

# CITY OF NOVATO COMMUNITY PROFILE



CITY OF NOVATO  
CALIFORNIA

## Marin County Multi-Jurisdictional Hazard Mitigation Plan 2023



This page is intentionally blank.

## **ACKNOWLEDGEMENTS**

The City of Novato 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 Operational Area (OA) Multi-Jurisdictional Hazard Mitigation Plan (MJHMP) 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 City of Novato more disaster resistant and sustainable.

This page is intentionally blank.

## TABLE OF CONTENTS

<b>CITY OF NOVATO COMMUNITY PROFILE</b> .....	<b>1</b>
<b>Acknowledgements</b> .....	<b>3</b>
<b>Table of Contents</b> .....	<b>5</b>
<b>Section 1.0: Introduction</b> .....	<b>7</b>
1.1 Introduction .....	7
1.2 Planning Process .....	7
1.2.1 Steering Committee Members (Jurisdictional Representatives).....	8
1.2.2 Steering Committee Planning Process.....	9
1.2.3 Coordination with stakeholders and agencies .....	9
1.2.4 Public Engagement .....	16
1.3 Overview and History .....	23
1.4 Government.....	27
1.5 Weather and Climate .....	27
1.6 Demographics.....	28
1.7 Social Vulnerability and Risk.....	31
1.8 Economy and Tax Base .....	38
1.9 Critical Facilities .....	39
1.10 Historical Properties.....	42
<b>2.0: Hazard Identification and Risk Assessment</b> .....	<b>45</b>
2.1 Climate Change.....	47
2.2 Hazards .....	54
2.2.1 Dam Failure.....	55
2.2.2 Debris Flows.....	61
2.2.3 Drought.....	67
2.2.4 Earthquake .....	68
2.2.5 Flooding.....	74
2.2.6 Land Subsidence/Sinkholes.....	84
2.2.7 Levee Failure.....	86
2.2.8 Sea Level Rise .....	89
2.2.9 Severe Weather – Extreme Heat .....	93
2.2.10 Severe Weather – High Wind and Tornado.....	94
2.2.11 Tsunami.....	97
2.2.12 Wildfire .....	99

<b>Section 3.0: Mitigation Strategy</b> .....	<b>108</b>
3.1 Changes in Development.....	108
3.2 Capability Assessment.....	109
3.2.1 Regulatory Capabilities.....	110
3.2.2 Administrative and Technical Capabilities.....	116
3.2.3 Fiscal Capabilities.....	119
3.2.4 Community Outreach.....	120
3.2.5 Participation in the National Flood Insurance Program .....	121
3.3 Mitigation Goals .....	126
3.4 Status of Previous Mitigation Actions .....	128
3.5 Hazard Mitigation Actions.....	129
3.6 Progress in Local Mitigation Efforts .....	137
3.7 Plan Integration.....	137
3.8 Future Development Trends.....	138
<b>Section 4.0: Plan Review, Evaluation, and Implementation.....</b>	<b>141</b>
4.1 Plan Adoption.....	141
4.2 Plan Monitoring .....	141
4.3 Plan Evaluation .....	142
4.4 Plan Update .....	142
<b>Figures and Tables.....</b>	<b>144</b>
<b>Acronyms/Abbreviations .....</b>	<b>147</b>

## SECTION 1.0: INTRODUCTION

### 1.1 INTRODUCTION

The City of Novato, Community Profile has been prepared in conjunction with the Marin County OA 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 City of Novato.

### 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 is consolidated into the Eastern portion of the 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 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 OA Multi-Jurisdictional Hazard Mitigation Plan Steering Committee, the City of Novato involved additional internal planning team to support the broader planning process. The City of Novato jurisdictional representatives for the coordinated Marin County OA 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**

David Dammuller, Engineering Services Mgr.  
Telephone: 415-899-8953  
E-mail Address: [ddammuller@novato.org](mailto:ddammuller@novato.org)

**Alternate Point of Contact**

Dave Jeffries, Consultant/JPSC  
Telephone: 707-483-1098  
E-mail Address: [Dave@jeffriespsc.com](mailto:Dave@jeffriespsc.com)

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.

<b>Table 1: City of Novato Local Hazard Mitigation Planning Team Members</b>				
<b>Jurisdiction</b>	<b>Name</b>	<b>Title/ Department</b>	<b>Phone</b>	<b>Email</b>
<b>Novato</b>	David Dammuller	Engineering Services Mgr.	415-899-8953	<a href="mailto:ddammuller@novato.org">ddammuller@novato.org</a>
<b>Novato</b>	Dave Jeffries	Consultant/JPSC	707-483-1098	<a href="mailto:dave@jeffriespsc.com">dave@jeffriespsc.com</a>
<b>Novato</b>	Jim Correa	Police Captain/ Novato PD	415-897-4361	<a href="mailto:jcorrea@novato.org">jcorrea@novato.org</a>
<b>Novato</b>	Sasha D'Amico	Police Captain/ Novato PD	415-897-4361	<a href="mailto:sdamico@novato.org">sdamico@novato.org</a>
<b>Novato</b>	Gerald McCarthy	Fire Deputy Chief/ Novato Fire District	415-878-2690	<a href="mailto:gmccarthy@novatofire.org">gmccarthy@novatofire.org</a>
<b>Novato</b>	John Dicochea	Fire Deputy Chief/ Novato Fire District	415-878-2690	<a href="mailto:jdicochea@novatofire.org">jdicochea@novatofire.org</a>
<b>Novato</b>	Chris DeGabriele	Public Works	415-899-8283	<a href="mailto:cdegabriele@novato.org">cdegabriele@novato.org</a>
<b>Novato</b>	Lyle Waite	Public Works	415-899-8283	<a href="mailto:lwaite@novato.org">lwaite@novato.org</a>
<b>Novato</b>	Vicki Parker	Community Development Director	415-899-8989	<a href="mailto:vparker@novato.org">vparker@novato.org</a>

**Table 1: City of Novato Local Hazard Mitigation Planning Team Members**

This 2023 Marin County 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 the unincorporated County of Marin, five special districts, and the eleven incorporated jurisdictions to include the City of Novato. All participating jurisdictions are within the geographical boundary of the Marin County OA 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 City of Novato 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 City of Novato 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 City of Novato 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 City of Novato 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.

<b>Table 2: 2023 MJHMP Local Planning Team Members</b>			
<b>No.</b>	<b>Agency</b>	<b>Point of Contact</b>	<b>Title</b>
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	DPW
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	County of Marin	Steven Torrence	OEM Director
20	County of Marin	Hannah Tarling	Emergency Management Coordinator
21	County of Marin	Chris Reilly	OEM Project Manager
22	County of Marin	Woody Baker-Cohn	Senior Emergency Management Coordinator
23	County of Marin	Leslie Lacko	Community Development Agency
24	County of Marin	Hannah Lee	Senior Civil Engineer
25	County of Marin	Felix Meneau	Project Mgr./ FCWCD
26	County of Marin	Julia Elkin	Department of Public Works
27	County of Marin	Beb Skye	Department of Public Works
28	County of Marin	Scott Alber	Battalion Chief, Marin County Fire Dept.

**Table 2: 2023 MJHMP Local Planning Team Members**

<b>No.</b>	<b>Agency</b>	<b>Point of Contact</b>	<b>Title</b>
29	County of Marin	Lisa Santora	Deputy Public Health Officer, Marin Health & Human Services
30	County of Marin	Koblick, Kathleen	Marin Health & Human Services
31	County of Marin	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 Fuelle	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.
<b>Special Districts &amp; Partner Agencies</b>			
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

<b>Table 2: 2023 MJHMP Local Planning Team Members</b>			
<b>No.</b>	<b>Agency</b>	<b>Point of Contact</b>	<b>Title</b>
64	Marin City Community Services District	Juanita Edwards	Interim General Manager
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
<b>State Partners</b>			
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
<b>Federal Partners</b>			
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 Local Planning Team Members**

Several opportunities were provided for the groups listed above to participate in the City of Novato’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 through 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:

<b>Table 3: City of Novato &amp; Marin County OA MJHMP Planning Meetings</b>				
<b>No.</b>	<b>Date</b>	<b>Attendees</b>	<b>Meeting</b>	<b>Planning Meeting Objectives</b>
<b>1</b>	10/26/22	Steering Committee	Project Overview Meeting	<ul style="list-style-type: none"> <li>• Plan Overview – Steps and Timeline</li> <li>• Planning Process</li> <li>• Steering Committee Role</li> </ul>
<b>2</b>	11/9/22	Steering Committee	Steering Committee Kickoff Meeting	<ul style="list-style-type: none"> <li>• Hazard Mitigation and Emergency Management Overview</li> <li>• Plan Overview – Steps and Timeline</li> <li>• Community Overview</li> <li>• Planning Process</li> <li>• Hazard Identification and Risk Assessment</li> <li>• Stakeholders and Planning Team Identification</li> </ul>
<b>3</b>	12/6/22	Steering Committee, Planning Team	Planning Team Kickoff Meeting	<ul style="list-style-type: none"> <li>• Hazard Mitigation and Emergency Management Overview</li> </ul>

<b>Table 3: City of Novato &amp; Marin County OA MJHMP Planning Meetings</b>				
<b>No.</b>	<b>Date</b>	<b>Attendees</b>	<b>Meeting</b>	<b>Planning Meeting Objectives</b>
				<ul style="list-style-type: none"> <li>Plan Overview – Steps and Timeline</li> <li>Community Overview</li> <li>Planning Process</li> <li>Hazard Identification and Risk Assessment</li> </ul>
<b>4</b>	02/07/23	Steering Committee	Steering Committee Hazard Profile Meeting	<ul style="list-style-type: none"> <li>Jurisdictional Letter of Commitment</li> <li>Identify Planning Team Members</li> <li>Hazard Risk Ranking Worksheets</li> <li>Jurisdictional Profiles</li> <li>Jurisdictional/ District Capability Assessment</li> <li>2018 Hazard Mitigation Project Status Update</li> </ul>
<b>5</b>	03/07/23	Steering Committee/ Planning Team	Planning Team Public Outreach Strategy Meeting	<ul style="list-style-type: none"> <li>Planning Goals and Objectives</li> <li>Hazard Risk Ranking Worksheets</li> <li>Jurisdictional Profiles</li> <li>Jurisdictional/ District Capability Assessment</li> <li>2018 Hazard Mitigation Project Status Update</li> <li>Public Outreach Strategy</li> </ul>
<b>6</b>	04/04/23	Steering Committee	Steering Committee Meeting	<ul style="list-style-type: none"> <li>HMGP (DR-4683) Funding Timeline</li> <li>Public Outreach</li> <li>Planning Goals and Objectives</li> <li>Jurisdictional Hazard Vulnerability Maps</li> <li>Jurisdictional Profiles</li> <li>Jurisdictional/ District Capability Assessment</li> <li>2018 Hazard Mitigation Project Status Update</li> </ul>
<b>7</b>	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	<ul style="list-style-type: none"> <li>Meeting translated live in Spanish with 29 language subtitle capability for virtual participants.</li> <li>Meeting also interpreted in American Sign Language</li> <li>Meeting recorded and posted on Hazard Mitigation website.</li> </ul>

<b>Table 3: City of Novato &amp; Marin County OA MJHMP Planning Meetings</b>				
<b>No.</b>	<b>Date</b>	<b>Attendees</b>	<b>Meeting</b>	<b>Planning Meeting Objectives</b>
				<ul style="list-style-type: none"> <li>• Hazard Mitigation and Emergency Management Overview</li> <li>• Planning Process</li> <li>• Hazard Identification and Risk Assessment</li> <li>• Planning Goals and Objectives</li> <li>• Hazard Mitigation Projects</li> <li>• Community Input</li> </ul>
<b>8</b>	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	<ul style="list-style-type: none"> <li>• Meeting translated live in Spanish with 29 language subtitle capability for virtual participants.</li> <li>• Meeting also interpreted in American Sign Language</li> <li>• Meeting recorded and posted on Hazard Mitigation website.</li> <li>• Hazard Mitigation and Emergency Management Overview</li> <li>• Planning Process</li> <li>• Hazard Identification and Risk Assessment</li> <li>• Planning Goals and Objectives</li> <li>• Hazard Mitigation Projects</li> <li>• Community Input</li> </ul>
<b>9</b>	05/31/23	Steering Committee	Steering Committee Hazard Ranking Meeting	<ul style="list-style-type: none"> <li>• HMGP (DR-4683) Funding Timeline</li> <li>• Public Outreach Status</li> <li>• Jurisdictional Hazard Vulnerability Maps</li> <li>• OEM Overview of Hazard Maps and Marin Maps</li> <li>• Marin Co. MJHMP Risk Assessment Tool Overview</li> <li>• 2018 Hazard Mitigation Project Status Update</li> <li>• Hazard Working Groups</li> </ul>
<b>10</b>	06/27/23	Steering Committee, Planning Team	Planning Team Meeting	<ul style="list-style-type: none"> <li>• HMGP (DR-4683) &amp; BRIC Grant Funding Timeline</li> <li>• Public Outreach Status</li> <li>• Jurisdictional Hazard Risk Assessment Tool</li> <li>• OEM Overview of Hazard Maps and Marin Maps</li> </ul>

<b>Table 3: City of Novato &amp; Marin County OA MJHMP Planning Meetings</b>				
<b>No.</b>	<b>Date</b>	<b>Attendees</b>	<b>Meeting</b>	<b>Planning Meeting Objectives</b>
				<ul style="list-style-type: none"> <li>• Marin County OA Hazards over the Last 5-Years</li> <li>• 2018 Hazard Mitigation Project Status Update</li> <li>• 2023 Hazard Mitigation Projects/Capital Improvement Projects</li> <li>• Hazard Working Groups</li> </ul>
<b>11</b>	07/01/23-09/01/23	Steering Committee Members	Steering Committee Members Plan Development Sessions	<ul style="list-style-type: none"> <li>• Individual phone or conference calls with planning jurisdictions and districts to answer specific questions and assist them in developing their profile annex.</li> </ul>
<b>12</b>	11/27/23	Steering Committee, Planning Team	Planning Team Meeting	<ul style="list-style-type: none"> <li>• Presentation and review of the Draft Marin County OA MJHMP and Jurisdictional/District Annexes</li> </ul>
<b>13</b>	11/28/23	General Public	Public Outreach Presentation on Marin County Office of Emergency Management Website	<ul style="list-style-type: none"> <li>• Presentation and review of the Draft Marin County OA MJHMP and Jurisdictional/District Annexes.</li> <li>• Opportunity for public comment and questions and answers.</li> </ul>

**Table 3: City of Novato & Marin County OA 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.

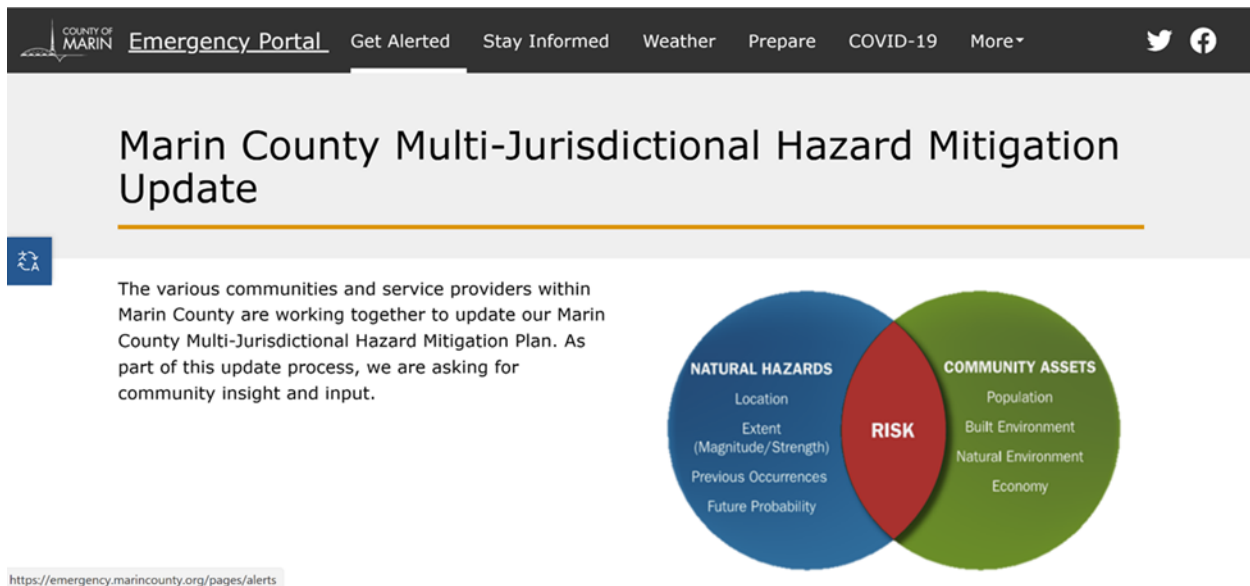
The Steering Committee has made the commitment to periodically bring this plan before the public through public meetings and community posting so that citizens may make input as strategies and implementation actions change. Public meetings will continue to be held twice a year after the first and third 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. Each planning partner 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 for the public review period. The County of Marin 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 OA 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

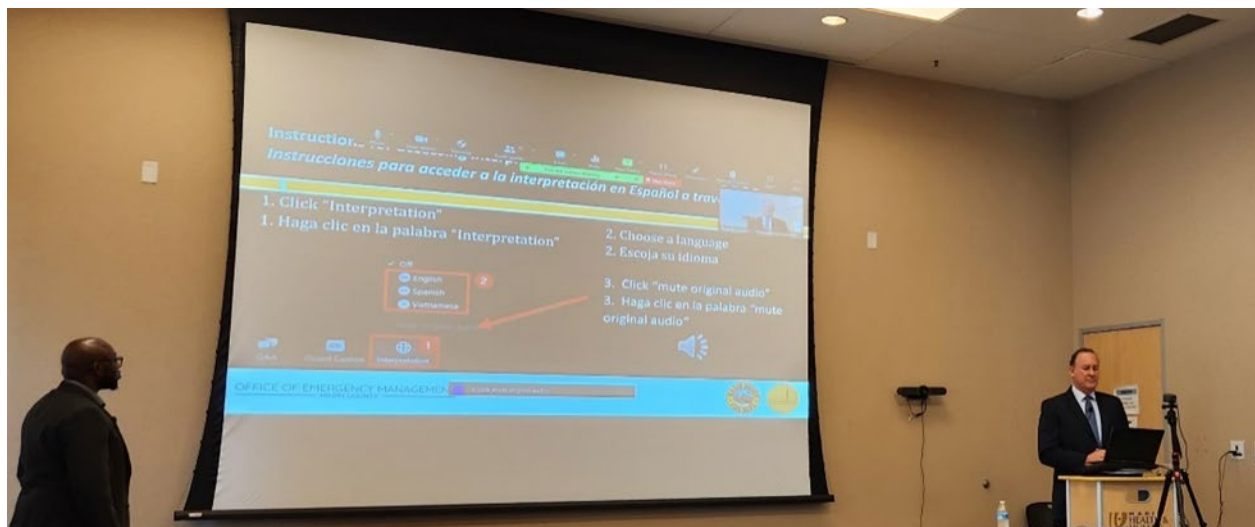
where they are.” Each Town Hall Meeting included, live Spanish translation and subtitles, Live American Sign Language (ASL/CDI) interpretation, the ability for the Zoom videoconferencing attendee to activate subtitles in to 28 different languages, and vision accessible PowerPoint slide.

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 OA 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**

The Marin County OA 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 OA MJHMP Public Town Hall Meeting. All press releases were made available to the community in both English and Spanish.

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.

## Public Outreach Survey



### Marin County Multi-Jurisdictional Hazard Mitigation Plan Survey

<https://www.surveymonkey.com/r/MarincountyMJHMP>





**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](http://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 City of Novato had an additional 14-day comment period for the City of Novato Community Profile where their profile was posted on the City 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 City of Novato 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**

What is now Novato was originally the site of several Coast Miwok villages: Chokecherry, near downtown Novato; Puyuku, near Ignacio; and Olómpali, at the present-day Olompali State Historic Park.

In 1839, the Mexican government granted the 8,876-acre (35.92 km<sup>2</sup>) Rancho Novato to Fernando Feliz. The rancho was named after a local Miwok leader who had probably been given the name of Saint Novatus at his baptism.[10] Subsequently, four additional land grants were made in the area: Rancho Corte Madera de Novato, to John Martin in 1839; Rancho San Jose, to Ignacio Pacheco in 1840; Rancho Olómpali, awarded in 1843 to Camilo Ynitia, son of a Coast Miwok chief; and Rancho Nicasio, by far the largest at 56,621 acres (229.1 km<sup>2</sup>), awarded to Pablo de la Guerra and John B.R. Cooper in 1844

Following the American Conquest of California and the Treaty of Guadalupe Hidalgo, Novato, along with the rest of California, became part of the United States on February 2, 1848. Early pioneers included Joseph Sweetser and Francis De Long who bought 15,000 acres (61 km<sup>2</sup>) in the mid-1850s and planted orchards and vineyards.

The original town was located around Novato Creek at what is now South Novato Boulevard. A railroad was built in 1879, connecting Novato to Sonoma County and San Rafael. The area

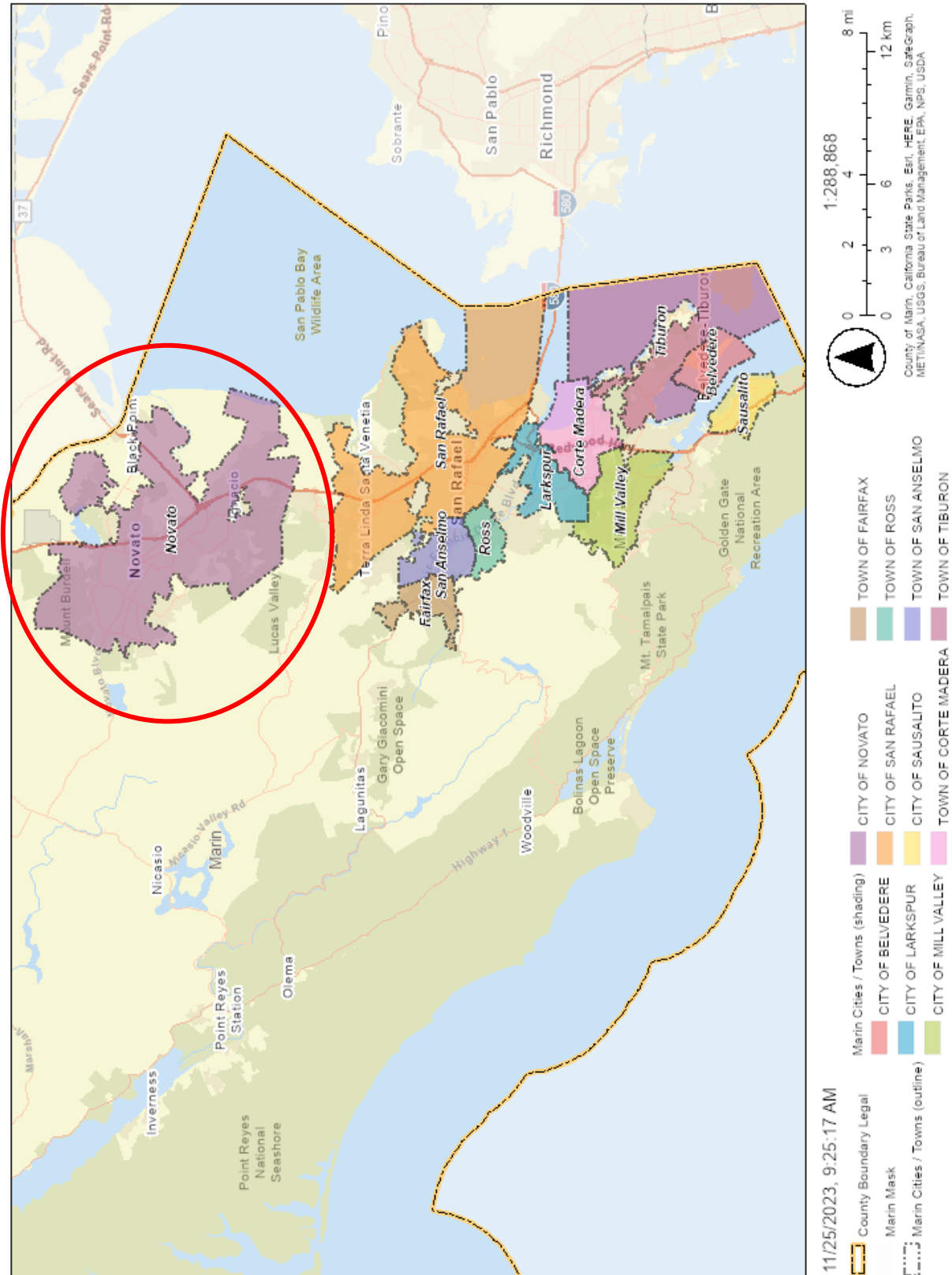
around the train depot became known as New Town, and forms the edge of what today is Old Town Novato. The Novato Flatiron Building was built in 1908.

The Great Depression of the 1930s had a marked effect on the area, as many farmers lost their land. After World War II, Novato grew quickly with the construction of tract homes and a freeway. As the area was unincorporated, much of the growth was unplanned and uncontrolled.

Novato was finally incorporated as a city on January 20, 1960. Novato is the northernmost city in the Marin County OA, California, and is located approximately 29 miles north of San Francisco and 37 miles northwest of Oakland. Novato, which covers 28 square miles, has a population of nearly 55,813—a density about one-half of San Rafael, and nearly one-third of Petaluma or Vallejo. Novato has a rural atmosphere largely because of its low population density and the high amount of open space and parks in and near the City.

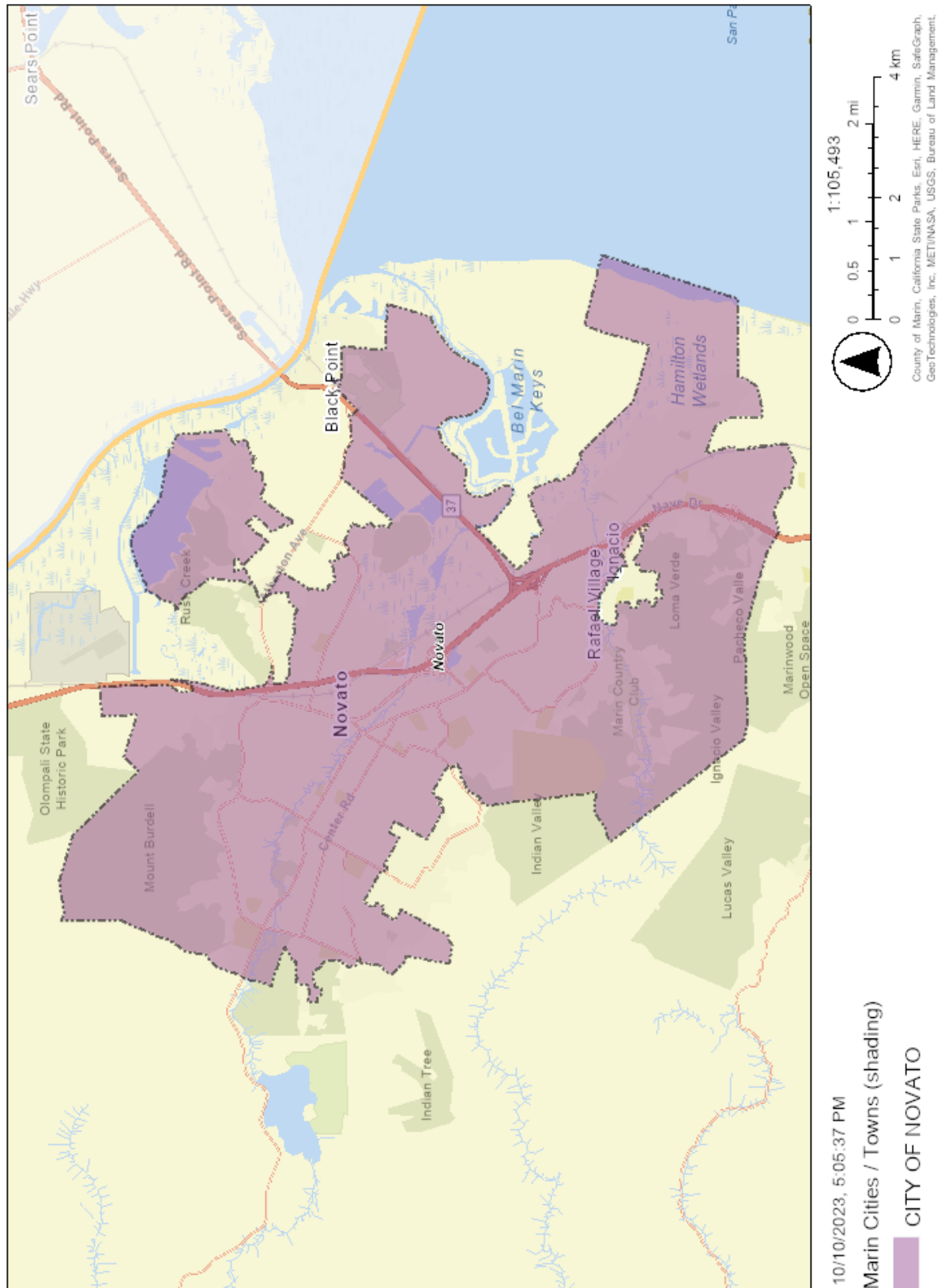
The City of Novato had an estimated population of 55,813 in 2020, with 22,290 housing units in the City. The median income for a household in the City was \$101,629, and the per capita income for the City was \$55,813. Approximately 4.0 percent of families and 6.4 percent of the population were below the poverty line (2020 data, U.S. Census Bureau).





**Figure 5: Map of City of Novato in Marin County**

Source: Marin County OEM



**Figure 6: Map of the City of Novato**  
Source: Marin County OEM

### 1.4 GOVERNMENT

The City of Novato is governed by a five-person City Council. The city council elects mayor and mayor pro tem each year from its membership, the executive head of the City; and appoints a City Manager, the administrative head of the City. The city consists of 6 departments: the Administration, Community Development, Finance, Parks, Recreation, and Community Services Police, and Public Works.

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

The Novato Fire Protection District established on July 6, 1926, as an independent Special District of the State of California. The purpose of the District is to provide all-risk emergency and non-emergency services to the City of Novato and the surrounding 71 square miles of unincorporated area serving an estimated population of 65,000.

The Novato Police Department is a full time police department, Novato Police provides a professional and proactive response through Patrol, Investigations, Traffic, Narcotics Enforcement, a 9-1-1 dispatch center, and disaster emergency services. The department is divided into the Operations and the Administrative Services Division. There are approximately 80 staff members that work for the department, including 60 sworn personnel and a volunteer program.

### 1.5 WEATHER AND CLIMATE

The City of Novato lies 30 feet above sea level. In Novato, 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 41.8°F to 74.7°F and is rarely below 41°F or above 75°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 %). The month with the lowest relative humidity is June (65 %). 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)	8.9 °C (48.1) °F	9.7 °C (49.5) °F	11 °C (51.8) °F	12.2 °C (53.9) °F	14.4 °C (57.9) °F	16.8 °C (62.2) °F	17.1 °C (62.8) °F	17.3 °C (63.1) °F	17.2 °C (63) °F	15.4 °C (59.7) °F	11.9 °C (53.3) °F	9.1 °C (48.5) °F
Min. Temperature °C (°F)	5.5 °C (41.8) °F	6.2 °C (43.1) °F	7.3 °C (45.1) °F	8.2 °C (46.8) °F	10.1 °C (50.1) °F	11.8 °C (53.3) °F	12.4 °C (54.4) °F	12.9 °C (55.2) °F	12.6 °C (54.7) °F	11.2 °C (52.1) °F	8.2 °C (46.7) °F	5.9 °C (42.6) °F
Max. Temperature °C (°F)	13.7 °C (56.7) °F	14.5 °C (58.1) °F	16 °C (60.8) °F	17.5 °C (63.4) °F	20 °C (68.1) °F	23.2 °C (73.8) °F	23.6 °C (74.5) °F	23.7 °C (74.7) °F	23.9 °C (75.1) °F	21.4 °C (70.6) °F	16.8 °C (62.3) °F	13.5 °C (56.2) °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%	79%	76%	70%	68%	65%	70%	71%	68%	68%	74%	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

Data: 1991 - 2021 Min. Temperature °C (°F), Max. Temperature °C (°F), Precipitation / Rainfall mm (in), Humidity, Rainy days. Data: 1999 - 2019: avg. Sun hours

**Figure 7: The City of Novato 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 the Marin County OA and the City of Novato since the last plan update in 2018. Of the total estimated 257,135 residents of the Marin County OA 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 City of Novato had an estimated population of 54,036 in the 2018 plan. 2020 U.S. Census Survey estimated the City’s population at 53,225. However, revised estimates for 2022 estimate the population to decrease to 52,441 population.

Jurisdiction	Population 2022 (Estimate)	Population 2020	Population 2018 (Estimate)	Percent Change 2018-2022
<b>Marin County OA</b>	257,135	262,321	262,179	-1.92%
<b>City of Novato</b>	52,441	53,225	54,036	-2.95%

**Table 4: City of Novato Estimated Jurisdictional Population**

Source: California Department of Finance

According to the U.S. Census, the population of The City of Novato is 53,225 as of 2020. Table 5 shows the population growth comparison of the State of California, County of Marin and the City of Novato between 2010 – 2020.

Jurisdiction	Total Population		Change, 2010-2020	
	April 1, 2010	April 1, 2020	Number	Percent
<b>California</b>	37,253,956	39,538,223	2,284,267	6.1%
<b>Marin County OA</b>	252,409	262,321	9,912	3.9%
<b>Novato, City</b>	51,904	53,225	1,321	-2.95%

**Table 5: Population Change of The City of Novato**

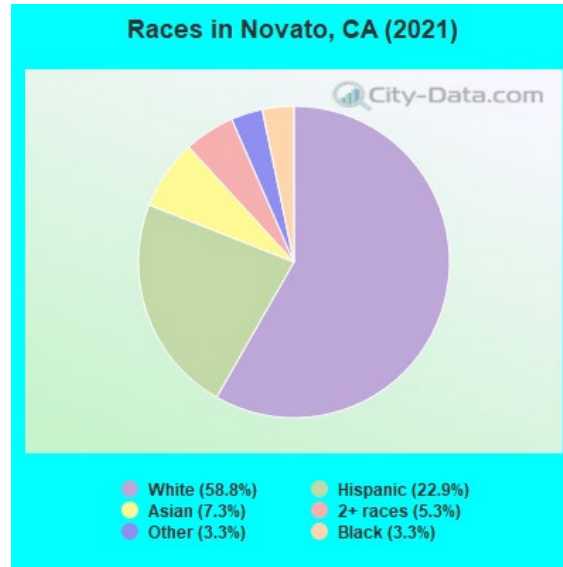
Source: City of Novato Housing Element, US Census Bureau, California Department of Finance

Table 6 lists the various languages spoken in the City of Novato.

