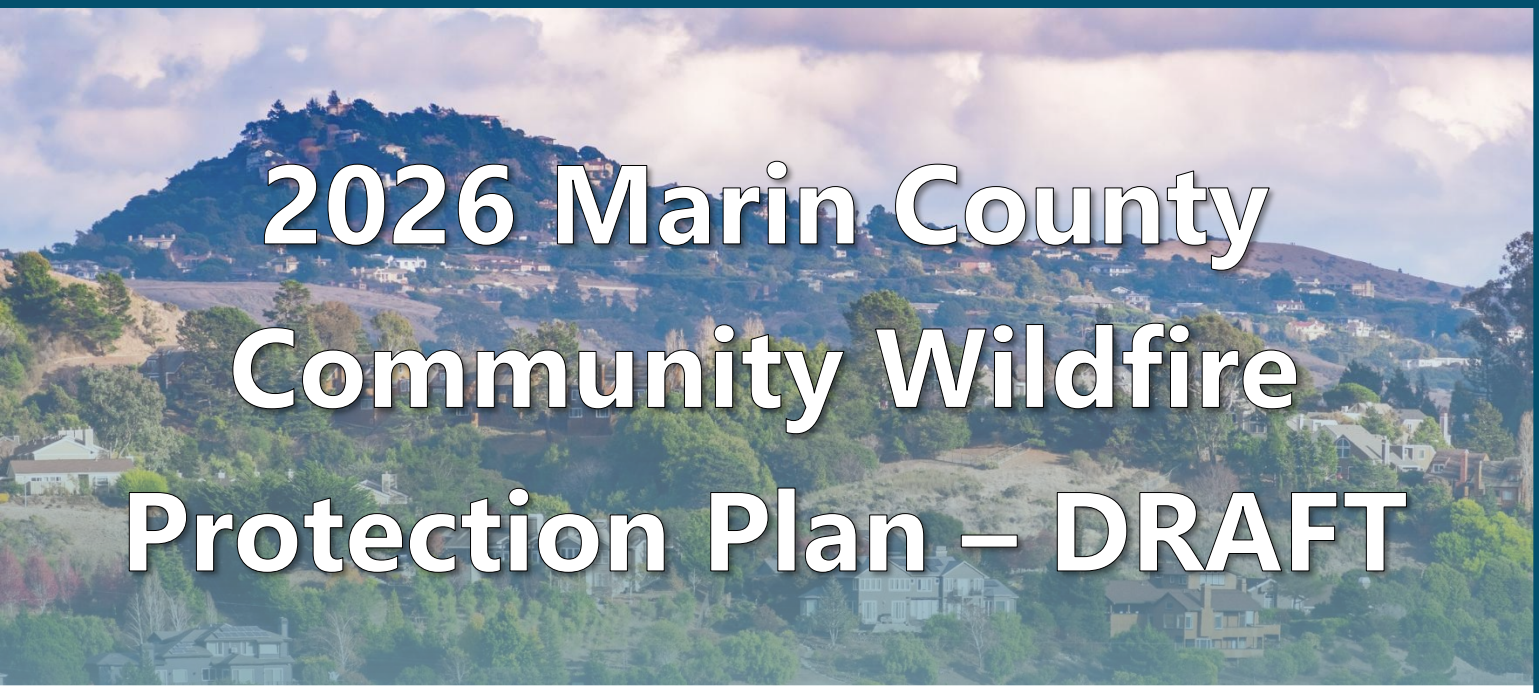

2026 Marin County Community Wildfire Protection Plan – DRAFT

This document contains blank pages to accommodate two-sided printing.

Contents

Tables

Executive Summary

Overview

The 2026 Marin County Community Wildfire Protection Plan (CWPP) establishes a unified, countywide framework for reducing wildfire risk to communities. The purpose of the CWPP is to identify where wildfire risk is highest, where communities are most vulnerable, and where investments in mitigation can deliver the greatest reduction in potential wildfire impacts.

This CWPP provides a unified action plan for wildfire risk reduction for the many stakeholders in Marin, including land managers, fire agencies, utilities, emergency managers, and resident groups. It was developed through a collaborative, multi-agency planning process that brought together fire agencies, land managers, Marin County departments, cities and towns, and other stakeholders. The process included an inventory of existing conditions and an assessment of current programs. In addition, the CWPP integrated a wide variety of science-based risk analyses to provide a robust, quantitative view of risk. This comprehensive approach ensures that the Plan accounts for existing investments in wildfire risk reduction and provides a forward-looking set of recommendations that reflect both local expertise and the best available wildfire science. This comprehensive CWPP provides a common, justifiable narrative to help residents, community groups, and agencies align to promote a safer, more fire adapted Marin County.

The CWPP is a dynamic and actionable planning framework that supports coordinated decision-making processes across County agencies. By combining multiple lines of evidence, including potential wildfire behavior, the likelihood of ignitions in given locations, community exposure, evacuation difficulty, structure vulnerability, and fire response capacity, the prioritization framework provides data-driven, geographically specific recommendations for implementing the policies, projects, and programs with the greatest opportunity to reduce wildfire risk. This CWPP uses a consensus-based approach to support transparent, defensible, and explainable prioritization rationale. The framework is designed to be repeatable and updateable over time as projects are implemented, conditions change, and new information becomes available.

Deliverables

Key deliverables from the CWPP include:

- A countywide summary of wildfire risk and a prioritized set of geographically specific opportunities for risk reduction, based on conditions as of 2025.
- A dynamic, updatable prioritization framework that can be used in future years to refresh recommendations as conditions change and mitigation projects are implemented.

- A public-facing storymap that explains the CWPP process, findings, and recommendations in a clear and accessible way and helps residents understand how the Plan supports community safety.
- A set of supporting datasets, maps, and technical resources that enable agencies to integrate wildfire risk and fire behavior information directly into project planning, grant applications, and program implementation.

Cross-Cutting Recommendations

This CWPP identifies several overarching strategic principles for fire planning and investment in Marin County:

Fire Adaptation, not Fire Exclusion: Fire is a natural and necessary ecological and cultural process in Marin County's ecosystems. Wildfire preparedness programming should be based on the expectation that wildfires will continue to occur in these fire-adapted landscapes. The objective of County and local programs should be to reduce the impacts of wildfires on life, property, and critical community assets, rather than to attempt to prevent wildfires altogether.

Prepare for a Changing Climate: Climate change is lengthening and intensifying fire seasons in Marin County. Planning should anticipate longer fire seasons, more severe autumn fire weather events, increased fire activity outside of the traditional dry season, and more severe multi-year droughts. More frequent wintertime atmospheric rivers are anticipated to produce robust annual grass crops, elevating the risk of rapid fire spread in subsequent dry seasons. "Routine" fire weather conditions are expected to increase in frequency and severity, placing additional strain on fire resources in the County. Fire prevention efforts should be designed for more frequent and more severe wildfire activity. Fire response agencies should plan for year-round fire seasons with increased fire danger throughout the year. The risk reduction activities in this plan are prioritized with the implicit understanding that climate change will drive longer, more intense fire seasons and fire suppression staff will be taxed due to increased fire frequency and severity.

Prioritize Community Safety: Prioritize programs that reduce risks to life and property. Mitigation efforts should focus on addressing the vulnerabilities that allow fire to become established and spread within communities and on ensuring safe evacuation and reliable warning systems. After these critical vulnerabilities are addressed, additional investments can target other values at risk to provide broader community and environmental benefits.

Continuous, Coordinated, and Systematic Wildfire Risk Reduction: Alignment and coordination across agencies, jurisdictions, and programs are essential to achieving meaningful risk reduction. Focus on targeted, cross-cutting initiatives rather than isolated or distributed projects. Coordinated action across jurisdictions and tactics can produce compounding benefits that exceed the impact of many independent initiatives. Integrated, place-based efforts, such as pairing targeted vegetation

management with intensive on-parcel risk reduction within a single neighborhood, can deliver more effective and durable risk reduction outcomes than programming without geographic and thematic alignment. Further, consider integrating wildfire risk into plans for new development in the County and ensure that land use planning works systematically with fire prevention planning. Progress should be evaluated using standardized, data-driven performance metrics wherever possible.

Plan Explicitly for Rare, Catastrophic Events: The greatest wildfire losses occur during rare, extreme wind-driven fires exacerbated by severe drought conditions. Preparedness, mitigation, and evacuation planning should explicitly account for these high-consequence scenarios in addition to average or most-likely scenarios. Risk reduction activities designed to meet the most severe wildfire scenarios are also likely to be effective during average scenarios; however, the opposite is not always true.

Local Operational Playbooks: Fire agencies and evacuation managers should create operational pre-plans for evacuation and firefighting response under a variety of likely fire scenarios. Emergency managers should communicate evacuation routes in advance and work with communities to ensure evacuation plans are in place and understood. Agencies should consider expanded efforts to identify potential congestion points and evaluate the role of temporary fire refuge areas (TFRAs) where appropriate. Planning should include residents, community groups, fire agencies, and facilities or populations with special needs.

Demographic-Specific Planning: Wildfire preparedness and risk reduction programs should be designed to meet the needs of Marin County's communities. Data sources such as the Marin Wildfire Risk Perceptions Survey can be used to identify population-specific needs and barriers. Outreach, education, and assistance programs should be tailored to reach these resident groups. Consider enhancing partnerships with community-based organizations, expanding needs-based grants programs, and providing targeted support for renters, socially vulnerable populations, and others who may face structural barriers to residential wildfire risk mitigation.

Emphasize Resident Action: Residents play a critical role in reducing wildfire risk at both the parcel and community scale. Programs should continue to emphasize the importance of low-cost, high-impact actions for homes, including vent and gutter screens, an ember-resistant 5-foot zone around the home (Zone Zero), and replacing combustible fences. Education, incentives, and enforcement should be coordinated between community organizations and fire agencies to increase adoption of fire-safe landscaping and home hardening practices. Consider focusing incentive programs to areas where fire may transition into the built environment and where public dollars can be most effective in reducing community risk.

Partner for Landscape Resilience: More than 50% of the land in Marin County is protected open space, which includes a mosaic of county, state, and federal parklands and preserves. These lands are recognized globally as a biodiversity hot spot and are included in the Golden Gate Biosphere Reserve designated by UNESCO in 1988. As identified in the Marin Regional Forest Health Strategy (*Forest Health Strategy*), a Regional Priority Plan developed with funding from the Department of

Conservation's Regional Forest and Fire Capacity Program, the more than 118,000 acres of forest and woodland in Marin County are irreplaceable natural resources. The *Forest Health Strategy* details how Marin's land managers and fire agencies are working together to advance actions that will promote forest health and ecosystem resilience at landscape scale in the face of climate change and other stressors. This CWPP will support continued collaboration to ensure fire prevention and landscape resilience efforts are complimentary and coordinated wherever they intersect.

Vision for Implementation

The CWPP is designed to be used as a reference for prioritizing wildfire resilience investments, designing projects, and coordinating programs across agencies. It is intended to inform budgeting, grant applications, capital planning, and annual work programs.

In addition, the CWPP can steer policy discussions, drive changes to local and state building codes and ordinances, and promote insurability in Marin County. While the primary goal of the plan is to

The CWPP framework and underlying datasets will be updated annually; completed projects will be reflected in the data, priorities will be recalculated, and programs will adapt based on measured outcomes.

The CWPP is not designed to supplant local expertise. Local fire agencies bring place-based knowledge that helps to contextualize and operationalize the recommendations in the CWPP into programs and tactics appropriate at the neighborhood scale. Instead, the CWPP is designed to outline a set of strategic guiding principles and foster inter-agency communication among fire and land management agencies in Marin County.

1. Approach and Framework

The 2026 Marin County Community Wildfire Protection Plan (CWPP) provides a science-based assessment of wildfire hazard and wildfire risk in Marin County, California. This CWPP's purpose is to guide fire agencies, land managers, and community stakeholders in identifying and implementing coordinated, effective, and durable programs to reduce wildfire risk, protect life and property, and enhance long-term community resilience.

This is the fourth edition of the Marin County CWPP. Building upon previous plans published in 2005, 2016, and 2020, the updated CWPP provides new recommendations based on the latest available wildfire science, improved spatial risk assessments, and new analytical approaches to reflect the evolving wildfire environment in Marin County. The updated CWPP is dynamic and forward-looking, and emphasizes programs with measurable risk reduction outcomes for communities.

Fire speed, size, and severity are increasing across the globe. As extreme fire behavior and wildfire disasters become increasingly common, Marin County must continue to recognize, mitigate, and adapt to potential wildfire threats to communities. Because budgets are limited, it is equally important that agencies effectively prioritize their limited resources to support the programs with the highest potential for risk reduction in the areas where the threat is greatest.

This plan focuses on identifying and prioritizing risk reduction opportunities with the highest potential for improving community safety and reducing the risk to critical infrastructure. In particular, the assessments focus on:

- **Structures:** Marin is home to about 255,000 people living in more than 112,300 households. This plan provides targeted recommendations for structural hardening and defensible space to reduce the likelihood of home ignition, as well as areas where vegetation management could slow fire spread, reduce fire intensity, and increase the probability of successful firefighter engagement before structures are impacted.
- **Roads and Evacuation Routes:** The safety of lives is critically important during a wildfire. The CWPP evaluates evacuation routes and identifies (1) opportunities for roadside clearance to increase fire resilience; (2) improvements to alerting systems to help residents know when, where, and how to safely evacuate; and (3) integrated vegetation management in the open space to lower the chances of fast-moving fires reaching evacuation routes while residents are evacuating.
- **Utilities and Infrastructure:** Water, electricity, and communication systems are critical assets needed for a community to thrive. The CWPP addresses risks to these assets and provides recommendations for vegetation management around these assets to ensure that residents have access to safe drinking water, emergency communications and alerts systems, and continuous electricity.

