

**ON “CHAPARRAL” versus “COASTAL SAGE SCRUB”
in San Diego County**

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Questions arising

The County of San Diego has both “Coastal Sage Scrub” and “Chaparral” in abundance (a detailed map is at www.Sdcounty.ca.gov/pds/mscp/docs/Biodiversity/veg_cntywide_2008.pdf). In fact, these two ecosystems cover most of the ground in the county, albeit with many different types (24 for “Chaparral” in the Holland classification system in the County map, 6 for “Coastal Sage Scrub”) (The Holland classification is in Holland and Keil, 1995). Many of the plants involved in the two systems are deceptively similar, although they quite commonly belong to different species. Naturally, one would like to know how to keep the two communities apart. The criteria, evidently, are plant species distributions. These have been and are being mapped by various methods, including field work by expert observers, collections of specimens in museum repositories, and the study of air photos and satellite images.

Plant cover is important to know for a number of reasons, one being the modeling of the distribution of protected bird species and other endangered organisms. Such modeling allows the County to advise prospective developers about areas suitable for urbanization, facilitating growth in some regions, while protecting others. Much of the coastal region has lost its “Coastal Sage Scrub” to human impact (urbanization, agriculture, planting of *Eucalyptus* trees, etc.). Protection of what remains is largely ensured by inclusion within parks or other preserves. The San Dieguito River Park is one such, administered by a coalition of local government units such as the County of San Diego and the cities of Escondido, Del Mar, Solana Beach, and San Diego. Several other relevant parks or open spaces are provided by the County of San Diego and by the State of California.

Reading in the Natural History Guide written by Ronald Quinn and Sterling Keeley (2006) we find this assertion: “Coastal Sage Scrub is not Chaparral” (p. 16). Also, there are useful hints regarding differences between the two ecosystems in question. These authors say that one of the differences is that Chaparral plants are evergreen while plants of the Coastal Sage Scrub are drought deciduous; that is, they lose their leaves (shut down) during the hot and dry part of the year. Make that “many plants” for either community. Keep in mind that many of the plants in the Coastal Sage Scrub do not shut down in the summer, and some do within the Chaparral as well.

In common understanding, Chaparral and Coastal Sage Scrub differ in their resistance to penetration by people and large animals. The Chaparral plants tear one’s clothes, while the Coastal Scrub plants are less aggressively armored, on the whole. That is why Coastal Sage Scrub is sometimes referred to as “Soft Chaparral.” A preference of the plant association for the coastal region earns it the label “Coastal Chaparral.” The question is whether these labels have to be abandoned. I argue that this is not so. For one reason, common usage tends to trump expert opinion. For another, the Coastal Sage Scrub is in many ways much like Chaparral.

True, defenses of Scrub plants against plant eaters (insects mainly) are largely based on chemistry, hence the sage scrub fragrance, including that of the California Sagebrush itself. The Coastal Sage Scrub

has many plants that have a strong smell, besides the California Sagebrush. One pungent plant of the Coastal Sage Scrub (when blooming) is the Wart-stem *Ceanothus* (Figure 1), which flowers white (hence the name “White Coast Ceanothus”). But this plant in other respects is much like a typical Chaparral plant. It is a close relative of the blue-flowering (and sweet-smelling) “California Lilac” (several species), a Chaparral plant that is commonly found in many gardens all over San Diego County. (The California Lilac is not a close relative of the European Lilac plant, which looks similar in some respects, from a distance.)



Figure 1. Wart-stem Ceanothus, a pungent member of the genus, commonly found in a Coastal Sage Scrub setting. Photo taken near Del Mar.

Plants of the Coastal Sage Scrub

When studying the make-up of the Coastal Sage Scrub, for example in Crest Canyon, south of the San Dieguito Lagoon near the coast at Del Mar, one readily finds the dominant members: California Sage Brush (not a sage of the genus *Salvia*, but a member of the genus *Artemisia*; Figure 2), California buckwheat (*Eriogonum fasciculatum*), and the broom-like Coyote Brush (*Baccharis pilularis*). Also, the true sages *Salvia mellifera* (“Black Sage”) and *Salvia apiana* (“White Sage”) are quite abundant. But we also find Chaparral-type plants, such as “Chamise” (*Adenostoma fasciculatum*) and the tall bushy sumac plants (Laurel Sumac, Lemonadeberry), Toyon (“California Holly”), along with Mountain Mahogany and a species of Manzanita. Chamise (Figure 3), incidentally, may well be the single most abundant plant species in San Diego County. It is dominant in one important type of Chaparral and abundant in many other types.



Figure 2. California Sage Brush (Artemisia californica), a common plant within the Coastal Sage Scrub.

