

5. Babbitt Peak (Talley 1977a, Keeler-Wolf 1989i)

Location

This established RNA is on Tahoe National Forest, adjacent to Toiyabe National Forest. It lies about 16 miles (26 km) NW. of Reno, Nevada, in Sierra County and lies within portions of sects. 4, 5, 8, and 17 T20N, R17E MDBM (39°36'N., 120°06'W.), USGS Sardine Peak and Dog Valley quads (fig. 11). Ecological subsection – Tahoe-Truckee (M261Ej).

Target Elements

Washoe Pine (*Pinus washoensis*) and Mountain Mahogany (*Cercocarpus ledifolius*)

Physical Characteristics

The ecological survey covers about 1747 acres (707 ha), including a small portion of Toiyabe National Forest, but the final boundaries include 1061 acres (429 ha). Babbitt Peak, the highest point of the Bald Mountain Range (8760 ft, 2670 m), lies along the E.-central boundary of the area. Watersheds within the area drain to the W. as a portion of the upper tributaries of the Feather River. The main ridge of the Bald Mountain Range runs NW.-SE. The topography on the central ridge consists of gentle convex or concave slopes interrupted by occasional rock outcrops. Two lateral spur ridges occur in the area. One runs for over a mile (1.6 km) before dropping below 7808 ft (2380 m) elevation. W.- and E.-facing slopes predominate and become increasingly convex away from the main ridge.

The area is underlain by Tertiary volcanic rock (primarily andesite). Soils are divided into 11 mapping units comprising the Aldi, Kyburz, Fugawee, Tahoma, Trojan, Meiss, Waca, Franktown, and Windy complexes. Average annual precipitation is slightly more than 30 inches (762 mm). Prevailing SW. winds have distorted many of the trees along the main ridge. Average annual temperature is estimated to be 33.5 °F (0.8 °C).

Distinctive Features

Washoe Pine: The species is endemic to the western Great Basin mountains. It occurs only in a few areas. The populations on the Babbitt Peak RNA and to the S. on Mount Rose are the only large ones that are morphologically distinct and geographically isolated from the closely related ponderosa pine (*Pinus ponderosa*) (Griffin and Critchfield 1976). This site is unusual for its pure stands of Washoe pines and the genetic uniqueness of the population.

The ecological requirements for local restriction of Washoe pine are unclear. Its dominance solely on E.-facing (leeward) slopes suggests that desiccating winds on the S.- and W.-facing slopes and the fires that the winds occasionally carry upslope from the lower-elevation Jeffrey pine-white fir forests may inhibit growth elsewhere in the area. Natural rock barriers surrounding the best stand of Washoe pine and small fire scars at the base of mature trees also suggest that the Washoe pine forest has been protected from crown fire for at least the past 500 years. The limited distribution, long intervals between periods of successful establishment, and slow growth of mature Washoe pine suggest that intense fires would be detrimental. There is some danger that the lower slope Washoe pine forests, which are being invaded by western white pine (*Pinus monticola*) and white fir (*Abies concolor*), may soon lose their resistance to fire through the increased fuel buildup by the invading species.

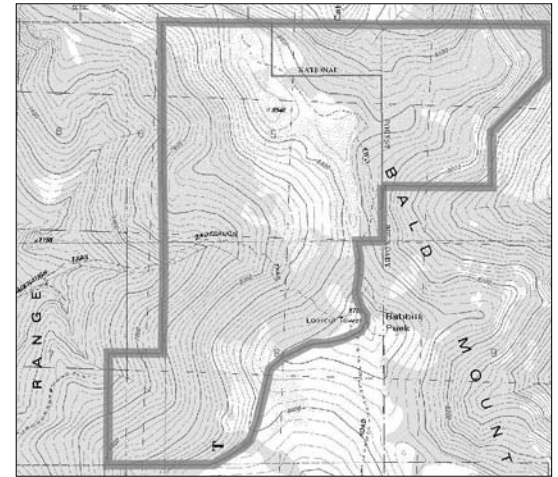


Figure 11—Babbitt Peak RNA

Pure Western White Pine Forest: Western white pine rarely forms pure forests in the Sierra Nevada. At Babbitt Peak, pure stands result from the presence of N.-facing slopes above the climatic limits of white fir. These slopes are too dry for red fir (*Abies magnifica*), the normal dominant on these aspects and elevations in the Sierra Nevada. The relatively xeric climate of Babbitt Peak provides the conditions for western white pine dominance and highlights the subtle differences between ecological requirements of the typically co-occurring red fir and western white pine in the California region.

