The California Chaparral Institute
*. . . the voice of the chaparral*

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*California Chaparral Institute, P.O. Box 545, Escondido, CA 92033*
*www.californiachaparral.org email: naturalist@californiachaparral.com phone: 760-822-0029*

# Threats to the Chaparral

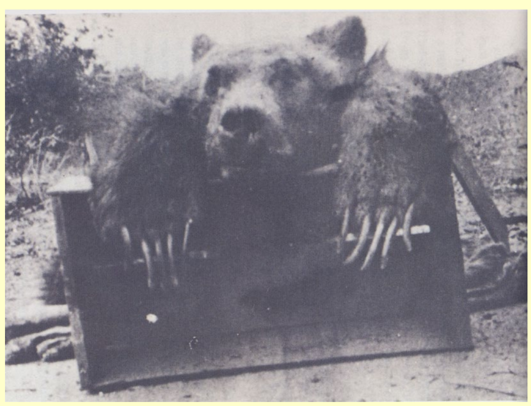
## Fire, fear of fire, and the exploitation of fear

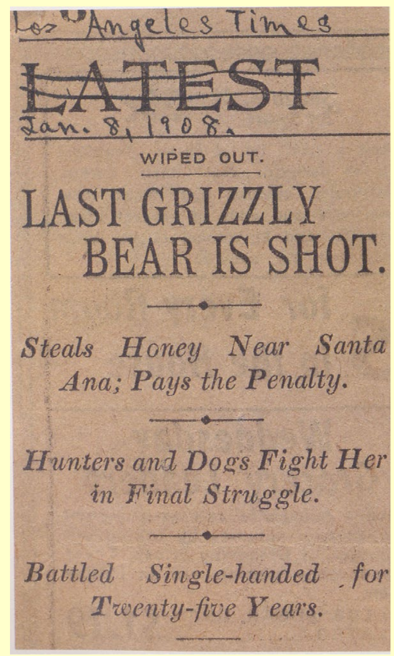
They once roamed the chaparral in packs of ten to twenty. They dominated the California landscape. They were the largest of their kind. They are no more. Hunted to extinction, the California grizzly bear was once the king of the chaparral.

California condors once soared in large flocks over the chaparral and depended in part on the carcasses left behind by the griz. Twenty-fire years ago the condor species hung by a thread, saved only by those who understand the importance of nature and feel a deep reverence for all life. The condor has been saved from extinction, for now.

Is the chaparral itself next to go? With headlines and politicians fanning the flames of fear, chaparral is seen as a threat, an "unnatural" accumulation of "brush", a thing that must be mitigated.

It's time to come to nature's defense.





Los Angeles Times
LATEST
Jan. 8, 1908.

WIPED OUT.

LAST GRIZZLY BEAR IS SHOT.

*Steals Honey Near Santa Ana; Pays the Penalty.*

*Hunters and Dogs Fight Her in Final Struggle.*

*Battled Single-handed for Twenty-five Years.*

**The last California grizzly bear in Southern California.** Shot in Holy Jim Canyon, Orange County.

**Cont. on pg 4**

## INSIDE THIS SPECIAL ISSUE



**The California Condor**

# The Witch Fire
## *October 23, 2007*
## Memories and Solutions

Richard W. Halsey

**The Witch fire, about 6:20AM, October 23, 2007.** My sons Jake and Nick and I awakened to see the flames moving down Bernardo Mountain toward our home.

Exactly one year ago today, we confronted the possibility that our home would be lost to flames. We were spared, but many of our neighbors were not. Ten people lost their lives that week: two in the Witch fire and eight in the Harris. Richard Varshock, 15-years-old at the time, lost both his home and father Tom. He continues to bravely deal with the memories and the burns that covered more than 50% of his body. A remarkable group of people at the Burn Institute helped Richard and many others cope with the devastating psychological and physical effects of their injuries. Please help make a difference by donating to the Burn Institute, the Varshock Fund, and the UC San Diego Burn Center.

How do we prevent all of this from happening again? Unfortunately, there are no simple answers. We live in a fire-prone environment. Like earthquakes, we can try and limit the damage wildfires can do, but they are coming regardless of our efforts. Some disagree with this perspective and feel we can indeed stop large wildfires by merely burning off the vegetation on a continual basis. While this will certainly change the dynamics of wildfires, it will not prevent them. As the million-plus acre grass fires in Texas and Oklahoma in 2005/06 demonstrated, as long as there are dry conditions and strong winds, the fires will come no matter what kind of vegetation is available to burn.

The first place to start is by finding common ground and asking the right questions. Rather than biasing our approach by asking how to prevent the unpreventable, we need to ask, how can we protect lives, property, and the natural resources we enjoy from the ravages of wildfire? The answer involves a change in how we live and how we see ourselves within the context of our communities. If we try to force nature to adapt to us, we are doomed to fail. Adapting to nature ourselves will be much more successful.

### Some ideas beyond defensible space and fire-safe building designs:

1. Develop a “Go Early or Stay” fire defense plan for every community in a high fire hazard zone.
2. Create neighborhood Fire-Watch Brigades in which a select group of volunteers are trained to remain in the community to assist firefighting efforts after those who need to evacuate do so.
3. Create *strategic* fuel breaks near communities that will assist firefighters during fire suppression operations.
4. Properly fund fire agencies so they have the firefighters (boots on the ground) they need to get the job done.
5. Value the natural environment in which we live. View threatened wildland areas, especially old-growth shrublands, like suburban communities and develop plans to protect them from fire.

# Condors are Soaring Above California Skies

**By Dianne Erskine-Hellrigel**

California Condors (*Gymnogyps californianus*), once on the brink of extinction, can now be seen soaring the skies above California, Arizona, and northern Baja California. In prehistoric time, they ranged all across America. Their numbers were greatly reduced in the late Pleistocene, along with the demise of many large mammals. The last remaining colony survived in the Western US. By 1982, there were only 22 condors in the wild, and all of them were in California. Out of this meager number, there was only one breeding pair left.

**Condor #8.** Photo by Dianne Erskine-Hellrigel

Without a captive breeding program, the condors would surely have been lost to us forever. Several dedicated individuals and organizations set out to capture the remaining 22, but by the time they were successful in capturing all the remaining condors, the population had dwindled to 10. DNA testing was done and it was found that all of these condors were interrelated, but that there was DNA of 3 distinct clans. After a tremendous amount of work by a remarkable group of people, the condor breeding programs were a success and the road to extinction was arrested. Currently there are more than 300 living condors, with approximately 35 living in the wild in California.

The goal of the recovery programs is to have at least 2 wild populations with 150 individuals in each, with at least 15 breeding pairs. The colonies must be self-sustaining with a positive population increase. Ten chicks have been born in the wild, but only one has survived. We haven't reached our goal yet, but we have high hopes for the future.

With a wing span of almost 10 feet across and up to 25 pounds, they are the largest flying birds in North America. Condors are scavengers that feed primarily on carrion. They do not have a good sense of smell, so they locate carcasses with their keen eyesight. They prefer deer, cattle, and sheep, but they will also eat rodents, rabbits, fish, and other animals. There has been one case reported of a condor eating live mussels. They will eat 2 to 3 pounds of meat at a time. They are able to go several days without food until they locate another carcass. Researchers have found that condors bathe after a meal and spend hours grooming themselves and drying their feathers.

