

50. L. E. Horton (Stone Corral-Josephine Peridotite) (Keeler-Wolf 1986d)

Location

L. E. Horton recommended RNA is on the Six Rivers National Forest. It is only 4 miles (6 km) S. of the Oregon border and about 6 miles (10 km) NW. of Gasquet. It includes portions of sects. 24, 25, 26, 35, and 36 T18N, R1E and sects. 19 and 30 T18N, R2E MDM (41°56'N., 124°01'W.), USGS High Plateau and High Divide quads (fig. 102). Ecological subsection – Gasquet Mountain Ultramafics (M261Ab).

Target Element

Darlingtonia californica (California pitcher plant)
Bog

Distinctive Features

Rare Plants: This area contains a higher percentage of rare plants than any other established or recommended/ candidate RNA in California. A total of 40 taxa (25 percent of the known flora of the area) are on CNPS lists. These include the following:

List 1B: *Arabis macdonaldiana* (also Federally- and State-listed endangered species)

List 2: *Arabis aculeolata*, *Castilleja elata*, *Calamagrostis crassiglumis*, *Eriogonum pendulum*, *Pinguicula macroceras*, *Senecio macounii*

List 3: *Aster paludicola*, *Gentiana setigera*

List 4: *Angelica arguta*, *Antennaria suffrutescens*, *Arnica spathulata*, *Aster brickelloides*, *Darlingtonia californica*, *Epilobium rigidum*, *Eriogonum ternatum*, *Gentiana affinis*, *Haplopappus racemosus* ssp. *congestus*, *Horkelia sericata*, *Iris innominata*, *Lathyrus delnorticus*, *Lilium bolanderi*, *L. vollmeri*, *Lomatium howellii*, *L. tracyi*, *Monardella purpurea*, *Poa piperi*, *Salix delnortensis*, *S. tracyi*, *Sanicula peckiana*, *Sedum laxum* ssp. *flavidum*, *Tauschia glauca*, *Trillium rivale*, *Vancouveria chrysantha*, *Veratrum insolitum*

Considered, but rejected due to taxonomic questions: *Arctostaphylos cinerea*, *A. parviflora*, *Juniperus communis* ssp. *jackii*

Considered, but rejected due to commonness: *Arctostaphylos intricata*, *Viola cuneata*

In addition to the species on the CNPS lists, a form of beach pine (*Pinus contorta* ssp.) may also be considered rare. The pine has been referred to as endemic to the ultramafic terrain of Del Norte County by Griffin and Critchfield (1976).

Klamath Mountains Serpentine Endemics: A total of 53 taxa, or 33 percent of the known flora of the study area, are Klamath endemics. It is likely that almost all of these species will prove to be serpentine endemics or indicator species (*sensu* Kruckeberg 1984) — a remarkably high percentage of endemics. Another RNA, Frenzel Creek, is in an area known for its high endemism to the central Coast Ranges (Stebbins and Major 1965), yet only 17 percent of its flora is endemic to that area.