Primary Language Spoken	% of Population
<b>English only</b>	73.2%
<b>Spanish</b>	16.5%
<b>Other Indo-European languages</b>	5.7%
<b>Asian and Pacific Islander languages</b>	3.8%
<b>Other languages</b>	0.9%

**Table 6: Languages Spoken in Novato**

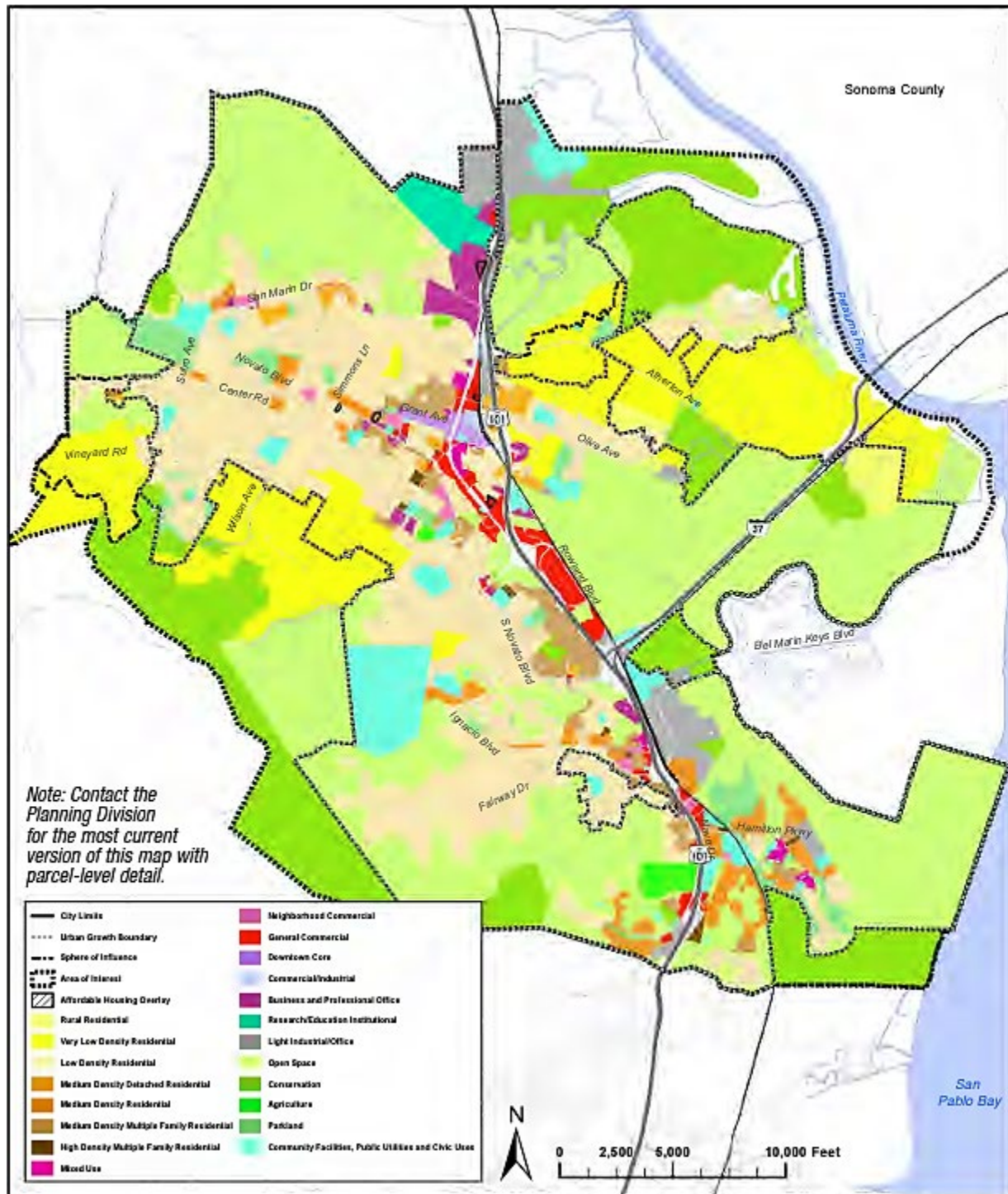
Source: US Census Bureau (2020)



**Figure 8: Races in Novato**  
Source: City-Data.com

Table 7: Marin County OA Jurisdictional Housing Stock							
2022 and 2018							
Year	Total Units	Single Family		Multi-Family		Mobile Homes	
		Detached	Attached	2 to 4	5 plus		
<b>California</b>							
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%
<b>Marin County OA</b>							
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%
<b>City of Novato</b>							
2022	Number	21,337	12,465	3,395	1,362	3,572	543
	Percent	100.00%	58.42%	27.24%	40.12%	262.26%	15.20%
2018	Number	21,448	12,581	3,427	1,335	3,557	548
	Percent	100.00%	58.66%	27.24%	38.96%	266.44%	15.41%

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



**Figure 9: City of Novato Land Use Map**  
Source: City of Novato 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 OA 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 OA MJHMP Hazards	
NRI Hazards	Marin County OA 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, Hail, Lightning

**Table 8: NRI Hazards and Marin County OA 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:

$$\text{Risk Index} = \text{Expected Annual Loss} \times \text{Social Vulnerability} \div \text{Community Resilience}$$

**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 Novato Census Tract 1022.03.

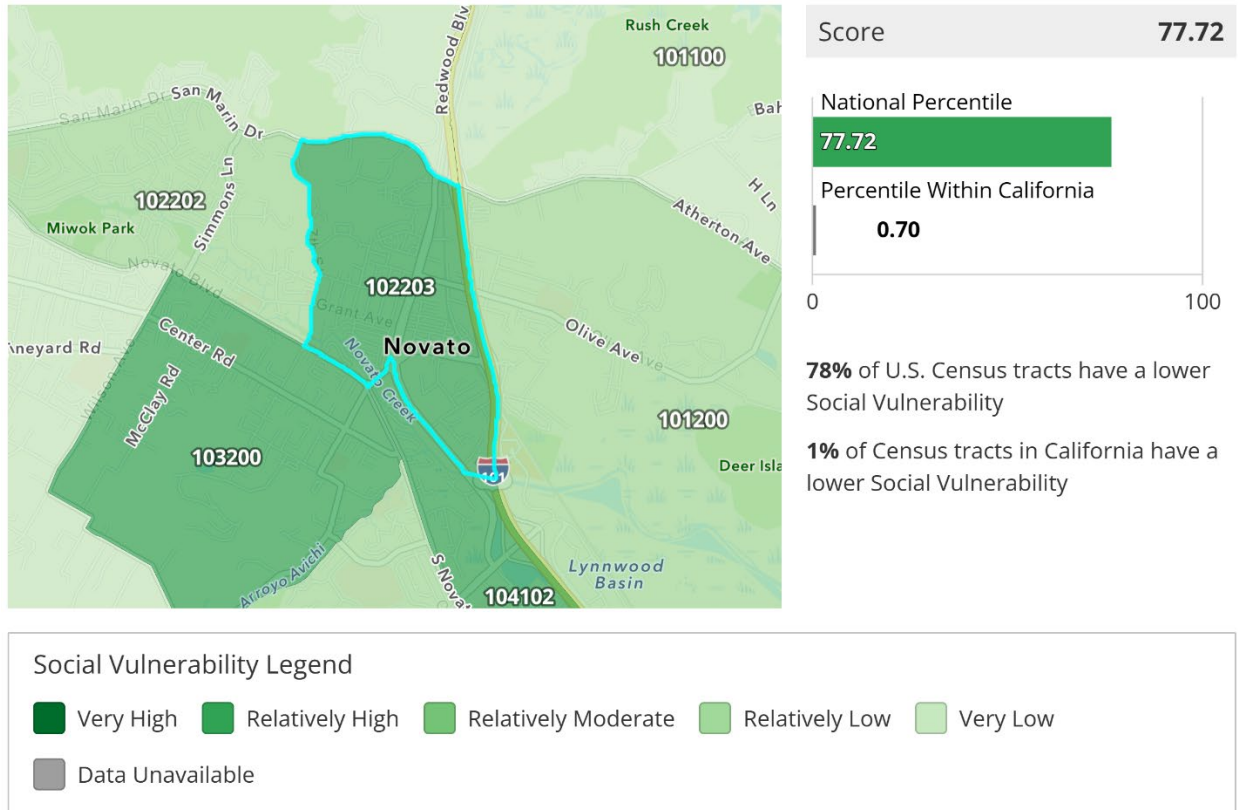
Tables 9 - 13 illustrate the Social Vulnerability Map for Novato Census Tracts.

Table 9: NRI Hazard Type Risk Index for Novato Census Tract 1022.03						
Hazard Type	EAL Value	Social Vulnerability	Community Resilience	CRF	Risk Value	Score
Earthquake	\$2,722,258	Relatively High	Very High	1.35	\$3,686,835	98.6
Riverine Flooding	\$183,359	Relatively High	Very High	1.35	\$248,329	92.9
Heat Wave	\$8,084	Relatively High	Very High	1.35	\$10,949	53.2
Tornado	\$3,889	Relatively High	Very High	1.35	\$5,267	12.6
Landslide	\$2,470	Relatively High	Very High	1.35	\$3,345	84.4
Strong Wind	\$264	Relatively High	Very High	1.35	\$357	11.5
Wildfire	\$68	Relatively High	Very High	1.35	\$92	35.4
Coastal Flooding	\$0	Relatively High	Very High	1.35	\$0	0
Drought	\$0	Relatively High	Very High	1.35	\$0	0
Tsunami	\$0	Relatively High	Very High	1.35	\$0	0

**Table 9: NRI Hazard Type Risk Index for Novato Census Tract 1022.03**  
Source: FEMA National Risk Index 2023

Figure 10 - 14 illustrate the Social Vulnerability Map for Novato Census Tracts.



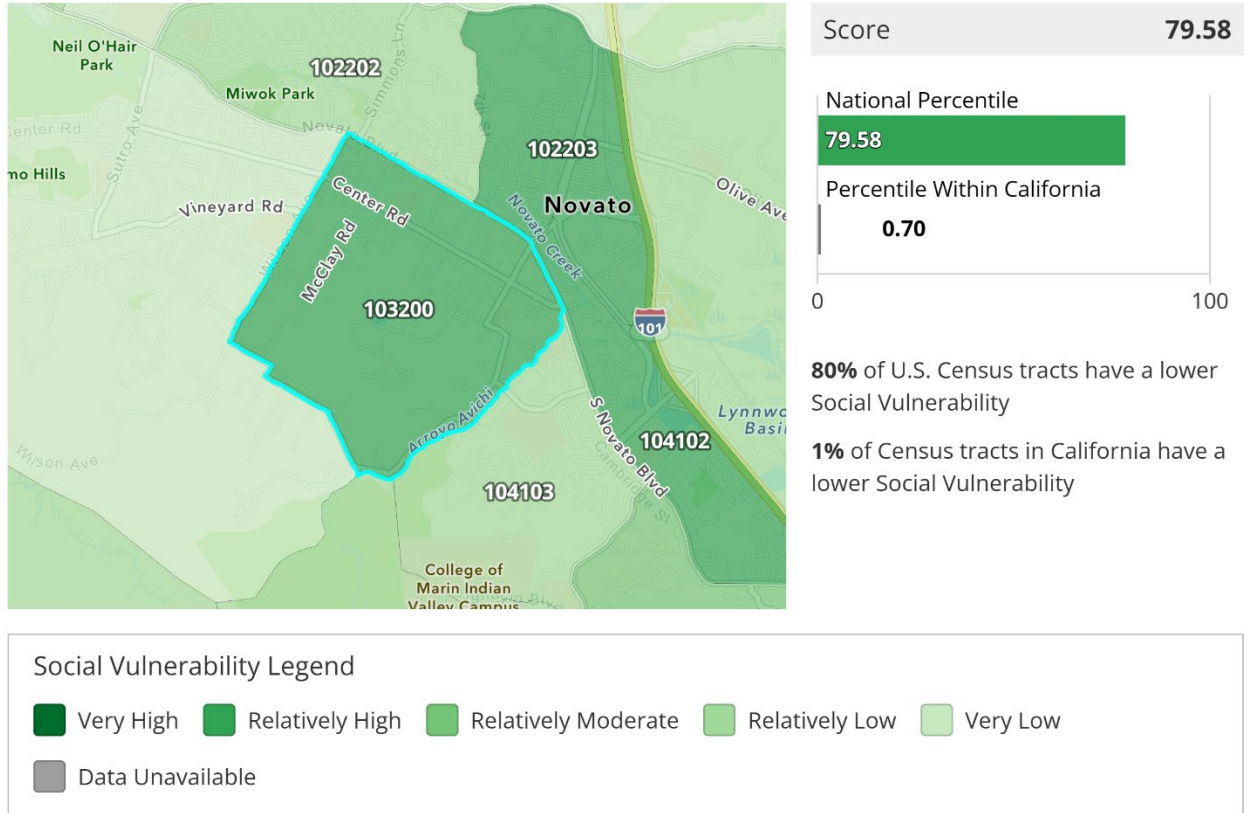


**Figure 10: City of Novato Social Vulnerability Map Census Tract 1022.03**  
Source: FEMA National Risk Index 2023

**Table 10: NRI Hazard Type Risk Index for Novato Census Tract 1032.00**

Hazard Type	EAL Value	Social Vulnerability	Community Resilience	CRF	Risk Value	Score
Earthquake	\$1,889,584	Relatively High	Very High	1.37	\$2,597,248	97.5
Riverine Flooding	\$1,697,035	Relatively High	Very High	1.37	\$2,332,588	99.4
Wildfire	\$43,948	Relatively High	Very High	1.37	\$60,407	91.9
Heat Wave	\$10,500	Relatively High	Very High	1.37	\$14,432	58.7
Tornado	\$5,050	Relatively High	Very High	1.37	\$6,941	16.8
Landslide	\$3,209	Relatively High	Very High	1.37	\$4,411	88.3
Strong Wind	\$342	Relatively High	Very High	1.37	\$471	13.8
Coastal Flooding	\$0	Relatively High	Very High	1.37	\$0	0
Drought	\$0	Relatively High	Very High	1.37	\$0	0
Tsunami	\$0	Relatively High	Very High	1.37	\$0	0

**Table 10: NRI Hazard Type Risk Index for Novato Census Tract 1032.00**  
Source: FEMA National Risk Index 2023

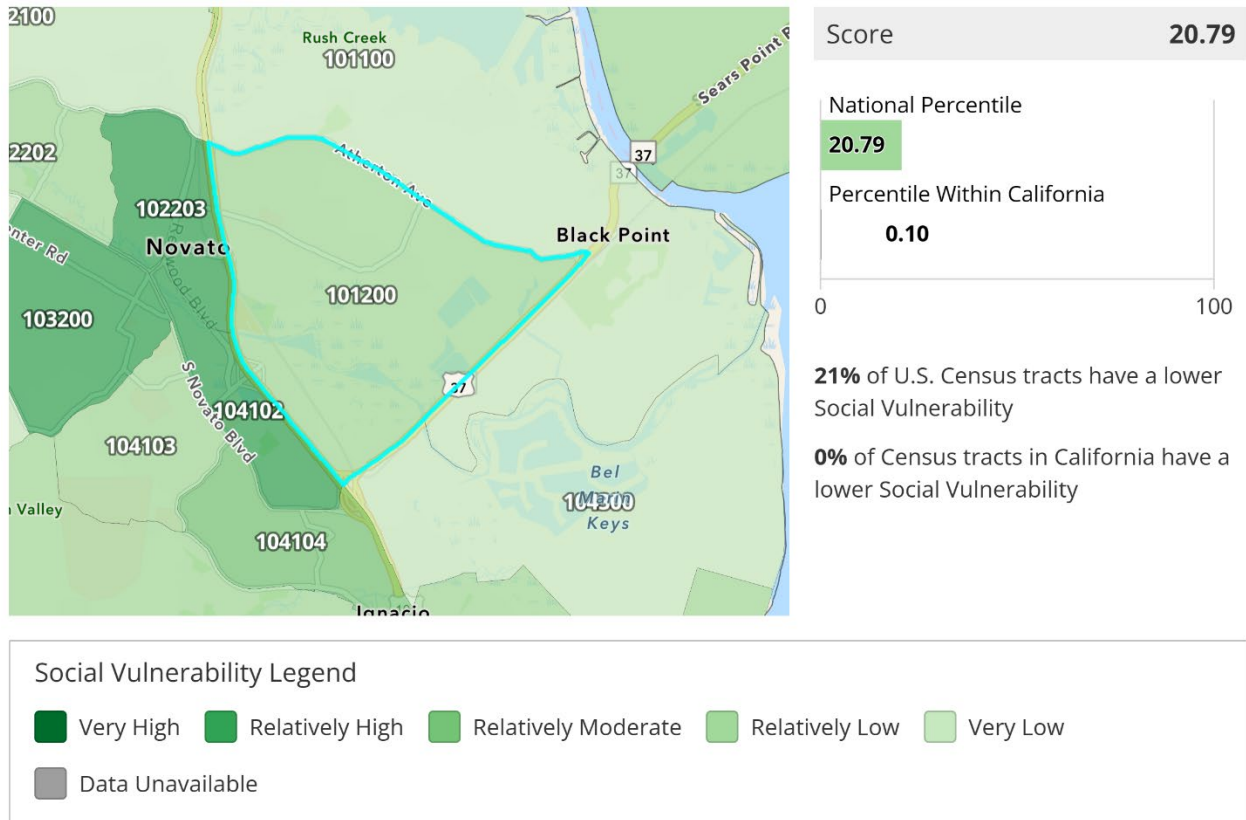


**Figure 11: City of Novato Social Vulnerability Map Census Tract 10320.00**  
Source: FEMA National Risk Index 2023

**Table 11: NRI Hazard Type Risk Index for Novato Census Tract 1012.00**

Hazard Type	EAL Value	Social Vulnerability	Community Resilience	CRF	Risk Value	Score
Earthquake	\$2,569,756	Relatively Low	Very High	0.88	\$2,272,662	96.8
Riverine Flooding	\$154,980	Relatively Low	Very High	0.88	\$137,063	88.1
Coastal Flooding	\$64,204	Relatively Low	Very High	0.88	\$56,781	95
Drought	\$44,177	Relatively Low	Very High	0.88	\$39,070	95.8
Heat Wave	\$4,569	Relatively Low	Very High	0.88	\$4,041	36.7
Wildfire	\$4,251	Relatively Low	Very High	0.88	\$3,760	79
Tornado	\$3,094	Relatively Low	Very High	0.88	\$2,736	6.3
Landslide	\$2,521	Relatively Low	Very High	0.88	\$2,230	77.9
Strong Wind	\$168	Relatively Low	Very High	0.88	\$148	6
Tsunami	\$0	Relatively Low	Very High	0.88	\$0	0

**Table 11: NRI Hazard Type Risk Index for Novato Census Tract 1012.00**  
Source: FEMA National Risk Index 2023

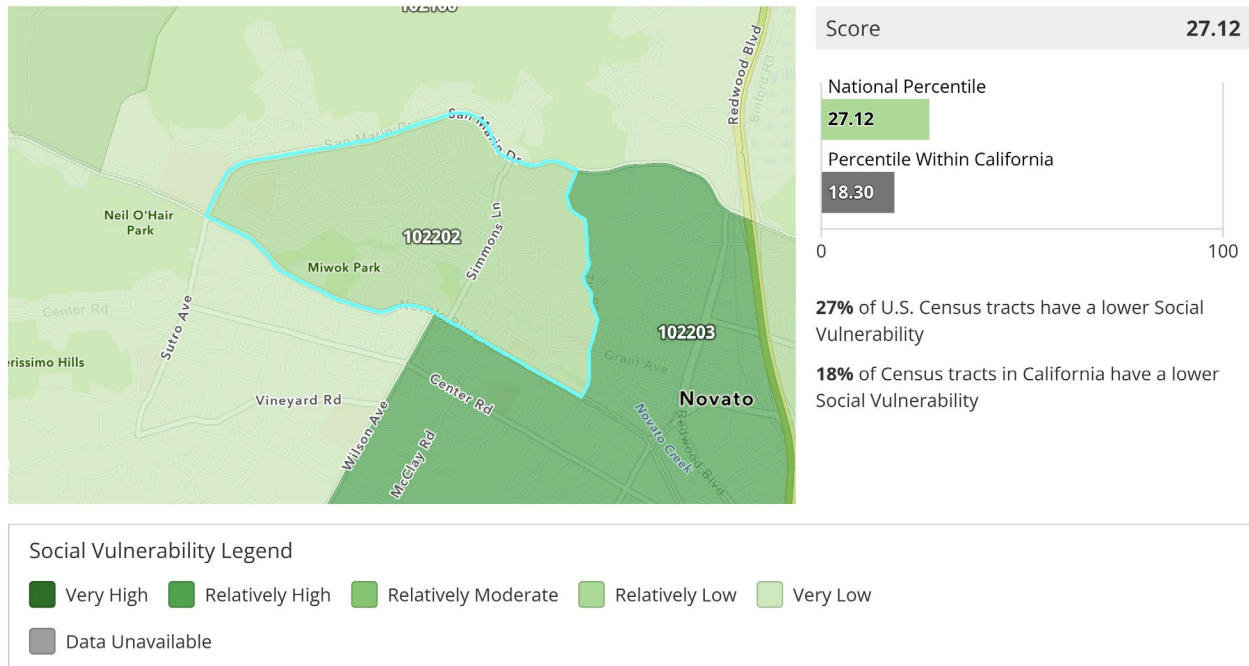


**Figure 12: City of Novato Social Vulnerability Map Census Tract 1012.00**  
Source: FEMA National Risk Index 2023

**Table 12: NRI Hazard Type Risk Index for Novato Census Tract 1022.02**

Hazard Type	EAL Value	Social Vulnerability	Community Resilience	CRF	Risk Value	Score
Earthquake	\$1,255,306	Relatively Low	Very High	0.94	\$1,177,508	92.4
Riverine Flooding	\$375,636	Relatively Low	Very High	0.94	\$352,356	94.9
Heat Wave	\$9,379	Relatively Low	Very High	0.94	\$8,798	49.2
Tornado	\$3,991	Relatively Low	Very High	0.94	\$3,744	8.7
Landslide	\$3,696	Relatively Low	Very High	0.94	\$3,467	85
Wildfire	\$1,511	Relatively Low	Very High	0.94	\$1,417	69.9
Strong Wind	\$295	Relatively Low	Very High	0.94	\$277	9.6
Coastal Flooding	\$0	Relatively Low	Very High	0.94	\$0	0
Drought	\$0	Relatively Low	Very High	0.94	\$0	0
Tsunami	\$0	Relatively Low	Very High	0.94	\$0	0

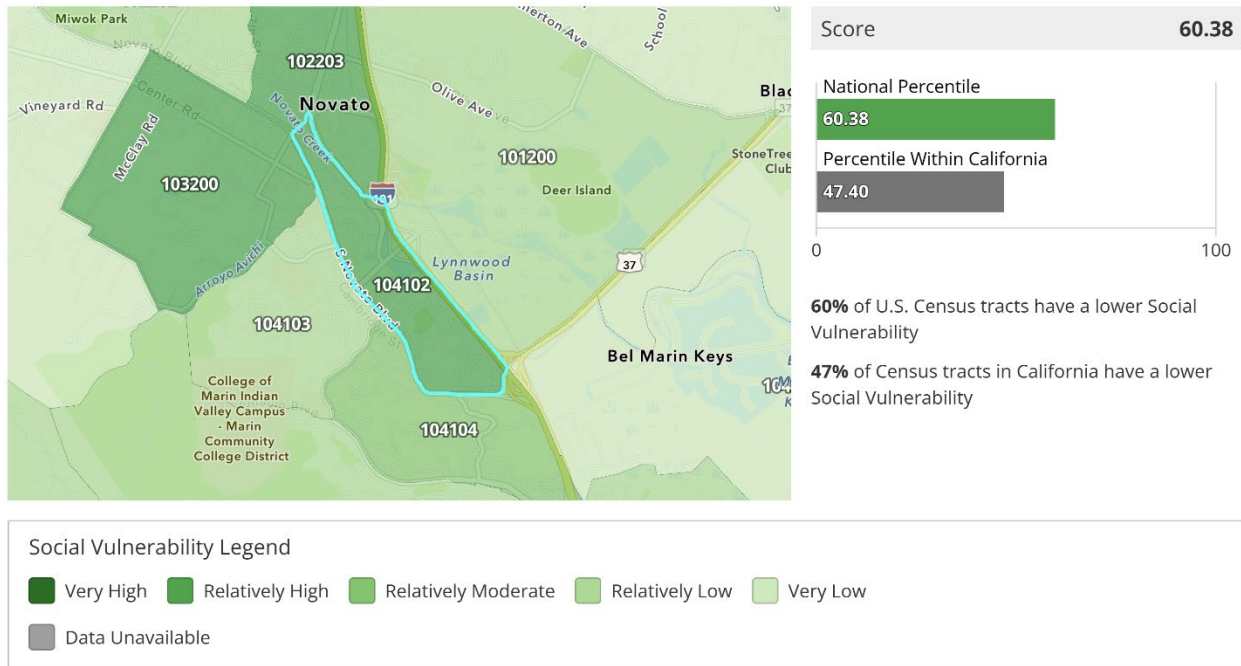
**Table 12: NRI Hazard Type Risk Index for Novato Census Tract 1022.02**  
Source: FEMA National Risk Index 2023



**Figure 13: City of Novato Social Vulnerability Map Census Tract 1022.02**  
Source: FEMA National Risk Index 2023

Table 13: NRI Hazard Type Risk Index for Novato Census Tract 1041.02						
Hazard Type	EAL Value	Social Vulnerability	Community Resilience	CRF	Risk Value	Score
Earthquake	\$1,540,791	Relatively High	Very High	1.19	\$1,837,291	95.6
Riverine Flooding	\$690,513	Relatively High	Very High	1.19	\$823,391	98
Heat Wave	\$8,314	Relatively High	Very High	1.19	\$9,914	51.4
Coastal Flooding	\$5,903	Relatively High	Very High	1.19	\$7,038	88.3
Tornado	\$3,151	Relatively High	Very High	1.19	\$3,757	8.8
Landslide	\$2,413	Relatively High	Very High	1.19	\$2,878	82.1
Wildfire	\$282	Relatively High	Very High	1.19	\$337	49.7
Strong Wind	\$254	Relatively High	Very High	1.19	\$303	10.2
Drought	\$0	Relatively High	Very High	1.19	\$0	0

**Table 13: NRI Hazard Type Risk Index for Novato Census Tract 1041.02**  
Source: FEMA National Risk Index 2023



**Figure 14: City of Novato Social Vulnerability Map Census Tract 1041.02**  
Source: FEMA National Risk Index 2023

### Social Vulnerability in Novato and the Marin County OA

Most socially vulnerable residents in the Marin County OA 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.

Looking to the community resilience index (CRI) results, the data is only calculated at the county-level and compared across the nation. As a whole, the Marin County OA is considered to have a “very high” ability to prepare for anticipated natural hazards, adapt to changing conditions, and withstand and recover rapidly from disruptions when compared to the rest of the U.S. Unfortunately, this metric does not give us the distinct experiences of the diverse communities across Marin.

When the Estimated Annual Loss Index, Social Vulnerability Index, and Community Resilience Index are aggregated as one, final results of the National Risk Index show the Marin County OA as a whole to have “Relatively High” risk, this is due to the financial implications a disaster may have on the county. When broken out by census tract, five tracts are in the highest category (“Very High Risk”), this matches generally with the same tracts that are ranked in as higher social vulnerability; parts of Novato, parts of San Rafael, including in and around the Canal District, the Greenbrae neighborhood of Larkspur, and unincorporated areas of Santa Venetia.

However, Marin City is ranked as “Very Low” risk for the National Risk Index. Previous discussion highlighted why the Expected Annual Loss was low, but further discussion is required. As a County, we know Marin City should not be classified as “Very Low” on the NRI. Marin City residents, for example, only have one way in and out of their community and this road floods frequently, making it unsafe to cross and leave the community for work, school, medical resources. Additionally, there is only one “grocery” store, a Target, in Marin City. Both of these elements contribute to the vulnerability of residents as they may be unable to leave or return home and have limited access to groceries, relying on a single store’s supply chain. At the local elementary school in Marin City, 47% of students are eligible for free and reduced-price meals (2022 – 2023 school year), a reflection of the financial capacity of local families. All this means, we can expect the social and built capacity of Marin City to be limited.

### 1.8 ECONOMY AND TAX BASE

The City of Novato is one of the Marin County OA’s primary retail, service, and commercial center. Table 14 shows income by household in The City of Novato as of 2019.

Table 14: Household Income for The City of Novato as of 2021		
Household Income	Number	Percent
<b>Total Households</b>	20,682	-
<b>Less than \$10,000</b>	600	2.9
<b>\$10,000 to \$14,999</b>	517	2.5
<b>\$15,000 to \$24,999</b>	972	4.7
<b>\$25,000 to \$34,999</b>	972	4.7
<b>\$35,000 to \$49,999</b>	1,551	7.5
<b>\$50,000 to \$74,999</b>	2,689	13.0
<b>\$75,000 to \$99,999</b>	2,399	11.6
<b>\$100,000 to \$149,999</b>	3,495	16.9
<b>\$150,000 to \$199,999</b>	2,792	13.5
<b>\$200,000 or more</b>	4,695	22.7
<b>Median household income (dollars)</b>	\$107,975	
<b>Mean household income (dollars)</b>	\$142,676	

Table 14: Household Income for The City of Novato as of 2019  
Source: US Census Bureau American Community Survey 2021 Estimates

Table 15 shows the percentage of people in The City of Novato over the age of 16 employed by industry.

