14. WILDFIRE

The *Humboldt County Community Wildfire Protection Plan (CWPP) Update*, approved by the County Board of Supervisors in 2019, is effectively the wildfire hazard mitigation plan for the Humboldt Operational Area. The CWPP is hereby linked to this hazard mitigation plan by reference, and key components of it are referenced in this chapter, which provides an overview of the wildfire hazard. The complete document can be viewed online at: https://humboldtgov.org/2431/CWPP-2019

14.1 GENERAL BACKGROUND

A wildfire is any uncontrolled fire on undeveloped land that requires fire suppression. Wildfires can occur naturally and are important to many ecosystem processes, but most are started by people. CAL FIRE has modeled and mapped wildfire hazard zones using a computer model that designates moderate, high or very high fire hazard severity zones (FHSZ). FHSZ ratings are derived from a combination of fire frequency (how often an area burns) and expected fire behavior under severe weather conditions. CAL FIRE's model derives fire frequency from 50 years of fire history data. Fire behavior is based on factors such as the following (CAL FIRE, 2017a):

Fire Hazard Severity as Determined by CAL FIRE

- The classification of a zone as Moderate, High, or Very High fire hazard is based on a combination of how a fire will behave and the probability of flames and embers threatening buildings.
- Zone boundaries and hazard levels are determined based on vegetation. For wildland areas, the current FHSZ model uses burn probability and expected fire behavior based on weather, fuel, and terrain conditions. For urban areas, zone boundaries and hazard levels are based on vegetation density, adjacent wildland FHSZ scores, and distance from wildlands.
- Each area of the map gets a score for flame length, embers, and the likelihood of the area burning. Scores are then averaged over the zone areas.

- **Fuel**—Fuel may include living and dead vegetation on the ground, along the surface as brush and small trees, and above the ground in tree canopies. Lighter fuels such as grasses, leaves and needles quickly expel moisture and burn rapidly, while heavier fuels such as tree branches, logs and trunks take longer to warm and ignite. Trees killed or defoliated by forest insects and diseases are more susceptible to wildfire.
- **Weather**—Relevant weather conditions include temperature, relative humidity, wind speed and direction, cloud cover, precipitation amount and duration, and the stability of the atmosphere. When the temperature is high, relative humidity is low, wind speed is increasing and coming from the east (offshore flow), and there has been little or no precipitation so vegetation is dry, conditions are very favorable for extensive and severe wildfires. These conditions occur more frequently inland where temperatures are higher and fog is less prevalent.
- **Terrain**—Topography includes slope and elevation. The topography of a region influences the amount and moisture of fuel; the impact of weather conditions such as temperature and wind; potential barriers to fire spread, such as highways and lakes; and elevation and slope of land forms (fire spreads more easily uphill than downhill).

The model also is based on frequency of fire weather, ignition patterns, and expected rate-of spread. It accounts for flying ember production, which is the principal driver of the wildfire hazard in densely developed areas. A related concern in built-out areas is the relative density of vegetative fuels that can serve as sites for new spot fires

within the urban core and spread to adjacent structures. The model refines the zones to characterize fire exposure mechanisms that cause ignitions to structures. Significant land-use changes need to be accounted for through periodic model updates. Detailed discussions of the zones and how they are developed are available on the CAL FIRE website (CAL FIRE, 2012 and 2012a).

14.2 HAZARD PROFILE

14.2.1 Wildfire Factors for the Planning area

Topography

Humboldt County has a mixture of rugged mountains, rolling hills, and broad valleys. Elevations range from the coastal community of Manila, just 13 feet above sea level, to Salmon Mountain, the county's highest peak at 6,962 feet (in the Trinity Alps Wilderness of Six Rivers National Forest). The drier, more fire-prone areas of the county are also the steepest and most rugged. These steep drainages can act as chimneys, which can move wind and fire very quickly up a slope. Due to the remoteness and steepness of slopes within the county, fire equipment and personnel can be limited in their access to wildfires. This adds significant fire risk to Humboldt County communities.

Weather

Inland thunderstorm activity in Humboldt County typically begins in June with wet storms. These storms often turn dry and are accompanied by lightning as the season progresses into July and August. The combination of dry thunderstorms and a lack of marine influence increases the potential for summer fires in the eastern portion of the county. Prevailing winds during the fire season (generally June through October) are out of the northwest. In July and August, local winds (slope winds and sea breezes) predominate, with the Pacific jet stream weak and well to the north. By September, weak to moderate north-to-northeast winds can become more prevalent. These winds are more critical for bringing in moist ocean air than in the late spring. The more easterly flows in particular are problematic, being significantly drier. Fires during foehn events—or subsiding winds— usually result in extreme fire behavior as the winds are particularly strong and dry, reducing fuel moistures. This leads to easier ignitions and increased fire intensity and rate of spread. Foehn winds can also cause extreme fire behavior at night when fires normally die down.

Vegetation and Fuels

Nearly every major fuel type in California exists in Humboldt County: grasslands, oak woodlands, brushlands, hardwood forests, mixed conifer forests, and conifer forests, including the redwood groves. Because of this ecosystem diversity, Humboldt County can experience virtually any type of wildfire that can occur in California, from fast spreading grass fires to long-duration forest fires.

The virtual exclusion of widespread low- to moderate-severity fire has affected the structure and composition of vegetation types. Conifer stands are generally denser, mainly in small- and medium-size classes of shade tolerant and fire-sensitive tree species like Douglas fir and tanoak. Fuels have become more vertically continuous, contributing to more spatially homogeneous forests. Selective cutting of large overstory trees, intense fire suppression, and the relatively warm, moist climate during much of the twentieth century likely enhanced conifer seedling establishment and hardwood sprouting.

14.2.2 Past Events

Fire has been a significant factor in Humboldt County's history. Evidence of this can be seen in the fire scars on ancient redwoods, some dating back more than a thousand years. Despite the generally damp climate prevailing in

these forests, studies have suggested an historical fire return interval of 50 to 100 years in the northern part of the county and 12 to 50 years in the south. Several of the more destructive historical fires occurred on the coast around the Trinidad area, including the 7,432-acre Luffenholz Fire of 1908, the 17,527-acre A-Line Fire of 1936, and a 15,000-acre unnamed fire near Patrick's Point in 1945.

According to current CAL FIRE data, 634 wildfires burned in Humboldt County between 1910 and 2017, as shown in the Figure 14-1. The decade with the highest number of large fires was the 1950s, followed by the decades at the beginning of the 20th century. This data is generated by CAL FIRE from a multi-agency map of fire history. CAL FIRE includes timber fires 10 acres or greater, brush fires 30 acres and greater, and grass fires 300 acres or greater. For fires recorded by the U.S. Forest Service, there has been a 10-acre minimum for fires since 1950.

