

96. William B. Critchfield (Bourland Meadow) (Petersen 1994c, Talley 1976)

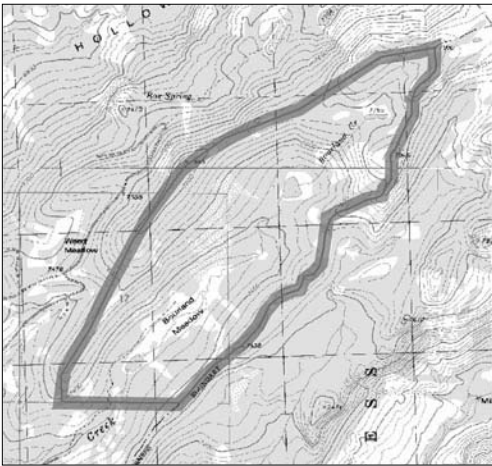


Figure 191—
William B.
Critchfield RNA

Location

This established RNA is on the Stanislaus National Forest about 7 miles (11 km) SE. of Pinecrest. It lies within sects. 8, 9, 16, and 17 T3N, R19E MDBM (38°6'N., 119°54'W.), USGS Pinecrest and Cherry Lake North quads (*fig. 191*). Ecological subsection – Upper Batholith and Volcanic Flows (M261Eh).

Target Element

Red Fir (*Abies magnifica*)

Distinctive Features

Red Fir Growth, Recruitment, and Succession: Growth rates of red fir vary widely, depending on exposure, with open S.-facing slopes providing the fastest growing conditions. There, height growth may attain 16 inches (41

cm) per year for trees between 20 and 100 years of age at breast height. Median growth rates are 14 inches (35 cm) per year for trees 30-110 years old at breast height on dense stands with S.-facing slopes, forested stands on gentle ridge crests, and young developing stands on N.-facing slopes.

The red fir forest at Bourland Meadow has a stable all age-class distribution. However, on a small scale, individual plots show marked gap-phase reproduction with thickets of young fir and pines developing in openings created by windfalls. The heavy shade of developing and mature stands suppresses saplings and seedlings, causing slow growth rates in the reproduction layer away from gaps.

There is evidence of primary succession in dry meadow sites. Here red fir is invading sites not characterized by porous sandy soil and also colonizing lodgepole pine (*Pinus contorta* ssp. *murrayana*) and aspen (*Populus tremuloides*) forest. In other areas, such as some *Quercus vaccinifolia* scrub, red fir also appears to be advancing. These types of invasions into adjacent habitats have been noted elsewhere (e.g., Oosting and Billings 1943) and appear to be a widespread phenomenon in the Sierra Nevada.

Unlike red fir sites in the extensive samples of Oosting and Billings (1943), those at Bourland Meadow appear to have lower relative basal area. This results from other important associated tree taxa such as white fir (*Abies concolor*), Jeffrey pine (*Pinus jeffreyi*), and western white pine (*P. monticola*). This added diversity of trees in this normally monospecific forest is possibly the result of a slightly warmer and more open nature of the Bourland Meadow red fir forests compared to other red fir locations sampled in the Sierra Nevada.

The lack of fire as an important influence on the local red fir forest is typical for this association. It is evidenced by the lack of pine saplings and such fire indicators as *Arctostaphylos nevadensis* in the understory as well as an absence of fire scars on mature trees.

Physical Characteristics

The area covers 1003 acres (406 ha) between 7240 and 7990 ft (2207-2435 m) on the W. slope of the Sierra Nevada. The site covers the uppermost watershed of Bourland Creek. The Emigrant Wilderness lies along the SE. boundary. About 75 percent of the area has either SE.- or NW.-facing exposures. The site is underlain by both Mesozoic granitic rock and Pleistocene volcanics, with volcanics

predominating. Quaternary alluvium underlies the meadow area. Soils vary from nonexistent on granitic outcrops to deep, organic-rich meadow soils. Annual precipitation is 50-60 inches (1270-1524 mm).

Association Types

Nineteen 700-m² plots were sampled in the red fir forest.

Red Fir Forest (85310): 562 acres (228 ha). Four subdominants occur with red fir, not exceeding 25 percent of total tree stratum cover either singly or in combination. These are lodgepole pine, western white pine, Jeffrey pine, and white fir. Importance values on the sample plots average more than 200 for red fir, with red fir basal area from 30 to 80 m²/ha and density from 150 to 1808 stems/ha. Average basal area on 11 plots is 68.8 m²/ha, of which 80 percent is red fir.