<b>Table 15: City of Novato Civilian Employed Population 16 years+ by Industry</b>		
<b>Industry</b>	<b>Estimated Employed</b>	<b>Percent</b>
<b>Civilian employed population 16 years and over</b>	1503	-
<b>Agriculture, forestry, fishing and hunting, and mining</b>	9	0.60 %
<b>Construction</b>	124	8.25%
<b>Manufacturing</b>	128	8.52%
<b>Wholesale trade</b>	0	0%
<b>Retail trade</b>	249	16.57%
<b>Transportation and warehousing, and utilities</b>	33	2.20%
<b>Information</b>	0	0
<b>Finance and insurance, and real estate and rental and leasing</b>	45	2.99%
<b>Professional, scientific, and management, and administrative and waste management services</b>	130	8.65%
<b>Educational services, and health care and social assistance</b>	388	25.81%
<b>Arts, entertainment, and recreation, and accommodation and food services</b>	221	14.70%
<b>Other services, except public administration</b>	45	2.99%
<b>Public administration</b>	131	8.72%

**Table 15 City of Novato 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 City of Novato to fulfill the requirements of its mission during an emergency:

<b>Table 16: City of Novato Critical Facilities</b>				
<b>Category</b>	<b>Name</b>	<b>Address</b>	<b>Fire Severity Zone</b>	<b>Flood Zone</b>
<b>Critical Facilities</b>				
<b>Fire</b>	Fire: Novato Fire Protection District (NOV) / Headquarters & Primary EOC	95 Rowland Way, Novato, CA 94945	N/A	X
<b>Fire</b>	Fire: Novato Fire Protection District (NOV) / Station 61	7025 Redwood Blvd Novato, CA 94945	N/A	X
<b>Fire</b>	Fire: Novato Fire Protection District (NOV) / Station 62	450 Atherton Ave, Novato, CA 94945	High	X
<b>Fire</b>	Fire: Novato Fire Protection District (NOV) / Station 63	65 San Ramon Way, Novato, CA 94945	Moderate	X
<b>Fire</b>	Fire: Novato Fire Protection District (NOV) / Station 64	319 Enfrente Rd, Novato, CA 94949	High	X
<b>Fire</b>	Fire: Novato Fire Protection District (NOV) / Station 65	5 Bolling Dr, Novato, CA 94945	High	X
<b>Law/EOC</b>	Novato Police Dept / Alternative EOC	909 Machin Ave Novato, CA 94945	N/A	X

<b>Local Government</b>	Novato City Hall	922 Machin Ave Novato, CA 94945	N/A	X
<b>Local Government</b>	Margaret Todd Senior Center/Evacuation Shelter	1560 Hill Road Novato, CA 94947	High	X
<b>Local Government</b>	Novato DPW - Corporation Yard	550 Davidson Street Novato, CA 94945	N/A	X
<b>Health / Medical</b>	Novato Community Hospital	180 Rowland Way Novato, CA 94945	N/A	X
<b>Health / Medical</b>	Novato Healthcare Center	1565 Hill Rd Novato, CA 94947	High	X
<b>Health / Medical</b>	Miles - Center Road House	1649 Center Rd Novato, CA 94947	N/A	AO
<b>Health / Medical</b>	Rae Lane House	858 Rae Ln Novato, CA 94947	N/A	X
<b>Health / Medical</b>	Lifehouse - Stonehaven	2 Stonehaven Ct Novato, CA 94947	N/A	X
<b>Health / Medical</b>	Atria Tamalpais Creek	853 Tamalpais Ave Novato, CA 94947	N/A	AO
<b>Health / Medical</b>	Oakmont of Novato	1465 S. Novato Blvd. Novato, CA 94947	N/A	X
<b>Health / Medical</b>	Creekwood	830 Tamalpais Ave. Novato, CA 94947	N/A	AO
<b>Health / Medical</b>	Novato Residential Support Services	1333 Seventh Street Novato, CA 94947	High	X
<b>Health / Medical</b>	Anton Pointe, The	1470 South Novato Blvd., Novato, CA 94941	N/A	X
<b>Health / Medical</b>	Young at Heart	37 Mendocino Lane Novato, CA 94947	N/A	X
<b>Health / Medical</b>	Cedars Dante	1914 Novato Blvd Novato, CA 94945	N/A	X
<b>Health / Medical</b>	Wildflowers I	256 Sunset Parkway Novato, CA 94947	N/A	AE
<b>Health / Medical</b>	Lifehouse - Bolling Circle	464 Bolling Circle Novato, CA 94949	High	X
<b>Health / Medical</b>	Bucklew Programs	201 Alameda del Prado Novato, CA 94949	High	X
<b>Health / Medical</b>	Canyon Manor	655 Canyon Road Novato, CA 94947	High	X
<b>Health / Medical</b>	Lifehouse - 271 Captain Nurse Circle	271 Captain Nurse Circle Novato, CA 94949	High	X
<b>Health / Medical</b>	Lifehouse - 400 Palm Drive	400 S. Palm Dr. Apt 201, Novato CA, 94949	N/A	X
<b>Health / Medical</b>	Yumi House	810 Eucalyptus Ave Novato, CA 94947	N/A	X
<b>Health / Medical</b>	Lifehouse - Sherwood Place	5 Sherwood Place Novato, CA 94945	High	X
<b>Health / Medical</b>	Cornerstone Community Homes - Brown's	36 Brown Drive Novato, CA 94947	High	X
<b>Health / Medical</b>	Cornerstone Community Homes - San Luis	365 San Luis Way Novato, CA 94945	High	X
<b>Health / Medical</b>	Cypress House	856 Cypress Ave Novato, CA 94947	N/A	AO
<b>Health / Medical</b>	Lynwood Home	1212 Lynwood Dr. Novato, CA 94947	Moderate	X
<b>Health / Medical</b>	Casa Allegra - San Felipe	4 San Felipe Way Novato, CA 94945	N/A	X
<b>Health / Medical</b>	Casa Allegra - Tamalpais	778 Tamalpais Avenue Novato, CA 94945	N/A	X
<b>Health / Medical</b>	Cedars of Marin - 2nd Street	1120 Second St. Novato, CA 94945	N/A	X



<b>Health / Medical</b>	Avery Lane	685 Atherton Avenue Novato, CA 94945	Moderate	X
<b>Health / Medical</b>	Elegance Hamilton Hill	1 Hamilton Hill Drive Novato, CA 94949	Moderate	X
<b>Health / Medical</b>	Cornerstone Community Homes - Cambridge	1420 Cambridge St. Novato, CA 94947	Moderate	X
<b>Health / Medical</b>	Buckelew RSS Novato	1333 7th Street Novato, Ca 94947	High	X
<b>Health / Medical</b>	Lifehouse - 251 Captain Nurse Circle	251 Captain Nurse Circle Novato, CA 94949	High	X
<b>Health / Medical</b>	Homeward Bound of Marin - New Beginnings Center	1399 N. Hamilton Parkway Novato, CA 94949	Moderate	X
<b>Health / Medical</b>	Homeward Bound - Transition to Wellness	385 North Hamilton Parkway Novato, CA 94949	Moderate	X
<b>Health / Medical</b>	Shalamo Home	200 Daryl Ave. Novato, CA 94947	High	X
<b>School</b>	Novato Unified School District – Admin Office	1015 7 <sup>th</sup> Street Novato, CA 94945	High	X
<b>School</b>	Hamilton Meadow Park School – Middle/Elementary	5530 Nave Drive Novato, CA 94949	Very High	X
<b>School</b>	Loma Verde Elementary (Unincorporated Novato)	399 Alameda de la Loma Novato, CA 94949	Very High	X
<b>School</b>	Lu Sutton Elementary	1800 Center Road Novato, CA 94947	Moderate	X
<b>School</b>	Lynwood Elementary	1320 Lynwood Drive Novato, CA 94947	Moderate	AE
<b>School</b>	Olive Elementary	620 Olive Avenue Novato, CA 94945	High	X
<b>School</b>	Pleasant Valley Elementary	755 Sutro Avenue Novato, CA 94947	High	X
<b>School</b>	Rancho Elementary	1430 Johnson Street Novato, CA 94947	N/A	X
<b>School</b>	San Ramon Elementary	45 San Ramon Way Novato, CA 94949	N/A	X
<b>School</b>	San Jose Middle School	1000 Sunset Parkway Novato, CA 94949	High	X
<b>School</b>	Sinaloa Middle School	2045 Vineyard Road Novato, CA 94947	N/A	X
<b>School</b>	Novato High School	625 Arthur Street Novato, CA 94947	High	X
<b>School</b>	San Marin High School	15 San Marin Drive Novato, CA 94945	Moderate	X
<b>School</b>	Hill Education Center / Marin Oaks High School	720 Diablo Avenue Novato, CA 94947	Moderate	X
<b>School</b>	Novato Charter School	940 “C” Street Novato, CA 94949	Moderate	X
<b>School</b>	Our Lady of Loretto School	1811 Virginia Avenue Novato, CA 94945	Moderate	AO
<b>School</b>	Marin Christian Academy	1370 South Novato Boulevard Novato, CA 94947	Moderate	AE
<b>School</b>	Good Shepherd Lutheran School	1180 Lynwood Drive Novato, CA 94947	High	X
<b>School</b>	North Bay Christian Academy	6965 Redwood Boulevard Novato, CA 94945	N/A	X
<b>Evacuation Shelter</b>	Margaret Todd Senior Center	1560 Hill Rd, Novato	High	X

<b>High Potential Loss Facilities</b>				
<b>Military/Civil Defense</b>	US Coast Guard – Pacific Coast Strike Team	450 Hangar Ave. Novato, CA 94949	N/A	X
<b>DAM</b>	Novato Creek Dam	3500 Novato Blvd. Novato, CA 94945	Moderate	X
<b>Critical Infrastructure</b>				
<b>Water/Wastewater</b>	DPW Pump Station (zone 1) - Cheda	38.0876595793068, -122.535515921059	Moderate	AE
<b>Water/Wastewater</b>	DPW Pump Station (zone 1) - Farmers	38.0889709965199, -122.534793113191	N/A	AE
<b>Water/Wastewater</b>	DPW Pump Station (zone 1) - Lynwood	38.0923793901915, -122.548345546799	N/A	AE
<b>Water/Wastewater</b>	Hamilton Storm Pumps - Pizarro	134 Pizarro Avenue Novato, CA 94945	N/A	X
<b>Water/Wastewater</b>	Hamilton Storm Pumps - San Pablo	115 San Pablo Avenue Novato, CA 94945	N/A	X
<b>Water/Wastewater</b>	Novato Sanitary District	500 Davidson St. Novato, CA 94945	N/A	X
<b>Water/Wastewater</b>	Sanitary District - Bel Marin Keys	425 Bel Marin Keys Blvd. Novato, CA 94949	N/A	X
<b>Power Utility</b>	PG&E - Machin	878 Sweetser Ave. Novato, CA 94945	N/A	X
<b>Power Utility</b>	PG&E - Stafford	38.119685, -122.614187	High	X
<b>Power Utility</b>	PG&E Substation - Ignacio	137 Hamilton Dr. Novato, CA 94949	N/A	AE
<b>Communications</b>	MERA Antenna Site - Mt Burdell	38.1449, -122.5941	Moderate	X
<b>Communications</b>	MERA Antenna Site – Big Rock Ridge	38.0591, -122.6039	Moderate	X
<b>Communications</b>	KCBS Transmitter site (EAS Alerting provider)	8198 Binford Rd. Novato, CA 94945	N/A	AE
<b>Transportation</b>	Golden Gate Transit: Bus Dispatch, Fuel, Maintenance	4 Golden Gate Place Novato, CA 94945	N/A	X

**Table 16: City of Novato Critical Facilities**  
Source: City of Novato

### 1.10 HISTORICAL PROPERTIES

The City of Novato has four 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)  
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.
- City of Novato Chamber of Commerce.
- City of Novato 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). There is a list of numerous other potentially historically significant structures listed in Appendix B of the City’s General Plan.

<b>Table 17: Historic Sites In The City of Novato</b>					
<b>Name/Landmark State Plaque Number</b>	<b>National Register (NR)</b>	<b>State Landmark</b>	<b>California Register</b>	<b>Date Listed (NR)</b>	<b>Jurisdiction</b>
<b>Camilo Ynitia Adobe (210)</b>		X	X		Novato
<b>Fashion Shop and Stephen Porcella House</b>	X			6/25/1980	Novato
<b>Hamilton Army Air Field Discontiguous Historic District</b>	X			11/20/1998	Novato

**Table 17: Historic Sites In The City of Novato**

Source: California Office of Historic Preservation and the National Register of Historic Places

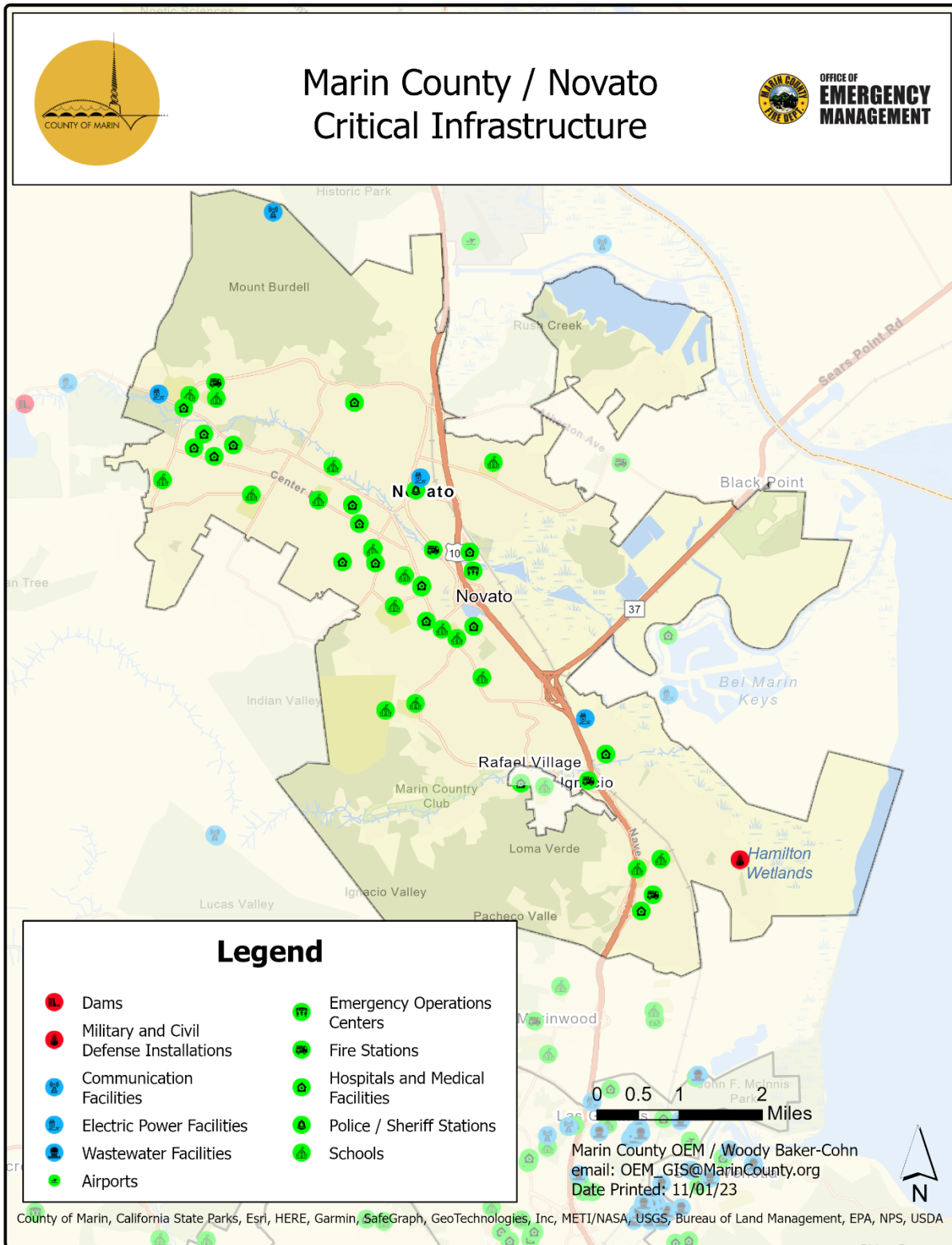
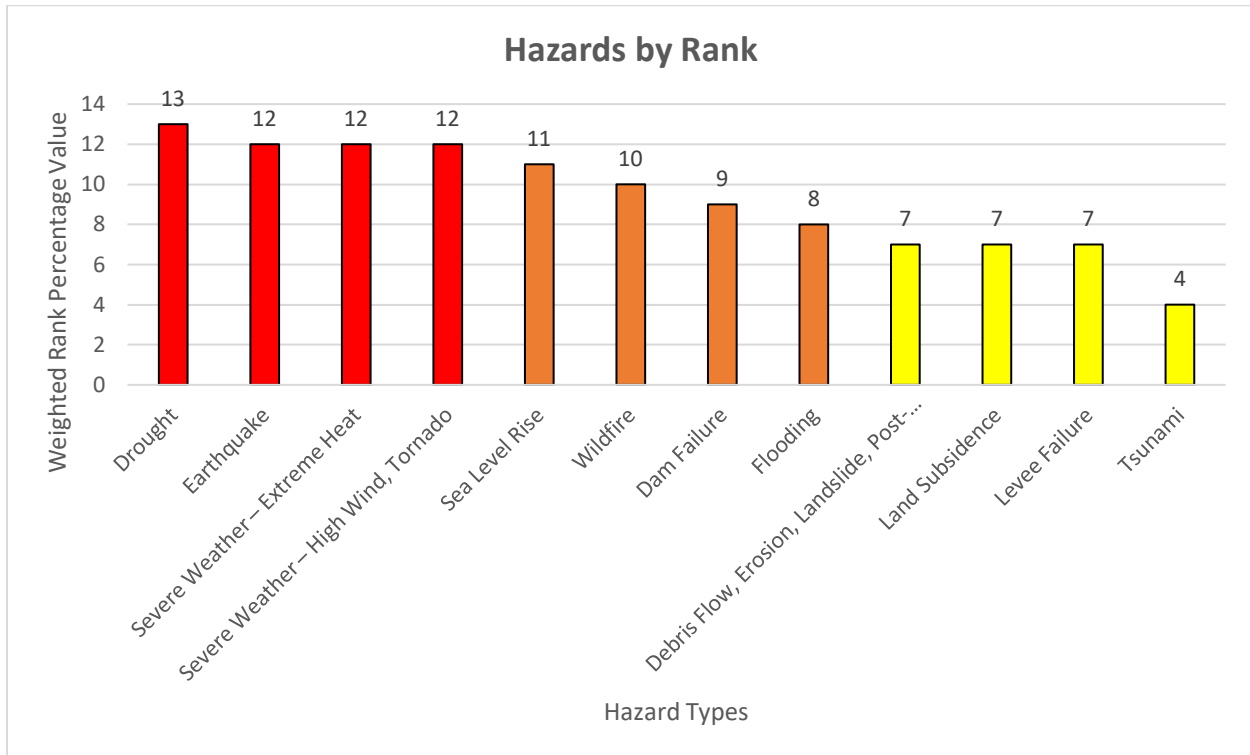


Figure 15: City of Novato Critical Facilities and Infrastructure  
Source: Marin County OEM

## 2.0: HAZARD IDENTIFICATION AND RISK ASSESSMENT

The City of Novato identified hazards that affect the city and developed natural hazard profiles based upon the countywide risk assessment, past events and their impacts. Figure 16 shows the top hazards that the Jurisdiction is at risk from according to the hazard mitigation Steering Committee.



**Figure 16: Marin County & City of Novato Risk Assessment – Planning Team Top Hazards**

Risk Level	Risk Numerical Score
High Risk	12 - 16
Serious Risk	8 - 11
Moderate Risk	4 - 7
Low Risk	1 - 3

**Figure 17: Hazard Risk Categorization**

Each Marin County OA 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 18: 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 18: 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**[AR6 WGI Headline Statements from the Summary for Policymakers \(ipcc.ch\)](#)

- 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 \(nasa.gov\)](#)

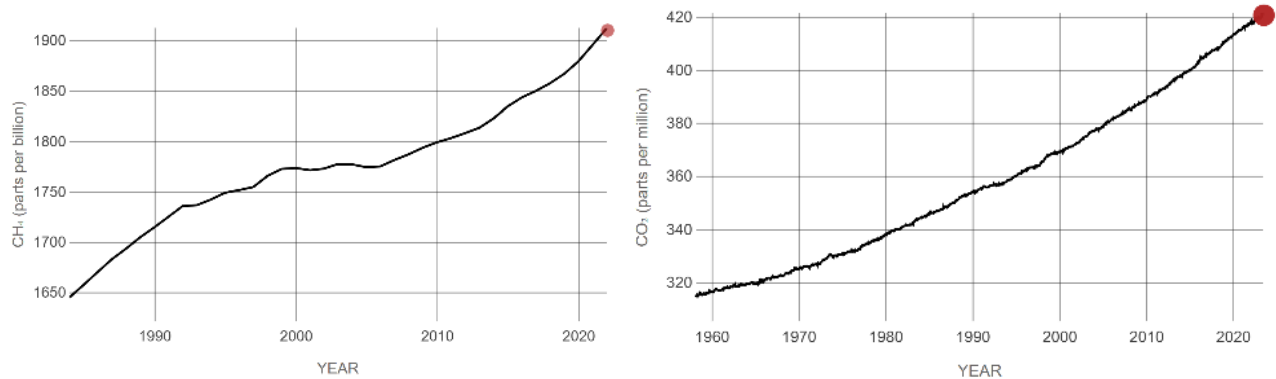
**Global Warming**

- 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.



**ATMOSPHERIC METHANE CONCENTRATIONS  
SINCE 1984**

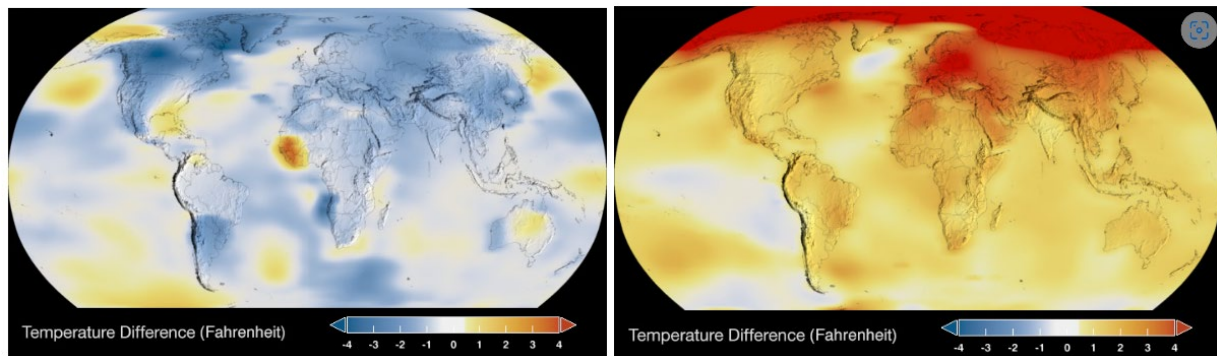
Data source: Data from NOAA, measured from a global network of air sampling sites



**Figure 18: NASA Global Temperature Change CO2 Gas**  
Source: NASA Global Climate Change, 2022

**TIME SERIES: 1884 TO 2022**

Data source: NASA/GISS  
Credit: NASA's Scientific Visualization Studio



**Figure 19: 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.

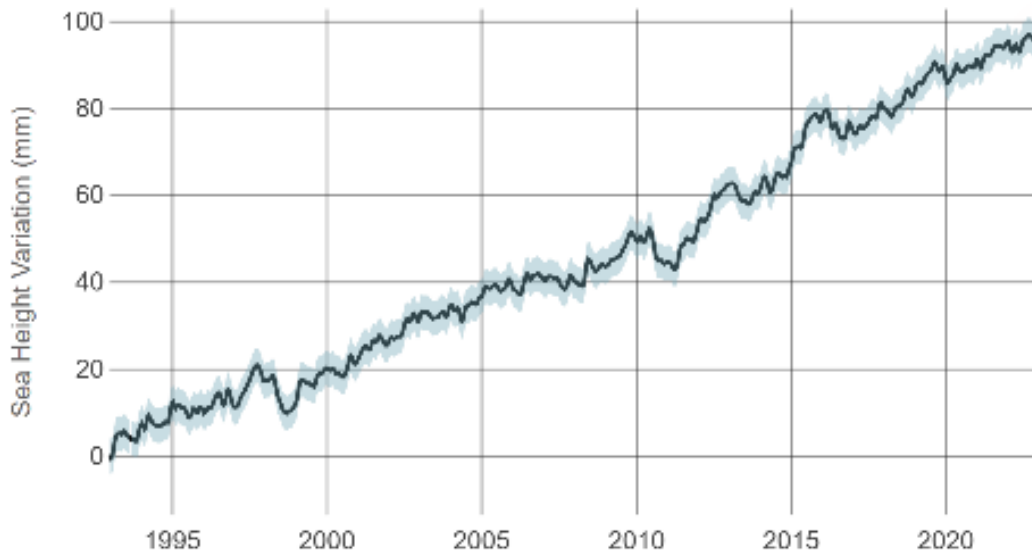
- Global sea level has risen about 8 inches (0.2 meters) since reliable record-keeping began in 1880. By 2100, scientists project that it will rise at least another foot (0.3 meters), but possibly as high as 6.6 feet (2 meters) in a high-emissions scenario.
- Sea ice cover in the Arctic Ocean is expected 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.

**SATELLITE DATA: 1993-PRESENT**

RISE SINCE 1993

Data source: Satellite sea level observations.  
Credit: NASA's Goddard Space Flight Center

↑ **98.5**  
millimeters



**Figure 20: 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).

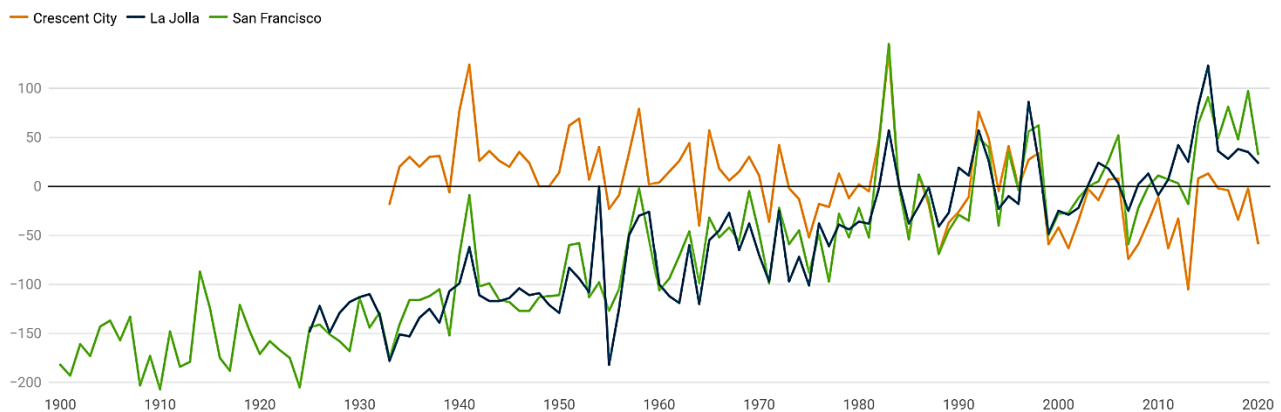


Chart: OEHHA Climate Change Indicators of California 2022 • Source: NOAA • [Get the data](#) • [Download image](#) • Created with [Datavrapper](#)

**Figure 21: 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 changes 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 including numerous Marin County jurisdictions, the County of Marin, and regional agencies, adopted a model Climate Action Plan (CAP) that is intended to support countywide strategic efforts and is currently being used to update or establish climate action plans for additional jurisdictions within Marin County. The adopted Climate Action Plan serves as the adopted plan for the unincorporated County, which was completed in 2020. The MCEP also collects data and reports on progress in meeting each County jurisdictions' individual greenhouse gas emission targets. In October 2022, the County published the Greenhouse Gas Inventory for Unincorporated Community Emissions for the Year 2020. 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 programs and 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 OA MJHMP, those noted in the table are specific for the City of Novato as per the planning team.

<b>Table 19: City of Novato Hazard Risk Assessment</b>						
<b>Hazard</b>	<b>Probability/ Likelihood of Future Events</b>	<b>Extent</b>	<b>Magnitude/ Severity</b>	<b>Climate Change Influence</b>	<b>Significance</b>	<b>Risk Score</b>
<b>Dam Failure</b>	Unlikely	Significant	Severe	Low	Low	<b>9.00</b>
<b>Debris Flow</b>	Likely	Negligible	Weak	Low	Low	<b>7.00</b>
<b>Drought</b>	Likely	Extensive	Weak	High	Medium	<b>13.00</b>
<b>Earthquake</b>	Occasional	Extensive	Extreme	None	Medium	<b>12.00</b>
<b>Flooding</b>	Likely	Negligible	Weak	Medium	Low	<b>8.00</b>
<b>Land Subsidence</b>	Likely	Negligible	Weak	Low	Low	<b>7.00</b>
<b>Levee Failure</b>	Occasional	Negligible	Weak	Medium	Low	<b>7.00</b>
<b>Sea Level Rise</b>	Occasional	Limited	Moderate	High	Medium	<b>11.00</b>
<b>Severe Weather – Extreme Heat</b>	Likely	Extensive	Weak	Medium	Medium	<b>12.00</b>
<b>Severe Weather – High Wind/Tornado</b>	Likely	Extensive	Weak	Medium	Medium	<b>12.00</b>
<b>Tsunami</b>	Unlikely	Negligible	Weak	None	Low	<b>4.00</b>
<b>Wildfire</b>	Likely	Limited	Weak	Medium	Medium	<b>10.00</b>

**Table 19: City of Novato Hazard Risk Assessment**  
Source: City of Novato

**Omitted Hazards**

Novato does not have any omitted hazards.

<b>Table 20: County of Marin Hazard Risk Assessment</b>						
<b>Hazard</b>	<b>Probability/ Likelihood of Future Events</b>	<b>Geographic Extent</b>	<b>Magnitude/ Severity</b>	<b>Climate Change Influence</b>	<b>Significance</b>	<b>Risk Score</b>
<b>Dam Failure</b>	Unlikely	Negligible	Extreme	Low	Medium	<b>9.00</b>
<b>Debris Flow</b>	Occasional	Extensive	Severe	Medium	Medium	<b>13.00</b>
<b>Drought</b>	Highly Likely	Extensive	Moderate	High	High	<b>16.00</b>
<b>Earthquake</b>	Highly Likely	Extensive	Extreme	None	High	<b>15.00</b>
<b>Flooding</b>	Highly Likely	Limited	Severe	High	Medium	<b>14.00</b>
<b>Land Subsidence</b>	Occasional	Limited	Moderate	Medium	Medium	<b>10.00</b>
<b>Levee Failure</b>	Unlikely	Negligible	Moderate	Medium	High	<b>9.00</b>
<b>Sea Level Rise</b>	Highly Likely	Limited	Extreme	High	High	<b>16.00</b>
<b>Severe Weather – Extreme Heat</b>	Highly Likely	Extensive	Moderate	High	Medium	<b>15.00</b>
<b>Severe Weather – High Wind/Tornado</b>	Highly Likely	Extensive	Moderate	High	Medium	<b>15.00</b>
<b>Tsunami</b>	Highly Likely	Limited	Extreme	Medium	High	<b>15.00</b>
<b>Wildfire</b>	Highly Likely	Significant	Severe	High	High	<b>16.00</b>

**Table 20: Hazard Risk Assessment**  
Source: County of Marin

### 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.



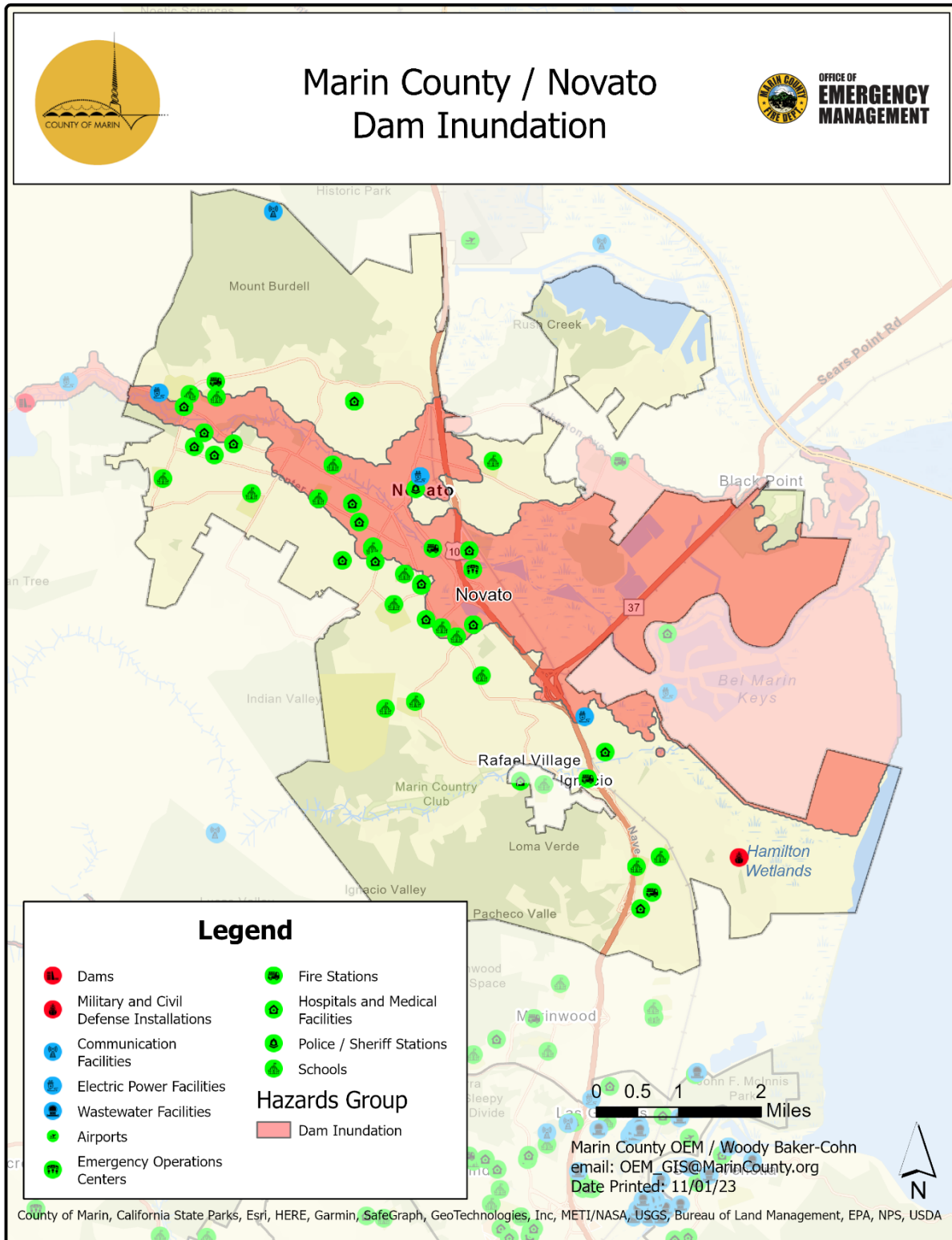
The 1963 failure of the Baldwin Hills Dam in Southern California led the Legislature to amend the California Water Code to include within state jurisdiction both new and existing off-stream storage facilities.

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.

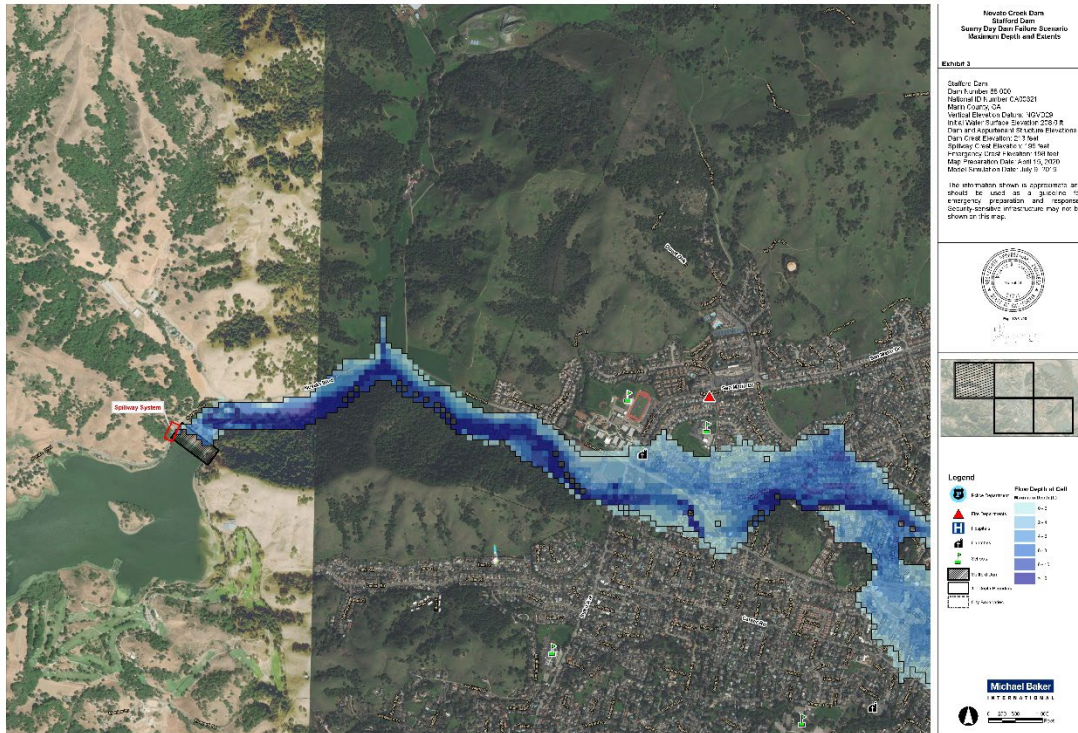
In 1972, Congress moved to reduce the hazards from the 28,000 non-federal dams in the country by passing Public Law 92-367, the National Dam Inspection Act. With the passage of this law, Congress authorized the U.S. Army Corps of Engineers (USACE) to inventory dams located in the United States. The action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

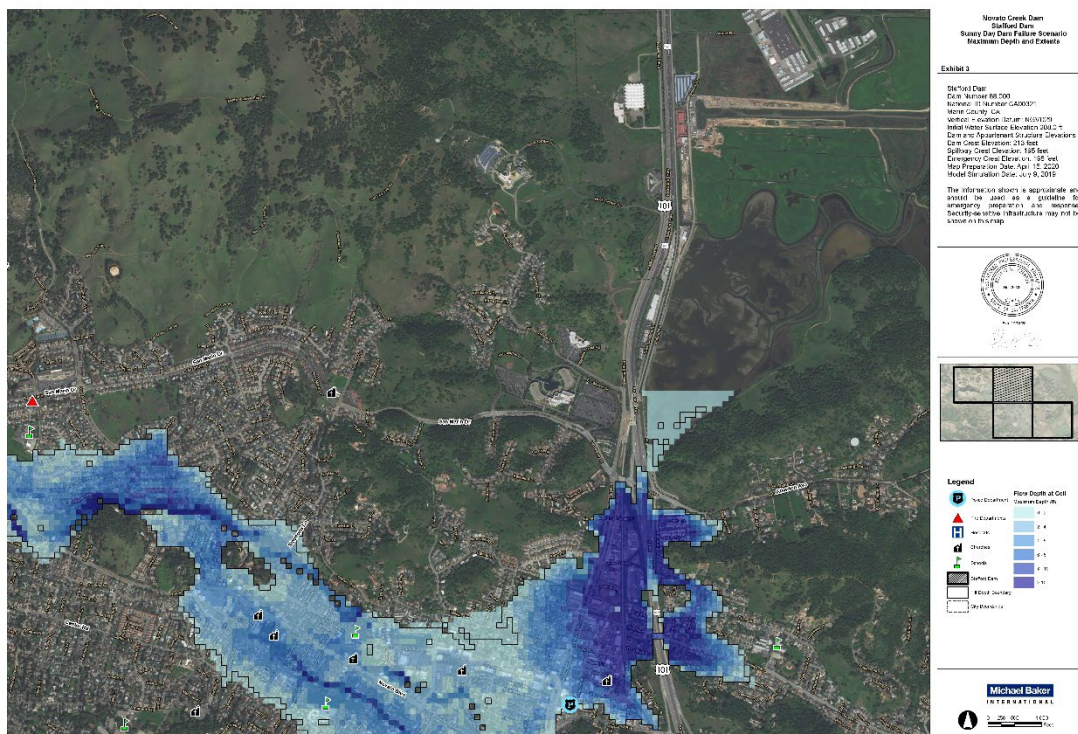
While there are no dams located within Novato, the City could be impacted by a failure of the Stafford/Novato Creek Dam which is located in the unincorporated County of Marin approximately 5,000 feet from the City's western boundary (see Figure 22). The dam has storage of 140-acre feet of water that would cascade down Novato Creek through the City of Novato and Bel Marin Keys in the unincorporated County of Marin before emptying into San Pablo Bay in the event of a sunny-day dam failure. In up to two hours, water would overtop Novato Creek and could extend up to 500 feet on both sides of the creek, potentially inundating dozens of homes, part of the PG&E substation at Stafford, and part of San Marin High School and San Ramon Elementary School in up to ten feet of water in some areas. In two to five hours, water would continue overtopping Novato Creek extending down Novato Boulevard up to 1,000 feet of both sides of the road to the intersection of Diablo Avenue. Hundreds of homes, numerous commercial businesses and medical facilities, the Lu Sutton Elementary School and Our Lady of Loretto Elementary School lie in this area and could be inundated in up to eight feet of water. In the same amount of time, water would continue overtopping Novato Creek to the City boundary. This area includes most of the downtown commercial core of Novato where hundreds of homes, dozens of businesses and shopping centers, numerous medical facilities, the City of Novato Police Department and Town Hall, the Novato Fire Protection District Headquarters and primary Emergency Operations Center for the City, the Novato Fire Protection District #61, Lynwood Elementary School, Hill Middle School, the Marin Christian Academy and the PG&E substation at Novato could be inundated in up to ten feet of water in some areas. Water would also spread northward along Redwood Boulevard into North Novato in two to five hours where flood depths could be deepest, inundating dozens of homes and parts of Old Town in over ten feet of water in some places. The entire inundation area covers numerous major roads and highways in the City including Highway 101, Novato Boulevard and Redwood Boulevard which could hamper ingress and egress throughout much of central Novato.



