Plan Integration for Resilience Scorecard™ (PIRS™) for Wildfire Guidebook

Spatially evaluating networks of plans to mitigate wildfire

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Executive Summary

The Challenge

More frequent and severe wildfire and urban conflagration events are increasing losses of life, property, habitat, and ecosystems in California, the United States, and across the world. Seven of the ten most destructive fires in California history have occurred in the last five years (CAL FIRE, 2025), and one in four Californians lives in an area considered high-risk for wildfire (Feo et al., 2020). Entire towns have been destroyed when wildfires transition to urban conflagrations—most notably Paradise, Pacific Palisades, and Altadena in California, and Lahaina in Hawaii. Nationally, over 129,000 structures have been destroyed since 2005 by wildland fires (Headwaters Economics, 2025). During that same period, over 2,000 U.S. communities experienced a wildfire of at least 100 acres burn within two miles of city limits.

Much of this is due to the continued expansion of the *wildland-urban interface* (WUI)—places where the built environment meets natural vegetation—as urban areas of all sizes grow and sprawl into rural areas. Growing consensus about the nature of wildfire behavior, namely that "fire spreads because the requirements for combustion are satisfied at locations along the [fire] path" (Cohen, 2000, p. 18), is another indication of the inherent *spatiality* of the hazard. Strengthening community resilience to wildfire and urban conflagration therefore requires more deliberate and effective planning and policy, based on spatial analysis that identifies hazard zones and fire pathways within local jurisdictions and a more holistic understanding of the relationship between fire and the built and natural environments.

Unfortunately, local urban planning and land use policies often pay insufficient attention to wildfire. While some guidance appears in community wildfire protection plans, hazard mitigation plans, and the safety element of general plans, the guidance is often narrowly developed, isolated from other plan documents, and spatially limited. Given the increasing frequency and severity of wildfire events—and the critical role that planning can play in mitigating (or exacerbating) resilience by guiding the development and management of communities—it is imperative that wildfire-awareness and resilience are integrated throughout a community's network of plans. Local, contextually appropriate, resilience-supporting plans and policies can help communities move beyond the traditional suppression-only (or suppression-*mainly*) paradigm, toward a more holistic approach that better reflects our rapidly changing world.

A New Approach: The Plan Integration for Resilience Scorecard™ for Wildfire

This Guidebook walks community planners, emergency managers, and other administrators through a local application of the **Plan Integration for Resilience Scorecard™ (PIRS™) for Wildfire** a method that facilitates the *systematic* and *spatial* evaluation of a community's network of plans to assess the potential effects of existing policies on hazard vulnerability. Originally developed for flooding hazards (Malecha et al., 2019; Masterson et al., 2017; Berke et al., 2015), the PIRS™ methodology was subsequently applied to urban heat hazards via the PIRS™ for Heat (Keith et al., 2022) and now to wildfire hazards via the PIRS™ for Wildfire. This WUI-focused methodology expands the core PIRS™ method to help local public officials prepare more effectively for wildfire and urban conflagration events by analyzing plans and policies from a fire-hazard perspective, revealing potential conflicts and opportunities to adjust policies (based on the latest scientific understanding) to strengthen community-wide resilience.

At the heart of the PIRS™ for Wildfire is the *scorecard*—an organized, vetted database of the community's wildfire-risk-affecting policies from across the network of plans, scored according to their likely effects and their geographic focus. Along with associated maps, derived from the scorecard results, this organization and novel perspective allow local staff to visually analyze areas in their community where policy guidance conflicts, and places that may require greater focus on wildfire resilience.

The PIRS™ for Wildfire method, described in detail in Chapter 2 of this Guidebook, consists of five steps:

(1) Build your local PIRS™ team.

(2) Select relevant policies from your community's network of plans.

(3) Delineate *district-hazard zones* (the spatial unit of analysis that is best suited to your community's needs).

(4) Score policies.

(5) Map, analyze, and utilize the results.

Users of this Guidebook will learn not only how to assemble a scorecard for their community, but also how to use the information to make meaningful mitigation decisions and formulate a more cohesive and effective wildfire mitigation strategy from their existing network of plans. Strategies like fire pathway disruption can be used, along with land use and site-scale based best practices, to focus on community-wide resilience planning and implementation, leading to unique and innovative policy adjustments.

Along with the organized, spatialized dataset and new perspective, the PIRS™ for Wildfire method has the added benefit (as reported by many communities that have used the process) of improving

cross-departmental coordination, information sharing, and overall local wildfire mitigation capacity. This ground-up approach promotes the integration of wildfire mitigation throughout local land use plans and procedures, providing a data-driven method to focus staff resources toward reducing losses.

With support from the Gordon and Betty Moore Foundation, the PIRS™ for Wildfire process was tested in collaboration with a diverse set of wildfire-vulnerable California communities, including the cities of Atascadero and Temecula and the counties of Placer, Santa Barbara, and Napa. These applications are summarized in a series of case studies in Chapter 3.

This PIRS™ for Wildfire Guidebook provides detailed instructions for any community interested in strengthening resilience to wildfire and urban conflagrations through better-integrated, hazard-aware planning. It is deliberately designed to offer flexibility and to be applicable in any local context. Every PIRS™ for Wildfire outcome will be unique to the local context and be informed by local expert practitioners. It is designed to be built and used by local staff. However, if your community is interested in receiving support or consultation for a local PIRS™ for Wildfire application, please contact our team at the following:

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PIRS™ Lab

CHAPTER 1

Introduction to PIRS™ for Wildfire

Why plan for wildfire?

Frequent and severe wildfire events are increasing the loss of life, property, habitat, and ecosystems in California, the United States, and across the world. Seven of the ten most destructive fires in California history have occurred in the last five years (CAL FIRE, 2025), and one in four Californians lives in an area considered high-risk for wildfire (Feo et al., 2020, p. 174). Fires that begin in wildlands can transition to urban conflagrations that have destroyed entire towns and neighborhoods (e.g., Paradise, Lahaina, Pacific Palisades, Altadena). Nationally, over 129,000 structures have been destroyed since 2005 by wildland fires (Headwaters Economics, 2025), due in part to the continued expansion of the *wildland-urban interface* (WUI)–the places where the built environment meets natural vegetation–-as urban areas of all sizes grow and sprawl into their wildlands.

Community planners, emergency managers, fire personnel, and other local staff and administrators face many challenges including socio-economic and environmental factors when addressing wildfire resilience in their communities. To achieve risk reduction in the WUI, planners must understand areas of wildfire hazard and location-specific mitigation effectiveness. In response to resilience methods, Nani Barretto, co-executive director of the Hawaii Wildfire Management Organization, said, “Fire is not like other natural hazards, it can only move where there is fuel, and we have a lot of say in that” (Angueira, 2025). Observant researchers have told us that “fire spreads because the requirements for combustion are satisfied at locations along the [fire] path” (Cohen, 2000, p. 18). Acting on Cohen’s spread principle, strengthening WUI wildfire resilience requires the integration of spatial analysis that identifies fire-hazard areas and ignition pathways within a jurisdiction. This calls for an approach that is contextually appropriate to local areas, rather than relying solely on suppression (Feo et al., 2020). As called for in the *Costs of Wildfire in California*, “Policy and planning should focus on variations in wildfire regimes across the state rather than the state-wide trends. Management and policy are most effective when specific to the local wildfire context” (Feo et al., 2020, p. 174). The implementation of alternative strategies, including targeted interventions, community design, and fire path disruption, can strengthen overall wildfire resilience. The need for strategies that reduce transmission (path spread) in the face of climate change is well developed in the literature (Cunningham et al., 2025).

An often overlooked yet critical part of the wildfire mitigation equation is local planning and land use policy guidance, which often lacks sufficient attention to wildfire. While some guidance appears in community wildfire protection plans, hazard mitigation plans, and the safety element of general plans, it is often narrowly developed, isolated from other plan documents, and spatially limited. Given the increasing frequency and severity of wildfire events—and the critical role that planning can play in mitigating (or exacerbating) resilience by guiding the development and management of communities—it is imperative that wildfire-awareness and resilience are integrated throughout a community’s network of plans. The April 2025 Federal Emergency Management Agency (FEMA) Local Hazard Preparation Guide calls for local-level integration of hazard risk and planning processes (like land use, economic development, and infrastructure) to “minimize conflicting initiatives, such as development in hazard-prone areas” (FEMA, 2025).

The need exists for a generalizable method that communities can apply within their local contexts to (1) assess their existing plans and policies with respect to wildfire resilience and (2) more effectively build wildfire resilience into plans and policies by reducing conflicts and focusing on the areas of greatest need. The Plan Integration for Resilience Scorecard™ (PIRS™) method meets this need, incorporating readily accessible spatial analysis tools that allow policymakers to *systematically* and *spatially* evaluate their community's policies based on how they affect resilience in at-risk areas.

What is the Plan Integration for Resilience Scorecard™?

The Plan Integration for Resilience Scorecard™ (PIRS™) is a method that facilitates the *systematic* and *spatial* evaluation of a community's network of plans to assess the potential effects of existing policies on hazard vulnerability. The PIRS™ for Wildfire method applies policy and spatial analysis tools to assess hazard mitigation effectiveness and identify opportunities for improving resilience to wildfire and urban conflagrations. Originally developed for flooding hazards (Malecha et al., 2019; Masterson et al., 2017; Berke et al., 2015), the PIRS™ method was subsequently applied to urban heat hazards via the PIRS™ for Heat (Keith et al., 2022) and now to wildfire hazards via the PIRS™ for Wildfire. This WUI-focused approach expands the core PIRS™ method to help local public officials prepare more effectively for wildfire and urban conflagration events by analyzing plans and policies from a fire-hazard perspective, revealing potential conflicts and opportunities to adjust policies—based on the latest scientific understanding and policy best practices—to strengthen community-wide resilience.

PIRS™ for Wildfire helps local planners overcome the common challenges of having multiple, poorly coordinated plans that cover various sectors of planning—a network of plans can be difficult to analyze, let alone spatially align. The PIRS™ for Wildfire method's step-by-step process (**Figure 0.3**) seeks to remedy this through a cohesive and spatial analytical system to better understand, and then improve, wildfire and urban conflagration mitigation strategies.

How to improve wildfire resilience using the PIRS™ for Wildfire method

PIRS™ for Wildfire offers a unique and effective approach to improving wildfire resilience through better planning. After building your local PIRS™ for Wildfire team (Step 1), relevant policies are selected (Step 2) and the community's unique hazard zones and planning districts are identified (Step 3, **Figure 0.1**). Using this context-specific, explicitly spatial, and hazard-focused framework, policies can then be scored relative to their likely effects on wildfire resilience *and* in reference to each zone and district (**Figure 0.2**). This helps visualize areas of policy conflict, or places that may require extra wildfire resilience attention, especially those that have a high wildfire hazard yet low policy scores. This analysis then opens opportunities for informed community plan updates, including resilience-focused policy revisions, and a stronger overall understanding of wildfire resilience needs across a community.

Chapter 2 will guide you through the PIRS™ methodology, following the 5-step approach. Chapter 3 showcases the cities, counties, and communities that participated in the pilot for PIRS™ for Wildfire.

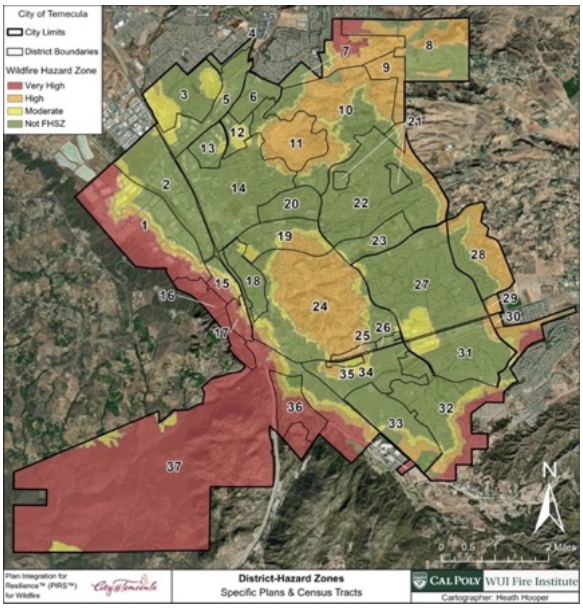


Figure 0.1 Temecula: District-Hazard Zone Map The combination of planning districts map layer with the hazard zone map layer.

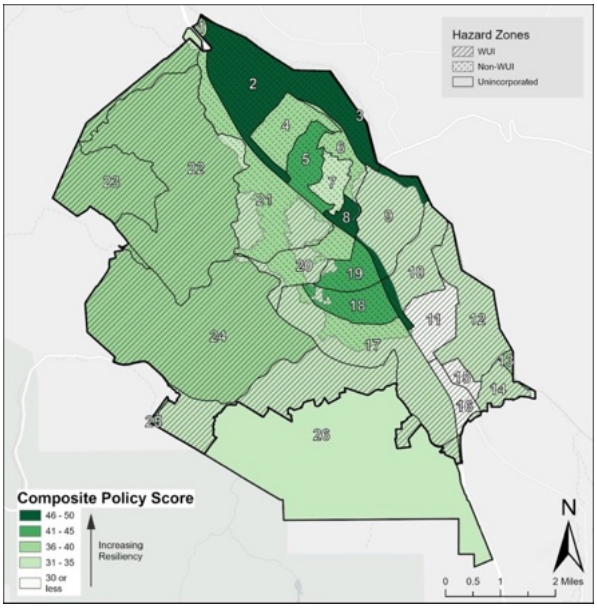


Figure 0.2 Atascadero: Composite "Network of Plans" Policy Score Map Scored policies are mapped on top of the district-hazard zone map.

CHAPTER 2

PIRS™ for Wildfire Methodology

PIRS™ for Wildfire Steps

Step 1: Build your PIRS™ Team. The participating team should consist of 3 or more staff members across local government departments with knowledge and skills in planning, policy, wildfire/WUI fire, emergency management, and GIS. Additionally, the inclusion of subject matter experts (SMEs) will be valuable resources for expertise feedback throughout the PIRS™ process.

Step 2: Select relevant policies from the community's network of plans. Closely review the community's existing plans for *actionable* policy statements that are likely to *affect wildfire resilience* and contain *place-specific term(s)* that helps identify where they apply (and where they do not). Add relevant policies to the scorecard. SMEs should participate in the validation of policies and provide feedback on policy's effect on wildfire resilience.

Step 3: Delineate District-Hazard Zones (DHZs), locally relevant "geographies of choice" that enable the spatial evaluation of community policies. Subdivide the community into *districts* that make sense for planning and management decisions (e.g., neighborhoods, U.S. Census block groups) and *hazard zones* that reflect the severity of wildfire hazards in specific areas (e.g., CAL FIRE's Fire Hazard Severity Zones). Combine these to form a layer of mutually exclusive DHZs. SMEs should review the DHZ's for proper scale related to wildfire control considerations.

Step 4: Systematically score and map each policy, based on its likely effect on wildfire resilience and its place-specific term(s) or location—after adjusting the policy list and DHZs, as needed, per the SME recommendations. Assign a score of "+1" (increases wildfire resilience), "-1" (decreases resilience), or "0" (neutral or unknown) to each policy, then map it to the appropriate DHZ(s). Repeat for all relevant policies across the entire network of plans.

Step 5: Analyze and map the results. The organized dataset of relevant policies, scored according to their likely effect on wildfire resilience and spatially mapped to appropriate DHZs, can then be analyzed to provide insight and reveal opportunities to strengthen resilience. The "policy mix" affecting any given DHZ can be instantly known, providing an opportunity to investigate conflicts and scrutinize negative-scoring policies. Summed scores for the DHZs can also be mapped for each plan, and for the network of plans, as a whole, revealing conflicts, gaps, and other relevant patterns—and facilitating comparisons with other spatial data (e.g., social vulnerability, evacuation plans).

PIRS™ for Wildfire: 5-Step Roadmap

Step 1: Build the PIRS™ Team

- Define roles and responsibilities
- Form a core planning team, with GIS staff
- Incorporate subject-matter experts into team for review throughout the scorecard building process

Step 2: Select relevant policies

- Identify community's "network of plans"
- Identify policies from plans that 1) are actionable, 2) affect wildfire resilience, and 3) contain a place-specific term
- Add selected policies to scorecard

Step 3: Delineate district-hazard zones

- Subdivide community into districts that make sense for the specific area
- Identify wildfire hazard zones
- Combine layers to form a single "district-hazard zone" map

Step 4: Score and map policies

- Score selected policies based on their affect on wildfire resilience: "+1", "0", or "-1" in each DHZ
- Sum policies per DHZ
- Map policies to appropriate DHZ

Step 5: Analyze and map results

- Map summed policy scores for each plan in the network
- Composite maps reveal conflicts and gaps in policies and plans
- Analyze results and plan resolutions

1

2

3

4

5

THE SCORECARD

District:	01		02		03		04	
Hazard Zone:	WUI	Non-WUI	WUI	Non-WUI	WUI	Non-WUI	WUI	Non-WUI
POLICY								
1.1.2. Concentrate higher density development downtown and within the Urban Core, and focus master planned commercial uses at distinct nodes along arterial corridors.		1		1		N/A		1
2.1.4. Allow for alternate road standards in rural areas in order to minimize grading and tree removals.		-1		-1		-1		-1
3.1.2. Designate and protect the east side of the Del Rio Road and El Camino Real intersection for a master planned retail commercial use.		N/A		1		N/A		N/A
4.1.1. Provide mixed-use/pedestrian scale zoning and development standards for the downtown. Encourage government, arts, entertainment, recreation, business facilities and residential uses to be mixed in multi-story buildings with sidewalk orientation and recessed or off-site parking.		N/A		N/A		N/A		N/A
4.1.6. Mixed-use multi-family residential development is allowed up to 20 du/ac, higher densities may be approved through a planned development process.		N/A		N/A		N/A		N/A
6.1.4. Scenic and sensitive lands including creeks, riparian corridors, wetlands and other areas of significant habitat value shall be protected from destruction, overuse, and misuse by the use of zoning, tax incentives, easements, or fee acquisition.		1		1		1		N/A

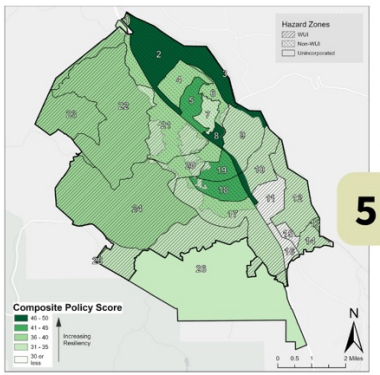


Figure 0.3 PIRS™ for Wildfire: 5-Step Roadmap

Step 1:
Build the PIRS™ Team

To engage in a PIRS™ analysis, the local team needs participation from several departments including Community Development (Planning), Emergency Management, Fire Services, and GIS (or IT). The team needs people who support collaboration, have an interest in hazard mitigation, and are curious about how to apply spatial tools to strengthen policy. They need to be curious about how to lower the risk of hazard damage within their communities. Team members will work together on some tasks and by themselves on others.

1.1 Assemble the Core Team

- Assemble the Core Team, of 3 or more staff members across local government departments
- The team can select a leader or have a senior member of the staff (department head) assign tasks

1.2 Engage subject matter experts

- Build a subject matter expert (SME) team
- SMEs possess local wildfire behavior expertise to provide feedback throughout your process

1.3 Draft the PIRS™ for Wildfire workplan

- Assign staff responsibilities
- Estimate timeline and describe tasks

Step 1.1: Assemble the Core Team

You will form a Core Team of staff members who can commit time to the PIRS™ process. The Core Team should consist of 3-4 staff members from across local government departments who are responsible for developing and/or implementing community and/or mitigation plans for the jurisdiction. This includes city or county planners, GIS staff as well as fire and emergency management personnel with knowledge of the local wildfire hazard and mitigation strategies.

At a minimum, the following four roles are essential to the core PIRS™ for Wildfire team:

- **Planning** staff play a key role throughout the PIRS™ for Wildfire process. Individuals with knowledge and experience in policy formation working with the spectrum of plans are particularly well suited. Planners typically lead the PIRS™ process.
- **GIS** capability is needed to support geospatial tasks throughout the PIRS™ process. This includes establishing planning districts, delineating hazard zones and providing data layers for scoring the selected place-based mappable policies. This expertise may come from dedicated GIS staff, planning staff, or supervised GIS interns.
- **Fire** personnel bring local knowledge of existing plans, best practices for wildfire mitigation and fuels (e.g., vegetation) management, WUI codes & standards, and first-hand experience in field operations relevant to wildfire protection, response and recovery.
- **Emergency Management** personnel provide valuable input on hazard reduction policies and procedures.

Skill requirements across the PIRS™ process include:

- Ability to link policies to potential wildfire hazard impacts
- Ability to identify place-specific terms within policies
- Ability to identify actionable policies
- Ability to access/acquire maps or GIS layers
- Ideally, an ability to bring shapefiles and data into GIS software to generate new information (manual overlay of maps can work as well).
- Competency with spreadsheet software and GIS software
- Ability to identify features on maps/layers that correspond to the place-specific terms identified in policies

Step 1.2: Engage Subject Matter Experts

Fire and emergency management personnel have an essential role within the PIRS™ for Wildfire method. As subject matter experts (SMEs), their knowledge of the local area hazards (including the impacts of weather, topography and fuels on fire behavior and ignition) best practices as well as codes and standards for wildfire mitigation and evacuation, must be integrated to effectively shape policies for wildfire resilience. Without SME input, communities run the risk of inaccurate assessments and ineffective policies that fail to properly consider the wildfire hazard.

Whether as integral members of the core team or in an advisory role, we recommend you enlist the support of a small "SME Team" of 2-3 trusted and invested local wildfire experts and an emergency manager. This provides the added benefit of including multiple perspectives that lead to informed consensus recommendations at each step of the PIRS™ for Wildfire method.

Fire-related SMEs that participate in this effort will ideally have direct experience in fire management, and should have knowledge of wildfire history, wind patterns, factors contributing to local wildfire hazard and fire behavior, and familiarity with the local community and surrounding area. Regional knowledge is also important; wildfires can travel considerable distances crossing jurisdictional lines and impacting distant communities. Consider recruiting members of your SME Team from organizations like the local Fire Safe Council, the International Association of Emergency Managers (your region), or the Western Fire Chiefs Association.

For Emergency management SMEs, a background in hazard mitigation and evacuation planning are central to their contributions to the PIRS™ method.

There is flexibility in how the community decides to **configure the core team** and engage subject matter experts (SMEs) in strengthening community plans and policies. Three examples for different team configurations can be seen in **Figure 1.1**.

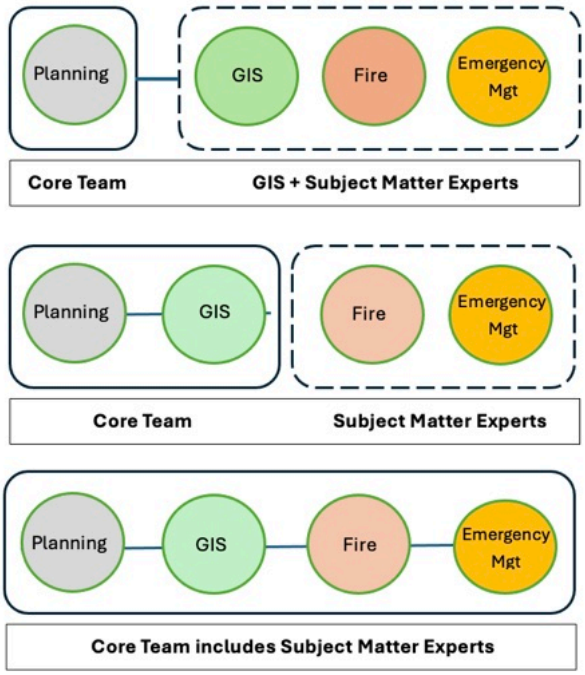


Figure 1.1 PIRS™ Team Configurations

Step 1.3: Draft your PIRS™ for Wildfire Workplan

With the PIRS™ core team in place and the SMEs' role decided, the next step is to draft your PIRS™ for Wildfire workplan. This includes assigning responsibilities as well as estimating time and describing tasks. See **Appendix A** for a sample work plan.

The time commitment will depend on how many plans and policies you will be evaluating, but generally this will be a 6-month minimum. Generally, team members work part-time on PIRS™, although there is no restriction on full-time effort, which will move the process along and maintain continuity.

Roles and responsibilities will be determined locally. We suggest identifying a team leader who can manage the process and support the team as they engage in the various required tasks, and focus on keeping the project moving forward across participating departments faced with competing time demands.

Step 1 Outcome: PIRS™ for Wildfire Team and Workplan

Step 1 Build the PIRS™ Team	• Define roles and responsibilities • Form a core planning team, with GIS staff • Incorporate subject-matter experts into team for review throughout the scorecard building process
Step 2 Select Relevant Policies	• Identify community's "network of plans" • Identify policies from plans that 1) are actionable, 2) affect wildfire resilience, and 3) contain a place-specific term • Add selected policies to scorecard
Step 3 Delineate District-Hazard Zones	• Subdivide community into districts that make sense for the specific area ("geography of interest") • Identify wildfire hazard zones • Combine layers to form a single "district-hazard zone" map
Step 4 Score and Map Policies Spatially	• Score selected policies based on their affect on wildfire resilience: "+1", "0", or "-1" in each DHZ • Sum policies per DHZ • Map policies to appropriate DHZ
Step 5 Analyze and Map Results	• Map summed policy scores for each plan in the network • Composite maps reveal conflicts and gaps in policies and plans • Analyze results and plan resolutions

Step 1 Outcome: PIRS™ Team

Name	Team Role	Department
Member 1	Team Lead	Planning
Member 2	Policy Staff	Planning or Emergency Management
Member 3	GIS Staff	GIS
Member 4	Subject Matter Expert	Fire Services
Member 5	Subject Matter Expert	Fire-Related Organization

Figure 1.2 Example of Outcome of Step 1: Build Your PIRS™ Team

Step 2:
Select Relevant Policies

With the PIRS™ team in place, this next step guides your team in completing Step 2 of the PIRS™ for Wildfire method: **select relevant policies**. Based on the core PIRS™ method developed by Berke and colleagues (Malecha et al., 2019; Berke et al., 2015), it is broken up into three tasks:

2.1 Assemble your community's "network of plans"

- Gather adopted plans that you wish to include in the PIRS™ evaluation
- Ensure plans meet criteria for inclusion

2.2 Generate lists of applicable policies

- From your plans, select all wildfire-resilience-related policies
- Add policies to each respective plan's scorecard

2.3 Validate policies and prepare them for scoring

- Confirm selected policies that meet the "three-point test" criteria (see Step 2.2)
- Prepare your policies for scoring
- SMEs review policies

Step 2.1: Assemble Your Community's "Network of Plans"

A community's **network of plans** consists of plan documents produced by any department, agency, or stakeholder group that influence the development and management of the community. Your first task is to gather these plans. The team chooses their own network of plans based on the depth of actionable policy content. By including more plans, the PIRS™ for Wildfire evaluation does not necessarily become more comprehensive—rather, more plans allow for consideration of more factors.

Types of Plans

Your network of plans to be evaluated should include all plans that govern land use and development in wildfire hazard areas (see case studies for examples). Of all the plans that local governments prepare, the **comprehensive (general) plan** typically deals most directly with how and where development will take place. The **hazard mitigation plan**, mandated by the Disaster Mitigation Act of 2000 as a requirement for communities to become eligible for federal pre- and post-disaster mitigation funds, is also commonly adopted by local governments. Communities are also increasingly developing **Community Wildfire Protection Plans** (CWPPs) that focus on wildfire threats.

Other standalone plans may also influence building development in wildfire hazard zones, including plans that focus on a particular geographic area or specialized function. Transportation and infrastructure plans, parks and recreation plans, wildlife habitat management plans, economic development plans, housing consolidated plans, and many others can affect the way hazard-prone areas are developed and managed. Capital improvement plans also influence where development will occur and can steer development toward or away from hazard zones. Examples of potentially applicable plans are included in **Table 2.1**.

Table 2.1 Examples of a Community's Network of Plans Each of these types of plans may be worth including in a PIRS™ for Wildfire evaluation.

Plan Type	Purpose	Contribution (+/-) to Vulnerability
Comprehensive (General) Plan	Main community planning document	Policies can guide future development into, or away from, hazard zones.
Hazard Mitigation Plan	Reduce long-term risk to human life and infrastructure	Advocates vulnerability reduction and resiliency building.
Community Wildfire Protection Plan (CWPP)	Organize community support for wildfire reduction.	Identifies most important wildfire challenges for participating organizations.
Disaster Recovery Plan	Address disaster recovery needs to be activated during recovery	Advocates vulnerability reduction and resiliency building post-disaster. Coordinates agencies to assist people post-disaster.
Area Plans: • Downtown (redevelopment) • Small Area / Neighborhood / District • Waterfront • Corridor Plan	Address planning issues pertaining to a portion of the community	Targeted policies may increase or decrease vulnerability, depending on purpose and location. Area plans may also contribute to policy district delineation.
Functional or Sector-specific Plans: • Transportation (or transit) • Parks / Open Space • Economic Development • Environmental Management • Climate Adaptation / Mitigation • Housing (Consolidated / Strategic)	Focus on individual or related functions or sectors in need of specialized planning	Individual plan policies (or objectives, action items, etc.) may increase or decrease vulnerability and are often distinct from those found in general or hazard mitigation plans. Applicability to individual policy districts may be aided by additional functional/sector maps.

Table adapted from *PIRS™ for Heat 2022*

Plan Criteria

As you gather plans, please check to see that they meet the following criteria:

- **Adopted plans** should still be relevant. They should still have some influence on policy decision-making. If a plan is too out-of-date, it may not be worth including.
- Include **draft plans** if they are far enough along in their development that draft policies are apparent. In fact, there is significant value in scrutinizing draft plans via the PIRS™ process as a way of strengthening integration and elevating wildfire awareness in advance of their official adoption.
- **Area plans** (see Table 2.1) should only be included if they are within a wildfire hazard zone (howsoever defined). An area plan in a low- or no-risk zone may not require a wildfire-focused evaluation.
- Consider especially plans that affect the way the community grows or develops, and that refer to specific aspects of the built or natural environment—regardless of whether the plan mentions wildfire. Consider plans for areas adjacent to your community since wildfires cross jurisdictional lines.
- Be sure to double-check with local and regional departments to ensure plans are not left out. Even a thorough initial search may miss some plans. You may want to circle back and contact specific agencies to inquire about extant plans.

