

HUMBOLDT COUNTY COMMUNITY WILDFIRE PROTECTION PLAN, 2019

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PART 2—RISK-ASSESSMENT SUMMARY

Weather and fire patterns, together with Humboldt County’s rugged topography and dense fuel loads, combine to create a generally high fire risk during dry parts of the year. Coastal areas are not immune from this risk, even with a cooler and moister climate than inland areas. Large wildfire conflagrations with significant damages are highly likely in coming decades, if not years. All Humboldt residents, organizations, and government entities share this risk, as well as the responsibility to minimize this risk and prepare their families, homes, and communities for the eventuality of wildfire.

This document is a summary of each risk assessment chapter in *Part 5* of this Community Wildfire Protection Plan (CWPP). This analysis is based on a qualitative scale from “low” to “very high,” with “very high” signifying the highest risk. In the case of *Wildfire Protection Capabilities* and *Community Preparedness*, a lower rating means a higher risk. This is because when fire-protection organizations have inadequate capacity and communities are unprepared, the risk of a wildfire damage and loss is higher.

2.1 COMMUNITY-IDENTIFIED RISKS, HAZARDS, ASSETS, AND RESOURCES

Through this CWPP process, a series of 14 community workshops were held throughout Humboldt County in late 2017. At those meetings, residents were given the opportunity to review previously identified local risks, hazards, fire-protection resources, and assets from the community meetings held in both 2004-2005 and 2012 for the previous versions of this CWPP. (A summary of the data gathered at each meeting is provided in each *Planning Unit Action Plan* document in *Part 4* of this CWPP.) This broad public process has led to the development of an extensive database of community-identified information. This information is available for public review and use at the Humboldt County Web GIS Portal, https://webgis.co.humboldt.ca.us/HCEGIS2.6_CWPP.

2.2 HUMBOLDT COUNTY ASSETS AND VALUES AT RISK

2.2.1 COMMUNITY AND ECONOMIC



Wildland-urban interface, Willow Creek.

The Humboldt County population was 136,754 in July 2017, representing a 1.6% increase since the 2010 Census.¹ The countywide average annual growth rate has been approximately 0.75% per year over the last thirty-five years.² About one-third of the population lives in the Humboldt Bay area of Eureka and Arcata and about half live in the county’s seven cities. Over half of the residents live in unincorporated areas, (*see Map D.1, Population and Communities at Risk in Appendix D*). Per capita income was \$24,038 in 2016, and the median household income was \$42,685.³

Property values range from moderate to moderately high. Prices are continuing to rise as people leave warmer

¹ U.S. Census Bureau (2016). Quick Facts, Humboldt County, California. Retrieved from <https://www.census.gov/quickfacts/fact/table/humboldtcountycalifornia/PST045216>

² Humboldt County. Department of Planning & Building. (2017). Humboldt County General Plan – Revised Draft Environmental Impact Report. Section 2.1: Project Location and Setting, Tables 2.1-1 and 2.1-2. (pp. 2-2 and 2-3). Retrieved from <https://humboldtqov.org/DocumentCenter/View/58838>

³ US Census Quick Facts Humboldt. (2016).

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areas for the cool coastal climate. Although real estate prices peaked in the first quarter of 2017 following recreational marijuana legalization and are now declining, they are still high in rural areas, with urban values consistently climbing.⁴ **On a statewide scale, real estate values in Humboldt County are considered moderate.**

Older wooden homes—commonly made of redwood or Douglas fir—generally have much higher structural ignitability than newer homes, unless those older homes have been retrofitted to current wildland-urban interface, or WUI, building standards (which is uncommon). Flammable siding and potential for ember incursion is especially high. Relatively few homes and structures have been lost to wildfire in Humboldt County to date, although this is more likely due to few wildfires burning close to urban areas, rather than a reflection of local fire-safe construction. There has been an increase in structure fires from faulty wiring and explosions from indoor marijuana grows and extraction labs. Although these are not technically wildfires, they do in some cases threaten nearby wildlands and neighborhoods.



Interface within the city of Eureka; there are at least four homes in this picture.

Generally, **structural ignitability of homes in Humboldt County is very high**, with most homes made of wood and built before the 2007 WUI Building Codes (California Building Code Chapter 7A) came into effect.

*For information on structural ignitability, see section 5.1.2 and Appendix H, **Living with Wildfire**.*

Humboldt County has a fairly diversified local economy. Management, business, science, arts, and service make up over half of measurable employment. However, natural resources still contribute significantly to the economy, whether through tourism, forestry, fishing, agriculture, or marijuana cultivation. The county is in the middle of a rapid economic shift with the legalization of marijuana; some areas of the local economy are growing, and others—most notably retail businesses in rural areas—are declining rapidly, presumably with less cash availability in the hands of local residents.

Any of these natural resource-based local economies could be severely impacted by wildfire, putting them at a very high risk to wildfire. *For more information on community and economic assets, see section 5.1.2.*

2.2.2 NATURAL

Humboldt County is known for its natural beauty—redwood forests, beaches, clean, cool watercourses, and diverse wildlife habitat—as well as its wealth of natural resources, from timber to fisheries. This wellspring of ecological diversity and beauty is valued and treasured highly, locally to internationally. It is an important tourism and retirement destination, especially with warming weather elsewhere.

Forest lands are very vulnerable to wildfire, given nearly a



Low-intensity understory fire.

⁴ Kyla and Charlie Tripodi, The Land Man Office, “Rural land valuation trends: cannabis and timber,” University of California Cooperative Extension: Redwood Region Forest Management and Market Trends workshop, April 4, 2018.

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century of fire suppression and intensive timber management leading to very dense and highly flammable forest stands. Although this is slowly changing with active fuel reduction and the introduction of prescribed fire throughout the county, in general **Humboldt County's forests remain at a high or very high risk to wildfire.**

Of note is the loss of native oak woodlands with the vigorous suppression of fire and the resultant invasion of Douglas fir and other conifers. New statewide management options and the active introduction of prescribed fire are expected to help reverse this trend.

While agricultural lands are generally at a lower risk to wildfire because of often-higher moisture levels, the economic impacts to them from wildfire could be devastating to local farmers.



Marijuana greenhouse sites in Southern Humboldt.

