

© August 2012. All Rights Reserved.



After witnessing the devastation of the Freeway Complex Fire, the regional conservation non-profit Hills For Everyone undertook a study of fires in the region. Though fires are a natural part of the ecosystem, there is nothing natural about the size and frequency of the fires destroying our wildlands year after year. Data, mainly from fire agencies, the California Department of Parks and Recreation, and newspapers, have provided details on fire perimeters, points of origin, and fire causes. This paper is the culmination of research that documents a near 100-year fire history (1914-2011) in and around Chino Hills State Park. This paper articulates the problem months, weather conditions, and "hot spots" of fire ignition. Recommendations are included for residents, jurisdictions, and fire, transportation, and natural resource agencies to implement that would reduce the number of fires to a more natural fire regime. We will continue to work with fire and natural resource agencies to bring the necessary resources to this area.





Fires are a natural part of the ecosystem. Many factors influence the natural fire regime: weather conditions, vegetation (fuel) types, vegetation moisture, and plant distribution, etc. The natural fire regime, however, has been drastically altered by humans who have caused many more fires than would have occurred naturally. "New" factors influencing this increased fire regime include the introduction and proliferation of flammable non-native vegetation (e.g., palm trees, pampas grass, *Arundo donax*, exotic annual grasslands, etc.), increased Wildland-Urban Interface (WUI), and roadways to name a few.

An article on global warming on the website of the State of California's Attorney General cites higher temperatures and decreased moisture in the vegetation will result in increased fires.¹ In fact, statistics show that the western United States now has a longer fire season (starting earlier and ending later) that is more intense than in previous decades.² A nearby example of a California landscape modified by wildfires is Chino Hills State Park in Southern California, where the dominant coastal sage scrub and chaparral vegetation is converting to highly flammable non-native annual grasses.³

In 2003 Southern California experienced 13 major wildland fires that swept through the region at an alarming rate.⁴ The Cedar Fire (San Diego) was called the state's most devastating as it burned down entire communities, including historic buildings in Cuyamaca, and killed 15 people.⁵ In 2007 the Santiago Fire (Orange County) burned 28,517 acres in the foothills of the Santa Ana Mountains, which damaged or destroyed 22 homes.⁶ Just a year later, in 2008, two fires ignited at opposite ends of the hills



and merged to create the Freeway Complex Fire which burned down 187 homes, damaged another 131 homes and other structures, burned 95% of Chino Hills State Park, and scorched a four-county region.⁷

⁷ Fire Department Network News. "Orange County Fire Authority Declares Full Containment Today of Triangle Complex Fire." Retrieved 3 Aug 2012 from the Fire Department Network News website: <u>http://www.fdnntv.com/news.asp_Q_articleID_E_3868_A_title_E_Orange_County_Fire_Authority_Declares_Full_Containment_Today of_Triangle_Complex_Fire.</u>



¹ Department of Justice. "Global Warming Impacts in California." Retrieved 28 Dec 2011 from the California Attorney General's website: <u>http://www.ag.ca.gov/globalwarming/impact.php</u>.

² Ibid.

³ Ing, Alissa. Environmental Scientist, Department of Parks and Recreation. Personal communication approximately June 2010.

⁴ CNN. "California Wildfires Burn Through 600,000 Acres." Retrieved 28 Dec 2011 from the CNN website: <u>http://articles.cnn.com/2003-10-28/us/california.wildfire_1_blazes-cuyamaca-and-julian-firefighters? s=PM:US</u>.

⁵ Ibid.

⁶ Orange County Fire Authority. <u>After Action Report: Santiago Fire</u>. Retrieved 3 Aug 2012, from the OCFA website: <u>http://www.ocfa.org/_uploads/pdf/aar_3-27-08.pdf</u>.

After completing a lengthy review of the fires throughout the Chino Hills area, it is now known that the State Park and neighboring hillsides have experienced more than 100 fires in just as many years, though most of the fires have occurred since 1977. As a result of this information, conservation advocates are working with fire, transportation, and natural resource agencies to protect the landscape from continued wildfire assaults. Together through protective mitigation measures that can reduce the fire frequency toward a more natural fire regime, this approach will protect life and property, and ensure our human and natural communities are safer.

Chino Hills State Park — The Setting

The State Park sits at the juncture of four of Southern California's most urbanized counties: Los Angeles, Orange, Riverside, and San Bernardino. The Park has been assembled through more than 30 different acquisitions to grow to more than 14,100 acres. The Park's first acquisition was in 1981 and even 30 years later the Park continues to expand. Chino Hills State Park was secured to protect its many rare natural resources. Its gently rolling hills are covered in grasslands and dotted with oak and walnut trees. In the steep canyons of the interior, sycamore-lined streams and walnut woodlands abound.



Figure 1. Chino Hills State Park is located at the juncture of four Southern California counties.



In 1771 the area was used for extensive grazing operations and by the early 1870s individuals began purchasing the land and using it for sheep and cattle ranching.⁸ This grazing damaged the native plants and allowed opportunistic non-natives to spread. Now that the land is protected as a State Park, the grazing has been stopped and habitat restoration is underway.

The Park protects five main plant communities: southern oak woodland (11%), native and nonnative grasslands (70%), coastal sage scrub (13%), mixed chaparral (5%), and cottonwood riparian woodland and riparian zones (1%).⁹ In fact, the Park "supports 14 different vegetation series defined in the California Native Plant Society's classification,"¹⁰ and 10 are considered unique or significant in Southern California because of their importance as habitat and because they are rapidly disappearing due to development.¹¹ The State Park contains some of the best remaining stands of walnut woodlands in Southern California. Similarly, the northern most stand of the rare tecate cypress tree is found in Coal Canyon in the State Park and neighboring Ecological Reserve.

- ¹⁰ Department of Parks and Recreation. <u>Chino Hills State Park General Plan</u>. (1999). p. 21.
- ¹¹ Ibid.



Figure 2. Chino Hills State Park's vegetative cover provided by USDA Forest Service (EVEG Data) from 2002-2003.



⁸ Department of Parks and Recreation. <u>Chino Hills State Park General Plan</u>. February 1999.

⁹ Department of Parks and Recreation. <u>Chino Hills State Park General Plan</u>. August 1986. p. 21.

A wide variety of wildlife depend on the vegetative cover. Deer, bobcats, foxes, coyotes, raccoons, and the occasional mountain lion live in the hills. Falcons, hawks, owls, songbirds, and even golden eagles are protected in the Park. Several endangered birds are making a comeback as well.

Bicyclists, hikers, equestrians, photographers, campers, and other park enthusiasts frequent this natural area.