Box 2.1 Tips: Building Network of Plans

• Plans and policies can affect wildfire resilience, **regardless of whether they explicitly focus on—or even mention—wildfire**. For instance, policies aimed at intensifying development can increase vulnerability if they apply in hazard-prone locations. Alternatively, policies focused on preserving sensitive habitats might change the wildfire resilience equation, depending on the circumstances.

• We recommend including as many **adopted and in-progress plans** as you can.

• Validate your selected plans with your **community's leadership team** and other departments to ensure that all relevant documents are included.

• Focus attention on **city- and county-level** plans. State level plans are generally not detailed enough for this type of local analysis and regional-level plans should be considered only if specific to your community.

Step 2.2: Generate Lists of Applicable Policies

After assembling your network of plans, you can begin building your scorecard by **generating lists of relevant policies for each plan**, which will then be evaluated for their likely effects on wildfire resilience. Start by thoroughly reviewing each plan. When you come across a policy that meets the **three-point test**, add it to the Policy List column of the appropriate plan tab in the scorecard (see PIRS™ for Wildfire template in **Appendix E** or download a copy from the PIRS™ Hub website).

Selection Criteria for Policies

To be selected for the scoring, policies from the network of plans a policy must meet all the following criteria to satisfy the **three-point test**:

(1) Potentially affects resilience to wildfire hazards,
(2) Includes a mappable, place-specific term(s); AND
(3) Includes an actionable policy tool(s).

These criteria are described in greater detail within this section. **Table 2.3**, at the end of this section, showcases examples of several policies that "pass" the three-point test.

Box 2.2 Tips: Selecting Relevant Policies

- **Remain flexible** and responsive to variations in plan structure, keeping in mind the end-goal of a PIRS™ for Wildfire evaluation: to systematically and spatially assess plans and their components regarding their likely effects on wildfire resilience, revealing policy conflicts, gaps, and opportunities to strengthen resilience.
- **"Cast a wide net"** when identifying policies to add to the list. You will have a chance to remove policies that do not fully meet all three criteria in **Step 2.3: Prepare Policies for Scoring**. Policies that do not make the cut for scoring and mapping may still present opportunities for adjustments that will improve community wildfire resilience (see **Step 5**), so retaining these "low-hanging fruit" may be useful.
- **Not all policies will be called "policies":** they may be called "action items" or something similar—or may simply exist as policy-esque language in the document's narrative. Hazard mitigation plans, for instance, typically contain lists of prioritized actions, rather than 'true' policies.
- **Ideally, two knowledgeable staff members** will independently generate policy lists, who will then compare and discuss their results to determine the final lists of applicable policies. This best practice, drawn from the plan evaluation literature, will ensure more comprehensive and objective lists.
- **Be thorough!** While this is one of the most time-consuming steps in the PIRS™ for Wildfire process, it is also one of the most valuable.

(1) Wildfire Resilience

The question of whether a given policy has the potential to affect wildfire resilience is important–and central to the PIRS™ for Wildfire methodology–but is sometimes less-than-straightforward. We encourage you to always look at both sides of the policy coin. The object of this analysis is to thoroughly scrutinize your existing (and proposed) plans and policies through the lens of wildfire resilience, *even if they do not explicitly reference wildfire hazards*. Many policies will appear, at first glance, to have no discernable impact on community wildfire resilience. However, policy guidance that affects the built or natural environment, or the distribution and movement of people within the community, is likely to affect resilience—possibly in unexpected ways. For instance, consider a policy that states:

> "Encourage higher-density multifamily development in pedestrian-oriented areas with access to transit, a broad range of services and amenities, and access to employment."

This policy supports greater residential population density in "pedestrian-oriented areas" and is an effective policy aimed at increasing walkability and reducing carbon emissions. However, if such "pedestrian-oriented areas" are in high-wildfire-hazard zones, it would also have the effect of increasing the number of people and structures in harm's way and could exacerbate evacuation if access to places of safety is inadequate. You may find that many policies in your plans similarly have planning objectives that, upon scrutiny from a spatial and hazard-focused lens, also have the 'hidden' potential to exacerbate wildfire risk unless properly mitigated.

As you read each policy, think about whether it might increase or decrease resilience to wildfire hazards—paying special attention to policies that relate to population density, development intensity, preservation of natural areas, and the like. Keep in mind that you do not necessarily need to "get it right" the first time, as you will have an opportunity to double-check your initial decisions in **Step 2.3: Prepare Policies for Scoring**.

(2) Mappable, Place-Specific Term(s)

Many policies contain **place-specific terms** that reveal their *spatiality*—indicating with some level of geographic specificity where the policy applies in the community (and where it does not apply). When present, these terms allow one to map, or "spatially assign", the policy to the appropriate part(s) of the community using GIS layers that contain corresponding features. Mapping relevant policies to different parts of the community visually represents the ways individual policies may affect specific areas, allowing for novel insight and opportunities to strengthen resilience.

As an example to illustrate this concept, several policies in the Atascadero, CA General Plan refer to the same specific place: *conservation areas*. In this case, conservation areas are well-defined in the plan as "park land or other preserved areas". As a result of containing this place-specific term, policies referring to conservation areas can be considered **mappable**.

You will also come across policies written in an *aspatial* way, without an obvious place-specific term. Policies such as these, which do not reference specific areas, features, or facilities, cannot be included in this spatial evaluation. Later on, however, you might consider strengthening such policies by adding additional spatial specificity as you update or renew planning documents (see **Step 5: Map, Analyze, and Utilize Results**).

Box 2.3 Examples of Place-Specific Terms

Administrative or cultural areas
- Neighborhoods
- Commercial centers (e.g. 'downtown')
- Cultural or recreational districts (e.g. 'the riverfront')
- Municipal lands

Geographic features
- Natural areas (e.g., wetlands, parks)
- Floodplains
- Conservation areas
- Rivers or riparian zones
- Streets (e.g., Main Street)
- Wildland-Urban Interface (WUI) or other wildfire hazard severity zones

Individual buildings
- Critical facilities
- Community facilities
- Repetitive loss structures

Another factor to consider is whether the policy impacts an area of the community exposed to hazards (located within a hazard zone). The PIRS™ for Wildfire is a spatial evaluation tool based on hazard vulnerability, so policies that are evaluated should intersect the spatial extent of a hazard. If you are unsure of whether a policy influences a part of the community in a hazard zone (hazard zones will be delineated in **Step 3: Delineate District-Hazard Zones**), err on the side of inclusion. The policy can be omitted later if you find there is no impact on hazard zones.

(3) Actionable Tool(s)

Policy tools are techniques or interventions to achieve specific objectives or outcomes. Inclusion of a recognizable policy tool is an important element of policymaking because a statement without such language – even if labeled a policy – is unlikely to be *actionable*. The literature is clear that a plan without strong policies has limited ability to influence local decision-making. **Table 2.2** includes a list of policy tools related to land use and hazard vulnerability (an expanded version of this table is found in **Appendix B**). As you read through your network of plans, these are the kinds of tools you are likely to find in applicable policies. Keep in mind that you may encounter policies that appear to meet the three-point test criteria but do not obviously include tools on this list. If there is no obvious policy tool, but the policy nevertheless appears to be actionable, include it. You will have a chance to justify your reasoning in **Step 2.3: Prepare Policies for Scoring**.

Table 2.2 Policy Tools: Land Use Policy Categories and Sub-Categories

Land Use Approach Category	Land Use Approach Subcategories
Development Regulations	Permitted Land Use Density of Land Use Subdivision Regulations Zoning Overlays Setbacks or Buffer Zones (such as Zone 0) Cluster Development
Land Acquisition	Acquire Land and Property Open Space or Easement Requirement/Purchase
Density Transfer Provisions	Transfer/Purchase of Development Rights
Financial Incentives and Penalties	Density Bonuses Tax Abatement Impact/Special Study/Protection Fees
Land Use Analysis Permitting Process	Land Suitability Site Review Design/Construction Guidelines/Requirements Evacuation Fire Response System Capacity and Design
Public Facilities (including Public Housing)	Siting Sizing/Capacity
Post-Disaster Reconstruction Decisions	Development Moratorium Post-Disaster Land Use Change Post-Disaster Capital Improvements
Capital Improvements	Infrastructure “Hardening” or Weatherproofing Elevating Drainage Improvements, Buffers, or Flood Control Ecosystem Enhancement

Table adapted from *PIRS™ for Heat 2022 (Malecha, et al., 2019). See Appendix for expanded table.*

Sample Policies Meeting the Three-Point Test

Table 2.3, below, provides examples of policies that "pass the three-point test" and were deemed eligible for inclusion in the scorecard during the PIRS™ for Wildfire effort conducted by the City of Atascadero, CA. Note that the policies are drawn from several different plans (and various sections within those plans), and that most of them do not explicitly mention wildfire.

Table 2.3 Examples of Policies that "Pass the Three-Point Test"

***Policy Example #1**: Designate and protect the east side of the Del Rio Road and El Camino Real intersection for a master planned retail commercial use. (ref. City of Atascadero General Plan Policy 3.1.2)*		
1. Affects Wildfire Resilience?	**2. Place-Specific Term?**	**3. Actionable Policy Tool?**
Development may impact environment and affect density. Area has moderate wildfire hazard.	East side of the Del Rio Road and El Camino Real intersection	Permitted Land Use

***Policy Example #2**: Prohibit development on slopes 30% or greater, unless no other feasible building site exists. (ref. City of Atascadero General Plan Policy 5.2.4)*		
1. Affects Wildfire Resilience?	**2. Place-Specific Term?**	**3. Actionable Policy Tool?**
Development may negatively impact the environment by increasing density in hazardous zones.	Slopes 30% or greater	Slope/Dune Stabilization

***Policy Example #3**: Plant at least 2,000 trees on City property by 2020, subject to water availability. (3-6) (ref. Atascadero Climate Action Plan Policy C-6.1, p.3-6)*		
1. Affect Wildfire Resilience?	**2. Place-Specific Term?**	**3. Actionable Policy Tool?**
Tree/vegetation development can affect wildfire resilience; it is particularly negative in WUI areas.	City-property	Ecosystem Enhancement

***Policy Example #4:** Adopt and enforce Wildland Urban Interface Building Code standards that emphasize ignition resistant construction. (San Luis Obispo County Hazard Mitigation Plan Policy 5.H, p. 7-8)*		
1. Affect Wildfire Resilience?	**2. Place-Specific Term?**	**3. Actionable Policy Tool?**
Building code directly relates to wildfire resilience.	Wildland Urban Interface	Design/Construction Guidelines/Requirements

Step 2.3: Prepare Policies for Scoring

Take the time to review each policy to validate its place in the scorecard ensuring it meets the three-point test in preparation for scoring.

When reviewing a policy, first consider whether and how it **meets the resilience criterion**—assuming that the policy applies to a wildfire hazard zone. If you believe that it is likely to positively or negatively affect wildfire resilience. Jot down a few notes in a separate scorecard column regarding your reasoning.

Once you have confirmed the directionality, you may find it helpful to color-code your policies – in, say, green (if it is likely to have a positive effect on resilience) or red (negative effect). If you think a policy in your list is unlikely to affect resilience – or that its effect is ambiguous or likely to be neutral, given the way it is phrased – you may choose to:

- move it to the "low-hanging fruit" list and set it aside for later consideration during a future plan revision, OR
- leave the policy in the scorecard but note its ambiguity or neutrality (e.g. color-code it beige or yellow). In this case, you will still spatially assign the policy during the scoring step but will not give it an actual positive or negative score—marking it, instead, with a '0' as a placeholder. As long as you are spatially assigning policies, doing so for these 'neutral' policies will not require much additional work, but may prove even more valuable during a plan revision process than if you simply move them to the "low-hanging fruit" list.

Either way, policies that have ambiguous or neutral effects on wildfire resilience will be prime candidates for adjustment (along with the negative-scoring policies, of course) as you work to improve integration and strengthen resilience to hazards through wise plan and policy guidance.

Confirm for each policy, that it **contains a place-specific term** (or terms) that allows you to spatially score it. As before, writing a few notes in the appropriate column – this time the "Place-specific Term" column – will help clarify and provide a record of your thinking. Be sure that your notes contain the actual place-specific term from the policy and, if appropriate, a brief explanation about how it ought to be spatially defined in your community. Keep in mind that you may find policies that you believe are applicable throughout the entire hazard zone (or zones). An example might be a development requirement that new buildings are built to a certain standard in very high wildfire hazard zones. When you finish this step for all of your policies, your notes from the 'place-specific term' column can be given to your GIS team to help them locate appropriate layers for mapping the policies. If they can develop a comprehensive set of maps/shapefiles/layers of place-specific terms, this will dramatically improve your ability to spatially assign policies during the scoring step.

If, upon reflection, you decide that you are unsure of a policy's place-specific term – or that it cannot really be mapped – simply move it to the "low-hanging fruit" list. Making policies more

explicitly place-specific by adding a place-specific term(s) during your plan revision process can strengthen them and improve your plan's ability to foster greater resilience.

Finally, confirm that each policy contains **an actionable policy tool**(s) and record it (them) in the "Policy Tool" column, along with a brief explanation if needed. **Table 2.4** can be referenced to help you decide what, if any, tool is suggested by the policy. If you are unsure whether a policy includes an actionable tool – or if you decide that it does not, in fact, include one – move it to the "low-hanging fruit" list. Adding one or more actionable policy tools during your plan revision process can substantially strengthen an otherwise unactionable policy, improving its (and the plan's) effectiveness. Make notes in the appropriate columns in the PIRS™ for Wildfire template.

Table 2.4 Policy Validation Example

Plan Integration for Resilience Scorecard *PIRS™ for Wildfire* City of Atascadero General Plan 2016*	**wildfire resilience? (+/-)**	**place-specific terms?**	**actionable policy?**	**Notes on 3-pt test (optional)**
POLICY LIST				
LAND USE, OPEN SPACE, CONSERVATION				
POLICY [1.3]10. The City will develop standards and undergrounding districts to require the undergrounding of existing utilities within the Urban Core.	+	✓	✓	Undergrounding utilities in most areas including the urban core is recommended best practice for wildfire mitigation.

*update in-progress (2025).

This step has several benefits:

1. First, it provides valuable documentation of each policy's key components and your logical reasoning, which you can easily revisit if the need arises.
2. It also reduces confusion and facilitates a smoother policy scoring process.
3. Finally, it generates an "auxiliary" list of potential "low-hanging fruit" policies, which represent additional opportunities for relatively simple and straightforward adjustments to strengthen integration and resilience. Despite their exclusion from the final scorecard (for one reason or another), these policies are currently part of an adopted plan and, therefore, are guiding community development and management.

Do not be discouraged if you find that many of the policies that you originally included in the policy list fail to meet one or more of the criteria upon closer inspection. It is typical for 20% (or more) of policies to drop out during this step if you "cast a wide net." Simply add them to the bottom of the scorecard in a separate section we refer to as the "low-hanging fruit."

NOTE! If SMEs are not part of the Core Team, now is a good time to have them review the list of selected policies from the step above and lend their expertise on whether the policies meet the criteria for affecting wildfire resilience. Your Core Team can decide how many policies the SMEs should review, and which ones. This could be a certain subset of policies or the whole list. A minimum review of 15% of policies from all network plans is recommended, though more is, of course, beneficial.

Using their unique perspective and knowledge, the SMEs will independently determine whether they believe each policy *supports* or *undermines* wildfire resilience, or if "*it depends*" ("Supports/Undermines/Depends" column in **Table 2.5**). SMEs can then provide justifications for their responses, based on their wildfire expertise ("Why?" column in **Table 2.5**). If more than one SME independently reviews the policies, record each justification separately (this can help with subsequent analysis and decision-making) but come to a consensus decision on whether each policy supports or undermines wildfire resilience—or whether "it depends". This is sometimes easier said than done, but the time spent and conversations and recommendations that result will offer significant and valuable insight into framing policies for wildfire resilience.

This task may be seen as duplicating the "Assign Directionality" however doing so from a different and critical SME perspective is an important check on the policy list produced by the Core Team, which will ultimately lead to a better list and more accurate scores.

View **Table 2.5** for an example SME policy audit. An SME policy feedback template can be found in **Appendix D**.

Table 2.5 Atascadero: SME Policy Audit Example

City of Atascadero General Plan 2025 (Update #3 - 2016)	Supports/ Undermines / Depends	Why? (Rationale for previous response)	What changes, if any, would you recommend to strengthen the policy (to make it more supportive of wildfire resilience)?	Other comments
[1.1.4]. Outside of the Urban Core and Single-Family Neighborhoods, maintain lot sizes of 2.5 to 10 acres based on performance standards and natural constraints including slope, distance from the center of the community, average neighborhood lot size, soil percolation capability, and adequacy of access...	Undermines			Adopt locally appropriate Defensible space standards for large parcels in WUI zones
	Undermines	Wildland fire is not mentioned as a hazard...needs to be explicit component	Explicit language to address WUI fire component	All construction in Atascadero should be to WUI building standards
	Undermines	Agree with the negatives. Suggest changing to "N/A" in Urban Core and Single-Family neighborhood DHZs, as this policy explicitly does not apply to those places. (Also, do the non-WUI parts of districts 13 and 14 get "-1" because they are basically in WUI, anyway?)	[1.1.]4. Outside of the Urban Core and Single-Family Neighborhoods, maintain lot sizes of around one acre, or cluster development, ~~2.5 to 10 acres~~ based on performance standards and natural constraints including slope, distance from the center of the community, average neighborhood lot size, soil percolation capability, and adequacy of access...	A 2.5-10-acre lot standard is likely to increase wildfire risk.
	Undermines	Agree with comments re N/A. Reword to reflect where policy applies vs. "outside the urban core and single-family neighborhoods."	[1.1.]4 Maintain lot sizes outside the urban core and single-family neighborhoods that will allow for creation of defensible space between structures and other fuel sources (structures, vegetation, etc.).	
SUMMARY >>	Undermines	Wildland fire is not considered in this policy. It needs to be mentioned – or otherwise obviously considered – in the policy text to reinforce resilience and prevent development that raises risk.	1.1.]4. Outside of the Urban Core and Single-Family Neighborhoods, maintain lot sizes of around one acre or cluster development, so as to promote defensible space, ~~2.5 to 10 acres~~ based on performance standards and natural constraints including slope, distance from the center of the community, average neighborhood lot size, soil percolation capability, and adequacy of access...	Suggest changing the scores in the scorecard to "N/A" in Urban Core and Single-Family neighborhood district-hazard-zones (DHZ), as this policy explicitly does not apply to those places. (Also, do the non-WUI parts of districts 13 and 14 get "-1" because they are basically in WUI, anyway?)

Step 2 Outcome: Policy List

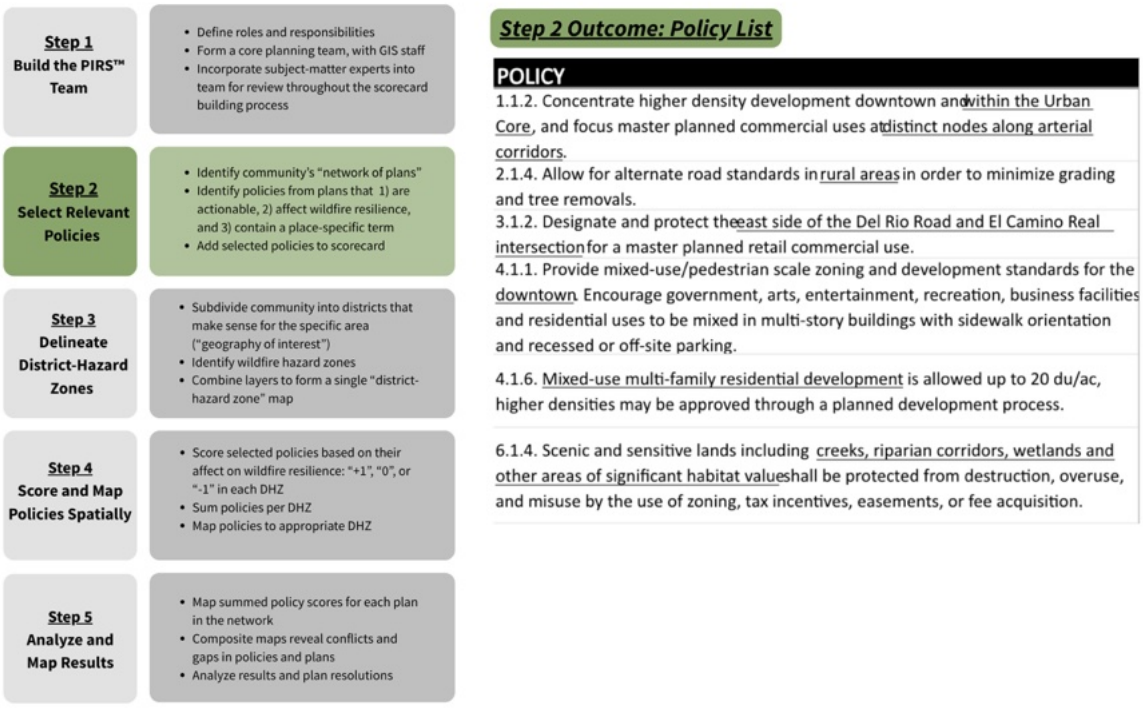


Figure 2.1 Example of Outcome of Step 2: Select Relevant Policies

Upon completion of Step 2, you will possess an organized, comprehensive, vetted list of wildfire-affecting policies from across your community's existing network of plans. The "state of the plans" will be reflected in your notes about each policy's directionality in the "Resilience +/-" column. Your list will also contain information about the place-specific term(s) and policy tool(s) contained within each wildfire-affecting policy. In and of itself, your annotated Policy List may support a range of preliminary analyses and insights. Completing the remaining PIRS™ for Wildfire steps will provide significantly more.

Step 3: Form District–Hazard Zones Map

The unique PIRS™ for Wildfire process enables you to *spatially* evaluate plans and policies and their likely effects on wildfire resilience. This section will guide your team in completing Step 3 of the PIRS™ for Wildfire process: **delineating your district-hazard zones (DHZs)**, which allows the mapping and scoring of the policies that you selected in Step 2. It is again broken up into three tasks, focused on selecting and delineating planning districts and wildfire hazard zones and then combining them to form your DHZ map, and is again based on the core PIRS™ method developed by Berke and colleagues (Malecha et al., 2019; Berke et al., 2015):

3.1 Form planning districts

- Select planning districts, based on the community's functional "geography of choice"
- Create planning districts map (GIS layer)

3.2 Select wildfire hazard zones

- Select hazard zones, based on accepted understanding of wildfire risk; engaging a subject matter expert familiar with local conditions is important at this step. Ask what is the most useful geography that informs their work locally.
- Create hazard zones map (GIS layer)

3.3 Form district-hazard zones

- Combine planning districts map and hazard zones map to form district-hazard zones (DHZ) map (GIS layer)
- Adjust district-hazard zones per SME feedback

It is strongly recommended that your district-hazard zone (DHZ) map takes the form of a single, standalone layer in a Geographic Information System (GIS). This DHZ layer, which delineates your community's unique DHZs, will be central to the spatial analysis and reporting of your PIRS™ for Wildfire evaluation (**Figure 3.1**).

By dividing the community into sub-geographies, and then carefully considering the spatial clues in policies (the place-specific terms identified in Step 2 of the PIRS™ for Wildfire method), you can begin to understand the inherent *spatiality* of many policies and, by extension, the entire plan. Seeing how a plan's various policies affect different parts of the community in different ways helps one assess its integration (or lack thereof) with respect to different variables—in this case, wildfire resilience. Analyzing the community by planning districts, rather than as a whole, can similarly reveal spatial differences in vulnerability. Note: A tradeoff exists between the size and number of planning districts and the amount of time required to complete the analysis—the smaller the districts, the more fine-grained the analysis, but more districts will take more time to score.

While highly recommended, GIS software is not required to complete the tasks or to create your scorecard given the many online mapping tools currently available, but it can make the process of mapping policies easier and more spatially precise. GIS also allows a finer-grained analysis (e.g., U.S. Census Block Group or parcel scale, as opposed to the larger-scale Census Tract more readily available when using online tools) and access to layers and spatial elements in the community that are not available in online tools.

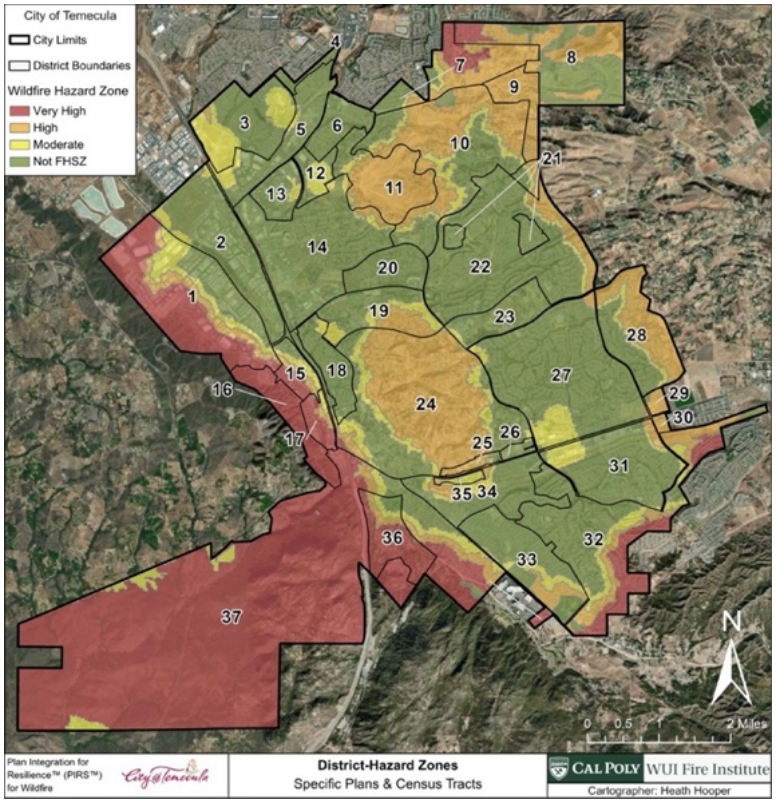


Figure 3.1 Temecula: District-Hazard Zone Map The planning districts and hazard zones are spatially joined to form the true unit of analysis, the "district-hazard zone", which will be the outcome for Step 3.

Step 3.1: Define Planning Districts

Spatially evaluating plans and policies first requires the subdivision of the community into smaller areas known as **planning districts**. Your team must delineate a set of planning districts at a scale that works for your level of analysis. By combining the planning district map with a hazard zone map (**Step 3.3**), you will be able to evaluate the way different policies affect different hazard zone areas within each district.

Select Planning Districts

Planning efforts often (though certainly not always) attempt to coordinate policies within smaller geographic units or districts (e.g., neighborhood planning, standalone small-area plans). This suggests that there is a certain amount of known value in a spatial approach to planning, which is also central to the PIRS™ process of plan evaluation.

Communities should determine the planning districts according to their specific goals and circumstances—their "geography of choice". Generally, there are three main strategies for selecting planning districts:

1. **Readily available data**: U.S. Census block groups or tracts, (depending on the size of your community) are a convenient and widely utilized sub-jurisdictional spatial unit.
2. **Neighborhoods**: Some communities have well-defined neighborhoods that are already used for planning and policymaking. If this sounds like your community, you're in luck!
3. **Community-specific or 'specialized' districts**: Often the focus of specific planning initiatives or policies, these may include historic or cultural districts, overlay districts, development focus areas, or other designated places referred to in local plans and policies.

As in the original PIRS™ (Malecha et al., 2019), the default planning districts for a PIRS™ for Wildfire analysis are U.S. Census Block Groups due to their widespread coverage and availability, linked demographic data, and location in a "goldilocks zone" in terms of size and scale for most towns and cities. However, Census Tracts or Blocks may be a more appropriate choice depending on your specific context and needs. **Figure 3.2** depicts this issue of scale when evaluating planning districts options for the City of Temecula. With 75 individual units, the default block groups (yellow) might be too numerous.

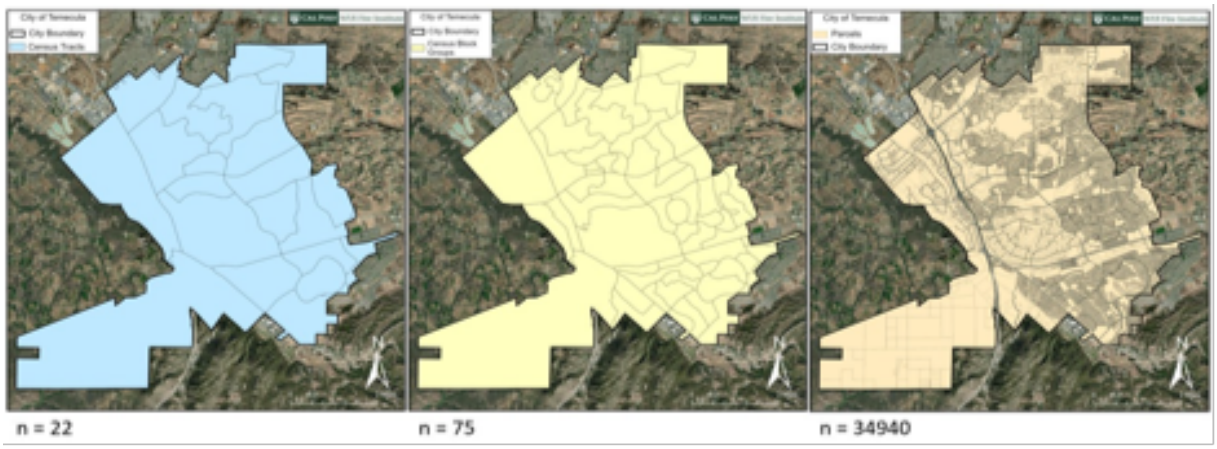


Figure 3.2 Temecula: Potential "Geographies of Choice" at Various Spatial Scales. U.S. Census Tracts (left) are one of the broadest spatial units to be considered, but communities can choose finer grained spatial units such as Census Block Groups (center). If the PIRS™ for Wildfire analysis is to be conducted manually, we recommend against using the finest spatial unit, the individual parcel.