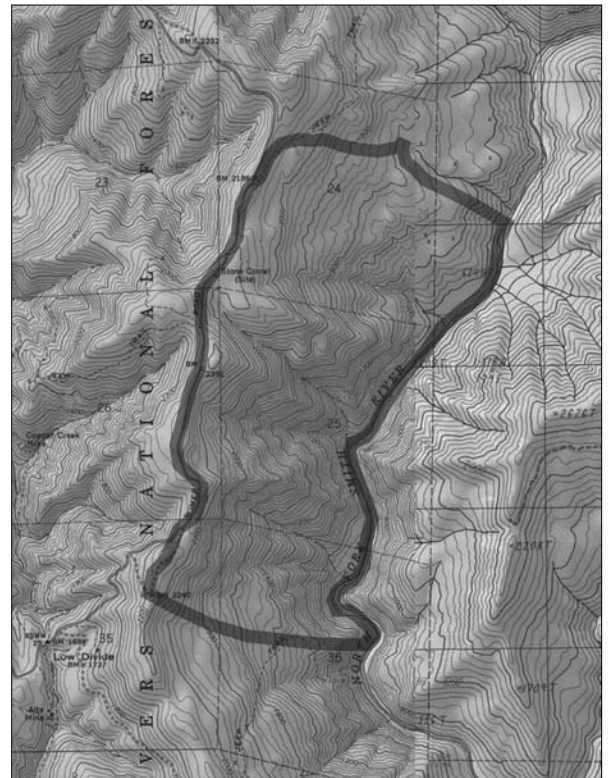


Figure 102—L.E. Horton rRNA

The *Darlingtonia* Bog: The extensive bogs in the N. portion of the area represent the best-developed *Darlingtonia* bog habitat in the California RNA system (fig. 103). Although California pitcher plant is widespread in N. California, the flora of the coastal type, of which this area is representative, is different from the inland higher-elevation types, which occur in several other Forest Service RNAs or Botanical Areas (e.g., Cedar Basin recommended RNA and Mount Eddy RNA).

Port Orford-Cedar (*Chamaecyparis lawsoniana*): This species also occurs in several other RNAs. Stands of POC in this area are neither as dense nor as large as in some other areas (e.g., Adorni RNA, Cedar Basin recommended RNA, Upper Goose Creek candidate RNA). They represent a different association type listed from the Siskiyou Mountain region by Atzet and Wheeler (1984). They also represent the oldest trees and highest volume forest in the study area. Some of the individuals are clonal, a feature which has occasionally been reported from other Port Orford-cedar stands with very wet substrates. This population has not been infected with root rot (*Phytophthora lateralis*).

Physical Characteristics

The study area covers 1305 acres (528 ha) of E.-facing slopes above the North Fork of the Smith River. Terrain is steep and rugged in most of the S. and central portions, but it becomes more gradual in the N. where the *Darlingtonia* bogs occur. Elevations range from about 600 ft (183 m) along the Smith River to 2400 ft (732 m) at the summit of the ridge near Stone Corral. The area is underlain by the lower or mid-Jurassic Josephine Peridotite Body, which stretches for 93 miles (150 km) along the W. border of the Klamath Mountains



Figure 103—L.E. Horton, dense aggregation of *Darlingtonia californica* and bog forest in L.E. Horton rRNA. (1985)

ecological section. Most of the rock is serpentinized peridotite with small inclusions of gabbro. Soils are generally shallow and poorly developed except in the wet bog area. They are typically poor in calcium and extremely high in magnesium. Precipitation totals are among the highest in the state, averaging 115-125 inches (2921-3175 mm) per year. Temperatures are moderate, with some snow falling in winter and frequent summer fog at lower elevations.

Association Types

Portions of the dwarf forest, bog forest, Jeffrey pine (*Pinus jeffreyi*) woodland, and Douglas-fir (*Pseudotsuga menziesii*) forest were sampled using 10-m by 10-m quadrats. The remaining vegetation is described qualitatively.

Dwarf Forest (no Holland equivalent, perhaps part of 84160): 815 acres (330 ha). The stunted, compact nature of many of the trees and shrubs of this

association and the presence of several typically high montane taxa give this low-elevation forest a peculiar subalpine quality. This forest is best developed on the relatively gentle (10-30°) upper slopes.

Ten plots were sampled. The forest is nearly continuous and dense (1960 stems/ha), dominated by spindly trees (total basal area cover 9.5 m²/ha) of beach pine (*Pinus contorta* ssp.), knobcone pine (*P. attenuata*), western white pine (*P. monticola*), and Douglas-fir. The canopy is broken occasionally by small herbaceous openings on more steeply sloping, rocky sites. The density (trees/ha), relative cover, and importance values are given below, following the dominants: beach pine (1040, 30 percent, 101), knobcone pine (490, 20 percent, 74), western white pine (250, 30 percent, 66), Douglas-fir (160, 20 percent, 51), Jeffrey pine (10, 1 percent, 4), Port Orford-cedar (10, trace percent, 3.4).

