

42. Horse Meadow (Burke 1992c, Phillips 1998d)

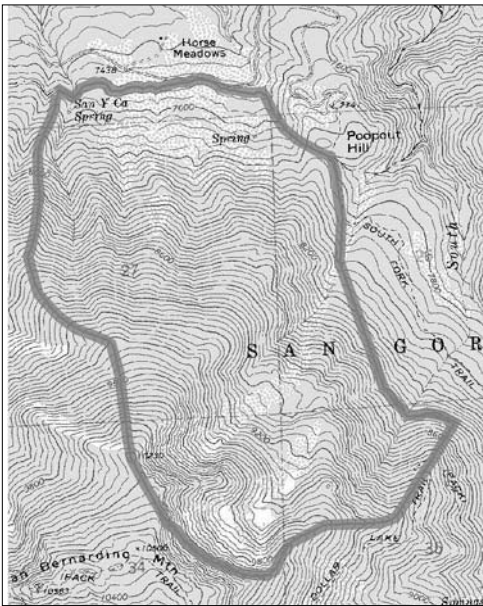


Figure 87—Horse Meadow RNA

Location

This established RNA is on the San Bernardino National Forest in San Bernardino County. It is approximately 21 miles (34 km) S. of Big Bear City, lying just S. of Barton Flats and NW. of San Gorgonio Mountain. It lies entirely within the San Gorgonio Wilderness of the San Gorgonio Ranger District. Its boundaries include portions of sections 22, 26, 27, 34, and 35 of T1N, R1E (34°08'N., 116°52'W.), USGS San Gorgonio Mountain quad (fig. 87). Ecological subsection – Upper San Gorgonio Mountains (M262Bh).

Target Element

White Fir (*Abies concolor*)

Distinctive Features

Much of the RNA consists of very steep, unstable slopes dominated by stands of small, young white fir. The S. California white fir stands in the RNA are more or less homogeneous and are of interest for comparison studies as a southern variation of both red fir and white fir forests.

In addition to the extensive white fir forest, several montane plant communities characteristic of mid- to high- elevation sites in the San Bernardino Mountains occur within the RNA.

Two avalanche chutes dissect the area and contribute to habitat diversity. The geologic instability and occurrence of these vegetated avalanche chutes add value to the area.

Rare Plants: Barton flat horkelia (*Horkelia wilderae*; CNPS List 1B) is present on the NE.-facing dry slopes of the Jeffrey pine-fir forest. Mountain dandelion (*Taraxacum californicum*; CNPS List 1B) is present on wet montane meadows. Heckard's Indian paintbrush (*Castilleja montigena*; CNPS List 4) is typically found in the forest-meadow ecotone. *Lilum parryi* (CNPS List 1B) is also present.

Rare Fauna: The spotted owl (*Strix occidentalis* ssp. *occidentalis*, California species of special concern) occurs along the N. boundary of the RNA. Williamson's sapsucker (*Sphyrapicus thyroideus*) and Lincoln's sparrow (*Melospiza lincolnii*), both of which are not on any protection list, also may occur on the RNA.

Geological: Glacial till deposits (some with unsorted angular fragments of gneiss and quartz monzonite as large as 10 ft [3 m] across) are found in a variety of locations in the RNA.

Fire History: The Ceanothus-Ribes patch at the N. end of the RNA burned in approximately 1959. Three other fires in the SW. quarter of sect. 22 T1N, R1E have been recorded since 1980. However, it is unclear whether these fires were inside the boundaries of the RNA.

A policy of fire suppression in the San Bernardino mountains has been in place since the early 1900s. It is speculated that some white fir stands in the RNA are unnaturally dense due to this suppression. Additionally, the understory in the Jeffrey pine-fir forests of lower elevation is five times denser than is typical where ground fires are not suppressed.

Physical Characteristics

The area covers 946 acres (378 ha) with elevations 7520 to 10230 ft (2294-3120 m). The RNA lies on the N. and NE.-facing slopes of the ridge between San

Gorgonio Mountain and San Bernardino Mountain. Slopes vary from 7° (12 percent) slope at the N. end to 30° (58 percent) slope along the steep terrain of the NE.-facing slopes at the W. boundary.

Several intermittent streams drain Horse Meadow along NE.-facing slopes. Morainal deposits occur on the RNA and affect spring flow.