Hills For Everyone (HFE), a regional nonprofit conservation organization, founded Chino Hills State Park in the early 1980s and has been working over the last 30 years to connect and protect this anchor parcel with protected lands in the Puente-Chino Hills Wildlife Corridor. Due to the work of HFE and State Parks, along with many other non-profits, agencies, and jurisdictions, a permanent connection at Coal Canyon was secured in 2001. Coal Canyon links the Trabuco District of the Cleveland National Forest in the Santa Ana Mountains with Chino Hills State Park and the greater Puente-Chino Hills ecosystem. This linkage provides

a critical connection that allows wildlife to move freely between the Santa Ana Mountains and the Puente-Chino Hills. It also provides a source to repopulate natural areas should a catastrophic event, like a fire or disease outbreak, occur.

THE STUDY

After three decades of witnessing fires race through the hills and, in the aftermath of the 2008 Freeway Complex Fire which devastated the State Park, HFE launched a study to try to understand why so many fires burned in or adjacent to the State Park and to see if any actions could be taken to reduce the number of fires, resulting in the protection of both houses and natural resources. The study has resulted in the digital history of more than 100 fires that have burned between 1914 and 2011.

The Study Area includes lands generally bounded on the west by the 57 Freeway, Grand Avenue to the north, the 71 Freeway to the east, and the 91 Freeway to the south. The region studied includes all of Chino Hills State Park, but due to the proximity of other protected natural lands, portions of the northern section of the Cleveland National Forest's Trabuco District, the northern portion of the Irvine Ranch Lands (OC Parks), and the Prado Wetlands were also reviewed. Numerous private ownerships in Orange, Riverside, San Bernardino, and Los Angeles Counties that abut these protected lands were also included due to proximity.





Figure 3. The Study Area, shown in blue, includes Chino Hills State Park and surrounding hillsides.

HFE had three main objectives in carrying out this study:

- 1. Using the data available document the fire perimeters, points of origin, causes, and weather conditions for each fire that burned in, adjacent to, or near Chino Hills State Park;
- 2. Analyze the results of the research and determine any fire-prone areas that needed particular attention; and
- 3. Provide general recommendations for residents and agencies to reduce the number of fires and impacts associated with wildland fires, and concurrently protect homes, people, and parkland from unnaturally frequent fires.

There are important terms used throughout this study and their meaning is useful to understand:

Cause: The confirmed or unconfirmed source of the wildland fire's ignition.

Fire Perimeter: The farthest geographical extent, also known as the outer boundary, of a fire. Note: Not all areas within the perimeter necessarily burned.

Fire Frequency: The number of times a specific geographic region has burned. This is similar to how population density is displayed, the darker the color the more frequent the area has burned.



Natural Fire Regime: The general classification of the role fire would play in the natural environment in the absence of modern human intervention.

Point of Origin: The approximate or exact location where the wildland fire ignited within the Study Area.

Study Area: Chino Hills State Park and environs.

Wildland-Urban Interface (WUI): The boundary between developed regions and the natural wildland areas.



Information Sources and GIS Analysis

HFE secured the shapefiles (digital data sets) of fire perimeters and points of origin from the California Department of Forestry and Fire Protection (CalFire), the Orange County Fire Authority (OCFA), and Chino Valley Independent Fire District (CVFD). Where appropriate, newspaper articles/maps, State Park Wildland Fire Reports, and personal accounts were used to digitally create a fire perimeter and/or point of origin. HFE used the ArcMap 10.1, a geographic information system (GIS) program, to assimilate the fire data. To enable wide distribution, the files were exported from ArcMap for use in Google Earth.

Through this research, HFE was able to piece together a digital dataset that outlines where known fires burned and where, and in some cases why, the fires started. Unfortunately, not all fires that burned in the Study Area were formally documented or no details about the perimeter or point of origin were complete enough to include in the study. Consequently, there are actually many additional fires that were not included in the study due to lack of adequate data. Historic record keeping for wildland fires wasn't as complete as it is now.



Fire Regime

HFE analyzed the fire regime (both natural and human-caused) of all documented fires that burned in, adjacent to, or had the potential to burn into Chino Hills State Park from 1914 - 2011. It seems in that 97 year history only two fires occurred naturally due to lightning strikes. This means the natural fire regime was one fire every 50 years. The balance of the fires (101) was caused by humans, either intentionally.

Fire Perimeters

HFE accumulated 71 separate fire perimeters in this study with 37 of those fires having known points of origin. The smallest fire is less than one acre, while the largest is over 41,000 acres.



Figure 4. The Study Area included 71 fire perimeters between 1914 - 2011.



The three largest fires from the study include:

- Green River Fire 41,285 acres November 1948
- Paseo Grande Fire 39,872 acres October 1967
- Freeway Complex Fire 30,306 acres November 2008

The first acquisition of parkland occurred in 1981 and since that date there has been increased pressure from residential development and road creation or expansions that have increased access to the undeveloped hills and the Park. It appears that the added housing developments at the WUI surrounding the Park have increased threefold the number of fires burning the Park. There were 26 fires between 1914-1980 and 76 fires between 1981-2011.





Figure 5. The Study Area's three largest fires included the Green River, Paseo Grande, and Freeway Complex Fires.



A 100 Year History of Wildfires Near Chino Hills State Park

Fire Points of Origin

HFE documented 70 separate fire points of origin in this study, with 37 of the fires having known perimeters. The smallest fires are less than one acre in size, while the largest with a known point of origin is over 38,000 acres.



Figure 6. The Study Area included 70 points of origin between 1914 - 2011, with some known causes and some unknown.



The points of origin data indicate fires started due to a variety of causes. They are broken down as follows:

Cause	Number of Fires	Total Acreage Burned
Unknown	29	83,405*
Arson	9	9,349 [*]
Power lines	7	53,048
Automobile	7	30,357*
Fireworks	5	10,316
Plane Crashes	5	829*
Machinery	4	393
Fire Agency**	2	14,150
Lightning	2	734
Total:	70	202,599*

 Table 1. Fire causes, quantities, and total acreage burned.

* indicates some acreages are unknown and therefore the number is actually higher than shown.

** indicates a re-ignited prescribed burn.



Figure 7. The fire causes have been broken down into different categories with arson, power lines, and automobiles as the three main causes.



Obtaining historic fire records was an issue during this study as 29 of the fires researched did not have a known or confirmed cause. The top three most identifiable causes of wildland fires in the Study Area are: arson, power lines, and automobiles.

Fire Frequency

By overlapping all the fire perimeters, HFE was able to determine the fire frequency in the Study Area. The lightest color on the map indicates that area only burned once. Whereas the darkest color on the map, a maroon color, indicates the area burned six or more times.

When one looks at the fire frequency and the points of origin there are obvious locations that have burned repeatedly. The data show the 91 Freeway Corridor (Santa Ana Canyon) between Anaheim and Corona, Carbon Canyon in Brea, and the Rim Crest entrance to Chino Hills State Park in Yorba Linda have burned the most. Later in this report, HFE will provide general recommendations for potential proactive steps to reduce the fire frequency at these known "hotspots."