The legal marijuana industry is still in its infancy in Humboldt County. Historically, production and extraction both have had a high potential for fire ignition. Regulations provide the opportunity to reduce fire risks and hazards associated with the industry. Reducing ignitions in this sector is targeted in this CWPP's ***Countywide Action Plan, Chapter 3.1, Wildfire Ignition Prevention.***

The risk to local wildlife from wildfire is difficult to define; some species are better adapted than others, while some prefer post-fire habitat. Humboldt County has a high degree of wildlife diversity, presumably among the highest in the state; local wildlife, especially vulnerable species, would likely be harmed by wildfire. Clearly, valuable old-growth forest habitat is not quickly replaced if destroyed by fire, although these forests tend to be more fire-resilient than younger or denser forests.

Vulnerable salmonid populations are at significant risk to sediment and erosion following wildfires, yet inversion layers created from smoke in late summer and fall can cool streams and help those same populations. Riparian areas are highly vulnerable to wildfire disturbance. Erosion can cause large sediment loads in streams, which can be transported and deposited into rivers and damage aquatic habitat. Humboldt County has an abundance of clean water that could be at great risk from wildfire.

Humboldt County generally has very good air quality, but it's often impacted by fires from elsewhere in the state and beyond. Research showing the differences between air quality impacts from prescribed fire versus wildfire is educating residents on the need for more prescribed fire to improve long-term air quality. *For more information, see **Air Quality** and Figure 5.1.2, **Orleans Smoke Impacts**, in Chapter 5.1.*

In general, the value of Humboldt County's natural assets is ranked very high, most of which could be severely impacted by wildfire. *For more information on natural assets, see section 5.1.3.*



The community of Orleans after the 2013 fire. Photo: T. Dunklin.

2.2.3 CULTURAL

More than a thousand sites of cultural significance have been surveyed and officially designated as cultural resources in Humboldt County, including archaeological sites, historic architecture, industrial relics, artifacts, cultural landscapes, spiritual places, and historic districts. Although fire can impact all of these, some are more threatened by wildfire than others, such as historical architecture and sites often made of very flammable, old redwood.

As the home of over a dozen Native American tribes, Humboldt County has a rich native cultural history, including actively using fire as a land-management tool. These cultures evolved with fire, and some—like the Karuk, Yurok, and Hoopa—are reclaiming that cultural heritage to coexist with wildfire.



Prescribed fire in the Hoopa Valley.

Given the rich Native American culture in Humboldt, cultural assets are very high. In general, tribal lands are considered to be at a very high risk to wildfire, with active efforts to reduce that risk in several communities.

*For more information on cultural assets, see section 5.1.4. For more information on local native burning practices, see **Native American Fire History** in section 5.2.5.*

In summary, the Assets and Values at risk for Humboldt County are given a high to very high rating. For more information on assets and values at risk, see Chapter 5.1, **Assets and Values at Risk.**



Fire in Southern Humboldt.

2.2.4 ASSETS AND VALUES AT RISK SIGNIFICANT FINDINGS

The following were identified in *Chapter 5.1, Assets and Values at Risk* and informed the development of the *Countywide Action Plan* chapters of *Part 3* of this CWPP, which will be used to guide action over the next five years. Relevant community-specific needs and related priority actions can be found in the *Planning Unit Action Plans* located in *Part 4*.

| FIGURE 2.2.1 ASSETS AND VALUES AT RISK SIGNIFICANT FINDINGS | |
|---|---|
| ❖ | Low per-capita income affects residents’ ability to fire-safe their homes and properties. |
| ❖ | Increased seasonal occupation during fire season from tourism and marijuana cultivation increases fire risk. |
| ❖ | High levels of structural ignitability exist throughout the county, especially in unincorporated areas. |
| ❖ | Future growth is expected to occur in areas that are more vulnerable to wildfire risk. |
| ❖ | Dispersed development patterns in many areas of the county (particularly Southern Humboldt) result in a high number of homes spread across a wildfire-prone landscape. |
| ❖ | Resurgence of fire as a land-management tool is occurring in local rangeland and timber management, especially in prairies and oak woodlands. |
| ❖ | Many dense, overstocked timber stands result from decades of clearcutting, fire suppression, public-lands management budget reductions, and finally, landscape fragmentation of forestlands to private ownerships with limited management resources. |
| ❖ | Public and private service and retail sectors are less vulnerable to impacts from wildfire. However, tourism, recreation, and most of the natural resource-based sectors of the local economy could be significantly impacted by a large wildfire, including deterioration of air quality from excessive smoke. |
| ❖ | Erosion and landslides following damaging wildfires pose a significant threat to transportation infrastructure, homes, natural resources, and special-status species. |
| ❖ | Rapid changes are happening in the legal marijuana industry, with unclear effects on local economies and fire risks and hazards. |
| ❖ | Marijuana producers and processors need to become familiar with the NFPA Fire Code 1, Chapter 38. |
| ❖ | Legal and illegal marijuana operations continue to pose an increased risk for firefighters. |
| ❖ | There is a high diversity of wildlife species, many designated threatened or endangered. |
| ❖ | Significant potential to deteriorate water quality following wildfire conflagrations, could negatively affect salmonid populations. |
| ❖ | Ongoing air quality issues occur during fire season. |
| ❖ | Local tribes’ efforts are bringing prescribed fire back onto the landscape in their traditional lands and beyond. |

2.3 HUMBOLDT COUNTY WILDFIRE ENVIRONMENT

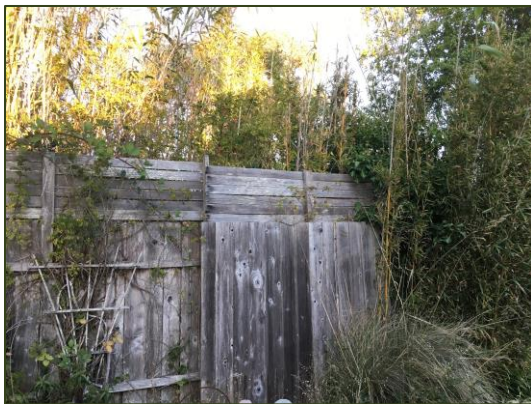
2.3.1 WILDFIRE ENVIRONMENT

The environs of Humboldt County evolved with fire, hence this is a fire-dependent environment. Local topography and fuels contribute to a very high fire risk, especially with the influence of sudden oak death killing large numbers of trees. However, local weather patterns generally reduce wildfire risk, especially with the marine influence along coastal areas. Thunderstorms inland can lead to very high wildfire risk in summer and late fall. In general, **Humboldt County’s wildfire environment is ranked as high risk.**

*For more information on the factors that contribute to wildfire in Humboldt County, see section 5.2.2, **General Wildfire Environment Description.***

