

## WILDLAND FIRE

A variety of fire protection challenges exist within Orange County, including urban fires, wildland fires, and fires at the urban/wildland interface. This hazard analysis focuses on wildland fires, but also addresses issues related to the urban/wildland interface.

The provision of adequate fire protection is directly affected by residential, commercial and industrial growth, all of which are proceeding rapidly in Orange County. Since 1950, manufacturing has replaced agriculture to become the County's primary industry. Industrial development has brought a corresponding increase in the home building industry. The County's rapid growth rate is expected to continue, bringing an estimated 34,000 new residents each year. In Orange County, the population is expected to increase by 216,827 persons during the period 2007-2010, with a corresponding increased demand for fire protection services.

The most common causes of wildland fires are arson and weather related incidents. However, a potential terrorist incident involving wildfire should be considered. Terrorist incidents would fall into two general categories: diversionary (intended to cover other activity and divert resources) and primary (the intended event to reduce availability of critical resources and disrupt normal routines).

### SPECIFIC SITUATION

The following discussion, which addresses the threat of fire to wildlands and the urban/wildlands interface, has been extracted from the information prepared by the OCFA for the Safety Element of the County's General Plan.

California experiences large, destructive wildland fires almost every year, and Orange County is no exception. Wildland fires have occurred within the County, particularly in the fall, ranging from small, localized fires to disastrous fires covering thousands of acres. The most severe fire protection problem in the unincorporated areas is wildland fire during Santa Ana wind conditions. Figure 20 shows fire hazard severity zones for the County.

Reasons for control difficulty associated with wildland fires are:

- Adverse weather conditions
- Large quantities of combustible fuel
- Inaccessible terrain
- Nonexistent or very limited water supply
- Large fire frontage requiring dispersal of fire forces

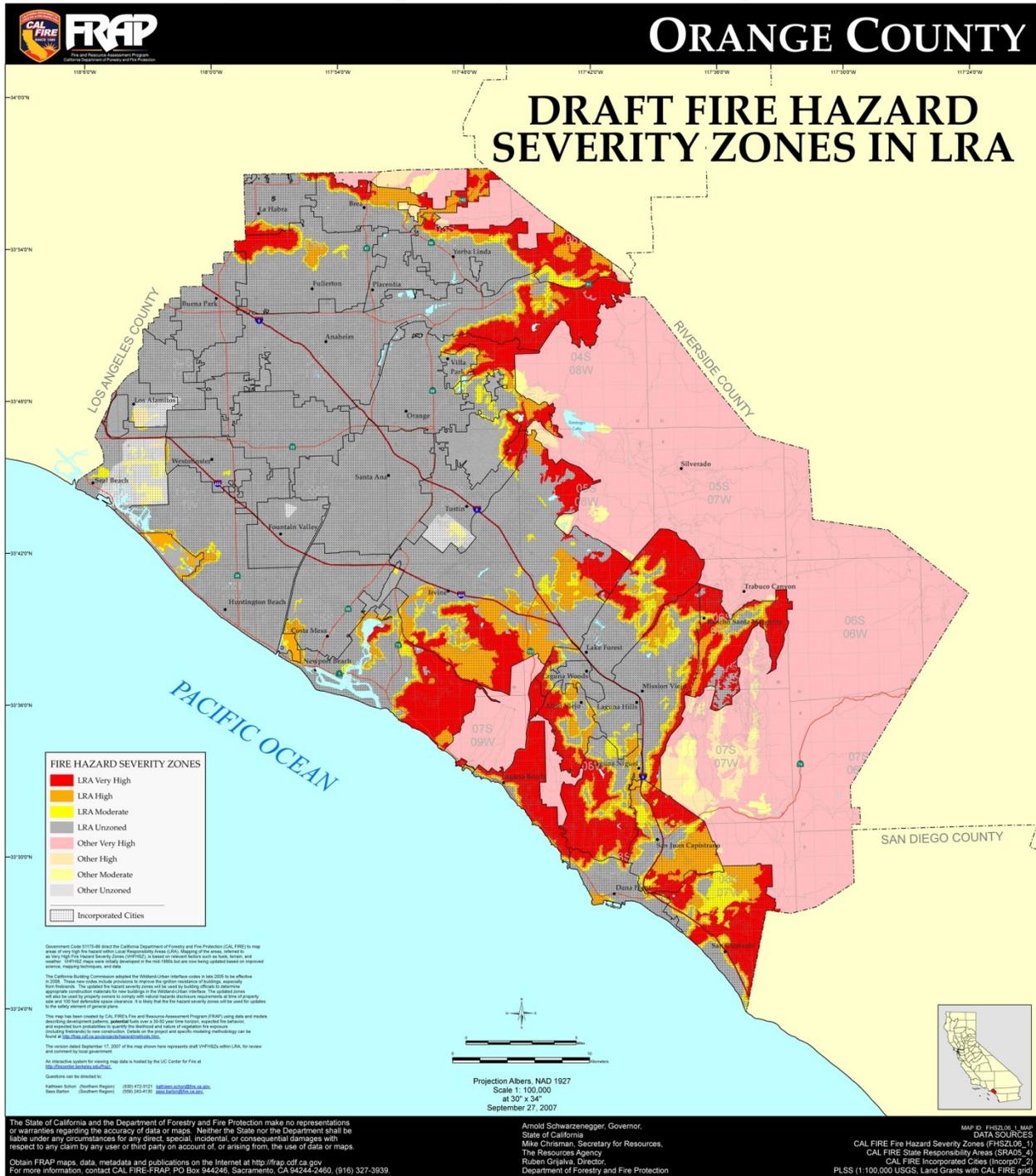
For these reasons, it is usually necessary for the fire force to meet the advancing fire front in an accessible area containing a minimum amount of vegetation for fuel, and preferably located close to a water source.

