

# Wildfire and Fire-adapted Ecology: How People Created the Current Fire Disasters

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## Abstract

Increasing numbers of wild fires have been noted in the past decades as well as increasing intensity and acreage burned. The invasion of wild lands and rural areas by new housing, the recreational industry, hikers, bikers and the destruction of wild life by increased hunting, thinning to reduce competition with commercial agriculture and effects of logging and new logging techniques have driven this increase. The last 400 years of exploitation of the land has created a fire-adapted ecology. Suggestions for reducing the dangerous and expensive consequences are given.

**Keywords:** Wildfire; Ecology; Fire disasters; Fire science

## Introduction

The Waldo Canyon fire in the foothills of Colorado Springs, Colorado in 2012 is a prime example of the nature of wildfire today [1]. Viewing the now iconic image of the fire destroying homes and cars across the suburban development gives a perfect picture of the problem. Most people think of wildfire taking place in forests or in rural areas where it is a natural environment that burns. The problem here is that there is no natural environment any more, humans are everywhere and all land is used for some human agency. The result of this human activity is a disturbed ecology and central to this is a fire adapted regime (Figure 1).

## Methods

The methods used in this report included walking the Mount Vision fire area in Marin County, California as well as the recent Valley Fire surrounding Middletown, analyzing reports of fire agencies of the fire response, interviews with fire fighters and home owners. Some soil samples were taken to verify reports in the case of the Vision fire. Comparing data on fire frequency and intensity from various agencies was utilized as a means of understanding historic trends in fire burns in areas and buildup of fire fuel in biomass.

## The Problem

In the mid-1960's, I began a program of research into forest



Figure 1: Waldo Canyon Fire June 26, 2012.

management after having visited a number of lumber camps and lumber mills in the Humboldt County area of California. The camps were squalid affairs where living conditions for workers and their families seemed to be a holdover from the 1930's. The mills were just as disturbing, not just the constant noise, but the ever present danger of serious injury and death. About this time the lumber mill in the Ferndale area had an explosion and spectacular fire. I viewed this fire with friends who had worked in the mill and it was not an unusual event. These are still common events due to a buildup of sawdust, equipment failure and poor safety procedures (Figure 2).

Today fires rage across the western United States taking human lives and destroying billions of dollars of property as well as the lives of untold thousands of animals. Yet this disaster is human created. My research since the 1960's has shown that since the arrival of humans in the Americas fire has been a tool to shape and tame the natural environment to human uses. With the arrival of Europeans this process accelerated dramatically. I made a number of core samples to find evidence of carbon from fires in the past and compared the results with published archaeological cores and some geological and botanical studies. It is clear that the evidence of ancient carbon supports the human created fire system we now live in. I published this work in 2002.

This seemed strange given as a student at Humboldt State College in the 1960's I was told by professors in "fire science" that forest fires were natural and had always been happening as long as there were forests. But studies of carbon in the geological record did not support this argument, and a major work in the study of ancient carbon by Edward DG [2] failed to support the assertion. What's more, it is illogical since the only way we could have huge seams of economically useful coal is if ancient forests did not burn and an analysis of coal samples from the oldest deposits bears this out.

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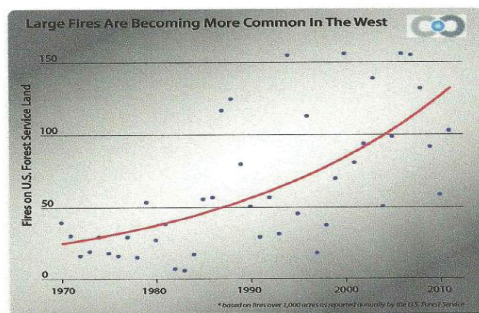
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## Causes of Forest and Wildland Fire

So if wildfire is not natural then why does it happen? It is true that there are lenses of carbon in the fossil and archaeological record that indicate short term, low intensity fire, but not the massive wild fires that we see today. If this is true, then how do we understand the difference? I found that data collected around the world for causes of wild fire show that almost 90% of all wild fire is human caused. This means both people purposely start most fires as well as they do so out of incompetence and stupidity. For the most part humans are fire bugs. We love to see fires. Obviously fire has utility; we cook things, clear land, and it is entertaining and to some people both compelling to watch and beautiful.