Along with Census geographies, a municipality's unique, pre-existing spatial delineations, such as specific plan areas or homeowner association (HOA) boundaries, are potentially useful alternatives for planning districts. Plans and policies may directly reference these kinds of delineations, making them highly suitable for use in a PIRS™ analysis.

Some communities choose a "hybrid" approach, using a foundation of, say, Census Block Groups and then superimposing specialized districts that are the specific focus of a series of policies (or even entire plans). If you choose this approach, just ensure that the specialized districts are incorporated such that no overlaps remain.

When selecting your planning districts, carefully consider how your community is organized, how policies are enforced, and what your end-goals are for the PIRS™ for Wildfire evaluation. Census geographies may be advantageous if subsequent analysis includes social and demographic data—which is often collected at these spatial units. Depending on population density, however, Census Tracts might be too broad to be considered useful from a planning perspective. Census Block Groups and Blocks are finer grained spatial units which can provide more detail but also require additional work when scoring policies (the aforementioned tradeoff).

Finally, when considering your planning districts, also give some thought to the total "planning area" that will be evaluated. We strongly recommend limiting it to the area in which your community has jurisdiction. For municipalities, this typically coincides with the municipal boundary but may also include an "area of influence", "extraterritorial jurisdiction", or the like. For counties, it may include the entirety of the county *outside* incorporated areas. Including areas over which you have no enforceable control or influence – while potentially interesting (and we'd never dream of discouraging cross-border coordination) – is likely to complicate the evaluation and require more effort than it's worth, as the goal of most PIRS™ for Wildfire analyses is to identify policy conflicts and adjust them through plan amendments. As an example, in Napa County, U.S. Census Block Groups were used as a starting point, after which municipalities and federal lands were removed. The resulting spatial units, all of which were within the County's jurisdiction, were used as planning districts for the spatial scoring process (**Figure 3.3**).

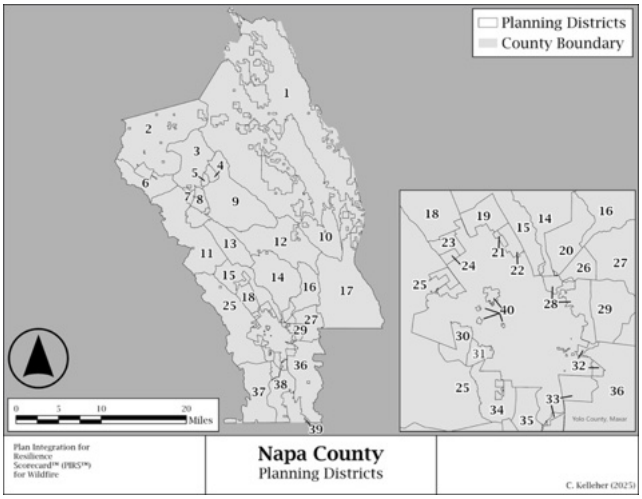


Figure 3.3 Napa County: Planning Districts Map

NOTE! If SMEs are not part of the Core Team, request their input on the choice of planning districts that will aid in the analysis for wildfire resilience before proceeding to the next step.

Create Planning Districts Map

After determining the planning districts you wish to use for your analysis, map them as a single, standalone "Planning Districts" GIS layer (shapefile) with mutually exclusive districts that cover the entire planning area. Number or label the districts in a logical manner to simplify future analysis and organization. Adding a new *text* field to the Planning Districts layer and numbering/labeling the districts as *text* will allow you to label notable districts (e.g., Downtown, Westside Redevelopment District), but we recommend labeling the remaining districts "1" through "*n*", generally beginning in the northwest and ending in the southeast. However you choose to label your districts, the district numbers/labels will correspond to the *columns* in your scorecard spreadsheet. Examples of planning districts maps from Atascadero and Temecula are shown in **Figure 3.4** and **Figure 3.5**.

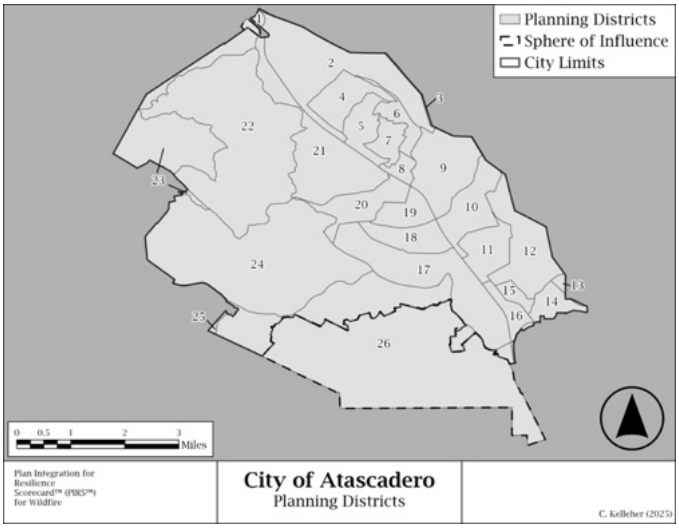


Figure 3.4 Atascadero: Planning Districts

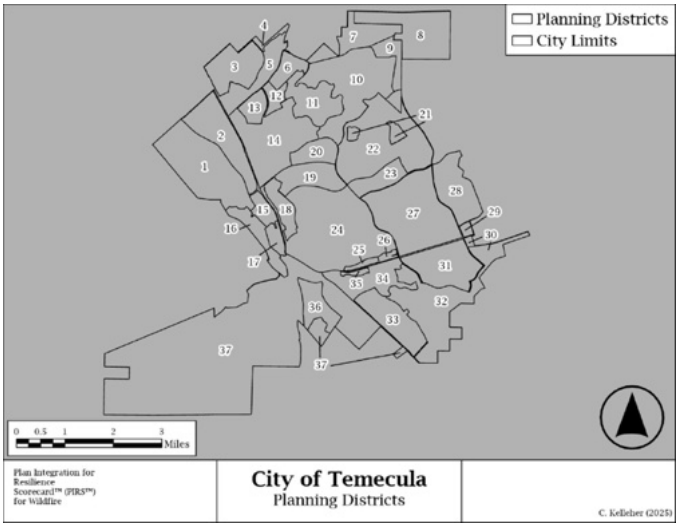


Figure 3.5 Temecula: Planning Districts

Step 3.2: Select Wildfire Hazard Zones

The second task in forming your district-hazard zones map is to identify and create a map of the wildfire **hazard zones** in your community planning area. Wildfire exposure and risk vary across the landscape due to factors like elevation, vegetation cover, and prevailing weather patterns (especially winds). Modeling these and other relevant variables enables the differentiation and mapping of wildfire hazard zones, providing decision makers (from individuals to elected officials) with spatial data to help inform their choices. In California, wildfire hazard modeling efforts are spearheaded by CAL FIRE, which determines Fire Hazard Severity Zones (FHSZ) for the entire state and produces the associated Fire and Resource Assessment Program (FRAP) maps that display relative exposure via these FHSZ categories. Another critical aspect of wildfire hazard mapping in communities is the existence of the *wildland-urban interface* (WUI), the area where the built environment meets natural vegetation. Wildfires (or "wildland fires" as they are commonly known) that occur in WUI areas pose a unique and extreme threat to the built environment and populations that exist within them due to the proximity and concentration of natural fuels. Troublingly, development in the WUI continues to expand in California and across the U.S. (and world) as urban areas of all sizes continue to grow and sprawl into their wildland areas.

As with the planning districts, you have several options when it comes to selecting the wildfire hazard zones that you will use in your PIRS™ for Wildfire effort. Most California communities rely on CAL FIRE's FHSZ modeling and FRAP maps. Others make their own determinations of local wildfire hazard risk, often taking a hybrid approach that incorporates the CAL FIRE modeling along with their own local knowledge and "ground truthing" to develop their preferred hazard zones. Some choose to focus primarily on the WUI, for the reasons described above (see **Figure 3.6**). Examples of the various options that communities have selected can be found below. Wildfire risk and hazard zone mapping resources can be found at the end of the section in **Box 3.1**.

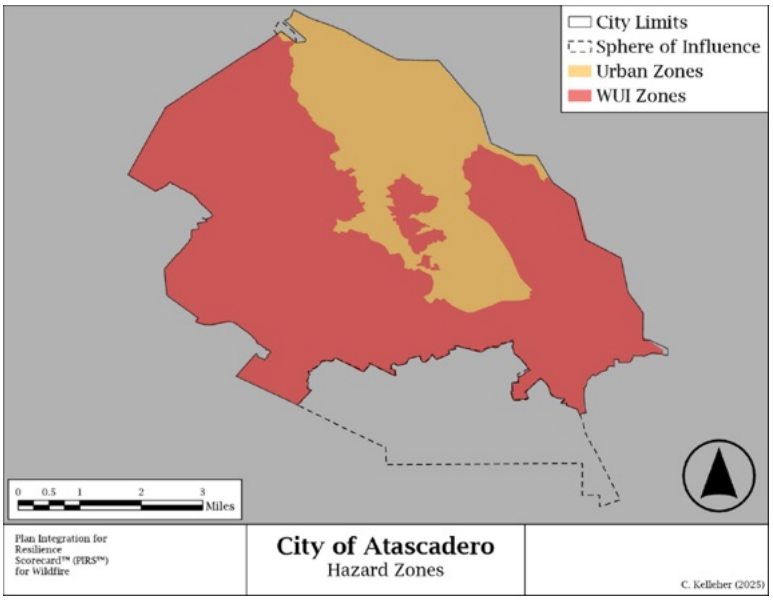


Figure 3.6 Atascadero: WUI Hazard Zones

Whatever you end up using as your wildfire hazard zone(s), be sure that it "works" for your community, whether that means conforming to an agreed-upon standard or pushing for an updated understanding of the wildfire hazard. To this end, we recommend that you keep political feasibility in mind, selecting wildfire hazard areas that are acceptable to your community's decision makers and avoiding those that might be dismissed (for one reason or another).

Finally, give some thought to the number of hazard zones you will use. As with the planning districts, there is a tradeoff between precision and practicality; the more hazard zones you use in your PIRS™ for Wildfire analysis, the more you'll be able to scrutinize the differences in policy approach between areas of differential wildfire risk. However, more hazard zones also mean more potential subdivisions of your community planning area (and of each district), and therefore more DHZs. In our experience, two or three wildfire hazard zones is a good "goldilocks zone" that provides sufficient differentiation but avoids an overly burdensome number of DHZs, though some ambitious communities have successfully completed the analysis with up to five hazard zones. There is also a school of thought – notably held by many fire experts – that a given part of a community is either at risk for wildfire or it's not at risk, and that differentiating degrees of risk is missing the point. Those persuaded by such arguments may decide to treat most (or even all) of the community as an "at wildfire risk" zone and evaluate all policies and all parts of the community through that lens.

NOTE! If SMEs are not part of the core PIRS™ Team, request their input on the appropriate choice of a hazard map before proceeding to the next step.

After determining the hazard zones that you want to use for your analysis, download them from the appropriate source (see **Box 3.1**) and clip them to your study area. You may also need to further manipulate the zones via GIS operations to, for instance, merge several hazard zones into one. Present them as a single, standalone "Hazard Zones" GIS layer (shapefile). **Figure 3.6** shows the final hazard zones map for the City of Atascadero, which is focused exclusively on the WUI but incorporates both CAL FIRE modeling and local expertise. **Figure 3.7** shows the hazard zones map for the City of Temecula, whose team followed the CAL FIRE-recommended FHSZs for the municipality's Local Responsibility Area (LRA). Whatever hazard zones you decide to use will correspond to the rows (or columns) in your scorecard spreadsheet that subdivide every policy line.

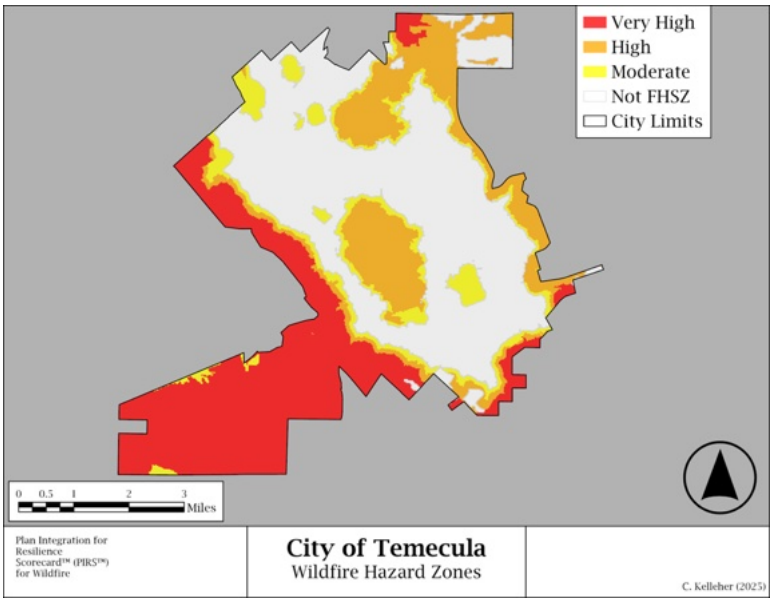


Figure 3.7 Temecula: Hazard Zones

Existing hazard maps such as the Cal Fire FRAP maps are satellite-derived products which have a 30 m spatial resolution (pixel size) and might be too coarse to assess hazard at fine spatial scales, which may be more important to community analysis. When communities have finer grained spatial information and local knowledge of their fire hazards, a map with finer spatial grain size can be created. In the case of Napa County, a new hazard map was created to assess fire hazard which incorporated local topography, fuel loading, and vegetation communities (**Figure 3.8**). For additional guidance on creating a more detailed hazard map, see **Appendix C**.

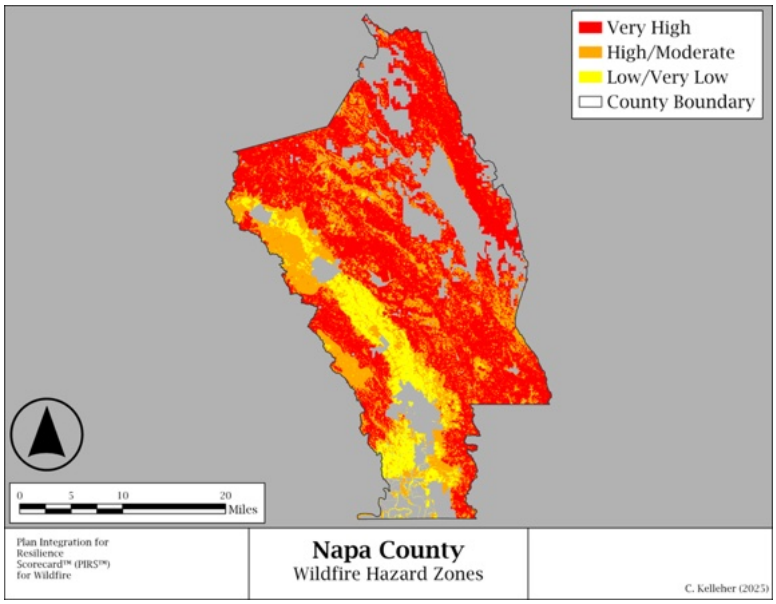


Figure 3.8 Napa County: Hazard Zones

Box 3.1 Fire Map Resources for Western States

Arizona: Wildfire Risk Assessment Portal (WRAP)
The Arizona Wildfire Risk Assessment Portal (WRAP) provides wildfire risk data and tools to support mitigation, planning, and awareness for the public and professionals statewide.

California: Fire and Resource Assessment Program (FRAP)

Wildfire hazard modeling efforts are spearheaded by CAL FIRE, which determines Fire Hazard Severity Zones (FHSZ) for the entire state and produces associated Fire and Resource Assessment Program maps that display relative exposure via these FHSZ categories.

Colorado: Wildfire Risk Viewer
The Colorado Wildfire Risk Viewer, developed by the Colorado State Forest Service, offers statewide fire risk and history data to educate residents, support mitigation, and guide community planning.

Montana: Montana Wildfire Risk Assessment (MWRA)
The Montana Wildfire Risk Assessment, hosted by the Department of Natural Resources and Conservation, provides spatial wildfire risk data to support planning for fire-adapted communities, resilient landscapes, and effective wildfire response.

New Mexico: New Mexico Wildfire Risk Assessment Portal
The New Mexico Wildfire Risk Assessment Portal aims to increase wildfire awareness and provide an overview of wildfire risk for the public.

Oregon: Oregon Wildfire Risk Explorer
The Oregon Wildfire Risk Explorer (OWRE), developed in collaboration with Oregon State University and the Oregon Dept. of Forestry, provides statewide hazard classifications and mapping tools to support community safety, wildfire resilience, and defensible space planning.

Utah: Utah Wildfire Risk Assessment Portal
The Utah Wildfire Risk Assessment Portal (UWRAP), developed by the Utah Department of Natural Resources, provides wildfire risk data and tools to support homeowners, planners, and fire managers in risk assessment and mitigation planning.

Wyoming: Wyoming Wildfire Risk Assessment Portal
The Wyoming Wildfire Risk Assessment Portal (WWRAP) offers Wyoming-specific wildfire risk data to support community safety, emergency planning, and wildfire response, using customized West Wide Wildfire Assessment information.

Step 3.3: Form District–Hazard Zones

The final task in Step 3 is to combine your planning districts layer and hazard zones layer to form the **district-hazard zones** map (**Figure 3.9**). This can be achieved by using the 'Spatial Join' or 'Union' function in ArcGIS or similar procedures in other GIS programs.

The district-hazard zones layer is central to the PIRS™ for Wildfire concept and method. The **district-hazard zone** (DHZ) represents the primary spatial unit of analysis–so it is important to be clear about what it entails and what it means. First, consider descriptions from a few different perspectives, then observations using **Figure 3.9**:

- An individual DHZ can perhaps best be understood as the portion of a given district that is within a specific hazard zone. One could also understand the inverse to be true: an individual DHZ is the portion of a given hazard zone that is within a specific district.
- By combining the planning districts layer and the hazard zones layer, you are essentially subdividing the districts by the hazard zones and/or subdividing the hazard zones by the districts. Either way, you are left with a series of (still mutually exclusive) meaningful geographic units that cover your community planning area and that can (and will) be used to spatially assign policies and analyze the results.
- Just as your districts subdivide your community planning area, the hazard zones further subdivide the districts (one could also say that the districts are subdividing the hazard zones), meaning that you will usually have many more DHZs than districts.
- If you chose to include multiple hazard zones during Task 2, above, it is likely that many of your districts will contain more than one hazard zone (and thus, more than one DHZ).

Take a look again at the City of Temecula's DHZ map (**Figure 3.9**). Observe District 24, near the center of the city, much of which is covered by a relatively conspicuous "High" (orange) hazard zone. District 24 also contains some smaller areas within the "Moderate" (yellow) hazard zone and some that are "Not FHSZ" (green). If you look closely at the extreme southwestern corner of District 24, you can also see that there is a very small portion in the "Very High" (red) hazard zone. Thus, we can observe that parts of District 24 are within each of the four hazard zones included in the analysis (assuming that "Not FHSZ" is being treated as a hazard zone, which was in Temecula's analysis). Thus, we can say that District 24 contains four distinct DHZs, one for each of the hazard zone types. And yes, DHZs can be discontinuous within a given District, as is the case for the "High", "Moderate", and "Not FHSZ" DHZs in District 24, each of which can be seen as existing in multiple parts within the confines of District 24. We can observe, too, that the conspicuous circular "High" (orange) hazard zone that comprises most of District 24 also extends into Districts 19 and 25. Even though the hazard zone extends, we conceptualize it as a new DHZ in District 19 (calling it something like "District 19-High"), which is spatially, conceptually, and analytically distinct from the "High" hazard zone in District 24 ("District 24-High").

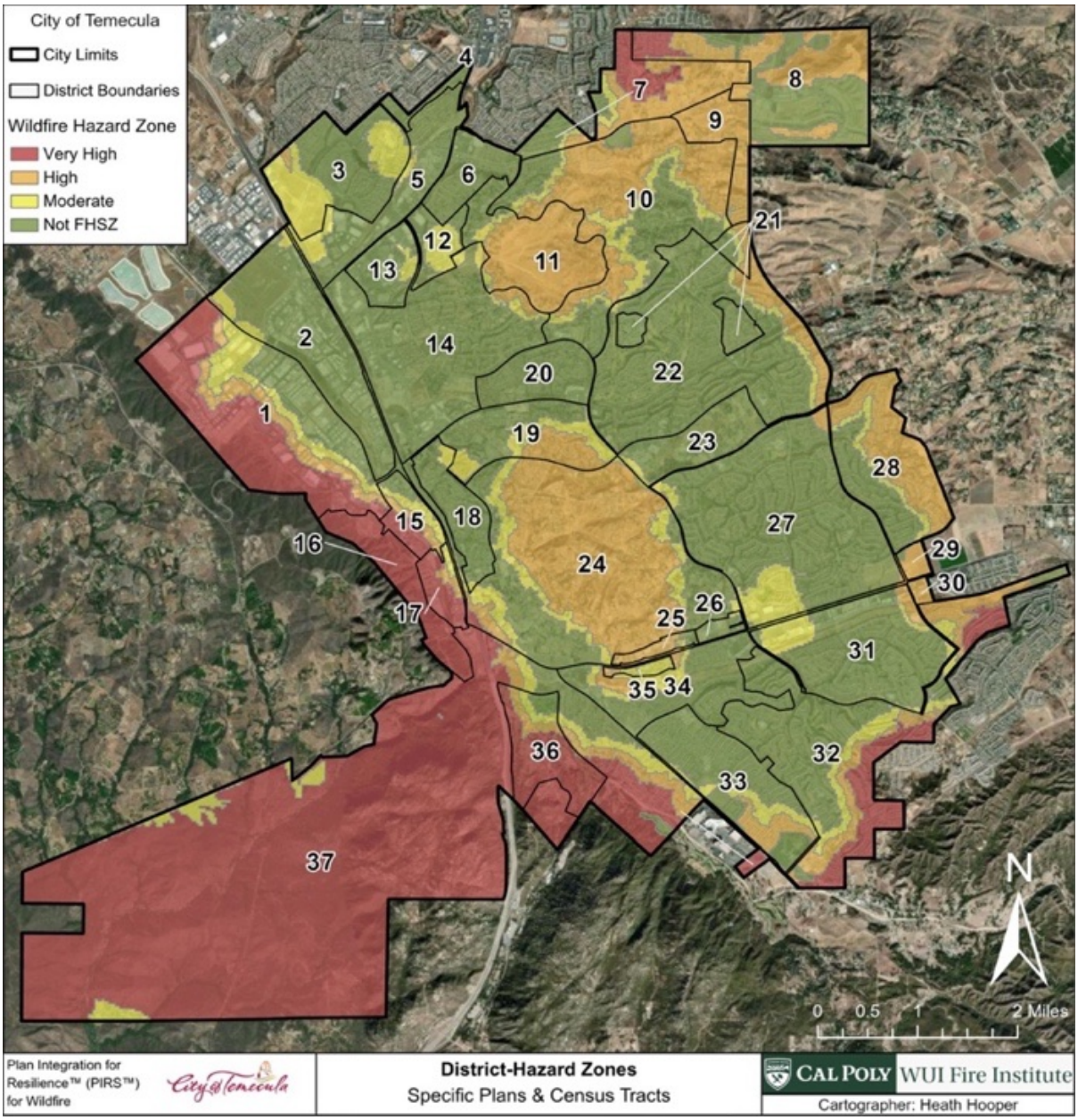


Figure 3.9 Temecula: District-Hazard Zone Map The planning districts and hazard zones are spatially joined to form the true unit of analysis, the "district-hazard zone." The resulting DHZ map shows the city subdivided into 37 separate districts, each of which contains up to 4 hazard zones.

Step 3 Outcome: District–Hazard Zones Map

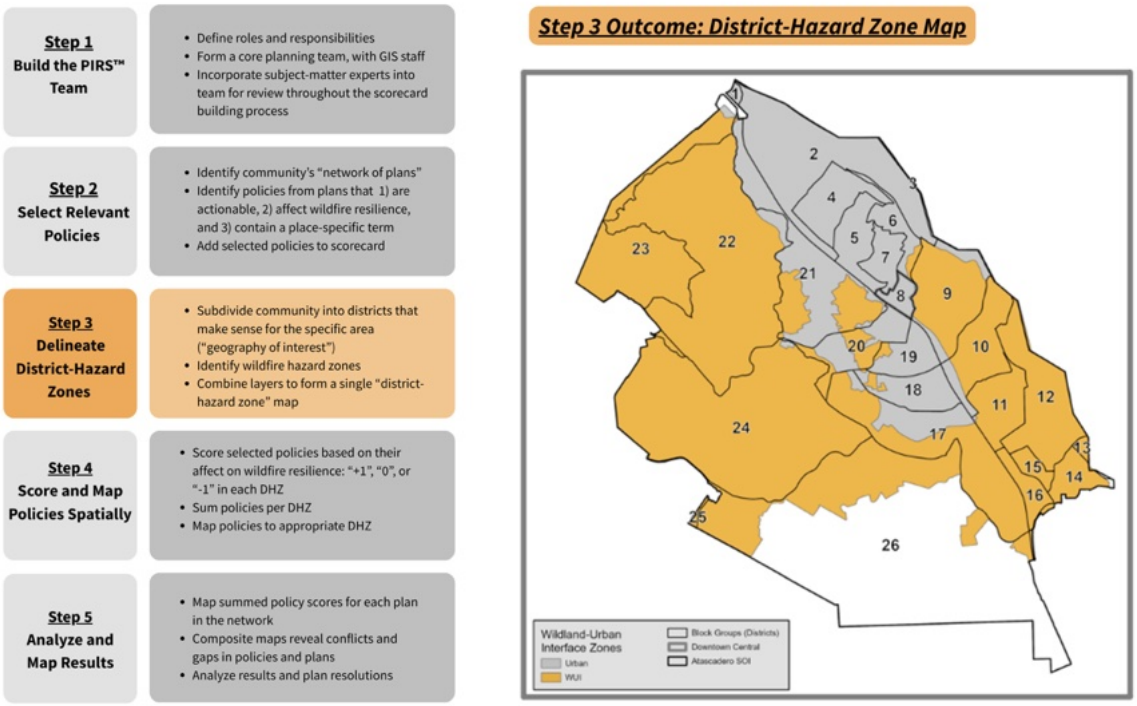


Figure 3.10 Example of Outcome of Step 3: Delineate District-Hazard Zones

Your Core Team has now defined your community's planning districts. Then, your team will produce a wildfire hazard zone map for the area. Both map layers will be combined to form the district-hazard zone map. A district-hazard zone (DHZ) is the intersection of a planning district and a wildfire hazard zone. The DHZ represents the true unit of analysis for the PIRS™ for Wildfire method. SMEs should review the DHZ map to ensure it accurately reflects the wildfire risk of the community.

Upon completion of Step 3, you will have created a map (layer) that will be central to your remaining PIRS™ for Wildfire analyses, and to the effective communication of your results. Your DHZ map (layer) is a grounded, logical way of subdividing your community planning area that will enable the mapping of policies and, eventually, the spatial evaluation of your community's network of plans and policies vis-a-vis wildfire resilience.

Step 4:
Score and Map Policies

Now that you have prepared your policy list (Step 2) and district-hazard zones (Step 3)—and had both scrutinized and confirmed, or amended, by your local team of wildfire experts—you can start scoring and mapping policies based on their likely effects on wildfire resilience and the parts of the community where they apply. As before, this step is based on the core PIRS™ method (Malecha et al., 2019; Berke et al., 2015), modified to apply to wildfire and urban conflagration hazards. In Step 4, you will:

4.1 Prepare the scorecard spreadsheet

- Gather or produce maps (GIS layers) for the place-specific terms identified in your selected policies, which will facilitate the assignment of scores to the appropriate DHZ(s).

4.2 Gather additional maps/layers

- Add corresponding districts and hazard zones to your scorecard spreadsheet, reflecting the decisions made during Step 2 (and confirmed/amended during Step 3) and your final DHZ map (layer).

4.3 Spatially assign scores

- Use your DHZ map (layer) and place-specific term maps (layers) to decide where each of your selected policies applies in the community.
- Place scores (+1, 0, -1) in the appropriate corresponding cell(s) in the scorecard, using the directionality assigned to each policy in Step 1 (and confirmed/amended in Step 3) as a guide.

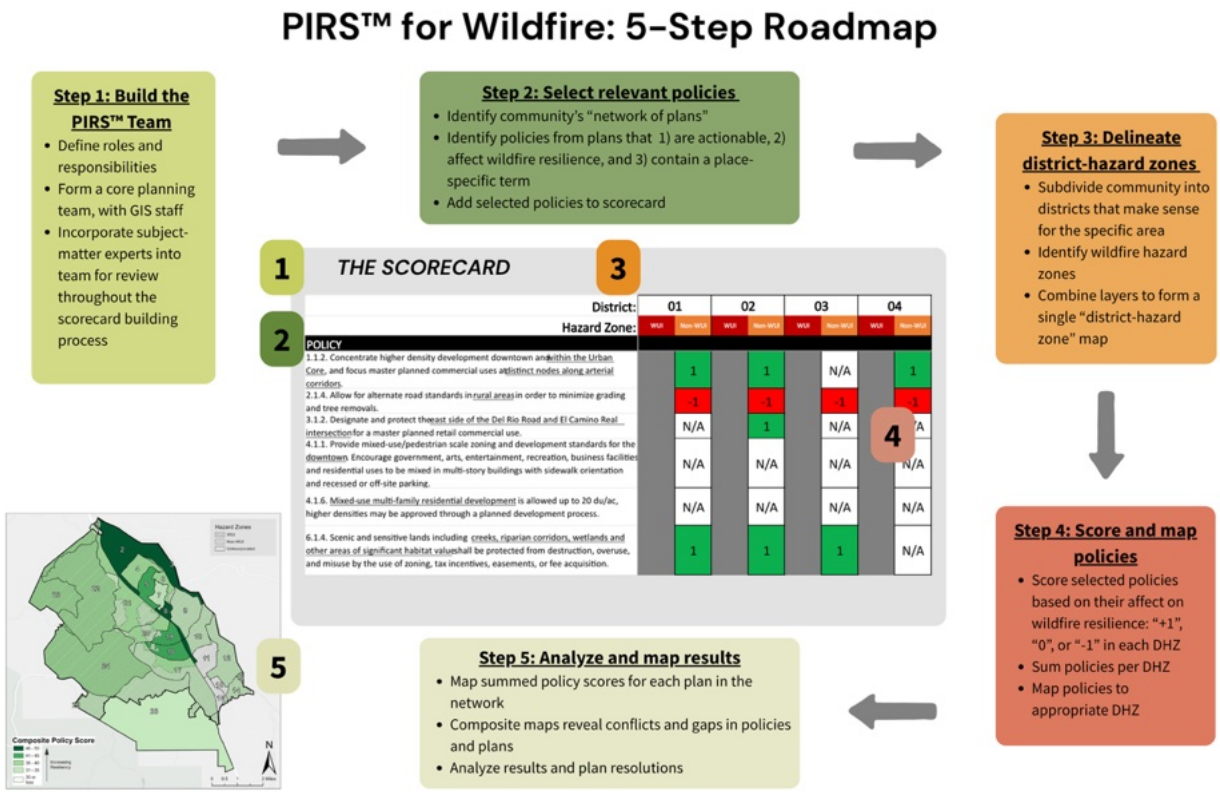


Figure 4.1 PIRS™ for Wildfire: 5-Step Roadmap

Your completed scorecard (seen in **Figure 4.1**) can then be analyzed and mapped (described in **Step 5: Map, Analyze, and Utilize Results**) to provide important and novel insights about the plans' relationship with wildfire hazards and the community. It also acts as an organizational tool and documentary source that can be utilized, along with your maps, as you work to improve plan alignment and resilience in your community.