Source: 2019 Humboldt County CWPP

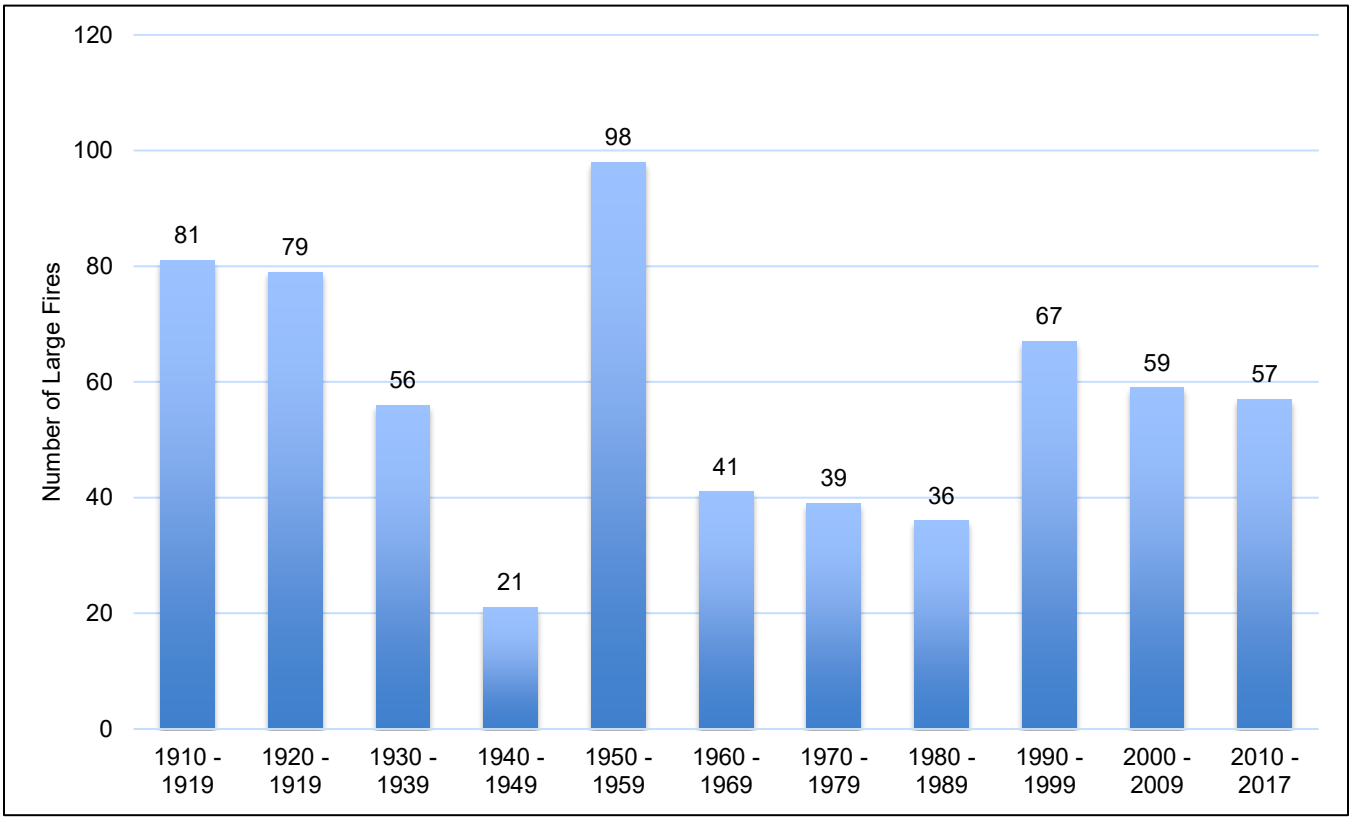


Figure 14-1. Humboldt County, Large Fires by Decade, 1910–2017

Figure 14-2 shows the total number of fires by size between 1908 and 2017. As expected, most fires (259 or 40 percent) are small, in this case less than 25 acres. Beyond these small fires, the largest number of fires (135 fires or 21 percent of all fires in Humboldt County between 1908 and 2017) were between 100 and 500 acres. There have been only 22 fires over 5,000 acres since 1908, 3 percent of the total. Of the 22 large fires, seven occurred since 1999.

Source: 2019 Humboldt County CWPP

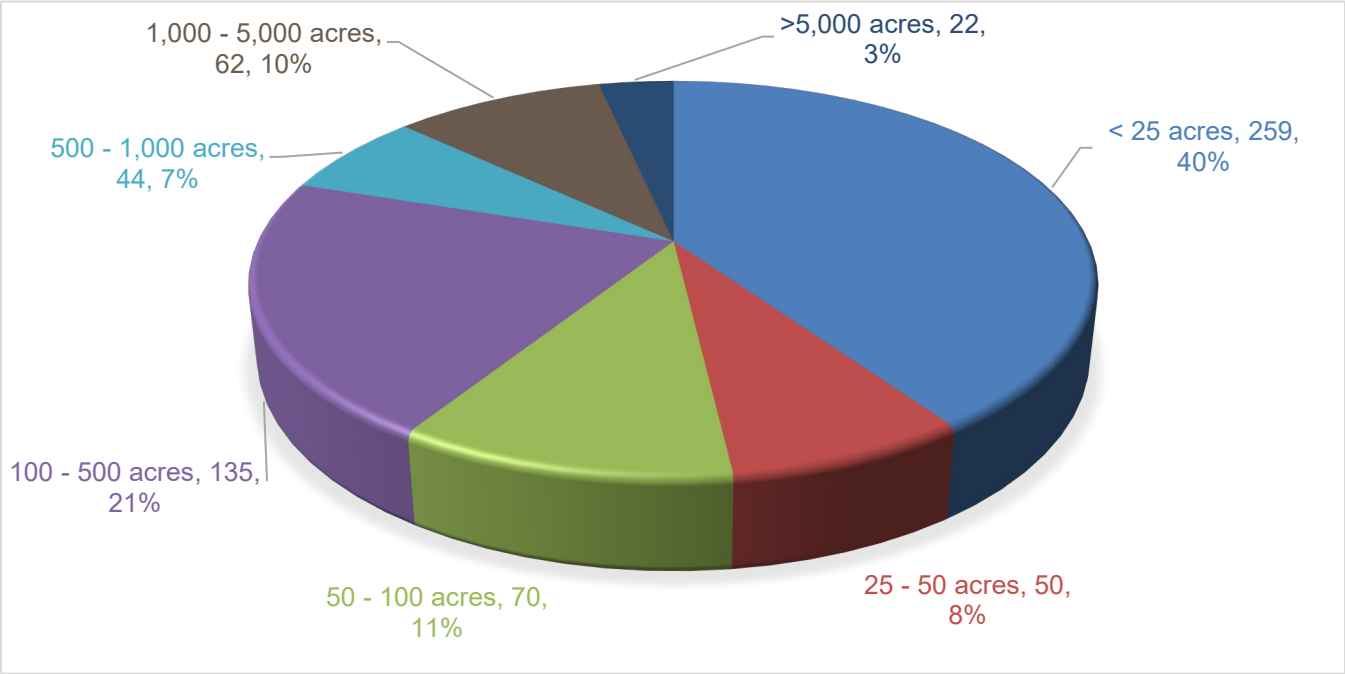


Figure 14-2. Humboldt County, Total Number of Fires by Size, 1908–2017

14.2.3 Location

Figure 14-3 shows the FHSZ mapping for the planning area. Humboldt County exhibits the complete range of severity classification from Moderate to Very High. In State Responsibility Area (SRA) lands, the map generally reflects a High rating in the western portions of Humboldt County, where the fuel potential is high, but the climate is damp. Humboldt's Very High ratings are generally in the drier, eastern portions of the county, or in very steep terrain, such as found along the Lost Coast. Moderate ratings are in valley bottom areas, which are generally urban or agricultural. Areas with lower fire risk are concentrated in coastal and estuary lands. There are no Very High classifications in the local responsibility area in Humboldt County. In Humboldt County, 2.13 million acres are in a high, or very high FHSZ. This represents over 82 percent of the area of the County.