Data from a number of sources, including state park services and the federal government cited in my 2002 paper show that where there is human activity we have the greatest concentration of fire and fire frequency as well as intensity (Figure 3). It is true that about 10% of fires are set by lightning and some few by spontaneous combustion, but the grand total can be blamed on humans. However, we hear from the forest industry and most “fire science” researchers that the history of fighting fires has created the fire fuel that produces massive fires. I show in my paper that the history of clearing land by pioneers, of land management by cattlemen and federal and state recreational agencies has routinely fired the forests as well as grasslands to both increase fodder for livestock and to produce more sport hunting and recreational areas. Lumber companies have also regularly set fire to logged over areas to clear debris and these areas are often where new fires appear. The fire regime is human caused and forest fighting efforts over the last 100 years did little to create the situation, usually they were aimed at only protecting property. Nevertheless, we have had a



The annual number of wildfires greater than 1,000 acres on U.S. Forest Service Land has been increasing across the West.

Figure 3: Distribution of Wildland fires over time on US Forest Service Land as intensity.

“let it burn” and proscribed burn policy in our wild lands and forests for nearly 20 years and yet the wild fires are getting more numerous and more intense [3]. I document this problem in a more recent article [4].

Are wild fires now due to global warming? Well we have had global warming episodes in the past before humans existed, both during the early Cenozoic and before, yet no wild land fires. Some argue that climate change [3] alone can explain the increase in fires in the past 50 years, but this seems unlikely given the tremendous impact humans have had on the land.

## Solutions to the Problem

How can we stop wild fires? Obviously this is a complex problem, we have a number of industries that have a more than 300 year history of setting fires as part of their routine. This includes farming and the stock industry. Farmers and livestock operations can do without the use of fire. This has been shown in California where typical end of the harvest burning of rice fields had largely ended as new products were identified in the waste plant stocks, including pet litter and this has extended to wheat debris. But in many parts of the country this practice continues and has both detrimental health effects to people as well as contributing to general air pollution (for example: <http://www.kait8.com/story/13281483/why-farmers-are-burning-fields>). Laws to outlaw this practice need to be put in place on a state-by-state basis.

Fires on rangeland must stop as well. The use of fire prevents the growth of trees and shrubs and promotes new growth of plants useful for grazing animals. However, it simply creates a fire-adapted ecology promoting a landscape that is formed by fire. However, much of the rangeland that is fired is public lands that are leased by farmers for very little public benefit. The degradation of the land is only a process of erosion and loss of habitat that should be stopped. Dr. Fleischer TL [5] has documented the political and economic problems of the current situation with unsupervised overgrazing of public lands and the lack of responsibility of the livestock owners to compensate the public for damage (see: [http://www.publiclandsranching.org/htmlres/wr\\_history\\_politics.htm](http://www.publiclandsranching.org/htmlres/wr_history_politics.htm)) (Figure 4).

Logging related fires to clear debris and to reduce certain types of plants noxious to forest growth should be ended as well as pesticides in forests that destroy insects and small vertebrates that feed on undergrowth. But logging in general creates conditions for intense and widespread fires as it promotes “fields” of tree “crops” all planted at the same time so that they grow as a canopy creating crown fires that rage for miles. Logging adapts forests for fire and post-logging fire catastrophes

