A Field Guide To the Tanoak And the Douglas-fir Plant Associations In Northwestern California

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Introduction

The USDA Forest Service has changed its approach to management of the National Forests and Grasslands under its jurisdiction This new strategy, labeled "Ecosystem Management", integrates ecological knowledge at various scales to produce desired resource values, products, services and conditions in ways that sustain the diversity and productivity of ecosystems Ecosystem management is designed to conduct management and research with emphasis on maintenance of ecosystem process and function The challenge of ecosystem management is to sustain ecosystems that are diverse, productive, resilient to short-term stress and able to respond to long-term change (Manley et al 1995) To begin understanding ecosystem process and function requires a vegetation classification system The Pacific Southwest Region (Region 5) of the Forest Service has begun a long-term project to develop an ecological classification system for the 20 million acres it manages in California This classification follows others developed by federal agencies throughout the United States and will describe potential natural plant communities in a hierarchical manner This hierarchy includes series, subseries and plant association classifications Each level of the hierarchy is distinguished from the others by differences in species composition, soils, productivity, physiography and expected response to management (Allen 1987) These potential natural vegetation (PNV) units are used to analyze ecosystems through coarse filter analysis An example of this is contained in the Six Rivers National Forest Land Management Plan (USDA 1995) Here, management ranges of vegetation seral stages are identified for each of the primary vegetation series based on historical changes over the last 200 years These seral stage ranges are used as a course filter sieve to assess the potential impacts of various management practices Those projects that have the potential to alter a vegetation seral stage outside of what is sustainable are modified or dropped, while those that show no significant effects on sustainability may go forward Managing within these ranges is our best professional judgement on how to manage for the maintenance of biological diversity It is thought that maintaining representative amounts of various PNV types and their seral stages will protect viable populations of most species (85–90%) and maintain biological diversity (Noss 1987, Hunter 1991)

This Guide describes an ecological classification for plant associations in the Tanoak (*Lithocarpus densiflora*) and Douglas-fir (*Pseudotsuga menziesii*) Series These two series are thought to be the most important vegetation series in northwestern California (USDA 1995) due to their extent and importance in supplying desired resource values, products, services and conditions from National Forest Lands

The purpose of ecological classification is to provide a unifying framework within which integrated multiple use management can be planned and carried out (Allen and Diaz 1986) The classification can be used to improve communication among resource specialists by simply using the plant association name to convey to people a host of information on a particular type This Guide is a pre-requisite to understanding ecosystem processes in the Tanoak and Douglas-fir Series The included management implications can be used to predict responses to management that could be used in coarse filter analysis

Area covered by the Guide

The Tanoak and Douglas-fir Series are the most extensive on the Six Rivers National Forest (Six Rivers NF) and the west side of the Klamath National Forest (Klamath NF) They accounted for 40% and 30% of the Guide area respectively and covered approximately 1,120,000 acres of the 1,600,000 acre study area (Figure 1) The Guide area includes the eastern limit of the Tanoak Series in Northwest California The Douglas-fir Series is much broader in extent and is found across the state

The information in this Guide covers the entire Six Rivers NF and the western portion of the Klamath NF in Northwestern California (Figure A 1). This area includes the Gasquet, Orleans, Lower Trinity and Mad River Ranger Districts on the Six Rivers NF and parts of the Ukonom and Happy Camp Ranger Districts on the Klamath NF According to the National Hierarchical Framework of Ecological Units (Bailey et al 1994) this area is in the Mediterranean Regime Mountains division of the Humid Temperate Domain within the Pacific Southwest Region This area is also part of two sections and a variety of subsections of the National Hierarchical framework The two sections are the Klamath Mountains section and the Northern California Coast Ranges section The subsections within the Klamath Mountains section include the Western Jurassic, Gasquet Mountain Ultramafics, Siskiyou Mountains, Pelletreau Ridge, Rattlesnake Creek and lower Salmon Mountains The Northern California Coast Ranges section includes the northern quarter of the Eastern Franciscan and the Central Franciscan subsections The northern boundary of the Guide is the California/Oregon border and the boundaries of the Six Rivers and Klamath NF Within the Klamath NF, the eastern boundary of the Guide follows the eastern range of tanoak This boundary roughly follows along Thompson Creek in the north, through lower elevation sites along the Klamath and Salmon Rivers and over Whiteys Peak into the Lower Trinity Ranger District on Six Rivers NF. The eastern boundary within Six Rivers NF is the Forest boundary The western boundary of the Guide is the western boundary of the Klamath Mountains and Northern California Coast Ranges section as well as the boundary of Six Rivers NF

Climate

The climate within the Guide area is an inland expression of a maritime climatic regime This regime is characterized by moderate temperatures, a distinct wet and dry period throughout the year and high rainfall in the winter months. Within the Guide area climate varies with distance from the Pacific Ocean, topography and elevation Average annual rainfall decreases and average monthly temperature increases from north to south and from west to east within the Guide area because of the diminished maritime influence inland In the northern part of the Guide area (Gasquet Ranger District), distance from the coast ranges from 6–30 miles In the most northwestern part, average annual rainfall ranges from 60–120". In the central and eastern portions of the Guide area (Orleans and Happy Camp Ranger Districts), distance from the coast ranges from 15 to 50 miles, the average annual rainfall is approximately 50" In the southern portion of the Guide area distance from the ocean ranges from 35–60 miles, average annual rainfall ranges from 40–70". Rainfall is also influenced by the mountainous terrain throughout the Guide area As moist air from the Pacific Ocean rises over the mountains, rainfall intensity and amounts increase (Elford and McDonough 1973). Almost 80% of the precipitation throughout the Guide area falls between November and February The driest months are July and August Monthly temperatures are moderate throughout the year for most of the Guide area but

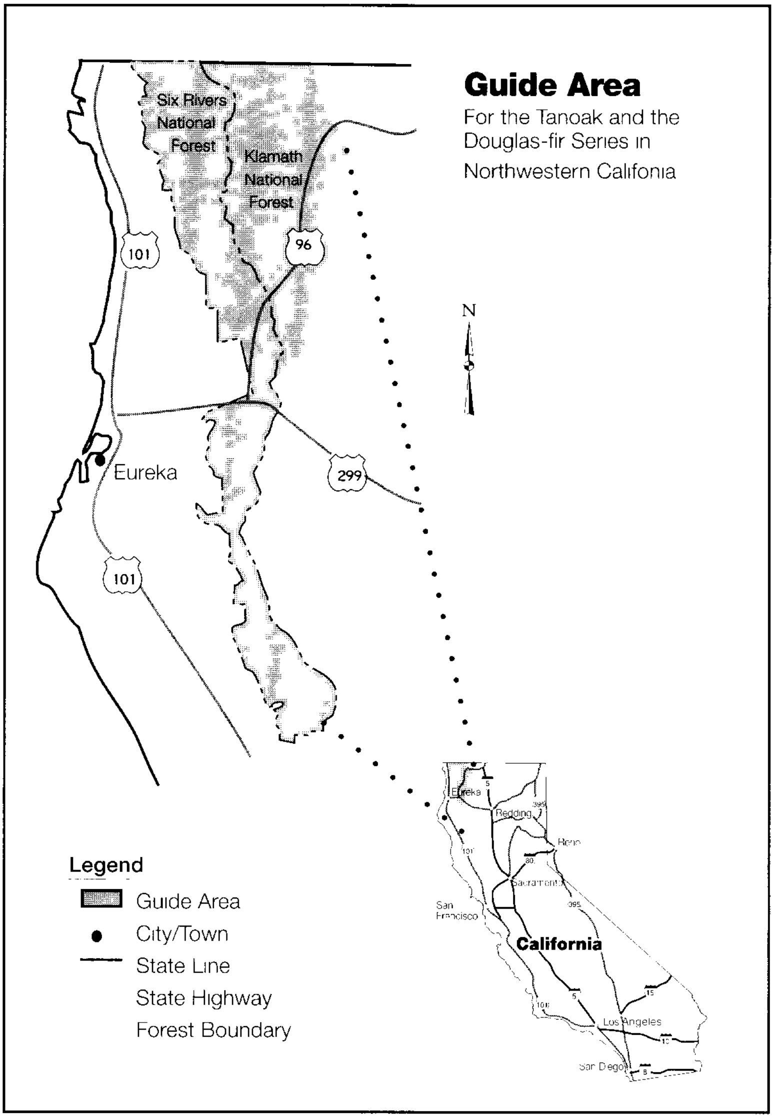


Figure A 1 Guide area map of the Tanoak and the Douglas-fir Series in Northwestern California

can be as high as 110° F during the summer months in the eastern section In the northern section mean monthly summer temperatures range from 46° to 67°F. Summer temperatures are slightly higher in the southern portion of the Guide area ranging from 62°– 72° F. Mean monthly temperatures during the winter months range from 33°–44°F in the northern portion of the Guide area. In the southern portion of the Guide area mean monthly winter temperatures range from 42°–46°F On the eastern side of the Guide area where elevations may be as high as 6000', mean monthly temperatures during the winter can be as low as 30°F. Snowfall also occurs at higher elevations with seasonal totals as much as 35 to 40"

Geology

Soils and vegetation represent a combined biological response to a variety of physical factors in a particular landscape, the most fundamental of which is the underlying geologic material. Parent material, the weathering products of a site's bedrock and overburden, is one of the five basic factors of soil formation (Jenny 1941). Bedrock varies in several ways that affect soil formation, and thus vegetation characteristics. The chemical composition of its constituent minerals govern the likely weathering products from which the soil will form. The degree of "toughness" or susceptibility to physical and biological weathering agents determines the rate of soil formation and its texture (e.g., how gravelly it is). The degree of fracturing controls the rate of weathering, the movement and storage of groundwater and the geomorphic stability of different parts of the landscape.

Soils and vegetation respond secondarily to the geomorphic history of a site and actually interact in that history. Geomorphic history refers to the sum of all physical and biological effects to the surficial landscape, including floods, wind, glaciers, landsliding, gullying, surface erosion, vegetation succession and the actions of animals and humans (American Geological Institute 1972). For the purposes of the Geology section of this Guide, human disturbance of the landscape is limited to pre-European colonization.

The following descriptions of geologic and geomorphic settings are based on a variety of published and unpublished sources which have been summarized and simplified for this Guide. More detailed information can be gained from the references cited. The geologic and geomorphic descriptions are also based on many years of experience studying stereo airphotos of this terrain and covering much of it in the field.

Geologic Setting

The Guide area is within the California Coast Ranges and Klamath Mountains physiographic provinces. The Coast Ranges are predominantly long, linear ridges and stream valleys of low to moderate relief in sedimentary rocks with a general N30°W trend. Drainage tends to form a trellis pattern along and across this structure; earthflows are common in weaker bedrock units. In contrast, the Klamath Mountains are an arcuate group of ranges with moderate to high relief in predominantly metamorphic rocks having diverse and complex structure, as well as scattered areas of various intrusive igneous rocks. Drainage tends to be more dendritic than in the Coast Ranges, and large landslide complexes are widespread in some bedrock units. Higher elevations have undergone alpine glaciation in the past.

Major Bedrock Terranes & Their Constituent Rock Types

In conjunction with the development of plate tectonic theory, the Klamath Mountains and adjoining Coast Ranges have come to be understood as a series of bedrock "packages" or belts of oceanic rocks that have been joined to the North American continent progressively from east to west over the last 250 million years (m.y.). These belts are separated by regional thrust faults that dip roughly eastward and are thought to be the remains of ancient subduction zones, like the modern Cascadia Subduction Zone offshore. The areal distribution of the belts is complex (Figure A.2) because they have been folded and faulted on a very large scale. Some sections are offset or separated from each other where erosion has removed those rocks in intervening areas to expose the underlying belt(s). It appears that most of this complex deformation preceded the emplacement of the various intrusive masses which are generally less deformed.

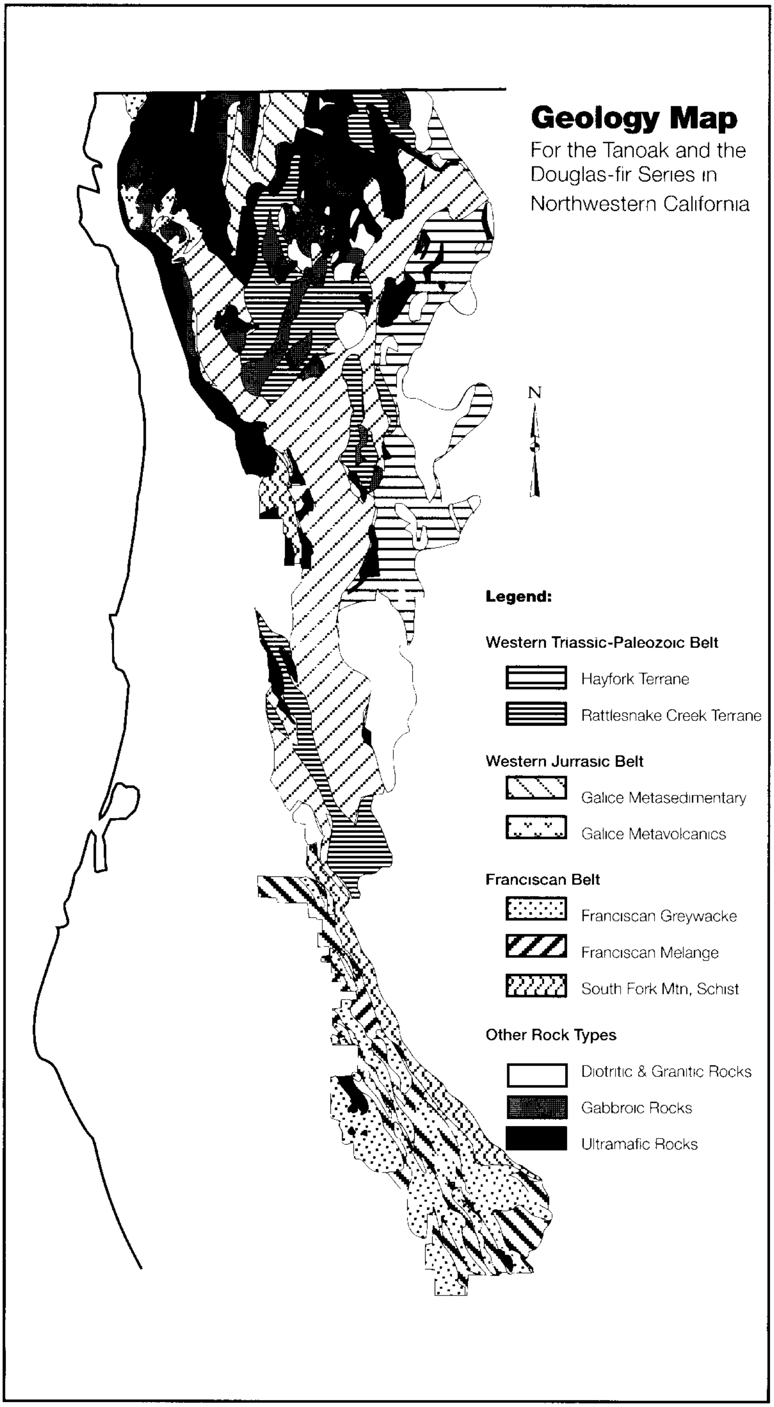


Figure A 2 Geology map of the Tanoak and the Douglas-fir Series in Northwestern California.

The oldest package of rocks, underlying the area roughly from Weaverville to Yreka and Redding, is the Eastern Klamath Belt, which is composed of the Trinity ultramafic sheet and overlying sedimentary and volcanic rocks The next younger group, extending north and south of Weaverville, is the Central Metamorphic Belt which is composed primarily of schist

The Guide area is underlain only by rocks of the youngest three belts. The oldest of these is the Western Paleozoic and Triassic Belt (Irwin 1960) which underlies a large area of the central Klamath Mountains and extends into Southern Oregon It is a very complex package consisting of three distinct terranes or groups of rocks with apparently similar origin From east to west, they are (1) the North Fork Terrane composed of ultramafic and mafic volcanic rocks, (2) the Hayfork Terrane composed of felsic to mafic volcanic rocks, metasedimentary rocks, and several dioritic batholiths, and (3) the Rattlesnake Creek Terrane, a highly sheared tectonic melange containing a wide variety of rock types These rocks vary in age from about 170– 220 million years (m y), but the terrane was probably emplaced about 150 m y ago

The slightly younger Western Jurassic Belt (Irwin 1960) adjoins the Rattlesnake Creek Terrane on the west along the Orleans/Hennessey Ridge/Bear Wallow Fault Zone It is comprised of Galice Formation slate, greywacke, phyllite, semi-schist and metavolcanics, as well as the Josephine ophiolite which consists of serpentinized peridotite (an ultramafic rock) and overlying mafic igneous rocks that are highly faulted and locally sheared These rocks were probably emplaced about 145 m y ago

The youngest of the belts is the Franciscan Complex (Aalto 1982) which underlies the Western Jurassic Belt along the Coast Range Thrust Fault The contact is a generally broad zone of sheared and crushed rock with abundant serpentinite Franciscan rocks are predominantly sedimentary or metasedimentary, including greywacke, argillite, conglomerate, semi-schist to schist, and a wide variety of other rock types as enclosed blocks These rocks extend out to the coast, and were emplaced about 30–130 m y ago

Geologic Characteristics Affecting Soils & Vegetation

Many of the rock types present in the Guide area are broadly similar in mineralogy, having formed from intermediate to mafic plutonic and volcanic rocks, as well as their weathered products However, there are significant exceptions to this generalization, as well as finer distinctions that influence landscape characteristics Some of these distinctions in rock type will have an effect on the soils and vegetation

The Hayfork Terrane is comprised of three units a lower coherent volcanic formation, a middle unit of chert, argillite, some limestone and an upper volcanic/sedimentary unit which appears to be a melange Hayfork Terrane rocks are widely intruded by dioritic (and some granitic) rocks, including the Ironside Mountain and Wooley Creek intrusives There are also scattered exposures of serpentinitic rock, especially along the western margin These Hayfork rocks underlie the eastern edge of the northern part of the Guide area Generally, they form fairly steep slopes on the east side of the Klamath River with productive, moderately deep soils Both the tanoak and Douglas-fir series are found on these soils and rock units and will differ in extent with elevation and available soil moisture Soil and vegetation patterns are typically less complex than in the Rattlesnake Creek Terrane (as described below) Soils on dioritic rocks are distinctly more granular, less loamy and excessively drained, compared to other Hayfork rocks They are also generally less productive and more erodible, particularly in areas with steep slopes

The Rattlesnake Creek Terrane also appears to consist of three distinct units (1) a basal layer of serpentinite-matrix melange containing blocks of peridotite, greenstone, amphibolite, pillow basalt, limestone, metachert, and mafic plutonic rocks; (2) a cover sequence of volcanic and sedimentary rocks, and (3) numerous intrusive bodies of gabbro to quartz diorite composition (Wright and Wyld 1994) The lower two layers are similar in composition and stratification to ophiolitic rocks that have been dislocated tectonically Soils developed on these strata are very heterogeneous because of the extremely chaotic nature of the underlying parent material and the widespread landsliding that has further disrupted this part of the landscape Hence, the Rattlesnake Creek Terrane supports a strong mosaic pattern of soil and vegetation types. For example, blocks of serpentinite support thin, unproductive soils adjacent to deeper, forested soils on sedimentary rocks and very resistant rocks such as chert, metavolcanics and limestone support thin, moderately productive soils with canyon live oak and brush among patches of more productive, forested soils Most of the forested vegetation types on this terrane are in the Douglas-fir series The tanoak series is not as prolific here because of the serpentine influence Only one plant association in the tanoak series is endemic to soils derived from serpentinite

The Western Jurassic Belt underlies a substantial part of the Guide area and consists of four main components In order of abundance, they are Galice Formation metasedimentary and metavolcanic rocks, the Josephine ophiolite, the Ammon Ridge diorite and other intrusives and bands of serpentinite along the western edge of the belt.

Galice rocks are primarily fine-grained slate, greywacke and some phyllite, with interbedded volcanic rocks of pyroclastic origin (airborne ash and magma deposits) These latter types tend to predominate in the lower part of the Galice Formation, and are locally known as the Rogue Formation Galice and Rogue bedrock tends to yield fairly uniform soils that vary primarily in texture relative to the parent material or due to geomorphic factors These generally productive soils support consistently dense forest cover throughout most of the Guide area Most of the forest types on the Galice formation, in the western part of the Guide area, are in the tanoak series The dominance of tanoak is both due to the parent rock as well as the moist climate found in the northern and more coastal part of the Guide area Steeper parts of the landscape may be sensitive to landsliding and erosion if disturbed by fire, logging or misdirected road drainage

The Josephine Ophiolite is a suite of rocks varying from serpentinized peridotite at the base, through mafic plutonic rocks, to volcanic rocks at the top These rocks are intensely sheared and faulted, particularly the peridotite which has experienced large-scale landsliding in the distant past. Smaller zones of serpentinite are also scattered along the western edge of this belt in the northern part of the Guide area Ultramafic rocks are relatively high in magnesium content and low in calcium, compared to other rock types that occur here The so-called serpentine soils that develop are unusual in soil chemistry, texture and fertility They commonly support distinctive and relatively rare flora because they are inhospitable to many of the more common species. Soil development on ultramafic parent material varies from very slight with shallow profiles on steeper, unstable terrain to extreme on long-stable surfaces with deep laterite profiles Several plant associations in the Douglas-fir series are found on the serpentine soils of the Josephine Ophiolite

Intrusive rocks in this belt are primarily dioritic in composition with occasional mafic-to-ultramafic zones. The main body is the Ammon Ridge diorite. Soil and vegetation relationships are similar to the Ironside Mountain diorite, although moisture and temperature regimes that affect soil formation and vegetation types moderate toward the ocean.

Rocks of the Franciscan Complex are exposed along the northwestern edge and through most of the southern part of the Guide area Like the other belts, the Franciscan consists of several fault-bound sedimentary units that become progressively younger and less metamorphosed from east to west They are known as the eastern belt of schist, semi-schist, greywacke and some melange, the central belt which is a very wide zone of melange with large blocks of more competent rock, and the coastal belt which is primarily greywacke with interbedded argillite Only eastern and central belt rocks underlie the Guide area

Eastern belt Franciscan is composed of sandstone and argillite that has been metamorphosed to varying degrees The South Fork Mountain schist and semi-schist occupy the eastern edge of the belt They are weakly to strongly foliated rocks that commonly have a crinkled appearance. The schist has developed distinctively hummocky terrain associated with widespread landsliding, whereas the semi-schist has been less prone to landsliding Soils developed on schist and semi-schist are generally deep and productive, especially on gentler landslide benches They may be locally prone to gullying also Metagreywacke units tend to form rugged terrain with shallower, very gravelly or sandy soils that are marginally productive. Typical vegetation includes white oak, canyon live oak, brush and sparse conifers, including Douglas-fir These slopes and soils are subject to occasional shallow landsliding and erosion The few areas of argillite contain highly sheared rocks that support a variety of vegetation from oak-grassland to low density Douglas-fir forests Soils are typically moderately deep, gravelly loams and only moderately well drained.

Central belt Franciscan consists of several melange belts with varying content of other blocks, principally greywacke but also chert, serpentine, metavolcanics and some exotic types These blocks are commonly elongated along the northwest trend of the melange belts, and vary from car-sized to several miles in length The melange matrix is mostly sheared argillite with some zones of sheared serpentinite It forms hummocky terrain with abundant earthflows and gullies Soils are typically moderate to deep clay or clay loams that are prone to surface runoff and support grasslands, oaks and some conifers Serpentine-melange areas have redder soils with Jeffrey pine, incense cedar and Douglas-fir with some black oaks Terrain underlain by large greywacke blocks is generally steeper with moderately deep gravelly-to-clay loams that support Douglas-fir, white fir and oak vegetation Some soils derived from deeply weathered greywacke support tanoak dominated plant associations in this area The higher available moisture in these soils apparently is able to support tanoak in this drier portion of the Guide area Small landslides are scattered throughout this area, particularly within valley innergorges

Weathering and Surficial Materials

Surficial geologic materials include the upper part of the geologic profile, the unconsolidated weathering products that have resulted from all geomorphic processes and lie between solid bedrock and the soil. The degree of weathering on a particular part of the landscape depends on several factors: the mineralogy and texture of parent bedrock (whether the rock constituents are coarse or fine-textured and how susceptible they are to physical or chemical breakdown), the intensity of fracturing of the bedrock, allowing entry of water, slope position as it affects site temperature and moisture, and the geomorphic stability of the surface (essentially how long it has been subjected to weathering agents) Weathered zones typically vary from one to 10 feet, but may be less than an inch or up to tens of feet in areas of saprolite.

Owing to the varied composition of bedrock, its complex geologic structure, and the complex geomorphic history (as described below), the pattern of surficial materials is likewise complex The most extensive types of surficial materials are residuum (which is essentially in-place products of physical and chemical weathering) and colluvium (which is rock and soil that has been transported downslope principally by gravity and then further subjected to weathering). These two major types differ in ways that may affect soil development and vegetation For example, areas mantled by colluvium often are more productive sites than adjacent ground because of the resultant gentler terrain and more abundant groundwater in the landslide debris On the other hand, residual soils are generally deeper and finer textured, having occupied stable slopes for longer periods

Less extensive surficial materials include alluvium (which is silt-to-boulder-sized material transported and deposited principally by flowing water) and scattered glacial deposits at higher elevations Recent alluvium adjacent to present stream channels has essentially no soil development and is generally occupied by grasses and various riparian species, including willow and alder However, older alluvial deposits are elevated from tens to hundreds of feet above the present stream These gentle, relict surfaces that are no longer subject to fluvial action may be deeply weathered with moderately to well developed soils that support productive Douglas-fir and tanoak forests

Surficial geologic materials vary widely in age from hundreds to millions of years old, depending primarily on the relative stability of different parts of the landscape The most stable areas with (generally) the oldest soils are gentle uplands or ridgetops, ancient landslide benches, and relatively gentle midslopes that have not been subject to landsliding The least stable areas are landslide scarps and toe zones, steep slopes in general (especially headwall basins), valley innergorges and modern alluvial zones These latter types of terrain often have the least developed and shallowest soils, they are not necessarily the least productive Weak soil development may be compensated by high available water content which is common in landslide toe zones, innergorge areas and alluvium

Many of the plant associations within both the Douglas-fir and tanoak series can be distinguished by the three main types of surficial material (residuum, colluvium, and alluvium) These distinctions are reported in the plant association descriptions

Geomorphic Setting

Overview of Landscape Development

The foregoing has already touched on landscape development since it is interwoven with the geologic history The geomorphic history of this landscape spans roughly the last 20 to 25 m y Most of that early history is only "known" in very general, regional terms The modern landscape is a product primarily of the last 5 m.y. or so, this history is better known. That landscape has been created and is maintained by a combination of erosional processes that have operated at different scales and over varying time frames

The first main element is the persistent uplift and erosion of the rocks and surficial materials of Northwestern California and Southwestern Oregon over the past 5 m y due to the Gorda Oceanic Plate being thrust under the North American continent along the Cascadia Subduction Zone Current data suggest uplift rates as high as a few meters per 1000 years centered around Cape Mendocino and lessening to the north and south. There were likely some intervals of relative quiescence, however Evidence of this in the modern landscape includes terrace remnants of ancient, broad river valleys high above modern stream channels, and eroded marine terraces along the coast In addition, plate movements along the subduction zone have most likely been accompanied by large earthquakes that have combined with a wet climate and inherently weak geologic materials to create a regional landscape dominated by mass wasting.

A second main element of this landscape development has been alpine glaciation during the Pleistocene (10,000 to 2 m.y. ago). The erosive and depositional action of ice, more intense physical weathering from the colder climate and more intense fluvial action and mass wasting at middle and lower elevations during the wetter climate significantly altered some parts of the landscape. Many of the higher slopes in the Siskiyou Mountains and Trinity Summit area were carved into steep, barren bluffs by these processes. Glacial tarns and morainic debris were also left at higher elevations below the Siskiyou-Trinity crest The upper part of the Siskiyou Fork of the Smith River is an excellent example of a glacially carved valley with its characteristic U-shape Subsequent weathering, soil development and vegetation succession has been somewhat different on these glacial surfaces and deposits In addition, lowered sea levels during Pleistocene glacial periods resulted in lowered base level for streams which augmented their erosional potential This is the dynamic landscape under which the present-day flora and fauna have evolved and adapted

Soils

Soils develop over very long time frames - tens to hundreds of thousands of years The factors that influence soil development are parent material, time, topographic position, climate and biotic elements (Jenny 1941) Parent material primarily influences soil texture (including coarse fragment content which is very important to fertility), soil chemistry and sometimes plant species such as on serpentine Together with organic content and precipitation, parent material affects leaching rates and soil pH

Time affects vertical differentiation of soils through weathering and leaching; soil horizons are generally more defined in older soils Many of the soils are only moderately well developed because the landscape itself is relatively young

The topographic factor involves the spatial association between soil characteristics and the geomorphic processes that shaped the landscape, principally mass wasting and fluvial erosion Rapid stream erosion and associated mass wasting have removed weathering products at a high rate and maintained predominantly young slopes in a substantial fraction of the landscape Some older soils may be found on gentle ridgetops and prehistoric landslide benches, while alluvial areas contain very young soils developed on reworked flood deposits. Topography also influences the distribution and density of vegetation relative to aspect and slope position, as well as soil depth

Climate is the most influential factor affecting soil formation and properties. It determines the weathering rates and organic components. Soil temperature fell within the mesic soil temperature regime. Precipitation varies with distance from the ocean and elevation These two factors control the distribution of tanoak Living organisms influence soil development such as color, thickness of the A horizon and accumulation of nitrogen and carbon The nature of the parent material influences soil texture, coarse fragment content, fertility and in some cases, plant species such as on serpentine. Parent material, the organic component and precipitation (influencing leaching rates) strongly influence soil pH Topography influences the distribution and density of vegetation (aspect and slope position) and soil depth (dormant landslide, mountain sideslope)

Finally, plants and animals interact with soils over long periods of time, adjusting to each other The soil is the more stable component, whereas the biotic elements change in composition over shorter time frames Living organisms influence soil development in terms of color, A horizon thickness and accumulation of nitrogen and carbon

The transformation of surficial geologic materials into soil is a long and complex process. In the dynamic landscape of the Guide area, these processes may be short-circuited by geomorphic processes and events that strip soil from a site or bury an existing soil profile under fresh, surficial material The most common stripping agents have been landslides, floods and high elevation glaciers Similarly, the most common agents of burial are mass wasting (landslides and rockfall), flood deposits, and glacial deposits In some cases, the buried soil may continue to have some positive effect on site productivity

The most important soil properties from the standpoint of ecosystem function are depth, available water capacity (AWC) and texture These characteristics are related to the soil's ability to store water and support plant growth. In combination with elevation, slope, aspect and parent material, they influence the distribution of plant communities on the landscape Rock fragment content also affects plantability and regeneration potential of a soil.