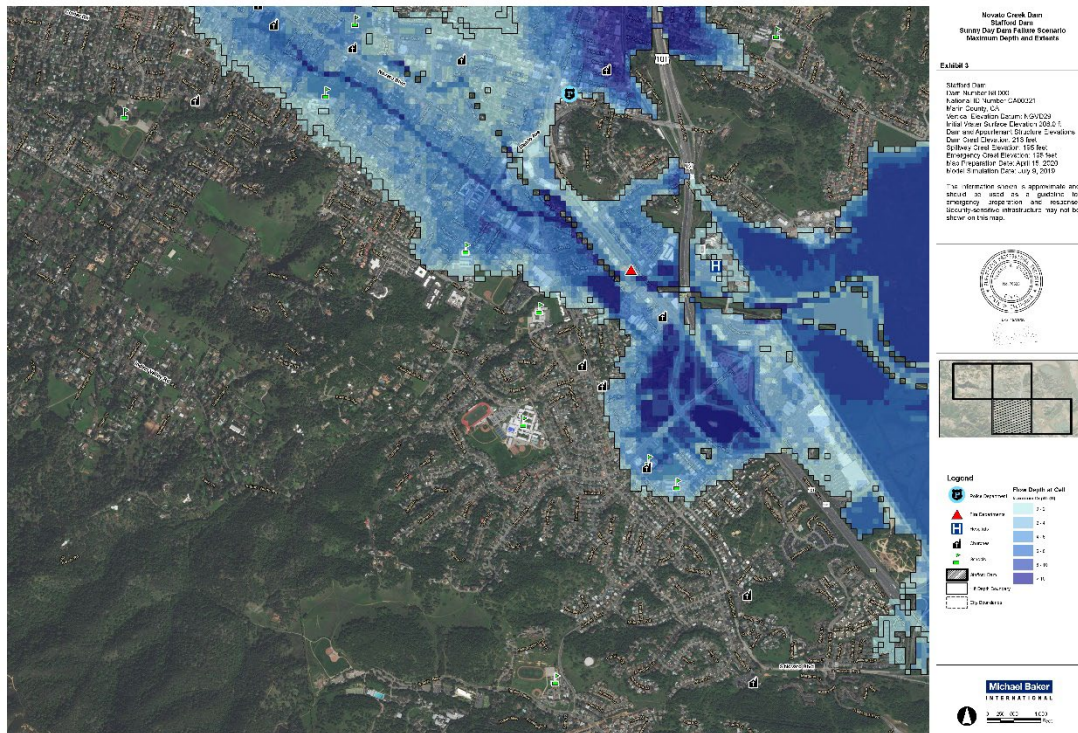
**Figure 22: City of Novato Dam Inundation Critical Facilities and Infrastructure**  
Source: Marin County OEM



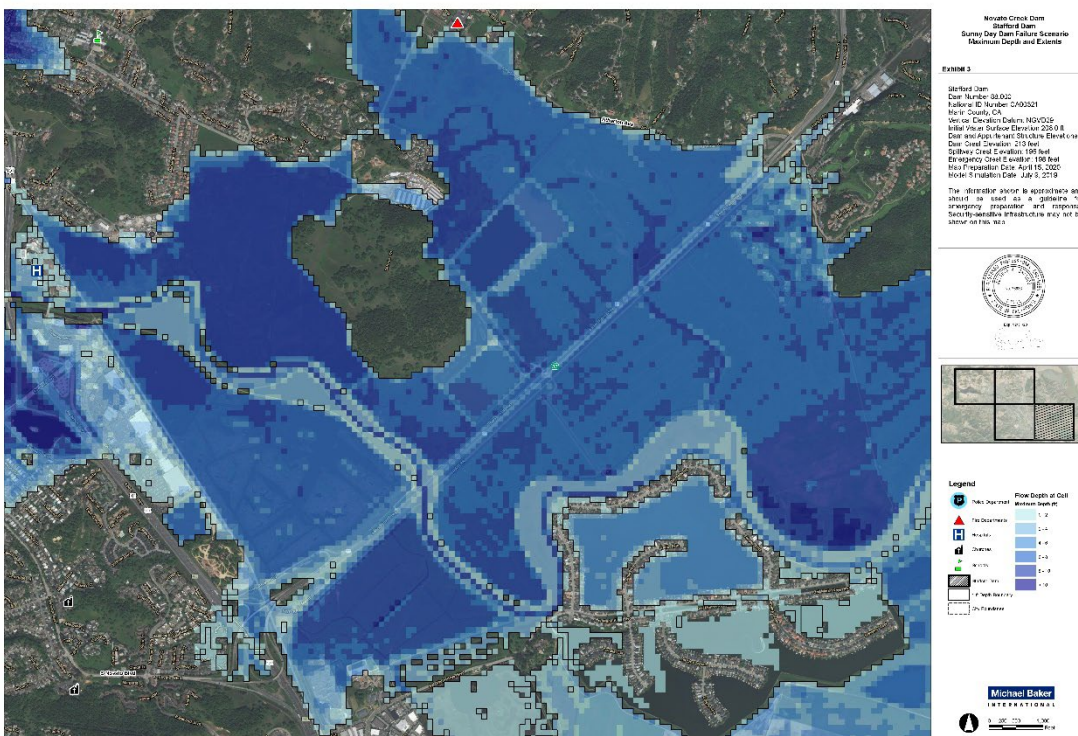
**Figure 23: City of Novato - Novato Creek Dam Inundation Impact – West Novato**  
Source: California Department of Water Resources, DSOD



**Figure 24: City of Novato - Novato Creek Dam Inundation Impact – North Novato**  
Source: California Department of Water Resources, DSOD



**Figure 25: City of Novato - Novato Creek Dam Inundation Impact – Central Novato**  
Source: California Department of Water Resources, DSOD



**Figure 26: City of Novato - Novato Creek Dam Inundation Impact – East Novato**  
Source: California Department of Water Resources, DSOD

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 are over 90 years old. The Novato Creek Dam is over 70 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 Novato Creek Dam, the potential for significant impacts to residents and infrastructure will only increase. This area includes part of the Novato. Future development along Novato 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 landslide 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:

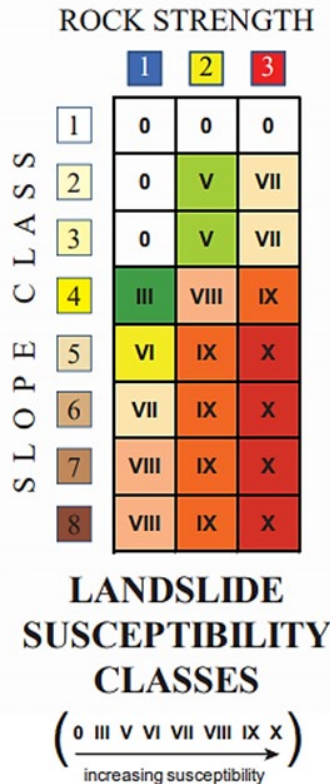
- Degree of slope
- Water (heavy rain, river flows, or wave action)
- Unconsolidated soil or soft rock and sediments
- Lack of vegetation (no stabilizing root structure)
- Previous wildfires and other forest disturbances
- Earthquake

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.

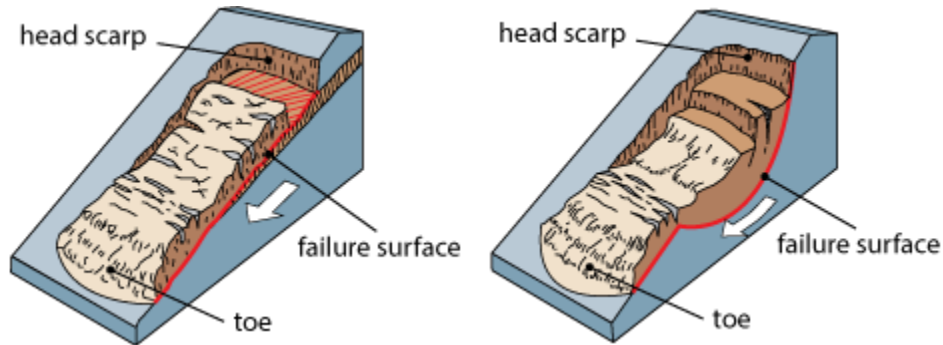
Landslide susceptibility can be characterized by looking at both slope class and rock strength. Landslide susceptibility classes express the generalization that on very low slopes, landslide susceptibility is low even in weak rock, and that landslide susceptibility increases with slope and in weaker rocks. Very high landslide susceptibility includes very steep slopes in hard rocks and moderate to very steep slopes in weak rocks. Figure 27 shows landslide susceptibility classes.



**Figure 27: 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 28 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.



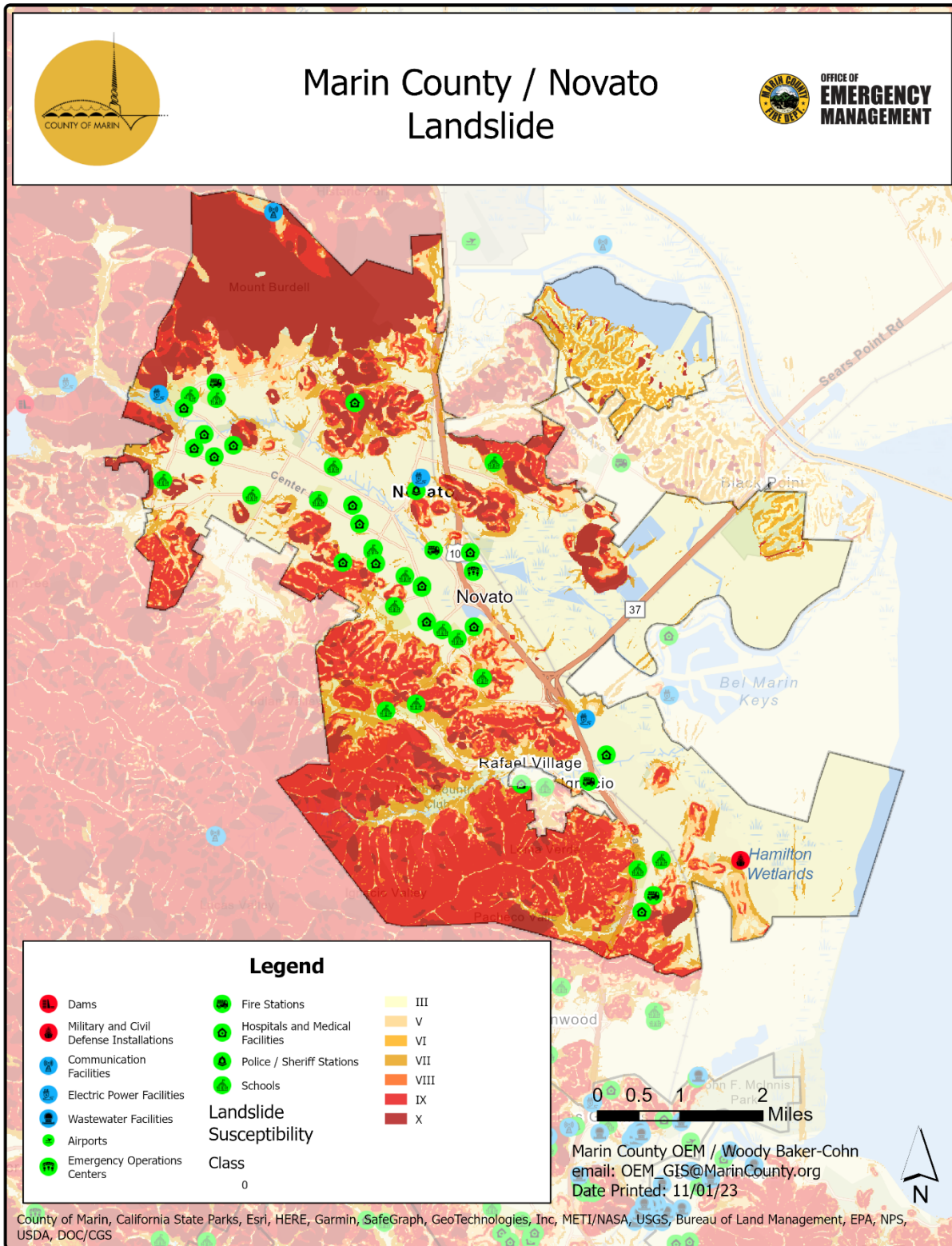
**Figure 28: Mud Flow Areas**  
Source: Washington Department of Natural Resources

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 Novato would most likely occur on the northern and southern sides of the City where the terrain is steeper and is more susceptible to movement of soil. This area of Novato is primarily residential and consists of numerous winding streets and hillside homes that could be damaged or destroyed by a landslide. Residences in or on the fringes of open space areas including the Mount Burdell Open Space Preserve, Miwok Park, Cherry Hill, South Marin Park, the Indian Valley Preserve, the Rush Creek Open Space Preserve and Novato Heights have moderate to high susceptibility to a landslide. There are hundreds of residences in these areas. Of particular concern are communities in southern Novato south of Novato Boulevard. A landslide impacting Ignacio Boulevard and/or Sunset Parkway could impact ingress and egress into communities in this area that are at high susceptibility of a landslide. Highway 101 also has high landslide susceptibility in this area near Pacheco Hill, and a landslide on the highway could cause significant transportation challenges that could impact the City. The College of Marin-Indian Valley Campus, the Loma Verde Elementary School, the Novato Station #65, the Good Shepherd Lutheran School, Novato High School and the Olive Elementary School all lie in areas of moderate to high landslide susceptibility. The main commercial areas of the City, including the downtown area, have little to no landslide susceptibility.





**Figure 29: City of Novato Debris Flow Critical Facilities and Infrastructure**  
Source: Marin County OEM

An earthquake has the potential to cause landslides throughout areas of landslide susceptibility in Novato. A wildfire and subsequent rain event in any of the open spaces in and surrounding Novato, including in the Mount Burdell Open Space Preserve, Ohair Park, the Verissimo Hills Preserve, the Indian Tree Open Space Preserve, the Indian Valley Preserve, the Ignacio Valley Preserve, the Loma Verde Preserve and the Rush Creek Open Space Preserve. A debris flow down Novato Creek could impact the City with mud and water that damage bridges and other infrastructure.

12/31/2005 - A mudslide came down on Pacheco Creek Drive, depositing over 2,000 cubic yards of mud and damaging several homes. Novato declared a state of emergency. Nobody was hurt, but mud poured into each home, forcing the residents to evacuate.

2/27/2017 – Heavy rain caused a landslide at Miwok Park along the southeast side of Novato Creek, destroying about 100 feet of a trail that connects the neighborhoods east and west of Miwok Park.

There have been no recorded debris flows in Novato since the last plan update, though a landslide on 3/22/2023 just north of Novato severely damaged Redwood Boulevard near Olompali State Park. The slide threatened two major utility lines serving the County of Marin OA.

### **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)<sup>1</sup>, 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 around Novato 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 Novato could be susceptible to post-fire debris flows. This includes areas along Novato Creek, Arroyo San Jose and south of the Mount Burdell Open Space Preserve. 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.

---

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

### 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 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 its 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 Novato, though it’s effects would be most felt in the mountainous areas around the City where the risk of wildfire would increase. The wetland areas of Novato, particularly the marshlands along San Pablo Bay, could become drier during prolonged period of drought and experience marshland fires that could impact local businesses and residences in the area. Dry trees in public spaces like Novato’s Miwok Park and Marin Highlands Park 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 Novato 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 Novato, 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 around Novato. 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 Novato where wildfires are more likely to occur. Drought also has the potential to dry out the marshlands along the shoreline of Novato, increasing the chances of brush fires there. Future development in this area and in the mountainous areas of Novato 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 Novato 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 surface. Intensity is most commonly measured on the Modified Mercalli Intensity (MMI) Scale (see Figure 30).

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 30: Modified Mercalli Intensity Scale**

Source: USGS

Figure 31 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
<b>1.0 – 2.9</b>	<b>I</b>
<b>3.0 – 3.9</b>	<b>II – III</b>
<b>4.0 – 4.9</b>	<b>IV – V</b>
<b>5.0 – 5.9</b>	<b>VI – VII</b>
<b>6.0 – 6.9</b>	<b>VII – IX</b>
<b>7.0 or higher</b>	<b>VIII or higher</b>

**Figure 31: 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 32). 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.

<b>Soil type A</b>	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.
<b>Soil type B</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.)
<b>Soil Type C</b>	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.
<b>Soil Type D</b>	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.
<b>Soil Type E</b>	200 m/sec > Vs	Includes water-saturated mud and artificial fill. The strongest amplification of shaking due is expected for this soil type.

**Figure 32: 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.

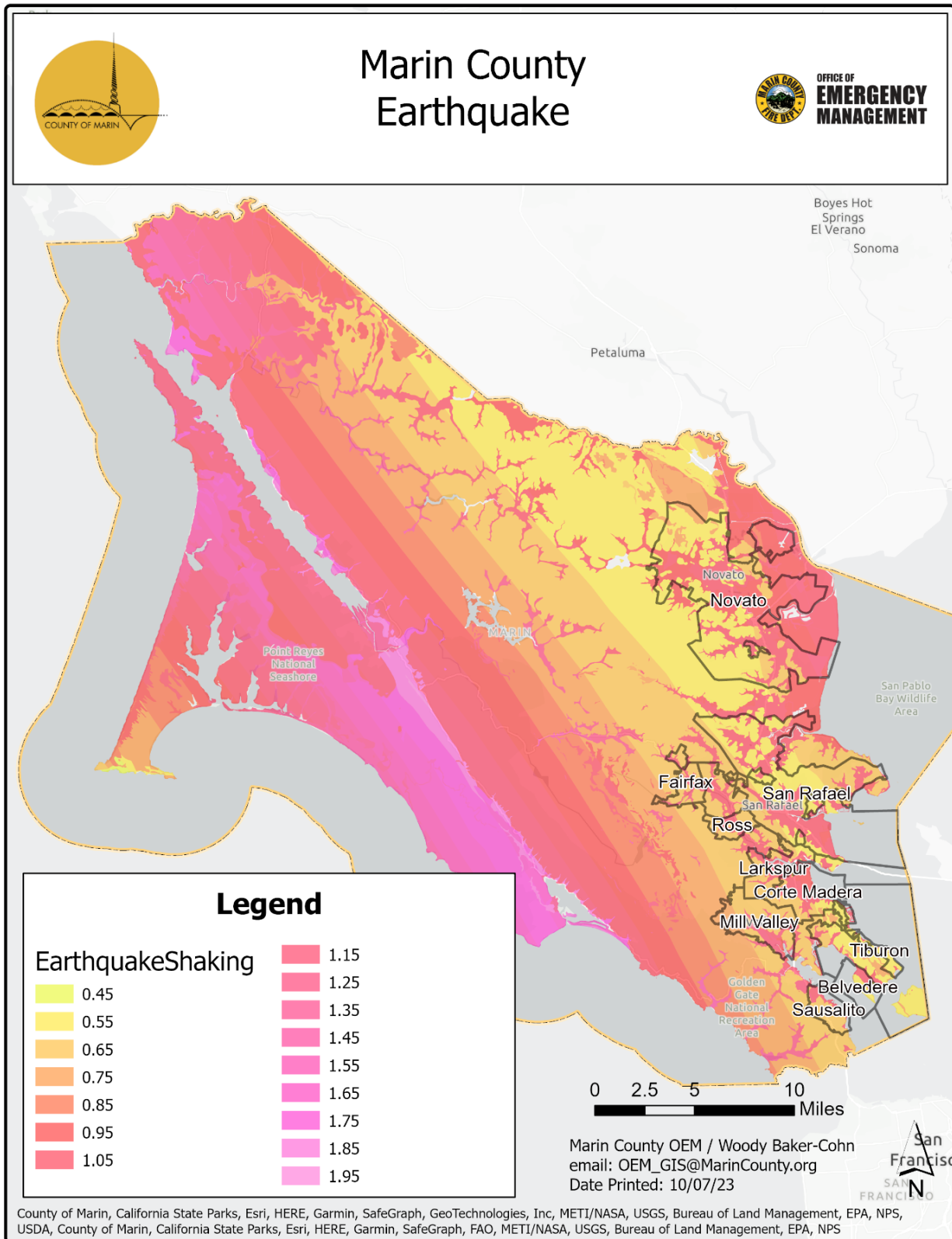
An earthquake could occur anywhere in and around Novato due to the number of active faults within and near the Marin County OA.

**Earthquake Shake Intensity**

The colors on Figures 33 and 34 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.

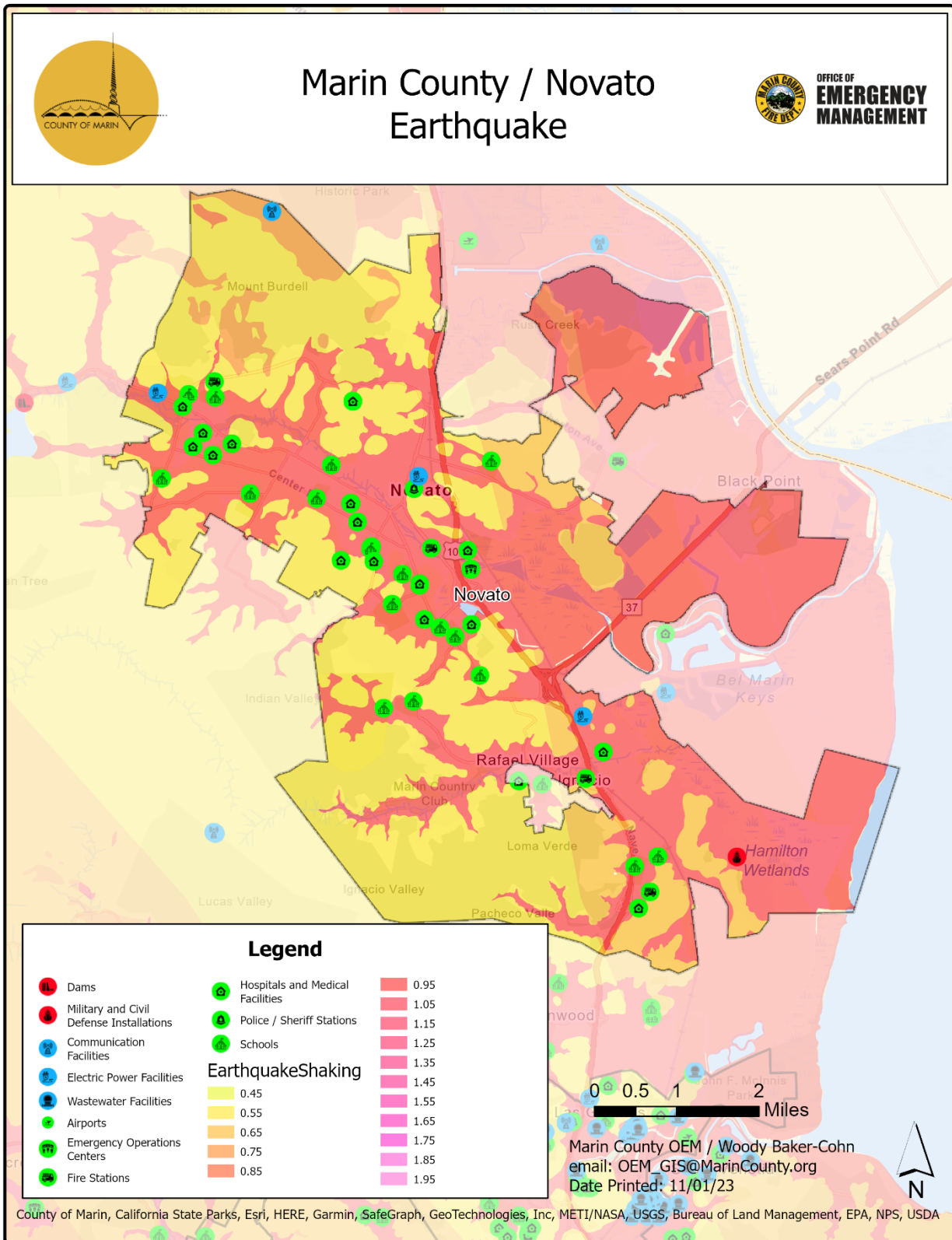
This map shows the expected relative intensity of ground shaking and damage in California from anticipated future earthquakes. The shaking potential is calculated as the level of ground motion that has a 2% chance of being exceeded in 50 years, which is the same as the level of ground-shaking with about 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.



**Figure 33: Marin County OA Earthquake Impact and Fault Lines**  
Source: Marin County OEM





**Figure 34: City of Novato Earthquake Critical Facilities and Infrastructure**  
Source: Marin County OEM

Novato is located directly between the San Andreas and Hayward faults. A moderate to extreme earthquake originating from either of these major faults or any of the other faults in the region could have major impacts to the City. There is increased risk of shaking and liquefaction in Novato from an earthquake, particularly in the central and eastern lowland areas where superficial deposits and fill are more prevalent. This includes the primary commercial area of City along the Highway 101 corridor, and numerous residential neighborhoods and commercial areas with schools and other critical facilities. All of the City's critical facilities with the exception of the Novato Fire Station #63 lie in an area of moderate earthquake shaking potential. Vulnerable structures include bridges and older buildings that have not undergone major seismic retrofitting. Utility infrastructure throughout the City could be impacted by an earthquake.

Earthquakes could also cause landslides in the open space areas in and surrounding Novato with steeper terrain, causing damage to homes and roads as a result of shifting soils.

Novato hasn't yet experienced a significant earthquake. The Marin County OA 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 the Marin County OA as the epicenter of the quake was further south in Santa Cruz County. Smaller earthquakes with minimal to no impacts are routinely felt in Novato.

#### **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 Novato, 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)<sup>2</sup>, 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 Novato. 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 Novato 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

<sup>2</sup> 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>

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 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 occurs as a result of 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 and distribution, the amount of soil moisture, seasonal variation in vegetation, snow depth, and water-resistance of the surface due to urbanization. In the Marin County OA, riverine flooding can occur anytime from November through April and is largely caused by heavy and continued rains, sometimes combined with snowmelt, increased outflows from upstream dams, and heavy flow from tributary streams. These intense storms can overwhelm the local waterways as well as the integrity of flood control structures. Flooding is more severe when antecedent rainfall has resulted in saturated ground 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.

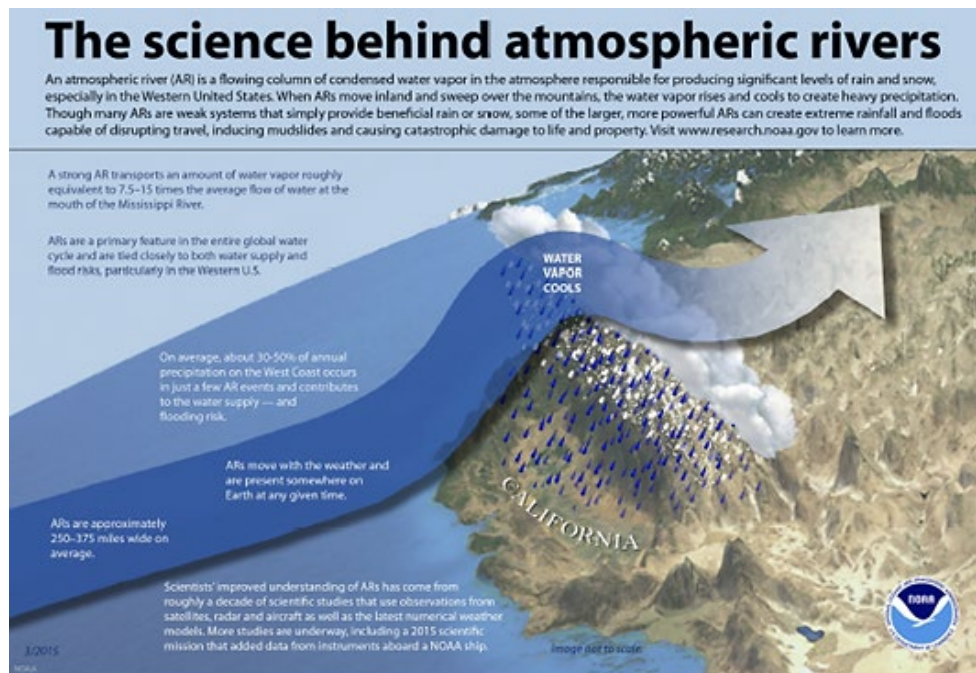
**Localized/Stormwater flooding** – Localized flooding problems are often caused by flash flooding, severe weather, or an unusual amount of rainfall. Flooding from these intense weather events usually occurs in areas experiencing an increase in runoff from impervious surfaces associated with development 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 are the most damaging.

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 extensive flooding. 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 35.

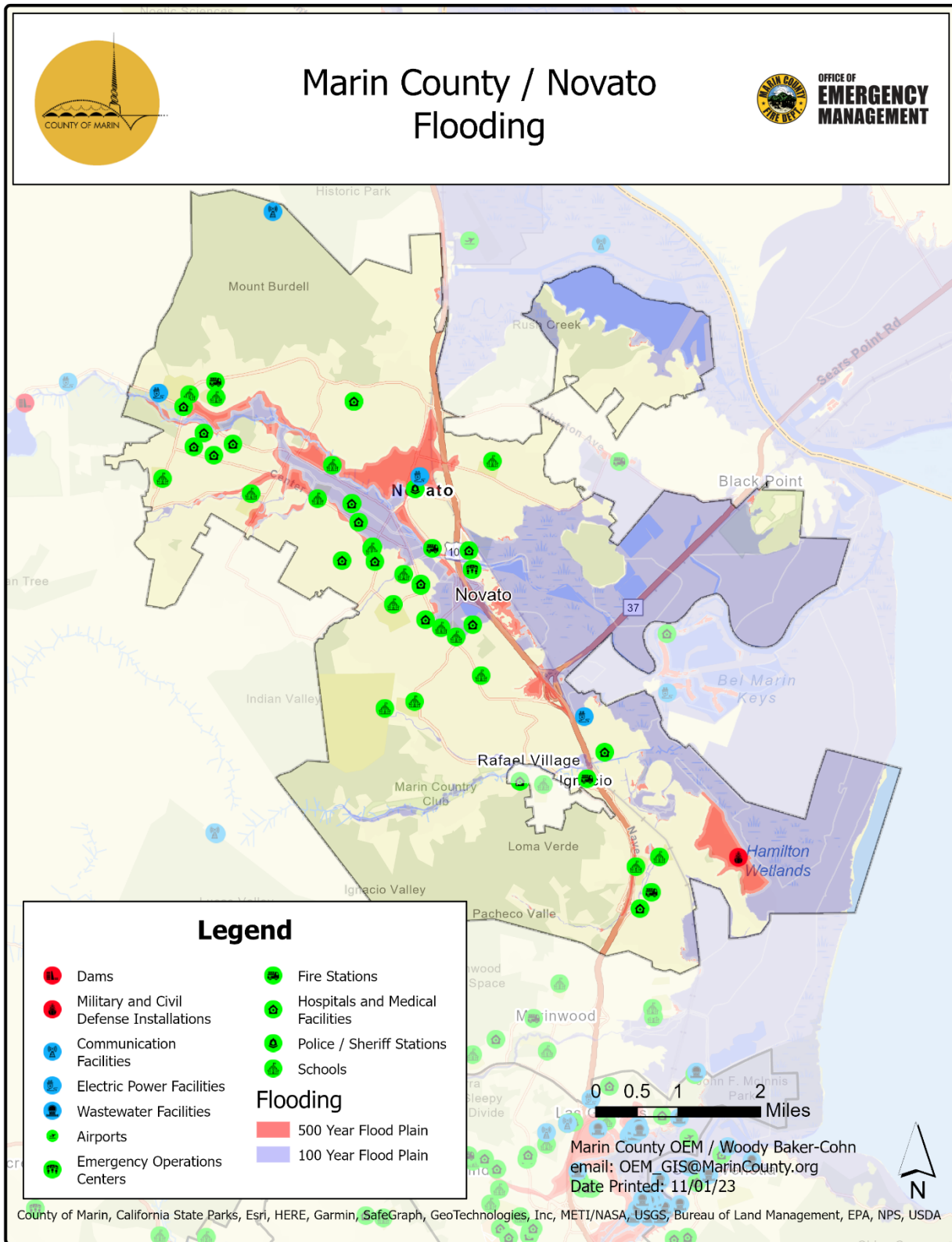


**Figure 35: Diagram of an Atmospheric River Event**  
Source: NOAA

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 pipes to creeks and the Bay. When the storm drains are obstructed or broken or when the water bodies to which they lead to are already full, water backs up onto the streets. Although stormwater overflow and isolated ponding also occur throughout the County, the effects are typically not widespread or significantly damaging.