- **Watersheds:** The majority of Marin's clean drinking water is supplied by watersheds within the county. The CWPP identifies opportunities for preserving access to clean water through vegetation management in order to prevent abnormally high fire severity during a wildfire, reduce tree mortality, and limit the likelihood of post-fire mudslides. The plan leverages the Marin Regional Forest Health Strategy to integrate ongoing science-based, ecological resilience planning and implementation efforts operating at landscape scale.
- **Schools, Hospitals, and Emergency Facilities:** Critical community assets like schools and hospitals are important to the long-term health of the community and may require additional time or resources to safely evacuate. The CWPP identifies the location of these assets in the context of fire spread patterns and highlights opportunities for evacuation planning and other forms of risk reduction efforts to these important locations.
- **Demographics:** Marin is home to people from many backgrounds. The CWPP addresses risks to traditionally underserved populations by integrating census data and local survey data and provides recommendations designed to meet the needs of Marin's residents.

This CWPP focuses on actions that directly reduce risk to people, homes, and critical infrastructure. Activities such as hardening homes, reducing fuels near communities, and improving detection and alerting systems lower the likelihood of impacts to lives and property during wildfires and escaped prescribed fire operations. As these risks decrease, fire agencies gain greater flexibility to implement large-scale prescribed burning with fewer constraints and stronger public support. The CWPP prioritizes immediate, community-level risk reduction with the goal of unlocking effective, long-term, landscape-scape wildfire management in the future.

In accordance with the U.S. Healthy Forest Act of 2003, the CWPP provides specific, prioritized recommendations for vegetation management and structural hardening. Numerous stakeholders were involved in the preparation of the CWPP, and outreach and engagement with land managers, fire officials, and the public were key elements of the plan's development.

Unlike previous CWPPs, which comprised a standalone planning effort every five to ten years, this CWPP introduces a dynamic prioritization framework. The data, models, and resulting recommendations are updated annually as risk in the county changes. As risk reduction activities are completed (such as shaded fuel breaks and home hardening), the component risk assessments can be updated and the prioritization process re-run so that new prioritized lists of activities are generated. The goal of the dynamic system is to promote annual, ongoing, coordinated fire risk reduction activities across the county and to provide stakeholders with timely, science-driven information to guide decision-making processes over the next five to ten years.

To guide subsequent project-specific analyses and additional planning efforts, a variety of GIS data layers are included as a key output of this CWPP, such as:

- Fire behavior characteristics (including flame length, rate of spread, and ember distribution)
- Fire pathways and community entry points

- Fuel model and vegetation structure data
- Fire resilient roads
- Fire response time analysis
- Structure separation distances

1.1 Guiding Principles for the 2026 CWPP

The 2026 edition of the Marin County CWPP is designed to deliver actionable, scientifically grounded guidance for fire agencies, land managers, and community partners. The CWPP is guided by the following principles:

- **Actionable:** Analyses and recommendations are spatially explicit and tied to specific actions with measurable outcomes.
- **Data-Driven and Stakeholder Informed:** Recommendations are grounded in the best available science, modeling, and data and are refined through engagement with local fire agencies, land managers, and community stakeholders to integrate local expertise and ensure feasibility.
- **Prioritized:** The plan identifies opportunities for risk reduction and ranks recommendations based on wildfire risk, supporting informed decision-making processes and helping agencies allocate limited budgets to programs that have the greatest impact.
- **Comprehensive:** The CWPP evaluates wildfire impacts across several themes, including vegetation management, residential risk reduction, evacuation, alerting, detection, and protection of critical infrastructure, creating a broader scope than previous CWPPs.
- **Dynamic:** The framework is designed to evolve over time, reflecting completed mitigation projects, new programs and policies, updated science, and future changes in land use and development patterns.
- **Supportive:** The CWPP is both informed by, and can inform, local subject matter experts in their decision making.

1.2 Assumptions and Limitations

The CWPP is a strategic planning document, aimed to help guide high-level programming and policy discussions for community risk reduction at an annual timescale. This approach provides a useful alignment of Marin County stakeholders and creates a shared risk reduction framework; however, it comes with several important assumptions and limitations:

- The CWPP and associated modeling efforts complement local knowledge and expertise. The CWPP is designed to provide a science-based, data-driven tool for staff to incorporate into program development; however, each agency brings local, on-the-ground expertise that will

help further refine project design and implementation. The combination of data-driven analysis and ground-truth expertise is a strong combination for building successful, effective programs.[1]

Because one potential use of the CWPP system is to seek funding for risk reduction activities, local practitioners are encouraged to use the many data layers and quantitative modules of the CWPP to construct grant applications and project proposals for programs that align with local expertise. While the relative prioritization rankings and zone-specific summaries are key outputs to this work, areas not mentioned in these summaries may still be high-priority candidates for risk reduction. Program staff can use the many fire modeling and risk assessment tools to identify characteristics that highlight the unique risks to those areas. When paired with on-the-ground expertise and locally focused narrative, the data provided by the CWPP can help quantify and guide program design while bolstering local funding applications.

- The CWPP is based on modeling of wildfire behavior and characteristics. While these models are widely used throughout Marin County and the western United States, they come with inherent assumptions. Although these models are useful and help provide robust, quantitative risk assessments, their results should always be interpreted in conjunction with local expertise.
- The CWPP is designed to evaluate and prioritize risk reduction activities in and around the wildland urban interface. While Marin's open spaces can support wildfire growth, this plan focuses specifically on the areas where wildland fire can come into contact with homes and community infrastructure. In collaboration with fire prevention agencies, land managers in Marin continue to plan and implement projects to reduce fuel accumulation, increase wildfire resilience, and promote forest health on open space and watershed lands. This CWPP acknowledges those contributions and builds on them to produce recommendations for community risk reduction. The Marin Regional Forest Health Strategy,[2] a Regional Priority Plan developed with funding from the California Department of Conservation's Regional Forest and Fire Capacity Program, provides a comprehensive framework to promote forest health and wildfire resilience at landscape scale in Marin County. Since releasing the *Forest Health Strategy* in 2023, One Tam partners Marin County Parks, California State Parks, Marin Municipal Water District, the National Park Service, and the Golden Gate National Parks Conservancy, together with the Federated Indians of Graton Rancheria and other regional partners, have leveraged grant and agency funding to increase the pace and scale of this critical work.
- The datasets that the CWPP relies upon can be incomplete, and additional datasets that would help further refine CWPP recommendations may be unavailable. For example, the CWPP lacks information about road widths throughout the county, limiting the ability to

[1] National Academies of Sciences, Engineering, and Medicine. (2017). *Using Science as Evidence in Public Policy*.
[2] Golden Gate National Parks Conservancy. (2023). Marin Regional Forest Health Strategy. Tamalpais Lands Collaborative (One Tam). https://www.onetam.org/our-work/forest-health-resiliency

evaluate constrained evacuation flow due to narrow, congested roads. Project staff and program managers should become familiar with the strengths and the limitations of the available datasets and evaluate whether additional data should be collected prior to program implementation. As a dynamic tool, this CWPP will be updated regularly and can incorporate new datasets as they become available. Through the CWPP processed, datasets requested by stakeholders but were unavailable or incomplete included:

- Road widths
- Evacuation travel paths and traffic modeling
- Fire response timing from computer-automated dispatch (CAD) systems in the county
- Fire ignition locations from county CAD systems
- Drinking water infrastructure and assets
- Urban conflagration analysis
- Cell phone and data network coverage

1.3 Previous Marin County CWPPs

Previous Community Wildfire Protection Plans for Marin County were completed in 2005, 2008, 2016, and 2020.[3] As the fourth update to the CWPP, this plan builds on the strategic objectives established in earlier editions. It refreshes and improves the assessment of wildfire risk across the county by integrating new tools for assessing wildfire likelihood, severity, and consequences and integrates local knowledge from land managers and fire officials from a wide stakeholder coalition. Further, it strengthens recommendations to reduce losses of life, property, and critical community assets due to wildfires and provides geographically specific guidance to support effective mitigation planning.

Since the last CWPP was completed in 2020, the wildfire environment has changed in several significant ways: fire behavior has intensified, large and fast-moving fires have become more common, and impacts in the wildland-urban interface (WUI) have increased in the form of urban conflagration fires. These changes reflect the need for a forward-looking mitigation strategy that prioritizes specific activities and adapts to new threats.

Nationally, developments since 2020 include:

- Substantial increase in WUI disaster fires nationally, including the 2021 Marshall Fire (Colorado), the 2023 Lahaina Fire (Hawaii), and the 2025 Palisades and Eaton Fires (California). Each of these fires destroyed thousands of homes and critical community assets, making them some of the most destructive fires in history.

[3] In addition, as a contract county, Marin County Fire and CAL FIRE jointly prepare and periodically update the Marin County Unit Strategic Fire Plan. The Unit Plans draw heavily on the Marin County CWPP.

- Increasing effects of climate change, including an increase in high severity days with abnormally high vapor-pressure deficits. Dry conditions lead to increases in dry, flammable fuels and seasonal droughts in many parts of the country.[4]
- Continued increases in fire size and the frequency of "megafires," with exceptionally large fires becoming more frequent. Nationally, the August Complex (2020), the Dixie Fire (2021), and the Smokehouse Creek Fire (2023) each burned over a million acres.
- Large-scale investments have been made in wildfire preparedness and fuel reduction. Nationally, the Bipartisan Infrastructure Law (2021) and Federal Emergency Management Agency (FEMA) programs created new funding streams for wildfire resilience projects. In addition, California state programs, including those through CAL FIRE and the California Office of Emergency Services (CalOES) have provided funds for local agencies to implement risk reduction activities. Many of these programs are funded through California Proposition 4 (2024), which provides nearly $1.5 Billion for wildfire resilience programs, statewide.
- Increasing availability of technical and data-driven solutions for fire planning and mitigation, including advanced detection, monitoring, and prediction capabilities. Remote sensing has improved, leading to more accurate methods for mapping fuel types and loads. Modeling software has matured and improved, providing more robust assessments of fire risk, possible consequences, and expected return on investment for different risk reduction strategies.
- More nuanced understanding of the drivers of WUI disaster fires. While recent fires have resulted in tragic consequences, scientists have leveraged post-fire surveys and close observation to gain a better understanding of structure-to-structure fire spread dynamics, evacuation bottlenecks, and the effectiveness of different mitigation strategies.

Within Marin County, significant organizational, operational, and analytical advances since 2020 have expanded the county's capacity for pre-fire risk reduction. Key developments include:

- Formation of the Marin Wildfire Prevention Authority, a 17-member agency Joint Powers Authority focused on coordinating wildfire resilience programs in the county. Marin Wildfire is funded by Measure C, a 10-year parcel tax approved by voters, providing approximately $20 million per year in fire prevention funding for Marin County.
- Implementation of approximately 2,000 acres of Measure-C funded vegetation management, and thousands of acres of fuels reduction and forest health projects undertaken by land management and local fire jurisdictions.
- Near-comprehensive defensible space home evaluations in the wildland urban interface, providing detailed data on the vulnerabilities on residential parcels in the county and valuable interactions between residents and fire prevention specialists, through Marin Wildfire's Defensible Space Home Evaluation Program and local equivalents.

[4] Hermann, M., Wernli, H., & Röthlisberger, M. (2024). Drastic increase in the magnitude of very rare summer-mean vapor pressure deficit extremes. Nature Communications, 15, Article 7022. https://doi.org/10.1038/s41467-024-51305-w

- Detailed analysis of risks to evacuation across the county and designation of evacuation routes in accordance with California state bills SB99 and AB747.
- Integration of science-based modeling and strategic measures to guide decision-making processes and track risk reduction progress over time.
- Creation of a centralized Emergency Command Center for Fire and Emergency Medical Services call-taking and dispatching of all fire agencies in the County, providing on-site, 24/7 Command and Control capacity for faster fire response and monitoring.
- Updated Wildfire Hazard Severity Maps covering the State Responsibility Area (SRA) and Local Responsibility Area (LRA).
- Legislation and public policy pushes to guide wildfire resilience throughout the State of California, including AB 3074, which requires homeowners in Very High Fire Hazard Severity Zones to create an ember-resistant Zone Zero (0 to 5 feet from the home).
- Development of the unified Marin Regional Forest Health Strategy (2023), which outlines a science-based, locally informed strategy for maintaining Marin's natural resources, including a detailed discussion of fire ecology and threats to forested ecosystems arising from continued fire suppression and climate change.

Due to the increasing severity of the wildfire environment nationally and the accelerated pace of wildfire resilience locally, coordinated action through an updated CWPP is an important next step for Marin County. The 2026 edition of the CWPP provides an updated assessment of wildfire risk in Marin County and establishes a framework for ongoing risk reduction planning aligned with current conditions, available resources, and emerging best practices.

2. Marin County: Geographic Setting and Wildfire Context

Marin County is located in the North San Francisco Bay Area in California. The county is approximately 520 square miles (332,800 acres) with a population of approximately 254,407.[5] The county is bordered by Sonoma County to the northeast, the San Francisco Bay to the east, and San Francisco to the south, with the Pacific Ocean along its western border. Most of the county's population resides in the eastern, developed region of the county along the Highway 101 corridor. The more sparsely populated west region of the county—in and around the Point Reyes Peninsula—is a popular local tourist region covered by parklands and recreation areas. The northwest of the county is rural, agricultural rangeland.

County-wide, approximately 60,000 acres (18% of the county's land area) falls within the WUI where residences (i.e., homes and other structures) are adjacent to or intermixed with open space and wildland vegetation.

2.1.1 Fire History and Ignition Patterns

Marin County's native vegetation evolved with the presence of frequent wildfires, ignited both by natural causes (lightning) and by the Coast Miwok. Short intervals of 2 to 20 years between wildfires promoted the health and regeneration of native grasslands, oak woodlands, and forests, favoring plant species that were best adapted to fire. These frequent, low-intensity wildfires were beneficial to sustaining a heterogeneous landscape, supporting and expanding native grasslands, increasing biodiversity, and maintaining the productivity of chaparral and coastal scrub ecosystems.

Today, most wildfires are suppressed due to their potential to negatively affect human communities and local economies. Decades of suppression have resulted in significant departure from precolonial fire regimes. Many forested areas in the county (>62%) have not burned for more than 70 years; historically, these areas would have likely burned two or three times in this interval.[6] Fire exclusion has negatively impacted ecosystems, changing their structure and composition, and caused fuel accumulation likely to drive more intense fire behavior when a fire does occur.

