

# FREMONTIA

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JOURNAL OF THE CALIFORNIA NATIVE PLANT SOCIETY

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## SPECIAL ISSUE: CHAPARRAL

CALIFORNIA CHAPARRAL

MANZANITAS

FREEZING AND CHAPARRAL PATTERNS

CHAPARRAL AND FIRE

CHAPARRAL BULBS AND FIRE

THE COST OF LIVING WITH CHAPARRAL

POST-FIRE RECOVERY OF CHAPARRAL IN SAN DIEGO

# FREMONTIA

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California Native Plant Society

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The California Native Plant Society (CNPS) is a statewide nonprofit organization dedicated to increasing the understanding and appreciation of California's native plants, and to preserving them and their natural habitats for future generations.

CNPS carries out its mission through science, conservation advocacy, education, and horticulture at the local, state, and federal levels. It monitors rare and endangered plants and habitats; acts to save endangered areas through publicity, persuasion, and on occasion, legal action; provides expert testimony to government bodies; supports the establishment of native plant preserves; sponsors workdays to remove invasive plants; and offers a range of educational activities including speaker programs, field trips, native plant sales, horticultural workshops, and demonstration gardens.

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Classic Californian chamise-dominated chaparral on a granitic hillside in western Riverside County. All photographs by the author.

## CHAPARRAL: PURE CALIFORNIA

by Richard W. Halsey

If there was ever a native plant community in California that deserved to be designated as the official state ecosystem, chaparral would certainly qualify. A shrub-dominated habitat covering many of the state's mountainsides with a dense carpet of green velvet, chaparral is found in every single county. Both the state bird, California quail, and the state flower, California poppy, can be found within the chaparral's extensive range. Chaparral was also the

favored habitat of the California grizzly bear, a magnificent animal that was last seen in 1924 near Sequoia National Park, the bear's last refuge from a rapidly changing world.

Unfortunately, many Californians do not recognize or appreciate the remarkable natural resource value chaparral provides, but rather view it with disdain, unaware of the system's inherent beauty. Pejoratively referred to as "brush" or "decadent vegetation," chaparral is seen

by some as only a fire threat, a risk in need of constant mitigation.

The last time *Fremontia* dedicated an entire issue to chaparral was in 1986. A significant amount of new information has been revealed since then, changing our understanding of the chaparral's relationship to fire, its response to the Mediterranean-type climate in which it thrives, and how best to manage it during a time of expanding development and global climate change.

It is time to pay another visit to California's most extensive ecosystem.

## CHAPARRAL BASICS

Chaparral is a drought tolerant plant community dominated by sclerophyllous, woody shrubs and shaped by a Mediterranean-type climate (summer drought and mild, wet winters) and naturally recurring wildfires. The term sclerophyllous, meaning "hard-leaved," was first coined by the German botanist Andreas F.W. Schimper in his classic 1898 text, "Plant Geography Upon a Physiological Basis." Its most characteristic species, the fine-leaved chamise (*Adenostoma fasciculatum*), is the most widely distributed shrub in the state. Other species that help define chaparral include manzanita (*Arctostaphylos* spp.), wild lilac (*Ceanothus* spp.), scrub oak (*Quercus* spp.), mountain mahogany (*Cercocarpus* spp.) and silk-tassel bush (*Garrya* spp.).

Chaparral dominates many foothills and mountain slopes from the Rogue River Valley in southwestern Oregon, down through California, to patches in Baja California's Sierra San Pedro Martir. Interesting stands of chaparral also exist in mid-elevation areas in central and southern Arizona, such as those in the Catalina Mountains above Tucson.

The essence of becoming a botanist is to become familiar with individual plants so that both the familiar and unfamiliar will stand out. "To be able to call the plants by name makes them a hundredfold more sweet and intimate," wrote Henry Van Dyke in his 1895 collection of essays titled "Little Rivers." Distinguishing between various types of chaparral is an equally interesting task, turning what previously appeared to be amorphous green hillsides into distinctly different vegetation communities. In pursuit of this endeavor, a recent CNPS organized effort has identified over



50 different alliances (Keeler-Wolf et al. unpublished). These range from types in which one shrub species, such as chamise or ceanothus, create almost pure stands over many acres, to various forms of mixed chaparral, each with its own unique combination of plants. Highly endemic types have also been identified such as those found on serpentine deposits in the Clear Creek area of San Benito County.