Step 4.1: Prepare the Scorecard Spreadsheet

Before you score and map ("spatially score") your policies, you must prepare the scorecard spreadsheet. Returning to your scorecard (where your final Policy List should be ready and waiting), add columns and sub-columns that correspond to your DHZs to the right of the Policy List (columns C-Z in the **Figure 4.2** spreadsheet). Every *district*, which you numbered/labeled in a logical way during **Step 2**, should now have a corresponding *column* in the scorecard. Each of the district columns, in turn, should be subdivided into *sub-columns* for the *hazard zones* contained within it. The result of this process is illustrated in **Figure 4.2**, which shows 12 district columns, each of which is subdivided into 2 hazard zones. Be sure to repeat this process with all the tabs in your spreadsheet (one for every plan being evaluated); this is perhaps most easily accomplished by copying the entire set of newly created columns and sub-columns and adding it to each of the other tabs (to the right of the Policy List). Now that every DHZ in the final DHZ map (GIS layer) corresponds to a sub-column in the spreadsheet, you can proceed with scoring and mapping ("spatially scoring") the policies in your final Policy List.

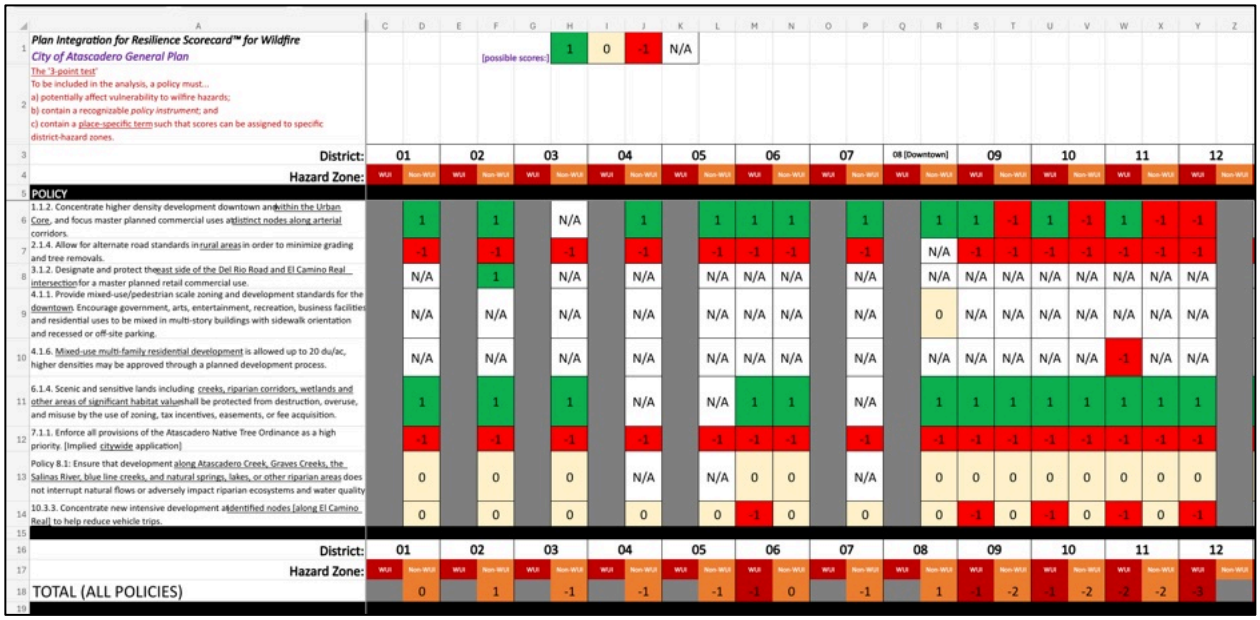


Figure 4.2 Atascadero: Excerpt of Scorecard Atascadero's General Plan scorecard provides an example of the final product of "scoring policies." Note that Atascadero's General Plan has 67 total vetted policies and not all of them are pictured here.

Alternative approach: Instead of subdividing the district columns, you may choose to subdivide each policy row. In this case, the *columns* will still correspond to your mapped districts, but *rows* will correspond to the hazard zones, and thus every *policy* will be subdivided into multiple rows. The only real difference that this makes is in the format and appearance of the table (especially the total columns), which will need to be kept in mind as you translate the results to summary tables and/or maps.

Step 4.2: Assemble Layers for Scoring

In **Step 2**, you created a list of wildfire-resilience-related policies with "place-specific terms" from across your network of plans. You then validated and prepared these policies for scoring and mapping (also referred to as "spatial scoring") by listing and defining the place-specific term(s) included in each policy. The SME audit confirmed and/or amended the list.

Now, in **Step 4**, you will put that effort to use to provide valuable insight into the spatial relationships between policies, plans, wildfire hazards, and the various parts of your community. Start by collecting or producing maps (GIS layers) that reflect the place-specific terms found within the policies. Relevant maps (GIS layers) will contain features that enable you to locate the specific places in the community where the corresponding policy applies. For instance, if a policy suggests a specific building code standard in Very High Fire Hazard Severity Zones, a map (GIS layer) that shows these zones will help you "map" the policy to the parts of the community in those zones. If a policy prohibits development within 300 feet of a Class I stream, a map (GIS layer) of streams in your community will be useful. **Figure 4.3** and **Figure 4.4**, below, provide additional examples of place-specific terms and corresponding maps (GIS layers). The actual scoring and mapping ("spatial scoring") procedure is explained in detail in **Step 4.3: Spatially Assign Scores**.

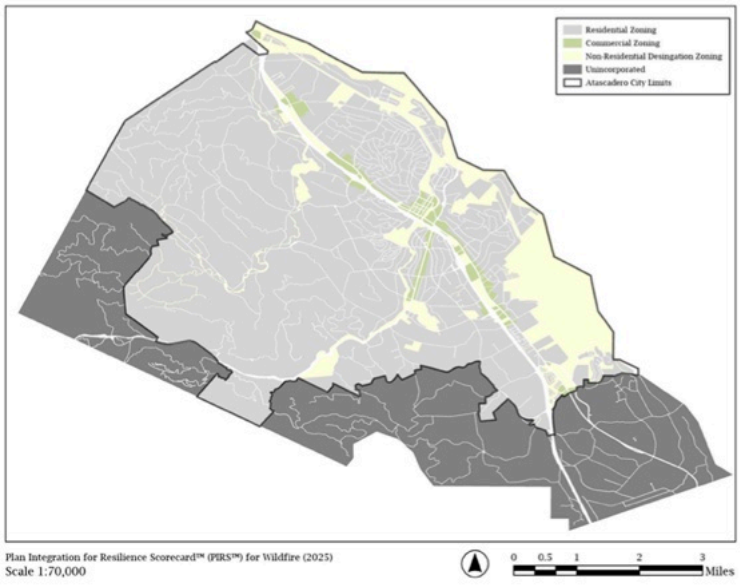


Figure 4.3 Atascadero: "Zoning" Place-Specific Term Map

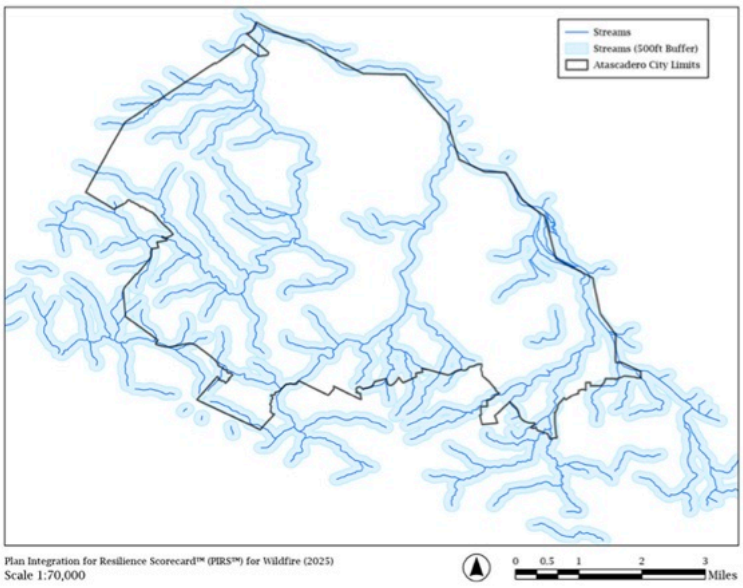


Figure 4.4 Atascadero: "Streams" Place-Specific Term Map

Not every place-specific term will require its own individual map (GIS layer). Many types of maps (GIS layers) contain multiple features that might correspond to more than one place-specific term. For instance, a land use map (GIS layer) will likely include mapped commercial areas, residential areas, special districts, and the like; a zoning map (GIS layer) includes the geographic location of all official zones within a community; transportation maps include different classes of roadways, transitways, and even projected future routes.

For some place-specific terms, you may find that performing additional (minor) GIS procedures is useful to improve the accuracy of your scoring and mapping ("spatial scoring"). In the stream example described above, using the "buffer" tool in a GIS program to create a 300-foot buffer around Class I streams can give you a more precise understanding of the policy's spatial focus, leading to more accurate results.

Add the comprehensive set of relevant place-specific term maps (GIS layers) to a GIS platform (online or desktop) along with the DHZ map (GIS layer) created in **Step 2**. This will enable you to turn layers on and off and adjust the symbology as needed, allowing you to see where specific features overlap with your DHZs.

Step 4.3: Spatially Assign Scores

With your place-specific term maps (GIS layers) compiled and your scorecard spreadsheet prepared, you can commence what is arguably the most enjoyable and rewarding part of the entire PIRS™ for Wildfire process: scoring and mapping ("spatially scoring") your policies!

By the end of **Step 4.3**, every DHZ will receive a score of "+1", "-1", "0", or "not applicable" ("N/A") for every policy, depending on how the policy is likely to affect wildfire resilience in that part of the community. These scores will be entered in the scorecard spreadsheet in the cells that correspond to the DHZs.

Beginning with the first policy in your scorecard – that is, in your final Policy List – read the policy and confirm the place-specific term, which was recorded during **Step 2.3: Validate Policies and Prepare them for Scoring**. Then select the relevant map (GIS layer) that contains that feature and review it, overlaying (superimposing) your DHZ map (GIS layer) on top to identify which DHZs contain the feature. The DHZs that contain the feature are, in effect, the spatial focus of this specific policy; that is, the policy applies to those parts of the community, specifically, and not to others. Thus, the cells in the scorecard spreadsheet that correspond to those DHZs will receive scores for this policy.

Box 4.1 GIS Tool Tip: Scoring Policies

To help you quickly and accurately score policies, display the district-hazard zone map with the place-specific term layer of the policy you are spatially assigning. If set up in a GIS, you can easily toggle map layers on and off for each place-specific term. For instance, a policy may refer to the place-specific term 'Urban Core'. The next policy may refer to the place-specific term 'public housing'. If you have these as layers within your map, you can easily see where they are located—and within which district-hazard zone(s).

Using your notes recorded in the "Resilience +/-" column (again, during **Step 2.3**) as a reference, assign the appropriate score (+1, -1, or 0) to the DHZs that are relevant to this policy. All other DHZs for this policy will receive a N/A, indicating that the policy does not apply to those parts of the community based on the identified place-specific term. Definitions for the potential scores are provided below:

- A **score of "+1"** indicates that a policy positively affects wildfire resilience in a specific DHZ. In other words, it reduces (directly or indirectly) the exposure of people or structures to the wildfire hazard or mitigates the negative effects of wildfire. Assign a score of +1 if a policy increases wildfire resilience.
- A **score of "-1"** indicates that a policy negatively affects wildfire resilience in a specific DHZ. In other words, it increases (directly or indirectly) the exposure of people or structures to the wildfire hazard or perpetuates or exacerbates the negative effects of wildfire. Assign a score of -1 if a policy decreases wildfire resilience.

- A **score of "0"** indicates the policy is neutral, whether that is because it is unlikely to have any effect on wildfire resilience or because it might have both positive and negative effects (and you cannot decide whether it is more likely, on balance, to be positive or negative).
- **"Not Applicable"** indicates that the *place-based feature* does not exist in a district-hazard zone and is labelled "not applicable" (N/A). "Scores" for not applicable (N/A) may be added to the scorecard to avoid confusion and enhance recognition of the spatial impact of policies. The N/As will not affect the summed index scores, but cells left empty may be misconstrued as not yet scored. However, if your team is comfortable with leaving these cells blank to indicate N/A, you may do so.
- Policies where *a hazard zone does not exist in a district* are not evaluated and therefore greyed out on the scorecard.

In most cases, scores will be consistent for an entire policy; that is, the policy will have the same positive, negative, or neutral effect in all the places that it applies. However, a few exceptions exist to this rule of thumb, including policies that explicitly target certain hazard zones (e.g., Very High Fire Hazard Severity Zones) for high resilience standards but ignore others (e.g., High Fire Hazard Severity Zones). In such instances, DHZs in the explicitly targeted zone might receive positive scores, while those in the other hazard zone(s) would receive neutral, or even negative, scores.

When you have completed these steps for the first policy in your scorecard spreadsheet, move on to the next one – then repeat for the entire plan (and the entire network of plans). While that may seem intimidating at first, trust us that it goes faster than you'd think. By the time you're finished with all the mapping and scoring ("spatial scoring"), you might even wish there was more to do! This has happened to us, and to our community collaborators, on occasion.

Box 4.2 Automating Policy Scoring

It is possible for your team to develop scripting to semi-automate the policy scoring process. This automated spatial policy scoring process is designed to allow users to automatically score their regions of interest, or 'geographies of choice'. It can allow users to use as much or as little spatial granularity as they want, since small regions require large amounts of time to score manually, and especially small regions require enough time to be prohibitive. The process is 'semi' automated because the policies themselves need to be analyzed by a subject matter expert with knowledge of how each policy will impact the resilience score. As such, the policy scoring is still a manual process, but the scoring of the spatial units is automated. This will allow users to pick any sized geography of choice, from large planning regions to small parcel level scales, with no additional effort in the scoring process. Each policy is scored with a positive (+1), negative (-1), or neutral (0) score, and these scores are automatically added to the scoresheet and applied to polygons which meet the spatial relationship criteria.

Step 4 Outcome: Draft Scorecard

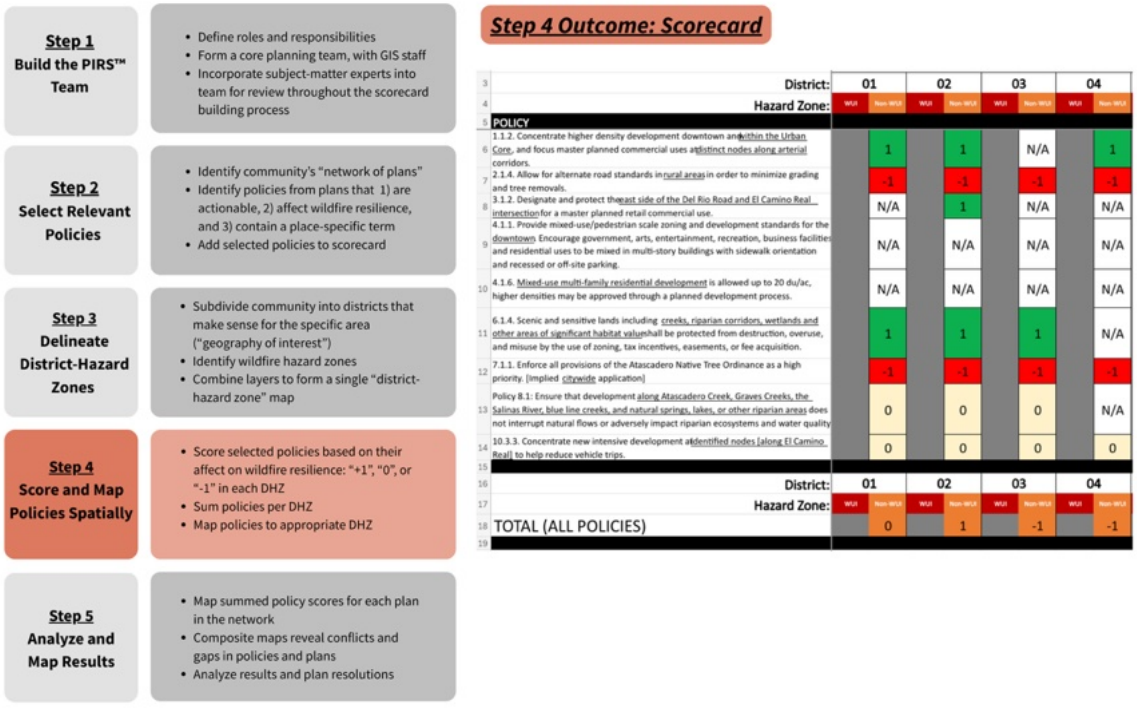


Figure 4.5 Example of Outcome for Step 4: Score Policies

You have produced a complete Plan Integration for Resilience Scorecard™ for Wildfire that documents your team's systematic and spatial evaluation of your community's network of plans (Figure 4.5). The scorecard reflects the current state of your plans and policies vis-a-vis wildfire hazards, and is situated within your community's unique geographic, hazards, and socio-political context.

Your completed scorecard can then be mapped and analyzed, as described in Step 5, to provide important and novel insights about the plans' relationship with wildfire hazards and the community. The scorecard also acts as an organizational tool as you work to improve plan integration and resilience in your community.

Step 5:
Map, Analyze, and Utilize Results

Upon completion of Step 4 of the PIRS™ for Wildfire process (congratulations, by the way!), you are ready to put those results to use by assessing your existing plans and policies, making needed adjustments, and otherwise utilizing the scorecard to strengthen plan integration and community wildfire resilience! You will produce composite maps (**Figure 5.1**), analyze your results, and apply your analysis to future planning decisions. Step 5 tasks include:

5.1 Map your PIRS™ for Wildfire results

- Sum policy scores in each plan's scorecard, then join the summed scores to your DHZ map (GIS layer) to create a composite policy score map for ***each plan***.
- Create a Composite Policy Score map, synthesizing maps across your network for an integrated, overall map that reflects the ***entire network of plans***.

5.2 Analyze your PIRS™ for Wildfire results

- Analyze the maps and the underlying scorecard data to identify patterns, understand the "policy mix" affecting different parts of the community, and reveal policies that may require adjustment.

5.3 Utilize your PIRS™ for Wildfire results

- Recommend individual policy adjustments, or the adoption of best practices, based on your community's PIRS™ for Wildfire results.
- Share the data and outcomes with planning, emergency management, and other community departments to better integrate wildfire mitigation with policy and local planning procedures.
- Use results to bolster grant proposals, funding requests, or major plan amendments.

Step 5.1: Map Your PIRS™ for Wildfire Results

The first part of **Step 5**—**map results**—entails transferring the text-based, yet inherently spatial, policy data stored in the scorecard into maps (**Figure 5.1**). Summed scores for the district-hazard zones (DHZs) can be mapped for each plan, and for the network of plans as a whole, revealing conflicts, gaps, and other relevant patterns. Converting text from a planning document to visual geospatial data enables novel assessment and understanding for planners, emergency managers, administrators, and the public. The resulting actionable maps can be used to guide future policy and wildfire mitigation strategies. They can also assist emergency management's strategies for evacuation routes, placement of resources, and situational planning.

Within your completed scorecard spreadsheet, sum the total scores for every DHZ, placing the total ("index") score in the "TOTAL (ALL POLICIES)" row—shown near the bottom of the scorecard image in **Figure 4.2**. Recall that districts are further subdivided into one or more hazard zones. After totaling the policy scores in each tab of your scorecard (that is for every plan in your network), map those totals onto your community's DHZ map (GIS layer) using the spatial join and union tools (or by inputting the values manually into that layer's attribute table). Consider compiling these results in a single attribute table which will contain a row for every plan in the network and a *composite* row that totals the scores across all plans. Map each of these rows, in turn, to produce choropleth policy score maps for each of the plans—and then for the composite map (**Figure 5.1**) that encompasses the entire network of plans. The images below (**Figure 5.2**-**Figure 5.7**) were produced in this fashion as part of the PIRS™ for Wildfire evaluation of the network of plans in the City of Atascadero, CA.

The policy score maps visually transform your community's PIRS™ for Wildfire data, illuminating patterns in policy focus and relative wildfire resilience across your community's DHZs. Mapping the results from individual plans, as well as the composite policy scores—which essentially layers all the policy score maps together—provides a wealth of spatial information. This can help your team and other local decision-makers identify "hot spots" of significant policy attention, including potential policy conflict, and "cold spots" of comparatively little policy focus (Malecha et al., 2019, pp. 53-54). This visual showcase helps you quickly and effectively determine which areas in your community might require policy intervention to strengthen wildfire resilience, and where resources might best be focused.

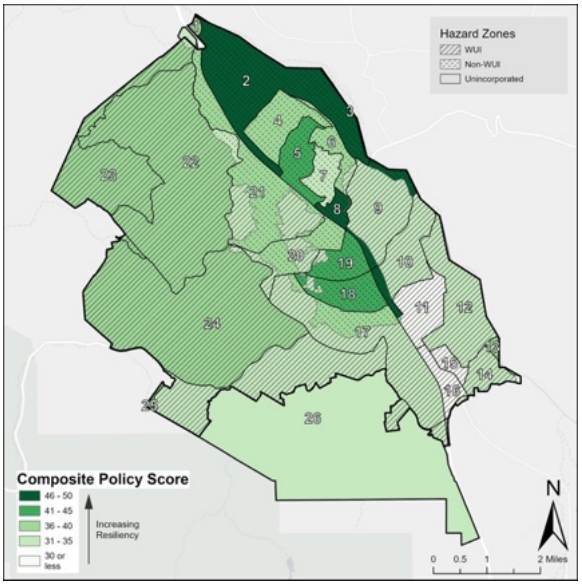


Figure 5.1 Atascadero: Composite Policy Score Map Maps of your community enable spatial analysis of your PIRS™ for Wildfire findings.

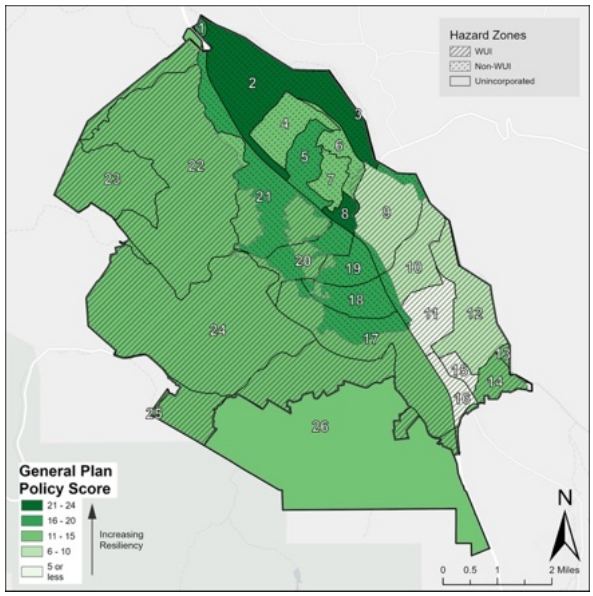


Figure 5.2 Atascadero: General Plan Policy Score Map

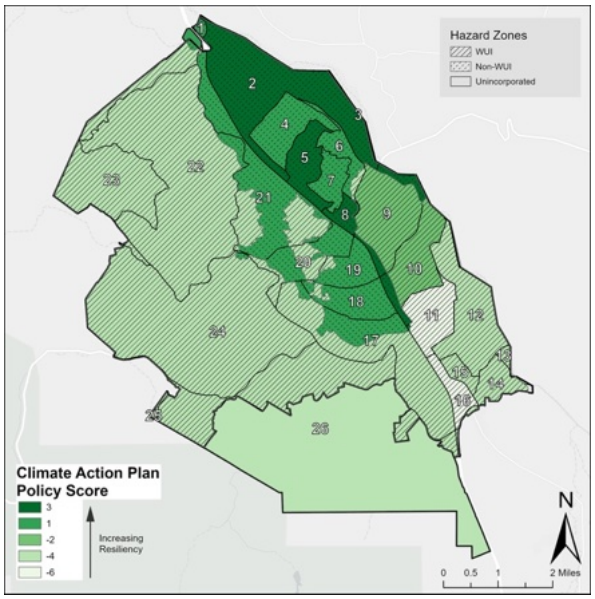


Figure 5.3 Atascadero: Climate Action Plan Policy Score Map

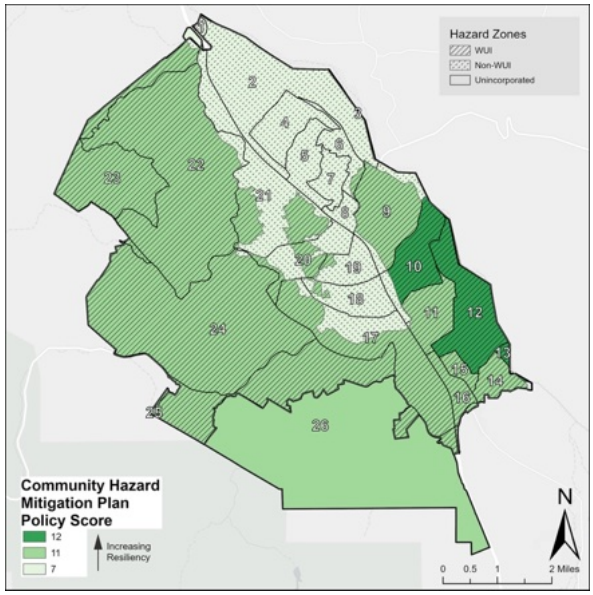


Figure 5.4 Atascadero: Community Hazard Mitigation Plan Policy Score Map

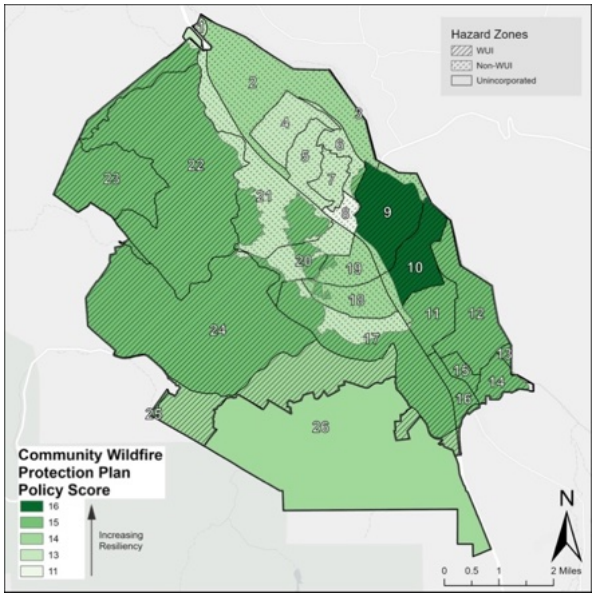


Figure 5.5 Atascadero: Community Wildfire Protection Plan Policy Score Map

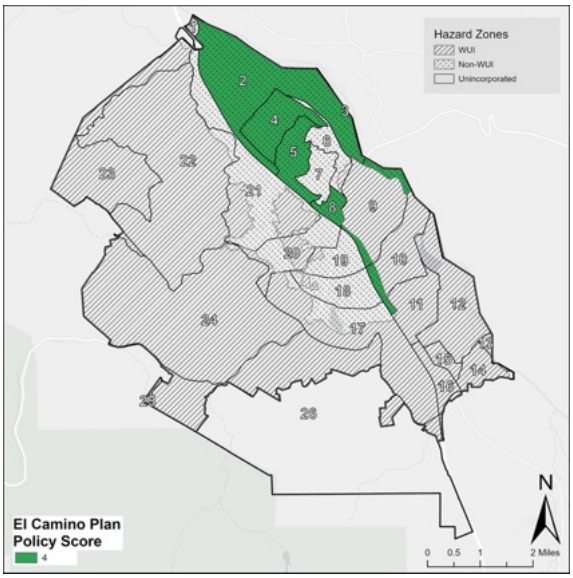


Figure 5.6 Atascadero: El Camino Plan Policy Score Map

Box 5.1 The Value of Mapping Hazards and Policy Effects

Assessment of wildfire hazard and community preparedness is a complex undertaking, given the inherent nature of how fires start, spread, and impact the landscape. Compared to other natural hazards, wildfire behavior is more dynamic and therefore more difficult to predict. For instance, assessment of flood risk across a community could consider factors such as elevation and distance from water bodies to give a relatively accurate depiction of what areas are at highest risk. Given the sporadic nature of wildfire ignitions and the significant influence local weather conditions, especially wind direction and velocity, have on fire behavior and severity, identifying the exact locations that will be impacted is difficult. Of course, places can and do have characteristics that may predispose them to wildfire hazard – and the patterns in these traits should be more effectively incorporated in decision-making. In short, wildfire hazard is more difficult to summarize uniformly across the landscape to the extent that other natural hazards can be modeled.