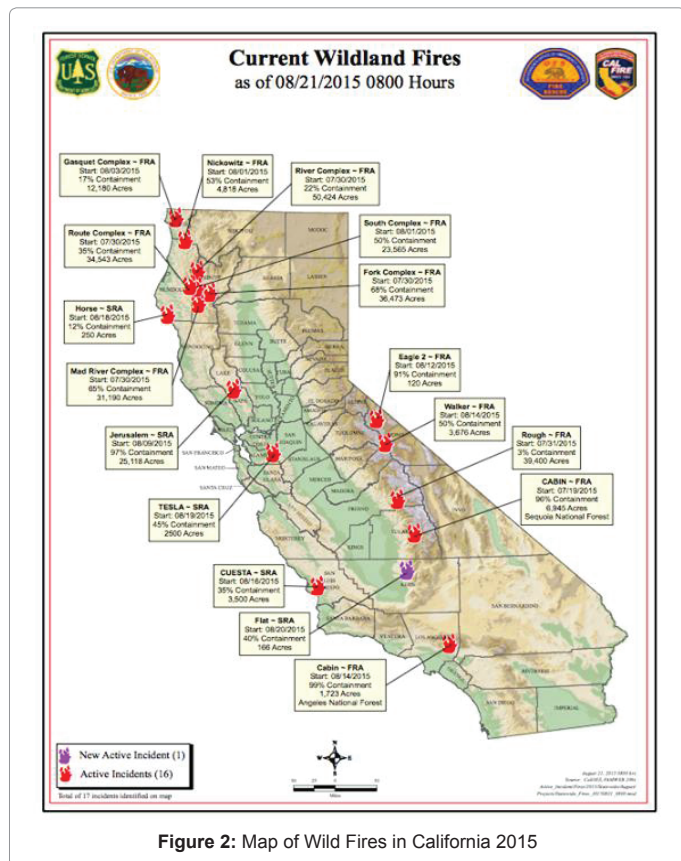


Figure 2: Map of Wild Fires in California 2015





A stock pond is just one of many alterations ranchers make to the landscape to better accommodate their cattle, to the detriment of native wildlife

**Figure 4:** Distribution of Wildland fires over time on US Forest Service Land as intensity.

were common in the late 19<sup>th</sup> and early 20<sup>th</sup> centuries (see for example: <http://www.algermichigan.com/docs/history/MAJOR%20POST-LOGGING%20FIRES%20IN%20MICHIGAN%20in%20the%201900%27s.pdf>). Logging is largely a welfare industry which relies on subsidies (e.g. public payments for logging roads) for its survival and tax benefits. Some of this has been the result of financial investors as in hedge funds buying up logging lands from defunct companies as in the case of Maxxam. This is described in detail by Richard W [6] in his 2009 book.

Hunting has a negative effect on reduction of fire burden. As hunters kill browsers the biomass increases year by year. It is no surprise to people that the prairies supported some 30,000,000 to 50,000,000 bison in pre-Columbian times [7] but that moose, elk and deer existed in huge herds across America. In forested areas there was the wood bison, but the central point here is that the reduction of herds leaves masses of plant life that can become fuel for fire. Eliminating or reducing hunting in parks, and open areas of the plains, prairies and our forests will go far to restoring a balance in growth of plant life and low fire fuel.

Building in rural areas new housing is a major problem. Cutting new roads in wild areas for new developments divides native species of animals from their ranges and causes toxic runoff and heat “stripes” across vast areas. Developments set housing into wild adapted ecologies where overextended fire services then are forced to protect homes. Amenities like gardens and trees, usually non-native are introduced. What is usually unknown to most people is that many grasses and brush (like Scotch Broom or French Broom) in our grasslands are non-native and yet are fire-adapted due to their origin in Eurasian contexts due to the long history of slash and burn agriculture. Also, many of these imports are not eaten by American wildlife adding therefore to the fire fuel. However, our grasslands (including chaparral) are so fire adapted that burning an area does not reduce frequency of burn, but we see frequent “reburied” areas instead [8].

Yet, just the presence of more people who routinely use a grassland

area will result in more human set fire, either intentional or accidental, thousands of structures in the USA are lost every year due to the increasing movement of housing into wild lands and forests [9]. This should be stopped or severely limited as the costs of protecting these homes and related commercial developments are unsustainable (Figure 5).

