SECTION 8: WILDFIRES

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Why are Wildfires a Threat to Newport Beach?

Fires have always been a natural part of the ecosystem in portions of southern California due to the region's weather, topography and native vegetation. The typically mild, wet winters characteristic of our Mediterranean climate result in an annual growth of grasses and plants that dry out during the hot summer months. This dry vegetation often provides fuel for wildfires in the autumn, when the area is intermittently impacted by Santa Ana winds, the hot, dry winds that blow across the region in the late fall. These winds often fan and help spread the fires. Furthermore, many of our native plants have a high oil content that makes them highly flammable.

Although wildfires can be highly disruptive and dangerous, the fact is that wildland fires are a necessary part of the natural ecosystem of southern California. Many of the native plants require periodic burning to germinate and recycle nutrients that enrich the soils. Native Americans took advantage of this, and used fire extensively to control their environment by enhancing feed for wildlife, decreasing insects and pests that impact wild foods, increasing the abundance and density of edible tubers, greens and other useful plants, and clearing underbrush to ease travel and provide increased visibility (Anderson, 2006). Wildfires become an issue, however, whenever they extend out of control into developed areas, with a resultant loss of property, and sometimes unfortunately, loss of life. The wildfire risk in the United States has increased in the last few decades with the increasing encroachment of residences and other structures into the wildland environment, and the increasing number of people living and playing in wildland areas. The National Interagency Fire Center estimates that approximately 15 percent of all wildland fires in the United States are started by lightning strikes, with humans causing the rest. The most common human causes of wildfires are arson, sparks from brush-clearing equipment and vehicles, improperly disposed cigarettes, and children playing with matches.

Wildfires pose a substantial hazard to life and property in communities built within or adjacent to hillsides and mountainous areas. As the 2003, 2006, 2007, 2009 and May 2014 fires in southern California have shown, the containment of wildfires that consume thousands to hundreds of thousands of acres of vegetated property require the participation of a multi-jurisdictional emergency response effort, with hundreds to thousands of people at or near the fire lines combating the flames, clearing brush ahead of the fire to establish defensible zones, and assisting evacuees. Under the right wind conditions, multiple ignitions can develop as a result of the wind transport of burning cinders (called fire brands) over distances of a mile or more. Wildfires in those areas where the wildland approaches or interfaces with the urban environment (referred to as the wildland-urban interface area or WUI area) can be particularly dangerous and complex, posing a severe threat to public and firefighter safety, and potentially causing devastating losses of property and life. This is so because when a wildland fire encroaches onto improved land, ignited structures can then sustain and transmit the fire from one building to the next. It has become increasingly clear that continuous planning, preparedness, and education are required to reduce the fire hazard potential and limit the destruction caused by fires. These mitigation measures are discussed in this document.

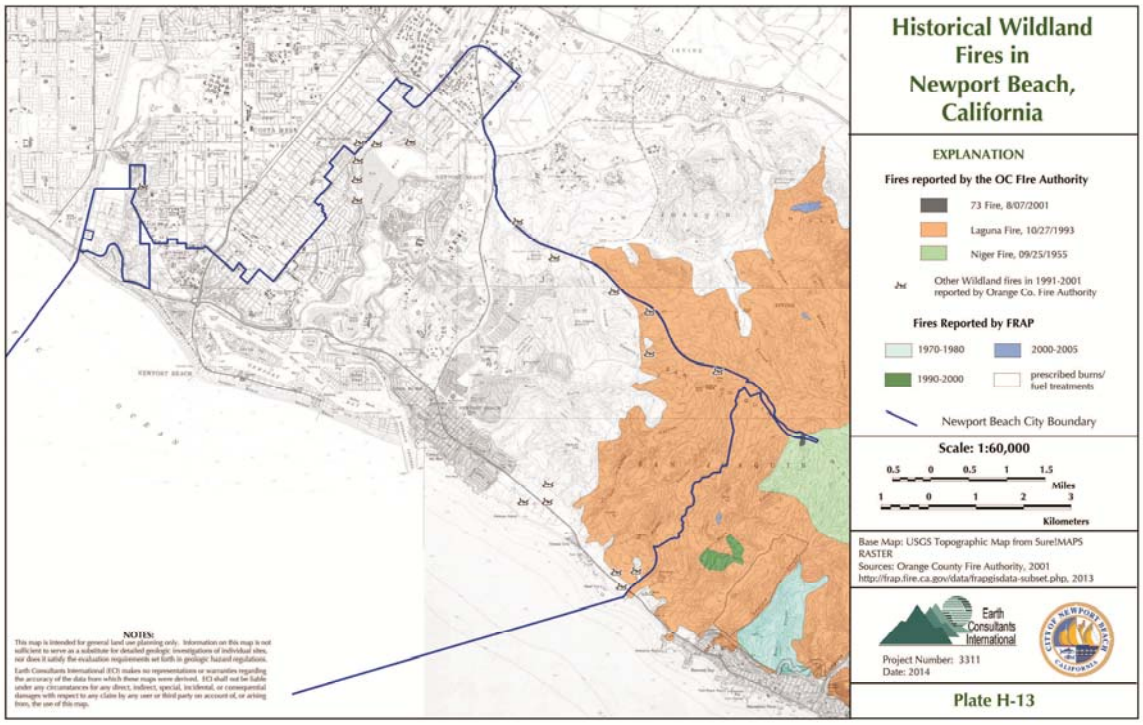
Historic Fires in Newport Beach and Vicinity

Several historical fires have impacted the Newport Beach area and vicinity over the years. The most devastating wildland fire in this area in recent history was the Laguna Beach fire of 1993. The 1993 fire, which was the result of arson, burned 14,437 acres and destroyed 441 homes.

This fire is still ranked in the top ten worst wildland fires in California. The 1993 fire spread into the Newport Coast area that is now part of the City of Newport Beach.

According to records kept by the Orange County Fire Authority, the Niger fire of 1955 burned 1,606 acres, impacting the northeastern-most corner of the current boundaries of the City of Newport Beach. The 73 Fire of 2001 burned only 6.63 acres, but because it occurred along the 73 Freeway, where it had the potential to impact traffic, it is considered a significant wildland fire. There have been several other smaller, less significant wildland and vegetation fires in the Newport Beach area, but records of these are limited. Those that were recorded by the Orange County Fire Authority between 1991 and 2001 are shown on Map 8-1 and Plate H-12.

Map 8-1: Historical Wildfires in the Newport Beach Area
(for a larger version of this map, refer to Plate H-13 in Appendix H)



Historic Fires in California

As mentioned above, large fires have been part of the southern California landscape for millennia. Researchers have determined that Native Americans in California used fire extensively to control their environment by enhancing feed for wildlife, decreasing insects and diseases that impact wild foods, increasing the abundance and density of edible tubers, greens and other useful plants, and clearing underbrush to ease travel and provide increased visibility (Anderson, 2006). It is estimated that as much as 12 percent of the State was burned every year by the various tribes (Coleman, 1994). One of the largest fires in Los Angeles County (60,000 acres) occurred in 1878, and the largest fire in Orange County's history, in 1889, burned over half a million acres. In the early 20th century, as development started to encroach onto the foothills, wildfires came to be unacceptable as they posed a hazard with the potential loss of property and life. As a result, in the early 1920s, the fire service began to prevent wildfires from occurring.

Unfortunately, over time, this led to an increase in fuel loads. Wildfires that impact areas with fuel buildup are more intense and significantly more damaging to the ecosystem than periodic, low-intensity fires. The 23 largest historic fires in California for the time period between 1923 and 2013 are listed in Table 8-1 below. Some of the most significant of these are discussed further in the sections below.

Table 8-1: Large Historic Fires in California for the Period 1923-2013
(in order of number of structures damaged)

	Fire Name	Date	County	Acres	Structures	Deaths
1	Tunnel	October 1991	Alameda	1,600	2,900	25
2	Cedar	October 2003	San Diego	273,246	2,820	15
3	Witch	October 2007	San Diego	197,990	1,650	2
4	Old	October 2003	San Bernardino	91,281	1,003	6
5	Jones	October 1999	Shasta	26,200	954	1
6	Paint	June 1990	Santa Barbara	4,900	641	1
7	Fountain	August 1992	Shasta	63,960	636	0
8	Sayre	November 2008	Los Angeles	11,262	604	0
9	City of Berkeley	September 1923	Alameda	130	584	0
10	Harris	October 2007	San Diego	90,440	548	8
11	Bel Air	November 1961	Los Angeles	6,090	484	0
12	Laguna	October 1993	Orange	14,437	441	0
13	Paradise	October 2003	San Diego	56,700	415	2
14	Laguna	September 1970	San Diego	175,425	382	5
15	Humboldt	June 2008	Butte	23,344	351	0
16	Panorama	November 1980	San Bernardino	23,600	325	4
17	Topanga	November 1993	Los Angeles	18,000	323	3
18	49er	July 1985	Ventura	118,000	312	0
19	Angora	June 2007	El Dorado	3,100	309	0
20	Simi	October 2003	Ventura	108,204	300	0
21	Slide	October 2007	San Bernardino	12,759	272	0
22	Sycamore	July 1977	Santa Barbara	805	234	0
23	Canyon	September 1999	Shasta	2,580	230	0

http://www.fire.ca.gov/communications/downloads/fact_sheets/20LSTRUCTURES.pdf;
http://cdfdata.fire.ca.gov/incidents/; http://cdfdata.fire.ca.gov/incidents/incidents_statsevents
"Structures" is meant to include all loss - homes and outbuildings, etc.

The autumn of 2003 marked the most destructive wildfire season in California history (in terms of acreage burned and structures destroyed). In a ten-day period, 12 separate fires raged across southern California in Los Angeles, Riverside, San Bernardino, San Diego and Ventura counties. The massive "Cedar" fire in San Diego County alone consumed more than 2,800 homes and burned over a quarter of a million acres (see Tables 8-1 and 8-2, and Figure 8-1). Three other fires in 2003, named "Old," "Paradise," and "Simi" are in the list of top 20 fires in California based on damage. The 2003 California fires caused an estimated $975 million in damages.

Table 8-2: October 2003 Firestorm Statistics

County	Fire Name	Date Began	Acres Burned	Homes Lost	Homes Damaged	Lives Lost
Riverside	Pass	10/21/03	2,397	3	7	0
Los Angeles	Padua	10/21/03	10,446	59	0	0
San Bernardino	Grand Prix	10/21/03	69,894	136	71	0
San Diego	Roblar 2	10/21/03	8,592	0	0	0
Ventura	Piru	10/23/03	63,991	8	0	0
Los Angeles	Verdale	10/24/03	8,650	1	0	0
Ventura	Simi	10/25/03	108,204	300	11	0
San Diego	Cedar	10/25/03	273,246	2,820	63	15
San Bernardino	Old	10/25/03	91,281	1,003	7	6
San Diego	Otay / Mine	10/26/03	46,000	6	11	0
Riverside	Mountain	10/26/03	10,000	61	0	0
San Diego	Paradise	10/26/03	56,700	415	15	2
Total Losses			**749,401**	**4,812**	**185**	**23**

Source: http://www.fire.ca.gov/php/fire_er_content/downloads/2003LargeFires.pdf

Figure 8-1: View of the Cedar Fire of October 2003 Moving Down Oak Canyon, Toward the 52 Freeway, in San Diego County.
This fire burned more than 273,000 acres, destroyed 2,820 structures, damaged 63 others, and caused 15 fatalities. The fire was cased by a signal flare set off by a lost hunter. This is the largest fire by acreage burned in California since at least 1932, when reliable records were first kept.

The top fires, in acreage and damage caused, in Southern California for the years 2007 through 2012 are listed in Table 8-3. The three most significant fires in that time period in Southern California include the Zaca and Witch fires of 2007, and the Station fire of 2010 (see Figure 8-2). As of the writing of this report, the 2013 statistics were still not available from Cal-Fire. Table

8-3 also lists for each year between 2007 and 2012, inclusive, the total acres burned, total number of structures destroyed and damaged, and the number of fatalities in the State caused by wildland fires. Data for 2013 and 2014 were not available as of the writing of this report.