When encountered and studied in the early 1900s by some land managers from the eastern United States, California shrublands violated traditionally accepted patterns of succession whereby shrubs were merely a transitional stage toward the development of a mature forest, not a climax community unto itself. Unlike forests, chaparral is auto-successional, meaning pioneer and climax communities are basically the same. After the system has been disturbed by natural processes, the most common of which is fire, chaparral immediately begins to replace itself through seeding and resprouting. In an attempt to correct this "problem," over one million conifers, a substantial share of which were non-native, were planted in the San Gabriel Mountains in Los Angeles



Top: Lichens growing on old growth chaparral burls of mission manzanita (*Xylococcus bicolor*), Bernardo Mountain, San Diego County. • Middle: Flannel bush (*Fremontodendron californicum*). • Bottom: Manzanita, the definitive chaparral shrub. Mexican manzanita (*Arctostaphylos pungens*), Descanso, San Diego County.

County during the 1920s. Most were eventually killed by fire or drought, convincing foresters to let nature be and allow chaparral to protect the region's watersheds naturally.

This does not mean, however, that succession is completely absent in chaparral. As most botanists eagerly anticipate, the first year or two after a fire, recovering chaparral stands explode with a remarkable variety of herbaceous growth and colorful wildflowers. Usually within ten years, the canopy closes and shrubs dominate the scene again. On drier, south facing hillsides, the community can be dominated by obligate-seeding, woody shrub species like *Ceanothus* (obligate seeders recolonize post-burn sites by seed germination alone). As time goes on, individual shrubs will drop out, frequently due to drought stress, with gaps in the canopy being filled in by surrounding species. On moister, north facing slopes that

have remained unburned for a century or more, groves of manzanita can grow up to 20 feet tall, with thick, shiny red trunks, creating remarkably beautiful old-growth chaparral stands. Such communities are extremely rare in the southern part of the state today because of increased fire frequency from human activity. Consequently, the best examples remain in central and northern parts of California where moisture levels are higher and fires are less frequent.

### MISCONCEPTIONS

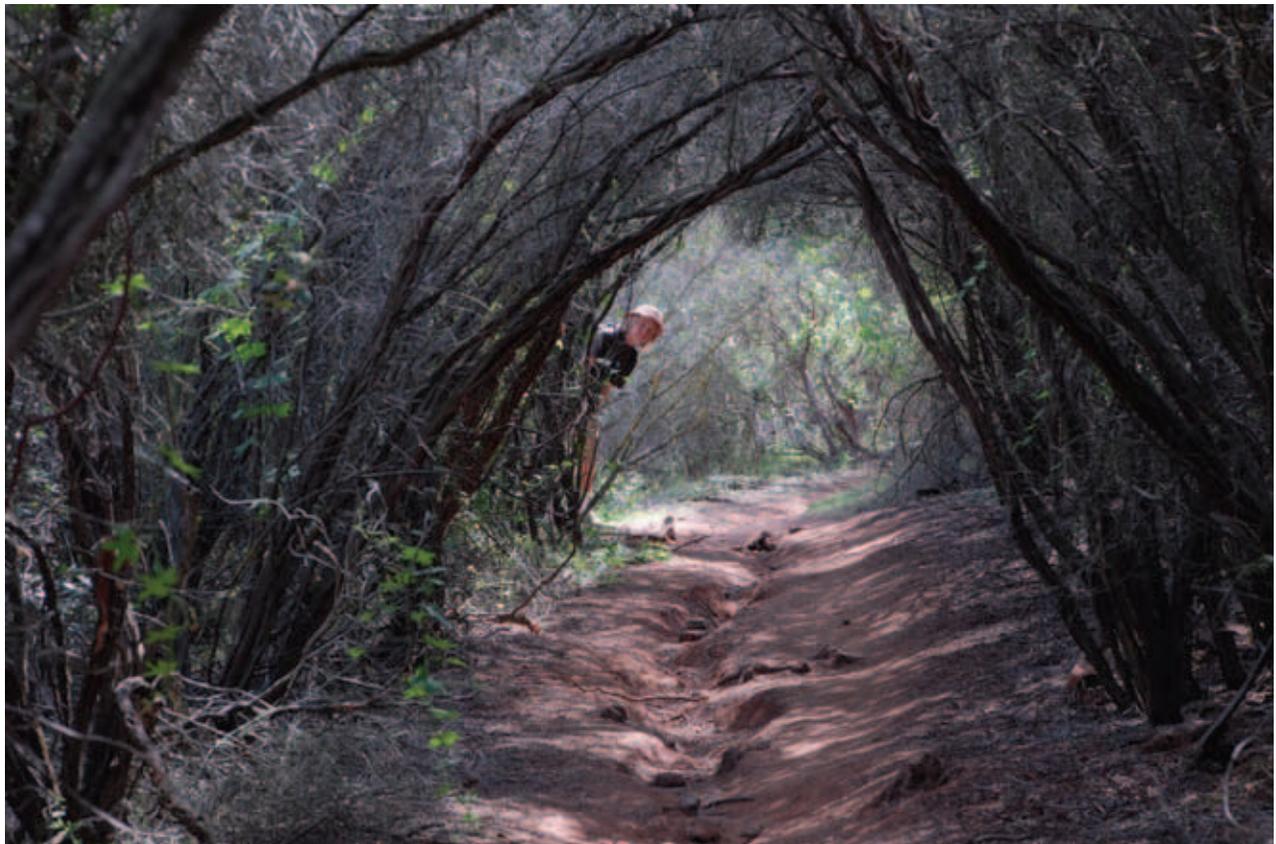
Possibly because chaparral research and fire ecology are relatively young fields, a significant number of misconceptions about California chaparral plant communities continue to persist. The most common deal with fire and include assumptions such as “chaparral needs to burn to remain healthy” and “chap-