Dominant trees are no larger than 11 inches (28 cm) dbh and are typically western white pine. Beach and knobcone pines are typically no larger than 5 inches (13 cm) dbh. The numerous small knobcone and beach pines average 40 years old; the sampled dominant western white pines are 86-104 years old. The oldest tree sampled in this forest is a 20-inch (51-cm) dbh Douglas-fir with an age of 209 years. Disease (blister rust, dwarf mistletoe, and other fungus) is extremely common in all trees and appears to be the principal cause of early death in these trees. Recent fire has not been widespread. A small fire burned about 5 acres (2 ha) in 1981 and killed all dominant trees.

Shrubs may cover more than 50 percent of the area. The most significant species are *Lithocarpus densiflorus* var. *echinoides*, *Quercus vaccinifolia*, *Rhamnus californica*, *Arctostaphylos nevadensis*, and *Umbellularia californica*. All of these species resprout after fire. The herb layer is well developed, consisting of at least 41 taxa. Such species as *Xerophyllum tenax*, *Festuca californica*, *Stipa lemmonii*, *Agrostis hallii*, and *Poa piperi* may locally cover up to 35 percent.

Lower Dwarf Forest (no Holland equivalent, perhaps partially 37600): 393 acres (159 ha). Below about 1200 ft (366 m) in the steep inner canyon of the North Fork of the Smith River, beach pine drops out and the density of western white pine and knobcone pine decreases. Densities of Douglas-fir and incense-cedar (*Libocedrus decurrens*) increase. Tree densities are lower than at higher elevations. Shrub cover also changes from the upper-elevation dwarf forest, with such species as *Arctostaphylos cinerea* and *Garrya buxifolia* increasing in cover while *Lithocarpus densiflorus* var. *echinoides* and *Quercus vaccinifolia* decrease. Other shrub species particular to this association include *Eriogonum pendulum*, *Eriodictyon californica*, *Arctostaphylos parviflora*, and *A. intricata*.

The herbaceous component also differs from the dwarf forest of higher elevations. It includes as important members *Phlox speciosa*, *Penstemon azureus*, *Chrysopsis oregona*, *Sedum laxum* ssp. *flavidum*, *Selaginella wallacei*, *Toxicodendron diversilobum*, *Arabis aculeolata*, *Lomatium tracyi*, *Stipa lemmonii*, *Phacelia nemoralis*, and *Arenaria* sp.

Bog Forest (51120, 82500): 48 acres (19 ha). In this area a forest dominated by Port Orford-cedar (POC) alternates with hillside bogs dominated by California pitcher plant. Both forest and bog are related in the area, hence the combined name of this association. The association occurs on gentle (5-15°) E.-facing slopes. Ten plots were sampled. The average tree-stem density is 1350/ha. POC strongly dominates, with density (per ha), relative cover, and importance value as follows: 510, 79 percent, 149. Other trees, with their corresponding figures in parentheses, are western white pine (420, 17 percent, 77), beach pine (340, 3 percent, 54), knobcone pine (70, 1 percent, 16), and Douglas-fir (10, trace percent, 4). Total basal area cover averages 58 m²/ha. All of the large POC have fire scars. One specimen, 146 years old, has light fire charring. The oldest is a 31-inch (79-cm) dbh individual that is 282 years old. Several large trees, 39-48 inches (1-1.2 m) dbh, are probably 350-400 years old.

Ledum glandulosum and *Rhododendron occidentale* are the principal shrubs indicative of this association (mean cover on 10 plots: 8.5 and 5.5 percent, respectively). However, a number of other shrubs (12 species in the sample) are shared with the surrounding dwarf forest. Of particular importance is *Lithocarpus densiflorus* var. *echinoides*, which averages 11 percent cover.