Despite their huge size, condors can travel up to 50 miles per hour, and up to 100 miles a day while searching for food. They can soar on thermals up to 2 miles high. The best way to identify them in flight

**Condor cont' on pg 26**

# Some Hope Amongst the Threats

Beyond development, chaparral and other native shrubland ecosystems are endangered by attitudes shaped by misinformation, ignorance, and greed. Unfortunately, these attitudes have translated into actionable policies and land management decisions that continually challenge all of us who care about nature and the integrity of protected wildlands. In this special edition of *The Chaparralian*, we examine these attitudes by focusing on four issues: **1) viewing chaparral only as a fuel, 2) the myth of fire suppression, 3) the exploitation of the fear of fire for economic gain, and 4) too many fires, no chaparral.**

While trying to protect the natural environment is an ongoing struggle, we are seeing some promising results from our efforts to help others see nature as something of value rather than something to fear.

1. Thanks to State Senator Christine Kehoe, a new defensible space law will replace an older version that had an inherent bias against native plant communities. It now addresses the *entire* fire-risk reduction equation. For a full analysis of the new law see our Protecting your home page on our website.

2. We helped convince San Diego County to use the best available science when drafting a new vegetation management plan. County staff asked and was granted an additional 6 months to do the job right. Earlier versions promoted landscape-scale prescribed burns and mastication that would cause severe damage to an already ecologically damaged region.

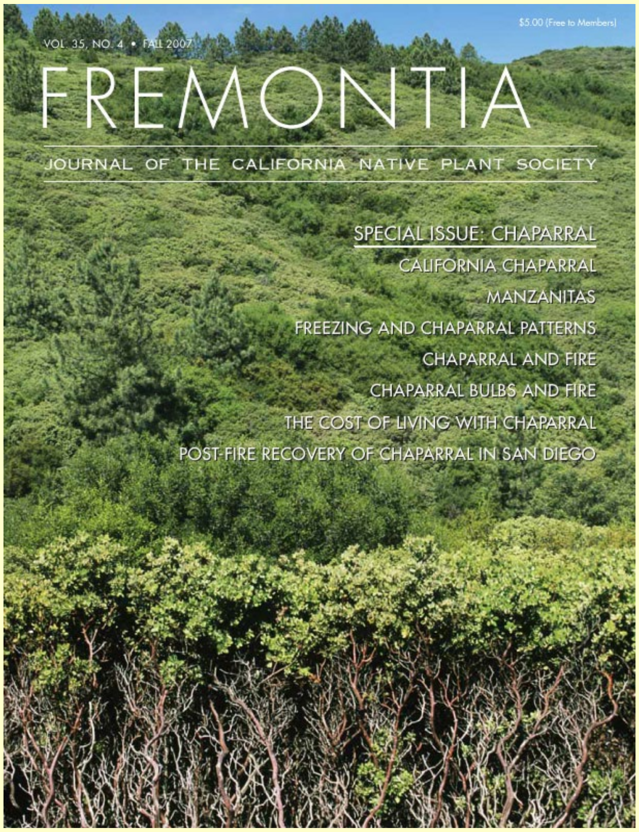
3. The truth is getting out concerning the value of old-growth chaparral, the negative impact frequent fires are having on chaparral, and the importance of fire-education. The vocabulary is changing. Instead of “clearing” we are hearing “thinning.” Instead of “brush” we are hearing “chaparral.” Instead of “chaparral needs to burn” we are hearing “chaparral can be destroyed by too much fire.”

Chaparralians are making a difference.

**Cont. next pg.**

**Original Chaparralians.** Master Naturalist Bill Howell and Padawan Richard Halsey with some old-growth chaparral friends: Big-berry manzanita (*Arctostaphylos glauca*) and an Engelmann oak (*Quercus engelmannii*).

# I: Chaparral as Fuel -*The Consequence of Tree Myopia*




When chaparral is viewed primarily as fuel and not as a valued ecosystem, it is threatened by poor land management practices. On the cover of the Fall 2007 issue of Fremontia, the quarterly journal of the California Native Plant Society, a remarkable stand of manzanita chaparral was featured (located in the Trabuco District, Cleveland National Forest). The area was masticated by the US Forest Service shortly thereafter in an attempt to reduce "fuel" around an artificial tree plantation. The plantation was established starting in 1956 with a mix of Coulter pines and a Frankenpine-like hybrid between a Monterey and knobcone pine. Coulters are native to the area and have adapted to living within the chaparral plant community by having serotinous cones which open when exposed to fire: **being surrounded by chaparral is the natural condition.**

In the recent USFS land management plans for Southern California, forest types were carefully distinguished and management strategies were offered for each. Silvicultural methods were detailed for seven forest types. Yet when it came to chaparral, types were neither distinguished nor was a vegetation management plan developed. It's time to start treating chaparral as a valued ecosystem, not as an afterthought to trees.

## II: Blaming Firefighters for Fires

### *The Myth of Fire Suppression - Part III -*

One of the primary threats to shrubland ecosystems, especially the remaining stands of old-growth chaparral, is the effort by vested interests to convince the public and government agencies that large chaparral fires are the fault of the fire service. According to this viewpoint, firefighters are at fault because they have allowed "unnatural" amounts of chaparral to build up ("fuel") by extinguishing wildfires in order to protect lives and property. To "correct" this problem, these interests want to base government policy on what can be referred to as the Baja/Southern California fire mosaic hypothesis.

Such a policy would promote the burning and mastication of shrubland plant communities across the landscape for the stated purpose of reducing "unnatural fuel" loads. This approach would not only be ineffective in stopping wind-driven wildfires, but would ultimately threaten the continued existence of native shrubland ecosystems across the state. Such consequences are vehemently denied by those who promote the hypothesis, but the science says otherwise.

The originator of the fire mosaic hypothesis, University of California geographer Dr. Richard Minnich, is quoted frequently in newspaper articles claiming that past fire suppression is responsible for nearly every large wildfire - even those in areas that had burned multiple times over the past 20 years.

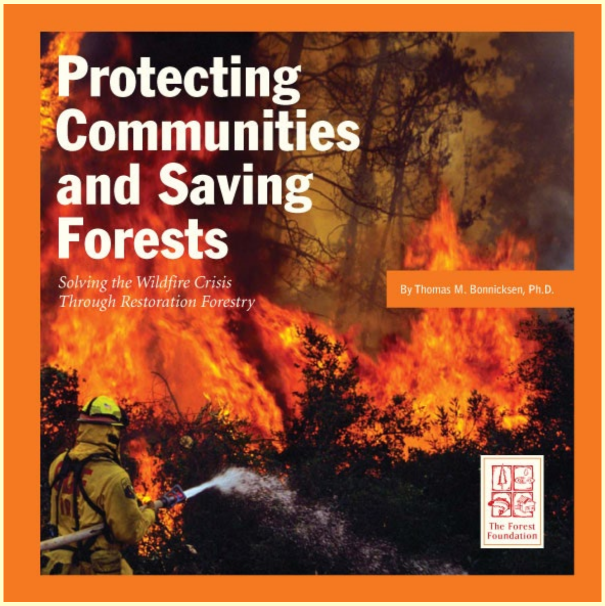
The "unnatural fuel" approach has also been promoted in a recent fire booklet published by the Forest Foundation. We examine this publication in the adjoining article on this page.

**Cont' on pg. 16**

## III: Exploiting the Fear of Fire for Economic Gain

### *Turning Protected wildlands into tree farms and biofuel*

Exploiting fear and stacking the decks with biased information are often used tools by the propagandist to shape public opinion. History is littered with examples. Today, one only has to tune into any number of AM talk radio shows to hear much of the same. So, when it comes to wildfire, it should be no surprise that those who can use the public's misunderstanding of fire to promote their own view of the world will do so.