Soil depth is categorized as deep (>40"), moderately deep (20-40"), or shallow (<20") Forest productivity is closely associated with soil depth. In general, soil depth is related to slope gradient and position Deeper soils are usually found on gentler slopes and on the lower third of the slope, some also occur on midslope benches of large, dormant landslides Shallow soils are most common on ridgetops or steep slopes adjacent to them

AWC appears to be a limiting factor to forest growth in Northwestern California because of the Mediterranean climate and highly seasonal rainfall distribution Forest growth diminishes rapidly as available water reserves in the soil are depleted Therefore, the more water the soil can hold in storage, the longer the effective growing season and the more forest growth a site can support AWC is estimated from soil depth, rock content and texture Obviously, deeper soils can store more water, other factors being equal Soil texture affects AWC because the size distribution and arrangement of soil particles affects the pore space AWC is maximized in soils that contain a mixture of particle sizes but only small fractions of clay and gravel sizes Soil coarse fragments reduce AWC by occupying relatively more pore space than finer particles would Soil texture tends to be strongly related to parent material Coarse-textured soils with lower AWC tend to occur on more competent rock types such as peridotite, gabbro, diorite and massive sedimentary rocks Fine-textured soils with higher AWC are more common on schist, melange and argillite

Tanoak Series Soils

The soils information presented below comes from the analysis of ecology plot data This information is also reported for each plant association in this guide

Soils in the Tanoak Series were mesic, 65% deep (> 40"), 32% moderately deep (20-40") and 3% shallow (< 20") They were well drained and formed predominately in residuum and colluvium from phyllite, schist, greenstone, sandstone, granite, gabbro and rarely serpentinized peridotite

A relationship was identified between soil formation and slope position Ridgetop and upper one-third slope positions were primarily formed in residuum (100% and 66% respectively) Middle and lower one-third slopes were split between residuum (50%) and colluvium (48%) Toeslopes, bottoms and draws displayed a mixture of soil formation modes including, residuum (36%), colluvium (46%) and alluvium (18%)

The A horizons were 25% thin (0-3"), 54% moderately thick (4-9") and 21% thick (10"+). Fifty-three percent of the A horizons contained less than 35% (nonskeletal) coarse fragments while 47% had coarse fragment content on the soil surface that was greater than 35% (skeletal) Soil textures were predominately loams, gravelly loams, very gravelly loams, extremely gravelly loams, sandy loams, gravelly sandy loams and very gravelly sandy loams The pH was 18%, very strongly to strongly acid (4 5-5 5), 72%, moderately to slightly acid (5 6-6 5), and 10%, neutral to mildly alkaline (6 6-7 8)

The subsoil coarse fragment contents were generally (54%) greater than 35% (skeletal) Soil textures were predominately gravelly loams, very gravelly loams, extremely gravelly loams, clay loams, gravelly clay loams and very gravelly clay loams The pH was 10%, very strongly to strongly acid (4 5-5 5), 72%, moderately to slightly acid (5 6-6 5), and 18%, neutral to mildly alkaline (6 6-7 8)

Soil family classification for the Tanoak Series is displayed in Table A 1 The order Inceptisols (68%) dominates the Tanoak Series, followed by Ultisols (18%), Alfisols (14%) and Entisols (3%) The major difference between soils in the Tanoak and Douglas-fir series appears to be the higher frequency of soils in the order Ultisol This indicates a slightly higher degree of soil development in the Tanoak Series This may be due to the higher degree of stability on these lower slope sites A better indication of soil/vegetation classification relationships is described in the plant association descriptions

Table A 1 Soil families and percent occurrence in the Tanoak Series

Texture	Parent Material	Temperature	Depth	Great Group	Percent
loamy-skeletal	mixed	mesic	Dystric	Xerochrept	33
fine-loamy	mixed	mesic	Dystric	Xerochrept	18
loamy-skeletal	mixed	mesic	Lithic Dystric	Xerochrept	3
clay-loamy	mixed	mesic	Dystric	Xerochrept	3
loamy-skeletal	serpentinitic	mesic	Typic	Xerochrept	2
fine-loamy	serpentinitic	mesic	Typic	Xerochrept	2
loamy	mixed	mesic	Lithic Dystric	Xerochrept	2
loamy-skeletal	mixed	mesic	Typic	Xerochrept	1
fine-loamy	mixed	mesic	Typic	Xerochrept	1
fine-loamy	mixed	mesic	Typic	Haploxerult	13
loamy-skeletal	mixed	mesic	Typic	Haploxerult	3
clay	serpentinitic	mesic	Typic	Haploxerult	1
clay	mixed	mesic	Typic	Haploxerult	1
fine-loamy	mixed	mesic	Ultic	Haploxeralf	7
loamy-skeletal	mixed	mesic	Ultic	Haploxeralf	4
fine-loamy	mixed	mesic	Typic	Haploxeralf	2
loamy-skeletal	mixed	mesic	Mollic	Haploxeralf	1
loamy-skeletal	mixed	mesic	Typic	Xerorfluvent	2
loamy-skeletal	serpentinitic	mesic	Lithic	Xerorthent	1
loamy-skeletal	mixed	mesic	Typic	Xerumbrept	2
fine-loamy	mixed	mesic	Pachic	Xerumbrept	1

Douglas-fir Series Soils

Soils in the Douglas-fir Series were mesic, 55% deep (>40"), 33% moderately deep (20-40") and 12% shallow (<20") They were well drained and formed predominately in residuum and colluvium from serpentinized peridotite, phyllite, gabbro/diabase, greenstone, semischist, schist and sandstone

Soil formation processes and slope positions were similar to that found in the Tanoak Series Ridgetop and upper one-third slope positions were primarily formed in residuum (95% and 76% respectively) Middle and lower one-third slopes were split between residuum (55%) and colluvium (45%) Toeslopes, bottoms and draws displayed a mixture of soil formation modes including, residuum (12%), colluvium (61%) and alluvium (27%)

The A horizons were 20% thin (0-3"), 57% moderately thick (4-9") and 23% thick (10+") Fifty-one percent of the A horizons contained less than 35% (nonskeletal) coarse fragments, while 49% had greater than 35% coarse fragments (skeletal) Soil textures were predominately loams, gravelly loams, very gravelly loams, extremely gravelly loams, sandy loams, gravelly sandy loams and very gravelly sandy loams The pH was 19%, very strongly to strongly acid (4 5-5.5), 62%, moderately to slightly acid (5 6-6.5), and 19%, neutral to mildly alkaline (6 6-7 8)

The subsoil coarse fragment contents were generally (64%) greater than 35% (skeletal) Soil textures were predominately gravelly loams, very gravelly loams, extremely gravelly loams, clay loams, gravelly clay loams and very gravelly clay loams The pH was 13%, very strongly to strongly acid (4.5-5 5); 66%, moderately to slightly acid (5 6-6.5); and 21%, neutral to mildly alkaline (6 6-7 8)

Soil family classification for the Douglas-fir Series is displayed in Table A 2 The order Inceptisols (70%) dominates the Tanoak Series, followed by Alfisols (20%), Ultisols (6%), and Entisols (3%) The major difference between soils in the Douglas-fir and Tanoak series appears to be the higher frequency of soils in the order Alfisol This indicates a slightly lower degree of soil development in the Douglas-fir Series This may be due to the lower degree of stability on these upslope sites. For more specific descriptions on soil characteristics for each plant association look at the specific plant association

Vegetation

Extensive ecology plot sampling (1200+ plots) throughout the Guide area identified the two potential natural vegetation (PNV) series Tanoak and Douglas-fir. Both series have a significant component of Douglas-fir in the overstory They differ in the dominance of tanoak in the mid and regeneration layers in the Tanoak Series The presence of tanoak has important management implications which are a key factor in the Forest Service classification program, hence the two series are classified separately here. For example, in late seral stands in the Tanoak Series, Douglas-fir regenerates in canopy gaps created by disturbance In the Douglas-fir series, Douglas-fir rehi6erates successfully under its own canopy

The Tanoak and Douglas-fir Series also differ in environment They were found arrayed along an elevation/moisture/parent material gradient The Tanoak Series was found between 500' and 3600' elevation, while the Douglas-fir Series occupied the elevation band between 2000' and 4200'. The two series can overlap in elevation, the extent of the overlap is related to latitude and distance from the Pacific Ocean (which influence available moisture) It appears that soil temperature may govern the upper elevation limit of tanoak. Where the two series overlap at high elevation, a general trend was the location of tanoak on south facing slopes and Douglas-fir on north-facing slopes

Table A 2 Soil families and percent occurrence in the Douglas-fir Series

Texture	Parent Material	Temperature	Depth	Great Group	Percent
loamy-skeletal	mixed	mesic	Dystric	Xerochrept	28
fine-loamy	mixed	mesic	Dystric	Xerochrept	19
clay-loamy	mixed	mesic	Dystric	Xerochrept	2
loamy-skeletal	mixed	mesic	Typic	Xerochrept	2
loamy-skeletal	serpentinitic	mesic	Typic	Xerochrept	2
fine-loamy	serpentinitic	mesic	Typic	Xerochrept	[illegible]
fine-loamy	mixed	mesic	Typic	Xerochrept	1
loamy-skeletal	serpentinitc	mesic	Lithic	Xerochrept	3
loamy	mixed	mesic	Lithic	Xerochrept	2
loamy-skeletal	mixed	mesic	Lithic	Xerochrept	1
loamy-skeletal	mixed	mesic	Ultic	Haploxeralf	9
fine-loamy	mixed	mesic	Ultic	Haploxeralf	9
fine-loamy	oxidic	mesic	Mollic	Haploxeralf	1
loamy-skeletal	mixed	mesic	Mollic	Haploxeralf	1
fine-loamy	mixed	mesic	Typic	Haploxerult	4
loamy-skeletal	mixed	mesic	Typic	Haploxerult	2
loamy-skeletal	serpentinitic	mesic	Typic	Xerorthent	2
loamy-skeletal	mixed	mesic	Typic	Xerofluvent	1
loamy-skeletal	mixed	mesic	Typic	Xerumbrept	3
loamy-skeletal	serpentinitic	mesic	Pachic	Xerumbrept	2
loamy-skeletal	mixed	mesic	Pachic	Xerumbrept	1
fine-loamy	mixed	mesic	Pachic	Xerumbrept	1
fine-loamy	mixed	mesic	Typic	Xerumbrept	1

The two series are also separated by their moisture requirements. Tanoak appears to have higher moisture requirements than Douglas-fir This is evidenced by the decreasing frequency of tanoak as you move east and southeast into drier areas with lower rainfall.

Parent material also appears to be a limiting factor in tanoak distribution It is rarely found on serpentine soils except in the shrub form dwarf tanbark (Lithocarpus densiflora var echinoides). In contrast, Douglas-fir can often be the dominant tree species on these harsh sites

Tanoak Series Species Composition

Species composition in the Tanoak Series is described below by layer The tree layer was dense and had a mean cover of 85% It was dominated by tanoak in the mid and regeneration layers with Douglas-fir as the dominant overstory species Hardwoods were the dominant associate tree species The dominant plant species was related to the micro-environment. Those species with limited micro-environment tolerances were used as indicator species in the classification They included Pacific madrone (*Arbutus menziesii*), chinquapin (*Castanopsis chrysophylla*), canyon live oak (*Quercus chrysolepis)*, Pacific dogwood (*Cornus* *nuttallii*), bigleaf maple (*Acer macrophyllum*), black oak (*Quercus kelloggii*), California bay (*Umbellularia californica*), and red alder (*Alnus rubra*) Associate overstory conifers included sugar pine (*Pinus lambertiana*), Port Orford cedar (*Chamaecyparis lawsoniana*), and infrequently Pacific yew (*Taxus brevifolia*) in the understory The shrub layer was moderately dense with a mean cover of 33% It included dwarf Oregon-grape (*Berberis nervosa*), salal (*Gaultheria shallon)*, poison oak (*Rhus diversiloba*), evergreen huckleberry (*Vaccinium ovatum*), wood rose (*Rosa gymnocarpa*), pacific blackberry (*Rubus ursinus*), California hazelnut (*Corylus cornuta* var. *californica*), pink honeysuckle (*Lonicera hispidula vacillans*), creeping snowberry (*Symphoricarpus mollis*), Pacific rhododendron (*Rhododendron macrophyllum*), red huckleberry (*Vaccinium parvifolium*), vine maple (*Acer circinatum*), oceanspray (*Holodiscus discolor*), huckleberry oak (*Quercus vaccinifolia*), and western azalea (*Rhododendron occidentale*) The herb layer was diverse, but of low cover with a mean of 9% It contained a variety of species including bracken fern (*Pteridium aquilinum*), swordfern (*Polystichum munitum*), rattlesnake plantain (*Goodyera oblongifolia*), little prince's pine (*Chimaphila menziesii*), western modesty (*Whipplea modesta*), prince's pine (*Chimaphila umbellata* var *occidentalis*), vanilla leaf (*Achyls triphylla*), whiteveined wintergreen (*Pyrola picta*), Hooker's fairybells (*Disporum hookeri*), starflower (*Trientalis latifolia*), western vancouveria (*Vancouveria hexandra*), beargrass (*Xerophyllum tenax*), iris (*Iris* spp), redwood violet (*Viola sempervirens*), small inside-out flower (*Vancouveria planipetala*), twinflower (*Linnaea borealis*) and white hawkweed (*Hieracium albiflorum*) The grass and sedge layer were lacking, with a mean cover of 1% When present they included fescues (*Festuca* spp.) or sedges (*Carex* spp)

Douglas-fir Series Species Composition

Species composition in the Douglas-fir Series is described by layer as follows. the tree layer was moderately dense with a mean cover of 75% It was dominated by the conifer species Douglas-fir, with sugar pine, incense cedar (*Calocedrus decurrens*), Jeffrey pine (*Pinus jeffreyi*) and white fir (*Abies concolor*) as associate species The tree layer also contained a significant component of hardwoods They included Pacific madrone, canyon live oak, chinquapin, tanoak, bigleaf maple, black oak, Pacific dogwood, Oregon white oak (*Quercus garryana*) and California bay The shrub layer was moderately dense with a mean cover of 28% It was dominated by dwarf Oregon-grape, wood rose, poison oak, California hazelnut, creeping snowberry, Pacific blackberry, red huckleberry, Pacific rhododendron, oceanspray, Sadler oak (*Quercus sadleriana*), Pacific serviceberry (*Amelanchier alnifolia*), huckleberry oak, salal, current/gooseberry (*Ribes* spp), pink honeysuckle and dwarf tanbark The forb layer was of moderate cover with a mean of 17% It contained a variety of species including swordfern, western modesty, prince's pine, white hawkweed, bracken fern, starflower, iris, rattlesnake plantain, little prince's pine, Hooker's fairybells, beargrass, whiteveined wintergreen, vanilla leaf, trailplant (*Adenocaulon bicolor*), western Solomon's seal (*Smilacina racemosa* var *amplexicaulis*), mountain sweet cicely (*Osmorhiza chilensis*), bedstraw (*Galium* spp), twinflower, western vancouveria, and redwood violet Grass cover varied by plant association, with a mean cover of 6% It was dominated by California fescue (*Festuca californica*), western fescue (*Festuca occidentalis*), blue wild rye (*Elymus glaucus*) and a variety of bromes (*Bromus* spp)

Vegetation Productivity

Vegetation productivity is reflective of a host of characteristics including: elevation, slope position, micro-relief, soil parent material, depth, coarse fragment content and texture Lower third slope positions are more productive than upper third positions due to both colluvial (soil moved by gravity) and alluvial (soil moved by water) soil movement Lower third slope positions can be thought of as areas of maximum soil accumulation, while their upper third slope counterparts can be thought of as areas of maximum soil loss

Vegetation productivity in forest stands is described below by site class, site index, volume, basal area, trees/acre and special features Dunning site class (Dunning 1942) is used in Figure A.3 to compare vegetation series productivity. It is based on height-age relationships, and ranges from 1A on the most productive sites (mid-class site index of 200 feet at 300 years) to 5 on the least productive sites (mid-class site index of 75 at 300 years).

Softwood and hardwood cubic volume are described in cubic feet/acre and are calculated by measuring the height, diameter, and taper of each tree, calculating

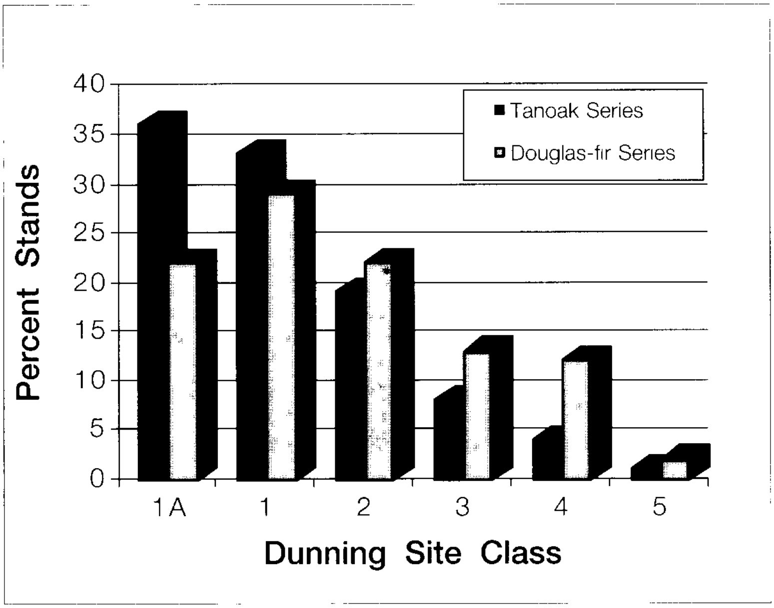


Figure A 3 Site class frequency comparison for the Tanoak and the Douglas-fir Series

its internal volume, and summing the volumes to come up with a per acre sum Softwood and hardwood basal area are described in square feet/acre and calculated by summing the diameter of each tree measured at breast height (4 5' above the ground) Next, softwood and hardwood trees/acre are described to compare the density of trees in each series. Last, any special series features are described

Tanoak Series Vegetation Productivity

Productivity in the Tanoak Series varies from low to high depending on environment The highest frequency of stands were found in site classes 1A (36%) and 1 (33%) (Figure A.3). In general, high site class corresponds to high structural diversity. That is the height of the trees, their diameters, and number of layers were greater on higher sites than lower Site class also influences the volume of a given stand. Site class 1A stands often contained twice the standing volume of low site stands One important finding in the Tanoak Series was the relationship between softwood and hardwood volume/basal area and elevation (Figures A 4 & A 5) It appears that softwood volume and basal area increase with elevation This is thought to relate to the decrease in hardwood volume and basal area that occurs with increasing elevation

A comparison of softwood to hardwood trees/acre by size class points to the importance of the hardwood layer in the Tanoak Series (Figures A 6 & A.7). The number of hardwoods in size class 1-5.9" was over 5 times higher than the number of softwoods in the same diameter class. In the next larger size class, 6-10 9", the number of hardwoods was over twice as high. The next two size classes, 11-17 9 and 18-24 9" are almost equal while the larger size classes >25" d b.h. are dominated by conifers Since a strong relationship exists between diameter and height (Figure A 8) it is clear that the hardwoods provide a significant contribution to stand structure in the Tanoak Series particularly in the mid layers

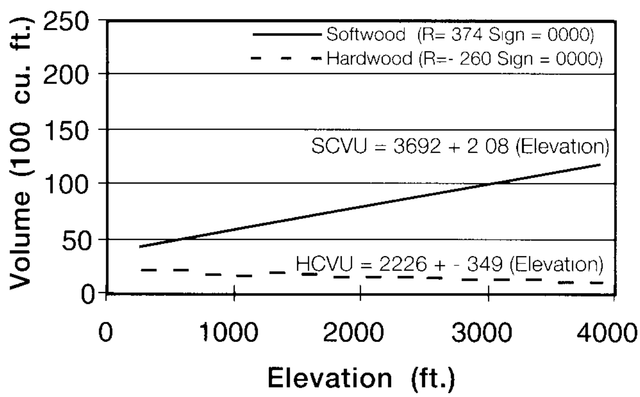


Figure A.4 Trend analysis for softwood and hardwood cubic volume by elevation in the Tanoak Series

Douglas-fir Series Vegetation Productivity

Productivity in the Douglas-fir Series also varies from low to high depending on environment The highest frequency of stands were found in site classes 1 (29%), 1A and 2 (22%) (Figure A 3) There was a higher frequency of stands in the lower site classes 3-5 in the Douglas-fir Series as a result of the high frequency of serpentine soils. Site class also influences volume here The high frequency of low site classes in the Douglas-fir Series tends to mask direct volume comparisons between the series An overall comparison with all site classes combined shows

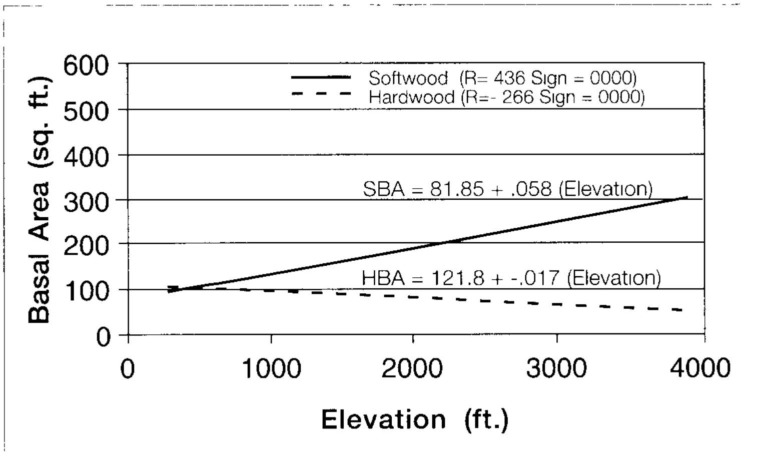


Figure A.5. Trend analysis for softwood and hardwood basal area by elevation in the Tanoak Series.

higher softwood volume in the Tanoak Series However, when the lower site classes (3-5) are dropped, softwood volume and basal area are higher in the Douglas-fir Series A clear difference between the two series is found in hardwood volume and basal area where the Tanoak Series is significantly higher.

A second major difference between the two series lies in the comparison of softwood to hardwood trees/acre by size class (Figures A.6 & A.7). The Douglas-fir Series has a typical reverse J shaped distribution of softwood trees/acre (Figure A.6). While the Tanoak Series had an uneven distribution of softwoods and was dominated by hardwoods (Figure A 7) The results of this tree size class distribution in the Douglas-fir Series is a tendency toward uneven aged stands, dominated by conifers, with a variety of size classes and tree heights

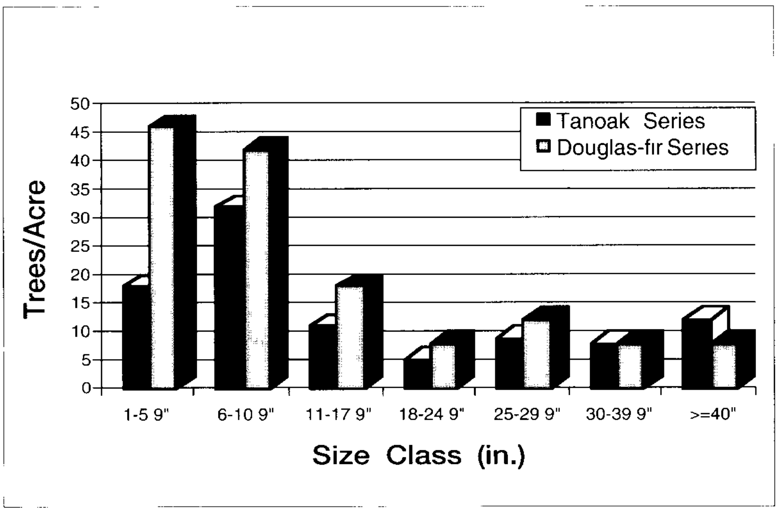


Figure A 6 Mean softwood trees/acre by size class in the Tanoak and the Douglas-fir Series

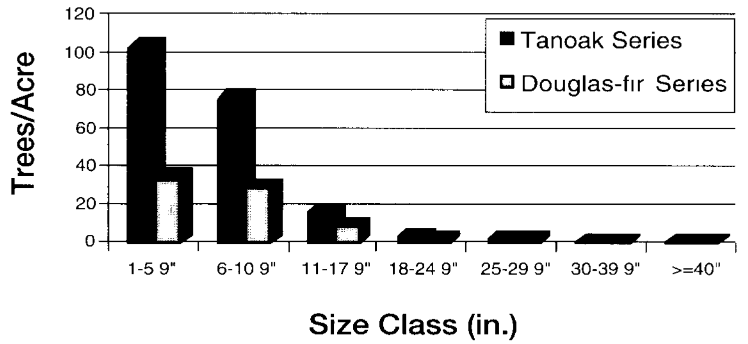


Figure A 7 Mean hardwood trees/acre by size class in the Tanoak and the Douglas-fir Series.

Seral Stages and Stand Structure

Forest seral stages are stages of stand development that correspond to changes in stand structure over time. They can be thought of as the development of structural diversity. Early seral stages lack structural diversity, while late seral stands, such as old-growth are high in structural diversity (Figure A.8). Structural diversity contributes to the resilience of forest stands to perturbations. For instance, during the extensive 1987 fires, most of the early seral stands which were burned resulted in high-intensity stand-replacing fire effects While late seral stands subjected to fire had a low frequency of stand replacing fires

Correct identification of forest seral stages is extremely important in predicting forest succession and assessing wildlife habitat suitability When seral stages are mapped they permit the development of ecosystem management strategies that are aimed at maintaining ecosystem processes and functions This is particularly true in areas where management of old-growth forests and sensitive wildlife species are proposed. Wildlife research has pointed toward the dramatic differences in stand structure that are utilized by wildlife (Ruggiero et al 1991) For instance, the spotted owl (*Strix occidentalis*) tends to use late seral, multilayered stands, with large trees, snags, and logs, while the northern goshawk (*Accipiter gentalis*) prefers mature forest structure that lacks many of the components used by the owl Since the Forest Service has begun an era of ecosystem management it is important to understand forest development over time in order to maintain a mosaic of vegetation types and their seral stages in order to manage for maintenance of biological diversity

Jimerson and Preisler (in prep) recognized six seral stages in the Tanoak and Douglas-fir Series They included shrub/forb, pole, early mature, mid-mature, late mature and old growth (Figure A 8) The structural characteristics for each seral stage are summarized by series in Appendix V The current distribution of seral stages for the Tanoak and Douglas-fir Series on the Six Rivers NF are displayed in Figure A 9

The program Forest Inventory Analysis (FIA) (USDA 1986), was used to analyze the tree data. Information generated by these programs included. standing cubic volume, cubic volume growth, basal area, basal area growth, site class, and trees per acre by species and dbh class

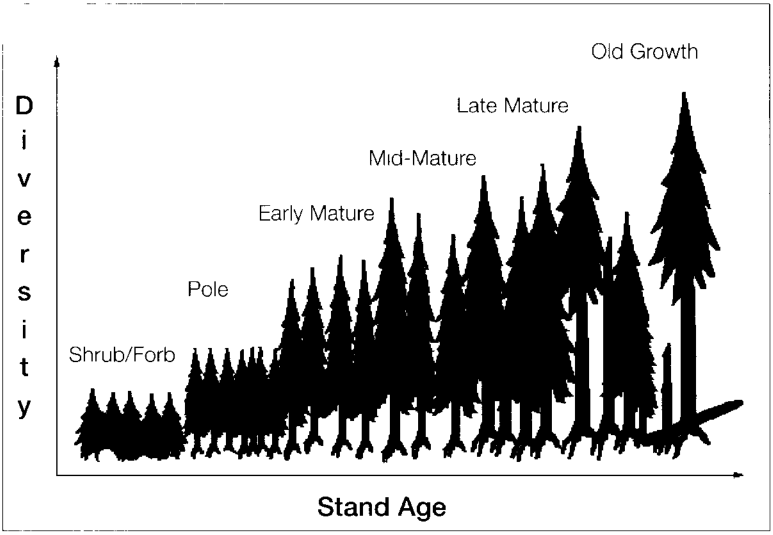


Figure A 8 Structural diversity by stand age in the Tanoak and the Douglas-fir Series.

The stand structure characterisitics by layer were derived from the growth information collected on the FIA card described above. Only late seral stands were included in this analysis to avoid height differences related to stand age. Trees were classified into layers based on a minimum of 10% difference in height From this data the number of layers were described along with mean age, dbh and height by layer

The statistical package SPSSPC+ (Norusis 1992) was used to develop descriptive statistics (mean, standard deviation, and standard error) and to calculate stand density index (SDI) (Reineke 1933)

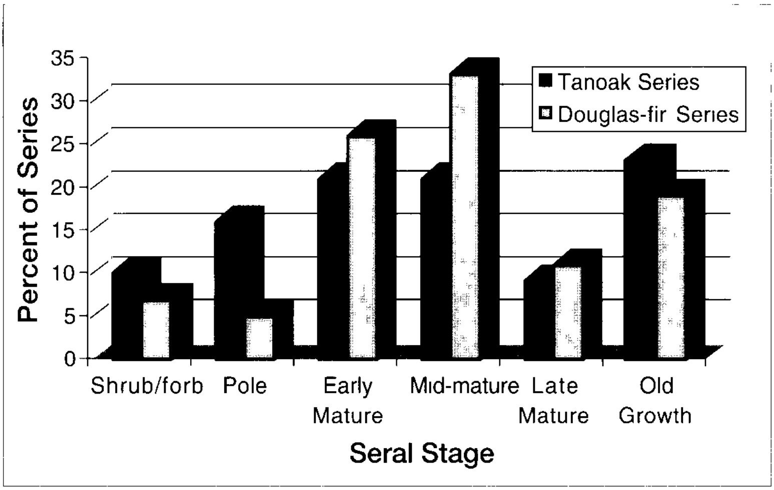


Figure A 9 Percent of Series in each seral stage for the Tanoak and the Douglas-fir Series

Disturbance

Forest disturbance in northwestern California falls into two general categories natural and human Natural disturbance primarily takes the form of wildfire, with flooding, windthrow, ice storms, insects and disease playing a lesser role Human disturbance includes logging, roads, arson fire, mining, grazing, recreational uses and the introduction of exotic species The seral stage distribution displayed in our current landscapes are the result of one or more of these factors including burning done by the American Indians Logging is the human disturbance that has had the most impact on the seral stage distribution in these series Fire is the primary natural disturbance agent affecting these stands The impacts of fire along with insects and disease will be discussed in detail in the following sections

Fire

Fire History

Fire has been, and continues to be an important disturbance factor in the Douglas-fir and Tanoak Series The fire history of these two series is a product of cultural and climatic changes over time Inferences about the fire history of these stands were made using written fire records, associated tree ring and fire scar studies, a comparison of climate data to seral stage distributions and knowledge and experience of Forest personnel

Written fire records can aid in understanding some cultural influences on the fire frequency in these series Fire records dating from 1909 are available for the Six Rivers NF portions of the guide area (Table A 4) The fire record illustrates that, while the number of fires over the century has increased, the amount of burned acres has decreased dramatically This trend suggests the effects of a combination of both natural and human processes. While the number of ignitions have increased during drought periods, changes in fire management over time may have affected the number of acres burned In the early part of the 20th century, American Indians still burned some areas to increase the health and vigor of tanoak stands Ranchers in some parts of this area also used fire to maintain summer grazing areas Some of these fires often increased in size because they were not easily accessible and adequate numbers of trained fire personnel were not available In the 1930's, fire suppression efforts in the Forest Service were supplemented with the available labor from the Civilian Conservation Corps Fire fighting effectiveness also has increased since the late 1940's in the form of equipment use (fire engines, aircraft), fire fighting chemicals, and other fire fighting technologies Accessibility to fires has also improved with increased roads and the use of aircraft to transport personnel The increase in fire fighting efforts and accessibility have helped lead to the decrease in number of acres burned Increased accessibility has also increased the number of human caused ignitions Lightning has accounted for approximately 38% of the fire starts since 1909

Table A 4 Six Rivers National Forest fire histories since 1909

Period:	Total Acres Burned	Average Acres Burned/Year	Total Fires	Average Fires/Year
1909–1939	299,077	9,648	1,106	36
1940–1969	28,811	960	1,457	49
1970–1994	21,789	872	1,655	66

Tree ring and fire scar studies show the variability of fires within some of these stands Only a few detailed fire studies have been done in the Douglas-fir and Tanoak Series Within the Klamath Province fire return intervals of 11–17 years

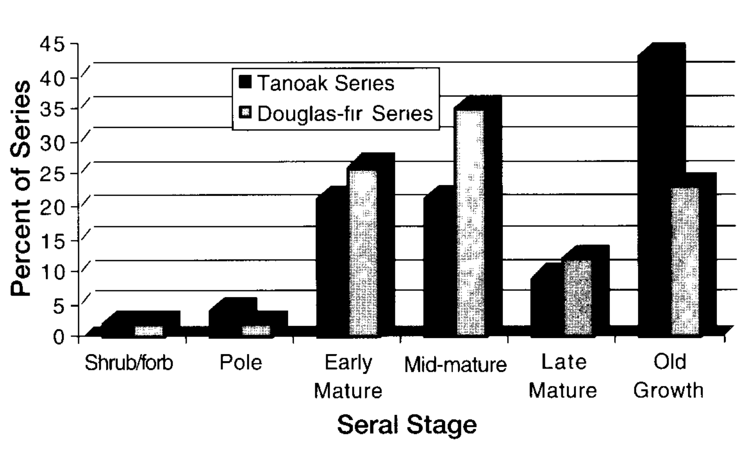


Figure A 10 Prelogging seral stage distribution for the Tanoak and the Douglas-fir Series on Six Rivers National Forest.

were found for Douglas-fir stands with tanoak dominating in the mid-layer in the Salmon River area (Wills and Stuart 1995). These stands also had a large range of years between fires, with one site having a range of 3–71 years. In Southwestern Oregon mean fire return intervals in the Tanoak Series was 90 years and the mean fire return interval in the Douglas-fir Series was 30 years (Atzet and Martin 1991). For Douglas-fir vegetation types on the Six Rivers NF, mean fire return intervals were 16 years and varied from 13 years in the southern portion to 21 years in the north (Adams and Sawyer 1980)

A comparison of seral stage distributions to climatic data can define when catastrophic events or stand replacing fires were most prevalent. The present seral stage distributions in the Tanoak and Douglas-fir Series shows the dominance of

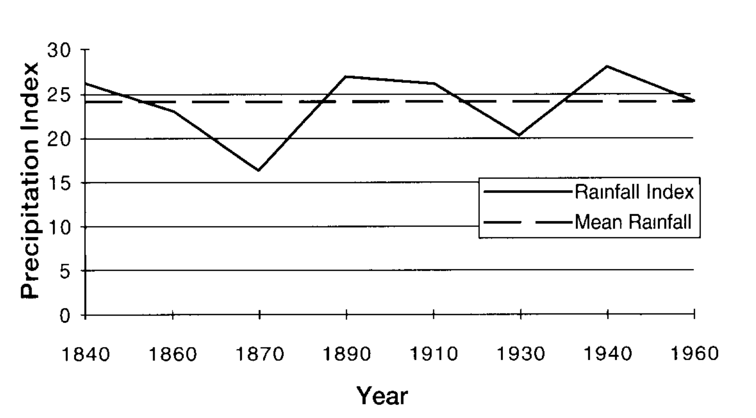


Figure A.11. Reconstructed annual precipitation for California from 1840–1960 (Fritz and Gordon 1980) early and mid-mature seral stages (Figure A 9) The prelogging seral stage distribution shows a marked increase in old growth (especially in the Tanoak Series) with the early and mid mature stands also well represented (Figure A 10) Climate data derived from a tree ring analysis in California (Fritz and Gordon 1980) shows the drought periods that occurred between 1840 and 1960 (Figure A 11) A correlation with these Figures and seral stage distributions suggests when stand replacing fires occurred The average age of the mid-mature and early mature stands correlates with the dry period that occurred between 1860 and 1890 Early mature stand ages also correlate with the dry period between 1915 and 1935

Fire Regimes

Fire is not a uniform process in time or space on the landscape Frequency, intensity and extent of fires differ considerably between plant associations within a vegetation series These differences can be categorized by the concept of the fire regime A fire regime is a general description of the characteristics of fire within an ecosystem These characteristics include a combination of fire frequency, predictability, intensity, seasonality and extent (Agee 1993) Fire regimes vary with environment (temperature and moisture patterns), ignition-pattern (lightning and human) and plant species characteristics (fuel accumulation and adaptations to fire) Several systems for characterizing fire regimes have been developed These systems are based on either the nature of the disturbance, vegetation characteristics or fire severity (Agee 1993). A description of fire regimes based on fire severity was developed for the Pacific Northwest (Agee 1990), and is applicable to both the Douglas-fir and Tanoak Series These fire regimes are separated into three broad, artificially grouped categories, which overlap considerably with one another: high-severity regimes, moderate-severity regimes and low-severity regimes.

Severity and intensity as related to fire regimes have different meanings Severity relates to the overall effects of the fire to the plant association, such as tree mortality, soil changes and duff consumption Fire severity has a direct relationship to fire effect, based on fire's ability to alter a plant association from an older seral stage back to an earlier seral stage Intensity is the amount of heat or energy produced by the fire Different levels of intensity will create various levels of severity in each seral stage Early seral stages may be subjected to high severity disturbance from a low intensity fire This is associated with root damage due to soil/duff consumption, crown damage due to flame length (scorch heights) with relation to tree height and cambium damage related to fire intensity and bark thickness.

In high-severity regimes, fires are very infrequent(more than 100 years between fires) and are usually high-intensity, stand-replacement events Fires in this regime are usually associated with drought periods and hot, dry east winds with lower humidity and fuel moisture These fires are often of short duration (days to weeks) but of high intensity and severity Fire is the agent of ecosystem instability in these plant associations, as it leads to shifts in forest structure, reverting to early seral stages Normally, during non-drought years, the moisture gradient has the effect of limiting fire behavior Fires during non-drought years only occasionally leave the litter and shrub layer and torch small pockets of the overstory

Fires in moderate-severity regimes are generally more-complex than other fire regimes These fires are infrequent (25-100 years) and are partial stand replacement events, including significant areas of high and low severity. Moderate-severity fire regimes occur in areas with typically long summer dry periods where fires may last from weeks to months In these areas, periods of intense fire behavior are mixed with periods of moderate and low intensity fire behavior Weather conditions within this regime are variable resulting in variability in fire effects The overall effects of these fires are patches of different severity burns over the landscape that results in plant associations exhibiting two or more age classes

Fires in low-severity regimes are frequent (1-25 years) and are low intensity events with few overstory effects Low-severity fire regimes are associated with nearly continual summer drought and support frequent and widespread fires Frequent fires limit the time for fuel accumulation, so typically fire intensity is moderate to low Limited overstory mortality occurs with the greatest effect on the very small trees in the understory The frequent presence of fire maintains ecosystem stability.

