

58. Moses Mountain (Keeler-Wolf 1989a, 1989l)

Location

This established RNA is on the Sequoia National Forest in Tulare County. It lies within the Golden Trout Wilderness, which is part of the Tule River Ranger District. Its boundaries include portions of sects. 12, 13, and 24 T19S, R30E and sects. 7, 18, and 19 T19S, R31E MDBM (36°17'N., 118°39'W.), USGS Moses Mountain quad (fig. 118). Ecological subsection – Upper Batholith (M261Eq).

Target Element

Giant Sequoia (*Sequoiadendron giganteum*)

Distinctive Features

Giant Sequoia: Moses Mountain RNA contains an excellent representation of giant sequoia with white fir (*Abies concolor*) and red fir (*A. magnifica*) dominated forests (fig. 119). The area lies largely within the Golden Trout Wilderness and has not been impacted significantly by human activities. A unique feature of the groves is that each is well-stocked with giant sequoia under 250 years old. Another unusual feature is the presence of 10- to 200-year-old trees extending beyond the edge of the main groves. The presence of young trees in the groves and in the outlying areas allows the long-term status of the groves to be monitored. A number of specimen trees with diameters greater than 16 ft (4.9 m) dbh are also present. The largest is about 21 ft (6.4 m) dbh; it has an estimated age of 2500 years.

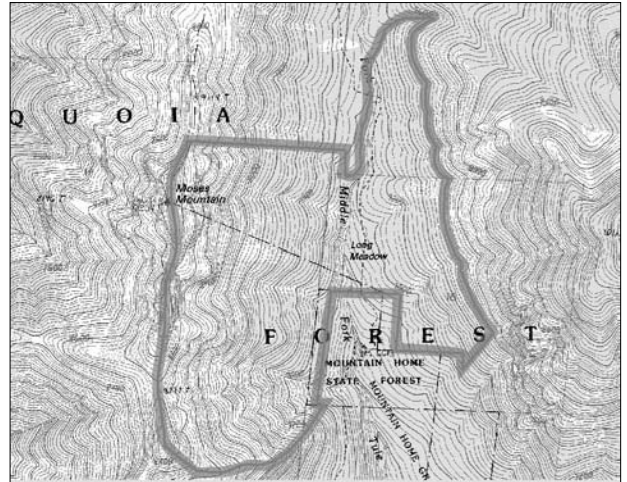
Well-Developed Riparian and Meadow Zones: At least 220 taxa of vascular plants are found within the RNA, including 26 taxa that reach the S. limits of their range in Tulare County and at least 6 endemics to the S. Sierra Nevada. A diverse assemblage of riparian plants is associated with the streamside of the N. fork of the Middle Fork of the Tule River. A rich flora of hydrophilic species is associated with seeps and meadows within the area.

Fauna: The RNA, by virtue of its proximity to large expanses of wilderness in both the Golden Trout Wilderness and the Sequoia National Park Wilderness, contains good habitat for a number of large, rare vertebrates. Black bear (*Ursus americanus*), mountain lion (*Felis concolor*), blue grouse (*Dendragapus obscurus*), mule deer (*Odocoileus hemionus*), and golden eagle (*Aquila chrysaetos*, State-listed species of special concern) have been seen or evidence of their presence detected in the area. The State-listed threatened species wolverine (*Gulo gulo*) and Forest Service-listed sensitive species fisher (*Martes pennanti*) are known from the area and may occur within the RNA. The Forest Service-listed sensitive species marten (*Martes americana*) and Federally- and State-listed endangered species peregrine falcon (*Falco peregrinus anatum*) might be present. The Moses Mountain population of pika (*Ochotona princeps*) may be the southernmost population in the Sierra Nevada.

Rare Plants: The RNA contains the largest population (more than five million plants) of the CNPS List 1B and Forest Service-listed sensitive species *Erythronium pusaterii*, the Kaweah fawn lily. This species is an endemic, localized to Tulare County.