Figure 8-2: View of a Backfire to the Station Fire Behind Homes in La Crescenta.
The Station fire burned 160,557 acres, 209 structures and caused 2 deaths.
It is considered the 12th largest California fire by acreage burned
(http://cdfdata.fire.ca.gov/incidents/incidents_statsevents).
(Photograph by Jae C. Hong/AP Photo, taken on September 1, 2009).

Table 8-3: Top Wildland Fire Statistics for 2007-2012 in Southern California Only With Totals by Year for the Entire State

County	Fire Name	Date Began	Acres Burned	Structures Lost	Structures Damaged	Lives Lost
Santa Barbara	Zaca	07/04/07	240,207	1	0	0
San Diego	Witch	10/21/07	197,990	1,650	85	0
San Diego	Harris	10/21/07	90,440	472	257	1
San Diego	Poomacha	10/23/07	49,410	217	12	0
Orange	Santiago	10/21/07	28,400	24	20	0
2007 Total Fires California			**1,520,362**	**3,238**		**1**
Orange-Riverside	Freeway	11/15/08	30,305	189	129	0
Santa Barbara	Gap	07/01/08	9,443	4	0	0
Los Angeles	Sesnon	10/13/08	14,703	78	15	0
Los Angeles	Sayre	11/14/08	11,282	604	147	0
2008 Total Fires California			**1,443,065**	**2,440**		**12**
Los Angeles	Station	8/26/09	160,577	209	57	2
Santa Barbara	La Brea	08/08/09	91,622	2	0	0
Ventura	Guiberson	09/22/09	17,500	0	0	0
Santa Barbara	Jesusita	05/05/09	8,733	160	17	0
2009 Total Fires California			**451,969**	**579**		**3**

Table 8-3: Top Wildland Fire Statistics for 2007-2012 in Southern California Only With Totals by Year for the Entire State

County	Fire Name	Date Began	Acres Burned	Structures Lost	Structures Damaged	Lives Lost
Los Angeles	Crown	7/29/10	14,000	10	6	0
San Diego	Aliso	7/13/10	3,225	0	0	0
2010 Total Fires California			**134,462**	**92**		**0**
San Diego	Eagle	07/21/11	14,100	100	0	0
San Diego	Great	10/01/11	2,135	0	0	0
San Bernardino	Hill	09/08/11	1,153	3	2	0
2011 Total Fires California			**228,599**	**174**		**0**
San Diego	Vallecito Lightning Complex	8/13/12	22,829	0	0	0
San Diego	Banner 4	5/29/12	5,320	0	0	0
Los Angeles	Williams	09/02/12	4,192	0	0	0
Riverside	Buck	8/14/12	2,681	4	0	0
2012 Total Fires California			**829,224**	**270**	**29**	**0**

This table shows the largest fires, either in acreage or number of structures destroyed and damaged, reported by the CDF for each year.
Source: Wildfire Activity Statistics Annual Reports (Redbooks) for each year included here, with data obtained from http://www.fire.ca.gov/fire_protection/ and National Climatic Data Center storm events database from https://www.ncdc.noaa.gov/stormevents/

Wildfire Characteristics

There are three categories of interface fire: The **classic** wildland-urban interface occurs where well-defined urban and suburban development presses up against open expanses of wildland areas; the **mixed** wildland-urban interface characterized by isolated homes, subdivisions and small communities situated predominantly in wildland settings; and the **occluded** wildland-urban interface where islands of wildland vegetation occur inside a largely urbanized area. Certain conditions must be present for significant interface fires to occur. The most common conditions include: hot, dry and windy weather; the inability of fire protection forces to contain or suppress the fire; the occurrence of multiple fires that overwhelm committed resources; and a large fuel load (dense vegetation). Once a fire has started, several conditions influence its behavior, including fuel, topography, weather, and degree of development, including dwelling density and accessibility, building construction (with emphasis on the use of fire-retardant construction materials and combustible roofs), and the availability of local mitigation measures and resources (such as nearby fire stations, fire hydrants, roads, fuel modification zones, fire sprinklers in structures, etc.). The most significant of these conditions are discussed further below.

The Interface

One challenge southern California faces regarding its wildfire hazard is the result of the increasing number of houses being built at the wildland-urban interface. Every year the growing population has expanded farther and farther into the hills and mountains, including forest lands. The increased "interface" between urban/suburban areas and the open spaces created by this expansion has produced a significant increase in threats to life and property from fires, and has pushed existing fire protection systems beyond original or current design and capability. Furthermore, human activities increase the incidence of fire ignition and potential damage. Because of the numerous Southern California wildfires that have occurred in recent years, property owners are increasingly more aware of the hazards associated with wildfires, and many are taking action to reduce their wildfire vulnerability using a variety of wildfire mitigation

activities, such as vegetation management. Homeowners in fire-susceptible areas must have insurance.

Fuel

Fuel is the material that feeds a fire and is a key factor in wildfire behavior. Fuel is classified by volume and by type. Volume is described in terms of "fuel loading," or the amount of available vegetative fuel. The type of fuel also influences wildfire. Southern California has two distinct areas of risk for wildland fire: 1) The foothills and lower mountain areas most often covered with scrub brush or chaparral, and 2) the forested terrain at higher elevations, in the mountains. Only the first type occurs in the Newport Beach area and is thus discussed further below.

Chaparral is a primary fuel of Southern California wildfires. In Southern California, chaparral habitat ranges in elevation from near sea level to over 5,000 feet. Chaparral communities experience long dry summers and receive most of their annual precipitation from winter rains. Although chaparral is often considered as a single species, there are two distinct types: hard chaparral and soft chaparral. Within these two types are dozens of different plants, each with its own particular characteristics.

Chaparral communities have evolved so that they require fire to spawn regeneration. Many species invite fire through the production of plant materials with large surface-to-volume ratios, volatile oils and periodic die-back of vegetation. These species have further adapted to display special reproductive mechanisms following fire. For example, several species produce vast quantities of seeds which lie dormant until fire triggers germination. The parent plant which produces these seeds defends itself from fire with a thick layer of bark that allows enough of the plant to survive so that the plant can crown sprout following the blaze. In general, chaparral community plants have adapted to fire through the following methods: a) fire induced flowering, b) bud production and sprouting subsequent to fire, c) in-soil seed storage and fire-stimulated germination, and d) on-plant seed storage and fire-stimulated dispersal.

Chaparral vegetation creates one type of exposure, with fires burning through an area rather quickly, and typically at lower temperatures than forest fires. Studies also suggest that prescribed burning programs of chaparral-covered areas are not effective in halting shrubland fires. Under Santa Ana wind conditions, fires carry through all chaparral regardless of age of the vegetation stands (Keeley and Fotheringham, 2001).

An important element in understanding the danger of wildfire is the availability of diverse fuels in the landscape, such as natural vegetation, manmade structures and combustible materials. A house surrounded by brushy growth rather than cleared space allows for greater continuity of fuel and increases the fire's ability to spread. After decades of fire suppression, "dog-hair" thickets have accumulated, which enable high intensity fires to flare and spread rapidly.

Topography

Topography influences the movement of air, thereby directing a fire course. For example, if the percentage of uphill slope doubles, the rate of spread in wildfire will likely double. Gulches and canyons can funnel air and act as chimneys, which intensify fire behavior and cause the fire to spread faster. Solar heating of dry, south-facing slopes produces up-slope drafts that can complicate fire behavior. Unfortunately, hillsides with hazardous topographic characteristics are also desirable residential areas in many communities. This underscores the need for wildfire hazard mitigation and increased education and outreach to homeowners living in interface areas.

Although Newport Beach is a highly urbanized community, there are several areas in the City

that consist of undeveloped, grass- and chaparral-covered hillsides. In fact, portions of the Newport Beach region and surrounding areas to the east and southeast include grass- and brush-covered hillsides with significant topographic relief that can facilitate the rapid spread of fire, especially if fanned by coastal breezes or Santa Ana winds. These canyons and hillsides are impacted by both strong seasonal Santa Ana wind conditions and westerly winds that can help transport embers up the west to southwest-facing canyons.

Weather

Weather patterns combined with certain geographic locations can create a favorable climate for wildfire activity. Areas where annual precipitation is less than 30 inches per year are extremely fire susceptible. High-risk areas in southern California share a hot, dry season in late summer and early fall when high temperatures and low humidity favor fire activity. The so-called "Santa Ana" winds, which are heated by compression as they flow southwestward from Utah to southern California, create a particularly high risk, as they can rapidly spread what might otherwise be a small fire.

The Newport Beach area typically has mild, wet winters that lead to an annual growth of grasses and plants. This vegetation dries out during the hot summer months and is exposed to Santa Ana wind conditions in the fall. During Santa Ana conditions, winds in excess of 15 to 25 miles per hour (mph) are typical; gusts in excess of 60 mph may occur locally (see Section 10). Santa Ana winds are generally consistent in their direction, but when combined with winds generated from burning vegetation, the wind direction generally becomes extremely erratic. This can stress fire-fighting resources and reduce fire-fighting success. Even with no unusual wind conditions, fire department response can be hindered by heavy traffic during peak hours, and by the long travel distances in the canyons and hillside areas of the southeastern part of the City. Furthermore, with the transportation corridors that now cut through these fire-prone areas, and the establishment of natural preserves in the canyons, there is an increased potential for fires, both accidental and purposely set, to impact the region. Therefore, enhanced onsite protection for structures and people in and near these wildfire-susceptible areas is necessary. The City of Newport Beach considers many of these factors in its definitions of Local Agency Very High Fire Hazard Severity Zones, Fuel Modification Zones, and Hazard Reduction Zones (Section 9.04.030 of the City of Newport Beach Municipal Code).

Recent concerns about the effects of climate change, particularly drought, are also contributing to concerns about wildfire vulnerability. The term drought is applied to a period in which an unusual scarcity of rain causes a serious hydrological imbalance. Unusually dry winters, or significantly less rainfall than normal, can lead to relatively drier conditions and leave reservoirs and water tables lower. Drought leads to problems with irrigation and may contribute to additional fires, and potentially additional difficulties in fighting fires.

Urban Development

Growth and development in scrubland and forested areas is increasing the number of human-made structures in the interface areas of southern California. Wildfire has an effect on development, yet development can also influence wildfire. Owners often prefer homes that are private, have scenic views, are nestled in vegetation and use "natural" construction materials. A private setting may be far from public roads, or hidden behind a narrow, curving driveway. These conditions, however, make evacuation and fire fighting difficult. The scenic views found along mountain ridges can also mean areas of dangerous topography. Natural vegetation contributes to scenic beauty, but it may also provide a ready trail of fuel leading a fire directly to the combustible fuels of the home itself.

In Newport Beach and adjacent areas, an increasing number of people use the surrounding undeveloped areas for recreation purposes, and as a result, there is an increased potential for fires to be accidentally or purposely set in the difficult-to-reach portions of the City.

Wildfire Hazard Identification and Regulatory Context

Wildfire hazard areas are commonly identified at the wildland-urban interface. Ranges of the wildfire hazard are further determined by the ease of fire ignition due to natural or human conditions and the difficulty of fire suppression. The wildfire hazard is also magnified by several factors related to fire suppression/control such as the surrounding fuel load, weather, topography and property characteristics. Generally, hazard identification rating systems are based on weighted factors of fuels, weather and topography. Since the early 1970s, several fire hazard assessment and classification systems have been developed for the purpose of identifying and quantifying the severity of the hazard in a given area. Many of these systems are regulatory in that they were implemented as a result of legislation enacted either at the State or Federal level, typically in response to a damaging fire or series of fires. Those that have been developed or used in California are described further below. Early systems characterized the fire hazard of an area based on a weighted factor that typically considered fuel, weather and topography. More recent systems rely on the use of Geographic Information System (GIS) technology to integrate the factors listed above to map the hazards, and to predict fire behavior and the impact on watersheds.

