

Flood-After-Fire Plan Alignment

Sonoma County

OVERVIEW

REGION

Northern California

POPULATION

488,863

TOOL TYPES

Post-Fire Recovery and Resiliency Plans, Local Hazard Mitigation Plans, Community Wildfire Protection Plans

LEAD AGENCIES

Permit Sonoma; Department of Emergency Management; Sonoma Water; Policy, Grants, and Special Projects Sonoma County Agricultural Preservation and Open Space District

CLIMATE IMPACT AREA

Wildfire, Post-Fire Flood, Flooding, Extreme Weather Events, Drought



SUMMARY

Fires and floods have always been part of the Northern California landscape. Beginning in 2017, however, Sonoma County experienced wildfires over the course of several years that brought devastation to communities and landscapes. The severity of several fires, including the Tubbs, Nuns, Kincade, Glass, and Walbridge fires, left many areas vulnerable to mudslides, debris flow, soil instability, and other post-fire flooding impacts that can occur during and after precipitation or extreme weather events. Although the County has been spared from any major post-fire flooding events, ongoing monitoring and proactive planning remains an important component of their resilience activities.

Sonoma County's experiences with flood-after-fire (wildfires and post-fire flooding events) have prompted local agencies to work collaboratively with other partners across a broad spectrum of topics to recover from disasters and prepare for future ones fueled by ongoing and increasing climate change impacts. The County relies on plans, tools, and strategies to advance and align fire and flood resiliency policies and actions, increase data collection, and develop post-fire monitoring systems. In addition, the County has implemented a suite of public outreach activities to increase engagement with vulnerable populations, expand emergency notification systems, and create additional mechanisms to increase preparedness and resilience.

Planning for such events is increasingly critical as research shows that extreme wet and dry years in California are expected to alternate more rapidly in a warming climate. This will likely increase the odds of extreme precipitation events occurring within one or two years after a wildfire. In addition, the severity of same-year sequential burned area-extreme precipitation events is expected to increase. These projections are reinforced by scenario models in the Sonoma County Multi-Jurisdictional Hazard Mitigation Plan, which indicate the County can expect more extreme weather events with variable precipitation patterns such as heavy rainfall events, prolonged dry periods, extreme heat, and an increase in wildfires.

This case study was selected because it shows how proactive planning and adaptive management to repeat hazards can increase preparedness to climate change and how this process is amplified through plan alignment. In addition, this case study illustrates how collaboration, public outreach, innovation, and usage of data play integral roles in the planning process.

OVERVIEW OF RELEVANT PLANS

Sonoma County has experienced repeated disasters since 2017. As a result, the County undertook an initial round of intensive planning activities that occurred immediately following the Tubbs and Nuns fires. As future disasters occurred, some initiatives and plans evolved as necessary. In addition, the County has undertaken a wide array of planning efforts to address all aspects of emergency response, disaster preparedness,

What is Plan Alignment?

The process of plan alignment leverages connections, information, and resources to build shared language, data foundations, and processes across multiple planning efforts at any scale. Plan Alignment, in essence, is based on collaboration. The resulting plan alignment products are:

- 1. a suite of plans (with different scopes and purposes) that share the same data, similar underlying assumptions, aligned visions, and complementary goals, strategies, and actions.*
- 2. a shared understanding, process, and structure for multiple entities in a community or region to continue to collaborate and align efforts over the long term.*

Plan alignment helps communities integrate planning teams, data, and processes to achieve more holistic and effective solutions, and better outcomes for everyone.

Why Plan Alignment for Wildfire, Flooding, and Climate Resilience?

Climate change does not stop at jurisdictional boundaries and continues to impact all aspects of our communities, economies, and environment. An adaptive response to complex, cross-sectoral issues like flooding and wildfire in the context of a changing climate requires a fundamental change in the way that communities plan and evolve over time: a response that utilizes future climate scenarios to guide planning decisions and builds a shared vision of resilience for all through collaboration, equity, and alignment.

hazard mitigation, climate adaptation, short- and long-term recovery, and resilience planning. Some plans address all types of hazards that the County faces while others are focused primarily on wildfire. Plans vary in terms of whether they oriented toward high level policy direction or specific actions, depending on the plan type and need. The following plans represent several of the most relevant plans developed for wildfire planning, recovery, and future resilience:

- Following the 2017 fires, the Board of Supervisors directed Sonoma County Agricultural Preservation and Open Space District to convene a multi-stakeholder coalition to identify short and long-term actions for watershed recovery and resiliency. Actions are contained in the report, [Living in a Fire Adapted Landscape: Priorities for Resiliency](#), which included a needs assessment and priorities to protect natural and working lands from the impacts of climate change and future disasters—such as supporting landowners and land managers in assessing and mitigating watershed impacts, protecting a network of lands that support biological diversity through changing climate conditions, and ensuring long-term attention to community and ecosystem resiliency.
- Drawing on many of the priorities identified in the Living in a Fire Adapted Landscape report,

the County’s Office of Recovery and Resiliency (ORR) collaborated with other stakeholders to develop the [Recovery & Resiliency Framework](#). Adopted in 2018, the framework established a vision for how the County recovered from the 2017 wildfires and set up an approach to a more resilient future by identifying goals, actions, and timelines for implementation. The framework was based on FEMA’s National Disaster Recovery Framework and structured around recovery efforts in the areas of community preparedness and infrastructure, housing, economy, safety net services, and natural resources.

- [The Sonoma County Multi-Jurisdictional Hazard Mitigation Plan](#) (MJHMP) was adopted by the County Board of Supervisors in December 2021 and updates the County’s previous Hazard Mitigation Plan. The MJHMP update took a regional approach by expanding the planning area to include cities, towns, and special districts. Plan development was led by Permit Sonoma and the Department of Emergency Management. The MJHMP identifies potential hazards within the planning area, assesses risk to people, property, and critical facilities, and contains a mitigation strategy to address these risks. The plan references data from California’s Fourth Climate Change Assessment in its summaries of climate change impacts on local hazards. Each

hazard section includes changes in exposures and vulnerability to the population, property, critical facilities, environment, and economy resulting from climate change. The Wildfire Hazard section notes the relationship among hazards and the range of potential secondary effects. For example, warming temperatures are projected to increase the occurrence and duration of droughts in the County, which would increase the probability of wildfire. Those increases in the frequency and intensity of wildfires increases the potential for more floods following fire, which increases the probability of mass movements and debris flows and creates additional water quality impacts.

- [The Sonoma County Operational Area Emergency Operations Plan](#) (EOP) is a guidebook for cities, special districts, tribal nations, and unincorporated areas of the County to utilize during the phases of an all-hazards emergency management process (preparedness, response, recovery, and mitigation). The EOP facilitates coordination between agencies and jurisdictions by assigning tasks and responsibilities to County agencies and organizations—specifying their roles before, during, and after an emergency or disaster situation. The EOP was updated and adopted in March 2022; Annexes are also adopted in support of the EOP to provide additional information on topics including extreme heat events, large-scale evacuations, public safety power shutoffs, animals in disaster, wildfire burn scar debris flow response, and flood response.

- Sonoma County is also updating its [Community Wildfire Protection Plan](#) (CWPP). This updated plan will address ways in which the County is changing its approach to wildfire mitigation following the series of fires beginning in 2017. In addition to meeting the minimum requirements established by the Healthy Forests and Restoration Act (e.g., including a risk assessment, prioritization of fuel treatments, and strategies to reduce structural ignitability), the County’s updated CWPP will incorporate elements such as an evacuation map and interactive online tools for ongoing public engagement.

- Depending on the severity of a wildfire, the County may also develop other action-oriented

plans to assist with response and recovery. These include Burned Area Contingency Plans, developed by the County Department of Emergency Management, and Watershed Emergency Response Team (WERT) Evaluations, led by the California Department of Forestry and Fire Protection (CAL FIRE) and the California Department of Conservation California Geological Survey. Burned Area Contingency Plans establish specific thresholds for evacuations, road closures, public notifications, and other necessary measures due to potential debris flows in a burn scar. WERT evaluations provide an assessment of conditions such as soil burn severity and estimated runoff to help local agencies plan for post-fire impacts (e.g., surface erosion, debris flows).

Many other plans incorporate climate change data in their assessment of hazards and risk and identify responses through hazard mitigation or adaptation. For example, Sonoma Water’s Climate Adaptation Plan (CAP), adopted in 2021, assesses climate risks including the ways in which increased wildfires may impact water supply, flood management, and wastewater systems. The CAP also provides priority actions for mitigation and/or adaptation strategies.

