

JEFFREY PINE SERIES

Pinus jeffreyi

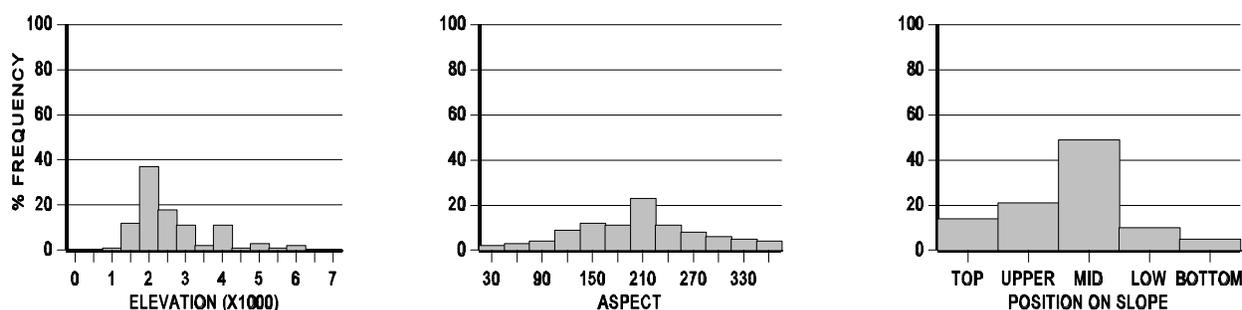
PIJE

Patricia A. Martinez

Southwestern Oregon is the northern extent of the range of Jeffrey pine. This species is scattered throughout Curry, Josephine, Jackson, and Douglas counties, with the heaviest concentrations in Josephine and Jackson counties. It usually occurs on ultramafic parent material. Jeffrey pine is often the dominant tree species on soils derived from ultramafic parent material, especially in interior valleys and foothills. Tanoak (*Lithocarpus densiflora*), western hemlock (*Tsuga heterophylla*), or Port-Orford-cedar (*Chamaecyparis lawsoniana*) may replace Jeffrey pine as the stand dominant near the coast.

Ultramafic bedrock, mainly serpentine and peridotite, is high in ferromagnesium silicate minerals with an unusually high proportion of nickel and chromium. This chemical composition, toxic to most plants, results in a unique and diverse flora. Soils weathered from ultramafic rock strongly reflect the elemental composition of the parent rock with high concentrations of magnesium, iron, and silica (Kruckeberg 1984).

As shown in the graphs below, the Jeffrey Pine Series covers a wide elevational band, from 1200 feet to 6000 feet, with a concentration near 2000 feet, and an average elevation of 2586 feet. Although this Series occurs on all aspects and slope positions, it is more commonly found on southerly aspects and mid-slope positions.