HUD Study System

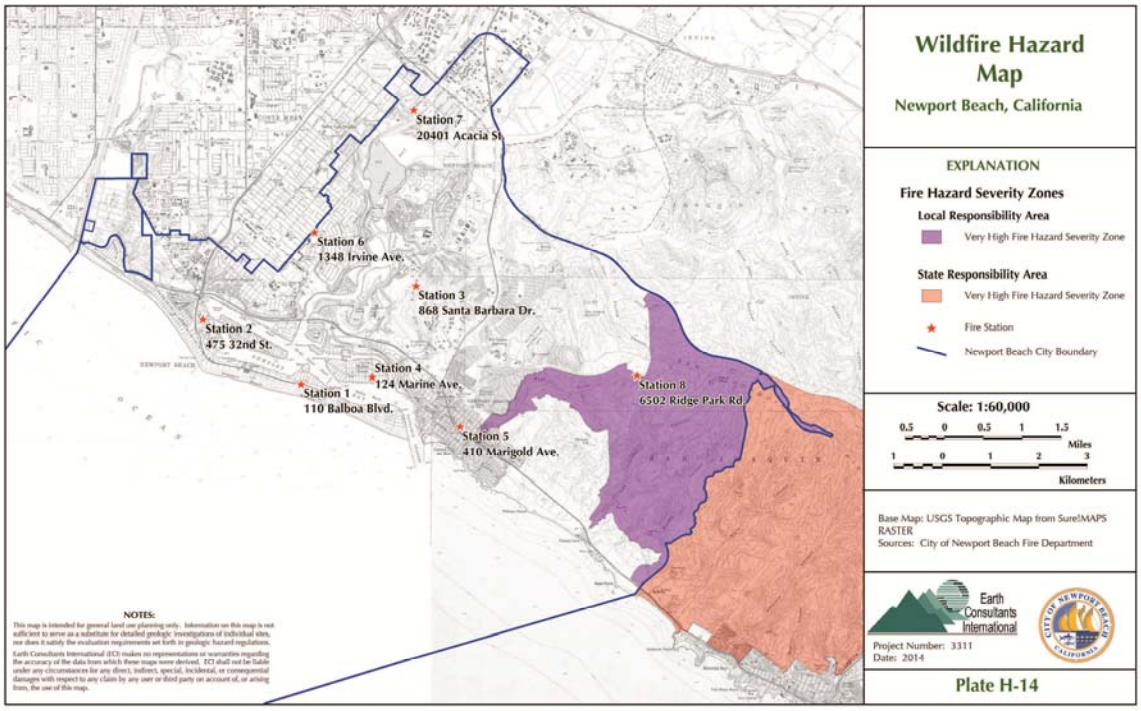
In April 1973, the California Department of Forestry (CDF – now the California Department of Forestry and Fire Prevention, also known as Cal Fire) published a study funded by the Department of Housing and Urban Development (HUD) under an agreement with the Governor's Office of Planning and Research (Helm et al., 1973). As is the case with several other more recent programs, the study was conducted in response to a disaster: during September and October 1970, 773 wildfires burned more than 580,000 acres of California land. The HUD mapping process relied on information obtained from US Geological Survey (USGS) 15- and 7.5-minute quadrangle maps on fuel loading (vegetation type and density) and slope, and combined it with fire weather information (available in real time at http://gacc.nifc.gov/oscc/predictive/fuels_fire-danger/index.htm) to determine the **Fire Hazard Severity** of an area. This system was the basis for several subsequent studies and programs that have been conducted as a result of more recent legislation, as described further below.

State Responsibility Areas System

Legislative mandates passed in 1981 (Senate Bill 81, Ayala, 1981) and 1982 (Senate Bill 1916, Ayala, 1982) that became effective on July 1, 1986, required the CDF to develop and implement a system to rank the fire hazards in California. Areas were rated as moderate, high or very high based primarily on fuel types. Thirteen different fuel types were considered using the 7.5-minute quadrangle maps by the U.S. Geological Survey as base maps (Phillips, 1983). Areas identified as having a fire hazard were referred to as **State Responsibility Areas** (**SRA**s) (Public Resources Code Section 4125). These are non-federal and non-incorporated lands covered wholly or in part by timber, brush, undergrowth or grass, for which the State has the primary financial responsibility of preventing and suppressing fires. SRAs also do not exceed a housing density of 3 unites per acre, and the land has watershed and/or range/forage value, effectively eliminating most desert lands from the SRA definition.

Crystal Cove State Park and Laguna Coast Wilderness Park immediately to the east-southeast of Newport Beach are located within a State Responsibility Area (see orange area on Map 8-2 and Plate H-13 in Appendix H).

Map 8-2: Wildfire Hazard Map for Newport Beach, Showing Local and State Responsibility Areas
(for a larger version of this map, refer to Plate H-14 in Appendix H)



Bates Bill Process

The Bates Bill (Assembly Bill 337, September 29, 1992) was a direct result of the great loss of lives and homes in the Oakland Hills Tunnel Fire of 1991. Prior to the adoption of this bill, the authority to apply wildland fire safety regulations in areas outside State control varied from one jurisdiction to the next, depending on the regulations adopted by individual legislative bodies. The original intent of the bill was to create a single fire district to provide coordinated response to any future fires in the area; the final document developed fire safety regulations to be applied consistently throughout the State (Collins, 2000). As part of this effort, the California Department of Forestry and Fire Protection (CDF), in cooperation with local fire authorities, was tasked to evaluate the fire hazard of **Local Responsibility Areas** (**LRA**s) and identify **Very High Fire Hazard Severity Zones** (VHFHSZs) therein. To accomplish this, the CDF formed a working group comprised of state and local representatives that devised a point system that considers fuel (vegetation), slope, weather, and dwelling density. To qualify as a VHFHSZ, an area has to score ten or more points in the grading scale.

Once the boundaries of a VHFHSZ have been delineated, the CDF notifies the local fire authorities that are responsible for fire prevention and suppression within that area. Since the State is not financially responsible for Local Responsibility Areas, local jurisdictions have final say regarding whether or not an area should be included in a VHFHSZ (Government Code Section 51178). Declaring an area a VHFHSZA means that the local fire department has to enforce the provisions of Section 4291 of the Public Resources Code. Local jurisdictions that do not follow

the Bates system are required to follow at a minimum the model ordinance developed by the State Fire Marshal for mitigation purposes. The risk of fire in VHFHSZs needs to be addressed in the Safety Element of the General Plan (see section below entitled Senate Bill 1241, Kehoe Statutes of 2012).

The Local Responsibility areas in the City of Newport Beach are shown on Map 8-2. The purple area is zoned as a Very High Fire Hazard Severity Zone. The unshaded areas are generally considered to not have a wildland fire hazard, although there are Fuel Modification Zones and Hazard Reduction Zones within these areas (see Map 8-3).

California Fire Plan

The California Fire Plan is a cooperative effort between the State Board of Forestry and Fire Protection and the CDF. This system ranks the fire hazard of the wildland areas of the State using four main criteria: fuels, weather, assets at risk, and level of service (which is a measure of the fire department's success in initial-attack fire suppression). The California Fire Plan uses GIS-based data layers to conduct the initial evaluations, and local CDF Ranger Units are then tasked with field validation of the initial assessment. The final maps use a Fire Plan grid cell with an area of approximately 450 acres, which represents 1/81 of the area of a 7.5-minute quadrangle map (called Quad 81). The fire hazard of an individual cell is ranked as **moderate**, **high** or **very high**. The main objective of the California Fire Plan is to reduce total costs and losses from wildland fire in the State by protecting assets at risk before a fire occurs. To do so, the plan identifies prefire management prescriptions that can be implemented to reduce the risk, and analyzes policy issues and develops recommendations for changes in public policy. The most current California Fire Plan, as of the writing of this document, dates from 2010. For more information, including a digital copy of the entire 2010 Plan, go to http://cdfdata.fire.ca.gov/fire_er/fpp_planning_cafireplan.

FireLine System

The Insurance Services Office (ISO) developed a program used by the insurance industry to identify those areas where the potential loss due to wildfire is greatest (ISO, 1997). ISO retained Pacific Meridian Resources of Emeryville, California to develop the FireLine software, which uses satellite-imagery interpretation to evaluate the factors of fuel types, slope and roads (access) to develop the risk rating. This is not a regulatory mapping program, but most insurance companies that provide insurance services to homeowners in California now use this system. Updated versions of this system are being developed that include the factors of elevation, aspect, and relative slope position.

National Fire Plan

Funding for the National Fire Plan was authorized by Congress in October 2000 in response to the wildfires of that year that burned millions of acres throughout the United States. These fires prompted politicians, fire managers, and government agencies to re-think their approach to fire management. Under Presidential Executive Order, the Secretaries of Agriculture and the Interior were tasked with preparing a report that outlined recommendations to minimize both the long- and short-term impacts of wildfires with a broader effort and closer cooperation between agencies and fire programs. The resultant report, entitled the "National Fire Plan," has as its main purposes to protect communities and restore ecological health on Federal lands (http://www.forestsandrangelands.gov/NFP/index.shtml). The Plan outlines five key points: 1) firefighting, 2) rehabilitation and restoration, 3) hazardous fuel reduction, 4) community assistance, and 5) accountability. The Plan, which was first funded in 2001, commits to funding for a continued level of "Hazardous Fuel Reduction" and new funding for a "Community

Assistance/Community Protection Initiative." The intent of the Community Assistance initiative is to provide communities that interface with federal lands an opportunity to get technical assistance and funding to reduce their threat of wildfires.

The plan is a cooperative effort of the U.S. Department of Agriculture's Forest Service, the Department of the Interior, and the National Association of State Foresters. National Fire Plan maps show communities that are within the vicinity of federal lands that are at high risk from wildland fire. The plan uses hazardous fuel reduction treatment techniques (including prescribed fire alone, mechanical treatment alone, mechanical treatment plus prescribed fire, and other/wildland fire use, such as allowing lightning-caused fires to burn) to reduce the impact of wildland fire on communities within the wildland-urban interface. For additional information refer to http://www.fireplan.gov/.

As part of the Community Assistance/Community Protection Initiative, the National Fire Plan funded a study to identify areas that are at high risk of damage from wildfire. Under this program, Federal fire managers authorized State foresters to determine which communities are at significant risk from wildland fire on Federal lands. In California, this task was undertaken by the California Fire Alliance (CFA), a cooperative group of State, Federal and local agencies, who in 2001 generated a list of communities at risk. Given California's extensive Wildland-Urban Interface (WUI), the list of communities extends beyond just those on or adjacent to Federal lands. As of 2014, the California Fire Alliance (CFA) has identified 1,289 fire-threatened communities in California, one of which is Newport Beach. Newport Beach was identified as a fire-threatened community in 2001 although the city is not located near federally regulated or Federal lands threatened by fire. Information on this program, is available at http://www.cafirealliance.org/communities_at_risk/.

BEHAVEPlus, FARSITE, FlamMap and FSPro

These are computer-based programs that can be used by local fire managers to calculate potential fire behavior in a given area using GIS data inputs for terrain and fuels. The purpose of these models is to predict fire behavior. Data inputs that can be used in the analyses include elevation, slope, aspect, surface fuel, canopy cover, stand height, crown base height and crown bulk density.

The oldest of these models is the BEHAVE Fire Behavior Prediction and Fuel Modeling System (Burgan and Rothermel, 1984; Burgan, 1987; Andrews, 1986; Andrews and Chase, 1989; Andrews and Bradshaw, 1990) that has been used since 1984. A newer version of it is referred to as the BehavePlus Fire Modeling System (Andrews and Bevins, 1999). BehavePlus is a suite of fire behavior systems that includes FlamMap, FARSITE, and FSPro. Input to the BehavePlus model is supplied interactively by the user; typically users run several calculations to evaluate and compare the effects that a range of values will have on the results. Each run consists of a set of uniform conditions.