PLAN ALIGNMENT & IMPLEMENTATION

Many of the County’s wildfire planning, recovery, and resilience plans align with one another in different ways to increase the effectiveness and reach of wildfire and post-fire flood resilience efforts throughout County planning and implementation efforts. For example, the updated County MJHMP provides improved foundational data from which other plans can build from. The MJHMP includes a Wildfire Hazard Index to quantify the relative hazard within Sonoma County. The Index takes into consideration predicted flame length, transmission line location, suppression difficulty, and fire weather potential. The Wildfire Hazard Index is used as one of the primary inputs for the CWPP Wildfire Risk Index, which is a model that predicts relative wildfire risk.



Santa Rosa Fires Community Meeting, October 2017. Image: Chris Godley, Sonoma County

The MJHMP has also been incorporated into the County’s General Plan Safety Element by reference. During the next Safety Element update, the County anticipates incorporating more disaster resilience policies that integrate with other plans and reflect significant fire and flooding events that have occurred since the Safety Element was last updated in 2014.

Other wildfire plans that align include the Burned Area Contingency Plans, which support the Sonoma County EOP by establishing a uniform plan for a joint response by local governments, special districts, and allied agencies in the Sonoma County Operational Area to the threat of or actual soil movement in the areas recently burned in a fire.

In addition, Sonoma County’s [Five-Year Strategic Plan](#) (2021-2026) guides how the County aligns short and long-term objectives with operations and budgets, so actions reflect a clear sense of purpose and demonstrate meaningful progress. The current Strategic Plan focuses on five pillars: healthy and safe communities, resilient

infrastructure, racial equity and social justice, climate action and resiliency, and organizational excellence. Strategic Plan goals and objectives also align with other county initiatives, including the Recovery and Resiliency Framework (mentioned above), Economic Recovery Action Plan (which supports economic and community resiliency and recovery from COVID-19 and natural disasters), forthcoming General Plan updates, and the Sonoma Water Climate Adaptation Plan.

COLLABORATION & ENGAGEMENT

Following the 2017 fires, collaboration and alignment across departments and agencies was imperative to address the multi-faceted issues associated with rebuilding, recovery, and planning for debris flow and flooding in burn scars. One of the County’s first steps was establishing the Office of Recovery and Resiliency (ORR), which

set up a dedicated team for supporting recovery efforts after disasters. The County also directed Sonoma County Agricultural Preservation & Open Space District to convene the Watershed Collaborative, a coalition of organizations and agencies. The Collaborative identified both short-term actions for watershed recovery and long-term strategies for watershed resiliency, and included engagement and participation of non-governmental organizations, Resource Conservation Districts, community groups, Sonoma County Water Agency (known as Sonoma Water), Sonoma County Regional Parks, University of California Cooperative Extension, and state and federal agencies including the Regional Water Quality Control Board, California Department of Fish and Wildlife, NOAA Fisheries, and USDA Natural Resources Conservation Service.

The ORR has transitioned to become part of the County's Policy, Grants, and Special Projects Division, which oversees the development and implementation of the County's Strategic Plan. Several of the Watershed Collaborative's members continue to work together as the Sonoma County Watershed Task Force, which reconvenes when wildfires occur to assist in land rehabilitation, restoration, and monitoring.

Other wildfire and resilience-related plans have also relied on collaborative approaches for their development process. The development of the MJHMP, led by Permit Sonoma and the Department of Emergency Management, included a Steering Committee made up of representatives from participating jurisdictions, an interdisciplinary stakeholder group of experts in emergency management, and community members. The Committee oversaw the development of the plan. Similarly, the CWPP development process has engaged with fire departments, state, federal, and local agencies, local non-profits, Fire Safe Councils, Tribes, land managers, community groups, and others to help build relationships, increase buy-in for wildfire risk reduction activities, and improve resource sharing. The CWPP has also created an interactive Hub Site, which includes a Project Ranking Tool that allows Sonoma County residents, agencies,

and interested parties to list fuel mitigation and fire prevention projects into an online Project List. This List can be used to prioritize projects in the county as well as provide the groundwork for applying for much needed grant funding.