The Douglas-fir and Tanoak Series generally exhibit a moderate-severity fire regime with periods of high-severity fires. These regimes can result in stands with complex structure and composition Old growth Douglas-fir stands in Southwest Oregon were found to have multiple cohorts of different age trees suggesting repeated fires of different intensity (Agee 1991) Fire regimes within plant associations of these two series, vary with seral stage, environmental factors (weather, fuel loading, elevation, slope), proximity to the coastal influence and between northern and southern ranges The fuel model tables in Appendix VII show the differences in fire regimes between plant associations based on seral stage and environmental variables The difference in fire regimes based on proximity to the coast and northern and southern latitudes are discussed below.

Coastal stands experience a high-severity fire regime Environmental factors in coastal areas typically do not support conditions to sustain fire behavior, resulting in infrequent fire disturbance events. Large scale, stand-replacing fires typically occur on the coast during periods of extended drought Annual weather conditions in the coastal influence only provides a short period or window that will sustain wildfire Coastal fog has a direct influence on the relative exclusion of fire in many plant associations Fires that do occur during non-drought periods are generally small (< 10 acre) and of low intensity, providing positive impacts to the ecosystem

Interior stands experience moderate and low severity fire regimes with occasional high-severity events The warmer climate inland is conducive to an increase in fire frequency The frequency of moderate and low severity regimes also increases from north to the south. Northern areas are generally cooler with higher moisture and usually experience high severity fire regimes Southern areas with a drier climate, are more likely to have a moderate or low severity fire regime. Elevation and latitude have a similar effect on Douglas-fir plant associations and their fire regimes

Few stands in the Douglas-fir and tanoak series are managed to maintain the primeval fire influence. Most areas have had their natural fire regimes altered by forest management practices, including aggressive fire suppression and/or too little natural prescribed fire There may be a higher probability of a high severity fire regime in all of these stands due to these management practices

Fire effects

Fire effects are considered to be any consequence of a fire, whether good, bad or neutral Although fire plays a direct role in processes associated with vegetation succession, nutrient cycling, and soil structure and stability, many resource managers only focus on the detrimental effects of fire Fire is a dynamic process where the response of an ecosystem varies with season of the fire or burn; amount of organic matter consumed, fire intensity, duration, time since the last burn and many other factors associated with vegetation and the landscape

The tanoak and Douglas-fir forests have adapted to the natural role of fire Tanoak has the capacity to withstand low to moderate-intensity fires through epicormic sprouting (regrowth from dormant buds protected by the bark) and high intensity fires by basal sprouting (regrowth from subterranean buds located on roots, rhizomes or lignotubers) (Gill 1977) Douglas-fir has thick bark that protects the cambial tissue from heat damage of low to moderate-severity fires (Martin 1963). Although moderate to high severity fires will often kill young Douglas-fir that lack a thick protective bark (Agee 1994).

Fire effects vary by vegetation series, subseries, plant association and seral stage. Each plant association has a unique vegetation mix of plants with varying degrees of fire tolerance or dependence The type of vegetation in each layer often contributes to the intensity of the fire For example, waxy-leaved shrubs and trees can carry flames into the overstory, creating a high-intensity fire. Long-range drought is the greatest contributor to major disturbance by fire in all plant associations, subseries and seral stages.

Insects and Pathogens

A number of native insects and pathogens are herbivores on trees and act as regulators of the forest Their actions affect species composition and the amount of vegetation growing on a site They recycle biomass, develop and provide wildlife habitat and food, and provide diversity locally and on a larger scale They can function as stress agents on trees, which results in injury or mortality to the tree Nonnative insects and pathogens have similar effects, but because they have not coevolved with their hosts, the impacts they cause can be much greater and ecologically damaging.

Native Pathogens

One group of pathogens commonly observed is dwarf mistletoe (*Arceuthobium* spp) These are flowering plants that are members of the Viscaceae The principal species in the Douglas-fir and tanoak series are Douglas-fir dwarf mistletoe (*A. douglasii*), white fir dwarf mistletoe (*A. abietinum* f sp *concoloris*), western dwarf mistletoe (*A campylopodum*) and sugar pine dwarf mistletoe (*A californicum*) These species are generally host specific, although they can occasionally or rarely infect nearby individuals of other species of the pine family. They infect twigs, branches and occasionally trunks of the host, obtaining water and nutrients through connections with the host xylem These dwarf mistletoe species usually do not cause tree mortality, but weaken a tree sufficiently, allowing bark or engraver beetles or wood borers to successfully attack and kill the tree

Numerous other native insects and pathogens occur on all trees found on these sites. Black stain root disease (caused by *Leptographium wageneri*) is commonly found on Douglas-fir in these series Most of the infections occur in the younger age classes, especially in plantations, but the disease is found occasionally in older stands This disease causes small pockets of tree decline and mortality where it occurs A relationship between occurrence of this root disease and plant association may exist, but evidence is lacking at this time Other pathogens and insects generally attack individual branches or stems and usually cause little significant widespread injury. Many of the hardwood species are susceptible to various foliar pathogens that occur sporadically over large areas when environmental conditions are suitable for infection They generally affect only a single or limited number of species

Nonnative Pathogens

Two nonnative pathogens occur on conifers in northwestern California: Port Orford cedar root disease (*Phytophthora lateralis*) and white pine blister rust (*Cronartium ribicola*) Port Orford cedar root disease is currently limited to the Smith River watershed and a tributary of the lower Klamath River except for occasional infections found in ornamental plantings along the coast It is believed it was introduced into California in the late 1950's or 1960's (Kliejunas and Adams

1981, Zobel, Roth, and Hawk 1985) White pine blister rust attacks white pines and gooseberries (Ribes spp.) and is found throughout the area It was introduced in the 1930's with subsequent spread southward

Port Orford cedar root disease principally affects Port Orford cedar, but Pacific yew have been found infected by the fungus when they are in close association with the principal host (DeNitto and Kliejunas 1991, Murray 1995) Infection of Port Orford cedar is fatal in the vast majority of cases Most living trees in infested pockets have likely escaped infection, but resistance to the pathogen is being explored The presence of the disease is related to human activities and the presence of standing or flowing water The fungus is transported either in water or soil and is not airborne Please see the Resource Protection Alert below

It is possible that there is a relationship between plant association and occurrence of Port Orford cedar root disease. Plant associations influence subsequent spread of the fungus within a drainage because of the position of certain plant associations along streams and the likelihood of root contacts Topography plays a role in the amount of Port Orford cedar lost from a drainage since uphill spread of the fungus without human assistance is limited (Hansen and others 1993) We have developed a general hazard rating for each plant association with Port Orford cedar root disease This rating is a relative assessment of the likelihood of infection and subsequent spread if trees are exposed to infested material. The rating is based on the slope position, topography and density of Port Orford cedar expected in the plant association. It is not an evaluation of risk for proposed projects and should not be used in lieu of a risk assessment for management activities

Two characteristics help identify the presence of Port Orford cedar root disease Areas infested by the fungus normally have trees in various stages of decline and mortality as the fungus spreads through the area. Individual trees that have not completely faded have a recognizable cinnamon-brown discoloration of the phloem that comes up the stem from the root system Infestations of a drainage can have significant ecological effects because of the loss of the majority of Port Orford cedar along the rivers and streams

Sugar pine is the only conifer species in these series that is affected by white pine blister rust Gooseberries are also infected, but the effect is minimal Sugar pine can be killed directly by the fungus or can result in successful attack by mountain pine beetle (*Dendroctonus monticolae*) and California flatheaded borer (*Melanophila californica*) Regeneration size pines are more significantly and rapidly affected than larger trees because of the shorter time required for the fungus to grow around and girdle the main stem Occurrence of this disease is dependent on the presence of both the pine host and the gooseberry host in the area and proper environmental conditions. That is part of the reason why this disease is more common and damaging in some sites than others It is becoming apparent that some areas are losing regeneration that could eventually replace existing overstory trees and alter the successional pathway Some natural resistance has been identified in sugar pine in California (Kinloch and others 1970) These mechanisms are being developed and rust resistant planting stock is available for some areas Other management strategies, including thinning, pruning, and gooseberry management, are available and may be effective in some areas.

Wildlife Habitat and Use

For many species the Klamath Province provides the southernmost extension of their ranges or the westernmost extension of species common to the Cascades and the Sierra Nevada Ranges Some species such as amphibians reflect the cool coastal influence of the Pacific Ocean along with the fog and higher rainfall that are part of that influence As conditions become drier the number of species of amphibians declines. The abundance of some species are likely to increase as habitat quality or special habitat components such as snags or coarse woody debris increases.

A review of published data on wildlife habitats, shows that few wildlife species appear to be unique to either the Tanoak or Douglas-fir Series. The habitat of these species are described as "coniferous forest species" or "forest/woodland species" This lack of information is probably due to the recent recognition of Tanoak and Douglas-fir as individual Series. Most of the wildlife species that occur in these vegetation series are influenced by the quantity, quality and spatial distribution of various structural habitat components These components include snags, down logs and canopy closure of different hardwood and understory shrub species. The presence of mast producing species such as tanoak, chinquapin and true oak trees and shrubs, or berry producing species, such as Pacific madrone, buckbrush and mistletoe, influence the diversity and abundance of the wildlife that utilize these two forest series. Wildlife were found to be essential to the function and processes of these vegetation series, as part of complex food webs and as seed dispersal agents (Block et al 1990) Some wildlife species were also dependent on the presence of "unique habitats" such as rock outcrops, caves, talus fields or riparian areas such as ponds, springs, or streams that occur as inclusions within the Tanoak and Douglas-fir Series.

Species/Habitat Relationships

The old-growth studies conducted in 1984-1985, did not differentiate between the series we are describing in this Guide.

Raphael (1987) found that the abundance of 12 bird species, 7 mammal species and 5 salamander species were greatest in stands with greater tanoak canopy volume. Capture rates of small mammals on clearcuts and among forested sites with varying tanoak volumes showed several species, especially northern flying squirrel, Allen's chipmunk and dusky-footed woodrat were closely tied to tanoak, which provided mast and nesting cover After controlling for stand age, elevation and solar radiation, a significant correlation for 3 salamanders, 3 mammals and 6 birds was found. The ensatina, Del Norte, black and clouded salamanders plus the deer mouse, appear to be tanoak associates

Ralph et al, (1991) surveyed 45 forested stands. They found 71 species of birds and 7 mammals that were detected in sufficient numbers for detailed analysis. Fourteen species of birds and two mammals were found in greater numbers in older (mature and old-growth) forest, however none of these species were limited to these forests The abundance of many of these species were correlated with total conifer or hardwood cover

Welsh and Lind (1991) conducted surveys for terrestrial and aquatic herpetofauna in the same stands as Raphael and Ralph. They detected 7 salamanders and 3 frogs at levels sufficient for further analysis Old and wet stands had proportionately more amphibian species, while young and dry sites had more reptile species. They also determined that structural components, such as large decaying logs, were the best predictors of increased numbers of salamanders, while use of particular sizes and decay classes varied among salamander species.

Most of the subseries in this Guide were determined by co-dominant vegetation, however these groupings also reflect major differences in parent material, moisture (i.e. riparian or fog influence) or slope position Therefore wildlife relationships are described by subseries in the introduction to the Tanoak and Douglas-fir Series

Riparian Habitats

Birds

Ralph et al (1995), conducted a Riparian and Upland census for bird species. They identified the song sparrow, yellow warbler, and yellow-breasted chat as "riparian specialists", and warbling vireo, Swainson's thrush, Wilson's warbler and MacGillivary's warbler as having a "riparian preference". In 1995 the warbling vireo and MacGillivary's warbler qualified as "riparian specialist", and the western wood-pewee and black-headed grosbeak and orange-crowned warbler showed a "riparian preference"

Ralph et al (1995) found birds exhibiting an "upland preference" were the purple finch, hermit thrush, Stellar's jay and Nashville warbler, and the western tanager "Upland specialists" were the black-throated/hermit warblers and the red-breasted nuthatch

Wilson (1991) found 7 bird species along the Trinity River which were identified as riparian associates. willow flycatcher, Merlin, osprey, yellow warbler, yellow breasted chat, sharp-shinned hawk and Cooper's hawk

Amphibians

Welsh and Lind (1991) found the Del Norte salamander associated with old-growth (mesic sites) on rocky soils, large trees and high hardwood basal area. The clouded salamander was found associated with increasing canopy closure and the presence of seeps and preferred larger size classes of down logs. The ensatina had a greater tolerance for higher temperatures, lower moisture in inland areas, and was associated with large hardwoods; and the presence of seeps. The California slender salamander occurred primarily in the Coast Ranges, and was associated with older stands with high surface rock and large hardwoods.

Walls et. al (1992) reported that Pacific giant and Olympic salamanders, plus the tailed frog commonly occurred in smaller mountain streams, spring heads and seepage's, while the foothill yellow-legged frog occupied larger streams and rivers Tailed frogs were dependent on cool flowing streams and were likely to be affected by increased water temperatures following clear-cutting Pacific giant salamanders were only found in steep portions of logged streams. Olympic salamanders required cold, flowing perennial water Clouded salamanders microhabitat preference were under lose bark of large down Douglas-fir logs, while the ensatina preferred well decayed logs. Block et al (1990) reported the California slender salamander mainly in association with canyon live oak (and interior live oak) especially on mesic north facing slopes

Special Wildlife Habitat Components

Snags and Logs

Jimerson (1992) found sugar pine snags were used extensively, more than their relative occurrence in a stand would predict

Raphael (1987a) found Pacific madrone provided important cavity-nesting opportunities. Its use was much greater than their relative occurrence in a stand. It's importance seemed to related to its susceptible to heartwood decay fungi which created ideal conditions for excavating a cavity surrounded by a strong outerwall This may explain the apparent preference for Pacific madrone and the high incidence of nests located in live trees. Red-breasted sapsucker, hairy, downy and acorn woodpeckers most often excavated cavities in Pacific madrone This generally occurred in trees >12" dbh. Since the hairy woodpecker and red-breasted sapsucker are two of the most abundant species in the Douglas-fir habitat type, their preference for Pacific madrone may result in a higher proportion of abandoned cavities that would be available for secondary cavity nesting species

Pacific madrone also provides a berry crop that, while it may fluctuate from year to year, may support more abundant populations (i e varied thrush and American robins) when the crop is heavy Raphael (1987) recommended leaving 1.5 live Pacific madrone snags >12" dbh/acre, about 10% of the existing large Pacific madrone stems/acre

Hardwoods

Potter and Johnston (1979) found acorns in diets of wintering deer ranged from 11 to 76%, and assumed acorns may constitute as much as 50% of their diet during the months of October through December in the Sierra Nevada. They also identified quail and squirrels as acorn users They assumed acorns comprised 50% of the quails diet for 3 months and 50% of the squirrels diet for 12 months.

Tietje (1990) reported that black-tailed deer ate 315 acorns per day (2.6 lb. dry wt/ day);availability of acorns in autumn was likely to be crucial to ensure fawn survival overwinter. He also reported that deer ate over 90% of the fallen acorns.

Koenig (1980 and 1990)and Tietje (1990,) reported acorn woodpeckers stored an average of 325+ acorns/bird/year in granaries, and scrub jays cached or buried an estimated 7,000 acorns/year.

Verner (1980) identified 110 bird species that used habitat where oaks were a significant part of the tree or shrub canopy. Of these 30 species of birds included acorns in their diet, 45 species obtained insects from the foliage, bark or wood, 3 species ate sap and at least 2 species used the berries from mistletoe that live on oaks.

Barrett (1980) identified 65 California mammals that used oaks directly or indirectly and documented 5 mammals with strong dependence on oak species for cover or food and 55 additional species that utilized oak species for cover or food

Tietje (1990) reported that California black oak did not produce large numbers of acorns until about 80 years old, and production gradually declined after 160 years of age. A 50 year old black oak may produce 5 lb of acorns, while a larger productive mature tree could produce 50 lb. Based on a nine year California Department of Fish and Game (CFG) study of 363 black oak trees, not all mature oaks produced acorns equally Seventy-five percent of the trees produced few or no acorns, while 3% were heavy producers, averaging 89 lb of acorns per tree. Insects occurred in about 20%, of the acorns according to the CFG study

Socio-cultural Context

One of the dominant human activities in the Tanoak and Douglas-fir Series is the gathering of native plants for both cultural and commercial use Native plants are used to sustain the cultural traditions of the Hupa, Karuk, Yurok, and Tolowa tribes as well as other aboriginal populations in Northwest California. Plants are also gathered by local residents for personal use or for profit Commercial uses of these plants include; salable food products such as mushrooms and herbs used for teas and medicines, floral industry uses such as ferns, leaves, branches, boughs and cones: and wood used for fences and firewood, as well as many other products.

Aboriginal Value and Uses

Aboriginal use of native plant species predates Euro-American uses and management of National Forest lands. Although aboriginal people gather plants from many other vegetation series, much of their subsistence comes from plants in the Tanoak and Douglas-fir Series The special purpose plants they gather include a variety of medicinal plants, as well as plant parts for making utilitarian items, such as basketry, wood tools and items used for ceremonial regalia They are the most experienced users of these plants since they have been gathering these materials in large numbers consistently year after year Because they are continuous users, they have a keen understanding of the habitat and various management techniques that can be used to increase the sustainability of the plants that they harvest This knowledge has been handed down from generation to generation. They have used several management strategies including planting, weed control, pruning and thinning to ensure a bountiful harvest. Past management and gathering in some stands has affected current plant composition and diversity

Widespread American Indian burning of tanoak, white oak and black oak landscapes was common in the past. In 1933, a Karuk woman explained her people's use of fire

> "Our kind of people never used the plow All they used to do was to burn the brush at various places, so that some good things will grow up And sometimes they also burn where the tanoak trees are lest it be brushy where they pick up the acorns They don't want to burn too hard, they fear the oak trees might burn . Some kinds of trees are better when it is burned off, they come up better once again" (Pavlik et. al 1992)

These stands were managed by using fire to.

1) Enhance the hardwoods, particularly tanoak, also black oak , white oak and live oak by clearing the ground of bug infested duff
2) Enhance the grasses, shrubs and ferns used in basket making, regalia making and tools.
3) Create areas, particularly meadows or open areas, that would attract large game, such as deer and elk, and produce subsistence plants, such as the brodiaea and various grasses.

Burning was also done to control insect infestations of the valuable acorn crops These crops were particularly important for sustaining people through long cold winters. Klamath River Jack, in 1916 explained in a letter to the Fish and Game Commission. "Indians have no medicine to put on all places where bug and worm are, so he burn, every year Indian burn Fire burn up old acorn that fall on ground Old acorn on ground have lots worm, no burn old acorn, no burn old bark, old leaves, bugs and worms come more every year Indian burn every year just same, so keep all ground clean, no bark, no dead leaf, no old wood on ground, no old wood on brush, so no bug can stay to eat leaf and no worm can stay to eat berry and acorn. Not much on ground to make hot fire so never hurt big tree where fire burn" (Blackburn & Anderson 1993).

The present tribal members believe that the abundance of hardwoods that still exist on the landscape today, are there due to the past practice of repeated burning by aboriginals and lightning caused wildfire. Fire suppression efforts by the Forest Service over the last 40 years, with the subsequent duff build up and the lack of consistent cultural burning has lead to a decrease in the quality and quantity of native plants Since approximately 1855-1860, American indian harvesters have not been able to maintain the desired habitat for these cultural plants because they have been prohibited from using burning and other techniques. In addition, land ownership and development has further impacted these species through timber harvesting and associated road building Fire suppression has also caused the structure of these hardwood stands to change It is believed that many Douglas-fir and tanoak stands were more open in the prehistoric past. These open spaces left room for the vigorous growth of young hardwoods as well as light for herbaceous and grass species. The absence or the suppression of fire creates closed canopies which results in a reduction of the numbers and quality of herbs and grasses. Some of the herbaceous and shrub species have been affected by an increase in openings due to timber harvesting. For example, clearcut harvests with subsequent burning has resulted in an increase in beargrass in some tanoak and Douglas-fir stands. Beargrass (from the lily family) has tough, wiry leaves that are used for making baskets and ceremonial dresses. Unfortunately, the increase in sunlight in the clearcut units, causes the beargrass leaves to become large and brittle, therefore unusable for dress and basket making Leaves of beargrass that grow under the shade of a tree canopy are more supple and pliable Burning beargrass also stimulates new growth which produces more pliable leaves. The cessation of burning may have been detrimental to the production of beargrass leaves that can be used by aboriginal people California hazelnut is another important cultural species that has benefitted from repeated burning in the past. Usable portions of hazelnut have only been found in limited numbers in recent years. Hazelnut's small, straight, pliable stems are a prized and important component of basket weaving Baskets are usually made with the 1 to 2 year old slender twigs (USDA Forest Service 1937) and most of the twigs found today are not suitable for basket making. The lack of useable twigs is due to the decrease in vigorous sprouting that in the past was stimulated by spring fires (Buckman 1964)

A reduction in quality of other herbaceous and shrub species is due to timber harvest practices Past silvicultural treatment was aimed at maintaining high numbers of well spaced, even-aged conifers and removing the majority of hardwoods from the harvest units. In replanting almost exclusively with conifers, the hardwood component was reduced. Tanoak, an important tree for acorn gathering, was one of the hardwoods removed from these stands. Many shrub and herb species are associated with the dense cover of tanoak stands (i.e huckleberry, Oregon-grape, prince's pine). But because of timber harvests, some of these plants have been rendered unsuitable for some cultural uses such as basket making or medicine

For aboriginal people, the importance of managing these types of plant communities was to provide a sustainable, consistent source of food (including wildlife species)that would in turn sustain their cultural traditions. Acorns were and are an important food source and are tied directly to past and present cultural activities

The primary acorn consumed by aboriginal people was from tanoaks. Acorns from black oak, Oregon white oak and canyon live oak were also utilized Tanoak acorns were ground into flour or made into a mush that could be eaten during the winter months when fresh food was lacking Black oak acorns were considered a treat, many styles of preparation and recipes are still used today. A typical family could harvest the crop of an average size black oak in a day and reap about 140 pounds of acorns. This is about one-fifth of what they would consume annually.

Oak species were managed extensively by aboriginal people to maintain their lifestyle Because many wildlife species were also a food source, this lifestyle also included providing an acorn crop to sustain wildlife populations. Fire was the main tool used to clear oak stands of disease It would also create openings and maintain meadows to attract wildlife such as deer The acorn crop became fairly reliable from year to year due to the management of the oak habitat.

Acorns were only second to salt as an item of trade. Tanoak acorns were particularly valued as a trade item and were often traded by local aboriginal peoples to eastern California tribes. Acorns were as important as the fish resource and, like the ceremonies attached to fisheries, there were ceremonies attached to acorns that still exist today with high ceremonial dances Today, acorns are still an important food resource, but are gathered in much smaller quantities, except when gathering for ceremonies, far less people use acorns as a mainstay in their daily or yearly diet Tanoak acorns today are gathered with a gunny sack, typical families will gather 1 to 3 gunny sacks to sustain them for a year The people strongly believe that, even though good quality acorns are sometimes difficult to find today, the interaction between the trees and themselves is an important one in which both are nourished

Along with acorns, large varieties of plants were gathered by aboriginal people both prehistorically and historically in both the Tanoak and Douglas-fir Series Appendix XII identifies the plants gathered by tribes today and indicates how they are used Some plants are gathered yearly, such as acorns and basketry materials, some are gathered only on special occasions, such as plants used in ceremonies and some plants are gathered when needed, such as healing plants There are a number of cultivation and gathering techniques and cultural traditions that are used and passed on to the younger gatherers

The plants collected are relied upon by the gatherer as: (1) an ethnic food that is unavailable on the open market, (2) as medicine to improve or maintain their health; (3) as income through the sale of various native crafts; (4) as an integral item interwoven into religious ceremonies; and (5) the gathering activity itself develops a strong sense of ethnic identity. Family gathering outings are fused into the cultural process of teaching the young and the transmission of cultural information .

The gathering activity is an integral aspect of the cultural community and is attached to the ethnic self view It is interwoven into the cultural community, religious community, and politically in the governing tribal bodies which provide support for the various forms of gathering in political leadership, philosophy statements and funds Ultimately, perhaps the most important function of gathering, is that it reinforces the bonds of Indian heritage and tribal identity. It is an ongoing and evolving cultural activity.

Other Values and Uses

The gathering of native plants by nonnative Americans is usually conducted by people who live near the boundaries of the National Forest. Gathering of plants in this case, is primarily for casual use, although there are some deeply held traditions associated with some uses. Examples of more casual use are, fuelwood gathering, christmas tree cutting, mushroom harvesting and berry picking. The collection of plants for these uses is lower overall when compared to aboriginal gathering. Other than fuelwood gathering, most activities are done intermittently and are carried out by only a few people usually to support their lifestyle, crafts or add to their subsistence. Detailed knowledge of exactly what plants and how much is being gathered by the casual user is lacking According to some of the data that has been collected, this group seems to be able to meet their personal needs and uses. Their gathering does not seem to be oriented towards a particular type of habitat but mostly associated with geography, such as near their homes or through historic ties of past family traditions.

Fuelwood collecting is extremely popular and has a high use Local communities have deeply held values regarding their ability to obtain fuelwood from the National Forests. Often the process of getting the fuelwood is as important as the wood itself.

Commercial Harvesting

There is currently no reliable data available to determine the amount of non-timber forest product extraction used for commercial sale A review of limited permit data over a three year period on the Orleans Ranger District showed that Douglas-fir, white fir, incense cedar, Port Orford cedar, California bay, huckleberry, scotch broom, salal, mushrooms and Christmas trees were harvested for commercial use

The floral industry harvests boughs, cones, beargrass, California hazelnut, willow, etc. Commercial collectors gather larger quantities of plants than American Indian plant collectors. For example, a commercial harvester will typically designate 1000 pounds of huckleberry and salal, 1000 pounds of white fir, incense cedar boughs, or 3000 pounds of incense cedar, Port Orford cedar, and red fir boughs, or 500 pounds of salal on a permit Those persons collecting plants for cultural purposes would designate far less than these amounts

Seven species identified above as commercial harvested plants are significant to American Indian plant gatherers for food, medicine and spiritual uses. They are Douglas-fir, white fir, incense cedar, Port Orford cedar, California bay, huckleberry, salal and mushrooms

Silviculture and Silvicultural Systems

Silviculture is the art and science of establishing, tending and protecting forests to produce desired products and conditions These products and conditions can be wood fiber, erosion protection, wildlife habitat, watershed protection, recreation, scenic values, etc. Silviculture is an important part of this Guide. It is used to determine what treatments, if any, are needed in a forest, so that management objectives can be met, or desired values are maintained and available. Silvicultral implications are supplied for each plant association in the Tanoak and Douglas-fir Series and are described in the Management Implication Section.

The silvicultural systems described below are the various strategies used to manage stands of trees that make up a forest in order to meet specific objectives. There are two basic silvicultural systems used in forest management. The most widely used is even-aged management. Lesser used, is uneven-aged management. Within these two broad categories are various silvicultural systems that can be used to manipulate forest vegetation

Even-aged Management

Even-aged management is defined as, forest stands where all the trees are essentially the same age or there are less than 3 distinct age classes represented Even-aged stands tend to be uniform in height The pole, early mature and mid mature seral stages in both the Tanoak and Douglas-fir Series are normally even-aged There are four silvicultural systems that can be used under even-aged management.

Clearcut

Clearcutting involves the harvesting of all trees in a single operation, from an area large enough that the influence from the surrounding uncut forested stands is removed from the majority of the area harvested The microclimate, shade, temperature, seed source, etc is substantially affected There are a number of reasons for harvesting this way. It is less costly to log when all trees are cut There is not a problem with damage to any residual trees Equipment only has to be moved in and out once Soil is disturbed only during logging and planting and then left to recover for the next growing cycle. Biologically, there are good reasons to use this system Conifer trees can be broadly grouped into two categories of shade tolerance (or the ability to grow in less than full sunlight) They are either tolerant (can grow in shade), or intolerant (needing almost full sunlight). Clearcuts favor intolerant species. Douglas-fir is considered to be relatively intolerant and requires openings to successfully regenerate, especially in the Tanoak Series where competition from tanoak can be high Most pine species are considered intolerant. To reestablish these intolerant species, the seedlings need the sunlight found in fairly large openings. Once established these new stands of trees can be managed together.

Patch Cut

Patch cutting is essentially the same system as clearcutting, except that the forest influence is greater than half of the area harvested In simple terms, this means that the majority of the harvested area is shaded by the surrounding trees; that temperatures and light are lower and tree seed sources remain.

Shelterwood

Shelterwood, an even-aged system, utilizes 2 or more harvest entries before the stand is regenerated (reforested) There are various reasons for using this method. It can be used on hotter sites to provide shade to the new seedlings It increases the forest influence, lowering the surface temperature and the shelter trees can be a source of seed if natural regeneration is desired. Shelterwoods can be used to lessen the visual impact of harvests, allowing the new stand to become established before all of the older, larger trees are removed The remaining trees can be removed when adequate reforestation has occurred, usually in 4-10 years. Removal should be done when seedlings are small to lessen the damage from the harvest of the remaining trees Recently, with the recognized need to maintain larger trees for snags (dead standing trees), downed logs for wildlife and fungal organisms, etc., some, or all, of the shelterwood trees may be left on the site. These "residual" trees do influence the growth and development of the next stand growing up under them If the management objective is rapid growth of the new stand, then the shelterwood may be completely removed.

Seed Tree

The seed tree system can be an intermediate step in shelterwood management or applied initially to a stand It is what it's name implies The desire is to leave high quality, wind firm trees for seed to establish the next stand If it is used in a shelterwood system, it is usually the second harvest The first is fairly light to establish wind firm seed trees The second harvest, or seed step, is done a few years later. The seed trees can be removed or left standing, as in the shelterwood.

Within any even-aged system, there are treatments or manipulations that take place during the rotation. Reforestation is critical. This may be done artificially through planting of site adapted species, from seed falling on the site or a combination of the two. Preparation of the site can be done mechanically, by hand, with fire, chemically or a combination. A release treatment may be necessary This is done in the early life of the new stand to insure survival and growth of the seedlings. They are released from competing vegetation that quickly occupies logged or burned areas. This is done mechanically, by hand, with chainsaws or with herbicides. It is probably worth noting that, despite the perception of many people, new forest stands are not monocultures More than one species may be planted, there will likely be natural seeding of local species, including hardwoods, which will produce a forest that will usually look very similar in composition to a forest that was there before harvest or fire

After the new stands are established, they may be pre-commercially thinned This means the removal of some of the conifers and possibly brush and hardwoods that are competing for light, water and nutrients. This takes place when the trees are 10-20 years old and leaves the remaining trees with more space to maintain rapid height and diameter growth.

As stands get older, they may receive one or more commercial thinnings. These harvest operations remove trees to provide more space to the remaining trees so they can maintain steady growth rates. Too many trees per acre results in slowed growth, small trees and risk of insect attack as the trees become stressed from lack of light and water It also may result in substantial mortality. New forests may start out with 400 to over 2000 trees per acre They may be thinned during the rotation back to as few as 50-75 trees per acre, depending on rotation length and stand management objective.

Uneven-aged Management

Uneven-aged management, is defined as a forest stand that has at least 3 distinct age classes of trees, usually greater than 30 years apart. On most sites the Douglas-fir Series is a candidate for this strategy. Uneven-aged stands may have ages ranging from 1 year old seedlings to 180 year old trees greater than 36" in diameter There are two methods used to manage forest stands in an uneven-aged system They are single tree selection and group selection. Uneven-aged systems technically do not have a rotation age, since in theory, these stands are composed of all ages (and sizes) all of the time. They have continuous forest cover without the interruption of a final harvest found under even-aged silviculture Again, in theory, an uneven-aged stand can be represented graphically using an inverted J shaped curve. The Y axis is trees per acre, the X axis is tree diameter As the number of trees per acre decreases, the diameters increase The optimum uneven-aged stand fits a predetermined J curve. When a predetermined maximum tree size and number is reached, these trees are removed Also, all other tree diameters have some trees removed, and regeneration of new trees is required, so that the J curve is maintained. Under this system, the stand can be entered many times more than in an even-aged system. This system can favor shade tolerant species, as the forest influence is close to 100% Shade intolerant species may not regenerate or grow well in the amount of shade in the stand Contrary to common belief, removing a big tree selectively does not automatically insure that a seedling will germinate in its place and grow to replace it Uneven-aged management requires substantial planning and attention to insure continued growth and replacement of desired tree species The two silviculture systems used under an uneven-aged system are described below.

Single tree selection

Single tree selection methods utilize the removal of individual trees from a stand. Trees to be cut are based on the desired number of trees per acre in each diameter group. Planting may be required. There may be three hundred 2" trees, and thirty 24" trees Each harvest entry may be only 10 years apart The operation will entail the cutting of many nonmerchantable (small trees of no commercial value) as well as many trees of low value. Only a few larger trees are removed as they reach the maximum planned size, then these are replaced with seedlings This system may not provide snag and down log habitat as the short reentry period allows removal of trees before competition for light and water causes mortality It does provide for continuous forest cover and the harvest operations are not as visible as those of even-aged systems.

Group selection

Group selection is an uneven-aged system, which utilizes small clearcuts of less than 3 acres in size It is based on the size of the area to be managed and the maximum age (substituted for desired maximum tree diameter) that the trees will be allowed to attain. If 100 years is chosen and the area is 200 acres, then the group selection harvests would be 2 acres in size and implemented so that after 100 years the forest would have equal areas with trees from age 0 to age 100 Entry could be every 5 or 10 years, with each entry cutting the appropriate number of acres This would result in small stands of trees 5 or 10 years apart in age, but the area would eventually be represented by ages 0-5-10....100. This cycle could then be continued, harvesting the oldest group again The management area would then be uneven-aged This system is much easier to apply as it is an area controlled harvest system, but it is very difficult on steep ground Reaching all acres without damaging areas previously reforested may be impossible As in single tree selection, the new trees must be periodically thinned to maintain growth and capture the value from smaller trees that would die from competition if not removed Snags and downed logs may be left in the groups, but higher costs, along with fewer trees removed may make it difficult.

Methods

Sampling Strategy

In this Guide potential natural plant communities were analyzed using soils and environment characteristics, combined with management implications, to establish plant associations. The potential natural plant community is the community that would become established if all successional sequences were completed without interference by humans or drastic environmental changes Natural disturbances are part of potential natural community development. This includes the introduction of naturalized nonnative plant species (FSM 2060) Using this definition, our goal is to find and describe late seral, undisturbed, self-reproducing plant communities in conjunction with soils and environment variables

Sampling Methods

This study was conducted in conjunction with the ecosystem classification program (Allen 1987) being conducted on the Six Rivers NF and Klamath NF. Late seral stage stands were the primary study sites Stands were located through a review of geology, timber type (USDA 1976), vegetation maps (USDA 1995) and verified through aerial photo analysis and ground reconnaissance. Sample stands were selected using the methodology of Pfister and Arno (1980). Sampling methods generally followed those described by Hall (1970), Moir and Ludwig (1983), and Allen and Diaz (1986) Sample plot locations were restricted to forested stands with homogeneous vegetation, seral stage, soils, geology and landform (Pfister and Arno 1980) Sample sites were selected after a review of the information on these factors and an extensive aerial photo and ground reconnaissance of the area Plot size was 0 1 acre for herbs, graminoids and understory trees and of variable radius for shrubs and overstory trees (Bitterlich 1947)

For each plot the following location information was recorded: plot number, National Forest, Ranger District, Forest map number, Forest compartment, township, range, section, degrees latitude, latitude minutes, degrees longitude and longitude minutes.

