

Chapter 11: Reducing Community Wildfire Risk

This chapter provides a synthesis of indicators, issues, and opportunities for reducing wildfire risk to communities.



INDICATORS

- ① 11.1 Structure Loss
- ① 11.2 Housing Units by Hazard Class
- ① 11.3 Housing Units in WUI
- ① 11.4 Community Planning

SUMMARY

In California, severe fire years can potentially lead to the loss of thousands of structures, and the historical trend shows the problem is getting worse (①11.1). This is consistent with trends from the wildfire chapter (Chapter 4) - increasing wildfire activity (①4.3) and severity (①4.4).

Development patterns have created a fire environment where about 3 million housing units are within Fire Hazard Severity Zones (FHSZ) and are potentially at risk (①11.2). This includes 2.2 million housing units within the Wildland Urban Interface (WUI), 83% of which are in dense Interface, and 17% of which are in more sparsely populated Intermix (①11.3). In addition, 67% of Interface and 73% of Intermix housing units are within High or Very High FHSZ.

The National Cohesive Wildland Fire Management Strategy includes a goal of creating Fire Adapted Communities, which recognizes the importance of various programs and actions such as community planning, land use planning, education programs, and homeowner responsibility. Communities are encouraged to take collective action to analyze their unique fire environment, identify appropriate solutions, and commit resources to mitigate risk and raise community awareness. Two ways this can be accomplished are by creating




a Community Wildfire Protection Plan (CWPP), or by becoming a Firewise community. Currently, of 1,338 communities identified as Communities at Risk (CAR), 66% (881) are covered by a CWPP (individual, regional or countywide) and/or are recognized by the Firewise program (①11.4). Numerous other communities are at various stages of CWPP development.

The CAL FIRE Land Use Planning program works with local government to address wildfire risk as part of the safety element in city and county general plans, as required in government code 65302. Land use planning includes considering wildfire risk in the location, arrangement, and composition of new development. There are opportunities to reduce overall fire risk through new development that meets current code and standards for fire resistive construction, infrastructure upgrades such as increased roadway and water flow standards, and fuel modification requirements.




Additional components of community safety are education programs such as Ready, Set, Go!, and homeowners taking responsibility to reduce their risk. A recent sample of almost 19,000 CAL FIRE defensible space home inspections indicates that 76% passed on the first visit; within Firewise communities the pass rate increased to 84%.

KEY FINDINGS





① 11.1 Indicator: Number of Structures Destroyed by Wildfire Annually

- ①  Since 1989, there were seven years in which a loss of more than 1000 structures (residences, commercial properties, outbuildings) occurred in CAL FIRE/Contract County Direct Protection Areas (DPA), including 2015, 2016, and 2017. In bad fire years, this number can exceed 5,000, as in 2003 and 2017.
- ①  In all jurisdictions, the top 20 most damaging fires on record destroyed 25,913 structures. About half of these losses occurred in 2015, 2016, or 2017.
- ①  The National Fire Information Reporting System has complex requirements for reporting structure loss due to wildfire. Structure losses on lands protected by local agencies are not always reported.



① 11.2 Indicator: Housing Units by Fire Hazard Severity Zone (FHSZ) Class

- ①  In 2010, in all counties, about 3 million housing units (HU) were in FHSZ and potentially at risk from wildfire. This includes about 1.2 million HU (41%) in the Very High class.
- ①  Over 460,000 HUs were added within FHSZ between 2000 and 2010. This includes 144,000 HU added to the Very High class.
- ①  A large proportion of the HU within FHSZ are in the southern portion of the state. The top five counties for FHSZ HU, all in southern California, contain about half of all statewide HU in FHSZ, and 62% of the HU in the Very High class. However, this is clearly a statewide problem – 37 counties have at least 10,000 HU in FHSZ.

① 11.3 Indicator: Housing Units and Wildfire Threat within the Wildland Urban Interface (WUI)

- ①  In 2010, in all counties, about 2.2 million housing units (HU) were in WUI, with 17% in Intermix and 83% in Interface.
- ①  County development patterns create unique fire risk environments. Urban counties like Los Angeles and Orange tend to have areas of dense development next to unpopulated open space, and HU are primarily in the Interface (97% and 99%). Conversely, numerous counties provide a rural lifestyle that includes low density Intermix dispersed within wildland fuels, where about half of HU are in Intermix (e.g. Butte, Eldorado, Santa Cruz, and Sonoma).
- ①  The difficulty in protecting HU from wildfire in California is demonstrated by the fact that 67% of Interface HU and 73% of Intermix HU are in High or Very High fire hazard classes.
- ①  Statewide, the 2010 WUI footprint is 17.7 million acres, including 1 million acres of Interface, 1.3 million of Intermix, and a 15.3 million acre influence zone.

① 11.4 Indicator: Number and Percent of Communities at Risk (CAR) that are Firewise Communities or Covered by a Community Wildfire Protection Plan (CWPP)

- ①  There are 1,338 individual communities represented by the Communities at Risk (CAR) list. Of these communities, 66% (881) are covered by a CWPP (individual, regional or countywide) and/or are recognized by the Firewise program. Numerous other communities are at various stages of CWPP development.
- ①  Of the CARs communities, 16% (213) are covered by individual CWPPs or the Firewise program. Individual CWPPs typically provide the finest detail for project-level planning; however, many county-level plans are very detailed, while others serve more generally as an umbrella for individual CWPPs.

DISCUSSION

This chapter uses indicators to examine development patterns and the resulting risk to housing from wildfire in terms of houses in Fire Hazard Severity Zones (FHSZ) and in the Wildland Urban Interface (WUI). It then examines opportunities to mitigate risk through community planning efforts and land use planning.

Historical Structure Loss

Figure 11.1 shows the historical trend in structures (residences, commercial properties, outbuildings) destroyed by wildfire in California (①11.1). Since 1989, there were seven years in which a loss of more than 1000 structures occurred in CAL FIRE/Contract County Direct Protection Areas (DPA), including 2015, 2016, and 2017. This is consistent with trends from the wildfire chapter (Chapter 4) – increasing wildfire activity (①4.3) and severity (①4.4).

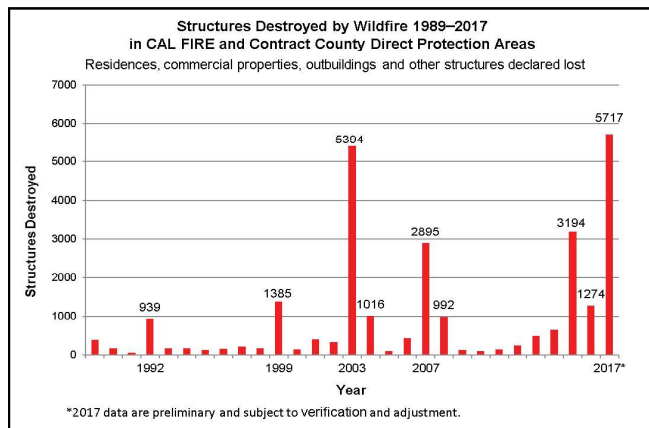


Figure 11.1: Structures Destroyed by Wildfire in CAL FIRE and Contract County District Protection Areas, 1989–2017.