Flooding in Novato generally results from a combination of high tides from San Pablo Bay and creek flooding from Novato Creek in low-lying areas. Local flooding in Novato is exacerbated where the storm water drainage network has inadequate capacity for peak flows.

Most of the lowland areas in Novato are in the 100-year floodplain, with several areas in the 500-year floodplain. The 100-year floodplain extends mostly along Novato Creek from Stafford Lake to San Pablo Bay, including a large area along Novato Boulevard for approximately two miles where hundreds of homes, numerous commercial buildings and shopping plazas, several medical facilities, Our Lady of Loretto School and Lynwood Elementary School could be susceptible to flooding. The 100-year floodplain also extends along some of the smaller tributaries in the City include parts of Warner Creek, Vineyard Creek, Wilson Creek, Arroyo Avichi Creek and Rush Creek. There are dozens of residences along these creeks that could be susceptible to flooding. The 100-year floodplain along Vineyard Creek extends through the middle of Sinaloa Middle School and the 100-year floodplain along Arroyo Avichi Creek runs along the edge of the Rancho Elementary School. Other areas with high flood danger include Ignacio and Arroyo San Jose, as well as the Bahia area. The area around Scottsdale Pond that includes a section of Highway 101 and the area north of Bel Marin Keys that includes several miles of State Route (SR) 37 lie in the 100-year floodplain and could be susceptible to flooding, which could cause transportation challenges for the City. The 500-year floodplain also follows Novato Creek for its length through most of the City and is interspersed with the 100-year floodplain. A large section of the 500-year floodplain lies north of downtown and extends along a mile of Redwood Boulevard, including the SMART railroad tracks which could be susceptible to flooding. The 500-year floodplain in Novato includes hundreds of homes, numerous commercial buildings and shopping plazas, Novato Fire Station #1, the PG&E substation at Novato and the Old Town area of downtown that could be susceptible to flooding. Most of downtown Novato, including the Novato Police Department and Novato City Hall, lie outside of the 100 and 500-year floodplains.



**Figure 36: City of Novato Flooding Critical Facilities and Infrastructure**  
Source: Marin County OEM

Table 21 shows the number of City of Novato critical facilities by flood zone.

<b>Table 21: City of Novato Critical Facilities by Flood Zone</b>			
<b>Category</b>	<b>Name</b>	<b>Address</b>	<b>Flood Zone</b>
<b>Critical Facilities</b>			
<b>Fire</b>	Fire: Novato Fire Protection District (NOV) / Headquarters & Primary EOC	95 Rowland Way, Novato, CA 94945	X
<b>Fire</b>	Fire: Novato Fire Protection District (NOV) / Station 61	7025 Redwood Blvd Novato, CA 94945	X
<b>Fire</b>	Fire: Novato Fire Protection District (NOV) / Station 62	450 Atherton Ave, Novato, CA 94945	X
<b>Fire</b>	Fire: Novato Fire Protection District (NOV) / Station 63	65 San Ramon Way, Novato, CA 94945	X
<b>Fire</b>	Fire: Novato Fire Protection District (NOV) / Station 64	319 Enfrente Rd, Novato, CA 94949	X
<b>Fire</b>	Fire: Novato Fire Protection District (NOV) / Station 65	5 Bolling Dr, Novato, CA 94945	X
<b>Law/EOC</b>	Novato Police Dept / Alternative EOC	909 Machin Ave Novato, CA 94945	X
<b>Local Government</b>	Novato City Hall	922 Machin Ave Novato, CA 94945	X
<b>Local Government</b>	Margaret Todd Senior Center/Evacuation Shelter	1560 Hill Road Novato, CA 94947	X
<b>Local Government</b>	Novato DPW - Corporation Yard	550 Davidson Street Novato, CA 94945	X
<b>Health / Medical</b>	Novato Community Hospital	180 Rowland Way Novato, CA 94945	X
<b>Health / Medical</b>	Novato Healthcare Center	1565 Hill Rd Novato, CA 94947	X
<b>Health / Medical</b>	Miles - Center Road House	1649 Center Rd Novato, CA 94947	AO
<b>Health / Medical</b>	Rae Lane House	858 Rae Ln Novato, CA 94947	X
<b>Health / Medical</b>	Lifhouse - Stonehaven	2 Stonehaven Ct Novato, CA 94947	X
<b>Health / Medical</b>	Atria Tamalpais Creek	853 Tamalpais Ave Novato, CA 94947	AO
<b>Health / Medical</b>	Oakmont of Novato	1465 S. Novato Blvd. Novato, CA 94947	X
<b>Health / Medical</b>	Creekwood	830 Tamalpais Ave. Novato, CA 94947	AO
<b>Health / Medical</b>	Novato Residential Support Services	1333 Seventh Street Novato, CA 94947	X
<b>Health / Medical</b>	Anton Pointe, The	1470 South Novato Blvd., Novato, CA 94941	X
<b>Health / Medical</b>	Young at Heart	37 Mendocino Lane Novato, CA 94947	X
<b>Health / Medical</b>	Cedars Dante	1914 Novato Blvd Novato, CA 94945	X
<b>Health / Medical</b>	Wildflowers I	256 Sunset Parkway Novato, CA 94947	AE
<b>Health / Medical</b>	Lifhouse - Bolling Circle	464 Bolling Circle Novato, CA 94949	X
<b>Health / Medical</b>	Buckelew Programs	201 Alameda del Prado Novato, CA 94949	X

<b>Health / Medical</b>	Canyon Manor	655 Canyon Road Novato, CA 94947	X
<b>Health / Medical</b>	Lifehouse - 271 Captain Nurse Circle	271 Captain Nurse Circle Novato, CA 94949	X
<b>Health / Medical</b>	Lifehouse - 400 Palm Drive	400 S. Palm Dr. Apt 201, Novato CA, 94949	X
<b>Health / Medical</b>	Yumi House	810 Eucalyptus Ave Novato, CA 94947	X
<b>Health / Medical</b>	Lifehouse - Sherwood Place	5 Sherwood Place Novato, CA 94945	X
<b>Health / Medical</b>	Cornerstone Community Homes - Brown's	36 Brown Drive Novato, CA 94947	X
<b>Health / Medical</b>	Cornerstone Community Homes - San Luis	365 San Luis Way Novato, CA 94945	X
<b>Health / Medical</b>	Cypress House	856 Cypress Ave Novato, CA 94947	AO
<b>Health / Medical</b>	Lynwood Home	1212 Lynwood Dr. Novato, CA 94947	X
<b>Health / Medical</b>	Casa Allegra - San Felipe	4 San Felipe Way Novato, CA 94945	X
<b>Health / Medical</b>	Casa Allegra - Tamalpais	778 Tamalpais Avenue Novato, CA 94945	X
<b>Health / Medical</b>	Cedars of Marin - 2nd Street	1120 Second St. Novato, CA 94945	X
<b>Health / Medical</b>	Avery Lane	685 Atherton Avenue Novato, CA 94945	X
<b>Health / Medical</b>	Elegance Hamilton Hill	1 Hamilton Hill Drive Novato, CA 94949	X
<b>Health / Medical</b>	Cornerstone Community Homes - Cambridge	1420 Cambridge St. Novato, CA 94947	X
<b>Health / Medical</b>	Buckelew RSS Novato	1333 7th Street Novato, Ca 94947	X
<b>Health / Medical</b>	Lifehouse - 251 Captain Nurse Circle	251 Captain Nurse Circle Novato, CA 94949	X
<b>Health / Medical</b>	Homeward Bound of Marin - New Beginnings Center	1399 N. Hamilton Parkway Novato, CA 94949	X
<b>Health / Medical</b>	Homeward Bound - Transition to Wellness	385 North Hamilton Parkway Novato, CA 94949	X
<b>Health / Medical</b>	Shalamo Home	200 Daryl Ave. Novato, CA 94947	X
<b>School</b>	Novato Unified School District – Admin Office	1015 7 <sup>th</sup> Street Novato, CA 94945	X
<b>School</b>	Hamilton Meadow Park School – Middle/Elementary	5530 Nave Drive Novato, CA 94949	X
<b>School</b>	Loma Verde Elementary (Unincorporated Novato)	399 Alameda de la Loma Novato, CA 94949	X
<b>School</b>	Lu Sutton Elementary	1800 Center Road Novato, CA 94947	X
<b>School</b>	Lynwood Elementary	1320 Lynwood Drive Novato, CA 94947	AE
<b>School</b>	Olive Elementary	620 Olive Avenue Novato, CA 94945	X
<b>School</b>	Pleasant Valley Elementary	755 Sutro Avenue Novato, CA 94947	X
<b>School</b>	Rancho Elementary	1430 Johnson Street Novato, CA 94947	X
<b>School</b>	San Ramon Elementary	45 San Ramon Way Novato, CA 94949	X
<b>School</b>	San Jose Middle School	1000 Sunset Parkway Novato, CA 94949	X



<b>School</b>	Sinaloa Middle School	2045 Vineyard Road Novato, CA 94947	X
<b>School</b>	Novato High School	625 Arthur Street Novato, CA 94947	X
<b>School</b>	San Marin High School	15 San Marin Drive Novato, CA 94945	X
<b>School</b>	Hill Education Center / Marin Oaks High School	720 Diablo Avenue Novato, CA 94947	X
<b>School</b>	Novato Charter School	940 "C" Street Novato, CA 94949	X
<b>School</b>	Our Lady of Loretto School	1811 Virginia Avenue Novato, CA 94945	AO
<b>School</b>	Marin Christian Academy	1370 South Novato Boulevard Novato, CA 94947	AE
<b>School</b>	Good Shepherd Lutheran School	1180 Lynwood Drive Novato, CA 94947	X
<b>School</b>	North Bay Christian Academy	6965 Redwood Boulevard Novato, CA 94945	X
<b>Evacuation Shelter</b>	Margaret Todd Senior Center	1560 Hill Rd, Novato	X
<b>High Potential Loss Facilities</b>			
<b>Military/Civil Defense</b>	US Coast Guard – Pacific Coast Strike Team	450 Hangar Ave. Novato, CA 94949	X
<b>DAM</b>	Novato Creek Dam	3500 Novato Blvd. Novato, CA 94945	X
<b>Critical Infrastructure</b>			
<b>Water/Wastewater</b>	DPW Pump Station (zone 1) - Cheda	38.0876595793068, -122.535515921059	AE
<b>Water/Wastewater</b>	DPW Pump Station (zone 1) - Farmers	38.0889709965199, -122.534793113191	AE
<b>Water/Wastewater</b>	DPW Pump Station (zone 1) - Lynwood	38.0923793901915, -122.548345546799	AE
<b>Water/Wastewater</b>	Hamilton Storm Pumps - Pizarro	134 Pizarro Avenue Novato, CA 94945	X
<b>Water/Wastewater</b>	Hamilton Storm Pumps - San Pablo	115 San Pablo Avenue Novato, CA 94945	X
<b>Water/Wastewater</b>	Novato Sanitary District	500 Davidson St. Novato, CA 94945	X
<b>Water/Wastewater</b>	Sanitary District - Bel Marin Keys	425 Bel Marin Keys Blvd. Novato, CA 94949	X
<b>Power Utility</b>	PG&E - Machin	878 Sweetser Ave. Novato, CA 94945	X
<b>Power Utility</b>	PG&E - Stafford	38.119685, -122.614187	X
<b>Power Utility</b>	PG&E Substation - Ignacio	137 Hamilton Dr. Novato, CA 94949	AE
<b>Communications</b>	MERA Antenna Site - Mt Burdell	38.1449, -122.5941	X
<b>Communications</b>	MERA Antenna Site – Big Rock Ridge	38.0591, -122.6039	X
<b>Communications</b>	KCBS Transmitter site (EAS Alerting provider)	8198 Binford Rd. Novato, CA 94945	AE
<b>Transportation</b>	Golden Gate Transit: Bus Dispatch, Fuel, Maintenance	4 Golden Gate Place Novato, CA 94945	X

**Table 21: City of Novato Critical Facilities in the Flood Zones**

Source: County of Marin/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. Flooding may occur when strong winds or tides result in a surge of seawater into areas that are above the normal high tide line. Tide elevations within San Pablo Bay have the potential to significantly impact the Novato storm drain system. Novato already sees flooding from king tides in San Pablo Bay and this is only expected to increase with sea level rise and climate change. A failure of the Stafford Lake/Novato Creek dam could contribute to flooding in the lowland areas of Novato.

On 1/14/2023, a storm flooded SR-37 in Novato, including the U.S. 101 connector ramps. SR-37 had to close in both directions near Atherton Avenue for the weekend. The storm also flooded Armstrong Avenue.

On 2/14/2019, Novato police closed several streets and issued at least one shelter-in-place order in the City at Paper Mill Court due to flooding across the City in the midst of a severe winter storm. South Novato Boulevard between Nave and Lark courts, Simmons Lane from San Marin Drive to Lesse Lane and all of Commercial Boulevard were closed.

On 1/19/2019, a storm flooded the westbound lanes of SR-37 in Novato, causing a three-day partial closure of the road.

On 1/22/2017, a storm flooded three miles of SR-37 between Highway 101 and Atherton Avenue with five feet of water, closing it for three days.



**Figure 37: SR 37 Flooding in Novato - 2017**  
Source: The Santa Rosa Press Democrat

On 12/11/2014, a storm flooded several neighborhoods in Novato, including on Garden Court and Chase Street. SR-37 flooded and the westbound lanes had to close.

On 12/31/2005-1/1/2005, a strong storm caused a mobile home park to flood with up to 4 feet of water, forcing the evacuation of about 100 stranded residents.

On 1/3-1/4/1982, torrential rains caused massive power outages, landslides, numerous injuries and over \$14 million in damages throughout Novato. More than 9 inches of rain fell in 36 hours causing water to rush over Stafford Dam, ultimately flooding neighborhoods and roadways including Grant Avenue, Center Road and Novato Boulevard. Flooding shut down the railroad for nearly a month. Novato was declared a disaster area and was soon followed by the largest cleanup effort in the city's history.



Figure 38: 1982 Novato Flood

Source: The City of Novato

### 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<sup>3</sup> 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 Novato. 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 Novato 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. Sea level rise as a result of climate change will exacerbate the impacts of tidal flooding in the lowland areas of the Marin County OA including the shoreline areas of Novato. Future development in these areas will expose more people and infrastructure to the effects of flooding. Development in the marshland area of Novato would expose additional people and infrastructure to flooding as marshlands act as a natural buffer to storm surge. Development along Novato Creek, Arroyo San Jose, and other

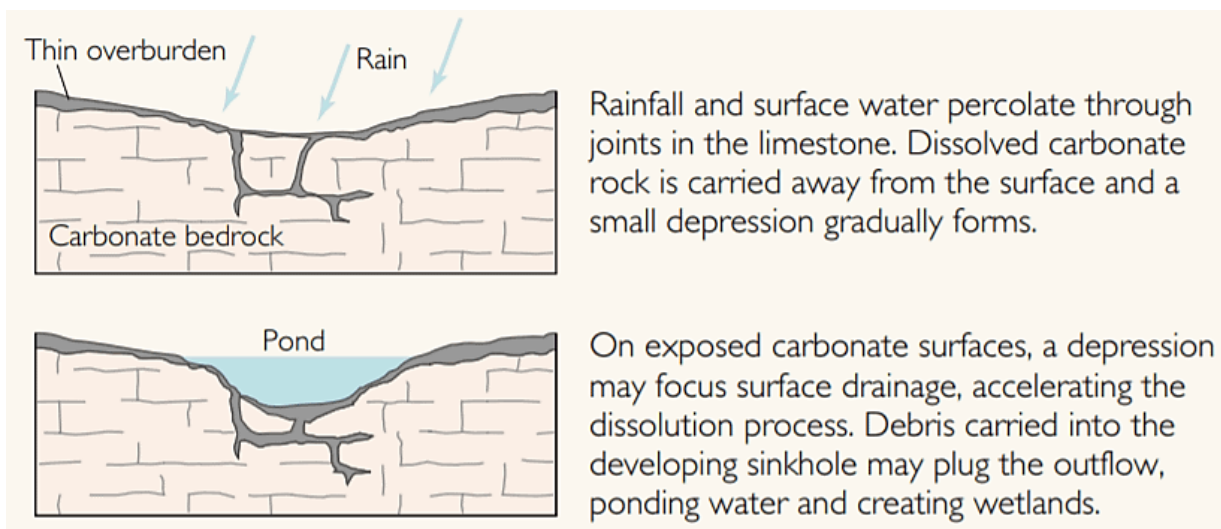
<sup>3</sup> Precipitation in a Warming World: Assessing Projected Hydro-Climate Changes in California and other Mediterranean Regaions. <https://www.nature.com/articles/s41598-017-11285-y>

creeks in Novato in the 100 and 500-year floodplain would expose more people, structures and infrastructure including major roads to creek flooding and storm surge from Novato Creek as a result of climate change.

### 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 39 for a picture and description of how dissolution sinkholes form.



**Figure 39: Dissolution Sinkhole Formation**

Source: USGS

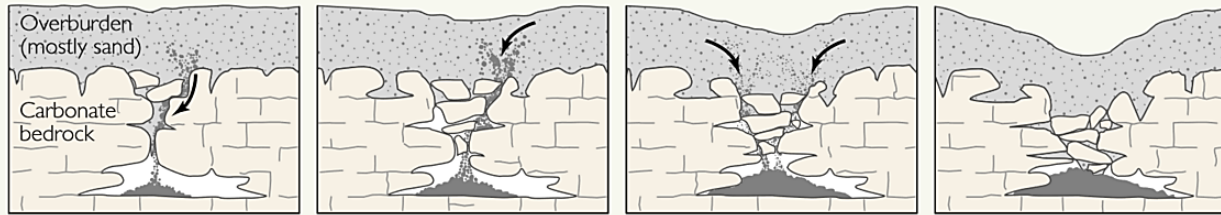
Cover-subsidence sinkholes tend to develop gradually where the covering sediments are permeable and contain sand. In areas where cover material is thicker, or sediments contain more clay, cover-subsidence sinkholes are relatively uncommon, are smaller, and may go undetected for long periods. See Figure 40 for a picture and description of how cover-subsidence sinkholes form.

Granular sediments spall into secondary openings in the underlying carbonate rocks.

A column of overlying sediments settles into the vacated spaces (a process termed "piping").

Dissolution and infilling continue, forming a noticeable depression in the land surface.

The slow downward erosion eventually forms small surface depressions 1 inch to several feet in depth and diameter.



**Figure 40: Cover-Subsidence Sinkhole Formation**  
Source: USGS

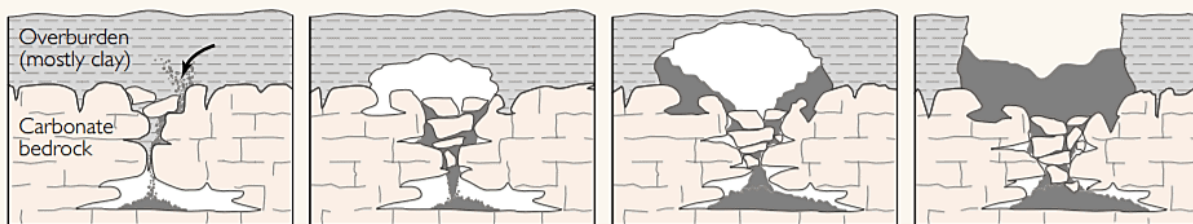
Cover-collapse sinkholes may develop abruptly over a period of hours and cause catastrophic damages. They occur where the covering sediments contain a significant amount of clay. Over time, surface drainage, erosion, and deposition of sediment transform the steep-walled sinkhole into a shallower bowl-shaped depression. See Figure 41 for a picture and description of how cover-collapse sinkholes form.

Sediments spall into a cavity.

As spalling continues, the cohesive covering sediments form a structural arch.

The cavity migrates upward by progressive roof collapse.

The cavity eventually breaches the ground surface, creating sudden and dramatic sinkholes.



**Figure 41: 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 and eastern lowland areas of Novato where superficial deposits and fill are more prevalent. This includes the primary

commercial area of the City along the Highway 101 corridor, and numerous residential neighborhoods with schools and other critical facilities. Land subsidence could have numerous impacts for Novato, including the settling of businesses and homes as well as the shifting of roadways and utility infrastructure that run through the City.

In 1/2016, a sinkhole formed at the Rotary Manor Senior Community as a result of a collapsed culvert that fed into San Rafael Creek. The complex garden was destroyed when the sinkhole appeared.

On 1/22/2010, a 1-2 foot sinkhole formed in a private driveway in the Bahia area of Novato due to a break in a storm drain pipe. There was no major damage.

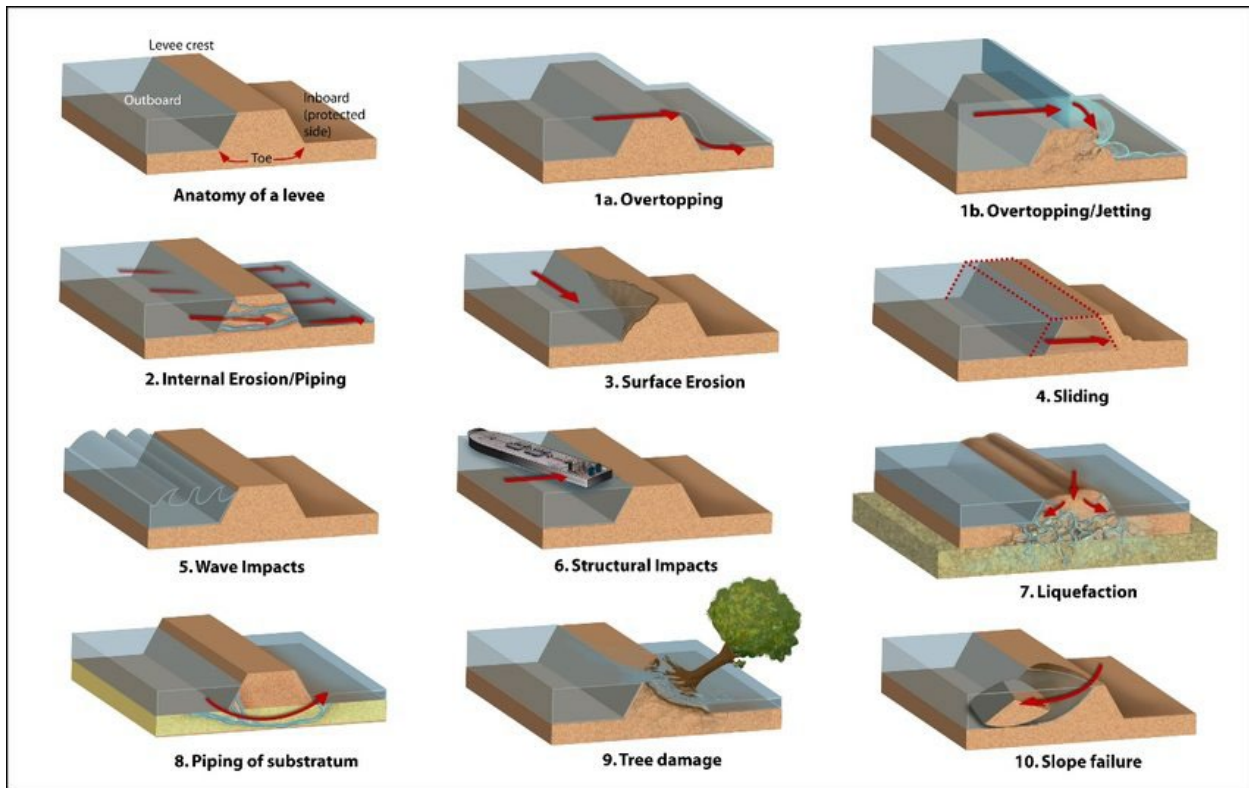
On 1/22/2021 a 2-3 ft sinkhole formed along the frontage of 2 Lauren Ave. The cause was not determined. There was no major damage.

### **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. In coastal areas like the Marin County OA including Novato, land subsidence leads to higher sea levels and increased flood risk. The rate of land subsidence could increase across the Marin County OA including the lowland areas of Novato as a result of climate change. The impacts of land subsidence on infrastructure, including roads and underground utilities, in Novato could increase with future development in the lowland populated areas of the city where land subsidence is more likely to occur.

### **2.2.7 LEVEE FAILURE**

Levee failure is the overtopping, breach or collapse of the levee. Levees can fail in the event of an earthquake, internal erosion, poor engineering/construction or landslides, but levees most commonly fail as a result of significant rainfall or very high tides. During a period of heavy rainfall, the water on the water-body side of the levee can build up and either flow over the top (“overtopping”) or put pressure on the structure causing quickening seepage and subsequent erosion of the earth. The overflow of water washes away the top portion of the levee, creating deep grooves. Eventually the levee weakens, resulting in a breach or collapse of the levee wall and the release of uncontrollable amounts of water. Figure 42 shows a levee and the multiple ways it can fail.



**Figure 42: Levee Failure Mechanisms**

Source: University of California

Novato is protected by non-accredited levees along both sides of Novato Creek in the southern part of Novato near Bel Marin Key. The Novato Creek LB Upper Levee on the north side of the Creek is 2.11 miles long with no documented height. Approximately 1,468 people and 265 buildings with a property value of \$361 million are at risk of a failure of the Novato Creek LB Upper Levee, including the Novato Community Hospital and part of Highway 101. The Novato Creek Levee on the south side of the Creek is 1.71 miles long with no documented height. Approximately 3,080 people and 214 buildings with a property value of \$526 million are at risk of failure of the Novato Creek Levee, including several commercial areas and part of Highway 101. The Novato Creek RB Lower levee on the south side of the Creek is 1.1.7 miles long with no documented height. One building at the Ignacio Treatment Plant with a property value of \$1.68 million is at risk from a failure of the Novato Creek RB Lower levee. The Novato Creek LB Lower Levee on the north side of the creek is 4.11 miles long with no documented height. Approximately 12 people and six buildings with a property value of \$6.93 million are at risk of failure of the Novato Creek LB Lower levee. Marin County Levee 10 is a 1.04-mile-long levee with an undocumented height that primarily protects part of the Ignacio Treatment Plant. Marin County Levee 7 and Marin County Levee 3 are two unaccredited levees south of SR-37 on the east and west sides of a small tributary. Marin County Levee 7 is 0.53 miles long with no documented height. There is no risk to populations or property from failure of Marin County Levee 7. Marin County Levee 23 is 0.55 miles long with no documented height. Approximately three people and one building with a property value of \$1.36 million is at risk of failure of the Marin County Levee 23. The Hamilton Levee along the Hamilton Wetlands is an accredited levee that is 1.09 miles long with 0.26 miles of embankment and no documented height. Approximately 1,786 people and 621 buildings with a property value of \$470 million in the

Hamilton neighborhood are at risk of failure of the Hamilton Levee. The Las Galinas Valley Sanitary District Levee is a non-accredited levee that is 3.63 miles long with no documented height. Approximately 19 people and nine buildings with a property value of \$9.74 million are at risk of failure of the Las Galinas Valley Sanitary District Levee. The Novato Creek Levee Evaluation Project was created to evaluate the feasibility of increasing the level of flood protection for residences and businesses within Novato Creek’s 100-year floodplain, and to work towards having the levees become FEMA accredited. A failure of any of the levees around Novato during a high rain event could cause flooding into residential neighborhoods and commercial areas of Novato, with property and infrastructure within the 100-year floodplain being most susceptible.

Novato

On 2/14/2019, a levee was breached in two places near SR 37, washing out railroad tracks and threatening to inundate the roadway with water. A second levee near Pacheco Pond in Novato was flowing over the top of the barrier, though the levee did not appear to have been breached. The largest breach, along Highway 37 and Harbor Drive, caused a swollen Novato Creek to spill over onto a field south of the highway.



**Figure 43: 2014 Levee Failure in Novato**  
Source: San Francisco Gate

On 12/31/2005-1/1/2006 a strong storm caused a levee breach behind Novato Community Hospital. Workers had to build a road out to the levee before they could begin repairs. The area being flooded was mostly wetlands and a park, and repairs were made before any homes were threatened.

**Climate Change and Future Development Considerations**

Climate change is expected to lead to an increase in the frequency and severity of major storm events, which can place added strain on levee systems. An increase in rainfall and runoff as a result of climate change will increase the potential for higher water levels in leveed areas across the Marin County OA including in Novato, increasing the potential for a levee failure. Rising seas will lead to increased stress on the levees around the Marin County OA shoreline including in Novato, particularly during a major tidal event and potential tsunami. As development increases in the populated areas of Novato protected by its levees, particularly along Novato Creek and around its marshlands, the potential for significant impacts to residents and infrastructure will only increase.



### 2.2.8 SEA LEVEL RISE

Climate change is the distinct change in measures of weather patterns over a long period of time, ranging from decades to millions of years. More specifically, it may be a change in average weather conditions such as temperature, rainfall, snow, ocean and atmospheric circulation, or in the distribution of weather around the average. While the Earth's climate has cycled over its 4.5-billion-year age, these natural cycles have taken place gradually over millennia, and the Holocene, the most recent epoch in which human civilization developed, has been characterized by a highly stable until recently.

The Marin County OA MJHMP is concerned with human-induced climate change that has been rapidly warming the Earth at rates unprecedented in the last 1,000 years. Since industrialization began, the burning of fossil fuels (coal, oil, and natural gas) at escalating quantities has released vast amounts of carbon dioxide and other greenhouse gases responsible for trapping heat in the atmosphere, increasing the average temperature of the Earth. Secondary impacts include changes in precipitation patterns, the global water cycle, melting glaciers and ice caps, and rising sea levels. According to the Intergovernmental Panel on Climate Change (IPCC), climate change will “increase the likelihood of severe, pervasive and irreversible impacts for people and ecosystems” if unchecked.

Through changes to oceanic and atmospheric circulation cycles and increasing heat, climate change affects weather systems around the world. Climate change increases the likelihood and exacerbates the severity of extreme weather – more frequent or intense storms, floods, droughts, and heat waves. Consequences for human society include loss of life and injury, damaged infrastructure, long-term health effects, loss of agricultural crops, disrupted transport and freight, and more. Climate change is not a discrete event but a long-term hazard, the effects of which communities are already experiencing.

Climate change adaptation is a key priority of the State of California. The 2013 State of California Multi- Hazard Mitigation Plan stated that climate change is already affecting California. The State has also seen increased average temperatures, more extreme hot days, fewer cold nights, a lengthening of the growing season, shifts in the water cycle with less winter precipitation falling as snow, and earlier runoff of both snowmelt and rainwater in the year. In addition to changes in average temperatures, sea level, and precipitation patterns, the intensity of extreme weather events is also changing.

Rising sea levels are considered a secondary effect of climate change due to warming ocean temperatures and melting glacial ice sheets into the ocean. The California coast has already seen a rise in sea level of four to eight inches over the 20th century due to climate change. Sea level rise impacts can be exacerbated during coastal storms, which often bring increased tidal elevations called “storm surge.” The large waves associated with such storm surges can cause flooding in low-lying areas, erosion of coastal wetlands, saltwater contamination of drinking water, disruption of septic system operations, impacts on roads and bridges, and increased stress on levees. In addition, rising sea levels results in coastal erosion as shoreline sediment is re-deposited back into the ocean. Evidence shows that winter storms have increased in frequency and intensity since 1948 in the North Pacific, increasing regional wave heights and water levels during storm events.

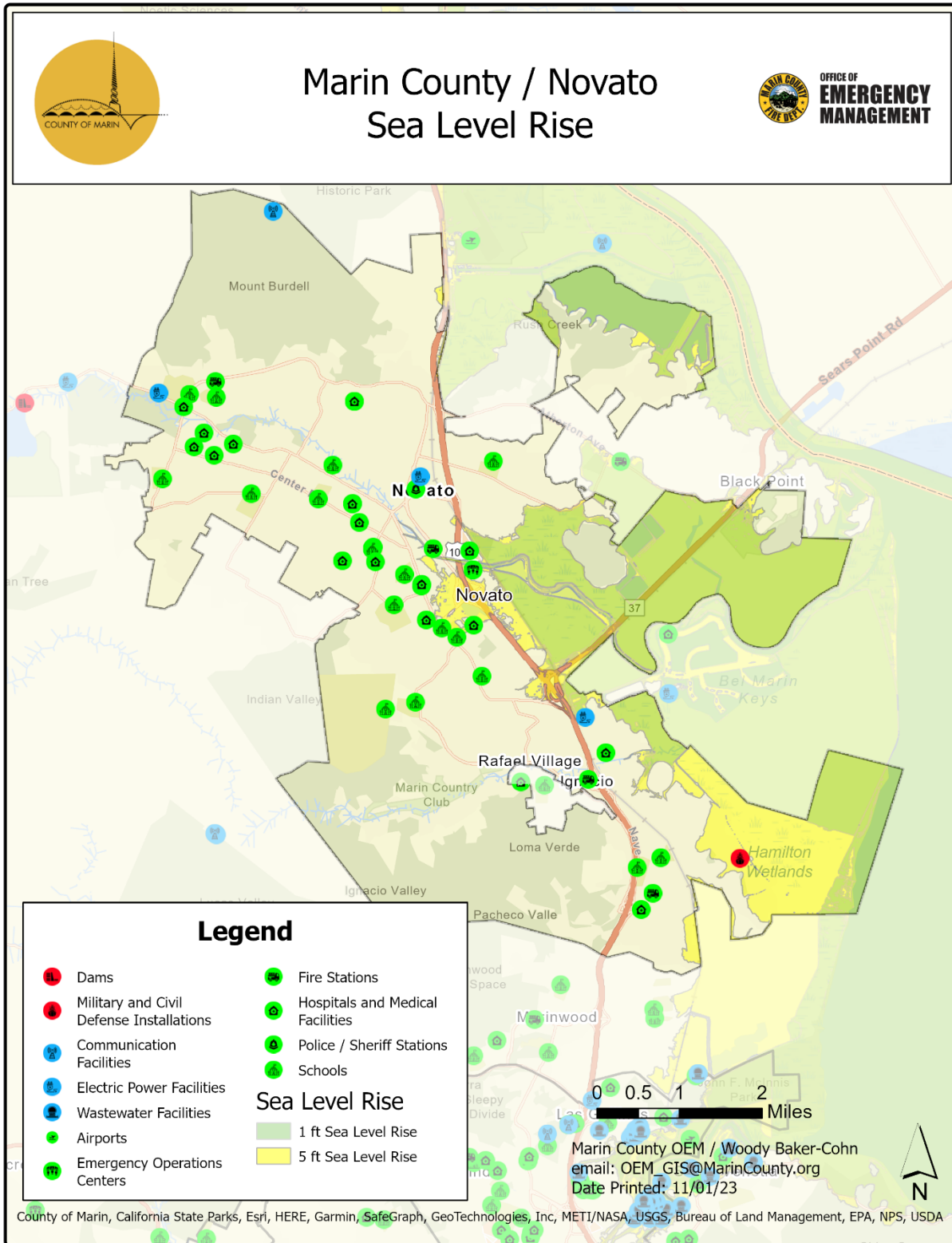
The lowland areas in Novato are particularly vulnerable to sea level rise and could experience between one and five feet of inundation. Development in Novato is largely inland with a few buildings fronted by tidal marshes and the bay. Much of the community is fronted by unincorporated areas, managed stormwater, agricultural, utility, and marsh lands. These lands could buffer Novato from San Pablo Bay for several decades, thus, the majority of assets may not experience saltwater flooding until the end of the century. A considerable number of parcels could flood, compromising their existing land uses and human activities. In addition, because of Novato's size and the existence of several smaller neighborhoods(?), complex levee systems, and extensive marsh land, much of the impacted developed land is dispersed into pockets of flooding.