Figure 8. The fire frequency shows three "hotspots:" the 91 Freeway Corridor, Carbon Canyon, and Rim Crest.



Fires and Weather Patterns

The prevailing wind for this region is a westerly onshore flow and the majority of the fires occur during those normal conditions. The Santa Ana Winds (which come from the east/northeast) are the exception and as these winds tend to be hot and dry, fires that start under these extreme conditions have a tendency to get out of hand. The relative humidity and temperature play a significant role in reducing the fuel moisture in the vegetation, especially the fine dead fuel (such as annual grasses and mustard). It was noted in the After Action Report for the Freeway Complex Fire that due to the winds (gusts above 60 mph) and heat, "over 10,000 acres were consumed in the first 12 hours—roughly 14 acres per minute. That's nearly the length of 14 football fields every 60 seconds."¹² Consequently, Santa Ana Wind events are known for helping spread the fires and therefore require expanded and rapid fire protection presence.

Briefly, the feohn winds, known locally as Santa Ana Winds, are caused when high pressure systems sit inland and a low pressure system sits off the coast. In our area, the foehn/Santa Ana Winds are generated when the high pressure system is positioned over the high desert (Mojave and Great Basin). The winds blow from the southern side of the high pressure system toward the low pressure system over the Pacific Ocean. Typically they are hot and dry with a very low relative humidity (10-20%).¹³ This is due to the compression of the wind after going up and over the mountains. Relative humidity indicates the ratio between the moisture in the air and the amount of moisture needed to saturate the air—it is a function of both moisture and temperature. Moisture in vegetation can be rapidly depleted in Santa Ana Wind conditions. Generally the finer the vegetation (grass) the quicker it dries out compared to a mature oak tree with a thick bark and a thick trunk.

Also researched were the weather patterns from the fires included in the study. Weather Underground and The Weather Channel websites were used to collect the data, using Chino Hills as the location. HFE was unable to obtain weather data before 1977.

Table 2. Weather jeatures during fire events.					
Weather Features on Fire Days					
Average Temperature was: (Data was available for 58 fires)90°F					
Average Relative Humidity was: (Data was available for 34 fires)	51%				
Average Wind Speed was: (Data was available for 78 fires)6 mph					
Average Wind Gusts were: (Data was available for 26 fires)	28 mph				
Wind Direction was:	North (N, NE, NW)	11 fires			
(The direction the wind originates from) (Data was available for 78 fires)	East (E, ENE, ESE)	6 fires			
	South (S, SE, SW)16 fires				
	West (W, WNW, WSW)	45 fires			

 Table 2. Weather features during fire events.

¹³ National Oceanic and Atmospheric Administration. "Santa Ana Conditions – Southern California." Retrieved 20 June 2012 from the National Oceanic and Atmospheric Administration website: <u>http://www.noaawatch.gov/2008/santa_ana.php</u>.



¹² Orange County Fire Authority. <u>After Action Report: Freeway Complex Fire</u>. November 15, 2008. Retrieved 3 Aug 2012 from the OCFA website: <u>http://www.ocfa.org/ uploads/pdf/aar1_freeway.pdf</u>.





Fires and Seasonal Patterns

It is not surprising that in the hotter, drier months between May and November there are more fires than in the moister winter months between December and April. There is a clear correlation between fire frequency and the summer months as seen in the table below. The majority of fires occur in July. However, October and November have the largest average acres burned. This is likely due to the fact that this is the end of the dry season and these months are prone to Santa Ana Wind conditions.

Month	Known Fires	Total Acreage Burned	Average Acreage Burned
Unknown	10	18,526*	2,058** (9 fires)
January	2	175*	175** (1 fire)
February	2	12,740	6,370
March	3	1,628*	814** (2 fires)
April	3	926	309
May	7	188	27
June	10	8,958	896
July	22	18,386*	919** (20 fires)
August	10	2,685*	298** (9 fires)
September	11	5,529*	614** (9 fires)
October	11	85,407*	8,541** (10 fires)
November	10	97,526	9,753
December	2	4*	4** (1 fire)
Total:	103	252,678*	2,717** (93 fires)

 Table 3. Fires by month, acreage burned, and average acreage burned.

* indicates some acreages are unknown and therefore the number is actually higher than shown.
 ** indicates acreages were averaged only where known fire acreages existed; if a fire acreage was unknown the fire was left out of the average.



CASE STUDY - THE 2008 FREEWAY COMPLEX FIRE

The power of zoning carries with it the responsibility for consequences.



Claire Schlotterbeck, Freeway Complex Fire (11/08)

The City of Yorba Linda has developed rapidly over the last 40 years. The data shows that Yorba Linda's population of 29,847 in 1980¹⁴ had grown to 64,234 by 2011.¹⁵ Despite the fact that many of the homes are relatively new and include fuel modification zones and other "ignition resistant" construction for the WUI, there was a tremendous loss of property in the 2008 Freeway Complex Fire. This case study outlines some of the fire statistics, anecdotes from Yorba Linda residents, and summarizes key points from the OCFA After Action Report.

The Freeway Complex Fire

On November 15, 2008 two fires started on opposite ends of the hills about two hours apart. The first fire ignited near the 91 Freeway on the eastern side of the hills in Corona by an automobile exhaust catching dry brush on fire, while the second fire began nearly 11 miles away to the northwest, in Brea, due to an unmaintained power line that also ignited dry brush.¹⁶

The weather conditions were ideal for a fire: 91°F, 4% relative humidity, sustained wind gusts at 35 mph (OCFA reports 43 mph with gusts at 60+ mph) coming from the northeast (a Santa Ana Wind event).¹⁷ Due to the extreme weather conditions OCFA had ramped up its crews in the days preceding the fire.¹⁸

¹⁸ Orange County Fire Authority. <u>Freeway Complex Fire - After Action Report</u>.



¹⁴ City Data. "Yorba Linda, California." Retrieved 31 Jul 2012 from the City Data website: <u>http://www.city-data.com/city/Yorba-Linda-California.html</u>.

¹⁵ United States Census Bureau. "State and County Quick Facts." Retrieved 31 Jul 2012 from the U.S. Census Bureau website: <u>http://quickfacts.census.gov/qfd/states/06/0686832.html</u>.

¹⁶ Orange County Fire Authority. <u>Freeway Complex Fire - After Action Report</u>.

¹⁷ Weather Underground. "Fullerton Weather Station." Retrieved 1 Aug 2012 from the Weather Underground website: <u>http://www.wunderground.com/history/airport/KFUL/2008/11/15/DailyHistory.html?req_city=NA&req_state=NA&req_state=NA</u>.