Data Source: Wildfire Activity Statistics (Redbooks), CAL FIRE, 1989–2017.

Development Patterns and Wildfire Hazard

As of 2010, there were about 3 million housing units (HU) in FHSZ and potentially at risk from wildfire (①11.2). Figure 11.2 shows how these HU are distributed among California counties. A large proportion of the HU within FHSZ are in the southern portion of the state. The top five counties for FHSZ HU, all in southern California, contain about half of all statewide HU in FHSZ. However, this is clearly a statewide problem – 37 counties have at least 10,000 HU in FHSZ.

Figure 11.3 shows the distribution of HU by hazard class for counties with at least 100,000 HU in FHSZ, for 2000 and 2010 (Appendix 11.1 provides 2010 numbers for all counties). Counties with the highest numbers of HU tend to be in densely populated southern California,

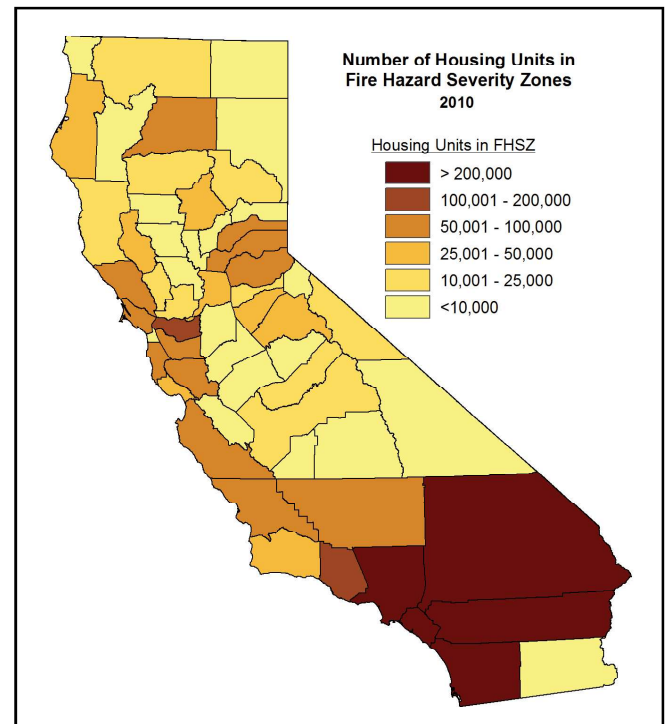


Figure 11.2: Number of Housing Units in Fire Hazard Severity Zones, 2010.

Data Sources: Fire Hazard Severity Zones, FRAP, v11; Census block data, U.S. Census Bureau, 2010.

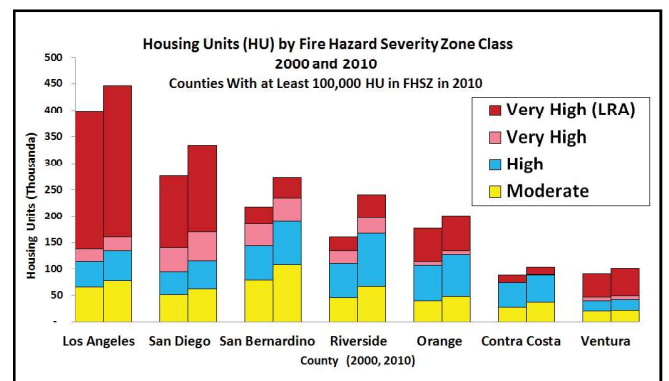


Figure 11.3: Census Housing Units by Fire Hazard Severity Zone Class, 2000 and 2010 (Counties with at least 100,000 HU in FHSZ in 2010).

Data Sources: Housing Density, LandScan, v12_2; Census block data, U.S. Census Bureau, 2000 and 2010; Fire Hazard Severity Zones, FRAP, v11_1.

where hazard tends to be the highest. The top five counties for FHSZ HU, all in southern California, contain 62% of all the statewide HU in the Very High class. Over 460,000 HU were added within FHSZ between 2000 and 2010. This includes 144,000 HU added to the Very High class.

Development can be classified into two Wildland Urban Interface (WUI) classes, each presenting unique fire protection problems and opportunities for risk mitigation. Interface represents dense urban development adjacent to wildland. The definable boundary between houses and wildland provides a line of defense, and focuses mitigation efforts along this boundary.

Intermix represents sparse development interspersed within a landscape that maintains much of the wildland characteristics. Intermix areas often require fire agencies to devote resources to protect individual houses. Mitigation includes actions such as prevention efforts, fire resistant building materials, and defensible space clearance around structures.

For the Assessment, FRAP focused on mapping WUI as the Interface and Intermix areas at risk from fire, and a 1.5 mile “influence zone” into adjacent fuels around those areas. Statewide, the 2010 WUI footprint is 17.7 million acres, including 1 million acres of Interface, 1.3 million of Intermix, and a 15.3 million acre influence zone.

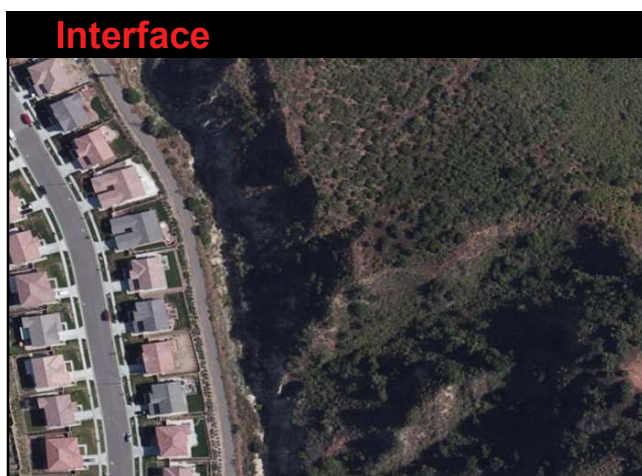
Development patterns have created a fire environment where in 2010 about 2.2 million housing units were within Wildland Urban Interface (WUI) (Table 11.1), 83% of which are in Interface, and 17% of which are in Intermix (Table 11.3) (Appendix 11.2 provides WUI class numbers by county). The difficulty in protecting houses from wildfire in California is demonstrated by the fact that 67% of HU in Interface are in High or Very High FHSZ classes. The same applies to 73% of HU in Intermix.

