Vil. GEOGRAPHIC REGIONS OF CALIFORNIA AND THEIR FLORAS. 1.

The Regional Parks Botanic Garden is divided into ten major geographic regions as follows:

' Deserts. [purple labels]. Includes the Mojave and Colorado (Sonoran) deserts in addition to the mountains of Ventura, Los Angeles, Orange, Riverside, and San Diego counties.

- The Channel Islands. [black labels] The set of eight unique islands off southern California's coast: Anacapa, Santa Cruz, Santa Rosa, San Miguel, Catalina, Santa Barbara, San Clemente, and San Nicolas.

- Central Valley and Foothills. [yellow labels] This region is principally focused on the inner central and south Coast Ranges and their foothills and the adjacent parts of the Central Valley.

- Santa Lucia section. [orange labels] Includes the mountains of Santa Cruz, Monterey, San Benito, San Luis Obispo, and Santa Barbara counties.

- Franciscan section. [yellow labels] The unique floras of San Francisco and northern San Mateo counties.

- Sierra Nevada. [blue labels] The entire Sierra Nevada and areas to its east.

- Redwood section. [red labels] The flora of the redwood region, including Marin, Sonoma, and Mendocino counties.

- Pacific rainforest. [green labels] The flora of the high-rainfall regions of far northwestern California, especially in Humboldt and Del Norte counties.

- Sea bluffs. [light green labels] Vegetation of the immediate coast, along bluffs, from southern to northern California.

- Shasta-Klamath section. [green labels] Flora of the mountains of Tehama, Shasta, Lassen, Trinity, Siskiyou, and Modoc counties.

This session we'll explore five of these regions, and next session we'll explore the remaining five.

DESERTS. [purple labels; beds 1-99]
The deserts are represented here as not only the Mojave and Colorado (Sonoran) deserts of southern California, but also the mountainous parts of the eastern half of Kern, and all of Ventura, Los Angeles, Orange, Riverside, and San Diego counties. This comprises a vast area of the state that is dominated by vegetation shaped principally by aridity. Deserts are defined as areas receiving less than 10 inches of precipitation annually. The mountains to the west--mainly the Transverse and Peninsular ranges--are also arid in quality, although the higher elevations and west slopes often receive considerably more than the desert minimum. Temperatures in this region vary from quite cold in winter at the highest elevations (which may reach to almost 12,000 feet) to mild year round in the lowest deserts.

The principal vegetation of this region is as follows: creosote bush scrub for the low desert flats and slopes; shadscale scrub for the lowest alkaline areas; Joshua tree woodland for the middle elevations of the Mojave (but not the

Colorado); pinyon-juniper woodland for the upper parts of desert mountains; fan palm oases around the bases of mountains along the border of the Colorado desert; and desert washes in the Colorado desert. Also, limited amounts of true riparian woodland occur fringing permanent streams.

The principal vegetation of the coastal mountainous areas includes southern riparian woodland along permanent water courses; southern oak woodland (mainly dominated by coast live oak) on well watered hills and canyons; coastal sage scrub and hard chaparral on steep, hot rocky slopes; and various kinds of montane coniferous forest at the middle to higher elevations.

California's deserts are rich in ephemeral annual wildflowers (which depend on the critical timing and amount of fall and winter rainfall), drought resistant deciduous and evergreen shrubs with deeply probing roots, halophytic shrubs (shrubs adapted to alkaline or saline soils) in the goosefoot family Chenopodiaceae, small leguminous trees of gravelly washes with deeply penetrating roots, small drought-tolerant coniferous trees that are very slow growing (pinyon pines and junipers), and a variety of succulent or semisucculent herbs, shrubs, and small trees. The latter category includes such leaf succulents as dudleyas, yuccas (including the bizarre Joshua tree, Yucca brevifolia), nolinas (bear grass), and agaves. The major stem succulents belong to the cactus family Cactaceae, bearing such common names as prickly pears (Opuntia spp.), chollas (Opuntia spp.), barrel cacti (Ferocactus spp.), hedgehog cacti (Echinocereus spp.), and pincushion cacti (Mamillaria and Coryphantha spp.). Several of the shrubs represent the only members of their families or subfamilies to enter California from Mexico and Central America, such as chuparosa (Justicia californica in the acanthus family), desert willow (Chilopsis linearis in the trumpet-vine family), and palo verde and senna (Cercidium floridum and Senna spp. in the senna subfamily of the pea family).