On average, there have been about 25 wildland fires per year in the county since 2006. Human activity, including recreation, roads, transmission lines, and residential settlement patterns, are responsible for most ignitions in Marin County with roughly 96% of fires within the last 20 years

[5] Census Reporter. (2023). Marin County, CA profile. Retrieved December 11, 2025, from https://censusreporter.org/profiles/05000US06041-marin-county-ca/.
[6] One Tam. (2023). Marin Regional Forest Health Strategy. https://www.onetam.org/sites/default/files/pdfs/marin_regional_forest_health_strategy_2023.pdf

occurring within a quarter mile of urban/developed environments. Only an average of about 1% of attributable fires were caused by natural ignition sources, such as lightning. Mechanical equipment, vehicles, debris burning, power generation and distribution, and smoking are common fire ignition mechanisms. Arson is also a frequent ignition mechanism, as about 8% of fires are started with malicious intent.[7]

Due to robust fire response, fires in Marin County are usually contained by firefighters when they are still very small. Between 2006 and 2020, the median fire size was just 0.1 acre.[8] The most significant fires in Marin County in recent history included the 1995 Vision Fire, which burned more than 12,000 acres and destroyed about 50 structures around Inverness in October 1995; and the 2020 Woodward Fire, which burned about 5,000 acres in remote parts of the Point Reyes National Seashore in August 2020.

• • • Insights • • •

Fire Adaptation, Not Fire Exclusion

Fire is an important cultural and natural ecological process in Marin County's landscapes, many of which are adapted to burn. Human-caused ignitions are likely to occur and may spread rapidly through vegetative fuels. Wildfire preparedness programs in Marin County should be designed with the expectation that fires will occur regularly. The objective of these programs should be to reduce the potential impacts of wildfires on life, property, and critical community assets, rather than to prevent wildfire occurrences altogether.

See the Marin Regional Forest Health Strategy at **https://www.onetam.org/forest-health** for more information on Marin's fire history, the relationship between native ecosystems and fire, Coast Miwok stewardship with fire prior to colonization, and opportunities to partner with the Federated Indians of Graton Rancheria to restore cultural burning and other forms of beneficial fire.

2.1.2 Fire Hazard Severity Zones

Fire Hazard Severity Zones (FHSZ) classify the likelihood and potential intensity of wildfires. The California Office of the State Fire Marshal (OSFM) defines and maps wildfire hazard classifications. Parcels within high and very high fire hazard severity zones must adhere to specific legal

[7] Short, Karen C. 2022. Spatial wildfire occurrence data for the United States, 1992-2020 [FPA_FOD_20221014] (6th Edition). Fort Collins, CO: Forest Service Research Data Archive. https://doi.org/10.2737/RDS-2013-0009.6
[8] ibid.

requirements, including mandatory defensible space, adherence to WUI building codes, and disclosing fire risk during real estate transactions.

In Marin, 4.1% (4,647) of structures are located within a Very High fire hazard severity zone. An additional 10.1% (11,452 structures) are located within a High fire hazard severity zone, and 12.3% (13,979 structures) are located within a Moderate zone. The remaining 76% of structures are located outside of the OSFM's designated zones.

While FHSZs define a legal framework for enforcing defensible space and other requirements, they are a measure of hazard, not risk. While these maps help illuminate where a high-severity fire is likely to occur, they do not show the areas where such a fire would have the greatest consequences on Marin's communities. For example, FHSZ delineations do not incorporate evacuation, alerting, or fire detection programs, nor do they evaluate aspects of the built environment, including defensible space and home hardening or conflagration potential. In contrast, the CWPP is a risk assessment tool that combines both hazard and consequence assessments to evaluate areas for how fire could affect important community values at risk. Thus, the CWPP provides a more nuanced and robust tool for planning and mitigation activities than the FHSZ and is capable of creating an action-oriented plan for risk reduction.

2.1.3 Wildland Urban Interface

The WUI is defined as the area where structures and human development meet or intermingle with undeveloped wildland vegetation.[9] In Marin, there are more than 69,400 homes within the WUI.[10] That figure comprises nearly 62% of the 111,000 housing units in the county.[11]

Due to the large number of at-risk homes within the WUI in Marin County, there is a high risk of fires affecting residences, people, and livelihoods. Throughout this CWPP, the focus is placed on risk reduction activities that can address these impacts to the built environment.

2.1.4 Marin Fire Weather and Climate Projections

Fire Weather

Fire weather patterns are important influences on fire intensity, speed, and direction. Marin County is located in a Mediterranean climate regime where precipitation is concentrated in the winter and early spring. Strong high pressure systems (the Pacific High) combined with cool, moist air over the

[9] Radeloff, V. C., Hammer, R. B., Stewart, S. I., Fried, J. S., Holcomb, S. S., & McKeefry, J. F. (2005). The wildland–urban interface in the United States. Ecological Applications, 15(3), 799–805. https://doi.org/10.1890/04-1413
[10] Halstead, R. (2022, April 22). Marin officials: Housing mandate shouldn't trump safety. Marin Independent Journal. https://www.marinij.com/2022/04/22/marin-officials-housing-mandate-shouldnt-trump-safety/
[11] Metropolitan Transportation Commission. (n.d.). Housing units: Marin County. Bay Area Census. https://census.bayareametro.gov/housing-units?location=marin_county

Pacific Ocean can create persistent fog conditions along the coast and inland valleys for much of the summer. The highest severity fire weather conditions occur in the fall when vegetation is dry at the conclusion of the annual growing season and when large-scale pressure gradients create hot, dry, and windy conditions. Neighboring counties (Sonoma and Napa) have experienced extreme wildfire events during periods of high wind in early October.

The 2025 Los Angeles, 2023 Lahaina, and 2021 Marshall fires highlighted the role of fire weather patterns in driving large-loss urban fires. These disaster fires were driven by a combination of common factors, including:

- Extremely high wind speeds, often blowing downslope and exhibiting mountain wave characteristics
- A wet previous winter, resulting in increased herbaceous vegetation growth
- Sustained drying in the fall and winter, often with delayed season-ending precipitation

These conditions are commonly exhibited in Marin County and are projected to increase in frequency as climate change progresses. High-severity fire weather events in Marin County typically occur in one of two ways:

- **Diablo Wind Events:** This scenario represents a northeast wind event, perhaps the most common driver of high-severity fire weather in Marin County. These winds typically occur in the fall, when a high-pressure system develops over the Great Basin and a low-pressure system sits offshore over the Pacific Ocean; this pressure gradient drives hot, dry air downslope from the continental interior, across the Sierra Nevada and Coast Ranges, and offshore toward the coast. As the air descends, it compresses and warms, leading to very low humidity and high temperatures. Diablo Wind events have driven some of the most consequential fire activity in the Bay Area, including the 2017 Northern California wildfires, the 1991 Oakland Hills fire, and the 1929 Mill Valley fire.
- **West Wind Events:** This scenario represents a dry onshore wind event, occurring when dry air that was previously pushed offshore during a Diablo wind event is driven back inland by a reversal in the pressure gradient. This creates a short-lived but dry and gusty westerly wind blowing from the Pacific Ocean toward the coast. Unlike the typical moist sea breezes, this return flow brings dry air back into coastal areas that were depleted of moisture during the preceding Diablo event. Moist onshore winds are common throughout coastal California, particularly in Marin. Dry onshore winds are rare, occurring only once every several years. However, these events can pose a significant fire risk and present control problems for fires driven by the preceding Diablo event by creating a sudden wind shift.

These two scenarios represent the two most frequent low-moisture, high-wind fire weather patterns facing the county. A detailed review of other potential fire weather events suggests that while fire weather events are experienced differently in different parts of the county, the observed data records

indicate that including alternative fire weather regimes would not significantly change fire prevention planning beyond the northeast and west fire weather scenarios described previously.

For more detailed information on fire weather in Marin County, readers should refer to **Appendix A. Marin County Fire Weather Assessment**.

Climate Change

Climate change is well underway, and changes in fire weather patterns, the timing and duration of annual precipitation, and wind regimes are already occurring in Marin County. While predicting the exact timing of specific weather events is infeasible, evaluating multi-annual trends in humidity, precipitation, temperature, and wind is possible using advanced climate models.

A detailed review of climate change projections for Marin County indicates that fire seasons will become longer. While overall precipitation is projected to increase in the next several decades, the seasonality of this precipitation is likely to create longer periods with limited precipitation. Marin County will experience fewer days in the spring with appreciable precipitation, and season-ending precipitation events in the fall will be delayed. Because October often coincides with peak Diablo wind conditions, an increase in the likelihood of Diablo wind events occurring before the arrival of seasonal moisture is expected. Fire managers should prepare for the increased severity of these events and leverage expanded vegetation management, increased fire response staffing, and coordinated work with homeowners to reduce the impacts of this trend.

Increased winter precipitation during intense atmospheric river events will drive increased herbaceous vegetation (grass) growth and result in elevated fire behavior the following year. Throughout the western United States, atmospheric river precipitation has been shown to correlate with elevated fire risk due to an expected increase in the availability of fine annual grasses and shrubs the following growing season. Fine fuels drive rapid rates of fire spread, particularly during wind-driven fires.

Fire season months are projected to become drier, and consecutive dry periods will lengthen. Increases in the duration of low-moisture periods will increase by up to 30%. Sustained drying will drive increased fire behavior and create elevated fire weather conditions for a greater portion of the fire season. While overall maximum wind speeds are projected to remain similar until at least mid-century, wind speeds during dry periods will increase substantially. An increase in the number of consecutive dry and windy days, paired with this increase in wind velocity, will drive increased fire activity throughout the summer and fall.

Climate models do not indicate an increase in the frequency or characteristics of the highest-severity fire weather events. However, they do indicate a substantial increase in the number of days with low relative humidity and moderate wind speeds. These “average” fire weather days may double by the middle of the twenty-first century. Further, climate models suggest that Marin County will experience an increase in the number of consecutive low-humidity, moderately windy days of at least 20%.

These moderate days are anticipated to expand wildland fire call volume and place an increased strain on fire suppression resources.

For more detailed information on climate change and its effects on fire behavior in Marin County, readers should refer to **Appendix B. Marin County Fire Weather and Climate Change Assessment**. For more insight into the potential effects of climate change on Marin's forest ecosystems see Chapter 4: Climate Change and other Forest Health Stressors, in the Marin Regional Forest Health Strategy.[12]

• • • Insights • • •

Fire Operations Should Consider Out-of-Season Weather Events

For fire prevention planning purposes, the two primary extreme fire weather scenarios (west and northeast) capture the dominant fire dynamics and should be used to prioritize risk reduction activities with the greatest benefit. However, from an operational perspective, fire managers should consider out-of-season fire weather events capable of bringing significant fire weather to Marin County outside of the normal fire season (e.g., a Diablo-type event occurring in December or January). Consider staffing and response capabilities in the context of these potential events.

Prepare for an Increase in the Frequency of Moderate Fire Weather

Fire managers should plan for an increased number of dry, moderately windy days that will increase the workload for fire response agencies throughout the fire season. Consider expanding public engagement campaigns to reduce ignitions during elevated fire weather periods and actively engage residents on local evacuation protocols. Agencies should also consider increasing staffing and equipment capabilities to handle the additional wildland call volume.

2.1.5 Demographics

While Marin County is one of the most affluent counties in the United States, with more than 37% of residents earning more than $200,000 annually, the county is also home to many lower-income,

[12] https://www.onetam.org/sites/default/files/pdfs/marin_regional_forest_health_strategy_2023.pdf#nameddest=Ch4_ClimateChange_Stressors

linguistically isolated, and traditionally underrepresented residents. These populations have fewer resources and face structural and linguistic barriers to wildfire preparedness.

Approximately 47% of Marin County's population resides in areas with median household incomes below 80% of the statewide median.[13] An estimated 9.1% of residents live below the federal poverty line.[14] Low-income residents are located throughout the county, but are most common in the Canal neighborhood of San Rafael, central Novato, and Bolinas. Many lower-income residents rent their homes and are not responsible for the maintenance of their home or landscaping, which make traditional resident education programs that focus on defensible space and home hardening ineffective. About 34% of all households are renter-occupied.[15]

About 18% of Marin County's population is estimated to live in households where English is spoken not at all or less than well.[16] Residents in below or near-poverty and other lower-income households are disproportionately affected by language barriers, which can complicate access to emergency information, evacuation guidance, and mitigation programs. Spanish is the most commonly spoken non-English language in the county.[17]

People of color often face structural barriers that can limit access to emergency preparedness resources and services. The Canal and Spinnaker Point areas of eastern San Rafael, the Davison and Rowland areas of Novato, and Marin City have high populations of non-white residents. In West Marin, transient farm worker communities also face structural barriers to preparedness resources and may struggle to find resources and alerts in their language. Alternative information channels, such as increased wildfire focus by community-based organizations in these areas, may be appropriate.

Finally, more than 23% of the county's population is over the age of 65.[18] Projections indicate that this segment of the population will continue to grow in the coming years. Aging populations face additional challenges to disaster preparedness and evacuation. In addition to mobility difficulties, older adults may face particular challenges using technology, an important part of understanding when and how to evacuate. Indeed, nationwide, it is estimated that less than one in ten adults over the age of fifty are subscribed to disaster related apps or text notifications from local emergency management agencies,[19] and so may benefit from alternative communication mechanisms.

[13] Data from the California Climate Investments Priority Populations dataset. https://www.caclimateinvestments.ca.gov/priority-populations
[14] Data from the US Census Bureau.
[15] Ibid.
[16] Data from the CalEnviroScreen dataset. https://oehha.ca.gov/calenviroscreen/report/calenviroscreen-40
[17] Data from the Marin Wildfire Risk Perceptions Survey.
[18] Data from the U.S. Census Bureau.
[19] AARP Research. (2023, August 30). *Older adults could be better prepared for natural disasters*. AARP. Available at https://www.aarp.org/pri/topics/technology/internet-media-devices/disaster-preparedness-50-plus/

• • • Insights • • •

Risk Based Grants

Consider implementing grants programs that incorporate both risk and need. Many areas of high wildfire risk also have high average incomes; conversely, many areas of lower wildfire risk have the greatest proportion of socially vulnerable people. For grants and incentive programs, consider identifying areas where high wildfire risk overlaps with high social vulnerability. The tools produced in this CWPP should help identify these areas on an ongoing basis. Grants that target areas that have high wildfire risk and address the financial needs of residents can have outsized impacts on risk reduction in high consequence areas.