County development patterns create unique fire risk environments. Urban counties like Los Angeles and Orange tend to have areas of dense development next to

Table 11.1: Housing Units (HU) by Wildland Urban Interface (WUI) Class, and Within High or Very High Fire Severity Zones (FHSZ), for Counties with at Least 25,000 HU in FHSZ

County	Housing Units (HU)	Percent of HU		Percent of HU in High/Very High FHSZ	
		Intermix	Interface	Intermix	Interface
Los Angeles	375,411	3%	97%	93%	82%
San Diego	264,272	8%	92%	76%	80%
San Bernardino	207,795	20%	80%	81%	58%
Riverside	185,363	6%	94%	84%	68%
Orange	177,546	1%	99%	93%	74%
Ventura	84,642	5%	95%	71%	77%
Contra Costa	80,207	12%	88%	87%	59%
Alameda	75,901	6%	94%	85%	69%
San Luis Obispo	62,346	25%	75%	81%	37%
Marin	54,341	36%	64%	75%	67%
El Dorado	52,079	48%	52%	76%	58%
Placer	47,008	36%	64%	61%	15%
San Mateo	43,923	13%	87%	71%	66%
Santa Clara	39,987	18%	82%	88%	67%
Monterey	34,512	38%	62%	94%	69%
Kern	33,956	22%	78%	71%	34%
Santa Cruz	33,518	50%	50%	33%	37%
Nevada	33,315	49%	51%	94%	85%
Sonoma	31,488	52%	48%	35%	23%
Santa Barbara	30,679	13%	87%	77%	59%
Butte	28,741	51%	49%	95%	54%
Shasta	27,900	37%	63%	90%	66%
Counties (>25K)	2,004,930	15%	85%	73%	69%
Statewide	2,213,881	17%	83%	73%	67%

Data Sources: Housing Density, LandScan, v12_2; Fire Hazard Severity Zones, FRAP, v11_1; Census block data, U.S. Census Bureau, 2000 and 2010; Vegetation (for urban areas), FRAP, v11_1.



unpopulated open space, and HU are primarily in the Interface (97% and 99%). Conversely, numerous counties provide a rural lifestyle that includes low-density Intermix dispersed within wildland fuels, where about half of HU are in Intermix (e.g. Butte, Eldorado, Santa Cruz, and Sonoma).

Figure 11.4 shows examples of two patterns of WUI typical in California. The highway 50 corridor in Eldorado County has Interface areas in the most densely populated areas such as Placerville and Camino, which are surrounded by widespread Intermix areas in more sparsely populated areas. This pattern of development is common in other rural Sierra and northern counties.

In the Los Angeles County example, an extended Interface zone is present where densely populated urban areas are immediately adjacent to wildlands. Here, the wildlands are not populated since they are primarily in public ownership (Angeles National Forest), and thus there is little Intermix. This pattern is commonly found in portions of other southern counties and the San Francisco Bay Area.

National Cohesive Wildland Fire Management Strategy

A national vision for wildfire management is expressed by the National Cohesive Wildland Fire Management Strategy. This represents a “strategic push to work collaboratively among all stakeholders and across all landscapes, using best science, to make meaningful progress towards the three goals:

1. Resilient Landscapes
2. Fire Adapted Communities
3. Safe and Effective Wildfire Response” [1]

The second goal, Fire Adapted Communities, recognizes the importance of various programs and actions such as community planning, land use planning, education programs, and homeowner responsibility.

Community Planning

Community Wildfire Protection Plans (CWPPs)

Communities are encouraged to take collective action to analyze their unique fire environment, identify appropriate solutions, and commit resources to mitigate risk and raise community awareness. Two ways this can

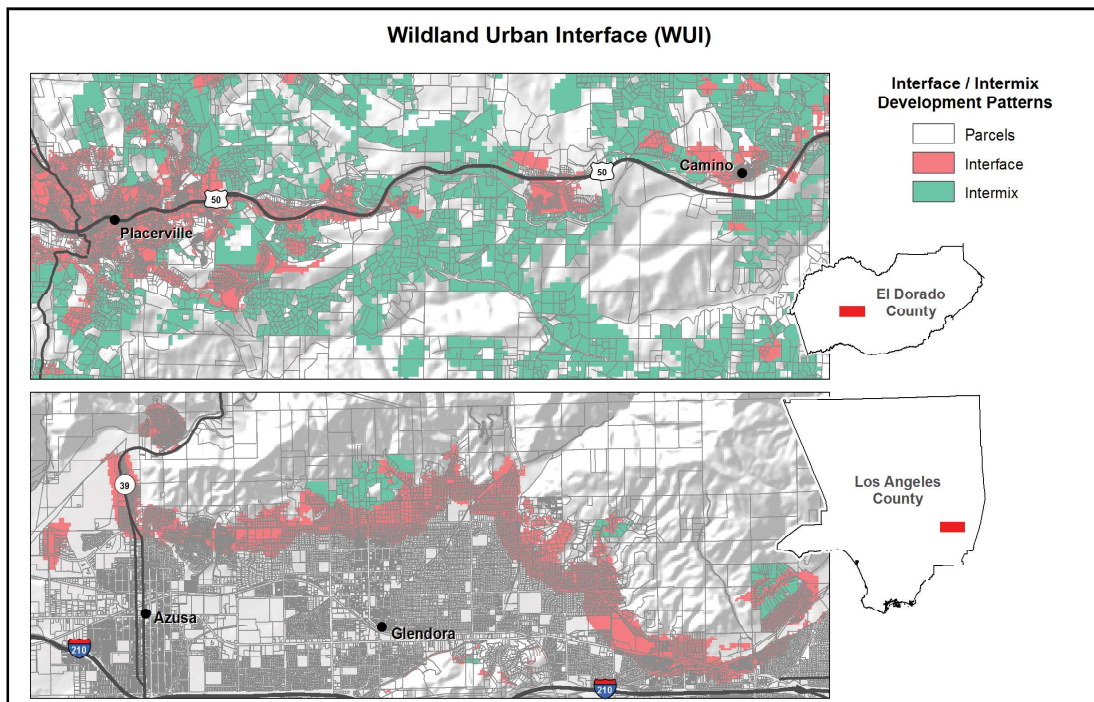


Figure 11.4: Wildland Urban Interface (Interface and Intermix), Highway 50 Corridor in Eldorado County (Top) and Glendora Area in Los Angeles County (Bottom).

Data Sources: Housing Density, LandScan, v12_2; Vegetation (for urban areas), FRAP, v11_1; Fire Hazard Severity Zones, FRAP, v11_1.

