

Geography and Vegetation

By Todd Keeler-Wolf

California's diverse geography is reflected in its vegetation. Vegetation expresses the interrelationship between all facets of the physical environment, such as climate and geology, and the primary producers (plants) within that environment. Vegetation may be defined as the patchwork of plant species arrayed across the landscape. It includes a variety of life forms such as trees, shrubs, grasses, forbs, and non-vascular plants like mosses. These different life forms are distributed in different patterns across the land and result in the structure of the vegetation. The individual species of plants within a given patch of vegetation are also characteristic. Thus, vegetation consists of physical life forms and the species of plants that make up those life forms.



Wet meadow complex, Silver King Creek, East Fork Carson River, Sierra Region
Photo © Marc Hoshovsky

The broad patterns of vegetation in the state relate most clearly to the combination of temperature and moisture, which is, in turn, strongly influenced by California's varied topography. (See account entitled "Climate and Topography.") The most extreme climates—the coldest alpine environments and the driest deserts—are largely unvegetated. The cooler and wetter portions of the state are forested with coniferous trees while the drier and hotter portions are unforested and covered with desert scrub. Areas of



Coast sagebrush (*Artemisia californica*) alliance, Garrapata State Park, Central Coast Region
DFG photo: Todd Keeler-Wolf

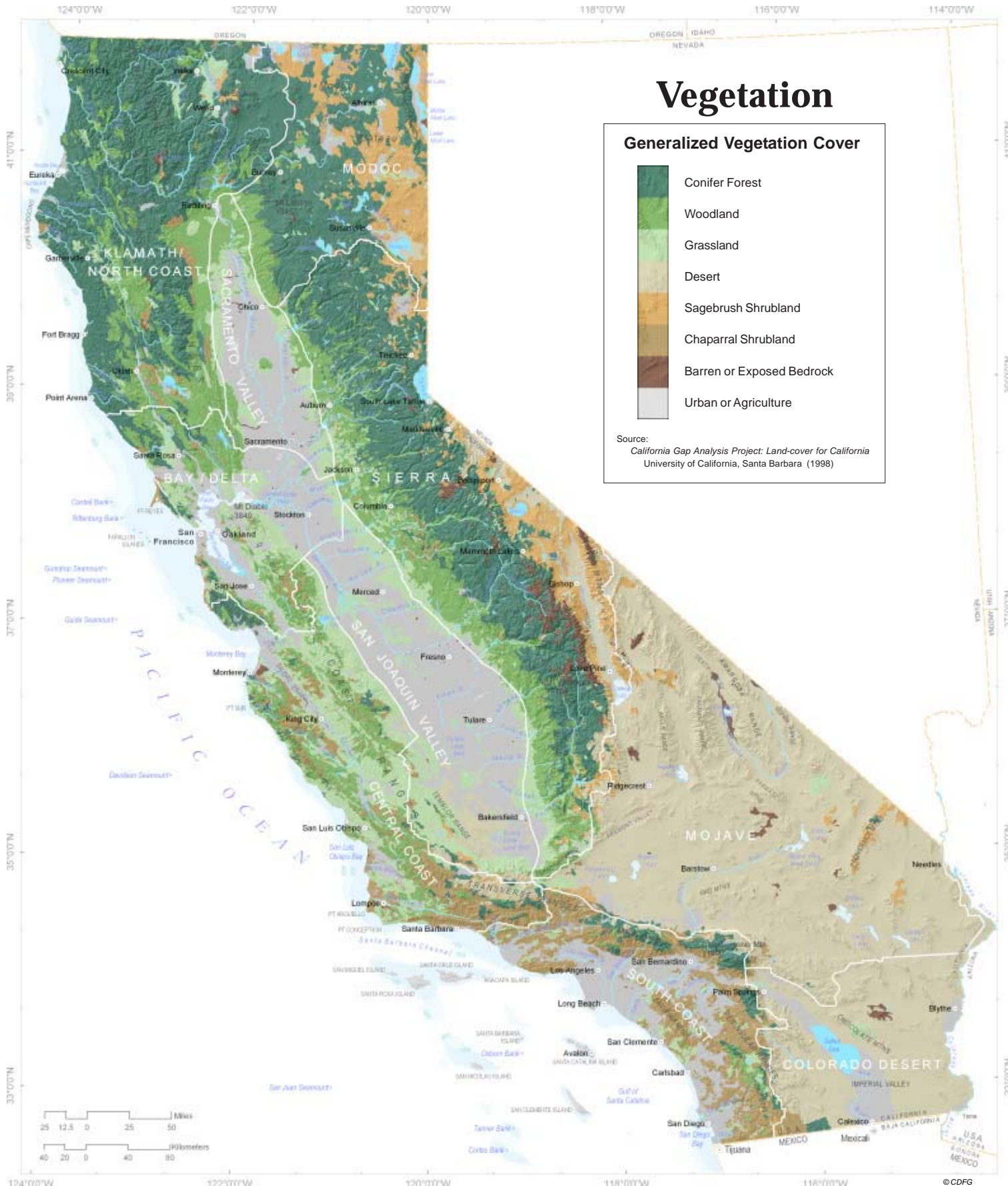
intermediate temperature and moisture are covered with woodlands, grasslands, chaparral, and coastal scrub.