14.2.4 Frequency

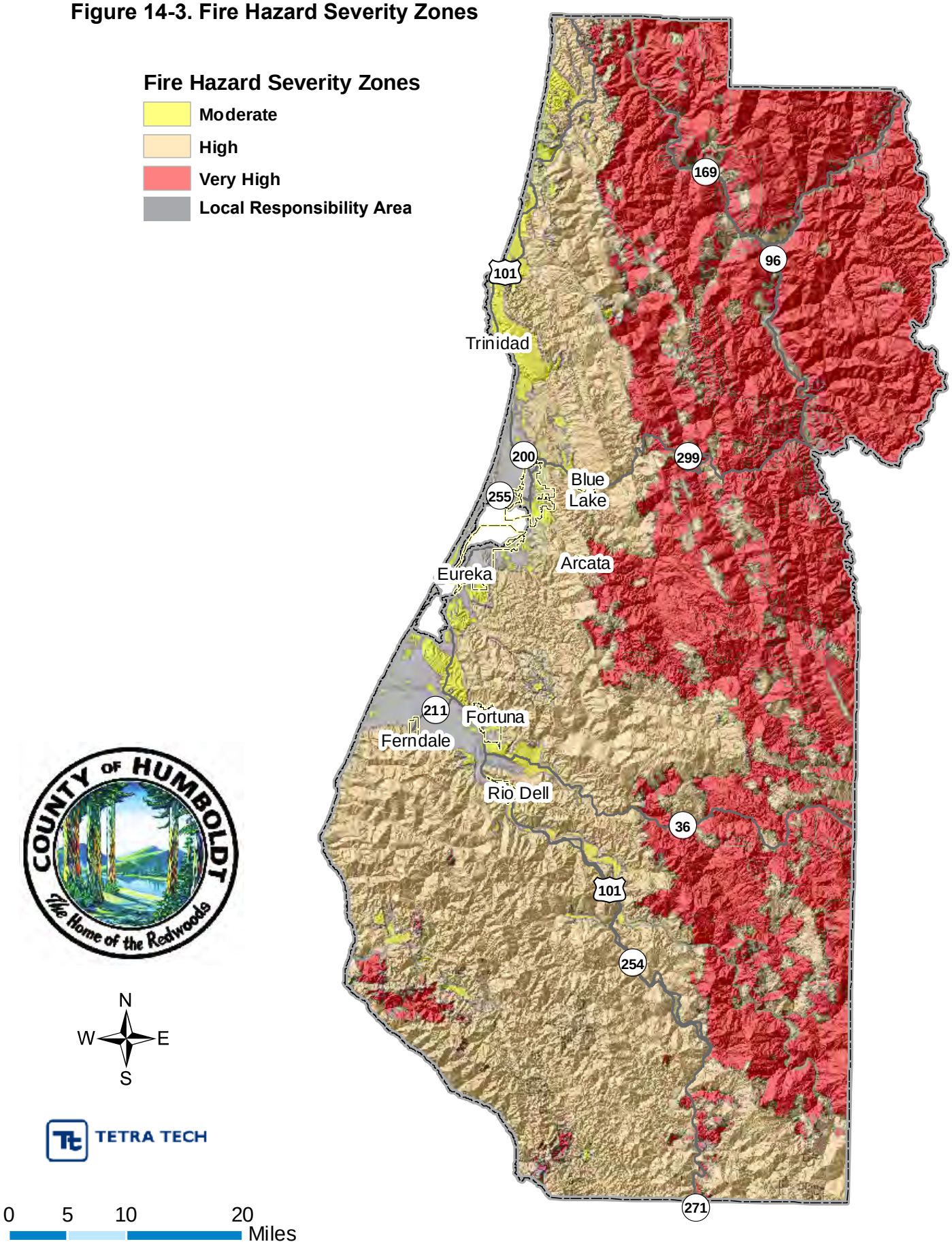
The overall probability of some wildfire event impacting the planning area is high. Figure 14-4 charts the major fires in the county each year from 1908 to 2017. The average is 2 fires per year, and the range is from 0 to 17 fires per year. The wildfire probability varies with time of year and size of fire, as described in the following sections.

Frequency by Month

The wildfire season in Humboldt County historically began in June and ended in mid-October; however, today's fire season is longer. Changing climate conditions are beginning to change the local fire season, especially in terms of earlier snowmelt and increased night-time temperatures. Drought, light snow pack, and local weather conditions can expand or shorten the length of fire season. In most parts of the state, the fire season is now considered to be year-round.