Physical Characteristics

The Moses Mountain RNA covers 960 acres (389 ha) on the W. slope of the S. Sierra Nevada. The topography drops precipitously to the W. of the RNA to the



**Figure 118—
Moses Mountain
RNA**

Tulare Basin. The area is underlain by a portion of the huge Sierra Nevada Batholith, which is composed of Mesozoic granitic rocks. These rocks occur as boulders along the river and as local outcrops at lower elevations, but they are most abundant on the upper slopes of Moses Mountain where the mountain forms the impressive E.-facing escarpment. A second type is pre-Cenozoic metasedimentary rock, primarily shistose with a fair amount of visible mica. These rocks are likely to be Paleozoic; some are conspicuous in small outcrops along the W. side of the N. fork of the Middle Fork of the Tule River.

Soils in the area may be divided into two mapping units. Forested and valley segments of the RNA are underlain by the Woolstaf-Hotaw Variant-Rock outcrop complex, 50-75° slopes. These are typically deep, well-drained, and formed from metasediments. The other mapping unit is Rock outcrop which covers the steep upper slopes. These areas are typically granitic, but local metasediment outcrops occur.

Temperatures are relatively low and frequent records of frost in late June and even July indicate a short growing season. Highest summer temperatures recorded over a 12-year period were less than 90 °F (32 °C), and winter temperatures probably drop below 0 °F (-17.7 °C) at upper elevations of the RNA. Precipitation at Moses Mountain is greatest during January and February whereas summer months are relatively dry. Compared to the central Sierra Nevada, the area probably receives somewhat more summer precipitation from thunderstorms. The upper elevations average 50-70 inches (1270-1906 mm) of snow on April 1 whereas the lower elevations of the RNA average 36-45 inches (914-1143 mm).

Association Types

Mixed Montane Chaparral (37510): 45 acres (18 ha). Small patches of mixed montane chaparral are interspersed with white and red fir forest in openings created by avalanches or by shallow rocky soil. A disclimax community maintained by regular avalanches is particularly evident on the mid-slopes of Moses Mountain at the interface between talus, outcrop, and red fir forest. Conifer saplings and trees taller than about 2 m are rare. Dominant shrub species in this association are *Chrysolepis sempervirens*,

Arctostaphylos patula, *Prunus emarginata*, *Ceanothus cordulatus*, and *Holodiscus microphyllus*. In some areas at lower elevations (at the base of long avalanche chutes) California black oak (*Quercus kelloggii*) dominates in a scrubby form up to 4 m in height.

Wet Montane Meadow (45110): 7 acres (3 ha). Long Meadow occupies the upper margin of an old stream terrace about 20 ft (6 m) above the present streambed of the N. fork of the Middle Fork of the Tule River. Seeps emerge above the riverbed and trickle down, saturating a swath up to 100 ft (30 m) wide and 300 ft (91 m) long throughout most summers. The heads of the seeps are dominated by willows and other riparian scrub species, but the majority of the saturated



Figure 119—Moses Mountain, the understory of a portion of the southwest-facing grove in Moses Mountain RNA. Note general lack of herbs and shrubs and scattered young white fir. (1987)

area is herb-dominated. Besides Long Meadow, two other wet meadows occur on steep slopes and are associated with permanent springs. The most conspicuous wet meadow species include *Aster occidentalis*, *Carex* spp., *Oxypolis occidentalis*, *Deschampsia elongata*, *Dodecatheon jeffreyi*, *Epilobium brevistylum*, *Habenaria dilitata* var. *leucostachys*, *Helenium bigelovii*, *Juncus macandrus*, *Mimulus primuloides*, *Parnassia palustris* ssp. *californica*, *Perideridia bolanderi*, *Polygonum bistortoides*, *Potentilla drummondii*, *P. gracilis* ssp. *nuttallii*, *Senecio clarkianus*, *Sidalcea oregana* ssp. *spicata*, *Sisyrinchium elmeri*, *Veratrum californicum*, and *Viola adunca*.