Bridging the Digital Divide

Because of the high proportion of older adults in Marin, resources to help this population navigate the technology needed to receive and respond to emergency alerts could be particularly useful during a large-scale evacuation.

Engage the Renter

Consider implementing programs that empower renters to work with landlords to create defensible space and home hardening. Work with CBOs and other groups to ensure that renters carry adequate renters insurance, have evacuation plans, and are registered for emergency alerts at their current address.

For more detailed information on the unique programming needs of socially vulnerable residents in Marin County, readers should refer to **Appendix C. Marin County Social Vulnerability Assessment**.

2.1.6 Marin County Values at Risk

A core component of the CWPP is to identify the likely consequences of a fire when it occurs. To do this, local, state, and federal GIS datasets were used to identify values at risk. Values at risk are homes, businesses, community infrastructure, and other assets needed for a thriving community.

Homes

There are approximately 112,359 living units in Marin County with a median home value of approximately $1.5 million. The built environment is concentrated in and around the Highway 101

Corridor. Other areas are more rural with larger lots and more isolated structures. About two-thirds of households are owner-occupied; the remainder are occupied by renters. Approximately 72% of residences are single-family homes; multi-unit buildings account for about 27% of households.[20]

The population in Marin County is relatively stable. More than 90% of residents live in the same house that they lived in a year ago and about 40% of residents moved into their current home before 2010. The average household is home to 2.4 people.

Many of Marin's communities are densely developed with low structure separation distance. Recent disaster fires have spread through the built environment via structure-to-structure spread, highlighting the importance of structure separation distance and community design in fire spread. Structure separation distances can be used as a proxy for areas where a fire could spread by radiant and convective heat between structures. Countywide, the median separation distance is just 16.7 feet. More than 68% of structures are less than 30 feet from their nearest neighbor. Just 12% of structures are located more than 100 feet from their nearest neighbor.

Structures located less than 30 feet from one another are at the highest risk of ignition via structure to structure spread. Areas that have low separation distances, are contiguous with vegetative fuels, and have on-parcel vulnerabilities, are those at the greatest risk of setting off a cascade of structure-to-structure ignitions. Expanded defensible space and coordinated residential risk reduction in these communities are recommended.

Wildfire and Insurance

High wildfire risk to homes in Marin County has recently led to a secondary problem: insurability. Like many other Californians, many residents in Marin County face difficulty obtaining insurance coverage from major carriers.[21] Difficulties getting insurance in high wildfire risk areas can have downstream impacts on housing markets, as prospective homebuyers are often unable to secure the insurance required by lenders to finalize a mortgage. With more than $101 billion in total property value, a healthy real estate market is an important element of a stable economy in Marin County.[22]

The California FAIR plan, the insurer of last resort, insures more than 4,360 policies in the county, accounting for nearly $7.4 billion in value. FAIR plan enrollment in Marin grew by 72% between 2023 and 2024 and another 51% between 2024 and 2025.[23] Mill Valley has the greatest concentration of FAIR plan policies in the county. FAIR plan policies tend to be expensive and have lower limits on coverage than traditional policies. Further, after the 2025 LA fires, the FAIR plan was sued over

[20] Ibid.
[21] Federal Reserve Bank of San Francisco. (2023). Climate risk and the housing market: Evidence from wildfire-prone areas. https://www.frbsf.org/
[22] County of Marin. (2023, June 29). Marin's assessment roll climbs 6.34% countywide. https://www.marincounty.gov/news-releases/marins-assessment-roll-climbs-634-countywide
[23] California FAIR Plan Association. (2025). Policy growth by fiscal year (residential, commercial and BOP lines): Data by county (FY25 report). https://www.cfpnet.com/wp-content/uploads/2025/11/CFP-5-yr-PIF-County-FY25-All-251114.pdf

allegations of systematically denying and limiting smoke damage claims.[24] While the FAIR plan provides an important safety net, it is not a viable alternative to a healthy, competitive private insurance market.

In high risk areas like Marin, parcel- and community-scale mitigation can reduce not only structure-losses but facilitate real estate transactions and reduce lending friction by improving a property's wildfire risk score in the eyes of an insurer. The California Department of Insurance's Sustainable Insurance Strategy now encourages insurers to incorporate variables related to property characteristics and local mitigation conditions with the goal of aligning mitigation actions with insurance availability and pricing.

While the end goal should not be insurability, the risk reduction activities addressed in this CWPP can help to create an environment that is safer for homes and more defensible for insurers.

Utilities

Water, electricity, and communications infrastructure are foundational community assets that ensure residents can continue to access clean drinking water, reliable power, and timely emergency information during and after wildfires. Disruption to these systems can rapidly escalate risk by affecting public health, evacuation, firefighting operations, and recovery.

Water facilities include pump stations, dams, and other facilities that facilitate water distribution. Water facilities are located throughout the county but are concentrated within and around the Mount Tamalpais watershed, which provides more than 75% of the drinking water consumed by Marin residents. The CWPP includes 44 water facilities, including 26 pump stations, 8 dams, and 10 other distribution facilities.

Electric infrastructure includes power generation facilities, transmission lines, and substations. Recent wildfire history has demonstrated that electrical infrastructure can both contribute to ignition risk and be highly vulnerable to wildfire impacts. Wildfire-caused power outages can disrupt water delivery, communications, medical services, and evacuation operations, compounding overall community risk. The CWPP includes 60 electric stations and about 130 linear miles of transmission lines.

Communications infrastructure is vital to ensure residents receive emergency alerts and communications. Communications assets include cell towers and AM/FM broadcasting towers. Loss or damage to these installations can significantly impair emergency response and public safety, particularly in fast-moving fire scenarios or during power outages. The CWPP includes 165 communications assets. A future update of the plan could also incorporate cell phone and data network coverage; however, a reliable countywide data source was not available for this analysis.

[24] California Department of Insurance. (2025, August 1). Department of Insurance expanding coverage for Californians who need it most. https://www.insurance.ca.gov/0400-news/0100-press-releases/2025/release054-2025.cfm

Community Facilities

Marin County has a wide variety of community facilities, including schools, healthcare facilities, government and emergency response buildings, and community centers. These facilities serve as important community gathering places and provide essential services, but they also pose unique evacuation and fire management challenges. Many host large numbers of people, serve vulnerable populations, or require coordinated transportation and staff assistance to evacuate safely, and some must maintain critical operations during emergencies. These factors can complicate evacuation timing, traffic management, and emergency response, and increase the consequences of delayed or disrupted evacuation. As a result, community facilities warrant special consideration in wildfire preparedness planning, including site-specific evacuation planning, coordination with facility operators and first responders, and, where appropriate, enhanced defensible space, vegetation management, and structural hardening.

Marin County public schools serve approximately 30,077 students. As of 2025, there were 46 public elementary schools, 9 public middle schools, and 8 public high schools,[25] with an additional 49 private schools educating about 8,600 students.

Emergency healthcare infrastructure is essential for maintaining life-safety services during and after a wildfire event. Hospitals are highly sensitive to wildfire impacts, including smoke infiltration, road closures affecting staff access, and reliance on stable utility grids. A loss of function at these facilities can severely strain regional emergency capacity during an emergency. The CWPP evaluates risk for three major hospitals.

Fire stations and law enforcement installations represent the frontline of public safety and incident management. Fire stations are the primary defense nodes for community protection, housing the personnel and equipment required for initial attack and structure defense. Law enforcement infrastructure is equally foundational to coordinating large-scale emergency response, serving as the nerve centers for emergency logistics and traffic control. Protecting these stations is critical to ensuring that fire suppression, rescue capabilities, and evacuation coordination remain operational throughout a wildfire's duration. The CWPP includes 48 fire stations and 17 law enforcement assets.

Aviation infrastructure serves as a critical logistics hub for both regional mobility and aerial firefighting operations. Wildfire impacts, such as poor visibility from smoke or direct damage to runways and hangars, can ground these vital resources and sever a key evacuation and supply route. Marin County is served by two regional airports.

Libraries play an important role as information hubs and serve as cultural and educational centers for the community. These facilities also provide climate-controlled environments for vulnerable populations escaping smoke and heat. Damage to or closure of libraries can limit the community's

[25] Education Data Partnership. County summary: Marin County. Ed-Data. Retrieved December 23, 2025, from https://www.ed-data.org/county/Marin

access to emergency resources as well as pose a risk to vital cultural and educational resources. The CWPP evaluates risk for 17 library facilities.

Recreation

Marin County boasts approximately 160,000 acres of parks and public lands. These lands are vital to Marin residents and visitors as a source of recreation. The local, regional, state, and federal parklands support a wide variety of recreational opportunities, including hiking, biking, picnicking, wildlife viewing, water access, and more. A trail network of more than 800 linear miles provides access for hikers, cyclists, equestrians, and other recreational uses.

Marin County's open spaces are an important driver for the local economy. In 2022, there were more than 17 million visitors to the Golden Gate Recreation Area (GGNRA) and Muir Woods.[26] The Point Reyes National Seashore consistently draws more than 2.2 million visitors annually.[27] The Mount Tamalpais Watershed sees about 2 million visitors each year. Altogether, these visits spurred more than $1.25 billion in spending in adjacent communities. This spending supported more than additional 12,014 jobs and provided hundreds of millions of dollars to local businesses.[28]

Ecosystems and Ecosystem Services

Marin County has nearly 118,000 acres of forest and woodland that are a vital resource for wildlife, residents, and visitors. The county is home to a wide variety of plants, including several rare and locally endemic species. The California Native Plant Society and the California Department of Fish and Wildlife characterize Marin County as one of the most biodiverse parts of the state. The most unique and distinctive plant communities are coast redwood forests, open canopy oak woodlands, evergreen hardwood forests, Douglas fir forests, bishop pine forests, chaparral ecosystems, coastal shrublands, grasslands, streambanks and lakeshores, freshwater marshes, saltwater marshes, and dunes. Marin County is also home to serpentine ecosystems, which support a large number of Marin County's rare and endangered plant populations.

Climate change, land use, fire suppression, invasive species, plant diseases, and other factors threaten the biodiversity and richness of Marin's essential ecosystems. Fire and other forms of disturbance are important drivers of ecosystem health and diversity. In the absence of fire, Douglas-fir forest is expanding into grassland, shrubland, and oak woodland habitat in many parts of the county. Fire exclusion also threatens chaparral species, many of which are endemic to Marin, and can

[26] This figure includes data for the Fort Point National Historic Site and other areas of the GGNRA outside of Marin. More information is available at National Park Service. (2023, August 25). Visitor spending to Golden Gate NRA, Muir Woods NM and Fort Point NHS set new record in 2022. U.S. Department of the Interior. https://www.nps.gov/goga/learn/news/visitor-spending-to-ggnra-sets-record-in-2022.htm

[27] National Park Service. (2025, March 14). Park statistics – Point Reyes National Seashore: Annual visitation, geographical data, and other management statistics. U.S. Department of the Interior. https://www.nps.gov/pore/learn/management/statistics.htm

[28] National Park Service. (2024, September 10). Visitor spending effects – Economic contributions of National Park visitor spending. U.S. Department of the Interior. https://www.nps.gov/subjects/socialscience/vse.htm

lead to unnatural fuel arrangements and the loss of biodiversity. Climate change is also spurring the expansion of forest pathogens like sudden oak death (SOD), which can drive tree mortality and fuel accumulation in forests throughout Marin County.

Many of Marin's residents receive clean drinking water from local watersheds. Marin Water serves more than 190,000 residents, and more than 75% of their water supply is derived from the Mount Tamalpais watershed. The North Marin Water district provides additional water management services in the greater Novato area and West Marin Point Reyes areas. Landscape stewardship is critical to ensuring the long-term sustainability and health of the watersheds that provide clean water to Marin residents.

Marin County is committed to developing sustainable and ecologically responsible solutions to fuel management. The Ecologically Sound Practices Partnership (ESP) is a community resource that advises Marin's fire professionals, defines management best practices, and offers expertise and recommendations on specific projects to protect the biodiversity and resilience of Marin's landscape and ensure that ecological values are retained or restored during project implementation. Additionally, a working group of the Marin Wildfire Prevention Authority in partnership with ESP and resource managers recently conducted a biomass recovery study to ensure that biomass utilization pathways support wildfire prevention and landfill diversion, while also reducing greenhouse gas (GHG) emissions in Marin County.[29]

For more information on Marin's ecosystems and the services they provide, readers are encouraged to review the Marin Regional Forest Health Strategy,[30] which provides data, analysis, and local knowledge integrated into a comprehensive management strategy for Marin's forested landscapes. This CWPP acknowledges the importance of ecosystem stewardship; however, it focuses primarily on reducing vulnerabilities in and around the built environment. The objective of this thoughtful sequencing is to enable large-scale use of beneficial fire without the looming specter of these burns morphing into community disaster fires.

2.1.7 Agencies and Organizational Structure

Marin County Fire Department (MCFD) is the primary agency responsible for wildland fire response within the county. CAL FIRE contracts with the MCFD to provide wildland fire protection and associated fire prevention services for approximately 200,000 acres of State Responsibility Area (SRA). In addition, MCFD provides wildland fire protection services to approximately 100,000 acres of federal lands, including the Golden Gate National Recreation Area, the Muir Woods National Monument, and the Point Reyes National Seashore.

[29] Marin Resource Conservation District. (n.d.). Marin biomass project. https://www.marinrcd.org/programs/home2/marinbiomassproject/
[30] https://www.onetam.org/forest-health#document

Other parts of the county are served by local fire departments and fire protection districts. These agencies include:

- Central Marin Fire Department, serving Corte Madera, Larkspur, and Greenbrae
- Southern Marin Fire, covering Mill Valley, Sausalito,
- Tiburon Fire Protection District, covering the Town of Tiburon and the City of Belvedere
- Kentfield Fire Protection District
- Ross Valley Fire Department, serving Ross, San Anselmo, and Fairfax ,and Sleepy Hollow
- San Rafael Fire Department
- Sleepy Hollow Fire Protection District
- Marinwood Fire Department
- Novato Fire Protection District
- Stinson Beach Fire Protection District
- Bolinas Fire Protection District
- Inverness Public Utility District

Marin County has a well-organized local mutual aid system based on the principles of resource sharing and cooperation with a goal of providing the public with the highest level of service that no one agency is equipped to provide. These agreements include resources from all fire agencies, law enforcement agencies, volunteer fire departments, CalOES, the National Park Service (NPS), CAL FIRE, and local landowners.