If one were to declare the plant species in (coastal) Crest Canyon (and in the nearby coastal Torrey Pines Park) as exclusive members of the Coastal Sage Scrub, there would be hardly any species left for many common types of Chaparral. Thus, one does not. Instead, one focuses on the plants that are dominant when assigning a label to a plant association. Identification is greatly assisted by the web site “Calphotos” of the University of California at Berkeley.



Figure 3. Chamise blooming. San Diego County, coastal sage brush near Del Mar.

The Coastal Sage Scrub can have its Chamise, as long as that plant is not dominant. Neither is the Coastal Sage Scrub entirely without spiny armor. Armor, then is not an absolute criterion. For fighting off trespassing, the Coast Prickly Pear (a common species of the genus *Opuntia* seen in Coastal Sage Scrub), seems uniquely qualified, with its long sharp spines. Its close relative, the Mohave Prickly Pear, is found all over the county in dry inland places. Prickly Pears are not the only spiny plants in the Coastal Sage Scrub. Representatives of the Yucca tribe (“Our Lord’s Candle” and the Mohave Yucca or “Spanish Bayonet”) are just as hostile to trespassers. And even stands of plants without armor are commonly difficult or impossible to penetrate for the off-path hiker. (This is one good reason to stay on the path. There are others, having to do with rattlesnakes and with conservation.)

Definition of “Chaparral” in contrast to “Coastal Sage Scrub”

So, with plant types being similar and boundaries extremely fuzzy, can we define “Chaparral” in a way that makes it clearly different from ecosystems belonging to the “Coastal Sage Scrub”? We can try glossaries in relevant books. Lightner (2011), for example, offers a succinct “dry habitat of dense woody shrubs” under the term *Chaparral*.

Quinn and Keeley (2006) use language that is much less pithy. They include a large number of crucial aspects in their definition (p. 2): “The Chaparral vegetation is composed of a diverse assemblage of different species of evergreen drought- and fire-hardy shrubs.” “...nearly impenetrable thicket...”; “...hard leaves and stiff and unyielding stems.” “...many shrubs have an enlarged woody base, called a burl or root crown, from which the main stems emerge. ...the function of the burl is to produce new shoots after damage by fire...” (p. 78).

The authors take fire resistance as a central criterion (p.135), saying that for Chaparral plants to be successful, they need to cope with periodic destruction by fire. In addition, the plants have to deal with the vicissitudes of highly variable and low-level precipitation, including severe drought. One might note, though, that the very same requirements regarding adaptation to fire and drought are applicable for the plants of the Coastal Sage Scrub. Drought and fire do not stop at some line parallel to the coast. Thus the

drought-and-fire criterion is not very helpful in separating the two ecosystems, although different ways of dealing with the problems created by drought and by fire might be.

Allan Schoenherr (1992) separates the two ecosystems on the basis of a difference in root systems (p. 340): “Chaparral plants are physiologically different from those of the Coastal Sage Scrub. Drought-deciduous and succulent plants of Coastal Sage Scrub are adapted for longer periods of drought. Their relatively shallow root systems absorb water as soon as it rains, and they quickly grow new shoots and leaves.” At least one of the plants in question, the Torrey Pine, benefits from fog drip in addition to the rain drops that make up the total precipitation here.

Schoenherr contrasts the shallow root system of the Coastal Sage Scrub with a two-layered root system of Chaparral plants, which absorb water from both shallow and deep regions of the soil, allowing these plants to grow till later in the summer. One wonders, where is the deeper and older water near the coast? If it were there, would not the coastal plants also attempt to tap into it with deep roots? Is the water near the coast more readily evaporated, the supply being more modest and drought conditions being stronger? And how come the Coyote Brush (a plant without spines and abundant in the Coastal Sage Scrub I have seen) is a lush green in the middle of summer, when the California Sagebrush is about to dry up and shut down? Does the Coyote Brush have deep tap roots, perhaps? It would seem so.

