THE CASUAL HIKER'S FIELD GUIDE

COASTAL MOUNTAIN HABITATS

001.
002.
003.

ROBIN CASEY

003. 004. 005.

001.

common name : Miner's lettuce
scientific name : Montia perfoliata
family : Portlacaceae
blooms : February-May
type : Herb

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ROBIN CASEY

TABLE OF CONTENTS

INTRODUCTION

Nearly one-fourth of the plants found in North America north of Mexico, and more than are found in any other state, grow in California. Around 6,000 species, subspecies, and varieties of native flowering plants, conifers, and ferns grow in woodlands, deserts, mountains, and wetlands of California, some from the days when dinosaurs roamed the earth and some of far more recent origin. California is home to the world's tallest trees, the coast redwood, the world's largest trees, the giant sequoia, and the world's oldest trees, the western bristlecone pine.

The extraordinary diversity found in California's native plants is a relfection of the complex geologic history, diverse topography, and climate of the area now called California that has changed dramatically over the eons. Particles eroded from base rocks combine with organic matter to slowly form soils. When an area is wet and warm, soils form faster, where dry and hot, soil formation can be almost nonexistent. Today's vegetation is a reflection of environmental conditions found in years past together with conditions found today. As conditions change, some plants can persist, whereas others cannot and become extinct. Fan palms (Washingtonia filifera), for example, are relics from 60 million years ago when the region was less mountainous and the climate tropical; the coast redwood and the giant sequoia are remnants from 40 million years ago when the climate was cooler and wetter; and some of the oaks and desert shrubs we see today are descendents of species that evolved in the warmer, drier period of 10 million years ago.

Because plants occur where environmental conditions meet their needs, understanding the subtle factors that affect plant distribution can be interesting and a challenge. Noting features such as slope direction, soil depth, history of disturbance, intensity of shade, and availability of moisture enable prediction of the assemblages of plants that might be expected, or the understanding of why certain plants so often grow together.

California's landscape is rich and varied, with dozens of vegetation types ranging from those found on coastal bluffs and dunes to towering montane forests. The stunning beauty of the annual spring wildflower displays on coastal terraces and on valley slopes alone brings visitors from around the world. As the population of this state continues to expand rapidly, being good stewards of this rich resource becomes a daunting challenge. Gaining an understanding and enjoyment of the plant life found in this state is a good place to begin.

FIG 1.1 CALIFORNIA ECOREGIONS

001. CENTRAL COASTAL MOUNTAINS
002. NORTHERN COASTAL MOUNTAINS
003. KLAMATH RANGE
004. MODOC PLATEAU
005. GREAT CENTRAL VALLEY
006. SIERRA NEVADA
007. GREAT BASIN
008. MOJAVE DESERT
009. SONORAN DESERT
010. SOUTH COAST

001.

002.

003.

004.

005.

OAK WOODLAND : TAN OAK 001.
CHAPARRAL : COYOTE BRUSH 002.
RIPARIAN : LADY FERN 003.
GRASSLAND : OATGRASS 004.
CONIFER FOREST : DOUGLAS FIR 005.

GEOLOGIC HISTORY

California's coastal mountains trace a sinuous 800-mile course from the northwest corner of Del Norte County south to the Mexican border. Except for a break in the chain at the Golden Gate, they form a continuous series of ranges and valleys, separating the coast from the Great Central Valley and the deserts of the interior. This mountainous barrier has a dramatic effect on California's climate: storms originating over the Pacific Ocean bring rain to the western slopes, while the eastern slopes remain relatively dry. Many of California's industries flourish in the climatic conditions created by the coastal mountains–the evergreen trees that support the north coast timber industry thrive on the increased rainfall and frequent fog of the region; coastal fog cools hot inland valleys just east of the coast mountains where wine grapes are cultivated; and fruit and nut trees and cool weather vegetables are grown in coastal areas from San Mateo County to San Diego.

The geologic history of California's coastal mountains begins several hundred million years ago when, according to current geologic theory, movement of the earth's crust set in motion the processes that created the coastal ranges. The geologic theory of plate tectonics describes the system of loosely interlocking plates, floating upon an underling mantle of less solid material, that cover the earth's surface. The North American Plate supports the continent of North America, and the Pacific Plate lies beneath the Pacific Ocean. About 250 million years ago these two plates, which had been gradually moving towards each other, collided and the sea floor crust of the Pacific Plate slipped beneath the continent, heating and melting as it reached the earth's interior. Between 150 and 140 million years ago this molten rock or magma, began to push upward, forming the Klamath and Peninsular ranges.

About 30 million years ago the relative movements of the North American Plate and the Pacific Plate changed from a head-on contact to a lateral slipping against each other. This zone of slippage, extending nearly the length of the state, is called the San Andreas Fault. Along this zone, folding of the sea floor along the margin of the North American Plate resulted in the creation of the Coast and Transverse ranges, which are composed of the crushed, crumpled, and folded sea floor sediments.

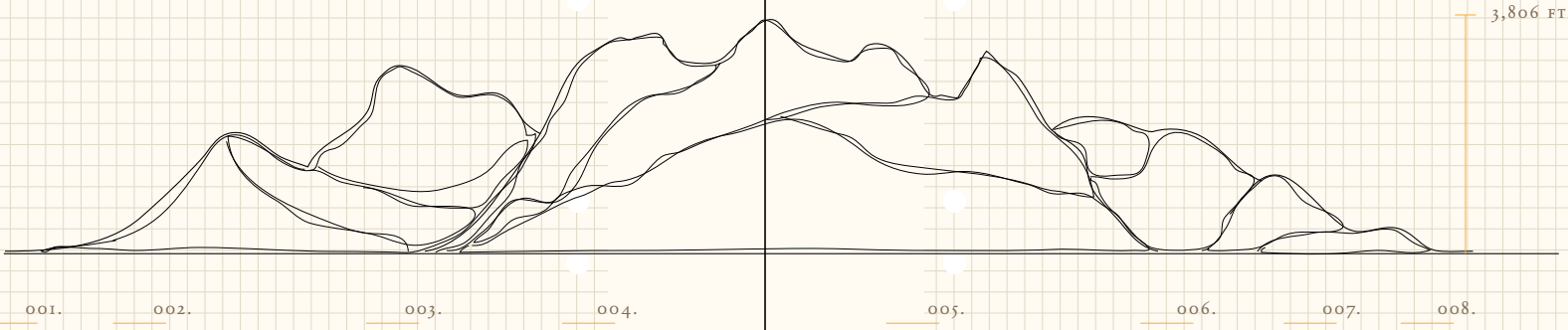
The coastal mountains constitute four geomorphic provinces or geologic regions within California. The northern-most is the Klamath Mountains province, which lies near the coast in northwestern Del Norte County and extends north into Oregon. The northwest-trending Coast Ranges, the largest of the state's geomorphic provinces, rises abruptly from the shore in northern Humboldt County and extend 400 miles south to the Santa Ynez River in Santa Barbara County. The Transverse Ranges lie along an east-west axis, from the Santa Barbara coast to the Mojave Desert, creating a natural barrier between Central and Southern California. The massive Peninsular Ranges complete the coastal mountain system, extending south from the Los Angeles Basin to the tip of the Baja Peninsula.

In Northern California, the Klamath Mountains are composed of metamorphic and granitic rock–formed as a result of extreme changes in temperature, pressure, and chemical composition that occurred when molten material from below the earth's crust was pushed to the surface. South of the Klamath Mountains, the Coast Ranges lie close to the continent's edge, from Humboldt County to San Francisco Bay, forming a series of low mountains paralleling the coast. south of the bay, which separates the Coast Ranges into northern and southern ranges, are the Diablo, Gabilan, Santa Cruz, and Santa Lucia mountains, the highest of which reach to 4,000 feet. The sea floor sediment–sandstones and shales–that make up the Coast Rages were crumpled so completely that it is difficult to discern individual layers of sedimentation. Visible in the sea cliffs along the Northern California coast are massive and steeply dipping rock layers, called the Franciscan Formation; a spectacular example of this geology can be seen along the cliffs at Devil's Slide in San Mateo County.

Dramatic changes in elevation and a variety of climatic zones contribute to a diversity of plant life in California's coastal mountains. Conifers–redwood and Douglas-fir–cloak the windward slops of the Klamath Mountains and the northern Coast Ranges. Heavy winter rainfall, summer fog, and moderate temperatures have produced redwood groves where 2,000 year-old trees tower more than 300 feet above the forest floor. South of San Francisco Bay, the slopes of the Santa Cruz Mountains are covered with stands of redwood while the drier regions of the southern Coast

Ranges are vegetated with oaks, pines, and chaparral. As precipitation decreases southward , in the central and southern Coast Ranges, stands of hardwoods including tanbark oak, coast live oak, big-leaf maple, and madrone begin to outnumber conifers. On steeper slopes and exposed ridges where thin soils lose moisture rapidly, drought-resistant chaparral species such as chamise, manzanita, sage, and scrub oak take hold.

In the semi-arid Transverse and Peninsular ranges, chaparral is abundant on windward and southwest-facing slopes. Mixed-coniferous forest–Ponderosa pine, sugar pine and white fir–grows in isolated stands in protected areas. Hardy, drought-resistant digger and knobcone pines grow on the dry, rocky slopes.



001. PACIFIC OCEAN
002. COASTAL PRAIRIE
003. RIPARIAN WOODLANT
004. REDWOOD FOREST
005. NORTH-FACING WOODLAND
006. SOUTH-FACING CHAPARRAL
007. GRASSLANDS
008. SAN FRANCISCO BAY

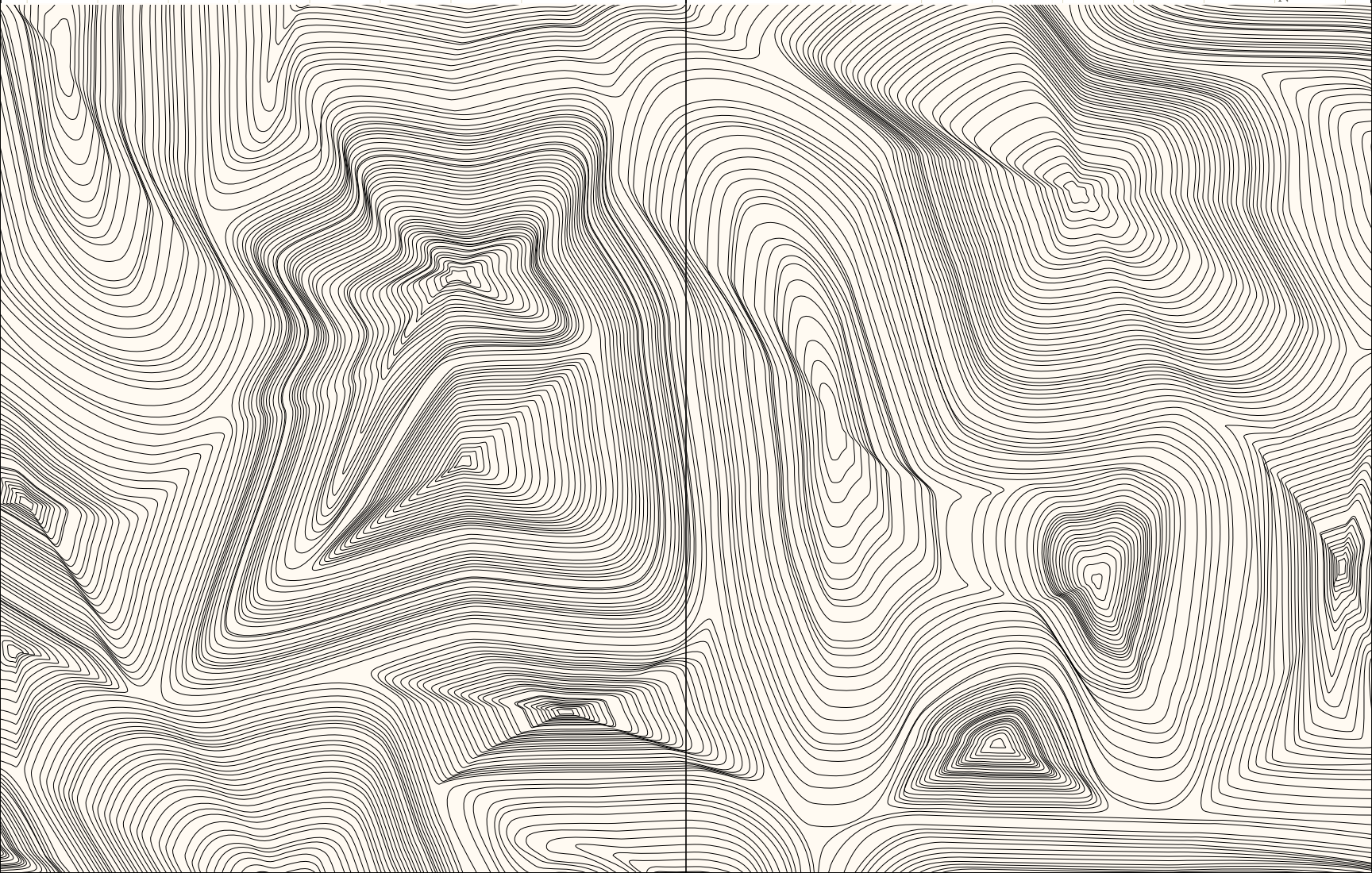
SOILS & TOPOGRAPHY

Soils develop from their base rocks very slowly over many years as the rocks weather. Organic materials such as lichens, fallen leaves, roots, dead insects or other animals decay and become integrated over time with the rock fragments to form soil. This process is greatly accelerated by the presence of soil organisms, particularly earthworms. Because there are so many types of rocks and conditions under which soil is formed, countless types of soils exist.

Topography also plays an important part in the distribution of species because slope direction and wind exposure affect temperature and drainage. California is in the northern hemisphere, so south-facing slopes get more direct sunlight and are thus hotter, whereas north-facing slopes are more moist and cooler, they support forests or denser growth. Winds are slowed, evaporation is reduced, and over time more leaf litter accumulates, leading to greater soil development. Chaparral stands tend to be on south-facing slopes and have little leaf litter and dry, humus-poor soils.

The addition of organic matter and moisture to soil brings a rich assortment of soil microbes (bacteria and fungi) and other soil organisms such as springtails, mites, and millipedes that can number in the trillions ber acre of temperate soil. The interactions of rock type, climate patterns, vegetation type, and associations of soil organisms are complex but determine the nature of the soil and hence the distribution of plant species. Soils develop slowly under conifer trees and tend to be more acid, whereas soils developing in grasslands are deeper, richer in organic matter, and less acid.

