FIELD GUIDE TO THE FORESTED PLANT ASSOCIATIONS OF SOUTHWESTERN OREGON

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INTRODUCTION

This publication is a field guide to the classification of the plant series and plant associations on forested land in southwestern Oregon (SWO). The guide facilitates field identification of plant associations. It covers the lands of the Umpqua, Rogue River, and Siskiyou National Forests, the Medford District of the Bureau of Land Management, the southern portion of the Roseburg District of the Bureau of Land Management, and areas of Curry County. A more comprehensive office guide will be published subsequently. This Office Guide will include more information on each plant association, for example, down woody material levels and productivity values.

The classification is based on the concept of potential natural vegetation. The potential natural vegetation for a site is the vegetation that would be present under climax conditions. In other words, if the site were allowed to grow, undisturbed by fire, insects, diseases, flood, wind, erosion, or humans, in approximately 500 years it would theoretically reach a steady state condition in vegetative composition which would be characteristic of the site potential. The climate of southwestern Oregon favors a frequent fire disturbance regime, resulting in very rare occurrences of climax vegetative conditions. Most forest stands have been burned several times, are multi-aged, and in early or mid-successional stages. The oldest trees are commonly less than 300 years old. As a result, potential natural vegetation has been inferred using younger successional vegetation.

This classification has two-levels, of which the broadest divisions are plant series and the finer divisions are plant associations. Series is based on the dominant, most shade tolerant, regenerating tree species on the site. This publication presents a classification for the Sitka Spruce (*Picea sitchensis*), Oregon White Oak (*Quercus garryana*), Ponderosa Pine (*Pinus ponderosa*), Tanoak (*Lithocarpus densiflora*), Douglas-fir (*Pseudotsuga menziesii*), Western Hemlock (*Tsuga heterophylla*), Western Redcedar (*Thuja plicata*), Port-Orford-Cedar (*Chamaecyparis lawsoniana*), Jeffrey Pine (*Pinus jefferyi*), White Fir (*Abies concolor*), Lodgepole Pine (*Pinus contorta*), Shasta Red Fir (*Abies magnifica shastensis*), Pacific Silver Fir (*Abies amabilis*), Western White Pine (*Pinus monticola*), and Mountain Hemlock Series (*Tsuga mertensiana*). Each series has been subdivided into plant associations. In addition, in the Tanoak Series, an intermediate “subseries” class has been provided. This grouping can be used when series or plant association does not provide the desired resolution.

Plant associations are described primarily by the presence or absence, and abundance of plant species. Environmental variables, including soil, are also used to classify, and often reflect the pattern of vegetation.

Species presence and abundance result from environmental gradients. Classification attempts to find plant responses to natural gradients such as aspect, slope, slope position, soil type, and moisture. For example, north slopes support vegetation that differs from south slopes, so each supports different plant associations. This type of natural break is easily recognized and delineated. Conversely, with constant aspect, vegetation often changes from the top of the slope to the bottom, but the change is so gradual that a boundary between plant associations is difficult to delineate. Boundaries between plant associations may be difficult to recognize where environmental gradients are gradual.

Descriptions of plant associations, sometimes based on fewer than ten sample plots (36 percent of the associations), will not exactly match a particular site. Therefore, the “best match” of a description should be used. Experience in using the key and guide is helpful for proper plant association identification.

DATA COLLECTION

The classification was divided, by Series, among the ecologists in this Area. The lead author is shown at the beginning of each Series chapter.

Analyses are based on over 2500 sample plots. These sample plots provided several data sets. These data sets were made up of: 1) intensive plots collected by the USDA Forest Service Ecology Program, 2) plots installed as part of the Oregon State University Forestry Intensified Research (FIR) Program on Bureau of Land Management (BLM) lands, 3) plots installed by the Natural Resource Conservation Service (NRCS) throughout Curry County, and 4) other plots installed by Oregon State University researchers.

Most data sets included basic vegetation (cover, dominance, etc.) and environmental variables. In addition to vascular species presence and abundance, site variables such as slope, aspect, elevation, and topographic position were collected at each plot.

Average total vascular plant species richness (the number of species present) was calculated for each association and for each vegetation layer within each association. The range of values for richness was divided into five sections and assigned very high, high, intermediate, low, and very low richness ratings. These ratings have a different scale for each Series based on the total range of values. Richness may be helpful in keying plant associations.