Humboldt County

Figure 14-3. Fire Hazard Severity Zones



Source: 2019 Humboldt County CWPP

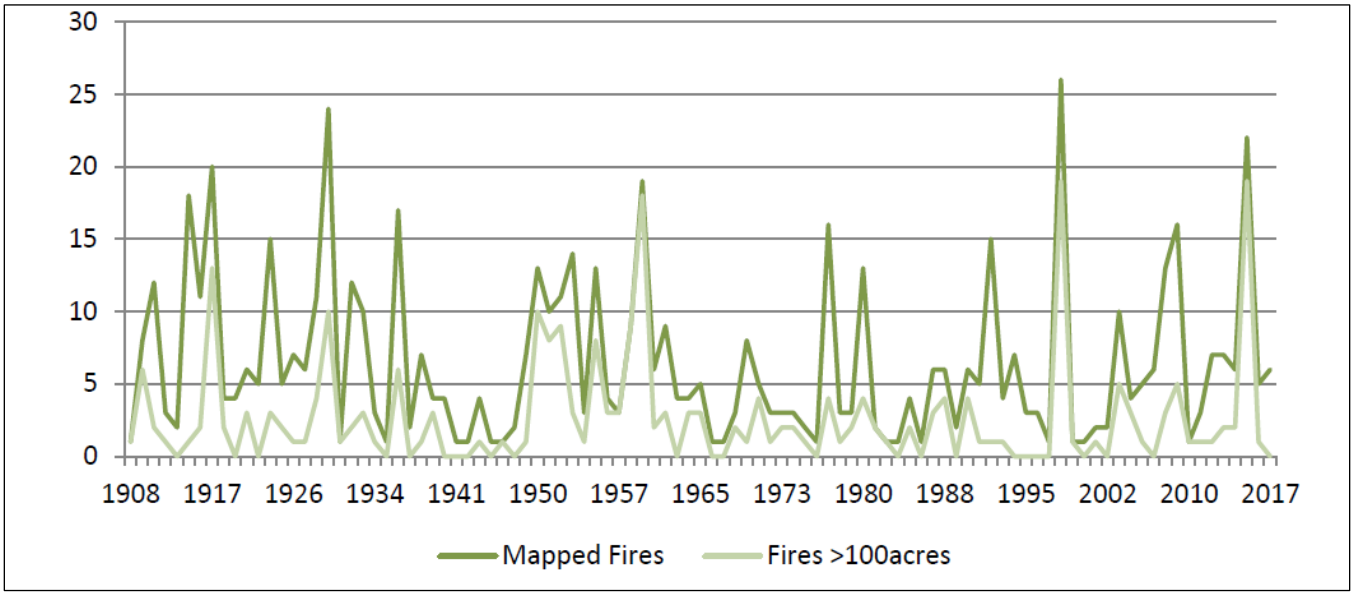


Figure 14-4. Humboldt County, Number of Fires per Year, 1908–2017

Figure 14-5 shows the number of fire ignitions by month in Humboldt County, from 1974 through 2017. The greatest potential for ignitions occurs between June and October. Figure 14-6 shows the average number of acres burned by month for the same years. The greatest potential for fires to grow to a large size happens in September. This is likely due to weather and fuel conditions, which could be exacerbated by the possibility that fire suppression resources could be stretched throughout the state in the fall.

