended by Assembly Bill 2140, each community should adopt (by reference or incorporation) this MJHMP into the Safety Element of their General Plans. Evidence of adoption (by formal, certified resolution) shall be provided to CalOES and FEMA
2) Integration of flood actions identified in this mitigation strategy with the actions and implementation priorities established in existing Flood Management Programs
3) Using the risk assessment information to update the hazards section in the County, City and Town Emergency Operations Plans

Efforts should continuously be made to monitor the progress of mitigation actions implemented through these other planning mechanisms and, where appropriate, their priority actions should be incorporated into updates of this hazard mitigation plan.

3.8 Future Development Trends

Located in the scenic Ross Valley amid wooded hillsides and meandering creeks, the Town of Ross is a quiet residential community that takes pride in its historic character, small-town charm, tree-lined streets, and excellent school system. Existing residential development in Ross numbers approximately 880 homes. These are predominantly single-family residences, with some guest houses and accessory dwelling units on single-family properties, and some apartment units located above retail in the downtown commercial area. The beauty of the natural landscape helps define the character of the community, but it also presents risk of natural hazards that limit the potential for new housing, including steep topography and areas of landslide hazard in the hills and risk of flooding and liquefaction on much of the valley floor.

Approximately 18 miles north of San Francisco and centrally located in Marin County, Ross is bounded by the Town of San Anselmo to the north, the City of San Rafael to the east, and the unincorporated community of Kentfield to the south, with undeveloped open space administered by the Marin Municipal Water District in the hills to the west. Sir Francis Drake Boulevard bisects Ross in a north south direction, providing the principal access route to and from the region. Marin Transit operates bus service along Sir Francis Drake, connecting Ross with San Rafael, Larkspur, Fairfax and the wider Bay Area. The Corte Madeira Creek runs roughly parallel to Sir

Francis Drake Boulevard and Ross Creek drains from Phoenix Lake in the western hills to the Ross Valley floor.

Home to 2,453 residents, the Town of Ross is the second smallest jurisdiction in Marin County, encompassing just 1.6 square miles. The town is largely developed with single-family homes with no vacant parcels on the valley floor. At the heart of the community is the Ross Common, located just west of Sir Francis Drake Boulevard and flanked by the Ross Post Office, the Ross School, and the downtown commercial area. The Ross Civic Center, comprised of the Town Hall and Public Safety Building, is located just north of the Post Office on the west side of Sir Francis Drake, while on the opposite side street is the Marin Art and Garden Center, an 11-acre site that features gardens and historic buildings, added to the National Register of Historic Places in 2022. Other notable land uses in Ross include the Branson School, the Lagunitas Country Club, and Saint Anselms Church. Much of the rest of the community is made up of single-family neighborhoods with a dense tree canopy. The lots on the flat land of the valley floor tend to be smaller, with large lots in the hilly terrain further away from the center of the community. Overall, residential uses account for 657.3 acres, commercial uses occupy 20.3 acres, and institutional uses occupy 1.6 acres. Vacant land accounts for 145.6 acres; however, this is predominantly located in areas of steep terrain.

SECTION 4.0: PLAN REVIEW, EVALUATION, AND IMPLEMENTATION

The strategies presented are deemed appropriate and effective by recommendation of the Town of Ross.

4.1 PLAN ADOPTION

Upon submission to the California Office of Emergency Services (CalOES) for review, and subsequent approval by the Federal Emergency Management Agency (FEMA), the Marin County MJHMP will be presented to local government for formal adoption. As appropriate, the adopted plan and accompanying Town of Ross Community Profile will then be incorporated into local general plans for integration into organizational policy.

4.2 PLAN MONITORING

The process of hazard mitigation does not end with the completion, approval, and adoption of the Marin County OA MJHMP. During the five-year lifespan the Marin County and Town of Ross plan, the County, cities, towns and special districts, along with community-based organizations will ensure that the mitigation goals and strategies identified are exercised and monitored under a collaborative and cooperative umbrella, and that the document itself is properly maintained.