Consideration for vulnerable populations is a high priority for the County, as reflected in multiple plans and activities. All County publications and communications that address emergency preparedness and response—including plans, brochures, and emergency alerts—are provided in both English and Spanish. Community preparedness meetings and training events have Spanish translators, and some meetings are held in Spanish only. The County has [webpages for access and functional needs](#) (AFN) to highlight emergency preparedness resources that help benefit these populations as well as an AFN Advisory Committee. The County also extended the CWPP timeline to ensure a more inclusive engagement process with neighborhood groups and underserved populations including seniors, homeless persons, low-income residents, and the Latino community, to ensure their voices and concerns are reflected in the final plan.

INNOVATIONS

Repeated disasters have resulted in ongoing learning and innovation to make better use of resources. For example, following the 2017 fires, the County installed thousands of absorbent straw wattles to help mitigate the threat of serious runoff and flooding conditions near burn scar areas due to concerns that the upcoming rainy season would have catastrophic impacts on watersheds, ecosystems, and homes. The County realized that this massive deployment was unnecessary, and resource allocation became more efficient over time—after subsequent fires, fewer wattles were used and strategically placed in select locations.

The County has also embraced monitoring and weather tracking tools to provide real time information to residents. Following the 2017 fires, the County installed rainfall and stream gauges within and around the burn areas to inform early



Sonoma County contracted with the California Conservation Corps to place wattles as sediment control measures to reduce potential impacts of post-fire soil erosion and runoff after the 2020 LNU Lightning Complex. Image: John Kessel, Sonoma County

flood warning systems due to the greater risk of flash floods and debris flows. Sonoma Water also developed the [One Rain website](#) which provides real time rainfall, river stream, and reservoir data. Data from the website is linked to the National Weather Service, which uses the information in issuing weather watches, alerts, and warnings. The County has also worked with the California Department of Water Resources, National Oceanic and Atmospheric Administration (NOAA), and Scripps Research to explore how new radar technology can better track storms that might affect burned areas.

FUNDING SOURCE

Following the Tubbs and Nuns fires, Permit Sonoma applied for and received funding from the Federal Emergency Management Agency's Hazard Mitigation Grant Program (HMGP) to update the 2016 Sonoma County Hazard Mitigation Plan—which is now the MJHMP (\$330,000) and the CWPP (\$200,000). The

County also applied for grant funding through the Building Resilient Infrastructure and Communities (BRIC) program to allow for an integrated wildfire management approach for three key mitigation measures: defensible space, vegetation management, and home hardening. The County has submitted additional grant applications to HMGP to implement activities in the Recovery and Resiliency Framework and meet County leadership priorities—the status of grant applications is available on the County's [HMGP webpage](#). The County also uses American Rescue Act funds following disaster events to fund recovery activities.

REPLICABILITY

Research from the National Center for Atmospheric Research demonstrates that the western United States faces a heightened risk of heavy rains inundating areas that were recently scarred by wildfires. If society continues to emit heat-trapping greenhouse gases at a high rate,

the number of times that an extreme fire event is likely to be followed within one year by an extreme rainfall event will more than double in California. Key insights from Sonoma County can help other communities proactively plan for wildfire resiliency and post-fire flooding impacts, including:

1. Plan alignment may be intentional or opportunistic depending on factors such as the timing of required plan updates, the need for new plans or updates in response to disaster and recovery needs (e.g., fire and post-fire impacts), and additional planning priorities that expand resilience efforts.
2. Learning in post-disaster settings is iterative and ongoing. Having a process for documenting information, such as local agency contact information, helps facilitate cross-department collaboration, alignment, and planning—especially when future disasters occur.

3. In post-fire settings, it's important to be prepared to deploy resources right away. This can be better enabled by having vetted contractors and contract templates in place to assist with efficiently stabilizing areas and getting resources to affected areas and vulnerable populations.

FURTHER INFORMATION

For general information about Sonoma County's plans, visit [Permit Sonoma](#) and the [Department of Emergency Management](#). The primary source of information related to emergency readiness, response, and recovery for residents can be found on the County website [SOCOemergency.org](#). Recovery resources include specific websites for fire or flood events to reflect any unique considerations in the affected area.

This case study was developed by the Community Wildfire Planning Center in partnership with the Governor's Office of Planning and Research.

