15. Cedar Basin (Keeler-Wolf 1982, 1989e)

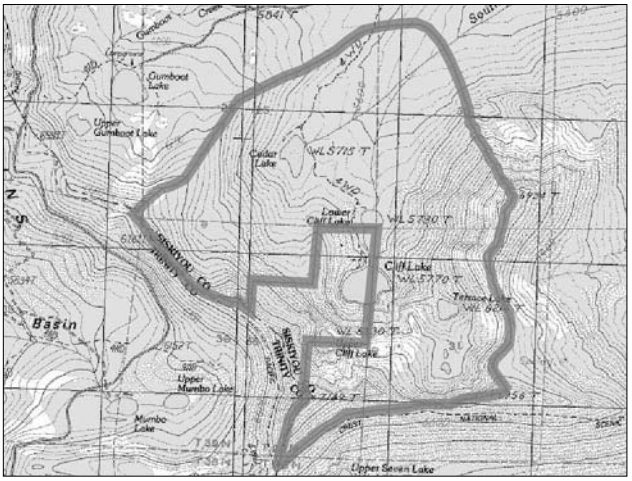

Figure 30—Cedar Basin rRNA

Location

This recommended RNA (rRNA) is on the Shasta-Trinity National Forest. It is about 12 miles (19 km) SW. of the town of Mount Shasta. The area falls partly within sects. 30, 31 T39N, R5W and sects. 25, 36 T39N, R6W MDBM (41°12'N., 122°27'W.), USGS Seven Lakes Basin and Mumbo Basin quads (*fig. 30*). Ecological subsection – Upper Scott Mountains (M261Aj).

Target Element

Port Orford-Cedar (*Chamaecyparis lawsoniana*)

Distinctive Features

Port Orford-Cedar: The stands of Port Orford-cedar at this site are at the highest known elevation (up to 6400 ft, 1950 m). These make up part of the inland distribution of the species concentrated along the headwaters of the Trinity and Sacramento rivers. This inland distribution is geographically separate from the more coastal stands of NW. California and SW. Oregon which have suffered varying degrees of infection from the introduced and lethal root rot *Phytophthora lateralis*. This inland population may be genetically distinct from the coastal populations. The rRNA encompasses an entire basin and thus affords good protection from the waterborne fungus. A variety of vegetation types are associated with Port Orford-cedar (POC) in this area, including Shasta red fir (*Abies magnifica* var. *shastensis*), lodgepole pine (*Pinus contorta* ssp. *murrayana*), mixed conifer, and mountain hemlock (*Tsuga mertensiana*) forests.

Rare Plants: A new species of manzanita (*Arctostaphylos klamathensis*) was discovered at Cedar Basin as a result of field studies for this ecological survey (Edwards and others 1983). A member of CNPS List 1B, this species is also listed as sensitive species by Shasta-Trinity National Forests. Additional rare species include *Polystichum lonchitis* (CNPS List 3), *Darlingtonia californica* (CNPS List 4), *Lilium washingtonianum* var. *purpurascens* (CNPS List 4), and *Carex gigas* (CNPS List 4). There is also a distinctive population of *Penstemon rupicola* with purple-blue flowers (flowers are typically rose red), which may be an undescribed taxon.

Zoological Values: A number of uncommon vertebrate predators are known in the RNA. These include spotted owl (*Strix occidentalis*, California species of special concern), pine marten (*Martes americana*, Forest Service-listed sensitive species), mountain lion (*Felis concolor*), fisher (*Martes pennanti*, Forest Service-listed sensitive species), and wolverine (*Gulo gulo*, State-listed threatened species).

Paleoenvironment: A pollen core sample has been taken from Cedar Lake in the rRNA and represents a continuous record of more than 10,000 years (West 1986). Analysis has shown a shift from cool-moist climate through warm-dry, and back to cool-moist periods over the record.

Physical Characteristics

The ecological survey covers 972 acres (394 ha). Elevations range from 5420 ft (1652 m) along the upper Sacramento River to 7149 ft (2179 m) atop the ridge on the SW. edge of the area. The survey area lies at the head of the S. Fork of the Sacramento River. The basin is oriented to the NE. and has had all of its major

features shaped by Pleistocene glaciation. The basin contains 10 permanent or semipermanent lakes and ponds, several lateral moraines, polished gabbro bedrock, and peridotite morainal deposits (both rock types from the Trinity Ultramafic Pluton). Soils of six major mapping units occur in the area. These are Jumpe-Zeb families, Endlich-Typic Cryaquolls, Crags family-rubbleland-Nanny complex, Toadlake-Hungary families, basic intrusive rock outcrop, and Inville-Jayar complex. Precipitation falls mostly as snow from November through March with a yearly average estimated at 60-80 inches (1524-2032 mm).

Association Types

Vegetation sampling was conducted in several of the forest associations. Ten 0.1-ha plots were sampled in relatively open coniferous vegetation, including five on serpentinite mixed conifer and five in red fir-mountain hemlock forest. Five additional 100-m^2 plots were sampled in Port Orford-cedar forest. The remaining associations are described qualitatively.