arral is adapted to fire,” both of which incorrectly imply that without frequent fire, chaparral will disappear.

While fire plays an intimate role in shaping chaparral systems, fire at the wrong time or frequency can eliminate them. This fact has been known for years by ranchers who have endeavored to “improve” and expand pastures by repeatedly burning native shrublands. Native Americans likely did the same in order to encourage the growth of herbaceous plants that produced edible seeds and increased deer populations. In the southern part of the state where fire frequency has increased dramatically over the past century, vast areas of chaparral have been converted to non-native, weedy grasslands (see Keeley article in this issue for more information on fire regimes in California chaparral).

In contrast, there has been no compelling research indicating that

A tunnel through an old-growth chaparral stand of Ramona lilac (*Ceanothus tomentosus*) in San Diego County.



long fire-return intervals are harmful to the ecological health or vitality of chaparral plant communities. In fact, extended fire-free periods are required for the seeds of many chaparral plants to germinate successfully, for specialized lichen colonies to form, and for old-growth stands to create the type of habitat that would have been favored by the grizzly bear (Keeley et al. 2005, Knudsen and Magney 2006, Storer and Tevis 1955).

Another misconception that is frequently found in various reports and articles is that chaparral shrubs produce allelopathic toxins that prevent the emergence of seedlings beneath the shrub canopy. Allelopathy is often cited to support the belief that “chaparral needs to burn” because fire is supposed to rid the soil of accumulated poisons. Not only is this untrue but many of the identified toxins actually increase in post-fire environments. With a few possible exceptions, seeds of chaparral species are innately dormant with their germination stimulated by particular fire cues, not the removal of inhibiting soil chemicals (Halsey 2004).

While the phrase “old-growth” is commonly invoked to inspire the vision of ancient forests, it is equally valid for use in describing many mature chaparral stands. With trunks of toyon and manzanita more than waist thick, gnarled stems of ceanothus supporting canopies filled with blue and white blossoms high above, and twisted branches of chamise covered with wildly colorful displays of lichen, the richly descriptive phrase “old-growth” is more than suitable. If one were to closely examine the diversity of all life thriving in such ancient landscapes, words like “decadent” and



This large big-berry manzanita (*Arctostaphylos glauca*) was killed outright by a fire.

“senescence” would be clearly inappropriate.