The Marin County Office of Emergency Management, as lead coordinating agency for hazard mitigation planning within the Marin County OA, leads the Marin Operational Area Hazard Mitigation Working Group that meets quarterly to review and manage the plan, projects, and programs. The Town of Ross is a participating member of the Marin Operational Area Hazard Mitigation Working Group. The Town of Ross Public Works Director will monitor and update the Town of Ross Annex to the Marin County OA MJHMP.

The review will identify changing community priorities, updated or new planning documents and the progress or status of the mitigation actions as detailed in the mitigation strategy. Additional questions to complete the review will be considered as follows:

- Do the goals address current and expected conditions?
- Are the goals and objectives consistent with changes in the local, state, and federal policy?
- Status updates on all mitigation actions?
- Have the hazards or risks changed?
- Are current resources appropriate for implementing the MJHMP?
- Have the outcomes occurred as expected?
- Is the County and jurisdictions or districts participating in the plan implementation process as expected?

The Working Group is a subgroup of the Marin Disaster and Citizens Corps Council. During the five-year update cycle, the Marin Operational Area Hazard Mitigation Working Group will have quarterly update meetings with the Hazard Mitigation Planning Committee and local stakeholders to discuss revisions to the plan and progress updates for the hazard mitigation actions. Further, Marin OEM will host an annual one-day mitigation summit to increase engagement and enhance collaboration on the plan and projects. The summit will also have the goal to educate stakeholders on innovative approaches to mitigation, trends, and new plan

requirements. Marin OEM, as the host, will seek subject matter experts, state and federal officials, and representatives from within the Marin OA to speak to mitigation and planning. The knowledge gathered and the coordination facilitated during the summit will be used to update the base plan and annexes.

Marin OEM has the capacity to lead the Working Group and Multi-Jurisdictional Planning with one coordinator assigned with direct maintenance of the plan, a department analyst assigned to support the coordinator with project and grant tracking, and a community preparedness coordinator assigned with conducting regular public outreach on the plan and education on mitigation. Community feedback and integration will continue through outreach events and OEM website, where residents and visitors are invited to provide feedback through a survey, available in English or Spanish.

Specific plan maintenance activities by the Marin County Office of Emergency Management and its participating jurisdictions/special districts may include:

- Hold quarterly update meetings with the Hazard Mitigation Planning Committee and local stakeholders to discuss revisions to the plan and progress updates for the hazard mitigation actions.
- Annual Hazard Mitigation Summit
- Holding public meetings after the first quarter and third quarter update meetings.
- Maintaining the Marin County OEM Hazard Mitigation Website, which provides the public with the ability to access identified hazard impact maps, location address search capability, and a listing of hazard mitigation actions.
- Monitoring of the Marin County and all participating jurisdiction mitigation project activities and dissemination of status reports.
- Generation of reports relative to plan status, project management, and revision updates to executive leadership.
  Preparations for the plan's future revision and updating.

4.3 Plan Evaluation

Upon approval and adoption by the Town of Ross, the prioritized mitigation strategies will be further developed for funding and implementation by the lead agencies. The plan describes the potential sources of hazard mitigation funding, and general procedures to obtain that funding.

The mitigation strategies represented and adopted within this plan are recommendations only and must be approved and funded in order to be implemented as official mitigation solutions. Ultimately, it is the responsibility of jurisdictional and agency officials within the Marin County to undertake project implementation based upon identified mitigation strategies, funding availability, and local need when it arises. The Marin County Office of Emergency Management will meet with the Marin Operational Area Hazard Mitigation Working Group, including the Town of Ross, to evaluate the plan after each update meeting.

4.4 Plan Update

The Town of Ross Public Works Director will monitor and update the Town of Ross Annex to the Marin County OA MJHMP. During the five-year update cycle, the Town of Ross and the Marin County Office of Emergency Management will hold quarterly update meetings with the Marin Operational Area Hazard Mitigation Working Group and local stakeholders to discuss revisions to the plan and progress updates for the hazard mitigation actions. The Marin County Office of

Emergency Management and all participating jurisdictions and special districts will continue to hold public meetings after the first quarter and third quarter update meetings annually and will continue to invite public participation in the update process via updated public surveys.