According to the 2017 "Rising Seas in California, An Update on Sea-Level Rise Science" report Marin County may experience impacts from Sea Level Rise over defined periods of time, to include long-term changes (second half of this century and beyond), and short- to mid-term projections (within the next two or three decades). The following are key issues related to Novato sea level rise and a 100-year storm surge:

- The Hamilton neighborhood could anticipate the FEMA certified levee overtopped in the long term. This would flood hundreds of homes and numerous professional workspaces.
- The Vintage Oaks Shopping Center could anticipate storm surge impacts in the medium term and tidal impacts in the long-term.
- Development east of US Highway 101 at the Bel Marin Keys and Rowland Boulevards.
- Buildings and marshes in Bahia, along Davidson Drive, and on Olive Avenue are vulnerable to sea level rise.
- SR 37 to Sonoma and Napa is vulnerable in the near-term in several locations along its route. This road provides access to several publicly accessible natural resource assets.
- Tidal and storm surge flooding could impair travel on US Highway 101 in the long-term.
- Sonoma Marin Area Regional Transit rail tracks could be vulnerable in the near-term. Train cars could also be damaged by saltwater exposure.
- The Novato Sanitary District wastewater treatment could expect long-term impacts to several critical buildings.
- The Novato Fire Station 62 is vulnerable in the medium-term, and flooded, in part, in the long term. In addition, the Fire Protection District and the Novato Professional Fire Fighter's Association office off Rowland Boulevard could be vulnerable.
- Most vulnerable parks are in Hamilton and are exposed in the long-term.
- Marsh lands are vulnerable in Hamilton, Deer Island and the surrounding diked baylands, and Bahia.

The most vulnerable assets are the wastewater treatment plant, SR 37, and Northern Marin Water District. In the long-term, the Hamilton neighborhood could also be vulnerable to levee overtopping. Due to Novato's inland development, very little of the community is directly impacted. Nevertheless, those dependent on the US Highway 101 corridor will be impacted. In

addition, those who use the Novato Sanitary District treatment plant could experience wastewater disruptions.

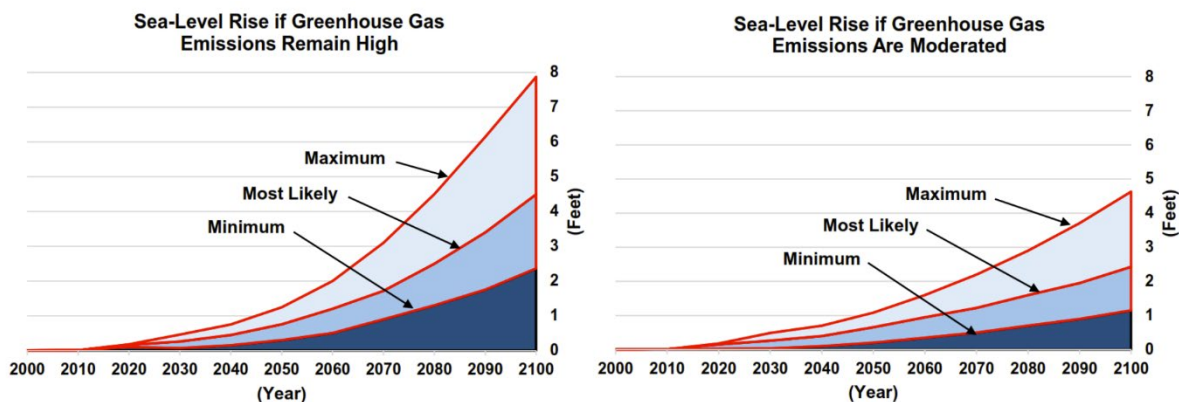


**Figure 44: City of Novato Sea Level Rise Impact**  
Source: Marin County OEM

The 2017 Marin Shoreline Sea Level Rise Vulnerability Assessment estimates that Novato could anticipate impacts to over 51,000 people over 1,100 living units with \$1 billion in assessed property value as a result of a 100-year sea level rise scenario and including storm surge. Structures throughout the City can become damaged extensively with their foundations compromised over time. Of particular concern are those structures and infrastructure that have not been elevated to projected sea level rise heights over the next century, including Highway 101 and SR 37 which could become more isolated due to sea level rise flooding. Sea level rise in Novato has the potential to exacerbate inland flooding when a significant rain or tidal event occurs, pushing water from local creeks over their banks and into adjacent neighborhoods. Sea level rise can also cause increased subsidence along Novato’s shoreline, which may damage underground water and wastewater pipelines and disrupt services. Novato’s marshland would eventually turn into open water as a result of sea level rise, eliminating a natural barrier that protects the City from increased storm surge. Novato would begin to experience seasonal, king tide, and storm surge flooding more frequently in the future.

**Climate Change and Future Development Considerations**

The two major causes of global sea level rise are thermal expansion of warming oceans and the melting of land-based glaciers and polar ice caps. Climate change is affecting natural and built systems around the world, including the California coast. In the past century, average global temperature has increased about 1.4°F, and average global sea level has increased 7 to 8 inches. Sea level rise in the San Francisco Bay Area is projected to increase by eight inches MHW in 2050 and could reach 4.5 to eight feet by 2021 if greenhouse gas emissions aren’t reduced.



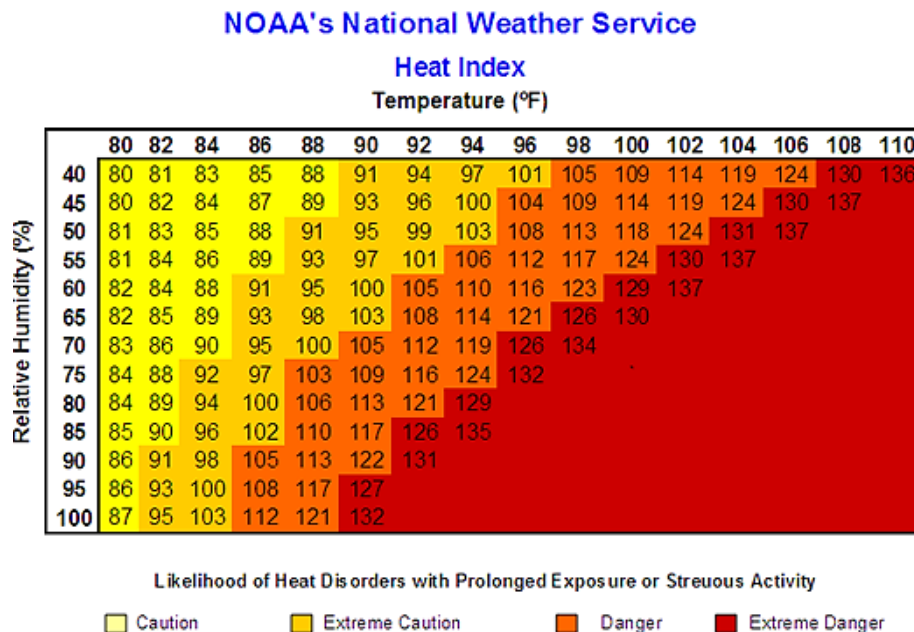
**Figure 45: Projections of Sea Level Rise in the San Francisco Bay Area, 2000-2100**  
Source: 2019–2020 Marin County Civil Grand Jury, Climate Change: How Will Marin Adapt?

While the Marin County OA shoreline including around Novato already experiences regular erosion, flooding, and significant storm events, sea level rise will exacerbate these natural processes, leading to significant social, environmental, and economic impacts. The third National Climate Assessment cites strong evidence that the cost of doing nothing exceeds the costs associated with adapting to sea level rise by 4 to 10 times. Sea level rise will continue to affect the Marin County OA including Novato with increased tidal flooding and storm surge during severe weather events, and future development along the Marin County OA shoreline including around Novato will only amplify these impacts. Sea level can also lead to increased land subsidence and the potential of levee failure. The impacts of a tsunami would also be

magnified with rising seas. Future development in the coastal and lowland areas of Novato will put more people and property at risk from flooding as a result of sea level rise. Roads and utility infrastructure across Novato will continue to become inundated.

**2.2.9 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 46):



**Figure 46: 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.

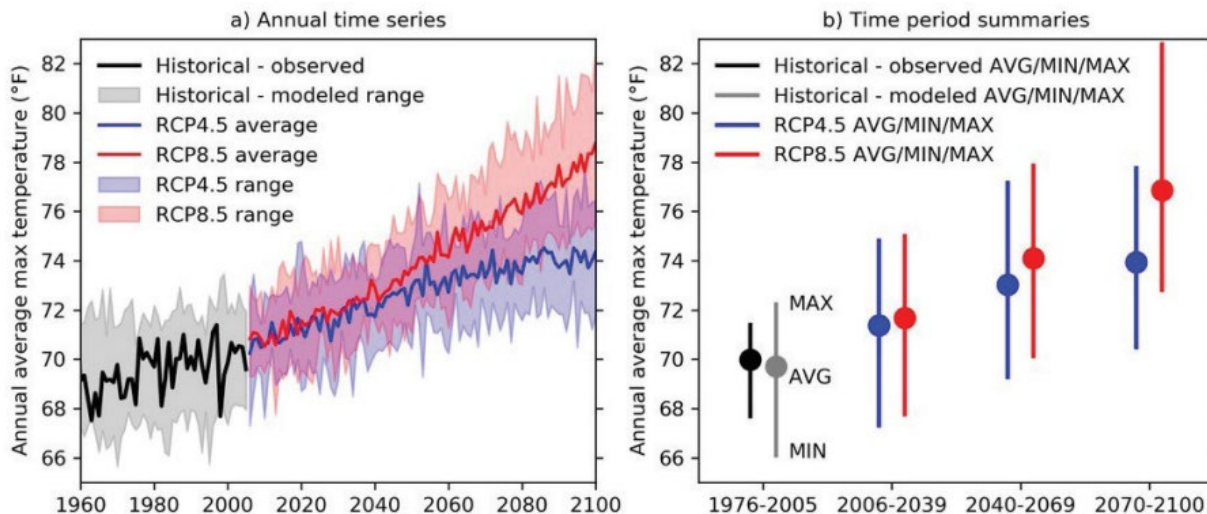
Extreme heat has the potential to impact all areas of Mill Valley and would be felt more in areas where there is a widespread presence of concrete and asphalt, which stores heat longer. This includes most of the downtown and commercial area of the city between Miller Avenue and E. Blithedale Avenue. 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 the Marin County OA including the Town of Novato experienced an Extreme Heat Event with temperatures exceeding 113 degrees.

**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 47: 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 Novato. 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 Novato where heat builds in developed areas. Heat waves also tax the energy grid. Future development in the Marin County OA including Novato 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 Novato as conditions become hotter and drier. These effects will primarily be felt in the mountainous and marshlands areas of Novato where hotter and drier conditions are more apt to lead to wildfires. Future development near the many open spaces around Novato could expose more people and infrastructure to the threat of a major wildfire as a result of increasing temperatures.

**2.2.10 SEVERE WEATHER – HIGH WIND AND 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 48).

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 48: 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 49) is commonly used to rate the intensity of tornadoes in the United States based on the damages that they cause.

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

Figure 49: 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.

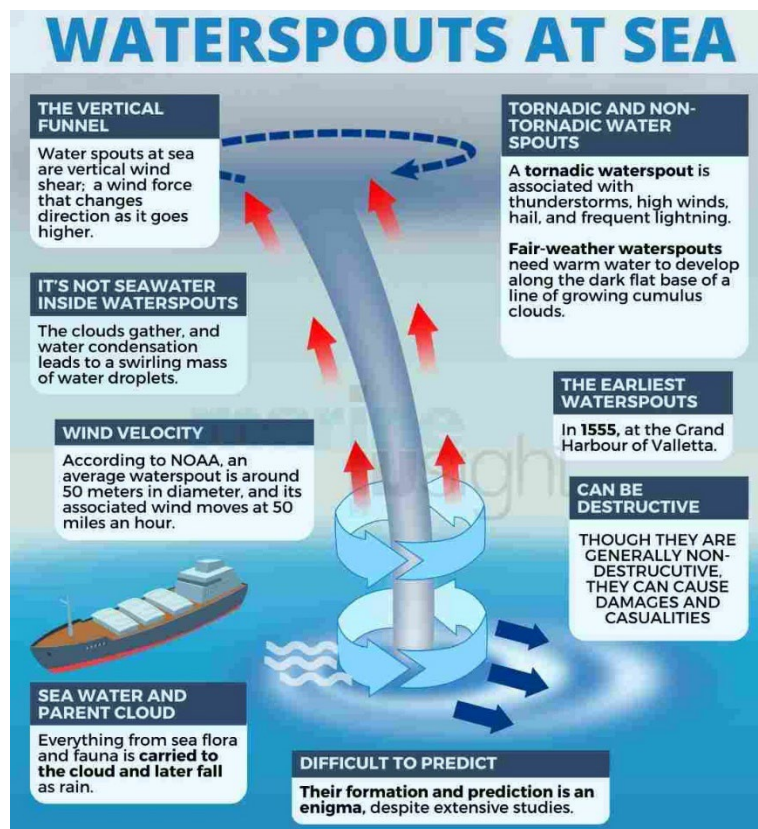


Figure 50: Waterspout Formation  
Source: MarineInsights



All of Novato is susceptible to storms and damage from wind and tornadoes, though the mountainous areas surrounding the City and the parks inside the City have increased susceptibility due to a higher presence of trees. 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.

On 3/14/2023 a strong storm with heavy winds caused a tree to fall onto a home. There were no injuries.

On 12/16/2017 heavy winds knocked down a tree, causing a power outage for 2,440 customers. A wind gust of 44 mph was recorded.

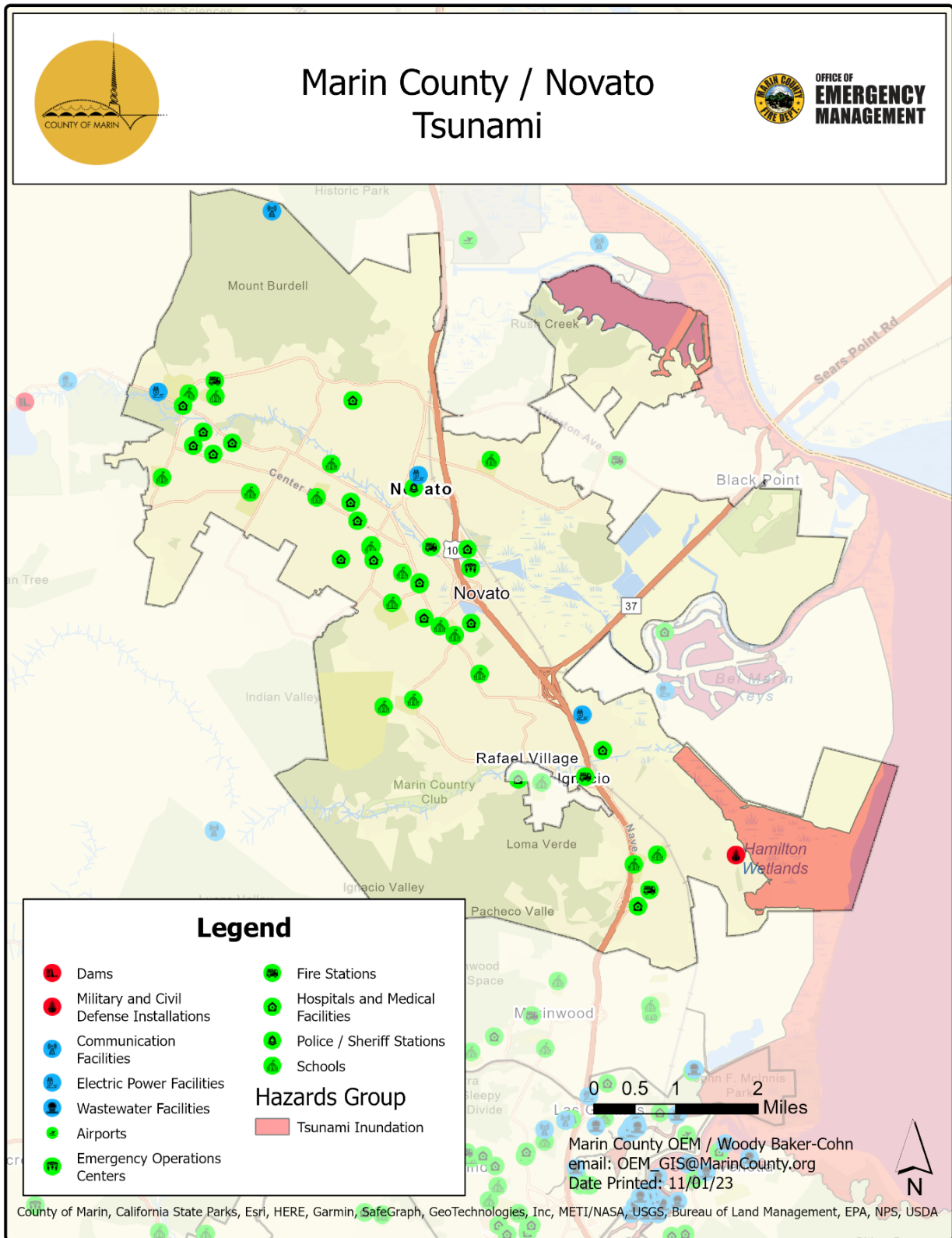
On 4/14/2009 high winds caused a tree to fall onto a power line on Pine Street causing a small fire and knocking out power along the street.

### **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 Novato. 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 Novato 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 Novato with high tree cover including in the southern and western mountainous residential areas will increase the effects of severe wind events.

#### **2.2.11 TSUNAMI**

Tsunamis consist of waves generated by large disturbances of the sea floor, which are caused by volcanic eruptions, landslides or earthquakes. Shallow earthquakes along dip slip faults are more likely to be sources of tsunami than those along strike slip faults. The West Coast/Alaska Tsunami Warning Center (WC/ATWC) is responsible for tsunami warnings. Tsunamis are often incorrectly referred to as tidal waves. They are actually a series of waves that can travel at speeds averaging 450 (and up to 600) miles per hour with unusual wave heights. Tsunamis can reach the beach before warnings are issued.



**Figure 51: City of Novato Tsunami Critical Facilities and Infrastructure**  
Source: Marin County OEM

A tsunami experienced by Novato would most likely occur from an earthquake, the location of which would determine the amount of time that the tsunami waves would reach the City. Much of the eastern half of Novato is at a lower elevation, though the tsunami inundation zone in Novato does not include any structures or populations. The two areas in Novato in a tsunami inundation zone include the Hamilton Wetlands in southern Novato and the wetlands north of the Rush Creek Open Space Preserve in Novato. The Hamilton Levee protects the Hamilton neighborhood of Novato from a tsunami and could be tested in a tsunami event.

Novato has never experienced a tsunami.

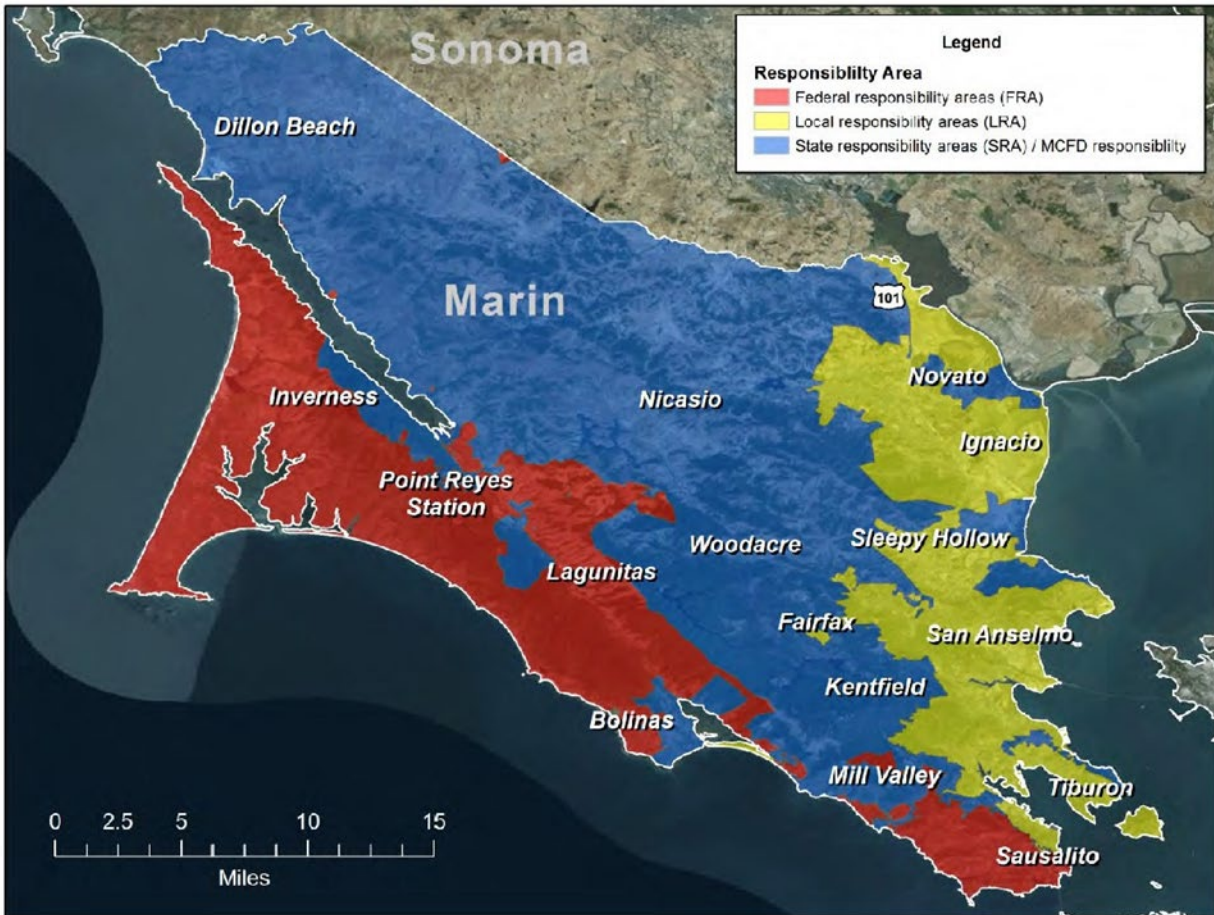
### **Climate Change and Future Development Considerations**

The biggest threat to tsunamis is sea level rise which is a direct result of climate change. Sea level rise can make tsunamis worse than they already are because higher sea levels allow for tsunamis to travel further inland and cause even more damage. Sea level rise results in more vulnerable coastlines which make coastal communities even more vulnerable to an incoming tsunami as the natural buffer to absorb the energy of an incoming tsunami will cease to exist. This is particularly true in the Marin County OA including Novato, where a large segment of the developed population lies in an area vulnerable to sea level rise. Furthermore, it has been theorized that ocean warming, caused by climate change, can impact the tectonic plates that rest below large bodies of water. Ultimately, this can result in more geological activities and worse tsunamis. Climate change has also affected ocean patterns, which could eventually lead to tsunamis distributing themselves across the ocean and impacting areas that are currently not susceptible to a tsunami. Tsunamis as a result of climate change and associated sea level rise will exacerbate the impacts of flooding in the lowland areas of the Marin County OA including Novato. This is particularly true along Novato Creek and around the marshland areas of Novato where additional storm surge as a result of a larger tsunami could cause greater impacts. Future development in these areas will expose more people and infrastructure to the effects of flooding in the Marin County OA as tsunami inundation areas expand with climate change. Development in marshland in Novato would expose additional people and infrastructure to flooding as marshlands act as a natural buffer to a tsunami. Flooding could be exacerbated in areas where levees could fail along Novato Creek and along the marshlands and shoreline of Novato as a result of high wave heights associated with a more significant tsunami.

#### **2.2.12 WILDFIRE**

Most areas of the Novato Fire Protection District are susceptible to a vegetation/wildland fire. Vegetation/wildland fire risk factors include vegetative fuel types and configuration, weather, topography, prior service demand, water supply, mitigation measures, and vegetation fire service capacity. Wildland Fire Hazard Severity Zones CAL FIRE designates wildland Fire Hazard Severity Zones (FHSZs) throughout the state based on analysis of multiple wildland fire hazard factors and modeling of potential wildland fire behavior. For State Responsibility Areas (SRAs) where CAL FIRE has fiscal responsibility for wildland fire protection, CAL FIRE designates Moderate, High, and Very High FHSZs by county.

Figure 52 indicates the federal responsibility areas, state responsibility areas and local responsibility areas in the Marin County OA.

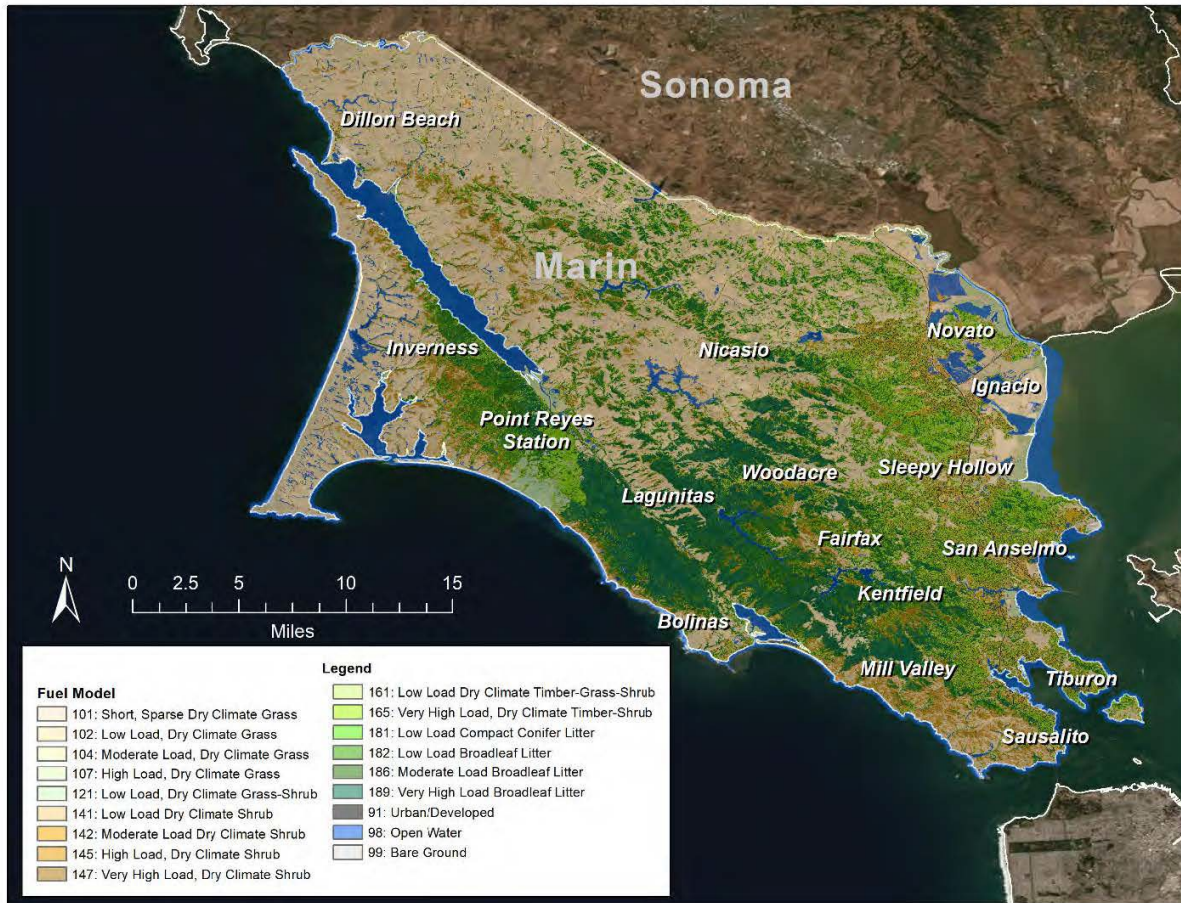


**Figure 52: Federal, State and Local Responsibility Areas in the Marin County OA**  
Source: Marin Community Wildfire Protection Plan

Both Moderate and High wildland FHSZs surround most of the District. Novato Fire Protection District (see Standards of Coverage Analysis Appendix A—Risk Assessment page 19). CAL FIRE also identifies recommended Very High FHSZs for Local Responsibility Areas, where a local jurisdiction is responsible for wildland fire protection, including incorporated cities. Wildland–Urban Interface (WUI) are areas where urban development meets undeveloped lands at risk of wildfires. These areas typically pose a significant threat due to the mix and density of structures and natural vegetative fuels combined with limited access/egress routes. Approximately 18 percent of the total land area is within the WUI. Of note is the extensive WUI within the District including higher building densities.

In addition to decorative landscape species, vegetative fuels within the District’s service area vary from dense stands of mostly hardwood tress, including coastal live oak, California bay, Pacific madrone, and other oak species, to chaparral vegetation and native and non-native annual and perennial grass and plant species. Once ignited, vegetation fires can burn intensely and contribute to rapid fire spread under the right fuel, weather, and topographic conditions.

Figure 53 indicates the Fuel Model Map for the Marin County OA.



**Figure 53: Fuel Model Map for the Marin County OA**  
Source: Unknown

Weather elements, including temperature, relative humidity, wind, and lightning, also affect vegetation/wildland fire potential and behavior. High temperatures and low relative humidity dry out vegetative fuels, creating a situation where fuels will more readily ignite and burn more intensely. Wind is the most significant weather factor influencing vegetation/wildland fire behavior, with higher wind speeds increasing fire spread and intensity. Wildland fire season, when vegetation fires are most likely to occur due to fuel and weather conditions, occurs from approximately June through October in Marin County. Summer weather within the service area typically includes cool mornings, warm afternoons and evenings, and west/northwest breezes that can reach 15 to 25 miles per hour. Occasional summer gradients can produce temperatures in the high 90s to low 100s, low relative humidity, and offshore winds as high as 40 miles per hour. These less frequent and transient weather patterns, as well as complex topography and annual variability of weather patterns, elevate the potential for a large, damaging wildfire.

Vegetation/wildland fires tend to burn more intensely and spread faster when burning uphill and up-canyon, except for a wind-driven downhill or down-canyon fire. Terrain within the District's service area varies from flat to steep slopes, which can contribute significantly to wildfire behavior and spread. Another significant vegetation fire impact severity factor is water supply immediately available for fire suppression. According to North Marin Water District staff,

available fire flow is at least 500 gpm in the rural areas of the District, and the District also has a water tender available to provide an augmented water supply as needed.

Figure 54 shows Critical Facilities in the City of Novato overlaid on Fire Severity Zones.

**Wildland Fire History:** Since the early 1900s, there have been several large wildland fires in Marin County, including the 1923 fire that burned from Ignacio in Novato to Woodacre (approximately 40,000 acres), the 1972 Kent Woodlands Fire, the 1976 Sorich Park Wildfire, and the 1995 Vision Fire (12,354 acres). In addition to the fire hazard service capacity, the areas of the District outside the City of Novato are within the SRA where CAL FIRE has fiscal responsibility for wildland fire protection. As such, all of CAL FIRE's wildland suppression resources, including engines, fire crews, bulldozers, and aircraft, are available for wildland fires within those areas of the District. In addition, as a CAL FIRE contract county, the Marin County Fire Department provides initial SRA wildland fire response within the County with six Type-3 wildland engines, one bulldozer, and one 12-person fire crew from approximately June 1 through October 31. Vegetation/Wildland Fire Hazard Mitigation refers to specific actions or measures taken to prevent a hazard from occurring or to minimize the severity of resultant impacts. While none of the hazards can be entirely prevented, measures can be taken to minimize the impacts when those hazards do occur.