Given these challenges in predicting fire hazard, there is tremendous value in utilizing geographic information systems (GIS) to assess the scale, development patterns, demographics, and environmental characteristics relevant to wildfire that may impact municipalities.

Step 5.2: Analyze Your PIRS™ for Wildfire Results

In addition to mapping the composite policy scores, **analyzing the scorecard**–an organized, vetted, spatially explicit, wildfire-resilience-focused dataset of your community's plans and policies–can provide valuable insight and reveal opportunities to mitigate wildfire threats through policy adjustment.

For example, negative-scoring (and neutral) policies will be readily apparent in the scorecard and can be assessed to discern patterns and opportunities for improvement. Policies that strengthen wildfire resilience can be identified and steps taken to expand their geographic reach and integration throughout the network of plans. Additionally, the "policy mix" that affects any given DHZ can be readily known, providing an opportunity to investigate conflicts and scrutinize negative-scoring policies that affect that part of the community.

There are many ways of assessing your scorecard results, including statistical analysis and comparison to other spatial datasets (see Malecha et al., 2019), but we will focus, here, on several intuitive and practice-oriented evaluations:

- Among the most immediately recognizable features of your final scorecard—and forgive us if you're way ahead of us, here—are the policies that were "flagged" with negative scores ("-1"). Assessing the patterns and geographic extent of these problematic policies – and then addressing them (see **Step 5.3: Utilize Your PIRS™ for Wildfire Results**) is surely among your top priorities.
- We suggest also scrutinizing the policies that were given neutral scores ("0"), as they may represent opportunities for relatively simple but effective adjustments to incrementally strengthen wildfire resilience.
- It may also be useful to look for patterns in the positive-scoring policies (+1), especially those that show up in unexpected places, such as development-focused plans or chapters. There may be opportunities to expand the geographic reach of such policies or to replicate their wildfire-resilience-strengthening attributes elsewhere.
- Last (but certainly not least among the analytical possibilities enabled by your scorecard), you might consider isolating individual DHZ columns to understand the "policy mix" in different parts of the community. For instance, a DHZ with a low score (also apparent on the policy score maps) may indicate policy conflict or a lack of policy attention. Scrutinizing the set of policies that you have identified as pertaining to that specific DHZ may provide insights that lead to policy changes and increased resilience.

For additional guidance on analyzing your scorecard results, refer to Chapter 3 of the *Plan Integration for Resilience Scorecard Guidebook, Version 2.0* (Malecha et al., 2019).

Step 5.3: Utilize Your PIRS™ for Wildfire Results

After thoroughly analyzing your community's PIRS™ for Wildfire results to illuminate positives and negatives, areas of synergy and conflict, and spatial patterns in your policy framework (especially "hot spots" and "cold spots"), put that knowledge and data to use to strengthen resilience by adjusting or adding policies to integrate hazard-awareness throughout the network of plans. Sharing and discussing the findings with colleagues and stakeholders across local government can also provide valuable insight and help break down "silos" that hinder a coherent, holistic, and proactive community approach to planning for and managing the wildfire threat. Results and analysis can also be (and have successfully been) utilized as empirical evidence to support funding proposals, project prioritization, and other key decisions.

Adjust and Add Policies

Among other insights, your analysis of the maps and the scorecard spreadsheet will surely highlight opportunities for revising, adding, or even removing policies across the network of plans to improve integration and wildfire resilience, as well as in adopted or soon-to-be-adopted plans. Policy adjustments that support resilience can be made at any local or regional administrative scale.

Consider a policy that calls for the increased development of Accessory Dwelling Units (ADUs). From a land-use perspective, this policy may increase housing opportunities in the community. From a wildfire-suppression lens, this policy has some gaps: it adds more people at risk from wildfire, increases the built environment footprint which may be harder to protect, and increases the need for more people to be evacuated. It is important, therefore, to evaluate and revise policies through a specialized wildfire mitigation lens. Revising plans and policies based on your scorecard results can be done in a variety of ways:

1. **Making "embedded" adjustments**: adding or changing language within existing policies to explicitly account for and mitigate wildfire risk in the built and natural environments. See **Table 5.1** for examples. If desired, this policy adjustment process can be continuous and built into an annual work program.
2. **Adding within-policy references**: adding language within existing policies that explicitly references (or even hyperlinks to) other plans, sections, or policies that provide effective guidance about relevant wildfire risk mitigation (e.g., policies in a Safety Element, Circulation Element, or the CWPP).
3. **Including new "best practice" policies**: creating new policies based on best practices for wildfire prevention and mitigation (Mowery, M., 2021).
4. **Cutting the most problematic policies**: consider the wholesale removal of policies that appear to have only negative effects on community wildfire resilience, or for which adjustment would be prohibitively difficult, particularly if their perceived community benefit is otherwise minimal or redundant.

Engaging your subject-matter expert (SME) teams in this process might prove fruitful. In previous collaborative applications of the PIRS™ for Wildfire process, SMEs reviewed selected policies from each plan, assessing whether the overall objective of contributing to wildfire hazard mitigation was met. Examples of recommended policy modifications include adding the terms "wildfire resistant (minimally flammable)", calling out wildfire as a primary hazard in some areas, and modifying actionable language (e.g., "hardening assets") when warranted. Additional examples of policy adjustment can be seen in **Table 5.1**.

Table 5.1 Examples of Policy Revisions in Atascadero's Network of Plans

Original Policy	Policy Score	Suggested Policy Revision (with SME input)
City of Atascadero General Plan **[1.1.]4**. Outside of the Urban Core and Single Family Neighborhoods, maintain lot sizes of 2.5 to 10 acres based on performance standards and natural constraints including slope, distance from the center of the community, average neighborhood lot size, soil percolation capability, and adequacy of access…	-1	[1.1.]4. Outside of the Urban Core and Single Family Neighborhoods, maintain lot sizes of around one acre or cluster development, so as to promote defensible space, ~~2.5 to 10 acres~~ based on performance standards and natural constraints including slope, distance from the center of the community, average neighborhood lot size, soil percolation capability, and adequacy of access.
City of Atascadero General Plan **[2.1.]7].** Residential second units shall be permitted in all single-family residential districts consistent with the requirements of the zoning ordinance. "Guesthouses" and "granny units" shall be considered second units for purposes of issuing building permits and collecting capital facility impact fees.	-1	[2.1.]7]. Residential second units shall be permitted in all single-family residential districts consistent with the requirements of the zoning ordinance provided they meet minimum standards of ignition resistance as found in Chapter 7A of California Building Code. "Guesthouses" and "granny units" shall be considered second units for purposes of issuing building permits and collecting capital facility impact fees.
City of Atascadero General Plan **[7.1.]1.** Enforce all provisions of the Atascadero Native Tree Ordinance as a high priority.	0 (depends)	[7.1.]1. Enforce all provisions of the Atascadero Native Tree Ordinance as a high priority, but with a strong preference for fire-resistant tree species.
City of Atascadero General Plan **[10.3.]3.** Concentrate new intensive development at identified nodes to help reduce vehicle trips.	-1	[10.3.]3. Concentrate new intensive development at identified nodes outside the WUI to help reduce vehicle miles traveled ~~trips~~.
Atascadero Climate Action Plan **C-6.1**: Plant at least 2,000 trees on City-property by 2020, subject to water availability. (3-6)	0 (depends)	C-6.1: Plant at least 2,000 fire-resistant trees on City-property by 2020, subject to water availability. (3-6)

For additional guidance on adjusting plans and policies based on your scorecard results, refer to Chapter 4 (pp. 67-73, specifically) of the *Plan Integration for Resilience Scorecard Guidebook™, Version 2.0* (Malecha et al., 2019). That edition of the Guidebook is focused on flooding hazards, but the principles of policy adjustment/addition/removal are generally the same.

Share with Colleagues, Elevate Wildfire Consideration, and Support Funding Proposals

The knowledge and perspective gained from the PIRS™ for Wildfire process—including the organized dataset, the systematic and spatial approach, and an increased awareness of wildfire behavior and interactions—can be broadly applied to future planning initiatives, shared with other departments, and used to strengthen funding proposals. These applications will help change the narrative around effectively and proactively planning for wildfire and, in so doing, strengthening community resilience. Examples of the way PIRS™ for Wildfire might be used to advance knowledge and resilience in your community include:

- The PIRS™ for Wildfire data and perspective can be used to "elevate" wildfire mitigation and resilience across the community planning and management process, helping staff draft and adjust policies that integrate wildfire awareness throughout the entire network of plans.
- Emergency Management staff might also utilize the specific and general findings to influence planning decisions that will enable them to perform their duties more effectively during a hazard response event.
- Training local GIS staff to keep planning districts up to date with relevant data can facilitate future evaluations, adjustments, and improve decision-making around resilience. For example, data layers showing vulnerability can be added to pinpoint spatially where to focus mitigation investments.
- City staff can (and plan to) incorporate the lessons learned about taking a more explicitly spatial and hazard-aware approach, using it in upcoming plan preparations. This supports internal staff capacity building and promotes integration of effort.
- The broader lessons about spatial and hazard awareness can be coupled with the latest science on wildfire path disruption and applied directly to development policy: new development in the WUI should be designed and managed to act as a fire break, thereby contributing to the protection of existing development. City staff can apply the spatially consistent nature of wind directionality and the effect this can have on wildfire risk in policy planning.
- The PIRS™ for Wildfire scorecard and associated maps can be used as compelling data and visuals when applying for future Federal, State, Local, or philanthropic grants.

Step 5 Outcome: Composite Policy Maps and Analysis

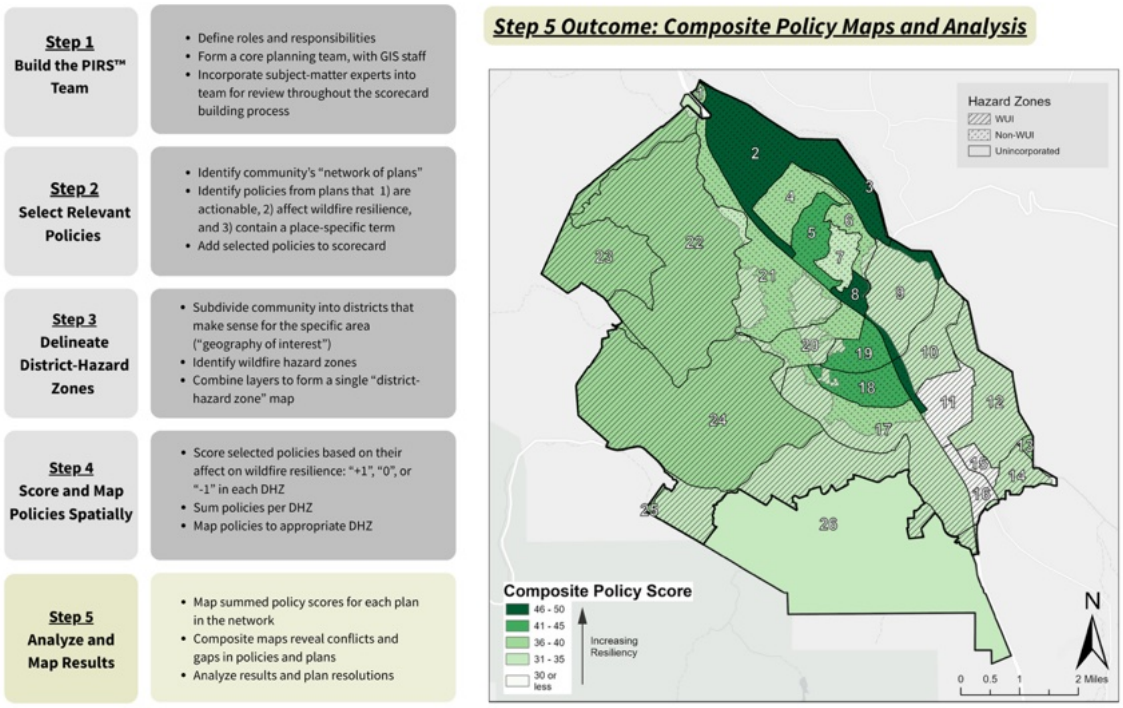


Figure 5.7 Example Outcome for Step 5: Analyze and Map Results

CHAPTER 3

Case Studies

Introduction

This chapter presents the collaborative application of the PIRS™ for Wildfire method in a group of testbed cities and counties (**Table 0.4**). They are included to demonstrate possible PIRS™ applications and outcomes and provide a reference point for your team to build your own scorecard and maps. Each unique community contributed to a more robust understanding of how to compose and use PIRS™ in different contexts and at different jurisdictional levels. Each application is different in its outcomes, but common in intent to apply a spatial policy approach to improve wildfire mitigation and strengthen community resilience in places that, based on their history, correctly view wildfire as a significant threat. The case studies collectively illustrate how the PIRS™ method can be used to systematically evaluate existing (and draft) plans and improve policy to reduce losses in the built and natural environments. The communities' participation was motivated by a desire to establish a new framework for integrating land use and wildfire mitigation policy into local practice. All cases included a PIRS™ for Wildfire evaluation of the relevant general plan (state requirement) and multi-hazard mitigation plan (federal requirement for post-disaster funding), as well as other selected local plans, as core documents central to building resilient networks of plans and forming a spatially explicit approach for wildfire mitigation.

Table 0.4 PIRS™ for Wildfire Pilot Communities: Population and Fire History

Name	Jurisdiction Type	Population (circa 2023)	Largest fire to impact area in the last 10 years (acres)
Atascadero, CA	Incorporated city	29,000	Chimney Fire (46,344 acres)
Temecula, CA	Incorporated city	110,000	Fairview Fire (28,357 acres)
Foresthill, CA	Unincorporated community: Placer County	1,102	Mosquito Fire (76,788 acres)
Eastern Goleta Valley, CA	Unincorporated community: Santa Barbara County	6,000	Aliso Fire (16,970 acres)
Napa County, CA	County	133,000	Glass Fire (27,300 acres)

The City of Atascadero

Context

Atascadero is a city in San Luis Obispo County in the Central Coast region of California with a total area of 26.1 square miles. As of 2023, Atascadero had a population of approximately 29,773 residents. The city is characterized by a Mediterranean climate—hot dry summers and cool wet winters—influenced primarily by its proximity to the Pacific coast.

Wildfire is a significant hazard due to the weather, the topography, the characteristics of the regional vegetation, and the suburban/rural buildout of Atascadero into the Wildland-Urban Interface (WUI). Historically, fires in the city have started in nearby hills in dense, dry vegetation, heavily influenced by strong winds and topographic characteristics. The 2016 Chimney Fire burned 46,344 acres. Wildfire is considered a significant hazard in the community, as 8,034 properties are located within the “moderate-high” and “very high” Fire Hazard Severity Zones (FHSZ).

The California Department of Forestry and Fire Protection (CAL FIRE) has designated the City of Atascadero as being at increased risk of severe wildfire risk (San Luis Obispo County Multi-Jurisdictional Hazard Mitigation Plan 2019). CAL FIRE indicates that areas in the “very high” FHSZ are expected to have significantly higher rates of burn probability and structural damage due to fuel characteristics and existing infrastructure and building placement.

PIRS™ for Wildfire Process

Step 1: Build Your PIRS™ Team

Atascadero assembled a core team from the Fire, Community Development and IT Departments. GIS support was provided by the Information Technology staff.

Step 2: Select Relevant Policies

This team selected a network of six key plans: the City of Atascadero General Plan, the SLO County Community Wildfire Protection Plan, the SLO County Multi-Jurisdictional Hazard Mitigation Plan, the city's Climate Action Plan, and the El Camino Area Plan (**Table AT1**). They developed a list of policies from across the network of plans that passed the "three-point test" and could be spatially scored. **Table AT2** and **Table AT3** display a summary of these selected policies, categorized by policy tool and fire mitigation strategy (following the format used in the PIRS™ for Heat Guidebook [2022]). The policy tool categories reflect those commonly found in local plans.

Table AT1 City of Atascadero: Relevant Plans and Policies

Plan Name	Year Adopted	Scale	Plan Category	Number of Relevant Goals & Policies
City of Atascadero General Plan	2024	City	Comprehensive	67
SLO County Community Wildfire Protection Plan	2019	County	Wildfire	16
SLO County Multi-Jurisdictional Hazard Mitigation Plan	2019	County	Hazard	13
Climate Action Plan	2014	City	Climate Action	6
El Camino Area Plan	2020	City	Specific Plan	5
Total Policies				**107**

Source: City of Atascadero

Table AT2 City of Atascadero: Policy Tool Categories

Policy Tool Category	Number of Selected Policies
Land Use Analysis and Permitting Process	23
Capital Improvements	13
Development Regulations	24
Land Acquisition	2
Density Transfer Provisions	8
Financial Incentives and Penalties	3
Public Facilities	2
Post Disaster Reconstruction Decisions	32
Total Policies	**107**

Source: City of Atascadero Policy Lists

Table AT3 City of Atascadero: Fire Mitigation Strategies by Category

Fire Mitigation Strategy Category	Number of Policies
Land Use	32
Urban Design	6
Fire-Resilient Landscape	24
Structural Hardening	28
Regulations	17
Total Policies	**107**

Source: City of Atascadero Policy Lists

A two-person Subject Matter Expert (SME) review was conducted on a selected set of policies derived from the initial policy list. This review provided a model for the city team to use on the remaining non-SME scored policies, and to make policy adjustments where needed. An example of a SME policy review is provided in **Table AT4**. This is a key feedback tool that the city team can use to strengthen wildfire-resilience-related policy statements.

Table AT4 City of Atascadero: SME Feedback Example

City of Atascadero General Plan 2025 (Update #3 - 2016)	Supports (+1) Undermines (-1) Depends (?)	Why?	Policy revisions?	Other comments
[10.3.]3. Concentrate new intensive development at identified nodes to help reduce vehicle trips.	+1	Agree (in line with first approach).	[10.3.]3. Concentrate new intensive development at identified nodes outside the WUI to help reduce vehicle trips.	
				Change "trips" to "vehicle miles traveled".
	It depends	If in high WUI fire area; needs to actively plan for wildland fire and evacuation	Explicit language to address WUI fire component, including evacuation	
	It depends	Are these nodes in fire-prone areas? Putting more people in fire-prone areas will be problematic for fire protection as well as evacuation.		
	It depends	No explicit language related to modifications to reduce wildfire threat.	[10.3.]3. Concentrate new intensive development at identified nodes to help reduce vehicle trips. New development to meet wildfire resiliency measures.	
SUMMARY >>	Undermines	Adding structures and people in fire-prone areas will be problematic for fire protection and evacuation.	[10.3.]3. Concentrate new intensive development at identified nodes outside the WUI to help reduce vehicle miles traveled ~~trips~~.	

Step 3: Delineate District-Hazard Zones

The team delineated a planning district map based on their geography of choice: U.S. Census block groups (**Figure AT1**). This formed a 26-district map. The team chose a city-wide WUI map based on local knowledge and CAL FIRE's FHSZs to construct the hazard zone map (**Figure AT2**). The maps are based on hazard, not risk, and expected fire behavior over a 30-50-year period. The PIRS™ team combined the WUI map with the Census block groups map to form Atascadero's district-hazard zone (DHZ) map, the ultimate spatial unit of analysis for their scorecard evaluation (**Figure AT3**).

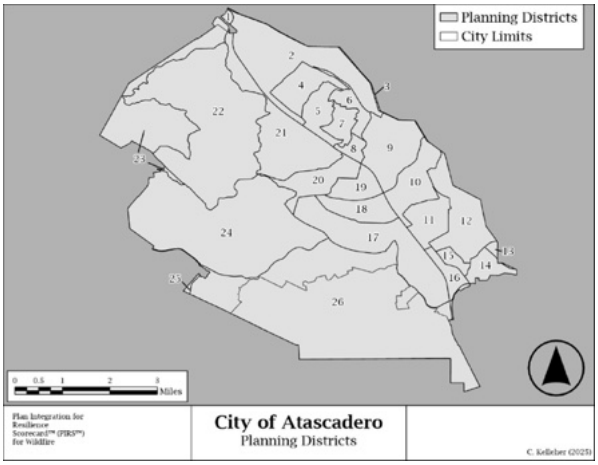


Figure AT1 City of Atascadero: Planning Districts

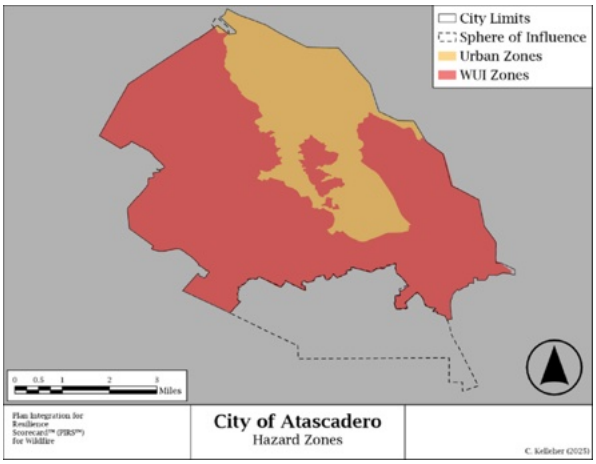


Figure AT2 City of Atascadero: Hazard Zones

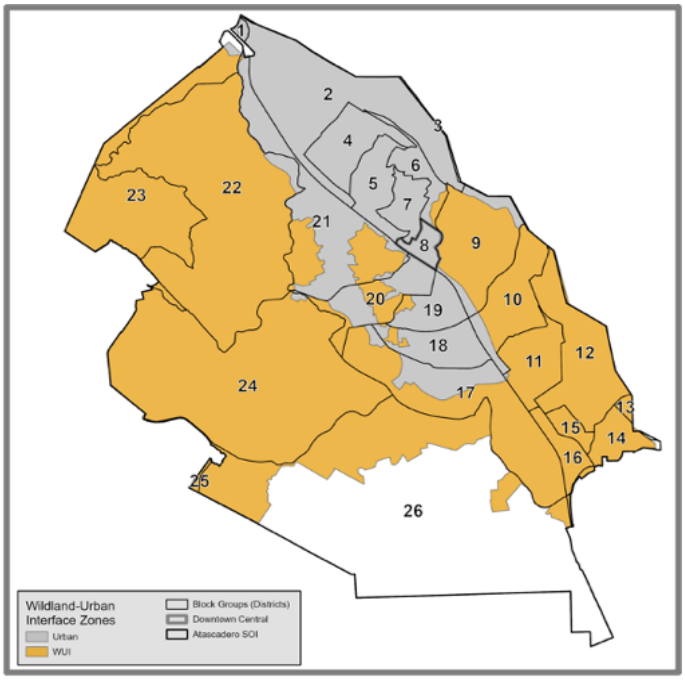


Figure AT3 City of Atascadero: District-Hazard Zone Map
(adopted 2021; based on the 2014 CAL FIRE LRA FHSZ Map)

Step 4: Score Policies

The team scored policies according to the PIRS™ for Wildfire method described in Chapter 2. **Figure AT4** is an excerpt of a scorecard from Atascadero's General Plan. Note that not all 26 planning districts, nor all policies and scores, are shown. After scoring, the team totaled scores within each DHZ and assembled composite maps.

Plan Integration for Resilience Scorecard™ for Wildfire *City of Atascadero General Plan*	[possible scores:]	1	0	-1	N/A
The '3-point test' To be included in the analysis, a policy must... a) potentially affect vulnerability to wilfire hazards; b) contain a recognizable *policy instrument*; and c) contain a place-specific term such that scores can be assigned to specific district-hazard zones.					

District:	01		02		03		04		05		06		07		08 [Downtown]		09		10		11		12	
Hazard Zone:	WUI	Non-WUI	WUI	Non-WUI	WUI	Non-WUI	WUI	Non-WUI	WUI	Non-WUI	WUI	Non-WUI	WUI	Non-WUI	WUI	Non-WUI	WUI	Non-WUI	WUI	Non-WUI	WUI	Non-WUI	WUI	Non-WUI
POLICY																								
1.1.2. Concentrate higher density development downtown and within the Urban Core, and focus master planned commercial uses at distinct nodes along arterial corridors.		1		1		N/A		1		1	1	1		1		1	1	-1	1	-1	1	-1	-1	
2.1.4. Allow for alternate road standards in rural areas in order to minimize grading and tree removals.		-1		-1		-1		-1		-1	-1	-1		-1		N/A	-1	-1	-1	-1	-1	-1	-1	
3.1.2. Designate and protect the east side of the Del Rio Road and El Camino Real intersection for a master planned retail commercial use.		N/A		1		N/A		N/A		N/A	N/A	N/A		N/A		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	
4.1.1. Provide mixed-use/pedestrian scale zoning and development standards for the downtown. Encourage government, arts, entertainment, recreation, business facilities and residential uses to be mixed in multi-story buildings with sidewalk orientation and recessed or off-site parking.		N/A		N/A		N/A		N/A		N/A	N/A	N/A		N/A		0	N/A	N/A	N/A	N/A	N/A	N/A	N/A	
4.1.6. Mixed-use multi-family residential development is allowed up to 20 du/ac, higher densities may be approved through a planned development process.		N/A		N/A		N/A		N/A		N/A	N/A	N/A		N/A		N/A	N/A	N/A	N/A	N/A	-1	N/A	N/A	
6.1.4. Scenic and sensitive lands including creeks, riparian corridors, wetlands and other areas of significant habitat value shall be protected from destruction, overuse, and misuse by the use of zoning, tax incentives, easements, or fee acquisition.		1		1		1		N/A		N/A	1	1		N/A		1	1	1	1	1	1	1	1	
7.1.1. Enforce all provisions of the Atascadero Native Tree Ordinance as a high priority. [Implied citywide application]		-1		-1		-1		-1		-1	-1	-1		-1		-1	-1	-1	-1	-1	-1	-1	-1	
Policy 8.1: Ensure that development along Atascadero Creek, Graves Creeks, the Salinas River, blue line creeks, and natural springs, lakes, or other riparian areas does not interrupt natural flows or adversely impact riparian ecosystems and water quality		0		0		0		N/A		N/A	0	0		N/A		0	0	0	0	0	0	0	0	
10.3.3. Concentrate new intensive development at identified nodes [along El Camino Real] to help reduce vehicle trips.		0		0		0		0		0	-1	0		0		0	-1	0	-1	0	-1	0	-1	

District:	01		02		03		04		05		06		07		08		09		10		11		12	
Hazard Zone:	WUI	Non-WUI	WUI	Non-WUI	WUI	Non-WUI	WUI	Non-WUI	WUI	Non-WUI	WUI	Non-WUI	WUI	Non-WUI	WUI	Non-WUI	WUI	Non-WUI	WUI	Non-WUI	WUI	Non-WUI	WUI	Non-WUI
TOTAL (ALL POLICIES)		0		1		-1		-1		-1	-1	0		-1		1	-1	-2	-1	-2	-2	-2	-3	

Figure AT4 City of Atascadero: Excerpt of General Plan Scorecard.

Step 5: Map, Analyze, and Utilize Results

Among other uses, the scorecard information was used to create a Composite Policy Score Map (the sum of all scored plans and policies) that reflects the overall scores derived from the PIRS™ for Wildfire evaluation (**Figure AT5**). Policy scores were summed for each DHZ and mapped to visualize places in the community that receive more and less policy attention related to wildfire resilience.

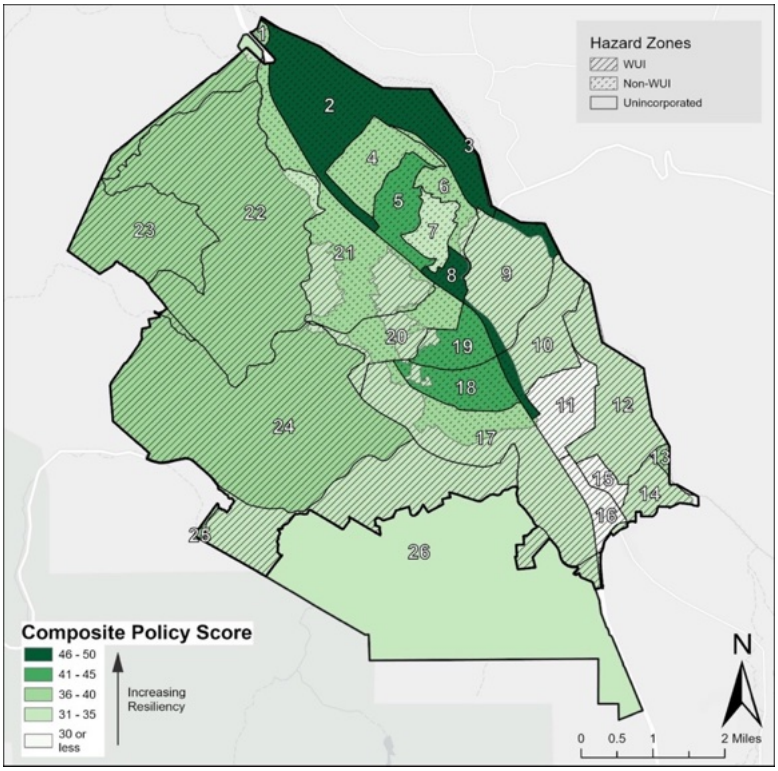


Figure AT5 City of Atascadero: Composite Policy Scorecard Map

Source: PIRS™ for Wildfire (Cal Poly San Luis Obispo, Texas A&M University)

The team also created scorecard maps for each plan in the network, aiding understanding and analysis of the attention that specific plans give to wildfire resilience—and where. When analyzing Atascadero's existing policies for their wildfire mitigation strategy, there was a significant focus on land use planning decisions and urban design planning decisions. Spatially, most policies focused on areas within the urbanized area of Atascadero and the downtown core. The hazard map and the spatially scored policies from the PIRS™ for Wildfire analysis show that the existing policies have a disproportionate impact on areas that are *not* in the WUI, namely the areas that are along El Camino Real (downtown core).

Drafting more spatially focused and wildfire-hazard-aware plans and policies to address the threat faced by the parts of the community in the "Very High" and "High" FHSZs will help lower risk in these areas. This can be accomplished in future updates to the General Plan, hazard mitigation plan, and other relevant plans.