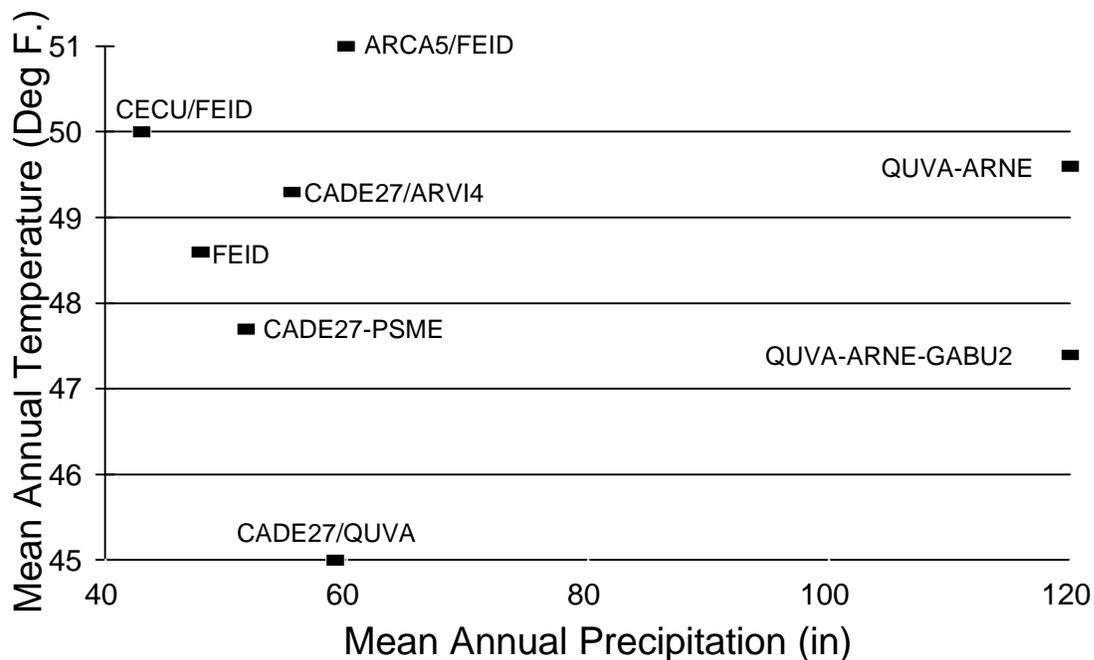


Parent material is either pure serpentine or peridotite (66 percent of the time) or a mixture of undifferentiated ultramafic material with other rock types. The Series rarely occurs on grano-diorite or meta-volcanic soils that apparently do not have any ultramafic influence.

The Jeffrey Pine Series tends to have high exposed gravel, surface rock, and bedrock components. Gravel cover ranges from 3 to 95 percent, with an average of 28 percent. Rock cover ranges from 5 to 75 percent, with an average of 39 percent. Bedrock cover ranges from 0 to 15 percent, with an average of 4 percent. Moss cover, however, is low compared to other Series, ranging from 0 to 50 percent, with an average of 3 percent. This reflects the dry surface soil conditions typical of the Series.

Based on ten plots sampled, soils are shallow to deep, and moderately well to well drained. Surface texture is clay loam, loam, or silty clay loam, with 0 to 33 percent gravel, 0 to 50 percent cobbles and stones, and 25 to 32 percent clay. Subsurface textures are clay, clay loam, loam, and silty clay loam, with 0 to 50 percent gravel, 5 to 70 percent cobbles and stones, and 20 to 50 percent clay. The soil moisture regimes are xeric or udic and the soil temperature regimes are mesic or frigid. Soils classify to the following subgroups: Lithic Xerochrept, Typic Xerochrept, Dystric Xerochrept, Lithic Haploxeralf, Typic Haploxeralf, and Typic Palexeralf.

The mean annual temperature for the Jeffrey Pine Series ranges from 45 degrees F to 51 degrees F and the mean annual precipitation ranges from 43 inches to 120 inches. The relative positions of the plant associations in the environment are shown below. Each association is plotted by mean annual temperature and mean annual precipitation.



As a result of the serpentine/peridotite parent material influence, there are many unique species found in this Series, i.e., Jeffrey pine, rock fern, dwarf ceanothus, Tolmie's mariposa, and box-leaved silk-tassel. These species will be frequently found, yet will usually have low covers. Jeffrey pine was present in every association in both the overstory and the understory. Douglas-fir and incense-cedar are consistently found in most associations in both the overstory and the understory. Coffeeberry and dwarf ceanothus are frequently found along with rock fern, huckleberry oak, and common beargrass.

Average total species richness, based on vascular plants only, is calculated for each association. The average total species richness for the Jeffrey Pine Series ranges from 15 to 49 species per plot. Richness is rated as very low, 15 to 21 species; low, 22 to 29 species; intermediate, 30 to 36 species; high, 37 to 43 species; and very high, greater than 44 species.

A characteristic feature of the Series is an open canopy of trees, shrubs, and herbs. On Forest Service sites, upper layer tree cover ranges from 6 to 25 percent, and averages 17 percent. Mid-layer tree cover ranges from 23 to 31 percent, and averages 27 percent, while lower layer tree cover ranges from 21 to 45 percent, and averages 35 percent. High shrub cover ranges from 3 to 18 percent, and averages 9 percent, while low shrub cover ranges from 21 to 56 percent, and averages 32 percent. Herb/grass cover ranges from 28 to 74 percent, and averages 49 percent. Low, intermediate, and high canopy covers are defined as the lower, middle, and upper thirds of the total range of average covers for each layer.