Figure 9. The red outline indicates the fire perimeter for the Freeway Complex Fire of 2008 with its two points of origin.

The Initial Timeline

The Corona Fire was reported at 9:01 AM. The first Orange County strike team arrived at 9:23 AM, and the first air assaults began at 10:10 AM. By 10:20 AM, OCFA reported the fire would reach the City of Yorba Linda within 30 minutes. The first 911 call to report the Brea fire arrived at 10:43 AM.¹⁹ A personal account from a 911 caller revealed the dispatcher dismissed the notion that a new fire had started in Brea, stating the smoke the caller was seeing was from the Corona blaze. The caller relayed that flames could be seen from Carbon Canyon Road (in Brea), which is no where near the Corona blaze.





¹⁹ Ibid.

A 100 Year History of Wildfires Near Chino Hills State Park

17

Bob

Firefighting crews arrived on scene for the Olinda Landfill Fire by 10:55 AM.²⁰ The presence of this second fire, which immediately threatened homes, shifted the firefighting strategy. By 10:58 AM Yorba Linda's first home had already been destroyed.²¹

Yorba Linda on Fire

With many residents at home on a Saturday morning, they were witness to the quick moving Corona Fire. Residents began self evacuating and quickly clogged traffic on the major

thoroughfares. Evacuees streamed down from the higher elevations making it harder for those closest to the thorough fares to enter the traffic flow. The flood of cars brought the main east-west traffic corridors of Imperial Highway and Yorba Linda Boulevard to a standstill. In addition, due to the Corona fire, traffic was stopped on the other east-west corridor, the 91 Freeway. Fire trucks struggled to get to the fire as residents

> Anecdotal accounts from Yorba Linda residents describe the chaos of trying to evacuate during the firestorm. One resident stated, "people can't get out on San Antonio... [it was] a huge, huge traffic jam."²³ When exiting their neighborhoods they also hit gridlock on the major arterial of Yorba Linda Boulevard. One resident who lost his home had no time to even drive his cars out of the driveway. With no car to drive, he ended up directing traffic at Via Del Agua and Yorba Linda Boulevard. Evacuees from his neighborhood couldn't leave because there was no traffic signal to stop the flow of traffic.

A Predictable Disaster

This disaster was predictable since large fires on Santa Ana Wind days on east-west trending terrain have occurred over and over again. Land use decisions in the City of Yorba Linda may have contributed to placing residents, their homes, and businesses at risk. In late 2002 the City of Yorba Linda approved the Shapell project which allowed a threefold increase over the General Plan density.²⁴ It is uncertain whether mitigations for traffic impacts on major thoroughfares, in times of emergency, were adequate.



"The fire moved through residential" neighborhoods from Brush *Canyon to the San Antonio* neighborhood—a 5.5 mile span *in less than five hours.*" — OCFA After Action Report, p. 36

²⁰ Ibid.

²¹ Ibid.

²² Ibid.

²³ The Weather Channel (Producer). <u>Weathering Disaster:</u> "Yorba Linda Fires" (Episode). (24 Sep 2011). Yorba Linda, CA: The Weather Channel.

²⁴ Los Angeles Times. "Yorba Linda Seeks to Rescind Development Vote." 5 Dec 2002. Retrieved 2 Aug 2012 from the Los Angeles Times website: http://articles.latimes.com/2002/dec/05/local/me-yorba5.



The Freeway Complex Fire burned down 187 homes, damaged another 131 homes and other structures²⁵ and burned 95% of Chino Hills State Park. According to the OCFA After Action Report: The Freeway Complex Fire burned "30,305 acres of watershed ... across six cities and four counties. [Fire] [s]uppression costs exceeded \$16.1 million, and property loss has been estimated at nearly \$150 million."²⁶

Lessons Learned

If there are lessons to be learned, it seems there are opportunities for jurisdictions to revisit how their communities grow and where the most appropriate place for housing developments should be located. Cities and homeowners' associations must maintain defensible space at the WUI,

buffering the homes from the edge of the WUI. When cities increase the density of a housing development but do not adequately increase the road capacity on arterials, evacuations during a fire storm are difficult, dangerous, and potentially disastrous.

Even with more stringent building codes and relatively new houses, hundreds of homes were lost or damaged. According to Kris Concepcion of OCFA, "embers were getting into the attics of homes."²⁷ It seems there is still work to be done



to harden homes from both flame fronts and ember storms. Most importantly, fleeing residents need to be able to evacuate safely.



²⁵ Fire Department Network News. "Orange County Fire Authority Declares Full Containment Today of Triangle Complex Fire."

²⁶ Orange County Fire Authority. <u>Freeway Complex Fire - After Action Report</u>. p. 28.

²⁷ The Weather Channel. <u>Weathering Disaster</u>: "Yorba Linda Fires" (Episode).

Freeway Complex Fire Photos (11/08)







© Lee Paulson (Diamond Bar) used with permiss











A 100 Year History of Wildfires Near Chino Hills State Park

RECOMMENDATIONS

The data demonstrate that there are three "hotspots" in the Study Area that show a propensity to burn: Santa Ana Canyon, Carbon Canyon, and Rim Crest. With that in mind HFE developed several suggestions for possible adoption by transportation and fire agencies, State Parks, cities, and homeowners. We recognize that these recommendations require appropriate staffing and reliable

funding. HFE is willing to help develop the political will and partner on implementing these recommendations.

General Recommendations

- Enforcement of fire rules and regulations is essential if fires in this region are to be reduced. Develop an effective and funded mechanism for fining violators to improve safety.
- OCFA and citizens of Yorba Linda should organize and work together to increase fire safety as the neighboring Carbon Canyon Fire Safe Council has done.
- Communities around the hills should create volunteer Fire Watch programs that patrol streets on high wind days, like the Santiago Canyon area residents have implemented.
- Individual residents should take personal responsibility to improve the fire safety of their own homes.



- Jurisdictions should require the highest standard and state-of-the-art construction for fire prevention (e.g., installing passive closure attic vents, which close without human intervention).
- When planning for future development at the WUI, developers and lead agencies should involve fire agencies at the earliest planning stages.

Santa Ana Canyon Recommendations

- Harden the edges of the 91 Freeway that abut natural lands using K-rails or similar structures.
- Incorporate and enforce an appropriately frequent maintenance program for the power lines owned or operated by Edison and any other utility providers.
- The steep terrain and the wind tunnel effect of this east-west trending canyon heighten the threat of fire in this location. It seems prudent to add a new fire station at either Green River or Gypsum Canyon to improve response time to Santa Ana Canyon fires especially given that the 91 Freeway is often congested which reduces response time.
- Continue to increase fire patrols or fire agency presence on high wind/high heat/low humidity days on the 91 Freeway and neighboring streets/communities.
- Include Caltrans-type flashing signage on high fire hazard days alerting commuters to be cautious and report suspicious behavior.
- Improve safety by enforcing violations caused by agencies, contractors, and businesses that work along the Santa Ana Canyon. For example, agencies should requiring spotters and water trucks when working in or next to natural lands.