The physical environment was defined by elevation, aspect, percent slope, distance from the Pacific Ocean, landform (general topographic characterization), micro-position (position of the plot on the slope), horizontal micro-relief (slope shape parallel to the contours), vertical micro-relief (slope shape across the contours), bare ground percent, surface gravel percent, surface rock percent, potential annual radiation (total annual radiation received for a given aspect, slope and latitude) (Frank and Lee 1966), transformed aspect transformed to a linear variable from 1-8) (Lewis 1982) and radiation index (Frank and Lee 1966). Radiation index is used in the plant association environment description as an indicator of potential surface temperature.

At each site, a soil pit was dug to a maximum depth of 40" or to bedrock. For each pit, data were recorded on percent surface litter cover, litter thickness, parent material, parent material origin, total soil depth (to a maximum of 40"), rootability (whether the soil can be penetrated by roots), A horizon thickness, A horizon texture (using texture by feel), percent A horizon coarse fragments (using 2 mm. sieved soil samples), A horizon color (hue, value and chroma using Munsell color charts) (Munsell 1975), subsurface texture, percent subsurface coarse fragments, subsurface color, soil drainage class, available water holding capacity (AWC) for the top 20" of soil, soil name (classified to family), pH of the surface horizon (using a Hellige-Truog Soil Reaction Tester) and pH of the subsurface horizon.

Ocular estimations of total percent cover were recorded at each plot for: moss, forbs, graminoids, shrubs and trees All plants were identified to species where possible (nomenclature follows Munz 1973 and Hickman 1993). Final reference for plant names was the Plants Database (USDA Soil Cons. Serv. 1994) Voucher specimens are stored at the Humboldt State University Herbarium. Abundance was recorded for the herbaceous and graminoid layers only (Allen and Diaz 1986) Estimates of tree height and standing basal area (basal area factor 10, 20 or 40) were recorded at three points per plot using a Speigel relaskop In addition, diameter at breast height (dbh), total tree age, 10 and 20 year radial growth were recorded for a minimum of one dominant tree per point

Initial classification was accomplished using the polythetic divisive classification technique Two-way Indicator Species Analysis, (TWINSPAN) (Hill 1979). Polythetic divisive techniques have a theoretical advantage over agglomerative techniques since all available information is used to make the topmost decisions. TWINSPAN requires species cover values to avoid unacceptable rates of misclassification (Gauch 1984). It uses information on all species to group the plots based on similarity of species cover values. The data are first ordinated by reciprocal averaging with the extremes positioned at the polar ends. The samples are then divided into 2 clusters and the process is repeated until some minimum group size is achieved (Gauch 1984) This minimum group adds an element of subjectivity to the classification This subjectivity can be reduced by applying the "stopping rule" of Hill (1980). Gauch (1984) recommends TWINSPAN because it is effective, robust, uses the original data in the classification rather than a similarity or dissimilarity index, integrates both samples and species, and places most similar samples together. One requirement of classification is that it must have heterogeneous communities to work, because some statistical programs will classify even a random data set (Ludwig and Reynolds 1988). TWINSPAN works best when paired with an ordination technique like the indirect gradient analysis tool, detrended correspondence analysis (DECORANA) (Hill 1979) and the direct gradient analysis tool, canonical correspondence analysis (CANOCO) (Ter Braak 1986) described below

DECORANA was used to further refine the classification DECORANA is a detrended form of reciprocal averaging that also uses species cover. It is an objective, effective, robust community centered ordination technique that is particularly effective with heterogeneous data (Gauch 1984) It ordinates both species and sample units and can be used to identify outlier plots and species, and to identify plant association relationships DECORANA develops a single ordination space partitioning The DECORANA scores (DCA) can be regressed with environmental variables to identify the underlying environmental meaning of the ordination axes. Multiple regression analysis (Neter and others 1983) is used here to predict change and uncover environmental meaning in ordination scores.

CANOCO was used next to refine the classification by identifying the primary environment gradients CANOCO is an extension of DECORANA, it is a direct gradient analysis technique designed to discover how a multitude of species respond to external environment variables (Ter Braak 1992, Palmer 1993)

The vegetation classification was further refined with Stepwise Discriminant Analysis (Jennrich and Sampson, 1985) Discriminant analysis forms linear combinations of the independent variables and uses them to classify cases into groups (Norusis 1992) Discriminant analysis is used to test membership in each group identified above and to identify the discriminating species and environmental variables It identifies plots that are misclassified through posterior probabilities of group membership and lists the variables correlated with each discriminant function. Discriminant analysis, species/environment scattergrams and linear regression were used to identify plants with indicator species value Indicator species are key to this classification and are those species that reflect changes in environment. The classification described in this Guide should be considered a first approximation. The classification may change in the future as new information is added

The program Forest Inventory Analysis (FIA) (USDA 1986) was used to analyze the tree data Information generated by these programs included· standing cubic volume, cubic volume growth, basal area, basal area growth, site class, and trees per acre by species and dbh class. The statistical package SPSSPC+ (Norusis 1992) was used to develop descriptive statistics (mean, standard deviation, and standard error) and to calculate stand density index (SDI) (Reineke 1933)

Using This Guide

The Guidebook is based on field sampling throughout the range of tanoak within the Six Rivers and Klamath National Forest boundaries in Northwestern California (Figure 1) It contains descriptions of plant associations included in the tanoak and Douglas-fir series. It contains keys to and descriptions of each series and plant association including vegetation composition, environment, soils, productivity, stand structure and management implications.

Each plant association has an EDP code name described below and a regional number (Eco-Code) for identification purposes The regional identification number correlates the plant association with any type survey work. Examples include ecological unit inventory, wildlife habitat relationships, forest inventory analysis, soil survey, vegetation mapping and old-growth inventory.

Plant Association Nomenclature

Species were assigned to structural categories, such as tree, shrub, herb, or grass, then given an abbreviated code according to the "Electronic Data Processing (EDP) Codes For California Wildland Plants" (Reed and others 1963) or the Plants Database (USDA Soil Cons.Serv. 1994). Used throughout the ecological classification program in California to standardize the identification of plant species and the naming of plant associations, they use the first two letters of the genus and first two letters of the specific epithet (species) and a numeric code if necessary to distinguish species Using Douglas-fir as an example, the scientific name Pseudotsuga menziesii would be represented as PSME A full list of species and EDP codes is found in Appendix I.

The plant association name is broken down into two parts, the biotic and abiotic The biotic segment is subdivided by strata, while the abiotic is separated by a double "//" Within the biotic portion of the name a "/" is used to represent a stratum change, while a "-" represents species in the same stratum. Examples of different plant association names include. PSME-ALRU2/ACCI/MOSI, PSME/QUVA and PSME-QUCH2//Rockpile In the first case, PSME-ALRU2/ACCI/MOSI, three strata are present (tree-tree/shrub/herb) In the second case PSME/QUVA, includes only two strata (tree/shrub) The third case, PSME-QUCH2//Rockpile, involves one strata and an abiotic feature (tree-tree//Rockpile). The abiotic portion of the name may be added to describe some special feature of the plant association, such as the previous example where the community is found on very rocky sites

The order of species in the plant association name identifies the vegetation series and subseries respectively The series is the naturally reproducing species that will dominate a site as the end product of succession The subseries is the indicator of the position of this ecological type along the environmental gradient within the series. Using the plant associations described above the PSME-ALRU2/ACCI/MOSI type is included within the Douglas-fir series. Within this type Douglas-fir is the naturally reproducing species that dominates late seral stands. The subseries modifier, red alder, indicates the wet end of the Douglas-fir series environment gradient. The PSME-QUCH2//Rockpile plant association is included in the Douglas-fir series The subseries modifier canyon live oak indicates the dry end of the moisture gradient.

Plant Association Summary Tables and Descriptions

The description of each plant association includes vegetation, environment, soils, productivity, stand structure and management implications Drawings of the indicator species and a photograph of each plant association are included Summary tables in the appendices compare plant associations by the variable categories described Many of the terms that are used are defined in the glossary

Distribution/Setting

The distribution is defined as coastal or inland and by National Forest Ranger District. Coastal sites are those that are located close to the Pacific Ocean and influenced by its temperature moderating effects or those sites that are subjected to coastal fog based on landscape position Inland sites are generally much warmer than coastal sites. The physical environment is defined by distance to the Pacific Ocean, elevation, aspect, percent slope classes (Table A 5), slope position, surface rock percent, and radiation index. Sites with low radiation index are considered cool, while those with high radiation index are generally warm unless influenced by topographic shading (Table A.6).

Comparisons of each plant association by environment variables are contained in Appendix III.

Table A.5. Definitions of slope classes (USDA, Soil Survey Division Staff 1993).

Slope Classes	Lower Percent	Upper Percent
Nearly level	0	3
Gently sloping	1	8
Strongly sloping	4	16
Moderately steep	10	30
Steep	20	60
Very steep	0	>45

Soils

Soils are described by depth to a maximum depth of 40" or to bedrock, AWC calculated to 20" A horizon thickness, A horizon coarse fragment percent, A horizon texture and parent material. Soils are classified to Order, Subgroup or family. Each plant association is compared by soil variables in Appendix IV

Vegetation

Vegetation is described by total percent cover for each layer including overstory and understory trees, shrubs, forbs and grasses Species with greater than 20% constancy are listed for each plant association. All plants were identified to species where possible. Species nomenclature follows Munz (1973) and Hickman (1993) common names used follow the Plants Database (USDA Soil Cons. Serv. 1994). A complete list of species encountered during this study are included in Appendix I, a vegetation summary by plant association is included in Appendix VI

Table A.6. Definitions of radiation index classes

Radiation Index Classes:	Lower Index	Upper Index
Cool	200	.400
Moderate	401	.500
Warm	501	.600

Stand Structure

Stand structure is described by mean values for stand age, trees/acre by diameter class, layers, height, conifer and hardwood cubic volume and basal area, Dunning site class (base age 300 years)(Dunning 1942) and stand density index. Stand structure is compared by plant association in Appendix V.

Fire Regime

Fire frequency, intensity and extent are described for each plant associations Fire regimes are separated into three broad, artificially grouped categories: high-severity regimes, moderate-severity regimes and low-severity regimes

Management Implications

Management implications are included for each plant association to provide predictive information about the response of plant associations to treatment and any special problems that may be encountered Species considerations are described that list species known to occur in a plant association that may have high biodiversity value, American Indian uses or are considered as special forest products by commercial collectors Fire suppression and prescribed fire opportunities are also introduced and described for each plant association A list of management implication categories is included in Table A.7. This is followed by a description of each category

Table A 7 List of management implication categories reviewed for each plant association

Management Implications:
Silvicultural Systems
Site Preparation
Regeneration
Release
Animal Damage Control Problems
Stockability
Species Considerations
Insects and Disease
Fire Suppression
Prescribed Fire

Management implications were derived from a variety of sources They included; literature, plot sampling, professional experience and ecology plot data queries The silviculture treatment responses were developed through sampling (over 500 plots) in plantations with known treatments (ecology plot sampling, older plantation inventory, KV plant succession study) and professional experience Species considerations and insects and diseases result from a combination of literature, ecology plot queries and professional experience. Fire management implications were developed by a team with over 100 years Forest Service experience and are backed up by the literature.

Silvicultural Systems: What silvicultural systems may or may not be applicable.

Site Preparation: Management applications that may or may not be appropriate.

Regeneration: Discussions on the appropriateness of artificial versus natural regeneration and plantability

Release: Information on competition problems that may be associated with various plant associations

Animal Damage Control Problems: Discusses any potential animals that may be associated with various plant associations, i e , gophers, deer.

Stockability: How plant associations relate to regional stocking levels (minimum) or could deviate from Regional Guides.

Species considerations: Tree species listed in this section are either important or undesirable to a stand. Some of these species should be maintained in a stand because they have important wildlife, cultural or genetic value. Examples of valuable tree species include, Pacific yew, black oak and Port Orford cedar

Cultural and commercial species: The plant species listed in this section are gathered to sustain cultural ways or are collected by commercial harvesters. Consideration should be given to these species when management activities are planned Two of these species, California hazelnut and beargrass provide basket making material for American Indians. The health and vigor of both of these species is dependent upon burning Prescribed burning could be considered when either of these species are present in a stand. All of the commercial and cultural species are listed in Appendix VI.

Three terms were used to describe the frequency of occurrence of specific cultural and commercial plant species, within each plant association Plants that were found in over 50% of the plots sampled were described as frequent Plants found in 10 to 49 9% of the plots sampled were described as infrequent, those found in less than 10% of the plots were described as intermittent

Insects and Disease: Insect or disease problems to be concerned about in any of the plant associations If the potential for insects or disease is present, what is the risk rating? For example, the risk rating for Port Orford cedar root disease examines the likelihood of infection and subsequent spread when exposure occurs

High: Potential for Port Orford cedar root disease infection and/or subsequent spread is high due to close proximity to free water and high density of Port Orford cedar.

Moderate: Potential for Port Orford cedar root disease infection and/or subsequent spread is moderate due to proximity to free water and low density of Port Orford cedar or limited proximity to free water and high density of Port Orford cedar.

Low: Potential for Port Orford cedar root disease infection and/or subsequent spread is low due to: (1) limited proximity to water and low density of Port Orford cedar, or (2) close proximity to water and infrequent occurrences of Port Orford cedar.

Management has only two options to use fire to enhance the ecosystem: (1) by fire suppression strategies and (2) by prescribed fire Other forest management practices may be used to reduce hazardous fuel accumulations, but the absence of fire may alter the ecosystems adaptation to fire, endangering species survivability.

Fire Suppression: There are three suppression strategies: confine, contain and control

Confine: To restrict the fire within determined boundaries established either prior to the fire or during the fire.

Contain: To take suppression action, as needed, which can reasonably be expected to check the fire's spread under prevailing conditions

Control: To complete control lines around a fire, spot fires, and any interior islands to be saved, burn out any unburned area adjacent to the fire side of the control lines, cool down all hot spots that pose immediate threats to the control line, until they can reasonably be expected to hold under foreseeable conditions.

Past and present suppression strategies have been to control all fires Recently tactics have been adopted to meet the control suppression objective while trying to lessen adverse impacts to the environment from the suppression operations, Minimum Impact Suppression Tactics or light hand on the land. These have been designated in the forest's Fire Management's Operation Guide primarily in special interest areas; wilderness, botanical areas, research natural areas and Indian cultural resource sites These limit use of dozers, aircraft and traditional chemical aerial retardants and in some areas power tools.

Many plant associations would benefit from suppression strategies other than control. Some associations are fire tolerant and/or fire dependent. Others experience greater adverse impacts from line construction than from the fire. Suppression alternatives or recommendations will be made for each plant association.

Prescribed Fire: Prescribed fire has had limited implementation. Douglas-fir and tanoak plant associations lend themselves to enhancement from fire disturbance under various conditions and fire behavior. This includes late seral reserves (LSR) if we are to maintain stand diversity and regeneration.

Prescribed fire use in ecological restoration and vegetation management should not be entirely based on historical "natural" occurrence of fire but in conjunction with the desired fire effects Burning for burning's sake is not the answer to years of fire suppression Managing plant associations provides the ability to understand their relationship and adaptation to fire and define the ecological effects desired and not just conditions under which a fire will spread and can be controlled By defining the desired ecological condition, objectives can better be evaluated, as well as the success of the burn. In turn, a range of prescriptions may be used to obtain a landscape diversity enhancing plant diversity

Many sensitive species of both plants and animals can experience adverse affects from fire disturbance of moderate to high fire behavior. Using prescribed fire under proper weather conditions and seasons of the year to benefit the plant association has been overlooked in the past or been limited by single animal species As managers we need to look at the total plant association and need to reintroduce fire to sustain the total ecosystem realizing that fire's negative impacts will not be an annual event, but short term disturbance. This must be done in a programmatic manner which treats areas on the basis of priorities derived from ecosystem and specific resource management needs, and to an extent aimed at successfully protecting and enhancing the acres for which we are responsible.

Total ecosystem management is difficult with existing conflicting resource management objectives (i e., wildlife, soils, timber) and legislation (i e , Clean Air Act related to smoke emissions and smoke dispersal). Total protection for one species may not be to the benefit of all species. Prescribed fire and fire's ecological effects need to considered as integral tools in ecosystem management

Closely Related Types: Closely related types are listed and significant differences between types are described.

Series Key

Series Key

Using the Vegetation Keys

Keys to vegetation series, subseries and plant associations in the Tanoak and Douglas-fir Series are provided. The series key should be used first It uses the dominance of key species in the overstory and regeneration layer to determine the potential natural vegetation series. The subseries key should be used next, it is based on indicator species. It also helps reduce the time required to key to a plant association The plant association keys are located in the introduction to each series They use the presence of or percent cover of the indicator species to key to plant associations

Before attempting to use the key, you should walk around the stand and familiarize yourself with the vegetation. The key and vegetation descriptions are constructed from data collected in late seral stage stands (PNV) Therefore, if you are trying to use them in younger or disturbed stands you should be aware that the percent species cover may not apply. For example, younger stands maybe dominated by ceanothus, manzanita, or knobcone pine They need to be carefully examined for the presence of the PNV regenerating species and indicator species in order to key to the correct plant association The indicator species should be present in all of these stands, however it may be of low cover.

The key is structured as a choice between two statements. To use the key first read both choices carefully, then choose the one that applies to the stand. This process is repeated until you end up at a plant association name. From here proceed to the description of the selected plant association and check the plant association summary table (environment and vegetation) to make sure that you have keyed to the correct vegetation type. If the description does not fit or you become lost in the key, return to the step you felt most secure at and try the key again.

Characteristic cover is used in this document rather than average cover. Characteristic cover is defined as the percent cover one could expect to find in a plant association if the species were present in this type It is the average cover of stands containing the species For example plant association X includes 10 plot samples, on 5 of these plots species Y had 10% cover. Its characteristic cover would be 10%. Characteristic cover is displayed along with constancy. Constancy is the percent of times a species was found to occur in a plant association among the plots sampled Using the same example from above, species Y would have a constancy of 50%, that is it occurred in 50% of the plots sampled

Series Key

1a.Tree cover < 10%, forb layer dominated by grass, rushes, or sedges 2
2a Rushes and sedges are dominant 3
3a. > 5000' elevation .... Montane Meadow
3b < 5000' elevation .... Juncus
2b Perennial or annual grasses are dominant 4
4a. > 40% perennial grasses Perennial Grassland
4b < 40% perennial grasses Annual Grassland
1b Tree cover > 10%, or not as above 5
5a Tree layer dominated by white oak or black oak, Douglas-fir absent or in the regeneration layer only 6
6a. Tree layer dominated by White oak .... White Oak
6b Tree layer dominated by Black oak Black Oak
5b Tree layer dominated by other species or not as above 7
7a Redwood cover > 20% and primary regenerating species .... Redwood
7b Redwood absent or not as above 8
8a Mountain Hemlock cover > 10% and primary regenerating species .... Mountain Hemlock
8b. Mountain Hemlock absent, or not as above 9
9a. Port Orford cedar cover >20% and primary regenerating species .... Port Orford Cedar
9b. Port Orford cedar absent, or not as above 10
10a True fir >20% total tree cover and primary regenerating species 11
11a Red fir cover exceeds white fir cover and is > 20% and the primary regenerating species Red Fir
11b White fir cover > 20% and primary regenerating species White Fir
10b True fir absent or not as above 12
12a Lodgepole pine cover >20% and primary regenerating species . Lodgepole Pine
12b Lodgepole pine absent or not as above . 13
13a. Jeffrey pine cover > 10%, and reproducing successfully, and cover > Western white pine Jeffrey Pine
13b Jeffrey pine absent or not as above 14
14a Tanoak cover (tree form) > 10% and present in the regeneration layer Tanoak
14b. Tanoak cover < 10%, or not as above 15
15a. Douglas-fir dominant in overstory and reproducing successfully .... Douglas-fir
15b Douglas-fir absent or not as above . 16
16a Sugar pine dominant tree species and reproducing successfully .... Sugar Pine
16b Sugar pine absent or not as above 17
17a. Western white pine present and reproducing successfully .... Western White Pine

17b. Western white pine absent or not as above 18

18a Knobcone pine dominant tree species 19

19a Knobcone pine dominant tree species and present in regeneration layer ... . Knobcone Pine

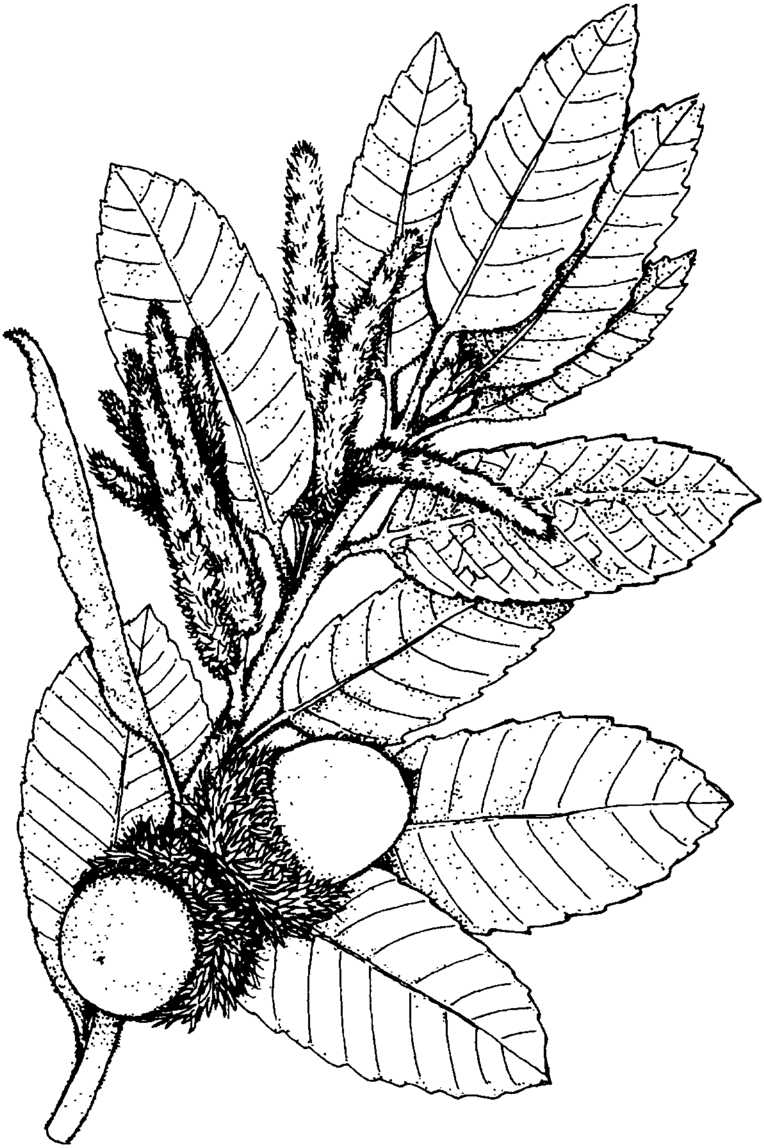
19b Knobcone pine not present in regeneration layer 20

20a Douglas-fir reproducing successfully .... Douglas-fir

20b. Jeffrey pine reproducing successfully Jeffrey Pine

18b. Knobcone pine absent or not as above Return to step 1

Tanoak Series



Tanoak Series

Tanoak Subseries Descriptions

The plant associations in the Tanoak Series were described using 662 ecology plots These plots were distributed from Del Norte County near the Oregon border to the southern limit of Humboldt County and extended from approximately seven miles from the Pacific Ocean in Del Norte County to fifty miles inland on the western edge of Trinity County The highest frequency of plots were sampled in Del Norte and Siskiyou Counties A large number of plots were also sampled in Humboldt County and a limited number in Trinity County.

Twelve subseries, containing thirty–eight plant associations, were described from the analysis of these plots (Table B 1) The twelve subseries were arranged along three primary environmental gradients elevation, soil moisture and the chemical composition of the soil–forming parent rock They are displayed by their relative relationship to one another in Figure B.1.

The classification is described below by subseries and describes distinctive features of each subseries and differences between subseries Conifer productivity (based on softwood cubic volume) were rated as low (< 6000 cu ft.), moderate (6000–9,000 cu ft) or high (>9000 cu. ft.). Structural diversity (based on the number of layers, diameter classes and height) are also rated as low, moderate or high Also included are a list of plant associations in the subseries, a description of differences between them and a table of significant discriminant variables. Next, a description of wildlife expectations is described for each subseries At the end of the subseries descriptions, plant associations described as riparian or found in riparian landscape positions are described and listed in Table B 10

Tanoak/Evergreen Huckleberry (LIDE2/VAOV) Subseries

This subseries along with the LIDE2–UMCA Subseries had the lowest mean elevation in the Tanoak Series It was identified on cool, shaded, moist, lower through upper third slope positions in close proximity to the Pacific Ocean or on inland sites subjected to coastal fog It had linear, concave and undulating micro-relief and was usually found in riparian positions Conifer productivity was moderate, while structural diversity was high due to the high number of conifer and hardwood layers This subseries was distinguished by high shrub cover, high cover of evergreen huckleberry in the shrub layer, low cover of tanoak in the regeneration layer, low cover of chinquapin in the tree layer and low cover of dwarf Oregon-grape in the shrub layer

The LIDE2/VAOV Subseries included three plant association types LIDE2/VAOV, LIDE2/VAOV–GASH and LIDE2/VAOV–RHMA The significant environment variables that distinguished between the three plant associations were elevation, transformed aspect, slope and distance to the Pacific Ocean. Vegetation differences included presence of, or percent cover of overstory Douglas-fir, Pacific rhododendron, salal, evergreen huckleberry, bracken fern and vanilla leaf Table B 2 displays the differences between the three plant associations

Tanoak–California Bay (LIDE2–UMCA) Subseries

This subseries had the lowest mean cover of surface rock and had high A horizon coarse fragments It was found on low elevation, cool, shaded, moist, lower and middle third slopes in riparian positions It had convex, linear and undulating micro-relief and was found in close proximity to the Pacific Ocean Conifer productivity was among the lowest, while hardwood volume was among the highest in the Tanoak Series. Structural diversity was rated as moderate This subseries was distinguished by the presence of California bay in the mid and regeneration layers and low total basal area

Table B 1 Vegetation classification for the Tanoak Series

EDP Code:	Plant Association Name:
LIDE2/VAOV Subseries	**Tanoak/Evergreen Huckleberry Subseries**
LIDE2/VAOV	Tanoak/Evergreen Huckleberry
LIDE2/VAOV-GASH	Tanoak/Evergreen Huckleberry–Salal
LIDE2/VAOV–RHMA	Tanoak/Evergreen Huckleberry–Pacific Rhododendron
LIDE2/GASH Subseries	**Tanoak/Salal Subseries**
LIDE2/GASH	Tanoak/Salal
LIDE2/GASH–RHMA	Tanoak/Salal–Pacific Rhododendron
LIDE2/GASH–BENE1	Tanoak/Salal–Dwarf Oregon-grape
LIDE2/Moist Shrub Subseries	**Tanoak/Moist Shrub Subseries**
LIDE2/COCOC	Tanoak/California Hazelnut
LIDE2/Dry Shrub Subseries	**Tanoak/Dry Shrub Subseries**
LIDE2/RHDI–LOHIV	Tanoak/Poison Oak–Pink Honeysuckle
LIDE2/BENE1	Tanoak/Dwarf Oregon-grape
LIDE2/QUVA Subseries	**Tanoak/Huckleberry Oak Subseries**
LIDE2/QUVA–RHMA	Tanoak/Huckleberry Oak–Pacific Rhododendron
LIDE2–QUKE Subseries	**Tanoak–Black Oak Subseries**
LIDE2–QUKE	Tanoak–Black Oak
LIDE2–CADE3 Subseries	**Tanoak–Incense Cedar Subseries**
LIDE2–CADE3/FECA	Tanoak–Incense Cedar/California Fescue
LIDE2–CHLA Subseries	**Tanoak–Port Orford Cedar Subseries**
LIDE2–CHLA–UMCA/VAOV	Tanoak–Port Orford Cedar–California Bay/ Evergreen Huckleberry
LIDE2–CHLA/VAOV–RHOC	Tanoak–Port Orford Cedar/ Evergreen Huckleberry–Western Azalea
LIDE2–CHLA/VAOV	Tanoak–Port Orford Cedar/Evergreen Huckleberry
LIDE2–CHLA/BENE1/LIBOL	Tanoak–Port Orford Cedar/Dwarf Oregon-grape/Twinflower
LIDE2–CHLA–ALRU2//Riparian	Tanoak–Port Orford Cedar–Red Alder//Riparian
LIDE2–CHLA/ACCI	Tanoak–Port Orford Cedar/Vine Maple
LIDE2–CHLA/VAPA	Tanoak–Port Orford Cedar/Red Huckleberry
LIDE2–CHLA/GASH	Tanoak-Port Orford Cedar/Salal
LIDE2–CHLA–TSHE/VAOV	Tanoak–Port Orford Cedar–Western Hemlock/ Evergreen Huckleberry
LIDE2–QUCH2 Subseries	**Tanoak–Canyon Live Oak Subseries**
LIDE2–QUCH2//Rockpile	Tanoak–Canyon Live Oak//Rockpile
LIDE2–QUCH2/VAOV	Tanoak–Canyon Live Oak/Evergreen Huckleberry
LIDE2–QUCH2/GASH–BENE1	Tanoak–Canyon Live Oak/Salal–Dwarf Oregon-grape
LIDE2–QUCH2–QUKE/RHDI	Tanoak–Canyon Live Oak–Black Oak/Poison Oak
LIDE2–QUCH2/RHDI	Tanoak–Canyon Live Oak/Poison Oak
LIDE2–QUCH2/BENE1	Tanoak–Canyon Live Oak/Dwarf Oregon-grape
LIDE2–CACH2 Subseries	**Tanoak–Chinquapin Subseries**
LIDE2–CACH2/GASH	Tanoak–Chinquapin/Salal
LIDE2–CACH2/GASH-RHMA	Tanoak–Chinquapin/Salal–Pacific Rhododendron
LIDE2–CACH2/RHMA/XETE	Tanoak–Chinquapin/Pacific Rhododendron/Beargrass
LIDE2–CACH2/PTAQL	Tanoak–Chinquapin/Bracken Fern
LIDE2–CACH2/BENE1	Tanoak–Chinquapin/Dwarf Oregon-grape
LIDE2–CACH2/VAOV–GASH	Tanoak–Chinquapin/Evergreen Huckleberry–Salal
LIDE2–Maple Subseries	**Tanoak–Maple Subseries**
LIDE2–ACMA/POMU1	Tanoak–Bigleaf Maple/Swordfern
LIDE2/ACCI–GASH	Tanoak/Vine Maple–Salal
LIDE2/ACCI	Tanoak/Vine Maple
LIDE2–UMCA Subseries	**Tanoak–California Bay Subseries**
LIDE2–UMCA/RHDI	Tanoak–California Bay/Poison Oak
LIDE2–UMCA/VAOV	Tanoak–California BayEvergreen Huckleberry

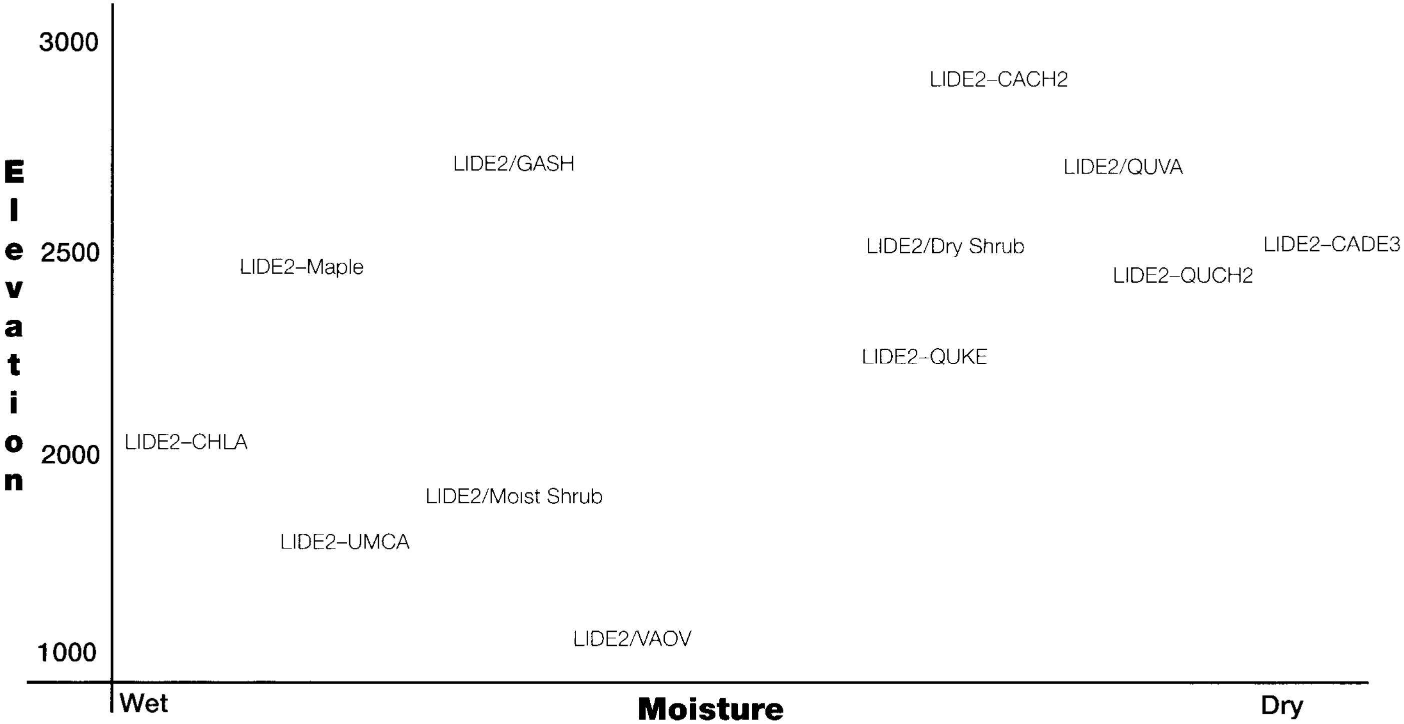


Figure B 1 Relative relationships of subseries in the Tanoak Series based on elevation and moisture.