FARSITE (Finney, 1995, 1998) is a deterministic modeling system that calculates the growth and behavior of a wildfire as it spreads through variable fuel and terrain under changing weather conditions (http://www.firemodels.org/index.php/farsite-introduction). This software can be used to project the growth of ongoing wildfires and prescribed fires, and can be used as a planning tool for fire suppression and prevention, and fuel assessment.

FlamMap (Finney, 2006; Stratton, 2006) is a mapping and analysis system that can be used to model fire behavior across the landscape under constant weather and fuel moisture conditions. The system provides the spatial component to the software suite. Because the environmental

conditions remain constant, the software cannot be used to simulate temporal variations in fire behavior. Given that fuel is a variable in the input data, this software is well-suited to run landscape-level comparisons to evaluate the effectiveness of different fuel treatments under varying topographic conditions.

FSPro is used to calculate the probability that fire will spread from a known perimeter or point, but it does not provide fire perimeters, nor does it provide a projection of fire size. This piece of software requires more computing power than that typically provided by a personal computer (http://www.firemodels.org/index.php/behaveplus-introduction/behaveplus-overview).

Disaster Mitigation Act of 2000

This 2014 Disaster Mitigation Plan Update for the City of Newport Beach, and its predecessor, the 2008 Plan, were completed to satisfy the requirements of the federally mandated Disaster Mitigation Act of 2000. This Act requires local governments to prepare and adopt a Local Hazard Mitigation Plan that has been reviewed and approved by the State's Mitigation Officer (in this case the California Emergency Management Agency – Cal OES) and the Federal Emergency Management Agency (FEMA), as a condition of receiving mitigation project assistance. These documents are to focus on pre-disaster planning and activities as a way to reduce response and post-disaster costs.

Local Disaster (or Hazard) Mitigation Plans should be consistent with the policies contained in the General Plan, especially the Safety Element. Wildfire mitigation programs discussed in these two documents should be in agreement and integrated to ensure that the hazard of wildfire is addressed in an effective manner.

Community Wildfire Protection Plan (CWPP)

The Healthy Forests Restoration Act of 2003 was enacted in response to the widespread forest fires of 2002. The main purposes of the Act are to thin overcrowded forest stands, clear away vegetation and trees to create fuel breaks, provide funding and guidance to reduce or eliminate hazardous fuels in National Forests, improve forest fire fighting efforts, and encourage research into new methods to deal with destructive insects that affect forest communities. The Act also requires communities within the wildland-urban interface to prepare Community Wildfire Protection Plans. Communities that have such a Plan in place can influence where and how federal agencies implement fuel reduction projects on federal lands, and will also be given priority for funding of hazardous fuels reduction projects carried out under the auspices of the Healthy Forests Restoration Act.

Information on how to prepare and implement a CWPP can be obtained from http://www.forestsandrangelands.gov/communities/cwpp.shtml. CWPPs have to be developed as a collaborative effort between local, state and federal officials, in addition to non-governmental stakeholders that manage land in or near the community; must identify and priority areas for hazardous fuel reduction treatments on both federal and non-federal land; recommend the types and methods of fuel reduction to be used to reduce the risk to the community; and recommend measures that homeowners and communities can take to reduce the ignitability of structures.

In part to assist communities with their CWPP, the Orange County Fire Authority (OCFA) has prepared and issued the Orange County Unit Strategic Fire Plan (2012). This report outlines a comprehensive program to reduce government costs and citizen losses from wildland fire in Orange County. The document addresses issues associated with firefighter and public safety, wildland-urban interface issues, prescribed fire, fire suppression, preparedness, protection priorities and cooperation. The most recent version of the plan can be downloaded from

http://cdfdata.fire.ca.gov/fire_er/fpp_planning_plans_details?plan_id=182. Furthermore, the OCFA has, at the Division and Battalion level, prepared tactical fire suppression plans for individual communities in or adjacent to the county's open spaces. The Newport/Laguna Coast Fire Plan covers the very large area of intermingled open spaces and densely populated areas within the incorporated cities of Laguna Beach, Newport Beach, and Irvine, unincorporated areas under the jurisdiction of the County, and the coastal areas of Newport Beach and Crystal Cove State Park. This document was a collaborative effort between the OCFA, the Newport Beach Fire Department, and the Laguna Beach Fire Department.

National Cohesive Wildland Fire Managements Strategy

The National Cohesive Wildland Fire Management Strategy (the Cohesive Strategy) is a three-phased effort undertaken and developed by the Wildland Fire Leadership Council in response to requirements of the Federal Land Assistance, Management, and Enhancement (FLAME) Act of 2009. The FLAME Act set aside two monetary funds to address the impacts of increasing wildfire suppression costs and the effects that these costs have on other programs funded by the Department of the Interior and the Forest Service. The Act requires the Secretary of the Interior and the Secretary of Agriculture to jointly submit a report that addresses a cohesive wildfire management strategy. Among other items, the report needs to identify the most cost-effective ways to allocate the fire management budget, provide appropriate management response to wildfires, assess a community's level of risk, assess the impact of climate change on the frequency and severity of wildfires, and address the effects of invasive species on wildfire risk. The resulting document, referred to as the National Strategy, establishes a national vision for wildland fire management and includes a set of guidelines that can be tailored for local and regional needs. The Strategy's vision is as follows: "To safely and effectively extinguish fire, when needed; use fire where allowable; manage our natural resources; and as a Nation, live with wildland fire."

The Cohesive Strategy identifies three primary factors that can have a positive effect in addressing wildland fire problems:

1. *Restoring and maintaining resilient landscapes.* This factor must recognize the current lack of ecosystem health and variability from geographic area to geographic area, including the effects of climate change on ecosystem health. The strategy should address landscapes on a regional and sub-regional scale given how landscape conditions and needs vary depending on local climate and fuel conditions, among other elements. This is addressed for the city of Newport Beach and surrounding environments in the Orange County Fire Authority's Unit Strategic Fire Plan (2012) mentioned above.
2. *Creating fire-adapted communities.* The strategy offers options and opportunities to engage communities and work with them to become more resistant to wildfire threats, and respond in the event of a wildfire emergency.
3. *Responding to wildfires.* This element considers the full spectrum of fire management activities, and recognizes the differences in missions among local, state, tribal and Federal agencies.

Western Wildfire Risk Assessment

This is a study on wildfire risk conducted for the 17 western states and selected Pacific islands. The study, administered by the Council of Western State Foresters and the Western Forestry Leadership Coalition (WFLC), was conducted by the Timmons Group in the spring of 2013 (http://www.timmonsgis.com/projects/west-wide-wildfire-risk-assessment). The assessment reportedly provides the most up-to-date fuels dataset and risk assessment outputs for the West, which provide a baseline for quantifying mitigation activities and monitoring change over time.

The methodology used for the analysis was comparable across the entire study region, allowing for a consistent basis during interpretation and use of the data. According to the Timmons Group's website, the emphasis now is to put the assessment results to use by integrating the datasets into interactive web mapping applications.

Senate Bill 1241 (2012 Kehoe Statutes)

To address the increasing issues at the wildland-urban interface, Senate Bill 1241 (Kehoe, Statutes of 2012) revised the Safety Element requirements for state responsibility areas and very high fire hazard severity zones (Government Code Sections 65302 and 65302.5). Specifically, SB 1241 requires cities revising their Housing Element of the General Plan on or after January 1, 2014, to also review and update their Safety Element to address the risk of fire in state responsibility areas and very high fire hazard severity zones. SB 1241 requires the Safety Element include the following:

1. Fire hazard severity zone maps available from the Department of Forestry and Fire Protection.
    a. Historical data on wildfires available from local agencies;
    b. Information about wildfire hazard areas that may be available from the United States Geological Survey;
    c. General location and distribution of existing and planned uses of land in very high hazard severity zones and in state responsibility areas, including structures, roads, utilities, and essential public facilities;
    d. Local, state and federal agencies with responsibility for fire protection, including special districts and local offices of emergency services.

2. A set of goals, policies, and objectives based on the information identified in subparagraph (1) regarding fire hazards for the protection of the community from the unreasonable risk of wildfire.

3. A set of feasible implementation measures designed to carry out the goals, policies, and objectives based on the information identified in subparagraph (2) including, but not limited to:
    a. Avoiding or minimizing the wildfire hazards associated with new uses of land;
    b. Locating, whenever feasible, new essential public facilities outside of high fire risk areas, including, but not limited to, hospitals and health care facilities, emergency shelters, emergency command centers, and emergency communication facilities, or identifying construction methods or other methods to minimize damage if these facilities are located in a state responsibility area or very high fire hazard severity zone;
    c. Designing adequate infrastructure if a new development is located in a state responsibility area or in a very high fire hazard severity zone, including safe access for emergency response vehicles, visible street signs, and water supplies for structural fire suppression;
    d. Working cooperatively with public agencies with responsibility for fire protection.

4. If a city or county has adopted a fire safety plan or document separate from the General Plan, an attachment of, or reference to a city or county's adopted fire safety plan or document that fulfills commensurate goals and objectives and contains information required pursuant to this paragraph.

SB 1241 also requires that the draft Element of or draft amendment to the Safety Element of a county or a city's General Plan be submitted to the State Board of Forestry and Fire Protection and to every local agency that provides fire protection to territory in the city or county at least 90 days prior to either: 1) the adoption or amendment to the Safety Element of its General Plan for each county that contains state responsibility areas; or 2) the adoption or amendment to the Safety Element of its General Plan for each city or county that contains a very high fire hazard severity zone as defined pursuant to subdivision (b) of Section 51177.

Vulnerability and Risk

As discussed previously, the easternmost one-third of the City of Newport Beach is considered at risk from wildfire by the California Department of Forestry and the City's Fire Department. The local Very High Fire Hazard Severity Zones in the City's Local Responsibility Areas are shown in purple on Map 8-2 (and Plate H-13). These areas are based on vegetation, access, zoning and topography. California State law requires that fire hazard areas be disclosed in real estate transactions; that is, real-estate sellers are required to inform prospective buyers whether or not a property is located within a wildland area that could contain substantial fire risks and hazards [Assembly Bill 6; Civil Code Section 1103(c)(6)]. Real-estate disclosure requirements are important because in California the average period of ownership for residences is only five years (Coleman, 1994). This turnover creates an information gap between the several generations of homeowners in fire hazard areas: Uninformed, new homeowners may attempt landscaping or structural modifications that could be a detriment to the fire-resistant qualities of the structure, with potentially negative consequences.

A vulnerability assessment of the interface areas of the City at risk from wildfire requires knowledge about the population and total value of the property at risk, and an estimate of the area that would be impacted by the fire. Other key factors that need to be considered in the assessment of wildfire risk include ignition sources, building materials and design, community design, structural density, slope, vegetative fuel, fire occurrence and weather, as well as whether or not the area is experiencing a drought, and if it is, how long have drought conditions persisted. The National Wildland/Urban Fire Protection Program has developed the Wildland/Urban Fire Hazard Assessment Methodology tool for communities to assess their risk to wildfire. For more information on wildfire hazard assessment refer to http://www.firewise.org.

Unlike an earthquake, which has the potential to impact the entire region, wildfires at the wildland-urban interface are often contained thanks to the heroic efforts of the local fire departments, in some cases, if necessary, with help from other regional, State, and Federal agencies. Furthermore, as discussed above, there are computer models available (FARSITE, BEHAVEPlus, and FlamMap) that, given reasonable inputs regarding slope, wind, fuel availability, moisture conditions, and other parameters, can be used to forecast the area that would be impacted. Once the impacted area is determined, a risk assessment that looks at the population and property within that area can be conducted, from which loss estimates can be calculated. Many of the wildfire assessment methods discussed in the previous section use a compilation of a variety of these data to define wildfire-susceptible areas.