Jaeger and Smith (1966) in their brief guide to the natural history of southern California have a list of characteristic plants for each of the two ecosystems (p. 44 and p. 45). For the Coastal Sage Scrub they list (in this order): California Wormwood or Sagebrush (*Artemisia californica*), White Sage (*Salvia apiana*), Black Sage (*Salvia mellifera*), California Bush Sunflower (*Encelia californica*), Yerba Santa, Golden Yarrow, California buckwheat, Lemonade-berry, Prickly pear cactus, and Our-Lord’s-Candle Yucca. For the Chaparral it is (in this order): Chamise, a species of Scrub Oak, Foothill Ash, California Mountain Mahogany (“Hard Tack”), Wild Lilacs (*Ceanothus* spp.), Holly-leaf Cherry, Fremont’s Silktassel (“Bear Brush”), Ashy Silktassel (“Quinine Bush”), manzanitas (*Arctostaphylos* spp.), Toyon, and Sugarbush. Curiously, the second plant in the Chaparral list of Jaeger and Smith is also known as “California Sage Scrub Oak” according to the USDA. Some other species in their Chaparral list are found in the Coastal Sage Scrub community, as well. Their Foothill Ash, on the other hand, is winter-deciduous and is also known as “Chaparral Flowering Ash.” While the lists are unlikely to line up with everyone’s experience concerning the plant communities, they do imply a deep root system for the Chaparral plants listed.

The ubiquitous Coyote Brush and Goldenbush are not mentioned in either of the lists of Jaeger and Smith. The omission flags the possibility that the lists were made when the two plant species (which are abundant in disturbed areas) were less conspicuous than they are now. In any case, the lists of these authors, while possibly useful as criteria for separation of the two plant communities under certain conditions, are inapplicable in terms of abundance patterns in many instances.

We might turn to the origin of the word “Chaparral” for further elucidation of a definition of the Chaparral and its difference from Coastal Sage Scrub. According to several authors the word is derived from the Spanish *chaparro*, referring to scrub oak and to a type of vegetation found in southern Spain. The Spanish brought the term to California, and applied it to the vegetation they found. A link into the Mediterranean is appropriate, of course, for our Mediterranean-type climate and vegetation.

The tie-in to scrub oak that is implied by the word itself is telling: Chaparral, like any dense scrub oak stand, is essentially impenetrable. The scrub oak link illustrates yet another aspect. Compared with their

large relatives (e.g., the “live oaks” and the “black oak”) scrub oaks are miniaturized. The Chaparral (a.k.a. “Elfin Forest”) is clearly a miniature forest. It has an understory with plenty of small mammals, snakes, lizards, and insects. This aspect, however, is shared with the Coastal Sage Scrub, a treasure trove for students of rodents, lizards, snakes, and insects. While the presence of abundant scrub oak flags a “Chaparral” environment, the presence of an understory, evidently, is not a good criterion for separating Chaparral from Coastal Sage Scrub.

Precipitation as the main environmental factor

What then are the environmental factors that make the Coastal Sage Scrub different from the true Chaparral? One clue is in the fact that the Coastal Sage Scrub looks a lot more like a desert ecosystem than does the true Chaparral. It is very dry along our coast. Long-term drought spells are not uncommon, as is readily seen in tree-ring records in the coastal Torrey Pine (Biondi et al., 1997). Ten inches of rain is not very much, only slightly more than in much of the desert itself. The rain is the deciding factor in separating the ecosystems. As we move higher up on the Peninsular Range in San Diego, we encounter areas with more precipitation, at the crest up to four times higher than on the coastal terrace to the west of the foothills (Pryde 1984, p. 34). The air that is forced to rise up toward the crest of the Range cools and loses its ability to hold moisture. Clouds form at Palomar Mountain and at Volcan Mountain and at the Cuyamaca peaks, and pines and other conifers thrive there thanks to the increased precipitation. The conifers accept that some of the precipitation arrives as snow.

The celebrated biodiversity in our San Diego landscape owes much to the precipitation-controlled zonation that starts with the Coastal Sage Scrub near the shores, at low elevation, and moves up into Chaparral and from there into oak groves and pine forests. And yes, the overall zonation also is strongly influenced by disturbance of the ecosystems by fire. Drought and fire are closely aligned, and they both respond to precipitation, including its seasonal variation and its variation from year to year. With the recent tremendous increase in population density, having a large fire, it seems, depends more on the presence of fuel than on the availability of a trigger. Only a few decades ago the chief initiator of fire was lightning. It is still as active as ever, of course. But the main trigger now is human impact, judging from the relevant news stories.

Conclusion

In summary, it seems that the Coastal Sage Scrub is hardly fundamentally different from many types of Chaparral, and that the labels “Coastal Chaparral,” or “Soft Chaparral,” besides being readily understood, remain valid and useful. In this non-expert view, the Coastal Sage Scrub is just another type of Chaparral with its own sub-types, albeit different from “true” Chaparral in a statistical fashion. If a “true” Chaparral is to be distinguished reliably from the coastal one, by precise mapping of a boundary between the two types of plant communities, it becomes necessary to go beyond generalities about plant properties, and to take into account quantitative abundance distributions of indicator species. This is in fact the approach being taken by expert botanists of the County, of the Natural History Museum in San Diego, and of other organizations.

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