The most distinctive element of the bog forest flora is the herbaceous component. About 53 percent of the 38 species encountered on the sample plots are locally restricted to this association. The dominant herbaceous species include *Darlingtonia californica*, *Scirpus criniger*, *Carex serratodens*, *Sanguisorba microcephala*, and *Narthecium californicum*. These and other characteristic species such as *Aster paludicola*, *Rudbeckia californica* var. *glauca*, *Deschampsia caespitosa* ssp. *beringensis*, *Calamagrostis nutkaensis*, and *Juncus orthophyllus* tend to dominate the wetter portions of this association (often concave slopes with small rivulets) to the exclusion of woody species.

Canyon Forest (81100 ±): 25 acres (10 ha). This association is similar to the classic mixed evergreen forest in that it is dominated by tanoak (*Lithocarpus densiflorus*), Pacific madrone (*Arbutus menziesii*), and canyon live oak (*Quercus chrysolepis*). However, the scattered canopy of Douglas-fir typical of most mixed evergreen forests is here augmented with western white pine, POC, and incense-cedar. This forest occupies ravines with permanent or intermittent stream channels; it is a more mesic environment than the surrounding dwarf forest. The dominant broad leaf sclerophylls form a dense canopy, with stems averaging about 10 inches (25 cm) dbh. The largest tree seen anywhere in the study area was a western white pine in this association; it measured 45 inches (114 cm) dbh.

Understory species are shared with dwarf and lower-dwarf forest and include *Garrya buxifolia*, *Lithocarpus densiflorus* var. *echinoides*, *Quercus vaccinifolia*, *Rhamnus californica*, and *Vaccinium ovatum*. *Berberis piperiana* is the only shrub apparently restricted to this type.

Jeffrey Pine Woodland (84171): 11 acres (5 ha). A small portion of the upper elevation near Stone Corral supports an open woodland of Jeffrey pine. This is a relatively young forest with dominant Jeffrey pines averaging about 20-22 m tall, 51 cm dbh, and 100 years old. Growth rates vary considerably depending on substrate; those on or near gabbro grow faster and taller than those on peridotite. Three plots were sampled in this association. Total tree density averages 730/ha, and total basal area cover averages 75 m²/ha. The only other tree species, western white pine, is an insignificant member.

Shrub cover is much lower than in adjacent dwarf forest. Eight species are in the sample, with *Arctostaphylos nevadensis* dominating (mean cover, 16 percent). Of the 19 species of herbs noted in the sample, the highest cover is provided by the grass *Festuca californica* which may cover up to 40 percent of the plots. Other frequent species include *Erigeron foliosus* ssp. *confinis*, *Achillea millefolium*, *Hastingsia serpentinicola* (recently described by Becking 1989), *Haplopappus racemosus* ssp. *congestus*, *Calystegia occidentalis*, *Trifolium oreganum*, and *Horkelia sericata*.

Douglas-Fir Forest (82420): 8 acres (3 ha). A small pocket of relatively lush young Douglas-fir forest occurs on gabbro near the Stone Corral Jeffrey pine woodland. The forest is locally dense (2150 trees/ha) with relatively high basal area cover (112 m²/ha). Typical dominant Douglas-firs are 50-60 cm dbh, 26 m tall, and 95-111 years old. Also occurring are trees of POC, Pacific madrone, tanoak, and canyon live oak. The shrub and herb layers are depauperate, with only six species of shrubs and seven herbs tallied on two plots. *Gaultheria shallon*, *Polystichum munitum*, and a thick carpet of moss are the most important understory members. The young age of the trees and the multiple stems of the sclerophylls suggest a crown fire somewhat more than 100 years ago.

Plant Diversity

One hundred sixty-two taxa are listed.

Conflicting Impacts

The N. portion of the area has been subjected to exploratory chromite and nickel mining over the past 10 years. This has resulted in a small network of bulldozer tracks and pits (up to 6 m deep). The impact of these excavations on the rare flora is not particularly severe because of the even dispersion of most of these species throughout the area of affected dwarf forest. Since it was proposed as a RNA, the area has not been affected by any additional mining. The rough nature of the tractor trails precludes vehicular access into the heart of the area. Dirt roads bound the W. and N. of the area. These may possibly act as vectors for transporting POC root rot into the area.