Papaver Californicum

The Chaparral Is Not Our Enemy

It’s Just Very Misunderstood, Leading to Disastrous Fires

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By Robert Muller

Three significant fires in 16 months. If anything, the Gap, the Zaca, and the Tea Fires have retaught us a lesson already learned: Wildfire is a reality for Santa Barbara. The serious injuries and loss of homes in the Tea Fire have made us all more sensitive to fire’s devastating impacts, but in order to have a true understanding of the threat, we need a better understanding of the ecosystem in which we live.

Chaparral Is a Unique Ecosystem: Much of Southern California is home to a unique environment characterized by cool wet winters and warm dry summers. This Mediterranean climate occurs in only five regions in the world and in all cases supports brushy vegetation such as the chaparral found in much of Santa Barbara County. The

species are unique. Of the 1,500 native plant species in Santa Barbara County, over half exist only in California; as many as 150 are found only in the Santa Barbara region. Santa Barbara's chaparral is also home to many endangered species. At least 50 of the 109 endangered plant species in Santa Barbara County occur in chaparral, including some found only in the foothills above Santa Barbara.

The plants of the chaparral provide important ecosystem services that allow us to live where we do. Most notably, they ease storm water runoff, reducing erosion and keeping our streams clean. Our mountains are also a source of beauty found nowhere else in the world. The textures and shades of green that clothe the slopes of the Santa Ynez Mountains are a constant reminder of the variety of life that they support. When chamise and the different species of ceanothus and manzanita that dominate our chaparral flower throughout the winter and spring, the mountains behind us burst into a subtle beauty that awes us every year.

Despite our close association and love for chaparral, it is often misunderstood and frequently mismanaged. In some minds, it has even become a menace that must be severely reduced for the safety of all. Several myths have been perpetuated about this vegetation that we know to be untrue, such as: It is a fire-cycle vegetation and is dependent upon fire for its survival; if it does not burn it will senesce and become a vestige of its former glory; the natural fire cycle is approximately every 25 years. The weight of scientific evidence strongly suggests otherwise.

As we have just witnessed, fire does indeed occur in chaparral. The long history of fire in Santa Barbara has been documented by measuring charcoal in the sediments of Santa Barbara Channel. Over a 560-year period, from 1425 to 1985, there were at least 20 large fires consuming more than 44,000 acres each. The average interval between fires was 20 to 30 years, with a range of five to 75 years.

However, there is no evidence that these fires burned the same areas over and over again. In fact, the evidence from the historical record of the last 100 years suggests that most of Santa Barbara's chaparral fires have not burned the same areas. Rather, most of the fires burned formerly unburned acreage.

Certainly, this is not always true, as evidenced by the recent Tea Fire, which burned in the same areas as the old Sycamore Canyon (1977) and Coyote (1964) fires. However, much of last year's Zaca Fire burned vegetation that was at least 100 years old and had no historical record of fire. The point is that while chaparral does burn, and burns with intensity, fire in chaparral is not a regular occurrence with a set periodicity.

We have also been told that old chaparral is "senescent" and "needs" to burn in order to retain its vigor. Fire releases nutrients that have built up in the undecomposed litter, and is necessary to rejuvenate a stagnant ecosystem. Again, the evidence does not support such conclusions. The 100-year-old stands of the Zaca Fire showed no sign of senescence. Indeed, stately old-growth manzanita occurred throughout those areas with no sign of decline. These stands supported a rich and diverse flora and fauna replete with

lichens that are not found in younger stands. Studies of old chaparral suggest that its productivity is every bit as vigorous as young stands that have recently burned. In fact, one study of 100-plus-year-old chaparral found that during non-drought years it represented a carbon sink as strong as some old-growth forests.

The chaparral adjacent to the scenic overlook on Highway 154 just west of Cold Springs Bridge has not burned in over 80 years and is strong and vigorous. Sensecent? Nothing could be further from the truth.