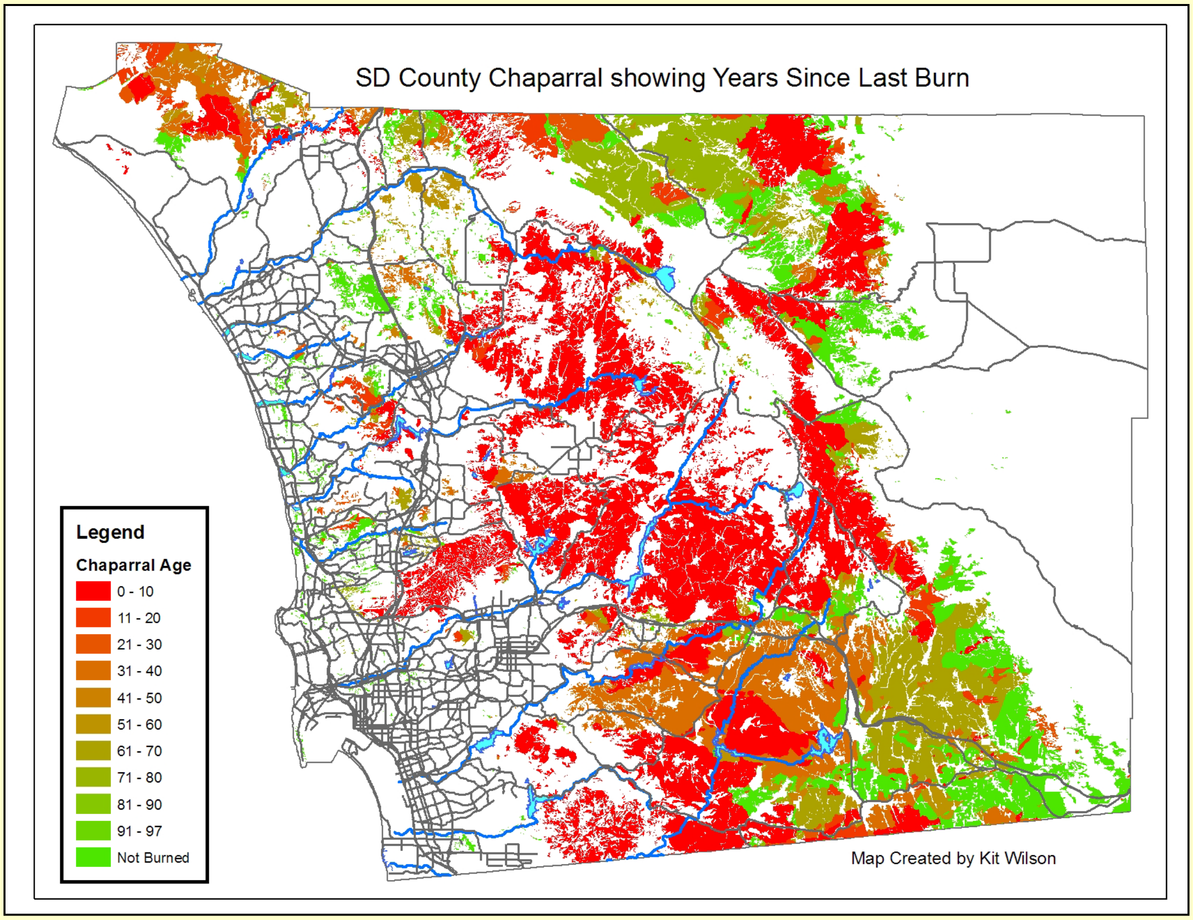



With the support of the Forest Foundation, a non-profit group supported by the timber industry, a glossy new booklet is being distributed that purports to be a treatise on how to protect communities and save wildlands from wildfires. However, it doesn't take long for the objective reader to realize that this document is designed to promote the economic interests of the wood products industry.

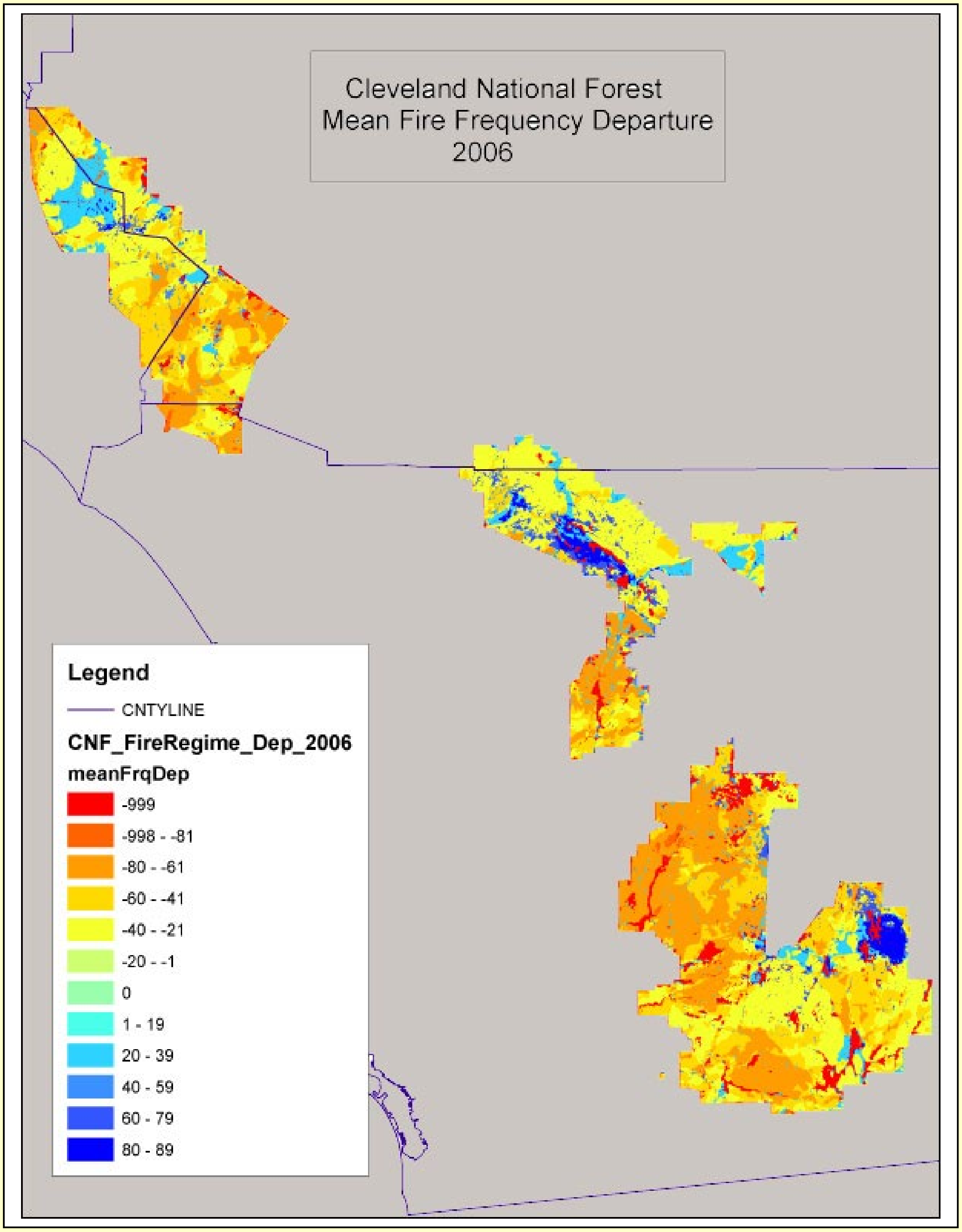
**Cont' on pg. 11**

# IV. Too Many Fires, No Chaparral


**Chaparral being type-converted to weedy, non-native grassland.** This site is east of Alpine off Interstate 8 in San Diego County. The upper left shows 38-year-old chaparral last burned during the 1970 Laguna fire. The middle/left of the picture shows the chaparral recovering normally after the 2001 Viejas fire. It is composed primarily of chamise, deerweed, and several other native shrub species. To the right is a portion of the Viejas fire scar re-burned in the 2003 Cedar fire. This area is now filled with non-native grasses. The majority of the re-sprouting shrubs have been killed and no obligate seeding species, such as Ceanothus, are present. The interval between the two fires was too short, causing the elimination of the chaparral plant community.