The 2020 Marin Community Wildfire Protection Plan (CWPP) identifies the following wildfire hazard mitigation strategies to minimize the risk of a catastrophic wildfire within the WUI:

- Public education and community outreach
- Wildfire preparedness and planning
- Reducing structural ignitability
- Defensible space
- Non-residential vegetation management
- Evacuation planning and preparation

The CWPP further identifies 20 priority mitigation projects for the District to focus on:

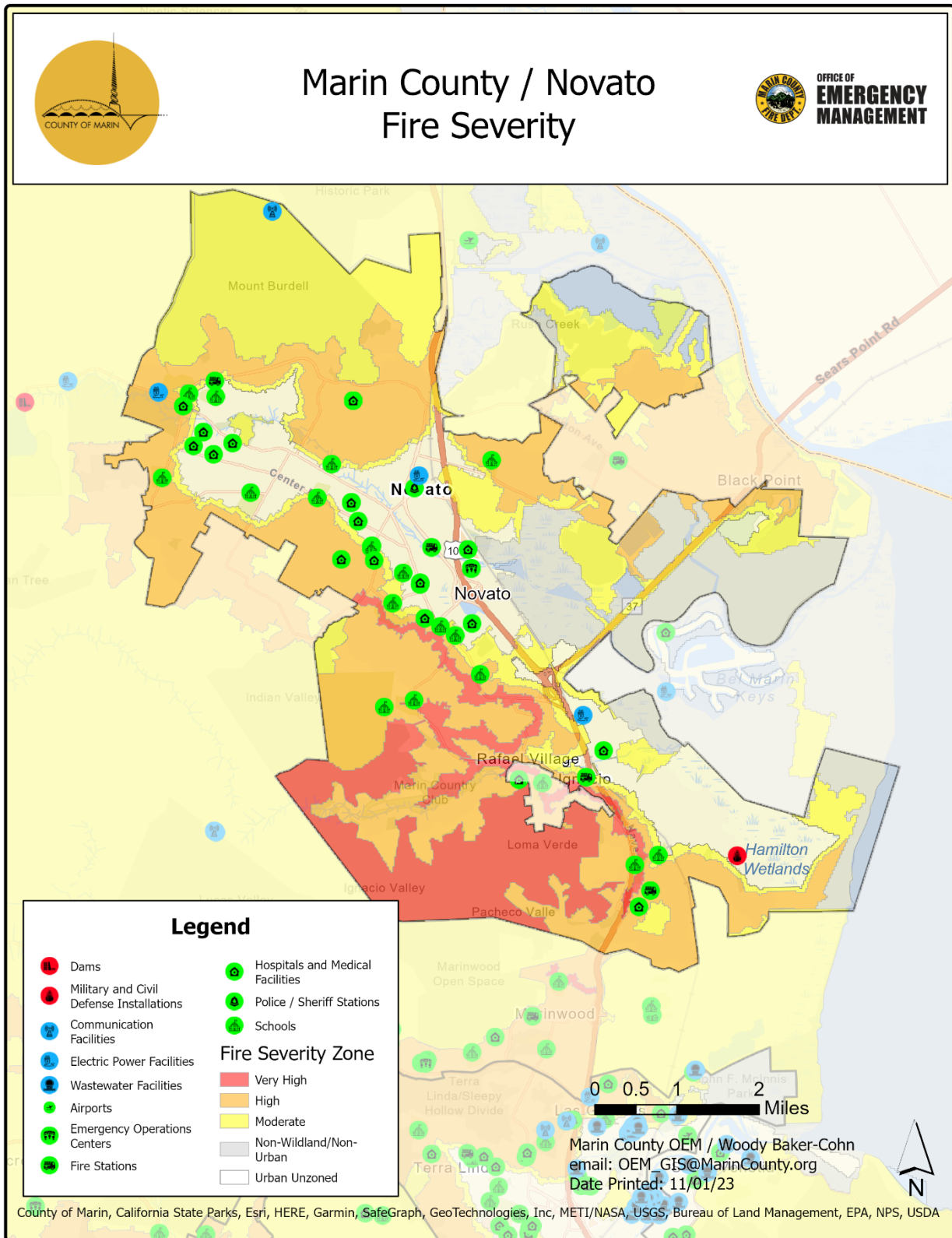
- Creating and maintaining shaded fuel breaks
- Conducting wildfire mitigation home assessments
- Improving evacuation routes
- Creating/improving defensible space
- Reducing wildland fuel loading
- Reducing structural ignitability
- Increasing public education/information

With the passing of Measure C in 2020, the Marin Wildfire Prevention Authority (MWPA) was formed and funded at \$20 million per year for 10 years to develop and implement a comprehensive Countywide wildfire prevention and emergency preparedness plan, to include:

- Vegetation management
- Wildfire detection and evacuation program improvements
- Grants
- Public education
- Defensible space evaluations
- Local wildfire prevention mitigation

The MWPA is a Countywide Joint Powers Authority with 17 member agencies, including cities, towns, the County, and special districts. The MWPA’s mission is to lead “the development of fire adapted communities using sound scientific, financial, programmatic, ecological practices, vegetation management, community education, evacuation and warning systems with the support of its member and partner agencies.”

In addition to being an MWPA member agency, the District requires fire resistive construction materials and methods in high fire hazard severity zones and WUI areas, has an annual weed abatement program, inspects and enforces defensible space requirements, and investigates all fire hazard complaints, taking appropriate actions as authorized by the City of Novato and District ordinances and regulations to eliminate or mitigate identified fire hazards.



**Figure 54: City of Novato Wildfire Critical Facilities and Infrastructure**  
Source: Marin County OEM



### **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 the Marin County OA) 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 the Marin County OA including 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.

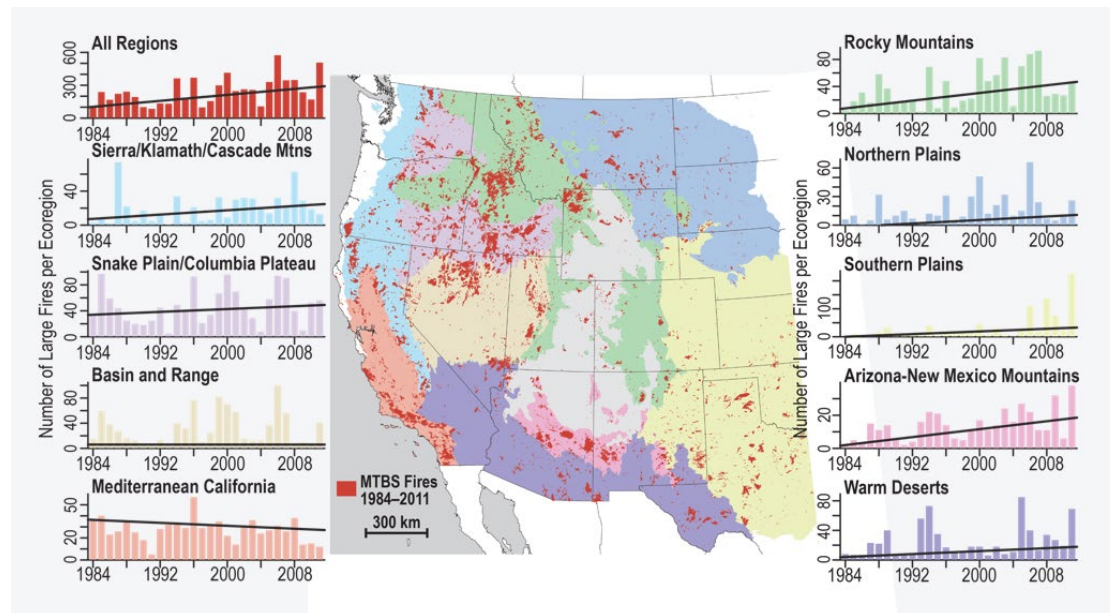
A wildfire in Novato would most likely occur from any of the open spaces surrounding the City where there is more forested terrain. A brush fire could also occur in any of the wetlands to the east of the City. The mountainous areas of Novato are primarily residential and consist of numerous winding streets and hillside homes that could be damaged or destroyed by a wildfire.

Of particular concern are those communities in southern Novato near the Indian Valley, Ignacio Valley, and Loma Verde Preserves that are located in a Very High FHSZ. There are hundreds of residences, the Novato High School, the San Jose Middle School, the Loma Verde Elementary School and the Hamilton Elementary School that lie in this area and could be susceptible to a wildfire. This area also has few major thoroughfares, which could impede evacuation in a wildfire. This area and the other areas surrounding Novato including the Mount Burdell Open Space Preserve, Ohair Park, the Verissimo Hills Preserve, the Indian Tree Open Space Preserve and the Rush Creek Open Space Preserve are located in Moderate to High FHSZs. This area includes thousands of residences, numerous commercial buildings and medical facilities, San Marin High School, Pleasant Valley Elementary School, Hill Middle School, the College of Marin – Indian Valley Campus, the Good Shepherd Lutheran School, Olive Elementary School, Our Lady of Loretto School, Novato Fire Station #62, Novato Fire Station #63, Novato Fire Station #64 and Novato Fire Station #65 that could be susceptible to a wildfire.

All of Novato 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 the Marin County OA or the surrounding region. As wildland areas around Novato become drier due to climate change, the risk of a wildfire occurring and impacting the City will continue to increase. Brush fires in the City may increase over time as marshlands, parks, and other open spaces experience drier conditions.

**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 55: 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 Novato 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 Novato. Future development in the WUI throughout Novato will expose more people and property to the impacts of a potentially significant wildfire. The growing number of people in the Novato WUI can increase risk to life, property and public health as a result of a wildfire. Future development around the Novato marshlands would expose more people to the effects of brush fires as the marshlands dry out in the summer due to climate change.

## SECTION 3.0: MITIGATION STRATEGY

### 3.1 CHANGES IN DEVELOPMENT

The various Marin County OA's General Plans guide growth and development across the County based on maintaining the County's small communities with their own unique character.

Since the last plan update in 2018, planning for the State's 6<sup>th</sup> Cycle housing allocations has occurred. The county-wide combined number for Marin was 14,405 new housing units. Of that total, Novato must accommodate 2,090 units. All jurisdictions must ensure that their general plans can accommodate their allocation, or they must update the General Plan to accommodate the growth.

Since 2018, there has been a moderate amount of development within the City of Novato, most of the new development has been residential. All of the development has been designed and/or conditioned to comply with general plan and zoning standards as well as compliance with the building code. These standards include setbacks from waterways, habitable spaces elevated about flood levels and fire-wise construction when located in the Wildland-Urban Interface.

Though new housing laws at the state level have exempted much residential development from the CEQA process; those laws have preserved all life safety requirements of the building and fire codes. When not usurped by State law, future land use and growth strategies in the City of Novato will be consistent with priorities detailed in the 2023 Marin County OA MJHMP and aim to concentrate future development in already developed areas and away from locations where natural characteristics should be avoided such as steep slopes and sensitive habitats. Priority areas for development are those that have, or can readily be supplied with, adequate public facilities and services. This is done through various policies relating to zoning and minimum development standards and requirements. Zoning designations prescribe allowed land uses and minimum lot sizes for the purpose of supporting efficient infrastructure design, conservation of natural resources, and avoidance of conflicting uses.

The best indicator of future growth areas is the location of currently proposed development projects and locations identified in the 2023 Housing Element update as either potential sites or sites identified to be rezoned for residential development. Those sites are listed in the following table. Unit counts are either those proposed/approved through the development review process, or the maximum number allowed under current or proposed zoning.

Table 22 City of Novato Projected Growth Areas						
Project Location	# of Units	# of Parce ls	Application Status	Acres	Fire Severity Zone	Flood Zone
200 San Marin Drive	6	1	Approved	0.56	None	X
8161 Redwood Blvd.	80	1	Approved	13.5	None	AE, X
777 San Marin Drive	1300	3	In Review	65	None	X
North Redwood & Pinkston	122	2	In Review	37.6	WUI Only	X
1787 Grant Avenue	35	2	In Review	2.1	None	AE, AO, X
1316-1320 Grant Avenue	227	1	In Review	1.2	None	X
1212-1214 Grant Avenue	67	2	In Review	0.37	None	X
1107-1119 Grant Avenue	198	2	In Review	0.85	None	X, AE
7530 Redwood Blvd.	178	2	In Review	5.85	None	X
Bahia Dr & Topaz Dr	5	1	Approved	6.87	WUI Only	X
101 Landing Court	32	1	Approved	1.98	None	X
115 San Pablo Avenue	91	2	In Design	10	None	X
826 State Access Road	50	1	Construction	2.64	None	X
970 C Street	32	1	In Review	2.67	None	AE, X
1110 Olive Avenue	9	1	n/a	0.49	None	X
1017 4 <sup>th</sup> Street	3	1	n/a	0.17	None	X
Vallejo Ave & 1 <sup>st</sup> Street	6	1	n/a	0.31	None	X
Meadow Crest Rd & Wood Hollow	20	1	n/a	8.36	None	X
1682 Novato Blvd.	22	1	n/a	1.41	None	AO
200 Landing Court	41	1	n/a	3.44	WUI Only	X
<b>Total</b>	<b>2524</b>	<b>28</b>		<b>165.37</b>		

**Table 22: City of Novato Future Growth Areas**  
Source: City of Novato

### 3.2 CAPABILITY ASSESSMENT

The overall priorities in the City of Novato have not changed since the 2018 MJHMP update. However, the strategies in which to support the overall City 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 City of Novato 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 City’s physical or built environment. Examples of legal and/or regulatory capabilities can include: a jurisdiction’s building codes, zoning ordinances, subdivision ordinances, 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 City of Novato 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:

- **Local Emergency Operations Plan and Continuity of Operations Plan:** Additional Training and exercises for City Staff to carryout the Emergency Operations Plan.
- **Continuity of Operations Plan:** Develop a Citywide Continuity of Operations Plan to enhance resiliency.

<b>Table 23: Legal and Regulatory Capabilities</b>		
<b>Plans</b>	<b>Yes/No Latest Update</b>	<b>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?</b>
<b>General Plan/Master Plan</b>	Y 2020	The City finalized an update to its General Plan in 2020, which serves as a basis for decisions that affect the City’s growth and development such as transportation, land use, streets and infrastructure, parks, housing and neighborhoods, recreation and community facilities, downtown, the environment, public health and safety, and flooding. The General Plan is a strategic and long-term document identifying goals and polices that guides and directs the City in terms of implementing policies, programs and resources. As required by State law, the City of Novato’s General Plan includes seven chapters, or "elements": land use, circulation, housing, conservation, open space, noise and safety.
<b>Strategic Plan</b>	No	
<b>Capital Improvements Plan</b>	Y Annual	Every year, City staff develops a Five-Year Capital Improvement Program (CIP) for council consideration, which serves as a multi-year planning tool to coordinate the financing and scheduling of major projects to improve and maintain its infrastructure.

		The CIP directs construction activities for City owned facilities and infrastructure for the next five years. Mitigation actions may involve construction of new or upgraded facilities and infrastructure.
<b>Economic Development Plan</b>	No	
<b>Local Emergency Operations Plan</b>	YES 2022	In conjunction with the County of Marin, the City of Novato and Novato Fire District developed a revised Emergency Operations Plan in 2022 that is pending approval.
<b>Continuity of Operations Plan</b>	NO	
<b>Flood Mitigation Plan (FMP)</b>		Included in Hazard Mitigation Plan
<b>Engineering Studies for Streams</b>	Yes	Stream studies are included in the FEMA Community Rating System (CRS) program and Flood Insurance Studies. The City of Novato Storm Drain Master Plan also includes hydrologic and hydraulic studies of the City storm drain system.
<b>Open Space Management Plan</b>	No	
<b>Regional Transportation Plan (RTP)</b>	No	
<b>Stormwater Management Plan/Program</b>	Yes 2022	The City Storm Drain Master Plan was adopted in 2022.
<b>Community Wildfire Protection Plan</b>	Yes	Stream studies are included in the FEMA Community Rating System (CRS) program and Flood Insurance Studies. The City of Novato Storm Drain Master Plan also includes hydrologic and hydraulic studies of the City storm drain system.
<b>Other special plans (e.g., brownfields redevelopment, disaster recovery, coastal zone management, climate change adaptation)</b>	Y 2020	The CWPP does address local hazards, identifies projects to include in the mitigation strategy and can be used in the implementation of mitigation actions.
<b>Building Code, Permitting, and Inspections</b>	Y/N	Are codes adequately enforced?
<b>Building Code</b>	Y	The development standards in Chapter 5 of the Municipal Code are authorized by the California Government Code which allows local government controls in building, planning and subdivision. The City development standards enforce disaster-resistant development to minimize risk from natural hazards.
<b>Building Code Effectiveness Grading Schedule (BCEGS) Score</b>	Y	The purpose of the Building and Housing code is to establish rules and regulations governing building activity in the city and to safeguard life, health, property, and public welfare by providing minimum fire retardancy requirements for new roof coverings. This information is also needed to assist the city in compiling information on the use, location, and condition of properties within the jurisdiction of the City of Novato and provides for the abatement of unsafe

		<p>buildings. By agreement, for health and safety reasons, the city may share this information or resultant vital statistics with other governmental agencies.</p> <p>The City has also adopted the most recent State of California approved Building Code, Mechanical Code, Seismic Safety Code, and National Electrical Code which contain structural requirements for existing and new buildings. The codes are designed to ensure structural integrity during seismic and other hazardous events and prevent personal injury, loss of life and substantial structural damage. The City is prepared to adopt new codes and standards as passed by the State of California.</p>
<b>Fire department ISO rating:</b>	Y	The City of Novato Building Code Effectiveness Grading Classification in 3.
<b>Site plan review requirements</b>	Y	ISO 1 Rating
<b>Land Use Planning and Ordinances</b>	Y/N	<p>Is the ordinance an effective measure for reducing hazard impacts?</p> <p>Is the ordinance adequately administered and enforced?</p>
<b>Municipal Code</b>	Y	The Municipal Code includes several sections that address hazard mitigation.
<b>Zoning ordinance</b>	Y	The City's Zoning Ordinance establishes various zoning districts and implements the goals and policies of the Novato general plan by classifying and regulating the uses of land and structures within the City of Novato. In addition, it protects and promotes the public health, safety, and general welfare of residents, and preserve and enhance the aesthetic quality of the city. When lots are subdivided, the developer is required to provide adequate access for firefighters, flowrates and storage of water for firefighting.
<b>Subdivision ordinance</b>	Y	The City's Subdivision Ordinance is authorized by the Subdivision Map Act of the State of California. The ordinance supplements and implements the Subdivision Map Act of the State of California and sets forth procedures and requirements applicable to subdivisions, land divisions and lot line adjustments.
<b>Flood Damage Prevention Requirements</b>	Y	Chapter 5-31 of the Municipal Code is titled Flood Damage Prevention Requirements. It was adopted to reduce flood hazards in the special flood hazard areas within the City of Novato. It addresses the construction, location, extension, conversion or alteration of structures or land in special flood hazard zones. These regulations apply to both new development and construction and existing structures. By regulating and restricting development in such areas will minimize risks of public and private losses due to flood hazards in these specific areas. The areas of special flood hazards are identified by the Federal Insurance Administration, through the Federal Emergency Management Agency. It is the purpose of this section to promote the public health, safety and general welfare, and to minimize public and



		private losses due to flood conditions in specific areas, and to minimize the need for rescue and relief efforts associated with flooding and generally undertaken at the expense of the general public.
<b>Clean Storm Drain Regulation</b>	Y	This regulation ensures the future health, safety, and general welfare of the citizens of the City of Novato by establishing a funding source to provide enforcement of the city's Urban Runoff Pollution Prevention Ordinance, to provide maintenance and repair of the city's stormwater drainage facilities, to provide capital improvements to the city's storm drainage system, and to provide other clean stormwater activities. It also protects and enhances the water quality of the State's, and the Nation's watercourses, water bodies, and wetlands in a manner pursuant to and consistent with the Clean Water Act.
<b>Adequate Water Supply</b>	Y	Section 5-55 of the Municipal Code requires each permit or approval application affected by this requirement shall include provisions for adequate water supply. The degree of specificity shall relate to the type of permit or approval requested. All affected permit or approval processes shall include provisions for adequate water supply. This insures that the North Marin Water District will provide water to serve the use and/or development upon the establishment of the use or the completion of the development. Each use or development proposal which involves or requires water service (domestic, commercial, industrial, agricultural) either for sanitary use, consumption, production, irrigation or visual amenity, shall provide for such water by agreement with the North Marin Water District.
<b>Drainage Development Requirements</b>	Y	In Section 5-15 of the Municipal Code standards for drainage are defined and are necessary to insure that underground and surface waters are conducted through and away from developments in such a manner as to not detrimentally affect other properties; insure that underground and surface water is not a problem within the completed development; and further, to correct or improve existing underground or surface water problems within the boundaries of the development and within the immediately affected surrounding area.
<b>Hillside and Ridgeline Protection (Erosion or sediment control program)</b>	Y	This ordinance reduces the potential for hazards and environmental degradation related to slope failure, increased erosion, sedimentation, storm water run-off, fire hazards, loss of vegetation, excessive grading, visual intrusion of structures, and potential for traffic hazards. It also provides for proper maintenance and fire management and minimizes public expense for long-term maintenance of slope areas and public improvements in hillside areas.
<b>Waterway and Riparian Protection</b>	Y	Section 7-12 of the Municipal Code provides standards for the protection, maintenance, enhancement and

		<p>restoration of streams and waterways in a manner which preserves and enhances their ecological integrity and resource functions and value. This ordinance establishes adequate buffer areas along watercourses to avoid flood hazards and maintain or expand storage capacity for flood waters; protect water quality and instream habitat; preserve, enhance and restore riparian habitat and adjacent wetlands and upland buffers; and, provide for continuous wildlife migration corridors connecting habitat areas. This regulation allows development, which is compatible with the important physical, habitat, aesthetic, and recreational functions of waterways, while ensuring that these functions and values are protected in perpetuity.</p>
<p><b>Fire Safety</b></p>	<p>Y</p>	<p>The City of Novato recognizes the Novato Fire Protection District as the agency responsible for providing fire prevention and firefighting services to the incorporated area of the City of Novato.</p> <p>Therefore, Chapter 5-21 of the Municipal Code requires all applications for permits or approvals affected by this chapter shall be referred to the Novato Fire Protection District for its review and comment.</p> <p>Fire regulations are adopted to minimize the hazard to life and property due to fire. All affected permit or request for approval applications shall include fire safety provisions. Such as:</p> <ul style="list-style-type: none"> <li>• Emergency Vehicle Access including but not limited to: Minimum street widths, grades, horizontal and vertical clearances are defined so certain major equipment can properly function on such streets to provide access and egress that is optimal for emergency response vehicles.</li> <li>• Certain developments that include proposed open space dedications or where developments abut existing open space, access for fire equipment to that open space shall be provided.</li> <li>• New developments, and certain types of remodels, proposed in identified fire hazard severity zones or in the defined Wildland Urban Interface (WUI) areas shall use ignition resistant building construction materials and methods to reduce structural ignitability.</li> <li>• Any new development or substantial remodel construction to occur in areas defined by the Novato Fire District Board, and adopted by resolution of the City Council, as Wildland Urban Interface areas shall, prior to final clearance occupancy or use, eliminate certain types of fire prone vegetation, except single specimen shrubs or trees, within 30 feet (or up to 100 feet for extra hazardous conditions upon direction of the fire chief) of all structures.</li> </ul>
<p><b>Natural hazard specific ordinance (stormwater, steep slope, wildfire)</b></p>	<p>Y</p>	<p>Section 19.26 of the Municipal Code defines hillside and ridgeline protections with the intent to reduce the potential for hazards and environmental degradation</p>

		related to slope failure, increased erosion, sedimentation, stormwater run-off, fire hazards, and potential traffic hazards.
<b>Flood insurance rate maps</b>	Y 2016	FIRM Maps are available at the City Administration Offices
<b>Elevation Certificates</b>	Y	Required in the FEMA Community Rating System Program that the City participates in.
<b>Acquisition of land for open space and public recreation uses</b>	Y	Included in development impact fees.
<b>Erosion or sediment control program</b>	Y	Section 5-23 of the Municipal Code provides requirements for erosion control. The City of Novato uses ABAG requirements for all development.

**Table 23: City of Novato Legal and Regulatory Capabilities**  
Source: City of Novato

**City of Novato General Plan or Master Plan**

California Government Code 65300 requires that every City and County in the state have a General Plan. The City of Novato General Plan, adopted in 10/27/2020, was prepared over a 12-year period that included an extensive public review process. The General Plan is the most important policy and planning document in the city and is used by virtually every department. The General Plan is the City's statement of its vision for the future. The General Plan contains policies covering every aspect of the City: land use (how land can be developed), circulation, noise, air quality, housing, open space and conservation, and health and safety.

City of Novato specific goals and policies related to mitigation of natural hazards are as follows:

<b>Table 24: City of Novato General Plan</b>	
<b>Goal/Policy/Program</b>	<b>Explanation</b>
<b>Land Use Element (Great Places, A City That Works)</b>	
<b>Goal</b>	Goal LU 1: Manage growth and maintain community character.
<b>Goal</b>	Goal LU 2: Establish clear limits to urban development outside the Novato City Limits.
<b>Conservation and Open Space Element (Environmental Stewardship)</b>	
<b>Goal</b>	Goal ES 1: Preserve, enhance and restore natural areas and features, including Novato's scenic hillsides, water- ways, riparian corridors, wetlands, baylands, and special status species.
<b>Goal</b>	Goal ES 2: Maintain clean, healthful air.
<b>Goal</b>	Goal ES 3: Continue prudent use and conservation of natural resources.
<b>Goal</b>	Goal ES 4: Protect trees and woodlands that provide ecological, economic and aesthetic benefits for Novato.
<b>Goal</b>	Goal ES 5: Engage in environmental stewardship that balances the needs of the environment, the economy and a diverse society to utilize our natural resources in a sustainable way.
<b>Public Safety (A City That Works)</b>	

Table 24: City of Novato General Plan	
Goal/Policy/Program	Explanation
<b>Goal</b>	Goal SH 1: Maintain high levels of public safety and emergency preparation.
<b>Public Facilities Element (A City That Works)</b>	
<b>Goal</b>	Goal PF 1: Provide well planned, maintained and adequate public infrastructure, buildings and landscaping.

**Table 24: City of Novato General Plan**  
Source: **City of Novato** General Plan

### 3.2.2 ADMINISTRATIVE AND TECHNICAL CAPABILITIES

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

Table 25: Administrative and Technical Capabilities		
Administrative	Yes/No	Is coordination effective?
<b>Planning Commission</b>	Y	Planning Commission has regularly scheduled meeting on the 2nd and 4th Monday of each month.
<b>Administrative Services</b>	Y	Maintains insurance on City facilities Operates the City Redevelopment Agency and manages Housing activities Manages internal City communications and computer systems  Designated a grant analyst position to develop additional funding opportunities for various projects and programs.
<b>Disaster Council</b>	Y	Established by City Municipal Code, 2-13 Develops and recommends emergency and mutual aid plans and agreements
<b>Hazard Mitigation Planning Committee</b>	Y	The City participates in the Marin County OA Multi-Jurisdictional Hazard Mitigation Planning Committee that meets quarterly to review and manage Hazard Mitigation projects and programs.
<b>Maintenance programs to reduce risk (e.g., tree trimming, clearing drainage systems)</b>	Y	Maintenance programs are listed in the City CRS program for clearing drainage systems.
<b>Mutual aid agreements</b>	Y	The Novato Police and Fire Departments utilizes mutual aid agreements with local agencies and jurisdictions that provide public safety personnel in times of emergency.
<b>Technical</b>	Yes/No	Has capability been used to assess/mitigate risk in the past?
<b>Warning systems/services (Reverse 911, outdoor</b>	Y	Utilizes the emergency warning systems through the EAS system as their primary warning capability. Utilizes the

<b>warning signals)</b>		emergency warning systems through telephone notification utilizing reverse 911.
<b>Hazard data and information</b>	Y	
<b>Grant writing</b>	Y	The City acquired a state grant to undertake the Climate Adaptation Assessment.
<b>Hazus analysis</b>	N	
<b>Staff/Personnel Resources</b>	Yes/No FT/ PT	Is staffing adequate to enforce regulations? Is staff trained on hazards and mitigation? Is coordination between agencies and staff effective?
<b>Chief Building Official</b>	Y Full-time	The City of Novato Building Department has 4 full time employees and supplements staff with consultants on an as needed basis. Staff is familiar with hazard mitigation and coordinates with police and fire on a regular basis.
<b>Floodplain Administrator</b>	Y	Assigned to Public Works Director
<b>Emergency Manager</b>	Y	Police Captain
<b>Community Planner</b>	Y	Community Development Department
<b>Civil Engineer</b>	Y	Public Works Department
<b>GIS Coordinator</b>	Y	City IT Department
<b>Community Development Staff</b>	Y/FT	Verifies compliance with Building Code through checking plans, issuing permits, and conduction field inspections. Conducts comprehensive planning activities, including leading preparation of the General Plan Develops zoning regulations Prepares CEQA documents Leads situation analysis, damage assessments and documentation during emergency response Conducts site inspections to enforce permit and code requirements
<b>City Planning, Building, and Public Works Staff</b>	Y/FT	Provides road construction and maintenance services Conducts emergency repair services to transportation and public works infrastructure systems Maintains drainage infrastructure Oversees floodplain management and flood mitigation programs Makes flood elevation determinations Works with water and sewer agencies to maintain surviving utilities, and services and evaluates the safety of public structures and infrastructure during emergency response Designs constructs and maintains city owned buildings Manages the Repetitive Loss Program
<b>Police Department Staff</b>	Y/FT	Plans and coordinates response, recovery and

		<p>mitigation activities</p> <p>Develops emergency operation plans for the City</p> <p>Leads emergency response and coordinates with fire for rescues and hazardous materials response</p> <p>Communicates with federal, state, and other local agencies</p> <p>Coordinates with the County to utilize the Marin Medical Reserve Corps (MMRC), Radio Amateur Civil Emergency Service (RACES) and other volunteer organizations, such as the Community Response Team (CRT)</p> <p>Oversees disaster volunteers</p> <p>Performs emergency response activities, including evacuation and security</p> <p>Utilizes the emergency warning systems through telephone notification utilizing reverse 911 and the EAS system as their primary warning capability.</p>
<p><b>Fire Protection District Staff</b></p>	<p>Y/FT</p>	<p>The City of Novato recognizes the Novato Fire Protection District as the agency responsible for providing fire prevention, firefighting services and emergency medical services to the incorporated area of the City of Novato. The district also responds to hazardous material incidents.</p> <p>Coordinates emergency response, including rescues, fire suppression and hazardous materials response.</p> <p>Plans and coordinates response, recovery, and mitigation activities</p> <p>Conducts emergency management and preparedness trainings</p> <p>Provides plan check and inspection services for fire related code compliance</p> <p>Enforces the Vegetation Management Plan which sets clearance distances, type of vegetation for fire fuel breaks around structures.</p> <p>The Novato Fire Protection District participates in the Marin Wildfire Prevention Authority (MWPA) for enhanced wildfire mitigation and prevention efforts.</p> <p>Novato also participates in the use of Zonehaven to support evacuation planning and implementation.</p>

**Table 25: City of Novato Administrative and Technical Capabilities**  
Source: **City of Novato**

**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.

<b>Table 26: Fiscal Capabilities</b>		
<b>Financial</b>	<b>Yes/No</b>	<b>Has the funding resource been used in past and for what type of activities? Could the resource be used to fund future mitigation actions?</b>
<b>Capital improvements project funding</b>	Y	Projects are funded under the 5 year Capital Improvement Plan which includes project listed in the Storm Drain Master Plan.
<b>Authority to levy taxes for specific purposes</b>	Y	City has the authority to levy taxes within the limitation of Proposition 218.
<b>Fees for water, sewer, gas, or electric services</b>	N	These fees are collected by other agencies.
<b>Impact fees for new development</b>	Y	City has a Development Impact Fee Study and program.
<b>Storm water utility fee</b>	Y	City collects a parcel tax for storm drain maintenance city wide.
<b>Incur debt through general obligation bonds and/or special tax bonds</b>	Y	Funding has not been used in the past for mitigation, but could possibly fund future mitigation activities.
<b>Incur debt through private activities</b>	N	City is a public agency.
<b>Community Development Block Grant</b>	Y	The City of Novato uses the Community Development Block Grant program for affordable housing..
<b>Other federal funding programs</b>	Y	City uses Federal Highway Bridge Program and Federal Highway Safety Improvement Program funding. State Homeland Security Grant Program (SHSGP)
<b>State funding programs</b>	Y	State Gas tax program is used for funding projects.

**Table 26: City of Novato Fiscal Capabilities**  
Source: City of Novato

**3.2.4 COMMUNITY OUTREACH**

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

<b>Table 27: City of Novato Community Outreach</b>		
<b>Outreach and Partnerships</b>	<b>Yes/No</b>	<b>Could the program/organization help implement future mitigation activities?</b>
<b>Local citizen groups or non-profit organizations focused on environmental protection, emergency preparedness, access and functional needs populations, etc.</b>	Yes	Coordinates with the County to utilize the Marin Medical Reserve Corps (MMRC), Radio Amateur Civil Emergency Service (RACES) and other volunteer organizations. Oversees disaster volunteers Community Resource Team (CRT)
<b>Ongoing public education or information program (e.g., responsible water use, fire safety, household preparedness, environmental education)</b>	Yes	Novato Fire Foundation – A non-profit organization supported by the Novato Fire Protection District provides enhanced fire and life safety programs, services and education to the Novato community. ( <a href="https://www.novatofirefoundation.org/">https://www.novatofirefoundation.org/</a> ) CRT Marin County Resource Conversation District
<b>Natural disaster or safety related school programs</b>	Yes	The CERT program, or Community Emergency Response Team is a national program to train citizens to help fill the gap between a disaster or emergency and the arrival of professional services. Novato participates in providing CERT training in coordination with other Marin County OA agencies. ( <a href="https://readymarin.org/cert/">https://readymarin.org/cert/</a> )
<b>StormReady certification</b>	No	
<b>Firewise Communities certification</b>	Yes	Firewise Neighborhoods: The Firewise USA™ program has empowered neighbors to work together in reducing their wildfire risk. Using a five-step process, communities develop an action plan that guides their residential risk reduction activities, while engaging and encouraging their neighbors to become active participants in building a safer place to live. 15 of 30 identified neighborhoods participate in the Novato area.
<b>Community Rating System</b>	Yes	
<b>Public-private partnership initiatives addressing disaster-related issues</b>	Yes	The Get Ready program, developed in the County of Marin, 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. ( <a href="https://readymarin.org/get-ready/">https://readymarin.org/get-ready/</a> )

**Table 27: City of Novato Community Outreach**  
Source: **City of Novato**



### 3.2.5 PARTICIPATION IN THE NATIONAL FLOOD INSURANCE PROGRAM

The City of Novato has participated in the Regular Phase of the NFIP since 1978. Since then, the City of Novato 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 City of Novato has been in the CRS program since 1995. 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 City of Novato is currently ranked a Class 6 community, which gives a 20 % premium discount to individuals in the City of Novato Special Flood Hazard Area (SFHA), and a 20 % discount to policyholders outside the SFHA.

Presently, the City of Novato 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 City's participation in the NFIP. As well, the City'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 City.

The City of Novato will continue to manage their floodplains in continued compliance with the NFIP. An overview of the City's NFIP status and floodplain management program are discussed in Table 28. Additional information on the City's CRS program follows.

The activities credited by the CRS program provide direct benefits to the Marin County OA 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 City of Novato and the County of Marin implements and receives CRS credits include:

**Activity 310** - We maintain Elevation Certificates for new and substantially improved structures in SFHA. There are occasions that homeowners submit their elevation certificates when they are not making any improvements to their property. We post the elevation certificates online and also we keep hard copies in the office in a binder.

**Activity 320**- We provide basic flood information to inquirers. We also provide additional information like flood depth, Historical flood information and etc.

We also send a Notice to Lending Institutions and Real Estate and Insurance agents letting them know that we can provide them that the City can make a flood zone determination for any particular property within the City.

**Activity 330-** Outreach program. We send a flyer to all the properties in the flood zone. In the flyer we have some language for the history of flooding, if their property is insured, protection of their property, protection and clean local creeks and stormdrains, build responsibly for flooding and City floodplain information services.

**Activity 340-** This is Hazard Disclosure. We used to have resale inspection. We were disclosing whether a property was or was not in the flood zone.

**Activity 350-** Our Public Library maintains flood protection materials. Also, we conduct an annual review and update of the information and links on our flood protection website.

**Activity 360-** We send a brochure to properties in the flood zone. We provide flood protection advice to inquirers. We provide on-site flood protection assistance to inquirers. We let them know that flooding is not covered by the standard insurance policies whether they are property owners or renters. We also let them know that if they live or work in the Marin County OA they can register and get an alert notification during an emergency situation. We also let them know that they have to have an emergency plan and also how they can protect their property from flooding by cleaning the gutters and downspouts and area drains and making sure if they have a sump pump, the sump pump is working.

