

PINYON – JUNIPER WOODLAND

Colorado or Two-Needle Pinyon Pine (*Pinus edulis*)

The two-needle or Colorado pinyon pine is the state tree of New Mexico and is one of eight pinyon pine species in North America. The two-needle pinyon of the southern Rocky Mountains grows on Vermejo in elevations of 6,500 to 7,800 feet. The pinyon-juniper woodland found around Vermejo Park (HQ) is the upper elevation extent of the ecosystem on the property where the pinyon-juniper intermixes with ponderosa pine forest.

Growth and Reproduction

Mature two-needle pinyon are 10-30 foot tall trees that have a rounded crown and are more bushy looking than compared to the tall and narrower ponderosa pine. The pinyon trees may start producing cones once they are about 35 years old, but often older. The trees are very slow growing and a tree ten feet in height may be 80-100 years old. Dominant trees in a stand may be as old as 400 years. The trees have large root systems adapted to drier climate of the southern Rockies. Seedlings of pinyon as well as ponderosa pine focus more resources developing their root systems versus trunk growth in their early years. The trees are monoecious, with both male and female cones on the same tree. Being wind pollinated, the trees can produce large amounts of yellow pollen that coat the ground surrounding the trees in pale yellow. It can take three years for a pinyon to produce fully ripened seeds or 'pine nuts'. The trees have cyclical nut masts, or heavy cone production seasons, every four to seven years.

Symbiosis

The pinyon has a symbiotic relationship with bird species that help plant its seeds. In particular, the pinyon jay and Clark's nutcracker, collect and then cache seeds to store to eat later. The pinyon jays are known to carry upwards of 50 seeds in their throat pouch and then bury the seeds in the soil. Not all the seeds are recovered and eaten by the birds allowing the seeds to germinate and produce offspring further away from the trees. The birds get the benefit of a very nutritious food source (see Pinyon Jay abstract).

Rocky Mountain Juniper (*Juniperus scopulorum*)

The Rocky Mountain juniper grows in a round to pyramid shaped tree form while common juniper, also found on Vermejo, is a low growing creeping shrub. The Rocky Mountain juniper is similar in appearance to the invasive Eastern red cedar that has spread to the western Great Plains.

Growth and Reproduction

Rocky Mountain juniper are also slow growing trees with the average height of an eight-year old tree being only one foot tall. The junipers commonly live to be 250-300 years old, however a Rocky Mountain juniper in Utah was documented to be 3,000 years old. The bark sheds as the tree ages giving the trunk of the tree a ragged appearance. The trees have scale-like branching needles that provide better shelter for nesting birds including broad-tailed hummingbirds, American robins and dark-eyed juncos and are often browsed by deer and sometimes elk. The junipers grow amongst the pinyon pine but also in the understory of narrowleaf cottonwood along small creeks and drainages. The junipers are wind pollinated and produce very small blue

cones, commonly referred to as juniper 'berries'. The trees also have cyclical production years with larger crops every 2-5 years. The cones are eaten by cedar waxwings, grosbeaks, wild turkeys, rabbits, foxes, and black bears.

Paleoindians in Pinyon-Juniper Woodlands

Historic use of the pinyon nuts in the Park Plateau is documented by archeologists. It is likely that nomadic groups traveled to areas to harvest the nuts during mast years. The later and more permanent farming settlements along the Vermejo River are almost all located in areas that are pinyon-juniper woodland dominated ecosystems suggesting that the pinyon nuts were a very important component to their diet and juniper cones were likely used for teas and medicinal purposes.

Mortality

Tent caterpillars produce a silk-like tent that protects larvae that then damage and potentially kill off portions on pinyon pine, often towards the top of the trees. Pinyon ips bark beetles can inhabit stressed or damaged trees which can lead to tree mortality. The junipers are very susceptible to fire for the first 20 years with their low spreading branches capable carrying the fire to the crown of the tree.

Pinyon-Juniper Woodland Plant Species

The woodlands have an understory of grasses, forbs, and shrubs. Common grasses include blue gramma, big bluestem, side oats gramma, western wheatgrass, and squirrel tail. Typical forbs include snakeweed, scarlet globe mallow, asters, and antelope horns milkweed. The parasitic bunched broomrape and paintbrush plants can also be found. These plants do not use photosynthesis but take the nutrients from other plants by tapping their root systems. A clue that a plant is parasitic is that it isn't green because it doesn't require photosynthesis. Common shrubs and cacti in the woodland are mountain mahogany, prickly pear, yucca, and mountain ball cacti. Large and edible puffball fungi are also common. Fragile biocrusts can also be found in some areas of the woodland where lichens, mosses, algae, and small fungi interact with soil to form a 'living soil'. Crustose and foliose lichen in various colors grow on rocks and tree trunks.

Pinyon-Juniper Woodland Animal Species

With critical seed production from both pinyon and junipers, the woodlands attract numerous species. Additional birds include northern flicker, juniper titmouse, chickadee, nuthatches, and lazuli bunting. Mammals common in the woodlands are chipmunks, rock squirrel, gray fox, coyote, black bear, and black-tailed jackrabbits. Reptiles include mountain short horned lizards, fence lizards, western terrestrial garter snakes, and prairie rattlesnakes. Taking an early morning hike through denser spaced pinyon, you may find orb spiders have built substantial webs between the trees.

Concerns and Management

More intense drought in the southwest potentially may lead to juniper replacement of pinyon trees. Research in the Great Basin shows that junipers are more resistant to drought mortality than pinyon, so in drought cycles, juniper begin to dominate over the pinyon. There is also an expected elevation shift due to hotter and drier climatic conditions which may move the woodland further into existing ponderosa pine ecosystems. USFW is considering the request for listing of the pinyon jay for the threatened and endangered species act due to declining populations.

Vermejo forestry conducts small scale treatments that address meadow encroachment, help prevent catastrophic wildland fire behaviors, and hopefully encourage new growth of seedling pinyon pine. Roughly 100 acres of woodland are treated annually. The wood from the treatment is sold as firewood by a company located in Cimarron, NM.