FIGURES AND TABLES

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ACRONYMS/ABBREVIATIONS

Acronym	Definition
ABAG	Association Bay Area of Governments
ADU	Accessory Dwelling Units
AQI	Air Quality Index
ARP	Address Resolution Protocol
ASL	American Sign Language
ATSDR	Agency for Toxic Substances and Disease Registry
BAAQMD	Bay Area Air Quality Management District
BCDC	Bay Conservation and Development Commission
BCEGS	Building Code Effectiveness Grading Schedule
BCPUD	Bolinas Community Public Utility District
BFE	Base Flood Elevation
BRIC	Building Resilient Infrastructure and Communities
CA	California
CAC	Community Assistance Contact
CAL FIRE	California Department of Forestry and Fire Protection
Cal OES	California Office of Emergency Services
CAP	Climate Action Plan
CASPER	Community Assessment for Public Health Emergency Response - California Department of Public Health
CAV	Community Assistance Visit
CDAA	California Disaster Assistance Act
CDC	Centers for Disease Control and Prevention
CDI	Certified Deaf Interpreter
CEQA	California Environmental Quality Act
CERT	Community Emergency Response Team
CGS	California Geological Survey
CIP	Capital Improvement Plan
CIR	Conservation Incentive Rate
CITR	Conservation Incentive Tier Rate
CMFD	Central Marin Fire District
CMSA	Central Marin Sanitation Agency
CNRA	California Natural Resource Agency

CO	Carbon Monoxide
COVID-19	Coronavirus Disease 2019
COYL	Coyote Creek Left Bank Levee
CPUC	California Public Utilities Commission
CRF	Community Risk Factor
CRI	Community Resilience Index
CRS	Community Rating System
CRT	Community Response Team
CSA	County Service Area
C-SMART	Sea-level Marin Adaption Response Team
CWPP	Community Wildfire Protection Plan
DDoS	Distributed Denial of Service
DMA	Disaster Mitigation Act
DNS	Domain Name System
DOF	California Department of Finance
DoS	Denial-of-Service
DPW	Department of Public Works
DR	Disaster Relief
DSOD	Division of Safety of Dams - California Department of Water Resources
DWR	California Department of Water Resources
EAL	Expected Annual Loss
EAS	Emergency Alert System
ECC	Emergency Command Center
EOC	Emergency Operation Center
EOP	Emergency Operations Plan
EPA	Environmental Protection Agency
EPC	Emergency Preparedness Commission
ESHA	Environmentally Sensitive Habitat Areas
FD	Fire Department
FEMA	Federal Emergency Management Agency
FHSV	Fire Hazard Severity Zones
FIRM	Flood Insurance Rate Maps
FMA	Flood Mitigation Assistance
FMP	Flood Mitigation Plan

FOG	Fats, Oils, & Grease
FPA	Floodplain Administrator
FRA	Federal Responsibility Areas
FY	Fiscal Year
GGBHTD	Golden Gate Bridge, Highway and Transportation District
GGNRA	Golden Gate National Recreation Area
GGNRA	Golden Gate National Recreation Area
GIS	Geographic Information System
Gov	Government
GPAC	General Plan Advisory Committee
H2S	Hydrogen Sulfide
HFHSZ	High Fire Severity Zone
HIRA	Hazard Identification and Risk Assessment
HIV/AIDS	Human Immunodeficiency Virus/Acquired Immunodeficiency Syndrome
HLR	Historic Loss Ratio
HMGP	Hazard Mitigation Grant Program
IoT	Internet of Things
IP	Intellectual Property
IPAWS	Integrated Public Alert and Warning System
IPCC	Intergovernmental Panel on Climate Change
ISEPA	Identified Site Emergency Planning Application
JPA	Joint Powers Agreement
LCP	Local Coastal Program
LGVSD	Las Gallinas Valley Sanitary District
LHMP	Local Hazard Mitigation Plan
LOMA	Letters of Map Amendment
LOMR	Letters of Map Revision
LRA	Local Responsibility Areas
LRAD	Long-Range Acoustic Device
LSAC	Levee Safety Action Classification
Marin IJ	Marin Independent Journal
MCEP	Marin Climate Energy Partnership
MCFD	Marin County Fire Department
MCOSD	Marin County Open Space District