Community Wildfire Issues

What is Susceptible to Wildfire?

The hills and mountainous areas of southern California are considered to be at the wildland-urban interface. The development of homes and other structures has encroached and will continue to encroach onto the wildlands, expanding the wildland-urban interface areas. The neighborhoods at the interface are characterized by a diverse mixture of housing structures, development patterns, ornamental and natural vegetation, and natural fuels. In the event of a wildfire, this diverse mixture of vegetation, structures and development patterns, compounded by the local topography and weather at that specific time, can result in an unwieldy and unpredictable fire. Factors important in fighting such fires include access, vegetation management, proximity of water sources, distance from a fire station and available firefighting personnel and equipment. A review of past wildland-urban interface fires has shown that many structures are destroyed or damaged for one or more of the following reasons:

- ✓ Combustible roofing material;
- ✓ Wood construction;
- ✓ Structures with no defensible space;
- ✓ Fire department with poor access to structures;
- ✓ Subdivisions located in heavy natural fuel types;
- ✓ Structures located on steep slopes covered with flammable vegetation;
- ✓ Limited water supply; and
- ✓ Winds over 30 miles per hour.

Given that the southeastern one-third of the City of Newport Beach is located within the local VHFHSZ, there is a significant inventory of residential and commercial structures at risk from wildland fire. Also in this area are several schools and one fire station (Station No. 8 at 6502 Ridge Park Road). A second fire station (Station No. 5 at 410 Marigold Avenue) is just outside the very high fire hazard zone. Several important transportation routes, including Newport Coast Road, a small segment of Coast Highway, and the San Joaquin Hills Transportation Corridor extend, at least partly, through this area. Other facilities at risk from wildland fire include the large electrical transmission lines through Buck Gully.

Elements Critical to Wildfire Fighting Success

Road Access

Road access is a major issue for all emergency service providers. In some areas of the county, as development has encroached into the rural areas, the number of houses without adequate turn-around space has increased. In many single-family residential neighborhoods, there is not adequate space for emergency vehicle turnarounds, hindering emergency workers' access to the houses at risk. Narrow winding roads with inadequate turn-around space are particularly challenging as fire trucks are too long to maneuver in these roads. In these cases, fire fighters may evacuate the property owners and then leave themselves, unable to safely remain to save the threatened structures. In the planned developments in Newport Coast, all proposed roads are reviewed by the Fire Department to make sure that they comply with the minimum width, grade and turning radii requirements (see Table 8-4).

Fires at the wildland-urban interface tend to move quickly, with most of the damage or losses generally occurring in the first few hours after the fire starts (Coleman, 1994). Therefore, access to the wildland-urban interface for the purposes of emergency response is critical. This requires streets that meet minimum access and egress requirements so that they can be traversed by fire apparatus. The Newport Beach Municipal Code includes minimum width standards for local

streets and width and length standards for cul-de-sacs. These standards are summarized in Table 8-4 below.

Table 8-4: Road Standards for Fire Equipment Access

Width of Fire Lanes	Minimum 20 feet wide with no parking on either side, minimum 28 feet wide with parking on one side, minimum 36 feet wide with parking on both sides.
Grades	Not to exceed 10 percent.
Turning Radius	No less than 20 feet inside radius and 40 feet outside radius, without parking. Cul-de-sacs with center obstructions require larger radii as approved by the Code Official.
Gates	Minimum width of any gate or opening required as a point of access shall be no less than 14 feet. Based on the length of the approach, this width may have to be larger. If there are separate gates for each direction of travel, then each gate shall be no less than 14 feet wide. Any point of access deemed necessary for emergency response shall remain unobstructed at all times. All electronically operated gates must be controlled by an approved key switch and approved remote opening device. Any secondary access points shall have a lock approved by the Newport Beach Fire Department.
Signage	All premises need to be identified with approved numbers or addresses in a position plainly visible and legible from the street or road fronting the property. Refer to Section 9.04.0450 of the City's Municipal Code for specifics on the minimum size of the letters and numbers.
Other Requirements for Fire Access Roadways	The fire code official is authorized to require more than one fire apparatus access road based on the potential for impairment of a single road by vehicle congestion, condition of terrain, climatic conditions or other factors that could limit access.

Water Supply

Fire fighters at the wildland-urban interface may be faced by limited water supply and lack of hydrant taps. Rural areas are characteristically outfitted with small-diameter pipe water systems, inadequate for providing sustained fire-fighting flows.

Areas at higher elevations may also be serviced by water that is pumped up to the higher elevations. In the event of a fire, there may be insufficient water pressure to do so. Emergency water storage is also critical, especially when battling large wildland fires. During the 1993 Laguna Beach (Orange County) fire, "water streams sprayed on burning houses sometimes fell to a trickle" (Platte and Brazil, Los Angeles Times, 1993), primarily because most water reservoirs in Laguna Beach were located at lower elevations, and the water district could not supply water to the higher elevations as fast as the fire engines were using it. Leaks and breaks in the water distribution system, including leaking irrigation lines and open valves in destroyed homes also reduced the amount of water available to the fire fighters. A seven-day emergency storage supply is recommended, especially in areas likely to be impacted by fires after earthquakes, due to the anticipated damage to the main water distribution system as a result of ground failure due to fault rupture, liquefaction, or landsliding.

Interface Fire Education Programs and Enforcement

Fire protection in wildland-urban interface areas relies more heavily on landowners taking measures personally to protect their properties. Property owners are more likely to take the initiative if they are informed of the risk. Therefore, public education and awareness should play

a greater role in interface areas. In those areas with strict fire codes, property owners who resist maintaining the minimum brush clearances on their property should be cited for failure to clear brush.

The Need for Mitigation Programs

Continued development into the wildland-urban interface will have a growing impact on the wildfire risk of the area. Wildfires in southern California occur periodically, often with catastrophic results, with the history of deadly and expensive fires going back decades, if not a century. Continued growth and development underscores the increased need for natural hazards mitigation planning in southern California.

Fires After an Earthquake – The Threat of Urban Conflagration

Although this section deals primarily with the hazard of wildfires, there is another type of fire hazard that needs to be addressed. Specifically, large fires following an earthquake in an urban region, although rare, have the potential to cause great losses. The two largest peace-time urban fires in history, the 1906 San Francisco and 1923 Tokyo, were both caused by earthquakes. The conflagration in San Francisco after the 1906 earthquake was the single largest urban fire, and the single largest earthquake loss, in U.S. history. Three days of fires consumed more than 28,000 buildings within a 12-square-kilometer area. The cost is staggering: $250 million in 1906 dollars, or about $5 billion at today's prices. Although the threat that existed in San Francisco was and is far greater than that in Newport Beach today, there are some sections of Newport Beach where, due to ground failure as a result of either fault rupture or liquefaction, breaks in the gas mains and the water distribution system could lead to a significant fire-after-earthquake situation. Refer to the maps in Appendix H for information regarding those areas of the City susceptible to surface fault rupture and liquefaction.

The 1989 Loma Prieta earthquake, the 1994 Northridge earthquake, and the 1995 Kobe, Japan earthquake all demonstrate the current, real possibility of a fire-following-an earthquake developing into a conflagration. In the United States, all the elements that would hamper fire-fighting capabilities are present: density of wooden structures, limited personnel and equipment to address multiple fires, debris blocking the access of fire-fighting equipment, and a limited water supply.

Of the examples above, let us look at the earthquake closest to home. The moderately sized, M6.7 Northridge earthquake of 1994 caused several structural fires, many the result of broken gas mains: the earthquake caused 15,021 natural gas leaks that resulted in three street fires, 51 structural fires (23 of these caused total ruin) and the destruction by fire of 172 mobile homes. In one incident, the earthquake severed a 22-inch gas transmission line and a motorist ignited the gas while attempting to restart his stalled vehicle. Response to this fire was impeded by the earthquake's rupture of a water main; five nearby homes were destroyed. Elsewhere, one mobile home fire started when a downed power line ignited a ruptured transmission line. In many of the destroyed mobile homes, fires erupted when inadequate bracing allowed the homes to slip off their foundations, severing gas lines and igniting fires. There was a much greater incidence of mobile home fires (49.1 per thousand) than other structure fires (1.1 per thousand).

The damages from the 1994 earthquake reminded researchers of the findings of a study published in 1988 by the California Division of Mines and Geology (Toppozada and others, 1988). This study identified projected damages in the Los Angeles area as a result of an earthquake on the Newport-Inglewood fault. The earthquake scenario estimated that thousands of gas leaks would result from damage to pipelines, valves and service connections. This study

prompted the Southern California Gas Company to start replacing their distribution pipelines with flexible plastic polyethylene pipe, and to develop ways to isolate and shut off sections of supply lines when breaks are severe. Nevertheless, as a result of the 1994 Northridge earthquake, the Southern California Gas Company reported 35 breaks in its natural gas transmission lines and 717 breaks in distribution lines. About 74 percent of the 752 leaks were corrosion related. Furthermore, in the aftermath of the earthquake, 122,886 gas meters were closed by customers or emergency personnel. Thankfully, most of the leaks were small and could be repaired at the time of service restoration, but the costs and time associated with these repairs were considerable.

History indicates that fires following an earthquake have the potential to severely tax the local fire suppression agencies, and develop into a worst-case scenario. Earthquake-induced fires can place extraordinary demands on fire suppression resources because of multiple ignitions. The principal causes of earthquake-related fires are open flames, electrical malfunctions, gas leaks, and chemical spills. Downed power lines may ignite fires if the lines do not automatically de-energize. Unanchored gas heaters and water heaters are common problems, as these readily tip over during strong ground shaking (State law now requires new and replaced gas-fired water heaters to be attached to a wall or other support).

Many factors affect the severity of fires following an earthquake, including ignition sources, types and density of fuel, weather conditions, functionality of the water systems, and the ability of firefighters to suppress the fires. Casualties, debris and poor access can all limit fire-fighting effectiveness. Water availability in Los Angeles County following a major earthquake will most likely be curtailed due to damage to the water distribution system — broken water mains, damage to the aqueduct system, damage to above-ground reservoirs, etc.

Loss-estimation scenarios were conducted for the City of Newport Beach using HazUS. Specifics of this analysis are discussed in detail in Section 6 – Earthquakes. Four different earthquake scenarios were considered for the City. The results of these loss estimations indicate that Newport Beach could experience between 2 and 16 ignitions immediately following an earthquake, with the San Andreas fault earthquake scenario triggering 2 ignitions, and the San Joaquin Hills and Newport-Inglewood faults triggering about 15 and 16 ignitions, respectively. An earthquake on the Whittier fault is thought capable of triggering 3 ignitions in the City. The burnt area resulting from these ignitions will vary depending on wind conditions. Normal wind conditions of about 10 miles per hour (mph) are expected to result in burn areas of between 3 and 100 acres. If Santa Ana wind conditions are present at the time of the earthquake, the burnt areas can be expected to be significantly larger.

The fires triggered by an earthquake on the Whittier fault are anticipated to displace about 40 people. The fires triggered by the other earthquake scenarios are expected to impact between 99 (San Andreas fault) and 707 people (Newport-Inglewood fault).

Existing Wildfire Mitigation Activities

Hazard mitigation programs in fire hazard areas currently include fire prevention, vegetation management, legislated construction requirements, and public awareness. Each of these programs is described further below.

Fire Prevention

Fire prevention aims to reduce the incidence and extent of fire by preventing wildfires from occurring in the first place. Over the years, a variety of fire prevention programs have been developed and implemented by Federal, State, and local agencies. These programs typically include education, engineering, patrolling, code enforcement, and signing (Greenlee and Sapsis, 1996). Smokey Bear is one of the best-known characters that both children and adults recognize, attesting to the success of public education programs aimed at fire prevention. Quantitative studies show that fire losses arising from human fires, especially those caused by children, dropped substantially after the Smokey Bear fire prevention program was introduced, in some cases by as much as 80 percent (Greenlee and Sapsis, 1996). Therefore, fire prevention is a well-understood program with a high degree of success. However, as discussed above, by preventing fire from occurring, fuel loads are allowed to increase, with the potential for high intensity fires and resultant damage. Therefore, fire prevention needs to be complemented with a variety of other programs that will guarantee long-term success in reducing the losses resulting from fires.