In March 2020, Measure C created the Marin Wildfire Prevention Authority (Marin Wildfire), a 17-member-agency joint powers authority (JPA). Marin Wildfire's mission is to develop and implement a comprehensive wildfire prevention strategy for Marin County.[31] Measure C provides approximately $20 million annually to fund fire prevention work.

Fire Safe Marin (FSM), Marin County's Fire Safe Council, promotes public and private partnerships to enhance wildfire safety and build Firewise Communities.[32] FSM is a nonprofit organization with the dual mission of reducing wildland fire hazards and improving fire-safety awareness in Marin County. FSM receives significant investments through Marin Wildfire, CAL FIRE Grants, PG&E Grants, other state and federal entities, and private donations.

The Marin County Office of Emergency Management (OEM) is the lead agency for emergency alerting in Marin County. OEM can issue countywide and localized alerts, and send alerts on behalf of cities, towns, and special districts to ensure consistent public messaging during incidents. OEM uses AlertMarin[33] as the countywide alerting "brand", using tools within the federal Integrated Public Alert

[31] Tiburon and Belvedere are not members of the Marin Wildfire Prevention Authority JPA and have their own wildfire preparedness plans.
[32] The National Fire Protection Association (NFPA) established the Firewise Communities Program to encourage local fire safety solutions by involving homeowners to take individual responsibility for preparing their homes for the risks of wildfires. The Firewise program uses their website (http://www.firewise.org/) to provide information and promotes ways to keep homes from igniting.
[33] Alert Marin is an alerting service provided by SirCom, https://sircom.org/

and Warning System (IPAWS), which can deliver alerts through mobile phones, televisions, radios, cables, and the NOAA Weather Radios.

Graton Rancheria is the only federally recognized tribe with ancestral territory in Marin County. Graton Rancheria comprises Coast Miwok and Southern Pomo peoples who are traditionally and culturally affiliated with the CWPP Program Area. The Tribe retains Traditional Knowledge about the lands, waters, environments, beings, and relationships that are essential to land stewardship and cultural and natural resource management in the CWPP Program Area.

Finally, land managers are important stakeholders for fire risk reduction. Vegetation management projects on public lands and watersheds can reduce risk to adjacent communities. In addition to departments in the cities and towns, land management agencies in the county include:

- Marin County Parks/Open Space District
- Marin Water
- U.S. National Parks Service and U.S. Fish and Wildlife Service
- California State Parks
- Ecologically Sound Practices Partnership

• • • Insights • • •

Integrated Fire Planning

Coordination and alignment of objectives is an important step towards fire resilience. While the CWPP is an important collaborative strategic planning effort, coordination on tactical project planning should be pursued whenever possible. Coordinated, cross-jurisdictional efforts enable strong partnerships and allow multiple agencies to align complementary tactics, such as vegetation management, residential risk reduction, evacuation improvements, and infrastructure protection, within a single planning context. This integrated approach produces compounding, "network" effects that can reduce wildfire risk more effectively and durably than actions undertaken by any single agency or program in isolation.

3. Existing Investment in Wildfire Prevention and Preparedness

3.1 Strategic Framework

As the coordinating wildfire prevention entity in most of Marin County, the Marin Wildfire Prevention Authority (Marin Wildfire) is responsible for developing and implementing effective wildfire prevention and preparedness programs with demonstrable risk-reduction outcomes. To support this mission, Marin Wildfire has established a set of goals and strategic measures to track community progress across key dimensions of wildfire risk mitigation. These measures are organized around Marin Wildfire's five programmatic goals and are designed to identify where programs are performing as intended and where additional focus or investment is needed to achieve meaningful risk reduction.

Marin Wildfire's strategic framework is an effective tool for tracking wildfire risk and mitigation progress over time. On the other hand, the purpose of the CWPP is to identify and prioritize locations in which multiple risk factors align to heighten risk to communities. Fire agencies and land managers can use the CWPP to design and implement targeted programs that address these high-risk areas using effective, place-based tactics. Marin Wildfire's strategic framework can then be applied to evaluate program effectiveness and demonstrate progress toward defined outcomes. The CWPP is not intended to replace Marin Wildfire's existing strategic measures; rather, it complements them by providing a spatially explicit toolset to support policy development, program design, implementation, and adaptive management..

Marin Wildfire has implemented public-facing interactive web dashboards that show the progress towards its goals in real time. These dashboards can be accessed via Marin Wildfire's website.

Links:

- **Progress on Vegetation Management**
- **Progress on Defensible Space and Home Hardening**
- **Progress on Detection, Alert, and Evacuation**
- **Progress on Public Outreach and Education (coming soon)**

3.1.1 Wildfire Detection

Marin County's urban population and extensive road network, combined with a robust wildfire camera-based detection system, make early wildfire detection very likely in most parts of the county. The AlertCalifornia system includes 12 camera sites in Marin and three additional cameras in adjacent counties that provide overlapping views into Marin. These cameras allow fire personnel, dispatchers, and emergency managers to rapidly confirm ignitions, assess fire growth, and coordinate multi-agency response. This configuration provides near-comprehensive coverage of the county. Approximately 80% of the land area in Marin County is visible by at least one wildfire-detection camera, and about 65% of the area is visible from two or more cameras.

Furthermore, more than 80% of the county's area is within 0.6 miles (1 km) of a road. Road access increases the likelihood of community detection, via 911 calls, and facilitates rapid emergency responder access. Approximately 99,600 acres of the county are located more than 1 km from roads. These roadless areas are concentrated in the northern and western portions of the county.

3.1.2 Alerting

Emergency alert and warning systems are important components of disaster management. They provide situational awareness and recommended actions to those at risk. County of Marin and Operational Area partners (cities, towns, and special districts) utilize multiple, redundant alerting systems to ensure residents are provided with timely notifications. In the coming years, Marin County will be developing and implementing a comprehensive Alerting and Warning Plan that will provide strategic and operational guidance on roles and responsibilities for emergency alerting.

Forms of alerting in Marin include:

- **AlertMarin:** the county's primary emergency alert system for action-oriented alerts. AlertMarin is intentionally reserved for situations in which recipients are being asked to take concrete protective actions such as "evacuate now," "prepare to evacuate," or "shelter in place." Utility customer data, obtained via SB821 from PG&E, is used to supplement notification contact information provided by community members during high-risk incidents.
- **Wireless Emergency Alerts (WEAs):** sends a "push notification" from each participating cell tower to all compatible mobile devices within a defined geographic area. The system does not rely on SMS, stored phone numbers, or contact lists. WEA messages are accompanied by a distinctive tone and vibration pattern designed to capture attention, even when a phone is silenced. WEA is especially valuable for warning residents, visitors, and travelers that are not subscribed to AlertMarin.

WebEOC is a redundant tool that can be used to send WEAs. While OEM is responsible for most alerting in the county, some local jurisdictions also have their own alerting authority. The City of Novato is authorized to send WEAs directly through IPAWS. Several cities and police agencies use

Nixle for local public safety notifications. Nixle is used primarily for police and fire activity information, road closures and traffic impacts, informational wildfire and smoke updates, and community advisories and recovery information. Nixle is usually used to provide broader, ZIP code-based informational messages compared with targeted, action-oriented warning messages from the AlertMarin system.

Comprehensive outdoor alerting systems provide an additional layer of communication during wildfires and other emergencies. Southern and Central Marin are served by a network of 20 high-powered speaker installations (Long Range Acoustic Device, LRAD) capable of broadcasting voice messages and tones over long distances in the event of a wildfire, evacuation, or other public safety threat. This system can deliver real-time instructions that are audible across neighborhoods, open spaces, and major transportation corridors. Other parts of the county, including much of West Marin, are served by Hi-Lo sirens that provide alerting, but no instructions, to dispersed populations. Some agencies have other acoustic warning capabilities, such as portable LRAD systems that can be employed during large-scale evacuations.

For additional information on alerting and evacuation warnings, readers should refer to **Appendix D. Alerting and Warning Systems**, which describes the role of OEM and the legal and technical details about the alerting systems in Marin County.

3.1.3 Vegetation Management

Vegetation management is a key aspect of fire preparedness and prevention and a core element of Marin County's strategic approach to wildfire risk reduction. Measure C has provided funding for numerous vegetation-management projects. From 2020 to late 2025, approximately 2,200 acres of vegetation in Marin County have been treated, primarily through near-community shaded fuel breaks. Projects for treating thousands of additional acres have been proposed, approved, and moved through the regulatory process. Furthermore, member agencies and land-management partners have completed additional vegetation management projects that either specifically or tangentially address wildfire risk reduction.

On average, across Marin Wildfire vegetation management projects, modeling studies highlight the anticipated benefits of the fuel reduction:

- A 55% average reduction in composite fire behavior, a metric which incorporates rate of spread, flame length, canopy fire activity, and firefighter access.
- A 78% average reduction in the area with flame lengths greater than 4 feet, a commonly used threshold to determine the effectiveness and safety of ground-based firefighters engaging the fire, and a 61% average reduction in flame length, a key indicator of fire intensity.

- A 77% reduction in the likelihood of canopy fire activity within the treated areas. Canopy fire activity indicates very active fire behavior and can pose a danger to firefighters and the public.

For additional information on vegetation management and projected effectiveness, readers should refer to **Appendix E. Marin County Vegetation Management Assessment**, which reviews the methods for evaluating vegetation management projects and catalogs recent Measure C-funded fuel-reduction initiatives.

3.1.4 Residential Risk Reduction

Risk reduction on residential parcels is one of the most important elements of community wildfire resilience and a cornerstone of Marin's wildfire preparedness strategy. Reducing vulnerabilities on and around homes, particularly those at the edge of the community, can prevent fire from transitioning into the built environment and provide firefighters with a safer environment in which to work. Ongoing work to reduce residential vulnerability in Marin includes community engagement, a comprehensive data-focused home evaluation program, and a complementary chipper program for green waste disposal.

Firewise Neighborhood Associations

The national Firewise USA recognition program provides a collaborative framework to help communities get organized, find direction, and take action to increase the ignition resistance of their homes and community and to reduce wildfire risks at the local level. Firewise communities provide a personalized and customized approach to deliver fire prevention messaging. Residents in these communities are more likely to take proactive measures, such as home hardening and creating defensible space, to reduce wildfire risk and protect their homes.

More than 80 Firewise neighborhoods coordinate fire preparedness activities for more than 21,000 homes (about one in every four homes in the county), promoting local leadership and community engagement. Through the Firewise framework, communities organize local assessments, develop annual action plans, and implement local defensible-space and home-hardening projects.

Home Evaluation Programs

Home evaluation programs, in which trained staff evaluate vulnerabilities on residential parcels, are a core tenet of wildfire risk reduction programming in Marin County. Marin Wildfire provides funding and staff support for these programs across its 17-member agency jurisdictions. Twenty percent of Measure C funds are allocated to defensible-space and home-hardening efforts annually. During these visits, inspectors evaluate residential properties, assess whether they meet WUI defensible space, vegetation management, and fire-resilient construction standards, and provide residents with

site-specific guidance. By educating residents on their defensible-space and structural-hardening responsibilities, these evaluations help reduce risk to homeowners and their neighbors.

At the conclusion of each evaluation, homeowners are provided with a comprehensive online report that includes specific recommendations for improving their home's ability to survive a wildfire. Information about a home's compliance with state and local defensible space standards is also provided.

Evaluation frequency, schedule, and outcomes vary by jurisdiction to meet the needs of each agency. Four different program models are practiced across the county:

Marin Wildfire Defensible Space Alliance (DSA):[34] Approximately 35,000 evaluations are conducted annually. The objective of the DSA is to inspect all WUI parcels within the Alliance's jurisdiction at least once every three years; some parcels are inspected more frequently.

Novato Fire Protection District: Home evaluations available on demand in Novato. Residents can request an evaluation year-round. Approximately 6,470 evaluations were completed in 2025. Residents that receive evaluations are subsequently eligible for grant funding to resolve issues found on their parcel.

San Rafael Fire Department and Marinwood Community Services District (CSD): High-risk parcels in the WUI are evaluated regularly with the objective of evaluating every parcel at least once every three years. Like other programs, residents are provided with valuable informational materials and can qualify for grant funding with recent evaluations. Citations may be imposed for residents who fail to resolve certain fire code violations.

Tiburon Fire District: The Tiburon Fire District conducts approximately 1,000 defensible space and home evaluations annually with the goal of inspecting all of the parcels in the WUI every year. Additional inspections are available upon resident request. Results are communicated to residents via a written inspection report delivered by email or mailed to residents; the goal is to provide education and information for compliance.

Across the Marin Wildfire JPA,[35] about 60% of residents who received a defensible space home evaluation opened their wildfire risk report at least once. In 2025, about 40% of residents opened their report within 15 days of receiving it. Each report details parcel-specific recommendations for vegetation-management and home-hardening improvements identified by the inspector during the parcel visit. Opening this report is an important part of resident engagement with the wildfire problem: when residents become aware of the vulnerabilities of their property, they are more likely to take steps to mitigate those vulnerabilities. Conversely, when residents do not open their report,

[34] Includes Bolinas Fire District, City of Larkspur, County of Marin Fire, Inverness Fire District, Kentfield Fire District, Sleepy Hollow Fire District, Stinson Beach Fire District, Town of Corte Madera, Town of Fairfax, Town of Ross, and Town of San Anselmo, City of Mill Valley, Southern Marin Fire District, and Muir Beach CSD.

[35] Metrics for Tiburon and Belvedere are not available, as those jurisdictions do not use the Fire Aside platform to track resident engagement.

meaningful action is less likely to occur; if work is undertaken, it may not target the most impactful mitigation measures.

About one in four Marin residents have resolved more than half of the defensible space violations identified on their reports. Significant risk remains on residential parcels, and a key recommendation of the CWPP is to identify areas in which additional investment in residential risk reduction could yield the greatest benefit.

For additional information on structure vulnerabilities, readers should refer to **Appendix F. Marin County Fire Structure Vulnerability Assessment**, which evaluates risk factors on residential parcels.