2.3.2 WILDFIRE HAZARD

A location’s fire-hazard ranking shows the expected behavior of fire in severe weather. Fire Hazard Severity Zones (FHSZs) are used by the State to assess and define fuel hazards, ranging from Moderate to High to Very High. *(See Map 2.3.1 on the following page for FHSZ designations.)* Local (urban or suburban) areas of Humboldt County (LRA⁵) are not classified in this system but are generally considered to have Moderate ratings. Generally, **Humboldt County’s coastal areas and river valleys with fog influence are rated Moderate, the western side of the county is rated High, and the eastern side of the county is rated Very High Fire Hazard Severity.** Forty-five percent of Humboldt County is classified Very High, 48% high, and only 4% Moderate, the remainder being unclassified as unzoned or water, etc. *For more information on fire hazard severity, see section 5.2.3, **Wildfire Hazard.***

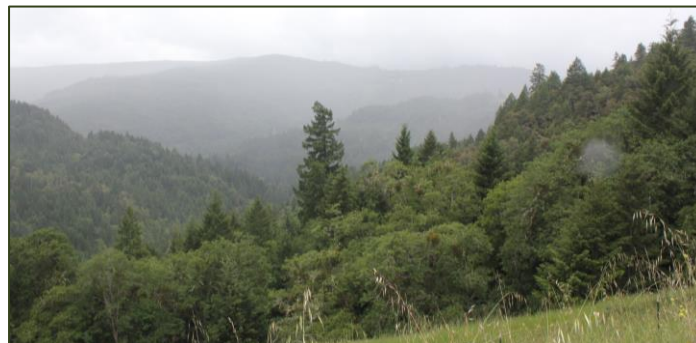


Urban fuels near the coast in Manila.

Interface fuels, also known as urban fuels in this risk assessment, generally refer to anything that can burn. This includes ornamental vegetation or the items found around homes, such as patio furniture, located near a structure, and often directly adjacent to and including homes. **There are commonly very heavy interface fuels surrounding homes in the coastal zones, likely resulting from a false sense of security from the prevailing climate and a lack of local understanding of fire hazards.** Throughout the county, there are heavy fuels surrounding homes, whether these homes are rural homesteads with firewood and outbuildings, or urban/suburban homes with an abundance of highly flammable vegetation. **Therefore,**

interface fuels throughout Humboldt County are ranked as high to very high risk.

*For information on interface fuels, see Part 4, **Planning Unit Action Plans** and Appendix H, **Living with Wildfire.***

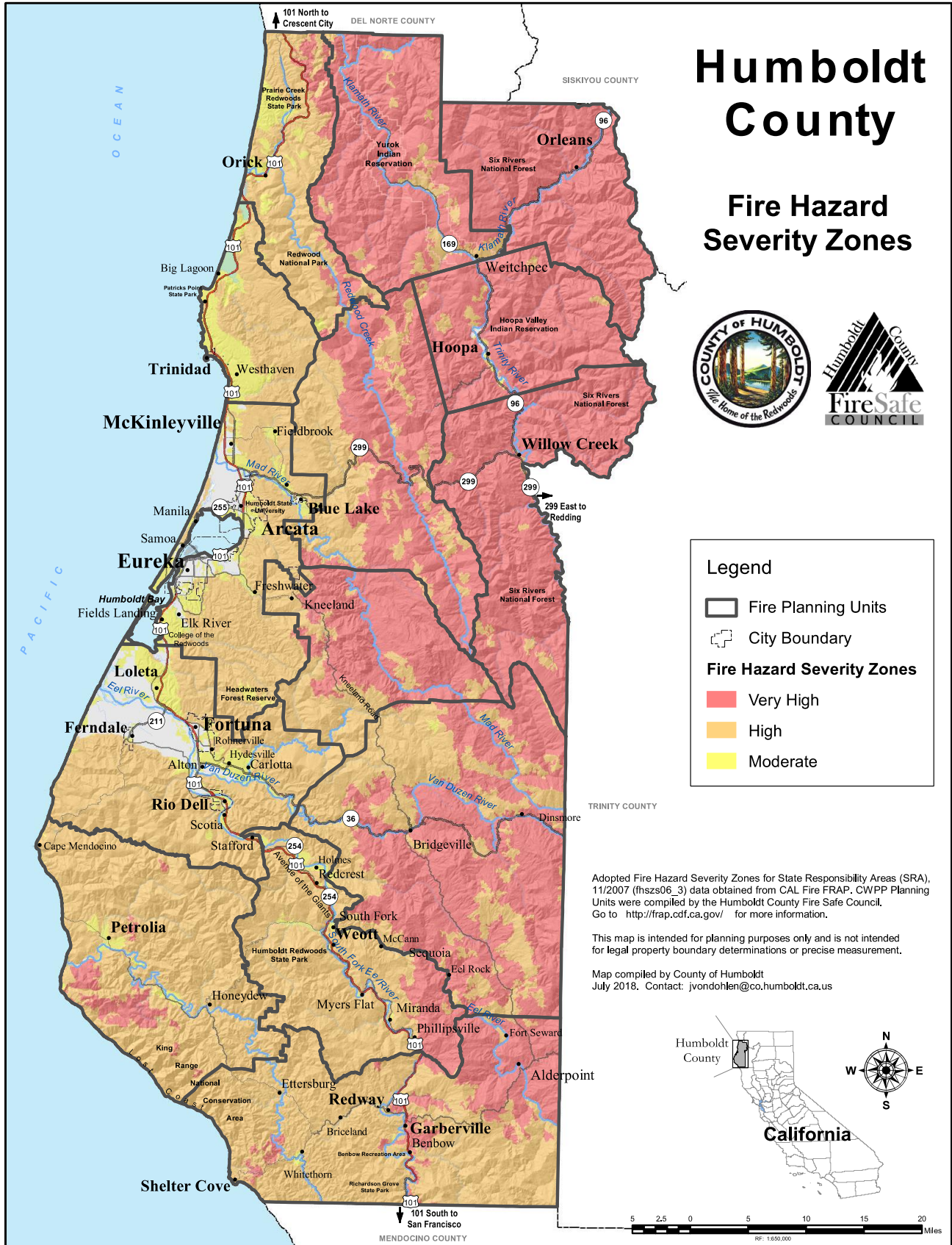


Forest fuels in Redwood Valley.

⁵ Local Responsibility Area (LRA).