Fire prevention can include limiting access to fire hazard areas during certain times of the year. Although not apparent from Map 8-2, the wildfire susceptibility of an area changes from one season to the next, and from year to year, typically in response to local variations in precipitation, temperature, vegetation growth, and other conditions. When the fire danger in a Very High Fire Hazard Zone is deemed to be of special concern, local authorities rely on increased media coverage and public announcements to educate the local population about being fire safe. For example, to reduce the potential for wildfires during fire season, the City of Newport Beach can opt to close hazardous fire areas to public access during at least part of the year. By monitoring the site-specific wildfire susceptibility of a region, the Fire Department can establish regional prevention priorities that help reduce the risk of wildland fire ignition and spread, and help improve the allocation of suppression forces and resources, which can lead to faster control of fires in areas of high concern.

Restricted public access to hiking trails in and around the City of Newport Beach when a red flag condition is in effect helps reduce the opportunity for human-caused wildfires in the area. Continued use of signs during high and extreme fire conditions along the freeways and roads that cut through the wildland areas in the City and adjacent areas can also help reduce the fire hazard by alerting and educating motorists and residents.

The City of Newport Beach has a variety of fire prevention programs in place. Routine (annual or bi-annual) fire prevention inspections are conducted on a citywide basis by the Fire Department for residential, commercial, and industrial-type occupancies. The Life Safety Services Division of the City's Fire Department inspects all new and existing public assemblies, educational facilities, institutions and hospitals, high-rise buildings, hazardous materials occupancies, malls and large retail centers, and certain residential dwellings. The inspections are conducted for the purpose of enforcing the Fire Code and hazardous materials regulations, for Fire Department personnel from within that jurisdictional area to become familiar with the premises (this is helpful in the event that they need to respond to a fire or emergency), and to instruct occupants about fire prevention methods and procedures.

Newport Beach's Life Safety Services Division is comprised of several different units, each with specific responsibilities. Life Safety Services members have the powers of a peace officer (Calif. Penal Code 830.37 (b)) in enforcing the City's Fire Code. The responsibilities of each unit are described further below:

- **Fire Code Inspection** – conducts inspections of new and existing structures.
- **Development Plan Review** – reviews proposed developments for conformance with fire protection requirements including fire-resistive construction, landscaping, emergency access, available fire flow, and built-in fire detection and suppression systems.
- **Fire Investigation and Arson** – investigates fire cause and origin, administers aggressive code enforcement, and analyzes cost recovery for negligent or malicious acts causing fire. All members of this unit have full police powers as set in California Penal Code Section 830.37(a).
- **Vegetation Management** – reviews existing properties for compliance with fuel management requirements; administers and enforces the weed abatement and brush clearance program, and contracts for fire hazard reduction measures, including fuel breaks, fire roads, and non-compliant parcels.
- **Hazardous Materials and Waste Management** – administers hazardous materials disclosure laws and legislation, as well as conducts inspection of facilities that use or store hazardous materials for environmental compliance.
- **Public Education** – provides public fire safety education for groups or individuals on the hazards associated with the wildland-urban interface area.

Vegetation Management

Although, as discussed above, wildland fire is a significant potential hazard in some portions of Newport Beach, there are several management tools that can be implemented to reduce this hazard to manageable levels. Experience and research have shown that **vegetation management** is an effective means of reducing the wildland fire hazard in southern California. As a result, in areas identified as susceptible to wildland fire, jurisdictions typically require property owners to use a combination of maintenance approaches aimed at reducing the amount and continuity of the fuel (vegetation) available.

Fuel or vegetation treatments often used include mechanical, chemical, biological and other forms of biomass removal (Greenlee and Sapsis, 1996) or **fuel modification** within a given distance from habitable structures. The intent is to create a **defensible space** that slows the rate and intensity of the advancing fire, and provides an area at the urban-wildland interface where firefighters can set up to suppress the fire and save the threatened structures. Defensible space is defined as an area, either natural or man-made, where plant materials and natural fuels have been treated, reduced, or modified. However, removal of the native vegetation and maintenance of a wide strip of bare ground is not aesthetically acceptable and it increases the potential for water runoff and soil erosion. Native vegetation can be replaced with a green belt of low-lying, vegetation, but the increased use of water and maintenance requirements can make this option undesirable.

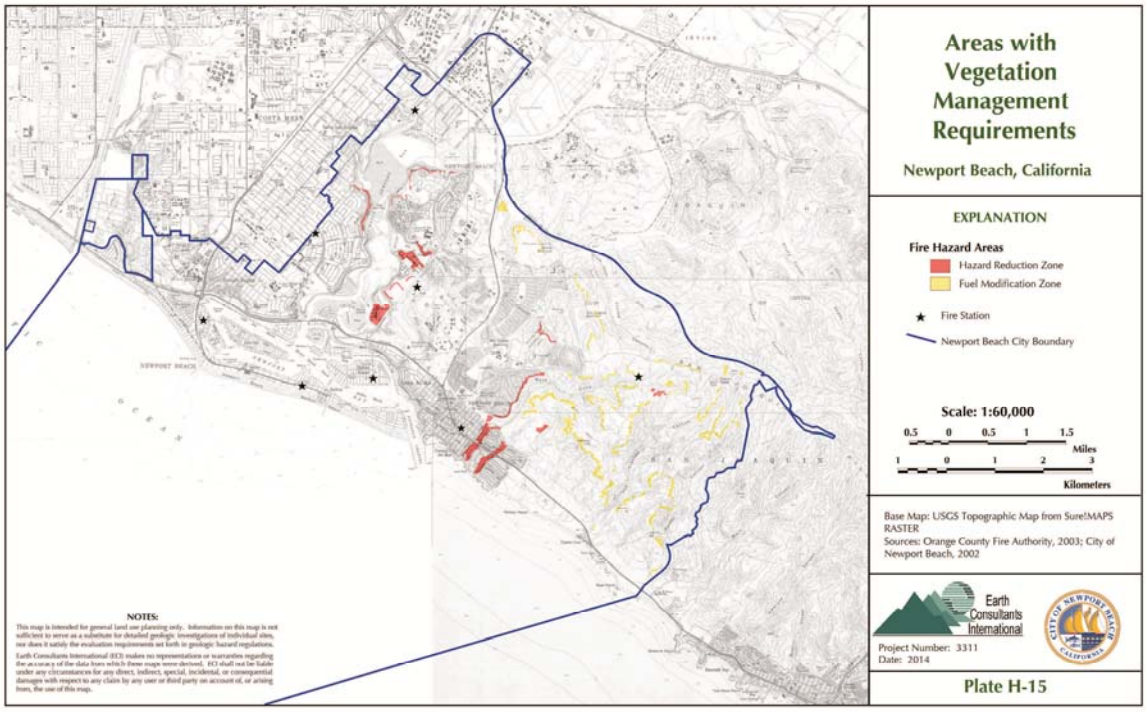
Another vegetation management approach used in some areas of southern California, including the Newport Beach areas of Buck Gully, Morning Canyon and some parts of Newport Coast, is referred to as **hazard reduction.** This method places emphasis on the space near structures that provides natural landscape compatibility with wildlife, water conservation and ecosystem health. Immediate benefits of this approach include improved aesthetics, increased health of large remaining trees and other valued plants, and enhanced wildlife habitat.

Fuel Modification Zone requirements are imposed when a new community or development is proposed adjacent to a wildland area. Any project in or adjoining a wildland fire hazard area is required to submit a Fire Protection Plan for review and approval before a grading or building permit for new construction is issued. These plans need to meet the criteria of the Newport

Beach Fire Department's Fuel Modification Plan and Maintenance Standard (Guideline G.02 - Fuel Modification Plans and Maintenance Standard).

In Newport Coast, the Orange County Fire Authority has the responsibility for reviewing and approving fuel modification zones and the inspection of the installation of these zones until the area is completely built out. The City of Newport Beach has the responsibility of ensuring that these areas are maintained in accordance with the Fire Protection Plan approved by the Orange County Fire Authority.

Map 8-3: Areas with Vegetation Management Requirements in Newport Beach
(refer to Plate H-14 in Appendix H for a larger version of this map)



A **fuel modification zone** is a ribbon of land surrounding a development within a fire hazard area that is designed to diminish the intensity of a wildfire as it approaches the structures. Fuel modification includes both the thinning (reducing the amount) of native combustible vegetation, and the removal and replacement of native vegetation with fire-resistive plant species. **The minimum width of a fuel modification zone is 170 feet**. These areas may be owned by individual property owners or by a homeowners' association. In the case of Newport Coast, local homeowners' associations own the majority of the fuel modification areas. Emphasis is placed on the space near structures that provides natural landscape compatibility with wildlife, water conservation and ecosystem health.

The fuel modification zone is typically divided into four areas referred to as the A, B, C and D zones (see Figure 8-3). The A Zone is the closest to the homes; the B, C and D zones lie outside the fence line and are within the common area typically owned by an association. Any dead or dying vegetation shall be removed from all zones, and certain fire-prone species of vegetation are required to be removed when found in any of the four fuel modification zones.

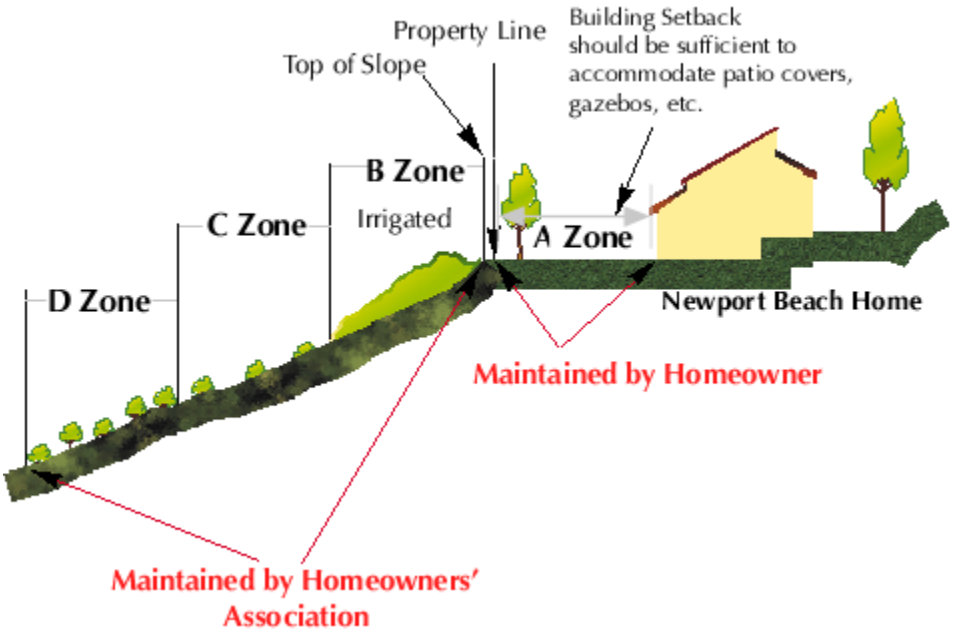
- The **A Zone** is the defensible space where firefighters will set up hose lines to extinguish the approaching fire. The A zone includes ornamental plants and single specimen trees. All plants in this area are required to be irrigated and must be selected from the City-approved plant list.

- The **B Zone** is the next 50 feet. This zone is an area where natural vegetation has been replaced with fire-resistive, drought-tolerant plants from the City-approved Fire Resistive Plant list. The B zone is fitted with automatic water sprinklers on a permanent basis. Non-approved vegetation must be removed from this zone.