Source: 2019 Humboldt County CWPP

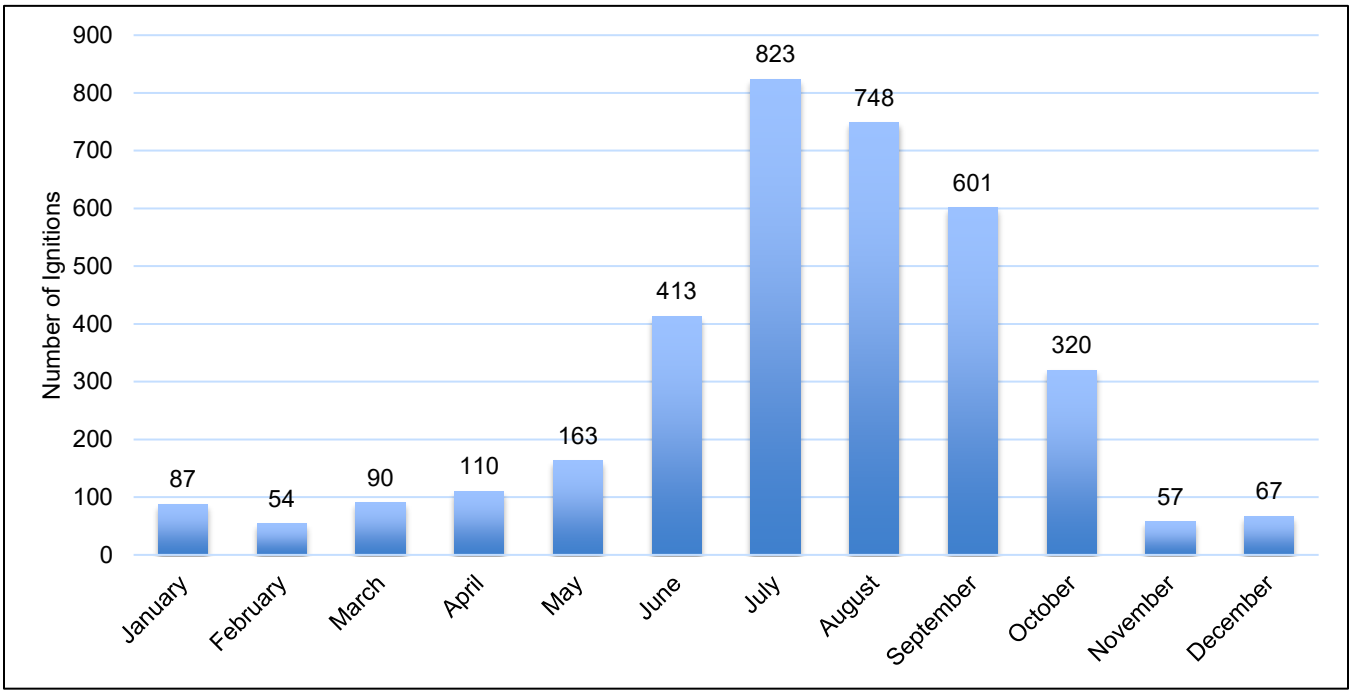


Figure 14-5. Humboldt County, Number of Ignitions by Month, 1974-2017

Source: 2019 Humboldt County CWPP

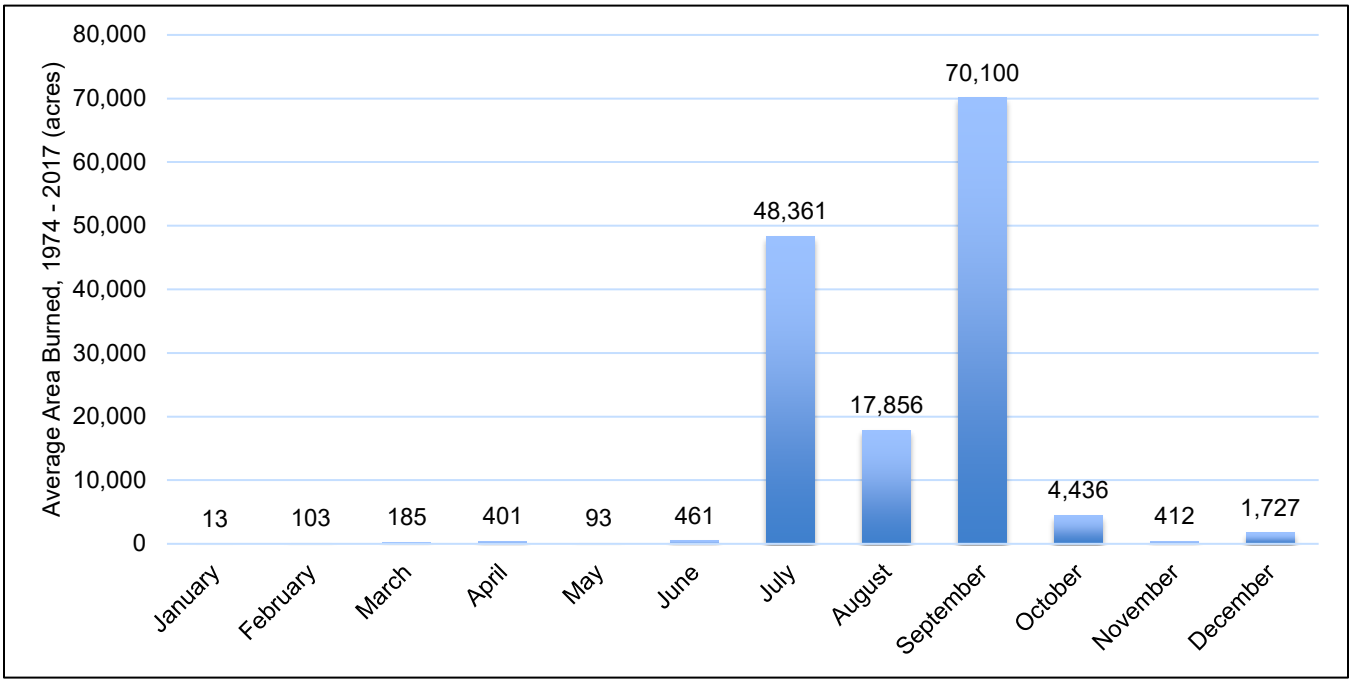


Figure 14-6. Humboldt County, Average Number of Acres Burned by Month, 1974-2017

Fire Regimes

Fire regime is a description of fire's historical natural occurrence, variability, and influence on vegetation dynamics in the landscape. Fire regimes can provide information for fire planning, as they describe the frequency of fire and the effects a fire is expected to have on a particular area's vegetation. Generally based on fire history reconstructions, fire regime descriptions include the season, frequency, severity, size, and spatial distribution of fires. There is a wide variability in intervals, severities and seasons, but some generalities have been made. Over the years, foresters and plant ecologists have come to use a small number of standardized fire regime classes to make general comparisons about the fire ecology of ecosystems and regions. Five historical fire regimes are defined, based on the average number of years between fires (fire frequency) and fire severity (amount of consumption of the dominant overstory vegetation):

- I: 0 to 35-year frequency and low (surface fires most common) to mixed severity (less than 75 percent of the dominant overstory vegetation replaced)
- II: 0 to 35-year frequency and high (stand replacement) severity (greater than 75 percent of the dominant overstory vegetation replaced)
- III: 35- to 100+-year frequency and mixed severity
- IV: 35- to 100+-year frequency and high severity
- V: 200+-year frequency and high severity.

According to CAL FIRE, Humboldt County primarily has Fire Regime I, which means a natural fire-return interval between 0 and 35 years of low severity fire. There are also scattered areas of Fire Regime III, with a mixed severity fire frequency from 35 to over 100 years, generally found on ridgetops, and more often in the eastern parts of the county. All three condition classes (1, 2, and 3) exist in Humboldt County. Condition class is generally within or near fires' historical range for the western and lower elevation/riparian areas of the county. As elevation increases, condition class changes from moderately altered to severely altered from historical range.

14.2.5 Severity

Potential losses from wildfire include human life, structures and other improvements, and natural resources. Given the immediate response times to reported fires and the proximity to firefighting resources, the likelihood of injuries and casualties is minimal. However, under the right conditions, fire can move quickly and overwhelm an initial response. Smoke and air pollution from wildfires can be a health hazard, especially for sensitive populations including children, the elderly and those with respiratory and cardiovascular diseases. Wildfire may also threaten the health and safety of those fighting the fires. First responders are exposed to the dangers from the initial incident and after-effects from smoke inhalation and heat stroke. In addition, wildfire can lead to ancillary impacts such as landslides in steep ravine areas and flooding due to the impacts of silt in local watersheds.

Air Quality Impact

Smoke generated by wildfire consists of visible and invisible emissions that contain particulate matter (soot, tar, water vapor, and minerals), gases (carbon monoxide, carbon dioxide, nitrogen oxides) and toxics (formaldehyde, benzene). Emissions from wildfires depend on the type of fuel, the moisture content of the fuel, the efficiency (or temperature) of combustion, and the weather. Public health impacts associated with wildfire include difficulty in breathing, odor, and reduction in visibility. The North Coast Unified Air Quality Management District monitors smoke impacts from active wildfires and issues wildfire smoke air quality notifications ranging from “good” to “hazardous” (North Coast Unified Air Quality Management District, 2018).

The planning area is prone to temperature inversions, which occur when a layer of warm air traps cool air near the surface and creates a lid that inhibits the vertical dispersion of smoke and other pollutants. The Megram Fire (Big Bar Complex Fire) burned 135,000 acres between late August and early November 1999 in eastern Humboldt and Trinity Counties, and resulted in the first air quality related state of emergency in California history. Smoke from the fire was trapped by an inversion layer between late September and early October, causing officials to close schools and encourage residents to leave the area. Those who remained in the affected area were encouraged to remain indoors.

14.2.6 Warning Time

Wildfires are mostly caused by humans, intentionally or accidentally. There is no way to predict when one might break out. Since fireworks often cause brush fires, extra diligence is warranted around the Fourth of July when the use of fireworks is highest.

Dry seasons and droughts are factors that greatly increase fire likelihood. Dry lightning may trigger wildfires. Severe weather can be predicted, so special attention can be paid during weather events that may include lightning. Reliable National Weather Service lightning warnings are available on average 24 to 48 hours prior to a significant electrical storm.

If a fire does break out and spread rapidly, residents may need to evacuate within days or hours. A fire’s peak burning period generally is between 1 p.m. and 6 p.m. Once a fire has started, fire alerting is reasonably rapid in most cases. The rapid spread of cellular and two-way radio communications in recent years has further contributed to a significant improvement in warning time; however, the lack of reliable cell service in many parts of Humboldt County means that providing warning to those in the path of a fire may still be difficult, particularly if individuals are not in areas with land lines.

14.3 SECONDARY HAZARDS

Wildfires can generate a range of secondary effects, which in some cases may cause more widespread and prolonged damage than the fire itself. Fires can cause direct economic losses in the reduction of harvestable

timber and indirect economic losses in reduced tourism. Wildfires cause the contamination of reservoirs, destroy transmission lines and contribute to flooding. They strip slopes of vegetation, exposing them to greater amounts of runoff. This in turn can weaken soils and cause failures on slopes. Major landslides can occur several years after a wildfire. Most wildfires burn hot and for long durations that can bake soils, especially those high in clay content, thus increasing the imperviousness of the ground. This increases the runoff generated by storm events, thus increasing the chance of flooding. These secondary impacts of wildfire can also affect the quantity and quality of water, which can pose a significant challenge to drinking water utilities (US EPA August 2019).

14.4 EXPOSURE

A quantitative assessment of exposure to the wildfire hazard was conducted using the fire hazard severity zone mapping shown in Figure 14-3 and the asset inventory developed for this plan (See Section 6.3). Detailed results are provided in Appendix C and summarized below.