Carbon Canyon Recommendations

- Caltrans should continue to improve consistency on fuel clearance in a more timely fashion along Carbon Canyon Road (Highway 142). Spraying of the plants in the Caltrans right-of-way should occur early in the growing season, when the plants are small making handcrew removal easier and more economical.
- Consider reducing the participation for fire agency mutual aid for cities with a WUI and a history of fires. For example, the fire agencies serving Brea, Yorba Linda, and Chino Hills should be "at the bottom of the list" for sending mutual aid to other areas on high fire hazard days since they may have their own fire to respond to. Requests for mutual aid should first be made to more urbanized communities with no WUIs.
- Continue to increase fire agency presence and patrols during high wind/high heat/low humidity days.

Rim Crest Recommendations

- Include a door-to-door homeowner education program before fire season begins each year.
- Incorporate proactive steps by OCFA and the City of Yorba Linda for retrofitting homes with hardening techniques e.g., boxed eaves, automatic attic vent closures, roofs cleared of leaf debris, no ladder fuels near the house, etc.
- Remove non-native highly flammable vegetation (such as palm trees and pampas grass).
- Give fire risk the highest consideration in approving housing projects on the WUI.
- Continue fire agency presence and patrols during high wind/high heat/low humidity days.
- Require new developments to use native, fire resistance landscape to reduce ignition at the WUI and incorporate defensible space within the development.

CONCLUSION

This study shows that Chino Hills State Park and environs have endured significantly more fires, 101 to be exact, than would have naturally occurred by lightning strikes (2). Instead of a fire burning every 50 years in the natural fire regime, humans have increased the ratio essentially to a fire a year. HFE recognizes that a sample size of two fires is not enough to draw firm conclusions. However, our local examples of natural fires indicate fewer acres burn (367 acres) on average than fires ignited by humans or human error (2,494 acres). Natural fires tend to ignite on ridge tops with a lightning strike. The fire then generally spreads downhill and does so more slowly allowing firefighters more time to attack the blaze. Human-caused fires tend to start at a canyon bottom, where roads usually are, and race uphill.

As communities arose and developments were built, opportunities for fires to ignite at the WUI increased. It is clear from this research that humans have changed the natural fire regime—both intentionally and unintentionally. Some of the causes, like machinery hitting a rock igniting dry brush could be prevented. Risk could be reduced with the incorporation of fire spotters, restrictions on work during certain weather conditions, and the presence of water trucks. Other fires ignited by power lines seem to indicate the region would benefit from an improved maintenance schedule before the fire season begins.





It is clear there are many more fires occurring here than would have occurred naturally and there are many consequences to having a fire a year burn in the region. First, there is an increased risk of loss of life, property, and natural resources, which all translate to a huge economic loss, not to mention personal losses, for a region each time it burns. Second, increased fires mean a shift in the type and location of vegetation that normally could have recovered in a natural fire regime. When burned too frequently the native vegetation does not have enough time, and in some cases stored energy, to regenerate or become mature enough to produce seeds. This stress on the native vegetation allows non-native plants to dominate the landscape. Finally, given the \$150+ million investment made by private and public agencies in protecting and restoring the hills, it challenges the sensibilities to think of the State Park merely as fuel load. In the short-term, reducing the fuel load exacerbates the long-term problem of type conversion to highly flammable non-native fuels, which generally dry earlier, ignite easier, and spread fire faster than native plants. It was reported during the Freeway Complex Fire (2008) that the non-native 30 foot tall water-loving *Arundo donax* spread the flames up Carbon Canyon Creek toward the community of Sleepy Hollow. Riparian corridors are natural buffers to flames, but not when they are choked by non-native, highly flammable plants.

The responsibility for protection of the community from wildland fires lies first with the developer during the planning phase of the development. Governmental jurisdictions also share in this responsibility because decision makers have the power to approve or deny inappropriate developments at the WUI. Finally, private homeowners have the responsibility to learn the vulnerabilities of their home and take proactive steps to remedy them where possible. Additionally, the city and homeowners' associations must ensure proper maintenance of the defensible space within the community.

To reduce the unnatural frequency of fires to a more natural pace: education, outreach, planning, and a shift in approach is needed. HFE is committed to working with planners, natural resource, transportation, and fire agencies to reduce the fire frequency to a more natural fire regime in the Study Area.

Suggestions for Further Study

Due to capacity and time limitations, HFE was only able to report on the wildland fires (perimeters and points of origin), however HFE believes there are additional areas of study that would benefit fire prevention, resource protection, and planning efforts at the WUI. These include:

- An analysis of the effect of repeated wildfires on wildlife habitat and its effect on wildlife
- A historical analysis documenting the loss of valuable vegetation types and type conversion
- The effects wildfires have on wildlife movement, foraging, reproduction, and survival
- Whether enforcement measures for fire prevention are adequate
- The expansion of the WUI and its impacts on the Park





About the Authors

Claire and Melanie Schlotterbeck are conservation advocates specializing in the Puente-Chino Hills Wildlife Corridor. This mother-daughter team both work as long time consultants to HFE. Melanie is a technical consultant and works on GIS mapping, land acquisition, research projects, and outreach efforts. More recently, her efforts have resulted in acquisition and restoration projects that benefit the State Park. She earned her bachelor's degree in Environmental Geography and her Master of Science in Environmental Science from Cal State Fullerton. Claire Schlotterbeck is the Executive Director of HFE and has been involved in preservation of the Puente-Chino Hills for over three decades. She played a key role in the formation of the 14,100-acre Chino Hills State Park. Claire earned her bachelor's degree in Political Science from UCLA and a Master of Science from Purdue University.

HFE also gratefully recognizes the contributions of:

- CalFire, Orange County Fire Authority, and Chino Valley Independent Fire District for providing digital data for analysis and inclusion in this study.
- Chino Hills State Park staff, Ron Krueper, Kelly Elliott, Ken Kietzer and Alissa Ing, for providing important reports, expertise, critiques, and personal accounts that led to a more complete study.
- Scott Carpenter of the National Weather Service for assisting HFE accumulate weather statistics on the wildland fires.
- GreenInfo Network for providing the initial mapping for this project.
- Dan Nove for his expertise in converting the GIS data to Google Earth and refinement of the maps for this project.
- Carbon Canyon Fire Safe Council, for its support of this project and efforts to educate canyon residents through its outreach and annual Wildfire Awareness Fair.
- The City of Brea, California Fire Safe Council, and the Santa Ana Watershed Association for their funding and work in restoring Carbon Creek through the *Arundo* removal project post Freeway Complex Fire.
- Drs. Rod and Carol McKenzie for their able editorial assistance.