Although plants need light to carry on photosynthesis, high temperatures, direct sun, and wind can nonetheless be sources of moisture stress. These factors can cause a plant to wilt, shred, or even die. Along the coast or high up in the mountains where winds tend to be strong, one can see wind-pruned trees and plants that have special adaptations such as prostrate growth forms or reduced leaves. Some desert plants have abandoned leaves and carry on photosynthesis in their trunks, such as the various cactuses or ocotillo that leafs out only after rain. Chaparral plants tend to have small, tough leaves that often grow upright to reduce solar exposure, whereas riparian plants have soft, horizontally growing, large leaves. Other kinds of defenses of leaves to wind and sun include increased hairiness, grayness, succulence, tough waxy coverings, and reduced surfaces.



OAK WOODLAND

In the San Francisco Bay Region, valley and foothill woodland occurs at elevations of about 300–3,500 feet and includes much of the area occupied by the Mount Diablo and Mount Hamilton ranges, and the hills in Napa and Solano counties. Oak woodland communities grow along many of the dry ridges. They receive about 20 inches of rain each year and are rarely touched by fog except in the winter. The summer weather is warm, with daytime temperatures often exceeding 90 degrees farenheit.

The trees are generally somewhat scattered, so there is a well-lit understory, with a few shrubs and a wide variety of herbaceous plants. These forests are usually open with large sunny patches of grasses and flowers scattered between the trees. Oak woodlands are known for their great spring wildflower displays. Some of the more common and conspicuous plants of this woodland community are listed below.

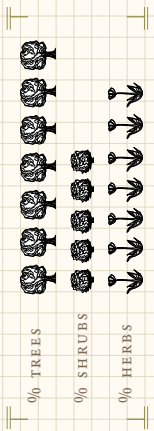
FIG. 2.1

PLANT TYPE RATIO IN OAK WOODLAND HABITAT

TREES
- CALIFORNIA BAY
- CALIFORNIA BUCKEYE
- COULTER PINE
- FOOTHILL PINE
- BLUE OAK
- CANYON LIVE OAK
- COAST LIVE OAK
- INTERIOR LIVE OAK
- SCRUB OAK
- VALLEY OAK

SHRUBS
- BUCKBRUSH
- YERBA-SANTA
- TOYON
- CALIFORNIA COFFEEBERRY
- COMMON SNOWBERRY
- WESTERN POISON-OAK

HERBS
- COMMON MILKMAIDS
- CHINESEHOUSES
- MOSQUITO-BILLS
- HILL STARFLOWER
- BABY-BLUE-EYES
- GOLDBACK FERN
- OAK MISTLETOE
- WESTERN BUTTERCUP
- CALIFORNIA SAXIFRAGE



OAKS

Quercus species

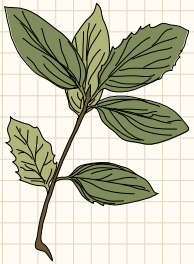
Although oaks have variable forms, they have several common characteristics. Ripening from female flowers are the acorns, composed of a smooth, thin-shelled nut protruding from a scaly cap. The male flowers hang down in pendant catkins.

Uses: The oaks were one of the most important food sources of the California Indians. Acorns were gathered by the women and thrown over their backs into large baskets, called burden baskets. Older women didn't join in the gathering, but instead enjoyed the privilege of sorting the wormy acorns from the whole ones. After years of eating acorns containing grit from leaching and grinding with rocks, these women had only stubby remnants of teeth. Therefore, the soft worms from the "bad" acorns were considered a great delicacy. This privilege of the old served a two-fold purpose, since it also kept worms from laying eggs in the acorns and destroying the meat before it could be used.

After sorting, the acorns were soaked overnight in hot water, hulled, and ground into meal. Since acorns contain a bitter tannic acid, they had to go through a complicated process of leaching before being eaten. This was usually done either by placing the meal in a frame of twigs and letting water run over it, or by boiling it by the hot rock method. In this process the meal was placed in watertight baskets and hot rocks from the fire were added until the water boiled. Since the water had to be changed several times to remove the dissolved tannic acid, this was a tedious process. After leaching, the meal was made into a thin gruel or wrapped in fern leaves and baked on hot rocks.

Acorns were important medicinally as well. Before it had been discovered by modern civilization, a type of penicillin was used by the Indians to draw out sores and boils. The acorn meal was covered tightly to cause mold to form, then, when this layer of mold or "skin" was strong enough to be pulled off, it was rolled into sheets and stored until needed.

The wood from some of our local oaks has been important in the past, and some of it is still used today. Although the spreading form of the coastal live oak precludes its use for lumber, the wood burns well and is often used as a fuel and a source of charcoal. The maul oak (canyon live oak) received its name because its wood is so hard and heavy that it was used to make maul heads in the pioneer days.



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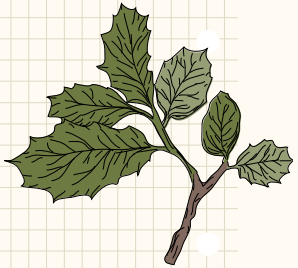

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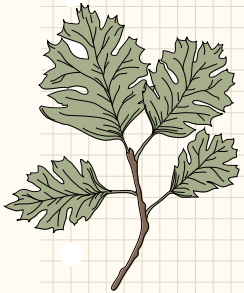


003.

004.

001. CANYON LIVE OAK
002. COAST LIVE OAK
003. BLACK OAK
004. SCRUB OAK

CANYON LIVE OAK

Quercus chrysolepis

The canyon or maul oak, like most oaks, is found on dry wooded slopes of the Coast Range. As the largest of the western oaks, this oak has been known to grow to a diameter of ten feet. The leaves have variable margins, ranging from smooth to coarsely-toothed, often on the same twig. They are usually characterized by a golden fuzz on the underside and a glossy green upper surface. In autumn, the second year acorns, with the golden-tinged rounded caps, fall to the ground.

COAST LIVE OAK

Quercus agrifolia

The coast live oak is the most common oak in these mountains, inhabiting mixed evergreen forests, oak woodlands, and grasslands. When uncrowded by other trees, this oak develops a distinctive rounded crown with wide spreading branches. The sharply-toothed leaves have a shiny dark green upper surface and a lower surface covered with tufts of tan fuzz. Sometimes mistaken for the interior live oak, the coast live oak has deep curved-under leaves. Oblong acorns grow from a fringed cap and end in a pointed tip.

BLACK OAK

Quercus kelloggii

Growing in open oak woodlands, black oaks are most often seen at higher elevations on the eastern slopes of the mountains. Unlike most other oaks, the black oak is deciduous. When the leaves first appear in the spring they are red and covered with fine hairs. Later they mature to deep green. Like those of the white oak, which grows in interior valleys, the leaves of the black oak are deeply lobed. They can be distinguished by the spiny points on the lobe margins.

SCRUB OAK

Quercus dumosa

Scrub oak is found growing in the coastal mountains, usually in the dry chaparral regions. Due to the harsh conditions in which it is found, this oak grows as a shrub, not a tree. The glossy green leaves are small, thick, and leathery.

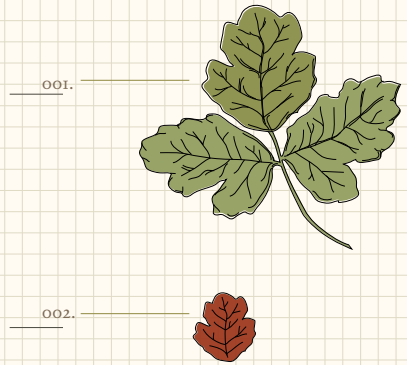
POISON OAK

Toxicodendron diversilobum

This well-known plant grows in a great variety of habitats throughout the coastal mountains. It is equally at home from dry chaparral to moist, shady redwood forests. Poison oak has many diverse growth forms, ranging from bushy shrubs to long vines. These vines can have extremely stout stems from several inches in diameter and can grow up the sides of trees forty feet tall or more. All variations have three-lobed leaves, small whitish flowers, and white berries in summer. They all have skin-irritating oils in the leaves and stems. In the early spring the leaves are bright green and shiny with oil, fading to a darker green in summer, and finally turning the characteristic red in fall before dropping.

In spite of its poison, this plant has many cultural uses. Early Indians, being largely unaffected by the poison, used the stems for thread, warp, and foundation in their baskets, and the juice to dye weaving material black. They also were known to draw patterns on their faces with poison oak juice, then tattoo them with a sooty California nutmeg needle, thereby getting an unfading bluish-green tattoo. Medicinally, the juice from the stems, leaves, and roots was used as a cure for warts and ringworm, and an antidote for rattlesnake venom.

How is it that the local Indians were unaffected by the poison? It's all in the diet. A primary food source was venison. The deer that were captured dined regularly on poison oak. When the Indians ate the deer meat, the antibodies present in the meat were transferred to the humans.



001. LEAVES OF THREE, LET THEM BE
002. LEAVES TURN RED IN LATE SUMMER

common name : Poison Oak
scientific name : Toxicodendron diversilobum
family : Anacardiaceae
blooms : March–May
type : Shrub or vine

TAN OAK

Lithocarpus densiflorus

The tan oak is a common resident of redwood and mixed evergreen forests and can be found on most forested trails in these mountains. This tree, which is not a true oak, grows straight and tall and has smooth gray bark. Its glossy green leaves are brittle and coarsely toothed along the margins. In late spring erect clusters of flowers appear, which mature into acorns after two years. These differ from true oak acorns by the bristly appearance of the cap. Tan oak acorns were prepared like oak acorns for food and medicine.

Tannic acid, used to tan leather, is derived from these trees. Large sections of bark were stripped from the trees, dried, and shipped to major cities by wagon. There they were boiled to leach the acid from the bark.

001.

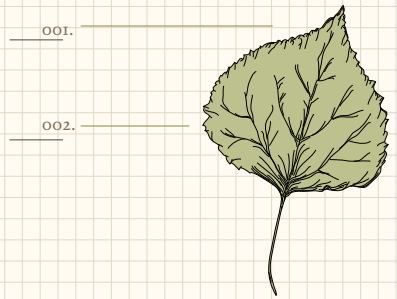
001. BRITTLE, COARSELY TOOTHED LEAVES
002. ACORNS HAVE BRISTLY CAP

common name : Tan oak
scientific name : Lithocarpus densiflorus
family : Fagaceae
blooms : May–June
type : Tree

FREMONT COTTONWOOD

Populus fremontii

The fuzzy cotton-like flowers and seeds are the namesake for this tree. In early spring, the flowers appear on bare branches, the leaves emerging in late spring. Summer finds cottonwoods in full leaf, providing much desired shade. Then, their cotton tufted seeds start floating away on the breeze. Come fall, the light green leaves fade to an opaque yellow and cover the valley floors. Winter finds the trees bare and gray against the sky. Cottonwoods are dependent on a constant supply of water. They have historically lead pioneers to water in arid lands. Due to their assistance in finding water and providing abundant shade, cottonwoods are the most written about tree in literature by early explorers. This deciduous tree grows 40 to 80 feet in height. The bark is smooth and gray for young trees, heavily furrowed on aged trees. The leaf is triangle or heart shaped with fine saw toothed edges. The flowers are male and female catkins (small dangling flower clusters) on separate trees.



001. TRIANGULAR OR HEART SHAPED LEAF
002. LEAVES TURN OPAQUE YELLOW IN FALL

common name : Fremont cottonwood
scientific name : Populus fremontii
family : Salicaceae
blooms : March-April
type : Tree

CALIFORNIA BUCKEYE

Aesculus californica

The habitat of California Buckeye ranges from open dry slopes to wooded canyons. It is abundant throughout the Coast Range. In late spring this is one of the showiest natives in this area. Fresh bright green leaves have replaced the bare limbs of winter. Characteristically, the leaves are palmate and composed of five to seven leaflets. Large fragrant white flower spikes also begin to appear. By the end of summer, the leaves have fallen and the flowers replaced by large brown chestnut-like fruits. It is the resemblance of these fruits to a deer's eye that give this tree its name. The fruit has a very bitter taste when not cooked, and is typically only eaten by animals such as squirrels or rodents when all other food sources are scarce.

Inedible before leaching, the toxic nuts were used in the capture of fish by California Indians. Mashed nuts floated on the surface of the water acted to stupefy the fish, enabling them to be scooped up and easily caught.

001. LONG WHITE FLOWER SPEARS
002. PALMATE LEAVES DROP IN LATE SUMMER
003. LIGHT BROWN SPOT ON THE FRUIT GIVES THE TREE ITS NAME

common name : California Buckeye
scientific name : Aesculus californica
family : Hippocastanaceae
blooms : April-June
type : Tree

TOYON

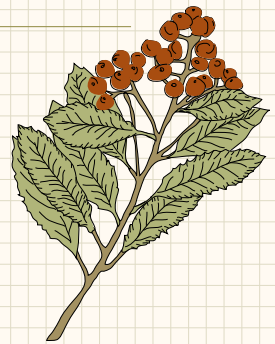
Heteromeles arbutifolia

The toyon or Christmas berry shrub is common in chaparral and as an understory in open wooded forests. It is also the official shrub of the State of California.

This native evergreen shrub is sometimes mistaken for a young tan oak tree. Like the tan oak, the leaves are glossy green, brittle, and toothed. However, a closer look shows that toyon leaves have veins which diverge before reaching the margin and are more finely-toothed than tan oak leaves. In early summer, clusters of drooping white flowers appear, then in late November and early December they ripen into large clusters of bright red berries, appropriately nicknamed Christmas berries.

Like the Spanish, the Indians rarely ate the berries raw due to their bitter taste when fresh. Instead, they either hung branches over hot coals or tossed individual berries in a cooking basket along with coals.

A good indicator of whether a berry is safe is observing the quantity of berries on the plant. In late summer, when food is scarce, if a plant still bears a large number of fruit it means the animals aren't eating them. If the animals don't eat them, you shouldn't either.