Table B 2 Significant discriminant variables in the late seral stands of the LIDE2/ VAOV Subseries (+ = trace cover)

Variable:	LIDE2/ VAOV	LIDE2/ VAOV-GASH	LIDE2/ VAOV-RHMA
Elevation	1633'	1732'	2512'
Transformed aspect	3.6	3 7	2 7
Slope	40%	50%	52%
Distance (ocean)	21 9 miles	24 8 miles	28 5 miles
Overstory Douglas-fir	35%	40%	42%
Pacific rhododendron	+%	+%	4%
salal	1%	16%	2%
evergreen huckleberry	44%	25%	10%
bracken fern	+%	2%	+%
vanilla leaf	+%	+%	2%

The LIDE2-UMCA Subseries included two plant association types. LIDE2-UMCA/VAOV and LIDE2-UMCA/RHDI The significant environment variable that distinguished between them was distance to the Pacific Ocean Vegetation differences included the presence of, or percent cover of salal, evergreen huckleberry and poison oak (Table B.3).

Table B 3 Significant discriminant variables in the late seral stands of the LIDE2-UMCA Subseries (+ = trace cover)

Variable:	LIDE2-UMCA/VAOV	LIDE2-UMCA/RHDI
Distance (ocean)	15.0 miles	38 0 miles
salal	8%	0%
evergreen huckleberry	42%	0%
poison oak	+%	5%

Tanoak/Moist Shrub (LIDE2/Moist Shrub) Subseries

This subseries had among the lowest mean elevation, slope and radiation index in the Tanoak Series It was identified on low elevation, cool, moist, inland sites, with high soil coarse fragments, in lower third or streamside riparian positions It had concave and undulating micro-relief Conifer productivity was the lowest, while hardwood productivity was the highest in the Tanoak Series Structural diversity was moderate This subseries was distinguished by high cover of tanoak in the regeneration layer, moderate total shrub cover, made up primarily of California hazelnut and Pacific madrone in the mid layers

The LIDE2//Moist Shrub Subseries included one plant association type LIDE2/COCOC The significant environment variables that distinguished it from the other subseries were elevation and slope Vegetation differences included low total shrub cover, the presence of, or percent cover of Pacific madrone, understory tanoak and canyon live oak

Tanoak-Port Orford Cedar (LIDE2-CHLA) Subseries

This subseries was identified primarily on cool, wet or moist, coastal sites, in lower third or streamside riparian positions Micro-relief was primarily concave or undulating The LIDE2-CHLA Subseries had the lowest mean slope, closest proximity to the Pacific Ocean and among the highest A horizon coarse fragments in the Tanoak Series Conifer productivity and the mean number of large trees >30" d b h were the highest in the Tanoak Series Structural diversity was very high This subseries was distinguished by the presence of Port Orford cedar in the overstory and mid layers.

The LIDE2-CHLA Subseries included nine plant association types LIDE2-CHLA-UMCA/VAOV, LIDE2-CHLA/VAOV-RHOC, LIDE2-CHLA/VAOV, LIDE2-CHLA/BENE1/LIBOL, LIDE2-CHLA-ALRU2//Riparian, LIDE2-CHLA/ACCI, LIDE2-CHLA/VAPA, LIDE2-CHLA/GASH and LIDE2-CHLA-TSHE/VAOV The significant discriminant environment differences that distinguished between these plant associations were elevation, bare ground%, surface rock and AWC. Vegetation differences included the presence of, or percent cover of overstory western hemlock, red alder and incense cedar, understory tanoak and California bay, salal, vine maple, western azalea, evergreen huckleberry, dwarf Oregon-grape and beargrass (Table B 4).

Some associations of this subseries, have subsurface water or seeps, which make them likely candidates for supporting clouded, Del Norte or southern torrent salamanders In a riparian/upland census (Ralph et al. 1994) identified the song sparrow, yellow warbler and yellow-breasted chat as "riparian specialists", warbling vireo, Swainson's thrush, Wilson's warbler and MacGillivary's warbler as having a "riparian preference" In 1995 the warbling vireo and MacGillivary's warbler qualified as "riparian specialists" and the western wood-pewee, black-headed grosbeak and orange-crowned warbler showed a "riparian preference"

This subseries is also likely to support a high number of amphibians and shrews Walls et al (1992) reports that the Pacific giant, Olympic salamander and tailed frog commonly occur in smaller mountain streams, spring heads and seeps, while the foothill yellow-legged frog occupies larger streams and rivers He also reported that tailed frogs are dependent on cool flowing streams, which are likely to be affected by increased water temperatures following clear-cutting and that the Pacific giant salamanders was only found in steep portions of logged streams He further stated that Olympic salamanders required cold, flowing, perennial streams

Tanoak–Black Oak (LIDE2–QUKE) Subseries

This subseries had the second highest mean radiation index, indicating the warm conditions here It was identified on mid elevation, warm, dry, upland sites, in upper and middle third slope positions, with convex, linear and undulating micro-relief It had the highest mean distance from the Pacific Ocean of all subseries in the Tanoak Series Conifer, hardwood productivity and structural diversity were high This subseries was distinguished by high radiation index, low total shrub cover, high AWC and the presence of black oak in the mid layers.

The LIDE2-QUKE Subseries included one plant association type LIDE2-QUKE The significant environment variables that distinguished it from the other subseries in the Tanoak Series were AWC and slope Vegetation differences included the presence of, or percent cover of black oak, dwarf Oregon-grape and chinquapin

Oak mast is an essential component to quail, scrub jay, acorn woodpecker, band-tailed pigeon and black-tailed deer Oak production is generally cyclic, every 2–3+ years and may take 2 years to mature Verner (1980) found mast production in black oak stands ranged from 0 to 1543 lb /acre

Tanoak–Canyon Live Oak (LIDE2–QUCH2) Subseries

This subseries was found on the steepest mean slopes, with high A horizon coarse fragments and the second highest surface rock percent It was identified on mid elevation, warm, dry, upland, ridgetop, upper and middle third slope

Table B 4 Significant discriminant variables in the late seral stands of the LIDE2-CHLA Subseries (+ = trace cover)

Variable:	LIDE2–CHLA/ UMCA/VAOV	LIDE2–CHLA/ VAOV-RHOC	LIDE2–CHLA/ VAOV	LIDE2–CHLA/ BENE1/LIBOL	LIDE2–CHLA- ALRU2// Riparian	LIDE2–CHLA/ ACCI	LIDE2–CHLA/ VAPA	LIDE2–CHLA/ GASH	LIDE2–CHLA- TSHE/VAOV
Elevation	1092'	1687'	1893'	2778'	2527'	2875'	2583'	2667'	1553'
Bare ground	+%	1%	+%	+%	4%	1%	+%	+%	+%
Surface rock	2%	2%	6%	2%	17%	5%	2%	1%	5%
AWC	2 8"	3 8"	2 9"	2 7"	1 9"	2 8"	1 5"	3 0"	2 3"
western hemlock	0%	0%	0%	0%	0%	0%	0%	0%	20%
red alder	2%	+%	1%	+%	39%	3%	0%	0%	1%
incense cedar	+%	1%	0%	0%	0%	0%	4%	0%	0%
tanoak	8%	8%	10%	13%	10%	11%	26%	7%	7%
California bay	3%	1%	+%	+%	+%	+%	0%	+%	0%
salal	7%	11%	15%	2%	8%	21%	2%	66%	5%
evergreen huckleberry	38%	25%	32%	+%	0%	+%	2%	1%	47%
vine maple	1%	0%	+%	+%	24%	48%	0%	0%	+%
western azalea	0%	13%	+%	+%	3%	+%	+%	+%	0%
dwarf Oregon-grape	1%	+%	3%	12%	+%	10%	0%	2%	2%
beargrass	+%	0%	+%	2%	1%	1%	+%	+%	+%

positions with convex, linear and undulating micro-relief Conifer productivity and structural diversity were low to moderate depending on the percentage of canyon live oak present. This subseries was distinguished by hot southerly aspects, the presence of high surface gravel and rock, high radiation index, low AWC, high subsurface soil coarse fragments and canyon live oak in the mid and regeneration layers

The LIDE2–QUCH2 Subseries included six plant association types LIDE2–QUCH2//Rockpile, LIDE2–QUCH2/VAOV, LIDE2–QUCH2/GASH–BENE1, LIDE2–QUCH2–QUKE/RHDI, LIDE2–QUCH2/RHDI and LIDE2–QUCH2/BENE1. The significant environment variables that distinguished between them were elevation, distance to the Pacific ocean, bare ground, A horizon thickness, A horizon coarse fragments and AWC. Vegetation differences included the presence of, or percent cover of overstory Douglas-fir and black oak, understory black oak, chinquapin and canyon live oak, salal, evergreen huckleberry, dwarf Oregon-grape and swordfern (Table B 5)

These associations tend to have high soil coarse fragments and surface rock and may be likely to support Del Norte salamanders, or in the Coast Range the California slender salamander

Oak mast here is an essential food to quail, scrub jay, acorn woodpecker, band-tailed pigeon and black-tailed deer (Block et. al. 1990) Oak production is generally cyclic, every 2–3+ years (Verner 1980) A canyon live oak stand has been recorded to produce as much as 1960 lb of mast/acre, but this is not typical Barrett (1980), showed heavy acorn use by western gray squirrel, moderate foliage use by black-tailed deer and dusky-footed wood-rat

Tanoak–Maple (LIDE2–Maple) Subseries

This subseries was identified on mid elevation, cool, streamside, lower and middle third slope positions with concave and undulating micro-relief Conifer and hardwood productivity were moderate and structural diversity was high This subseries was distinguished by high surface rock, high A horizon coarse fragments, concave micro-relief, low radiation index, primarily inland site locations and the presence of bigleaf maple in the overstory, vine maple and dwarf Oregon-grape in the shrub layer and swordfern in the herb layer

The LIDE2–Maple Subseries included three plant association types LIDE2–ACMA/POMU1, LIDE2/ACCI–GASH and LIDE2/ACCI. The significant environment variables that distinguished between them were elevation, surface rock and gravel, distance to the Pacific Ocean, A horizon coarse fragments and subsurface pH Vegetation differences included total tree and shrub cover, moss cover, total basal area, the presence of, or percent cover of chinquapin, understory Pacific yew, salal, vine maple, evergreen huckleberry, dwarf Oregon-grape, swordfern and twinflower.

Ralph (1994) identified the song sparrow, yellow warbler and yellow-breasted chat as "riparian specialists" and warbling vireo, Swainson's thrush, Wilson's warbler and MacGillivary's warbler as having a "riparian preference" Surveys conducted in 1995 revealed that the warbling vireo and MacGillivary's warbler qualified as "riparian specialists" and the western wood-pewee and black-headed grosbeak and orange–crowned warbler showed a "riparian preference"

This subseries was also likely to support a large number of amphibians and shrews Walls (1992) reported that the Pacific giant and Olympic salamander, plus the tailed frog commonly occurred in smaller mountain streams, spring heads and seeps, while the foothill yellow-legged frog occupied larger streams and rivers. He also reported that tailed frogs are dependent on cool flowing streams, which are

Table B 5 Significant discriminant variables in the late seral stands of the LIDE2–QUCH2 Subseries (+ = trace cover)

Variable:	**LIDE2–QUCH2// Rockpile**	**LIDE2–QUCH2/ VAOV**	**LIDE2–QUCH2/ GASH–BENE1**	**LIDE2–QUCH2- QUKE/RHDI**	**LIDE2–QUCH2/ RHDI**	**LIDE2–QUCH2/ BENE1**
Elevation	3121'	1488'	3033'	2422'	2178'	3116'
Distance (ocean)	25 0 miles	19 1 miles	21.4 miles	32 3 miles	29 6 miles	22 8 miles
Bare ground	8%	+%	+%	1%	3%	1%
A horizon thickness	7 0"	4.7"	5 5"	5 8"	8 9"	5.5"
A horizon coarse fragment	35%	38%	49%	21%	45%	39%
AWC	2.8"	1 9"	2 3"	3 8"	2.5"	1 5"
Total tree cover	90%	87%	88%	87%	76%	89%
Overstory Douglas-fir	45%	44%	50%	37%	38%	61%
Overstory black oak	+%	0%	+%	7%	0%	+%
Understory black oak	0%	0%	0%	1%	3%	1%
Understory Douglas-fir	1%	1%	1%	5%	1%	1%
Understory chinquapin	0%	+%	2%	+%	+%	+%
Understory canyon live oak	5%	3%	4%	3%	8%	6%
salal	+%	9%	24%	0%	0%	0%
evergreen huckleberry	+%	63%	+%	0%	+%	0%
dwarf Oregon-grape	+%	1%	14%	+%	1%	16%
swordfern	+%	3%	2%	1%	1%	1%

likely to be affected by increased water temperatures following clear-cutting and that the Pacific giant salamander was only found in steep portions of logged streams He also found that the Olympic salamander required cold, flowing perennial streams as its optimum habitat

Table B.6 Significant discriminant variables in the late seral stands of the LIDE2–Maple Subseries. (+ = trace cover)

Variable:	LIDE2-ACMA/ POMU1	LIDE2/ACCI–GASH	LIDE2/ ACCI
Elevation	2200'	2227'	2954'
Surface rock	9%	16%	22%
Surface gravel	7%	4%	6%
A horizon coarse frag	35%	48%	47%
Subsurface pH	5 7	6.1	5 0
Moss cover	9%	18%	2%
Distance (ocean)	31.3 miles	21 3 miles	32 3 miles
Total basal area	288 sq. ft	329 sq ft	299 sq ft
Total tree cover	89%	77%	81%
Total shrub cover	17%	64%	22%
Pacific yew	+%	2%	+%
chinquapin	+%	+%	5%
salal	2%	27%	0%
vine maple	1%	22%	17%
evergreen huckleberry	2%	7%	0%
dwarf Oregon-grape	6%	11%	8%
swordfern	3%	11%	1%
twinflower	+%	+%	3%

Tanoak/Dry Shrub (LIDE2/Dry Shrub) Subseries

This subseries was identified on mid elevation, cool, dry, inland sites, in lower through upper third slope positions Conifer and hardwood productivity were moderate and structural diversity was high This subseries was distinguished by low radiation index, high distance from the ocean, thick A horizons, low subsurface coarse fragments and high total basal area. Vegetation differences included low shrub cover, dwarf Oregon-grape and trace cover of canyon live oak and chinquapin

The LIDE2/Dry Shrub Subseries included two plant association types LIDE2/RHDI–LOHIV and LIDE2/BENE1 The significant variables that distinguished between them were elevation, percent cover of poison oak, dwarf Oregon-grape and twinflower (Table B 7)

Table B 7 Significant discriminant variables in the late seral stands of the LIDE2/Dry Shrub Subseries (+ = trace cover)

Variable:	LIDE2/RHDI–LOHIV	LIDE2/BENE1
Elevation	1848'	2780'
poison oak	4%	+%
dwarf Oregon-grape	0%	10%
twinflower	0%	1%

Tanoak-incense Cedar (LIDE2-CADE3) Subseries

This subseries was identified on mid elevation, hot, dry sites, in upper and middle third slope positions, with serpentine soils Conifer productivity was moderate while hardwood productivity was low Structural diversity was moderate

The LIDE2–CADE3 Subseries included one plant association type. LIDE2–CADE3/FECA The significant variables that distinguished between it and other subseries were serpentine soils, high soil pH, low subsurface coarse fragments, low shrub cover, the presence of, or cover of incense cedar, California bay, black oak and California fescue.

This subseries includes grassland characteristics which provide savannah or open woodlands preferred by some wildlife species such as deer, bear and elk.

Tanoak/Salal (LIDE2/GASH) Subseries

This subseries had the highest mean conifer volume of all subseries in the Tanoak Series It was found on steep, mid elevation, moist, cool, shaded, upper and middle third slope positions with linear, concave and undulating micro-relief, usually in coastal positions Conifer productivity and structural diversity were high This subseries was distinguished by its close proximity to the Pacific ocean, high elevation position within the Tanoak Series, very steep slopes and high cover of salal and understory tanoak.

The LIDE2/GASH Subseries included three plant association types LIDE2/GASH, LIDE2/GASH-RHMA and LIDE2/GASH-BENE1 The significant variables that distinguished between the three were vertical micro-relief, total forb cover, the presence of, or percent cover of Douglas-fir, Pacific yew, tanoak, Pacific rhododendron, dwarf Oregon-grape, salal, poison oak and vanilla leaf (Table B 8)

Table B.8 Significant discriminant variables in the late seral stands of the LIDE2/GASH Subseries. (+ = trace cover)

Variable:	LIDE2/ GASH–RHMA	LIDE2/ GASH	LIDE2/ GASH–BENE1
Vert micro-relief	concave	linear	concave
Total forb cover	23%	6%	5%
Overstory Douglas-fir	60%	54%	48%
tanoak	24%	45%	46%
Pacific yew	2%	+%	0%
Pacific rhododendron	21%	+%	+%
salal	41%	60%	22%
dwarf Oregon-grape	7%	3%	9%
poison oak	0%	1%	+%
vanilla leaf	4%	1%	+%

Tanoak/Huckleberry Oak (LIDE2/QUVA) Subseries

This subseries had the second highest mean elevation and surface rock, the lowest number of hardwoods > 11" d b.h. and the second lowest hardwood volume It was identified on high elevation, dry, rocky, upland sites on serpentine soils, in upper and middle third slope positions, with convex, linear and undulating micro-relief Total vegetation cover was very high with an open overstory tree layer and dense shrub layer Conifer productivity was moderate while hardwood volume was low Structural diversity was low

The LIDE2/QUVA Subseries included one plant association type LIDE2/QUVA–RHMA The significant variables that distinguished between it and other subseries in the Tanoak Series were cool radiation index, moderate bare ground, high subsurface coarse fragments, high soil pH, low total tree cover, the presence of huckleberry oak, dwarf tanbark, red huckleberry, wood rose, Pacific rhododendron and beargrass

This subseries included huckleberry oak which provides mast and foliage for wildlife Barret (1980) documented moderate deer browsing on this oak species

Tanoak-Chinquapin (LIDE2–CACH2) Subseries

This subseries had the highest mean elevation in the Tanoak Series It was identified on cool, moist, upland sites, where conifer productivity was often at its highest Structural diversity ranged from moderate to high This subseries was distinguished by its cool aspects, moderate slopes, high elevation position in the Tanoak Series. Vegetation differences included the presence of chinquapin in the mid and regeneration layers, Pacific rhododendron and salal in the shrub layer and beargrass in the herb layer

The LIDE2–CACH2 Subseries included six plant association types: LIDE2–CACH2/GASH, LIDE2–CACH2/GASH–RHMA, LIDE2–CACH2/RHMA/XETE, LIDE2–CACH2/PTAQL, LIDE2–CACH2/BENE1 and LIDE2–CACH2/VAOV–GASH types The significant environment variables that distinguished between the six were distance to the Pacific Ocean, surface gravel, subsurface coarse fragments and AWC. Vegetation differences included total shrub cover, the presence of, or percent cover of understory tanoak and Douglas-fir, salal, evergreen huckleberry, Pacific rhododendron, red huckleberry, dwarf Oregon-grape and vanilla leaf (Table B.9).

Riparian Types

The Tanoak Series included a number of plant associations considered to be riparian or found in riparian landscape positions (Table B 9) True riparian types are described here as those directly associated with standing or running water Types found in riparian landscape positions are defined as those located within the riparian zone (FEIS ROD 1994)

The following are descriptions of plant associations in the Tanoak Series described as riparian types or identified in riparian landscape positions All types listed below were found in the Klamath Mountains The LIDE2/VAOV and LIDE2/VAOV–GASH types were often found in riparian landscape positions, while the LIDE2/VAOV–RHMA type was considered to be a true riparian type. The LIDE2/GASH, LIDE2/GASH–RHMA and LIDE2/GASH–BENE1 types were infrequently found in riparian positions. The LIDE2/COCOC type was often found in wet areas along order 1 and 2 streams and was considered a true riparian type The LIDE2/QUVA–RHMA type was found in riparian landscape positions on serpentine soils Within the LIDE2–CHLA Subseries, the LIDE2–CHLA–UMCA/VAOV, LIDE2–CHLA/VAOV–RHOC, LIDE2–ALRU2//Riparian and LIDE2–CHLA/ACCI types were considered true riparian types They were found along order 1-5 stream courses The LIDE2–CHLA/VAOV, LIDE2–CHLA/BENE1/LIBOL, LIDE2–CHLA/VAPA, LIDE2–CHLA/GASH and LIDE2–CHLA–TSHE/VAOV were primarily found in riparian positions The LIDE2–ACMA/POMU1 type is one of the most widespread riparian types in the Klamath and Coast Range Mountains It was found along order 2–5 stream courses, most often in close proximity to mountain streams The LIDE2/ACCI–GASH type is a true riparian type, found along order 1–3 streams in coastal positions. The LIDE2/ACCI type is also a true riparian type found primarily on inland sites adjacent to order 1–3 streams The LIDE2–UMCA/RHDI and LIDE2–UMCA/VAOV types were found in riparian landscape positions, often on streamside benches

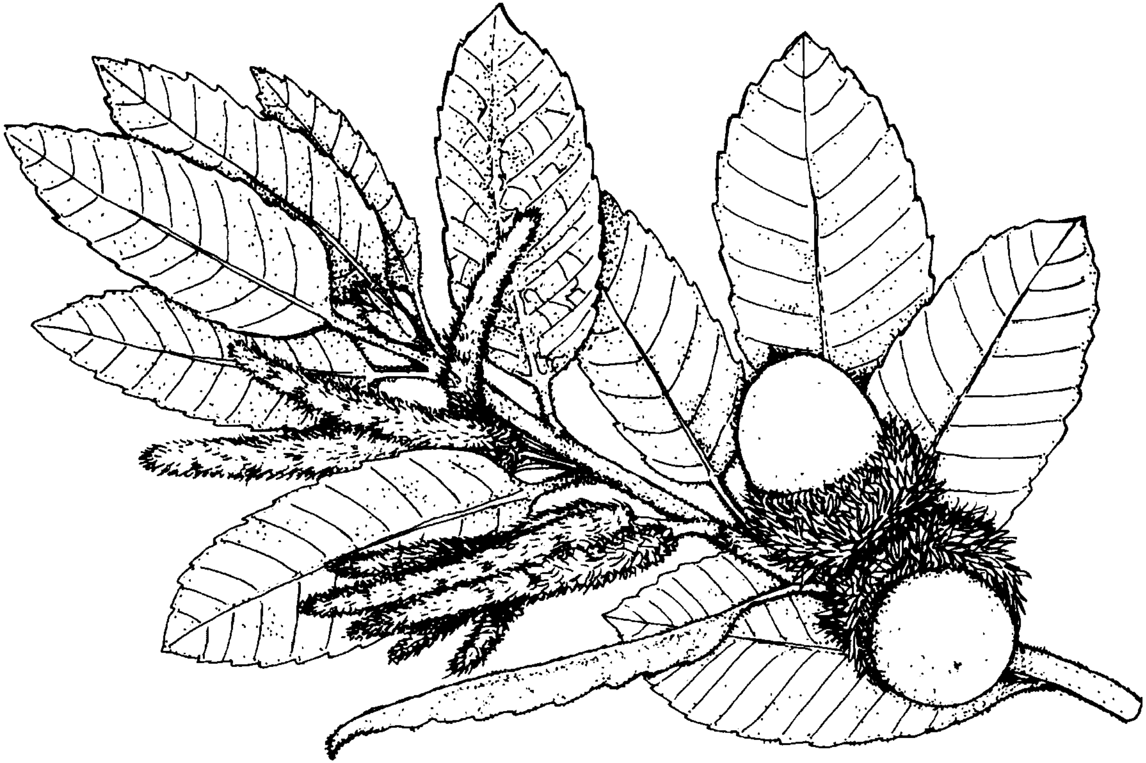
Table B.9 Significant discriminant variables in the late seral stands of the LIDE2-CACH2 Subseries (+ = trace cover)

Variable:	LIDE2–CACH2/ GASH	LIDE2–CACH2/ GASH–RHMA	LIDE2–CACH2/ RHMA/XETE	LIDE2–CACH2/ PTAQL	LIDE2–CACH2/ BENE1	LIDE2–CACH2/ VAOV–GASH
Distance (ocean)	21 4 miles	20 8 miles	29 2 miles	26 0 miles	31.7 miles	18.5 miles
Surface gravel	2%	1%	+%	1%	6%	+%
Subsurface co. fragragment	39%	35%	28%	48%	33%	20%
AWC	3 3"	3.0"	3 5"	2.6"	4 2"	4.8"
Total shrub cover	60%	89%	38%	4%	16%	61%
Understory tanoak	15%	15%	8%	7%	26%	6%
Understory Douglas-fir	1%	1%	2%	5%	1%	1%
salal	54%	71%	0%	0%	+%	2%
evergreen huckleberry	+%	4%	0%	0%	+%	50%
Pacific rhododendron	+%	34%	22%	+%	0%	1%
red huckleberry	+%	+%	5%	1%	1%	4%
dwarf Oregon-grape	8%	5%	1%	0%	8%	0%
vanilla leaf	+%	+%	+%	+%	4%	0%

Table B.10 Plant associations in the Tanoak Series described as riparian or found in riparian landscape positions.

EDP Code:	Plant Association Name:
LIDE2/VAOV Subseries	**Tanoak/Evergreen Huckleberry Subseries**
LIDE2/VAOV	Tanoak/Evergreen Huckleberry
LIDE2/VAOV–GASH	Tanoak/Evergreen Huckleberry–Salal
LIDE2/VAOV–RHMA	Tanoak/Evergreen Huckleberry–Pacific Rhododendron
LIDE2/GASH Subseries	**Tanoak/Salal Subseries**
LIDE2/GASH	Tanoak/Salal
LIDE2/GASH–RHMA	Tanoak/Salal–Pacific Rhododendron
LIDE2/GASH–BENE1	Tanoak/Salal–Dwarf Oregon-grape
LIDE2/Moist Shrub Subseries	**Tanoak/California Hazelnut Subseries**
LIDE2/COCOC	Tanoak/California Hazelnut
LIDE2/QUVA Subseries	**Tanoak/Huckleberry Oak Subseries**
LIDE2/QUVA–RHMA	Tanoak/Huckleberry Oak-Pacific Rhododendron
LIDE2–CHLA Subseries	**Tanoak–Port Orford Cedar Subseries**
LIDE2–CHLA–UMCA/VAOV	Tanoak–Port Orford Cedar-California Bay/Evergreen Huckleberry
LIDE2–CHLA/VAOV–RHOC	Tanoak–Port Orford Cedar/Evergreen Huckleberry–Western Azalea
LIDE2–CHLA/VAOV	Tanoak–Port Orford Cedar/Evergreen Huckleberry
LIDE2–CHLA/BENE1/LIBOL	Tanoak–Port Orford Cedar/Dwarf Oregon-grape/Twinflower
LIDE2–CHLA–ALRU2//Riparian	Tanoak–Port Orford Cedar–Red Alder//Riparian
LIDE2–CHLA/ACCI	Tanoak–Port Orford Cedar/Vine Maple
LIDE2–CHLA/VAPA	Tanoak–Port Orford Cedar/Red Huckleberry
LIDE2–CHLA/GASH	Tanoak–Port Orford Cedar/Salal
LIDE2–CHLA–TSHE/VAOV	Tanoak–Port Orford Cedar-Western Hemlock/Evergreen Huckleberry
LIDE2–Maple Subseries	**Tanoak–Maple Subseries**
LIDE2–ACMA/POMU1	Tanoak–Bigleaf Maple/Swordfern
LIDE2/ACCI–GASH	Tanoak/Vine Maple–Salal
LIDE2/ACCI	Tanoak/Vine Maple
LIDE2-UMCA Subseries	**Tanoak–California Bay Subseries**
LIDE2–UMCA/RHDI	Tanoak–California Bay/Poison Oak
LIDE2–UMCA/VAOV	Tanoak–California Bay/Evergreen Huckleberry

Tanoak Series Key



Tanoak Series Keys and Plant Association Descriptions

Two keys are provided for your use· a Subseries Key and a Plant Association Key The Plant Association Key includes both subseries and plant associations. It is longer, but can be used without the Subseries Key The Subseries Key includes only subseries and is provided as a shortcut to plant associations Numbers in the Subseries Key in brackets ( ) refer to lines in the Plant Association Key. For example, if you answer yes to line 3a you would proceed to line (15) in the Plant Association Key If you answered no, you would proceed to line 3b, where a yes answer would refer you to line 4 of the Subseries Key

Please remember that these keys were developed from data collected in late seral stage stands If you are attempting to use them in younger stands you should expect changes in the percent cover of individual species For instance, if you are attempting to use the keys in a 100 year old (early seral stage) LIDE2–QUCH2/VAOV type. You should expect the cover of canyon live oak (QUCH2) will often be less than the 5% required to key to this subseries. By walking around in the stand prior to using the key you should have a good idea of what the subseries is The point is, that the indicator species are almost always there, but their cover may vary

After you have run through the key and determined which plant association you are in; read through the Plant Association Summary Table for that plant association There you will find a list of the species that were frequently found in that plant association and environmental variables associated with the plant association If you do not see the species you were looking for listed in the Plant Association Summary Table for that plant association, then look at the Vegetation Summary (Appendix VI), for a more complete list of plant species found in that type.

Tanoak Subseries Key

1a. Port Orford cedar present and > 10% cover .... (2)

Tanoak–Port Orford cedar Subseries

1b. Port Orford cedar absent or not as above 2

2a. Incense cedar present and > 5% cover .... (13)

Tanoak–Incense Cedar Subseries

2b Incense cedar absent or not as above 3

3a Canyon live oak present and > 5% cover .... (15)

Tanoak–Canyon Live Oak Subseries

3b. Canyon live oak absent or not as above 4

4a. Chinquapin present and > 5% cover . . .. (21)

Tanoak–Chinquapin Subseries

4b Chinquapin absent or not as above 5

5a Maple (bigleaf or vine) present and > 5% cover .. (27)

Tanoak–Maple Subseries

5b Maple absent or not as above 6

6a. Black oak present and > 2% cover, total shrub cover < 10% . . ... (31)

Tanoak–Black Oak Subseries

6b Black oak absent or not as above 7

7a. Evergreen huckleberry > 10% cover and exceeds Salal .... (33)

Tanoak/Evergreen Huckleberry Subseries

7b. Evergreen huckleberry absent or not as above 8

8a Salal present and > 10% cover .... (36)

Tanoak/Salal Subseries

8b. Salal absent or not as above 9

9a. Huckleberry oak and Pacific rhododendron > 5% cover (38)

Tanoak/Huckleberry Oak Subseries

9b. Huckleberry oak or Pacific rhododendron absent or not as above 10

10a California bay present and > 10% cover .. (39)

Tanoak-California Bay Subseries

10b California bay absent or not as above 11

11a California hazelnut present and dwarf Oregon grape absent(40)

Tanoak/Moist Shrub Subseries

11b Not as above 12

12a Poison oak and hairy honeysuckle present ...... (41)

Tanoak/Dry Shrub Subseries

12b. Not as above ... (42)

Tanoak Plant Association Key

1a Port Orford cedar present and ≥ 10% cover 2

Tanoak–Port Orford Cedar Subseries

2a Evergreen huckleberry present and > 10% cover 3

3a Western hemlock present and > 10% cover LIDE2–CHLA–TSHE/VAOV (B–77)

3b Western hemlock absent or not as above 4

4a Western azalea present and > 2% cover LIDE2–CHLA/VAOV–RHOC (B–85)

4b Western azalea absent or not as above 5

5a California bay present and ≥ 2% cover with evergreen huckleberry LIDE2–CHLA–UMCA/VAOV (B–81)

5b California bay absent but evergreen huckleberry present or not as above LIDE2–CHLA/VAOV (B–89)

2b. Evergreen huckleberry absent or not as above 6

6a Red alder present and ≥ 5% cover LIDE2–CHLA–ALRU2//Riparian (B–93)

6b. Red alder absent or not as above . 7

7a Vine maple present and ≥ 10% cover LIDE2–CHLA/ACCI (B–105)

7b Vine maple absent or not as above 8

8a Dwarf Oregon-grape present and > 2% cover with twinflower and Salal < 10% cover LIDE2–CHLA/BENE1/LIBOL (B–107)

8b Dwarf Oregon-grape absent or not as above 9

9a Salal present and ≥ 10% cover LIDE2–CHLA/GASH (B–101)

9b. Salal absent or not as above 10

10a Red huckleberry present and ≥ 2% cover LIDE2–CHLA/VAPA (B–97)

10b. Red huckleberry absent or not as above 11

11a California bay present in overstory with evergreen huckleberry and huckleberry oak absent LIDE2–CHLA–UMCA/VAOV (B–81)

11b California bay absent or not as above 12

1b Port Orford cedar absent or not as above 12

12a Incense cedar present and ≥ 5% cover 13

Tanoak–Incense Cedar Subseries

13a California fescue present and ≥ 2% cover LIDE2–CADE3/FECA (B–73)

13b. California fescue absent or not as above 14

12b Incense cedar absent or not as above 14

14a. Canyon live oak present and ≥ 5% cover 15

Tanoak-Canyon Live Oak Subseries

15a Evergreen huckleberry present and ≥ 10% cover LIDE2–QUCH2/VAOV (B–125)

15b Evergreen huckleberry absent or not as above 16

16a Dwarf Oregon-grape present and ≥ 2% cover 17

17a. Salal present and ≥ 5% cover .. ....
.... LIDE2–QUCH2/GASH–BENE1 (B–137)
17b. Salal absent or not as above LIDE2–QUCH2/BENE1 (B–141)
16b Dwarf Oregon-grape absent or not as above 18
18a. Black oak present and ≥ 2% cover with poison oak ....
. .. . . . LIDE2–QUCH2–QUKE/RHDI (B–129)
18b Black oak absent or not as above 19
19a Poison oak present and ≥ 2% cover LIDE2–QUCH2/RHDI (B–131)
19b Poison oak absent or not as above and soil covered by rock mulch
LIDE2–QUCH2//Rockpile (B–145)
14b. Canyon live oak absent or not as above 20
20a Chinquapin present and ≥ 5% cover 21

Tanoak–Chinquapin Subseries

21a Evergreen huckleberry ≥ 5% cover with salal ..
. LIDE2–CACH2/VAOV-GASH (B–149)
21b Evergreen huckleberry absent or not as above 22
22a. Pacific rhododendron present and ≥ 10% cover 23
23a Salal ≥ 10% cover LIDE2–CACH2/GASH-RHMA (B–157)
23b Salal absent or not as above with beargrass
.... LIDE2–CACH2/RHMA/XETE (B–163)
22b Pacific rhododendron absent or not as above 24
24a Salal present and ≥ 10% cover LIDE2–CACH2/GASH (B–153)
24b. Salal absent or not as above 25
25a. Dwarf Oregon-grape present LIDE2–CACH2/BENE1 (B–159)
25b Bracken fern present and not as above ....
. LIDE2–CACH2/PTAQL (B–169)
20b. Chinquapin absent or not as above . ... .26
26a. Maple (bigleaf or vine) present and ≥ 5% cover 27

Tanoak–Maple Subseries

27a Vine maple present and ≥ 10% cover 28
28a Salal present and ≥ 10% cover LIDE2/ACCI–GASH (B–49)
28b Salal absent or not as above LIDE2/ACCI (B–57)
27b Vine maple absent or not as above 29
29a. Bigleaf maple present and ≥ 5% cover 30
30a Swordfern present and California hazelnut either absent or trace ..
. . .. LIDE2–ACMA/POMU1 (B–53)
30b Swordfern absent 31
29b Bigleaf maple absent or not as above 31
26b Maple (bigleaf or vine) absent or not as above 31

Tanoak–Black Oak Subseries

31a Black oak present and ≥ 2% cover, total shrub cover < 10%
.. . . LIDE2–QUKE (B–45)
31b Black oak absent or not as above . 32

32a Evergreen huckleberry ≥ 10% cover and exceeds Salal 33

Tanoak/Evergreen Huckleberry Subseries

33a Pacific rhododendron ≥ 10% cover, huckleberry oak absent
. . .. LIDE2/VAOV–RHMA (B–29)

33b Pacific rhododendron absent or not as above 34

34a Salal present and ≥ 10% cover LIDE2/VAOV–GASH (B–37)

34b Salal absent or not as above LIDE2/VAOV (B–33)

32b Evergreen huckleberry absent or not as above 35

35a Salal present and ≥ 10% cover 36

Tanoak/Salal Subseries

36a. Pacific rhododendron ≥ 10% cover LIDE2/GASH–RHMA (B–69)

36b Pacific rhododendron absent or not as above 37

37a Dwarf Oregon-grape ≥ 5% cover LIDE2/GASH–BENE1 (B–65)

37b Dwarf Oregon-grape absent or not as above
. . .. LIDE2/GASH (B–61)

35b Salal absent or not as above 38

Tanoak/Huckleberry Oak Subseries

38a. Huckleberry oak and Pacific rhododendron ≥ 5% cover ....
.. . . LIDE2/QUVA–RHMA (B–113)

38b Huckleberry oak or Pacific rhododendron absent or not as above 39

39a California bay present and ≥ 10% cover 40

Tanoak–California Bay Subseries

40a Evergreen huckleberry ≥ 10% cover
.... LIDE2–UMCA/VAOV (B–21)

40b. Evergreen huckleberry absent or not as above and poison oak present LIDE2–UMCA/RHDI (B–25)

39b. California bay absent or not as above 41

Tanoak/Moist Shrub Subseries

41a California hazelnut present and dwarf Oregon-grape absent LIDE2/COCOC (B–41)

41b. Not as above . 42

Tanoak/Dry Shrub Subseries

42a. Poison oak and pink honeysuckle present
LIDE2/RHDI–LOHIV (B–117)

42b. Not as above 43

43a Dwarf Oregon-grape present LIDE2/BENE1 (B–121)

43b Not as above .... Return to step 1 and try again

Plant Association: Tanoak–California Bay/ Evergreen Huckleberry
EDP Code Name: LIDE2–UMCA/VAOV
Eco-Code: HT0HBC12

Indicator species:
California bay (*Umbellularia californica*–UMCA) was found on moist, low elevation, moderately steep sites, in streamside and lower third slope positions.