The major objective of wildland fire defense planning is to prevent wildland fires from starting and, if unsuccessful, to minimize the damage to natural resources and structures. Some of the more successful programs currently in effect which contribute to the success of wildland fire prevention activities are:

- Closure of public access to land in hazardous fire areas
- Uniform Building Code prohibition of combustible roof covering materials
- Construction and maintenance of community and private fuel modification zones
- Vegetation Management Program (controlled burning)
- Weed Abatement Program
- Fire Prevention Education Programs

There are a number of natural conditions which might increase the possibility of wildland fires. Examples of such conditions are weather elements, the topography of the area, and the type and condition of wildland vegetation.

Figure 20 - Orange County Fire Hazard Severity Zones



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## 1) Weather

Weather conditions have many complex and important effects on fire intensity and behavior. Wind is of prime importance; as wind speed increases, the rate of fire spread also increases. Relative humidity (i.e., relative dryness of the air) also has a direct effect; the drier the air, the drier the vegetation and the more likely the vegetation will ignite and burn. Precipitation (annual total, seasonal distribution, and storm intensity) further affects the moisture content of dead and living vegetation, which influences fire ignition and behavior.

Many wildland fires have been associated with adverse weather conditions. In the 1982 Gypsum Canyon Fire, 17 homes were lost and 18,000 acres burned, leaving an estimated \$16 million in damage. The fire was difficult to contain because the Santa Ana winds were blowing at approximately 50-55 mph.

In 1993, aided by extreme fire weather conditions, devastating firestorms swept the County between October 24 and November 4. During this period, a total of 20 major fires in six southern California counties burned out of control. Three fires burned in Orange County during this time: the Stagecoach, Laguna Beach, and Ortega fires. The Stagecoach fire burned 750 acres and destroyed 9 buildings. The Ortega fire burned 21,384 acres and destroyed 19 buildings. The Laguna Beach fire burned 14,337 acres, destroyed 441 homes and caused approximately \$528 million in damage.

