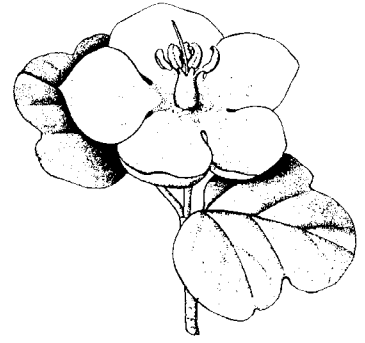


FREMONTIA

A Journal of the California Native Plant Society





Limited occurrences of a unique vegetation type, southern maritime chaparral, are found at Torrey Pine State Reserve. Here, coreopsis (*Coreopsis maritima*) grows on a mesa top under Torrey pine (*Pinus torreyana*). Photograph by Tom Oberbauer.

SOUTHERN MARITIME CHAPARRAL

by David C. Hogan, John O. Sawyer, and Colin Saunders

CONSERVATION BIOLOGISTS have recognized southern maritime chaparral as a special and imperiled kind of chaparral along the San Diego coastline, but they have had few tools to halt the loss of the last acres of this vegetation type to development. In order to protect remaining acreage, San Diego conservationists rallied in 1990 to define and map southern maritime chaparral and create ways to protect critical areas. At the same time the California Native Plant Society was augmenting its work in rare species protection with a complementary focus on the protection of rare plant communities. A Vegetation Committee was created to develop methods of conservation for areas of special vegetation such as southern maritime chaparral. Two tangible re-

sults of over five years of committee work were the publication of *A Manual of California Vegetation*, a guidebook to the vegetation types of the state, and the establishment of a protocol for sampling vegetation to help in definition and description of rare vegetation types. This protocol is illustrated in Frank Landis' 1994 article in *Fremontia*, "Surveying Santa Catalina Plant Communities." Sampling is one of the first steps in defining and describing a vegetation type and understanding its relationship to other communities. The outcome of this exercise is definitions that can be evaluated because the methods by which they were created are known in detail. Using this evolving approach, we present a clarified definition of southern maritime chaparral.



The distribution of southern maritime chaparral (above) has been severely reduced by development and is limited by sandy soils poor in nutrients and the coastal climate. Photograph by Tom Oberbauer. The coastal endemic Del Mar manzanita (*Arctostaphylos glandulosa* ssp. *crassifolia*) (below) is part of the southern maritime chaparral community. Photographs by Eva Armi unless otherwise noted.



Background

Southern maritime chaparral is a unique vegetation type with an extremely limited distribution. Found along the southern coastline of Orange County and coastal areas of San Diego County, this chaparral is distinct in its plant species composition and distribution. It is thought that the area's climatic conditions and nutrient-deficient sandy soils limit its distribution. Some 20,630 acres of southern maritime chaparral once covered extensive areas of the coastline. That distribution has been severely reduced by development, and now represents only twelve percent of that original extent. According to Oberbauer and Vanderwier, less than 2,530 severely fragmented acres remain.

Southern maritime chaparral is found in two forms. On ocean bluffs, shrubs such as chamise (*Adenostoma fasciculatum*) and coast white ceanothus (*Ceanothus verrucosus*)

are often windswept and low-growing. Rich arrays of herbs grow in the gaps. A bit further inland, up to one mile from the ocean, less harsh conditions allow shrubs to reach ten feet high, and coastal sage scrub is limited to sandy bottomlands while chaparral dominates all slope aspects and mesa tops. Here, Torrey pines (*Pinus torreyana*) are sometimes found among the shrubs. The herbaceous layer reaches its greatest diversity in this area; as many as fifty species, including chachalagua (*Centaurium venustum*), Indian pink (*Silene laciniata*), and a rein orchid (*Piperia unalascensis*), can be found in a single patch.

On mesa tops approximately two miles from the ocean, southern maritime chaparral begins to integrate with more common kinds of inland chaparral. Eroded slopes and bluffs, however, still support southern maritime chaparral with its coastal endemics such as Del Mar manzanita (*Arctostaphylos glandulosa* ssp. *crassifolia*), Encinitas baccharis (*Baccharis vanessae*), and Nuttall's scrub oak (*Quercus dumosa*). Two to four miles from the ocean southern maritime chaparral is strictly limited to valley slopes and tributary canyons reached by coastal fog. Further inland other kinds of chaparral completely replace southern maritime chaparral.