The effects of other important determinants of vegetation, such as soil fertility and depth, are influenced by topography and geology. These patterns are more easily seen at a finer scale than can be presented on the map at right. (See account entitled "Mojave Desert Vegetation" for a detailed map of vegetation types for a portion of the state.) Thus, within a general area climatically suitable for woodlands, we may see chaparral on shallower, steeper, and rockier soils; grasslands on deeper and less steep clay-rich soils; and woodlands on intermediate soils of gentle and moderate slope. The substrate on which vegetation grows may affect the



species composition of certain broad types of vegetation. For example, vegetation on soils derived from serpentine, our state rock, may often be chaparral, but will be composed of very different species and be less dense than adjacent chaparral on soils derived from non-serpentine rock.

Coast redwood (*Sequoia sempervirens*) forest, Klamath/North Coast Region
Photo © Marc Hoshovsky



Plants

By Roxanne Bittman

California contains some of the highest plant diversity in the world. It leads the nation in numbers of native plants. The latest figures indicate California has 6,272 plant taxa, including species and subspecies. Its 5,047 species (Jepson Flora Project 2002) represent 32 percent of the total number of plant species in the United States and nearly 25 percent of all the plant taxa found in North America north of the Mexican border. California also has an enormous number of endemic plants. Its 2,153 endemic taxa represent over one third of its native plants.



Chaparral clusterlily (*Brodiaea jolonensis*)
Photo: John Game

Dune primrose (*Oenothera deltooides*) and
desert sand verbena (*Abronia villosa*)
Photo © Rodney Temples

Reasons for this plant diversity stem from the unique combination of Mediterranean climate and topographic, geologic, and soils diversity. In addition, many taxa from the Tertiary Period, such as the giant sequoia (*Sequoiadendron giganteum*), have survived here due to our mild climate. Finally, over geological time, outbursts of speciation have occurred among some groups of plants, such as the wildflowers.

The map of California plant richness comes from data provided by the Jepson Flora Project in 2002. The dataset was created by assigning each plant in *The Jepson Manual: Higher Plants of California* (Hickman 1993) to a geographic subregion as defined in the manual. The map displays the total number of California native plant taxa present in each Jepson geographic subregion. As with any simplified map, a

number of assumptions have been made, and as the data are refined, a different picture may emerge. However, the general patterns follow the basic driving ecological factors known to most strongly influence plant distribution and diversity.



Five-spot (*Nemophila maculata*)
Photo © Barbara J. Nelson

Vegetation and plant species closely follow shifts in moisture and temperature as produced by topography and accompanying climate. The topographic and moisture gradients in the Sierra Nevada are the most extreme in the state, followed by those in the Klamath Mountains and in the San Bernardino Mountains. Thus, the map at right shows the richest plant diversity in the high Sierra and Klamath areas, with the next richest areas being the outer North Coast ranges, the Cascades, and the San Bernardino Mountains. Lowest in plant richness are the desert and Central Valley areas.

Compare this map and the special status plant map that follows. Rare plant richness may more closely follow geologic variation than does overall plant richness, and thus the Klamath, desert mountain ranges, and several coastal areas are rare plant hotspots. Also, the high level of rarity in the Bay/Delta and South Coast regions may reflect the greater level of habitat destruction in those regions than in the Sierra, where total plant richness is high.



Crinkled onion
(*Allium crispum*)
Photo: John Game