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Map 2.3.1 Fire Hazard Severity Zones



2.3.3 WILDFIRE RISK AND FIRE HISTORY

“Risk of wildfire occurrence” refers to the possibility of a wildfire occurring based on factors such as fire history and ignition potential. It is derived from historic evidence of wildfire starts and the presence of ignition sources such as frequent lightning storms, occupied residential properties, camping areas, power lines, heavily traveled roads, arson, and logging operations.

The county has a strong presence of ignition sources with a prevalence of homes sprinkled throughout wildland-urban interface (WUI) areas, power lines crisscrossing the landscape, and a massive network of well-traveled rural roads. Although it is difficult to precisely measure, marijuana production can also contribute to an increased risk of both structure fire and wildfire.

Lightning fire ignitions are generally less prevalent in Humboldt County than in other areas of the state, but they do occur, especially in the northeastern area of the county. Most recent extensive lightning ignitions were in 2003, 2008, and 2015.

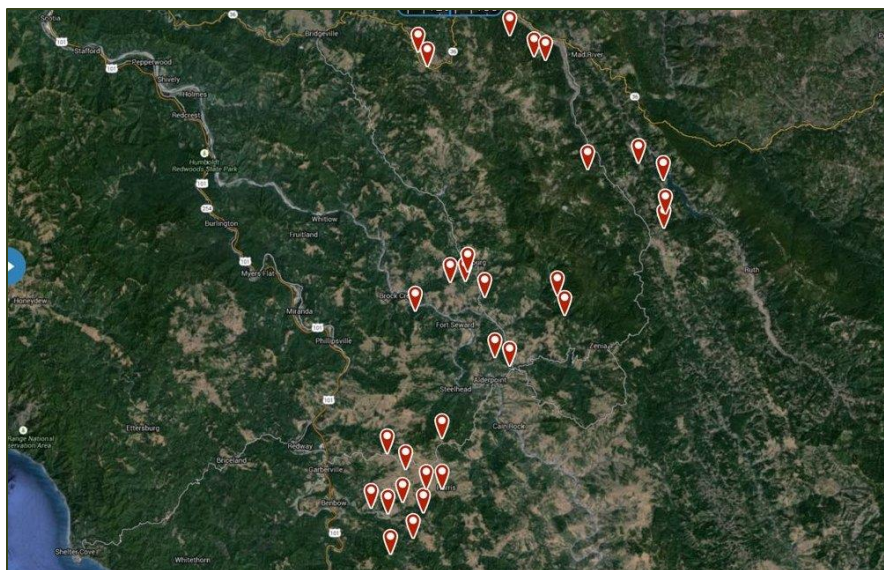
The number of large wildfires reached 22 in 2015, close to the maximum annual number of 24 fires in both 1998 and 1929. Fire has been a significant factor in Humboldt County’s history. Studies suggest an historical fire return interval of 12 to 50 years.⁶

*See Map 5.2.2, **Wildfire Starts** in section 5.2.4, **Wildfire Risk and Ignition Sources** for a display of where fires start in Humboldt County. Map 2.3.2, **Fire History 1908-2017** on the following page, illustrates local fire history.*

Native American fire history indicates very frequent burning throughout the area. These cultural practices are now being actively reintroduced through local tribal efforts, especially in the Klamath Region. The use of fire to achieve fuel reduction and other landscape benefits is also increasing among federal and state agencies as well as private land managers and property owners.

The county is divided into two distinct areas of wildfire risk. **The northeast and extreme southwest parts of the county have a high risk of wildfire occurrence, while the coastal areas and river valleys have moderate risk and generally better fire-protection access, which increases initial attack success.**

*For more information on wildfire risk, see section 5.2.4, **Wildfire Risk and Ignition Sources** and section 5.2.5, **Fire History**. Section 5.1.3 contains a discussion on the cultivation of marijuana and its potential impacts to fire risk.*