Growth Rate and Forest Structure: Many saplings and trees have been sampled for height, diameter, and age at breast height (1.4 m) to establish growth trends for red fir, white fir, western white pine, and Washoe pine. To summarize: maximum growth rates for both white fir and western white pine occur under similar conditions at lower elevations. Early growth rates for Washoe pine are relatively rapid (to reach breast height in about 38 years). Young ridgetop and low-elevation, E.-facing slope trees are particularly slow growing (5 inches or 13 cm height growth per year between 20 and 100 years old [age determined at breast height]); at 100 years old [age at breast height] the height of trees is about 44.3 ft or 13.5 m.

Diameter growth for white fir and red fir are about equal (16 inches or 40 cm dbh in 100 years). Subsequent growth slows greatly, with an additional 120 years required to reach 2 ft (60 cm) dbh. Washoe pine growth is more uniform over time, attaining similar dbh after 100 years, but attaining 60 cm after only 180 years. Given the slow growth rate of mature trees, the largest of the local white firs (1.24 m dbh) may be among the oldest specimens known for this species (about 600 years). Years having heavy white fir reproduction correlate well with moist periods. Recent resurgence of white fir may result from lack of periodic fires.

Western white pine regeneration is strongly gap-phase, with the oldest trees being 500-600 years. Gap-phase regeneration is also the rule for Washoe pine, with greatest ages up to and possibly exceeding 800 years.

Potential Solar Beam Irradiation (PSBI): According to theoretical calculations, the red fir-western white pine forests receive the least amount of light, and white fir-Jeffrey pine forests receive the highest. Washoe pine PSBI is nearly as high as that of the white fir-Jeffrey pine forest type. These calculations are discussed in conjunction with other microclimatic influences (e.g., undulating topography creating local snow traps, etc.) and provide a good view of basic environmental situations for each major vegetation type.

Rare Vertebrates: northern goshawk (*Accipiter gentilis*, State-listed species of special concern, Forest Service-listed sensitive species), prairie falcon (*Falco mexicanus*, State-listed species of special concern), and mountain lion (*Felis concolor*, not on any protection list) have been seen several times in the area.

Association Types

Vegetation was sampled using 75- by 100-ft (0.07-ha) plots. Twenty-three plots were sampled, covering all major vegetation types. The data were arranged in an association table.

White Fir Forest (84240, 85210): 425 acres (172 ha). This forest varies from nearly pure, dense, 100-year-old white fir stands to more mature forest with white fir and western white pine codominating. The younger forest has densities of more than 1000 stems/ha with canopy cover of 90 percent and basal area cover of about 70 m²/ha. The older white fir-western white pine forests have lower density, lower cover, and greater basal area.

White fir-western white pine forest varies from dominance by white fir at lower elevations to a broad mixing zone at mid-elevations and finally to

western white pine dominance at higher elevations. All exhibit moderate density (329 stems/ha), high percent cover (64 percent), and a total basal area cover of 82 m²/ha.

Jeffrey pine (*Pinus jeffreyi*) is also important in some white fir forest on S.- and W.-facing slopes. Although Jeffrey pines are few, they are large and contribute about 20 percent each to basal area cover and canopy cover figures. Low relative density of Jeffrey pine is a result of prolific regeneration by white fir.

There is a trend toward total dominance by white fir in these forests, with the dense white fir creating a severe fire hazard. Burned forest similar to this forest results in dominance by *Ceanothus velutinus* (Holland 37530).

Western White Pine (no Holland equivalent): 232 acres (94 ha). This association occurs between 7600 and 8695 ft (2316-2650 m) on gentle NW.- to NE.-facing exposures near ridge summits. Two sampled essentially pure western white pine stands average 400 stems/ha for 57 percent cover and 78 m²/ha basal area. On steep concave N.-facing slopes or below ridge crests, white fir and red fir may codominate. Ecotone between western white pine forest and sagebrush scrub is typically sharp.

Red Fir Forest (85310): 212 acres (86 ha). This type is restricted to concave N.-facing slopes between 7800 and 8400 ft (2377-2560 m). The largest stands occur at the far N. end in a selectively logged area. A smaller grove (54 acres, 22 ha) of old-growth red fir occurs on NW.-facing slopes of the spur ridge running SW. from Babbitt Peak. Here red fir, western white pine, and, to a lesser extent, white fir form mixed stands with red fir dominant (importance values > 200). There are complex boundary relationships with vegetation adjacent to this small old-growth stand. Atop ridges this stand may grade into a mixed community with red fir, western white pine, Jeffrey pine, lodgepole pine (*Pinus contorta* ssp. *murrayana*), western juniper (*Juniperus occidentalis*), and white fir occurring among *Ceanothus velutinus*, mountain mahogany, and other sagebrush scrub species. Other boundaries are with white fir forest (W. and N.) and mixed white fir, Jeffrey pine, and Washoe pine forest (along the NE. boundary). A few old Washoe pines still occur within the WNW.-aspect red fir forest, suggesting that this area was once more open.