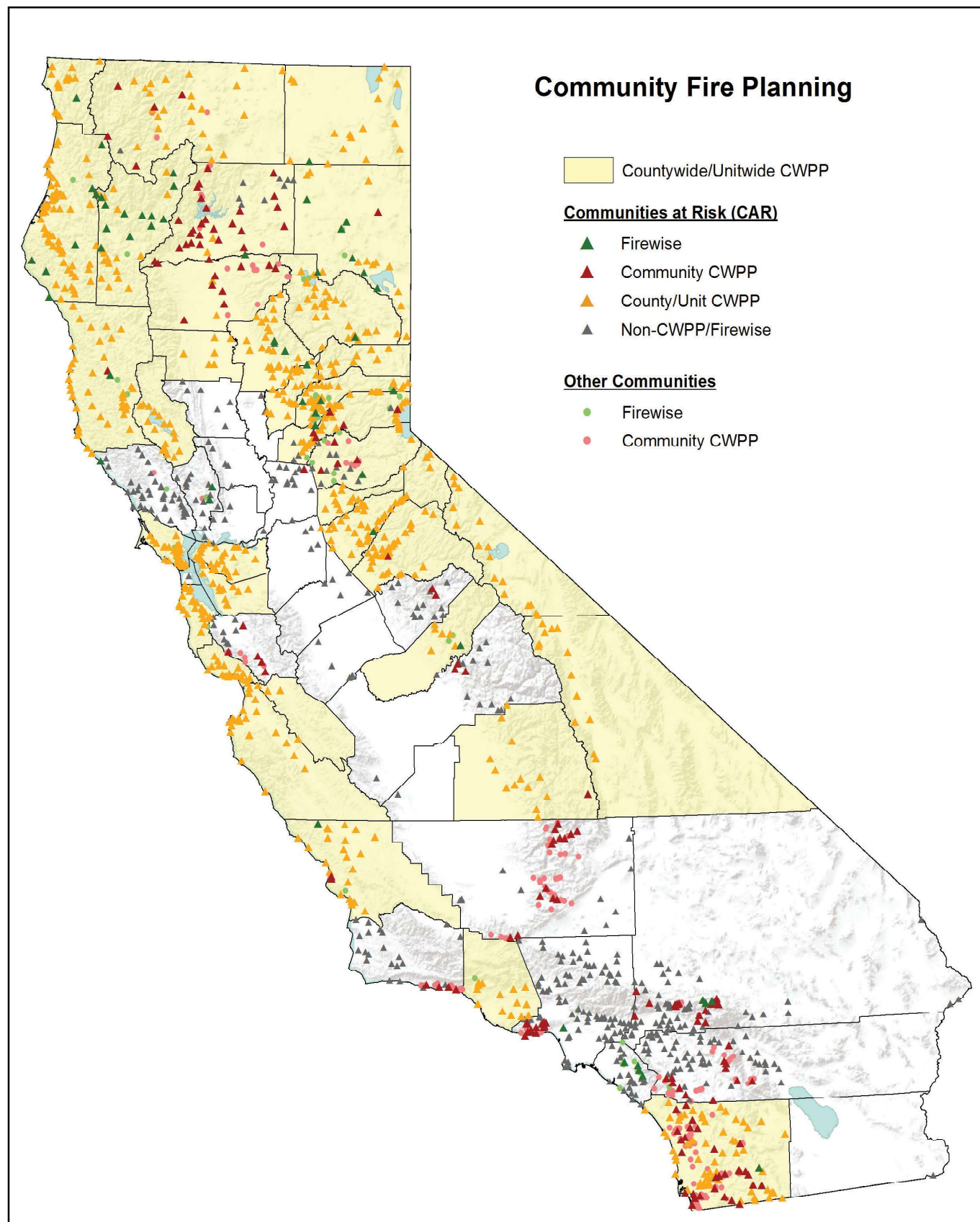


Figure 11.5: Communities at Risk (CAR) and Other Communities with a Signed Community Wildfire Protection Plan or Identified as Firewise.

Data Sources: Communities at Risk, CAL FIRE, v15_2; CWPP/Firewise community data, local sources, 2015.

be accomplished are by creating a Community Wildfire Protection Plan (CWPP), or by becoming a Firewise community.

One of the goals of the Healthy Forests Restoration Act of 2003 (HFRA) was to incentivize community fire planning through development of a Community Wildfire Protection Plan. “An approved CWPP can influence and prioritize future funding for hazardous fuel reduction projects, including where and how federal agencies implement fuel reduction projects on federal lands”[2]. Creating and maintaining a CWPP is a collaborative process that can include participation by local government, fire safe councils, fire protection districts, resource conservation districts, residents, and appropriate state and federal agencies. One primary purpose of CWPPs is to provide a guiding document for future actions by local Fire Safe Councils, land management agencies, private landowners, and local emergency service providers [3]. CWPPs can be developed for an individual community, an entire county, or a unique multi-community portion of a county.

The National Fire Protection Association’s (NFPA) Firewise Communities program “... encourages local solutions for safety by involving homeowners in taking individual responsibility for preparing their homes from the risk of wildfire”[4]. Firewise communities are required to demonstrate an ongoing commitment to reducing fire risk, for example by developing a community wildfire hazard assessment, conducting an annual Firewise Day event, and demonstrating a level of effort of at least \$2 per capita in the community.

Currently, of 1,338 communities identified as Communities at Risk (CAR) [5], 66% (881) are covered by a CWPP (individual, regional or countywide) and/or are recognized by the Firewise program (①11.4). Numerous other communities are at various stages of CWPP development. Of the CARs, 16% (213) are covered by individual CWPPs or the Firewise program. Individual CWPPs typically provide the finest detail for project-level planning, however, many county-level plans are very detailed, while others serve more generally as an umbrella

for individual CWPPs. Figure 11.5 shows the distribution of communities involved in these efforts.

Fire Safe Councils

The California Fire Safe Council [6] is a statewide non-profit organization that supports various grassroots fire-related movements, as the state liaison for the Firewise program, operating the innovative online Grants Clearinghouse, and encouraging the formation of local fire safe councils (Figure 11.6). Local fire safe councils are typically groups of volunteers that conduct a variety of activities to reduce fire risk that are beyond the capacity of fire services [7]. In California, there are 34 countywide fire safe councils, and over 125 community councils (Figure 11.6).

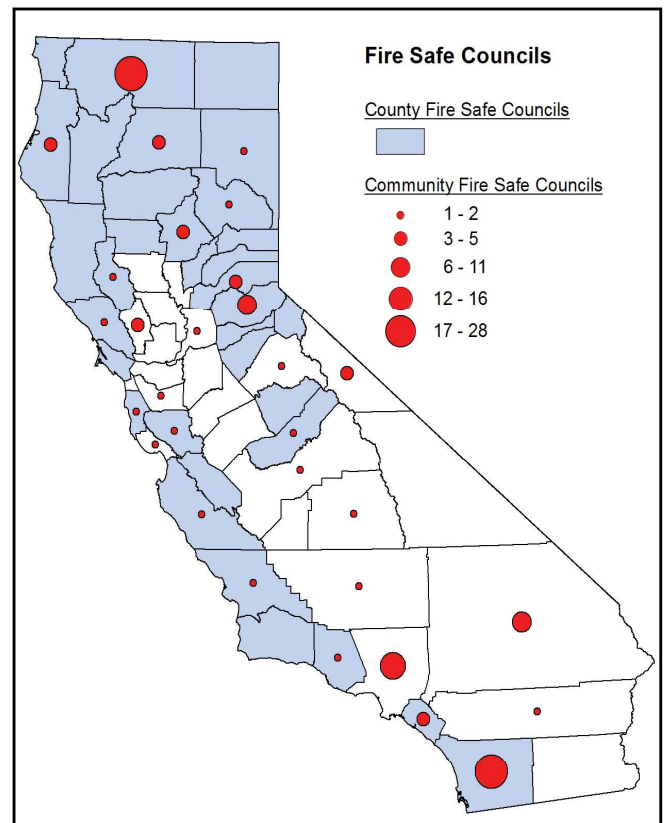


Figure 11.6: County and Community Fire Safe Councils in California.