Fire Perimeter Data

Fire Name	Fire Date	Acreage Burned	Cause	Point of Origin
Fuel Break (Historical)	—	132	_	—
Irvine Ranch	1914	14,830	Unknown	Unknown
Fresno Canyon*	1928	1,007	Unknown	Unknown
Gypsum*	1929	1,085	Unknown	Unknown
Carbon Canyon*	1930	733	Unknown	Unknown
Santa Ana Canyon	Nov. 8, 1943	9,375	Unknown	Unknown
Gaines	Sep. 22, 1944	270	Unknown	Unknown
Shell	July 2, 1947	118	Unknown	Unknown
Green River	Nov. 4, 1948	41,285	Unknown	Unknown
Nohl	June 21, 1951	176	Unknown	Unknown
Santiago	Oct. 15 ,1958	110	Unknown	Unknown
La Vida	Nov. 29, 1959	611	Unknown	Unknown
91 Freeway*	1962	139	Unknown	Unknown
Paseo Grande	Oct. 29, 1967	39,872	Unknown	Known
Firestone	Oct. 30, 1967	236	Unknown	Known
Tonner Canyon	June 13, 1971	9	Unknown	Unknown
Serranos	Sep. 9, 1973	304	Unknown	Known
Mine	July 28, 1977	4,956	Unknown	Unknown
Soquel	Oct. 23, 1978	5,428	Unknown	Known
Soquel Canyon*	Oct. 25, 1978	251	Unknown	Unknown
Los Sarranos [Serranos]	June 19, 1979	172	Unknown	Known
Paseo	Sep. 15, 1979	3,644	Smoldering Sleeper Fire	Known
Corona	1980	116	Unknown	Unknown
Green River	July 13, 1980	379	Unknown	Known
Owl	Oct. 28, 1980	18,332	Unknown	Known
Carbon Canyon	Nov. 16, 1980	14,613	Unknown	Known
Euclid	Oct. 30, 1981	714	Unknown	Known
Fresno Canyon*	Oct. 1982	211	Unknown	Unknown
Gypsum	Oct. 9, 1982	19,986	Power lines	Known

 * indicates the fire name was assigned by Hills For Everyone.



Fire Perimeter Data Continued...

Fire Name	Fire Date	Acreage Burned	Cause	Point of Origin
Santa Ana Canyon*	Fall 1983	443	Unknown	Unknown
Fresno*	July 12, 1983	642	Unknown	Unknown
91 Freeway*	July 13, 1983	1,618	Unknown	Unknown
Bane Canyon*	Sep. 14, 1983	581	Unknown	Unknown
Wardlow Wash*	July 8, 1984	114	Unknown	Unknown
Coal Canyon	July 9, 1984	450	Fireworks (Bottle Rocket)	Known
Coal Canyon	July 2, 1985	540	Plane Crash into Power lines	Known
Shell	Aug. 11, 1985	1,635	Unknown	Known
Green River	Oct. 6, 1985	Less than 1	Unattended Children	Known
Fresno Canyon*	Aug. 2, 1986	95	Unknown	Unknown
Bane Canyon*	June 24, 1988	820	Unknown	Unknown
South Ridge	May 24, 1989	5	Mower hit rock, ignited brush	Known
Aliso Canyon	June 29, 1989	44	Unknown	Unknown
Carbon Canyon	June 27, 1990	6,664	Arson	Known
Yorba	July 12, 1990	7,884	Model Rocket	Known
91 Freeway	July 5, 1991	50	Machinery	Known
San Juan Hill	June 10, 1992	249	Plane Crash	Known
Stagecoach	Oct. 26, 1993	581	Unknown	Unknown
91 Freeway*	1994	41	Unknown	Unknown
Carbon Canyon [Wagon]	June 25, 1994	757	Unknown	Known
91 Freeway*	Aug. 5, 1994	28	Unknown	Known
Highway 91	Aug. 26, 1995	177	Unknown	Unknown
Carbon Canyon	Aug. 31, 1998	733	Lightning	Known
Green	Feb. 9, 2002	2,234	Downed Power lines	Known
Evening	Apr. 21, 2002	893	Fireworks	Known
Blue Gum	Nov. 20, 2002	497	Arson	Known
Coal Canyon	July 12, 2003	2	Arson	Known
Green River	July 24, 2004	16	Car Crash	Known
Carbon Canyon	Sep. 25, 2004	18	Car Fire	Known

 * indicates the fire name was assigned by Hills For Everyone.



Fire Name	Fire Date	Acreage Burned	Cause	Point of Origin
Yorba Linda	July 5, 2005	1,079	Fireworks	Known
Carbon Canyon	Aug. 4, 2005	1	Arson	Unknown
Sierra Peak	Feb. 6, 2006	10,506	Backfire	Known
Brush Canyon	July 11, 2006	1	Unknown	Unknown
Blue Gum	Aug. 2, 2006	3	Illegal Campfire	Unknown
241 Incident	Aug. 22, 2006	Less than 1	Unknown	Unknown
Windy Ridge [241 Incident]	Mar. 11, 2007	1,618	Burning Car (Arson)	Known
Rose	Apr. 12, 2007	8	Machinery	Known
Freeway Complex	Nov. 15, 2008	30,306	Auto Exhaust & Power lines	Known
241 Incident	Sep. 25, 2009	Less than 1	Unknown	Unknown
91 Freeway Incident	June 16, 2010	47	Unknown	Known
Carbon Canyon	July 11, 2011	518	Arson	Known
Rose Drive*	Nov. 2, 2011	5	Power lines	Known

Fire Perimeter Data Continued...

* indicates the fire name was assigned by Hills For Everyone.