A significant amount of San Diego County's chaparral and coastal sage scrub habitat has burned over the past 10 years (areas in red). Few old-growth chaparral stands have survived. In order to maintain a sustainable level of protection for the region's native species, it is essential that fire be kept out of the remaining old-growth shrubland ecosystems and areas that have burned over the past 30 years. Map by Kit Wilson.




**Most of the Cleveland National Forest has experienced *more* fire than its ecosystems can handle.** Map above shows percent departure of current mean fire return interval (1910-2006) from the reference mean fire return interval (pre-Euroamerican settlement). Areas that are experiencing *more* fire today than during the pre-settlement period are shown red to green (negative departures). Areas that are experiencing *less* fire today than during the pre-settlement period are shown in shades of blue (positive departures). Source: Hugh Safford, USFS.

# What's at risk?

Native chaparral and sage scrub ecosystems.

**The consequence of type-conversion (below).** Chaparral and sage scrub ecosystems are replaced by non-native, weedy grasslands. Clevenger Canyon, east of Escondido, Highway 78.

## Fear of Fire from pg. 6

From the very beginning, *Protecting Communities and Saving Forests* by Thomas M. Bonnicksen lays blame for large wildfires on "unnaturally" dense forests and the endangerment of thousands of lives on fire agencies (through past fire suppression policies), the government (through conservation policies), and an ignorant public (we are disconnected from the land).

To correct these problems, the booklet urges us to imitate what it claims Native Americans did (actively managed forests for thousands of years), significantly increase logging on public lands (trees of all ages should be cut), and "restore" forests that have burned by logging the dead trees and replanting new ones. Nature should not be allowed to take its course. To save the taxpayers from paying for all this, the booklet suggests that we engage the private sector by giving financial incentives to encourage the development of a new "biomass energy" industry, open up currently protected areas to logging, and restrict the public's ability to appeal logging and biomass production plans. The biomass that will fuel this new industry will be masticated chaparral, logging slash, and unwanted trees.

The basic problem with the fire booklet is that it takes what is applicable to a limited number of forests and applies it across the entire state of California. The basic premise appears to be all wildfires are the result of "nature overgrown." Clear out the plants, the mantra goes, and wildfires will no longer be a problem. This is not "modern science" as the booklet claims, but the selective manipulation of the truth.

**When forest fires aren't forest fires**

The misrepresentation of information is nowhere more clearly demonstrated than when the booklet falsely uses the wind-driven, 2003 wildfires as proof that public forests need to be logged. Here are several examples:

*"With an abundance of dead, dry trees in the forests, fires burn hotter than natural. They can easily jump 8-lane highways and blow right through or around fuel breaks. Intensely hot fires create strong winds and can hurl firebrands, or bits of burning trees, up to a mile away."*

Yes, a number of forests do have an abundance of dead trees. Federal and state agencies are doing their best to remove these near communities. But dead trees were not involved in the situation described above.

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The *"8-lane highway"* jump occurred on Interstate 8 in San Diego County, far from any *"dead, dry trees in the forests."* Photo taken looking west from the area of Tavern Rd near Harbison Canyon. Source: SD County Sheriff.

## Fear of Fire from pg. 11

Only 5% of the landscape that burned in the 2003 fires involved forests. The vast majority of the areas burned were dominated by shrubland ecosystems, or "brushfields" as the booklet pejoratively refers to them. The "*8-lane highway*" jumps occurred in areas dominated by grass and shrubs. The "*dead, dry trees*" were miles away from such events. The "*strong winds*" that blew embers far ahead of the fire front were the result of Santa Ana wind conditions that originated in the desert, not "*intensely hot fires*."

*"Living amongst the trees without caring for and thinning the forest has proven to be lethal…In 2003, Southern California wildfires claimed two dozen lives and destroyed some 3,700 homes in a predictable and preventable event."*

**The vast majority of lives lost and homes destroyed in the 2003 wildfires were within shrubland ecosystems and had nothing to do with "*living amongst the trees.*"**

*"During the 2003 Southern California firestorm, hundreds of homes that were theoretically protected by fuel breaks burned. The Old Fire, for example, simply swept around the east and west ends of Highway 18 that firefighters were using as a fuel break to protect Lake Arrowhead."*

**Forests?** The 2003 Old fire swept down weed covered foothills (foreground) and burned hundreds of homes along either side of Del Rosa Ave. (left center) in San Bernardino.

**Del Rosa Palms.** Note the black trunks on the three Mexican fan palms in the background. With embers being propelled by strong Santa Ana winds during the Old fire, ornamental vegetation played a significant role in spreading the flames. It appeared most homes ignited from the inside out after embers entered attic vents and other openings. The home in foreground is new.

Yes, many homes near fuel breaks burned including those near Lake Arrowhead. However, what the booklet fails to explain is that more than half of the homes that burned in the Old Fire were within suburban communities far from any forests. As it roared down the mountains above San Bernardino, the Old Fire was fueled by weeds and degraded shrublands. As the embers blew into town, homes ignited as ornamental vegetation and exposed flammable surfaces caught fire.

While there is no doubt that many mountain communities in California are surrounded by hazardous amounts of forest vegetation, it is disingenuous to attribute shrubland wildfires in the southern part of the state to overly dense forests.

**Forests *need* us to be natural?**

The booklet also claims that forests have been "managed" for at least 12,000 years by humans and therefore must continue to be so.

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## Fear of Fire from pg. 12

According to the booklet, images of forests as "*dark, mysterious places with huge trees, moss-covered logs under foot and chattering wildlife in tree canopies high overhead – are fleeting glimpses of reality at best.*" Such old-growth forests were "*relatively few and far from permanent*." All forests should be "*open enough to gallop a horse through without hitting a tree*."

One wonders how nature survived without us. Apparently, humans are needed to cut down huge trees and make sure shrubs don't keep popping up to prevent the expansion of those dark and mysterious old-growth places.

While there is no data to support the notion that old-growth forests have always been restricted to small patches, there is significant evidence that commercial exploitation has been responsible for destroying vast stretches of the "*pristine forest*" the booklet calls a myth. Ninety-six percent of the original old-growth coast redwoods have been logged. Of the two million acres of original redwood forests that existed when California gained statehood in 1850, less than three percent remain today. Much of the forested landscape in California that is claimed to be overly-dense originally became so because of past logging practices, not fire suppression. Logging, especially clear cutting, opened-up or removed forest canopies, allowing sunlight to reach the forest floor and encouraging lush growth.

Fire suppression has excluded fire in some forests, especially those composed primarily of ponderosa pine, leading to overly dense vegetation. However, in most forests such as those along the coast and higher elevation areas of the Sierra Nevada, fire suppression has had minimal impact because natural fire return intervals are so long. In Southern California, fire suppression has been essential in protecting chaparral ecosystems from too many fires.