Annual and perennial understory species are similar among all the conifer forests and include *Pyrola picta* ssp. *dentata*, *P. picta*, *Kelloggia galioides*, *Penstemon heterodoxus*, *Poa* sp., and *Paeonia brownii*. *Pterospora andromedea* and *Hieracium albiflorum* are largely confined to Washoe pine and white fir forests, respectively, and *Chimaphila umbellata* occurs only in western white pine and red fir forests. Widespread subordinate species in several conifer forest types include *Viola purpurea*, *Symphoricarpos vaccinioides*, *Bromus marginatus*, *Sitanion hystrix*, *Monardella odoratissima*, *Lupinus* sp., *Gayophytum ramosissimum*, *Haplopappus* sp., *Osmorhiza occidentalis*, *Penstemon speciosus*, *Ribes roezlii*, *Phacelia* sp., and *Ceanothus velutinus*.

Mountain Mahogany Woodland (no Holland equivalent): 194 acres (79 ha). This scrubby woodland occurs on SW.-, S.- and SE.-facing exposures (best developed on steep, convex S.- and SE.-facing slopes above 8000 ft [2438 m]). On gentle SW.-SE. aspects this type overlaps with sagebrush scrub, degraded sagebrush scrub, aspen groves, and conifer forest species. On gentle slopes, the soil is rocky, there is exposure to SW. winds, or both.

Stands may be pure or contain occasional Washoe pine or western white pine or both. Importance value of typical mountain mahogany is high (on three 0.07-ha plots, averaging 1052 stems/ha, 34 percent cover, and 41 m²/ha basal area). Such herbs as *Penstemon newberryi*, *Cryptantha microstachys*, and *Chrysopsis*

breweri are common, with several other taxa spilling over from adjacent coniferous associations (e.g., *Pedicularis semibarbata*, *Silene lemmonii*, *Poa* sp.) and the sagebrush association (e.g., *Artemisia tridentata*, *Wyethia mollis*).

Sagebrush Scrub (35210, 37510): 170 acres (69 ha). This association occurs on even-graded slopes of S. to W. aspects and steep slopes with E. aspect. *Artemisia tridentata* is dominant. Other common shrubs and subshrubs include *Ribes cereum*, *Purshia tridentata*, *Symphoricarpos vaccinoides*, *Monardella odoratissima*, *Eriogonum umbellatum*, *Ribes roezlii*, *Eriophyllum confertiflorum*, and mountain mahogany. Steep E.-facing exposures have more mesic taxa such as *Arctostaphylos nevadensis*, *Ceanothus velutinus*, *C. prostratus*, *Holodiscus microphyllus*, and occasional western white pine. Herbaceous taxa include *Sitanion hystrix*, *Bromus marginatus*, *Gayophytum ramosissimum*, *Carex* sp., *Lupinus* sp., and *Leptodactylon pungens*. An overgrazed area (44 acres, 18 ha) is dominated by *Wyethia mollis* (called the degraded sagebrush scrub).

Washoe Pine Forest (85220): 102 acres (41 ha). This association prevails on gentle to moderate upland slopes and benches with S. and, less importantly, W. and E. aspects at elevations between 7600 and 8500 ft (2316-2590 m). The majority of this population (86 acres, 35 ha) is a nearly pure stand on the spur ridge extending NE. from Bald Mountain. Here, Washoe pine accounts for 90 percent frequency, cover, and basal area. On the W. slope of Bald Mountain only a small grove exists; however, it contains large specimens up to 112 ft (34 m) high and 4.6 ft (1.4 m) dbh. Mixed Washoe pine, western white pine, and white fir forest occurs in the NE. corner of the RNA. In the mixed forest, Washoe pine accounts for about 50 percent of basal area and cover but only 30 percent frequency. White fir has recently increased densities, accounting for the lower relative density of the Washoe pine.

Washoe pine also occurs as a subordinate member of Jeffrey pine, white fir, and western white pine forest, within 20 acres (8 ha) of white fir and Jeffrey pine forest, and in marginal red fir forest.

Aspen Forest (81B00): 67 acres (27 ha). Several groves of aspen (*Populus tremuloides*) are scattered within sagebrush scrub. They occur on gentle S. to W.-facing slopes and range from shrubby ridgetop thickets to dense clusters of small trees with verdant understories, adjacent to conifer forests. These aspen forests currently are not being invaded by conifer forest. Associated taxa vary depending upon location of the grove, but typically they do not include moist or wet meadow species.

Plant Diversity

Eighty-five taxa are listed in the establishment record.

Conflicting Impacts

Controlled burning may be required to maintain viable populations of Washoe pine because of increasing colonization of western white pine and, especially, white fir. Should a fire occur, the increased density of these species may have a devastating effect on the Washoe pines. Past heavy grazing of the sagebrush scrub has degraded portions of it to *Wyethia mollis*-dominated herb land. Selective logging in the 1960s of the largest stand of red fir has altered the natural regeneration cycle and age structure of that association.