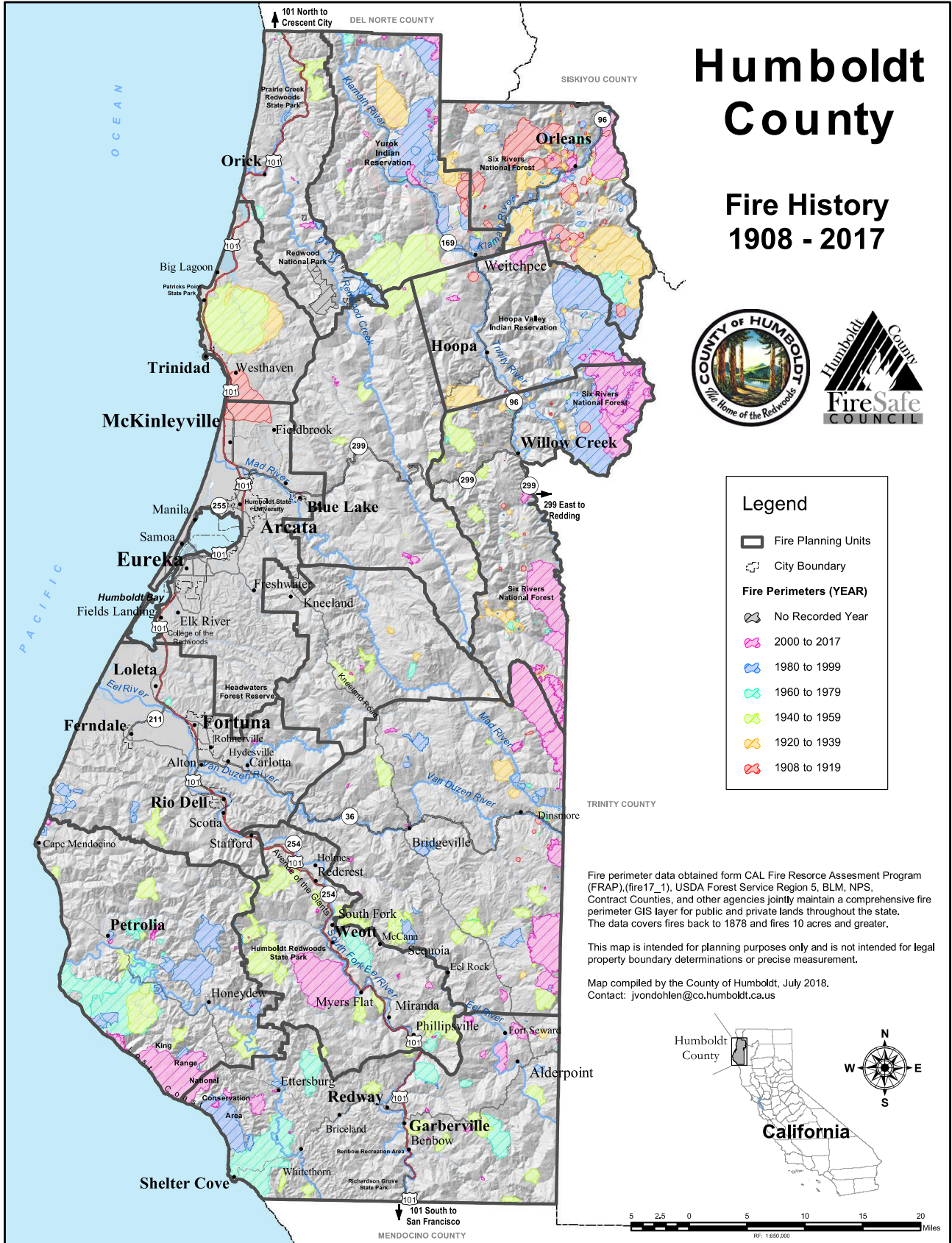


Confirmed lightning fires for CAL FIRE Humboldt. Estimated 44 fires, 37 have control lines, 7 to locate. Photo: CAL FIRE HUU, Twitter, July 31, 2015.

⁶ CAL FIRE: Humboldt – Del Norte Unit (HUU). (2017). Strategic Fire Plan Humboldt – Del Norte Unit 2017. (p. 9). Retrieved from http://cdfdata.fire.ca.gov/fire_er/fpp_planning_plans_details?plan_id=270

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Map 2.3.2 Fire History 1908-2017



Humboldt County

Fire History 1908 - 2017



Legend

- Fire Planning Units
- City Boundary
- Fire Perimeters (YEAR)**
- No Recorded Year
- 2000 to 2017
- 1980 to 1999
- 1960 to 1979
- 1940 to 1959
- 1920 to 1939
- 1908 to 1919

Fire perimeter data obtained from CAL Fire Resource Assessment Program (FRAP), (fire17_1), USDA Forest Service Region 5, BLM, NPS, Contract Counties, and other agencies jointly maintain a comprehensive fire perimeter GIS layer for public and private lands throughout the state. The data covers fires back to 1878 and fires 10 acres and greater.

This map is intended for planning purposes only and is not intended for legal property boundary determinations or precise measurement.

Map compiled by the County of Humboldt, July 2018.
Contact: jvondohlen@co.humboldt.ca.us



2.3.4 CLIMATE CHANGE AND WILDFIRE

It is not clear exactly how climate change will impact wildfire risk and behavior in Humboldt County. The North Coast Resource Partnership recently commissioned a study that predicts “an approximately 40% increase in probability of fire across the region by end-century...”⁷ The US Forest Service has found that local mean minimum nighttime temperatures have risen in some areas of the county by almost 4% from 1931-2014.⁸ Perhaps most significant for wildfire is the trend toward lower *snowmelt water equivalent* and earlier snowmelt,⁹ which means less water flow and availability in summer and fall. Recent research shows that precipitation levels at the time of ignition is an increasingly important factor in terms of fire activity and area.¹⁰ That said, it is expected that “forested systems in northwestern California will burn under favorable weather conditions, and it is logical to expect more and larger fires under future climate change scenarios.”¹¹

Temperatures, precipitation, and fire frequency and severity are changing in Humboldt County and throughout California. What that could mean regarding wildfire in Humboldt County is less predictable fire behavior. There may be more frequent and more erratic fires inland, perhaps with a decrease of wildfire risk along the coastal areas of the county. **Such changes in fire behavior lead to increased fire risk for Humboldt County.** Many scientists now agree that carefully managing wildfires and an active use of prescribed fire are important tools in creating *adaptive resiliency* in the face of climate change.¹²

For more information, see Section 5.2.6, Climate Change and Wildfire in Humboldt County.

2.3.5 WILDFIRE ENVIRONMENT SIGNIFICANT FINDINGS

The following were identified in *Chapter 5.2, Wildfire Environment* and informed the development of the *Countywide Action Plan* chapters of *Part 3* of this CWPP, which will be used to guide action over the next five years. Relevant community-specific priority actions are found in the *Planning Unit Action Plans* located in *Part 4*.

FIGURE 2.3.1 HUMBOLDT COUNTY WILDFIRE ENVIRONMENT SIGNIFICANT FINDINGS

| | |
|---|---|
| ❖ | Humboldt County landscapes have adapted to and evolved with fire; fire will continue to shape them. Exclusion of wildfire is not an option. |
| ❖ | A pressing challenge is how to reduce high levels of fuel, using methods that minimize carbon emissions and maintain and/or restore ecosystem functions, processes, and health. |
| ❖ | Due to the remoteness and steepness of slopes within the county, fire equipment and personnel can be limited in their access to suppress wildfires as well as to mitigate them. |
| ❖ | A challenge for coastal communities is the denial or lack of understanding about the potential for wildfire to affect these areas and the subsequent lack of wildfire preparedness. |

⁷ Micheli, E., Dodge, C. Pepperwood, T. & Flint, L. (2018). Climate and Natural Resources Analysis and Planning for the North Coast Resource Partnership: A Technical Memorandum Summarizing Data Products. Final Technical Report. USGS, January 2018. (p. 26).

⁸ Butz, R.J., Sawyer, S., & Safford, H. (2015). A summary of current trends and probable future trends in climate and climate-driven processes for the Six Rivers National Forest and surrounding lands. USDA Forest Service Pacific Southwest Region. (p. 3). Retrieved from https://www.fs.usda.gov/Internet/FSE_DOCUMENTS/fseprd490216.pdf

⁹ Butz, R.J., Sawyer, S. & Safford, H. (2015). (p. 16).

¹⁰ Miller, J.D., Skinner, C.N., Safford, H.D., Knapp, E.E., & Ramirez, C.M. (2012). Trends and causes of severity, size, and number of fires in northwestern California, USA. *Ecological Applications* 22(1): 184-203, quote on pp. 194-195.

¹¹ Miller, J.D. et al. (2012). (p. 201).

¹² Schoennagel, T., Balch, J.K., Brenkert-Smith, H., Dennison, P.E., Harvey, B.J., Krawchuk, M.A., Mietkiewicz, N., Morgan, P., Moritz, M.A., Rasker, R., & Turner, M.G. (2017). Adapt to more wildfire in western North American forests as climate changes. *Proceedings of the National Academy of Sciences* 114(18), and Miller J.D. et al. (2012).

