

61. Mud Lake (Mud Lake - Wheeler Peak) (Keeler-Wolf 1985b, Keeler-Wolf 1989n)

Location

This established RNA is on the Plumas National Forest. It is divided into two units: Mud Lake and Wheeler Peak. Both areas lie about 13 miles (21 km) E. of Greenville. The first unit is within sects. 23 and 26 T27N, R11E MDBM (40°10'N., 120°42'W.); the second unit is about 5 miles (8 km) S., lying entirely within sect. 23 T26N, R11E MDBM (40°06'N., 122°42'W.), USGS Kettle Rock and Genesee Valley quads (*fig. 124*). Ecological subsection – Diamond Mountains-Crystal Peak (M261Ea) and Fredonyer Butte-Grizzly Peak (M261Eb).

Target Element

Baker (Modoc) Cypress (*Cupressus bakeri*)

Distinctive Features

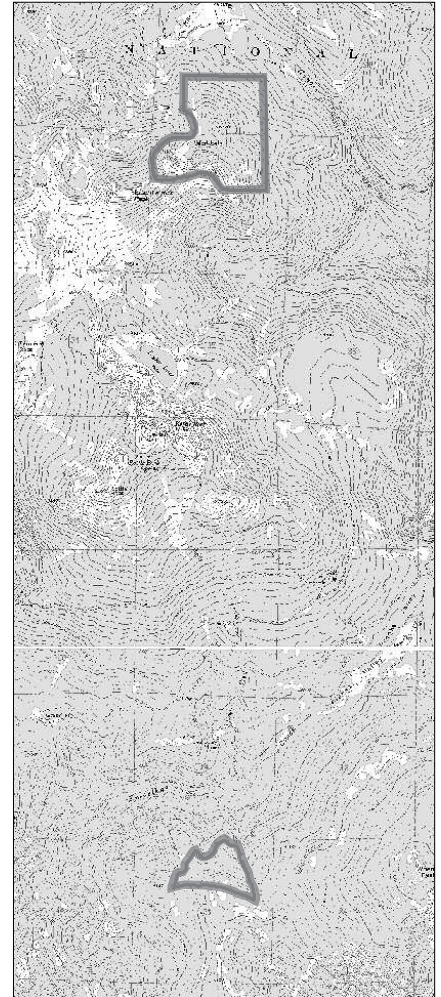
Baker Cypress: The two stands of this species within this RNA are unique for several reasons: They are the only stands of this species in Plumas County, marking the southernmost range limit for this species. Second, no other stands of any species of cypress in the State are known above 6000 ft (1829 m), and none are farther from the coast. Both of these stands are above 6500 ft (1981 m) and about 175 miles (282 km) from the nearest point along the coast. Thus, these stands are probably subjected to more snowfall and colder temperatures than any cypresses in the State or the world.

These stands are about 76 miles (122 km) from the nearest Baker cypress in Shasta County. The cool climate and isolation have undoubtedly influenced the genetic composition of these stands, and research is currently being done to determine their taxonomic position (C. Millar personal communication 1989).

The S. unit (Wheeler Peak) contains several large cypress individuals with dbh larger than 1 m. One of these, the largest known Baker cypress (4.7 ft [1.42 m] dbh, 71 ft [21.6 m] tall) (*fig. 125*), may be well more than 300 years old. These large trees occur at the edges of dense monospecific cypress stands just N. of a largely unvegetated, rounded ridgetop.

The number of large individuals at Wheeler Peak contrasts sharply with the situation at the N. unit (Mud Lake). At Mud Lake, trees occur in dense spindly stands less than 100 years old or as senescent individuals scattered in a dense, young forest of white fir (*Abies concolor*). The oldest tree is less than 150 years and most are under 90, indicating an extensive crown fire 90 or more years ago. The competition for light between Baker cypress and white fir at Mud Lake has produced some of the tallest known Baker cypress (about 92 ft, 28 m).

Biogeographic Significance: This area represents the NE. extension of the N. Sierra Nevada (Sierra Nevada ecological section) and is only a few miles from the edge of the N. end of Great Basin. This cold desert influence is apparent on the xeric ridgetops of both units, where vegetation is dominated by typical Great Basin species (e.g., *Artemisia tridentata*, *Purshia glandulosa*, *Wyethia mollis*). Species associated with these ridgetops include several other Great Basin forms such as *Bromus richardsonii*, *Penstemon speciosus*, *Thelypodium flexuosum*, *Poa nevadensis*, and *Stipa williamsii*, which are atypical of the W. side of the Sierra-Cascades Divide.



**Figure 124—
Mud Lake RNA**

Rare Plants: Baker cypress (*Cupressus bakeri* ssp. *bakeri*) is a member of CNPS List 4.