Chipping Program

Vast amounts of vegetative material are removed every year from parcels throughout Marin County via Chipper Programs. These programs provide free or reduced-cost vegetation removal and can help residents dispose of debris created during defensible space implementation. Marin Wildfire and some member agencies offer chipping services to residents. More than 17,000 cubic yards of vegetation are collected and disposed of annually through these programs.

Tiburon Fire District offers five Chipper Day events from May to September each year. At these events, residents of Tiburon and Belvedere are able to drop off all green waste, regardless of species and size, to be hauled for free. On average, this program removes 2,840 cubic yards of vegetation per year. The City of Belvedere also offers free curbside pickup of green waste for residents.

For further context around county Chipper Programs, readers should refer to **Appendix G. Marin County Assessment of Local Preparedness,** which provides quantitative metrics for the Marin Wildfire and TFD programs.

3.1.5 Evacuation Preparation

Designated evacuation routes have been established for communities in Marin. In accordance with SB99, the safety elements of local general plans must analyze the local road network within their area of responsibility and identify residential areas lacking at least two emergency evacuation routes. Furthermore, as specified by California AB747, planners in Marin must evaluate the designated evacuation routes for safety and viability during a variety of emergency scenarios.

In 2023, Marin Wildfire released a comprehensive evacuation risk assessment to evaluate the safety and capacity of roadways in Marin to support wildfire evacuation. This study helped local officials identify and prioritize areas of concern and actions that could mitigate evacuation risks throughout Marin County. Recommendations from this study included enhanced fuel-reduction programs for evacuation routes, more comprehensive evacuation pre-planning processes, planning for temporary

safe locations and sheltering-in-place, traffic restrictions during Red Flag Warning days, and enhanced evacuation drills. The full report is available on the Marin Wildfire website.[36]

Marin County and its agencies have contracted with Genasys and use this platform to create, manage, and communicate evacuation zones during wildland fires and other incidents, ensuring a consistent, shared operational picture across agencies. The system was adopted countywide beginning in 2021 and is actively maintained as part of ongoing emergency management operations.

Community-specific wildfire evacuation maps have been produced to guide residents during evacuation. These maps provide clear, actionable information on evacuation routes, alert and emergency notification systems, and step-by-step evacuation checklists. Maps are available online through Fire Safe Marin.[37] Fire Safe Marin's role is informational; it aggregates and links to maps produced by jurisdictions using the county's system.

Evacuation drills are conducted regularly. Marin County schools conduct regular emergency drills that include fire as part of a comprehensive preparedness plan. Furthermore, Marin County organizes annual, voluntary wildfire evacuation drills encouraging residents to practice evacuating with their go-bags to a designated spot.

For additional information on evacuation safety, readers should review **Appendix H. Marin County Fire Evacuation Risk Assessment**, which discusses evacuation risk assessment and review the Evacuation Ingress/Egress Risk Assessment.

[36] https://www.marinwildfire.org/project/evacuation-ingress-egress-risk-assessment
[37] https://firesafemarin.org/prepare-yourself/evacuation-guide/evacuation-maps/

• • • Insights • • •

Local Operational Playbooks

Marin residents are extremely concerned about being trapped on roadways during evacuation and not receiving emergency alerts. Fire and evacuation managers should help provide additional specific guidance about where to go during an emergency, the routes to take, and how to prepare. When available, consider integrating local data, fire-spread analysis, and/or traffic modeling to improve these plans. Consider addressing special evacuation considerations for schools, medical facilities, community centers, and other community assets if appropriate.

Temporary Fire Refuge Areas

Consider expanding evacuation plans to include temporary fire refuge areas. These areas are predefined areas where residents can take shelter during a fire. Refuge areas can help to alleviate traffic bottlenecks and increase safety by diverting travel during a wildfire. Additional studies, particularly traffic flow modeling and simulation studies, should be performed to identify the most appropriate refuge locations, their capacities, and their role in larger evacuation strategies.

3.1.6 Public Outreach and Education

Marin Wildfire, in coordination with local fire agencies and community stakeholders, delivers clear, actionable, and measurable guidance and assistance to help residents and property owners take meaningful steps toward creating fire-adapted communities. This work includes a range of outreach and engagement activities, including public meetings and community events, field trips and site tours, and presentations and trainings. The agency also provides expert testimony and technical briefings at the state level to inform wildfire safety legislation and policy.

Engaging residents via trusted, high-credibility partners is essential to strengthening community awareness and adoption of wildfire-safe practices. Marin Wildfire has identified a set of strategic partners and professional networks that can significantly expand the reach and impact of wildfire education materials throughout the county. These partners include Marin builders, the Marin Association of Realtors, landscaping and landscape architecture firms, plant nurseries, home-hardening vendors, property managers, and local chambers of commerce. Ongoing partnerships also include Fire-Smart Landscaping programs delivered in partnership with the University of California Cooperative Extension (UCCE) Marin Master Gardeners.

Tiburon Fire District also supports public education and engagement efforts. Tiburon Fire District supports residents via evacuation and emergency preparedness presentations at homeowners' associations meetings, public events, and annual school field trips.

Fire Safe Marin (FSM) supports and coordinates public wildfire-prevention outreach for Marin Wildfire and local fire agencies throughout Marin County. Each year, FSM connects with thousands of residents through dozens of community events. FSM has a long history of participating in public events in the county and has built a dedicated outreach team of "Ambassadors," along with the equipment, materials, and vehicles to support this work. The organization also maintains a strong digital presence, with more than 150,000 website visits, active social media usage, and regular e-newsletters. FSM produces original educational media, including short instructional videos and a growing YouTube library. FSM's existing communications experience about fire prevention is unique in facilitating this outreach work on behalf of Marin Wildfire and member agencies.

Marin Wildfire, local fire agencies, and local land management agencies are also working to educate the public about the benefits of prescribed and managed fire in Marin's fire-dependent ecosystems. Resources like the OneTam's frequently asked questions on prescribed burns[38] are important tools for garnering public support for prescribed fire projects.

Risk Perceptions Survey

To better understand the needs of traditionally underrepresented groups, Marin Wildfire conducted a Wildfire Risk Perceptions Survey in 2022 and 2023. Focus groups and interviews with 220 participants informed the survey design. The survey involved partnerships with community organizations serving low-income residents, residents of color, and individuals with access and functional needs. The results of this study were provided to CBOs and local fire departments to enable these organizations to more effectively engage with their communities.

Respondents expressed a high level of concern about wildfire risk, particularly related to safe evacuation. Traffic congestion during evacuations was the most significant concern, and many respondents reported limited preparedness, lack of evacuation plans, and uncertainty about where to seek temporary refuge. While most residents have received and understood emergency alerts, substantial secondary remain about alert reliability and network coverage.

The survey results also identified major challenges related to residential risk reduction. Many respondents—particularly renters—lack responsibility or authority over exterior maintenance and landscaping, limiting their ability to reduce wildfire risk on their property. Residents were more likely to perceive wildfire risk from neighborhood or nearby open-space vegetation than from their own parcels, highlighting a knowledge gap regarding the importance of on-parcel mitigation.

[38] One Tam. (n.d.). FAQs: Prescribed burns in Marin. https://www.onetam.org/faqs-prescribed-burns-marin

• • • Insights • • •

Partnering with Community Organizations

Multiple data sources underscore the importance of equity-focused and demographically informed wildfire planning. Ongoing partnerships with community-based organizations (CBOs) and Community Resilience Teams (CRTs) enable agencies to engage residents via diverse and trusted communication channels and address the specific preparedness, evacuation, and risk-reduction needs of historically underserved communities.

4. Fire Response and Suppression

Pre-fire mitigations are most effective when accompanied by a robust firefighting response. Local agencies in Marin are well prepared to engage with significant wildland fires.

Across all jurisdictions, there are 76 fire engines, of which about 40% are designed specifically for wildland firefighting. There are also six water tenders for helping establish water supplies at rural incidents and two dozers for cutting firebreaks. Furthermore, Marin County Fire staffs four handcrews that provide support for fire suppression and pre-fire mitigation activities.

These fire resources are distributed across the county and are strategically located to serve residents rapidly. Spatial network analysis indicates that the vast majority of structures in Marin can be reached within 10 minutes of fire engine travel time.

In the event of a major wildland fire, resources from neighboring jurisdictions will assist, in accordance with existing automatic and mutual aid agreements. Fire responders from other counties may take longer to arrive and may arrive with limited coordination compared with responders within the same county, who regularly train together and respond to incidents together. Particularly in areas along the Sonoma County border, adjacent county mutual aid plays an important role in the initial fire response. No agency in Marin is capable of preventing large-scale structure loss alone. Automatic aid and mutual aid resources are important in preventing large-consequence fires in Marin. Prioritizing initiatives that ensure smooth communication and practicing inter-agency operational tactics and strategies will maximize the effectiveness of mutual aid.

Aid agreements also facilitate resource prepositioning. During certain fire weather conditions, additional resources can be positioned and upstaffed within the county and the surrounding region. These agreements ensure that sufficient firefighting response resources are available during periods of high fire danger.

Marin County is also well covered by regional aerial firefighting resources. In addition to hosting an exclusive-use firefighting helicopter in Novato (a partnership between Pacific Gas & Electric and Marin County Fire), two Firehawk helicopters, capable of nighttime operations, two C-130 large airtankers, and nearly a dozen S-2T airtankers are located within about 30 minutes' flight-time of the county.

For additional information on fire suppression and response in Marin, readers should refer to **Appendix I. Marin County Fire Response Assessment**, in which local and mutual aid suppression resources are tallied and response times throughout the county are modeled.

• • • Insights • • •

Combined Strength from Pre-Fire Mitigation and a Robust Fire Response

Prioritize additional fire-mitigation activities in areas in which fire response will take longer. There may be fewer firefighters than structures needing structure defense in these areas. Additional home hardening, defensible space, vegetation management, and evacuation initiatives in these areas can slow fire growth and resist its transition into the built environment, while providing additional time for firefighters to arrive to perform offensive and defensive actions. Firefighters are safer and more effective when engaging in fire suppression in resilient and prepared communities compared with communities with hazardous fuels and unprepared homes. In areas where evacuation is difficult, firefighters often spend time and energy assisting evacuations, rather than suppressing the fire, which can lead to increased fire growth and community damage.

5. Prioritizing Risk-Reduction Activities

The primary objective of this CWPP is to provide data-driven recommendations for various types of risk-reduction activities based on the risk profile of different areas of the county. The results of this prioritization analysis are designed to help plan and select mitigation strategies that meet the specific needs of Marin communities. This prioritization analysis uses evacuation zones as a method for geographically partitioning the county into distinct neighborhoods.

Specifically, the goals of this prioritization analysis include:

1. Identifying which risk-reduction activities are most important in each evacuation zone.
2. Creating maps of the relative priority of each mitigation activity across the county.
3. Supporting local subject matter experts build better, more data-informed programs by complementing on-the-ground knowledge

The CWPP will address risk across several Prioritization Themes that characterize different types of risk and highlight potential activities to address those risks. These Prioritization Themes include:

4. **Vegetation Management Near Communities:** Maintain appropriate vegetation management in the areas between the wildlands and the built environment.
5. **Vegetation Management Open Space:** Maintain appropriate vegetation management throughout the county's open spaces, including in parks, watersheds, and other vegetated areas, and around key utility assets.
6. **Roadside Vegetation Clearance:** Maintain safe travel conditions along evacuation routes.
7. **Fire Detection:** Ensure fires are detected quickly.
8. **Alerting:** Promote safe evacuations via robust public alerting systems and ensure residents are ready and able to act on the alerts.
9. **Evacuation Planning:** Maintain safe evacuation plans and prepare for contingencies.
10. **Residential Risk Reduction:** Reduce structural ignitability on all parcels via defensible space and provide resources on fire-adapted building codes. Assist the community with the creation of defensible spaces, fire-adapted structures and homes, and fire-adapted landscaping through grants and direct assistance.

Previous Marin County CWPPs provided more general recommendations. The theme-based prioritization system of this CWPP enables stakeholders to disaggregate risk into various components based on their mission, authority, available funding sources, partnerships, and other on-going priorities. For example, stakeholders responsible for safe evacuation can review the Alerting, Evacuation Planning, and Roadside Clearance themes, while defensible space inspection programs can review the Residential Risk Reduction theme. This approach is designed to provide a flexible and

explainable system, while enabling stakeholders to take action on different kinds of risk throughout the county.

The CWPP relies on Marin Wildfire's system of strategic measures to track risk reduction towards each of the risk reduction activity themes.

5.1 Risk Assessment Models and Tools

Many wildfire risk-assessment tools are available. Each tool has its own strengths and weaknesses, and each tool provides recommendations with specific caveats and focuses. The goal of the CWPP is to identify areas of consensus where many tools indicate high risk to a particular type of community asset. This approach ensures that programs are being prioritized where there is the greatest chance of success for risk reduction. The goal of the consensus analysis is not to create a "perfect" wildfire risk model; rather, it is to overcome the tool-specific limitations associated with each risk-assessment method.

The tools included in the CWPP range from wildland fire behavior models, assessments of risk in the built environment, and methods for characterizing roadway safety. In the following section, these different methods for risk assessment are brought together into a single unified risk-assessment framework. Each of these tools have been vetted and evaluated by Marin Wildfire and agency staff prior to inclusion in the CWPP. A full description of each of the methods is provided in **Appendix N. Wildfire Risk Assessments and Modeling Tools**.

The tools incorporated into the CWPP's prioritization process include assessments of the following factors, among others:

- Burn probability
- Potential flame length, rate of spread, and canopy fire activity
- Ember production, transport, and deposition
- On-parcel vulnerabilities
- Roadways where travel is difficult and where evacuees could be exposed to unsafe conditions
- Fire response travel time

The risk models employed in the CWPP are robust and proven tools for evaluating and measuring wildfire risk. They leverage contemporary science and integrate fire-spread dynamics, principles of thermodynamics, and fire response information. However, these tools should not be used blindly. Rather, they should be incorporated into planning and project implementation by local subject matter experts. Armed with data and the ability to track risk over time, program staff can supplement their local, on-the-ground knowledge with defensible metrics to demonstrate the efficacy of their programs.

