TECHNICAL NOTES

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WESTERN JUNIPER SITE INDEX CURVES

The results of the western juniper (Juniperus occidentalis) field study, conducted by the U.S. Bureau of Land Management and U.S. Soil Conservation Service, and the laboratory analysis conducted by the U.S. Forest Service's Forest and Range Experiment Station at Bend, Oregon, are presented here.

(The site index of western juniper, unlike other western junipers, is predictable.) We found that, although growth was slow, a steady upward height trend is established in western juniper. Unlike its associates, Utah and one-seed, the western juniper contains a single dominant stem. Even on the lowest sites, the central stem dominates. Large spreading branches are common, and make up a significant volume of the total biomass; however, the well-defined trunk contains the largest percentage of mass. On highest sites, the trees are generally mixed with scattered ponderosa pine, and have shorter branches curving upright. Some approach the form of an incense cedar in outward appearance. Taper is also less.

The study field data was gathered in central, southern, and southeastern Oregon, with one plot from southeastern California. This represents the spread of high to low sites of the species.

Soils common to these areas include deep sands of the Deschutes soil series, and mapping units named scablands, and very stony and extremely stony loams. All of these sites are climax woodland sites, containing stands of older junipers. None of the old growth stands were sampled, however, for two reasons. First, the trees become rounded on top or die back at maturity. Secondly, the hearts are decayed with pocket rot and ages cannot be obtained. Trees up to 258 years of age were measured, but most of the trees were less than 150 years old.

Second growth stands were selected that appeared free from cutting, excessive grazing, and fire. They represented well-stocked stands. On the low sites, the number of trees per acre taller than 4.5 feet, were mostly in the 65 to 100 range, while on higher sites, up to 250 trees per acre were counted.

The three tallest trees per one-fifth acre plot were cut and measured. The trees were cut with chainsaws and handsaws at ground, one-foot and four and one-half foot, and at three-foot intervals to the tip, except on the tallest and oldest trees which were cut at four-foot intervals above breast height.

Sections were counted for age with a hand lense, and inside and outside bark diameters taken to tenths of inches using a steel tape. Heights to tenths of feet were measured using a metallic cloth tape after felling. All trees on the one-fifth acre plots were measured for diameter and height to obtain stand data. Crown widths were measured also at widest point and then at right angles to obtain average width. Crown length was also obtained. Heights were measured with an extension measuring rod or clinometer.

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Plots were located on public lands, administered by the Bureau of Land Management or U.S. Forest Service. The unused portions of the trees were left for fuelwood cutters. The cross-section disks were stored at the U.S.F.S. Sellwood shops yard in Portland until all measurements were verified.

In addition to the tree measurements at each plot, location by section, township, and range were recorded, along with elevation, plant community, soil type or series, exposure, slope, and basal area in square feet around each felled tree.

A total of twenty plots were taken. Only two were finally rejected by the research staff because of insufficient data, such as lack of total age or some other irregularity.

The tallest tree measured was 62.5 feet in height, and near the same plot, an exceptionally tall juniper, standing in a grove of ponderosa pine, was 75 feet in height. At another location near Sisters, Oregon, again located in a ponderosa stand, was a juniper 83 feet in height. These trees tended to have small limbs and excellent form class, like a western redcedar.

The understory plant communities were mostly bluebunch wheatgrass and Idaho fescue, with big sagebrush the most common shrub.

Plots were commonly located on a small rock outcropping, along a rimrock area, or on very stony or extremely stony sites. The exception was on very deep coarse sands.

All of these sites demonstrated that deep moisture availability gave junipers a preferential place. In ungrazed or lightly grazed areas, the perennial grasses grew in the shade and shelter of the juniper trees, and juniper organic litter seemed to provide the medium needed to hold moisture and stabilize the site. Recently cut areas were devoid of good bunch grasses, indicating a site decline.

The site index curves developed by Barrett and Cochran [1], Figure I, were developed from regressions of site index on height for a given breast height age, plotted for each decade, as done by Barrett [2] for ponderosa pine. To obtain the site index for western juniper, obtain the height of the tallest tree on a one-fifth acre plot, then obtain the breast height age. Read resulting site index from figure 1. Note the base age for its index in 50 years at breast height. For a single soil, the tallest tree from a number of one - fifth acre plots should be measured to determine the average site index and standard deviation. Care should be taken to insure each tree measured is of good form and growth, without damage, and avoiding overgrazed or otherwise abused areas, choosing well-stocked stands, with root systems in competition.

This set of curves should be inserted in the woodland technical (pocket) handbook and coded pages W-890. The ADP code f o r form SCS-WOOD-5 is 210.

For best results, data should be gathered on SCS- WOOD5's, and summarized for inclusion on SCS-SOILS-5's. Understory data is especially desirable for determining stocking rates by canopy classes. Sites in good condition or better should be selected.

These site curves are suitable for the entire range of western juniper, which, for the most part, includes southwestern Idaho, eastern Oregon, northeastern California, and western Nevada. It is not suitable for the subspecies, Sierra juniper, a larger subspecies tree found at higher altitudes in the Sierra Nevada Range.

Cubic foot and board foot volume tables are being constructed by the Pacific Northwest Forest and Range Experiment Station in Portland. When these tables are available, they will be issued as a supplement to this technical note. Height-diameter data collected now in the field can be assessed later for volume and

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yield. These yield data will be suitable for ordinating juniper sites into woodland suitability groups as with other species. It will add to the total knowledge known about western juniper sites.

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