Most of the RNA is composed of undifferentiated gneissic rocks of Precambrian Age. Near the top of the steep, N.-facing slopes, a small area of quartz monzonite (Mesozoic Age) occurs, which is a small outcropping of the extensive underlying granitic rock. The NE. boundary contains small areas of fanglomerate (mostly gneiss and quartz monzonite derived from pre-Tertiary rocks of adjacent mountains).

Four types of soil exist in the RNA:

1. Morical Hecker families complex occurs on alluvial fans or terraces with 15-30 percent (9-17°) slopes. These soils are brown, gravelly loams with a granular or fine granular structure. Surface soils are only 0-6 inches (0-15 cm) deep, but subsoils are very deep (6-60 inches [15-250 cm]). Jeffrey pine-fir forest is the typical vegetation for this soil type.

2. Merkel-Wapal families complex occurs on 30-50 percent (17-27°) slopes. These soils are light- to dark-brown, very gravelly loams with a weak to fine granular structure. The surface soils are 0-3 inches (0-7.5 cm) deep and the subsoils range from 3 to 27 inches (7.5 to 68 cm). Jeffrey pine-fir forest, southern California white fir forest, and southern California subalpine forest are the typical vegetation types on this soil complex.

3. Wapal family-Lithic Xerorthents, cool association, occurs on 50-75 percent (27-37°) slopes of mountainous uplands. The soil is a light olive brown, very gravelly, sandy loam with up to 80 percent rock fragments. The surface soils are 0-3 inches (0-7.5 cm) and the subsoils are rather shallow, ranging from 3 to 40 inches (7.5-100 cm). White fir forest is the typical vegetation for this soil type.

4. Lithic Xerorthents, cool-Rock outcrop complex, is present in the S. half of the site on 50-100 percent (27-45°) slopes. It is a shallow loam, sandy loam, or loamy sand with a high proportion of rock fragments. Lodgepole pine and Jeffrey pine are usually the dominant trees on this soil type.

Climate in this region typically includes a prolonged summer drought and infrequent winter storms. As winter storms move into S. California, precipitation increases from the W. edge of the mountains to the crest of the range. Located along the main crest of the San Bernardino Mountain Range, the RNA may receive up to 40 inches (100 cm) annual precipitation, much of which falls as snow. The nearest weather station is located at Big Bear Lake, which is at 34°15'N., 116°53'W., 6790 ft (2070 m) elevation. The average temperature ranges from 30 to 65 °F (-1 to 18 °C) with extremes ranging from a winter low of -7 °F (-22 °C) to a summer high of 87 °F (31 °C). High winter snowpack is typical. Elevation of the RNA is higher than that of the Big Bear Lake Weather Station; therefore, lower temperatures and higher precipitation should be expected.

Association Types

Southern California White Fir Forest (85320): 375 acres (150 ha). This association is the most extensive vegetation type on the RNA. It is mostly a young forest occurring on mid- and upper N.- and NE.-facing slopes. White fir (*Abies concolor*) occurs on the RNA as nearly pure stands or in stands where dominance is shared. It is codominant with Jeffrey pine (*Pinus jeffreyi*) on drier, gentler, mid-elevation, NE.-facing slopes. Lodgepole pine (*Pinus contorta* ssp. *murrayana*) and limber pine (*Pinus flexilis*) share up to 50 percent dominance with white fir on steep slopes at high elevations. On these high, steep, unstable slopes, white fir occurs in dense

stands of small trees. The trees here often have a pronounced basal crook, most likely due to sliding soils. On more stable soil (around rock outcropping on high, N.-facing slopes), white fir can reach great size (fig. 88).

Tree cover is between 80 and 100 percent, forming a dense, dark forest. White fir often comprises nearly 100 percent of tree cover on true N.-facing slopes. Understory is sparse or absent. Typical associates include *Pedicularis semibarbata*, *Poa fendleriana*, *Penstemon bridgesii*, *Penstemon labrosus*, *Draba corrugata*, and *Pyrola picta*. At lower elevation and drier sites where Jeffrey pine codominates, *Symphoricarpos parishii*, *Eriogonum wrightii* ssp. *subscaposum*, and *Galium* cf. *nuttallii* occur. At higher elevation sites, *Ribes roezlii*, *Phyllodoce breweri*, *Pyrola picta*, *Poa fendleriana*, *Heuchera* ssp. and *Sedum spathulifolium* ssp. *andersonii* occur as associates of white fir, lodgepole pine, and limber pine. *Chrysolepis sempervirens* and *Arctostaphylos patula* ssp. *platyphylla* occur both as occasional understory associates and as a distinct shrubby vegetation type in forest openings.