The unique natural resource value old-growth chaparral provides Californians demonstrates why misunderstandings about fire can be so damaging. If land managers and private citizens believe chaparral “needs” fire and that it is a “good thing” when it burns, then beautiful, legacy manzanitas and ancient chaparral stands are perceived as having little value. In addition, the threat of converting native shrublands to non-native grasslands due to increased fire frequency is not adequately recognized.

## CHAPARRAL ACROSS CALIFORNIA

There is little mystery why chaparral is not as well known as many other native California plant communities; the name is more commonly used to identify everything from housing developments to herbal remedies. The four Southern California National Forests are actually not dominated by forested sys-

tems at all, but chaparral. In fact, more than 90% of the Cleveland National Forest is covered by native shrublands. Changing the name of some of these public lands to National Chaparral Recreational Areas may begin to help Californians properly recognize the native plant communities in which they live.

There are a number of remarkable chaparral stands across the state. One exists on the north side of Guatay Mountain in San Diego County. The local Kumeyaay Indians call it Na-wa Ti'e and believe it is protected by a spirit guardian. For fear of angering Na-wa Ti'e, in-

habitants in the village that once occupied the valley below never ventured up the mountain's slopes. Legend has it that the mountain has never burned because of the guardian's watchful eyes. Today, it remains a sacred place, both for the Kumeyaay and those who value the unique natural resources that can be found there. On its northern exposure resides the last, ancient Tecate cypress (*Cupressus forbesii*) grove in California and one of the last, intact old-growth stands of chaparral in the region.

Punching out of a dense, eight-foot thick carpet of Eastwood manzanita (*Arctostaphylos glandulosa*), cupleaf ceanothus (*Ceanothus greggii*), and scrub oak (*Quercus berberidifolia*) are islands of 20-foot tall, multi-trunked canyon live oak (*Quercus chrysolepis*).

The vigorous Tecate cypress grove is at least 145 years old (Gautier and Zedler 1980). These trees are truly remarkable with their thin, reddish bark, large trunks, and fine, scale-like leaves. They can reach up to 30 feet and form an airy canopy decorated with quarter-sized cones

that remain closed until the parent branch dies either by fire or injury. Although they have been labeled as fire-dependent, multiple fires in other groves have seriously compromised the reproductive success of the species in California. Therefore, it is better to view the Tecate cypress, as well as all other plants that have some type of fire-adaptive reproductive trait, as “fire regime sensitive.” Fire is a disruptive force that can have various impacts depending on its time of arrival.

## ISOLATED TREASURES

Clinging on to a geological island near the central California town of Ione, a unique type of chaparral named after the town struggles to maintain its grip. Abandoned mining activity and road cuts expose the soils upon which the community exists—fine, white sands and strange layers of ancient marine sediments laid down 35 to 57 million years ago during the Eocene. All share high levels of acidity, lots of aluminum, and poor fertility.

Covering the ground in low mounds are the intermingled mats of Ione manzanita (*Arctostaphylos myrtifolia*), the characteristic species of this isolated patch of fragile ecology. In fall the mats are covered with bright red, nascent inflorescences, immature flower buds ready

to release urn-shaped blossoms in late winter. Randomly scattered between the olive-green shrubs is the occasional sticky whiteleaf manzanita (*Arctostaphylos viscida*) standing out with its contrasting lighter color. Combined with the varied foliage and unusual soil hues, the area takes on a quality best described by the brush of an Impressionistic painter.

First identified in 1886 by Charles Parry, Ione manzanita survives on a patchwork of sites totaling approximately 1,000 acres, portions of which are being preserved through a cooperative effort between landowners and various interested parties (including CNPS). Currently the Bureau of Land Management (BLM) manages two reserves of 86 and 20 acres, each with CalTrans managing populations along its right-of-way. Large portions of Ione chaparral are on the private Arroyo Seco Ranch whose owners have expressed an interest in protecting the endangered system.