001. RED CHRISTMAS BERRIES IN LATE FALL
002. FINELY TOOTHED LEAVES

common name : Toyon
scientific name : Heteromeles arbutifolia
family : Malaceae (Apple)
blooms : June–July
type : Shrub

MADRONE

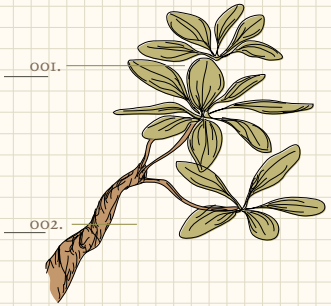
Arbutus menziesii

Although only occasionally found in the deeper redwood valleys, the madrone is quite common on the upper slopes and ridges in the mixed evergreen forest. Because of its constant search for light, this large native tree often assumes unusual gnarled and twisted shapes. Another unusual feature of the tree is the characteristic thin bark on the trunks and limbs. Each summer this outer bark peels off and hangs in tatters, exposing smooth wood which weathers to a rich red brown.

The evergreen leaves are a waxy green and grow alternately along the branches. In early spring small clusters of waxy, white, bell-shaped flowers appear, and in late summer these mature into large orange berries. This tree was used for food, medicine, and utensils by both Indians and settlers. Roots and leaves were brewed into a tea to treat stomach aches. Sores and wounds were treated with a lotion made from the leaves and bark. Whether eaten raw or boiled in baskets with hot rocks, the berries were an important food. When dried they were stored and used as an important winter staple.

The fine-grained wood of the madrone was used by Indians for lodgepoles and by some early settlers to make stirrups. Charcoal from the burned wood reportedly made an excellent gunpowder, which was sold commercially.

The madrone is often referred to by its nickame "the refrigerator tree" as the smooth trunk is always cool to the touch, a very refreshing feature to hikers on hot day.



001. RED BARK PEELS OFF IN TATTERS TO REVEAL SMOOTH WOOD UNDERNEATH

002. BARK SIMILAR TO MANZANITA, BUT LEAVES ARE MUCH BIGGER

common name : Toyon
scientific name : Heteromeles arbutifolia
family : Malaceae (Apple)
blooms : June-July
type : Shrub

INDIAN WARRIOR

Pediularis densiflora

Common on the warm eastern slopes of the mountains, the stunning Indian warrior grows in dry oak woodland or chaparral. The deep red flowers which call attention to this plant grow in dense spikes atop a six to twenty inch tall stem. Several of these flower spikes grow from the base of each plant. The fern-like, finely divided leaves are also mostly basal, although some smaller ones do grow on the erect stem.

According to legend, each of these beautiful plants grows for a fallen Indian warrior. The legend behind the genus name isn't quite so romantic. An old superstition that sheep became infested with lice when they ate this plant resulted in the name Pedicularis, meaning louse.

001.

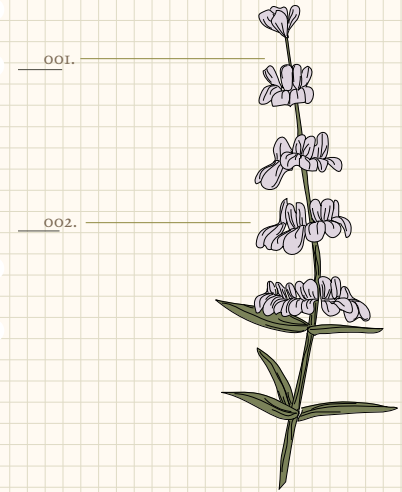
001. EASILY MISTAKEN FOR INDIAN PAINTBRUSH, BUT COLOR IS MORE PURPLE THAN ORANGE-RED

common name : Indian warrior
scientific name : Pediularis densiflora
family : Scrophulariaceae
blooms : January-July
type : Herb

CHINESE HOUSES

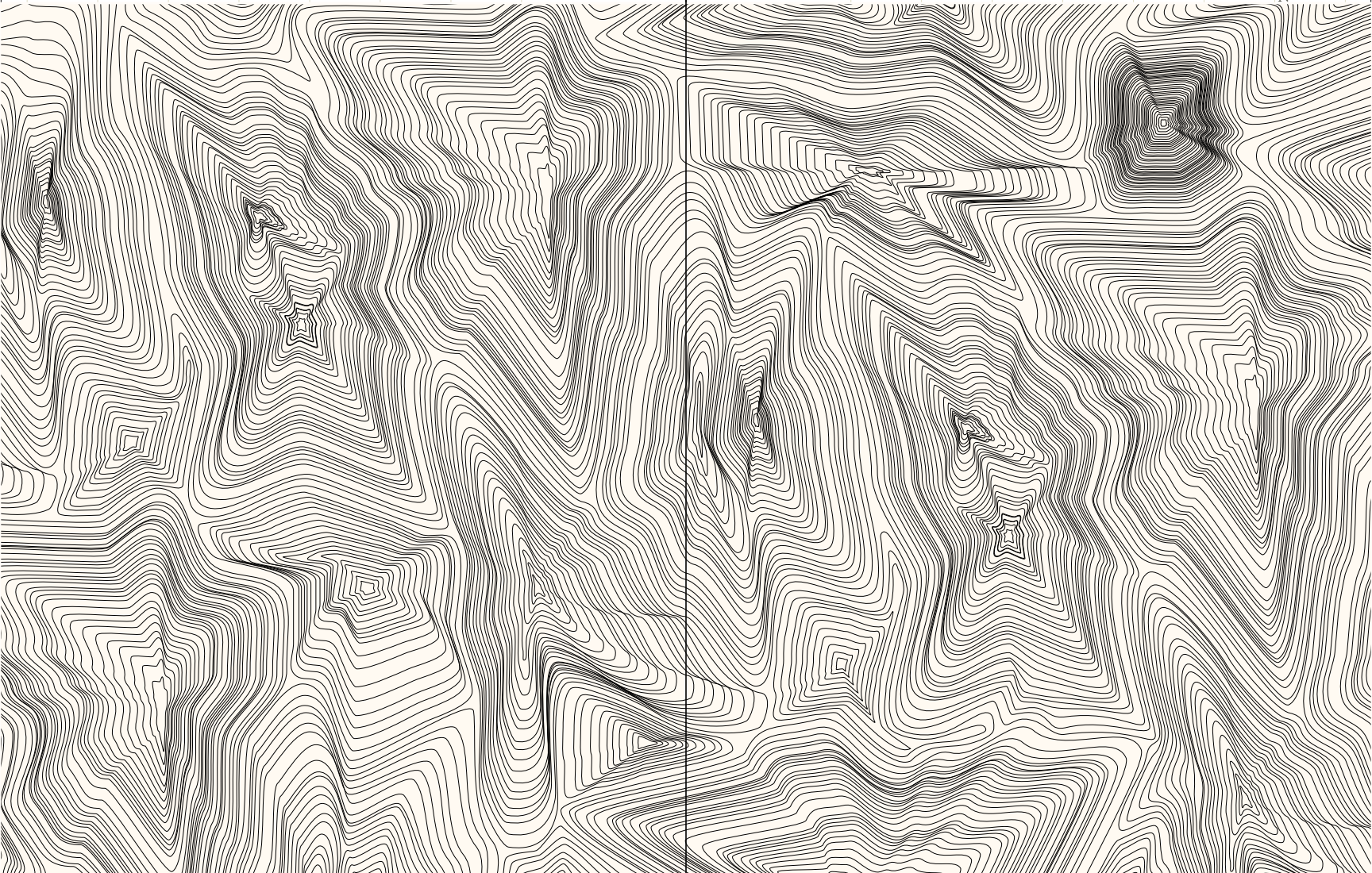
Collinsia heterophylla

Chinese houses inhabit open or shaded slopes throughout the coastal mountains. They are often associated with oak woodlands and grassy knolls. This annual grows from one half to one foot in height. Slightly toothed, oblong leaves grow opposite on the slender stem. Blooming in late spring, clusters of two to five flowers grow in whorls. The individual flower parts are fused, forming two major lips. The upper lip is usually whitish and the lower lip is a deep lavender. The beautiful shape of the flowers gives the plant its common name, for they resemble Chinese pagodas.



GROWS QUICKLY, BLOOMS HEAVILY, 001.
DIES WITH FIRST FROST
FLOWER STALK RESEMBLES PAGODAS 002.

common name : Chinese houses
scientific name : Collinsia heterophylla
family : Rosaceae
blooms : May–June
type : Herb



CHAPARRAL

This is the typical brushy growth of the hillsides that means wild California to many people. It is the dangerous community in that so many destructive wildfires originate in its highly flammable vegetation. It is also one of the most effective plant barriers against ground travel by the larger animals. Man and deer alike find mature chaparral with its profusion of stiff twigs almost impossible to enter. One can crawl through it, but this can be fatiguing and painful. Imitate deer and follow their trails if you go exploring, but be sure to wear long pants and shirts.

The word chaparral has an interesting history. It comes from the Spanish, el chaparro, meaning the evergreen scrub oak. This in turn has a Basque root, chabarra, which also refers to scrub oak. The –al suffix is common to many of the Spanish place names throughout the West, being added to the root word to indicate the frase "the place of." We get the cowboy's chaps from the leather pants or chaparajos he used when riding through this dense prickly cover. It must have been very gratifying to the Spanish settlers in California when they discovered a land so much resembling their own, even to the same type of shrublike oak.

Chaparral consists for the most part of what can be considered either short trees or tall shrubs that are admirably adapted to a summer drought-winter rain climatic pattern. Its most active season is late winter and spring, when rainfall and temperature curves meet for optimum growing conditions. Then it sprouts and flowers. Summer and fall are the resting seasons, unlike

regions having summer precipitation and cold winters where the frost season is the time of inactivity. The small leathery leaves of the dormant shrubs transpire sparingly – that is, emit little water vapor. Evergreenness is of real survival value to these plants; the growing season is so short, often just two or three months, that it is to the plant's advantage to retain its foliage. It does not have to expend energy in producing a whole new crop of leaves annually. These features are of great importance to the plant when dry years hit, and rainfall is less than normal. Brushy hillsides may suffer but are not put out of business; most healthy shrubs manage to remain alive until the next rainy season.

Chamise, the most typical shrub of the community, sometimes covers drier knolls and ridges with the uniform texture of broadloom carpentry; its tiny, needle-thin, water-conserving leaves are well adapted to drought. Other chaparral plants have leaves grading from the thumbnail-size foliage of mountain mahogany to the three-inch-long spear points of toyon and osoberry. There is a rough correlation between leaf size and dryness of site. Larger leaved shrubs such as creambush tend to remain on moister ground, while the small-leaved species of manzanita and ceanothus can cope with drier areas.

CHAPARRAL COMMUNITY SPECIES

FIG. 3.1

PLANT TYPE RATIO IN CHAPARRAL HABITAT

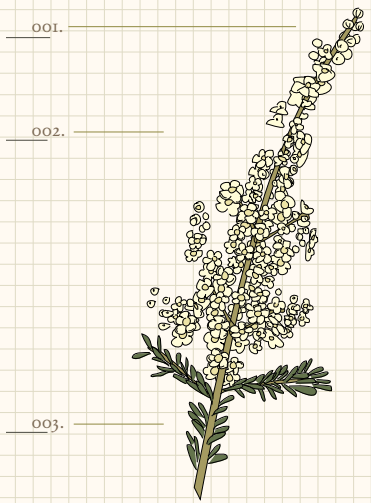
CHAMISE

Adenostoma fasciculatum

Chamise is one of the most common shrubs in the dry rocky chaparral communities. Well adapted to the dry sunny habitats in which it grows, chamise has small, thick, leathery leaves. The highly branched stems are capable of regeneration by stump sprouting after a fire. In addition, this shrub exhibits an interesting survival mechanism called alleopathy, which is characteristic of many chaparral plants. Growth-inhibiting toxins are produced in the leaves, then washed into surrounding soil during rains to eliminate close competition. The small, thin leaves also serve as protection against the long exposure to hot sun.

During the early summer, tiny white flowers grow profusely in panicles on the tips of the upper stems. By August, the dried flowers turn colors into a beautiful rusty orange.

Although this tough plant isn't much of a delicacy, young stems can be tenderized by boiling for several hours, then seasoned, and eaten like a vegetable.



001. TINY WHITE FLOWERS GROW PROFUSELY ON TIPS OF STEMS

002. DRIED FLOWERS TURN DARK ORANGE

003. SMALL, LEATHERY LEAVES PROTECT AGAINST HOT SUN

common name : Chamise
scientific name : Adenostoma fasciculatum
family : Rosaceae
blooms : May–June
type : Shrub

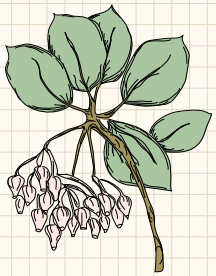
MANZANITA

Arctostaphylos

Manzanita is one of the most common shrubs in chaparral. It grows on almost every dry ridgeline in the mountains. These shrubs seem to be undergoing rapid evolution which results in many species, some of which are very similar and some very different. This makes it difficult to distinguish between species. However, all are characterized by reddish bark, with an outer skin which periodically peels off. Thick, leathery leaves are arranged alternately on the woody stems. Small clusters of bell-shaped flowers hang from the terminal tips of the branches.

Manzanita means little apple in Spanish and was so named because of its berries. Like several other wild berries, these fruits are edible and can be eaten raw or cooked in preserves, pies, and stews. When scalded, crushed, and strained they make a spicy cider, and can also be made into wine.

One species of manzanita has leaves and bark which were used as tobacco by West Coast Indians. Its leaves were also used for treatment of urinary tract disorders and are still used today as an ingredient in astringents. Because of the high tannic acid content of the leaves, they were once used in the tanning industry and are still so used in Russia.



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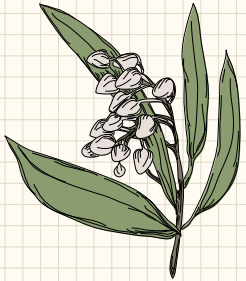

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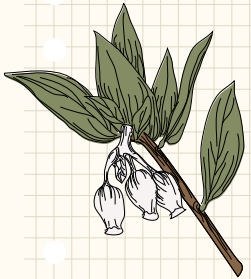

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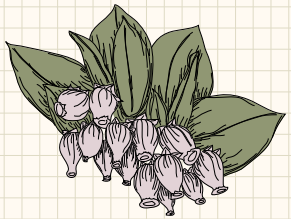


004.