Four subtypes are recognized: red fir-lodgepole pine, red fir-western white pine-lodgepole pine, red fir-white fir, and red fir-white fir-Jeffrey pine. Red fir-lodgepole pine forests cover 242 acres (98 ha) on well-drained NW.-facing exposures. Western white pine occurs as an additional associate at the head of Bourland Creek underlain by granitic rock. On SE.-facing slopes white fir is the principal associate within 76 acres (31 ha) of red fir forest. White fir is particularly common along ecotones between red fir and aspen forests. *Ceanothus cordulatus* is common in the understory of open red fir-white fir stands. Jeffrey pine occurs inside 62 acres (25 ha) of red fir-white fir forest with a S.-facing aspect.

Throughout the various phases of red fir forest, the most common herbs include *Viola purpurea*, *Pedicularis semibarbata*, *Smilacina amplexicaulis*, *Erigeron peregrinus* var. *angustifolius*, *Kelloggia galioides*, *Thalictrum fendleri*, *Chrysopsis breweri*, *Hieracium albiflorum*, *Phacelia hydrophyloides*, *Pyrola picta*, and *Pterospora andromedea*. In more open types of red fir forest, additional species such as *Collinsia parviflora*, *Bromus marginatus*, *Poa bolanderi*, *Monardella odoratissima*, *Streptanthus tortuosus*, and *Allium campanulatum* occur. There is no clear association between slope exposure and herb species composition.

Huckleberry Oak Scrub (37542): 130 acres (53 ha). This mountain chaparral covers open granitic outcrop with patches of soil, rocky ridges, or steep slopes with S.-facing exposures. The largest patch occurs on the granitic rock at the head of the Bourland Creek watershed. Some of this area supports Jeffrey pine. Total cover for both Jeffrey pine and *Quercus vaccinifolia* is usually less than 10 and 30 percent, respectively. One stand of *Q. vaccinifolia* on a S.-facing slope at 7350 ft (2240 m) had scrubby California black oak (*Quercus kelloggii*) growing near its upper elevational limits.

Scrubby Lodgepole Pine and Red Fir (85300, 86100): Stands of this type occur over 80 acres (32 ha) of dry meadow terrain. Density of both species is limited by germination sites. Stem breakage is high. The understory is poorly developed because of the dry, sandy substrate. *Streptanthus tortuosus*, *Calyptridium umbellatum*, *Eriogonum* sp., and *Collinsia parviflora*, are among the most common understory species.

Wet and Dry Meadow (45100, 52430): These meadow types cover 80 acres (32 ha), most of which can be classified as wet type. Several shallow ponds with some aquatic vegetation are present (fig. 192). Cattle grazing was so heavy during the time of study that most plants were not identifiable.

Aspen Forest (81B00): 60 acres (24 ha). This association occurs on a SE. exposure and is surrounded by red fir forest on rocky soil at the lower half of a 0.6-mile- (1-km-) wide incline. The location probably concentrates subterranean water movement. Density of stems is high (670 stems/ha), although cover is low. A large assemblage of woodland and wet and dry meadow species is associated with the aspen grove.

Lodgepole Pine Forest (86100): 90 acres (36 ha). Lodgepole pine may occur as nearly pure stands adjacent to wet meadows (wet subtype) or as forests on slopes bordering meadows (dry subtype). Wet types cover 37 acres (15 ha) around Bourland Meadow with some aspen (*Populus tremuloides*) and white fir. Lodgepole pine is the clear dominant, with importance values of nearly 300.

Many wet meadow species occur in these forests, including *Dodecatheon alpinum*, *Senecio triangularis*, *Veratrum californicum*, and species of *Carex*, *Juncus*, *Melica*, *Viola*, *Bromus*, *Gentiana*, and *Erysimum*. The understory in the dry phase includes many species associated with red fir forests and also *Elymus glaucus*, *Galium aparine*, *Montia perfoliata*, *Ribes roezlii*, *Rumex pauciflorus*, *Calochortus leichtlinii*, *Lupinus densiflorus*, *Brodiaea exioides* var. *lugens*, *Castilleja lemmonii*, and *Ligusticum grayi*.

Plant Diversity

Approximately seventy-five taxa are listed in an association table; actual diversity is certainly much higher.

Conflicting impacts

A portion of the area was logged in 1967. The meadow area, although well-developed, shows strong evidence of overgrazing, with the upper portion of the meadow suffering rapid downcutting by Bourland Creek. Therefore, the area was once removed from the RNA system. However, in 1990 it was again recommended for candidacy for its aquatic (bog) values, largely undiscussed in the survey.



Figure 192—W. B. Critchfield, view looking south across Bourland Meadow. Jeep tracks are those of deer hunters who use two primitive camps along the Meadow. (L. Johnson, 1974)