Data Sources: [6] California Fire Safe Council, 2017; CAL FIRE Unit and Contract County staff.

Land Use Planning

In addition to community planning, a second opportunity to mitigate fire risk involves land use planning. The CAL FIRE Land Use Planning program works with

local government to address wildfire risk as part of the safety element in city and county general plans, as required in government code 65302. Land use planning includes considering wildfire risk in the location, arrangement, and composition of new development. The location of new development should include a consideration of fire hazard, for example favoring infill development over patterns that create additional Interface or Intermix. There are opportunities to reduce overall fire risk through new development that meets current code and standards for fire resistive construction (California Building Code (CBC), Chapter 7A, Office of the State Fire Marshal, 2013), infrastructure upgrades such as increased roadway and water flow standards, and fuel modification requirements (14 CCR § 1270).

For example, the photos at the right show two very different types of Interface. In the top photo, wildland extends directly to the edge of development, and elements of the natural landscape are maintained even within the developed area. While creating a desirable living environment, under the wrong conditions this has the potential to carry fire up to and even through a community.

The bottom photo shows an area where the slopes that surround a community have been converted to terraces where fuel modification is maintained. This includes a minimum 20 foot level irrigated zone immediately adjacent to housing [8], which creates a defensible space buffer around the community. This is a good example of how the county general planning process and local ordinances and guidelines can result in development patterns that seek to minimize community wildfire risk.

Education Programs

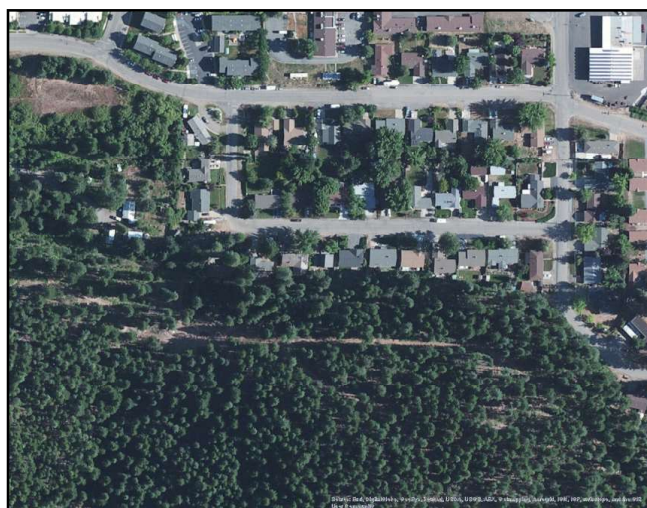
Educating the public about the importance of wildfire preparedness is vital. For example, CAL FIRE participates in “Ready, Set, Go!” [9, 10], a worldwide communication and education program to assist the public in being better prepared for wildfire. Topics covered include:

- Fire safe landscaping
- Creating a defensible space

- Safe use of equipment to prevent ignitions
- “Hardening” your home from fire (roofs, vents, windows, gutters, etc.)
- Evacuation preparedness
- Safe evacuation procedures

Homeowner Responsibility

A significant component of community safety is homeowners acting to reduce their individual risk. CAL FIRE provides education and assistance to homeowners in this effort through defensible space home inspections that verify homeowners comply with regulations related to establishing a defensible space and reduced fuel zone, clearance around propane tanks, adequate display of address numbers, and proper configuration of chimney and stove openings. A recent sample of almost 19,000 CAL FIRE home inspections indicates that 76% passed on the first visit. Within Firewise communities, for a



much smaller sample of 396 inspections in six communities, the pass rate increased to 84%. Collecting inspection data within the CAL FIRE enterprise Geographic Information System (GIS) is a recent development; once statewide data for multiple years are available we can generate more definitive numbers to examine the value of education programs such as Firewise for raising homeowner awareness.

Opportunities

The following is a summary of opportunities discussed in the chapter to reduce costs and losses from wildfire.

Community Planning

- Continue to support community involvement in developing Community Wildfire Protection Plans (CWPPS), and becoming Firewise and/or Fire-Adapted Communities.

Land Use Planning

- Continue the CAL FIRE Land Use Planning program to work with local government to address wildfire risk as part of the safety element in city and county general plans, as required in government code 65302.

- Reduce overall fire risk through new development that meets current code and standards for fire resistive construction, infrastructure upgrades such as increased roadway and water flow standards, and fuel modification requirements.

Education Programs

- Continue to support programs such as “Ready, Set, Go!” to educate landowners in wildfire preparedness, and encourage them to take responsibility for their home and community.

Homeowner Responsibility

- Continue and improve the CAL FIRE defensible space inspection program to assist homeowners in correcting problems that could put them at risk from wildfire.

Indicator: Number of Structures Destroyed by Wildfire Annually

11.1

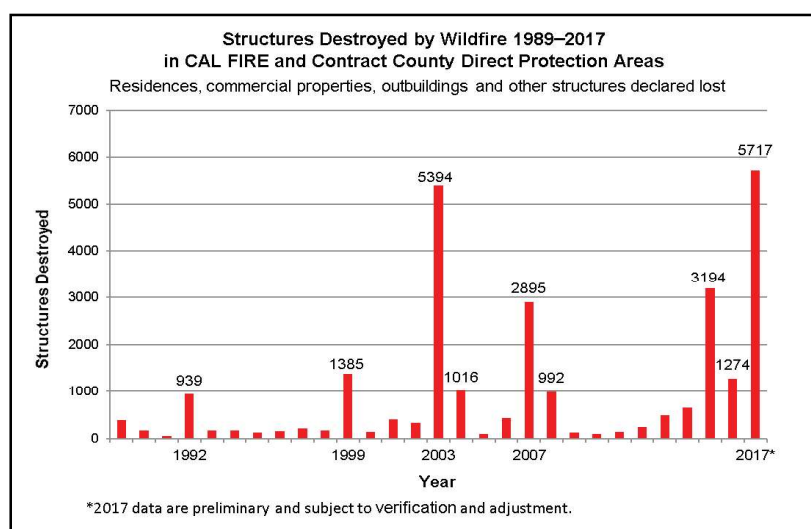
Which Montreal Process Criteria does the indicator evaluate?

MPC6: Maintenance and enhancement of long-term multiple socio-economic benefits to meet the needs of societies

Why is the indicator important?

Structure loss over time is a reflection of factors such as development patterns, land management activities, fire suppression and pre-fire operations, and changes in climate. Tracking trends can signify when program or policy changes are needed to modify one or more of these factors.

What does the indicator show?