Forest Service sample plot data estimated percent cover for six vegetation layers. The upper tree layer included cover above 50 feet tall, the middle tree layer included cover between 12 and 50 feet tall, and the lower tree layer, included cover less than 12 feet tall. High shrub cover included shrubs over three feet tall, and low shrub cover, shrubs less than three feet tall. Herb cover included all herbs and grasses.

Data on percent cover of vegetation, by layer, collected by FIR researchers on Bureau of Land Management lands, were stratified differently than the Forest Service data. Data were stratified into five layers. Tree cover was estimated for trees greater than 10 feet tall (3 meters) and less than 10 feet tall. Tall shrubs were greater than 20 inches (50 centimeters) and low shrubs less than 20 inches in height. Herb cover included all herbs and grasses.

Vegetation data collected in the Sky Lakes Wilderness were segregated into cover classes. For the analyses, the midpoint of each cover class was used. The percent cover values were 1, 3, 8, 20, 40, 60, 80, and 95. Aspect codes were also collected and were converted to the midpoint of the range for analyses.

Vegetation data collected by the NRCS in Curry County were collected predominantly on north aspects and were characterized by dominance classes (Anderson and Poulton 1958). Species with a dominance rating of 5 were dominant; 4, codominant; 3, common; 4, uncommon; and 5, rare. Constancy values were calculated for each species, but percent cover was not collected.

Field identification *of Festuca* species was extremely difficult. In southwestern Oregon, the native dryland fine-leaved fescues with gray-green or blue-tinged leaf color have been called Idaho fescue (*Festuca idahoensis*), red fescue (*Festuca rubra*), Roemer's fescue (*Festuca roemeri*), and sheep fescue (*Festuca ovina*). Field characteristics to discriminate between these species are not useable in southwestern Oregon. Name(s) were attached to these fescues in order to refer to them in this guide. Idaho fescue (*Festuca idahoensis*) is used as the name for all the native, dryland, fine-leaved fescues with gray-green or blue-tinged leaf color. This is not a taxonomic determination (Rolle 1996, pers. comm.).

The tree species white fir (*Abies concolor*) and grand fir (*Abies grandis*) hybridize throughout southwestern Oregon. In this field guide they were identified as white fir. A more thorough explanation is provided in the White Fir Series introduction.

The constancy tables in each plant association description show only the most common species for that association. Full constancy tables will be provided in the office guide. Due to the format and limited space in this field guide, the BLM vegetative data were stratified from five layers into the overstory-understory catagories seen in the tables. This incompatablity of data may have resulted in constancy and cover values for overstory and understory species that may not reflect field conditions.

Soil data were collected on Forest Service and Bureau of Land Management lands. More extensive soil and geology information was summarized from a subset of plots for most plant associations, depending on soil plot data availability. A combination of geology maps, exposed bedrock along road cuts, and soil pit rock fragments were used to identify parent material (type of geologic material from which the soil developed). More information in minerology and rock types is provided in “Geology of Oregon” (Orr, Orr, Baldwin 1992). Soil data were not collected on NRCS sample plots and are not available for Sky Lakes Wilderness data.

Soil taxonomic classification, moisture regime, and temperature regime have been provided where possible to help identify some of the environmental factors characteristic of each plant association. A xeric soil moisture regime identifies soils where winters are moist and cool, the summers are warm and dry, and the soil is dry for more than 45 days of the summer. A udic moisture regime describes areas where some soil moisture is available for plant growth throughout the summer. Frigid soils have a mean annual soil temperature less than eight degrees Celsius (C); mesic soils have a mean annual temperature between 8 and 15 degrees C; and isomesic soils maintain a mean annual temperature in the mesic range, but with less fluctuation throughout the year. More soil taxonomy information is provided in the “Keys to Soil Taxonomy” (1996).

To ease the transition from the Draft Plant Association classification (Atzet and Wheeler 1984, Atzet and McCrimmon 1990) to the Final Plant Association classification, a list is presented at the end of each series introduction showing each draft association and listing the possible new associations into which it could fall. The percentages following each new association reflect the percent of plots from the old association that made up the new association. For example, the draft Western

Hemlock-Pacific Silver Fir/ Thin-leaved Huckleberry Association is described by 11 plots. In the final classification, those plots were divided as follows:

46 percent (5 plots) Western Hemlock-Pacific Silver Fir Association
27 percent (3 plots) Western Hemlock/Vine Maple-Pacific Rhododendron Association
18 percent (2 plots) Pacific Silver Fir-Western Hemlock/Thin-leaved Huckleberry Association
9 percent (1 plot) White Fir-Western Hemlock/Dwarf Oregongrape Plant Association.