There also is a mistaken feeling that the intense fires of recent years are a product of fire suppression that has allowed the accumulation of large amounts of fuel. This has led to the misconception that homes can be protected by establishing a system of controlled burns to remove accumulated fuel. Yes, we can probably be comforted that the area of the Gap Fire will not burn again in the next couple of years; however, the protection from controlled burns or other means of fuel reduction is short-lived. A brief drive up Highway 154 into the area of the Painted Cave Fire shows dense vegetation that is easily capable of carrying a fire every bit as intense as the fire of 1990. In fact, the regrowth of vegetation in that area was so fast that a new fire could have been carried a mere five years later.

This is not without precedent. Significant portions of the intense 2007 fires in San Diego County occurred in areas that had burned only four years previously. What can we conclude from this? Chaparral carries strong fires regardless of frequency. Since fuel accumulates quickly, fires will burn equally hot whether the vegetation is five years old or 100 years old. The fuel is already there. Chaparral is not a “fire-dependent” ecosystem. It does burn, but it does not “depend” upon fire to be self-sustaining.

There is also evidence that too-frequent burning leads to massive conversion of landscapes from chaparral to a landscape infested with weeds, which are also known to burn with intensity. In San Diego County, the 2003 Cedar Fire burned areas of the 2001 Viejas Fire. Those areas have lost their ability to regenerate native species and now are dominated by invasive annual weeds. These pose an equally dangerous fire problem and a serious ecological problem for land managers. Using controlled burns to reduce fuel accumulation can lead to a pernicious cycle of frequent and continued burning, and may have consequences far beyond those intended.

Chaparral's Recovery Following Fire: In looking at the pictures or visiting the areas that have burned, it is natural to ask how anything could ever recover from such a devastating event. In many areas, it appears that nothing remains. Where homes once stood, outlines remain. In the chaparral, only a few blackened sticks may survive to remind us of what was once there. As a measure of the intensity of heat that was reached, sterling silver melts at 1,640oF.. Soda-lime glass becomes soft at 1,063oF and fully melts at 1,904oF. Sterling silver sets and glass windows in homes lost in the Tea Fire were reduced to little more than puddles.With fire intensities so great, how can anything survive?

Chaparral species exhibit numerous remarkable characteristics that enable them to survive such drastic impacts. Most of their ability to survive depends upon the fact that, while temperatures at the soil surface may reach well over 1000oF, soil temperatures four inches below the surface barely change. Many woody species and herbaceous perennials of the chaparral have large underground burls (technically known as lignotubers) that store water, nutrients, and energy. These burls contain dormant buds that will begin growing almost immediately following a fire.

Chamise resprouting where the Gap Fire burned just five months before.

Indeed, as you read this, young sprouts are forming at the base of many plants throughout the chaparral area of the Tea Fire and will be visible in just a few weeks. A short trip along West Camino Cielo where the Gap Fire burned only five months ago will show sprouts one to two feet tall. This kind of growth led to much of the rapid revegetation of the area burned in the Painted Cave Fire.

Other species are killed outright by fire, yet survive by other means. These species produce large amounts of seed that remain dormant in the soil for decades. These buried seed banks give rise to the showy displays of fire-following annual wildflowers that are so prominent in the first or second year following a fire. Those buried seed banks are also the means of re-establishing the few woody species that are killed outright by a fire. Bigberry manzanita and bigpod ceanothus are two important chaparral shrubs that do not resprout from underground burls. Instead, their successful re-establishment following fire depends entirely on large buried seed banks which have been accumulating for years. The buried seed banks of annual wildlfowers and woody shrubs are an important aspect of the recovery process.

However, these seeds have remained dormant in the soil for decades. How do they "know" to germinate following a fire and not at some other time? For a long time we thought that the heat of a fire was sufficient to trigger germination. Now, we understand that exposure to the chemicals in smoke may be a more important trigger. In fact, some scientists have found that soaking seeds of chaparral plants in Liquid Smoke or some other smoke condensate is sufficient to bring about their germination. Buried seeds are, however, susceptible to moist heat. This is one of the drawbacks of controlled burns, which are typically conducted in the spring when soils are usually wet. In a successful springtime controlled burn, the high moisture content of the soils produces super-heated steam, which may reach temperatures that destroy the buried seed bank, thereby impeding much of the chaparral's natural regeneration.