The City of Temecula

Context

Temecula is located in the southwestern corner of Riverside County in Southern California, known as the Inland Empire. As of 2025, approximately 111,073 residents live within its 37.18 square mile area. Temecula has a hot Mediterranean climate that experiences moderate precipitation in winter months. Wildfire is a significant hazard due to the local climate, and the buildout of Temecula into its WUI exacerbates the potential risk to human life and property. Historically, fires in the city have generally started in creek beds or been driven into the city by prevailing winds that average 20 mph. A large amount of the native vegetation in the area, chaparral, has evolved to persist in fire-prone habitats. The city's interest in the PIRS™ method comes from the need to address fire mitigation risk and to utilize a spatial tool in its General Plan Update effort.

Temecula's historic development has focused on residential communities east of Highway US 15, which runs adjacent to the mountainous. The high fire hazard occurs on the western side of the city, and primarily north of Highway 79. There is a large density of residential developments south of Highway 79, abutting the Pechanga Reservation, which primarily contains undeveloped, chaparral slopes that have had a high frequency of large wildfire events in the past. Directly west of Highway US 15, there is a large concentration of industrial units, along with Temecula's historic Old Town business district. These spatial characteristics of development create a prominent WUI zone surrounding the developed core of the city.

Recent fire history (**Table TE1**) in Temecula suggests an escalation in the scale and destructive capabilities of wildfires in the area, especially within the WUI. The 2025 CAL FIRE maps indicate that areas of Temecula in the "Very High" Fire Hazard Severity Zone are expected to have higher rates of burn probability due to fuel characteristics and existing infrastructure and building placement. Temecula's warm, dry summers contribute to low relative humidity and low fuel moisture. When combined with high fuel loading, the potential for a catastrophic wildfire event is significant.

Table TE1 City of Temecula: Recent Fire History

Fire Name	Year	Acres Burned
Pauba	2024	101
Highland	2023	2,487
Fairview	2022	28,307

Sources: City of Temecula Local Hazard Mitigation Plan, 2023-2027, pg. 90.; Historic Fire Perimeters, CAL FIRE Fire and Resource Assessment Program (FRAP), 2024.

The city's Local Hazard Mitigation Plan classifies wildfire as a "high" priority (Tier I) hazard that requires significant investment and planning to address. Temecula sponsors a community-wide Wildfire Program to support mitigation and preparedness efforts. Mitigation efforts include an aggressive weed abatement program, public education, workshops on wildfire defense, enhancing of firefighting apparatus and equipment, fire inspections of established businesses, updating and implementing new building codes for community development, and consistent work with homeless outreach to prevent the unintentional spread of wildfire from open warming fires.

PIRS™ for Wildfire Process

Step 1: Build Your PIRS™ Team

Temecula's PIRS™ for Wildfire effort was led by a small team from the Community Development Department, with assistance from Emergency Management staff and consultation with GIS personnel. The Cal Poly / Texas A&M PIRS™ Team provided mapping support. The process was completed, intermittently, covering the course of a calendar year. A typical PIRS™ for Wildfire process takes 6 months, or more, depending on the number of plans to be reviewed and local schedules and staff work task priorities.

Step 2: Select Relevant Policies

Temecula's PIRS™ team began by defining the network of plans to be evaluated, which included the General Plan, Quality of Life Master Plan, Urban Forest Management Plan, and Local Hazard Mitigation Plan, as well as the Western Riverside County Multiple Species Habitat Conservation Plan and the Temecula Creek Community Wildfire Protection Plan (**Table TE2**). The General Plan is a mandatory document in California. The Local Hazard Mitigation Plan is required to obtain federal disaster and mitigation assistance. All other plans were produced voluntarily to help guide additional aspects of the city's growth and resource management.

Using the network of plans, the city team developed a list of policies to score, pulling policies that pass the "three-point test". The categorization of policies—based on policy tool and fire mitigation strategy—can be found in **Table TE3** and **Table TE4**.

Table TE2 City of Temecula: Relevant Plans and Policies

Plan Name	Year Adopted	Scale	Plan Category	Number of Relevant Goals & Policies
City of Temecula General Plan	2006	City	Comprehensive	27
Quality of Life Master Plan	2022	City	Comprehensive	21
Urban Forest Management Plan	2023	City	Urban Forestry	9
Local Hazard Mitigation Plan	2022	City	Hazard	18
Multi-Species Habitat Conservation Plan	2004	County	Conservation	3
Temecula Creek Community Wildfire Protection Plan	2024	Community	Specific Plan Area for Wildfire	34

Source: City of Temecula

Table TE3 City of Temecula: Land Use Policy Tool Categories

Policy Tool Category	Number of Selected Policies
Land Use Analysis and Permitting Process	23
Capital Improvements	48
Development Regulations	13
Land Acquisition	2
Density Transfer Provisions	0
Financial Incentives and Penalties	1
Public Facilities	8
Post Disaster Reconstruction Decisions	8
Total	**103**

Source: City of Temecula, Categories derived from PIRS™ Heat Workbook (2022).

Table TE4 City of Temecula: Fire Mitigation Strategies by Category

Fire Mitigation Strategy Category	Number of Policies
Land Use	34
Urban Design	13
Resilient Landscape	22
Structural Hardening	12
Regulation	22
Total	**103**

Source: City of Temecula Network of Plans; and PIRS™ for Heat (2022).

A sample of the initial city team policy set was provided to the SME team who audited the sample for mitigation impact (**Table TE5**). This feedback provided the city team with a basis for revising other policies from the various plans. The SME team consisted of two members with wildfire experience in the region. The audit demonstrated how to build more wildfire resilient actions into the city's policy regime. Having two SMEs conduct the review provided the jurisdiction with an experience-based approach to wildfire mitigation.

Table TE5 City of Temecula: SME Feedback Example

City of Temecula General Plan	Supports (+1) Undermines (-1) Depends (?)	Why?	Policy revisions?	Other comments
[Open Space / Conservation Element] Policy 5.5 Coordinate with Homeowners Associations to maintain landscaping along slopes adjacent to public rights-of-way.	It depends	As long as wildfire is a consideration of the landscape planning effort and so stated in the policy	[Open Space / Conservation Element] Policy 5.5 Coordinate with Homeowners[a] Associations to maintain wildfire resistant landscaping along slopes adjacent to public rights-of-way.	Wildfire resilience needs to be front and center … (between the eyes) in landscape design; especially along rights of way that are used for evacuation
	It depends	Continued maintenance of low amounts of irrigated landscaping will support. If landscaping increases fire-prone vegetation, then resilience will be undermined.	Include something in policy that includes continued maintenance to minimize flammability of combustible materials in rights-of-way.	
	It depends	Could be improved by requiring fire-resistant landscaping.		
	Supports	Landscape or vegetation management practices have the potential to reduce wildfire risk.		
	It depends	Continued maintenance of low amounts of irrigated landscaping will support; if landscaping increases fire-prone vegetation, resilience will be undermined. Mention fire-resistant or wildfire resilient landscaping.	[Open Space / Conservation Element] Policy 5.5 Coordinate with Homeowners Associations to maintain wildfire-resistant or minimally flammable landscaping along slopes adjacent to public rights-of-way.	
SUMMARY >>	Supports			

Step 3: Delineate District-Hazard Zones

The Temecula team chose to delineate their district-hazard zones in a unique way. For districts, they created a context-relevant hybrid that combined city-produced Specific Plan boundaries with U.S. Census tracts. (**Figure TE1**). For hazard zones, they relied on CAL FIRE-derived Fire Hazard Severity Zones (FHSZs) for the local responsibility area (LRA) that includes Temecula (**Figure TE2**). The resulting DHZ map shows the city subdivided into 37 separate districts, each of which contains up to 4 hazard zones (**Figure TE3**). For analytical purposes, "Not in FHSZ" was considered as a hazard zone, albeit one with relatively low risk.

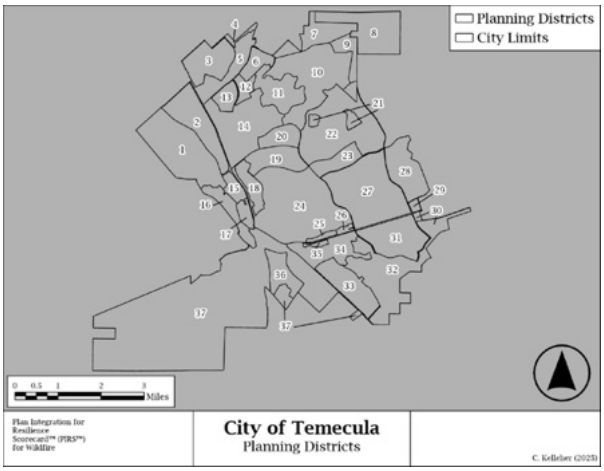


Figure TE1 City of Temecula: Planning Districts

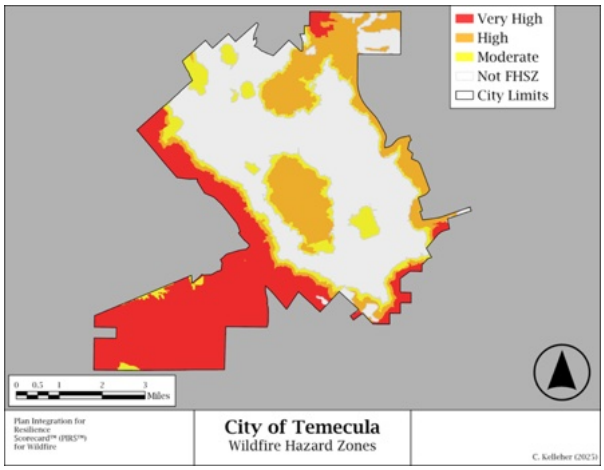


Figure TE2 City of Temecula: Hazard Zones

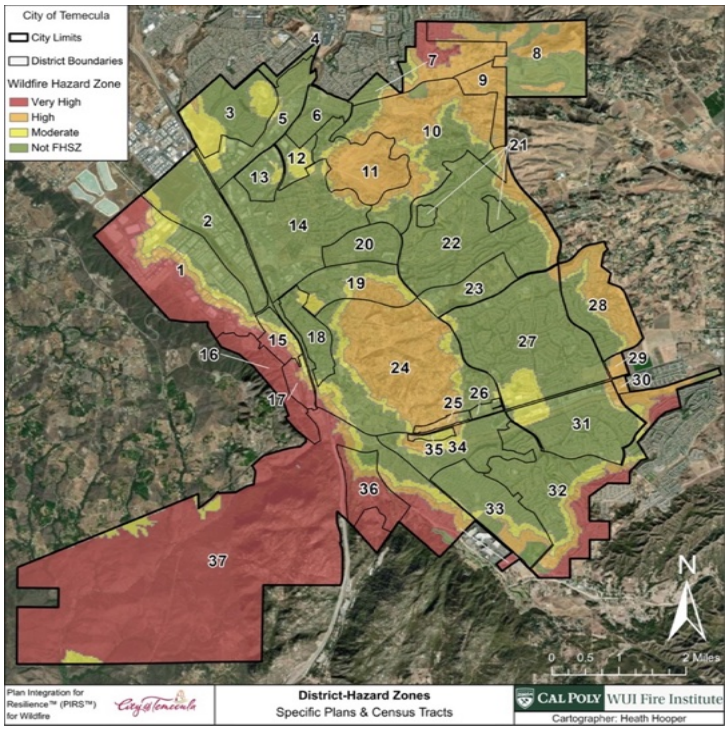
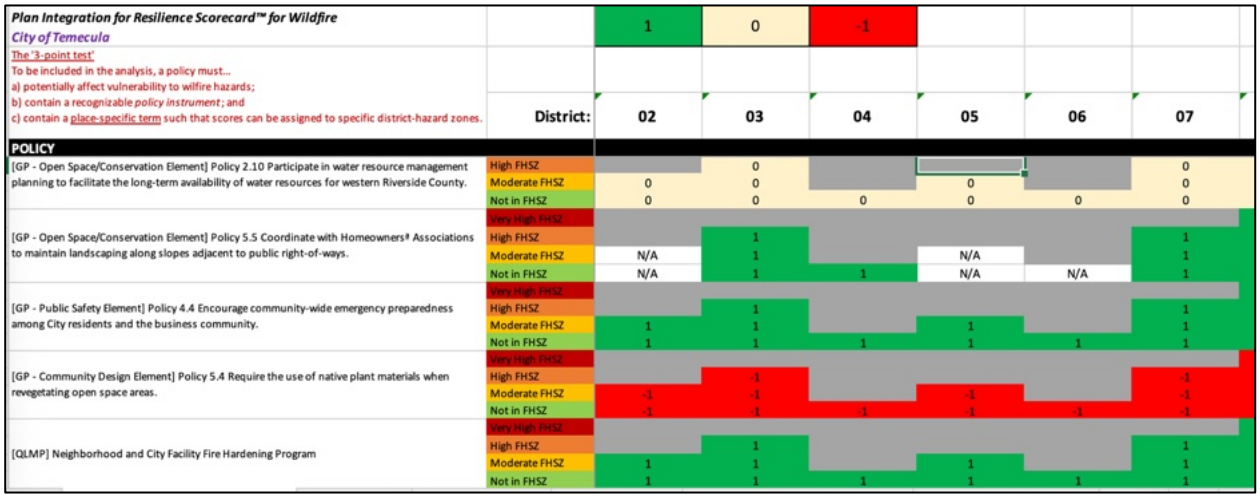


Figure TE3 City of Temecula: District-Hazard Zone Map

Step 4: Score Policies

Alongside their other plans, the Temecula team scored policies selected from the General Plan. Note that for each planning district, four hazard scores are possible (high, moderate, not in FHSZ, and very high). This reflects the spatial dynamic of the community in terms of fire risk.



Plan Integration for Resilience Scorecard™ for Wildfire		1	0	-1			
City of Temecula							
The '3-point test'							
To be included in the analysis, a policy must...							
a) potentially affect vulnerability to wilfire hazards;							
b) contain a recognizable *policy instrument*; and							
c) contain a place-specific term such that scores can be assigned to specific district-hazard zones.	District:	02	03	04	05	06	07
POLICY							
[GP - Open Space/Conservation Element] Policy 2.10 Participate in water resource management planning to facilitate the long-term availability of water resources for western Riverside County.	High FHSZ		0				0
	Moderate FHSZ	0	0		0		0
	Not in FHSZ	0	0	0	0	0	0
	Very High FHSZ						
[GP - Open Space/Conservation Element] Policy 5.5 Coordinate with Homeowners' Associations to maintain landscaping along slopes adjacent to public right-of-ways.	High FHSZ		1				1
	Moderate FHSZ	N/A	1		N/A		1
	Not in FHSZ	N/A	1	1	N/A	N/A	1
	Very High FHSZ						
[GP - Public Safety Element] Policy 4.4 Encourage community-wide emergency preparedness among City residents and the business community.	High FHSZ		1				1
	Moderate FHSZ	1	1		1		1
	Not in FHSZ	1	1	1	1	1	1
	Very High FHSZ						
[GP - Community Design Element] Policy 5.4 Require the use of native plant materials when revegetating open space areas.	High FHSZ		-1				-1
	Moderate FHSZ	-1	-1		-1		-1
	Not in FHSZ	-1	-1	-1	-1	-1	-1
	Very High FHSZ						
[QLMP] Neighborhood and City Facility Fire Hardening Program	High FHSZ		1				1
	Moderate FHSZ	1	1		1		1
	Not in FHSZ	1	1	1	1	1	1

Figure TE4 City of Temecula: Excerpt of General Plan Scorecard

Step 5: Map, Analyze, and Utilize Results

The Composite Policy Score Map for Temecula (**Figure TE5**) reflects the overall scores from the PIRS™ for Wildfire evaluation of the entire network of plans. Policy scores are summed for each DHZ and mapped to visualize places in the community that receive more and less policy attention vis-a-vis wildfire resilience. These maps and scorecard will be used in the city's General Plan Update to help the community understand the WUI conditions and to update mitigation policies throughout their network.

Note that some parts of the community are in the "Very High" wildfire hazard zone but also receive relatively high composite policy scores. District 37, which contains Temecula Canyon, is a good example of this phenomenon. This is due to the positive policy attention that this part of the city receives from multiple policies across the network of plans—most notably from the Temecula Creek CWPP. On the other hand, some parts of Temecula are at relatively low risk – though not completely risk-free, of course–but receive comparatively little attention, which may pose a problem in the event of a WUI fire.

When spatially applied across the community, Temecula's existing network of plans shows a trend of increased net + effects in lower-risk areas. CAL FIRE's FHSZs show that existing policies have a disproportionate impact on areas that are in the "Moderate FHSZ" and the "Not in FHSZ" parts of the community, with more need for policy attention in higher fire hazard areas. The "High FHSZ" areas of Temecula have a significant impact from the existing policies, though to a noticeably lesser extent than the lower two tiers. The "Very High FHSZ" areas of the City have significantly less support from existing policies.

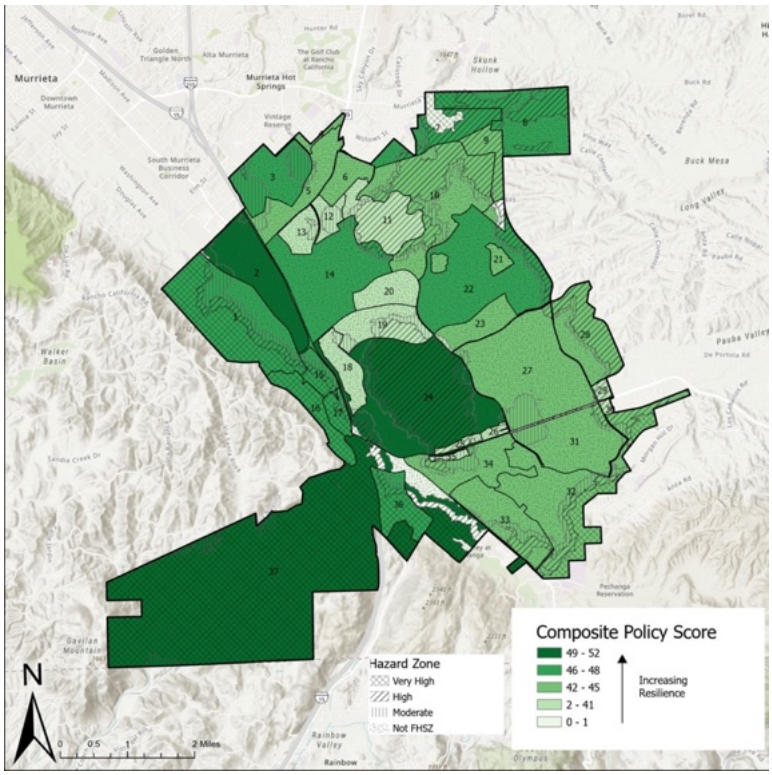


Figure TE5 City of Temecula: Composite Policy Scorecard Map

Drafting more spatially focused plans and policies to address the threat of wildfire in the "Very High FHSZ" communities of the city would improve wildfire resilience. These can be accomplished in future updates to the General Plan and relevant hazard mitigation plans.

When categorizing the existing network of plans throughout the city, there is a focus on the categories of "Land Use Analysis and Permitting Process," "Capital Improvements," and "Land Use" as shown in **Table TE3** and **Table TE4**. A focus on these areas is typical of municipal planning regarding the importance of land use planning, infrastructure, and general capital improvements. However, this also shows a lack of specialized planning decisions to address problems faced in the WUI neighborhoods throughout Temecula. While there are a significant number of land use policy decisions throughout Temecula, they are targeted towards areas of the City not in the immediate danger of wildfire. These areas include the downtown and commercial core, and more dense housing areas near the center of the city.

A stronger focus on the outlying neighborhoods in the WUI is needed to address the threat of wildfire that exists in Temecula. Strengthening building, landscaping, and design standards to address "defensible space" can reduce the threat of wildfire in these areas.

Placer County: Foresthill

Context

Foresthill is an unincorporated community in Placer County, CA, located in the Central Sierra Foothills. It has a population of 1,102 and spans approximately 11.2 square miles. The area experiences a hot-summer Mediterranean climate, with dry, hot summers and cool, wet winters.

Wildfire risk in Foresthill is significant due to its terrain, dense vegetation, and location within the Wildland-Urban Interface. Foresthill is situated on the ridge between the North and Middle forks of the American River and has significant fuels and steep slopes that can exacerbate fire conditions. In 2022 the Mosquito Fire consumed 76,788 acres between Placer and El Dorado counties. A substantial part of Foresthill falls within CAL FIRE's Very High Fire Hazard Severity Zone (VHFHZ), as illustrated in red on the accompanying map (**Figure FO2**). Areas shown in orange represent High Fire Severity Zones (HFHZ), while gray indicates land under federal jurisdiction. Regions classified as VHFHZ are particularly prone to frequent and intense wildfire activity, largely due to dense fuels, challenging terrain, and the configuration of homes and infrastructure that increase vulnerability to structural damage.

By using PIRS™, Placer County and its community partners gain a structured, data-driven process to identify inconsistencies across plans, highlight opportunities to strengthen wildfire resilience, and support updates to key planning documents with a focus on integration, efficiency, and hazard reduction.

PIRS™ for Wildfire Process

Step 1: Build Your PIRS™ Team

Placer County's Foresthill team was made up of a senior planner and Civic Spark fellow from the community planning department, a GIS analyst intern, and an advisory group of seven subject matter experts, and fire related organizations.

Step 2: Select Relevant Policies

Foresthill's team assembled a network of nine plans (**Table FO1**). After these nine plans were identified, the team went through and pulled all policies that would influence wildfire resilience to put them into the scorecard. Policies that included a place-specific term and a clear policy tool were prioritized, but some policies without these criteria were included to allow county staff to identify policies in need of revision.

Table FO1 Foresthill: Relevant Plans and Policies

Plan Name	Year Adopted	Scale	Plan Category	Number of Relevant Goals & Policies
Bureau of Land Management (BLM) Statewide Wildland Urban Interface Fuels Treatment (SWIFT) Plan	2023	State	Federal	8
Foresthill/Iowa Fire Safe Council Community Analysis	2012	Community	Wildfire	10
Strategic Plan for the Placer County Wildfire Protection and Biomass Utilization Program	2014	County	Wildfire	13
Foresthill Divide Community Plan	2008	Community	Land Use	120
General Plan – Health and Safety Element	2021	County	County	38
Health and Safety Element Implementation Program	2021	County	County	34
Local (Multi-Jurisdiction) Hazard Mitigation Plan	2021	County	Hazard	13
Placer County Community Wildfire Protection Plan	2012	Community	Wildfire	45
Placer County Sustainability Plan	2020	County	County	17
Total Policies				**298**

Categorizing all policies by policy tool category found that development regulations were the most common policy type, followed by policies related to public facilities, the land use analysis, the permitting process, and capital improvements (Table FO2). For the wildfire context, policies such as fuel breaks, vegetation management programs, and home hardening were considered capital improvements, alongside more substantial infrastructure projects. Many policies did not fit neatly into a policy tool category and were instead listed as "other". These policies primarily included cooperation with other agencies, public education programs, and conservation/habitat policies.

Table FO2 Foresthill: Land Use Policy Tool Categories

Policy Tool	Number of Policies
Development Regulations	77
Land Acquisition	4
Density Transfer Provisions	2
Financial Incentives/Penalties	8
Capital Improvements	33
Land Use Analysis / Permitting	37
Public Facilities	40
Post Disaster Reconstruction	6
Other	80

Step 3: Delineate District-Hazard Zones

The district-hazard zones were established by combining the census-block delineations in Foresthill (**Figure FO1**) and the wildfire hazard zone map (**Figure FO2**). This created ten distinct district hazard zones within the final district-hazard zone map (**Figure FO3**).

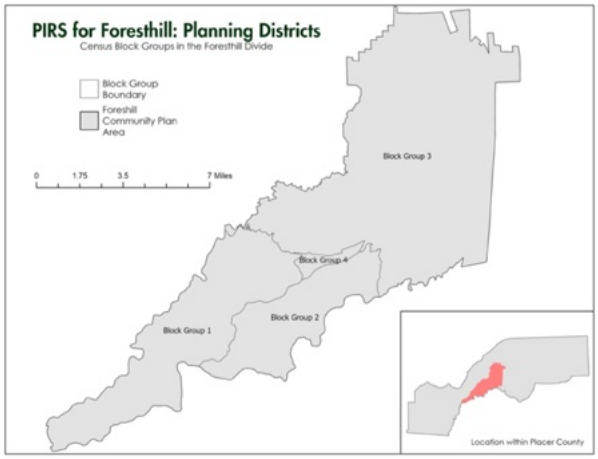


Figure FO1 Foresthill: Planning Districts

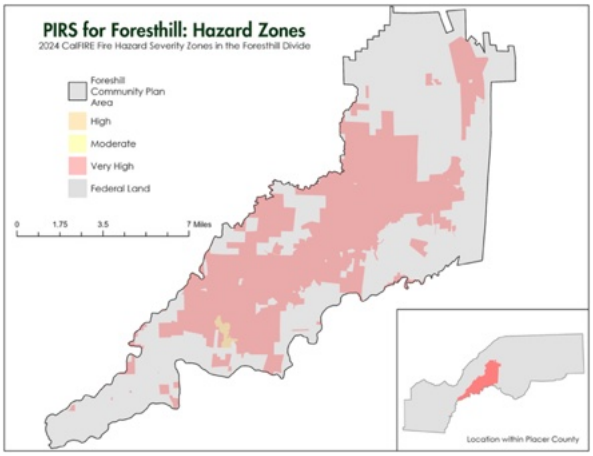


Figure FO2 Foresthill: Hazard Zones

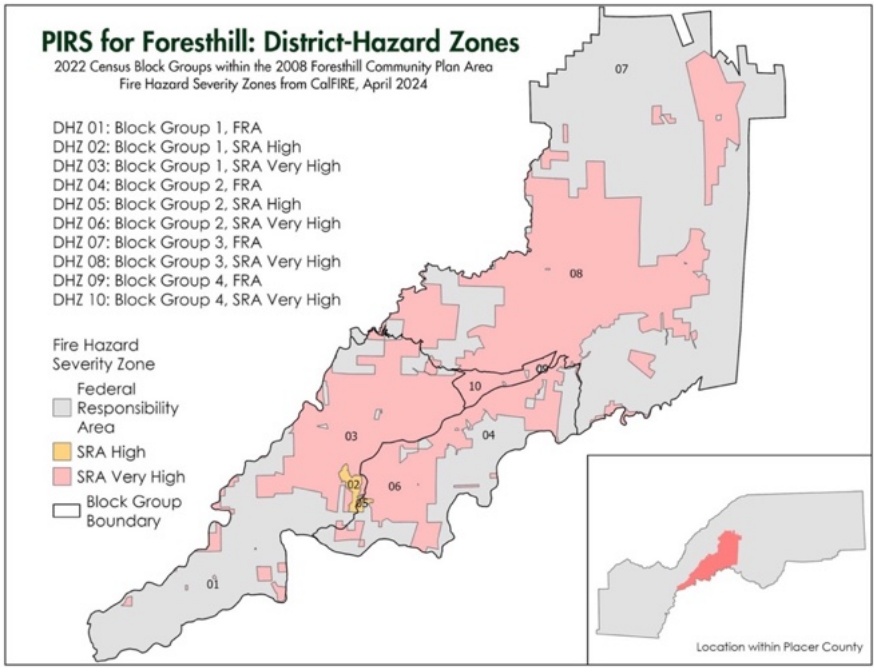


Figure FO3 Foresthill: District-Hazard Zones Map

Step 4: Score Policies

With the district hazard zone maps and overlays, all 298 policies were able to be scored as having a positive, negative or neutral effect on wildfire resilience within the scorecard (**Figure FO4**). For the policies with negative scores, this tool will be used as a flagging mechanism when it comes to plan updates, especially since Placer County was in the process of beginning a General Plan Update.

Plan Integration for Resilience Scorecard™ for Wildfire Placer County CWPP 2012												
The '3-point test' To be included in the analysis, a policy must... a) potentially affect vulnerability to wilfire hazards; b) contain a recognizable *policy instrument*; and c) contain a place-specific term such that scores can be assigned to specific district-hazard zones.												
					[possible scores:]	1	['0']	-1	NOT APPLICABLE			
						Census Block Group 1			Census Block Group 2			Census Blo
				District:	DHZ 01	DHZ 02	DHZ 03	DHZ 04	DHZ 05	DHZ 06	DHZ 07	
POLICY	Notes	Policy Tool										
Maintain your defensible space constantly	Individual homeowners	other	Very High FHSZ				1			1		
			High FHSZ		1				1			
			Moderate FHSZ									
			FRA	0				0			0	
Clean your roof and gutters at least twice a year especially as vegetationbegins to cure in the autumn.	Individual homeowners	other	Very High FHSZ			1				1		
			High FHSZ		1				1			
			Moderate FHSZ									
			FRA	0				0			0	
Stack firewood uphill or on a side contour, at least 30 feet away from structures, outbuildings, and other infrastructure, such as propane tanks and power poles.	Individual homeowners	development regulations	Very High FHSZ			1				1		
			High FHSZ		1				1			
			Moderate FHSZ									
			FRA	0				0			0	
Do not store combustibles or firewood under decks or downhill.	Individual homeowners	other	Very High FHSZ			1				1		
			High FHSZ		1				1			
			Moderate FHSZ									
			FRA	0				0			0	
Post reflective house numbers so that they are clearly visible from the main road. Reflective numbers should also be visible on the structure itself.	Individual homeowners	development regulations	Very High FHSZ			1				1		
			High FHSZ		1				1			
			Moderate FHSZ									
			FRA	0				0			0	
Discourage the use of combustible materials for decks, siding and roofs, especially where homes are upslope from heavy vegetation.	Individual homeowners, County	development regulations	Very High FHSZ			1				1		
			High FHSZ		1				1			
			Moderate FHSZ									
			FRA	0				0			0	
Maintain and clean spark arresters on chimneys.	Individual homeowners	other	Very High FHSZ			1				1		
			High FHSZ		1				1			
			Moderate FHSZ									
			FRA	0				0			0	

Figure FO4 Foresthill: Excerpt of the Community Wildfire Protection Plan Scorecard

The team followed a few basic criteria to identify negative-scoring policies. Any policy that encouraged increased development in VHFHSZs, without identifying specific mitigation measures, was scored as negative. Policies that inhibit fire-safe practices such as defensible space, home hardening, and vegetation management were also generally scored as negative. These included policies mandating vegetated buffers around structures, development standards promoting the use of exposed wood building materials, and encouragement of close clustering of structures in downtown Foresthill. Positive-scoring policies were those that regulated development, encouraged low-intensity open space or forestry uses, or specifically encouraged fire-safe practices.