So, if a stand was classified as Western Hemlock-Pacific Silver Fir/Thin-leaved Huckleberry in the past, it is likely (46 percent chance) it will be Western Hemlock-Pacific Silver Fir under the new classification. Also note, the draft plant association names use the Forest Service Region 6 codes and the final plant associations use the national codes provided in the PLANTS database (NRCS 1996). It is recommended, when possible, to reclassify the area using the new Field Guide.

HOW TO USE THE KEY

There are two levels of keys, the first level is the plant series key, the second divides the plant series into plant associations. Plant series are named for the climax dominant trees of a stand. At the next level, plant associations are named for the two or three consistently occurring species (of a stand) within each series.

Steps in Determining Plant Associations:

<u>To determine plant series</u>. Series are based on the climax dominant tree species that is successfully regenerating on the site. For example, if the overstory cover is 50 percent Douglas-fir and 10 percent western hemlock, and the understory cover is 40 percent western hemlock and 10 percent Douglas-fir, it would fall into the Western Hemlock Series, because western hemlock regeneration would be dominant. If there is 49 percent Douglas-fir regeneration and 50 percent western hemlock regeneration it still falls into the Western Hemlock Series.

Another characteristic to look for is the distribution of age classes by species. For example, it is possible to have a stand dominated by Douglas-fir in the overstory, with no Douglas-fir regeneration, with 25 percent cover of white fir regeneration of all one age class, along with 20 percent western hemlock regeneration. If the western hemlock regeneration has many age classes (i.e. a reverse "J" shaped curve of abundance versus age) then it is considered most successful because it has regenerated over many years, and the site would fall into the Western Hemlock Series. The high cover of white fir could have been the result of different weather conditions during only one or two years, or the result of a disturbance.

<u>Select a uniform site</u>. If the area is not uniform, i.e., it has both north and south slopes or it has two soil parent material types, stratify and key both areas or identify the most extensive area and key it. Microsite variations, such as rocky areas or draws, may lead to incorrect identification and should be avoided.

<u>Select a representative site</u>. Select the sites for keying after viewing the entire area. If

the area is mostly pumice, key a pumice site. If the area varies significantly, consider stratifying, particularly if the association responses to management are different.

Make a species list. List the most abundant and common species on the site and estimate their cover ocularly by mentally dividing a fifth acre plot into quarters, eighths, etc. For example, if Pacific rhododendron cover could fill about 1/4 of the plot, it averages 25 percent cover.

Use the key sequentially. Always start at the beginning with the series key and note that the distinctions between alternatives are given in order of importance. The first sentence is the most important. Always read all alternatives before choosing. After a series is determined, work through the appropriate key to the plant association.

Make a tentative identification. After a plant association is determined, read the description to see if it fits the site. Use the constancy tables to see if the characteristic species are present. For example, if a species has 100 percent constancy, it should almost always be present. If the constancy table lists Pacific rhododendron as having 80 percent constancy that means it should be present four out of five times. Also compare the percent cover in the constancy table with the percent cover of your species list from the site. Covers should be similar. Another way to verify identification is to check the location to see if the association occurs in the area. The association may also occur on adjacent areas or in areas with similar environmental conditions that have not been sampled. If the description does not match the area, return to the first point in the key that was troublesome and take another alternative. Read the description for that plant association, see which description best fits the site, and compare it with the first association.

Make the final determination. Choose the plant association that best reflects site conditions but remember, there will be sites that simply do not fit the key or the classification.

TO KEY DISTURBED SITES

Although the Plant Association key was constructed to identify potential natural vegetation, with some adjustment, and greater uncertainty, it can be used for younger sites or those that have been heavily disturbed.

Select an area to key. As described previously, select uniform, representative sites.

Find undisturbed or minimally disturbed vegetation. Find plants that characterize the site by using islands of undisturbed vegetation when present. If all areas have been disturbed, use the area with the least disturbance, such as around stumps. Research in southwestern Oregon indicates that even areas that have been clearcut and burned will have about 65 percent of the original species present within two years after burning. The percent cover, of course, will be lower than reported in the plant association description.

Check an adjacent stand with the same site characteristics. Adjacent stands can be used to check the plant association on the disturbed site. Match the adjacent stand as closely as possible to the aspect, slope, parent material, soil, etc. of the area being keyed.

Read the association descriptions. When disturbed sites are keyed, understory occurrence is most important. The list of understory species, especially shrubs, should match the constancy table in the plant association description (covers may be different). Also compare the environmental description.