Top 20 Most Damaging California Wildfires (Any Direct Protection Area)		
Fire	Year	Structures
Tubbs	2017	5,643
Tunnel	1991	2,900
Cedar	2003	2,820
Valley	2015	1,955
Witch	2007	1,650
Nuns	2017	1,355
Thomas	2017	1,063
Old	2003	1,003
Jones	1999	954
Butte	2015	921
Atlas	2017	781
Paint	1990	641
Fountain	1992	636
Sayre	2008	604
City of Berkeley	1923	584
Harris	2007	548
Redwood Valley	2017	544
Bel Air	1961	484
Laguna	1993	441
Erskine	2016	386
Total	ALL	25,913

Key Findings:

- ① Since 1989, there were seven years in which a loss of more than 1000 structures (residences, commercial properties, outbuildings) occurred in CAL FIRE/Contract County Direct Protection Areas (DPA), including 2015, 2016, and 2017. In bad fire years, this number can exceed 5,000, as in 2003 and 2017.
- ① In all jurisdictions, the top 20 most damaging fires on record destroyed 25,913 structures. About half of these losses occurred in 2015, 2016, or 2017.
- ① The National Fire Information Reporting System has complex requirements for reporting structure loss due to wildfire. Structure losses on lands protected by local agencies are not always reported.

Data Sources and Quality

Data Theme	Source	Quality (5 star max)
Structures Destroyed	Wildfire Activity Statistics (Redbooks), CAL FIRE, 1989-2017.	***

Indicator: Housing Units by Fire Hazard Severity Zone (FHSZ) Class ⓘ 11.2

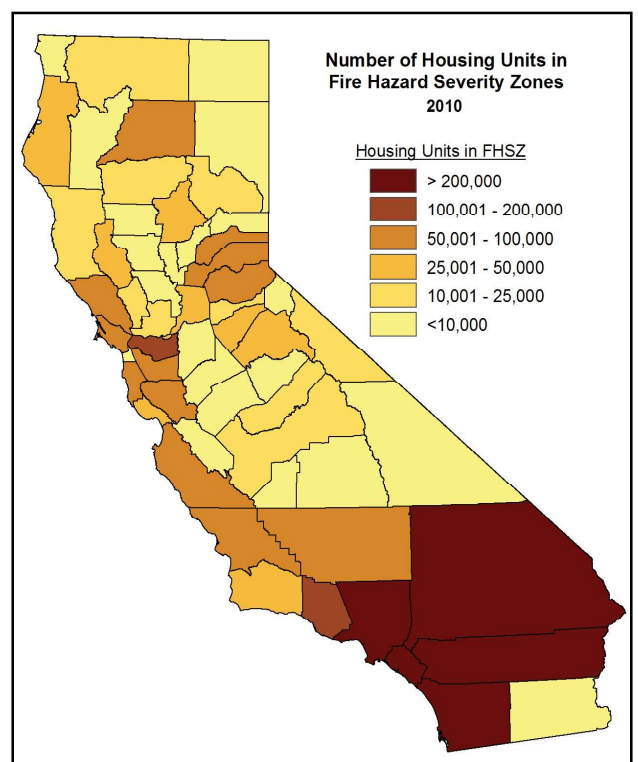
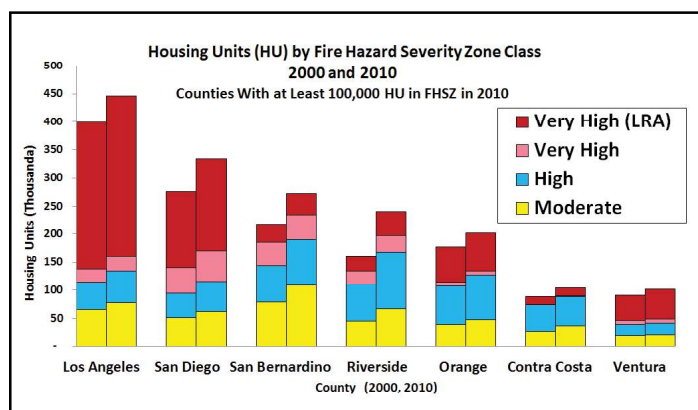
Which Montreal Process Criteria does the indicator evaluate?

MPC6: Maintenance and enhancement of long-term multiple socio-economic benefits to meet the needs of societies

Why is the indicator important?

Number of housing units (HU) by hazard class provides one measure of the pre-fire planning and overall fire protection problem. It also provides a measure to track and evaluate county growth patterns in terms of mitigating potential losses from wildfire.

What does the indicator show?



Key Findings:

- ① In 2010, in all counties, about 3 million housing units (HU) were in FHSZ and potentially at risk from wildfire. This includes about 1.2 million HU (41%) in the Very High class.
- ① Over 460,000 HU were added within FHSZ between 2000 and 2010. This includes 144,000 HU added to the Very High class.
- ① A large proportion of the HU within FHSZ are in the southern portion of the state. The top five counties for FHSZ HU, all in southern California, contain about half of all statewide HU in FHSZ, and 62% of the HU in the Very High class. However, this is clearly a statewide problem – 37 counties have at least 10,000 HU in FHSZ.

Data Sources and Quality

Data Theme	Source	Quality (5 star max)
Housing Units	Census block data, U.S. Census Bureau, 2000 and 2010.	****
Fire Hazard	Fire Hazard Severity Zones, FRAP, v11_1.	****

Indicator: Housing Units and Wildfire Threat Within the Wildland Urban Interface (WUI)

11.3

Which Montreal Process Criteria does the indicator evaluate?

MPC6: Maintenance and enhancement of long-term multiple socio-economic benefits to meet the needs of societies

Why is the indicator important?

For the Assessment, FRAP focused on capturing WUI as the Interface and Intermix areas at risk from fire, and a 1.5 mile buffer area into adjacent fuels. WUI Interface is defined as high-density development adjacent to wildland fuels. Intermix is defined as lower-density housing mingled within wildland fuels. These classes pose unique problems for fire protection and pre-fire strategies. These classes combined with Fire Hazard Severity Zones provide a way to quantify the structure protection problem by county. Tracking this indicator over time will provide a measure of the effectiveness of county growth strategies.

What does the indicator show?

The table shows statistics for counties with at least 25,000 housing units (HU) in WUI, and the totals for all counties. (Appendix 11.2 provides details for all counties).

Key Findings:

- 🔑 In 2010, in all counties, about 2.2 million housing units (HU) were in WUI, with 17% in Intermix and 83% in Interface.
- 🔑 County development patterns create unique fire risk environments. Urban counties like Los Angeles and Orange tend to have areas of dense development next to unpopulated open space, and HU are primarily in the Interface (97% and 99%). Conversely, numerous counties provide a rural lifestyle that includes low-density Intermix dispersed within wildland fuels, where about half of HU are in Intermix (e.g. Butte, Eldorado, Santa Cruz, and Sonoma).
- 🔑 The difficulty in protecting HU from wildfire in California is demonstrated by the fact that 67% of Interface HU and 73% of Intermix are in High or Very High fire hazard classes.
- 🔑 Statewide, the 2010 WUI footprint is 17.7 million acres, including 1 million acres of Interface, 1.3 million of Intermix, and a 15.3 million acre influence zone.