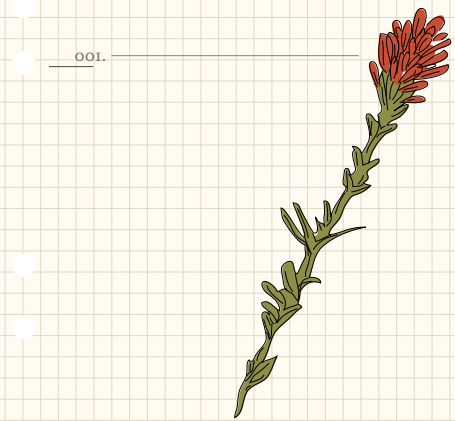
WHITELEAF MANZANITA 001.
STANFORD MANZANITA 002.
EASTWOOD MANZANITA 003.
HOARY MANZANITA 004.

INDIAN PAINTBRUSH

Castilleja affinis

Indian paintbrush is common on rocky chaparral slopes. Several erect unbranching stalks with linear, sometimes three-lobed leaves grow from the woody base of each plant. Covering both stems and leaves, long white hairs form a dense woolly mat and protect against moisture loss. On the upper tips of the stalks are bright scarlet flowers which stand out against the somber chaparral background. Unlike most flowers, it is the sepals and leaf-like bracts below them which are brilliant red, hiding the smaller yellow-green petals.

Since Indian paintbrush is found in rocky chaparral areas which are favorite places for rattlesnakes, they were known by some Indian tribes as “snake’s friend.” Their bright flowers were thought to be the source of rattlesnake venom. Surprisingly, or perhaps not, they were also used as a love charm.



001. “PETALS” LOOK LIKE THEY’VE BEEN DIPPED IN A BUCKET OF PAINT

common name : Indian Paintbrush
scientific name : Castilleja foliolosa
family : Scrophulariaceae
blooms : March–August
type : Herb

STICKY MONKEY FLOWER

Mimulus aurantiacus

Sticky monkey flower is a hardy plant found in most dry chaparral regions in these mountains. It is composed of woody, branched stalks with opposite, narrow, dark green leaves. These thick, sticky leaves give the plant its name. In spring the entire stalk is covered with bright orange tubular flowers. These funnel shaped flowers have two lips, with the upper one slightly longer than the lower. The flower, slightly resembling a monkey's face, also contributes to its name.

Although bitter, young leaves and stems can be eaten in salads. Indians crushed the raw leaves and stems and applied them to wounds. The roots have been used to treat fever, dysenery, diarrhea, and to curtail hemorrhages. In early spring, the flowers contain a drop of sweet nectar at the base.

Sticky monkey flower has a method to prevent self-pollination. As an insect crawls deep inside the flower, where two pairs of stamens are located, the petals close around the stigma. If the insect collects pollen during this visit, the closed petals prevent the pollen from depositing on the stigma during the exit. You can witness this method by gently touching the middle of the petals with your fingers or a small twig.

001. BRIGHT YELLOWISH-ORANGE FLOWER
LOOKS LIKE A MONKEY FACE
002. UNDERSIDE OF LEAVES IS VERY STICKY

common name : Indian Paintbrush
scientific name : Castilleja foliolosa
family : Scrophulariaceae
blooms : March-August
type : Herb

COYOTE BRUSH

Baccharis pilularis

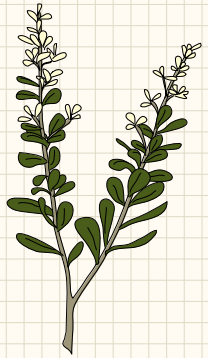
Coyote brush is a very common shrub of chaparral, the edges of open woods, and disturbed areas. Several species are native to California. These evergreen plants grow two to five feet in height and width. The small leaves, one half to one inch long, are oblong and coarsely toothed. Whitish-yellowish flower clusters form at the ends of the branches and branchlets in leafy panicles. They are dioecious which means that male and female flowers form on separate shrubs.

COMMON YARROW

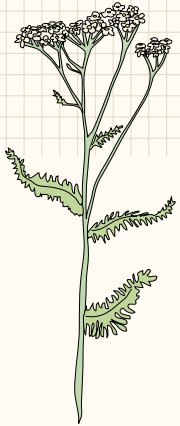
Achillea millefolium

As its name indicates, common yarrow is abundant in all dry areas. A dense cluster of tiny white flowers grows on the top of a slender one and a half to three foot stalk. Soft, feather-like basal leaves grow to be about eight inches long.

Used by ancient people to treat colds, fevers, and other ailments, yarrow has been known for centuries as a remedy. However, care should be taken in its use since it may contain some alkaloid poisons. Its genus name Achillea is for Achilles, who, it was said, used a species of yarrow to treat the wounds of his warriors. The species name millefolium means thousand-leaved and refers to the very finely-divided basal leaves.



common name : Coyote Brush
scientific name : Baccharis pilularis
family : Compositae
blooms : August-October
type : Shrub



common name : Common Yarrow
scientific name : Achillea millefolium
family : Compositae
blooms : April-July
type : Herb

YERBA SANTA

Eriodictyon californicum

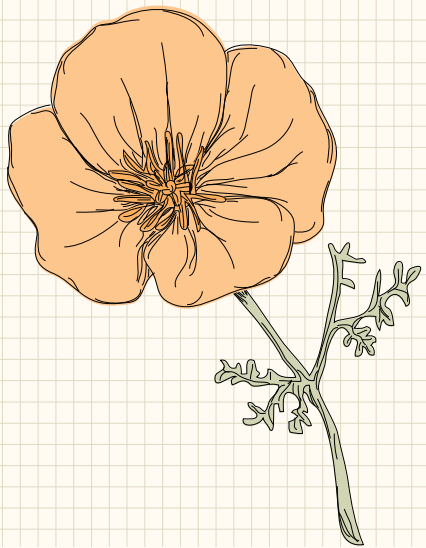
Yerba santa is one of the most abundant plants of the dry chaparral regions. However, it is an opportunist and can occasionally be seen growing along shaded streamsides. A tall shrub, sometimes reaching five feet in height, yerba santa has numerous erect stalks growing from a small short trunk. The main stems are often black from a covering of sooty fungus. Leaves are lance-shaped, thick and sticky. The tubular flowers are soft lavender and grow in clusters from the tops of the stems.

The California Indians had many uses for yerba santa. A bitter tea made from the leaves was used to treat everything from tuberculosis to rheumatism, including coughs, sore throats, and asthma. A weaker tea was used as a blood purifier. Fresh leaves in a poultice were bound on sores, and a strong solution brewed from the leaves was used to soothe sore and tired limbs. Some tribes smoked or chewed these leaves like tobacco.

Yerba santa means holy weed in Spanish. The plant was given this name by missionaries when they were told by Indians of its many medicinal uses.

001. SMALL LAVENDER FLOWERS GROW AT TIPS
002. LEAVES LANCE-SHAPED, THICK, STICKY

common name : Indian Paintbrush
scientific name : Castilleja foliolosa
family : Scrophulariaceae
blooms : March–August
type : Herb



common name : California poppy
scientific name : Eschscholzia californica
family : Papveraceae (Poppy)
blooms : March–October
type : Herb

CALIFORNIA POPPY

Eschscholzia californica

Well adapted to dry areas, the California poppy is common on chaparral slopes and along roadsides. Each plant produces several satiny, bright orange, cup-shaped flowers, each on a separate stalk. After blooming, these flowers mature into long seed pods that contain numerous seeds. The basal leaves are dull green and so finely divided that they appear feathery.

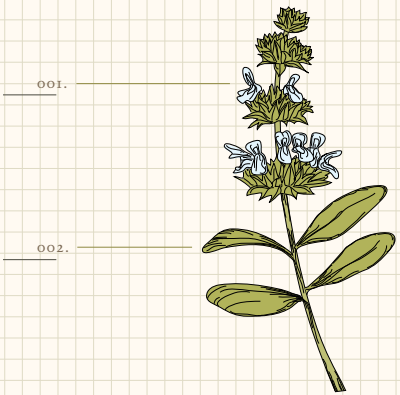
Because of its abundance and bright appearance, the poppy is well known as the state flower of California. It is also known for its narcotic properties, which it shares with other members of this family. The leaves were crushed and packed around aching teeth to kill pain. Today the drug is still used in some places as a headache cure. A common myth associated with the plant is that cutting or otherwise damaging the California poppy is illegal because it is a state flower. There is no such law. There is a state law that makes it a misdemeanor to cut or remove any plant, flower, grass, tree, or shrub that is growing on state or county highways.

BLACK SAGE

Salvia mellifera

Black sage is a common inhabitant of chaparral in the central and southern portion of the coastal mountains. This shrub has oppositely arranged oblong leaves which have slightly toothed margins. The aromatic leaves, characteristic of the mint family, are a distinguishing feature. Whitish to pale blue tubular flowers grow in clusters along a tall stem, often reaching high above surrounding plants.

The seeds of black sage were used to flavor food by early Californians, who added them to cooking meats and poultry. A tea can be made by soaking these seeds in water.



001. FLOWERS GROW IN POM-POM LIKE TUFTS
002. LEAVES ARE VERY AROMATIC, OFTEN SMELLING SIMILAR TO MINT OR LEMON

common name : Black sage
scientific name : Salvia mellifera
family : Labiatae
blooms : March-August
type : Shrub

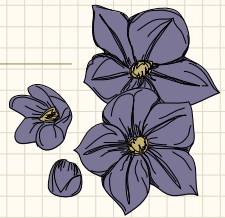
BLUE WITCH

Solanum umbelliferum

Blue witch is found on dry rocky slopes in chaparral or in open areas of oak woodlands. This woody shrub has hairy leaves which are grayish green. The pinwheel-shaped flowers are deep purple with bright yellow anthers. On the base of the petals surrounding the anthers are pairs of small white dots with green spots in their centers.

Although a closer relative of the tomato and potato, this plant is poisonous if eaten. The entire plant is high in solanine, an alkaloid which is also present in the leaves and stems of tomatoes and potatoes. Solanine poisoning can cause minor symptoms such as drowsiness, trembling, weakness, nausea, and abdominal pain, or it can lead to serious problems such as paralysis, unconsciousness, or death.

001.



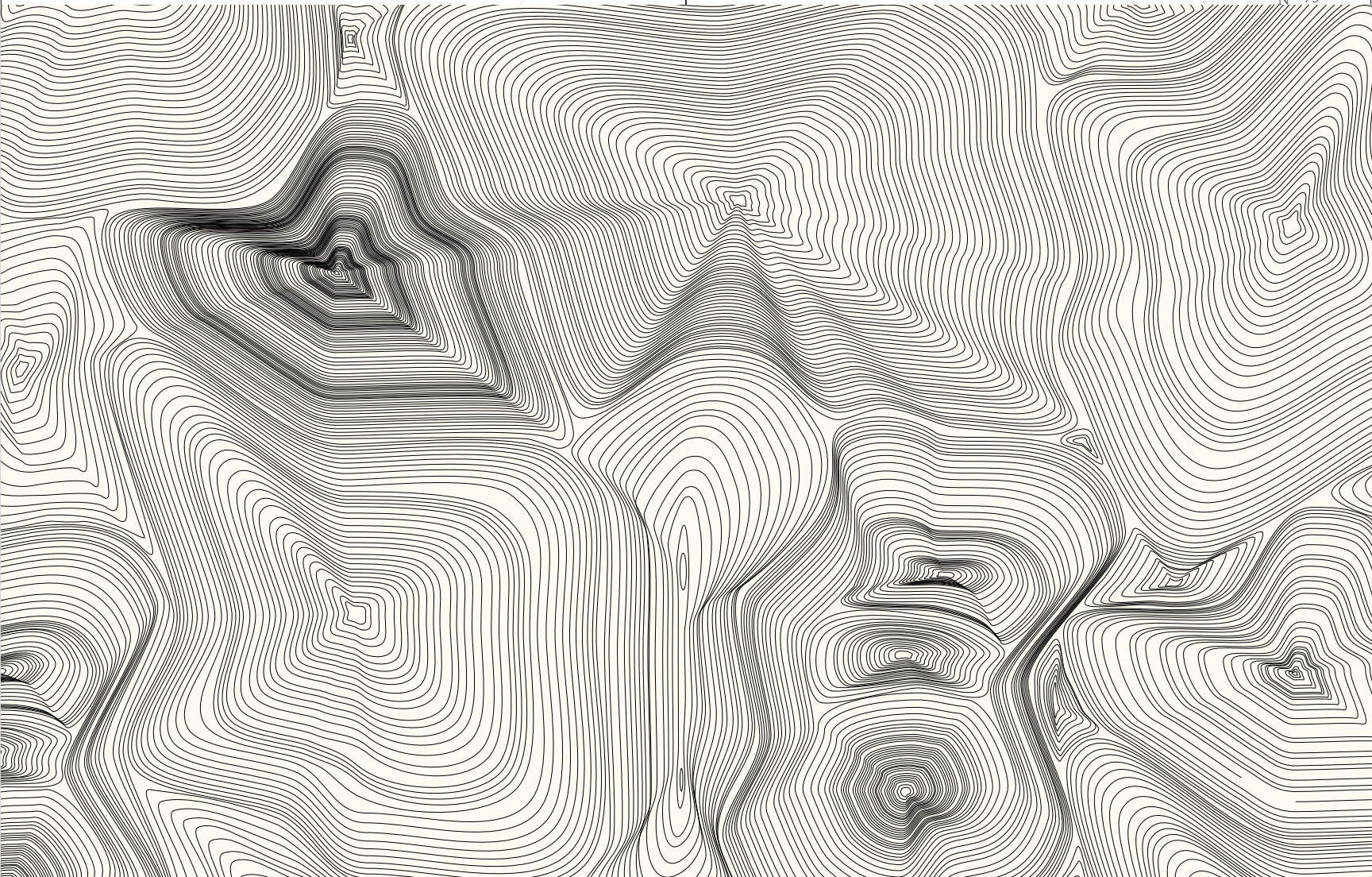
PINWHEEL SHAPED, DEEP PURPLE 001.
FLOWERS HAVE YELLOW CNETERS

common name : Blue witch or Nightshade
scientific name : Solanum umbelliferum
family : Solanaceae
blooms : January-September
type : Herb

COASTAL MOUNTAIN RANGE

RIPARIAN

No. 73



RIPARIAN

A riparian zone is the interface between land and a flowing surface water body. The word riparian means along the river margins. The vegetation consists mostly of species that require more soil moisture than do the oaks and other constituents of the valley and foothill woodland community. Plant communities seen along the river margins are commonly referred to as riparian vegetation. From the beginning to the end the riparian vegetations are highly influenced by the quantum and flow of the water in the river channel. They are typically characterized by hydrophilic vegetation and are often subject to flooding. Riparian zones are significant in ecology, environmental management and civil engineering due to their role in soil conservation, their biodiversity and the influence they have on aquatic ecosystems. Riparian zones occur in many forms including grassland, woodland, and wetland. In some regions the terms riparian woodland, riparian forest, riparian buffer zone or riparian strip are used to characterize a riparian zone.