Animals also quickly re-establish in burned areas. Birds and larger animals may flee a fire and return when the habitat is more welcoming. However, many smaller animals do not have such mobility. Instead, they also take advantage of cooler temperatures below the soil surface. Using the ubiquitous burrows in the soil, many a snake, vole, or beetle has survived to recolonize the seemingly desolate landscape. Bacteria and fungi also survive at depth in the soil and recolonize the root zone of the regrowing vegetation.

One of the features of the Santa Barbara landscape that makes wildfire so dangerous also makes recovery difficult. The steep slopes of the Santa Ynez Mountains (40% to 60% average slope) contain chimney-like landscape features that create firestorms of ferocious intensity. These slopes make fire suppression extremely difficult and dangerous. However, the difficulties do not stop when the fire ends.

In the aftermath of a fire, these slopes are at risk of considerably increased erosion. The loose soils and bouldery rubble coating the mountain slopes no longer have the protective clothing of chaparral and accumulated dead litter to facilitate percolation of winter rains into the soil. As a result, water flows down the slope surface and carries a large volume of eroded soil and boulders. The results of this erosion are immediately evident when driving up Refugio Creek along the Refugio Canyon Road. Prior to the Refugio Fire (1955), Refugio Creek supported a fine population of our native steelhead trout. Today, that stream has become clogged with boulders and is only a vestige of its former self. Similar clogging of the stream and loss of habitat can be seen in Alamo Pintado Creek at the base of Figueroa Mountain, which burned in the Marre Fire (1993). Increased erosion and slope failure are impacts that often come with winter rains following summer fires. Regrowing vegetation will do much to stabilize those slopes and minimize erosion; however, erosion will occur.

Can this be minimized? The application of hydromulch, as was done this summer on the Gap Fire, may help to stabilize the soil during the first winter rains until the vegetation re-establishes. In the past, reseeding has been undertaken, often with fast-growing non-native annual grasses. However, this introduced all the problems of exotic species and had limited value. Regeneration of native vegetation is far more effective in controlling erosion. The hydromulch applied to the portion of the Gap Fire on the Los Padres

National Forest contained no plant seeds and is being used simply to retard erosion until the native species can re-establish.

How to Reduce Risk: So what are we to do? We chose to live in this beautiful land, but we do so at a terrible risk. Some want the privacy and seclusion provided by canyons and ravines shaded by oaks and chaparral. Others want the breathtaking views of mountains and ocean afforded by the steep slopes.

The issue is that we chose to live in a dangerous landscape. The idea of removing the chaparral is impractical and illogical. Vegetation will regrow. If chaparral is removed, it will be replaced by weeds, most of them exotic and many invasive. The expansion of weedy alien species into parts of the Gaviota burn is evidence of this possibility. Those weeds are equally capable of carrying intense and rapidly moving fires when confronted with the right fire weather (hot, dry, and windy).

Are there other ways to reduce our risk? Most certainly there are. These are the exact things that have been advocated by fire agencies for some time: Using fire-safe building materials, removing combustible materials near homes, protecting eaves and vents, installing and maintaining a fire-scape extending at least 100 feet from a home. Other steps will include broader community responses such as improved road access and brush removal near roads.

Some of the greatest danger to our homes is of our own doing, especially the introduction of landscape plants that create vertical fire ladders. Eucalyptus and conifers are prime examples, although there are others. Replacing chaparral with equally flammable, dense yard vegetation simply exacerbates the problem.

As we have built our homes further and further into the wildlands surrounding Santa Barbara, we have changed these ecosystems dramatically without reducing the risks. As we seek answers to protect ourselves from future tragedies, we should not take our fears out on the native vegetation that surrounds us. It is a precious natural resource that inspires awe and wonder, and deserves our appreciation and understanding.

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http://www.independent.com/news/2008/dec/24/chaparral-not-our-enemy/