

Ecology of El Dorado County Debra Ayres

El Dorado County is one of the most botanically diverse places on the planet, home to over 2,300 native plant species. Though the county includes only 1% of the state's area, it contains almost 30% of the plants native to California.

Why is El Dorado County so diverse?

First, we live in a botanically rich area; with over 7,000 plants, the California Floristic Province* is one of the top 25 plant biodiversity hotspots in the world.

Second, the county is topographically varied; west-slope elevation increases from 450 to over 10,000 feet above sea level, and the 70 mile-long slope is bisected by the south and middle forks of the American River, and their tributaries, creating riverine valleys, slopes, and peaks. Millions of years ago the Sierra Nevada was uplifted, a process that continues today, due to plate tectonics. The uplift created elevational climatic zones that support seven distinct plant communities each containing 100s of native plants. (link to table 6 on communities and their plants)

Third, our area contains a diversity of soil types, also due to plate tectonics, including several that have botanical significance. Specifically, we have areas with serpentine soils and those with gabbro soil, both of which create harsh or unusual growing conditions for plants. The result is that unique plant assemblages have developed in these areas. (link here to the new rare plant section of the website, which will include Traverse Creek, Lava Caps, and Pine Hill). El Dorado County is home to almost 200 species of plants that can thrive on serpentine (link to old webpage on Traverse Creek). There are only 5 federally listed plant species in El Dorado County and they all occur on the gabbro soil area of Pine Hill (link to Ayres' CDFW Pine Hill talk, and the new webpage on rare plants).

What grows here? The plant list for El Dorado County includes over 100 trees, almost 300 shrubs, and over 1,900 grass-like plants and forbs (link to Table 1). The most common trees are conifers (31 species link to Table 2), including 15 pine trees (link to Table 3), and oaks (15 kinds link to Table 4), with several willows (9 tree species) growing near creeks and in wet meadows. There is a diversity of California lilacs, manzanitas, and currants and gooseberries in our shrub flora. The sunflower/daisy family is particularly well-represented with almost 300 species, mostly forbs, occurring in the county, as is the grass family with 160 species (link to Table 5).

Where do the plants grow?

Seven distinct plant communities are encountered driving up the "hill" from El Dorado Hills in the west to the mountain passes in the east due to plant adaptations to elevational climatic zones (link to Fig. 1, and Table 6). Precipitation, both amount and kind (rain or snow), and the length of the growing season determine these zones. Precipitation increases as moist air masses ascend the slope, cool, and shed their moisture as rain (lower down) or snow (higher up), and growing season decreases from several months to as short as 7 weeks at the highest peaks. Grassland, dominated by annual plants, extends from the Central Valley into El Dorado Hills. Woodlands, distinguished by blue oak and gray pine, occur on cooler north-facing slopes with chaparral on warmer south slopes as one ascends to Shingle Springs. Woodland gives way to widespread Mixed Coniferous Forest from Placerville to beyond Kyburz. Ponderosa Pine, with its jigsaw-puzzle-like bark, is the characteristic tree here but this community has the highest plant diversity in the County with over

1,100 species including hardwoods like black oak and big-leaf maple. Lodgepole Pine-Red Fir forest extends from 5,000 to 7,000 feet and is our “snow forest” receiving 50 feet of snow in typical years past. Above this forest is Subalpine Forest, composed of conifers, apparently arising out of granite, adapted to shallow soils and a short growing season. Above tree line is the Alpine community dominated by perennial grasses and forbs that put on spectacular wildflower displays during the short summer.

*The California Floristic Province extends northward from the state of California into southern Oregon and southward into Baja, Mexico and excludes the Modoc Plateau, Great Basin and deserts in the southeastern part of the state (link to: https://en.wikipedia.org/wiki/California_Floristic_Province).

Fig. 1 (from old website) Elevational transect from Folsom Lake to Echo Summit listing the plant communities found at each elevation (note that Grassland occurs at lower elevations and is intermixed with chaparral and woodland).

