

121.4 Sierran Subalpine Conifer Forest

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Subalpine forests of Limber Pine (*Pinus flexilis*) and/or Lodgepole Pine (*P. contorta* var. *murrayana*) occur above ca. 2,450–6,660 m, on the highest peaks of the San Gabriel, San Bernardino, and San Jacinto ranges (Fig. 17). These forests are generally single layered, open (=woodland), and of shorter stature than the montane forests downslope; the pines range in height from a few feet above ground near krummholz above 3,050 m on Mts. San Gorgonio and San Jacinto, to trees 18 to 23 m tall on mesic north slopes. Climatological data are lacking, but mean annual precipitation probably averages more than 635 mm—almost all of which falls as snow. The overall xeric appearance is a result of a short growing season of often only 50 to 75 days (and even then occasionally interrupted by freezing temperatures), wind desiccation, and poor soil development.

Many of the Limber Pines appear to be very old, and neither they nor the Lodgepole Pines are here relegated to the subclimax role these species play farther north. Missing altogether in the Southwest are characteristic and representative Sierran subalpine conifers such as Mountain Hemlock (*Tsuga mertensiana*), Western White Pine (*Pinus monticola*), Whitebark Pine (*P. albicaulus*), and Foxtail Pine (*P. balfouriana*). Aspen, so common in successional stands in the subalpine zone farther north, is also virtually absent in Southwestern Sierran subalpine forests.

At lower elevations, below 2,600 m, there is much intermingling of Lodgepole Pine with White Fir (*Abies concolor*), Western Juniper (*Juniperus occidentalis*), and Jeffrey Pine (*Pinus jeffreyi*) and, at least in southern California, these and other montane species may persist in decreasing numbers upward through most of the subalpine forest. Conversely, Lodgepole Pine extends downward into cool, upward levels of the mixed conifer series of cold-temperate montane forest (Canadian life-zone). It would probably be an exaggeration to consider these lower elevation communities, and the small stands of this pine in the Sierra San Pedro Mártir, as subalpine.

The understory tends to be open except for occasional clumps and patches of Mountain Whitethorn (*Ceanothus cordulatus*), Bush Chinquapin (*Castanopsis sempervirens*), Green Manzanita (*Arctostaphylos patula*), Curleaf Mountain-mahogany (*Cercocarpus ledifolius*), currants (*Ribes* spp.), and Rockspirea (*Holodiscus microphyllus*). Grasses, except for Parish Needlegrass (*Stipa parishii*) and Squirreltail (*Sitanion hystrix*), are also poorly represented and the major understory species are forbs. According to Thorne (1977) these include wintergreen (*Pyrola* spp.), Coral Root (*Corallorhiza maculata*), Pine Drops (*Pteropora andromedea*), Rockcress (*Arabis platysperma*), sedges (*Carex* spp.), Draba (*Draba corrugata*), Bedstraw (*Galium parishii*), Sandwort (*Arenaria nuttallii*), Silene (*Silene verecunda*), Penstemon (*Penstemon* spp.), Mariposa (*Calochortus invenustus*), Alumroot (*Oreonana vestita*), Fleabane (*Erigeron breweri*), Monardella (*Monardella cinerea*), Wild Onion (*Allium monticola*), *Sarcodes sanguinea*, Goosefoot Violet (*Viola purpurea*), and the buckwheats (*Eriogonum saxatile*, *E. umbellatum*, *E. kennedyi*). None of these is confined to, or particularly indicative of, subalpine forest, and they either extend upward into alpine tundra fellfields or downward into montane communities; an apparent exception is Small Mistletoe (*Arceuthobium cyanocarpum*), which Thorne (1977) records as occurring in subalpine forests in the San Bernardino



Figure 17. Subalpine conifer forest of Lodgepole Pines (*Pinus contorta* var. *murrayana*) in the San Gorgonio Wilderness, San Bernardino National Forest, California, ca. 2,650 m elevation. The forest is approaching timberline, the trees losing stature and becoming more open as they approach Mount San Gorgonio, elevation 3,506 m. U.S. Forest Service Photograph.

and San Jacinto mountains.

The Sierran subalpine fauna is depauperate. Of the boreal mammals, only the Lodgepole Pine Chipmunk (*Eutamias speciosus*), Golden-Mantled Ground Squirrel (*Citellus lateralis*), Northern Flying Squirrel (*Glaucomys sabrinus*), and Long-tailed Meadow Mouse (*Microtus longicaudus*) reach one or more of these southern "islands." A race of Chickaree (*Tamiasciurus hudsonicus mearnsi*), isolated in the high Sierra San Pedro Mártir, is the most southwestern representative of this essentially boreal and cold-temperate forest squirrel.

Characteristic nesting subalpine birds are thinly represented in these forests by the Williamson Sapsucker (*Sphyrapicus thyroideus*), Clark's Nutcracker (*Nucifraga columbiana*), Red-breasted Nuthatch (*Sitta canadensis*), Ruby-crowned Kinglet (*Regulus satrapa*), and Cassin's Finch (*Carpodacus cassinii*). Other species such as the Dusky Flycatcher (*Empidonax oberholseri*), Mountain Chickadee (*Parus gambeli*), Pine Siskin (*Carduelis pinus*), and Red Crossbill (*Loxia curvirostra*), while present, are equally or more indicative of Sierran montane conifer forests.