**Chaparral**

After claiming without references that a "*patchy forest mosaic*" dominated California's lands before European settlement, the booklet turns to chaparral.

*While the same strategy can also restore brushlands, re-introducing low-intensity fire can help sustain reasonable fuel loads in brushlands. The goal in brushlands is to establish a mosaic in which half of the vegetation is less than 20 years old.*

Chaparral is characterized by a high-intensity, crown-fire regime. Burned moonscapes are a natural condition after a chaparral fire, as they are in some forests such as those dominated by lodgepole pine. The low-intensity surface-fire regime the booklet seems to insist is the only natural way fires burn reveals either the author's bias or a severe misunderstanding of fire ecology. Infrequent, hot, intense fires are exactly what chaparral needs to maintain its ecological health. Details and references on this and why the scientific community has rejected the mosaic hypothesis can be found in the adjoining article in this issue, "Blaming Firefighters for Fires" on page 5.


**Lodgepole pine forests of Yellowstone.** Despite dire warnings that the forests of Yellowstone had been "destroyed" by the 1988 fire, they are recovering beautifully…all by themselves.

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## Fear of Fire from pg. 13

**Furniture is the answer to senior-citizens**

In early 2008, the Forest Foundation released another publication that promoted a new angle in their efforts to increase logging: older forests need to be logged in order to reduce global warming. US Forest Service scientists evaluated the paper describing this model (Conard et al. 2008) and found it "greatly inflates the net effect of wildfires", makes "questionable assumptions", and cited references that "do not meet the standard that would be expected from a typical peer-reviewed paper."

The fire booklet we are reviewing here repeats many of the same patterns. The basic message it offers is that old-growth forests must be logged because *"well managed forests"* absorb and store vast quantities of greenhouse gases. And the wood products produced from such "management" helps to store carbon long-term. After all, *"Furniture from the Elizabethan era still holds the carbon fixed hundreds of years ago."*

While it is generally agreed that the health of some forests can be improved and fire risk reduced by thinning out small trees and shrubs and removing dead trees, the booklet makes clear this is not enough.

*"…trees of all ages must be harvested…While densely packed smaller trees may present the greatest fire danger, for instance, removing only young trees would ultimately result in a senior-citizen forest that would present its own challenges. You don't want just old, decaying trees on the landscape; they are not productive, diverse, nor sustainable."*

This is the same justification loggers used to destroy most of the remarkable old-growth forests in the Olympic National Forest and National Park. This perspective was even displayed in a USFS educational exhibit at the Forks Ranger Station in the park as recently as 2000:

*"A mature stand of timber is largely stagnant. Some liken it to a desert. Decay and death of individual trees diminish what's there. Nothing much happens until management begins."*

Below is a photo of what the so-called forests of "*decay and death*" used to look like in the Olympic Peninsula. This is far different from the cherry picked, historical photos showing the "open" forests that were supposed to "dominate" the landscape before Europeans arrived. This photo was taken from Carsten Lien's book, *Olympic Battleground*, an excellent piece of journalism that documents the 100 year struggle to protect Washington State's ancient forests.

**A wall of wood** up to 300 feet high confronted those who entered the Olympic Peninsula's west side forests. None was saved. Only the inferior fringe forest in the Olympic National Park suggest what it was like. Photo circa 1890. Bert Kellogg Collection.

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## Fear of Fire from pg. 14

**Restoration**

In an attempt to convince readers that nature can not do it alone, the booklet demands, *"Forests that are destroyed by wildfire must be restored."* It continues by claiming, *"Without reforestation, forestland conversion to brush fields may be permanent or delayed by a century or more."* The restoration process includes logging the burned trees, replanting species that provide quality lumber and *"…returning a few years after planting to remove competing brush so trees grow quickly and are protected against future wildfires."*

Lost in this entire diatribe against anything that can't produce 2x4's is the fact that all those shrubs (brush, brushfields, brushlands, etc.) provide critical habitat for numerous species and are extremely important for post-fire ecosystem restoration. One of the key nitrogen fixing post-fire species is Ceanothus. By removing such plants, the health of the recovering plant community is compromised. However, contrary to the impression it would like to make, ecosystem restoration is NOT what the booklet is proposing. The emphasis is on creating economically viable tree plantations. See Donato 2006 for details on how salvage logging can harm forest recovery.

How do these "restoration" efforts proceed? After removing the trees killed by the fire, herbicides are typically applied to eliminate any germinating "brush" seedlings. Then cyanide is used to kill the gophers. After dead trees were logged within the perimeter of a large 1987 fire in the Stanislaus National Forest, areas with less than 30 degree slopes were Roto-tilled (more than 10,300 acres), then herbicides and cyanide was applied to eliminate any pesky competition.

Restoration forestry is NOT about ecological restoration. It's about economics and lumber production. Consequently, since it is not commercially viable to thin skinny trees out of forests in order reduce fire risk, the logging industry has created a rather sophisticated propaganda effort to convince the public the entire forest needs to be managed to save it from itself.

We obviously need lumber, but we also need honest, science-based land management strategies that will allow us to obtain that lumber while protecting natural resources.

*Some* forests are overgrown due to past fire suppression efforts. However, by ignoring contrary data, misapplying forest management techniques to other ecosystems, and using Orwellian ecology to disguise the legitimate need to make a profit, the Forest Foundation makes the difficult task of protecting lives and property from fire even more so.

**Herbicide "restoration."** After the 2002 Star Fire, the El Dorado National Forest sprayed herbicides, preventing nitrogen-fixing ceanothus shrubs from growing (left). Due to litigation, the portion of the fire that burned on the Tahoe National Forest was allowed to recover naturally, creating a biodiverse ecosystem in contrast to the degraded landscape on the El Dorado National Forest.
Photo: J.E. Keeley.

## Blaming Firefighters from pg. 6

In this third and final installment of our **The Myth of Fire Suppression** series we examine the whole "unnatural fuel" perspective as it applies to Southern California.

### Resolving the Controversy
### Why Large Wildfires in Southern California?

When research accumulates and calls into question an older established idea, the ensuing debate is often portrayed in the popular media as simply a difference of opinion between competing perspectives of equal merit, regardless of the quality and depth of evidence. The current controversy over why there are large shrubland wildfires in Southern California is one such example. The older perspective that such wildfires are unnatural is being challenged by more recent research showing large, infrequent crown fires have always been part of the chaparral dominated landscape.

The older paradigm can be referred to as the Southern California/Baja fire mosaic hypothesis.

*According to this hypothesis, past fire suppression efforts in Southern California shrubland ecosystems have caused an unnatural build-up of vegetation, leading to unnaturally large fires. The hypothesis suggests that wildfires in Baja California are small because unsuppressed fires have created a mixed-aged mosaic of vegetation which naturally constrains fire spread. Commonly proposed options to eliminate the hypothesized "fuel" build-up in Southern California include allowing fires to run, conducting prescribed burns, and using mechanical mastication.*

Support in the scientific community for the hypothesis since it was published in 1983 has been generally restricted to the original author and his students. In contrast, a significant number of scientists from both government agencies as well as academia have raised serious questions about the hypothesis. More than 40 of their papers are listed in the attached bibliography. These scientists have reached this opinion through their own independent investigations and **offer substantial scientific evidence that the fire mosaic hypothesis should be rejected.**

The rejection is not a matter of opinion, but rather based on an objective analysis of data.