CHANNEL ISLANDS [black labels; beds 301-320]
The Channel Islands comprise a clearly defined group of four northern and four southern islands off southern California's coast. The islands are generally considered to have never been connected directly to the California mainland, but during past epochs when sea levels fell, the channels separating the islands from the mainland were much narrower. Today the islands are from about 15 miles to more than 30 miles from the coast. The smallest islands, such as the Anacapa group, are only a few square miles in extent, whereas the largest islands-including Santa Rosa, Catalina, and Santa Cruz islands--cover tens of square miles. Santa Cruz, the island directly off Santa Barbara's coast, covers nearly 100 square miles and has mountains that reach almost 3,000 feet elevation.

These islands experience a different mix of climate than their mainland counterparts because they're surrounded on all sides by the mitigating factor of the ocean. This means that average temperatures are milder year round and that overall humidity is generally higher, stressing plants less. Because of this difference in climate, these islands have created a refuge for plants that are winter tender or are susceptible to water stress in summer. These islands are home to several relict plants that have died out on the mainland because of inability to compete with other more vigorous plants or adapt to generally drier climates. In addition, isolation from the mainland has allowed several species or varieties to evolve forms unique to these islands but related to mainland counterparts. In general, forms with larger leaves and/or flowers have evolved here as compared to their mainland sisters.

The Channel Islands harbor a variety of vegetation types, but in many places typical plant communities look atypical in their compositions! The most common types include coastal bluffs, coastal sage scrub, hard chaparral, oak woodlands, and grasslands. Additional unusual types include ironwood forests and closed-cone pine forests. Much of the vegetation on several islands has been heavily altered by man's activities, including the disastrous introduction of feral animals. Although some areas are recovering, many are heavily degraded, and some unique species have been lost.

Endemic and unusual species are scattered across the botanical spectrum, including island oak (Quercus tomentella), island ironwood (Lyonothamnus floribundus), large shrubby buckwheats (Eriogonum giganteum and arborescens),

several succulent dudleyas, an unusual barberry (Berberis pinnata insularis), island sunrose (Helianthemum greenei), an island currant and gooseberry (Ribes viburnifolium and thacherianum), giant coreopsis (Coreopsis gigantea), island pine (Pinus remorata), island bush poppy (Dendromecon rigida harfordii), island paintbrush (Castilleja hololeuca), and island cherry (Prunus lyoniO. Of these, the oak, ironwood, and buckwheats undoubtedly represent relicts, while many of the others have close mainland counterparts.

SANTA LUCIA REGION [orange labels; beds 201 to 288]
The Santa Lucia range is an exceptionally high mountain chain close to the central California coast, especially in Monterey and San Luis Obispo counties, with elevations reaching well in excess of 5,000 feet. The extremely rugged relief and stark topography of this area give it a visually stunning appearance and create many microhabitats for plants. In addition, the area has extremes in climate from fog-drenched coastal foothills to very hot and dry inland foothills, and from nearly frost-free coastal areas to areas of at least some winter snow. This is the region where the coastxedwood (Sequoia sempervirens) reaches its southernmost limits while the chaparral yucca (Yucca whipplei)--so typical of southern California--reaches its northern extreme. The Santa Lucias are also noted for their unusual geology, which includes extensive areas of granite and limestone. The surrounding mountains, including the southern Santa Cruz mountains, the Pinnacles area, and the western end of the Transverse ranges share some of the Santa Lucia's characteristic flora, and so are included in this region.

Because of the diversity of climate, soils, and topography there is a corresponding diversity in plant communities. Starting with the foggy coast, we see promontories of Monterey pine and cypress forests, canyons with coast redwoods, north coastal scrub and coastal sage scrub meeting and mixing, hard chaparral on the higher drier slopes, hills with oak woodland, higher hills with mixed-evergreen forest (including the rare conifer Santa Lucia fir, Abies bracteata), mountain tops with mixed conifer forest, riparian corridors, colorful grasslands and vernal pools on grassy plains, and even bits of desertlike vegetation on the inner fringes, where summer heat and drought rule.

The mix of conifers in these mountains is remarkable: Monterey pine (Pinus radiata), Monterey cypress (Cupressus macrocarpa), Santa Cruz cypress (Cupressus abramsiana), gowen's cypress (Cupressus goveniana), bishop pine (Pinus muricata), and knobcone pine (Pinus attenuata) all meet in various specialized habitats near the coast. Most are considered relict species of very limited modern distribution. The coastal mountains are home to Coulter pine (Pinus coulteri), Douglas fir (Pseudotsuga menziesii), ponderosa pine (Pinus ponderosa), sugar pine (Pinus lambertiana), and Santa Lucia fir. Inland, we find stands of gray pine (Pinus sabiniana) and California juniper (Juniperus californica). And of course, there are those coast redwoods tucked into favorable coastal canyons and flood plains.