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FIGURE 2.3.1 HUMBOLDT COUNTY WILDFIRE ENVIRONMENT SIGNIFICANT FINDINGS

- ❖ The potential effect of sudden oak death on the local wildfire environment is significant. The disease and its ramifications in local ecosystems must be considered in fuel-reduction and other ground-disturbing activities to minimize its negative effects.
- ❖ Most fire ignitions in Humboldt County are started by people; most large wildfires occur when multiple fire ignitions happen on the same day, such as lightning strikes.
- ❖ Most local fire ignitions happen in July, while the largest wildfires have occurred in September.
- ❖ The number of fires started by marijuana operations is not tracked, so it is difficult to document the extent of this impact. It is also unclear how the legalization and regulation of this industry will impact associated wildfire risks. More research is needed on this topic.
- ❖ The *California Strategic Fire Plan* describes the changing fire conditions that have led to an increase in wildfire and its resulting damage throughout California. These trends are expected to reach areas within Humboldt County. Residents and stakeholders here must consider how to adapt and respond locally to this emerging problem.
- ❖ Recent and historic wildfire events in Humboldt County and the surrounding region have shown the potential for hazardous burning conditions, which can threaten life, health, and property.
- ❖ The history of effective fire suppression in Humboldt County is one of the factors contributing to a buildup of hazardous wildfire fuels in both wildlands and WUI areas.
- ❖ Considering the probability of significant increased wildfire threats, it is important that Humboldt County residents are increasingly vigilant regarding reducing wildfire risks and hazards in their homes and communities to improve their fire safety.
- ❖ There are still many unknowns to living with wildfire within a changing climate and continued research and modeling are necessary to better understand the impacts of climate change on the fire environment throughout Humboldt County and to inform adaptation strategies.
- ❖ The probability of fire is projected to increase up to 40% across the North Coast region with climate change.
- ❖ Mean minimum (i.e., nighttime) temperatures have risen in some local areas by almost 4° F, and there is a trend toward lower snow water equivalent and earlier snowmelt, which is leading to drier summer and fall conditions.
- ❖ Although fire frequency is expected to increase with climate change, fire severity may not.
- ❖ Prescribed fire and cultural burning have seen a resurgence in use. These practices have been utilized in recent decades by tribes, federal and state agencies, local ranchers, logging companies, and other private property owners for fuel reduction and other landscape benefits.
- ❖ The active use of fire is at the forefront of current management discussions in both Humboldt County and the state.
- ❖ Landscape-level fuel treatments are best focused on building forest resiliency to wildfire and need to be designed to minimize impacts to sensitive wildlife and plant species.
- ❖ Community-preparedness mitigations to reduce fuels are most effectively focused around WUI communities, or landscape features to protect these communities from fast-moving wildfires.



Community fuel reduction in the Mattole watershed.

2.4 HUMBOLDT COUNTY WILDFIRE-PROTECTION CAPABILITIES

2.4.1 FIRE-PROTECTION ORGANIZATIONS AND LEVEL OF SERVICE

Due to the highly diverse range of community characteristics and fire-protection needs throughout Humboldt County, each local fire department strives to develop a response and deployment system that reflects community needs, expectations, and local risks, while staying within the organization's revenue and support constraints. **With forty different local and tribal fire-protection organizations, a coordinated approach to response is crucial in Humboldt County.** Local fire departments are quick to assist each other, as well as state and federal partners. Fundamental to the coordination of local fire protection, the Humboldt County Fire Chiefs' Association (HCFCFA) and associated chapters work to improve the Level of Service throughout the county through increased coordination, communication, standardization, and support.

While wildfires constitute a small percentage of the overall calls for emergency services, demand placed on local, state, and federal firefighting resources by wildfire can be substantially greater than the combination of most of the other types of emergency-response calls.

Humboldt County has one local-government, Type-3 Engine Strike Team composed of members from several local fire organizations. This experience increases the ability of local firefighters to quickly and efficiently organize resources, should a large wildfire event happen here.

Improvements have been made since the publication of the 2013 CWPP in the ability of local and tribal fire-protection organizations to efficiently, effectively, and safely deploy fire-protection resources. This is due in part to Public Safety and Essential Services Sales tax (Measure Z) funding. **Local fire organizations still experience a high degree of variability in their training levels, the amount and quality of their equipment, and the number of firefighting personnel at their disposal.**

Many local and tribal fire departments are faced with a myriad of challenges related to: the high cost of insurance and workers' compensation, ever-increasing mandatory requirements and standards, a lack of capital for the replacement of safety equipment, barriers to seamless coordination and communication, and access to appropriate levels of training. One of the many lessons learned through this CWPP effort has been the need for a more robust and ongoing volunteer recruitment and retention strategy. **All local and some tribal fire departments here depend fully or partially on volunteers; nearly**

all agree that recruiting and retaining these volunteers is their biggest challenge. As firefighter numbers fall, services suffer in local communities. In recent years, some fire companies have closed their doors; neighboring departments have been impacted as they try to provide coverage for these affected areas.

One new fire district was formed and two others expanded their boundaries since the 2013 CWPP. However, there are still many areas outside the boundaries of an established district, where local residents may receive fire protection from district resources responding outside the district's jurisdiction. Fire departments and companies provide services to these areas without being under obligation to do so, and



Forest fuels in an urban area. Photo: Humboldt Bay Fire.



Fortuna Volunteer Fire Department, March 2018. Photo: J. Mills.

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receive no compensation, other than grants and donations. (See Map 5.3.1, *Local Fire Protection in Chapter 5.3 for jurisdictional response areas.*)

Regarding dispatch issues in Humboldt County, if the annual rate of calls for service continues to increase, options for expanding service capabilities will need to be explored.

Seasonality strongly affects federal and state fire-protection capacity in Humboldt County. These agencies are currently fully staffed and stable, but they could be pulled away at any time for disaster response elsewhere. This usually means that local fire-protection resources are spread thin, and often during the highest times of fire danger, as was the case several times in recent years.

Fire-protection capability has improved overall since the 2013 CWPP. However, sustainability of some smaller, rural volunteer fire departments is now more tenuous. This is due to a lack of volunteers and funding; increased training, regulations, and unfunded mandates; and liability issues. Complete, year-round community protection coverage for developed areas is also a significant challenge.

