

55. Mayfield (Imper 1991b)



Figure 112—
Mayfield cRNA

Location

This candidate RNA is on the Lassen National Forest in Siskiyou County. It is approximately 37 air miles (60 km) due E. of Mount Shasta and about 27 miles (43 km) N. of Fall River Mills. The cRNA lies within the Hat Creek Ranger District. Its boundaries include parts of sections 10, 11, 12, 14, and 15 of T40N, R3E MDM (41°19'N., 122°36'W.), USGS Hambone quad (fig. 112). Ecological subsection – Medicine Lake Lava Flows (M261Dh).

Target Element

Knobcone Pine (*Pinus attenuata*)

Distinctive Features

The cRNA, which includes some of the most extensive knobcone pine forest known in the E. portion of its range in California, is located on an extensive lava flow that originates in the Medicine Lake Highlands, 18 miles (29 km) N. The volcanic substrate and the absence of any permanent surface water have contributed to the uniquely depauperate

and uniform flora of the area.

Rare Plants: No Federally-, State- or Forest Service-listed sensitive plants species are known to occur in the area. On the basis of habitat and range distribution, the following rare species could occur: *Calochortus longibarbat* (CNPS List 1B), *Orcuttia tenuis* (CNPS List 1B), *Gratiola heterosepala* (CNPS List 1B), *Asplenium septentrionale* (CNPS List 2), *Trillium ovatum* ssp. *oettingeri* (CNPS List 4), and *Fritillaria eastwoodiae* (CNPS List 1B). Two species endemic to the basalt flows of the Modoc Plateau (not listed by CNPS) are *Agastache parvifolia* and *Penstemon deustus* ssp. *heterander* (Jepson [Hickman 1993]: *Penstemon deustus* var. *pedicellatus*).

Fauna: The cRNA does not support much wildlife because there is no permanent water source nearby. No sensitive species have been reported for the area, although a golden eagle (*Aquila chrysaetos*, California species of special concern) area is located immediately E. of the cRNA and the Townsend's big-eared bat (*Plecotus townsendii*, California species of special concern) is suspected within the cRNA. Other sensitive species that could be in the vicinity include wolverine (*Gulo gulo*, State-listed threatened species), fisher (*Martes pennanti*, Forest Service-listed sensitive species), marten (*Martes americana*, Forest Service-listed sensitive species), Swainson's hawk (*Buteo swainsoni*, State-listed threatened), Sierra Nevada snowshoe hare (*Lepus americanus tahoensis*, California State species of special concern), and spotted bat (*Euderma maculatum*, California State species of special concern).

Geology: The geology within the cRNA is volcanic, recent basalt (USGS Alturus Sheet). The lava flow is approximately 4 miles (6 km) wide in this vicinity. The age of the flow is believed to be less than a few thousand years.

The lava rock itself is relatively unweathered and varies in color from black to dark red. Lava morphology of the cRNA ranges from lava tubes and ridges to ropy lava. The difference in lava morphology and perhaps chemistry appears to have had a direct influence on the present vegetation pattern.

Fire History: Numerous spot fires caused by lightning have burned near the cRNA, but none actually within the cRNA. It appears that no significant fire has occurred in the cRNA since about 1910. Current California Department of Forestry policy is to control fires in this area.

Preponderance of Disease: The cRNA exhibits severe, widespread infection of knobcone and ponderosa pine (*Pinus ponderosa*) by western dwarf mistletoe (*Aceuthobium campylopodum*) and to a lesser extent, infection of western juniper (*Juniperus occidentalis*) by American mistletoe (*Phorodendron bolleanum*). Because of their relatively old age and the effects of drought, knobcone pines have been particularly susceptible to infection and mortality. As the infection by the mistletoe persists, the knobcone pine forest will continue to be converted to chaparral.

Physical Characteristics

The area covers 1000 acres (404 ha). Elevation over the entire cRNA varies less than 20 ft (6 m) from 3880 ft (1183 m). Low elevations are associated with the bottom of collapsed lava tubes, sinkholes, and other localized, low flats (covered by knobcone pine forest). Slopes are gentle to flat. Fissures up to 20 ft (6 m) deep occur in the W. portion of the area associated with a reticulated system of lava tubes running NW. to SE.

The area is mapped as lava flow in the Forest Soil Survey (Kliwer 1983) with 10 percent Lithic Xerochrepts and Lithic Xerumbrepts. Soils are generally shallow, sandy loams restricted to pockets or localized low areas of rock, and they are well to excessively drained. In some areas, a layer of gray ash occurs on top of the bedrock.

Precipitation and temperature are typical of the eastside pine type in NE. California. Precipitation averages about 25 inches (63 cm) annually, with about 70 percent falling as snow. Temperatures range from about 105 to -30 °F (41 to -34 °C), with an estimated 100 frost-free days per year.

Association Types

Vegetation is typical of the volcanic substrate and shows little variation over the landscape. There are four recognized community types, which overlap considerably in species composition and physical habitat characteristics.

Knobcone Pine Forest (83210): 320 acres (129 ha). The knobcone pine forest is the second most abundant vegetation in the area. However, it is in decline due to the combined effects of drought and mistletoe infection and currently restricted to isolated stands of 40 acres (16 ha) or less. As little as 15-20 years ago, this forest probably comprised 60-70 percent of the area. The healthier, older stands (up to 120 years old) are confined to the low areas (lava tube sinkholes), where better soil conditions appear to have increased the vitality of these pines (fig. 113).