Physical Characteristics

The Mud Lake unit covers 307 acres (124 ha), and the Wheeler Peak unit covers 73 acres (30 ha). Elevations at Mud Lake range from 6160 to 7320 ft (1878-2231 m). Elevations at Wheeler Peak range from 6080 to 6560 ft (1853-2000 m). The Mud Lake unit occupies the NE. slope of Eisenhower Peak and includes a small glacial cirque containing the shallow 2.5-acre (1-ha) Mud Lake. The Wheeler Peak unit occupies the N.-facing slope of a spur ridge running W. from Wheeler Peak. Both areas have slopes averaging 25-35 degrees.

Rocks at both units are Tertiary volcanics, primarily andesite of the Penman and Ingalls formations. The summit ridge at Wheeler Peak is capped by mudflow breccia. Soils are described as one principal mapping unit at both sites; the Inville-Woodseye-Goodlow complex covers the Mud Lake site, and the Inville-Woodseye complex covers the Wheeler Peak site. The Goodlow family is a moist soil that underlies the meadows and lake at Mud Lake. Annual precipitation is estimated at about 40 inches (1016 mm) at both sites, with the majority as snow. Drifts of more than 6 ft (2 m) occur regularly at the highest elevations. Temperatures average 27 °F (-3 °C) in January, with annual minima at or below 5 °F (-15 °C). The July mean is about 61 °F (16 °C).

Association Types

Mixed conifer and cypress stands were sampled using nineteen 100-m² plots. The remaining vegetation is qualitatively described.

Mixed Conifer Forest (84230, 84240): 307 acres (124 ha). Both units contain large areas of this forest type. The majority of the Mud Lake forest is dominated by white fir (*Abies concolor*) with the major subdominants Baker cypress and red fir (*Abies magnifica*), whereas the Wheeler Peak forest is more mixed, with white fir, sugar pine (*Pinus lambertiana*), Jeffrey pine (*P. jeffreyi*), incense-cedar (*Libocedrus decurrens*), and Douglas-fir (*Pseudotsuga menziesii*) co-dominating.

Thirteen 10- by 10-m plots were sampled in the Mud Lake forest. Most of these are in the young forest strongly dominated by white fir. Trees in this forest average only 6 inches (15 cm) dbh (maximum about 20 inches, 51 cm). Canopy height is 89-100 ft (27-30 m) in the areas with deepest soil. Tree density is high (3340/ha), with white fir accounting for 77 percent of the stems. Basal area cover is correspondingly low, averaging 77 m²/ha, with white fir accounting for 69 percent of the total. Baker cypress accounts for 16 percent of the stems and 20 percent of the cover. Portions of this association at the lower elevations at Mud Lake and most of it at Wheeler Peak contain large mature trees with dbh up to 5 ft (1.5 m) and heights of 161 ft (49 m).

The understory of the dense, young forest is sparse, with occasional shade-tolerant herbs such as *Chimaphila umbellata*, *C. menziesii*, *Pyrola picta*, and *Corallorhiza maculata*. The more open, mature forests have occasional shrubs of *Ceanothus prostratus*, *Symphoricarpos acutus*, *S. vaccinioides*, *Ribes roezlii*, *Amelanchier pallida*, and *Arctostaphylos patula*.

Mountain Chaparral (37510): 24 acres (10 ha). This association occurs at both units. Much of the Mud Lake chaparral is being invaded by young white and red firs. The most extensive remaining areas are on the N. side of the main ridge. Here, thickets border on sagebrush scrub and are mixed with young red and white firs and the uppermost cypress groves. *Arctostaphylos nevadensis* dominates the rocky margins, whereas taller *A. patula*, *Ceanothus velutinus*, *Prunus emarginata*, and *Chrysolepis sempervirens* dominate adjacent to young forest. A

similar type of successional chaparral occurs at Wheeler Peak in openings on the N. side of the ridge. These openings may have been partially created by selective logging within the Wheeler Peak unit in 1957-1959.

An edaphic climax mountain chaparral occurs in the upper cirque basin of Mud Lake. The thin rocky soil is scattered with andesite boulders and supports a sparse cover of *Arctostaphylos nevadensis*, *Ceanothus velutinus*, *C. cordulatus*, *Symphoricarpos vaccinioides*, *Ribes cereum*, *Spiraea densiflora*, and *Amelanchier pallida*. Perennial herbs such as *Penstemon newberryi* and *Monardella odoratissima* ssp. *pallida* are common.

Ridgetop Scrub and Herb Association (35210): 13 acres (5 ha). This association is called "big sagebrush scrub" in the establishment record. It is dominated by a sparse to moderate cover of *Artemisia tridentata*, *Purshia tridentata*, *Chrysothamnus nausiosus* ssp. *albicaulis*, and *Haplopappus bloomeri*. Other characteristic species include *Eriogonum umbellatum*, *E. ursinum*, *E. marifolium*, *Penstemon speciosus*, *P. deustus*, *Crepis occidentalis*, and *Wyethia mollis* (31 species listed as characteristic). Certain areas of the ridgetops are vegetated with scattered Jeffrey pine and white fir. These areas tend to have higher representation of mountain chaparral shrubs such as *Ceanothus velutinus* and *Prunus emarginata*. A large-leaved form of *Ceanothus prostratus* is conspicuous at the Wheeler Peak site.