5.2 Evacuation Zones

The CWPP uses evacuation zones (EZs) as prioritization units. EZs function as discrete units within which each risk is evaluated and mitigation activities are prioritized. EZs were established by fire operations teams throughout Marin County using recommendations developed by Genasys. Each EZ has a permanent name and identifier that creates an ideal system for ongoing prioritization and tracking changes over time. Furthermore, EZs reinforce the connection between fire preparedness and response, and they can be communicated with the public directly.

5.3 Prioritization Methodology

The CWPP prioritizes actions using a consensus-based approach that highlights locations where multiple risk indicators act in concert to result in elevated risk. For each theme, prioritization follows a consistent, repeatable process:

- **Identify values at risk.** Each theme considers only the values that matter for that topic. For example, utility assets are a key value in the Vegetation Management Near Communities theme, but these assets are not considered in the Detection theme.
- **Identify risk assessments.** As with values at risk, not all risk assessments are appropriate for all themes. The CWPP identifies the most appropriate tools to use for each theme.
- **Analyze local risk.** For each risk-assessment tool, the risk assessment in the vicinity of each value at risk is calculated. For example, the Near-Community Vegetation Management theme considers flame lengths within 200 feet of structures.
- **Aggregate results.** Risk scores from all applicable values and assessments are combined and summarized at the evacuation-zone scale.
- **Ranking.** Zones are converted to percentile rankings to enable clear comparison and support decision making.
- **Recommendations.** Recommendations are formulated for each zone based on the risk factors within each zone.

5.4 Public Outreach and Education

Underpinning many community wildfire resilience initiatives are effective public outreach and engagement programs that help residents understand what to do, why these initiatives are important, and how their actions can contribute to community-scale risk reduction. Because public outreach is a cross-cutting theme, it is not considered as a standalone prioritization theme in this CWPP. Instead, public outreach is integrated throughout as recommendations for targeted programming initiatives that support specific risk reduction strategies. Fire agencies in the county,

Marin Wildfire, and Fire Safe Marin all engage in many different forms of community outreach and education.

In addition to theme-specific recommendations, this CWPP offers several overarching recommendations for future outreach and education programs in the county:

- **Development and coordination of new and existing Firewise communities:** Firewise communities provide a personalized and customized approach to deliver fire-prevention messaging. Residents in these communities are more likely to take proactive measures, such as home hardening and creating defensible space, to reduce wildfire risk and protect their homes. Because these neighborhoods commit to risk reduction, they can serve as coordinated hubs for residential risk reduction and roadside vegetation clearance. Firewise neighborhoods also offer benefits to evacuation and alerting by creating a more deeply integrated community of neighbors who can look out for one another during an emergency.

  Firewise communities commit to engaging in a number of prevention and education activities annually, which require support and materials. Fire agencies in Marin should support the expansion of the Firewise program in Marin County by supporting existing Firewise neighborhoods and helping foster the creation of new Firewise groups when possible. Consider providing regular hands-on education for these groups or financial or material support, when appropriate.

- **Community events:** Marin Wildfire and member agencies take advantage of existing public events happening across the county throughout the year to raise awareness and provide resources about fire adaptation, fire agencies, Fire Safe Marin, and Marin Wildfire. These organizations should continue to have active involvement in public events throughout the county to ensure that fire-prevention messaging is being shared as broadly as possible.

- **School education and outreach:** Marin County fire agencies recognize the importance of early, consistent wildfire education delivered via trusted community channels, particularly schools. Schools provide a unique and credible pathway to reach parents, caregivers, and families of school-aged children with actionable wildfire-preparedness information. Education of school-age children reinforces the importance of local evacuation preparedness planning, emphasizes the agency of local residents in reducing fire risk, and creates effective dialogue around fire risk reduction.

  Rather than creating new standalone programs, local fire agencies should leverage existing school events, organizational structures, and relationships to reinforce family preparedness behaviors that reduce wildfire risk and improve community resilience. Fire agencies and emergency managers should integrate local evacuation playbooks as one element of school education and outreach programs.

- **Integrate novel approaches:** Wildfire preparedness education based on data, knowledge, or information alone does not always result in people taking risk-reduction action. Zone Zero compliance is triggering fight-flight-freeze reactivity in the public (e.g., defensiveness, resistance, distrust, and blame). Marin Wildfire and local fire agencies should create and

implement programs and training that raise awareness about how fight-flight-freeze neurobiology can prevent personal mitigation action and behaviors. Agencies should provide training to build internal capacity and interpersonal skills, including co-regulation, communication, and empathy.

Marin Wildfire's Goal 4 outlines data-driven measures for tracking progress towards outreach and education goals. These metrics include:

- The percent of residents that meaningfully interact with their Wildfire Risk evaluation inspector
- The percent of parcels organized into fire-focused communities (Firewise, The Insurance Institute for Business & Home Safety (IBHS) prepared)
- Partnerships with organizations and vendors, including but not limited to those involved with home preparedness: builders, realtors, landscape architects and landscapers, nurseries and home-hardening vendors, property managers, and chambers of commerce
- Partnerships with unique needs communities from a fire-risk perspective

5.5 Near-Community Vegetation Management

Vegetation management near communities is prioritized where high-severity fire is projected to impact structures and infrastructure (energy, water, or communications). The goal of this theme is to identify where targeted shaded fuel breaks, mowing programs, or intensive herbivory could provide the greatest impact towards slowing fast-moving fire spreading towards communities or critical community assets. More distant fuel treatments, such as forest health projects or strategically placed local area treatments (SPLATs) are covered by the next theme, which addresses risk reduction potential further from the built environment.

Near-community vegetation management is prioritized where:

- Flame length is high within 200 feet (90 meters) of structures, indicating the potential for high-severity and difficult-to-suppress fires around homes.
- Entry points or fire pathways that enter the built environment are present, indicating the potential for rapid fire spread affecting residences in the community.
- Many structures are present, indicating the potential for vegetation management to affect many residents at once.

Recommended actions for these areas include:

- Targeted vegetation management to reduce fuel loads near residential structures (shaded fuel breaks), with a particular focus on interrupting the fire pathways capable of bringing fire into the community.

- Targeted vegetation management to reduce fuel loads near key infrastructure locations (such as pump stations, transmission towers, and substations). Vegetation management in these areas can help prevent ignition of these assets and ensure continuity of service during a large-scale wildfire.
- Strategic grazing and/or mowing programs to interrupt fire pathways in lighter fuels. These programs should focus on the areas where wind, fuel, and terrain align to produce rapid fire spread towards communities.
- Coordination with residents to maximize the effectiveness of vegetation management. In areas where agencies are creating shaded fuel breaks, consider additional messaging, defensible space inspection coverage, or incentive programs to reduce the vulnerability of parcels adjacent to the management project. Coordinated action can bring network effects that increase the value of vegetation management alone.
- Continue to maintain existing vegetation management projects and ensure adequate budget to re-treat key areas regularly. Consider prioritizing areas along fire pathway entry points to help slow fire growth before it becomes established within the community.
- In areas where hazardous materials facilities may be exposed to wildfires, ensure that these facilities have adequate defensible space and that they have contingency plans for a wildfire evacuation. Ensure that responding firefighters are aware of local hazardous materials facilities and are equipped with the proper equipment when responding to fires in these areas.

The metrics used to track progress towards this goal include:

- **Acres Approved for Treatment:** This metric tracks the acres approved for vegetation management treatment via regulatory processes like CEQA.[39]
- **Acres of Treatment Implemented:** This metric evaluates the acres of strategic fuel reduction completed.
- **Flame Length Reduction:** Flame length is an observable measure of fire intensity. This metric tracks the change in flame length within the treatment areas, highlighting areas where fire intensity is measurably decreased due to management activities.
- **Attackable Area Increase:** This metric tracks the change in the area within a treatment project with flame lengths less than 4 feet, which are likely to be accessible to ground-based firefighters for fire suppression.
- **Composite Fire Behavior Reduction:** Because fire behavior is multidimensional, this metric tracks the change in a composite fire behavior metric (including flame length, rate of spread, canopy fire activity, attackable area, and ember flight distance) within treated areas.

[39] California Environmental Quality Act.

5.6 Vegetation Management - Open Space

Vegetation management in open spaces can be effective at maintaining healthy ecosystems and watersheds and preventing rapid fire development and the spread of fire towards other values at risk. This theme is designed to identify areas where landscape-scale management, Potential Operational Delineations (PODs), and SPLATs could provide the most benefit. Drinking water headwaters are evaluated to identify areas where pre-fire vegetation management can prevent runoff and water-quality issues arising from unplanned high-severity fires.

Prioritization factors for vegetation management in the open space include:

- Fire pathways that lead into the built environment, indicating the ability for vegetation management to interrupt fire spread before it reaches the community.
- Relatively low fire response capacity, indicating areas where fire responders may be delayed due to difficult access or long travel times.
- Burn probability, flame length, ignition risk, and rate of spread are high near utility infrastructure. Utilities include energy, water, and communications infrastructure. This analysis indicates the potential exposure that could compromise community safety by causing failures in electric or water distribution or the inability to send timely emergency alerts due to impacted communications infrastructure.
- High flame length and likely canopy fire activity, particularly within drinking water headwaters, indicating the potential for high-severity fires to cause tree mortality and subsequent issues to drinking water supply or runoff.
- High burn probability and ignition risk, indicating the likelihood of new fire starts that could be addressed via ongoing management.

Recommended actions for these areas include:

- In areas where contemporary fire suppression has caused substantial deviation from "natural" fire return intervals, consider re-introducing beneficial fire as a tool to maintain this landscape. Large-scale, low-intensity broadcast burns are recommended in areas with the potential for high-severity, high-mortality wildfires, particularly within watershed headwaters, to lower the likelihood of post-fire flooding and water-quality impacts. Work with public information officers and communications staff to educate the public on the benefits and risks of prescribed fires. Leverage existing communication tools, such as California's Strategic Plan for Expanding the Use of Beneficial Fire.[40]
- SPLATs along fire pathways leading into communities to slow fire growth and enable evacuation and firefighter ingress.

[40] California Wildfire and Forest Resilience Task Force. (2022). California's strategic plan for expanding the use of beneficial fire. https://wildfiretaskforce.org/wp-content/uploads/2022/05/californias-strategic-plan-for-expanding-the-use-of-beneficial-fire.pdf

- Develop projects that incorporate both ecological and fire risk reduction benefits.
- Transmission lines cause elevated ignition risks, may be vulnerable during a fire, and can cause extended power outages if affected by fire. Consider vegetation management along rights of way to limit impact of ignitions and wildland fire exposure. Work with electric utility partners, including Pacific Gas & Electric, to ensure ongoing maintenance of vegetation management along high-risk transmission line corridors.
- High-severity fires may adversely affect drinking water availability and quality in areas that are the source of drinking water. Consider low-intensity broadcast burning and other landscape-scale vegetation management to reduce the risk of water quality and/or post-fire runoff impacts of unplanned high-severity fires.
- Consider extended clearance around infrastructure assets to ensure continuity of service during a wildfire. Assets include energy (substations and solar plants), water (pump stations, dams, and other facilities), and communications (AM/FM broadcast towers and cellular towers). Vegetation management should be conducted to ensure that these assets, which are often located in remote areas, can withstand a wildfire with minimal firefighter intervention.

Metrics used to track progress towards this objective are the same metrics used to track progress towards the Near-Community Vegetation Management objective.

5.7 Fire Detection

Although the likelihood of fire detection in Marin is already very high, some areas of the county may benefit from additional investments in detection capabilities. Detection is a priority in areas that are (a) not covered by the viewshed of a wildfire camera and (b) located far from roads and settlements. Other areas are already likely to have rapid detection, either due to resident reporting through 911, wildfire detection cameras, or both.

Priority for investments in fire detection is highest in areas with:

- A low percentage of space covered by fire detection cameras, indicating a large portion of the evacuation zone is “blind” to the cameras.
- A high ignition risk and a rate of spread within areas not covered by wildfire cameras, indicating the potential for rapid development within the blind spot.
- A high ignition risk and rate of spread within areas more than 1,000 m from roads, indicating the potential for rapid growth in areas that are difficult for firefighters to reach and less likely to be observed by passing vehicles.

Recommended actions in areas where detection is a priority include:

- Installing additional wildfire detection cameras to reduce blind spots, particularly in remote areas far from communities where rapid fire growth is anticipated.

- Pre-positioning apparatuses to increase the rate of fire response in remote areas with difficult access.
- Manned or unmanned (fixed-wind, rotorwing, Unmanned Aerial Vehicle/drone) aircraft flights over areas where detection is difficult during periods of significant fire weather.
- Coordination with energy utilities and planning public-safety power shutoffs (PSPS) to reduce the likelihood of utility-caused ignition in hard-to-detect areas.
- Evaluate satellite-detection capabilities as space-borne systems become more capable of providing high-resolution, near-real-time wildfire detection support.

Metrics used to track progress towards this objective include:

- **Detectable Acres:** Percentage of acres visible from two or more camera installations that would enable the detection of a 50-foot smoke column.

5.8 Alerting

AlertMarin, the countywide alerting system for Marin, advises community members to take action to protect themselves during and after emergencies. The Alerting prioritization theme is focused on increasing AlertMarin subscriptions and pre-incident planning, including incorporating demographic data into planning efforts to support community members that may be at increased risk due to accessibility or mobility challenges.

Prioritization factors for the Alerting theme include:

- The percentage of parcels with at least one active AlertMarin subscription, indicating areas where few community members are subscribed to geographically targeted, action-oriented emergency warnings.
- Fire pathways and high rates of spread within 200 feet of structures, indicating areas where fire is likely to move quickly into communities and can trigger rapid evacuations.
- Household characteristics (SVI Theme 2), indicating access and functional needs or transportation issues that could limit the ability to quickly and effectively evacuate after receiving an emergency alert.

In areas identified by the Alerting prioritization theme, recommended actions include:

- Evaluate existing public education campaigns to help community members understand alert channels, sign-up process, and definitions of different evacuation terminology.
- Continue to enhance alerting system effectiveness by encouraging sign-ups for AlertMarin and maintaining modernized alerting capabilities.
- Continue to partner with community-based organizations (CBOs), including Community Resiliency Teams, neighborhood associations, faith-based groups, tenant coalitions, and

cultural centers, to help distribute preparedness and evacuation messaging before and during emergencies. Consider new partnerships to drive sign-ups in low subscription areas. Identify alternative messengers in communities with limited trust in law enforcement or government agencies to increase compliance and reduce fear during evacuation orders.