Indicator species:
Evergreen huckleberry (*Vaccinium ovatum*–VAOV) was found on moist, low elevation sites close to the Pacific Ocean or sites with coastal fog. Shrub cover here was low, while surface rock, A horizon thickness, and total basal area was also low.

Tanoak–California Bay/Evergreen Huckleberry

LIDE2–UMCA/VAOV Association
Eco-Code HT0HBC11

This coastal, riparian, low elevation type was found on slopes cooled by topographic shading. The soils were primarily deep with high coarse fragment content. It was characterized by the mesic site indicators, California bay and evergreen huckleberry.

Plant Association Summary

(Sample size: 6)		COVER	CON
Tree Overstory Layer			
PSME	Douglas-fir	47	100
LIDE2	Tanoak	25	100
UMCA	California Bay	20	100
ACMA	Bigleaf Maple	10	60
Tree Understory Layer			
LIDE2	Tanoak	22	100
UMCA	California Bay	9	100
PSME	Douglas-fir	1	40
TABR	Pacific Yew	1	40
Shrubs			
VAOV	Evergreen Huckleberry	36	100
GASH	Salal	11	80
BENE1	Dwarf Oregon-grape	2	80
VAPA	Red Huckleberry	5	60
COCOC	California Hazelnut	2	60
Herbs & Grasses			
POMU1	Swordfern	16	80
XETE	Beargrass	2	40
TROV2	White Trillium	1	40

Ranger Districts
Gasquet

Environment
Distance to the Ocean: 7.5–25.5 miles

Elevation: 1100–2300'

Aspect: W., E.

Slope: 7–70%

Slope Position: lower 1/3, streamside

Surface Rock: 2–4%

Soils
Pit Depth: 40"+

AWC: 2.0–3.1"

Parent Material: phyllite, sandstone

A Horizon—
Coarse Frag: 43–75%
Textures: xgl, vgl
Thickness: 2–14"
pH: 5.7–6.3"

Physical and Biological Environment

Distribution/Setting

This type was found in riparian positions on coastal sites where mean distance to the Pacific Ocean was 15 miles Elevation averaged 1,548' and slopes were typically steep, averaging 39% Mean radiation index was .436, but is likely much cooler as the result of topographic shading.

Soils

Soils were predominately mesic, deep (67%) and well drained They formed in alluvium, residuum and colluvium The litter layer thickness averaged 1 6" at 70% cover Surface rock averaged 2% cover. The average surface horizon thickness was 10", texture varied from very gravelly to extremely gravelly loam, coarse fragment content averaged 64% and pH averaged 6.1 (slightly acid)

Subsoil textures were predominately very gravelly loam. Subsoil coarse fragment content averaged 54% and ranged from 50% to 58%. Subsurface pH averaged 6.1 (slightly acid) and ranged from 5.7 (moderately acid) to 6.3 (slightly acid) The soils were skeletal. Total soil AWC averaged 2 7" and ranged from 2 0" to 3 1" These soils were classified into the subgroups Dystric Xerochrepts and Entic Xerumbrepts

Vegetation

The total vegetation cover was very high ranging from 97% to 99% with an average of 98% Mean overstory tree cover was 94% Overstory tree cover was split between conifers that averaged 50% cover and ranged from 33% to 80% and hardwoods that averaged 54% and ranged from 30% to 93% cover The regeneration layer averaged 29% cover Shrub cover was high with an average cover of 67%. Forb cover was moderate with an average of 13% cover. Grass cover was spotty with < 1% average cover.

Stand Structure

Late seral stands often had 5 or more layers of trees, while early mature and mid-mature stands usually had 2 or 3 layers. In late seral stands the top 2 layers were dominated by Douglas-fir The lower three layers were dominated by tanoak and California bay Large conifers dominated the top two layers with an average of 13 trees/acre > 30" d b h and 11 trees/acre > 40" d b h Hardwoods dominated the lower layers and included 181 trees/acre > 5" d.b.h., 30 trees/acre > 11" d b h. and 9 trees/acre > 18" d.b.h.

The stand structure characteristics by layer were as follows: the top layer averaged 291 years old with an average diameter of 50" and average height of 156'. The second layer had an average age of 314 years with a mean diameter of 39" and a mean height of 136'. The third layer was dominated by California bay and tanoak, it had a mean diameter of 21" and mean height of 91'. The fourth layer had a mean diameter of 14" and a mean height of 73' The fifth layer had a mean diameter of 9" and a mean height of 51'

Overall biomass production (conifer + hardwoods + shrubs) was generally moderate Modal Dunning site class was 1, with site index of 175 at 300 years Conifer productivity was generally moderate with an average volume of 6183 cu. ft , it ranged from 4176 to 8313 cu ft , due to the variable cover of hardwoods Softwood basal area averaged 165 sq ft. and ranged from 107 to 200 sq ft. Hardwood volume averaged 1336 cu. ft and ranged from 495 to 2921 cu ft. Hardwood basal area averaged 71 sq ft and ranged from 27 to 133 sq. ft Stand density index was 382 and fell in the lower group of the Tanoak Series.

Fire Regime

This type was rarely found in early seral stages (shrub/forb and pole) indicating a high-severity fire regime with very infrequent high-intensity stand-replacing fires following periods of extended drought. Typical fires (in non-drought years) were slow moving, creeping ground fires, burning by opportunity (occasional logs and fuel accumulations), and scorching small pockets of the overstory

Management Implications

This type is often found in riparian positions that limit management treatments Port Orford cedar root disease is an issue here When Port Orford cedar is present a risk assessment needs to be completed for any management activity

Silvicultural Systems: Silvicultural systems are limited when this type is found in riparian positions Outside riparian areas all silvicultural systems are applicable

Site Preparation: Hand pile, jackpot burn or underburn are recommended in riparian areas Moderate or high intensity broadcast burns can lead to significant competition from snowbrush

Regeneration: Anticipate lower survival rates in areas with high soil coarse fragments

Release: Early and multiple releases are recommended.

Animal Damage Control Problems: None known

Stockability: Anticipate stocking levels below regional stocking guidelines on sites with high soil coarse fragments

Species Considerations: Pacific yew and Oregon white oak were infrequent components and should be maintained in all management treatments Port Orford cedar occurs occassionally should also be maintained

Cultural and Commercial: The cultural species most frequently found were tanoak, bigleaf maple, dwarf Oregon-grape, California hazelnut, beargrass and prince's pine. The most frequently occurring commercial plant species were California bay, red huckleberry and salal (also cultural species)

Insects and Disease: Potential for Port Orford cedar root disease infection and/ or subsequent spread is moderate due to proximity to free water and low density of Port Orford cedar or limited proximity to free water and high density of Port Orford cedar.

Fire Suppression: Line construction is labor intensive. Fire suppression tactics using control strategies can be more detrimental than fire effects. Opportunities exist to use modified suppression tactics (light hand on the land), confine and contain strategies Fires originating in this plant association will normally creep around and eventually come into contact with adjacent upslope fuels where it may become more intense.

Prescribed Fire: Use fire to manage for cultural species (i.e., beargrass) and to create openings for natural regeneration. Allowing fires to back into riparian areas will help reduce fuel loading.

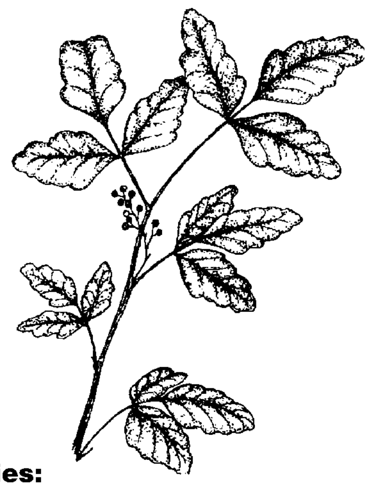
Closely Related Types

The LIDE2–UMCA/VAOV type may be replaced on moist streamsides by the LIDE2–CHLA–ALRH//Riparian and on residuum and colluvium at upland sites by the LIDE2/VAOV type .

Notes

Plant Association: Tanoak–California Bay/Poison Oak
EDP Code Name: LIDE2–UMCA/RHDI
Eco-Code: HT0HBC11

Indicator species:
California bay (*Umbellularia californica*–UMCA) was found on moist, low elevation, moderately steep sites, in streamside and lower third slope positions.



Indicator species:
Poison oak (*Rhus diversiloba*–RHDI) was found on steep, warm, low elevation, inland sites, with moderate soil coarse fragments and acidic soil pH.

Tanoak–California Bay/Poison Oak
LIDE2–UMCA/RHDI Association
Eco-Code HT0HBC11

This inland, riparian, low elevation type was found on very steep, cool slopes where temperatures were moderated by topographic shading. The soils were deep to moderately deep and had high AWC. It was characterized by the indicator species, California bay and poison oak.

Plant Association Summary

(Sample size: 5)		COVER	CON
Tree Overstory Layer			
PSME	Douglas-fir	45	100
LIDE2	Tanoak	34	100
UMCA	California Bay	23	100
ARME3	Pacific Madrone	23	80
Tree Understory Layer			
LIDE2	Tanoak	14	100
UMCA	California Bay	7	100
PSME	Douglas-fir	3	60
Shrubs			
RHDI	Poison Oak	7	80
COCOC	California Hazelnut	6	60
LOHIV	Pink Honeysuckle	1	60
Herbs & Grasses			
TRLA3	Western Starflower	1	80
PTAQL	Bracken Fern	1	60
POMU1	Swordfern	1	60
CHME2	Little Prince's Pine	1	60

Ranger Districts
Gasquet, Mad River, Ukonom, Happy Camp

Environment
Distance to the Ocean: 25.5–43.5 miles

Elevation: 1140–2580'

Aspect: S.W., E.

Slope: 14–68%

Slope Position: lower, middle 1/3

Surface Rock: 0–2%

Soils
Pit Depth: 31–40"+

AWC: 3.1–6.0"

Parent Material: mafic, serpentine, greenstone

A Horizon—

Coarse Frag: 16–50%

Textures: gl, vgl

Thickness: 3–7"

pH: 6.5–7.0

Physical and Biological Environment

Distribution/Setting

This type was found in riparian positions on inland sites where mean distance to the Pacific Ocean was 33.3 miles. Elevation averaged 1810' and slopes were typically very steep, averaging 47%. Mean radiation index was .467, but is likely moderated by topographic shading.

Soils

Soils were predominately mesic, deep (60%) and moderately deep (40%) and well drained They formed in residuum and colluvium. The litter layer thickness averaged 1.5" at 90% cover. Surface rock averaged 1% cover The average surface horizon thickness was 5", texture varied from gravelly to very gravelly loam, coarse fragment content averaged 33% and pH averaged 6.7 (neutral).

Subsoil textures were predominately gravelly silt loams and clay loams Subsoil coarse fragment content averaged 31% and ranged from 15% to 61% Subsurface pH averaged 6 2 (slightly acid) and ranged from 5.3 (strongly acid) to 6 9 (neutral). The soils were 67% non-skeletal and 33% skeletal Total soil AWC averaged 4.2" and ranged from 3.1" to 6.0". These soils were classified into the subgroups Typic Xerochrepts, Typic Haploxerults and Dystric Xerorthents.

Vegetation

The total vegetation cover was high ranging from 90% to 95% with an average of 92%. Mean overstory tree cover was 87%. Overstory tree cover was split between conifers that averaged 55% cover and ranged from 50% to 60% and hardwoods that averaged 57% and ranged from 25% to 90% cover The regeneration layer averaged 24% cover Shrub cover was moderate with an average cover of 15%. Forb cover was moderate with an average of 11% cover. Grass cover was spotty with < 1% average cover

Stand Structure

Late seral stands often had 5 or more layers of trees, while early mature and mid-mature stands usually had 2 or 3 layers. In late seral stands the top 2 layers were dominated by Douglas-fir The lower layers were dominated by tanoak and California bay. Large conifers dominated the top two layers with an average of 14 trees/acre > 25" d b h , 8 trees/acre > 30" d b h and 7 trees/acre > 40" d b h Hardwoods dominated the lower layers and included 68 trees/acre > 5" d.b h , 26 trees/acre > 11" d b h and 21 trees/acre > 18" d b h

The stand structure characteristics by layer were as follows: the top layer averaged 249 years old with an average diameter of 65" and average height of 189' The second layer had an average age of 135 years with a mean diameter of 39" and a mean height of 153'. The third layer was dominated by tanoak and California bay it had a mean diameter of 21" and mean height of 91'. The fourth layer had a mean diameter of 14" and a mean height of 73'. The fifth layer had a mean diameter of 9" and a mean height of 51'.

Overall biomass production (conifer + hardwoods + shrubs) was generally moderate Modal Dunning site class was 1, with site index of 175 at 300 years Conifer productivity was generally moderate with an average volume of 5654 cu ft., it ranged from 3200 to 8100 cu. ft., due to the variable cover of hardwoods. Softwood basal area averaged 136 sq ft and ranged from 100 to 173 sq. ft. Hardwood volume averaged 2104 cu ft and ranged from 2047 to 2160 cu. ft Hardwood basal area averaged 90 sq. ft. and ranged from 80 to 100 sq ft Stand density index was 421 and fell in the middle group of the Tanoak Series

Fire Regime

This type was rarely found in early seral stages (shrub/forb and pole) indicating a high-severity fire regime with very infrequent high-intensity stand-replacing fires following periods of extended drought Typical fires (in non-drought years) were slow moving, creeping ground fires, burning by opportunity (occasional logs and fuel accumulations), and scorching small pockets of the overstory

Management Implications

This type is often found in riparian positions on unstable ground or in stream terraces that limit management treatments. Port Orford cedar root disease is an issue here. When Port Orford cedar is present a risk assessment needs to be completed for any management activity

Silvicultural Systems: Silvicultural systems are limited when this type is found in riparian positions. Outside riparian areas all silvicultural systems are applicable

Site Preparation: Hand pile, jackpot burn or underburn are recommended in riparian areas Moderate or high intensity broadcast burning normally leads to removal of the O horizon and on slopes > 25% may lead to significant soil loss from sheet erosion It may also lead to significant competition from snowbrush.

Regeneration: None

Release: Early and multiple releases are recommended.

Animal Damage Control Problems: None known.

Stockability: Regional stocking guidelines are applicable.

Species Considerations: Black oak and Oregon white oak were found frequently and infrequently, respectively, and should be maintained in all management treatments. Port Orford cedar occurs occassionally and should also be maintained.

Cultural and Commercial Species: The cultural species most frequently found were California hazelnut, tanoak, Pacific madrone, black oak and prince's pine. The most frequently occurring commercial plant species was California bay (also a cultural species).

Insects and Disease: Potential for Port Orford cedar root disease infection and/or subsequent spread is moderate due to proximity to free water and low density of Port Orford cedar or limited proximity to free water and high density of Port Orford cedar

Fire Suppression: Line construction is labor intensive. Fire suppression tactics using control strategies can be more detrimental than fire effects. Opportunities exist to use modified suppression tactics (light hand on the land), confine and contain strategies. Fires originating in this plant association will normally creep around and eventually come into contact with drier adjacent upslope fuels where it may become more intense Exposure to poison oak oils from leaves and through inhalation is a hazard to fire fighters

Prescribed Fire: Use fire to manage for cultural species (i.e., beargrass) and create openings for natural regeneration. Allowing fires to back into riparian areas will help reduce fuel loading.

Closely Related Types

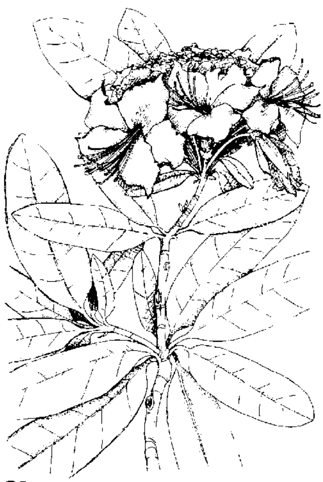
The LIDE2–UMCA/RHDI type may be replaced on moist streamsides by the LIDE2–ACMA/POMU1 and on upland sites it is replaced by the LIDE2/VAOV type

Notes

Plant Association: Tanoak/Evergreen Huckleberry–Pacific rhododendron
EDP Code Name: LIDE2/VAOV–RHMA
Eco-Code: HT0SEH13

Indicator species:

Evergreen huckleberry (*Vaccinium ovatum*–VAOV) was found on moist, low elevation sites close to the Pacific Ocean or sites with coastal fog Shrub cover here was low, while surface rock, A horizon thickness, and total basal area was also low.



Indicator species:

Pacific rhododendron (*Rhododendron macrophyllum*–RHMA) was found on mid elevation, cool, moist sites, with high subsurface coarse fragments, close to the Pacific Ocean.

Tanoak/Evergreen Huckleberry–Pacific Rhododendron

LIDE2/VAOV–RHMA Association
Eco-Code HT0SEH13

This coastal, low elevation type was found on very steep, north-facing, rocky slopes where soils were deep to moderately deep and had high AWC. It was characterized by a high shrub cover dominated by Pacific rhododendron and evergreen huckleberry.

Plant Association Summary

(Sample size: 14)

		COVER	CON
Tree Overstory Layer			
LIDE2	Tanoak	47	100
PSME	Douglas-fir	43	100
ARME3	Pacific Madrone	5	57
CACH2	Chinquapin	4	50
Tree Understory Layer			
LIDE2	Tanoak	8	85
CACH2	Chinquapin	2	42
PSME	Douglas-fir	1	42
Shrubs			
VAOV	Evergreen Huckleberry	51	100
RHMA	Pacific Rhododendron	24	100
GASH	Salal	13	92
Herbs & Grasses			
POMU1	Swordfern	8	92

Ranger Districts

Gasquet

Environment

Distance to the Ocean: 7.5–20.5 miles
Elevation: 300–1910'
Aspect: N.E, N.W,
Slope: 20–80%
Slope Position: lower, middle 1/3
Surface Rock: 1–5%

Soils

Pit Depth: 27–40"+
AWC: 2.1–5.1"
Parent Material: phyllite, greenstone
A Horizon—
Coarse Frag: 20–85%
Textures: gl, xgl
Thickness: 3–11"
pH: 5.3–6.5"

Physical and Biological Environment

Distribution/Setting

This type was found on coastal sites where mean distance to the Pacific Ocean was 13.1 miles. Elevation averaged 1158' and slopes were typically very steep, averaging 50%. Mean radiation index was a cool 381 as a result of north facing aspects

Soils

Soils were predominately mesic, deep (60%) to moderately deep (30%) and well drained. They formed in residuum and colluvium The litter layer thickness averaged 1.9" at 81% cover. Surface rock averaged 4% cover The average surface horizon thickness was 7", texture varied from gravelly to extremely gravelly loam, coarse fragment content averaged 52% and pH averaged 6.0 (moderately acid).

Subsoil textures were predominately gravelly to extremely gravelly loams and gravelly to very gravelly clay loams Subsoil coarse fragment content averaged 40% and ranged from 20% to 48%. Subsurface pH averaged 5.9 (moderately acid) and ranged from 5.3 (strongly acid) to 6.7 (neutral). The soils were 40% non-skeletal and 60% skeletal Total soil AWC averaged 3.3" and ranged from 2 1" to 5 1" These soils were classified into the subgroups Dystric Xerochrepts and Typic Haploxerults.

Vegetation

The total vegetation cover was high ranging from 90% to 99% with an average of 97% Mean overstory tree cover was 89%. Overstory tree cover was split between conifers that averaged 38% cover and ranged from 31% to 60% and hardwoods that averaged 61% and ranged from 31% to 60% cover. The regeneration layer averaged 10% cover. Shrub cover was very high with an average of 77% Forb cover was low and spotty with an average of 2% cover. Grass cover was lacking with < 1% average cover.

Stand Structure

Late seral stands often had 4 or more layers of trees, while early mature and mid-mature stands usually had 2 or 3 layers In late seral stands the top 2 layers were dominated by Douglas-fir, while the lower 2 layers were dominated by tanoak and Pacific madrone. Large conifers dominated the top three layers with an average of 17 trees/acre > 25" d.b.h., 12 trees/acre > 30" d.b.h. and 8 trees/acre > 40" d b h Hardwoods dominated the lower layers and included 219 trees/acre > 5" d b h , 30 trees/acre > 11" d.b.h. and 12 trees/acre > 18" d.b.h.

The stand structure characteristics by layer were as follows: the top layer averaged 314 years old with an average diameter of 46" and average height of 171'. The second layer had an average age of 271 years with a mean diameter of 33" and a mean height of 131'. The third layer was dominated by tanoak, it had a mean diameter of 14" and a mean height of 73' The fourth layer was also dominated by tanoak, it averaged 9" in diameter and 51' in height. Large numbers of small hardwoods were often found in the lower layers

Overall biomass production (conifer + hardwoods + shrubs) was generally high. Modal Dunning site class was 1, with site index of 175 at 300 years Conifer productivity was generally low with an average volume of 5545 cu ft , it ranged from 2741 to 7339 cu. ft., due to the variable cover of hardwoods and rocky sites. Softwood basal area averaged 140 sq ft and ranged from 60 to 213 sq ft Hardwood volume averaged 1466 cu. ft. and ranged from 464 to 2140 cu ft

Hardwood basal area averaged 90 sq ft and ranged from 40 to 147 sq ft Stand density index was 394 and fell among the low productivity group in the Tanoak Series.

Fire Regime

This type had a moderate-severity fire regime with infrequent fires of partial stand replacement nature, that may include areas of high and low intensity tree mortality. It also experienced periodic creeping ground fires of low intensities with low overstory tree mortality.

Management Implications

This plant association can be found in riparian positions and had moderate to low conifer productivity

Silvicultural Systems: Shelterwood, single tree selection and sanitation salvage are not recommended in late seral stands due to the high cover of hardwoods Sites with high soil coarse fragments and low productivity should be carefully examined before treatment due to regeneration difficulties.

Site Preparation: Moderate or high intensity broadcast burning normally leads to removal of the O horizon and on slopes > 25% may lead to significant soil loss from sheet erosion Regeneration can be more difficult here due to the high cover of Pacific rhododendron. Cutting Pacific rhododendron may reduce this problem.

Regeneration: Anticipate lower seedling survival rates due to high soil coarse fragments and competition from shrubs, beargrass and fireweed.

Release: Early release with multiple treatments are recommended due to high density of shrubs and hardwoods

Animal Damage Control Problems: None known

Stockability: Anticipate stocking levels below regional stocking guidelines

Species Considerations: Pacific yew is an infrequent component, but when it occurs it should be maintained in all management treatments.

Cultural and Commercial: The cultural plants most frequently found included tanoak, Pacific madrone and chinquapin Two other cultural species, beargrass and California hazelnut, were found infrequently and intermittently, respectively The most frequent commercial species were evergreen huckleberry and salal (also cultural species).

Insects and Disease: None known

Fire Suppression: Confine and contain strategies using prescribed natural fire objectives are recommended. A good opportunity exists here to use fire suppression strategies to meet other resource objectives Costs of control tactics including line construction are high and may cause greater resource damage than the fire effects.

Prescribed Fire: Prescribed fire may be used to reduce natural fuels, enhance cultural species (i e , beargrass) and may create regeneration sites in older stands Burning may be difficult after fall rains due to moist conditions and topographic shading.

Closely Related Types

The LIDE2/VAOV–RHMA type may be replaced on wetter sites by the LIDE2–CHLA/VAOV–RHOC type and on slightly drier, warmer, upland sites by the LIDE2/GASH–RHMA type.

Notes

Plant Association: Tanoak/Evergreen Huckleberry
EDP Code Name: LIDE2/VAOV
Eco-Code: HT0SEH11

Indicator species:

Evergreen huckleberry (*Vaccinium ovatum*–VAOV) was found on moist, low elevation sites close to the Pacific Ocean or sites with coastal fog. Shrub cover here was low, while surface rock, A horizon thickness, and total basal area was also low.

Tanoak/Evergreen Huckleberry

LIDE2/VAOV Association
Eco-Code HT0SEH11

This low elevation, primarily coastal type was typically found on moist, steep slopes with primarily deep soils that had high AWC. It is characterized by a dense shrub layer dominated by evergreen huckleberry.

Plant Association Summary

(Sample size: 36)		COVER	CON
Tree Overstory Layer			
LIDE2	Tanoak	59	100
PSME	Douglas-fir	40	100
ARME3	Pacific Madrone	12	77
Tree Understory Layer			
LIDE2	Tanoak	9	100
PSME	Douglas-fir	1	69
PILA	Sugar Pine	1	25
Shrubs			
VAOV	Evergreen Huckleberry	50	100
GASH	Salal	3	58
RHDI	Poison Oak	2	58
BENE1	Dwarf Oregon-grape	7	36
Herbs & Grasses			
PTAQL	Bracken Fern	1	63
POMU1	Swordfern	3	50
GOOB	Rattlesnake Plantain	1	41
WHMO	Western Modesty	1	38
CHME2	Little Prince's Pine	1	36

Ranger Districts

Gasquet, Orleans, Ukonom

Environment

Distance to the Ocean: 10.5–27.5 miles

Elevation: 820–2100'

Aspect: W., N.W, E., S.E.

Slope: 0–75%

Slope Position: lower, middle, upper 1/3

Surface Rock: 0–10%

Soils

Pit Depth: 22–40"+

AWC: 1.8–6.0"

Parent Material: mafic, phyllite

A Horizon—

- **Coarse Frag:** 20–65%
- **Textures:** gl, vgl, xgl, gcl
- **Thickness:** 2–11"
- **pH:** 5.3–7.0

Physical and Biological Environment

Distribution/Setting

This type was found on coastal sites where mean distance to the Pacific Ocean was 18 9 miles Elevation averaged 1624' and slopes were typically steep, averaging 39% Mean radiation index was .461 but is not a good indicator of overall site temperature due to the moderating effects of topographic shading

Soils

Soils were predominately mesic, deep (71%) to moderately deep (25%) and well drained. They formed in residuum and colluvium The litter layer thickness averaged 1 8" at 87% cover Surface rock fragments averaged 5% The average surface horizon thickness was 7", coarse fragment content averaged 36% and pH averaged 5 9 (moderately acid).

Subsoil textures were predominately loam to very gravelly loam and gravelly or stony clay loam. Subsoil coarse fragment content averaged 32% and ranged from 10% to 51%. Subsurface pH averaged 6 0 (moderately acid) and ranged from 5.5 (strongly acid) to 6 9 (neutral) The soils were 67% non-skeletal and 33% skeletal. Total soil AWC averaged 4.2" and ranged from 1.8" to 6 0" These soils were classified into the subgroups Dystric Xerochrepts, Typic Haploxerults and Ultic Haploxeralfs.

Vegetation

The total vegetation cover was high ranging from 88% to 99% with an average of 95%. Mean overstory tree cover was 87% Overstory tree cover was split between conifers that averaged 37% cover and ranged from 20% to 50% and hardwoods that averaged 73% and ranged from 31% to 95% cover The regeneration layer averaged 12% cover. Shrub cover was high with an average of 58%. Forb cover was low and spotty with an average of 4% cover. Grass cover was lacking with < 1% average cover.

Stand Structure

Late seral stands often had 5 or more layers of trees, while early mature and mid-mature stands usually had 2 or 3 layers In late seral stands the top 3 layers were dominated by Douglas-fir, while the lower 2 layers were dominated by tanoak and Pacific madrone Large conifers dominated the top three layers with an average of 20 trees/acre > 25" d.b.h., 16 trees/acre > 30" d b h and 11 trees/acre > 40" d.b.h Hardwoods dominated the lower layers and included 294 trees/acre > 5" d.b.h., 31 trees/acre > 11" d.b.h. and 10 trees/acre > 18" d b h

The stand structure characteristics by layer were as follows: the top layer averaged 326 years old with an average diameter of 50" and average height of 176'. The second layer had an average age of 262 years with a mean diameter of 37" and a mean height of 136' The third layer averaged 179 years with a mean diameter of 26" and mean height of 101', occasional large tanoaks were found in this layer The fourth layer was dominated by tanoak, it had a mean diameter of 14" and a mean height of 73' The fifth layer was also dominated by tanoak, it averaged 9" in diameter and 51' in height. Large numbers of small hardwoods were often found in the lower layers

Overall biomass production (conifer + hardwoods + shrubs) was generally high. Modal Dunning site class was 1A or 1, with site index of 175-200 at 300 years Conifer productivity was generally moderate with an average volume of 7026 cu. ft , it ranged from 4150 to 11,510 cu. ft., due to the variable cover of hardwoods. Softwood basal area averaged 173 sq ft and ranged from 80 to 267 sq. ft Hardwood volume averaged 1675 cu ft and ranged from 517 to 3124 cu ft

Hardwood basal area averaged 105 sq. ft. and ranged from 50 to 147 sq. ft. Stand density index was 472 and fell about midway in the Tanoak Series.

Fire Regime

This type had a moderate-severity fire regime with infrequent fires of partial stand replacement nature, that may include areas of high and low intensity tree mortality. It also experienced periodic creeping ground fires of low intensities with low overstory tree mortality.

Management Implications

This type is occasionally found in riparian positions which limit management treatments.

Silvicultural Systems: Shelterwood, single tree selection and sanitation salvage not recommended in late seral stands due to the high cover of hardwoods

Site Preparation: Moderate or high intensity broadcast burning normally leads to removal of the O horizon and on slopes > 25% may lead to significant soil loss from sheet erosion. It may also lead to significant competition from snowbrush Tractor operations may result in soil compaction

Regeneration: Sites are plantable

Release: Early release with multiple treatments are recommended due to high density of hardwood stems

Animal Damage Control Problems: None known.

Stockability: Regional stocking guidelines are applicable

Species Considerations: Sugar pine (understory) is an infrequent component and should be maintained in all management treatments

Cultural and Commercial Species: The cultural plants most frequently found included, tanoak and Pacific madrone. Two other important cultural species, California hazelnut and beargrass, were found infrequently The most frequently found commercial species were evergreen huckleberry and salal (also cultural species).

Insects and Disease: Due to the potential for white pine blister rust, planting of rust resistant sugar pine should be considered.

Fire Suppression: Confine and contain strategies using prescribed natural fire objectives are recommended. A good opportunity exists here to use fire suppression strategies to meet other resource objectives Costs of control tactics including line construction are high and may cause greater resource damage than the fire effects.

Prescribed Fire: Prescribed fire may be used to reduce natural fuels, enhance cultural species and may create regeneration sites in older stands. Burning may be difficult after fall rains due to moist site conditions and topographic shading

Closely Related Types

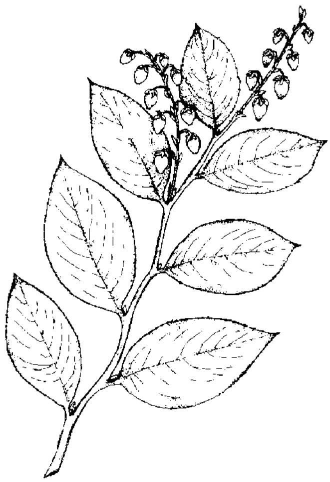
The LIDE2/VAOV type may be replaced on wetter, alluvial sites by the LIDE2–UMCA/VAOV and LIDE2–CHLA/VAOV types and on slightly drier, colluvial upland sites by the LIDE2/VAOV–GASH type On rockier, drier sites, primarily on colluvium, with lower AWC, it is replaced by the LIDE2–QUCH2/VAOV type

Notes

Plant Association: Tanoak/Evergreen Huckleberry–Salal
EDP Code Name: LIDE2/VAOV–GASH
Eco-Code: HT0SEH12

Indicator species:

Evergreen huckleberry (*Vaccinium ovatum*–VAOV) was found on moist, low elevation sites close to the Pacific Ocean or sites with coastal fog. Shrub cover here was low, while surface rock, A horizon thickness, and total basal area was also low.