**Activity 420-** This activity is preserving our open space in the floodplain.

**Activity 430-** We enforce the floodplain management provisions of our zoning, subdivision and building code ordinances. Examples of this activity are requiring the lowest floors of residences to be higher than the base floor elevation. If the cost of improvements or repairs are more than 50% of the building's value, the owner needs to bring the building to compliance. Also, requiring new manufactured housing in existing manufactured housing parks to meet the same level of protection as is required for other new buildings.

**Activity 440-** We use and update our flood data maintenance system on an annual basis as needed, because we want to make the community floodplain data more accessible, current and useful.

1. We implement digital mapping or paper mapping systems that improve access and quality.
2. We maintain our historical Flood Hazard Boundary Map, FIRMs and Flood Insurance Studies.
3. We maintain benchmarks so surveyors can request obtain them from the City.

**Activity 450-** This activity is about stormwater management.

We regulate development on a case-by-case basis to ensure we treat runoff before it leaves the site and also ensure that the peak flow of stormwater runoff from each site will not exceed the pre-development. There are instances that the post-development peak flow rates for the developed area have been slightly increased from pre-development conditions however, onsite bio-retention areas or other treatment facilities have been provided to mitigate the increase in flow rate. We enforce regulations to minimize erosion from land disturbance due to construction.

**Activity 502-** This is about repetitive loss Category- Properties that have had losses and reported to FEMA for these losses. We are in Category B. Category B means we are a community with at least one, but fewer than 50 repetitive loss properties that have not been mitigated. We have a map of the areas. We send a notice every year to those properties letting them know about flood prevention and insurance information. We have 38 repetitive loss properties however we send notices to 65 properties.

**Activity 510-** Floodplain Management Planning- The City of Novato has adopted the County of Marin Multi-Jurisdictional Hazard Mitigation Plan which has flood related sections like Dam Failure, Severe Storm, Flooding, Repetitive Loss Properties and Safety Warning/Evacuation Systems.

**Activity 540-** This activity is about drainage system maintenance - Community’s drainage system is inspected regularly throughout the year and maintenance is performed as needed. We enforce a regulation prohibiting dumping in the drainage system.

**Activity 630-** This activity is about the safety of Dams. States provide dam safety information to communities. The Stafford Lake Dam, also known as the Novato Creek Dam, is classified as an Extremely High Hazard Dam. North Marin Water District has an Emergency Action Plan for this Dam. There is also a Dam Failure Inundation Map that we submit and get credit for it.

We maintained a class 6 rating with 2060 points at the last 5 Year Cycle Visit in 2020.

**Table 28: City of Novato NFIP Status**

NFIP Topic	Comments
<b>Insurance Summary</b>	
<b>How many NFIP policies are in the community? What is the total premium and coverage?</b>	NFIP insurance data provided by DWR indicates that as of 4/2/2023, there were 1060 policies in force in the City of Novato with \$745,659 in premiums, resulting in 281,304,000 of insurance in force.
<b>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?</b>	There have been 434 closed paid losses totaling \$3,263,954.26. 14 of the claims were considered substantial damage losses.
<b>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.</b>	Per our GIS Consultant who queries GIS for building footprints against the SFHA boundary, there are 2000 buildings in SFHA.
<b>Describe any areas of flood risk with limited NFIP policy coverage</b>	None
<b>Staff Resources</b>	
<b>Is the Community Floodplain Administrator or NFIP Coordinator certified?</b>	No
<b>Is floodplain management an auxiliary function?</b>	Yes
<b>Provide an explanation of NFIP administration services (e.g., permit</b>	Review permit plans for FEMA regulation compliances. Use GIS to find out if the property is in a

review, GIS, education or outreach, inspections, engineering capability)	Flood Zone. Outreach brochure mailed to all properties in SFHA. Inspection is performed as needed.
What are the barriers to running an effective NFIP program in the community, if any?	There is no barrier to run an effective NFIP Program.
<b>Compliance History</b>	
Is the community in good standing with the NFIP?	YES
Are there any outstanding compliance issues (i.e., current violations)?	No. There are no outstanding compliance issues.
When was the most recent Community Assistance Visit (CAV) or Community Assistance Contact (CAC)?	No
Is a CAV or CAC scheduled or needed?	No
<b>Regulation</b>	
When did the community enter the NFIP?	1978
Are the FIRMs digital or paper?	We have both digital and paper.
Do floodplain development regulations meet or exceed FEMA or State minimum requirements? If so, in what ways?	Yes. This is through development limitations, free board requirement, foundation protection, cumulative substantial improvements. We also have adopted and enforced the International Building Code. We do maintain drainage systems all year around to prevent flooding in different neighborhoods.
Provide an explanation of the permitting process.	Before the applicant submits plans for design review, she/he needs to get some information about her/his property. That is when planning/engineering will have a meeting with them to go over the requirements such as building in the Special Hazard Flood Zone. All projects that will be constructed in the SFHA will be subject to the provisions of Novato Municipal Code 5-31, Flood Damage Prevention Requirements. The finished floor elevation of all the building will need to be at least 1-foot above the base flood elevation. No exception taken.
<b>Community Rating System (CRS)</b>	
Does the community participate in CRS?	Yes
What is the community's CRS Class Ranking?	CRS Class 6
What categories and activities provide CRS points and how can the class be improved?	All the activities that are performed/accomplished are described above. To improve the class to a higher classification the City needs to expand and do more work towards activities.
Does the plan include CRS planning requirements	Yes

Table 28: City of Novato NFIP Status  
Source: FEMA, City of Novato

### **NFIP Insurance Coverage Details**

The City of Novato joined the NFIP in 1978. The City of Novato does participate in the Community Rating System. NFIP insurance data provided by DWR indicates that as of 4/2/2023, there were 1060 policies in force in the City of Novato with \$745,659 in premiums, resulting in 281,304,000 of insurance in force. There have been 434 closed paid losses totaling \$3,263,954.26. 14 of the claims were considered substantial damage losses. Of these losses, 101 parcels were in AE, A & D zones, 295 parcels were in AO, B, C & X zone. Of the 434 claims, 380 claims were associated with pre-FIRM structures and 16 with post-FIRM structures. There were 44 repetitive loss structures in the City. 34 were in A zones, and 10 were in B, C, or X zones. These repetitive loss structures account for \$1,367,467.52 of the total losses in the City of Novato. There were 2 severe repetitive loss properties in the City of Novato \$60,698.72.

### **Repetitive Loss Properties**

Repetitive loss records are as follows:

- Number of FEMA-identified Repetitive-Loss Properties: 44
- Number of FEMA-identified Severe-Repetitive-Loss Properties: 2
- Number of Repetitive-Loss Properties or Severe-Repetitive-Loss Properties that have been mitigated: 0
- Repetitive Loss Residential Structures:44
- Repetitive Loss Non-Residential Structures: 0
- Severe Repetitive Loss Residential Structures: 2
- Severe Repetitive Loss Non-Residential Structures: 0

### 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.



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 the Marin County OA. 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 the Marin County OA 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 the Marin County OA.

- Minimize economic and resource impacts and promote long-term viability and sustainability of resources throughout the Marin County OA.
- 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 29 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 29: Status of Previous Hazard Mitigation Actions					
Action Number / Name	Completed	Ongoing	Not Started	Still Relevant	Included in Updated Action Plan
Continue the code enforcement inspection program for apartments of 3 or more units in the City to find seismic safety, flood and health and safety compliance issues and to identify buildings at risk to specific hazards.		X			X
Update the City's Emergency Operations Plan, as needed and update the plan when the State of California and the County of Marin update their Emergency Operations plans.		X			X
Refine Open Space mapping to differentiate between city owned and county owned properties.	X				
Participate in the completion of the County's Watershed Stewardship Plan. The plan's projects will address preventative measures to mitigate flood impacts.		X			X
Create a comprehensive computerized model of the Novato's basins and produce maps to aid the Clean Storm Water program by completing the Storm Drainage Master Plan. In conjunction with Marin County Flood Control District the GIS database will work to monitor flow at key location(s) within the City's network of storm drains.	X				
Meet annually with all agencies involved in Marin County Flood Control projects to ensure that structural projects are considered and continue to cooperate with Marin jurisdictions in pursuing all available sources of funding to finance improvements to storm drainage facilities.		X			X



<b>Table 29: Status of Previous Hazard Mitigation Actions</b>					
<b>Action Number / Name</b>	<b>Completed</b>	<b>Ongoing</b>	<b>Not Started</b>	<b>Still Relevant</b>	<b>Included in Updated Action Plan</b>
Implement action items identified for Novato in the current Marin County Wide Community Wildfire Protection Plan (CWPP).		X			X
Articulate and promote the concept of land use planning related to fire risk and individual landowner objectives and responsibilities.		X			X
Coordinate with county and local government staff to integrate Firewise approaches into planning documents and ordinances.		X			X
Consider the creation of transition zones (areas between developed residential areas and open space areas) where additional defensible space clearance is needed.		X			X
Consider the creation of transition zones (areas between developed residential areas and open space areas) where additional defensible space clearance is needed.		X			X
Continue efforts to partner with neighborhoods located in WUI areas to educate them on becoming fire adapted or Firewise communities.		X			X
Continue implementation of the countywide fuel break and fire plan implementation.		X			X
Work to reduce regulatory barriers that limit hazardous fuels reduction activities (e.g., tree removal process).		X			X

**Table 29: Status of Previous Hazard Mitigation Actions**  
Source: City of Novato

### 3.5 HAZARD MITIGATION ACTIONS

The 2023 Marin County OA MJHMP was revised to reflect progress in local mitigation efforts. Mitigation projects were selected for each hazard and for the City of Novato 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 30 lists the Current Hazard Mitigation Actions for the City of Novato.

**Table 30: City of Novato Current Hazard Mitigation Actions**

Mitigation Action	Hazards Mitigated/ Goals Met	Jurisdiction/ Responsible Agency	New, Existing, Completed, Removed	Estimated Cost and Potential Funding Source	Timeline/ Priority	Comments/ Progress
<b>N-1</b> Continue the code enforcement inspection program for apartments of 3 or more units in the City to find seismic safety, flood and health and safety compliance issues and to identify buildings at risk to specific hazards.	All Hazards/ 1, 2, 3, 4, 5	Novato Community Development	Existing (2018)	TBD: City General Fund	1 – 2 years On-going/ High	
<b>N-2</b> Update the City's Emergency Operations Plan, as needed and update the plan when the County of Marin updates their Emergency Operations Plan.	All Hazards/ 1, 2, 3, 4, 5	Novato Emergency Management	Existing (2023)	TBD: City General Fund and Fire General Fund	1 – 2 years On-going/ High	Update the City's Emergency Operations Plan, as needed and update the plan when County of Marin updates their Emergency Operations Plan.
<b>N-3</b> Participate in the completion of the County's Watershed Stewardship Plan. The plan's projects will address preventative measures to mitigate flood impacts.	Flooding, Sea Level Rise, Tsunami/ 1, 2, 4, 5	Novato Public Works	Existing (2018)	TBD: City General Fund	On-going High	
<b>N-4</b> Meet annually with all agencies involved in Marin County Flood Control projects to ensure that structural projects are considered and continue to cooperate with Marin jurisdictions in pursuing all available sources of funding to finance improvements to storm drainage facilities.	Dam Failure, Flooding, Sea Level Rise, Tsunami/ 1, 2, 4, 5,6	Novato Public Works	Existing (2018)	TBD: City General Fund	On-going High	
<b>N-5</b> 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	Novato Emergency Management, NMWD, Marin OEM	New (2023)	TBD: General Funds	Ongoing/ High	Continue to encourage residents to participate in Alert Marin with an emphasis on properties at risk from dam failure.
<b>N-6</b> Implement action items identified for Novato in the current Marin	Wildfire/ 1, 2, 4, 5,	Novato Fire District	Existing (2018)	Marin Wildfire Prevention Authority, CDAA,	On-going High	Currently in year 3 workplan of 10-year commitment to implementation of county

**Table 30: City of Novato Current Hazard Mitigation Actions**

Mitigation Action	Hazards Mitigated/ Goals Met	Jurisdiction/ Responsible Agency	New, Existing, Completed, Removed	Estimated Cost and Potential Funding Source	Timeline/ Priority	Comments/ Progress
<b>County Wide Community Wildfire Protection Plan (CWPP).</b>				HMPG, BRIC, grants and Fire General Fund		wide JPA wildfire prevention and mitigation efforts
<b>N-7 Articulate and promote the concept of land use planning related to fire risk and individual landowner objectives and responsibilities.</b>	All Hazards/ 1, 2, 4, 5,	Novato Community Development	Existing (2018)	TBD: City General Fund	On-going Medium	
<b>N-8 Coordinate with county and local government staff to integrate Firewise approaches into planning documents and ordinances.</b>	Wildfire/ 1, 2, 4, 5,	Novato Fire District and Novato Community Development	Existing (2018)	TBD: Marin Wildfire Prevention Authority, Fire General Fund and City General Fund	On-going High	
<b>N-9 Consider the creation of transition zones (areas between developed residential areas and open space areas) where additional defensible space clearance is needed.</b>	Wildfire/ 1, 2, 4, 5,	Novato Public Works and Novato Fire District	Existing (2018)	Marin Wildfire Prevention Authority, CDAA, HMGP, BRIC Grants, City General Fund and Fire General Fund	On-going High	Implement the creation of transition zones (areas between developed residential areas and open space areas) where additional defensible space clearance is needed. Included in 2035 General Plan adopted in 2020.  Greater Novato Shaded Fuel Break has been planned, approved and is now being implemented starting July 2023. Vegetation clearance up to 300 ft from the property line of residential and business properties.
<b>N-10 Continue efforts to partner with neighborhoods located in WUI areas to educate them on becoming fire adapted or Firewise communities.</b>	Wildfire/ 1, 2, 4, 5,	Novato Fire District	Existing (2018)	TBD: Marin Wildfire Prevention Authority and Fire General Fund	On-going High	We have divided the entire community up into 35 neighborhoods and have successfully initiated 13 Firewise designations throughout. We have

**Table 30: City of Novato Current Hazard Mitigation Actions**

Mitigation Action	Hazards Mitigated/ Goals Met	Jurisdiction/ Responsible Agency	New, Existing, Completed, Removed	Estimated Cost and Potential Funding Source	Timeline/ Priority	Comments/ Progress
						provided educational materials and support a county wide Ember stomp festival annually to promote fire adaptive communities across Marin.
<b>N-11 Continue implementation of the countywide fuel break and fire plan implementation.</b>	Wildfire/ 1, 2, 4, 5,	Novato Fire District	Existing (2018)	TBD: Marin Wildfire Prevention Authority, City General Fund and Fire General Fund	On-going High	Greater Novato Shaded Fuel Break has been planned, approved and is now being implemented starting July 2023. Vegetation clearance up to 300 ft from the property line of residential and business properties.
<b>N-12 Work to reduce regulatory barriers that limit hazardous fuels reduction activities (e.g., tree removal process).</b>	Wildfire/ 1, 2, 4, 5,	Novato Community Development	Existing (2018)	TBD: City General Fund	On-going Medium	Novato Municipal Code re: Tree Permits  17-1.4 <i>Tree Permits.</i> e. The director may waive public notice and the appeal process otherwise required by this chapter, and immediately issue the permit with a finding that the tree constitutes a hazard or threat to the public health and safety or property in the vicinity in cases where: 1. The tree (or trees) in question is dying, diseased or has been substantially damaged and will imminently threaten the health, safety, or property improvements in the immediate vicinity and such disease or threat is verified in writing by a licensed tree surgeon, certified arborist,

**Table 30: City of Novato Current Hazard Mitigation Actions**

Mitigation Action	Hazards Mitigated/ Goals Met	Jurisdiction/ Responsible Agency	New, Existing, Completed, Removed	Estimated Cost and Potential Funding Source	Timeline/ Priority	Comments/ Progress
						landscape architect or similar licensed professional; 2. The tree (or trees) in question is classified as a pyrophyte, including Monterey Pine, Bishop Pine, Acacia species, and Eucalyptus species; or 3. Tree removal or alteration is by a public agency to provide for the routine maintenance of public land.
<b>N-13 Implement a Vegetation Management Plan to include the removal of exotic, invasive, and hazardous species and replacing them with native, safer vegetation.</b>	Wildfire, Drought, Severe Weather – Heat & Wind 1, 2, 4, 5,	Novato Fire District	New (2023)	Marin Wildfire Prevention Authority	2024	Vegetation reduction projects have been implemented over the past three years including but not limited to work completed along roadside evacuation routes, city owned open space areas that are immediately adjacent to neighborhoods, and other CORE funded projects like the Greater Novato Shaded Fuel Break.
<b>N-14 Participate in County Wide Evacuation Route Assessment and Mapping Study. Study will be complete this year and will provide the basis for prioritizing additional fuels reduction work along evacuation routes.</b>	Dam Failure, Debris Flow, Flooding, Tsunami, Wildfire/ 1, 2, 4, 5, 6	Novato Fire District	New (2023)	Marin Wildfire Prevention Authority	2024	Study is completed and accepted by the MWPA. The data is in the process of being reviewed and future plans and projects to improve ingress and egress will continue to be reviewed, planned and implemented for priority routes.
<b>N-15 Conduct Structure Assessments of all homes and businesses with the NFD jurisdiction for home hardening and defensible space</b>	Wildfire/ 1, 2, 4, 5,	Novato Fire District	New (2023)	Marin Wildfire Prevention Authority	2024	12,000 assessments are now complete, and we are working towards 100% of all

**Table 30: City of Novato Current Hazard Mitigation Actions**

Mitigation Action	Hazards Mitigated/ Goals Met	Jurisdiction/ Responsible Agency	New, Existing, Completed, Removed	Estimated Cost and Potential Funding Source	Timeline/ Priority	Comments/ Progress
evaluations. Completed 100% of our WUI areas and approximately 2/3 total parcels in Novato.						inspectable parcels in the district.
<b>N-16 Provide matching grant funding for home hardening projects replacing existing combustible construction features with ignition resistant construction features that are California Building code Ch. 7A compliant.</b>	Wildfire/ 1, 2, 4, 5,	Novato Fire District	New (2023)	TBD: Marin Wildfire Prevention Authority	On-going	Over 2 million dollars have already been reinvested back into the community specifically for home hardening. The incentives have generated two to three times that amount in total replacement costs.
<b>N-17 Provide matching grant funding for defensible space creation by removing fire prone vegetation within 100ft of structures.</b>	Wildfire/ 1, 2, 4, 5,	Novato Fire District	New (2023)	TBD: Marin Wildfire Prevention Authority	On-going	Over 1 million dollars have already been reinvested back into the community specifically defensible space work. The incentives have generated two to three times that amount in total removal costs.
<b>N-18 Create Escape Route vegetation reduction within 10ft of evacuation routes in WUI areas.</b>	Wildfire/ 1, 2, 4, 5,	Novato Fire District	New (2023)	Marin Wildfire Prevention Authority	On-going	Dozens of miles of roadway have had vegetation modified for both vertical and horizontal clearance
<b>N-19 Conduct ongoing all hazards evacuation Drills in high fire hazard neighborhoods.</b>	All Hazards/ 1, 2, 3, 4, 5,	Novato Fire District	New (2023)	Marin Wildfire Prevention Authority	On-going	Annual evacuation drill have been conducted for multiple neighborhoods. Most recently 12 Firewise designated neighborhoods participated in a mass evacuation and were directed to an Emberstomp festival which focuses on all aspects of a fire adapted community.
<b>N-20 Participate in the creation and ongoing support of Annual Ember Stomp Event to promote wildfire prevention and</b>	Wildfire/ 1, 2, 3, 4, 5,	Novato Fire District	New (2023)	TBD: Marin Wildfire Prevention Authority	On-going	Maintained an all day presents at the event via a NFD booth to meet and greet the community and share public education materials

**Table 30: City of Novato Current Hazard Mitigation Actions**

Mitigation Action	Hazards Mitigated/ Goals Met	Jurisdiction/ Responsible Agency	New, Existing, Completed, Removed	Estimated Cost and Potential Funding Source	Timeline/ Priority	Comments/ Progress
<b>Mitigation efforts county wide. (&gt; 5000 public attended)</b>						and sign homeowners up for free home assessments. Fire Chief gave a lecture to the crowd on fire adaptive community actions.
<b>N-21 Conduct Sound Study for installation of long-range acoustical devices in neighborhoods to facilitate evacuation notification—Once study is completed, we will begin installing several LRADs in high fire risk neighborhoods on a voluntary basis; as funding permits.</b>	Dam Failure, Debris Flow, Flooding, Tsunami, Wildfire/ 1, 2, 4, 5, 6	Novato Fire District	New (2023)	Marin Wildfire Prevention Authority	Study – 2023 Install – 2024	Study is complete and the first installation of LRAD set to begin in 2024.
<b>N-22 Fire code amendments to reduce the damage to structures from earthquake, landslide and fire. Including automatic natural gas shut-off valves and fire sprinklers for new and substantially remodeled structures.</b>	Earthquake, Debris Flow, Wildfire, Land Subsidence/ 1, 2, 4, 5	Novato Community Development	Existing (2018)	Cost: General Funds	1 – 3 years/ High	

**Table 30: City of Novato 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 City of Novato. 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 29 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 City of Novato identified and prioritized the mitigation actions as detailed in Table 30, 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 LHMP by all participating jurisdictions is included in Section 4.0: Plan Review, Evaluation, and Implementation.

### 3.7 PLAN INTEGRATION

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 City of Novato will maintain this plan and will serve as a lead staff for grant project applications on City 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 City of Novato 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 City of Novato 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 OA MJHMP:

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

**City and District Emergency Operations Plans** – Integrates hazard mitigation through the consideration of the City’s planned response to hazards most likely to impact the City.

**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:

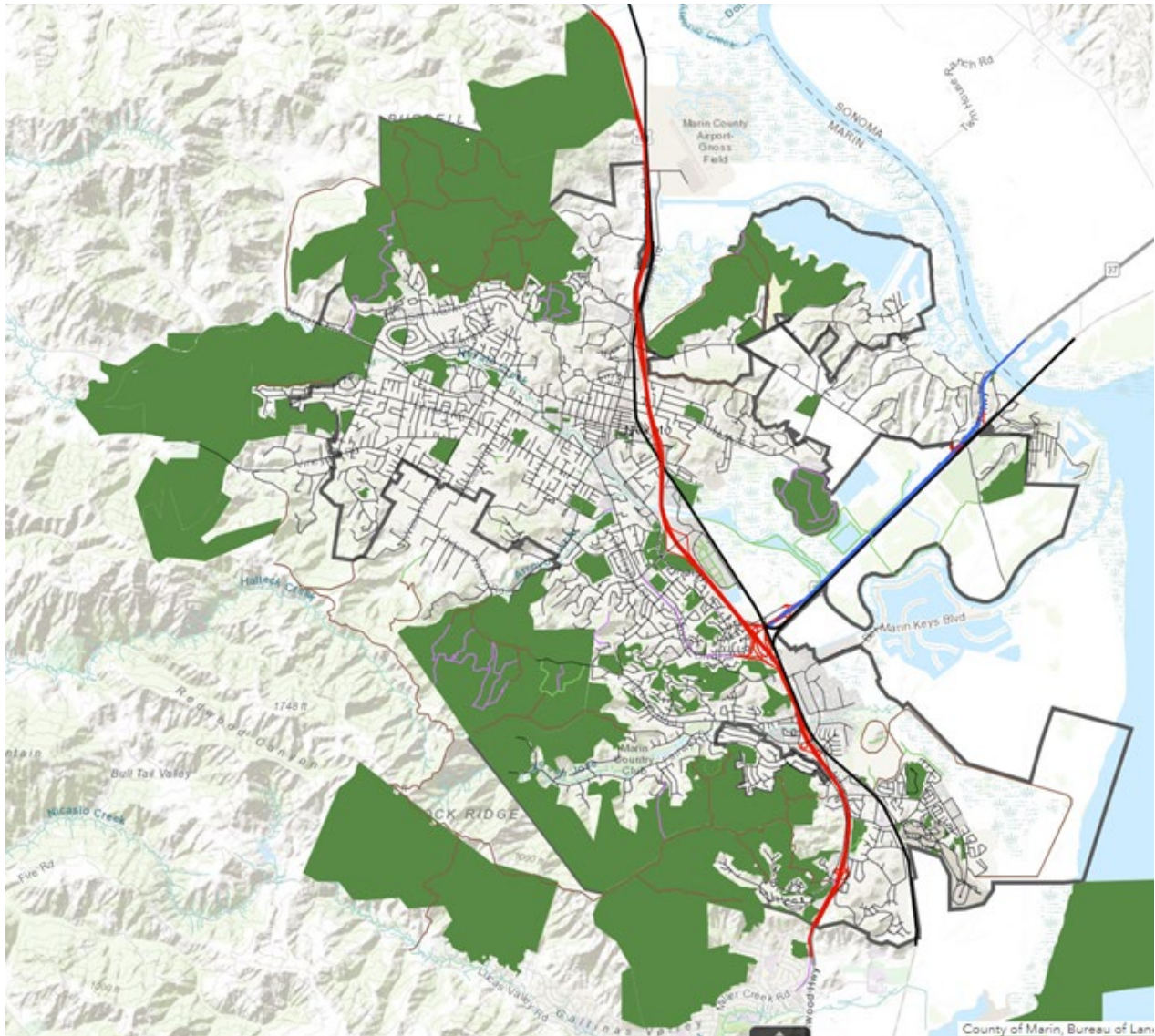
1. As recommended by Assembly Bill 2140, each community should adopt (by reference or incorporation) this MJHMP into the Safety Element of their General Plans. Evidence of adoption (by formal, certified resolution) shall be provided to CalOES and FEMA
2. Integration of flood actions identified in this 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**

Incorporated in 1960, the City of Novato is the northernmost city in the Marin County OA, California, approximately 29 miles north of San Francisco and 37 miles northwest of Oakland. Novato, which covers 28 square miles, has an estimated population of 53,225, slightly smaller than neighboring San Rafael to the south, at 61,271 and Petaluma to the north (59,776) and about half the population of Vallejo to the east (124,886). Novato has a rural atmosphere largely because of its low population density and large amounts of designated parks and open space in and around the City.

Much of western Novato is comprised of considerable slope and is, therefore, undeveloped or developed at very low densities under the Marin County OA land use regulations. Much of this area has been made into parks and open space for passive recreation. Parks and open space can be seen identified in green in the image below while the City boundary is outlined in a heavy black line.



**Figure 56: City of Novato Land Use Map – Open Space**  
Source: City of Novato

A number of creeks run from these slopes on the west to the Baylands on the east. These creeks vary in size and drainage areas so flood zones vary significantly throughout the various basins and are location-specific.

Highway 101, the main freeway connecting San Francisco with the Marin communities and Sonoma County, bisects Novato. The City’s most significant growth period was from 1960 (year of incorporation) to 1979. The vast majority of existing housing stock was built in this period. Since 2000, Novato’s population has increased by 12.7 percent, averaging about 1.5 percent per year and slightly below the region’s average of 14.8 percent. According to the California Department of Finance, the City had a population of 53,702 at the time of the 2020 census.

Housing affordability in the Marin County OA and the Bay Area has become increasingly important. Novato’s housing conditions are reflective of many area-wide and even nationwide trends. Over the past several decades, housing costs have skyrocketed out of proportion to

many people's ability to pay, with increasing construction and land costs contributing to the rise in housing prices. In the Bay Area, the high demand for housing pushes prices even higher. This mismatch in household incomes and housing costs has several implications: it becomes more difficult for employers to recruit and retain employees; new residents are pushed farther away from job centers where home prices are less expensive, leading to long traveling distances to work, higher greenhouse gas emissions from vehicles, and increasingly clogged highways; and many young families, longtime residents, their children, and other community members without high incomes relocate because they can no longer afford to live in the community.

## SECTION 4.0: PLAN REVIEW, EVALUATION, AND IMPLEMENTATION

The strategies presented are deemed appropriate and effective by recommendation of the City of Novato.

### 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 OA MJHMP will be presented to local government for formal adoption. As appropriate, the adopted plan and accompanying City of Novato 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 City of Novato 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 City of Novato is a participating member of the Marin Operational Area Hazard Mitigation Working Group. The City of Novato Public Works Director will monitor and update the City of Novato 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 City of Novato, 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 City of Novato, to evaluate the plan after each update meeting.

### **4.4 PLAN UPDATE**

The City of Novato Public Works Director will monitor and update the City of Novato Annex to the Marin County OA MJHMP. During the five-year update cycle, the City of Novato 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

### Figures

Figure 1: Marin County OEM MJHMP Website.....	18
Figure 2: Marin County OEM MJHMP Public Town Hall Meeting.....	19
Figure 3: Hazard Mitigation Plan Public Outreach Press Release .....	20
Figure 4: Hazard Mitigation Plan Survey .....	22
Figure 5: Map of City of Novato in Marin County.....	25
Figure 6: Map of the City of Novato.....	26
Figure 7: The City of Novato Precipitation and Monthly Temperatures .....	27
Figure 8: Races in Novato.....	29
Figure 9: City of Novato Land Use Map.....	30
Figure 10: City of Novato Social Vulnerability Map Census Tract 1022.03.....	33
Figure 11: City of Novato Social Vulnerability Map Census Tract 10320.00.....	34
Figure 12: City of Novato Social Vulnerability Map Census Tract 1012.00.....	35
Figure 13: City of Novato Social Vulnerability Map Census Tract 1022.02.....	36
Figure 14: City of Novato Social Vulnerability Map Census Tract 1041.02.....	37
Figure 15: City of Novato Critical Facilities and Infrastructure .....	44
Figure 16: Marin County & City of Novato Risk Assessment – Planning Team Top Hazards .....	45
Figure 17: Hazard Risk Categorization.....	45
Figure 18: NASA Global Temperature Change CO2 Gas .....	49
Figure 19: NASA Global Temperature Change 1884 to 2022 .....	49
Figure 20: NASA Global Temperature Change Sea Level .....	50
Figure 21: Annual Mean Sea Level Trends.....	52
Figure 22: City of Novato Dam Inundation Critical Facilities and Infrastructure.....	58
Figure 23: City of Novato - Novato Creek Dam Inundation Impact – West Novato .....	59
Figure 24: City of Novato - Novato Creek Dam Inundation Impact – North Novato.....	59
Figure 25: City of Novato - Novato Creek Dam Inundation Impact – Central Novato.....	60
Figure 26: City of Novato - Novato Creek Dam Inundation Impact – East Novato .....	60
Figure 27: Landslide Susceptibility Classes .....	63
Figure 28: Mud Flow Areas .....	64
Figure 29: City of Novato Debris Flow Critical Facilities and Infrastructure.....	65
Figure 30: Modified Mercalli Intensity Scale .....	69
Figure 31: Mercalli Scale vs. Magnitude.....	69
Figure 32: Soil Types .....	70
Figure 33: Marin County OA Earthquake Impact and Fault Lines.....	72
Figure 34: City of Novato Earthquake Critical Facilities and Infrastructure .....	73
Figure 35: Diagram of an Atmospheric River Event.....	76
Figure 36: City of Novato Flooding Critical Facilities and Infrastructure.....	78
Figure 37: SR 37 Flooding in Novato - 2017 .....	82
Figure 38: 1982 Novato Flood.....	83
Figure 39: Dissolution Sinkhole Formation .....	84
Figure 40: Cover-Subsidence Sinkhole Formation .....	85
Figure 41: Cover-Collapse Sinkhole Formation .....	85
Figure 42: Levee Failure Mechanisms .....	87
Figure 43: 2014 Levee Failure in Novato.....	88



Figure 44: City of Novato Sea Level Rise Impact .....91  
 Figure 45: Projections of Sea Level Rise in the San Francisco Bay Area, 2000-2100 .....92  
 Figure 46: Heat Index.....93  
 Figure 47: Annual Average Temperatures in the San Francisco Bay Area, 2000-2100 .....94  
 Figure 48: Beaufort Wind Scale .....95  
 Figure 49: Enhanced Fujita Scale .....96  
 Figure 50: Waterspout Formation.....96  
 Figure 51: City of Novato Tsunami Critical Facilities and Infrastructure .....98  
 Figure 52: Federal, State and Local Responsibility Areas in the Marin County OA..... 100  
 Figure 53: Fuel Model Map for the Marin County OA ..... 101  
 Figure 54: City of Novato Wildfire Critical Facilities and Infrastructure.....104  
 Figure 55: Trends in the Annual Number of Large Wildfires in the United States..... 106  
 Figure 56: City of Novato Land Use Map – Open Space ..... 139

**List of Tables**

Table 1: City of Novato Local Hazard Mitigation Planning Team Members .....8  
 Table 2: 2023 MJHMP Local Planning Team Members..... 12  
 Table 3: City of Novato & Marin County OA MJHMP Planning Meetings ..... 16  
 Table 4: City of Novato Estimated Jurisdictional Population .....28  
 Table 5: Population Change of The City of Novato .....28  
 Table 6: Languages Spoken in Novato.....28  
 Table 7: Marin County OA Jurisdictional Housing Stock .....29  
 Table 8: NRI Hazards and Marin County OA MJHMP Hazards..... 31  
 Table 9: NRI Hazard Type Risk Index for Novato Census Tract 1022.03 .....32  
 Table 10: NRI Hazard Type Risk Index for Novato Census Tract 1032.00 .....33  
 Table 11: NRI Hazard Type Risk Index for Novato Census Tract 1012.00 .....34  
 Table 12: NRI Hazard Type Risk Index for Novato Census Tract 1022.02 .....35  
 Table 13: NRI Hazard Type Risk Index for Novato Census Tract 1041.02 .....36  
 Table 14: Household Income for The City of Novato as of 2019 .....38  
 Table 15 City of Novato Civilian Employed Population 16 years+ by Industry..... 39  
 Table 16: City of Novato Critical Facilities..... 42  
 Table 17: Historic Sites In The City of Novato.....43  
 Table 18: Select Hazards Magnitude/ Severity Scale or Index.....46  
 Table 19: City of Novato Hazard Risk Assessment.....54  
 Table 20: Hazard Risk Assessment.....55  
 Table 21: City of Novato Critical Facilities in the Flood Zones .....81  
 Table 22: City of Novato Future Growth Areas..... 109  
 Table 23: City of Novato Legal and Regulatory Capabilities ..... 115  
 Table 24: City of Novato General Plan ..... 116  
 Table 25: City of Novato Administrative and Technical Capabilities ..... 118  
 Table 26: City of Novato Fiscal Capabilities..... 119  
 Table 27: City of Novato Community Outreach.....120  
 Table 28: City of Novato NFIP Status .....124  
 Table 29: Status of Previous Hazard Mitigation Actions..... 129  
 Table 30: City of Novato Current Hazard Mitigation Actions..... 136



## ACRONYMS/ABBREVIATIONS

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

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

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

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

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

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