A thorough analysis of this hypothesis is important because it has **two very profound implications** for Southern California urban and wildland systems:

1. **Negative impacts on fire safety and finance.** Supporters of the hypothesis emphasize spending substantial funds on landscape-scale vegetation management. By spending scarce funds to artificially create mixed-aged mosaics across the landscape, dollars will not be available to support efforts that are known to reduce fire risk. Such efforts include creating defensible space zones around homes and communities, strategic fuel treatments near communities, public fire education, design and maintenance actions to reduce structural ignitions, community planning, and funding local fire departments.

2. **Ecological damage.** Adding more fire to backcountry and protected wildlands in an effort to

create mosaics will increase the threat of type-conversion, converting many of California's native shrubland ecosystems to flammable, non-native, weedy grasslands.

While an honest cost/benefit analysis will not favor creating mixed-aged mosaics across the natural landscape, *strategically placed* fuel treatments near communities have been shown to be an effective way to reduce fire risk. The location of such fuel treatments can be selected by fire professionals to maximize their effectiveness and minimize their costs, both financially and ecologically.

We have provided the following analysis of the hypothesis and an extensive bibliography of the relevant papers so that others may examine the evidence and draw their own conclusions.

## The Hypothesis

| **Assumptions of the Baja/Southern California fire mosaic hypothesis** | **Alternative explanations from other research** |
|---|---|
| Large fires are unnatural and are the result of past fire management activities. | Infrequent, large fires are a natural part of the landscape. Fires are now unnaturally frequent due to human-caused ignitions. |
| Fire suppression has been successful in excluding fires on Southern California landscapes and this has led to an unnatural accumulation of older shrubland vegetation. | Fire suppression has been successful at protecting urban environments, but has not excluded fire on the broader landscape. There is no evidence that the extent of older shrublands is above the historical range of variability. |
| Large fires can be prevented by creating mixed-aged vegetation mosaics across the landscape. | Large fires are wind-driven and are capable of burning through, over, or around mosaics of mixed-aged vegetation. |
| Baja can provide a model for how fire should be dealt with in Southern California. | Baja is not comparable to Southern California due to differences in weather, vegetation, and land use practices. |
| Fire spread is a function of fuel age. Chaparral stands less than 20-years-old will not burn. | Fires spread is determined by numerous variables (e.g. fuel type, fuel moisture, weather, and topography). Young stands burn. |
| Too frequent fires leading to type-conversion of native chaparral to non-native grasslands is not acknowledged as significant. | Significant type-conversion of all native shrubland ecosystems is occurring due to overly frequent fires. |

## Rejecting the Fire Mosaic Hypothesis

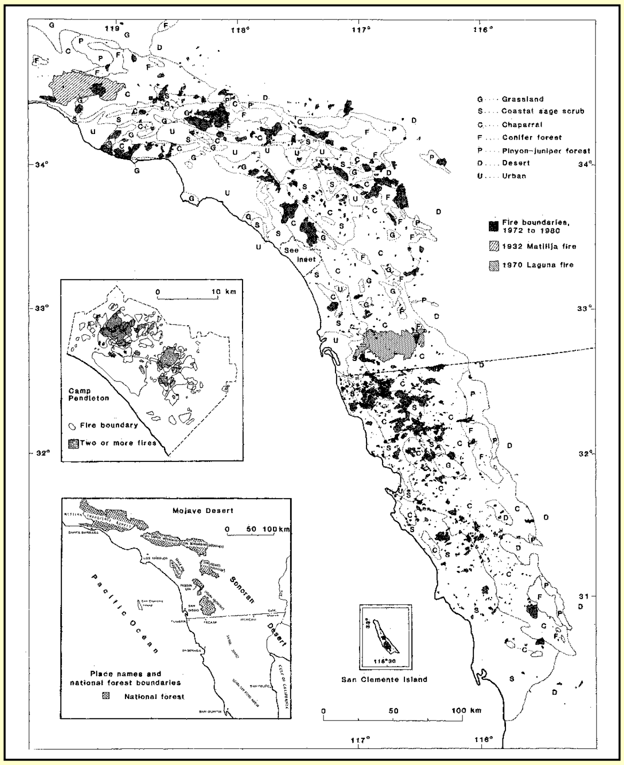
The validity of a hypothesis rests on the ability of scientists to confirm that the methodology used, the data collected, and the predictions made in the original investigation were appropriate and unbiased.

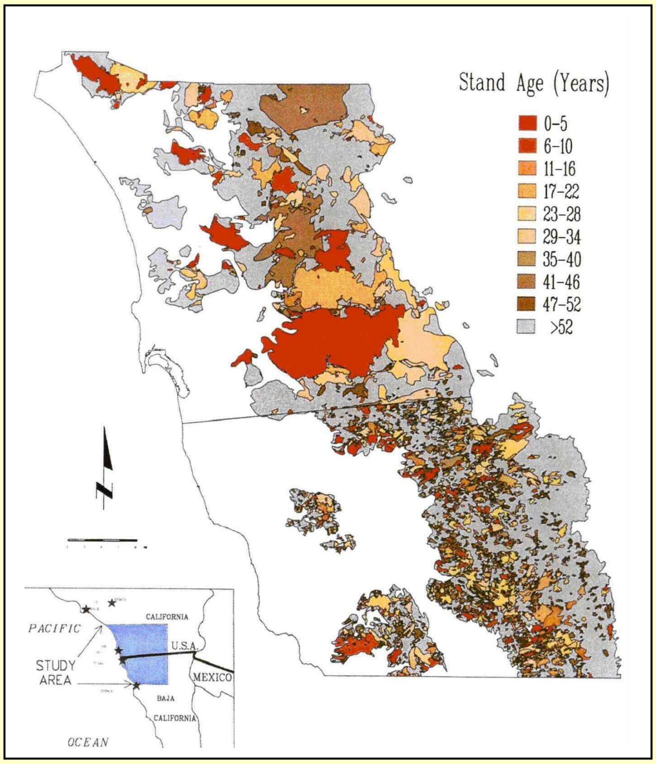
The research demonstrates that the data, assumptions, and predictions behind the Baja/Southern California fire mosaic hypothesis are flawed. It also shows that past fire suppression (fuel age), the sole variable in the hypothesis, can not account for why there are large wildfires in Southern California and small ones in Baja.

**I. Flawed Data**

The map in the original research paper (Minnich 1983) biases the comparison between Baja and Southern California by including two very large fires north of the border that occurred outside the study period (1932 Matilija and the 1970 Laguna fires).

In a follow-up paper (Minnich 1989), fire perimeter data south of the border were compiled in a completely different manner than north of the border. For Baja, three sets of aerial photographs separated by 16-18 years were used to estimate fire perimeters. There was no validation that fire perimeters could be accurately determined in this manner. North of the border, official state and federal records were used. This data set did not include smaller fires (below 40 acres). Between 1970 and 1979, a time period included in one of the aerial photo sets, 95% of the fires in San Diego County were less than 40 acres.




**The Maps.** Dark splotches in the left map (1983) represent fire scars as determined by analyzing satellite images. By inserting fires outside the study period (two grey splotches) the reader is left with the biased impression that fires north of the Southern California/Baja border are much larger than they actually were during the period in question. For the map on the right (1989), estimated fire perimeters in Baja were derived by subjectively analyzing aerial photos. Perimeters north of the border were determined by government investigators after the fire event. The different methodologies used raise serious questions about the validity of the maps.

**II. Flawed Assumptions**

Several assumptions supporting the hypothesis have been proven to be incorrect. The citations listed below reference the scientific studies which falsify these assumptions.