Southern Maritime Chaparral

It was not until the mid-1970s that biologists began to suggest that the presence of endemic plants along the Orange/San Diego County coastline, including coast white ceanothus, Del Mar manzanita, Encinitas baccharis, Orcutt's spineflower (*Chorizanthe orcuttiana*), and short-leaved dudleya (*Dudleya blochmaniae* ssp. *brevifolia*) might be associated with a distinctive kind of vegetation. Various names were used to identify chaparral that supported these species, including Cheatham and Haller's (1975) south coastal mixed chaparral and the colloquially used coastal mixed chaparral. In 1986 Robert Holland, then plant ecologist for the California Department of Fish and Game (DFG), described this chaparral in his *Preliminary Descriptions of the Terrestrial Natural Communities of California*. Holland used the term southern maritime chaparral to describe the chaparral and habitat located in and around Torrey Pines State Reserve near Del Mar. Many biologists recognized that Holland's description agreed with the more regional, south coastal mixed chaparral of Cheatham and Haller. South coastal mixed chaparral and southern maritime chaparral have become synonymous despite differences in species composition and range. Yet some consulting biologists take a literal interpretation of Holland and continue to hold that southern maritime chaparral is found only at Torrey Pines State Reserve.

Holland never intended his report to be a definitive treatment on California's vegetation. He called for updated and additional information regarding his descrip-



The only known stand of summer holly (*Comarostaphylis diversifolia*) (top) occurs on Carmel Mountain near Del Mar. The endemic Del Mar manzanita, shown here (bottom) in fruit, is a coastal endemic associated with this limited type of chaparral.

tions. Responding to this need for additional research, the Southwest Center for Biological Diversity, assisted by CNPS and DFG, led an effort to sample and map remaining coastal chaparral vegetation. Forty-eight sampling transects were completed using the CNPS method in coastal areas within and outside the fog belt.

Computer analyses based on data collected on presence of plant species and their cover segregated the transects into three vegetation types. First, transects within two and a half miles of the ocean were readily separated from those further than five miles from the ocean. The shorter distance from the ocean roughly corresponds with



Lemonade berry (*Rhus integrifolia*) is an important shrub component of southern maritime chaparral.

the inland distribution of the densest autumnal fog banks. In the inland transects chamise shares dominance with other shrubs such as mission manzanita (*Xylococcus bicolor*), and woollyleaf ceanothus (*Ceanothus tomentosus*). Within two and a half miles of the ocean the analysis recognized two vegetation types. In the first, nearly always found on south- or west-facing slopes, chamise and black sage (*Salvia mellifera*) share dominance with a diverse mix of herbaceous species. The second coastal vegetation type, nearly always found on north- or east-facing slopes, is characterized by a higher diversity of shrub species, including bushrue (*Cneoridium dumosum*), California sagebrush (*Artemisia californica*), chamise, spiny redberry (*Rhamnus crocea*), and Nuttall's scrub oak. Mesa tops within two and a half miles of the ocean support a mosaic of the two vegetation types.

A Distinct Vegetation Type

Analyses of data collected in the transect surveys indicate that coastal chaparral in San Diego County is distinct from inland chaparrals at the series and association levels as discussed in Sawyer and Keeler-Wolf *A Manual of California Vegetation* (1995). The inland transects can be assigned to the chamise-mission manzanita-woollyleaf

Description of Southern Maritime Chaparral

Definition: A chamise-black sage chaparral including rare species that are associated with coastal fog and weathered sandstone soils.

Vegetation: Dense to open shrubs 1.5 to ten feet in height including black sage (*Salvia mellifera*), bushrue (*Cneoridium dumosum*), California buckwheat (*Eriogonum fasciculatum* ssp. *fasciculatum*), chamise (*Adenostoma fasciculatum* var. *obtusifolium*), honeysuckle (*Lonicera subspicata*), laurel sumac (*Malosma laurina*), Mojave yucca (*Yucca schidigera*), and spiny redberry (*Rhamnus crocea*) growing with a high number of herbaceous species. Two phases exist: in the first phase, plants are open and less than three feet in height, and in the second phase, plants are dense and up to ten feet in height. These phases may be considered associations of the Chamise-black sage series (Sawyer and Keeler-Wolf 1995).

Rare species: 'coast white ceanothus (*Ceanothus verrucosus*), "Del Mar manzanita (*Arctostaphylos glandulosa* ssp. *crassifolia*), "Del Mar Mesa sand-aster (*Corethrogyne filaginifolia* var. *linifolia*), "Encinitas baccharis (*Baccharis vanessae*), "Nuttall's scrub oak (*Quercus dumosa*), "Orcutt's spineflower (*Chorizanthe orcuttiana*), "sea-dahlia (*Coreopsis maritima*), "short-leaved dudleya (*Dudleya blochmaniae* ssp. *brevifolia*), "summer-holly (*Comarostaphylis diversifolia* ssp. *diversifolia*), and/or "Torrey pine (*Pinus torreyana* ssp. *torreyana*) may be present.

Site conditions: Southern maritime chaparral is found on soils of weathered sandstone within the coastal fog belt including those of the Carlsbad series, Cesterton series, and the Corralitos sandy loam. Southern maritime chaparral is also found on loamy alluvium, rough broken land, and terrace escarpments. Southern maritime chaparral is usually found within five miles of the ocean, but may be located up to five miles inland. Fire may be necessary for continued reproduction of many characteristic shrub species.