14.4.1 Population

Population was estimated using the residential building count in each mapped hazard area and multiplying by the 2018 estimated average population per household (US Census American Community Survey, 2018). Using this approach, the estimated population living in mapped wildfire risk areas is 55.9 percent of the planning area population (76,012 people). The population exposure estimates by risk area are shown in Table 14-1. In addition to populations who reside in risk areas where fires may occur, hikers and campers in the mountains may be exposed to wildfires and the entire population of the planning area has the potential to be exposed to smoke from nearby wildfires.

Table 14-1. Humboldt County Population Exposure to the Wildfire Hazard

Fire Hazard Severity Zone	Population Exposed	% of Total Population
Moderate	42,597	31.3%
High	27,896	20.5%
Very High	5,519	4.1%
Total	**76,012**	**55.90%**

14.4.2 Property

Figure 14-7 shows the percentage and count, by land use type, of planning area structures in very high and high severity zones. An estimated 83 percent of these structures (11,862 structures) are residential.

The total replacement value of property in the wildfire hazard area is about $18.6 billion—52.7 percent of the planning area total:

- Moderate fire hazard severity: $10.4 billion
- High fire hazard severity: $6.7 billion
- Very high fire hazard severity: $1.6 billion

14.4.3 Critical Facilities and Infrastructure

Critical facilities and infrastructure exposed to the wildfire hazard represent 35 percent of the total critical infrastructure and facilities in the planning area. The breakdown of exposure by severity zone and facility type is shown in Figure 14-8. Linear, above-ground infrastructure, such as power lines, is also exposed to damage from wildfire, but is not included in this quantitative analysis.

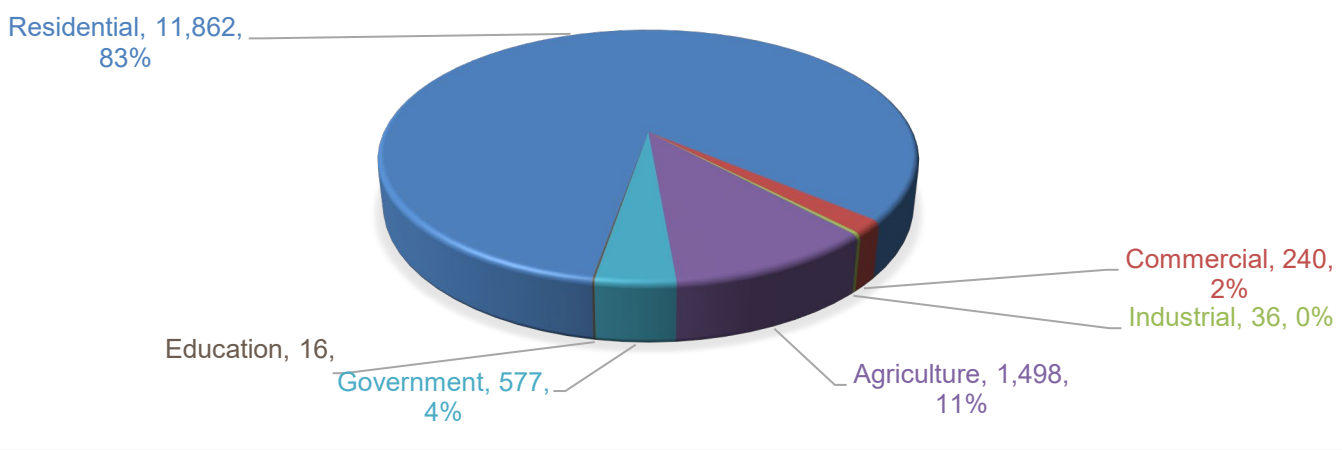


Figure 14-7. Structures in the High or Very High Fire Hazard Severity Zones, by Land Use Type

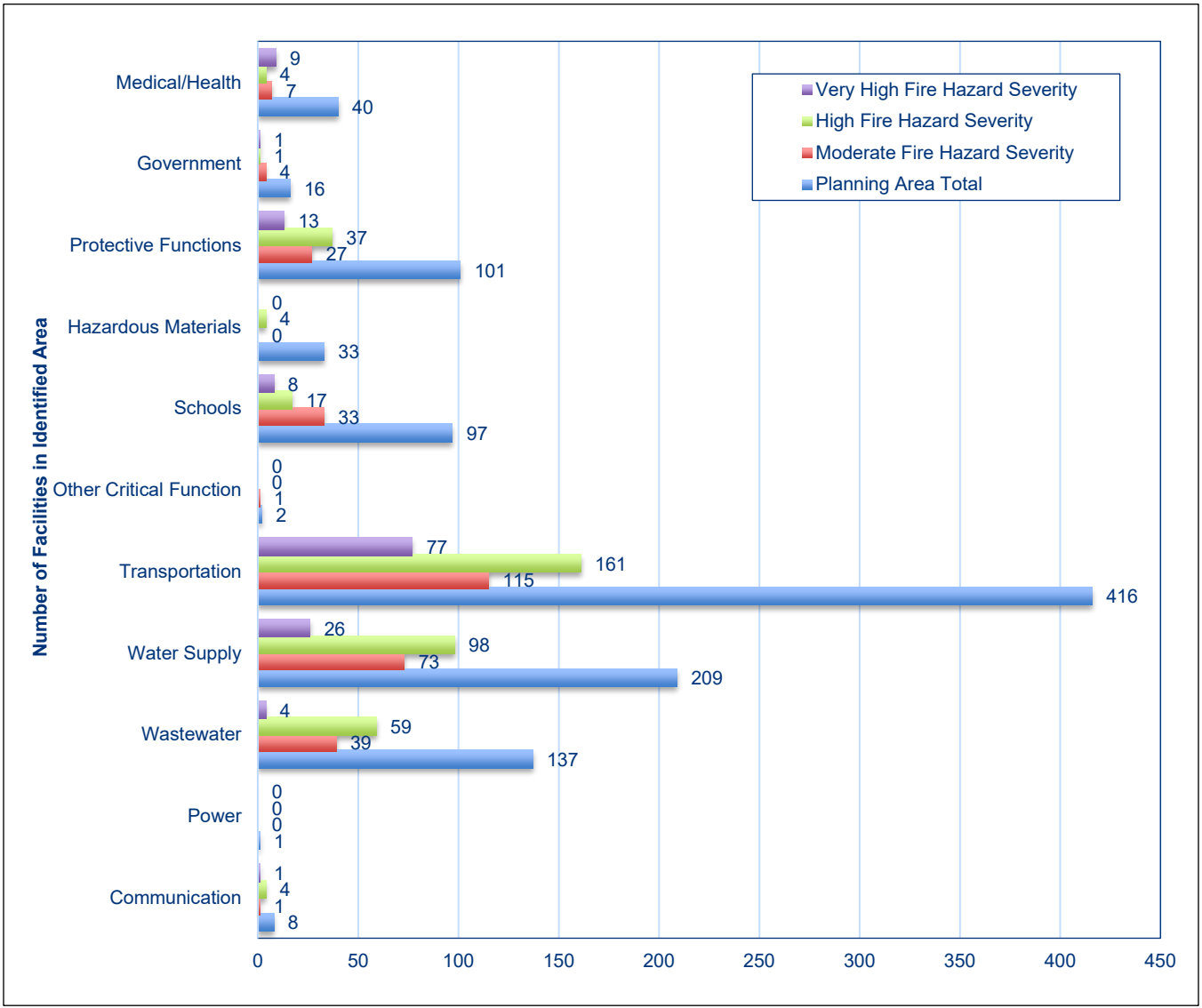


Figure 14-8. Critical Facilities and Infrastructure in Mapped Fire Hazard Severity Zones and Countywide

14.4.4 Environment

All natural resources and habitats in mapped fire hazard severity zones are exposed to the risk of wildfire.