Dry Montane Meadow (45120): Trace. This association most commonly forms a border around the wet meadows. It is vernal moist, but dries by midsummer. Soil is typically shallow and rocky. Most dry meadows in the area are being colonized by red and white fir saplings, usually younger than 70 years. Occasionally, dry meadow vegetation occurs in small glades in white fir forest in the valley bottom. Dry meadow species include: *Gilia leptalea*, *Linanthus ciliatus*, *Rumex angiocarpus*, *Bromus laevipes*, *Calochortus venustus*, *Collinsia parviflora*, *Madia elegans*, *Orthocarpus hispidus*, *Polygonum douglasii*, *Taraxacum officinale*, *Trifolium repens*, *Mimulus floribundus*, *Perideridia parishii*, *Viola adunca*, and *Stipa californica*.

Montane Riparian Scrub (63500): 20 acres (8 ha). This diverse association occurs along several seeps and rivulets descending the slopes of Moses and Maggie Mountains and also forms a border along much of the N. fork of the Middle Fork of the Tule River within the RNA. It is dominated by hydrophilic shrubs such as: *Alnus tenuifolia*, *Ribes nevadense*, *Salix caudata* var. *bryantiana*, *S. melanopsis*, *Lonicera involucrata*, and *Cornus stolonifera*. The herbaceous component includes *Lilium kelleyanum*, *L. parvum*, *Aconitum columbianum*, *Delphinium polycladon*, *Dicentra formosa*, *Aquilegia formosa* ssp. *truncata*, *Epilobium glaberrimum*, *Galium trifidum* var. *pusillum*, *Glyceria elata*, *Heracleum lanatum*, *Montia chamissoi*, and *Stachys albens*.

Sierran Mixed Coniferous Forest (84230): 59 acres (24 ha). This widespread forest type occurs only at lower elevations and on relatively xeric exposures. The dominant species on SW.-facing slopes of the SE. side of the RNA is white fir, with sugar pine (*Pinus lambertiana*) and incense-cedar (*Libocedrus decurrens*) as subdominants. Higher up on rockier slopes, Jeffrey pine (*Pinus jeffreyi*) and small, shrubby California black oak (*Quercus kelloggii*) dominate the canopy and understory. Jeffrey pine dominates on a SE.-facing slope on schist in an open forest with little understory. The largest Jeffrey pine are more than 300 years old, and most bear fire scars from repeated ground fires.

Sierran White Fir Forest (84240): 240 acres (97 ha). This forest type is widespread at mid-elevations of the RNA on both E.- and W.-facing slopes. Trees are generally rather small in stature except for irregular patches and isolated individuals of larger and older trees. These appear to be survivors of a large crown fire that probably swept through the area in the 1870s. Understory is typically sparse due to heavy duff and shade. Openings are dominated by *Pteridium aquilinum* ssp. *pubescens*, *Symphoricarpos parishii*, *Monardella odoratissima*, *Viola lobata*, *Delphinium pratense*, *Hackelia mundula*, *Montia perfoliata*, *Hieracium albiflorum*, and *H. horridum*.

Big Tree Forest (84250): 70 acres (28 ha). Three groves of giant sequoia occur within the RNA. The largest is part of an even larger grove centered in the Redwood Crossing area along the S. end of the RNA. It includes about 40 mature giant sequoias over 8.2 ft (2.5 m) dbh. The second is a relatively small grove of about 15 mature trees in the lower river valley near Long Meadow. The third and smallest grove occupies the mid E.-facing slopes of Moses Mountain and contains eight mature trees.