Riparian Associations (61520, 63500): 11 acres (4 ha). The Mud Lake unit has willow (*Salix ligulifolia*, *S. pseudocordata*, *S. drummondiana* var. *subcoerulea*), mountain alder (*Alnus tenuifolia*), and aspen (*Populus tremuloides*) riparian areas surrounding the lake, its outlet stream, and several seeps. The aspen type is limited to a few acres along the outlet stream. It is not well developed, with only scattered moderate-sized trees. It is closely associated with the willow-dominated riparian thickets.

The willow thickets are particularly common on the margins of the lake, but they also occur as patches along the intermittent outlet stream. Beneath them is a rich herb layer including *Mertensia ciliata*, *Bromus marginatus*, *Elymus glaucus*, *Cirsium andersonii*, *Aster occidentalis*, *A. integrifolius*, and *Senecio triangularis*.

Mountain alder is locally dominant at the S. end of the lake and also occurs in shadier areas along the outlet stream and in several seep areas surrounded by coniferous forest.

Northern Interior Cypress Forest (83220): 9 acres (4 ha). This association is considered within the mixed conifer forest in the ecological survey but treated separately in the establishment record. This classification pertains largely to the monospecific stands of Baker cypress at Wheeler Peak and to the few dense high-elevation stands at Mud Lake. The Mud Lake stands are crowded and spindly; they are becoming senescent as they are shaded out by the competing white and red firs.

In contrast, most of the stands at Wheeler Peak are isolated from surrounding mixed conifer forests and border on the open ridgetop. These stands appear to be healthy, although often dense. They are exposed to more sun and less competition than the Mud Lake stands. Densities for six plots in this forest at the Wheeler Peak site average 3100/ha, with Baker cypress comprising 44 percent of the stems and white fir (mostly pole size) comprising about 56



Figure 125—Mud Lake, champion Baker cypress at Wheeler Peak site. This tree is 22 m (71 ft) tall and has a dbh of 142 cm (56 inches). (1984)

percent. Basal area cover averages 52 m²/ha, with Baker cypress comprising 72 percent of the cover and white fir 26 percent. The understory is poorly developed because the canopy is dense.

Red Fir Forest (85310): 6 acres (2 ha). This forest occurs at the head of the Mud Lake cirque above 7000 ft (2134 m). It is associated with the edaphic climax form of mountain chaparral and is relatively open. Some of the successional fir forest surrounding the uppermost cypress stands also may be considered of this type.

Riparian Border Forest (86100): 6 acres (2 ha). This association forms an intermittent border lying between the young mixed conifer forest and the riparian and meadow associations at the Mud Lake unit. It is dominated by lodgepole pine (*Pinus contorta* ssp. *murrayana*) with occasional aspen, red fir, white fir, Baker cypress, and Jeffrey pine intermixed. This is the most mesic situation for Baker cypress, and some of the largest and oldest individuals at the Mud Lake unit occur here (up to 76 cm dbh and 130 years old). The understory is shady and contains some of the more shade-tolerant riparian and meadow species.

Meadow (45110, 45120): 4 acres (2 ha). This association is interspersed with the riparian shrubs and trees around the lake and its outlet. Both wet and dry phases occur. A large number of herbs occur in this association (35 species listed as characteristic). Typical meadow species include *Agrostis variabilis*, *Carex heteroneura*, *C. stipata*, *Danthonia intermedia*, *Glyceria striata*, *Juncus xiphioides*, *J. nevadensis*, *Perideridia gairdneri*, *Sisyrinchium idahoense*, and *Trifolium varigatum* var. *pauciflorum*.

Montane Freshwater Marsh (52430): 3 acres (1 ha). This association is restricted to Mud Lake. This shallow lake harbors a patchy cover of shallow-rooted and floating-leaved hydrophytes including *Carex rostrata*, *Sparganium multi-pedunculatum*, and *Potamogeton natans*. *Carex rostrata* forms a dense band around the lake. This association was termed “aquatic association” in the ecological survey.

Plant Diversity

One hundred eighty-one taxa are listed in the ecological survey. An additional six species were noted in the establishment record (total 187).

Conflicting Impacts

The cypress stands at the Mud Lake unit must be rejuvenated by fire or they will soon be shaded out by the dense young white fir forest. Prescribed burning at Mud Lake will be difficult because of the dense fir forest. Wheeler Peak also will require burning to rejuvenate the cypress stands there, but this will be less difficult because of the surrounding open vegetation. Some of the Wheeler Peak unit was selectively logged between 1957 and 1959. However, the scattered cypress in this part of the area justifies its inclusion in the RNA.