CALIFORNIA NATURAL HISTORY GUIDES

INTRODUCTION TO THE PLANT LIFE OF SOUTHERN CALIFORNIA

Coast to Foothills

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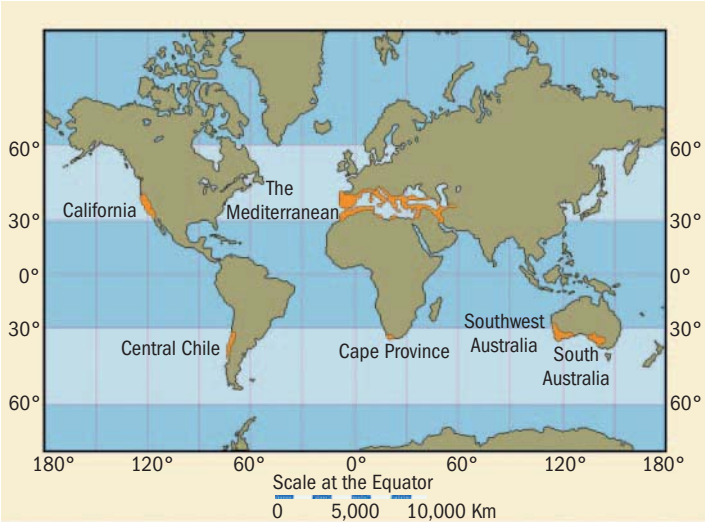
Mediterranean-Climate Regions

California represents one of only five small regions of the world that possess a mediterranean climate, which is characterized by mild, wet winters and dry summers. The other locations are in central Chile, the Mediterranean Basin of southern Europe and northern Africa, the Cape Region of South Africa, and Southwestern and South Australia (map 1). These regions with this highly unusual climate account for only a tiny portion of the world's land area and occur only on the western margins of continental landmasses between about 30 and 40 degrees latitude. Subtropical high-pressure centers shield these areas from summer storms. Millennia of evolution in the five mediterranean climate regions have produced a remarkable and globally significant degree of diversity among both plants and animals. All five regions are included in a select group of 25 regions around the world designated as key ecological hot spots because of the size and uniqueness of their biota.

The California floristic province, representing one of these important ecological hot spots, is defined not only by a mediterranean climate but also by unique plant relationships. It covers the great majority of the state, excluding only the southwestern desert regions and the Great Basin to the east of the Sierra Nevada and Cascade Range (map 2). The region extends beyond our state northward into the Klamath Mountains of southwestern Oregon and southward into northwestern Baja California.

Southern California Region

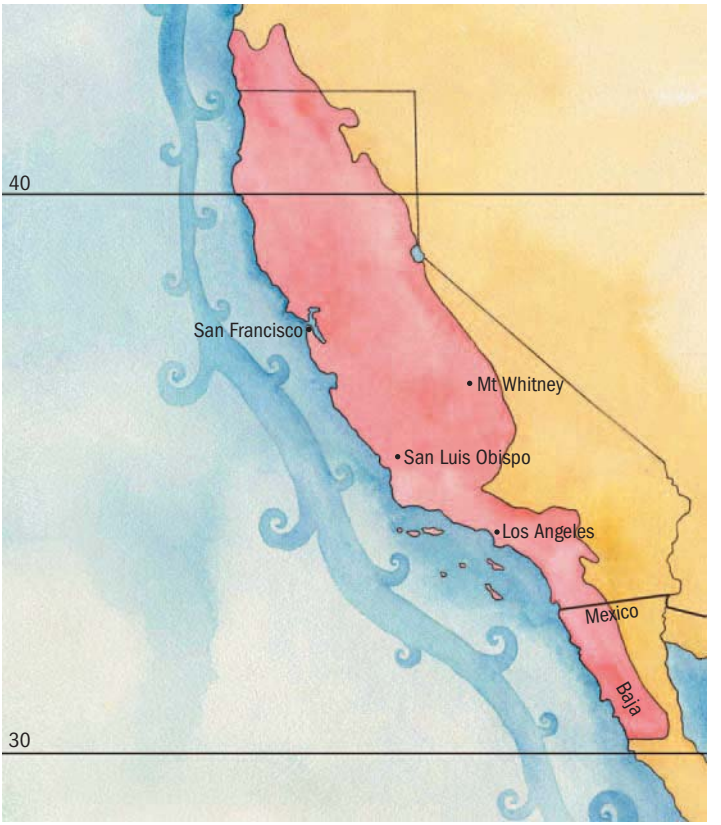
Southern California as defined in this book begins at Point Conception, where the shoreline curves south and eastward, and extends along the coast to the Mexican border. The Santa Inez Mountains of Santa Barbara County and the Transverse



Map 1. Mediterranean-climate regions of the world (map by Lisa Pompelli).

