BRISTLECONE PINE FOREST

Likely the oldest trees on Vermejo, the Rocky Mountain bristlecone pine (Pinus aristata), do not live quite as long as the Great Basin bristlecone, but can live up to 2,500 years. The bristlecone trees grow in very exposed areas amongst the subalpine and aspen forests of Vermejo's high country. Bristlecone forests often grow in similar habitats as limber pine (pinus flexilis).

Biology

Bristlecone pines have very dense needles that curve slightly that resemble a bottle brush. The trees are not usually very tall because of the harsh environment where they grow. Bristlecone at tree line, or the upper limit of elevation where trees are able to grow, are often only a few feet tall, while the pines at their lower elevation limit may be 30-40 feet tall depending on resources such as precipitation and soils. Often, older bristlecone no longer have bark on their trunk but can still be alive with the inner function of the tree still viable. The trunks are notorious for having a twisted appearance, and many trees after their death, will remain standing for hundreds of years.

Reproduction and Growth

Bristlecone pines are wind pollenated and are monoecious, having both male and female cones on the same tree. The male cones are small and orange colored while the female cones are larger and purple to brown colored. The cones have a bristle on the ends of the scales giving the pines their name. The trees reproduce from winged seeds that are distributed by wind. The trees almost always grow in exposed windy locations so the seed dispersal can be fairly widespread. The trees also depend on the Clark's nutcracker to cache seeds, some of which will be forgotten and allowed to germinate. Tree growth is extremely slow and a 20-inch tall tree may be 200-250 years old. The tree growth rings are very tight forming a very dense and hard wood. Seedlings require full sun and do not grow under the canopy of older trees.

Harsh Environment

The bristlecone pines grow in very exposed, windy, cold and sunny locations. These mountain slopes or high points have a very short growing season, usually have poor soils, and are normally windswept in winter with the snow blowing clear to pile in drifts elsewhere. The primary moisture for the trees comes from the summer monsoons and the pines grow more in years following a good summer monsoon season. Bristlecone have adapted to the short growing season and potential drought years by only shedding a few needles each year. The needles can create sugars through photosynthesis for 10-15 years so the trees expend less energy producing new needles.

Timberline or Tree Line

Bristlecone can form krummholz trees near or at tree line. Krummholz trees are stunted and windblown trees that look more like short shrubs than trees. These trees survive at the very upper most limit of the forest on the upper slopes of the Sangre de Cristo mountains. The stunted trees provide shelter to small animals on the harsh slopes like the snowshoe hare.

Animal species

Bristlecone forests, because of the harsh environment where they grow, typically have lower biodiversity than in surrounding aspen forests or wet meadows. However, there are some hardy animals that live in the bristlecone forests. The yellow-bellied marmot burrows under rocks and hibernates for the winter after eating

grasses, forbs and seeds in the summer. Elk and bison will graze amongst the bristlecone pine in the summer months. The red crossbill and Clark's nutcracker eat the seeds of the pines. Golden mantle ground squirrels, commonly mistaken for chipmunks, also live in the high elevation forest. The golden mantles do not have stripes on their face whereas the least chipmunk have stripes around its eyes.

Porcupines utilize the bristlecone pine forest year-round remaining active in winter. The porcupines eat needles, bark, and cambium of the trees. The porcupines are excellent climbers using their long claws and can prop themselves up in trees with their tail. Their sharp quills provide a formidable defense, as many as 15,000 to 30,000, that have barbs and will painfully attach to a predator.

Plant Species

The rocky soils and harsh climate limit the understory and open canopy areas of the bristlecone pine forest to plants that can grow in drier conditions with a short growing season. Mountain muhly, Arizona fescue, pussytoes, alpine clover, locoweed, western wallflower, and shrubby cinquefoil are some of the plant species that grow in the bristlecone forest.

Mortality and disease

The primary disease and mortality concern for the bristlecone pine is white pine blister rust. The 'rust' is a fungus, Cronartium ribicola, that is not native to North America. The fungus also infects limber pine and southwestern white pine. The fungus can kill single branches, cause top-kill or eventually kill an entire tree. Bristlecone can also become infected by dwarf mistletoe. Bristlecone can survive low severity fires, but more intense fires will likely kill the pines.

Forestry Management

Vermejo's Forestry Department uses hydro-axe equipment to simulate small fires in the bristlecone forest. The hydro-axes, like big mulchers that can mulch a small tree from the top down, can be used to open up an area similar to how a fire would have killed smaller trees. The hydro-axe areas are usually about 250-300 acres. Fire return intervals of bristlecone pine forest were historically 300 years or more.

Frequently Asked Questions:

1. What elevation is timberline or tree line on Vermejo? Timberline on the southern peaks of the Sangre de Cristo mountains is around 11,900 ft feet in elevation above Glacier Lakes and 12,000 ft below Ptarmigan Peak.

2. How much snow does the Vermejo high country get in winter? A snow pillow located in the Costilla watershed measures snow depth with a combination of weight and an ocular sensor. The maximum snow depth can vary from year to year. During winter 2022-23, the maximum snow depth recorded was 30 inches. In the winter of 2021, the maximum depth was 42 inches. The weather station is located below timberline so greater depth can occur along protected areas of the peaks, especially in the trees near timberline.

3. What is a flag tree? A flag tree or banner tree is a tree that grows in harsh and very windy conditions that has few branches that only grow on one side of the tree. The tree's branches facing into the wind do not survive leaving a distinctive one-sided tree. Flag trees are considered a type of krummholz tree.