14.5 VULNERABILITY

Vulnerability estimates for the wildfire hazard are described qualitatively. No loss estimation of these facilities was performed because damage functions have not been established for the wildfire hazard. Modeling based on identified fire hazard areas would overestimate potential losses because it is unlikely that all areas susceptible to wildfire would experience a fire at the same time.

14.5.1 Population

All people exposed to the wildfire hazard are potentially vulnerable to wildfire impacts. Humboldt County is very large, and fires can occur almost anywhere. The resident population is widely distributed. Response times can be very long and the weight of response (number of firefighters and engines) can be limited. Humboldt County has many areas where the roads accessing communities and residential clusters do not meet emergency access standards for road width (to allow residential population evacuation and incoming emergency apparatus) and where alternative access routes are not available. Smoke and air pollution from wildfires can be a severe health hazard, especially for sensitive populations, including children, the elderly and those with respiratory and cardiovascular diseases. In addition, wildfire may threaten the health and safety of those fighting the fires. First responders are exposed to dangers from the initial incident and after-effects from smoke inhalation and heat stroke. Persons with access and functional needs, the elderly and very young may be especially vulnerable to a wildfire if there is not adequate warning time before evacuation is needed.

14.5.2 Property

All property exposed to the wildfire hazard is vulnerable. Structures that were not constructed to standards designed to protect a building from a wildfire may be especially vulnerable. As of 2008, California State Building code requires minimum standards be met for new buildings in fire hazard severity zones. Most housing in the planning area—84 percent—was built prior to this code requirement (U.S. Census, 2018). It is unknown how many of these structures are in fire hazard zones.

Estimates were developed to indicate the loss that would occur if wildfire damage were equal to 10, 30 or 50 percent of the exposed property value, as summarized in Table 14-2. Damage in excess of 50 percent is considered to be substantial by most building codes and typically requires total reconstruction of the structure.

Table 14-2. Loss Estimates for Fire Hazard Severity Zones

Fire Hazard Severity Zone	Exposed Value	Damage = 10% of Exposed Value		Damage = 30% of Exposed Value		Damage = 50% of Exposed Value	
		Loss	% of Total Replacement Value	Loss	% of Total Replacement Value	Loss	% of Total Replacement Value
Moderate	$10.4 billion	$ 1.04 billion	2.94%	$ 3.1 billion	8.82%	$ 5.2 billion	29.4%
High	$6.7 billion	$669.6 million	1.9%	$2 billion	5.69%	$3.3 billion	9.49%
Very High	$1.6 billion	$160.4 million	0.45%	$ 481.1 million	1.36%	$ 801.9 million	2.27%
Total	**$18.7 billion**	**$1.8 billion**	**5.29%**	**$5.6 billion**	**15.87%**	**$9.34 billion**	**26.45%**

14.5.3 Critical Facilities and Infrastructure

Critical facilities not built to fire protection standards, utility poles and lines, and facilities containing hazardous materials are most vulnerable to the wildfire hazard. Most roads would not be damaged except in the worst scenarios, although roads and bridges can be blocked by debris or other wildfire-related conditions and become impassable. The following critical facilities are located in very high and high severity zones and their vulnerability could complicate response and recovery efforts during and following an event:

- **Hazardous Materials and Fuel Storage**—During a wildfire event, these materials could rupture due to excessive heat and act as fuel for the fire, causing rapid spreading and escalating the fire to unmanageable levels. In addition, they could leak into surrounding areas, saturating soils and seeping into surface waters, and have a disastrous effect on the environment.
- **Communication Facilities**—If these facilities are damaged and become inoperable, it would exacerbate already difficult communication in the planning area.
- **Protective Function Facilities (Police and Fire)**—Approximately 50 percent of these types of facilities are within the high-severity wildfire zone.

14.5.4 Environment

Fire is a natural and critical ecosystem process in most terrestrial ecosystems, affecting the types, structure, and spatial extent of native vegetation. However, under a specific set of circumstances, it can also cause severe environmental impacts, such as the following:

- **Damaged Fisheries**—Critical fisheries can suffer from increased water temperatures, sedimentation, and changes in water quality.
- **Soil Erosion**—The protective covering provided by foliage and dead organic matter is removed, leaving the soil fully exposed to wind and water erosion. Accelerated soil erosion occurs, causing landslides and threatening aquatic habitats.
- **Spread of Invasive Plant Species**—Non-native woody plant species frequently invade burned areas. When weeds become established, they can dominate the plant cover over broad landscapes, and become difficult and costly to control.
- **Disease and Insect Infestations**—Unless diseased or insect-infested trees are swiftly removed, infestations and disease can spread to healthy forests and private lands. Timely active management actions are needed to remove diseased or infested trees.
- **Destroyed Endangered Species Habitat—**Wildfire can have negative consequences for endangered species by degrading their habitat.
- **Soil Sterilization**—Some wildfires burn so hot that they can sterilize the soil. Topsoil exposed to extreme heat can become water repellant, and soil nutrients may be lost.
- **Reduced Timber Harvesting**—Timber can be destroyed and lead to smaller available timber harvests.
- **Reduced Agricultural Resources**—Wildfire can have disastrous consequences on agricultural resources, removing them from production and necessitating lengthy restoration programs.
- **Damaged Cultural and Historical Resources**—The destruction of cultural and historic resources may occur, scenic vistas can be damaged, and access to recreational areas can be reduced.

14.6 FUTURE TRENDS IN DEVELOPMENT

The urbanized portions of the planning area, while having, in many cases, relatively hazardous wildfire conditions (high fuels and rugged topography), also have a low likelihood or risk of wildfire. Urbanization tends to alter the natural fire regime, and can create the potential for the expansion of urbanized areas into wildland areas. The expansion of development toward wildfire hazard areas can be managed with strong land use and building codes.