Step 5: Map, Analyze, and Utilize Results*

The review process scored most policies in the network of plans as positive. The most negative-scoring policies were found in the Foresthill Divide Community Plan, which as a comprehensive plan, includes many development-oriented policies that would increase the number of structures in fire hazard severity zones within the "downtown core." This contrasted with the CWPP and PCSP, both of which saw more positive scores in the more developed and residential parts of Foresthill. The rest of the plans had a central focus on hazard reduction, and as a result had few policies that would increase wildfire vulnerability.

Federal responsibility areas (FRAs), which are owned by national government agencies and are largely undeveloped, saw the least policy attention with the fewest number of both positive and negative scores. Typically, only highly generalized policies, or those related to open space and forestry, were scored as affecting vulnerability in the FRAs.

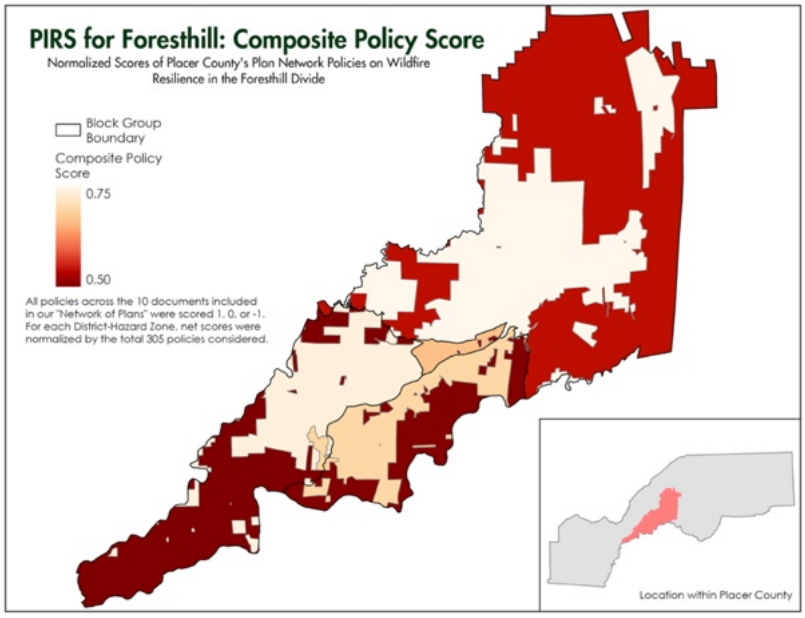


Figure FO5 Foresthill: Composite Policy Score Map

Mapping the results of the scoring process for each plan revealed clear spatial differences in vulnerability, both across the Foresthill study area and between the plan documents. **Figure FO5** shows the composite policy score per district-hazard zone of Foresthill's network of plans. The Placer team used a local advisory group to serve the SME function. The group provided a forum for discussion about decisions on the planning districts and policy scoring.

*This is a condensed version of the Placer case prepared by the Placer team consisting of Angel Green (Senior Planner), Seth Lorenzen (GIS Analyst Intern), Jena Brasil (Civic Spark Fellow), and six members of an SME advisory group.

Santa Barbara County: Eastern Goleta Valley

Context

Santa Barbara County is located in Southern California, adjacent to the coast of the Pacific Ocean. With a population of 441,257 in 2023, one-third of its land area of 2,735 square miles is in the Los Padres National Forest. Santa Barbara County's climate is characterized by warm and dry summers with cool and mildly wet winters, relatively close to that of a Mediterranean-type climate.

The PIRS™ effort in Santa Barbara County is a pilot project for the unincorporated Eastern Goleta Valley planning area (EGV) located between the cities of Goleta and Santa Barbara. The County planning staff requested a pilot of the PIRS™ method be conducted in one of its 10 unincorporated community planning areas. The plan with the most wildfire and natural hazard components, the Eastern Goleta Valley Plan, was chosen for the pilot. If the pilot yielded WUI hazard reduction results beyond the existing policy wildfire policy framework, an expansion to the entire county, using a nested approach, could follow. The pilot produced a composite map utilizing policies in the EGV network of plans and a simple spatial approach to address the hazard.

Wildfire is the highest-ranking hazard in the County. From 2002-2021, the county has experienced wildfires ranging in size from 1,014 to 281,981 acres. As called out in the *Santa Barbara County Multi-Jurisdictional Hazard Mitigation Plan (2023)*, wildfire in the wildland-urban interface (WUI) is of special concern. The number of acres burned is expected to increase to 23,040 acres per year (30 percent increase) by 2030 due to higher annual average temperatures and the increased

frequency and intensity of droughts. For this community, climate change will also contribute to the long-term hazard risk.

EGV, a census-designated community (**Figure EG1**), is at particular risk. Given its suburban character, combined with much of the area being within the WUI, EGV is at considerable wildfire risk. The EGV area covers 15,300 acres in the rural area and 7,900 acres in the designated urban area. It is bordered on the north by the Santa Ynez Mountain range and Los Padres National Forest. To the south is the Pacific Ocean. It experiences annual sundowner winds blowing downslope from north to south (Ryan, 1991). When active, the sundowner winds form a corridor that can carry embers from the mountains to the ocean.

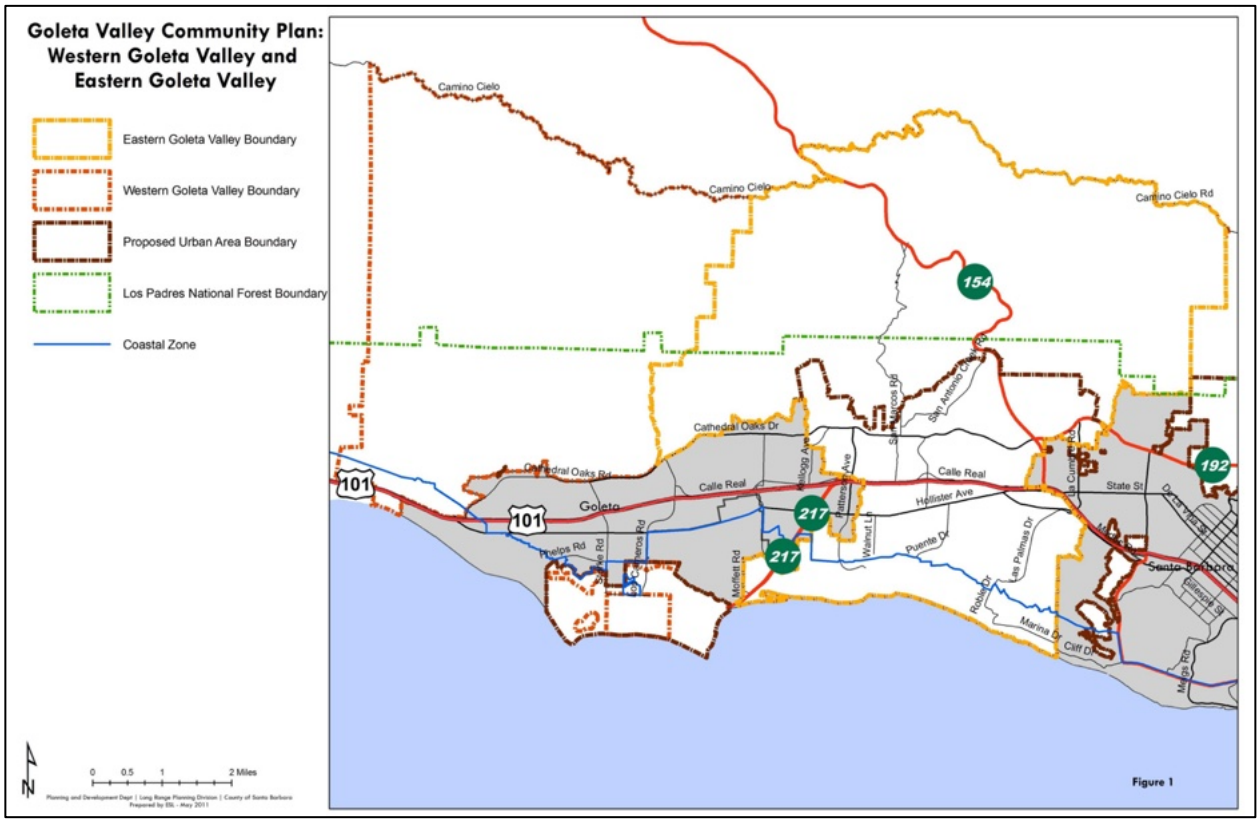


Figure EG1 East Goleta Valley Community Plan Area

Source: Eastern Goleta Community Plan (2025 Update)

PIRS™ for Wildfire Process

Step 1: Build Your PIRS™ Team

The EGV team was made up of one staff planner who allocated 100 hours to the project, with supervision from two other planning supervisors. The team received extra support from Cal Poly, San Luis Obispo and Texas A&M, including SME guidance and the creation of planning district and hazard maps.

Step 2: Select Relevant Policies

The selected EGV network consists of six plans, three of which are General Plan elements, with separate goals, objectives and policies (see **Table EG1**). The Community Wildfire Protection Plan is specific to the area, while the multi-hazard plan covers the entire county, and has annexes for sub-areas, such as incorporated cities. The East Goleta Valley Community Plan contained the most WUI-related policies. For this network of plans, a count of policies by category is shown in **Table EG2**. Development regulations lead the policy tools category, demonstrating the strategy of in-depth pre-development review.

Table EG1 EGV: Relevant Plans and Policies

Plan Name	Year Adopted	Scale	Plan Category	Number of Relevant Goals and Policies
East Goleta Valley Community Plan	2015	Community	Community	179
San Marcos Pass-Eastern Goleta Valley Mountainous Communities-Community Wildfire Protection Plan	2019	Community	Wildfire	51
Multi-Jurisdictional Hazard Mitigation Plan	2023	County	Hazard	75
Santa Barbara County Comprehensive Plan – Agriculture Element	2014	County	Comprehensive	5
Santa Barbara County Comprehensive Plan – Safety Element	2014	County	Comprehensive	10
Santa Barbara County Comprehensive Plan – Land Use Element	2016	County	Comprehensive	37
Total Policies				**357**

Table EG2 EGV: Land Use Policy Tool Categories

Policy Tool Category	Number of Policies
Land Use Analysis and Permitting Process	68
Capital Improvements	42
Development Regulations	112
Land Acquisition	19
Density Transfer Provisions	5
Financial Incentives and Penalties	3
Public Facilities	36
Post Disaster Reconstruction Decisions	71
Total Policies	**357**

Source: Santa Barbara County. Tool Categories derived from PIRS™ for Heat 2022.

The large number of policies in the "Development Regulations" category reflects the in-depth coverage of fire-related regulations in the county's General Plan's Safety Element section.

There are several strategies (plans of action) that can be applied to lower WUI risk. From the network of plans, Resilient Landscape is the dominant strategy (**Table EG3**). This reflects the fuel reduction approach where vegetation management dominates the mitigation practice agenda.

Table EG3 EGV: Fire Mitigation Strategies by Category

Fire Mitigation Strategy Category	Number of Policies
Land Use	73
Urban Design	29
Resilient Landscape	133
Structural Hardening	39
Regulation	83
Total Policies	**357**

Source: Santa Barbara County PIRS™ policy list

The initial policy list was developed by the county team and a student research assistant. The policy list assembly involved the use of the PIRS™ three-point selection criteria. A final audited working list was completed by County planning staff in consultation with the Cal Poly/Texas A&M PIRS™ team as a support group.

Evaluation and qualitative scoring of a subset of selected policy examples from the working policy list was conducted by a fire subject matter expert (SME) team (**Table EG4**). Specific recommendations on vegetive fuel management and understanding of local wind patterns were provided. The Cal Poly/Texas A&M team provided the County team with feedback on 15 SME-scored policies, accompanied by notes and comments on the county-scored policies. This step provided a model for the team to use in conducting a complete final scorecard audit and considering revisions across policies in all plans.

Table EG4 EGV: SME Feedback Example

Comprehensive Plan - County of Santa Barbara (2014)	Supports (+1) Undermines (-1) Depends (?)	Why?	Policy revisions?	Other comments
2022-1.2: Prioritize development projects in known high hazard areas that include passive open space uses over sensitive structural development, such as residential development. (p. 7-33)	Not Sure	I don't even understand this statement. If prioritizing open space areas in high wildfire hazard areas may increase wildfire risk if mitigating wildfire risk is not designed in	*"Prioritize development projects in known high hazard areas that include passive open space uses",* when the open space is in a wildfire threat area a wildfire mitigation design must be utilized and maintained	
	Undermines	Unless I'm reading this wrong, why would you want to prioritize areas with known high-hazard areas. Shouldn't you instead focus on NON- or LOW-hazard areas?		
	Y and N	Generally a good idea and a good policy. Could be strengthened further.	2022-1.2: Prioritize development projects in known high hazard areas that include passive open space uses, while discouraging ~~over~~ sensitive structural development, such as residential development. (p. 7-33)	
SUMMARY >>	Undermines	Passive open space by itself does not reduce wildfire risk especially in high fire hazard areas.	2022-1.2: Prioritize development projects~~ in known high hazard areas~~ that include passive open space uses designed for wildfire mitigation over sensitive structural (e.g., residential) development, ~~such as residential development) i~~n known high hazard areas. ~~that include,~~ ~~:~~ (p. 7-33)	

Step 3: Delineate District-Hazard Zones

The county EGV team followed the EGV Community Plan practice and divided the Eastern Goleta Valley area into two districts: an urban and rural zone (**Figure EG2**). Census districts were initially considered as potential planning districts, but they were found not to provide good spatial coverage for a PIRS™ analysis. This two-zone approach using the rural-urban boundary to create simple planning districts made policy scoring simpler as most of the designated very high fire areas are in the rural zone (**Figure EG3**). The planning district and hazard zone map were overlaid to create a simple district-hazard zone map (**Figure EG4**).

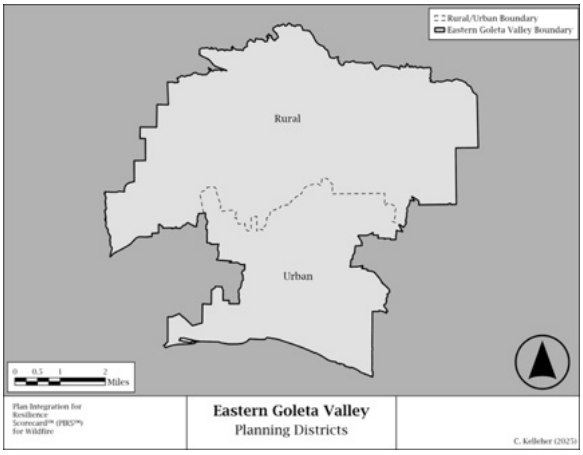


Figure EG2 EGV: Planning Districts

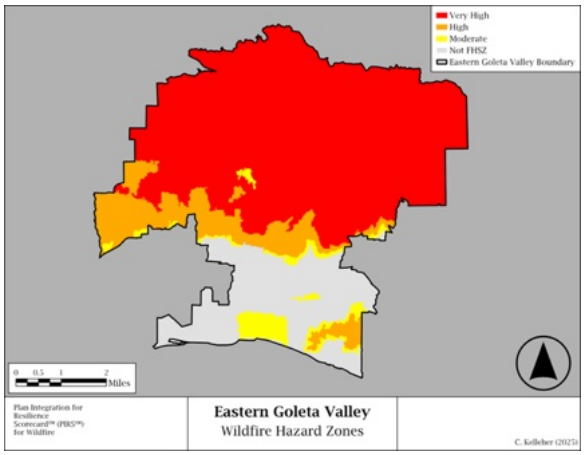


Figure EG3 EGV: Hazard Zones

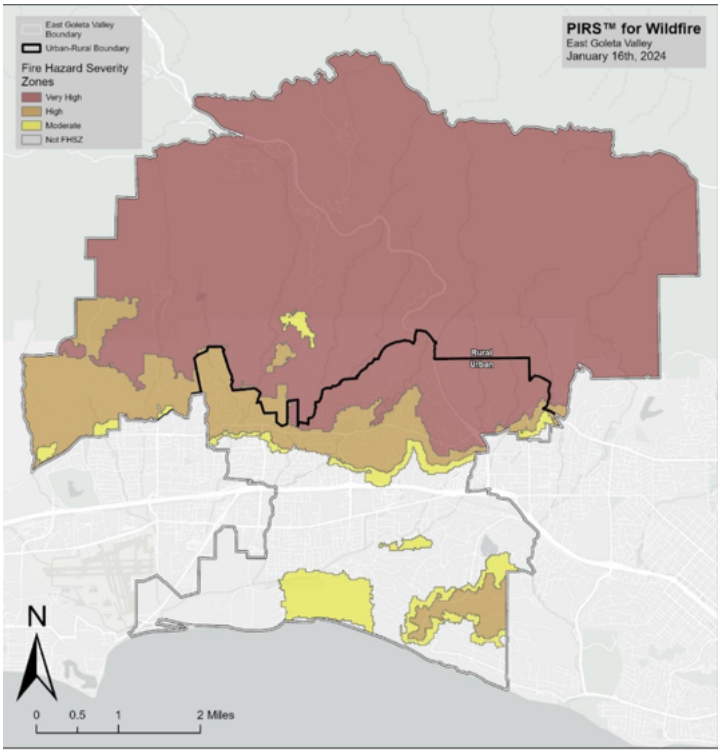


Figure EG4 EGV: District-Hazard Zones Map

Step 4: Score Policies

The county team scored the policy list using the district-hazard zone map and the following system: +1 for policies that reduce the wildfire hazard in that zone, -1 for policies that increase the wildfire hazard in that zone, and 0 for policies that are neutral (i.e., neither reduce nor increase the wildfire hazard in that zone). Policies where a hazard does not appear were not evaluated and therefore greyed out on the scorecard. Policies where the place-based feature does not exist in a district-hazard zone were labelled “not applicable” (N/A).

Step 5: Map, Analyze, and Utilize Results

The county team used the EVG pilot to test the strength and depth of its existing policy framework which they found adequate for use in small community areas. The utilization of two zones (urban and rural) allowed for simple spatial understanding of the area. It also established a simple method for small area analysis. The composite policy scores are shown in **Figure EG5**, demonstrating a strong WUI policy framework exists for this community. The EGV pilot provides a simple approach to constructing a PIRS™ where there are a few planning zones and associated hazard overlays.

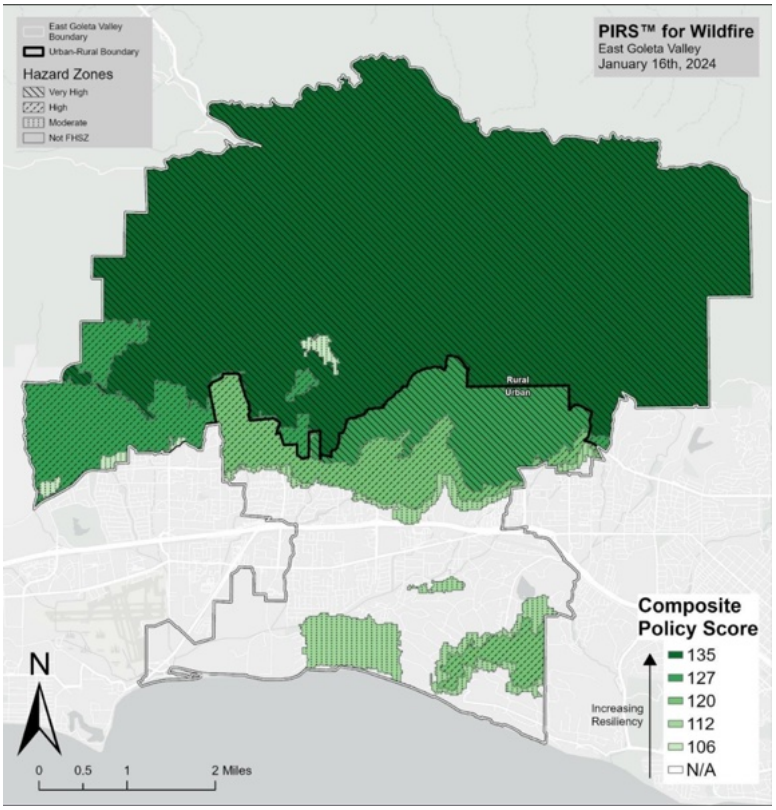


Figure EG5 EGV: Composite Policy Score Map
Source: PIRS™ For Wildfire, Cal Poly San Luis Obispo, Texas A&M University.

Napa County

Context

Napa County is located in Northern California, about 50 miles north of San Francisco. The County shares borders with Sonoma County to the West, Solano County to the Southeast, and Lake County to the North. With an estimated 133,000 residents in 2024 and a land area of 748 square miles, Napa County is known for its abundance of wineries as well as its picturesque landscapes of rolling hills and valleys. Most Napa County residents live in the city of Napa, the largest city in Napa County, with a population of around 80,000. The main economic sectors are agriculture and tourism, with a robust regulatory system to protect agriculture.

Napa County has a hot-summer Mediterranean climate, characterized by warm, dry summers and mild, wet winters. The region experiences occasional dry winds, which, combined with the highly flammable oak woodlands, grasslands, and chaparral vegetation that cover its rolling hills and steep terrain, contribute to a significant wildfire risk. Napa County has experienced several large major wildfires in the last 15 years. The Glass fire in 2020 burned 67,484 acres, and the Pickett fire of 2025 burned 6,819 acres. Sixteen of its 40 PIRS™ planning districts are classified as CAL FIRE Very High Fire zones (VHFHZ), and 13 have 50% or more district coverage in VHHFZs.

PIRS™ for Wildfire Process

Step 1: Build Your PIRS™ Team

The Napa team consisted of staff from the Planning, Building, and Environmental Services; the Fire Administrator from the Office County Executive; and the Office of Emergency Services.

Step 2: Select Relevant Policies

The Napa network of plans includes several elements from the General Plan and the Multi-Jurisdictional Hazard Mitigation (MJHM) Plan. The team developed a list of policies to score, pulling policies that pass the "three-point test" from the network of plans. The categorization of policies—based on policy tool and fire mitigation strategy—can be found in **Table NA1** and **Table NA2**.

Table NA1 Napa County: Land Use Policy Tool Categories

Policy Tool Category	Number of Policies (General Plan)	Number of Policies (MJHM Plan)	Combined Network of Plans
Land Use Analysis and Planning Process	25	1	26
Capital Improvements	8	4	13
Development Regulations	22	0	22
Land Acquisitions	1	0	1
Density Transfer Provisions	0	0	0
Financial Incentives and Penalties	3	0	3
Public Facilities	21	3	24
Post Disaster Reconstruction Decisions	2	0	2
Total	**82**	**8**	**90**

Source: Napa County Network of Plans.

Table NA2 Napa County: Fire Mitigation Strategies by Category

Fire Mitigation Strategy Category	Number of Policies (General Plan)	Number of Policies (MJHM Plan)	Combined Plans Network
Land Use	25	1	26
Urban Design	17	1	18
Fire-Resilient Landscape	21	2	23
Structural Hardening	9	4	13
Regulations	10	0	10
Total	**82**	**8**	**90**

Source: Napa County Network of Plans.

After selecting a policy list, a two-person SME team reviewed a sample of 15 policies to provide feedback on improving wildfire resilience (**Table NA3**). This SME work provided the NAPA team a specialized perspective to adjust the remaining policies in the overall list. A sample of the SME audit is shown below.

Table NA3 Napa County: SME Feedback Example

Napa County General Plan SAFETY Element	Supports (+1) Undermines (-1) Depends (?)	Why?	Policy revisions?	Other comments
(14) Policy SAF-10.21: Construct fuel breaks and roadside treatment projects. Construct shaded fuel breaks and complete roadside treatment projects as prescribed in the Community Wildfire Protection Plan.	Depends	Mostly good, but what is described in the CWPP? Is it possible financially to implement everything in said plan, or is it weak?	Add the verbiage "Construct AND MAINTAIN fuel breaks..."	These projects want STOP fire (especially in winds), but will increase public safety during evacuations and enable areas that would maximize effectiveness of fire suppression operations.
	Supports	Actions that guide fire pathways are positive and used in subdivision design review,	Provide a complete reference if using the CWPP as a source. Better to cast this type of mitigation as landscape mitigation actions.	Try and build such actions into evacuation plans, so achieve integrated actions and policy.
	Supports	Shaded fuel breaks are much preferred to unpruned "wild" areas from a wildfire perspective.		Is this another "best practice" policy?
SUMMARY >>>	+1	Integrates wildfire risk reduction practices from CWPP into Safety Element.		

Step 3: Delineate District-Hazard Zones

After analyzing several spatial units, the team delineated a planning district map with 40 zones (**Figure NA1**). For hazard zones, the county used an alternative method to generate a more localized fire hazard map (**Figure NA2**) as described in **Appendix C**. The maps were combined to form the final district-hazard zone map (**Figure NA3**) to be used in the policy's spatial scoring process.

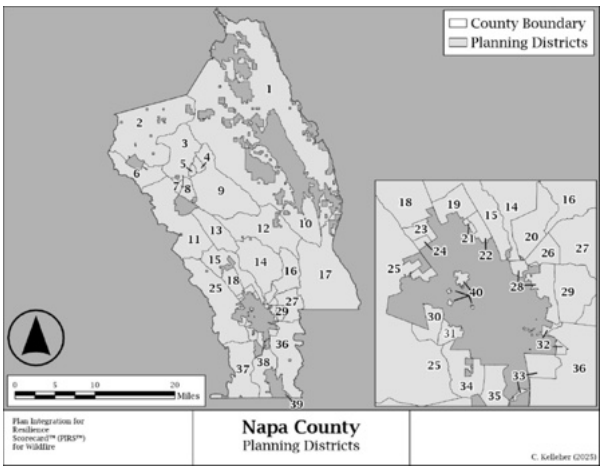


Figure NA1 Napa County: Planning Districts

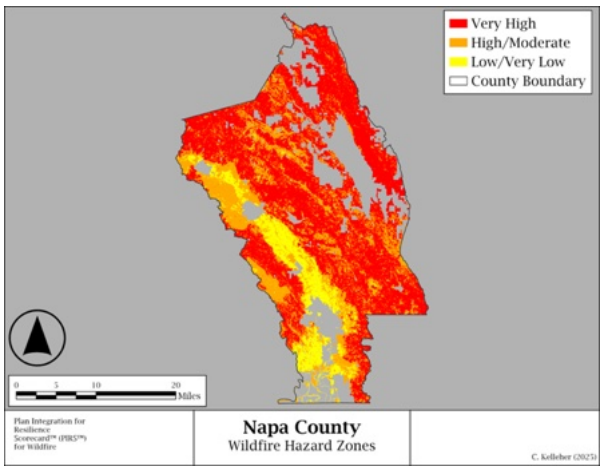


Figure NA2 Napa County: Hazard Zones

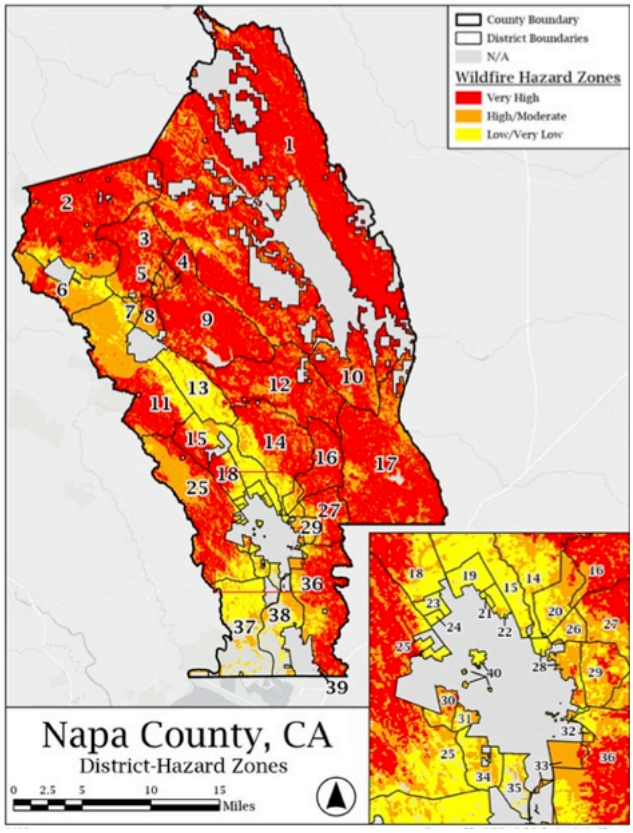


Figure NA3 Napa County: District-Hazard Zone Map

Step 4: Score Policies

The initial policy list developed by the Napa team yielded 186 policies which were reduced to 90 after an audit of how well they met the three criteria. An SME review was conducted on a sample of the final policies, providing guidance on where and how to strengthen and revise the final policy list. Below is an excerpt from the Napa scorecard representing 6 policies from the General Plan, scored for 40 districts (only 4 shown) and 3 hazard zones.