MCPIO	Marin County Public Information Officers
MCSTOPP	Marin County Stormwater Pollution Prevention Program
MERA	Marin Emergency Radio Authority
MERS	Middle Eastern Respiratory Syndrome
MFHSZ	Moderate Fire Severity Zone
MG	Million Gallons
MGD	Million Gallons Per Day
MHOAC	Medical/Health Operational Area Coordinator
MHW	Mean High Water
MJHMP	Multi-Jurisdictional Hazard Mitigation Plan
MMI	Modified Mercalli Intensity
MMRC	Marin Medical Reserve Corps
MMWD	Marin Municipal Water District
MRZ	Mineral Resource Zones
MV2040	Mill Valley General Plan 2040
Mw Scale	Moment Magnitude Scale
MWPA	Marin Wildfire Prevention Authority
NASA	National Aeronautics and Space Administration
NCDC	National Climatic Data Center
NEPA	National Environmental Policy Act
NFDRS	National Fire Danger Rating System
NFIP	National Flood Insurance Program
NID	National Inventory of Dams
NIH	National Institute for Health
NMWD	North Marin Water District
NPDES	National Pollutant Discharge Elimination System
NPR	Northwestern Pacific Railroad
NR	National Register of Historic Places
NRI	National Risk Index
NWS	National Weather Service
O3	Ozone
OA	Operational Area
OEM	Office of Emergency Management
OHP	Office of Historic Preservation

OWTA	On-Site Wastewater Treatment Systems
PD	Police Department
PG&E	Pacific Gas & Electric
PM10	Particulate Matter Less Than 10 Microns In Aerodynamic Diameter
PSPS	Public Safety Power shutoffs
PtH	Pass the hash
PUD	Public Utility District
PW	Public Works
RACES	Radio Amateur Civil Emergency Service
RAWS	Remote Automated Weather Stations
RCD	Resource Conservation District
RHNA	Regional Housing Needs Assessment
RTP	Regional Transportation Plan
SASM	Sewerage Agency of Southern Marin
SFBRA	San Francisco Bay Restoration Authority
SFHA	Special Flood Hazard Area
SFHA	Special Flood Hazard Areas - FEMA
SFHA	Special Flood Hazard Area
SHMP	State Hazard Mitigation Plan
SHSGP	State Homeland Security Grant Program
SMART	Sonoma Marin Area Rail Transit
SMCSD	Sausalito Marin City Sanitary District
SMFD	Southern Marin Fire District
SOD	Sudden Oak Death
SOX	Sulfur Oxides
SQL	Structured Query Language
SR	State Route
SRA	State Responsibility Areas
SSMP	Sewer System Management Plan
SVI	Social Vulnerability Index
TAM	Transportation Authority of Marin
TBD	To Be Determined
TENS	Telephone Emergency Notification System
UCERF2	Uniform California Earthquake Rupture Forecast, Version 2

UCERF3	Uniform California Earthquake Rupture Forecast, Version 3
USACE	U.S. Army Corps of Engineers
USGS	United States Geological Survey
UWMP	Urban Water Management Plan
VHFHSV	Very High Fire Severity Zone
VMP	Vegetation Management Plans
WC/ATWC	West Coast/Alaska Tsunami Warning Center
WHO	World Health Organization
WSCP	Water Shortage Contingency Plan
WUI	Wildland Urban Interface
WWTP	Waste Water Treatment Plant
XSS	Cross-Site Scripting