On Bureau of Land Management sites, cover for trees greater than 10 feet tall (3 meters) ranges from 12 to 50 percent, and averages 30 percent, while cover for trees less than 10 feet tall ranges from 1 to 11 percent, and averages 5 percent. Cover for shrubs greater than 20 inches tall (50 centimeters) ranges from 3 to 46 percent, and averages 25 percent, while cover for shrubs less than 20 inches tall ranges from 3 to 32 percent, and averages 13 percent. Herb/grass cover ranges from 31 to 62 percent, and averages 48 percent.

Eight plant associations have been classified for the Jeffrey Pine Series in southwestern Oregon. They were described from 91 plots, 54 from Bureau of Land Management data and 37 from Forest Service data. There may be some additional types on the Illinois Valley, Galice, and Chetco Ranger Districts of the Siskiyou National Forest not detected by sampling. If the southwestern Oregon key fails, try the Jeffrey Pine Series Key from "A Field Guide to Serpentine Plant Associations and Sensitive Plants in Northwestern California" by Thomas M. Jimerson et. al. (R5-ECOL-TP-006, 1995).

SPECIES TO KNOW

There are several species used in the plant association key that are easily confused with similar species. A general description of each of these occurs below.

Idaho fescue (FEID) - In southwestern Oregon, the native dryland fine-leaved fescues with gray-green or blue-tinged leaf color have been called Idaho fescue (*Festuca idahoensis*), red fescue (*Festuca rubra*), Roemer's fescue (*Festuca roemerii*), and sheep fescue (*Festuca ovina*). Field characteristics to discriminate between these species are not usable in southwestern Oregon. Name(s) were attached to these fescues in order to refer to them in this guide. Idaho fescue (*Festuca idahoensis*) is used as the name in this publication for all the native dryland fine-leaved fescues with gray-green or blue-tinged leaf color. It is not a taxonomic determination (Rolle 1996).

Hoary manzanita (ARCA5) - An erect or spreading shrub, 1 to 3 (or to 6) feet high, without a basal burl. Bark is smooth, dark red-brown; densely soft white-pubescent branchlets, and peduncles. Leaves are pale green and gray pubescent or canescent on both surfaces; ovate to roundish; 1.25 to 2 inches long. Flowers about 0.25 inches long, in short racemes or panicles, white or pinkish; bracts large and foliaceous. Fruit is depressed-globular, 0.25 to 0.38 inches broad, usually pubescent, sometimes slightly glandular or glabrate and glaucous. Easily confused with whiteleaf manzanita (ARVI4) (Munz 1968).

Whiteleaf manzanita (ARVI4) - Evergreen, erect shrub; 3.3 to 13.0 feet high, without a basal burl. Bark is smooth, reddish-brown. Leaves are pale, glaucous, whitish-green, sticky; ovate or elliptic, rounded at the tip; 1 - 1.5 inches long. Flowers urn-shaped, pink to whitish; 0.2 - 0.3 inches long. Fruit is light brown or red berry, smooth or glandular, 0.2 - 0.3 inches in diameter. Whiteleaf manzanita is capable of inhabiting low elevation, dry sites. It can withstand extremely high moisture stress levels and is capable of extracting water from bedrock (Zwieniecki and Newton 1996). Easily confused with hoary manzanita (ARCA5) (Seda, Atzet, and Wheeler 1989).

Box-leaved silk-tassel (GABU) - Low, evergreen shrub, 2 - 6.5 feet tall. Young twigs are stiffly hairy. This species is dioecious (male and female plants). Leaves are oblong-elliptic to roundish, 0.4 - 1.6 inches long, glabrous on upper surface, densely pubescent below, with petiole 0.1 - 0.2 inches long. Flowers - male catkins 2 - 2.8 inches long, in clusters of 2 - 4; female flowers 1.2 - 3.5 inches long. Fruit are blue-black, subglabrous berries, 0.1 - 0.2 inches. Be careful not to assume this is a manzanita at first glance. Silk-tassels have opposite leaves (Seda, Atzet, and Wheeler 1989).