Plan Integration for Resilience Scorecard™ for Wildfire *Napa County General Plan (2013)*		[possible scores:]	1	['0']	-1
The '3-point test' To be included in the analysis, a policy must... a) potentially affect vulnerability to wilfire hazards; b) contain a recognizable *policy instrument* ; and c) contain a place-specific term such that scores can be assigned to specific district-hazard zones.*	Notes:				
	District:	**1**	**2**	**3**	**4**
POLICY					
Policy AG/LU-3: The County's planning concepts and zoning standards shall be designed to minimize conflicts arising from encroachment of urban uses into agricultural areas. Land in proximity to existing urbanized areas currently in mixed agricultural and rural residential uses will be treated as buffer areas and further parcelization of these areas will be discouraged.	Very High FHSZ	1	1	1	1
	High/Moderate FHSZ	1	1	1	1
	Low/Very Low FHSZ	0	1	1	1
Policy AG/LU-4: The County will reserve agricultural lands for agricultural use including lands used for grazing and watershed/open space, except for those lands which are shown on the Land Use Map as planned for urban development.	Very High FHSZ	1	1	1	1
	High/Moderate FHSZ	1	1	1	1
	Low/Very Low FHSZ	1	1	1	1
Policy AG/LU-7: The County will research, evaluate, and pursue new approaches to ensure ever stronger protections for the County's finite and irreplaceable agricultural resources. Approaches to be evaluated shall include implementation of a "Super Williamson Act" program, a conservation easement program or other permanent protections, and programs promoting the economic viability of agriculture.	Very High FHSZ	1	1	1	0
	High/Moderate FHSZ	1	1	1	0
	Low/Very Low FHSZ	1	1	1	0
Policy AG/LU-9: The County shall evaluate discretionary development projects, re-zonings, and public projects to determine their potential for impacts on farmlands mapped by the State Farmland Mapping and Monitoring Program, while recognizing that the state's farmland terminology and definitions are not always the most relevant to Napa County, and shall avoid converting farmland where feasible. Where conversion of farmlands mapped by the state cannot be avoided, the County shall require long-term preservation of one acre of existing farm land of equal or higher quality for each acre of state-designated farmland that would be converted to nonagricultural uses. This protection may consist of establishment of farmland easements or other similar mechanism, and the farmland to be preserved shall be located within the County and preserved prior to the proposed conversion. The County shall recommend this measure for implementation by the cities and town and LAFCO as part of annexations involving state-designated farmlands.	Very High FHSZ	1	1	1	1
	High/Moderate FHSZ	1	1	1	1
	Low/Very Low FHSZ	1	1	1	0
Policy AG/LU-11: Agricultural employee housing shall be permitted in agricultural zoning districts in conformance with state law. Seasonal farm labor housing may be provided in agricultural areas without regard to the location of farm employment in Napa County when the housing is under local public agency ownership or control.	Very High FHSZ	1	1	1	1
	High/Moderate FHSZ	1	1	1	1
	Low/Very Low FHSZ	1	1	1	0
Policy AG/LU-15.5: Where proposed residential, commercial or industrial development abuts lands devoted to agriculture production, the non-agricultural uses shall be required to incorporate buffer areas to mitigate potential land use conflicts as conditions of approval for subdivision or use permit. The type and width of buffer areas shall be determined based on the character, intensity and sensitivity of the abutting land uses.	Very High FHSZ	1	0	0	1
	High/Moderate FHSZ	1	0	0	1
	Low/Very Low FHSZ	0	0	0	0
TOTAL (ALL POLICIES)	Very High FHSZ	6	5	5	5
TOTAL (ALL POLICIES)	High/Moderate FHSZ	6	5	5	5
TOTAL (ALL POLICIES)	Low/Very Low FHSZ	4	5	5	2

Figure NA4 Napa County: Excerpt of General Plan Scorecard

Step 5: Map, Analyze, and Utilize Results

The data gathered from the existing General Plan, the Multi-Jurisdictional Hazard Mitigation Plan, and the district-hazard maps will be used as inputs to the administrative draft of the Baseline Data Report (BDR) with "existing land uses, environmental, cultural, economic, and social conditions, as well as the current regulatory landscape" for the General Plan Update process (Napa County PBES, 2025).

An example of a General Plan Composite Map for six policies is shown below in **Figure N5**.

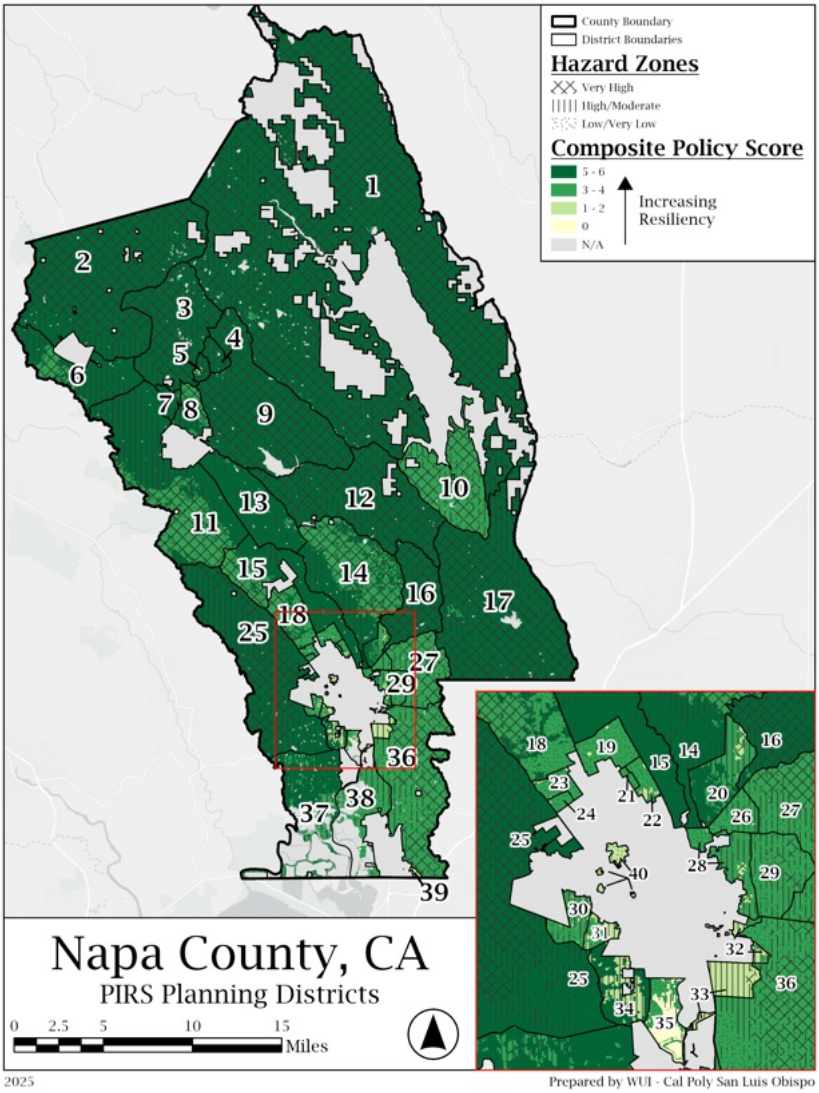


Figure NA5 Napa County: General Plan Composite Policy Score Map

Appendices

Appendix A: Core Team and Workplan Example

ABSTRACT

This document provides an overview of the Scorecard process, including tasks and staff requirements, presented in chronological order for a typical 5–6-month PIRS™ project to be accomplished by local staff. Brief descriptions of the individual tasks and estimates of staff time needed to conduct them are provided so that a jurisdiction can develop its own scope of work. This model can be adjusted to meet local needs. Following the time and task steps will help build an initial project budget sheet.

Part I. Overview

A generalized description of the PIRS™ process – considering tasks, meetings, and associated staff time – is presented in Part II. All time estimates depend on the number of plans and hazards being analyzed, as well as data availability and technical/GIS capacity. For a hypothetical application using 4 plans, we estimate the assessment will require roughly 40-58 person-hours of combined time from the Core Team (described in the tasks below) and 16-22 person-hours from GIS staff to complete Tasks A-D. The entire process, based on these estimates, will require about 2 weeks of combined time for the Core Team and less than 1 week of combined time for GIS staff, typically spaced out over a 5–6-month period.

Part II. Detailed Tasks

A. Organize the Core Team (Month 1)
   a. Assemble the Core Team, or 3-4 staff members from across local government departments who are responsible for developing and/or implementing community plans. Consider including city planner, fire officer, floodplain manager, emergency management staff, etc. We recommend also including a member of the GIS staff.
   b. Set up biweekly meetings for technical assistance “office hours”.

B. Prepare Policies (Months 1 and 2)
   Output: Policy database, or a comprehensive list of all policies across the network of plans

   Total Staff Time: ~22 hrs (combined time of Core Team) + 4 hrs (time of GIS staff) + Team Meeting time

   The Core Team will complete the following tasks:

a. Policy Task 1: Assemble the 'network of plans.' The Core Team will gather all planning documents to be considered for the PIRS™ assessment.
Staff Time: 2-4 hrs

b. Policy Task 2: Generate lists of applicable policies.
Staff Time: 16 hrs (4 plans x 4 hrs per plan split across the Core Team)

c. Policy Task 3: Validate and prepare policies for scoring.
Staff Time: 4 hrs (1 hr per plan split across the Core Team) + 4 hrs (GIS staff)

C. Prepare Maps (Month 2 or 3)
Output: New "district-hazard zone" map layers

Total Staff Time: ~2 hrs (combined time of Core Team) + ~8 hrs (time of GIS staff) + Team Meeting time

The Core Team should designate a GIS staff person to assist in completing the following tasks:

a. Map Task 1: Determine planning districts
Staff Time: 1 hr (Core Team) to decide + 1 hr (GIS staff)

b. Map Task 2: Delineate hazard zones
Time for this task depends on the availability of hazard zone data.

i. Wildfire
ii. Consider assessing additional hazards as appropriate.

Staff Time: 1 hrs (Core Team) to decide + Variable (GIS staff)

c. Map Task 3: Combine planning districts and hazard zones to form "district-hazard zones"
Staff Time: 1 hr (GIS staff)

d. Map Task 4: Develop additional maps to aid scoring process; creating these as layers on a webmap or standalone GIS will facilitate scoring in Task D.
Staff & GIS time varies

D. Scoring (Month 3 or 4)
Output: Scorecard of all policies across plans and their impacts on hazard resilience

Total Staff Time: ~15 hrs (combined time of Core Team) + ~3 hrs (GIS staff) + Team Meeting time

The Core Team will complete the following tasks:

a. Score Task 1: Assign policy scores
Staff Time: 12 hrs (3 hrs per plan)

b. Score Task 2: Evaluate policy scores, including mapping
Staff Time: 4 hrs (Core Team) + 3 hrs (GIS staff)

E. Summarize and Validate Results (Month 5 or 6) (*optional, but recommended)
Output: Scorecard validated by subject-matter experts

Total Staff Time: ~10 hrs + Team Meeting time

The Core Team will complete the following tasks:

a. Summarize and Validate Results and Areas of Concern
Staff Time: 10 hrs (combined time of Core Team)

b. Utilize subject-matter experts (internal or external) to provide additional input and feedback on scores and potential policy changes

Part III. PIRS™ Process: TASKS and TIME ESTIMATES*

Task	Core Team (person-hours)	GIS Staff (person-hours)	Notes
A. Organize the Team			
B. Policy Tasks			
Policy Task 1: Assemble the 'network of plans'	2		This may be the entire network of existing plans in your community, or just the most influential ones; it can also include draft or in-progress plans, if desired.
Policy Task 2: Generate lists of applicable policies	16		Average of 4 hrs/plan; general (comprehensive) or hazard mitigation plans with many policies take longer, smaller or more focused plans take less time (<4 hrs). Some plans may not have any applicable policies (discovered after an hour or so of perusing).
Policy Task 3: Validate and prepare policies for scoring	4	4	1 hr/plan, depending on number of applicable policies; Core Team consult with GIS staff

C. Map Tasks			
Map Task 1: Determine planning districts	1	1	Relatively straightforward for GIS staff, after planning decisions are made
Map Task 2: Delineate hazard zones	1	3	Relatively straightforward for GIS staff, after decisions are made
Map Task 3: Combine to form district-hazard zones		1	Relatively straightforward for GIS staff, after decisions are made
Map Task 4: Develop additional maps to aid scoring process		4	Usually straightforward for GIS staff; may be iterative, working with Policy Team
D. Scoring Tasks			
Scoring Task 1: Assign policy scores, conference session, produce final scorecard	12		Average of 3 hrs/plan, depending on number of applicable policies
Scoring Task 2: Evaluate policy scores, including mapping	4	3	Depends on level of detail desired and staff experience
E. Assessment Tasks			
Assessment Task 1 (optional): Assess physical vulnerability, including mapping	4	3	Depends on level of detail desired and staff experience
Assessment Task 2 (optional): Assess social vulnerability, including mapping	4	3	Depends on level of detail desired and staff experience
F. Summary			
Summarize & Validate Results (optional)	10		
Subtotal (in person-hours)	**40-58**	**16-22**	

*This example is based on 4 plans, analyzed over a 5-6-month period.

Appendix B: Expanded Policy Tools Table

Land Use Approach	Application to Hazard Vulnerability
Development Regulations	
Permitted Land Use	Provision regulating the types of land use (e.g. residential, commercial, industrial, open space, etc.) permitted in areas of community; may be tied to zoning code
Density of Land Use	Provision regulating density (e.g. units per acre); may be tied to zoning code
Subdivision Regulations	Provision controlling the subdivision of parcels into developable units and governing the design of new development (e.g. site storm water management)
Zoning Overlays	Provision to use zoning overlays that restrict permitted land use/density in hazardous areas; may be special hazard zones or sensitive open space protection zones
Setbacks or Buffer Zones	Provision requiring setbacks or buffers around hazardous areas (e.g. riparian buffers and ocean setbacks)
Cluster Development	Provision requiring clustering of development away from hazardous areas, such as through conservation subdivisions
Land Acquisition	
Acquire Land and Property	Purchase land/property in hazard area
Open Space or Easement Requirement/Purchase	Provision encouraging open space purchase by the community or open space easements as an element of development approval
Density Transfer Provisions	
Transfer/Purchase of Development Rights	Provision for transferring development rights to control density; may be transfer of development rights or purchase of development rights
Financial Incentives and Penalties	
Density Bonuses	Density bonuses such as ability to develop with greater density in return for dedication or donation of land in areas subject to hazards
Tax Abatement	Tax breaks offered to property owners and developers who use mitigation methods for new development
Impact/Special Study/Protection Fees	Provision requiring impact fees, special study fees, or protection fees for development in hazardous areas; fees could cover costs of structural protection
Land Use Analysis Permitting Process	
Land Suitability	Hazards are one of the criteria used in analyzing and determining the suitability of land for development
Site Review	Provision requiring addressing hazard mitigation in process of reviewing site proposals for development
Design/Construction Guidelines/Requirements	Guidelines or requirements that apply to the design or construction of developments in hazard areas

Evacuation	Comprehensive regional and localized evacuation plans including road network capacity and designated "places of safety
Fire response System Capacity and Design	"Standards of Cover" evaluating the community's and region's ability to respond to WUI fires. Identify high priority occupancies or unacceptable loss locations (cultural, historical, iconic, or economy drivers)
Public Facilities (including Public Housing)	
Siting	Provision to site public facilities, including municipal buildings and public housing, out of hazard areas
Sizing/Capacity	Provision limiting capacity of public facilities, including public housing, in hazard areas to cap amount of development
Post-Disaster Reconstruction Decisions	
Development Moratorium	Provision imposing a moratorium on development for a set period of time after a hazard event to allow for consideration of land use change
Post-Disaster Land Use Change	Provision related to changing land use regulations following a hazard event; may include redefining allowable land uses after a hazard event
Post-Disaster Capital Improvements	Provision related to adjusting capital improvements to public facilities following a hazard event
Capital Improvements	
Infrastructure "Hardening" or Weatherproofing	Provision encouraging or requiring development in hazard zones to increase structural resilience to hazards
Elevating	Provision pertaining to the physical elevation of structures in hazard zones
Drainage Improvements or Flood Control	Provision that pertains to drainage or fooding issues within the community
Ecosystem Enhancement	Provision that seeks to improve or preserve the functioning of the natural environment within the community

Table adapted from *PIRS™ for Heat 2022*.

Appendix C: Alternative Fire Hazard Zone Approach

The Fire Hazard Severity Zones (FHSZ) layer is published by CAL FIRE and covers the entire state of California for Local and State Responsibility Areas (LRA and SRA, respectively). While this spatial coverage is comprehensive, it might lack fine-scale details and nuanced spatial information only available at the local level. To improve the hazard layer, Napa County created their own map that incorporated local knowledge, finer scale vegetation surveys, agricultural cultivation locations, and high-resolution Light Detection and Ranging (LiDAR) data. The methodology used by Napa County to refine their hazard map is described in this section.

Methodology

Fire_Hazards_PIRS layer Napa Co. PBES Dept. | Oct. 2024

PROBLEM STATEMENT

Originally, the Fire Hazards Severity Zones layer published by CAL FIRE was going to be used to determine relative fire hazards across Napa County. After review and consideration, it was determined that using the FHSZ layer would be problematic for two main reasons: 1) the fire hazard zones are relatively homogenous across the county and, 2) areas included in the PIRS study (e.g., valley floor) are not rated in the FHSZ layer because they are considered Local Responsibility Areas not covered by CAL FIRE. The first reason would result in not being much help in determining which areas of Napa County have higher wildfire risk relative to others. The second reason would lead to missing data in the LRA and skewed ratings across the county.

Another challenge the team had experienced is the collective lack of fire risk / fire behavior modelling expertise. This meant the team would be reliant on canned data created by knowledgable professionals.

DATA SOURCES & GENERAL APPROACH

The FHSZ layer was removed from the project based on the issues mentioned above. In its place, two models from the USDA/USFS's "Wildfire Risk to Communities" project were used:

- Burn Probability (BP)
- Conditional Risk to Potential Structures (cRPS)

Together, these two layers formed the backbone of fire risk/hazard rating across the County, spatially informing the project as to 1) the likelihood an area would burn and 2) what the relative risk to structures would be should a wildfire occur.

The two layers and their scoring criteria above were spatially merged in a meta-analysis fashion to create an aggregated risk/hazard score.

To increase the spatial resolution and accuracy of the two models, local, more accurate data was fed into the model. These '*localizing factors*' included:

1 - Slope
2 - Aspect
3 - Vegetation type (life form)
4 - Fire history
5 - Wind speeds
6 - Waterbody locations
7 - Vineyard locations

The first five factors played an additive role in the model, increasing the overall hazard score by 20% each, and if all 5 local factors were in agreement (i.e., all having maximum risk scores), they would effectively have the same weight as the BP or cRPS models above (or an added 1/3 weight overall). The last two factors played a subtractive role in the analysis; if waterbodies were present, they zeroed-out the total score completely, while the presence of vineyards had a dampening (-20 points) effect on the total score, not by bringing the total score to zero, but by reducing it by a significant factor to reflect vineyard's roles in fire mitigation.

PROCESS & SPECIFICATIONS

Data processing work was done in ArcGIS Pro and QGIS (mostly QGIS).

To create a standardized sampling environment, a 300-ft hexbin grid was created to cover the extent of Napa County. All layers above, except #6, were added to the hexbin layer via the zonal statistics tool in QGIS.

The Vineyard layer ID'd areas where vineyard exists. Hexbins that were mostly covered in vineyard were given a score of -20. "Mostly covered" was determined via zonal stats of a rasterized vineyard feature class; mean zonal stats per cell with values ranging from > 0 to < 1.7 were determined to most closely align with the original vector extents of vineyards in the subject area.

After the 6 layers were processed and added, the waterbodies layer was unioned to the resulting layer to ID which areas should have a total score of zero based on the presence/likelihood of water.

In layers where pre-existing low-med-high class breaks didn't exist, the range of values were categorized using the natural breaks (Jenks) clustering method using a 3-class array of low-med-high.

Refer to the "fields" tab for details on data sources, class breaks, and use justifications.

Fields, sourcing, & use criteria

Fire_Hazards_PIRS layer Napa Co. PBES Dept. | Oct. 2024

FIELD	SCORES LOW	MED	HIGH	NOTES	SOURCE	REFERENCE / JUSTIFICATION
fid	-	-	-	auto-generated	layer	n/a
id	-	-	-	auto-generated	layer	n/a
row_index	-	-	-	horizontal index for hexbin grid	layer	n/a
col_index	-	-	-	vertical index for hexbin grid	layer	n/a
Cell_acres	-	-	-	acre size of cell	layer	n/a
WRTC_BP_mean	-	-	-	mean value of burn probabilities raster via zonal statistics	wildfirerisk.org	canned model from the USDA / USFS
BP_Score	**10**	**20**	**30**	Low (1): 0-0.0005302 | Med (2): 0.0005302-0.0016689 | High (3): 0.0016689-0.0579126	wildfirerisk.org	canned model from the USDA / USFS
WRTC_cRPSmean	-	-	-	mean value of risk to structures raster via zonal statistics	wildfirerisk.org	canned model from the USDA / USFS
cRPS_Score	**10**	**20**	**30**	Low (1): 0-11.40 | Med (2): 11.40-25.27 | High (3): 25.27-99.92	wildfirerisk.org	canned model from the USDA / USFS
Slope_mean	-	-	-	mean value of slope raster values via zonal statistics	Napa Co PBES	NWCG Guide to Fireline Fire Assessment (Sep 2021), p. 28
Slope_score	**2**	**4**	**6**	N/A (0): 0-20% | Low (1): 20-40% | Med (2): 40-60% | High (3): > 60%	Napa Co PBES	
Wind_mean	-	-	-	mean value of wind @ 10m height raster via zonal statistics	globalwindatlas.info	NWCG Guide to Fireline Fire Assessment (Sep 2021), p. 94
Wind_Score	**2**	**4**	**6**	Low (1): 0-6 mph | Med (2): 7-18 mph | High (3): > 18 mph	globalwindatlas.info	
Vyd_mean	-	-	-	converted vector lyr to raster, ran zonal stats for mean value of each bin	Napa Co PBES	See below *
Vyd_Score	**-20**	**0**	**0**	Bins w/ Vyd_means ranges of > 0 to <1.7 were assigned as vineyard	Napa Co PBES	See below *
FireHx_Score_num	**2**	**4**	**6**	Calc'd age of fire perimeters. Low (< 10 yrs): 0 | Med (10-20 yrs): 3 | High (> 20 yrs): 6	CAL FIRE	https://esajournals.onlinelibrary.wiley.com/doi/full/10.1890/ES14-00224.1, https://nrfirescience.org/sites/default/files/RepeatFiresSciReview1_Update2019-comp.pdf
Aspect_mean	-	-	-	mean value of aspect raster via zonal statistics	Napa Co PBES	NWCG Guide to Fireline Fire Assessment (Sep 2021), p. 28
Aspect	-	-	-	text descriptor of aspect: generalized as North, East, South, West	Napa Co PBES	
Aspect_Score	**2**	**4**	**6**	North: 0 | East: 1 (low) | West: 2 (med) | South: 3 (high)	Napa Co PBES	
Veg_Type	-	-	-	Generalized countywide veg lyr to 3 main classes	Napa Co PBES	Wildfire Risk to Communities: Methods for developing spatial datasets of landscape-wide wildfire risk components for the United States (May 2024), p. 9
Veg_Score	**2**	**4**	**6**	Low (1): Grass | Med (2): Shrub | High (3): Tree	Napa Co PBES	Wildfire Risk to Communities: Methods for developing spatial datasets of landscape-wide wildfire risk components for the United States (May 2024), p. 9
Wtr_Name	-	-	-	Name of waterbody (from internal waterbodies lyr)	Napa Co PBES	Water doesn't burn! Only used waterbodies > 1.8ac in size (hex bin size) to ± insure they would hold water year-round
Wtr_Classifica	-	-	-	Type of waterbody	Napa Co PBES	
Wtr_Acres	-	-	-	size in acres (limited to >= 1.8ac for this	Napa Co PBES	
Wtr_Waterbody	-	-	-	yes = waterbody, so assign "Total_Haz_Score" = 0	Napa Co PBES	
Total_Haz_Score	**10**	**60**	**90**	Total of all highlighted "score" fields	layer	

NOTE: raw Total_Haz_Score ranges shown above aren't meaningful in terms of low, med, high classes.

*For reference to vineyards slowing/preventing wildfire spread

https://modernfarmer.com/2023/07/california-wineries-wildfire/

https://wineserver.ucdavis.edu/industry-info/viticulture-resources/wildfire-impact-ca-grapes

https://www.sfchronicle.com/california-wildfires/article/Yes-vineyards-can-help-stop-fires-as-they-did-14572161.php

And local/personal observation and experience

Appendix D: SME Feedback Template

This template can be used to organize SME input and policy review. It can be amended to add columns to fit your local team's review process.

Plan Title	Supports (+1) Undermines (-1) Depends (?)	Why?	Policy revisions?	Other comments
Policy				
SUMMARY >>				

Appendix E: Scorecard Template

The standard and alternate scorecard templates are available for use. Both templates display the same data but employ slightly different spreadsheet organization methods—you can pick which one makes more sense to your team.

The STANDARD spreadsheet presented in the Guidebook displays the same score but uses more columns to score each policy.

The ALTERNATE spreadsheet option allows the user to place the policy SCORE for the Hazard Level (very high, high, etc.) inside a single column, indicated at the head of the sheet. This allows for more policies to appear on a page and is visually easy to assess the hazard score for several columns.

For working copies of these sample Excel scorecard templates, see the Contacts listed at the end of the Executive Summary in the Guide.

Plan Integration for Resilience Scorecard™ for Wildfire

PLAN TITLE (DATE OF ADOPTION) [new tab for each plan]

The '3-point test'
To be included in the analysis, a policy must...
a) potentially affect vulnerability to wilfire hazards;
b) contain a recognizable *policy instrument* ; and
c) contain a place-specific term such that scores can be assigned to specific district-hazard zones.

[possible scores:] | 1 | 0 | -1 |

District:		01	02	03	04	05	06	07	08	09	10	11	12	...	N
POLICY															
EXAMPLE POLICY: Residential second units shall be permitted in all single-family residential districts consistent with the requirements of the zoning ordinance. "Guesthouses" and "granny units" shall be considered second units for purposes of issuing building permits and collecting capital facility impact fees. [page # for reference]	Very High FHSZ														
	High FHSZ														
	Moderate FHSZ														
	Not in FHSZ														
EXAMPLE POLICY: Continue to facilitate construction of high quality mixed-use and medium and high-density land uses located close to transit nodes, existing bus routes, or park and ride facilities with regularly scheduled, daily service. [page # for reference]	Very High FHSZ														
	High FHSZ														
	Moderate FHSZ														
	Not in FHSZ														
EXAMPLE POLICY: Require planting of large canopy shade trees in new projects, in part to provide shading adjacent to buildings to conserve energy use. [page # for reference]	Very High FHSZ														
	High FHSZ														
	Moderate FHSZ														
	Not in FHSZ														
EXAMPLE POLICY: Scenic and sensitive lands including creeks, riparian corridors, wetlands and other areas of significant habitat value shall be protected from destruction, overuse, and misuse by the use of zoning, tax incentives, easements, or fee acquisition. [page # for reference]	Very High FHSZ														
	High FHSZ														
	Moderate FHSZ														
	Not in FHSZ														
EXAMPLE POLICY: Encourage the clustering of lots and buildings in higher fire hazard areas to reduce the need for multiple response teams during fires. [page # for reference]	Very High FHSZ														
	High FHSZ														
	Moderate FHSZ														
	Not in FHSZ														
EXAMPLE POLICY: Through the Development Review process, require new developments to incorporate community wildfire protection planning. [page # for reference]	Very High FHSZ														
	High FHSZ														
	Moderate FHSZ														
	Not in FHSZ														
	Very High FHSZ														
	High FHSZ														
	Moderate FHSZ														
	Not in FHSZ														
	Very High FHSZ														
	High FHSZ														
	Moderate FHSZ														
	Not in FHSZ														
	Very High FHSZ														
	High FHSZ														
	Moderate FHSZ														
	Not in FHSZ														
	Very High FHSZ														
	High FHSZ														
	Moderate FHSZ														
	Not in FHSZ														
[Suggestion: Copy entire line and "Insert Copied Cells" for additional policies (to retain scorecard structure, which includes merged cells)]	Very High FHSZ														
	High FHSZ														
	Moderate FHSZ														
	Not in FHSZ														
TOTAL (ALL POLICIES)	Very High FHSZ														
TOTAL (ALL POLICIES)	High FHSZ														
TOTAL (ALL POLICIES)	Moderate FHSZ														
TOTAL (ALL POLICIES)	Not in FHSZ														

Potential 'low-hanging fruit' [fails '3-point test' (not sufficiently spatial or actionable), but worth later consideration]

Plan Integration for Resilience Scorecard™ for Wildfire

PLAN TITLE (DATE OF ADOPTION) [new tab for each plan]

[possible scores:] 1 | 0 | -1

The '3-point test'
To be included in the analysis, a policy must...
a) potentially affect vulnerability to wildfire hazards;
b) contain a recognizable *policy instrument*; and
c) contain a place-specific term such that scores can be assigned to specific district-hazard zones.

District:	01				02				03				04				05				06				07				08				09				10			
Hazard Zone:	Very High FHSZ	High FHSZ	Moderate FHSZ	Not in FHSZ	Very High FHSZ	High FHSZ	Moderate FHSZ	Not in FHSZ	Very High FHSZ	High FHSZ	Moderate FHSZ	Not in FHSZ	Very High FHSZ	High FHSZ	Moderate FHSZ	Not in FHSZ	Very High FHSZ	High FHSZ	Moderate FHSZ	Not in FHSZ	Very High FHSZ	High FHSZ	Moderate FHSZ	Not in FHSZ	Very High FHSZ	High FHSZ	Moderate FHSZ	Not in FHSZ	Very High FHSZ	High FHSZ	Moderate FHSZ	Not in FHSZ	Very High FHSZ	High FHSZ	Moderate FHSZ	Not in FHSZ	Very High FHSZ	High FHSZ	Moderate FHSZ	Not in FHSZ
POLICY																																						
EXAMPLE POLICY: Residential second units shall be permitted in all single-family residential districts consistent with the requirements of the zoning ordinance. "Guesthouses" and "granny units" shall be considered second units for purposes of issuing building permits and collecting capital facility impact fees. [page # for reference]																																						
EXAMPLE POLICY: Continue to facilitate construction of high quality mixed-use and medium and high-density land uses located close to transit nodes, existing bus routes, or park and ride facilities with regularly scheduled, daily service. [page # for reference]																																						
EXAMPLE POLICY: Require planting of large canopy shade trees in new projects, in part to provide shading adjacent to buildings to conserve energy use. [page # for reference]																																						
EXAMPLE POLICY: Scenic and sensitive lands including creeks, riparian corridors, wetlands and other areas of significant habitat value shall be protected from destruction, overuse, and misuse by the use of zoning, tax incentives, easements, or fee acquisition. [page # for reference]																																						
EXAMPLE POLICY: Encourage the clustering of lots and buildings in higher fire hazard areas to reduce the need for multiple response teams during fires. [page # for reference]																																						
EXAMPLE POLICY: Through the Development Review process, require new developments to incorporate community wildfire protection planning. [page # for reference]																																						
[Suggestion: Copy entire line and "Insert Copied Cells" for additional policies (to retain scorecard structure, which includes merged cells)]																																						
District:	01				02				03				04				05				06				07				08				09				10			
TOTAL (ALL POLICIES)																																						

Potential 'low-hanging fruit' [fails '3-point test' (not sufficiently spatial or actionable), but worth later consideration]

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