Indicator species:

Salal (*Gaultheria shalon*–GASH) was found on mid elevation sites with high shrub cover, moderate AWC and thin A horizons.

Tanoak/Evergreen Huckleberry–Salal

LIDE2/VAOV–GASH Association
Eco-Code HT0SEH12

This low elevation, moist, coastal type was found on very steep, south facing slopes where temperatures were modified by topographic shading. It is characterized by a mixture of evergreen huckleberry and salal.

Plant Association Summary

(Sample size: 27)		COVER	CON
Tree Overstory Layer			
LIDE2	Tanoak	50	100
PSME	Douglas-fir	42	100
ARME3	Pacific Madrone	8	66
Tree Understory Layer			
LIDE2	Tanoak	13	96
PSME	Douglas-fir	1	59
CONU4	Pacific Dogwood	2	33
UMCA	California Bay	2	25
Shrubs			
VAOV	Evergreen Huckleberry	41	100
GASH	Salal	23	100
RHDI	Poison Oak	2	66
ROGY	Wood Rose	1	40
Herbs & Grasses			
POMU1	Swordfern	4	66
PTAQL	Bracken Fern	5	62
WHMO	Western Modesty	3	33

Ranger Districts

Gasquet, Orleans

Environment

Distance to the Ocean: 8.5–25.5 miles

Elevation: 400–2400'

Aspect: E., S.E., S.W., N.W,

Slope: 20–75%

Slope Position: lower, middle, upper1/3

Surface Rock: 0–40%

Soils

Pit Depth: 20–40"+

AWC: 2.0–6.1"

Parent Material: mafic, phyllite, schist

A Horizon—
Coarse Frag: 15–70%
Textures: gl, vgl, xgl
Thickness: 1–8"
pH: 5.1–7.1

Physical and Biological Environment

Distribution/Setting

This type was found on coastal sites where mean distance to the Pacific Ocean was 18.6 miles. Elevation averaged 1618' and slopes were typically very steep, averaging 51%. Mean radiation index was .443 but is moderated by topographic shading

Soils

Soils were predominately mesic, deep (57%) to moderately deep (33%) and well drained They formed in residuum and colluvium. The litter layer thickness averaged 1.9" at 84% cover. Surface rock fragments averaged 9% The average surface horizon thickness was 4", coarse fragment content averaged 43% and pH averaged 6.1 (slightly acid).

Subsoil textures were predominately gravelly to very gravelly loams and gravelly or very gravelly clay loams Subsoil coarse fragment content averaged 31% and ranged from 15% to 45% Subsurface pH averaged 6.0 (moderately acid) and ranged from 5 3 (strongly acid) to 7 1 (neutral) The soils were 67% non-skeletal and 33% skeletal. Total soil AWC averaged 3.7" and ranged from 2 0" to 6 1" These soils were classified into the subgroups Dystric Xerochrepts and Typic Haploxerults.

Vegetation

The total vegetation cover was high ranging from 90% to 99% with an average of 97%. Mean overstory tree cover was 90% Overstory tree cover was split between conifers that averaged 48% cover and ranged from 15% to 70% and hardwoods that averaged 62% and ranged from 33% to 86% cover The regeneration layer averaged 16% cover. Shrub cover was high with an average of 63% Forb cover was low and spotty with an average of 8% cover. Grass cover was lacking with < 1% average cover.

Stand Structure

Late seral stands often had 5 or more layers of trees, while early mature and mid-mature stands usually had 2 or 3 layers. In late seral stands the top 3 layers were dominated by Douglas-fir, while the lower 2 layers were dominated by tanoak and Pacific madrone Large conifers dominated the top three layers with an average of 25 trees/acre > 25" d b h , 17 trees/acre > 30" d b h. and 10 trees/acre > 40" d b h Hardwoods dominated the lower layers and included 259 trees/acre > 5" d.b.h., 26 trees/acre > 11" d.b.h. and 9 trees/acre > 18" d b h

The stand structure characteristics by layer were as follows: the top layer averaged 286 years old with an average diameter of 40" and average height of 174'. The second layer had an average age of 220 years with a mean diameter of 41" and a mean height of 144' The third layer averaged 222 years with a mean diameter of 39" and mean height of 118' The fourth layer was dominated by tanoak, it had a mean diameter of 14" and a mean height of 73'. The fifth layer was also dominated by tanoak, it averaged 9" in diameter and 51' in height. Large numbers of small hardwoods were often found in the lower layers

Overall biomass production (conifer + hardwoods + shrubs) was generally high. Modal Dunning site class was 1, with site index of 175 at 300 years Conifer productivity was generally moderate with an average volume of 7675 cu. ft., it ranged from 3790 to 11,654 cu ft , due to the variable cover of hardwoods. Softwood basal area averaged 202 sq. ft. and ranged from 120 to 293 sq ft Hardwood volume averaged 1477 cu. ft. and ranged from 491 to 2409 cu ft

Hardwood basal area averaged 89 sq ft and ranged from 27 to 173 sq. ft. Stand density index was 456 and fell about midway in the Tanoak Series.

Fire Regime

This type had a moderate-severity fire regime with infrequent fires of partial stand replacement nature, that may include areas of high and low intensity tree mortality It also experienced periodic creeping ground fires of low intensities with low overstory tree mortality.

Management Implications

Silvicultural Systems: Shelterwood, single tree selection and sanitation salvage are not recommended in late seral stands due to the high cover of hardwoods

Site Preparation: Moderate or high intensity broadcast burning normally leads to removal of the O horizon and on slopes > 25% may lead to significant soil loss from sheet erosion It may also lead to significant competition from snowbrush Tractor operations may result in soil compaction.

Regeneration: Sites are plantable, high cover of salal may effect regeneration success

Release: Early release with multiple treatments are recommended due to high density of hardwood stems. Manual release difficulty increases when salal cover is high.

Animal Damage Control Problems: None known.

Stockability: Regional stocking guidelines are applicable

Species Considerations: Sugar pine (understory) is an infrequent component and should be maintained in all management treatments.

Cultural and Commercial: The cultural plants most frequently found included, tanoak and Pacific madrone. Two other important cultural species, California hazelnut and beargrass, were found infrequently The most frequent commercial species were evergreen huckleberry and salal (also cultural species)

Insects and Disease: Due to the potential for white pine blister rust, planting of rust resistant sugar pine should be considered.

Fire Suppression: Confine and contain strategies using prescribed natural fire objectives are recommended. A good opportunity exists here to use fire suppression strategies to meet other resource objectives. Costs of control tactics including line construction are high and may cause greater resource damage than the fire effects

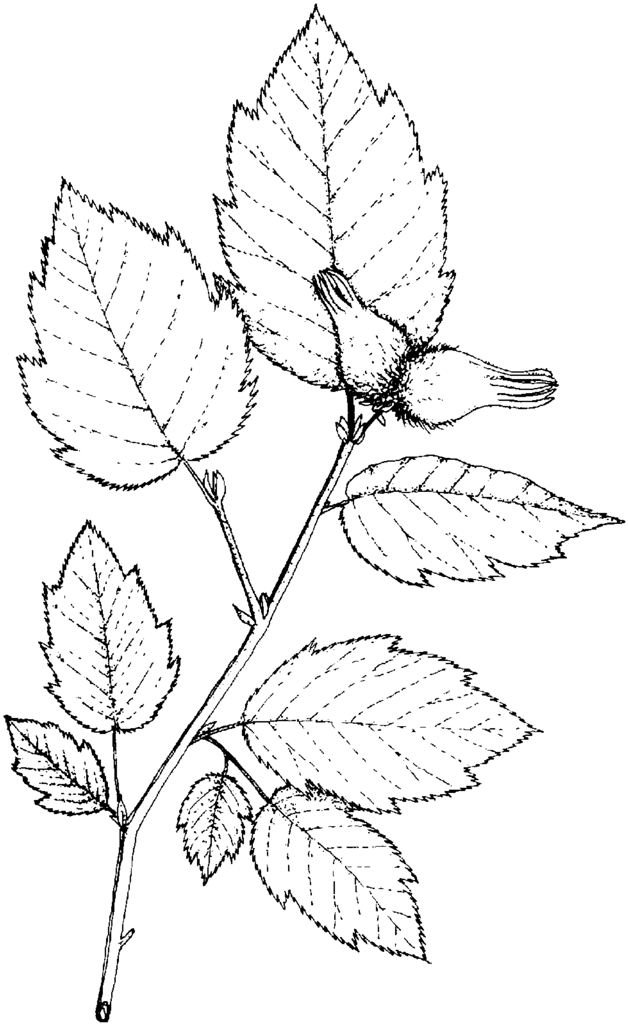
Prescribed Fire: Prescribed fire may be used to reduce natural fuels, enhance cultural species (i.e. hazelnut and beargrass) and may create regeneration sites in older stands. Burning may be difficult after fall rains due to moist conditions and topographic shading.

Closely Related Types

The LIDE2/VAOV–GASH type may be replaced on wetter alluvial sites by the LIDE2-UMCA/VAOV and LIDE2–CHLA/VAOV types and on slightly moister sites by the LIDE2/VAOV type. On rockier, drier sites with lower AWC it is replaced by the LIDE2–QUCH2/VAOV type and on higher elevation upland sites by LIDE2/GASH

Notes

Plant Association: Tanoak/California Hazelnut
EDP Code Name: LIDE2/COCOC
Eco-Code: HT0SM011



Indicator species:

California hazelnut (*Corylus cornuta californica*–COCOC) was found on middle elevation, inland, steep, lower third slopes, with high forb cover and high soil coarse fragments.

Tanoak/California Hazelnut

LIDE2/COCOC Association

Eco-Code HT0SM011

This inland type was found primarily in riparian positions on steep slopes with primarily deep soils with high AWC. It is characterized by the presence of California hazelnut.

Plant Association Summary

(Sample size: 8)

		COVER	CON
Tree Overstory Layer			
PSME	Douglas-fir	42	100
LIDE2	Tanoak	41	100
ARME3	Pacific Madrone	11	100
Tree Understory Layer			
LIDE2	Tanoak	33	100
PSME	Douglas-fir	2	75
CONU4	Pacific Dogwood	3	37
Shrubs			
COCOC	California Hazelnut	3	100
LOHIV	Pink Honeysuckle	2	50
RHDI	Poison Oak	4	37
SYMO	Creeping Snowberry	2	37
ROGY	Wood Rose	1	37
Herbs & Grasses			
CHME2	Little Prince's Pine	1	75
DIHO2	Hooker's Fairybell	1	75
PTAQL	Bracken Fern	2	62
ACTR	Vanilla Leaf	2	62
POMU1	Swordfern	1	50
GOOB	Rattlesnake Plantain	1	50

Ranger Districts

Ukonom, Orleans, Lower Trinity

Environment

Distance to the Ocean: 21.5–36.5 miles

Elevation: 710–3740'

Aspect: N.W., W.

Slope: 26–67%

Slope Position: lower, middle 1/3

Surface Rock: 0–8%

Soils

Pit Depth: 26–40"+

AWC: 2.4–5.6"

Parent Material: phyllite, schist

A Horizon—

Coarse Frag: 18–65%
Textures: gl, xgl
Thickness: 3–14"
pH: 5.7–6.2

Physical and Biological Environment

Distribution/Setting

This type was found on inland sites where mean distance to the Pacific Ocean was 28 4 miles Elevation averaged 1880' and slopes were typically steep, averaging 42% Mean radiation index was a moderate .400.

Soils

Soils were predominately mesic, deep (86%) to moderately deep (14%) and well drained They formed in alluvium, residuum, and colluvium The litter layer thickness averaged 1.1" at 80% cover. Surface rock averaged 5% cover The average surface horizon thickness was 7", texture varied from gravelly to extremely gravelly loams, coarse fragment content averaged 38% and pH averaged 6 0 (moderately acid).

Subsoil textures were predominately gravelly to very gravelly loams, very gravelly clay loams and gravelly sandy clay loams Subsoil coarse fragment content averaged 32% and ranged from 20% to 49% Subsurface pH averaged 6.0 (moderately acid) and ranged from 5.8 (medium acid) to 6 1 (slightly acid) The soils were 50% non-skeletal and 50% skeletal. Total soil AWC averaged 3.7" and ranged from 2.4" to 5.6". These soils were classified into the subgroups Dystric Xerochrepts and Ultic Haploxeralfs

Vegetation

The total vegetation cover was high ranging from 80% to 95% with an average of 88%. Mean overstory tree cover was 81%. Overstory tree cover was split between conifers that averaged 41% cover and ranged from 12% to 60% and hardwoods that averaged 58% and ranged from 51% to 70% cover. The regeneration layer averaged 42% cover Shrub cover was low with an average of 22% Forb cover was low and spotty with an average of 10% cover. Grass cover was lacking with 1% average cover.

Stand Structure

Late seral stands often had 3 or more layers of trees, while early mature and mid-mature stands usually had 2 layers. In late seral stands the top 2 layers were dominated by Douglas-fir, while the lower layers were dominated by tanoak and Pacific madrone Large conifers dominated the top two layers with an average of 10 trees/acre > 25" d b h , 7 trees/acre > 30" d.b h and 5 trees/acre > 40" d.b.h Hardwoods dominated the lower layers and included 148 trees/acre > 5" d.b.h., 57 trees/acre > 11" d.b.h. and 13 trees/acre > 18" d b h

The stand structure characteristics by layer were as follows: the top layer averaged 313 years old with an average diameter of 46" and average height of 171'. The second layer had an average age of 209 years with a mean diameter of 38" and a mean height of 152'. The third layer was dominated by tanoak, it had a mean diameter of 14" and a mean height of 73' The fourth layer was also dominated by tanoak, it averaged 9" in diameter and 51' in height

Overall biomass production (conifer + hardwoods + shrubs) was generally low Modal Dunning site class was 2, with site index of 150 at 300 years Conifer productivity was generally low with an average volume of 4123 cu. ft., it ranged from 2277 to 7813 cu. ft., due to the high cover of hardwoods Softwood basal area averaged 98 sq ft and ranged from 70 to 173 sq. ft. Hardwood volume averaged 3284 cu ft , highest in the Tanoak Series and ranged from 2060 to 4426 cu. ft. Hardwood basal area averaged 132 sq ft and ranged from 107 to 160 sq ft Stand density index was 350, among the lowest in the Tanoak Series

Fire Regime

This type had a moderate-severity fire regime with low intensity events and infrequent fires of a partial stand-replacing nature These partial stand replacing events included areas of high and low tree mortality

Management Implications

Conifer productivity is low here and may influence management treatments

Silvicultural Systems: Shelterwood, single tree selection and sanitation salvage are not recommended in late seral stands due to the high cover of hardwoods

Site Preparation: Moderate or high intensity broadcast burning normally leads to removal of the O horizon and on slopes > 25% may lead to significant soil loss from sheet erosion It may also lead to significant competition from deerbrush.

Regeneration: Bracken fern can be significant competitor to seedling survival

Release: Early release with multiple treatments may be required if deerbrush competition is high.

Animal Damage Control Problems: None known

Stockability: Regional stocking guidelines are applicable

Species Considerations: Sugar pine is an infrequent component and should be maintained in all management treatments.

Cultural and Commercial: The cultural species most frequently found were tanoak, Pacific madrone and California hazelnut. California bay (also a cultural species), the only species in this plant association used for commercial purposes, was found infrequently in the understory.

Insects and Disease: Due to the potential for white pine blister rust, planting of rust resistant sugar pine should be considered.

Fire Suppression: Confine, contain and control strategies apply here and are dependent on time of year and fuel moisture. Fire suppression strategies should be designed to meet other resource objectives.

Prescribed Fire: This type is well suited to manage for cultural materials (i.e. hazelnut). Frequent (every two years) understory burns of low to moderate intensities will meet resource objectives. Burns must be scheduled around specific needs of the user (i.e spring burning versus fall burning).

Closely Related Types

The LIDE2/COCOC type is often found in close association with the LIDE2/RHDI-LOHIV type which is found on somewhat drier upland sites on soils formed from residuum

Notes

Plant Association: Tanoak–Black Oak
EDP Code Name: LIDE2–QUKE
Eco-Code: HT0HOB11

Indicator species:

Black oak (*Quercus kelloggii*–QUKE) was found on warm, inland, middle elevation sites, with low soil coarse fragments and moderately acidic soil pH.

Tanoak–Black Oak
LIDE2–QUKE Association
Eco-Code HT0HOB11

This mid-elevation, inland type was found on warm, south facing slopes with primarily deep soils that had high AWC. These soil characterisitics explain the presence of black oak.

Plant Association Summary

(Sample size: 20)

		COVER	CON
Tree Overstory Layer			
PSME	Douglas-fir	49	100
LIDE2	Tanoak	39	100
QUKE	Black Oak	7	100
ARME3	Pacific Madrone	10	65
Tree Understory Layer			
LIDE2	Tanoak	20	100
PSME	Douglas-fir	2	80
QUKE	Black Oak	1	35
QUCH2	Canyon Live Oak	1	35
Shrubs			
ROS	Rose spp.	2	65
RHDI	Poison Oak	2	55
Herbs & Grasses			
CHME2	Little Prince's Pine	1	60
PTAQL	Bracken Fern	1	50
GOOB	Rattlesnake Plantain	1	45

Ranger Districts
Ukonom, Happy Camp, Orleans, Lower Trinity, Mad River

Environment
Distance to the Ocean: 19.5–43.5 miles

Elevation: 1600–3400'

Aspect: N.W., N., E., S.

Slope: 10–56%

Slope Position: lower, middle, upper 1/3

Surface Rock: 0–15%

Soils
Pit Depth: 36–40"+

AWC: 2.5–7.0"

Parent Material: phyllite, schist, greenstone

A Horizon—
- **Coarse Frag:** 10–70%
- **Textures:** l, gl, gcl, gsl, xgl
- **Thickness:** 3–10"
- **pH:** 5.0–6.8

Physical and Biological Environment

Distribution/Setting

This type was found on inland sites where mean distance to the Pacific Ocean was 31.6 miles. Elevation averaged 2385' and slopes were typically steep, averaging 35%. Mean radiation index was a warm .477 due to south facing aspects. Aspect here was moderated by elevation, south facing aspects were generally found on higher elevation sites

Soils

Soils were predominately mesic, deep (83%) and moderately deep (17%) and well drained They formed in residuum and colluvium. The litter layer thickness averaged 1 0" at 90% cover. Surface rock averaged 6% cover. The average surface horizon thickness was 7", texture varied from loam to extremely gravelly loam, gravelly sandy loam and occasionally gravelly clay loams, coarse fragment content averaged 34% and pH averaged 6.0 (moderately acid).

Subsoil textures were predominately gravelly loams to very gravelly loams and clay loams to very gravelly clay loams Subsoil coarse fragment content averaged 29% and ranged from 7% to 45%. Subsurface pH averaged 6.2 (slightly acid) and ranged from 5 5 (strongly acid) to 6 8 (neutral). The soils were 76% non-skeletal and 24% skeletal Total soil AWC averaged 5.1" and ranged from 2.5" to 7.0". These soils were classified into the subgroups Dystric Xerochrepts, Typic Haploxerults and Ultic Haploxeralfs.

Vegetation

The total vegetation cover was very high ranging from 90% to 99% with an average of 95% Mean overstory tree cover was 86% Overstory tree cover was split between conifers that averaged 49% cover and ranged from 39% to 70% and hardwoods that averaged 53% and ranged from 33% to 85% cover The regeneration layer averaged 28% cover Shrub cover was very low with an average cover of 4%. Forb cover was also low with an average of 6% cover. Grass cover was lacking with < 1% average cover.

Stand Structure

Late seral stands often had 5 or more layers of trees, while early mature and mid-mature stands usually had 2 or 3 layers In late seral stands the top 3 layers were dominated by Douglas-fir with some large hardwoods in layer 3. The lower 2 layers were dominated by tanoak, Pacific madrone and black oak. Large conifers dominated the top three layers with an average of 28 trees/acre > 25" d.b.h., 20 trees/acre > 30" d b h and 11 trees/acre > 40" d b h Hardwoods dominated the lower layers and included 165 trees/acre > 5" d b h , 22 trees/acre > 11" d.b.h. and 10 trees/acre > 18" d.b.h.

The stand structure characteristics by layer were as follows. the top layer averaged 274 years old with an average diameter of 53" and average height of 183'. The second layer had an average age of 204 years with a mean diameter of 42" and a mean height of 157' The third layer had an average age of 113 years old, with a mean diameter of 24" and mean height of 130'. The fourth layer was dominated by tanoak and black oak, it had a mean diameter of 14" and a mean height of 73'. The fifth layer was dominated by tanoak, it averaged 9" in diameter and 51' in height Large numbers of small hardwoods were often found in the lower layer

Overall biomass production (conifer + hardwoods + shrubs) was generally high. Modal Dunning site class was 1A or 1, with site index of 200 or 175 at 300 years.

Conifer productivity was generally high with an average volume of 9380 cu. ft , it ranged from 5300 to 12,390 cu. ft , due to the variable cover of hardwoods. Softwood basal area averaged 228 sq. ft. and ranged from 107 to 320 sq. ft. Hardwood volume averaged 1728 cu ft. and ranged from 309 to 2220 cu ft Hardwood basal area averaged 91 sq. ft. and ranged from 27 to 140 sq. ft. Stand density index was 509 and fell in the upper end of the Tanoak Series

Fire Regime

This type had a moderate-severity regime with infrequent partial stand-replacing events, which includes significant areas of high and low tree mortality. As well as frequent low intensity events with minimal overstory mortality. The greatest potential for stand replacement events are in the early seral stages. Later seral stages are associated with low to moderate intensity fires with fast rates of spread. Stand replacement in older seral stages is usually associated with drought.

Management Implications

Silvicultural Systems: Shelterwood, single tree selection and sanitation salvage are not recommended in late seral stands due to the high cover of hardwoods

Site Preparation: Moderate and high intensity broadcast burns can lead to high cover of deerbrush. Machine site preparation is an option on gentle slopes

Regeneration: Anticipate lower survival rates on sites with high soil coarse fragments.

Release: Early release with multiple treatments are recommended due to high density of tanoak stems.

Animal Damage Control Problems: None known

Stockability: Regional stocking guidelines are applicable

Species Considerations: Black oak is an important component of this type and should be maintained in all management treatments

Cultural and Commercial: The cultural species most frequently found were tanoak, Pacific madrone, black oak, beargrass and prince's pine California hazelnut, also a cultural species, was found infrequently here The commercial plant species: incense cedar, California bay and salal (also cultural species) were found intermittently here

Insects and Disease: None known

Fire Suppression: Because fire line construction is relatively easy, contain and control strategies are recommended.

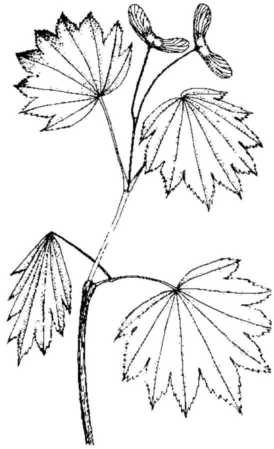
Prescribed Fire: Use of prescribed fire under low-moderate intensities is recommended to reduce fuel accumulations and provide diversity of herbaceous plants

Closely Related Types

The LIDE2–QUKE type may be replaced on lower elevation sites by the LIDE2/RHDI–LOHIV type, on rockier sites by the LIDE2–QUCH2–QUKE/RHDI type and on moist locations sometimes on alluvium by the LIDE2/COCOC type

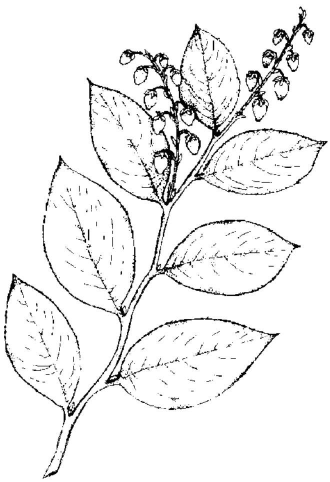
Notes

Plant Association: Tanoak/Vine Maple–Salal
EDP Code Name: LIDE2/ACCI–GASH
Eco-Code: HT0HM012



Indicator species:

Vine maple (*Acer circinatum*–ACCI) was found on cool, lower third slopes, often in streamside positions, with thick A horizons, high AWC, high soil coarse fragments, moderate surface rock and high softwood basal area.



Indicator species:

Salal (*Gaultheria shalon*–GASH) was found on mid elevation sites with high shrub cover, moderate AWC and thin A horizons.

Tanoak/Vine Maple–Salal
LIDE2/ACCI–GASH Association
Eco-Code HT0HM012

This cool, riparian, mid-elevation type was found along lower order streams on very steep slopes. The soils were primarily deep with high coarse fragment content and high AWC. It was characterized by the presence of vine maple and salal.

Plant Association Summary

(Sample size: 17)

		COVER	CON
Tree Overstory Layer			
PSME	Douglas-fir	49	100
LIDE2	Tanoak	27	100
ACMA	Bigleaf Maple	7	76
CONU4	Pacific Dogwood	5	51
Tree Understory Layer			
LIDE2	Tanoak	7	94
PSME	Douglas-fir	2	94
TABR	Pacific Yew	3	70
Shrubs			
GASH	Salal	30	100
ACCI	Vine Maple	21	100
BENE1	Dwarf Oregon-grape	14	88
RUUR	Pacific Blackberry	1	47
Herbs & Grasses			
POMU1	Swordfern	11	94
ACTR	Vanilla Leaf	2	70
TROV2	White Trillium	1	58
PTAQL	Bracken Fern	2	47
TRLA3	Western Starflower	1	47

Ranger Districts
Gasquet, Orleans, Ukonom

Environment
Distance to the Ocean: 15.5–26.5 miles

Elevation: 1060–2880'

Aspect: N.W., S.E.

Slope: 40–80%

Slope Position: streamside

Surface Rock: 0–2%, 20–85%

Soils
Pit Depth: 30–40"+

AWC: 1.1–5.6"

Parent Material: schist, phyllite, mixed, sandstone

A Horizon—
- **Coarse Frag:** 25–68 %
- **Textures:** gl, vgl, xgl
- **Thickness:** 3–11"
- **pH:** 5.5–6.8

Physical and Biological Environment

Distribution/Setting

This riparian type was found on coastal and inland sites in streamside positions in lower order streams, such as Order 1 and 2. Surface rock averaged 18% and fell into two groups. the first ranged from 0 to 2%, while the second ranged from 20% to 85% and was often covered by moss. Mean distance to the Pacific Ocean was 21 3 miles Elevation averaged 2226' and slopes were typically very steep. Mean radiation index was 432, but probably is much cooler as a result of topographic shading

Soils

Soils were predominately mesic, deep (69%) and moderately deep (25%) and well drained. They primarily formed in colluvium with some in alluvium and residuum The litter layer thickness averaged 1 8" at 75% cover. The average surface horizon thickness was 7", textures were mainly gravelly to extremely gravelly loam, coarse fragment content averaged 46%, pH averaged 6 1 (slightly acid).

Subsoil textures were predominately gravelly to extremely gravelly loam, stony loam, or gravelly clay loam Subsoil coarse fragment content averaged 52% and ranged from 22% to 90% Subsurface pH averaged 6.3 (slightly acid) and ranged from 6 0 (moderately acid) to 6 9 (neutral) The soils were 30% non-skeletal and 70% skeletal. Total soil AWC averaged 3.6" and ranged from 1.1" to 5.6". These soils were classified into the subgroups Dystric Xerochrepts and Typic Haploxerults

Vegetation

The total vegetation cover was very high ranging from 90% to 99% with an average of 97%. Mean overstory tree cover was 77% Overstory tree cover was split between conifers that averaged 55% cover and ranged from 27% to 80% and hardwoods that averaged 41% and ranged from 12% to 65% cover. The regeneration layer averaged 15% cover Shrub cover was high with an average cover of 64% Forb cover was high with an average of 21% Grass cover was spotty with < 1% average cover.

Stand Structure

Late seral stands often had 5 or more layers of trees, while early mature and mid-mature stands usually had 2 or 3 layers. In late seral stands the top 3 layers were dominated by Douglas-fir, with occasional large hardwoods in the third layer. The lower 2 layers were dominated by tanoak, bigleaf maple and Pacific madrone. Large conifers dominated the top three layers with an average of 35 trees/acre > 25" d b h , 24 trees/acre > 30" d.b h and 14 trees/acre > 40" d.b.h Hardwoods dominated the lower layers and included 156 trees/acre > 5" d b.h., 18 trees/acre > 11" d.b.h. and 5 trees/acre > 18" d b h

The stand structure characteristics by layer were as follows: the top layer averaged 334 years old with an average diameter of 51" and average height of 188' The second layer had an average age of 291 years with a mean diameter of 44" and a mean height of 159'. The third layer had an average age of 236 years old, with a mean diameter of 33" and mean height of 136' The fourth layer was dominated by tanoak, bigleaf maple and Pacific madrone, it had a mean diameter of 14" and a mean height of 73' The fifth layer was dominated by tanoak, it averaged 9" in diameter and 51' in height.

Overall biomass production (conifer + hardwoods + shrubs) was generally high. Modal Dunning site class was 1, with site index of 175 at 300 years. Conifer productivity was generally high with an average volume of 9704 cu. ft., it ranged from 4887 to 13,669 cu. ft., due to the variable cover of hardwoods. Softwood basal area averaged 261 sq. ft. and ranged from 173 to 387 sq. ft Hardwood volume averaged 1101 cu. ft. and ranged from 220 to 1723 cu. ft. Hardwood basal area averaged 64 sq ft and ranged from 27 to 107 sq. ft. Stand density index was 500 and fell in the upper group of the Tanoak Series

Fire Regime

This type had a high-severity fire regime with infrequent high-intensity stand replacing fires during extended drought periods Typical fires (in non-drought years) were slow moving, creeping ground fires, burning by opportunity (occasional logs and fuel accumulations), and scorching small pockets of the overstory

Management Implications

Management treatments are limited here due to the riparian nature of this type. Port Orford cedar root disease is an issue here If present a risk assessment needs to be completed for any management activity.

Silvicultural Systems: Silvicultural systems are limited due to the riparian nature of this type Intermediate harvest or sanitation salvage could be used

Site Preparation: Hand pile, jackpot burn or underburn are recommended. Moderate or high intensity broadcast burning normally leads to removal of the O horizon and on slopes > 25% may lead to significant soil loss from sheet erosion It may also lead to significant competition from snowbrush. Site preparation can also lead to significant competition from bigleaf maple

Regeneration: Natural regeneration is recommended but difficult due to high cover of vine maple and salal

Release: Limited or none.

Animal Damage Control Problems: None known.

Stockability: Regional stocking guidelines are applicable

Species Considerations: Pacific yew is a frequent component of this type while Port Orford cedar occurs occasionally, they should be maintained in all management treatments.

Cultural and Commercial: The cultural species most frequently found were tanoak, bigleaf maple, dwarf Oregon-grape and California hazelnut The most frequently occurring commercial plant species were salal and red huckleberry (also cultural species).

Insects and Disease: Potential for Port Orford cedar root disease infection and/ or subsequent spread is moderate due to proximity to free water and low density of Port Orford cedar or limited proximity to free water and high density of Port Orford cedar

Fire Suppression: Line construction is labor intensive. Fire suppression tactics using control strategies can be more detrimental than fire effects. Opportunities exist to use modified suppression tactics (light hand on the land), confine and contain strategies. Fires originating in this plant association will normally creep around and eventually come into contact with drier, adjacent upslope fuels where it may become more intense.

Prescribed Fire: Use fire to manage for cultural species and create openings for natural regeneration Allowing fires to back into riparian areas will help reduce fuel loading.

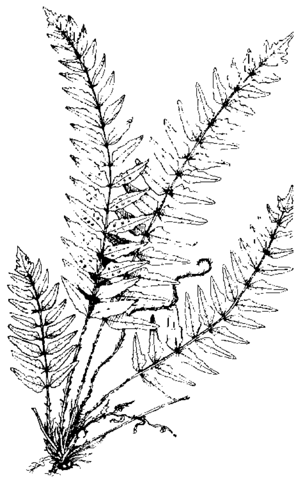
Closely Related Types

The LIDE2/ACCI-GASH type may be replaced on moist streamside locations by the LIDE2–ACMA/POMU1 type and on terraces by the LIDE2–UMCA/RHDI On higher elevation inland sites it is replaced by the LIDE2/ACCI type

Plant Association: Tanoak–Bigleaf Maple/Swordfern
EDP Code Name: LIDE2-ACMA/POMU1
Eco-Code: HT0HM011

Indicator species:

Bigleaf maple (*Acer macrophyllum*–ACMA) was found on moist, steep, lower third slope, middle elevation sites, with topographic shading, high surface gravel and rock, high soil coarse fragments, acidic soils and high softwood basal area.



Indicator species:

Swordfern (*Polystichum munitum*–POMU1) was found on moist, cool, steep, lower third slope, middle elevation sites, with moderate AWC and soil coarse fragments.

Tanoak–Bigleaf Maple/Swordfern
LIDE2–ACMA/POMU1 Association
Eco-Code HT0HM011

This widespread, riparian type was found on inland sites on very steep slopes cooled by topographic shading. It was also often found along streamsides on deep soils with high AWC. Bigleaf maple and swordfern are the indicator species.

Plant Association Summary

(Sample size: 35)		COVER	CON
Tree Overstory Layer			
PSME	Douglas-fir	44	100
LIDE2	Tanoak	36	100
ACMA	Bigleaf Maple	14	100
ARME3	Pacific Madrone	8	57
Tree Understory Layer			
LIDE2	Tanoak	16	100
PSME	Douglas-fir	3	60
QUCH2	Canyon Live Oak	3	48
Shrubs			
RHDI	Poison Oak	2	68
BENE1	Dwarf Oregon-grape	9	65
COCOC	California Hazelnut	3	45
Herbs & Grasses			
POMU1	Swordfern	3	85
WHMO	Western Modesty	7	48
TRLA3	Western Starflower	1	40

Ranger Districts
Gasquet, Orleans, Mad River, Lower Trinity, Ukonom, Happy Camp

Environment
Distance to the Ocean: 18.5–50.5 miles
Elevation: 890–3400'
Aspect: N.W., S.E., N.E.
Slope: 5–90%
Slope Position: lower, middle, upper 1/3, streamside
Surface Rock: 1–30%

Soils
Pit Depth: 21–40"+
AWC: 1.5–5.4"
Parent Materia: schist, mafic, greenstone, granite, sandstone
A Horizon—
Coarse Frag: 13–65 %
Textures: gl, vgl, gsl, vgsl, cosl
Thickness: 1–17"
pH: 5.7–7.0

Physical and Biological Environment

Distribution/Setting

This type was mainly found in riparian positions on inland sites Surface rock averages 15% and was often covered by moss. Mean distance to the Pacific Ocean was 31 3 miles Elevation averaged 2249' and slopes were typically very steep, averaging 57% Mean radiation index was 416, but probably is much cooler as a result of topographic shading

Soils

Soils were predominately mesic, deep (62%) and moderately deep (26%) and well drained They formed in residuum and colluvium as well as alluvium The litter layer thickness averaged 1 1" at 75% cover. The average surface horizon thickness was 6", texture varied from gravelly to very gravelly loam and sandy loam to gravelly sandy loam, coarse fragment content averaged 38% and pH averaged 6.2 (slightly acid)

Subsoil textures were predominately gravelly to very gravelly loam and gravelly sandy clay loam Subsoil coarse fragment content averaged 44% and ranged from 20% to 81% Subsurface pH averaged 6.3 (slightly acid) and ranged from 5 6 (moderately acid) to 7 0 (neutral). The soils were 54% non-skeletal and 46% skeletal Total soil AWC averaged 3.7" and ranged from 1.1" to 5.4" These soils were classified into the subgroups Dystric Xerochrepts, Typic Haploxerults and Ultic Haploxeralfs.