Overall, **fire-protection capability for Humboldt County is moderate.** For more information on fire protection, see Chapter 5.3, *Wildfire Protection Capabilities.*

2.4.2 FIRE-PROTECTION SUPPORT

Fire-protection support is based on the ease of fire-engine access to homes, adequate water supply and pressure, and community support both financially and via volunteers. It is dependent upon sufficient *hardened homes* and *defensible space* around structures, and timely evacuations by local residents. Access is related to fire codes at the time of development, terrain, and the potential for road blockage.

Adequate defensible space allows firefighters the ability to protect a home safely. Timely evacuation allows firefighters to focus solely on structure protection, instead of saving lives. Local agencies have a high capacity for providing fire protection when timely notice and evacuation occur and good access, water, and defensible space are present. There are communities in Humboldt that enjoy strong community support for local fire services. However, achieving the support described above is highly challenging in the county as a whole, **making support for fire protection in Humboldt County generally low and even lower during extreme fire weather events.**

For more information on how residents can prepare their access, water supply, defensible space, and evacuation, see Appendix H, *Living with Wildfire*; for more information on how local communities prepare for emergencies, see Chapter 5.4, *Community Preparedness*. Finally, for more information on local fire protection and support issues, see the *Planning Unit Action Plans* in Part 4.

2.4.3 WILDFIRE DISASTER RESPONSE AND EVACUATION VULNERABILITY

Rural communities in Humboldt County face a number of challenges when wildfire forces evacuation of residents, including rugged terrain, the poor condition of many rural roads, and the limited availability of resources in remote areas. In many places, there are no secondary escape routes, only narrow, dead-



Classic Humboldt County evacuation challenges, Shelter Cove.

end roads between residences and major evacuation arteries. Many roads are not well maintained, and numerous are unpaved, requiring very slow speeds and 4x4 vehicles. There are many low-weight-bearing bridges, gated roads, and unmarked roads and addresses.

Due to the additional time required for remote communities to safely evacuate, early and effective notification of fire information and evacuation orders is critical. The vulnerability of many remote Humboldt communities is increased by inadequate communications infrastructure. Some areas don't have cellular coverage, land

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lines, and/or broadband internet, and are dependent on neighborhood-level phone trees and radio communications.

Given the additional time it can take to notify and evacuate some remote communities, evacuations may be ordered earlier by law enforcement and fire personnel than for other areas. Rural residents with fewer available evacuation routes are often advised to evacuate before a *Voluntary Evacuation Advisory* escalates to a *Mandatory Evacuation Order*. Residents requiring more time to evacuate individuals with medical needs or other special considerations, and/or households with animals, are advised to evacuate early, when a *Voluntary Evacuation Advisory* is issued. Many residents with horses and small livestock do not have the equipment needed to evacuate animals and will require assistance.

Given these conditions and resources, **evacuation vulnerability is considered very high for Humboldt County.**

In addition to evacuation planning, County OES is completing community profiles for high-risk, populated rural areas, in coordination with local volunteer fire departments, community volunteers, and planning partners. Community profiles assess available resources and gaps in WUI communities to pre-identify needs and more efficiently order and assign resources during and following disasters.

*For more information on evacuation, see **Wildfire Disaster Response** in section 5.3.3, **Evacuation Preparedness** in section 5.4.6, and the **Evacuation** section of each **Planning Unit Action Plan** in Part 4.*

2.4.4 WILDFIRE PROTECTION IDENTIFIED NEEDS 2018–2023

The following items have been identified in *Chapter 5.3, Wildfire-Protection Capabilities*, as collective priority needs for fire-service organizations in Humboldt County. They are based on the experience of fire-protection organizations operating here and on information gleaned during this CWPP process.

*The following list of identified needs are addressed in Part 3, **Countywide Action Plan**, particularly in Chapter 3.4, **Fire Protection**. More specific needs for each local fire organization can be found in their respective **Planning Unit Action Plan** in Part 4.*

| FIGURE 2.4.1 WILDFIRE PROTECTION PRIORITY NEEDS 2018–2023 | |
|---|--|
| ❖ | Volunteers for local fire organizations. |
| ❖ | Repairs and maintenance of local fire equipment and funding for the replacement of safety equipment. |
| ❖ | Consistent training, with local training opportunities for fire departments and companies. |
| ❖ | Development of regionally based or located fire-training programs and facilities, to include fire academy, and driver-operator training skills. |
| ❖ | Strategies to address the high cost of insurance and workers’ compensation; coordination to meet the associated training and medical-screening requirements. |
| ❖ | A baseline for identifying local Level of Service standards. |
| ❖ | Strategies to improve Level of Service to boost ISO Fire Suppression Rating Schedules. |
| ❖ | Options for expanding service capabilities to support the ever-increasing demand for service. |
| ❖ | Additional funding, staffing, and expanded facilities for dispatch centers if demand for services continues to increase. |
| ❖ | Consistent and sustainable funding sources for all fire-service organizations and agencies. |
| ❖ | Resolution to the mismatch between service demands and jurisdictional boundaries. |
| ❖ | Response-area maps for all local agencies. |
| ❖ | Pre-fire attack planning resources for all local agencies. |
| ❖ | A well-supported website for the Humboldt County Fire Chiefs’ Association and sub-county chapters. |
| ❖ | Multi-jurisdictional evacuation mapping. |

FIGURE 2.4.1 WILDFIRE PROTECTION PRIORITY NEEDS 2018–2023

- ❖ Evacuation support incorporated into local fire-service training programs.
- ❖ Continued improvement in coordination and pre-incident planning between law enforcement/OES and CAL FIRE field personnel (Incident Commander) to facilitate seamless communication and quick response during an evacuation.

2.5 HUMBOLDT COUNTY COMMUNITY PREPAREDNESS

2.5.1 COMMUNITY FIRE-SAFETY EFFORTS

Multiple opportunities exist for community members in Humboldt County ready to take responsibility for preparing their communities for wildfire. Forming or collaborating with a local Fire Safe Council (FSC), or being designated a Firewise® Community, are significant steps that residents can take towards improving their fire safety. These volunteer organizations collaborate to enhance fire protection and minimize potential losses to wildfire. Through them, neighbors identify local wildfire issues and develop projects to address local risks and hazards.

Six local FSCs exist in Humboldt County, and ten Firewise® Communities; four Firewise® Communities are new since the 2013 CWPP. The Humboldt County FSC (HCFSC) provides support and technical assistance to these entities in a variety of ways and at varying levels. Many local Fire Safe Councils need sustainable funding sources to manage their organization, organize volunteers, and educate their neighbors. The most effective FSCs in the county are those umbrellaed by a local non-profit organization, and usually with substantial social capital.



