

69. Red Butte-Red Fir Ridge (Shasta Red Fir) (Imper 1988b, Cheng 1996d)

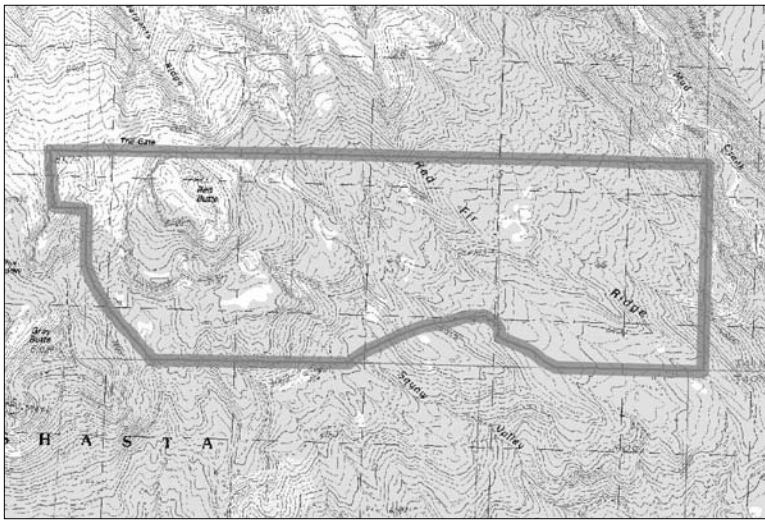


Figure 139—Red Butte-Red Fir Ridge RNA

Location

This established RNA is located on the Shasta-Trinity National Forest. The area is about 6.5 miles (10.5 km) N. of McCloud and occupies portions of sects. 33, 34, 35, and 36 T41N, R3W MDBM (41°21'N., 122°10'W.), USGS Mt. Shasta quad (fig. 139). Ecological subsection – High Cascades (M261Df).

Target Element

Red Fir (*Abies magnifica*)

Distinctive Features

Shasta Red Fir Forest: Taxonomically, the description of Shasta red fir (*Abies*

magnifica var. *shastensis*), a botanical variety of red fir (*Abies magnifica*), was based on the red firs at Mount Shasta. Despite the type location, some trees exhibit the nonexserted bract cones of typical red fir of the N. and central Sierra. Before logging, the red fir forest formed a continuous ring around the mountain. The local red fir forests are variable successional, ranging from exceptionally old (about 650 yr) to young stands, the latter stemming from past fires as well as selective logging (in one part of the area). The area's broad elevational span includes most of the local range of red fir forest. The soils are uniform throughout this range.

General Habitat Diversity: This area includes all typical plant associations on the S. side of Mount Shasta above 6500 ft (1981 m). Along with red fir, these include mountain hemlock (*Tsuga mertensiana*) and mixed subalpine forests, wet and dry meadows, and alpine and riparian vegetation. The glacier-fed wet subalpine meadow areas are the best examples of this type on the mountain. The mountain hemlock stands are perhaps the oldest (700+ yr) and best developed on the mountain.

Rare Plants: *Campanula wilkinsiana* (CNPS List 1B) is known from sites near the study area. The only plant on CNPS lists known from the RNA is *Arnica viscosa* (List 4).

Physical Characteristics

This area covers about 1640 acres (664 ha). Elevations range from 5920 to 8377 ft (1804-2533 m). The general aspect of the area is SE., although some SW. and NE. exposures exist. The W. part is dominated by Red Butte, a recent cinder cone rising 400-800 ft (122-244 m) above surrounding terrain. The E. part is dominated by Red Fir Ridge, which separates the Squaw Valley drainage on the W. from Mud Creek drainage on the E. Slopes in the E. portion are moderate but strongly dissected by NW.-SE. trending gullies up to 30 ft (9 m) deep. Parts of the Mud Creek canyon are very steep, as are the upper slopes of Red Butte.

Rocks are entirely Pleistocene andesite erupted from Mount Shasta. Soils are primarily Andic Cryumbrept-Rock outcrop complex (>90 percent of area). A small portion of the E. area is Andeptic Cryotherents with 40-100 percent slopes. These soils have a deeper A horizon than the Andic Cryumbrept-Rocks

and are derived from recent deep volcanic ash deposits. Precipitation averages 60 inches (1524 mm) annually, mostly from snowfall. Normal winter snow depth is about 8 ft (2.4 m), judged by lichen growth on trees. Temperatures in winter range from 0 to 30 °F (-18 to -1 °C), and winds may be in excess of 100 mph (161 km/hr).

Association Types

Fourteen 0.1-acre (404-m²) plots were sampled in five association types including all forested associations except for cut-over forest.

Red Fir Forest (85310): 956 acres (387 ha).