CENTRAL VALLEY AND FOOTHILLS SECTION [yellow labels; beds 101-123]
This long area, consisting of medium-sized mountains, inner foothills, and the valley bottom, ranges from Glenn County in the north to western Kern County in the south and so includes much of the central and inner south Coast Ranges. Counties included within this category are Glenn, Colusa, Lake, Yolo, Napa, Sutter, Sacramento, Solano, Contra Costa, San Joaquin, Alameda, Santa Clara, Stanislaus, Merced, Kings, and the

western parts of Madera, Fresno, and Kern. Although mountains such as Mt. Hamilton and Mt. St. Helena may reach well over 4,000 feet elevation, most are less lofty. Predictably, the vegetation reflects this fact.

In some ways this region comprises some of California's most characteristic vegetation: oak woodlands, savannahs, and foothill woodlands on rolling hills; valley oak woodland and riparian corridors along permanent streams; valley grassland and its attendant vernal pools on low hills or valley bottoms; and hard chaparral on

steep, dry, rocky slopes. In addition, the highest areas may contain forests of ponderosa pines and mixed conifers, and there are many areas dominated by serpentinite rocks. Plants adapted to soils derived from these rocks are poor competitors elsewhere and have adapted to very difficult conditions that few other plants can tolerate. The kind of vegetation characteristic of these soils may include a bunchgrassland, stunted chaparral and, with sufficient moisture, groves of Sargent's cypress (Cupressus sargentii).

This foothill area is noted for its vivid annual wildflower and bulb displays. Two prime areas still extant today include the Carrizo plains and Bear Valley. Both still are carpeted by millions of brightly colored wildflowers in years of generous rainfall, including such typical Californians as shooting stars (Dodecatheon), gilias (Gilia and Linanthus spp.), poppies (Eschscholzia spp.), creamcups (Platystemon californicus), redmaids (Calandrinia ciliata), tidytips (Layia spp.), monolopias, goldfields (Lasthenia spp.), glue-seed (Blennosperma nanum), lupines (Lupinus spp.), phacelias, larkspurs (Delphinium spp.), clarkias, fiddleneck (Amsinckia spp.), popcorn flower (Plagiobothrys and Cryptantha spp.), and many more. Bulb genera that flourish here include the brodiaea complex (Brodiaea, Triteleia, and Dichelostemma spp.), soap plant (Chlorogalum pomeridianum), fritillaries (Fritillaria spp.), wild onions (Allium spp.), and mariposa tulips (Calochortus spp.).

SEA BLUFFS [light green labels; beds 801-818]
California's sea bluffs are often neglected. Yet these rugged rocky promontories are home to a unique set of plants that are influenced by a mix of summer-cool coastal fogs, mild winters, fast-draining rocky or sandy soils, and strong winds. As a consequence, the vegetation from north to south shows remarkable similarity and coherence.

Vegetation seen on coastal bluffs includes coastal sage scrub and north coastal scrub, coastal prairie, and the vegetation of the immediate bluff edges and sides. Although all of these characterize coastal bluffs, the Garden mainly features plants from the hard-to-define yet distinctive bluff edges and sides. Adaptations of this vegetation are similar to those for plants from coastal dunes and strand and, often, the same species will appear in both places. Adaptations are to the strong desiccating winds and the lack of soils that retain water well. Plants here are often matted or cushionlike, with close rosettes of fleshy or grayish to bluish-green leaves. Plants are usually taprooted and extend their territories by rooting as they grow. Because of mild temperatures, flowers often appear throughout the year, but are most prolific in spring, when many bluffs are converted into rock gardens of great beauty.

The bluff flora is strongly represented by composites (bluff goldenrod, Solidago spathulata; dune sagebrush, Artemisia pycnocephala; dune bursage, Ambrosia chamissonis; seaside daisy, Erigeron glaucus; golden aster, Chnysopsis villosa, among others. Colorful spring wildflowers include bluff onion, Allium dichlamydeum; ground brodiaea, Brodiaea terrestris; coast rockcress, Arabis blepharophylla; various wallflowers, Erysimum spp.; California poppy, Eschscholzia californica maritima; sea-thrift, Armeria maritima; California phacelia, Phacelia californica; bluff dudleya, Dudleyafarinosa; and coast angelica, Angelica hendersonii. Several low, creeping woody plants related to taller shrubs also occur here: Arctostaphylos uva-ursi, kinnikinnick; Ceanothus gloriosus, glory-mat; dwarf coyote bush, Baccharis pilularis; and low-growing versions of coffee berry, salal, and blue-blossom ceanothus.