- The **C and D zones** are the next 100 feet away from the homes. Each of these zones is a minimum of 50 feet in width. These zones are called the thinning zones. Natural vegetation is reduced by 50 percent in the C zone, and by 30 percent in the D zone. A way to imagine this thinning principle is as follows: in the 50 percent thinning zone (C zone) two people can walk side by side around clumps of vegetation. In a 30 percent thinning zone (D Zone), two people would have to walk single file between clumps of natural vegetation. These areas are not irrigated.

In addition to reduction of the vegetation hazards, structures immediately adjacent to the wildland areas and all structures located in a High Fire Hazard Severity Zone are hardened by being constructed under the provisions of the California Building Code Chapter 7A and the Newport Beach Municipal Code. These provisions include the installation of Class A roof assemblies, installation of dual glazed windows, ignition-resistant construction, and special attic venting requirements.

Figure 8-3: Fuel Modification Zones Required in Fire Hazardous Areas in Newport Coast



The Fuel Modification and Hazard Reduction Zone Guidelines and Standards adopted by Newport Beach for vegetation management in defensible areas are designed to be a fire prevention partnership between property owners and the City in order to prevent disastrous fires. The ordinance is designed to minimize fire danger by controlling density and placement of flammable vegetation. It does not recommend indiscriminate clearing of native coastal sage scrub and other types of plants that perform important roles in erosion control. The mitigation measures provided herein are the minimum required standards. In some high fire hazard areas or during certain times of the year, when due to the hot, dry weather there is an increased risk of wildfires, the Fire Marshal may determine that conditions warrant greater fire protection measures than what the minimum standards provide for. In that event, the Fire Marshal has the authority to supercede the requirements described above.

These standards require property owners in fire hazard areas, especially at the wildland-urban interface, to conduct maintenance, modifying or removing non-fire-resistive vegetation around their structures to reduce the fire danger. This affects any person who owns, leases, controls, operates, or maintains a building or structure in, upon, or adjoining the WUI area. Other specific maintenance actions that can be undertaken by property owners in the fire hazard areas include:

- Remove all dead vegetation and keep grasses and weeds maintained within 100 feet of any building and within 10 feet of any roadway. These provisions are part of an amendment to the Hazardous Vegetation Ordinance adopted in 1990. In extreme cases, clearance up to 200 feet from a structure and 50 feet from a roadway may be required by the Fire Department.
- Grasses and other vegetation located more than 30 feet from any building and less than 18 inches in height may be maintained where necessary to prevent erosion. Large trees and shrubs in that area should be at least 18 feet apart.
- Remove leafy foliage, dead wood, combustible ground cover, twigs, or branches within 3 feet of the ground from mature trees located within 100 feet of any building or within 10 feet of any roadway.
- Remove dead limbs, branches, and other combustible matter from trees or other growing vegetation adjacent to or overhanging any structure.
- Remove any portion of a tree that extends within 10 feet of a chimney or stovepipe.
- Trim and maintain all vegetation away from the curb line up to a height of 13.5 feet to accommodate emergency vehicles.
- Maintain 5 feet vertical clearance between roof surfaces and any overhanging portions of trees.
- Property owners in the urban-wildland interface area can request that the Fire Department conduct a comprehensive fire safety survey of their homes and property. The Fire Department inspects the residences for compliance with applicable regulations, and prepares a report for use by the homeowner to reduce its fire hazard. Implementation of the recommended mitigation measures may help the homeowner obtain a reduction in the cost of fire insurance.

It is the philosophy of the Newport Beach Fire Department to prevent catastrophic brush fires through comprehensive code enforcement efforts and, when necessary, a rapid response of properly trained and equipped firefighters. Successfully preventing fires requires a partnership between the community and the Newport Beach Fire Department to maintain the hill areas free of hazardous brush and combustible vegetation.

Hazard Abatement Notices

Each year, Fire Department personnel survey the hillside areas and issue notices of violation for hazardous vegetation. If uncontrolled or high weeds, brush, plant material, or other items prohibited under the City's Municipal Code are present in a property, the Fire Marshal has the authority to give the property owner of record a notice to abate the hazard. The property owner has 30 days to comply. If the owner does not abate the hazard during the time period specified in the notice, the City may take further action to reduce the fire hazard. Further action may include the following:

- ✓ The City or its contractor may enter the parcel of land and remove or otherwise eliminate or abate the hazard;
- ✓ upon completion of the work, the City can bill the property owner for the cost of the work plus any administrative costs, or the cost can become a special assessment against that parcel; and
- ✓ upon City Council confirmation of the assessment and recordation of that order, a lien may be attached to the parcel, to be collected on the next regular property tax bill levied against the parcel.

The Fire Marshal has to notify the property owner of the intention to abate the fire hazard by certified mail. The notices have to be mailed at least 15 days prior to the date of the proposed abatement. The property owner may appeal the decision of the Fire Marshal requiring the maintenance of an effective firebreak by sending a written appeal to the Fire Chief within 10 days of the notice. For additional information regarding the Notification and Abatement procedures, refer to Section 9.04.030 of the City's Municipal Code.

Legislated Construction Requirements in Fire Hazard Areas

Building construction standards for such items as roof coverings, fire doors, and fire resistant materials help protect structures from external fires *and* contain internal fires for longer periods. That portion of a structure most susceptible to ignition from a wildland fire is the **roof**, due to the deposition of burning cinders or brands. Burning brands are often deposited far in advance of the actual fire by winds. Roofs can also be ignited by direct contact with burning trees and large shrubs (Fisher, 1995). The danger of combustible wood roofs, such as wooden shingles and shakes, has been known to fire fighting professionals since at least 1923, when California's first major urban fire disaster occurred in Berkeley. It was not until 1988, however, that California was able to pass legislation calling for, at a minimum, Class C roofing in fire hazard areas. Then, in the early 1990s, there were several other major fires, including the Paint fire of 1990 in Santa Barbara, the 1991 Tunnel fire in Oakland/Berkeley, and the 1993 Laguna Beach fire, whose severe losses were attributed in great measure to the large percentage of combustible roofs in the affected areas. In 1994-1996 new roofing materials standards were approved by the California legislature for Very High Fire Hazard Severity Zones.

So what do these Classes A, B and C mean? To help consumers determine the fire resistance of the roofing materials they may be considering, roofing materials are rated as to their fire resistance into three categories that are based on the results of test fire conditions that these materials are subjected to under rigorous laboratory conditions, in accordance with test method ASTM-E-108 developed by the American Society of Testing Materials. The rating classification provides information regarding the capacity of the roofing material to resist a fire that develops outside the building on which the roofing material is installed (The Institute for Local Self Government, 1992). The three ratings are as follows:

Class A: Roof coverings that are effective against **severe** fire exposures. Under such exposures, roof coverings of this class:

- Are not readily flammable;
- Afford a high degree of fire protection to the roof deck;
- Do not slip from position; and
- Do not produce flying brands.

Class B: Roof coverings that are effective against **moderate** fire exposures. Under such exposures, roof coverings of this class:

- Are not readily flammable;
- Afford a moderate degree of fire protection to the roof deck;
- Do not slip from position; and
- Do not produce flying brands.

Class C: Roof coverings that are effective against **light** fire exposures. Under such exposures, roof coverings of this class:

- Are not readily flammable;
- Afford a measurable degree of fire protection to the roof deck;
- Do not slip from position; and
- Do not produce flying brands.

Non-Rated Roof coverings have not been tested for protection against fire exposure. Under such exposures, non-rated roof coverings:

- May be readily flammable;
- May offer little or no protection to the roof deck, allowing fire to penetrate into attic space and the entire building; and
- May pose a serious fire brand hazard, producing brands that could ignite other structures a considerable distance away.

In very high fire hazard severity zones, new construction and reconstruction are required to have, as a minimum, Class A roofing assemblies. If more than 50 percent of the roof on an existing structure is replaced during any one-year period, the entire roof must then consist of Type A roofing materials. Any repair or replacement of less than ten percent of an existing roof must consist of materials equal to or greater in fire resistance than the existing roof and not less than Class C.

In other areas, when more than 50 percent of the roof area on existing structures is replaced within one year, the entire roof covering must consist of materials equal to or greater than the existing roof and not less than Class B. In addition, any roof materials applied in the alteration, repair, or replacement of 10 percent or more of the roof shall also be equal to or greater than the existing roof and not less than Class B. Repair or replacement of less than 10 percent shall consist of materials equal to or greater than the existing roof and not less than Class C. All new structures in these areas must have Class A roof assemblies. Section 1505 (Table 1505.1) of the 2013 California Building Code provides minimum roof covering classifications for different types of construction.

Attic ventilation openings are also a concern regarding the fire survivability of a structure. Attics require significant amounts of cross-ventilation to prevent the degradation of wood rafters and ceiling joists. This ventilation is typically provided by openings to the outside of the structure, but these openings can provide pathways for burning brands and flames to be deposited within the attic. Therefore, it is important that all ventilation openings be properly

screened to prevent this. Additional prevention measures that can be taken to reduce the potential for ignition of attic spaces are to "use non-combustible exterior siding materials and to site trees and shrubs far enough away from the walls of the house to prevent flame travel into the attic even if a tree or shrub does torch" (Fisher, 1995).

In the Very High Fire Hazard Severity Zones in the City of Newport Beach, attic or foundation ventilation openings in vertical walls and attic roof vents must comply with the 2013 California Building Code, Chapter 7A Section 706A.

The type of **exterior wall construction** used can also help a structure survive a fire. Ideally, exterior walls should be made of non-combustible materials such as stucco or masonry. During a wildfire, the dangerous active burning at a given location typically lasts about 5 to 10 minutes (Fisher, 1995), so if the exterior walls are made of non-combustible or fire-resistant materials, the structure has a better chance of surviving. For the same reason, the type of **windows** used in a structure can also help reduce the potential for fire to impact a structure. Single-pane, annealed glass windows are known for not performing well during fires; thermal radiation and direct contact with flames cause these windows to break because the glass under the window frame is protected and remains cooler than the glass in the center of the window. This differential thermal expansion of the glass causes the window to break. Larger windows are more susceptible to fracturing when exposed to high heat than smaller windows. Multiple-pane windows, and tempered glass windows perform much better than single-pane windows, although they do cost more. Fisher (1995) indicates that in Australia, researchers have noticed that the use of metal screens helps protect windows from thermal radiation. Some homeowners may consider the use of exterior, heavy-duty metal blinds that are dropped down into position, at least on the windows in the exposed portion of the structure facing the wildland area.

The City of Newport Beach has construction requirements for **cornices, eaves, overhangs, soffits, and exterior balconies** in Very High Fire Hazard Severity Zones. According to Section 707A of the 2013 California Building Code, these need to be made of non-combustible construction materials, enclosed in one-hour fire-resistive material, or made of heavy timber construction. Space between rafters at the roof overhangs need to be protected by non-combustible materials or protected by double 2-inch nominal solid blocking under the exterior wall covering.

Public Awareness

Individuals can make an enormous contribution to fire hazard reduction and need to be educated about their important role. The Newport Beach Fire Department has several outreach programs aimed at providing fire safety education to the public. These presentations are given to local schools, service clubs and associations, homeowners groups, the Chamber of Commerce, Board of Realtors, businesses and other professional organizations.

The Fire Department has also prepared and distributes informational brochures to hillside property owners. The brochures describe mitigation measures that can be implemented to reduce the fire hazard, and describe how property owners can help themselves to prevent loss of property or life as a result of a wildland fire. In addition to the specific requirements in the Municipal Code mentioned in the sections above regarding appropriate landscaping and construction materials, there are other steps that homeowners can take to reduce the risk of fire on their property. Some of these are listed below. This list is not all-inclusive, but provides a starting point and framework to work from.