Shasta Red Fir/Slender Penstemon Forest: Stands typifying this association are pure Shasta red fir with a dense canopy and sparse understory. *Penstemon gracilentus* is often the only herb, with total understory often less than 1 percent cover. This association occurs from the lowest elevation up to about 7400 ft (2256 m). In moist areas at upper elevations, mountain hemlock becomes important and may be slowly replacing red fir as the dominant. White fir (*Abies concolor*) becomes important below about 6500 ft (1981 m). Western white pine (*Pinus monticola*) and Jeffrey pine (*Pinus jeffreyi*) are occasional at lower elevations. Other species associated with this type include *Arctostaphylos nevadensis*, *Carex rossii*, *Chimaphila menziesii*, *Corallorhiza maculata*, *Hieracium albiflorum*, *Lupinus albicaulis*, *L. obtusilobus*, *Pyrola picta*, and *Viola purpurea*.

A typical stand is even-aged (200 yr) with a closed canopy and 80 m²/ha basal area. Much of this association appears to have experienced crown fire, initiating the even-aged canopy.

Shasta Red Fir/Pinemat Manzanita Forest: This association occupies upper slopes and ridges. It has an open canopy and low basal area (<57 m²/ha). The understory is dominated by *Arctostaphylos nevadensis*. The soil is poorer and rockier than Shasta red fir/slender penstemon forest. Other species include *Carex multicaulis*, *Carex rossii*, *Monardella odoratissima* ssp. *pallida*, *Penstemon gracilentus*, and *Stipa occidentalis*. Whitebark pine (*Pinus albicaulis*) and *Holodiscus dumosus* (*microphyllus*) may occur at high elevations. This forest is not well represented in the area, and it is confined to small stands.

Typical stands of this association are uneven-aged (average canopy dominants are 290 years old) and have a low canopy dominance compared to Shasta red fir/slender penstemon forest. The successional state of these open forests is not clear. It may be a later stage of Shasta red fir/slender penstemon forest based on fire history, or it may be controlled by microclimate (fig. 140).

Mountain Buckwheat/Western Needlegrass Dry Meadow (45120, 91220): 269 acres (109 ha). Several types of dry meadows are included in this category. They occur in both subalpine and red fir forest zones. *Polygonum newberryi* and *Stipa occidentalis* are consistent throughout. Soils vary from coarse cinders and cobbles to fine ash, and slopes range from steep to gradual. Other species include *Arctostaphylos nevadensis*, *Calyptidium umbellatum*, *Carex multicaulis*, *Eriogonum marifolium*, *E. pyrolaeifolium*, *Haplopappus bloomeri*, *Lupinus albicaulis*, *Monardella odoratissima* ssp. *pallida*, *Phlox diffusa*, and *Viola purpurea*.

Several variants include the following: (1) *Anemone* scree slopes. This phase is dominated by a sparse cover of *Anemone occidentalis*, *Penstemon davidsonii*, *Streptanthus tortuosus*, *Phlox diffusa*, and *Eriogonum marifolium* (similar to Holland 91220). (2) Onion/hemlock barrens. This phase is associated with areas of snow accumulation and characterized by young mountain hemlock and *Allium obtusum*. (3) *Cycladenia* cinder barrens. Some of the red cinder slopes in sect. 34 have a sparse cover of *Cycladenia humilis*. (4) Typical dry meadow. Most of the

dry meadows in the area are characterized by *Lupinus albicaulis*, *Stipa occidentalis*, *Haplopappus bloomeri*, *Viola purpurea*, *Eriogonum marifolium*, *Calyptridium umbellatum*, and *Arctostaphylos nevadensis*.

Whitebark Pine-Mountain Hemlock Forest (86210): 305 acres (123 ha).

Whitebark Pine/Rock Spiraea Woodland: This association occurs between 7600 and 8000 ft (2317-2438 m) and is the typical timberline woodland on the S. side of Mount Shasta. Canopy cover is very open (<20 percent), and basal area ranges from 9.2 to 23.0 m²/ha, with the highest cover at the lowest elevations. Stands occur on all slope aspects and are generally dominated by uneven-aged whitebark pine with some red fir and mountain hemlock. Dominant trees are more than 400 years old and taller than 49 ft (15 m). The substrate is rocky and steep. This association grades into the mountain hemlock/heather forest at lower elevations on mesic sites, into the mountain hemlock/alpine rush association on cool, but drier sites, and into the open Shasta red fir/pinemat manzanita forest on warm, xeric sites.

Species include Shasta red fir, *Arctostaphylos nevadensis*, *Chrysolepis sempervirens*, *Castilleja affinis*, *Cryptogramma acrostichoides*, *Holodiscus (microphyllus) dumosus*, *Juniperus communis*, *Pinus albicaulis*, *Penstemon davidsonii*, and *P. newberryi*.

Mountain Hemlock/Alpine Rush: This association occurs between 7300 and 7800 ft (2225-2377 m) on gentle, partially sheltered slopes. The canopy is more closed than in whitebark pine/rock spiraea woodland, but more open than in typical red fir forest. Soils are well developed with an A horizon about 13 inches (33 cm) deep. Dominant trees may be 4 ft (1.3 m) dbh and are the oldest in the study area (600-800 years). Tree height is usually under 100 ft (30 m). Mountain hemlock is dominant and climax, but ancient red firs up to 700 years old are present. Mountain hemlock reproduces well in older stands but requires shade. Red fir requires disturbance for appreciable reproduction. Fire is of minor importance.