Distribution: Southern maritime chaparral is found in Orange County in the vicinity of Nigel Hill and Temple Hill and in San Diego County from Carlsbad to Point Loma. Southern maritime chaparral of a transitional nature is found in San Diego County at Little Shaw Valley, Del Mar Mesa/Penasquitos Canyon, and Spooner's Mesa. Maps of all known southern maritime chaparral sites are available through the Southwest Center for Biological Diversity.

' indicates a CNPS 2 list plant

" indicates a CNPS 1B list plant (Skinner and Pavlik, 1994)

ceanothus series, first defined in the Peninsular Ranges by ecologists Gordon and White of the Cleveland National Forest. The two coastal vegetation types are associations of Sawyer and Keeler-Wolf's chamise-black sage series.

Apparently, moisture supplied by fog decreases the strong vegetation pattern seen outside the fog belt. Inland from the ocean, chamise-dominated chaparral, mixed chaparral, and coastal sage scrub occur with little merging. This mosaic of vegetation can be classified at the series level. Along the coast, however, two related associations of chamise-black sage chaparral exist in close proximity. These two associations represent southern maritime chaparral.

The fine-scale pattern of consistent similarities in plant species composition correlated with specific habitat conditions assert that these associations should be treated as a single vegetation type. The significant reduction in all chaparral acreage along the immediate coast of Orange and San Diego counties is significant. It is our hope that a clarified description will contribute to efforts to protect the few remaining patches of this vegetation. Most important, the CEQA process must be monitored to prevent any further loss of southern maritime chaparral through biological surveys that fail to identify significant impacts that proposed projects will have on this resource. Federal and local government agencies are belatedly moving toward regulatory protection of southern maritime chaparral, including the proposed listing of six plant species as threatened or endangered, and are considering acquisition of key areas such as Carmel Mountain. Management decisions, which need to address prescribed fire and other issues, will determine the future of this rare and remarkable vegetation type.

The short-leaved dudleya (*Dudleya brevifolia*) is another coastal endemic plant associated with southern maritime chaparral.



Increasingly, biologists are asked to evaluate areas where decisions may result in major changes to native vegetation. Since each patch of vegetation is different in detail from others, assigning each patch to a category in a consistent and easily understood classification becomes increasingly important to eliminate confusion and controversy. The quality of a classification depends on available information. In the case of vegetation, information comes from conducting quantitative field surveys, followed by analyses of data. This procedure allows the creation of defensible definitions of vegetation types at several different scales that can be compared to others in the region, state, and nation. As biologists follow these steps, the commonness or rarity of vegetation in a given location can objectively be evaluated, and protection of declining vegetation types from the danger of elimination will be possible.

References

- Barbour, M. 1995. The story behind the *Manual of California Vegetation*. *Fremontia* 23:19-22.
- Beauchamp, R.M. 1986. *A Flora of San Diego County, California*. Sweetwater Press. National City, CA.
- Cheatham, N.H. and J.R. Haller. 1975. An annotated list of California habitat types. Unpublished report. University of California, Berkeley, CA.
- Gordon, H.J. and T.C. White. 1994. Ecological guide to southern California chaparral plant series. Technical Publication R5-ECOL-TP-005. USDA, Forest Service, Pacific Southwest Region, San Francisco, CA.
- Holland, R.F. 1986. Preliminary descriptions of the terrestrial natural communities of California. Unpublished report. State of California, The Resources Agency, Department of Fish and Game, Natural Heritage Division, Sacramento, CA.
- Keeler-Wolf, T. 1993. Conserving California's rare plant communities. *Fremontia* 22:14-22.
- Landis, F. 1994. Surveying Santa Catalina plant communities. *Fremontia* 22:24-27.
- Oberbauer, T.A. and J.M. Vanderwier. 1991. The vegetation and geologic substrate association and its effects on development in southern California. Pages 203-212 in P.I. Abbott and W.J. Elliott, editors. *Environmental Perils: San Diego Region*. The San Diego Association of Geologists. San Diego, CA.
- Sawyer, J.O. and T. Keeler-Wolf. 1995. *A Manual of California Vegetation*. California Native Plant Society Press. Sacramento, CA.
- Skinner, M.W. and B.M. Pavlik. 1994. *California Native Plant Society's Inventory of Rare and Endangered Vascular Plants of California*. Fifth edition. California Native Plant Society, Sacramento, CA.

David C. Hogan, Southwest Center for Biological Diversity, P.O. Box 17639, Tucson, AZ 85731; John O. Sawyer, Department of Biological Sciences, Humboldt State University, Arcata, CA 95521; Colin Saunders, 652 Renaissance Avenue, Fairfield, CA 94585