Stands consist of pure knobcone pine up to 6 inches (15 cm) dbh, 40 ft (12 m) in height, and 65-80 years old. Average stand density is 700 live stems/acre (1729/ha). Up to 50 percent of some stands are composed of standing dead trees. No regeneration of knobcone pine was observed.

The understory shrub layer averages 55 percent cover, with *Arctostaphylos patula* reaching up to 90 percent cover in some areas. Other associated species include *Ceanothus prostratus*, *Rhamnus californica*, *Purshia tridentata*, *Cercocarpus ledifolius*, *Penstemon deustus*, *Arabis holboellii*, *Streptanthus tortuosa*, *Elymus sitanion*, and *Vulpia microstachys*. A few species that distinguish this forest from the eastside ponderosa pine forest include *Ribes roezelii*, *Ceanothus velutinus*, and *Epilobium minutum*.

Montane Manzanita Chaparral (37520): 465 acres (188 ha). The majority of the montane manzanita chaparral was once knobcone pine forest. It currently occupies broad lava flats set above the remaining knobcone stands. Western juniper is the current dominant live tree, but it has very low density and cover. Small sand or mud flats are scattered in the open areas, often with dense stands of *Allium campanulatum* and *Antennaria geyeri*.

The shrub layer is better developed than in the knobcone and eastside ponderosa pine types, with a cover ranging 50 percent or more. *Arctostaphylos patula* is the most important shrub. Other associated species include *Ceanothus prostratus*, *Purshia tridentata*, *Rhamnus californica*, *Cercocarpus ledifolius*, *Penstemon deustus*, *Arabis holboellii*, *Castilleja applegatei*, *Streptanthus tortuosa*, *Elymus sitanion*, *Madia minima*, *Calyptridium umbellatum*, *Horkelia tridentata*, *Potentilla glandulosa*, and *Erigeron pumilus*. A lone *Artemisia tridentata* seedling and a few *Cercis occidentalis* also were found. The chaparral contains the only introduced species noted in the cRNA: *Agoseris grandiflora*, *A. heterophylla*, and *Tragopogon dubius*.

Eastside Ponderosa Pine Forest (84220): 155 acres (62 ha). This association type occurs on relatively flat, poorly fractured ropy lava or on uniform-sized gravel/cobble substrate with soils confined to depressions in the lava surface. The overstory is open and consists of uneven-aged ponderosa pine and western juniper, and even-aged knobcone pine. The ponderosa pine are usually less than 24 inches (61 cm) dbh, but range to 36 inches (92 cm) dbh and 95 ft (29 m) tall. Tree density averages 240 trees/acre (593/ha). Ponderosa pine and western juniper that were 350 years or older (associated with sinkholes) were found in the RNA, and both are reproducing well in this type.

The understory shrub cover averages 30 percent and includes *Arctostaphylos patula*, *Purshia tridentata*, *Ceanothus prostratus*, *Rhamnus californica*, *Cercocarpus ledifolius*, and *Prunus emarginata*. Species that distinguish this forest from the knobcone pine forest include *Eriophyllum lanatum*, *Eriogonum umbellatum*, *Madia minima*, *Carex rossii*, *Poa sandbergii*, and *Zigadenus paniculatus*.

Temporary ponding (i.e., in sinkholes) occurs due to melting snow and rainstorms. *Deschampsia danthonioides*, *Danthonia unispicata*, and *Lotus purshianus* are associated with these pools.

Lava Flow Scrub (no Holland equivalent): 60 acres (24 ha). This association type is affiliated with the roughest, most topographically varied lava substrate in the area. It is associated with the network of lava tubes, sinkholes, and ridges that stem from the NW. portion of the area. Most lava tubes are 10-20 ft (3-6 m) deep and less than 25 ft (8 m) wide. Giant sinkholes are spaced periodically from the NW. to the SW. portions of the cRNA, measuring up to 150 ft (46 m) across and more than 30 ft (9 m) deep. Raised flow areas rise as much as 20 ft (6 m) above the surrounding surface.

Vegetation on this substrate is the most distinctive of the cRNA, with many species either restricted to this substrate, or reaching greatest importance. Trees are typically absent, although an occasional ponderosa pine or western juniper occurs on some of the flows. Dense cover of *Prunus virginiana* and *P. emarginata* often occur at the base of the ridges, and rings of knobcone pine can be found surrounding raised lava areas. Shrub cover is relatively high.

Species reaching greatest importance include *Cercocarpus ledifolius*, *Prunus virginiana*, *P. emarginata*, *Chrysothamnus nauseosus*, and *Woodsia scopulina*. Species primarily restricted to basalt flows of NE. California include *Rubus leucodermis*, *Amelanchier alnifolia*, *Chamaebatiaria millefolium*, *Agastache parvifolia*, *Scrophularia lanceolata*, and *Penstemon deustus* ssp. *heterander*. Notably absent from this community are *Arctostaphylos patula* and *Ceanothus prostratus*. There is almost no species overlap between this and similar nearby forest located off the recent lava flow.

Plant Diversity

Seventy-five species of vascular plants are listed.

Conflicting Impacts

Recreational use of the cRNA is minimal. A management strategy should be written that provides for prescribed burning of the area and control of the mistletoe infection if the knobcone pine and other tree species are to be protected.



Figure 113—
Mayfield, one of the
healthiest knobcone
pine forests present in
the Mayfield cRNA.
(1990)