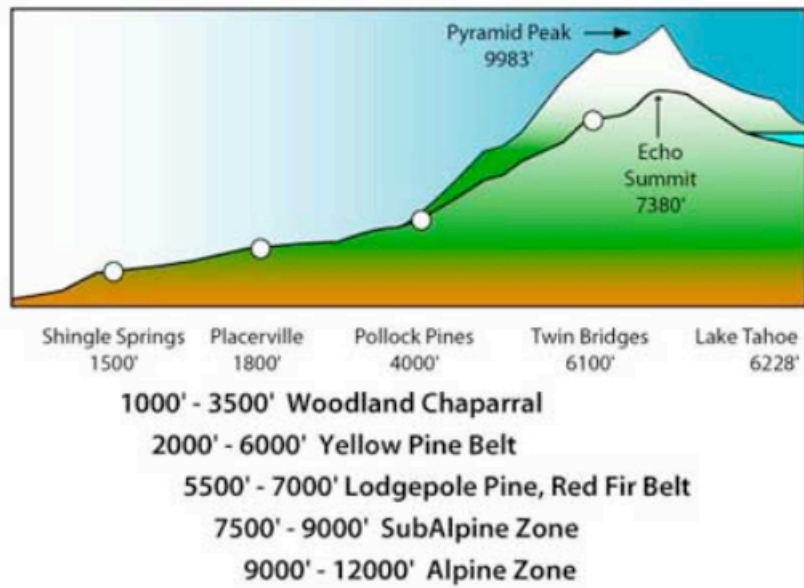


Table 1. Trees, shrubs, grass-like plants and forbs found in El Dorado County noting number rare, number that can grow on serpentine soil and the most species-rich genera.

Lifeform	# Native	# Rare	# Serpentine	Taxa # species
Trees	104	4	11	Conifers 32 (Pines 15); <i>Quercus</i> (Oaks) 12, <i>Salix</i> (Willow) 9
Shrubs	298	18	22	<i>Ceanothus</i> 24, <i>Ribes</i> 18, <i>Salix</i> 15, <i>Arctostaphylos</i> (manzanita) 14, <i>Ericameria</i> (Golden/rabbit brush) 12
Grass-like plants and Forbs	1932	145	24	NON-native species = 387
Total El Dorado County	2351	181	193	Non-native species = 429

Table 2. Coniferous trees of El Dorado County arranged according to number of species per genus.

Common Name	Scientific Name
Pines – 15	<i>Pinus</i> sp.
Firs – 4	<i>Abies</i> sp
Junipers – 2	<i>Juniperus</i> sp.
Cypress – 2	<i>Hesperocyparis</i> sp.
Douglas Fir - 2	<i>Pseudotsuga menziesii</i>
Yew	<i>Taxus brevifolia</i>
Hemlock	<i>Tsuga mertensiana</i>
Incense Cedar	<i>Calocedrus decurrens</i>
California nutmeg	<i>Torreya californica</i>
Lawson cypress	<i>Chamaecyparis lawsoniana</i>

Table 3. Common pines of El Dorado County listed according to elevation.

Common Name	Scientific Name	Elevation/Abundance/Community*
Gray pine	<i>Pinus sabiniana</i>	Low-Mid/widespread/woodland, chaparral
Ponderosa pine, Western yellow pine	<i>P. ponderosa</i>	Mid/widespread/ MCF
Sugar Pine	<i>P. lambertiana</i>	Mid-Upper/common/MCF, LP-RFF
Lodgepole pine	<i>P. contorta</i>	Mid-Upper/widespread/ (LP-RFF)
Western white pine	<i>P. monticola</i>	Mid-Upper/common/LPRF- SAF
Lodgepole pine, Tamarack	<i>P. contorta ssp. murrayana</i>	Mid-Upper/common/LPRFF-SAF-Lake Tahoe
Jeffrey Pine	<i>P. jeffrei</i>	Mid-Upper common/LPRFF-SAF-Lake Tahoe
Whitebark Pine	<i>P. albicaulis</i>	Upper/common/SAF

*MCF = Mixed Coniferous Forest; LP-RFF = Lodgepole Pine-Red Fir Forest; SAF = Subalpine forest
 Low = county line to 2000 ft (Placerville); Mid = 2000 – 5000 feet (MCF) Camino to Pollock Pines);
 Mid-Upper = 5000-7000 (LP-RFF Strawberry to passes); Upper = > 7000 ft (SAF); Lake Tahoe = LT

Table 4. Oaks (*Quercus* sp.) of El Dorado County, arranged by lifeform, and listed according to elevation.

Common Name	Scientific Name	Elevation/Abundance/Community*
TREES		
Inland Scrub	<i>Q. berberidifolia</i>	Low/Pine Hill/ uncommon in county/chaparral
Blue	<i>Q. douglasii</i>	Low/common/grassland, woodland
Valley	<i>Q. lobata</i>	Low/common/grassland, woodland
Oracle (hybrid)	<i>Quercus</i> × <i>morehus</i>	Low/not common/woodland
Interior Live – 3 var	<i>Q. wislizeni</i>	Low/common/woodland, chaparral
Black	<i>Q. kelloggii</i>	Low-Mid/common/woodland, MCF
Oregon - 3 ssp.	<i>Q. garryana</i>	Mid/not common/woodland, MCF
Canyon Live	<i>Q. chrysolepis</i>	Mid-upper/common/all except SAF
SHRUBS		
Nuttall’s Scrub	<i>Q. dumosa</i>	Low-Mid/Pine Hill preserve /rare/chaparral
Leather	<i>Q. durata</i> – 2 var	Low/ unusual soil (Pine Hill gabbro, serpentine)/common/chaparral
Huckleberry	<i>Q. vacciniifolia</i>	Mid-Upper/common/ LP-RFF, SAF, LT
*MCF = Mixed Coniferous Forest; LP-RFF = Lodgepole Pine-Red Fir Forest; SAF = Subalpine forest		
Low = county line to 2000 ft (Placerville); Mid = 2000 – 5000 feet (MCF) Camino to Pollock Pines); Mid-Upper = 5000-7000 (LP-RFF Strawberry to passes); Upper = > 7000 ft (SAF); Lake Tahoe = LT		