Fire Name	Fire Date	Acreage Burned	Cause	Perimeter
Sonome Canyon	Unknown	Unknown	Plane Crash	Unknown
Paseo Grande	Oct. 29, 1967	39,872	Unknown	Known
Firestone	Oct. 30, 1967	236	Unknown	Known
Serranos	Sep. 9, 1973	304	Unknown	Known
Soquel	Oct. 23, 1978	5,428	Unknown	Known
Los Sarranos [Serranos]	June 19, 1979	172	Unknown	Known
Paseo	Sep. 15, 1979	3,644	Smoldering Sleeper Fire	Known
Green River	July 13, 1980	379	Unknown	Known
Owl	Oct. 28, 1980	18,332	Unknown	Known
Carbon Canyon	Nov. 16, 1980	14,613	Unknown	Known
Euclid	Oct. 31, 1981	714	Unknown	Unknown
Gypsum Canyon	Oct. 9, 1982	19,986	Electric Lines	Known
Coal Canyon	July 9, 1984	450	Fireworks (Bottle Rocket)	Known
Coal Canyon	July 2, 1985	540	Plane Crash into Power lines	Known
Shell	Aug. 11, 1985	1,635	Unknown	Known
Green River	Oct. 6, 1985	Unknown	Unattended Children	Known
Coal Canyon	Apr. 21, 1987	25	Vehicle Fire	Unknown
Gypsum Canyon	May 12, 1987	20	Incendiary Device	Unknown
Coal Canyon	July 7, 1987	5	Unknown	Unknown
Coal Canyon	July 28, 1987	10	Unknown	Unknown
Rim Crest	Mar. 13, 1988	10	Kids with Matches	Unknown
Coal Canyon	May 13, 1988	3	Unknown	Unknown
La Vida	Dec. 4, 1988	Unknown	Unknown	Unknown
South Ridge	May 24, 1989	5	Mower hit rock, ignites brush	Known
Carbon Canyon	July 5, 1989	Unknown	Unknown	Unknown
Featherly Regional Park	July 14, 1989	Unknown	Unknown	Unknown

Fire Causes and Points of Origin Data



Fire Causes and Points of Origin Data Continued...

Fire Name	Fire Date	Acreage Burned	Cause	Perimeter
Chino Hills State Park	Oct. 10, 1989	400	Unknown	Unknown
Carbon Canyon	June 27, 1990	6,664	Arson	Known
Yorba	July 12, 1990	7,884	Model Rocket	Known
Carbon Canyon	July 22, 1990	1	Unknown	Unknown
Carbon Canyon	July 27, 1990	2	Downed Power line	Unknown
91 Freeway	July 5, 1991	245	Machinery	Known
Coal Canyon	May 10, 1992	3	Unknown	Unknown
San Juan Hill	June 10, 1992	249	Plane Crash	Known
Chino Hills State Park	Sep. 8, 1992	500	Power lines	Unknown
Carbon Canyon	Nov. 15, 1993	40	Plane Crash	Unknown
Carbon Canyon [Wagon]	June 25, 1994	757	Unknown	Known
91 Freeway	Aug. 5, 1994	28	Unknown	Known
71 Freeway	Dec. 19, 1994	4	Unknown	Unknown
Carbon Canyon	June 24, 1998	20	Road Flare (Arson)	Unknown
Carbon Canyon	Aug. 31, 1998	733	Lightning	Known
Chino Hills State Park	Jan. 19, 1999	Unknown	Plane Crash	Unknown
Woodview	Sep. 12, 2000	200	Unknown	Unknown
Chino Hills Parkway	Sep. 18, 2000	2	Unknown	Unknown
Green	Feb. 9, 2002	2,234	Downed Power lines	Known
Evening	Apr. 21, 2002	893	Fireworks	Known
71 Freeway	Aug. 3, 2002	10	Car Exhaust Pipe	Unknown
Blue Gum	Nov. 20, 2002	497	Arson	Known
Coal Canyon	July 12, 2003	2	Arson	Known
71 Freeway	Aug. 19, 2003	3	Unknown	Unknown
Coal Canyon	May 30, 2004	2	Unknown	Unknown
Green River	July 24, 2004	16	Car Crash	Known
Carbon Canyon	Sep. 25, 2004	18	Car Fire	Known



Fire	Causes	and	Points	Of	Origin	Data	Continued
------	--------	-----	--------	----	--------	------	-----------

Fire Name	Fire Date	Acreage Burned	Cause	Perimeter
Yorba Linda	July 5, 2005	1,079	Illegal Fireworks	Known
Sierra Peak	Feb. 6, 2006	10,506	Back Fire	Known
Brush Canyon	July 23, 2006	1	Lightning	Unknown
Feldspar	Sep. 26, 2006	Unknown	Car Crash	Unknown
Red Star	Jan. 7, 2007	175	Unknown	Unknown
Windy Ridge [241 Incident]	Mar. 11, 2007	1,618	Burning Car (Arson)	Known
Rose	Apr. 12, 2007	3	Machinery	Known
Coal Canyon	May 7, 2007	140	Caltrans Machinery	Unknown
Western Hills	May 16, 2008	15	Downed Power lines	Unknown
Freeway Complex	Nov. 15, 2008	30,306	Auto Exhaust	Known
			Power lines	
Windy Ridge	Nov. 25, 2009	80	Unknown	Unknown
Coal Canyon	Mar. 16, 2010	Unknown	Car Accident	Unknown
91 Freeway Incident	June 16, 2010	47	Unknown	Known
Quarter Horse	Sep. 4, 2010	10	Fireworks	Unknown
Carbon Canyon	July 11, 2011	518	Arson	Known
Rose Drive	Nov. 2, 2011	5	Power lines	Known





All Fires Combined (Perimeters and Points of Origin) Data

Fire Name	Fire Date	Acreage Burned	Cause	Data Type
Fuel Break (Historical)	—	132	—	Perimeter
Sonome Canyon	Unknown	Unknown	Plane Crash	Point of Origin
Irvine Ranch	1914	14,830	Unknown	Perimeter
Fresno Canyon*	1928	1,007	Unknown	Perimeter
Gypsum*	1929	1,085	Unknown	Perimeter
Carbon Canyon*	1930	733	Unknown	Perimeter
Santa Ana Canyon	Nov. 8, 1943	9,375	Unknown	Perimeter
Gaines	Sep. 22, 1944	270	Unknown	Perimeter
Shell	July 2, 1947	118	Unknown	Perimeter
Green River	Nov. 4, 1948	41,285	Unknown	Both
Nohl	June 21, 1951	176	Unknown	Perimeter
Santiago	Oct. 15, 1958	110	Unknown	Perimeter
La Vida	Nov. 29, 1959	611	Unknown	Perimeter
91 Freeway*	1962	139	Unknown	Perimeter
Paseo Grande	Oct. 29, 1967	39,872	Unknown	Both
Firestone	Oct. 30, 1967	236	Unknown	Both
Tonner Canyon	June 13, 1971	9	Unknown	Perimeter
Serranos	Sep. 9, 1973	304	Unknown	Both
Mine	July 28, 1977	4,956	Unknown	Perimeter
Soquel	Oct. 23, 1978	5,428	Unknown	Both
Soquel Canyon*	Oct. 25, 1978	251	Unknown	Perimeter
Los Serranos [Serranos]	June 19, 1979	172	Unknown	Both
Paseo	Sept. 15, 1979	3,644	Smoldering Sleeper Fire	Both

* indicates the fire name was assigned by Hills For Everyone.



All Fires Combined (Perimeters and Points of Origin) Data Continued...