Riparian zones may be natural or engineered for soil stabilization or restoration. These zones are important natural biofilters, protecting aquatic environments from excessive sedimentation, polluted surface runoff and erosion. They supply shelter and food for many aquatic animals and shade that is an important part of stream temperature regulation. When riparian zones are damaged by construction, agriculture or silvaculture, biological restoration can take place, usually

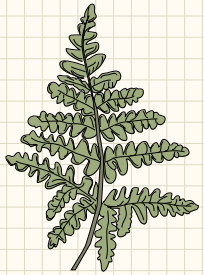
by human intervention in erosion control and revegetation. If the area adjacent to a watercourse has standing water or saturated soil for as long as a season, it is normally termed a wetland due to its hydric soil characteristics. Because of their prominent role in supporting a diversity of species, riparian zones are often the subject of national protection.

Research shows riparian zones are instrumental in water quality improvement for both surface runoff and water flowing into streams through subsurface or groundwater flow. Particularly the attenuation of nitrate or denitrification of the nitrates from fertilizer in this buffer zone is important. Riparian zones can play a role in lowering nitrate contamination in surface runoff from agricultural fields, which runoff would otherwise have a negative effect on ecosystem and human health. The use of wetland riparian zones shows a particularly high rate of removal of nitrate entering a stream and thus has a place in agricultural management.

RIPARIAN COMMUNITY SPECIES

FIG. 4.1

PLANT TYPE RATIO IN RIPARIAN HABITAT



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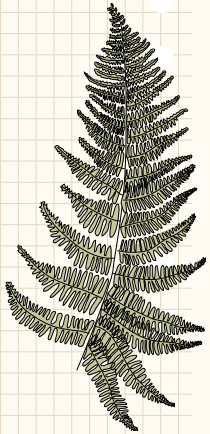

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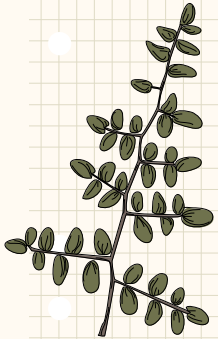

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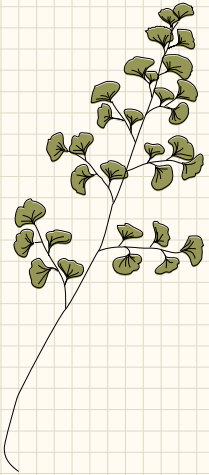


004.

001. GOLDENBACK FERN
002. COASTAL WOOD FERN
003. COFFEE FERN
004. MAIDENHAIR FERN

GOLDENBACK FERN

Pityrogramma triangularis

The goldenback fern often inhabits shaded spots in mixed evergreen and oak forests. Occasionally it can also be found on dry brushy slopes. This fern has small triangular fronds which grow atop a slender black stem, ranging from one to four inches in height. As suggested by the common name, a characteristic waxy golden powder, which comes off easily when touched, covers the underside. California Indians wove black patterns into their baskets by using the goldenback fern stem.

COASTAL WOOD FERN

Dryopteris arguta

The coastal wood fern grows well in the shaded areas found within redwood or mixed evergreen forests. This is a dark-green perennial fern that grows eight to twenty inches in height. Growing from a short underground stem, the fronds have slender pinnae which branch off the main axis. These pinnae grow tightly together, giving a ruffled appearance. The sori, which contain the spores, are arranged in two rows along the lower surface and are covered by a horseshoe-shaped flap.

COFFEE FERN

Pellaea andromedaefolia

Coffee fern is one of the few ferns which is found in dry, sunny areas. It is usually found in rocky locations in chaparral. This hardy fern is generally under ten inches in height. Small stems grow from the creeping rhizome and branch two to four times. Growing from these stems are tiny, rounded pinnae, which have a slightly reddish tinge. The scientific name Pellea is a derivation of the Greek word pellos, meaning dusky, and refers to the appearance of the stems.

MAIDENHAIR FERN

Adiantum jordanii

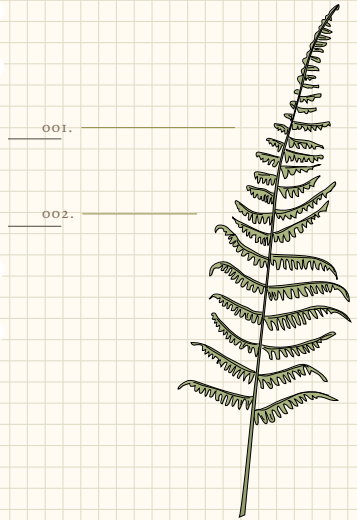
California maidenhair is found in moist shaded areas, usually on wet, rocky outcrops. Several erect to gently curing fronds grow out of a single, scaly base. The rounded pinnae grow on small stems which branch off the one to two foot long central stem. Uncurled margins of the pinnae enclose the spores.

The black stems of the maidenhair were pounded by Indians until they broke into long flat strands, which were woven into baskets as a black pattern. It was the strands of maidenhair which made the pattern of a special hat called the squaw cap. When a woman was widowed, her hair was burned off at the neckline, then smeared with a pine pitch. She wore the squaw cap for a year as a sign of her grief.

LADY FERN

Athyrium filix-femina

Lady fern grows in moist shady areas, usually next to or very near a water source. This fern is an annual, sending up new, tightly-curled fronds every year. During late spring and early summer, the small shoots develop into large, three to four foot long, lacy fronds. These fronds are twice pinnate, which means that the highly divided pinnae grow off the main stem. Its light green color and deeply fringed pinnae make this fern one of the most beautiful plants in the forest.



001. DEEPLY FRINGED FRONDS
002. FRONDS START TIGHTLY WOUND IN FIDDLEHEADS, THEN GROW THREE TO FOUR FEET LONG

common name	Lady fern
scientific name	Athyrium filix-femina
family	Polypodiaceae
blooms	n/a
type	Herb

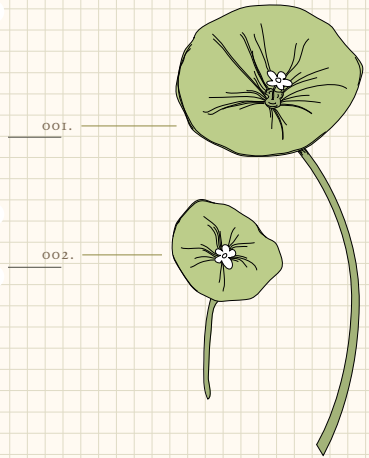
MINER'S LETTUCE

Montia perfoliata

Miner's Lettuce is fairly common in moist wooded areas. Large patches of the plant will cover shady hillsides in the early spring.This plant is easily identifiable by its united, saucer-like leaves which grow on three to eight inch long stems. Tiny white flowers bloom on stalks from the leaf centers.

As the name implies, miner's lettuce can be eaten raw in salads or boiled like spinach. The leaves taste best when small and young, and make a delicious trail-side snack. A common practice of California Indians was to place the plant near red ant hills. As the ants crawled over the leaves, they left behind a vinegary flavor like a salad dressing. The Indians also made a tea from the leaves, which was used as a laxative.

The common name Miner's lettuce is named after the California gold rush miners of the mid-1800s who ate it to get their vitamin C in order to prevent scurvy.



001. SAUCER SHAPED LEAVES
002. SMALL WHITE FLOWER SPROUTS FROM CENTER OF LEAF

common name : Miner's lettuce
scientific name : Montia perfoliata
family : Portulacaceae
blooms : February-May
type : Herb

CALIFORNIA BAY

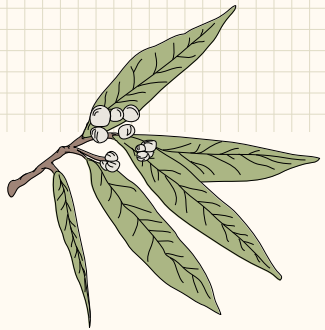
Umbellularia californica

California bay is common on wooded slopes of the Coast Range. It reaches its largest size in northwestern California and southwestern Oregon. The leaves, which are wedge-shaped at the base and pointed at the tips, somewhat resemble wax myrtle leaves, but can be distinguished by their pungent fragrance. Arranged in an alternate pattern, these leaves are leathery and usually dark green. In early spring, small yellowish-green flowers develop and profusely cover the tree. These then mature into large, oval shaped nuts.

The bay tree had many uses for the Indians, the most important being medicinal. Leaves were used to clean wounds and to cure headaches. For headaches the leaves were either bound around the head or placed up the nostril. Leaves steeped in boiling water were used as a disinfectant, while smoke from the leaves burned directly on the fire was used as a "vaporizer" for colds. For treatment of rheumatism the Indians would rub their bodies with bay oil while taking their steambaths. The combination of the stinging bay oil and a complete body rubdown was supposed to be an effective cure. Evidently there was some merit to this, since the settlers later adopted the treatment.

Bay nuts were roasted and later eaten whole, or ground into flour and baked into breads. Roasting removed the bitter taste caused by the high acid content. Leaves were also used as a flea repellent in Indian dwellings. By spreading leaves on the floor they kept their living quarters flea free.

Today the bay is still useful. Leaves are dried and ground into a spice which is similar to the expensive European bay leaves. The wood, which is white and fine-grained, is used under the name of Oregon myrtle to make bowls and other ornamental objects. Another nickname for the bay is the spagetti tree, named for its popular use as a spice for spagetti sauce.



common name : California bay
scientific name : Umbellularia californica
family : Lauraceae
blooms : December-April
type : Tree

BIG-LEAF MAPLE

Acer macrophyllum

This large native tree grows along streams and moist areas throughout the coastal mountains, often forming dense strands. When the maple is young it has smooth light gray bark, but as it grows older it becomes darker gray-brown with large cracks and ridges. At maturity the tree can reach up to eighty feet in height. Its large, three to five-lobed, palmate leaves turn to bright yellow or orange in the fall. Before new leaves grow again in spring, long drooping clusters of yellowish-green flowers appear. These flowers ripen into double-winged fruits, called samaras, which blow easily in the wind.

Although this maple is not widely used, its sap can be made into syrup using traditional tree tapping methods. Its early growing season makes it a less desireable tree for syrup than the popular sugar and black maples.

001. LARGE PALMATE LEAVES HAVE FIVE FINGERS AND ARE SHAPED LIKE A PALM

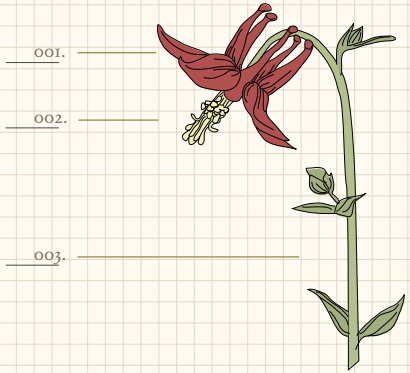
002. DECIDUOUS LEAVES TURN BRIGHT YETILLOW IN FALL

common name : Big-leaf maple
scientific name : Acer macrophyllum
family : Aceraceae
blooms : March-May
type : Tree

CRIMSON COLUMBINE

Aquilegia Formosa var. truncata

This beautiful spring wildflower can be found on many moist wooded slopes in the coastal mountains. The nodding flowers often hang over trails and road banks, delighting many a passer-by. Dramatically, a single, delicate, bright flower can be spotted in the dark forests. Growing from a woody base, this perennial plant has a variously lobed, toothed, basal leaves. Openly branching stems often reach three to five feet in height. The showy flowers hang singly from the stem, at the outermost tips of the branches. Extending between the spurred red petals are five bright orange-red sepals. The long yellow stamens hang down from the center like a hammer on a bell.



001. FLOWER HEAD DROOPS LIKE A BELL
002. LONG YELLOW STAMENS HANG DOWN PAST PETALS FROM CENTER
003. TALL STRAIGHT STEMS REACH THREE TO FIVE FEET IN HEIGHT

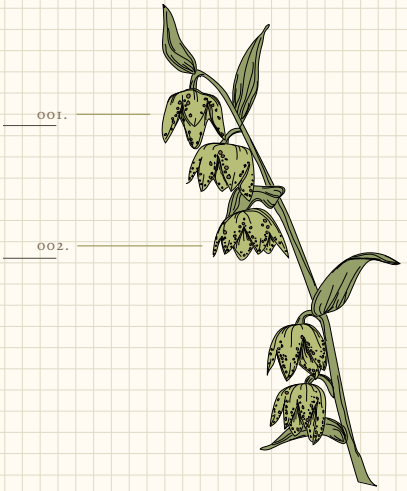
common name : Scarlet columbine
scientific name : Aquilegia Formosa
family : Ranunculaceae
blooms : April-June
type : Herb

CHECKER LILY

Fritillaria lanceolata

Although it sometimes grows on dry open slopes, the checker lily is usually found in the shade of redwood and mixed evergreen forests. When not blooming, all that can be seen of the checker lily is a large oval basal leaf. However, in early spring a one to two foot long stem grows from the small subterranean bulbs. On the upper portion of this stem are several whorls of three to five lance-shaped leaves. Unless seen together, it is hard to believe these leaves grow from the same bulb as the basal leaf. Near the tip of the stem nod greenish-yellow flowers with purple spots. Because of these bell-shaped flowers, another name for this plant is mission bells.