**A. Large fires are new to Southern California.** Scientific research and historical documents have shown this to be false (Mensing et. al 1999, Keeley and Zedler in press).

**B**. **Fire suppression has been effective in excluding fire from Southern California shrubland ecosystems over the last century.** Scientific research has clearly shown that fire suppression in these ecosystems has not been successful in excluding fire (Keeley et. al 1999).

**C. Baja and Southern California are comparable.** This is false as there are a significant number of differences between the two regions. For example:

- There are <u>significant land management differences</u> north and south of the border. Baja has been subjected to hundreds of years of ranching and farming which has resulted in a significant alteration of the natural landscape (Henderson 1964, Dodge 1975).

- <u>Weather patterns are different</u> north and south of the border. The proportion of the area studied in Baja subject to strong Santa Ana winds is small when compared to Southern California. Such wind events gradually diminish south of the border. Precipitation is dramatically greater in Southern California when compared to Baja California (Henderson 1964, Mitchell 1969, Markham 1972).

- As a result of different weather, topography, and soil conditions, <u>plant communities are distinctly different</u> in many areas of Baja when compared to Southern California (Keeley and Fotheringham 2001a).

**III. Flawed Predictions**

Mixed-aged vegetation mosaics alone have proven to be inadequate barriers to fire spread, especially during wind-driven events. Age of vegetation is not the only variable determining fire size as suggested by the hypothesis. Other variables are important in determining fire spread such as topography, fuel moistures, local weather conditions, and fire suppression efforts (Zedler and Seiger 2000, Moritz et. al 2004, Halsey 2006). Large fires occur in Baja California. More than 37,000 acres burned in Baja during the 2007 firestorm (Hernandez 2007).

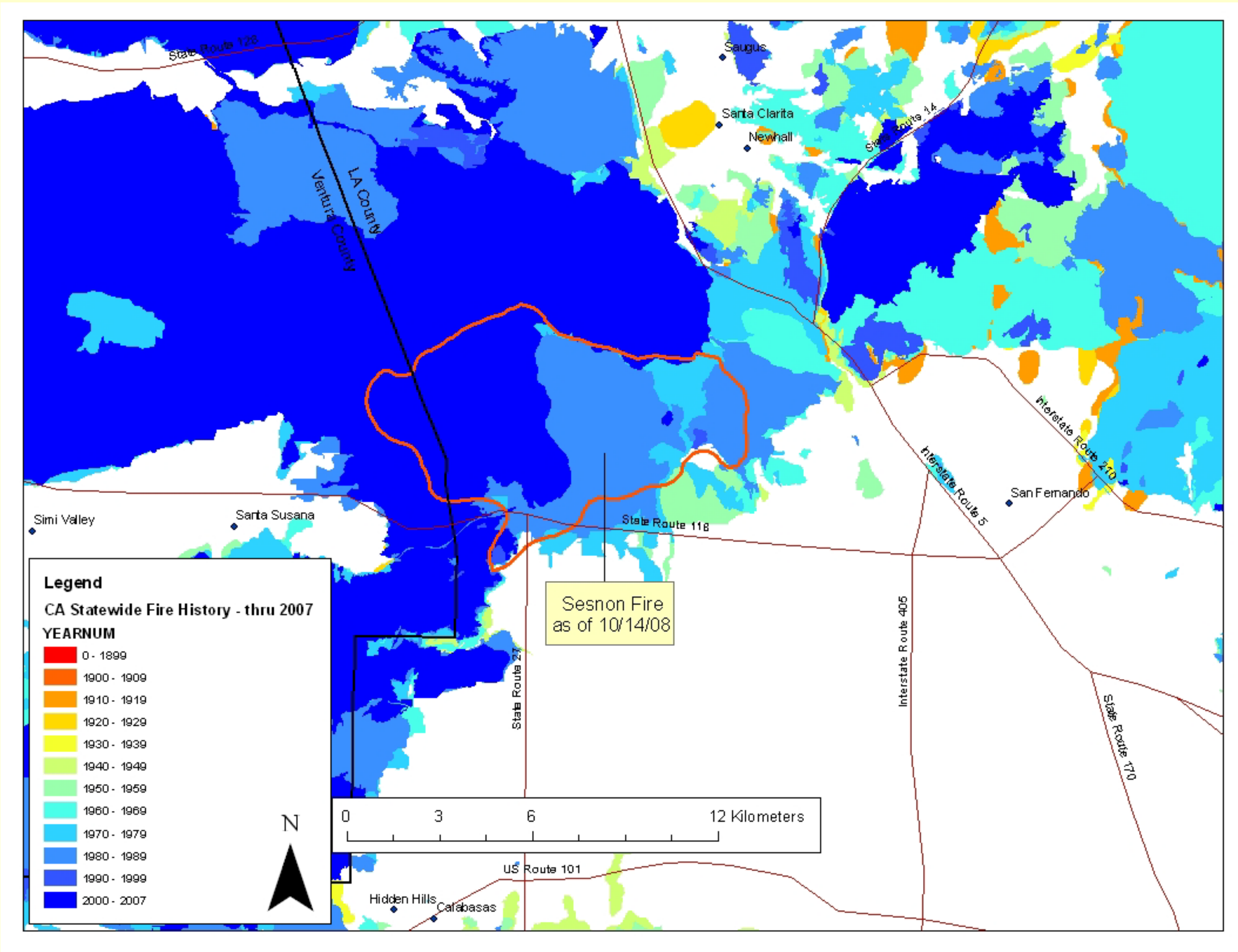
The nearly exclusive focus on fuel age as the sole variable to fire spread often leads to the assumption that all large wildfires are due to the "unnatural" build-up of vegetation. This was demonstrated in an article about the October 2008 fires in the San Fernando Valley in UCLA's newspaper, The Daily Bruin (10/21/08):

> *"The cause of the fires is still unknown, though what caused it is irrelevant, said Richard A. Minnich, a professor of geography at UC Riverside…Fire suppression, Minnich said, has*

*increased the severity of the wildfires. He said that since small fires which break out during the summer are typically extinguished, the vegetation which would normally be burned by the fires is still in abundance during the fall season. As a result, fires in the fall have much more fuel to burn, and are increased due to the strong Santa Ana winds. "Because we're putting fires out …we're making the role of the Santa Ana winds (larger)," Minnich said.'*

Two fires burned during the San Fernando Valley event in October: the 4,824 acre Marek fire and the 14,703 acre Sesnon fire. As shown in the map below, the larger Sesnon fire burned within an area that had seen multiple fires over the past 27 years. The left one third of the fire scar (dark blue) burned in the 2003 Simi fire. The right portion had last burned in 1988. The central portion had burned in 1981. Fire suppression has not been effective in excluding fire from these areas.

The cause of these fires is relevant because they are all human-caused. Natural, summertime lightning-caused fires are extremely rare. Such an artificial increase in fire frequency threatens native shrublands with type-conversion to highly flammable, non-native grasslands (see pg. 24 for references).




**2008 Sesnon fire (central outlined red perimeter) with fire history of the general area.** Map by Anne Pfaff and Jon E. Keeley, USGS Western Ecological Research Center.

# The Research

(Internet links are provided for most papers)

The following papers provide the basics of the Baja/Southern California fire mosaic hypothesis (Minnich 2001) and a point by point explanation why it is flawed (Keeley and Fotheringham 2001a,b):

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Minnich, R. A. 2001. An integrated model of two fire regimes. Conservation Biology 15:1549-1553.