Southern Humboldt Fire Safe Council fuel reduction activities.

Most of the remaining FSCs and Firewise® Communities depend on dedicated individual volunteers, several of whom are over sixty years old and—like their volunteer fire department counterparts—need a new cadre of younger replacements to continue their efforts to lead these vital community activities.

There is new momentum gathering via the Humboldt County Prescribed Burn Association to bring together landowners to cooperatively implement prescribed burns on private lands throughout the county. This will be an important model to follow locally and beyond.

There are nine Community Emergency Response Teams (CERTs) operating here, in addition to the Humboldt CERT Coalition, which provides coordination and trainings.

Although a number of communities have taken initiative to increase their fire preparedness, many more Communities at Risk¹³ have multiple unmet hazard-mitigation needs. Therefore, community preparedness through fire-safety efforts is moderate in Humboldt County.

*For more information on community fire-safety efforts, see Chapter 5.4, **Community Preparedness**, and the **Planning Unit Action Plans** in Part 4.*

¹³ See section 5.1.2 for more information on designated Communities at Risk from wildfire in Humboldt County.

2.5.2 FIRE PREVENTION AND EDUCATION



Honeydew Volunteer Fire Company, CWPP meeting announcement.

Many fire-service entities and fire-management jurisdictions in Humboldt County devote time and resources to promoting fire education and prevention programs within local communities. These educational programs stress the importance of citizen involvement in local hazard mitigation and fire planning to help protect communities from wildfire. Generally, these programs are underfunded and understaffed, which means there are few resources to dedicate to wildfire prevention education.

While public understanding of fire prevention and fire safety is increasing in Humboldt County, education is still needed, especially among the smaller, more remote Communities at Risk. Therefore, community preparedness through fire prevention and education is moderate in Humboldt County.

For more information on fire prevention and education, see Chapter 5.4, Community Preparedness.

2.5.3 COMMUNITY PREPAREDNESS IDENTIFIED NEEDS 2018–2023

The agencies and organizations introduced in Chapter 5.4, are making significant contributions towards community preparedness in Humboldt County. To expand on their efforts and continue to build local wildfire preparedness and community wildfire-adaptation capacity, the following items have been identified in Chapter 5.4, Community Preparedness, as the priority community-preparedness needs in Humboldt County over the next five years.

The following list of identified needs are addressed in the Countywide Action Plan chapters of Part 3 of this CWPP. Community-specific needs and related priority actions are found in the Planning Unit Action Plans located in Part 4.

FIGURE 2.5.1 COMMUNITY-PREPAREDNESS PRIORITY NEEDS 2018–2023

- ❖ Find sustainable funding sources to support the coordinators of the HCFSC and local FSCs.
- ❖ Build capacity for FSCs, including identification of healthy and appropriate host organizations for those that are not associated with an existing organizational umbrella.
- ❖ Increase coordination and collaboration between FSCs and local tribes.
- ❖ Support formation of new FSCs where there is a need and potential for success. Underserved areas include:
 - Avenue of the Giants (Planning Unit 14)
 - Eel (Planning Unit 10)
 - Humboldt Bay Area (Planning Unit 8), specifically the WUI areas around Arcata, Blue Lake, Eureka, Fieldbrook, and McKinleyville
- ❖ Support the continued work of existing Firewise® Community sites and assist with the recognition of new sites where needed, Including:

| | |
|---|---|
| <ul style="list-style-type: none"> ➢ Alderpoint ➢ Avenue of the Giants individual communities ➢ Blue Lake and greater area ➢ Blue Lake Rancheria ➢ Briceland ➢ Ettersburg | <ul style="list-style-type: none"> ➢ Garberville/Redway area ➢ Hoopa ➢ Orick ➢ Westhaven/Trinidad ➢ Whitethorn |
|---|---|
- ❖ Maintain existing Community Emergency Response Teams (CERTs) and identify agencies to support new local CERTs. Train more members through Humboldt CERT Coalition to join teams throughout the county. Form a countywide CERT for all unincorporated areas and areas that do not have existing CERTs.

FIGURE 2.5.1 COMMUNITY-PREPAREDNESS PRIORITY NEEDS 2018–2023

- ❖ Expand local fire-agency prevention and preparedness programs to more departments throughout the county; include wildfire-preparedness programs.
- ❖ Create information and other resources to help residents understand how to use prescribed fire to reduce fuels on their properties.
- ❖ Complete the County Evacuation Plan, community profiles for each identified isolated community or CWPP Fire Planning Unit, and identify Community Liaisons.
- ❖ Develop and/or strengthen outreach programs to prepare communities to evacuate safely and effectively.
- ❖ Work with community members to identify and map potential evacuation routes, potentially safe public escape areas, and known evacuation barriers. Ensure these are communicated to both first responders and residents.

2.6 FURTHERING RISK ASSESSMENT IN HUMBOLDT COUNTY

The risk assessment undertaken for this CWPP was done at a very coarse scale. As shown in *Parts 4* and *5* of this plan, more detailed local CWPPs and Firewise® Assessments have been completed for some areas of the county. However, a more detailed assessment of risks (home-by-home, or at least at the neighborhood level) is still needed for most areas.

A significant amount of community-identified fire-planning information has been collected and mapped over the fifteen years of fire-safe planning by the Humboldt County Fire Safe Council. As will be explored in the implementation of the *Countywide Action Plan, (Chapter 3.6, Integrated Planning)*, these community-generated data need to be evaluated—sometimes on the ground—and integrated as appropriate into fire-agency and local Fire Safe Council planning datasets to facilitate effective wildfire mitigation in Humboldt County. Managing these datasets is a significant task.

To fully assess local fire risk as systematically and comprehensively as possible is a substantial undertaking. **Humboldt County residents—especially through local FSCs, Firewise® Communities, and other neighborhood or community organizations—are encouraged to use the resources in this CWPP to better understand the fire hazards and risks where they live.** In addition, the County of Humboldt and the HCFSC, will need to **track evolving climate change research and modeling as it pertains to wildfire risk and incorporate findings into wildfire adaptation strategies** as this CWPP is implemented and maintained. In this way, Humboldt County can continue to improve its community fire safety and hence reduce its risk of catastrophic wildfire damage.

The following chapters in *Part 3, Countywide Action Plan*, are the HCFSC and its collaborators’ proposed actions to address the issues identified in this risk assessment.



Smoke from the 2015 fires in and around Humboldt County.