The California Building Code includes minimum standards related to the design and construction of buildings in fire hazard zones. Any newly permitted buildings within the SRA in Humboldt County must conform to standards that manage flammable materials from around the building (defensible space laws) and construct buildings from fire resistant material (Chapter 7A or the Building Code). New residential construction permitted in Humboldt County's State Responsibility Areas have been built according to the standards of the 2007 California Building Code Chapter 7A, "Materials and Construction Methods for Exterior Wildfire Exposure" (effective January 1, 2008). In addition, the Humboldt County General Plan and those for each municipal planning partner include policies that address managing development in fire hazard severity zones. The planning area is well equipped with these tools, and this planning process has asked each planning partner to assess its capabilities with regards to the tools. As the planning area experiences future growth and if the recommendations of this plan are implemented, it is anticipated that the exposure to this hazard will remain as assessed or even decrease over time due to these capabilities.

State and local policies and regulations require landowners to carry out activities such as maintaining defensible space and reducing vulnerability to damage or loss from wildfire. The most important policies and regulations related to residential wildfire safety in Humboldt County are as follows:

- **General Plan Safety Element Review: Government Code 65302.5**—The Board of Forestry and Fire Protection (BOF) must provide recommendations to a local jurisdiction's General Plan Safety Element at the time that the General Plan is being amended. BOF recommendations include goals and policies that provide for contemporary fire-prevention standards for the jurisdiction. This is not a direct and binding fire-prevention requirement for individuals.
- **Sprinkler Systems: California Residential Code, Chapter 3, Section R313—**All new dwellings, dwelling units, and one- and two-family townhomes must be equipped with an automatic fire-sprinkler system that can protect the entirety of the dwelling. Dwellings and homes constructed prior to January 1, 2011, that do not have a sprinkler system may be retrofitted, but it is not required. This code is locally enforced by the Humboldt County Planning and Building Department.
- **Fire Safety Standards: California Public Resources Code 4290 and 14 California Code of Regulations (CCR) 1270—**These regulations govern roads, driveway width, clearance, turnarounds, signing, and water related to fire safety throughout California. Public Resources Code 4290 is typically enacted through regulation at the county level, as described below.
- **SRA Fire Safe Regulations: Humboldt County Code Title III, Div. 11—**These standards to reduce the risk of fire apply to proposed development within the State Responsibility Area (SRA). They are a locally adopted equivalent to the state's SRA Fire Safe Regulations and have been approved by the BOF as meeting or exceeding state regulation. The Humboldt County Planning and Building Department, with CAL FIRE, oversees the development permitting process to ensure that these standards are met. County Building Division staff inspect vegetation clearance and other improvements at the time of construction.
- **Wildland-Urban Interface Building Standards: California Government Code 51189**—The Office of the State Fire Marshal is required to create building standards for wildfire resistance. Construction of buildings in the wildland-urban interface must use fire-resistant materials to save life and property. As of 2011, the standards relevant to fire-safe construction for all new structures in the SRA are the California Building Code, Chapter 7A (for commercial construction) and the California Residential Code, Chapter 3, Section R327 (for residential construction). Humboldt County has adopted these codes.
- **State Responsibility Area: Public Resources Code 4102, 4125-4229 and 14 CCR 1220**—These statutes and regulations establish the locations where CAL FIRE has the financial responsibility for preventing and suppressing fires. These designations define financial arrangements for fire protection services and establish the locations where fire safe and defensible space laws or regulations apply.
- **Hazardous Fire Areas: Public Resources Code 4251-4255 and 14 CCR 1200—**These laws and regulations allow petitioners to the BOF or CAL FIRE to establish hazardous fire areas, providing for area closures and other restrictions for fire prevention.

- **Defensible Vegetation Clearing Around Structures: Public Resources Code 4291/14 CCR 1299**—Public Resources Code 4291 regulates fuel management around a property. It states that a person who owns or controls a building or structure in or adjoining to forest, brush, or grass covered lands shall follow certain guidelines outlined in the code. At least 100 feet of defensible space is required. The owner of the property is liable for making these changes to protect habitable structures. The 100 feet is separated into two zones, with the closer zone, 30 feet out from the structure, being managed more intensively.

14.7 SCENARIO

A major wildfire in the planning area might begin with a wet spring, adding to fuels already present on the forest floor. Flashy fuels would build throughout the spring. The summer could see the onset of insect infestation. A dry summer could follow the wet spring, exacerbated by dry hot winds. Carelessness with combustible materials or a tossed lit cigarette, or a sudden lightning storm could trigger a multitude of small isolated fires.

The embers from these smaller fires could be carried miles by hot, dry winds. The deposition zone for these embers could be deep in forested areas. Fires that start in flat areas move slower, but wind still pushes them. It is not unusual for a wildfire pushed by wind to burn the ground fuel and later climb into the crown and reverse its track. This is one of many ways that fires can escape containment, typically during periods when response capabilities are overwhelmed. These new small fires would most likely merge. Suppression resources would be redirected from protecting the natural resources to saving more remote subdivisions.

The worst-case scenario would include an active fire season throughout the American west, spreading resources thin. Firefighting teams would be exhausted or unavailable. Many federal assets would be responding to other fires that started earlier in the season.

To further complicate the problem, heavy rains could follow, causing flooding and landslides and releasing tons of sediment into rivers, permanently changing floodplains and damaging sensitive habitat and riparian areas. Such a fire followed by rain could release millions of cubic yards of sediment into streams for years, creating new floodplains and changing existing ones. With the forests removed from the watershed, stream flows could easily double. Floods that could be expected every 50 years may occur every couple of years. With the streambeds unable to carry the increased discharge because of increased sediment, the floodplains and floodplain elevations would increase.

14.8 ISSUES

The major issues for wildfire are the following:

- According to the Humboldt County CWPP, of all the wildfires from 1974 to 2017 with known ignition sources, 60 percent were started by people, including 35 percent as arson; 12 percent were caused by lightning. The remaining 28 percent were of unknown origin.
- More than 50 percent of the planning area population lives in wildfire risk areas, including 4.1 percent in very high fire hazard severity zones.
- Much of the planning area's building stock is of wood-frame construction built before 2008 when California building codes began requiring minimum standards for buildings in fire hazard severity zones. Large clusters of structures are wood-frame structures in high and very high severity zones.
- An estimated 35 percent of the critical facilities and infrastructure in the planning area are located in wildfire risk areas. A large number of the facilities are believed to be wood-frame structures. These facilities could have a significant amount of functional downtime after a wildfire. This creates not only a need for mitigation but also a need for continuity of operations planning to develop procedures for providing services without access to critical facilities.

- There are vulnerable and isolated populations in areas of high and very high risk for wildfire.
- Public education and outreach to people living in the fire hazard zones should include information about and assistance with mitigation activities such as defensible space, and advance identification of evacuation routes and safe zones.
- Wildfires could cause landslides as a secondary natural hazard.
- Analyses based on the degree of wildfire risk should be updated to match new calculations.
- Regional consistency, application and enforcement of higher building code standards such as residential sprinkler requirements and prohibitive combustible roof standards.
- Fire departments require reliable water supply in high risk wildfire areas.
- Certifications and qualifications should be expanded for fire department personnel. All firefighters should be trained in basic wildfire behavior and basic fire weather, and all company officers and chief level officers should be trained at the wildland command and strike team leader level.