Fire Name	Fire Date	Acreage Burned	Cause	Data Type
Corona	1980	116	Unknown	Perimeter
Green River	July 13, 1980	379	Unknown	Both
Owl	Oct. 28, 1980	18,332	Unknown	Both
Carbon Canyon	Nov. 16, 1980	14,613	Unknown	Both
Euclid	Oct. 30, 1981	714	Unknown	Both
Fresno Canyon*	Oct. 1982	211	Unknown	Perimeter
Gypsum	Oct. 9, 1982	19,986	Power lines	Both
Santa Ana Canyon*	Fall 1983	443	Unknown	Perimeter
Fresno*	July 12, 1983	642	Unknown	Perimeter
91 Freeway*	July 13, 1983	1,618	Unknown	Perimeter
Bane Canyon*	Sep. 14, 1983	581	Unknown	Perimeter
Wardlow Wash*	July 8, 1984	114	Unknown	Perimeter
Coal Canyon	July 9, 1984	450	Fireworks (Bottle Rocket)	Both
Coal Canyon	July 2, 1985	540	Plane Crash into Power lines	Both
Shell	Aug. 11, 1985	1,635	Unknown	Both
Green River	Oct. 6, 1985	Less than 1	Unattended Children	Both
Fresno Canyon*	Aug. 2, 1986	95	Unknown	Perimeter
Coal Canyon	Apr. 21, 1987	25	Vehicle Fire	Point of Origin
Gypsum Canyon	May 12, 1987	20	Incendiary Device	Point of Origin
Coal Canyon	July 7, 1987	5	Unknown	Point of Origin
Coal Canyon	July 28, 1987	10	Unknown	Point of Origin
Rim Crest	Mar. 13, 1988	10	Kids with Matches	Point of Origin
Coal Canyon	May 13, 1988	3	Unknown	Point of Origin
Bane Canyon*	June 24, 1988	820	Unknown	Perimeter
La Vida	Dec. 4, 1988	Unknown	Unknown	Point of Origin
South Ridge	May 24, 1989	5	Mower hit rock, ignited brush	Both
Aliso Canyon	June 29, 1989	44	Unknown	Perimeter
Carbon Canyon	July 5, 1989	Unknown	Unknown	Point of Origin
Featherly Regional Park	July 14, 1989	Unknown	Unknown	Point of Origin

 * indicates the fire name was assigned by Hills For Everyone.



All Fires Combined (Perimeters and Points of Origin) Data Continued...

Fire Name	Fire Date	Acreage Burned	Cause	Data Type
Chino Hills State Park	Oct. 10, 1989	400	Unknown	Point of Origin
Carbon Canyon	June 27, 1990	6,664	Arson	Both
Yorba	July 12, 1990	7,884	Model Rocket	Both
Carbon Canyon	July 22, 1990	1	Unknown	Point of Origin
Carbon Canyon	July 27, 1990	2	Downed Power lines	Point of Origin
91 Freeway	July 5, 1991	50	Machinery	Both
Coal Canyon	May 10, 1992	3	Unknown	Point of Origin
San Juan Hill	June 10, 1992	249	Plane Crash	Both
Chino Hills State Park	Sep. 8, 1992	500	Power lines	Point of Origin
Stagecoach	Oct. 26, 1993	581	Unknown	Perimeter
Carbon Canyon	Nov. 15, 1993	40	Plane Crash	Point of Origin
91 Freeway*	1994	41	Unknown	Perimeter
Carbon Canyon [Wagon]	June 25, 1994	757	Unknown	Both
91 Freeway*	Aug. 5, 1994	28	Unknown	Both
71 Freeway	Dec. 19, 1994	4	Unknown	Point of Origin
Highway 91	Aug. 26, 1995	177	Unknown	Perimeter
Carbon Canyon	June 24, 1998	20	Road Flare (Arson)	Point of Origin
Carbon Canyon	Aug. 31, 1998	733	Lightning	Both
Chino Hills State Park	Jan. 19, 1999	Unknown	Plane Crash	Point of Origin
Woodview	Sep. 12, 2000	200	Unknown	Point of Origin
Chino Hills Parkway	Sep. 18, 2000	2	Unknown	Point of Origin
Green	Feb. 9, 2002	2,234	Downed Power lines	Both
Evening	Apr. 21, 2002	893	Fireworks	Both
71 Freeway	Aug. 3, 2002	10	Car Exhaust Pipe	Point of Origin
Blue Gum	Nov. 20, 2002	497	Arson	Both
Coal Canyon	July 12, 2003	2	Arson	Both
71 Freeway	Aug. 19, 2003	3	Unknown	Point of Origin

* indicates the fire name was assigned by Hills For Everyone.



All Fires Combined (Perimeters and Points of Origin) Data Continued...

Fire Name	Fire Date	Acreage Burned	Cause	Data Type
Coal Canyon	May 30, 2004	2	Unknown	Point of Origin
Green River	July 24, 2004	16	Car Crash	Both
Carbon Canyon	Sep. 25, 2004	18	Car Fire	Both
Yorba Linda	July 5, 2005	1,079	Fireworks	Both
Carbon Canyon	Aug. 4, 2005	1	Arson	Perimeter
Sierra Peak	Feb. 6, 2006	10,506	Backfire	Both
Brush Canyon	July 11, 2006	1	Unknown	Perimeter
Brush Canyon	July 23, 2006	1	Lightning	Point of Origin
Blue Gum	Aug. 2, 2006	3	Illegal Campfire	Perimeter
241 Incident	Aug. 22, 2006	Less than 1	Unknown	Perimeter
Feldspar	Sep. 26, 2006	Unknown	Car Crash	Point of Origin
Red Star	Jan. 7, 2007	175	Unknown	Point of Origin
Windy Ridge	Mar. 11, 2007	1,618	Burning Car	Both
[241 Incident]			(Arson)	
Rose	Apr. 12, 2007	8	Machinery	Both
Coal Canyon	May 7, 2007	140	Caltrans Machinery	Point of Origin
Western Hills	May 16, 2008	15	Downed Power lines	Point of Origin
Freeway Complex	Nov. 15, 2008	30,306	Auto Exhaust & Power lines	Both
241 Incident	Sep. 25, 2009	Less than 1	Unknown	Perimeter
Windy Ridge	Nov. 25, 2009	80	Unknown	Point of Origin
Coal Canyon	Mar. 16, 2010	Unknown	Car Accident	Point of Origin
91 Freeway Incident	June 16, 2010	47	Unknown	Both
Quarter Horse	Sep. 4, 2010	10	Fireworks	Point of Origin
Carbon Canyon	July 11, 2011	518	Arson	Both
Rose Drive*	Nov. 2, 2011	5	Power lines	Both

* indicates the fire name was assigned by Hills For Everyone.





P.O. Box 9835 • Brea, CA 92822 • www.HillsForEveryone.org