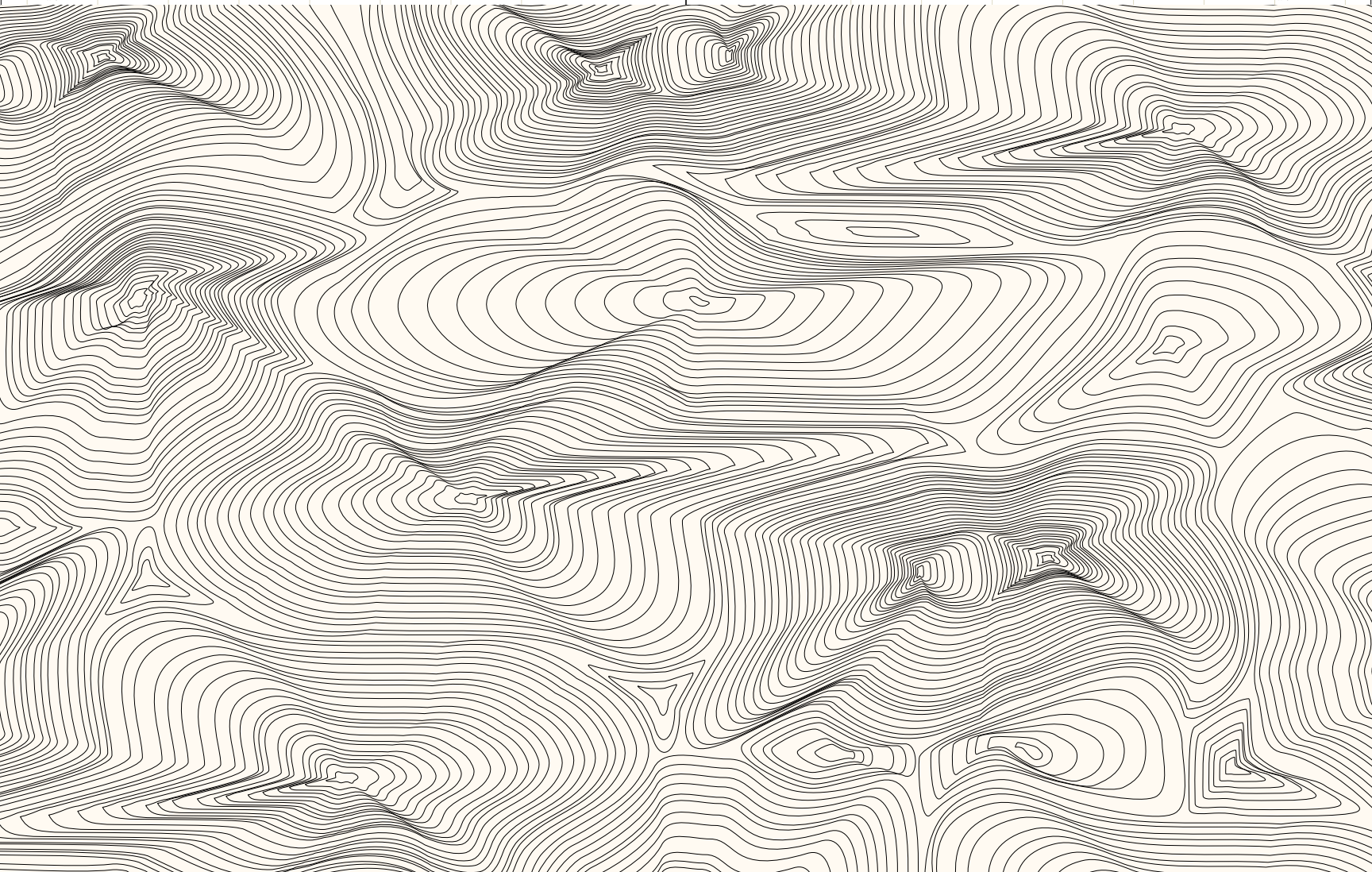
Since the bulbs of most species in this genus are edible either raw, boiled, or dried, the checker lily is probably no exception. Care should be taken, however, since some individuals may not be able to handle large quantities. Because of this, and the fact that these flowers are so beautiful, they should not be eaten.



001. FLOWER ALSO CALLED MISSION BELLS AS NAME IMPLIES, FLOWERS ARE SPOTTED AND GROW ON SINGLE STEM

002.

common name : Checker lily
scientific name : Fritillaria lanceolata
family : Liliaceae
blooms : March–May
type : Herb



GRASSLAND

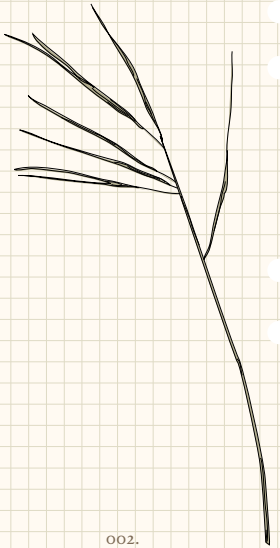
Grassland is a treeless, shrubless vegetational assemblage that occupies large areas of California. Toward the end of the nineteenth century, three factors had begun to bring about an irreversible change in this kind of habitat. One of these was the conversion of grasslands into cultivated fields. Another was overgrazing by livestock first introduced by the Spanish in the 1700s. Still another was the introduction of plants, especially annual grasses, native to other parts of the world. Most of the native grasses were clump-forming perennials of the type called bunchgrasses. They were literally grazed to death, and their demise was hastened by lack of sufficient rain in certain years, which prevented them from making enough new growth to compensate for the grazing they suffered. The aggressive introduced species–their seeds arriving on the hair of domestic animals, on clothing, and by other means–joined a few native grasses in filling up the space that was opened up for them. The introduced grasses die by summer, giving California's grasslands a golden appearance. It is likely that before the flora was significantly altered, there would have been a substantial green or gray green component during the dry season.

It is now nearly impossible to find examples of pristine grassland. Nevertheless, there are many localities where bunchgrass has persisted, even though they have been diluted by introduced species. And it is our grasslands that provide the most spectacular displays of native wildflowers, most of which have survived change better than the native bunchgrasses.

FIG. 5.1

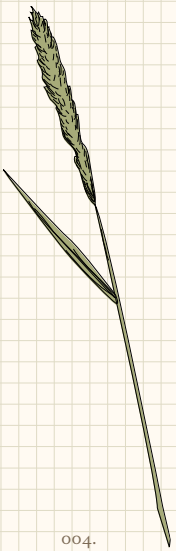
PLANT TYPE RATIO IN GRASSLAND HABITAT

001.



002.

003.



004.

FOOTHILL NEEDLEGRASS 001.
PURPLE NEEDLEGRASS 002.
BLUE WILD RYE 003.
NIT GRASS 004.

FOOTHILL NEEDLEGRASS

Nassella lepida

Foothill needlegrass thrives in shady margins of chaparral and woodland, but also grows in full sun, often in company of the locally more abundant N. pulchra. Spikelets are single-flowered, as are those of all other members of Stipeae (needlegrass tribe). The two needlegrasses resemble one another but N. lepida is smaller and noticeably finer, with lemma awns usually about half-as-long (to 3 cm.) as those of N. pulchra.

PURPLE NEEDLEGRASS

Nassella pulchra

In 2004, purple needlegrass became the official California state grass. Purple needlegrass thrived in California soil long before Europeans arrived here. Native Californians ate the seeds. During the Mexican era, ranchers moved their cattle through vast sections of Nassella and other perennial grasses. Purple needlegrass can compete in non-serpentine soils with annual grasses. It forms tufts, creating a hummocky appearance on the landscape. Older plants generally have larger tufts (or crowns). Larger individuals, up to 12-inch diameter, are 100-200 years old, or perhaps substantially older. Its suitability for restoration in different soils and climates makes purple needlegrass the most common native perennial grass today.

BLUE WILD RYE

Elymus glaucus

Blue wildrye is often found on the edge of an opening, in a transitional habitat between full sun and partial shade. A bunchgrass, it can grow to shoulder height, with long smooth, waxy stems. The basal leaves are of medium width and some turn brown and curl in the summers. The green stems slowly turn straw colored and the seeds fall in late summer. Blue wildrye has a smooth, large stem, and small seeds arranged in a distinct cylinder. When they break off, they lack the backward-pointing hairs of weedy grasses.

NIT GRASS

Gastridium ventricosum

This slender, erect annual has four- to sixteen-inch mostly glabrous culms. The leaves have narrow, flat, or inrolled blades. The panicle-like, 1/2- to 3 1/2-inch inflorescence is very narrow and dense. Each spikelet has one floret with a straight to curved, eigth-inch awn. Nit grass is found in open, dry, disturbed places. It was introduced from Europe. The scientific name Gastridium is Greek meaning “small pouch,” referring to the swollen base of the spikelet. Ventricosum comes from venter, “belly,” and means “swollen, inflated.”

IDENTIFYING GRASSES

The importance of grasses – especially wheat, barley, oats, rice, corn, and rye – in providing food for humans and livestock should be understood by everyone. Many species, furthermore, are cultivated for their ornamental foliage, interesting habit of growth, erosion-controlling attributes, and suitability for lawns. So successfully have introduced grasses taken over wild areas, however, that native species are no longer found in many places. Accounting in part for the decline in the number of native species are overgrazing by livestock, conversion of natural areas into cropland, and urbanization, with its varied impacts. About twenty percent of our native grasses are annual, the rest are perennials. Some of our perennial species are being propagated for use in landscaping. They are not only attractive, but they also survive summer drought and fit in with other native plants.

As common as grasses are, and as simple as they may appear to be, they are often very difficult to identify. The parts that are generally used in identification tend to be small–so small in some cases that even a 10x hand lens is not adequate. Furthermore, certain structures of grasses are unlike those of other plants. Thus they require a special set of terms. Each major unit of the inflorescence is called a spikelet. At the base of the spikelet is a pair of glumes, and within these glumes are one or more florets. A fertile floret typically consists of a pistil, stamens, or both, enclosed within two bracts. The lower bract, known as the lemma, is almost always larger and better developed than the upper one, called the palea, and at least partially encloses the palea. the pistil becomes a one-seeded dry fruit which is referred to as the grain. Some florets may be sterile, lacking a pistil. Also, some florets may contain only stamens or a pistil The lemmas and glumes are especially important in identification of grasses. It is necessary to examine them carefully to see if they have a hairlike or bristlelike projection, called an awn, at the tip, riblike lengthwise thickenings (veins), or other differentiations.

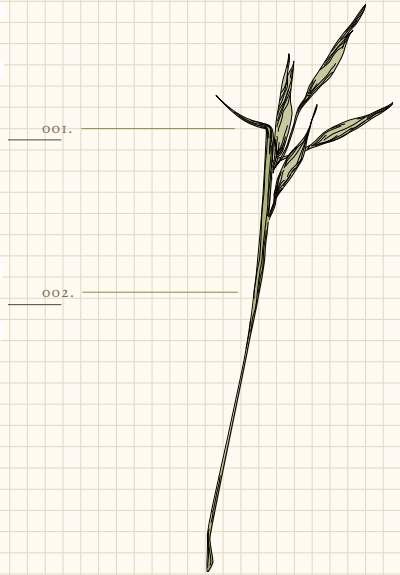
In the field, when you first encounter a grass, be sure to observe its overall growth form and especially the appearance of parts that may be easily disturbed upon collection. For instance, the stems and leaves are often grouped together in a dense basal clump; other types are simple individual plants, or form a sod, or spread outward by means of prostrate stems, which may root at the nodes. You will have to look closely at the leaf blades and leaf sheaths. The hairiness of some parts of the plant may be important. The general appearance of the inflorescence, or cluster of flowers, is also important.

Many species exhibit considerable variation and may appear in more than one section of the key. Furthermore, certain grass species freely interbreed, and even experts are often unable to agree on identification of a particular specimen. Even if you just come close, you are to be congratulated!

TALL OATGRASS

Danthonia californica

Tall oatgrass, native to Europe, was brought to the United States early in the last century. It is now grown widely in the central and northern states, and in the Pacific Northwest. It is a hardy, upright perennial bunchgrass reaching to five feet, with many leaves. The seed head resembles that of oats, hence the name. It tends to grow in bunches and is well adapted to light textured soils. It is suitable for pastures and yields a palatable hay. It is frequently seeded in combination with other grasses and legumes as sweet and red clovers. It isshorter lived than most bunchgrasses.



001. SEED HEAD RESEMBLES THAT OF OATS
002. CCAN REACH UP TO FIVE FEET TALL

common name : Tall oatgrass
scientific name : Danthonia californica
family : Poaceae
blooms : n/a
type : Herb

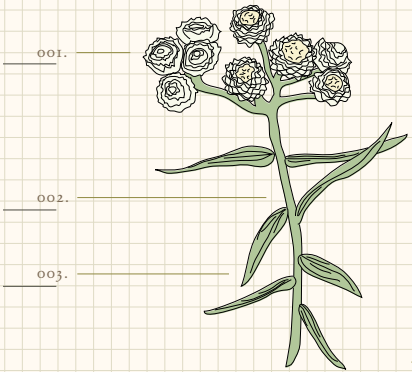
PEARLY EVERLASTING

Anaphalis margaritacea

Pearly everlasting is commonly found in open, dry fields and meadows and along roadsides. It does well in poor soil and can often be seen in disturbed areas throughout the Coast Range. At first glance, the rounded clusters atop grayish wooly stems seem to be composed of pearly white flowers with brownish-yellow centers. A closer look shows that the dark centers are the actual flowers, which are surrounded by papery white bracts. This perennial grows about two feet tall, with narrow, dull-colored leaves three to four inches long.

Pearly everlasting is one of those plants which can usually be found by following your nose. It smells strongly of maple syrup or curry, depending on your particular tastes and probably which meal you're looking forward to! Its nickname is the maple syrup plant. Papery even when young, the flower heads are often used in dried flower arrangements.

Most people will smell the pearly everlasting well before they ever see it. The powerful aroma of maple syrup wafting across the trail is unmistakeable.



001. PAPERY, WHITE FLOWERS
002. WOOLY, LOW GROWING STEMS
003. NARROW DULL-COLORED LEAVES

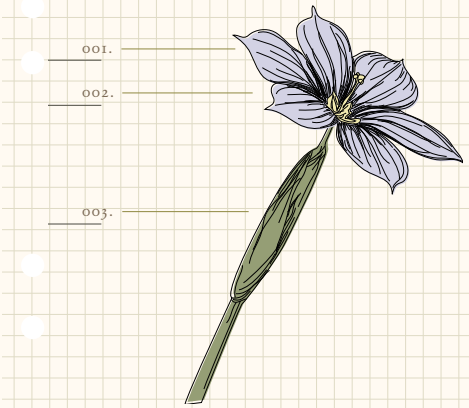
common name : Pearly everlasting
scientific name : Anaphalis margaritacea
family : Compositae
blooms : May–September
type : Herb

BLUE-EYED GRASS

Sisyrinchium bellum

Blue-eyed grass is common in open meadow areas, often associated with oak woodlands. This plant is a classic demonstration of the problems with common names. Blue-eyed grass is not a grass at all, but an iris. Rather than having blue "eyes," the flowers are dark purple with yellow "eyes" in the center. These flowers are perched sisngly on short stalks off the main stem. Long, slender leaves that clasp the stem are often hidden by surrounding grasses.