Housing Units (HU) by Wildland Urban Interface (WUI) Class, and Within High or Very High Fire Severity Zones (FHSZ), for Counties with at Least 25,000 HU in FHSZ					
County	Housing Units (HU)	Percent of HU		Percent of HU in High/Very High FHSZ	
		Intermix	Interface	Intermix	Interface
Los Angeles	375,411	3%	97%	93%	82%
San Diego	264,272	8%	92%	76%	80%
San Bernardino	207,795	20%	80%	81%	58%
Riverside	185,363	6%	94%	84%	68%
Orange	177,546	1%	99%	93%	74%
Ventura	84,642	5%	95%	71%	77%
Contra Costa	80,207	12%	88%	87%	59%
Alameda	75,901	6%	94%	85%	69%
San Luis Obispo	62,346	25%	75%	81%	37%
Marin	54,341	36%	64%	75%	67%
El Dorado	52,079	48%	52%	76%	58%
Placer	47,008	36%	64%	61%	15%
San Mateo	43,923	13%	87%	71%	66%
Santa Clara	39,987	18%	82%	88%	67%
Monterey	34,512	38%	62%	94%	69%
Kern	33,956	22%	78%	71%	34%
Santa Cruz	33,518	50%	50%	33%	37%
Nevada	33,315	49%	51%	94%	85%
Sonoma	31,488	52%	48%	35%	23%
Santa Barbara	30,679	13%	87%	77%	59%
Butte	28,741	51%	49%	95%	54%
Shasta	27,900	37%	63%	90%	66%
Counties (>25K)	2,004,930	15%	85%	73%	69%
Statewide	2,213,881	17%	83%	73%	67%

Data Sources and Quality

Data Theme	Source	Quality (5 star max)
Fire Hazard	Fire Hazard Severity Zones, FRAP, v11_1.	****
Housing Density	Housing Density, LandScan, v12_2.	****
Housing Counts	Census block data, U.S. Census Bureau, 2010.	****
Urban Areas	Vegetation (for urban areas), FRAP, v11_1.	****

Indicator: Number and Percent of Communities at Risk (CAR) that are Firewise Communities or Covered by a Community Wildfire Protection Plan (CWPP)

① 11.4

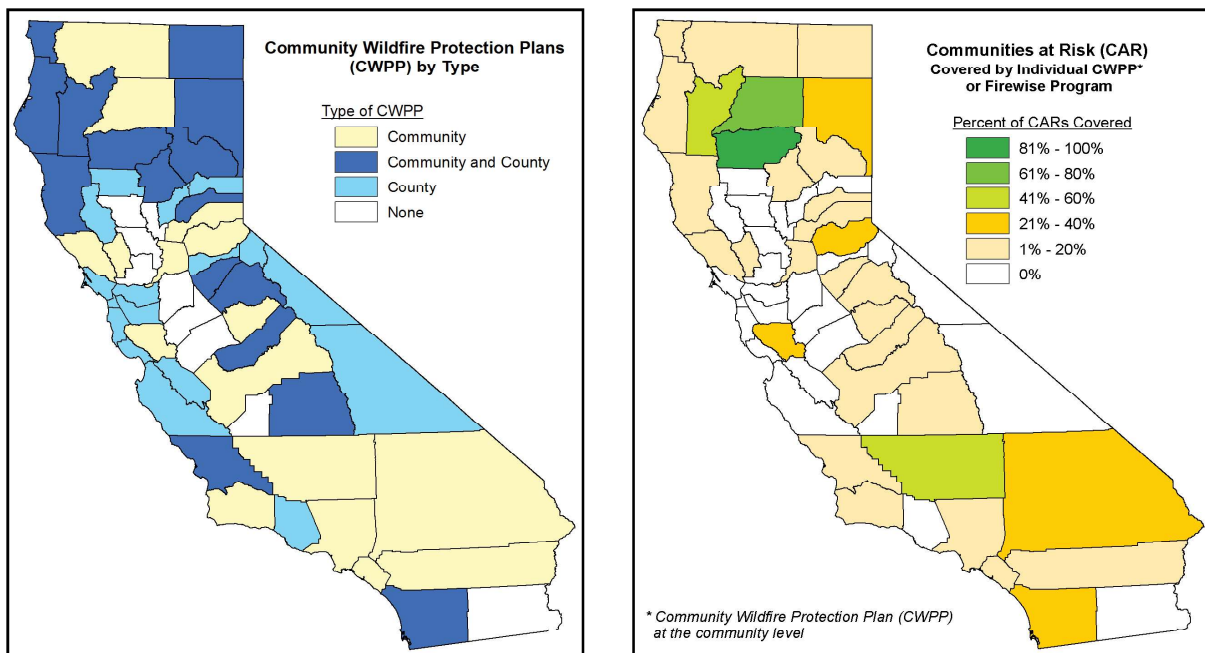
Which Montreal Process Criteria does the indicator evaluate?

MPC6: Maintenance and enhancement of long-term multiple socio-economic benefits to meet the needs of societies

Why is the indicator important?

Community planning efforts, and associated pre-fire actions, have the potential to reduce wildfire frequency, severity, and damage. This is especially important in communities identified as having elevated wildfire risk.

What does the indicator show?



Key Findings:

- ① There are 1,338 individual communities represented by the Communities at Risk (CAR) list. Of these communities, 66% (881) are covered by a CWPP (individual, regional or countywide) and/or are recognized by the Firewise program. Numerous other communities are at various stages of CWPP development.
- ① Of the CARs, 16% (213) are covered by individual CWPPs or the Firewise program. Individual CWPPs typically provide the finest detail for project-level planning; however, many county-level plans are very detailed, while others serve more generally as an umbrella for individual CWPPs.

Data Sources and Quality

Data Theme	Source	Quality (5 star max)
Community Planning Points	Community Wildfire Planning, FRAP, 2016.	****

Appendix 11.1

Table 11.2: Number of Housing Units by Fire Hazard Severity Zone (FHSZ) Class, 2010