This forest, the target element for the RNA, is strongly dominated by giant sequoia, not only basally but also in density and total importance value. The high densities of giant sequoia are largely due to the excellent representation of younger age classes, both in the groves and on their peripheries. Reproduction of these trees at the RNA is largely in distinct groups, suggesting that fire and, to a lesser extent, occasional avalanches have provided the disturbance necessary for giant sequoia reproduction. The occurrence of numerous ground fires in the giant sequoia groves is clearly indicated by the large fire scars on virtually all mature trees. Isolated juveniles, either younger than the youngest major cohort or in-between cohorts, may be associated with flooding disturbance along the N. fork of the Middle Fork of the Tule River.

Seedlings of any conifer are rare in the midst of all giant sequoia groves in the RNA, and the understory vegetation is generally sparse. Typical understory species at the higher elevation and more mesic E.-facing sites include: *Symphoricarpos parishii*, *Osmorhiza chilensis*, *Pteridium aquilinum* var. *pubescens*, *Chrysopsis breweri*, *Lilium kelleyanum*, *Ribes roezlii*, *Lupinus polyphyllus* ssp. *supurbus*, and *Smilacina racemosa* ssp. *amplexicaulis*. At the lower elevations are bush chinquapin, California hazelnut (*Corylus cornuta* ssp. *californica*), snowbush, *Pyrola picta*, *Draperia systyla*, *Potentilla glandulosa* ssp. *nevadensis*, *Chamaebatia foliosa*, *Galium sparsiflorum*, and *Carex multicaulis*. In several localities are small springs where a subset of shade-tolerant riparian meadow species occur. Of particular importance are *Carex fracta*, *Glyceria striata*, *Aquilegia formosa*, and *Habenaria dilitata* ssp. *leucostachys*. As is typical for giant sequoia groves, these species at Moses Mountain appear to be strongly tied to abundant groundwater.

Red Fir Forest (85310): 222 acres (90 ha). This forest type occupies the upper forested slopes of Moses Mountain and the valley bottom above 7000 ft (2134 m). It is dominated by red fir but may have a large component of white fir and Jeffrey pine at lower elevations and western white pine (*Pinus monticola*) on the highest E.-facing slopes. The forests may be dense with little understory. Or, as a result of rocky substrate and occasional avalanche damage, they may be open, with a moderately dense understory of mountain chaparral or more mesophilic species such as *Acer glabrum* var. *torreyi*. The majority of trees in denser stands are under 120 years old, but at upper elevations or on rocky sites, where protection from fire may be better, are numerous large trees up to 6.5 ft (2 m) dbh.

Alpine Talus and Scree Slope (91200): 297 acres (120 ha). The large expanses of open granitic slabs, innumerable crevices, and decomposed granite benches on the upper slopes of Moses Mountain support an extensive community of plants similar to those of higher alpine environments. Hydric species occur along moist-to-wet cracks and intermittent rivulets, while xeric types occur on the exposed sunny substrates. Species of the xeric type include: *Sedum obtusatum*, *Holodiscus microphyllus*, *Arctostaphylos nevadensis*, *Calyptridium umbellatum*, *Cheilanthes gracillima*, *Dudleya cymosa*, *Eriophyllum confertiflorum*, *Eriogonum saxatile*, *Lomatium torreyi*, *Melica stricta*, *Pellaea breweri*, *Penstemon newberryi*, *Poa incurva*, *Pteryxia teribenthina*, *Selaginella watsonii*, and *Zuasncheria latifolia*. Wet-area species include *Acer glabrum* ssp. *torreyi*, *Triteleia dudleyi*, *Cryptogramma acrostichoides*, *Erythronium pusaterii*, *Heuchera rubescens*, *Juncus parryi*, *Luzula divaricata*, *Silene sargentii*, *Smilacina racemosa* ssp. *glaucula*, and *Zigadenus exaltatus*.

Plant Diversity

Two hundred thirty-one taxa are listed.

Conflicting Impacts

Despite heavy use of a trail through the area and several regularly used campsites, human impact on most of the area is slight. Areas around campsites are regularly lightly grazed by pack animals, but heavy trampling is restricted to immediate areas of trails and campsites.