Probably the biggest problem concerning reducing wild fire and its costs involves recreational use of public lands. Since we know that people are associated with the greatest number of fires, the presence of people is a factor that cannot be ignored. Yet people want to use the “wild” as a place to enjoy themselves, but they do not want real “wild” animals occupying these areas like wolves, bears, mountain lions or coyotes as someone might get hurt. The fact that our rural areas can hardly be called “wild” today is irrelevant to most. The fantasy of being in the “great outdoors” is a powerful incentive and the recreation industry uses that power to greatest advantage.

Everyone from the Sierra Club to CSAA are boosters for getting out in nature, yet the idea of hordes of people stamping over the last wild space and crushing its natural inhabitants in good healthy exercise is lost to them. The general idea in environmental groups like the Sierra Club is that if people go into nature they will want to protect it. The fact that the more people who do that and the more facilities we build to allow access and overnight accommodations, etc. the less nature there is seems again, just a complication. Mathieson & Wall [10] discuss the nature of “trampled” tourist sites and the varieties of vegetation that suffer the most. Belsky, et al. [11] present a more recent picture of the mass effects of both recreation and tourism on natural areas.

Perhaps the development of indoor recreation is the answer, and support of this trend could be a means of taking pressure off rural and “wild” or once natural areas. Already there are very significant investments being made in experiences like indoor skiing. Another growing recreational opportunity that many young people seem to be attracted to is the virtual experience. Whatever replacement we can create to divert human impact on the open spaces in the future, either to prevent the further destruction of the environment or to limit or outlaw more built space, will have a positive effect in reducing wild fire. The caveat to this rosy picture is that humans have adapted to making and experiencing fire and fire that consumes organic materials on a significant scale [12]. How to repress this trait will be a considerable undertaking. Some mass experience like Burning Man might be devised, only perhaps not as destructive or have as significant effect on the environment as Burning Man, though it might be produced indoors and have a similar effect, given that the first Burning Man took place in San Francisco in a park (Figure 6). Of course it could also reproduce in virtual conditions and the human need for fire might also be satisfied in virtual spaces as well.

## Conclusion

From this review of the fire history of the past decade it seems clear that current policy is inadequate to deal with increasing fires, fire intensity, costs of fighting fires and loss of property. The central problem in the past decade is the expansion of homes, roads and recreation into wild areas without planning or cost analysis of how to pay for fires or avoid them. Hunting and grazing should be limited and money should be allocated to educate people to reduce fire potential and loss of life and property (Figure 7).

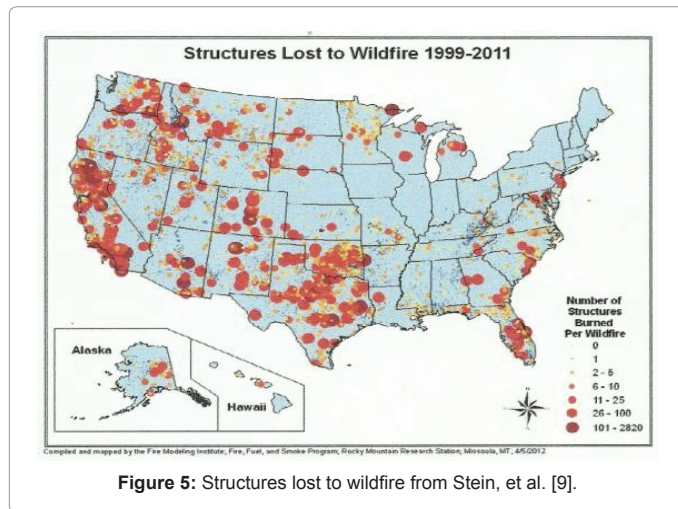


Figure 5: Structures lost to wildfire from Stein, et al. [9].



Figure 6: Indoor skiing TheSnowCenter.com London.



Figure 7: Burning man event Nevada Desert.

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