Mixed Conifer Forest (84180, 85420): 392 acres (159 ha). Two subtypes occur in this area: an open xeric subtype growing on SE.-facing serpentinite glacial moraine and a more mesic subtype growing on gabbro at the lower elevations of the basin. The serpentinite subtype was sampled, and results indicated basal areas ranging from 23.9 to 69.6 m^2/ha and tree densities of 180-971 per hectare. Dominance is traded among Jeffrey pine (*Pinus jeffreyi*) on driest exposures, white fir (*Abies concolor*) and Douglas-fir on mesic low sites, and western white pine (*Pinus monticola*) on upper elevation sites. Incense-cedar (*Libocedrus decurrens*) is widely scattered throughout. The open understory is dominated by scattered clumps of *Quercus vaccinifolia*, *Arctostaphylos nevadensis*, and other mountain chaparral shrubs. Within the cRNA, two shrubs (*Rhamnus californicus* ssp. *occidentalis* and *Ribes roezlii*) appear locally restricted to this type.

The gabbro subtype differs by its high abundance of Shasta red fir and lodgepole pine. All other tree species from the serpentinite subtype also occur here, although Jeffrey pine and incense-cedar are less important in this subtype than in the serpentinite subtype. The moist aspect of this association and, perhaps, a more fertile substrate than the previous subtype combine to create a denser canopy and understory. Although the understory is dominated by mountain chaparral species, *Chrysolepis sempervirens* is often most important, and some mesophilic species such as *Leucothoe davisiae* and *Vaccinium arbuscula* are locally common.

Herbs and subshrubs are widely scattered in both subtypes, although a much higher diversity of species occurs on the gabbro subtype (21 species listed as characteristic). A few, such as *Lupinus croceus*, *Eriophyllum lanatum* var. *lanceolatum*, *Calystegia malacophylla*, *Lotus crassifolius*, *Angelica californica*, and *Cirsium andersonii*, seem locally restricted to the serpentinite subtype.

Mountain Chaparral (37510, 37542): 213 acres (86 ha). This association covers large areas of shallow, rocky soil, especially on the W.-facing slopes. Dominants are *Quercus vaccinifolia*, *Arctostaphylos nevadensis*, and *A. patula*. Other important shrubs are *Ceanothus prostratus*, *Amelanchier pallida*, and *Holodiscus boursieri*; the latter is particularly abundant on stabilized talus and rock outcrops. *Prunus emarginata*, *Ceanothus velutinus*, and *Chrysolepis sempervirens* are locally important. The endemic *Arctostaphylos klamathensis* dominates locally W. and SW. of Terrace Lake. A number of herbs (26 of the most common species are listed) occur in this association, many of which are shared with the xeric rock outcrop association. Large portions of the mountain chaparral are not rapidly succeeding to coniferous vegetation, probably as a result of the xeric exposure and poor, ultramafic, rocky soil.

Red Fir-Mountain Hemlock Forest (85310, 86210): 192 acres (78 ha). This association dominates on all N. exposures at higher elevations. Five plots were

sampled. Basal area ranges from 34.0 to 87.9 m^2/ha, and density ranges from 561 to 2392 trees/ha. The forest ranges from dense, closed stands of primarily red fir on NE. and NW.-facing plots to stands dominated by mountain hemlock with some lodgepole pine in cold, mesic valley bottoms to open, senescent red fir forest and, finally, to very open forest codominated by red fir, western white pine, and lodgepole pine on very rocky soils. In the establishment record, this association is broken down into mountain hemlock (139 acres, 56 ha) and red fir (53 acres, 22 ha) forests. However, there is much overlap, and even at the highest, snowiest portions of the basin, mountain hemlock is not usually exclusively dominant.

The understory of open forests is dominated by mountain chaparral shrubs. The endemic *Arctostaphylos klamathensis* is locally important, covering up to 60 percent in some areas of the Terrace Lake subbasin. In closed-canopy, shady stands, the understory is sparse, with scattered herbaceous species such as *Chimaphila umbellata*, *Pyrola picta*, and *Corallorhiza maculata* predominating. *Leucothoe davisiae*, *Vaccinium arbuscula*, *V. scoparium*, *Anemone quinquefolia* var. *minor*, and *Pyrola secunda* occur in mesic stands. Stature of the dominant trees is somewhat smaller than other sampled red fir areas in the N. Sierra Nevada (e.g., Mount Pleasant RNA and Onion Creek ecological survey area). This may be the result of the relatively poor, rocky, gabbroic soil.

Port Orford-Cedar Forest (82500): 74 acres (30 ha). This is an edaphic association reliant upon permanent moisture. POC forest fringes all of the major lakes and streams in the basin. Two subtypes are distinguishable: a bottomland form occurring around Lower Cliff and Cedar lakes as well as around the slow-flowing portions of the Sacramento River at the lower elevations, and a rocky streamside and lakeshore type that occurs at the upper elevations along fast-flowing streams and around Cliff and Terrace lakes (*fig. 31*).