Squaw carpet (CEPR) - Evergreen trailing shrub forming dark green mats. Leaves opposite, leathery, with toothed margins. Flowers showy, blue to white clusters. Fruit capsules, 0.2 - 0.4 inches broad, with three lobes. Dwarf ceanothus (CEPU) is very similar, but the leaves are smaller and it grows in ultrabasic soils, such as serpentine (Seda, Atzet, and Wheeler 1989).

Dwarf ceanothus (CEPU) - Low, mat-forming, creeping shrub. Leaves opposite, persistent, wedge-shaped to oblong-lanceolate; 0.2 - 0.6 inches long on petioles less than 0.1 inches long; often with few teeth on the margins. Flowers blue to white, borne in few-flowered umbels. Fruit globose capsules, 0.2 inches in diameter, containing shiny, flattened seeds. Similar to squaw carpet (CEPR) (Seda, Atzet, and Wheeler 1989).

The relationship of draft and final plant associations in the Jeffrey Pine Series is shown below. The draft associations are listed, with the final associations below, each in order of most to least common, with the percentage of plots that make up each association (refer to Methods section).

PIJE-PIMO (N=9)
 PIJE/QUVA-ARNE-GABU2 (33%)
 PIJE-CADE27/QUVA (22%)
 PIMO3-PIJE/QUVA/XETE (22%)
 CHLA/QUVA-XETE (11%)
 LIDE3-PIMO3/QUVA/XETE (11%)

PIJE-QUVA (N=14)
 PIJE-CADE27/QUVA (72%)
 PIJE-CADE27/ARVI4 (14%)
 PIJE/QUVA-ARNE-GABU2 (14%)

PIJE/GRASS (N=1)
 PIJE-CADE27/ARVI4 (100%)

PIJE/CEPU (N=8)
 PIJE-CADE27/ARVI4 (88%)
 PIJE-CADE27/QUVA (12%)

The flow chart below shows a graphical presentation of the classification and the relationships between the plant associations. It is not intended to be used as the plant association key.

KEY TO THE JEFFREY PINE PLANT ASSOCIATIONS

- 1a. Idaho fescue* (FEID) usually present. 2
- 1b. Idaho fescue* (FEID) usually absent. 4
- *See Idaho fescue write-up in the Jeffrey Pine Series writeup for list of species called Idaho fescue.*
- 2a. Hoary manzanita (ARCA5) and dwarf ceanothus (CEPU) present. PIJE/ARCA5/FEID
Page PIJE 8
- 2b. Hoary manzanita (ARCA5) and dwarf ceanothus (CEPU) absent. 3
- 3a. Buckbrush (CECU) and/or whiteleaf manzanita (ARVI4) present. PIJE/CECU/FEID
Page PIJE 10
- 3b. Whiteleaf manzanita (ARVI4) absent. PIJE/FEID
Page PIJE 12
- 4a. Huckleberry oak (QUVA) usually present. 5
- 4b. Huckleberry oak (QUVA) usually absent. 7
- 5a. Incense-cedar (CADE27) present. PIJE-CADE27/QUVA
Page PIJE 14
- 5b. Incense-cedar (CADE27) absent. 6
- 6a. Knobcone pine (PIAT), California-laurel (UMCA), dwarf ceanothus (CEPU), coffeeberry (RHCA), and pinemat manzanita (ARNE) present. PIJE/QUVA-ARNE
Page PIJE 16
- 6b. Not as above. PIJE/QUVA-ARNE-GABU2
Page PIJE 18
- 7a. Whiteleaf manzanita (ARVI4) usually present. PIJE-CADE27/ARVI4
Page PIJE 20
- 7b. Whiteleaf manzanita (ARVI4) usually absent. PIJE-CADE27-PSME
Page PIJE 22

LITERATURE CITED

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