Table 5. Breakdown of non-woody species by lifeform and number of species in the family; within family the number of rare species, the number of species that can grow on serpentine soils, and the most speciose genera with the number of species in each genus.

Family	# Native	# Rare	# Serpentine	Genus # species
Grass and grass-like families	328			
Poaceae (Grass)	160	6	12	<i>Agrostis</i> 24, <i>Poa</i> 19, <i>Elymus</i> 18
Cyperaceae (Sedge)	123	11	4	<i>Carex</i> 88
Juncaceae (Rush)	45	1	0	<i>Juncus</i> 39
Forbs	1604			
Asteraceae (Sunflower)	298	18	29	<i>Erigeron</i> 30
Fabaceae (Pea)	117	2	2	<i>Lupinus</i> 40, <i>Trifolium</i> 30
Boraginaceae (Forget-me-not)	103	5	13	<i>Phacelia</i> 24, <i>Plagiobothrys</i> 19
Brassicaceae (Mustard)	77	12	4	<i>Boechera</i> 21
Polemoniaceae (Phlox)	71	4	9	<i>Navarretia</i> 24
Polygonaceae (Knotweed/Buckwheat)	64	4	3	<i>Buckwheat</i> 33
Rosaceae (Rose)	49	2	2	<i>Potentilla</i> 15
Apiaceae (Carrot)	42	3	9	<i>Perideridia</i> 9, <i>Lomatium</i> 8
Caryophyllaceae (Pink)	41	3	6	<i>Silene</i> 14
Phrymaceae (Lopseed)	34	6	2	<i>Mimulus</i> 34
Liliaceae (Lily)	28	3	5	<i>Calochortus</i> 11

Table 6. Plant communities of El Dorado County according to Calflora including numbers of native species, rare species and those species found on serpentine, and common families, genera and species of the community. Note: Calflora separates Lodgepole Pine-Red fir forest into two communities and Mixed Coniferous Forest is called Yellow Pine forest.

Plant Community	#native	#rare	#serpentine	Common family/genera/species
Grassland	370	10	34	Grasses 35 (bromes and bentgrasses), forbs 269 (lupines, CA poppy, daisies, monkey flower, popcorn flower, buttercups, clovers)
Foothill Woodland	624	42	93	68 native grasses, 449 native herbs, Oaks (canyon live, blue, valley, interior live), willows, cottonwoods, Pines (foothill, Coulter, knobcone), OR ash, redbud, manzanita, alder, buckeye, big-leaf maple
Chaparral	535	42	81	405 grasses and herbs, 97 shrubs (chamise, manzanita (7 sp), coyote brush, Ceanothus (12 sp), hazelnuts, Yerba Santa, buckwheat (3 sp), coffeeberry, toyon, silktassel (5 sp), oaks (4 sp), willows. Poison oak)
Yellow-Pine Forest = mixed coniferous forest	1,107	69	101	Yellow Pine, White Fir, big-leaf maple, alders, mazanitas, incense cedar, dogwood, OR ash, western juniper, tanoak, pines, cottonwood, var Prunus, Doug fir, OR oak, black oak, willows, yew, bay
Lodgepole pine	594	13	35	<u>LP Pine</u> , white fir, Mt. maple, western juniper, western white pine, cottonwood, quaking aspen, canyon live oak, willows
Red Fir	787	26	51	White and <u>Red fir</u> , Mt. maple, alders, western juniper, tanoak, pine (jeff, sugar, wwhite pine), cottonwood, quaking aspen, canyon live oak, OR oak, willows, yew
Sub-alpine forest	527	20	29	Pines (Whitebark, lodgepole, wwhite), Mt. hemlock, poplars, willows, dwf juniper, honeysuckles, currents and gooseberries, 451 grasses and forbs
Alpine	169	10	6	0 trees, 17 shrubs; 151 grass+forbs (15 sedges, 6 buckwheat)
Riparian/wetland - within various communities throughout El Dorado County	731	54	21	34 Trees: Maple, alder, willow, poplar; 61 Shrubs: willow, current, dogwood, twinberry; 170 grass and grass-like: sedges, spikerush, rush; 452 forbs: cinquefoil, willowherb, meadowfoam, monkeyflower, navarretia, popcornflower, pondweed, buttercup, dock, clover