The bottomland type has the highest density stands of any forest in the area, averaging 4033 trees/ha (range 2900-5300 trees/ha). POC strongly dominates (total mean cover 80 m^2/ha, of which POC comprises 73 percent). The trees are shallow rooted, and because of the saturated soil, they are often windthrown. The understory is usually littered with fallen trunks. Shallow, boggy, water-filled depressions left by uprooted trees are plentiful. Saplings and seedlings of POC are common in the understory. Understory shrubs and herbs form a dense cover in many areas. Hydrophilic, shade-tolerant species predominate, including *Ledum glandulosum*, *Gaultheria humifusa*, *Leucothoe davisiae*, *Physocarpus capitatus*, *Alnus tenuifolia*, *Cornus stolonifera*, *Darlingtonia californica*, *Linnaea borealis*, *Allium validum*, *Listera convallarioides*, *Caltha howellii*, and *Athyrium filix-femina* (20 species listed as characteristic). Much of this forest, despite its moist substrate, appears to have suffered a fire about 100 years ago.

The streamside rocky lakeshore type of POC forest has lower densities but higher basal area than the previous type. This subtype has the highest basal area of any forest in the cRNA, up to 226 m^2/ha. The largest POC in this type is about 4 ft (1.2 m) dbh; it is estimated to be 400-500 years old. The understory species in this type includes *Leucothoe davisiae*, *Goodyera oblongifolia*, *Chimaphila umbellata*, *Pyrola picta*, *Vaccinium arbuscula*, *Pteridium aquilinum* var. *pubescens*, and *Pedicularis semibarbata*.

Rock Outcrop (91200): 76 acres (31 ha). A large portion of the upper elevation is open, rocky slopes and cliffs. This environment harbors a group of herbaceous or sub-shrubby plants growing in crevices and small hollows in the rocks. The species may be divided into mesic and xeric groups. Many of the xeric type also occur in mountain chaparral and include *Penstemon rupicola*, *Sitanion hystrix*, *Lewisia leana*, *Arenaria nuttallii* ssp. *gregaria*, *A. congesta*, *Eriogonum umbellatum*, *Sedum obtusatum* ssp. *boreale*, *Juncus parryi*, and many others (28 species listed as characteristic).

The mesic type includes such species as *Cryptogramma acrostichoides*, *Adiantum pedatum* var. *aleuticum*, *Polystichum lonchitis*, *P. lemmonii*, *Athyrium alpestre*, *Phyllodoce empetriformis*, *Casiope mertensiana*, *Romanzoffia sitchensis*, *Carex spectabilis*, *Saxifraga ferruginea*, and many others (30 species listed as characteristic).

Shallow Lakes and Ponds (52430): 25 acres (10 ha). With the exception of Cliff Lake and Terrace Lake, all 10 ponds and lakes in the basin have a zone of aquatic vegetation. Cedar Lake and Lower Cliff Lake have the best-developed aquatic associations. Characteristic species include *Isoetes occidentalis*, *I. bolanderi*, *Nuphar polysepalum*, *Menyanthes trifoliata*, *Potemogeton natans*, *Sparganium angustifolium*, *Scirpus validus*, *Heleocharis montevidensis* var. *parishii*, *Dulichium arundinaceum*, and *Carex rostrata*.

Bog and Meadow (51120, 45100): No acreage given. Well-developed bogs occur at Cedar and Lower Cliff lakes. These consist of both raised hummocky areas topped with ericaceous shrubs and lower mucky areas dominated by *Darlingtonia californica* and various members of the *Cyperaceae*. The raised areas support a near-continuous layer of the shrubs *Kalmia polifolia* var. *microphylla*, *Ledum glandulosum*, *Vaccinium occidentale*, and *Spiraea douglasii*. *Drosera rotundifolia*, *Tolfieldia glutinosa* ssp. *occidentalis*, *Narthecium californicum*, *Carex buxbaumii*, and *Carex aquatalis* are characteristic of the edges of the hummocks.

The low mucky bog is dominated by *Darlingtonia californica*, *Heleocharis montevidensis*, *Carex ormantha*, *C. integra*, *Aster alpigenus* ssp. *andersonii*, and *Hastingsia* (*Schoenolirion*) *alba*. A number of other species occur where more soil has developed such as near inlet streams and lakes. Fifty species are listed as characteristic of this association. Meadow vegetation is not well developed in the area and is grouped with bog vegetation in the ecological survey.

Figure 31—Cedar Basin, steep streamside Port Orford-cedar forest along outlet to Terrace Lake with saplings of mountain hemlock and shasta red fir. (1987)

Plant Diversity

Two hundred sixty taxa of vascular plants are listed in the establishment record, an updated version of the list in the ecological survey.

Conflicting Impacts

The major impacts on the Cedar Basin cRNA include camping, woodcutting, and the threat of root rot disease.