Mixed Montane Chaparral (37510): 239 acres (96 ha). This association type occurs in two forms — as the more typical forest associate and also as thick, heterogeneous thickets occurring in avalanche chutes of NE.-facing slopes.

The more typical form of the (*Ceanothus cordulatus*-*Ribes cereum*) chaparral occurs at the N. end of the RNA. The rich vegetation present here is an indication that the area may have burned recently. Species include *Artemisia dracuncululus*, *Gayophytum diffusum* ssp. *parviflorum*, *Cryptantha* spp., *Euphorbia palmeri*, *Sitanion hystrix*, *Bromus* cf. *tectorum*, and *Agropyron trachycaulum*.

The avalanche chutes are dominated by *Chrysolepis sempervirens*. They reach the high-elevation slopes of the RNA, cutting through the subalpine, white fir, and Jeffrey pine-fir forests. Understories are very sparse, and associate species are few due to the nearly closed canopy.

Southern California Subalpine Forest (86500): 170 acres (67 ha). At higher, drier, and colder sites, white fir grades into S. California subalpine forest. Although this forest type is often a low krummholz (stunted-growth) tree structure in the San Bernardino Mountains, here the trees occur in upright, relatively dense stands. On the high-elevation ridges, lodgepole pine occurs as pure forest or as a codominant with limber pine. Understory is sparse, the slopes are very steep, and the ground is mostly bare except for a pine needle duff. Trees on the rocky ridges are subject to high winter winds.

Associated species include *Chrysolepis sempervirens*, *Carex* spp., *Penstemon caesius*, *Phyllodoce breweri*, *Pyrola picta*, *Pedicularis semibarbata*, and *Silene lemmonii*. In open hollows, where late lying snow provides water into the growing season, dense patches of *Pteridium aquilinum*, *Ribes montigenum* var. *pubescens*, *Aquilegia formosa*, and *Carex* spp. occur.

Jeffrey Pine-Fir Forest (85210): 162 acres (65 ha). This association occurs on the gentler, lower slopes of the RNA and along the S. Fork trail (E. boundary) where it grades upslope into white fir. The forest is tall and open, and the tree layer is codominated by white fir and Jeffrey pine. On the nearly level slopes of the far N. area of the RNA, black oak (*Quercus kelloggii*) is an important component of the vegetation. Tree cover ranges from 50 to 80 percent.

On steeper, drier slopes, associated species include *Symphoricarpos parishii*, *Chrysolepis sempervirens*, *Ceanothus cordulatus*, *Carex* spp., *Penstemon labrosus*, *Euphorbia palmeri*, *Eriogonum wrightii* ssp. *subscaposum*, and *Leptodactylon pungens*. Rocky, open areas at low elevations include *Erysimum capitatum*, *Poa fendleriana*, *Penstemon grinnellii* ssp. *grinnellii*, *Sitanion hystrix*, and *Symphoricarpos parishii*. Moist areas contain *Pteridium aquilinum*, *Achillea millefolium*, *Potentilla glandulosa*, *Geranium richardsonii*, *Erigeron breweri*, and *Solanum xantii* ssp. *montanum*. Where black oak is an important dominant or near riparian washes,

Salix scouleriana, *Ribes cereum*, *Ceanothus cordulatus*, *Gayophytum diffusum* ssp. *parviflorum*, *Castilleja martinii* var. *martinii*, *Delphinium parryi*, *Lotus nevadensis*, *Lupinus formosus*, *Bromus* spp., and *Calochortus invenustus* occur.

Montane Meadow (45100): No acreage given. This association occurs in small patches on saturated soils scattered along waterways in the Jeffrey pine and white fir forests. Slopes are nearly level or gentle (5-15 percent).

Poa palustris and *Carex hoodii* are the most dominant species here. *Salix lasiolepis* and *Salix scouleriana* are among the many associated plants.

Plant Diversity

One hundred twelve species of vascular plants are listed.

Conflicting Impacts

The entire RNA is within the S. Fork camping permit zone. The San Geronio Wilderness is heavily visited by campers and hikers, and its trails border the RNA. The RNA, however, is relatively free from disturbance. The most significant current disturbance is near the N. boundary in the Jeffrey pine-fir forest where there is evidence of illegal firewood gathering in areas of black oak and white fir.

Air pollution from the valley floor is a significant hazard to coniferous species of the area.



Figure 88—Horse Meadow, in rocky outcrops at the top of the Horse Meadow ridge where tree roots can find stable soils, white firs can attain relatively large sizes. (between 1989 and 1991)