- Ensure that evacuation and emergency alerts are accessible in both English and Spanish.
- Establish the Marin County Alert and Warning Annex to the Marin Emergency Operations Plan.
- Advocate for and support policy changes at the state and federal level to address gaps in Wireless Emergency Alerts (WEA) data coverage and ensure emergency managers have the data from cellular providers necessary to successfully send alerts.

Metrics for tracking progress towards the Alerting prioritization theme include:

- **Alert Marin Subscriptions:** The percent of all parcels that have at least one AlertMarin subscription.

Additional measures may be developed in the future.

5.9 Evacuation Planning

The evacuation Planning theme identifies areas where additional planning and evacuation management should be implemented. Evacuation Planning is distinct from the Alerting and Detection themes and covers activities beyond roadside vegetation management.

Evacuation planning is prioritized in areas in which:

- The burn probability is high within 200 feet of structures and roadways, indicating a high likelihood of fire exposure and potential evacuations.
- Fire pathways and entry points are near structures and along roadways, indicating the potential for fast-moving fires to impact these assets.
- There are high roadway difficulty scores, highlighting road segments that have a complex geometry (curvy, multi-way intersections, etc.), have a high potential for collisions, or are on steep grades.
- There is relatively low fire response capacity, indicating areas where fire responders may be delayed due to difficult access or long travel times.
- There is a relatively large population, indicating areas where a significant number of residents may need to evacuate during a wildfire event.

Recommended risk reduction activities for this theme include:

- Continue public outreach and engagement to help residents understand the evacuation process and where to go during an evacuation.
- Identifying local evacuation playbooks for each zone, potentially including temporary fire refuge areas (TFRAs), and coordinating the execution of these plans with local agencies, law enforcement, and community residents. Develop evacuation-decision points informed by fire behavior modeling and fire weather characteristics.
- Prohibiting parking along key evacuation routes during Red Flag Warning days to ensure adequate road supply for evacuations.
- Preparing local playbooks for law enforcement and public works to manage intersections likely to create traffic bottlenecks.
- Performing community-specific evacuation drills to familiarize residents with the evacuation process and local evacuation routes.
- Enhance planning for vulnerable populations, including individuals with access and functional needs, children, elderly residents, and the unhoused, by developing zone-specific response plans that identify transportation resources and specific assistance requirements.
- Work with school districts to ensure that school staff, children, and parents are familiar with evacuation procedures. Identify and document evacuation routes and backup plans. Evacuation plans are recommended for all schools, even those outside of the wildland urban interface, given the potential for large-scale urban fire spread and potentially limited communications between parents and school administrators during a severe fire event.
- Medical and other emergency facilities that may need to be evacuated should consider advanced evacuation planning. Staff should be familiar with evacuation procedures. Operational playbooks are recommended for all hospitals and senior facilities. These facilities face unique constraints and may require specific resources (such as ambulances) during evacuation.

Metrics to track progress towards evacuation planning have not yet been developed.

5.10 Roadside Clearance

Roadside clearance is recommended in areas where evacuation routes may not support safe evacuations due to adjacent fire conditions. In these locations, targeted roadside vegetation management can remove hazardous fuels to enable safer ingress for firefighters and egress for evacuating residents. These treatments can also reduce the likelihood of roadside ignitions by lowering fuel continuity and ignition susceptibility along high-risk road segments.

Note that while the CWPP prioritizes evacuation zones for roadside clearance, the roads themselves are the priority objective. Often, major roads form the border of the evacuation zone. Staff should

review these maps carefully when considering roadside clearance programs. Moreover, conditions can vary on small scales, and targeted, site-specific roadside clearance projects can make substantial differences in evacuation safety and firefighter ingress.

The highest-priority areas for roadside clearance are those with:

- A high burn probability and ignition risk along roadways, indicating a high likelihood of fire exposure or new fire starts.
- A high flame length and likely canopy fire activity along roadways, indicating the potential for high-severity fire conditions that could threaten egress or ingress.
- A high fraction of non-fire-resilient roads, indicating that roadways in the zone may not support safe evacuation during peak fire conditions due to high-severity fire adjacent to the roadway.
- The presence of fire pathways along public roadways, indicating a high likelihood of rapid fire exposure, which could impact evacuation.

In areas identified by the Roadside Clearance prioritization theme, recommended actions include:

- Clear roadside vegetation in areas anticipated to produce high flame lengths, which could compromise evacuation routes. Prioritize clearance along designated evacuation routes, which are anticipated to serve many evacuees during an evacuation and may be the only way out of the community.
- Consider targeted clearance along roadways where canopy mortality may cause standing dead trees to fall and compromise evacuation routes.
- Ensure roadway vegetation allows fire apparatus ingress. Clear vegetation both horizontally and vertically along roadways to ensure both access for firefighters and egress routes for residents.
- Manage lighter fuels through mowing or weed-whipping to reduce the potential for vehicle-caused ignitions in areas of high ignition risk.
- Coordinate road maintenance and vegetation management among fire agencies, CalTrans, and the Marin County Department of Public Works to ensure clearance and limit traffic bottlenecks during peak fire season.
- Defensible space around vulnerable bridges on evacuation routes is recommended to ensure they are not compromised during a large-scale evacuation.

Metrics to evaluate progress towards to roadside clearance theme include:

- **Fire-Resilient Roads:** The percent of road miles that are fire resilient. Cars provide protection from heat, embers, and smoke during a wildfire evacuation. Fire-resilient roadways have been cleared of vegetation so that, at the peak intensity of the fire, the temperature inside the car is expected to rise no more than 3°F per minute.

5.11 Residential Risk Reduction

The Residential Risk Reduction theme addresses the potential to address wildfire risk via on-parcel risk reduction, including defensible space and home hardening. This theme prioritizes activities in areas in which high-density structures are likely to be exposed to fast-moving wildfires and where resident action could yield multiplicative community benefits.

Prioritization factors for the residential risk reduction theme include:

- A high rate of spread within 200 feet of residential structures, indicating the potential for fast-moving vegetation fires to ignite structures.
- High structure exposure scores within 200 feet of residential structures, indicating a high probability of high-severity fires and embercast.
- High on-parcel risk scores, indicating numerous on-parcel vulnerabilities, including combustible building materials, structure design, or defensible space violations.
- Presence of a fire pathway entrypoint, indicating the potential for fire to quickly move from the wildland into the built environment.
- A relatively low fire response capacity, indicating areas where fire responders may be delayed due to difficult access or long travel times.
- Low structure separation distance, indicating areas of high-density buildings where urban fire may become established.

Recommended activities for zones identified by this theme include:

- Focus inspections and re-inspections on high-risk parcels to ensure compliance with defensible space requirements. Consider enforcement in these areas, when applicable.
- Develop a risk-based grants program that supports residents in high-risk, low-resource areas. Grants should focus on high-return-on-investment activities, such as vent screens, combustible fences, and vegetation in Zone Zero.
- Expand resident outreach and engagement to increase understanding of parcel-level wildfire risk in areas with high risk and low engagement. Use direct mail or home-to-home outreach to encourage participation in defensible-space and home-hardening programs. Identify and collaborate with CBOs, Firewise leaders, and neighborhood groups to further promote engagement.
- Focus chipper programs in high-risk zones to derive benefits from on-parcel vegetation removal.
- Coordinate outreach and assistance efforts with community-based organizations to reach renters, elderly residents, and non-English-speaking households who may face barriers to participation. Consider deploying Spanish-speaking inspectors and bilingual materials when

performing defensible space inspections in zones that have many Spanish-language-speaking residents. While resources in other languages could be useful for some residents, focusing on Spanish speakers is likely to provide the greatest opportunity for sharing important information with non-English speakers.

- Consider enabling residents to schedule inspections or make appointments with defensible space inspectors to maximize the educational benefits of home evaluations.
- Consider piloting innovative incentives programs that address the social aspects of resistance to residential risk reduction.
- For Marin Wildfire member agencies using Fire Aside, provide accurate, detailed, and up-to-date information on each of the approximately 120 "discoveries." Campaigns should be developed to increase awareness about the inspection reports, create a call to action, and provide a continuum of branding and vocabulary so that the language in the Wildfire Risk Report is integrated with information available via other member agency outlets.
- Support residents in implementing the recommended mitigations outlined in their wildfire risk reports (or inspection summary) and provide reference resources to residents, such as plant lists, landscaping design advice, and contractor lists.

The metrics used to track progress towards this goal include:

- **Evaluation Progress:** tracks the number of evaluations of residential parcels, calibrated against an agency-set target for evaluation coverage, providing a measurement of progress against a predetermined benchmark.
- **Resident Engagement:** reports the degree to which Marin County residents are engaging with their on-parcel risk factors by tracking the number of residents who open their Wildfire Risk Report.
- **Mitigation Progress:** tracks the percentage of parcels that resolve at least 50% of all defensible space violations found on their parcel.
- **Reducing Risk on Private Parcels:** tracks the percentage of evaluated parcels with at least one unresolved issue identified as high risk via a multi-dimensional analysis of the risk attributable to each finding identified in the home evaluations.
- **Reducing Flame Length:** counts the number of evaluated parcels for which all remaining fire hazards have a projected flame length of 4 feet or less, a threshold at which fires are anticipated to be easier to control.
- **Grant Program Contribution to Risk Reduction:** tracks the contribution of the Marin Wildfire's grants program to the overall mitigation effort by evaluating the percentage of residential risk factors resolved with the assistance of Marin Wildfire grant funds.

Public-facing dashboards are available to show progress towards risk-reduction goals on these measures.

6. Stakeholder Engagement and Insights

6.1 Stakeholder Engagement Summary

A key requirement when developing a CWPP is stakeholder and community involvement and collaboration. A CWPP provides a mechanism for obtaining community input and identifying where wildfire risk is highest, where communities are most vulnerable, and where investments in mitigation can deliver the greatest reduction in potential wildfire impacts. The information contained in this plan reflects the collaboration of county stakeholders made up of fire agencies, land managers, county departments, and other groups and organizations. Table 1 lists the stakeholders that are included in the CWPP stakeholder group.

Table 1. CWPP stakeholders.

Fire Agencies			
Marin County	Southern Marin	Bolinas	Central Marin
Inverness	Kentfield	Novato	Tiburon
Stinson Beach	San Rafael	Muir Beach	Ross Valley
Special Districts			
Marinwood Community Services District		Inverness Public Utilities District	
One Tam Partners and Land Management Agencies			
National Park Service		California State Parks	
Marin Water		Marin County Parks	
Parks Conservancy			
Private Groups, Private Foundations, and Educational Services			
PG&E	Point Blue	Firewise Communities	FireSafe Marin
Ecologically Sound Practices Partnerships	HOAs and POAs	UC Agriculture and Natural Resources	
County and Local Government Agencies			
City of Larkspur	City of San Rafael	Town of Tiburon	Law Enforcement Agencies
Muir Beach Community Services District	City of Belvedere	Town of Fairfax	Town of Corte Madera
Town of San Anselmo	Town of Ross	City of Mill Valley	Office of Emergency Management

A variety of collaboration strategies were used to interact with the stakeholder community, including:

- Monthly project updates and presentations delivered via regular stakeholder meetings, often delivered in combination with Marin Wildfire's Advisory/Technical Committee (ATC) meetings.
- One-on-one and small-group stakeholder meetings with local officials, fire personnel, community leaders, and land managers.
- Surveys and homework assignments developed to collect input, feedback, and local knowledge based validation from stakeholders on project data inputs, initial fire modeling results, and prioritization methodology (see **Appendix P. Homework Questions, Comments, and Responses**).
- Regular office hours to solicit feedback and answer questions on CWPP prioritization results.

Feedback was reviewed and incorporated throughout the planning process to ensure the plan reflects local conditions and community perspectives. Data collected throughout the feedback process are provided in several of the attached appendices and constitute a valuable resource for ensuring that ongoing planning efforts continue to reflect the place-based knowledge of agency staff and other stakeholders.

6.2 Public Engagement

Meaningful public engagement is an important component of the development of a CWPP. The planning process was designed to ensure that residents, landowners, community organizations, and local partners were kept informed on CWPP development progress and provided the opportunity to contribute local knowledge, express concerns, and help identify wildfire risks and mitigation priorities.

The public engagement process aimed to:

- Increase community awareness of wildfire risk and shared responsibility for mitigation efforts
- Incorporate local experience and values into future risk assessments and priority-setting processes
- Strengthen coordination among residents, local government, and emergency response agencies

Through Fire Safe Marin, monthly public newsletters were created to inform and educate the public about the various components of the CWPP. Fire Safe Marin's goal for the newsletter articles is threefold: (1) build awareness and understanding of what a CWPP is and why it matters; (2) allow public education to happen in manageable pieces, allowing residents gain confidence and capacity to take action; and (3) provide regular updates to show where the CWPP is in the development process and what is coming next. Additionally, Marin Wildfire monthly updates about the CWPP were provided to Firewise leaders, Marin County realtors, and Marin County builders.

In addition to ongoing outreach via public newsletters, Fire Safe Marin, the Marin Wildfire Prevention Authority, and local fire agencies will host a one-day CWPP public outreach meeting designed to deepen community engagement and gather meaningful input; this event will occur on May 2, 2026. This outreach meeting will feature a combination of a formal presentation, a panel discussion, and an interactive, booth-style outreach format. Following the presentation and panel, attendees will be invited to explore a series of topic-focused stations at their own pace. This self-guided approach will allow participants to prioritize the issues most relevant to them and engage in brief, meaningful conversations with staff from local fire agencies, Marin Wildfire, and Fire Safe Marin. Tables will also offer takeaways—including handouts, checklists, and QR codes linking to additional resources—so participants can continue learning and take action beyond the event.

This flexible and interactive format fosters a more personalized and engaging experience, supporting both community education and the collection of actionable public input.

Public engagement will continue beyond the adoption of the CWPP; ongoing outreach, education, and collaboration will be essential for successful implementation. The community will be encouraged to stay involved via future meetings, project updates, and opportunities to participate in mitigation activities and plan updates.

Appendices

The following appendices to this document will be available on the Marin Wildfire website.