Unfortunately, large mats of Ione manzanita have been dying throughout its small range, leaving behind only pale, woody skeletons. The die-back appears to have been occurring at least since 1988. According to George Hartwell, a talented naturalist who once lived in the area, the fungus responsible for madrone canker (*Fusicoccum aesculi*) has been

found in Ione manzanita tissue. Another fungus that causes root and crown rot (*Phytophthora cinnamomi*) was found to be infecting the plants in 2001. Drought stress may be the primary cause of the problem with fungal infections dealing the final blow. Whatever the cause for the die off, the future of the remaining stands of Ione manzanita chaparral is questionable.

## CHAPARRAL BY THE SEA

The Elfin Forest Preserve in Los Osos, right across the bay from Morro Rock, is a model example of how a group of dedicated individuals can restore a seriously damaged ecosystem and protect it for future generations. Due to the efforts of local residents, the 90-acre maritime chaparral landscape was purchased between 1987 and 1994. Although many ancient pygmy coastal live oaks (*Quercus agrifolia*), endemic Morro manzanitas (*Arctostaphylos morroensis*), and wedgeleaf ceanothus (*Ceanothus cuneatus*) remained in the lower, relatively pristine portion of the preserve, a large area had been severely compromised by motorcyclists and non-native veldt grass (*Ehrharta calycina*). Through steadfast volunteer efforts, the area is recovering nicely.

A walk along the preserve’s boardwalk is like traveling back in time, when large portions of coastal California were covered with the varied and colorful foliage of a maritime form of mixed chaparral shaped by ocean influences. Yellows from mock heather (*Ericameria ericoides*), subtle grays from California sagebrush (*Artemisia californica*), and creamy whites, scarlet reds, and lupine purples decorate the landscape like floral confetti.

At one juncture along the way, you’ll find a bronze plaque dedicated to the Fairbanks family. The reason for its presence is clear. It is a tribute to Jeff and Ann Fairbanks, along with their three daughters,

Ione chaparral featuring the endangered Ione manzanita (*Arctostaphylos myrtifolia*).



Courtney, Galen, and Siena, who were strong supporters of protecting the Elfin Forest. “The beauty of this county is one of the major reasons for living here,” Jeff wrote as the editor of the local *Telegram-Tribune* newspaper. “We are all responsible for it.”

The plaque also reminds us of the fragility of life. Jeff, Ann, and their daughter Siena lost their lives in a horrible traffic accident in 1995. “Stand here for a moment,” the dedication concludes, “close your eyes and see the Elfin Forest through a child’s eyes. That is Siena’s view.”

## THE FUTURE

Chaparral provides the closest and easiest way many Californians have to make contact with nature. Exploring it, studying its remarkable botanical diversity, and sharing its beauty with others are essential if we intend to preserve the continued vitality and survival of chaparral as well as that of other native plant communities.

Although at present there may appear to be a significant amount of chaparral in California, continuing drought conditions, increased fire frequencies, and ignorance about the system can easily change that over the next 100 years. If current drought conditions are a reflection of the ongoing change in global climate, California may witness a dramatic redistribution of native plant communities over the next century.

In Southern California, experienced wildland firefighters are noting large populations of scrub oak, ceanothus, and chamise dying from desiccation in numbers they have never seen before. Vegetation moisture levels dropped to record lows this past summer, which led to highly unusual wildfires. The lightning-caused July blaze in the Inyo National Forest burned more than 35,000 acres, a place that was once referred to as the “asbestos forest” because of its resistance to burning.



The Elfin Forest Preserve in Los Osos, San Luis Obispo County, features the endemic Morro manzanita (*Arctostaphylos morroensis*) in the middle ground of this photograph.

Record low moisture levels have changed that, as well as changing fire patterns throughout the West.

Although extended droughts have occurred in the past, this time things are different. California’s population has increased dramatically, and human activity is now having a significant impact on the redistribution of native plant communities because humans cause most of the fires. As a consequence, anthropogenic fire in shrubland systems is unnaturally accelerating ecosystem change, seriously compromising normally resilient native habitats. Such change will likely be one of California’s most challenging environmental issues for years to come.

Although there is not much we can do about long-term drought, we do have the ability to encourage the development of appropriate land management plans designed to protect the native landscapes we love. Our success depends a lot on awareness. This is why your interest in the natural world and the efforts of the California Native Plant Society are so important; learning to enjoy native plant communities and help-

ing others do the same is the key to their continued existence, especially those that are underappreciated.

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