County	FHSZ Class				Percent by FHSZ Class		
	Very High	High	Moderate	Total	Very High	High	Moderate
Alameda	27,090	38,090	25,610	90,790	30%	42%	28%
Alpine	710	290	660	1,660	43%	17%	40%
Amador	6,250	2,510	7,560	16,320	38%	15%	46%
Butte	22,560	11,070	10,200	43,830	51%	25%	23%
Calaveras	15,330	9,450	2,910	27,690	55%	34%	11%
Colusa	50	260	500	820	6%	32%	61%
Contra Costa	15,370	50,590	37,490	103,450	15%	49%	36%
Del Norte	1,010	360	5,980	7,340	14%	5%	81%
El Dorado	44,260	14,990	24,340	83,590	53%	18%	29%
Fresno	4,120	5,790	4,300	14,210	29%	41%	30%
Glenn	140	120	500	760	18%	16%	66%
Humboldt	3,450	13,560	17,720	34,730	10%	39%	51%
Imperial	-	20	7,800	7,820	0%	0%	100%
Inyo	-	6,670	1,700	8,360	0%	80%	20%
Kern	12,840	13,720	29,010	55,570	23%	25%	52%
Kings	-	380	500	890	0%	43%	56%
Lake	12,700	6,570	7,070	26,350	48%	25%	27%
Lassen	2,420	2,290	4,140	8,850	27%	26%	47%
Los Angeles	311,370	56,380	77,840	445,590	70%	13%	17%
Madera	3,080	2,000	12,410	17,480	18%	11%	71%
Marin	6,460	39,220	22,030	67,710	10%	58%	33%
Mariposa	2,800	2,460	4,100	9,360	30%	26%	44%
Mendocino	2,250	11,930	10,470	24,650	9%	48%	42%
Merced	-	-	2,090	2,090	0%	0%	100%
Modoc	210	1,440	1,120	2,770	8%	52%	40%
Mono	960	5,160	5,980	12,110	8%	43%	49%
Monterey	15,640	25,130	9,490	50,250	31%	50%	19%
Napa	3,620	2,530	8,100	14,250	25%	18%	57%
Nevada	28,460	19,170	4,790	52,420	54%	37%	9%
Orange	73,610	78,880	48,420	200,910	37%	39%	24%
Placer	26,760	4,520	42,990	74,270	36%	6%	58%
Plumas	8,040	5,240	1,810	15,080	53%	35%	12%
Riverside	73,620	100,230	66,610	240,450	31%	42%	28%
Sacramento	100	2,300	27,100	29,500	0%	8%	92%
San Benito	530	1,210	1,130	2,870	18%	42%	39%
San Bernardino	83,490	81,310	108,050	272,850	31%	30%	40%
San Diego	218,750	53,820	61,460	334,020	65%	16%	18%
San Francisco	-	410	2,410	2,820	0%	15%	85%
San Joaquin	-	-	3,250	3,250	0%	0%	100%
San Luis Obispo	9,980	36,210	38,120	84,310	12%	43%	45%
San Mateo	13,760	23,830	17,190	54,780	25%	44%	31%
Santa Barbara	11,580	13,370	13,410	38,350	30%	35%	35%
Santa Clara	10,560	27,590	13,030	51,180	21%	54%	25%
Santa Cruz	360	17,580	29,530	47,470	1%	37%	62%
Shasta	31,110	10,720	8,610	50,440	62%	21%	17%
Sierra	1,300	460	340	2,110	62%	22%	16%
Siskiyou	11,130	4,150	6,410	21,690	51%	19%	30%
Solano	40	4,320	15,310	19,670	0%	22%	78%
Sonoma	3,370	18,500	38,200	60,070	6%	31%	64%
Stanislaus	-	260	2,060	2,330	0%	11%	88%
Sutter	-	-	410	410	0%	0%	100%
Tehama	5,400	2,010	4,630	12,040	45%	17%	38%
Trinity	7,140	1,220	60	8,420	85%	14%	1%
Tulare	2,580	3,010	2,320	7,910	33%	38%	29%
Tuolumne	24,010	5,620	1,330	30,960	78%	18%	4%
Ventura	59,680	20,460	21,350	101,490	59%	20%	21%
Yolo	70	580	1,690	2,340	3%	25%	72%
Yuba	4,170	840	2,810	7,820	53%	11%	36%
Statewide	1,224,280	860,840	926,410	3,011,530	41%	29%	31%

Data Sources: Census Block Data, U.S. Census Bureau, 2010; Fire Hazard Severity Zones, FRAP, v11_1.

Appendix 11.2

County	Housing Units (HU)	Percent of HU		Percent of HU in High and Very High FHSZ	
	All WUI	Intermix	Interface	Intermix	Interface
Alameda	75,900	6%	94%	85%	69%
Alpine	250	40%	60%	98%	43%
Amador	7,710	54%	46%	76%	31%
Butte	28,740	51%	49%	95%	54%
Calaveras	12,550	56%	44%	94%	88%
Colusa	370	10%	90%	81%	2%
Contra Costa	80,210	12%	88%	87%	59%
Del Norte	3,960	60%	40%	7%	27%
El Dorado	52,080	48%	52%	76%	58%
Fresno	5,010	59%	41%	80%	19%
Glenn	300	11%	89%	1%	21%
Humboldt	19,190	59%	41%	41%	28%
Imperial	4,880	8%	92%	0%	0%
Inyo	5,720	4%	96%	82%	87%
Kern	33,960	22%	78%	71%	34%
Kings	770	9%	91%	80%	38%
Lake	16,490	35%	65%	73%	74%
Lassen	3,660	43%	57%	47%	68%
Los Angeles	375,410	3%	97%	93%	82%
Madera	7,820	76%	24%	31%	12%
Marin	54,340	36%	64%	75%	67%
Mariposa	3,060	81%	19%	43%	83%
Mendocino	8,920	70%	30%	45%	18%
Merced	1,080	9%	91%	0%	0%
Modoc	440	50%	50%	71%	31%
Mono	6,960	37%	63%	66%	45%
Monterey	34,510	38%	62%	94%	69%
Napa	8,670	24%	76%	42%	34%
Nevada	33,320	49%	51%	94%	85%
Orange	177,550	1%	99%	93%	74%
Placer	47,010	36%	64%	61%	15%
Plumas	5,600	38%	62%	96%	74%
Riverside	185,360	6%	94%	84%	68%
Sacramento	23,650	10%	90%	3%	10%
San Benito	1,090	71%	29%	48%	53%
San Bernardino	207,800	20%	80%	81%	58%
San Diego	264,270	8%	92%	76%	80%
San Francisco	2,360	0%	100%	0%	17%
San Joaquin	1,810	36%	64%	0%	0%
San Luis Obispo	62,350	25%	75%	81%	37%
San Mateo	43,920	13%	87%	71%	66%
Santa Barbara	30,680	13%	87%	77%	59%
Santa Clara	39,990	18%	82%	88%	67%
Santa Cruz	33,520	50%	50%	33%	37%
Shasta	27,900	37%	63%	90%	66%
Sierra	1,130	44%	56%	98%	60%
Siskiyou	9,710	36%	64%	87%	46%
Solano	14,700	11%	89%	8%	20%
Sonoma	31,490	52%	48%	35%	23%
Stanislaus	1,110	46%	54%	19%	8%
Sutter	160	18%	82%	0%	0%
Tehama	3,710	44%	56%	68%	32%
Trinity	2,590	66%	34%	100%	99%
Tulare	2,180	70%	30%	71%	16%
Tuolumne	16,590	70%	30%	99%	81%
Ventura	84,640	5%	95%	71%	77%
Yolo	1,470	8%	92%	8%	40%
Yuba	3,290	41%	59%	87%	9%
Statewide	2,213,880	17%	83%	73%	67%

Data Sources: Housing Density, LandScan, v12_2; Fire Hazard Severity Zones, FRAP, v11_1; Census block data, U.S. Census Bureau, 2010; Vegetation (for urban areas), FRAP, v11_1.

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