Because pigs sometimes would grub at the woody roots, the genus name Sisyrinchium means pig snout; the species name bellum means handsome. Tea made from blue-eyed grass was used as an early remedy for fever reduction.



001. DARK PURPLE FLOWERS ON SINGLE STALK
002. "EYES" ARE ACTUALLY YELLOW
003. LEAVES HIDDEN BY SURROUNDING GRASS

common name : Blue-eyed-grass
scientific name : Sysyrinchium bellum
family : Iridaceae
blooms : February-May
type : Herb

common name : Baby-blue-eyes
scientific name : Nemophila menziesii
family : Hydrophyllaceae
blooms : February-May
type : Herb

JOHNNY JUMP-UPS

Viola pedunculata

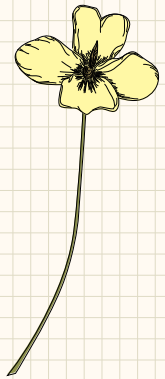
The Heartsease, also known as Johnny-jump-ups, is a small plant of creeping habit, reaching at most 15cm in height, with flowers about 1.5 cm in diameter. It grows in short grassland on farms and wasteland, chiefly on acid or neutral soils. It is usually found in partial shade. It flowers from April to September. The flowers can be purple, blue, yellow or white. They are hermaphrodite and self-fertile, pollinated by bees.

It has been recommended, among other uses, as a treatment for epilepsy, asthma, skin diseases and eczema. It has expectorant properties, and so has been used in the treatment of chest complaints such as bronchitis and whooping cough.

OWL'S CLOVER

Castilleja densiflora

Often coloring entire meadows with a deep purple haze, owl's clover grows in grassland and open woodlands from central California north to Mendocino county. The pale to deep magenta flowers grow atop short unbranched stems in dense tufts, like fat paintbrushes. Resembling tiny perched owls, each flower has an upper hooked lip and lower puffy lip. The lower lip is three-lobed with three small teeth. Its tip is colored yellow or white. Hiding beneath the showy flowers are small leaves, each divided into several small segments. The half-inch long seed capsule gives this genus its Greek name which means "straight fruit." Owl's clover is bee pollinated. Its delicate purple coloring is due to anthocyanin, a pigment which fades if picked.



common name	Johnny jump-ups
scientific name	Viola penduculata
family	Scrophulariaceae
blooms	March-May
type	Herb

common name	Owl's clover
scientific name	Castilleja densiflora
family	Scrophulariaceae
blooms	March-May
type	Herb

BUTTERCUP

Ranunculus californicus

Buttercups are found on grassy slopes that are moist in spring. In fact, the Latin name Ranunculus means little frog, because both are found in this habitat. The compound leaves are basal, lobed, and somewhat variable. The glossy, bright lemon-yellow flowers grow on long stems and are shaped like little saucers.

Indians boiled the roots like potatoes. They also tossed seeds in a basket on a windy day to clean them, then placed them in a basket with slow-burning coals, tossing them again as they roasted. Roasting removed the poisonous toxin, protoanemonim, and gave the seeds a popcorn-like flavor. After this preparation the seeds were eaten whole or ground into flour. Western settlers pickled the young flowers. Also, a yellow dye was made by the Indians by crushing and washing the flowers.

An old superstition says that if you hold a buttercup under your face, and yellow light is reflected on your face, it means that you like butter.

001. GLOSSY, BRIGHT YELLOW PETALS
002. FLOWER SHAPED LIKE A SAUCER

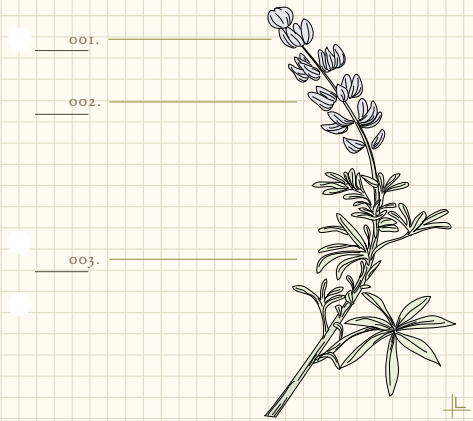
common name : Buttercup
scientific name : Ranunculus californicus
family : Ranunculaceae
blooms : February-May
type : Herb

LUPINE

Lupinus

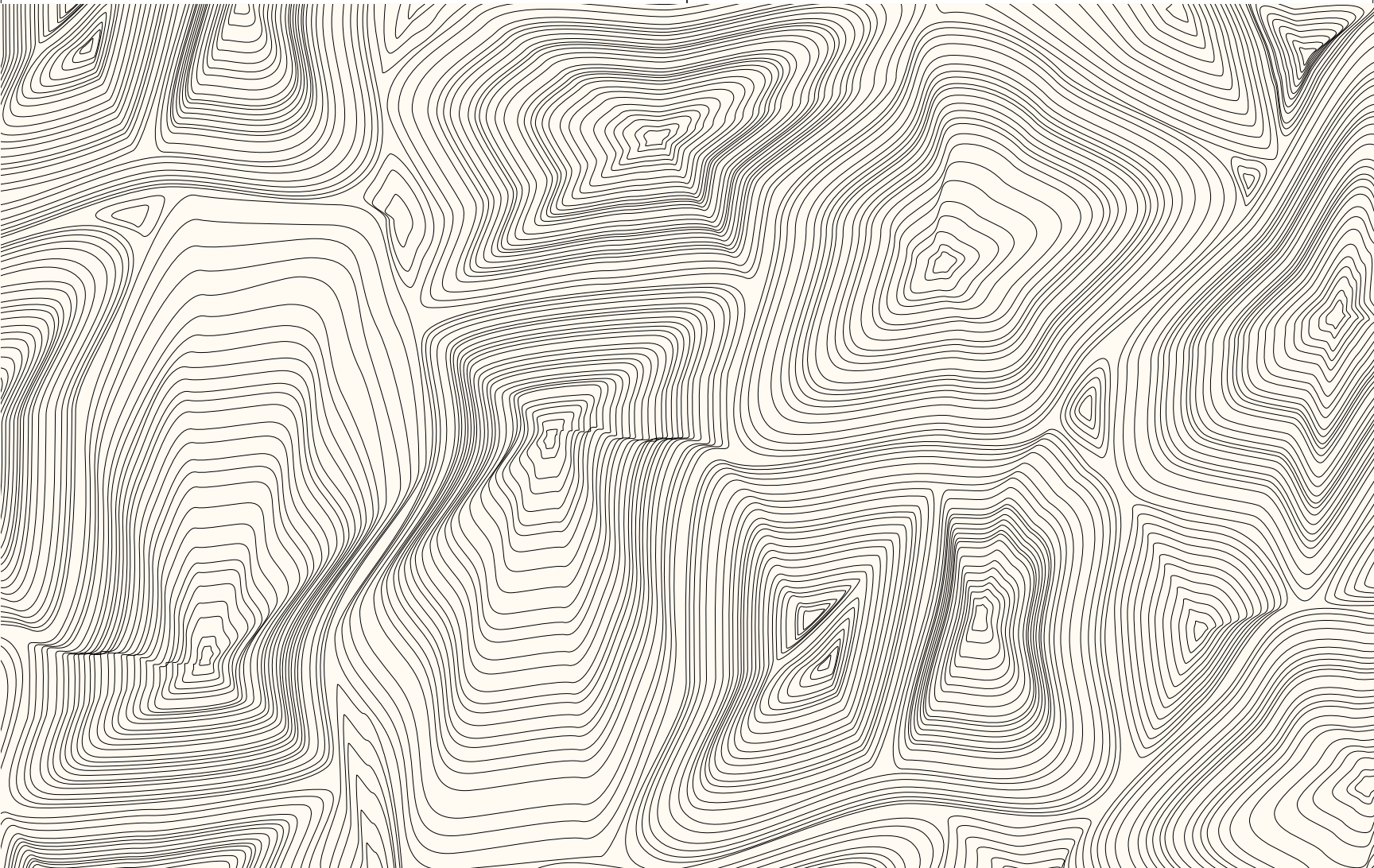
Several species of lupine are found in this area. Although probably most common in open meadows, these plants can be found in almost every habitat from sandy beaches to shady forests. The various species range from being quite common to extremely rare. Although their growth forms vary from small annual or perrenial herbs to large shrubs, lupines have several distinguishable features in common. The leaves, which are always alternate and compound palmate, are the most easily identifiable characteristic of these plants. Also, all lupines have flowers arranged in whorls near the top of erect stems. Individual flowers are pea-like with five parts. Reflexed back behind the other petals, the large upper petal is called a banner. In front of this petal are two smaller petals called the keel. Most of our local lupines are various shades of lavender to blue, although a few are shades of yellow or white.

The name Lupinus comes from lupus, meaning wolf, because these plants were once thought to destroy the soil. However, this couldn't be further from the truth, since lupines help the soil both by stabilizing it with their deep roots and by building up its nitrogen supply with the bacteria in its root nodules. Although the seeds reportedly were boiled and used to treat urinary disorders, they often contain dangerous alkaloids.



001. FLOWERS ARRANGED IN WHORLS NEAR TOP OF ERECT STEM
002. PEA-LIKE FLOWERS WITH FIVE PARTS
003. ALTERNATE, COMPOUND PALMATE LEAVES

common name : Lupine
scientific name : Lupinus ssp.
family : Fabaceae
blooms : March-August
type : Herb



CONIFER FOREST

Coniferous forests often cover mountainsides. The trees grow close together for protection from the wind. They also have thick bark, which resists damage from low-heat summer fires. Trees that produce their seeds in cones, such as redwood, pine or fir trees, dominate the Coniferous forest. These trees often have shallow roots that spread out widely to take advantage of the moisture in the upper levels of the ground and because of the poor soil and rocky conditions.

Trees in the Coniferous forest primarily possess pine needles instead of broad leaves. Being dark in color they absorb what little light falls on their surfaces. The waxy, pine needles produce a thick mat of undecayed litter on the forest floor. Since nutrients are not released, the soil remains poor and acid, and not many plants can share this habitat with the conifers.

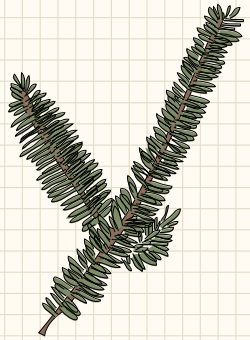
Natural forests of Sequoia sempervirens (Coast Redwood) are found from Monterey County to Southern Oregon. The best known and perhaps most nearly pristine grove in our area is the one in Muir Woods, Marin County. Furthermore, some of the groves that had been cut down for lumber have made a fairly good recovery. Natural groves are found in areas that receive considerable annual rainfall of at least thirty-five inches and that have frequent heavy fogs during the dry season.

FIG. 6.1

PLANT TYPE RATIO IN RIPARIAN HABITAT

001.

002.



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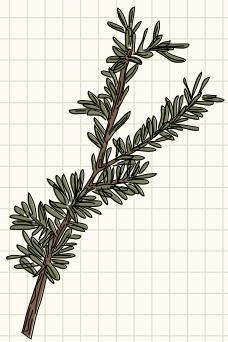


004.

001. DOUGLAS FIR
002. COAST REDWOOD
003. SITKA SPRUCE
004. COAST HEMLOCK

DOUGLAS FIR

Pseudotsuga menziesii

Douglas fir is one of the most common trees in the mixed evergreen forest, and i a prominent member of the redwood forest. Besides being one of the most common trees, this native is one of the largest, second only to the coast redwoods. Because of their size, Douglas firs are sometimes confused with redwoods, but there are many distinguishing features between the two trees, the most outstanding being the bark. Both trees have furrowed bark, but the redwoods have long deep parallel grooves running the entire length of the tree, while fir grooves are short and not so symmetrically parallel. The bark of Douglas fir is a dark gray, while redwood bark is a deep reddish brown.

The light green single needles grow in whorls around drooping stems. Although these stems droop, the sharply uplifted branches give the tree an erect profile. The cones, which mature in one year, hang from the branch tips. These cones are three to four inches long and have three-forked bracts between the rounded scales.

Douglas fir had many uses in the past, and is still important today. Medicinally it was used as a treatment for rheumatism and tuberculosis by inhaling steam from buried burning branches or drinking a tea rich in vitamin C. Smoke from burning limbs was used as a good luck charm. It was believed that by holding their bows over the smoke, hunters would be undetectable to deer, and the hunt would be successful. Another hunting use involved fashioning a shaft from the branches to be used as a salmon spear.

COAST REDWOOD

Sequoia sempervirens

The coast redwood is the most outstanding tree in this area and because of its immense size and beauty, it was instrumental to the establishment of the northern California redwood parks in the early twentieth century.

Often reaching a height of three hundred feet and a diameter of twelve to sixteen feet, the coast redwood is the largest tree along the Pacific Coast. The thick bark, with its deep furrows running the length of the tree, is a rich reddish brown. It is this bark that gives the redwood its excellent fire resistant quality. The dark green leaves are needle-like and grow flat off the branches.

Small cones, usually about an inch long, hang from the branch tips, releasing tiny brown seeds when mature. Of these seeds, only fifteen to twenty percent germinate and grow into seedlings. Redwoods are also capable of sprouting from the roots of parent trees. These sprouts, because of already established root systems, grow more vigorously than seedlings and so are the more common form of reproduction.

The Coast Indians were the first people to make use of the stately redwood. The strong roots were dug up, stripped for their fibers, and used as a thread in woven baskets. Today the tree is primarily used for lumber.

SITKA SPRUCE

Picea sitchensis

The Sitka spruce is a stately tree inhabiting the coastal mountains from northern California to Alaska. It thrives in cool, moist environments, along with hundreds of clinging mosses and ferns which often cover the tree's buttressing trunk.

A tall forest tree, this spruce can reach heights of one hundred twenty-five to two hundred feet. Its gracefully whorled branches and lush growth give it a conical shape. The bark, when visible, is a beautiful reddish-brown with thin, loose scales. The flattened leaves, whitish on the upper surface and bright green beneath, are simple and arranged spirally along the stem. Jointed at the base, they are one-half to one inch long with sharply pointed tips. The brown cones, composed of several spirally arranged scales, are two to four inches long. Two seeds are at the base of each scale.

The spruces can be distinguished from the firs and false-hemlocks by the rough texture of the branches. This is due to the small woody pegs left on the branch after a leaf falls. During World War I the Sitka spruce was extensively harvested; the lumber was used to build wood-framed, canvas-covered fighter planes. Today, this tree is often planted as an ornamental in Oregon and Washington states.

