

vada; (1) Sierran, (2) Rocky Mountain, and (3) Great Basin.

(1) The Sierran is found only in the Carson Range a few miles south of Reno. The pine-fir zone occurs between 5000 and 7500 ft and comprises large trees from 75 to 200 ft high; it is an open forest dominated by yellow pine (*Pinus ponderosa*), Jeffrey pine (*P. jeffreyi*), and white fir (*Abies concolor*). There is an extensive understory of shrubs, etc.

The next zone (7500–9300 ft) is dominated by red fir (*Abies magnifica*) and may include lodgepole pine (*P. murrayana*), western white pine (*P. monticola*), Jeffrey pine (*P. jeffreyi*), and mountain hemlock (*Tsuga mertensiana*). Aspen (*Populus tremuloides*) often forms groves in moister places. From about 9300 ft to the timberline (about 10,300 ft) is a semi-open patchy subalpine forest. The principal tree is whitebark pine (*P. albicaulis*), which diminishes in height from about 40 ft at 9300 ft to 2 or 3 ft at timberline, where it forms the characteristic krummholz. Other trees are limber pine,

lodgepole pine, and mountain hemlock.

(2) The Rocky Mountain subdivision comprises the eastern ranges from the Jarbidge Mountains in Elko County to the Spring Mountains in Clark County. The complete Rocky Mountain zonal series is (in ascending order): ponderosa pine; Douglas fir (*Pseudotsuga menziesii*), and white fir; subalpine fir (*Abies lasiocarpa*), Engelmann spruce (*Picea engelmannii*), and often limber pine or bristlecone pine. In most cases one or more zones are missing or zones may be telescoped, producing mixtures.

(3) In Billing's third division the ranges have the simplified forest zones of the Great Basin proper. The Pinyon-Juniper Biome reaches up to 7500–8500 ft. Above this is an almost treeless zone of sagebrush, mountain mahogany (*Cercocarpus ledifolia*), and other shrubs reaching 9500–10,000 ft. Above the treeless zone is an open subalpine forest of limber pine and bristlecone pines, which we regard as ecotone.

In all zones of all three subdivisions mountain streams are bordered by aspen,

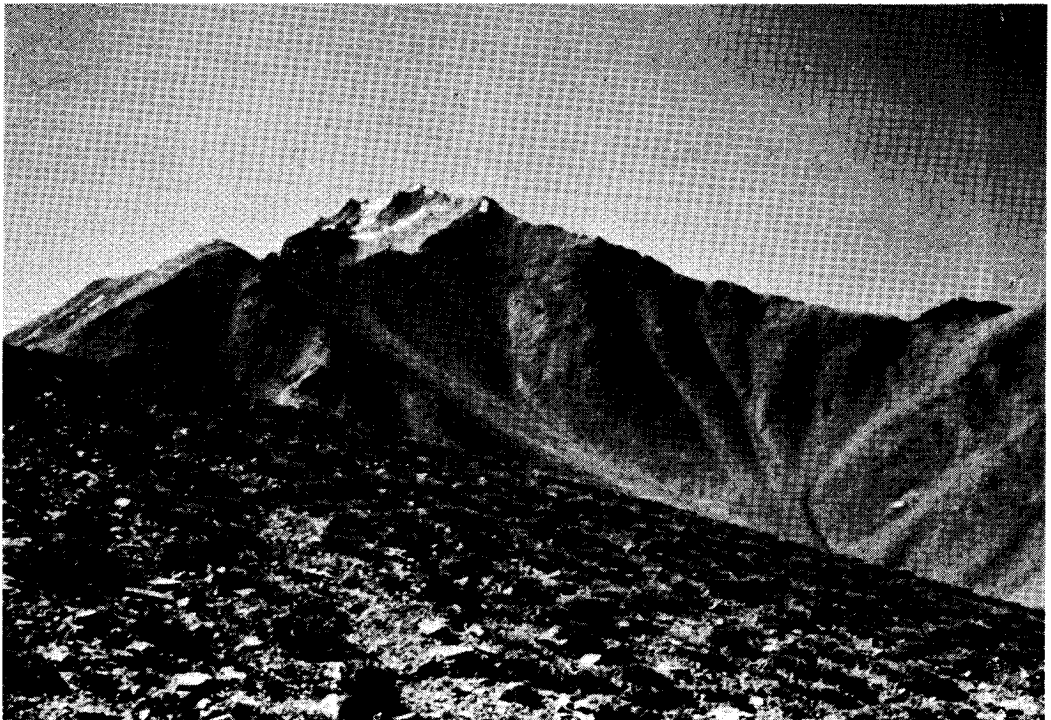


Fig. 2. Alpine Biome. Foreground with typical mat vegetation. Esmeralda County: Summit of Boundary Peak in background. Photograph by Gary Nigro.