Ranges, including the Tehachapi, San Gabriel, and San Bernardino Mountains, mark the northern boundary of Southern California (pl. 1). The eastern regional boundary extends southward along the Peninsular Ranges, which include the San Jacinto and Santa Ana Mountains in Riverside and Orange Counties and the Palomar, Cuyamaca, and Laguna Mountains to the south in San Diego County. Excluded from the Southern California region are the central Coast Ranges and the San Joaquin Valley to the north, and the Mojave and Sonoran Deserts that lie to the east in the rain shadow of the Transverse and Peninsular Ranges.

Southern California presents classic mediterranean-climate conditions. Rainfall is highly seasonal, peaking in winter and rarely occurring in summer. Periods of six months or more without rain are not at all unusual. Santa Barbara, near the northern coastal limit of our region, receives a yearly average of



Map 2. The California floristic province (map by Lisa Pompelli).

18 inches of rain. Los Angeles averages only 15 inches and San Diego only 10 inches. Inland, the yearly average is typically 20 to 35 inches in the foothills and increases with elevation on the coastal sides of the mountains. Precipitation, much of it snow, reaches about 45 inches per year in the upper elevations of the San Gabriel, San Bernardino, and San Jacinto Mountains.

Rainfall also varies greatly between years. Los Angeles, for

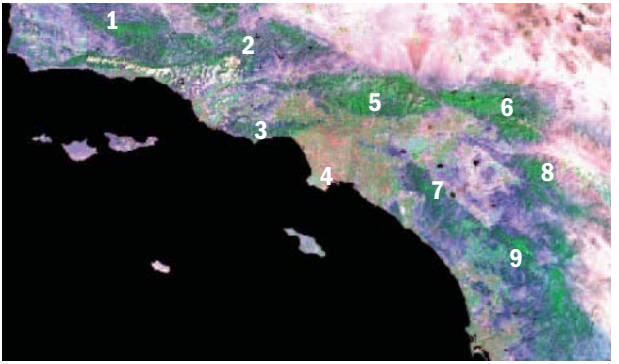


Plate 1. Satellite view of Southern California showing major topographic features: 1. Coast Ranges, 2. Tehachapi Mountains, 3. Santa Monica Mountains, 4. Palos Verdes Peninsula, 5. San Gabriel Mountains, 6. San Bernardino Mountains, 7. Santa Ana Mountains, 8. San Jacinto Mountains, 9. Peninsular Ranges.

example, with an annual average of about 15 inches, has had as little as four inches and as much as 38 inches per year over the past century. The intensity of rainfall over short periods is also remarkable and contributes to landslides and mudflows. The foothills of the San Gabriel Mountains have had up to 25 inches of rain in 24 hours.

The coastal regions virtually never experience freezing temperatures, and thus many plant species with subtropical ancestry survive there. Frost and even snow become regular features as elevations increase. Like rain, however, they can vary greatly from year to year. Hard frosts sometimes extend across the Los Angeles Basin and into desert areas to the east. In such years snowfalls can extend down to the foothill suburbs of Los Angeles. Mount Wilson, at the upper margin of the chaparral zone in the San Gabriel Mountains above Los Angeles, has recorded temperatures as low as nine degrees F.

Over the past few million years a variety of geologic forces have shaped the Southern California landscape. Perhaps the

most significant influence has been the ongoing collision of the Pacific Plate with the North American Plate along our coastal margin. Almost all of the Southern California region and most of the coastal ranges of central California as far north as San Francisco lie to the south and west of the San Andreas Fault and thus are part of the Pacific Plate. The majority of California, however, is part of the North American Plate. Contact between these two plates began about 24 million years ago and continues to be a major force shaping our landscape today. As the two plates try to occupy the same physical space, lateral slippage along hundreds of miles of faults has dissipated much of the tremendous force generated, but the remaining pressure has still wrinkled the crust, forcing up mountain ranges and forming deep subsidence basins.