COAST HEMLOCK

Tsuga heterophylla

This tree grows in many locations near the coast in the northwestern California area. Further north towards Alaska the hemlock forms dense, almost pure stands. A large tree with deeply furrowed brown bark the coast hemlock can reach heights of one hundred to two hundred feet. Long roots often entwine themselves over nearby fallen logs, giving it the nickname "Octopus tree." Its evergreen, needle-like leaves are spirally arranged along the slender, drooping branches, but may appear flattened. The leaves, dark green above and whitish beneath, are twisted near the base and attach to the branch with short, peg-like petioles. They range from one-quarter to three-quarters of an inch in length.

The solitary cones are cylindrical, one-half to one inch long, and hang from the ends of the branchlets. Tiny winged seeds mature in their first year and are released to the wind for dispersal. The wood from the coast hemlock is used in the construction industry and is known for its durability.

SANTA CRUZ CYPRESS

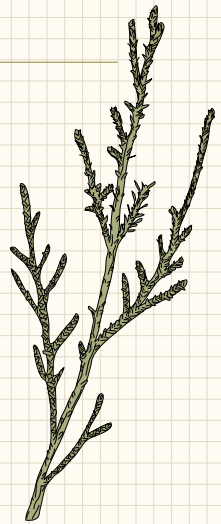
Cupressus abramsiana

The Santa Cruz cypress, found in only a few locations in the Santa Cruz Mountains, is on the rare and endangered list. It inhabits dry, often sterile, inland marine sand deposits and sandstone outcroppings. Unfortunately, due to increased development within this unique environment, the Santa Cruz cypress is threatened with extinction.

Related to many cultivated varieties for cypress, this native grows to heights of fifty to sixty feet and has thick bright green foliage. Small, overlapping, scale-like leaves grow along the branches. The cones, which are found at the tips of these branches, are closed until the second season and upon maturity release tiny, brown, winged seeds.

The cones remain closed for many years, only opening after the parent tree is killed in a wildfire. The heat of the fire opens the cone, in addition to allowing the seeds to colonise the bare ground exposed by the fire.

001.



001. TINY, OVERLAPPING, SCALE-LIKE LEAVES

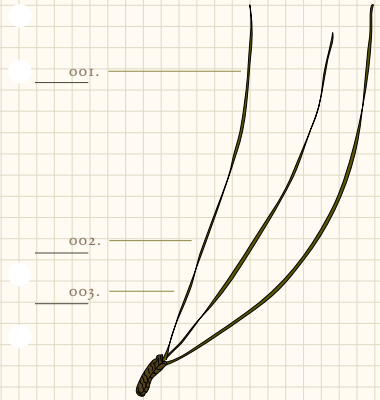
common name : Santa Cruz cypress
scientific name : Cupressus abramsiana
family : Cupressaceae
blooms : n/a
type : Tree

KNOBCONE PINE

Pinus attenuata

The knobcone pine is native to California and can be found on dry slopes, often where few other trees can survive. This adaptation to poor soil conditions makes it a hardy pioneer plant for recently burned or disturbed areas. It grows from Santa Cruz county, north to Del Norte and Siskiyou counties.

Because of its harsh environment, the knobcone pine is usually sparse and scraggly. The needles, which grow in clusters of three on slender branches, range from four to seven inches in length. Closed woody cones adhere tightly to the trunk and branches, opening only in extreme heat to release the small seeds. Like most other pine, the seeds are edible either raw or roasted. They can be gathered by heating the cones until the bracts open, allowing the seeds to fall out.



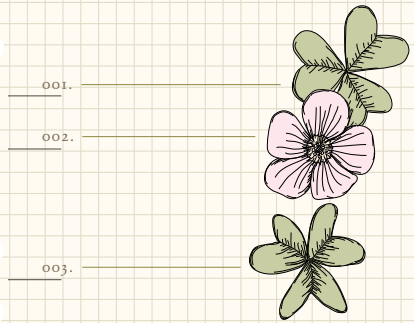
001. NEEDLES FOUR TO SEVEN INCHES LONG
002. NEEDLES GROW IN CLUSTERS OF THREE
003. TREE HAS SPARSE, SCRAGGLY APPEARANCE DUE TO HARSH ENVIRONMENTS

common name	Knobcone pine
scientific name	Pinus attenuata
family	Pinaceae
blooms	n/a
type	Tree

REDWOOD SORREL

Oxalis oregana

Redwood sorrel is extremely abundant in the redwood and mixed evergreen forests, often covering the grown in thick carpets. The clover-like leaves are extremely sun sensitive, folding down like umbrellas whenever it gets too hot. Solitary flowers grow on small stalks and turn from white to deep pink with age. Both the stems and leaves can be eaten raw in salads or slightly fermented for a tangy dessert. Their sour taste is responsible for the Latin name Oxalis, or acid juice. The pioneers used these sour stems in a pie similar to rhubarb pie.



001. COVERS THE GROUND IN THICK CARPETS
002. FLOWERS TURN WHITE TO PINK WITH AGE
003. CLOVER-LIKE LEAVES FOLD DOWN WHEN WEATHER GETS TOO HOT

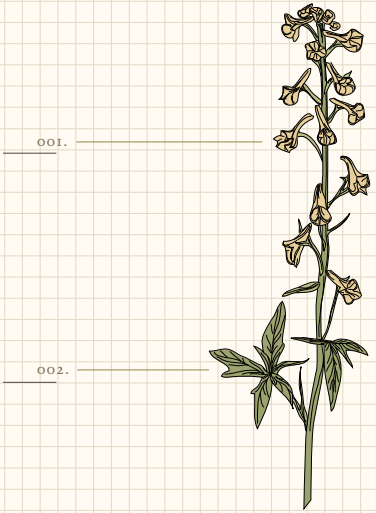
common name : Redwood sorrel
scientific name : Oxalis organa
family : Oxalidaceae
blooms : February-September
type : Herb

RED LARKSPUR

Delphinium nudicaule

Larkspur grows in dry areas in the mixed evergreen forests. Although not commonly seen in all regions, occasional large concentrations of the bright flowers can be found. When not in bloom, larkspur in an inconspicuous plant with short, lobed leaves. However, in late spring several scarlet red flowers with long spurs appear at the end of three foot long leafless stalks. A related species, coast larkspur, has brilliant blue flowers.

Another name for red larkspur is sleep root, since it was used as a narcotic to dull the sense of gambling opponents by California Indians.



001. RED FLOWERS WITH LONG SPURS
002. SHORT, LOBED LEAVES

common name : Red larkspur
scientific name : Delphinium nudicaule
family : Ranunculaceae
blooms : April-June
type : Herb

WESTERN WAKE ROBIN

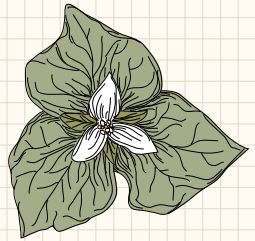
Trillium ovatum

The wake robin is common in shady redwood forests. It grows especially well in valleys along the many mountain streams. This small plant is characterized by a whorl of three large, dark green leaves atop a five to eight inch stem. On a short, slender stalk above the leaves is a small, three-petaled flower, which changes from white to purple as it ages. The name Trillium refers to the fact that the leaves and flower parts are in threes. Caution: the thick, fleshy, underground stems may cause violent vomiting when eaten.

THIMBLEBERRY

Rubus parviflorus

The thimbleberry is extremely common in moist redwood and mixed evergreen forests. Thimbleberry shrubs can reach three to four feet tall, forming dense thickets. Its large palmate leaves are covered with soft woolly hairs. Simple, rose-like flowers appear in spring, later ripening to hollow berries. These thimble-shaped berries give the plant its name. As with many other berries, these fruits are edible both raw or cooked into jams and pies. Instead of using rouge, pioneer women reddened their cheeks by rubbing them with soft, hairy thimbleberry leaves.



common name : Western wake robin
scientific name : Trillium ovatum
family : Convallariaceae
blooms : March-May
type : Herb

common name : Thimbleberry
scientific name : Rubus parviflorus
family : Rosaceae
blooms : March-August
type : Shrub

common name :
scientific name :
family :
blooms :
type :

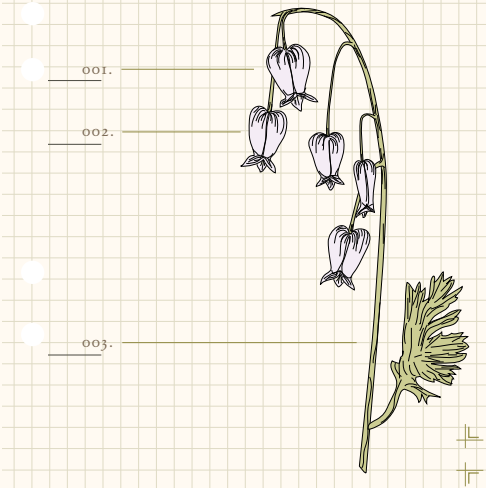
WESTERN BLEEDING HEART

Dicentra formosa

This native grows in damp, shady areas along the coast of northern California to British Columbia. Arising from a fleshy rootstock, the western bleeding heart has long-petioled, finely-divided fern-like leaves. The clusters of rose-purple flowers are heart-shaped and hang from long, naked stems. Individual flowers are about three-quarters inch long with four petals, the two outer ones forming the outline of the "heart."

In gardens the bleeding heart grows rapidly and can be propagated easily by divisions of the root or from seed. This plant is also known as "Dutchman's Breeches."

A nursery grown variety of bleeding heart is often planted in gardens. Five species are native to California.



001. HEART-SHAPED LAVENDER FLOWERS
002. FLOWERS HANG DOWN IN CLUSTERS
003. LEAVES FINELY-DIVIDED; FERN-LIKE

common name : Western bleeding heart
scientific name : Dicentra formosa
family : Fumariaceae
blooms : March-July
type : Herb

GLOSSARY

acorn : a hard, one-seeded nut whose base is enclosed by a scaly cap

alternate : leaves situated singly along a stem, arising from different leaf nodes; not in pairs

annual : a plant that produces flowers and fruit in its first year and then dies

anther : the enlarged part of the stamen that bears pollen

basal : arising from the base of a plant

blade : expanded surface portion of a leaf

bract : a modified leaf just below a flower or an inflorescence; may resemble other leaves or may be quite different

biodiversity : the full range of variety and variability within and among all living organisms (plants and animals), and the ecological complexes in which they occur

calyx : a collective term for sepals

catkin : a group of flowers, often of one sex, growing tightly-clustered along a stalk

chaparral : a broad-leaved sclerophyll type of vegetation

chlorophyll : the green pigment that enables plants to absorb the light energy needed for synthesis of organic compounds

compound : a leaf composed of two or more leaflets which look like true leaves

corolla : a collective term for petals

coniferous : a shrub or tree with needlelike or scalelike leaves that bears its seeds in cones. Conifers do not produce true flowers

deciduous : a tree or shrub whose leaves fall at nearly the same time or after their function has been performed

ecotype : a locally adapted, genetically distinct race within a species

endemic : a plant species that is restricted to a specific locality or habitat

evergreen : a plant that retains most of its leaves from one year to the next

floret : a single flower and its immediately subtending bracts

genus : a universal scientific name for a group of closely related species

glandular : a hair, bump, or or pit that secretes a sticky substance

herb : a plant that does not have woody stems, at least not above the base of the plant

inflorescence : a cluster of flowers, or several clusters, on a plant

leaf : generally the main food-producing structure of plants, commonly composed of a stalk and expanded surface

leaflet : a leaf-like part of a compound leaf

lobed : a flower or leaf that has deep indentations

mesic : soil that is moist

needle : a narrow, stiff leaf of a pine, fir, or other cone-bearing tree

node : the “joint” of a stem, where one or more leaves are attached and where a brach, flower, or inflorescence may develop

opposite : leaves growing along a stem in pairs; arising from the same node

palmate : leaves with three or more veins developing from a common center; like a hand

parasitic : a plant that draws nourishment from another plant

perennial : a plant that lives from year to year, including those that die back to bulbs in winter

petal : usually the showy portion of the flower parts; inside the whorl of sepals

petiole : stalk of a leaf

pinna : (plural pinnae) the leaf-like parts of a fern, often finely divided

pinnate : a compound leaf composed of leaflets arranged along a central stalk; featherlike

pistil : the portion of a flower in which a seed is eventually produced

pod : a usually narrow fruit that splits open when dry

pollen : the fine, often yellow powder produced by the stamens

rhizome : a fleshy, underground stem; often called a rootstalk

riparian : a plant or plant community that occurs next to a strema or along a river in a floodplain

saprophyte : a plant that receives nutrients from dead organic matter

sclerophyll : trees and shrubs with tough leaves adapted to relatively dry climates

sepal : the outermost whorl of flower parts, usually green

shrub : a perennial plant whose stems are woody throughout; usually does not have a distinct trunk and is not often more than three meters tall

serpentine : a type of soil that has a very low calcium content and correspondingly high magnesium content, a high nickel and chromium content, and a low nutrient content; serpentine soils have a very high proportion of endemic plant species restricted to them

species : a taxonomic term for closely related plants with similar morphological characteristics

spore	:	the microscopic body by which ferns, mosses, lichens, fungi, and algae reproduce
spur	:	a hollow, saclike, or tubular extension of a petal or sepal, as in larkspur, columbine, or violet
stamen	:	the pollen-producing part of a flower, usually consisting of an anther and filament; most flowers have at least two stamens, and some have many
stigma	:	the sticky tip of a pistil which traps pollen
thorn	:	a short branch that has become specialized as a stiff, sharp-tipped structure
vein	:	in a leaf, petal, or lemma, a structure, usually branched, consisting of tissues that distribute water and nutrients; in the case of petals, the term is often applied to colored lines
vernal pool	:	seasonal wetlands formed in shallow basins that are underlain by heavy clay soils that retain seasonal rainfall
whorl	:	leaves or flower parts that grow from a single location on a stem

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INDEX

common name : yerba santa
scientific name : Eriodictyon californicum
family : Hydrophyllaceae
blooms : April–July
type : Shrub

001.

common name : California meadow barley
scientific name : Hordeum brachyantherum
family : Poaceae
blooms : n/a
type : Herb

002.

rous :
nate :
tic soil :
phyll :
escence :
phyte :
ntine :
versity :
uous :
rral :