Understory vegetation is sparse and includes *Allium obtusatum*, *Arctostaphylos nevadensis*, *Carex multicaulis*, *C. rossii*, *Eriogonum marifolium*, *Juncus parryi*, *Phyllodoce empetrifomis*, and *Viola sheltonii*.

Mountain Hemlock/Mountain Heather Forest: This association occupies relatively moist flats. It is similar to the mountain hemlock/alpine rush type, but the soil is more rocky. The canopy is also more open (about 30 percent) and contains more whitebark pine than the previous association. Basal areas average 23-55 m²/ha, with stands tending to be old (up to 650 yr). There is good regeneration of mountain hemlock. The sparse understory is dominated by scattered clumps of *Phyllodoce empetrifomis*, but it is otherwise similar to the mountain hemlock/alpine rush type. This association also follows creeks and meadows to elevations as low as 6300 ft (1920 m). There it is associated with many riparian zone species. The riparian association is not discussed, but such species as *Allium validum*, *Luzula subcongesta*, *Arnica viscosa*, *Juncus parryi*, *Carex spectabilis*, *Ligusticum grayi*, *Mitella pentandra*, and *Viola macloskeyi* are typical.

Alpine Saxifrage/Alpine Sedge Rockland (91200, 91300): 81 acres (33 ha). This association occurs in the highest and coldest parts of the area. The two characteristic species *Saxifraga tolmiei* and *Carex breweri* are scattered, with cobbles and boulders composing up to 95 percent of the surface. Slopes may be very steep. Occasional krummholz whitebark pines are present. Other species include *Agoseris glauca*, *Arabis platysperma*, *Calyptridium umbellatum*, *Cardamine bellidifolia*, *Juncus parryi*, *Penstemon davidsonii*, *Phlox diffusa*, and *Polygonum shastense*.

Greenleaf Manzanita/Pennyroyal Shrubland (37520, 37510): 17 acres (7 ha). This scrub association with its two indicators, *Arctostaphylos patula* and *Monardella*

odoratissima ssp. *pallida*, is usually seral to the two red-fir associations. The conversion of this type to forest is slow, with many areas still dominated by scrub 80 years after fire. This association occurs on steep S.-facing slopes and is surrounded by dense young stands of red fir. White fir and sugar pine (*Pinus lambertiana*) are more conspicuous than in any other association. Other species include *Arctostaphylos nevadensis*, *Apocynum androsaemifolium*, *Boschniakia strobilacea*, *Carex rossii*, *Chrysolepis sempervirens*, *Ceanothus velutinus*, and *Penstemon newberryi*. A more mesic subtype atop Red Fir Ridge includes *Ribes roezlii*, *Ceanothus velutinus*, *Holodiscus discolor*, *Acer glabrum* var. *torreyi*, *Prunus emarginata*, *Potentilla glandulosa*, *Hieracium horridum*, *Phacelia mutabilis*, and *Bromus marginatus*.

Mountain Heather/Showy Sedge Wet Meadow (45100, 45210): 13 acres (5 ha). Four principal meadow areas occur in the RNA. All are associated with creeks. The dominants include dense stands of *Phyllodoce empetrifomis*, *Kalmia microphylla*, and *Vaccinium nivictum* with a number of other species including *Allium validum*, *Antennaria alpina*, *Carex spectabilis*, *Castilleja miniata*, *Luetkea pectinata*, *Saxifraga aprica*, *Sibbaldia procumbens*, and *Veratrum californicum*. The grass *Trisetum spicatum* borders one of the meadows. A subtype of wet meadow dominated by *Carex nigricans* occurs in a moist N.-facing scree area. Two temporary ponds just outside the area contain dense stands of *Muhlenbergia jonesii* with a ring of *Juncus parryi*.

Plant Diversity

Eighty-seven species are listed. Diversity of the area is notably low considering the variety of habitats.

Conflicting Impacts

The most serious impact involves a history of selective logging in the central section of the study area. The high subalpine valleys in this section are recovering very slowly from logging and will show its impact for many years. However, the integrity of the area is increased by the inclusion of these sections, which connect the two undisturbed sections, provide a useful post-logging comparison to adjacent undisturbed lands, and includes the oldest stands of hemlock and good examples of red fir/pinemat manzanita and wet meadow associations. The entire RNA is part of the Mount Shasta Wilderness and receives relatively heavy recreational use. This use may be increased if the proposed Mount Shasta ski area is developed. Access to part of the area is difficult because of gated private roads adjacent to the E. side.



Figure 140—Red Butte- Red Fir Ridge, Shasta red fir/slender penstemon forest in Red Butte – Red Fir Ridge RNA. (1988)