In 1997, the Baker Canyon fire by Irvine Lake burned 6,317 acres of vegetation, followed by two additional fires in 1998: the Blackstar/Santiago Canyons fire destroyed 8,800 acres, and the Carbon Canyon fire burned 733 acres of brush.

In October 2007, The Santiago Fire began which was a part of The California Fire Siege which included 22 fires and burned over 516,818 acres across California. Critical fire weather conditions were in existence. Santa Ana winds were a major contributing factor to the fire's unpredictable behavior and rapid progression. Hot, dry winds continued to fan the fire throughout the week of October 21-28. Flame heights were reported as high as 100 feet. The Santiago Fire burned 28,400 acres and caused 16 minor injuries to fire personnel. Individual claims for damage or destroyed property included 24 outbuildings, 23 residential structures (8 damaged/15 destroyed), and 12 vehicles which is currently estimated at \$7,358,810.

In addition to winds, structural development within or adjacent to wildland exposures represents an extreme fire protection problem due to flying embers and the predominance of combustible roof coverings.

## 2) Topography

Topography has considerable effect on wildland fire behavior and on the ability of firefighters to position and utilize their equipment to suppress wildland fires. Simply because of topography, a fire starting in the bottom of a canyon may expand quickly to

the ridge top before initial attack forces can arrive. Rough topography greatly limits road construction, road standards, and accessibility by ground equipment. Steep topography also channels airflow, creating extremely erratic winds on leeward side of the slopes and in canyons. Water supply for fire protection to structures at higher elevations is frequently dependent on pumping units. The source of power for such units is usually from overhead distribution lines, which are subject to destruction by wildland fires.

### 3) Vegetation

A key to effective fire control and the successful accommodation of fire in wildland management is the understanding of fire and its environment. Fire environment is the complex of fuel, topographic, and air mass factors that influence the inception, growth, and behavior of a fire. The topography and weather components are, for all practical purposes, beyond human control. Fuels, on the other hand, can be controlled before the outbreak of fires. In terms of future urban expansion, finding new ways to control and understand these fuels can lead to possible fire reduction.

A relatively large portion of the County is covered by natural (though modified) vegetation. Of these different vegetation types, coastal sage scrub, chaparral, and grasslands reach some degree of flammability during the dry summer months and, under certain conditions, during the winter months. For example, as chaparral gets older, twigs and branches within the plants die and are held in place. A stand of brush 10- to 20-years of age usually has enough dead material to produce rates of spread about the same as in grass fires when the fuels have dried out. In severe drought years, additional plant material may die and contribute to the fuel load. There will normally be enough dead fuel accumulated in 20- to 30-year old brush to give rates of spread about twice as fast as in a grass fire. Under moderate weather conditions that produce a spread rate of one-half foot per second in grass, a 20- to 30-year old stand of chaparral may have a rate of fire spread of about one foot per second. Fire spread in old brush (40 years or older) has been measured at eight times as faster than grass, about four feet per second. Under extreme weather conditions, the fastest fire spread in grass is 12 feet per second or about eight miles per hour.

### **WILDLAND/URBAN INTERFACE**

In an effort to assist in alleviating fire dangers near urban development interface, the construction of a fuel modification zone (firebreak, fuel break or greenbelt) has been required. The continued application of this method does have drawbacks and, therefore, is not the only acceptable solution. There are the impacts on wildlife, on unique vegetation and, in some cases, to the watershed cover as deep-rooted chaparral species are replaced by shallow-rooted grasses. Fuel breaks are costly to install, require expensive maintenance to ensure their success during a wildfire, and offer protection primarily to these structures with direct exposure to the wildland. This inequity in protection versus installation/maintenance costs represents a very important point with respect to the natural resource/urban development interface conflict. Fire prevention measures to reduce the level of risk to the structures with wildland exposure must be

developed within the design of the residential development rather than in the natural resource.