LITERATURE CITED

Anderson, E.W., C.E Poulton. 1958. Collection of ecological data for soil-site correlation in Oregon. U.S.D.A. Soil Conservation Service. Unnumbered publication. Portland, OR.

Atzet, T., L.A. McCrimmon. 1990. Preliminary plant associations of the southern Oregon Cascade Mountain Province. U.S.D.A. Forest Service, Pacific Northwest Region, Siskiyou National Forest, Grants Pass, OR. 330 pp.

Atzet, T., D.L.Wheeler. 1984. Preliminary plant associations of the Siskiyou Mountain Province. U.S.D.A. Forest Service, Pacific Northwest Region, Siskiyou National Forest, Grants Pass, OR. 315 pp.

Keys to Soil Taxonomy, Seventh Edition. 1994. U.S.D.A. Soil Conservation Service.

Orr, Elizabeth, W. Orr, E. Baldwin. 1992. Geology of Oregon. Fourth Edition. Kendall/Hunt Publishing. 254 pp.

Rolle, W. 1996. Rogue River National Forest. Medford, Oregon.

KEY TO THE PLANT SERIES

1a. Sitka spruce (PISI) is the dominant regenerating species on the site. — SITKA SPRUCE, FIRST RED

1b. Sitka spruce (PISI) is absent or not dominant compared to other regenerating species on the site. — 2

2a. Oregon white oak (QUGA4) is the dominant regenerating species on the site. — OREGON WHITE OAK, FIRST BLUE

2b. Oregon white oak (QUGA4) is absent or not dominant compared to other species regenerating on the site. — 3

3a. Ponderosa pine (PIPO) is the dominant regenerating species on the site. — PONDEROSA PINE, FIRST YELLOW

3b. Ponderosa pine (PIPO) is absent or not dominant compared to other regenerating species on the site. — 4

4a. Tanoak (LIDE3) is the dominant regenerating species on the site. — TANOAK, FIRST GREEN

4b. Tanoak (LIDE3) is absent or subordinant to other regenerating species on the site. — 5

5a. Douglas-fir (PSME) is the dominant regenerating species on the site. — DOUGLAS-FIR, FIRST ORANGE

5b. Douglas-fir (PSME) is absent or subordinant to other species. — 6

6a. Western hemlock (TSHE) is the dominant regenerating species on the site. — WESTERN HEMLOCK, FIRST PURPLE

6b. Western hemlock (TSHE) absent or subordinant to other species in the understory. — 7

7a. Western red cedar (THPL) is the dominant regenerating species on the site. — WESTERN REDCEDAR, FIRST BROWN

7b. Western red cedar (THPL) absent or subordinant to other species in the understory. — 8

8a. Port-Orford-Cedar (CHLA) is the dominant regenerating species on the site. — PORT-ORFORD-CEDAR, SECOND RED

8b. Port-Orford-Cedar (CHLA) is absent or subordinant to other regenerating species on the site. — 9

9a.	Jeffrey pine (PIJE) is the dominant regenerating species on the site.	JEFFREY PINE SECOND BLUE
9b.	Jeffrey pine (PIJE) is absent or subordinant to other regenerating species on the site.	10
10a.	White fir (ABCO) is the dominant regenerating species on the site.	WHITE FIR SECOND YELLOW
10b.	White fir (ABCO) absent or subordinant to other species.	11
11a.	Lodgepole pine (PICO) is the dominant species in the overstory and is replacing itself as evidenced by a sequence of age classes.	LODGEPOLE PINE SECOND GREEN
11b.	Lodgepole pine (PICO) absent or subordinant to other species in the overstory and understory.	12
12a.	Shasta red fir (ABMAS) is the dominant regenerating species on the site.	SHASTA RED FIR SECOND ORANGE
12b.	Shasta red fir (ABMAS) absent or subordinant to other species on the site.	13
13a.	Pacific silver fir (ABAM) is the dominant regenerating species on the site.	PACIFIC SILVER FIR SECOND PURPLE
13b.	Pacific silver fir (ABAM) absent or subordinant to other species in the understory.	14
14a.	Western white pine (PIMO3) is the dominant regenerating species on the site.	WESTERN WHITE PINE SECOND BROWN
14b.	Western white pine (PIMO3) is absent or subordinant to other regenerating species on the site.	15
15a.	Mountain hemlock (TSME) is the dominant regenerating species.	MOUNTAIN HEMLOCK THIRD RED