- Mow and irrigate your lawn regularly.
- Dispose of cuttings and debris promptly, according to local regulations.
- Store firewood away from the house.
- Be sure the irrigation system is well maintained.
- Use care when refueling garden equipment and provide regular maintenance for your garden equipment.
- Store and use flammable liquids properly.
- Dispose of smoking materials carefully.
- Do not light fireworks (in accordance with the Municipal Code).
- Become familiar with local regulations regarding vegetation clearing, disposal of debris, and fire safety requirements for equipment.
- Follow manufacturers' instructions when using fertilizers and pesticides.
- Keep the gutters, eaves, and roof clear of leaves and other debris.
- Occasionally inspect your home, looking for deterioration, such as breaks and spaces between roof tiles, warping wood, or cracks and crevices in the structure.
- Use non-flammable metal when constructing a trellis and cover it with high-moisture, non-flammable vegetation.
- Install automatic seismic shut-off valves for the main gas line to your house. Information for approved devices, as well as installation procedures, is available from the Southern California Gas Company.

Other Mitigation Programs and Activities

Firewise

This is a program developed within the National Wildland/ Urban Interface Fire Protection Program and it is the primary federal program addressing interface fire. It is administered through the National Wildfire Coordinating Group whose extensive list of participants includes a wide range of federal agencies. The program is intended to empower planners and decision makers at the local level. Through conferences and information dissemination, Firewise increases support for interface wildfire mitigation by educating professionals and the general public about hazard evaluation and policy implementation techniques. Firewise offers online wildfire protection information and checklists, as well as listings of other publications, videos and conferences.

The interactive home page allows users to ask fire protection experts questions and to register for new information as it becomes available.

Wildfire Resource Directory

Local Resources

Newport Beach Fire Department

The Newport Beach Fire Department is responsible for fire suppression on all private lands within the City of Newport Beach. The Newport Beach Fire Department constantly monitors the fire hazard in the City and has ongoing programs for investigation and alleviation of hazardous situations. Fire fighting resources in the immediate Newport Beach area are provided by eight Newport Beach Fire Department Stations (see Table 8-6). The general telephone number for the Newport Beach fire department is **949-644-3104. For emergencies, dial 911.**

Each engine or truck company has a staff of three persons per 24-hour shift. Each paramedic ambulance has a staff of two firefighter-paramedics per 24-hour shift.

Table 8-4: Fire Stations in the City of Newport Beach

Fire Station No.	Street Address	Location Area	Units Available		
			Ladder Trucks	*Engine Companies*	*Paramedic Ambulances*
1	110 Balboa Blvd. East	Balboa	0	1	0
2	475 32nd St.	Lido	1	1	1
3	868 Santa Barbara Dr.	Newport Center	1	1	1
4	124 Marine Avenue	Balboa Island	0	1	0
5	410 Marigold Avenue	Corona del Mar	0	1	1
6	1348 Irvine Avenue	Mariners	0	1	0
7	20401 SW Acacia St.	Santa Ana Heights	0	1	0
8	6502 Ridge Park Road	Newport Coast	0	1	0

Newport Beach has automatic aid agreements with the cities of Costa Mesa, Santa Ana, Huntington Beach, and Fountain Valley, and with the Orange County Fire Authority. These agreements obligate these fire departments to help each other under pre-defined circumstances. **Automatic aid** agreements obligate the nearest fire company to respond to a fire regardless of the jurisdiction. **Mutual aid** agreements obligate fire department resources to respond outside of their district upon request for assistance.

Numerous other agencies are available to assist the City if needed. These include local law enforcement agencies that can provide support during evacuations and to discourage people from traveling to the fire zone to watch the fire, as this can hinder fire suppression efforts. Several State and Federal agencies have roles in fire hazard mitigation, response, and recovery, including: the Office of Emergency Services, the Fish and Wildlife Service, National Park Service, US Forest Service, Office of Aviation Services, National Weather Service, and National Association of State Foresters, the Department of Agriculture, the Department of the Interior, and, in extreme cases, the Department of Defense. Private companies and individuals may also assist.

County Resources

Orange County Fire Authority

1 Fire Authority Road
Irvine, California 92602
Telephone: (714) 573-6000
http://www.ocfa.org/

The Orange County Fire Authority (OCFA) delivers fire, emergency medical and rescue services, and hazardous materials incidents response in the unincorporated Orange County region and, when needed, to its partner cities. It also provides aircraft fire and rescue services to John Wayne Airport.

The Operations Department of the OCFA is divided into six geographic areas referred to as operational divisions, each under the command of a Division Chief. Most divisions are in turn

divided into two Battalions, commanded by field Battalion Chiefs. The OCFA has 71 fire stations (5 to 10 stations per Battalion). The OCFA also provides public education programs to schools, businesses, childcare providers and other members of the community, coordinates the inspection of all commercial buildings, investigates all fires, and enforces hazardous materials regulations. The OCFA works with developers and jurisdictional planning departments on development projects that have the potential to impact fire protection services, conducts new construction inspections, fire safety inspections, and State Fire Marshal required inspections to high rises, jails, board and care, and day-care inspections. For a complete list of services and more information on the OCFA, refer to their website.

State Resources

California Division of Forestry & Fire Protection
1416 9th Street
PO Box 944246
Sacramento California 94244-2460
(916) 653-5123
http://www.fire.ca.gov/php/index.php

Office of the State Fire Marshal (OSFM)
1131 "S" Street
Sacramento, CA 95814
PO Box 944246
Sacramento, CA 94244-2460
Tel. (916) 445-8200
Fax. (916) 445-8509

Federal Resources and Programs

The role of the federal land managing agencies in the wildland-urban interface is reducing fuel hazards on the lands they administer; cooperating in prevention and education programs; providing technical and financial assistance; and developing agreements, partnerships and relationships with property owners, local protection agencies, states and other stakeholders in wildland-urban interface areas. These relationships focus on activities before a fire occurs, which render structures and communities safer and better able to survive a fire occurrence.

Federal Emergency Management Agency (FEMA) Programs

FEMA is directly responsible for providing fire suppression assistance grants and, in certain cases, major disaster assistance and hazard mitigation grants in response to fires. The role of FEMA in the wildland-urban interface is to encourage comprehensive disaster preparedness plans and programs, increase the capability of state and local governments and provide for a greater understanding of FEMA programs at the Federal, State and local levels.

- **Fire Suppression Assistance Grants**: Fire Suppression Assistance Grants may be provided to a state with an approved hazard mitigation plan for the suppression of a forest or grassland fire that threatens to become a major disaster on public or private lands. These grants are provided to protect life and improved property and encourage the development and implementation of viable multi-hazard mitigation measures and provide training to clarify FEMA's programs. The grant may include funds for equipment, supplies and personnel. A Fire Suppression Assistance Grant is the form of assistance most often provided by FEMA to a state for a fire. The grants are cost-shared with

states. FEMA's US Fire Administration (USFA) provides public education materials addressing wildland-urban interface issues and the USFA's National Fire Academy provides training programs.

- **FEMA Hazard Mitigation Grant Program**: Following a major disaster declaration, the FEMA Hazard Mitigation Grant Program provides funding for long-term hazard mitigation projects and activities to reduce the possibility of damages from all future fire hazards and to reduce the costs to the nation for responding to and recovering from the disaster.

National Wildland/Urban Interface Fire Protection Program

Federal agencies can use the National Wildland/Urban Interface Fire Protection Program to focus on wildland-urban interface fire protection issues and actions. The Western Governors' Association (WGA) can act as a catalyst to involve state agencies, as well as local and private stakeholders, with the objective of developing an implementation plan to achieve a uniform, integrated national approach to hazard and risk assessment and fire prevention and protection in the wildland-urban interface. The program helps states develop viable and comprehensive wildland fire mitigation plans and performance-based partnerships.

U.S. Forest Service Program

The U. S. Forest Service (USFS) is involved in a fuel-loading program implemented to assess fuels and reduce hazardous buildup on forest lands. The USFS is a cooperating agency and, while it has little to no jurisdiction in State and Local Responsibility Areas, it has an interest in preventing fires in the interface, as fires often burn into forest lands.

Other Federal and National Resources

Federal Wildland Fire Policy, Wildland/Urban Interface Protection

This is a report describing federal policy and interface fire. Areas of needed improvement are identified and addressed through recommended goals and actions. http://www.fs.fed.us/land/wdfire7c.htm

National Fire Protection Association (NFPA)

This is the principal federal agency involved in the National Wildland/Urban Interface Fire Protection Initiative. NFPA has information on the Initiatives programs and documents.
Public Fire Protection Division
1 Battery March Park.
P.O. Box 9101
Quincy, MA 02269-9101
Phone: (617) 770-3000

National Interagency Fire Center (NIFC)

The NIFC in Boise, Idaho is the nation's support center for wildland firefighting. Seven federal agencies work together to coordinate and support wildland fire and disaster operations. These agencies include the Bureau of Indian Affairs, Bureau of Land Management, Forest Service, Fish and Wildlife Service, National Park Service, National Weather Service and Office of Aircraft
National Interagency Fire Center
3833 S. Development Ave.
Boise, Idaho 83705
(208) 387-5512
http://www.nifc.gov/

United States Fire Administration (USFA) of the Federal Emergency Management Agency (FEMA)

As an entity of the Federal Emergency Management Agency, the mission of the USFA is to reduce life and economic losses due to fire and related emergencies through leadership, advocacy, coordination and support.
USFA, Planning Branch, Mitigation Directorate
16825 S. Seton Ave.
Emmitsburg, MD 21727
(301) 447-1000
http://www.fema.gov/hazards/fires/wildfires.shtm - Wildfire Mitigation
http://www.usfa.fema.gov/index.htm - U.S. Fire Administration

Additional Resources

Firewise - The National Wildland/Urban Interface Fire Program

Firewise maintains a Website designed for people who live in wildfire prone areas, but it also can be of use to local planners and decision makers. The site offers online wildfire protection information and checklists, as well as listings of other publications, videos and conferences.
Firewise
1 Battery March Park.
P.O. Box 9101
Quincy, MA 02269-9101
Phone: (617) 770-3000
http://www.firewise.org/

Publications:

National Fire Protection Association Standard 299: Protection of Life and Property from Wildfire, National Wildland/Urban Interface Fire Protection Program, (1997), National Fire Protection Association, Washington, D.C.
This document, developed by the NFPA Forest and Rural Fire Protection Committee, provides criteria for fire agencies, land use planners, architects, developers and local governments to use in the development of areas that may be threatened by wildfire. To obtain this resource:
National Fire Protection Association Publications
(800) 344-3555
http://www.nfpa.org or http://www.firewise.org

National Volunteer Fire Council
Provide training courses, tools and resources designed to help firefighters address structural assessments in the wildland urban interface and well as prepare communities before the next wildfire. Their website lists courses for fire personnel and home owners, home assessment tools, videos, apps, and other webpages that provide additional information. http://www.nvfc.org/programs/wildland-fire-assessment-resources

An International Collection of Wildland- Urban Interface Resource Materials
(Information Report NOR- 344). Hirsch, K., Pinedo, M., & Greenlee, J. (1996). Edmonton, Alberta: Canadian Forest Service.
This is a comprehensive bibliography of interface wildfire materials. Over 2,000 resources are included, grouped under the categories of general and technical reports, newspaper articles and public education materials. The citation format allows the reader to obtain most items through

a library or directly from the publisher. The bibliography is available in hard copy or diskette at no cost. It is also available in downloadable PDF form.
Canadian Forest Service, Northern Forestry Centre, I-Zone Series
Phone: (780) 435-7210
http://www.prefire.ucfpl.ucop.edu/uwibib.htm

Wildland/Urban Interface Fire Hazard Assessment Methodology.
National Wildland/Urban Interface Fire Protection Program, (1998).
NFPA, Washington, D.C.
Firewise (NFPA Public Fire Protection Division)
Phone: (617) 984-7486
http://www.firewise.org

Fire Protection in the Wildland/Urban Interface: Everyone's Responsibility.
National Wildland/Urban Interface Fire Protection Program, (1998). Washington, D.C.
Firewise (NFPA Public Fire Protection Division)
Phone: (617) 984-7486
http://www.firewise.org