Keeley, J. E., and C. J. Fotheringham. 2001b. History and management of crown fire ecosystems: a summary and response. Conservation Biology 15: 1561-1567.

## The Original Paper:

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## Major papers supporting the mosaic hypothesis (by date):

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Minnich, R. A., and R. J. Dezzani. 1991. Suppression, fire behavior, and fire magnitudes in Californian chaparral at the urban/wildland interface. Pages 67-83 in J. J. DeVries, editor. California watersheds at the urban interface, proceedings of the third biennial watershed conference. University of California, Davis, CA.

Minnich, R.A., and C.J. Bahre. 1995. Wildland fire and chaparral succession along the California-Baja California boundary. International Journal of Wildland Fire*, 5*:13-24.

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Minnich, R. A., and E. Franco-Vizcaino. 1999. Prescribed mosaic burning in California chaparral. Pages 247-254 In A. Gonzalez-Caban, editor. Proceedings of the symposium on fire economics, planning, and policy: bottom lines. Pacific Southwest Research Station, Albany, CA.

Goforth, B. S., and R. A. Minnich. 2007. Evidence, exaggeration, and error in historical accounts of chaparral wildfires in California. Ecological Applications 17:779-790.

## Key research that leads to the rejection of the mosaic hypothesis by testing its data set, assumptions, and/or predictions:

Keeley, J.E and P.H. Zedler. In press. Large, high intensity fire events in southern California shrublands: debunking the fine-grain age patch model. Ecological Applications.

Keeley, J. E., C. J. Fotheringham, and M. Morais. 1999. Reexamining fire suppression impacts on brushland fire regimes. Science 284:1829-1832.

Mensing, S. A., J. Michaelsen, and R. Byrne. 1999. A 560-year record of Santa Ana fires reconstructed from charcoal deposited in the Santa Barbara Basin, California. Quaternary Research 51:295-305.

Moritz, M.A., J.E. Keeley, E.A. Johnson, and A.A. Schaffner. 2004. Testing a basic assumption of shrubland fire management: How important is fuel age? Frontiers in Ecology and the Environment 2:67-72.

Zedler, P.H., Seiger, L.A. 2000. Age mosaics and fire size in chaparral: A simulation study. In 2nd Interface Between Ecology and Land Development in California. USGS Open-File Report 00-02, pp. 9-18.

## Other important research with findings inconsistent with the mosaic hypothesis:

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Dunn, A.T., and D. Piirto. 1987. The Wheeler Fire in retrospect: factors affecting fire spread and perimeter formation. Report on file at: U.S. Department of Agriculture, Forest Service, Forest Fire Laboratory, Riverside, CA.

Dunn, A.T. 1989. The effects of prescribed burning on fire hazard in the chaparral: toward a new conceptual synthesis. Pages 23-24 *in* N.H. Berg (technical coordinator). Proceedings of the symposium on fire and watershed management. General Technical Report PSW-109, U.S. Department of Agriculture, Forest Service, Pacific Southwest Forest and Range Experiment Station, Berkeley, CA.

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Moritz, M. A. 2003. Spatiotemporal analysis of controls on shrubland fire regimes: age dependency and fire hazard. Ecology 84:351-361.

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Zedler, P.H. 1995. Fire frequency in southern California shrublands: biological effects and management options. Brushfires in California Wildlands: Ecology and Resource Management. Ed. J.E. Keeley and T. Scott. International Association of Wildland Fire, Fairfield, WA.

**Research discussing the negative ecological impacts of short fire return intervals in chaparral:**

Brooks, M.L., C.M. D'Antonio, D.M. Richardson, J.M. DiTomaso, J.B. Grace, R.J. Hobbs, J.E. Keeley, M. Pellant, D. Pyke. 2004. Effects of invasive alien plants on fire regimes. Bioscience 54:677-688.

Diaz-Delgado, R., F. Lloret, X. Pons, and J. Terradas. Satellite evidence of decreasing resilience in Mediterranean plant communities after recurrent wildfires. 2002. Ecology 83: 2293-2303.

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**And finally, two papers discussing the importance of examining all variables, not just ones that agree with a favored hypothesis:**

Chamberlin, T.C. 1890. The method of multiple working hypotheses. Science: Feb. 7. Also reprinted in 1965. Science 148: 754 –759.

Feynman, R.P. 1974. Cargo cult science. Engineering and Science, June.

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**References for Article: Exploiting the Fear of Fire for Economic Gain**

Conard, S., T. Trapani, G. Reams, R. Birdsey, R.Ottmar, M. Nechodom, S. Urbanski. 2008. Comments on Recent Estimates of Greenhouse Gas Emissions from California Wildfires by Dr. Tom Bonnicksen. Fire Ecology Research, US Forest Service, Washington Office.

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## Condor cont' from pg. 3

is to look at their under-wings. You will see a white, triangular pattern that is very distinctive. Vultures may look similar in flight to the novice, but will not have these distinctive white feathers.

Condors can live up to 60-80 years in the wild without man's negative influences. Unfortunately they succumb to micro-trash, lead bullets that are left behind in carrion and entrails, poisons such as DDT, loss of habitat, illegal egg collection, high transmission wires, eating poisoned carrion, and being shot by hunters. Education of the public is an important part to every condor recovery program.

Condors are monogamous and mate for life. They are sexually mature at approximately 5 years old. Juveniles under 3 will have grey/black beaks, which turn ivory after age 3. Upon sexual maturity, their heads will turn pinkish/orange. Condors do not build nests, but prefer to build nests in caves, on rock ledges or in cavities in trees. Both male and female birds care for the chick. The chick will fledge at approximately 6 months, but may stay near the nesting site for up to a year.

Condors are among the most endangered birds in the world and were placed on the endangered list in 1967. The U.S. Fish and Wildlife Service started the captive breeding program in conjunction with the Los Angeles Zoo and the San Diego Wild Animal Park. We should all be eternally grateful for their efforts. The hope for the condor's recovery lies in their capable hands. The lives of the wild condors are everyone's responsibility, but especially for those who share areas in which they live. Broken beer bottles are the biggest problem. Countless environmentalists pick up this micro-trash, but it is almost impossible to keep up with the volume. It only takes one shard of glass, or one bottle cap to kill a condor.

Chicks hatched in the breeding programs are fed by condor puppets to help prevent human imprinting. They are trained to avoid landing on high tension wires. And they are given proffered food to avoid lead poisoning from eating carrion tainted with lead bullets. In July 2008, a law was passed outlawing the use of lead bullets in condor foraging areas. This is great news for the condor population.

In my many hours of observing the condors, I find that they are extremely social birds. They spend a great deal of time together. They soar together, roost together, and play together. They are also very curious birds. Several of them visit me whenever I am in their territory. One of them soars over my head for hours while I am on the mountain and follows me when I leave. One condor has even landed near me, coming within a few feet, and "talking" to me. While they don't have vocal cords, they do make hissing, growling, and honking sounds.

Habitat is extremely important to the condors. They prefer mountainous areas, hillsides, gorges, and cliffs that provide updrafts and good soaring conditions. California chaparral provides the condor with ample scavenging opportunities.  Unfortunately, chaparral is one of the fastest disappearing habitats on earth. It is important that we realize that chaparral is important to our ecosystems and should be protected as much as the pine forests and pristine mountains. We need to be wiser in our development, keeping animal corridors and animal habitat requirements in mind before it is too late for all the earth's creatures, including the condor.

**Condor** taking a rest from soaring over the Los Padres National Forest. Photo: Lane Frank