Uplift of the crust and subsequent erosion have been going on for millions of years and continue today. Much of the Los Angeles Basin and the Oxnard Plain of Ventura County, for example, were once deep ocean basins, but they have slowly filled with erosional debris from mountains over the past few million years. Young mountain ranges such as the San Gabriel and San Bernardino Mountains erode even as they continue to be uplifted. Our shoreline, as well, is highly dynamic, with uplift and erosion occurring at the same time. Coastal areas of Ventura County, for example, have been uplifted at a remarkable average rate of six inches per decade for the past 200,000 years, one of the highest rates known in the world.

It is not surprising, therefore, that the Southern California region includes a wide diversity of topographic features. Moreover, its dynamic geologic history has exposed a variety of types of rocks, which have in turn produced a variety of soil conditions. Granites, sedimentary sandstones and shales, volcanic basalts, occasional limestones, and nutrient-deficient metamorphic rock all influence soil types in Southern California. These varied soil conditions, combined with high topographic diversity and the associated climatic gradients, which have experienced dynamic changes over the past 10,000 years,

have been ideal for the evolution of varied plant species. Elevation, slope exposure, proximity to the ocean, soil depth, and soil nutrition have profound influences on the distribution and occurrence of plant species and communities.

Plant Diversity

Whether we measure biodiversity by numbers of plant and animal species present or by conservation significance (for example, by numbers of designated rare and endangered species), coastal Southern California rates higher than any other part of California or the continental United States. Here a mediterranean climate combines with diverse topography and dynamic fire cycles to produce a mosaic of habitat types, including chaparral, woodlands and savannas, coastal sage scrub, grasslands, riparian woodlands, wetlands, and coastal marshes (pl. 2).

Plate 2. A mosaic of chaparral and woodlands, the characteristic landscape of Southern California.

The richness and evolution of plant diversity in Southern California depend not only on physical geography and climate, but also on natural disturbances. Fire of varying frequency, intensity, and extent, as discussed in more detail in chapter 5, has been a natural component of the Southern California environment since long before humans first arrived in our region 10,000 to 12,000 years ago, and it still is today, al-

though in a somewhat altered manner (pl. 3). Added to this are irregular extreme climate conditions, which are more significant than ordinary conditions in driving the evolution of plants and animals.

The Southern California region includes approximately 2,200 species of native vascular plants (pl. 4), which constitute nearly half of the flora occurring anywhere within our state. Another 700 species of nonnative plants now grow and reproduce on their own here. The most widespread natural ecosystems of our region are the coastal and interior sage scrub, chaparral, and oak woodlands that cover the great majority of Southern California below the coniferous forests of the higher mountains. Also important but more restricted in size and location are coastal dunes and bluffs, low-elevation conifer woodlands, riparian woodlands, and a variety of wetland habitats such as salt marshes, freshwater marshes, and vernal pools. The plant communities of each are described in the following chapters, beginning on the coast and moving inland. A separate chapter covers the Channel Islands and their unique flora, followed by final chapters about invasive nonnative plant species and issues in preserving biodiversity.

Space limitations allow us to discuss here only about 300 plant species—less than 10 percent of the total number possible. Because our approach is ecological, we have chosen to focus on the most characteristic or most frequently encountered plants. Our selection is further bi-

Plate 3. Fire, a natural factor in Southern California.

Plate 4. Diverse species of spring annuals carpeting the foothills of Southern California.

ased toward woody and semiwoody plants in the most common habitats because these species can generally be recognized at any time of year. We have given particular attention to commonly encountered species in coastal and interior sage scrub, chaparral, and oak woodland habitats because of their widespread occurrence. Coniferous forest communities of pines and firs at higher elevations (above about 5,000 feet) are not within the scope of this book.

We give both common names and scientific, or Latin, names for all plants. Common names are more familiar but are often very local, with different names used in different areas. Three or four books may each use a different common name for the same species. Latin names are more stable, but even these are subject to revision as scientists study individual species and develop new understandings of relationships. The Latin names used here follow those of *The Jepson Manual* (Hickman 1993), the most up-to-date summary of the California flora. Flowering periods listed indicate the earliest and latest month in which flowering would be expected to occur. Actual flowering dates in any given year, of course, are subject to seasonal patterns of rainfall.