Vegetation

The total vegetation cover was very high ranging from 85% to 99% with an average of 93% Mean overstory tree cover was 89%. Overstory tree cover was split between conifers that averaged 46% cover and ranged from 23% to 77% and hardwoods that averaged 67% and ranged from 27% to 95% cover The regeneration layer averaged 22% cover. Shrub cover was moderate with an average cover of 17% Forb cover was moderate with an average of 11% cover Grass cover was spotty with < 1% average cover

Stand Structure

Late seral stands often had 5 or more layers of trees, while early mature and mid-mature stands usually had 2 or 3 layers In late seral stands the top 3 layers were dominated by Douglas-fir, with occasional large hardwoods in the third layer. The lower 2 layers were dominated by tanoak, bigleaf maple and Pacific madrone Large conifers dominated the top three layers with an average of 27 trees/acre > 25" d b.h., 18 trees/acre > 30" d b.h. and 12 trees/acre > 40" d b h Hardwoods dominated the lower layers and included 179 trees/acre > 5" d b h , 27 trees/acre > 11" d b.h. and 10 trees/acre > 18" d b h

The stand structure characteristics by layer were as follows the top layer averaged 269 years old with an average diameter of 46" and average height of 181' The second layer had an average age of 242 years with a mean diameter of 39" and a mean height of 151' The third layer had an average age of 150 years old, with a mean diameter of 23" and mean height of 121' The fourth layer was dominated by tanoak, bigleaf maple and Pacific madrone, it had a mean diameter of 14" and a mean height of 73'. The fifth layer was dominated by tanoak, it averaged 9" in diameter and 51' in height Large numbers of small hardwoods were often found in the lower layer.

Overall biomass production (conifer + hardwoods + shrubs) was generally moderate. Modal Dunning site class was 1, with site index of 175 at 300 years Conifer productivity was generally moderate with an average volume of 7581 cu.

ft , it ranged from 3050 to 11,740 cu. ft , due to the variable cover of hardwoods. Softwood basal area averaged 207 sq. ft. and ranged from 80 to 387 sq. ft Hardwood volume averaged 1521 cu ft. and ranged from 252 to 3000 cu. ft Hardwood basal area averaged 83 sq. ft and ranged from 13 to 150 sq. ft Stand density index was 471 and fell in the middle group of the Tanoak Series.

Fire Regime

This type had a high-severity fire regime with very infrequent high-intensity stand-replacing fires during extended drought periods. Typical fires (in non-drought years) were slow moving, creeping ground fires, burning by opportunity (occasional logs and fuel accumulations), and scorching small pockets of the overstory.

Management Implications

Management treatments are limited here due to the riparian nature of this type.

Silvicultural Systems: Silvicultural systems are limited due to the riparian nature of this type. Intermediate harvest or sanitation salvage could be used.

Site Preparation: Hand pile, jackpot burn or underburn are recommended. Moderate or high intensity broadcast burning normally leads to removal of the O horizon and on slopes > 25% may lead to significant soil loss from sheet erosion. Tractor operations may result in soil compaction Site preparation can lead to significant competition from bigleaf maple

Regeneration: Natural regeneration is recommended

Release: Limited or none.

Animal Damage Control Problems: None known.

Stockability: Regional stocking guidelines are applicable

Species Considerations: Pacific yew, sugar pine, and black oak are infrequent components of this type, that should be maintained in all management treatments.

Cultural and Commercial: The cultural species most frequently found were tanoak, Pacific madrone, bigleaf maple, dwarf Oregon-grape and swordfern. Two other cultural species, California hazelnut and beargrass, were found infrequently and intermittently, respectively. The commercial plant species: incense cedar and California bay (also cultural species) were found intermittently

Insects and Disease: Due to the potential for white pine blister rust, planting of rust resistant sugar pine should be considered.

Fire Suppression: Line construction is labor intensive Fire suppression tactics using control strategies can be more detrimental than fire effects Opportunities exist to use modified suppression tactics (light hand on the land), confine and contain strategies Fires originating in this plant association will normally creep around and eventually come into contact with drier, adjacent upslope fuels where it may become more intense

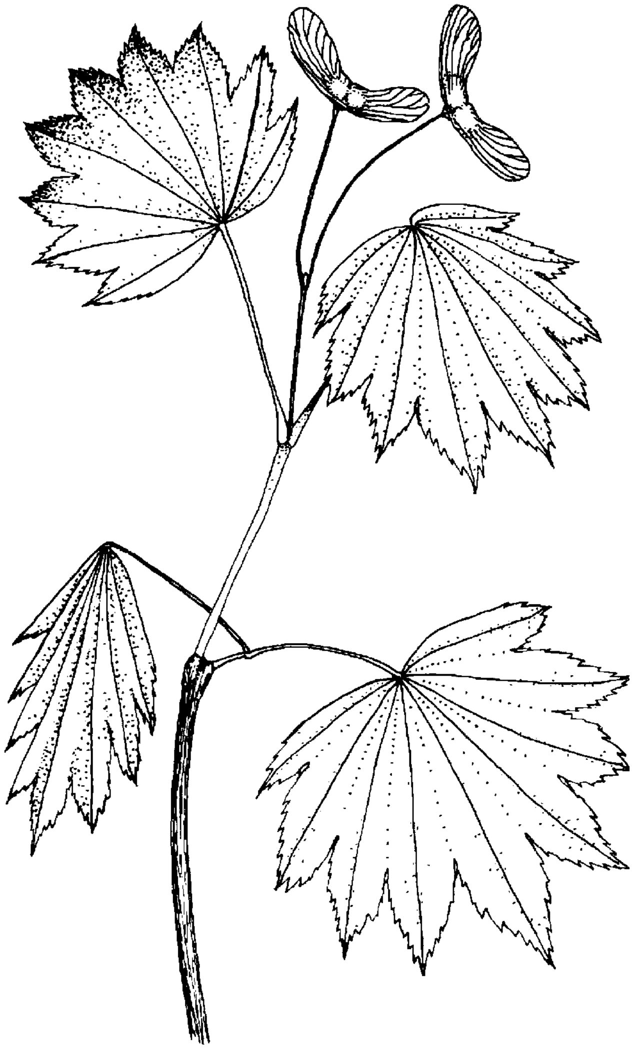
Prescribed Fire: Use fire to manage for cultural species and create openings for natural regeneration. Allowing fires to back into riparian areas will help reduce fuel loading.

Closely Related Types

The LIDE2-ACMA/POMU1 type may be replaced on moist streamside terraces by the LIDE2-UMCA/RHDI and on higher elevation colluvial sites with lower stream orders by the LIDE2/ACCI-GASH type On higher elevation inland sites it is replaced by the LIDE2/ACCI type.

Notes

Plant Association: Tanoak/Vine Maple
EDP Code Name: LIDE2/ACCI
Eco-Code: HT0HM013



Indicator species:

Vine maple (*Acer circinatum*–ACCI) was found on cool, lower third slopes, often in streamside positions, with thick A horizons, high AWC, high soil coarse fragments, moderate surface rock and high softwood basal area.

Tanoak/Vine Maple
LIDE2/ACCI Association
Eco-Code HT0HM013

This cool, riparian, mid-elevation type was found along lower order streams on very steep slopes. The soils were deep to moderately deep with high coarse fragment content and high AWC. It was characterized by the presence of vine maple.

Plant Association Summary

(Sample size: 12)		COVER	CON
Tree Overstory Layer			
PSME	Douglas-fir	47	100
LIDE2	Tanoak	28	91
CONU4	Pacific Dogwood	4	66
Tree Understory Layer			
LIDE2	Tanoak	15	100
QUCH2	Canyon Live Oak	2	50
PSME	Douglas-fir	1	41
Shrubs			
ACCI	Vine Maple	16	100
BENE1	Dwarf Oregon-grape	10	75
COCOC	California Hazelnut	3	50
Herbs & Grasses			
VAHE	Western Vancouveria	2	66
ACTR	Vanilla Leaf	2	58
WHMO	Western Modesty	2	58
PYPI2	Whiteveined Wintergreen	1	58
POMU1	Swordfern	2	50
CHME2	Little Prince's Pine	1	50

Ranger Districts
Ukonom, Salmon River

Environment
Distance to the Ocean: 27.5–40.5 miles

Elevation: 2340–3320'

Aspect: N.W., N.E.

Slope: 20–80%

Slope Position: lower, middle 1/3, streamside

Surface Rock: 0–5%, 25–80%

Soils
Pit Depth: 21–40"+

AWC: 1.9–4.4"

Parent Material: granite, phyllite, mixed

A Horizon—

Coarse Frag: 25–70 %

Textures: gl, xgl

Thickness: 3–10"

pH: 6.0–6.9

Physical and Biological Environment

Distribution/Setting

This riparian type was found on inland sites in streamside positions Surface rock averaged 28% and fell into two groups: the first grouped ranged from 0 to 5%, while the second group ranged from 25% to 80% surface rock Mean distance to the Pacific Ocean was 32.3 miles. Elevation averaged 2981' and slopes were typically very steep, averaging 52% Mean radiation index was a cool .368 as a result of north aspects.

Soils

Soils were predominately mesic, deep (58%) and moderately deep (34%) and well drained. They formed in residuum and colluvium. The litter layer thickness averaged 0.5" at 90% cover. The average surface horizon thickness was 7", textures varied from gravelly loam to extremely gravelly loam, coarse fragment content averaged 46% and pH averaged 6.3 (slightly acid).

Subsoil textures were predominately clay loam to very gravelly clay loam and gravelly loam to extremely gravelly loam Subsoil coarse fragment content averaged 46% and ranged from 25% to 70%. Subsurface pH averaged 6 3 (slightly acid) and ranged from 6.0 (medium acid) to 6.6 (neutral) The soils were 25% non-skeletal and 75% skeletal. Total soil AWC averaged 3 6" and ranged from 1 9" to 4 4" These soils were classified into the subgroups Dystric Xerochrepts and Typic Haploxerults

Vegetation

The total vegetation cover was high ranging from 90% to 99% with an average of 94%. Mean overstory tree cover was 81% Overstory tree cover was split between conifers that averaged 46% cover and ranged from 25% to 65% and hardwoods that averaged 46% and ranged from 21% to 75% cover The regeneration layer averaged 17% cover Shrub cover was moderate with an average cover of 22% Forb cover was moderate with an average of 11% cover Grass cover was spotty with < 1% average cover.

Stand Structure

Late seral stands often had 4 or more layers of trees, while early mature and mid-mature stands usually had 2 or 3 layers. In late seral stands the top 3 layers were dominated by Douglas-fir The lower layer was dominated by tanoak, Pacific dogwood and chinquapin Large conifers dominated the top three layers with an average of 26 trees/acre > 25" d.b.h , 22 trees/acre > 30" d b h and 11 trees/acre > 40" d b h. Hardwoods dominated the lower layer and included 183 trees/acre > 5" d.b.h. and 11 trees/acre > 11" d b.h

The stand structure characteristics by layer were as follows the top layer averaged 293 years old with an average diameter of 44" and average height of 177' The second layer had an average age of 339 years with a mean diameter of 46" and a mean height of 160'. The third layer had an average age of 254 years old, with a mean diameter of 34" and mean height of 140'. The fourth layer was dominated by tanoak and chinquapin, it had a mean diameter of 9" and a mean height of 51'

Overall biomass production (conifer + hardwoods + shrubs) was generally high Modal Dunning site class was 1, with site index of 175 at 300 years. Conifer productivity was generally high with an average volume of 8692 cu. ft., it ranged from 4199 to 11,391 cu. ft., due to the variable cover of hardwoods Softwood basal area averaged 225 sq ft. and ranged from 110 to 347 sq ft Hardwood volume averaged 626 cu ft and ranged from 155 to 1000 cu ft. Hardwood basal area averaged 50 sq. ft. and ranged from 13 to 93 sq. ft. Stand density index was 423 and fell in the middle group of the Tanoak Series

Fire Regime

This type had a high-severity fire regime with infrequent high-intensity stand-replacing fires during extended drought periods Typical fires (in non-drought years) were slow moving, creeping ground fires, burning by opportunity (occasional logs and fuel accumulations), and scorching small pockets of the overstory.

Management Implications

This type is often found in riparian positions that limit management treatments

Silvicultural Systems: Silvicultural systems are limited here Intermediate harvest or sanitation salvage could be used. Outside riparian areas all silvicultural systems are applicable

Site Preparation: Machine site preparation on clay loams could lead to soil compaction, broadcast burning is recommended Site preparation can lead to significant competition from bigleaf maple.

Regeneration: Anticipate lower survival rates in areas with high soil coarse fragments. High surface rock may cause problems with artificial regeneration.

Release: Early release with multiple treatments is recommended.

Animal Damage Control Problems: None known.

Stockability: Anticipate stocking levels below regional stocking guidelines on sites with high soil coarse fragments.

Species Considerations: Pacific yew and sugar pine are frequent components of this type, that should be maintained when they occur

Cultural and Commercial: The cultural species most frequently found were tanoak, dwarf Oregon-grape, prince's pine, California hazelnut and western modesty Beargrass, another cultural species was found intermittently The commercial plant species, incense cedar and red huckleberry (also cultural species) were found intermittently and infrequently respectively

Insects and Disease: Due to the potential for white pine blister rust, planting of rust resistant sugar pine should be considered.

Fire Suppression: Line construction is labor intensive. Fire suppression tactics using control strategies can be more detrimental than fire effects. Opportunities exist to use modified suppression tactics (light hand on the land), confine and contain strategies Fires originating in this plant association will normally creep around and eventually come into contact with drier, adjacent upslope fuels where it may become more intense.

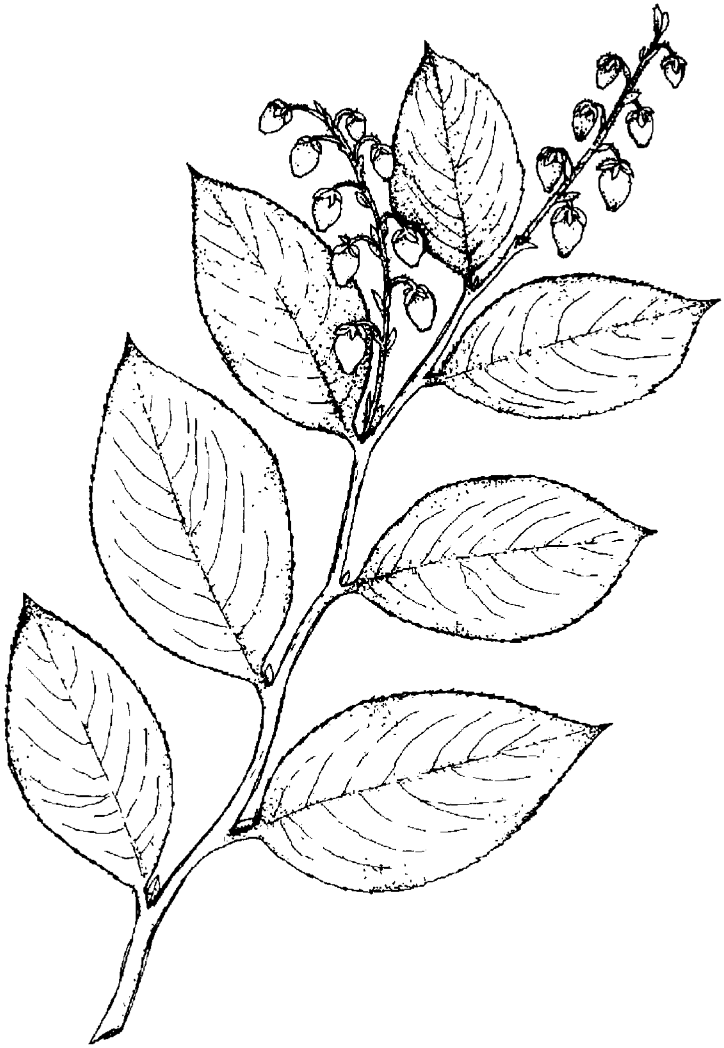
Prescribed Fire: Use fire to manage for cultural species and create openings to for natural regeneration Allowing fires to back into riparian areas will help reduce fuel loading

Closely Related Types

The LIDE2/ACCI type may be replaced on moist streamsides by the LIDE2–ACMA/POMU1 and on coastal colluvial sites it is replaced by the LIDE2/ACCI–GASH type.

Notes

Plant Association: Tanoak/Salal
EDP Code Name: LIDE2/GASH
Eco-Code: HT0SSG11



Indicator species:

Salal (*Gaultheria shalon*–GASH) was found on mid elevation sites with high shrub cover, moderate AWC and thin A horizons.

Tanoak/Salal

LIDE2/GASH Association
Eco-Code HT0SSG11

This mid-elevation type was found on cool, moist, very steep, rocky slopes. It is characterized by by a very high shrub cover dominated by salal.

Plant Association Summary

(Sample size: 19)		COVER	CON
Tree Overstory Layer			
PSME	Douglas-fir	53	100
LIDE2	Tanoak	45	100
ARME3	Pacific Madrone	5	84
Tree Understory Layer			
LIDE2	Tanoak	25	94
PSME	Douglas-fir	3	73
QUCH2	Canyon Live Oak	1	36
Shrubs			
GASH	Salal	57	100
BENE1	Dwarf Oregon-grape	4	68
VAOV	Evergreen Huckleberry	6	57
RHDI	Poison Oak	2	57
ROGY	Wood Rose	1	57
RUUR	Pacific Blackberry	1	42
Herbs & Grasses			
POMU1	Swordfern	3	78
GOOB	Rattlesnake Plantain	1	68
ACTR	Vanilla Leaf	1	63
CHME2	Little Prince's Pine	1	57
WHMO	Western Modesty	1	47

Ranger Districts

Gasquet, Orleans, Lower Trinity, Ukonom, Happy Camp

Environment

Distance to the Ocean: 11.5–27.5 miles

Elevation: 1625–3100'

Aspect: N.W., W., N.E.

Slope: 40–85%

Slope Position: lower, middle, upper 1/3

Surface Rock: 0–11%

Soils

Pit Depth: 20–40"+

AWC: 1.0–3.9"

Parent Material: phyllite, sandstone, schist

A Horizon—

Coarse Frag: 30–70%
Textures: vgl, xgl
Thickness: 2–13"
pH: 5.0–6.5

Physical and Biological Environment

Distribution/Setting

This type was found on coastal and inland sites where mean distance to the Pacific Ocean was 20 9 miles Elevation averaged 2345' and slopes were typically very steep, averaging 63% Mean radiation index was a cool 364

Soils

Soils were predominately mesic, deep (50%) to moderately deep (50%) and well drained They formed in residuum and colluvium as well as alluvium The litter layer thickness averaged 2.0" at 85% cover. Surface rock averaged 6% cover. The average surface horizon thickness was 6", texture varied from very gravelly to extremely gravelly loam, coarse fragment content averaged 46% and pH averaged 5.9 (moderately acid).

Subsoil textures were predominately gravelly to extremely gravelly loams Subsoil coarse fragment content averaged 46% and ranged from 22% to 65% Subsurface pH averaged 6.1 (slightly acid) and ranged from 5.5 (strongly acid) to 6.6 (neutral) The soils were 22% non-skeletal and 78% skeletal. Total soil AWC averaged 2 9" and ranged from 1 0" to 3 9" These soils were classified into the subgroups Dystric Xerochrepts and Typic Xerumbrepts

Vegetation

The total vegetation cover was very high ranging from 95% to 99% with an average of 98%. Mean overstory tree cover was 91% Overstory tree cover was split between conifers that averaged 56% cover and ranged from 40% to 80% and hardwoods that averaged 51% and ranged from 17% to 90% cover. The regeneration layer averaged 29% cover Shrub cover was high with an average of 67%. Forb cover was low and spotty with an average of 6% cover. Grass cover was lacking with < 1% average cover.

Stand Structure

Late seral stands often had 5 or more layers of trees, while early mature and mid-mature stands usually had 2 or 3 layers. In late seral stands the top 3 layers were dominated by Douglas-fir, while the lower 2 layers were dominated by tanoak and Pacific madrone Large conifers dominated the top three layers with an average of 31 trees/acre > 25" d b h , 22 trees/acre > 30" d b h and 13 trees/acre > 40" d b h Hardwoods dominated the lower layers and included 262 trees/acre > 5" d.b.h., 11 trees/acre > 11" d.b.h.

The stand structure characteristics by layer were as follows the top layer averaged 270 years old with an average diameter of 50" and average height of 188' The second layer had an average age of 233 years with a mean diameter of 39" and a mean height of 154'. The third layer averaged 293 years with a mean diameter of 28" and mean height of 122' The fourth layer was dominated by tanoak, it had a mean diameter of 9" and a mean height of 51' The fifth layer was also dominated by tanoak, it averaged 5" in diameter and 30' in height Large numbers of small hardwoods were often found in the lower layers.

Overall biomass production (conifer + hardwoods + shrubs) was generally high due to higher elevation and lower cover of hardwoods Modal Dunning site class was 1A, with site index of 200 at 300 years Conifer productivity was generally high with an average volume of 10,841 cu ft , it ranged from 6170 to 15,579 cu ft , due to the variable cover of hardwoods Softwood basal area averaged 270 sq. ft and ranged from 173 to 373 sq ft Hardwood volume averaged 972 cu ft and ranged from 309 to 1452 cu ft Hardwood basal area averaged 67 sq. ft and ranged from 25 to 107 sq. ft. Stand density index was 485 and fell about midway in the Tanoak Series.

Fire Regime

This type had a moderate-severity fire regime with infrequent fires of partial stand replacement nature, that may include areas of high and low intensity tree mortality It also experienced periodic creeping ground fires of low intensities with low overstory tree mortality

Management Implications

Silvicultural Systems: Shelterwood, single tree selection and sanitation salvage are not recommended in late seral stands due to the high cover of hardwoods

Site Preparation: Moderate or high intensity broadcast burning normally leads to removal of the O horizon and on slopes > 25% may lead to significant soil loss from sheet erosion. It may also lead to significant competition from snowbrush Tractor operations may result in soil compaction.

Regeneration: High cover of salal may effect regeneration. Bracken fern can be a significant competitor on selected sites

Release: Early release with multiple treatments are recommended due to high shrub cover and moderate hardwood cover.

Animal Damage Control Problems: None known.

Stockability: Regional stocking guidelines are applicable.

Species Considerations: Sugar pine occassionally occurs here and should be maintained in all management treatments

Cultural and Commercial: The cultural species most frequently found were tanoak, Pacific madrone, dwarf Oregon-grape and prince's pine. Two other cultural species, California hazelnut and beargrass, were found infrequently. The most frequent commercial plant was salal (also a cultural species)

Insects and Disease: Due to the potential for white pine blister rust planting of rust resistant sugar pine should be considered.

Fire Suppression: Confine and contain strategies using prescribed natural fire objectives are recommended A good opportunity exists here to use fire suppression strategies to meet other resource objectives Costs of control tactics including line construction are high and may cause greater resource damage than the fire effects.

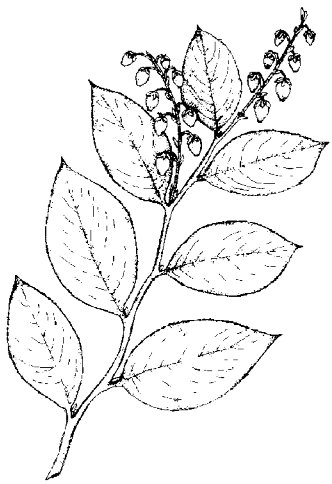
Prescribed Fire: Prescribed fire may be used to reduce natural fuels, enhance cultural species and may create regeneration sites in older stands. Burning may be difficult after fall rains due to moist conditions and topographic shading.

Closely Related Types

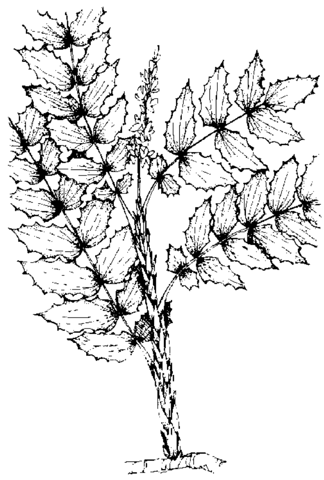
The LIDE2/GASH type may be replaced on lower elevation, wetter sites by the LIDE2/GASH–RHMA (on residuum) and LIDE2–CHLA/GASH types and on slightly drier upland sites by the LIDE2/GASH–BENE1 type. On rockier, drier sites with lower AWC it is replaced by the LIDE2–QUCH2/BENE1–GASH type.

Notes

Plant Association: Tanoak/Salal–Dwarf Oregon-grape
EDP Code Name: LIDE2/GASH–BENE1
Eco-Code: HT0SSG13



Indicator species:
Salal (*Gaultheria shalon*–GASH) was found on mid elevation sites with high shrub cover, moderate AWC and thin A horizons.



Indicator species:
Dwarf Oregon-grape (*Berberis nervosa*–BENE1) was found on cool, steep, high elevation sites, with high softwood basal area, moderate shrub cover and low grass cover.

Tanoak/Dwarf Oregon-grape–Salal

LIDE2/GASH–BENE1 Association
Eco-Code HT0SSG13

This mid-elevation type was found on cool, steep, north facing slopes with slopes with high AWC. It is characterized by the presence of salal and dwarf Oregon-grape.

Plant Association Summary

(Sample size: 18)		COVER	CON
Tree Overstory Layer			
PSME	Douglas-fir	52	100
LIDE2	Tanoak	42	94
ARME3	Pacific Madrone	7	55
Tree Understory Layer			
LIDE2	Tanoak	28	100
CACH2	Chinquapin	5	38
PSME	Douglas-fir	3	38
Shrubs			
GASH	Salal	23	100
BENE1	Dwarf Oregon-grape	13	100
ROGY	Wood Rose	1	38
Herbs & Grasses			
POMU1	Swordfern	2	72
PTAQL	Bracken Fern	1	61
CHUMO	Prince's Pine	2	50
CHME2	Little Prince's Pine	1	50

Ranger Districts

Gasquet, Lower Trinity, Orleans, Ukonom

Environment

Distance to the Ocean: 12.5 –29.5 miles

Elevation: 1560–3650'

Aspect: N.W., N.E.

Slope: 33–70%

Slope Position: lower middle, upper 1/3

Surface Rock: 1–5%

Soils

Pit Depth: 21–40"+

AWC:1.0–4.9"

Parent Material: phyllite, schist, greenstone, sandstone

A Horizon—

Coarse Frag: 8–51%
Textures: l, gl, vgl
Thickness: 2–13"
pH: 5.0–6.5

Physical and Biological Environment

Distribution/Setting

This type was found on coastal and inland where mean distance to the Pacific Ocean was 22 5 miles Elevation averaged 2580' and slopes were typically very steep, averaging 54% Mean radiation index was a cool 379 as a result of north aspects

Soils

Soils were predominately mesic, deep (53%) to moderately deep (41%) and well drained They formed in residuum and colluvium. The litter layer thickness averaged 1.5" at 80% cover. Surface rock averaged 6% cover The average surface horizon thickness was 6", texture varied from loam to very gravelly loam, coarse fragment content averaged 33% and pH averaged 5 8 (moderately acid).

Subsoil textures were predominately gravelly loams and clay loams and gravelly clay loams Subsoil coarse fragment content averaged 32% and ranged from 10% to 40% Subsurface pH averaged 6.0 (moderately acid) and ranged from 5.4 (strongly acid) to 6 5 (slightly acid). The soils were 65% non-skeletal and 35% skeletal. Total soil AWC averaged 3 8" and ranged from 1 0" to 4.9". These soils were classified into the subgroups Dystric Xerochrepts, Typic Haploxerults, Typic and Ultic Haploxeralfs

Vegetation

The total vegetation cover was high ranging from 90% to 99% with an average of 96%. Mean overstory tree cover was 90% Overstory tree cover was split between conifers that averaged 50% cover and ranged from 30% to 76% and hardwoods that averaged 53% and ranged from 20% to 85% cover. The regeneration layer averaged 37 cover Shrub cover was moderate with an average cover of 35%. Forb cover was low and spotty with an average of 5% cover. Grass cover was lacking with < 1% average cover.

Stand Structure

Late seral stands often had 5 or more layers of trees, while early mature and mid-mature stands usually had 2 or 3 layers In late seral stands the top 3 layers were dominated by Douglas-fir, while the lower 2 layers were dominated by tanoak and Pacific madrone. Large conifers dominated the top three layers with an average of 23 trees/acre > 25" d.b.h., 20 trees/acre > 30" d.b h and 13 trees/acre > 40" d.b.h. Hardwoods dominated the lower layers and included 198 trees/acre > 5" d b h , 23 trees/acre > 11" d.b h. and 10 trees/acre > 18" d b h

The stand structure characteristics by layer were as follows: the top layer averaged 271 years old with an average diameter of 49" and average height of 191' The second layer had an average age of 235 years with a mean diameter of 40" and a mean height of 158'. The third layer averaged 190 years with a mean diameter of 30" and mean height of 133', occasional large tanoaks were found in this layer The fourth layer was dominated by tanoak, it had a mean diameter of 14" and a mean height of 73'. The fifth layer was also dominated by tanoak, it averaged 9" in diameter and 51' in height. Large numbers of small hardwoods were often found in the lower layers.

Overall biomass production (conifer + hardwoods + shrubs) was generally high Modal Dunning site class was 1A or 1, with site index of 175-200 at 300 years. Conifer productivity was generally high with an average volume of 9112 cu. ft., it ranged from 4179 to 14,401 cu. ft., due to the variable cover of hardwoods Softwood basal area averaged 214 sq ft. and ranged from 90 to 320 sq ft Hardwood volume averaged 1728 cu. ft. and ranged from 552 to 3660 cu ft

Hardwood basal area averaged 93 sq ft. and ranged from 40 to 147 sq. ft. Stand density index was 463 and fell about midway in the Tanoak Series

Fire Regime

This type had a moderate-severity fire regime with infrequent fires of partial stand replacement nature, that may include areas of high and low intensity tree mortality. It also experienced periodic creeping ground fires of low intensities with low overstory tree mortality

Management Implications

Silvicultural Systems: Shelterwood, single tree selection and sanitation salvage are not recommended in late seral stands due to the high cover of hardwoods.

Site Preparation: Moderate or high intensity broadcast burning normally leads to removal of the O horizon and on slopes > 25% may lead to significant soil loss from sheet erosion.

Regeneration: High cover of salal may effect regeneration success.

Release: Early release with multiple treatments are recommended due to high density of hardwood stems. Manual release difficulty increases when salal cover is high

Animal Damage Control Problems: None known

Stockability: Regional stocking guidelines are applicable

Species Considerations: None known.

Cultural and Commercial: The cultural species most frequently found were tanoak, Pacific madrone, dwarf Oregon-grape and prince's pine California hazelnut and beargrass, two other cultural species, were found infrequently. The most frequent commercial plant was salal (also a cultural species).

Insects and Disease: None known.

Fire Suppression: Confine and contain strategies using prescribed natural fire objectives are recommended A good opportunity exists here to use fire suppression strategies to meet other resource objectives Costs of control tactics including line construction are high and may cause greater resource damage than the fire effects

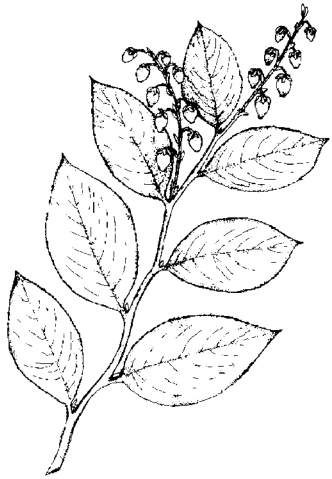
Prescribed Fire: Prescribed fire may be used to reduce natural fuels, enhance cultural species and may create regeneration sites in older stands. Burning may be difficult after fall rains due to moist conditions and topographic shading

Closely Related Types

The LIDE2/GASH–BENE1 type may be replaced on moister sites by the LIDE2/GASH type and on drier upland sites by the LIDE2/BENE1 type On rockier, drier colluvial sites with lower AWC it is replaced by the LIDE2–QUCH2/BENE1–GASH type

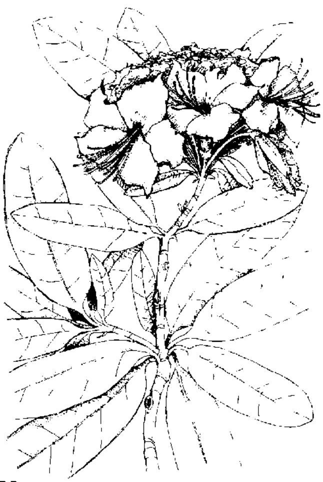
Notes

Plant Association: Tanoak/Salal–Pacific Rhododendron
EDP Code Name: LIDE2/GASH–RHMA
Eco-Code: HT0SSG12



Indicator species:

Salal (*Gaultheria shalon*–GASH) was found on mid elevation sites with high shrub cover, moderate AWC and thin A horizons



Indicator species:

Pacific rhododendron (*Rhododendron macrophyllum*–RHMA) was found on mid elevation, cool, moist sites, with high subsurface coarse fragments, close to the Pacific Ocean.

Tanoak/Salal–Pacific Rhododendron

LIDE2/GASH–RHMA Association

Eco-Code HT0SSG12

This coastal type was found on cool, moist, very steep slopes with primarily deep soils that had high AWC. It is characterized by a very high shrub cover dominated by salal and Pacific rhododendron.

Plant Association Summary

(Sample size: 12)		COVER	CON
Tree Overstory Layer			
PSME	Douglas-fir	61	100
LIDE2	Tanoak	26	91
ACMA	Bigleaf Maple	9	41
CONU4	Pacific Dogwood	5	41
Tree Understory Layer			
LIDE2	Tanoak	14	100
PSME	Douglas-fir	1	66
QUCH2	Canyon Live Oak	2	41
Shrubs			
GASH	Salal	40	100
RHMA	Pacific Rhododendron	25	100
BENE1	Dwarf Oregon-grape	10	91
VAOV	Evergreen Huckleberry	4	41
Herbs & Grasses			
POMU1	Swordfern	8	75
ACTR	Vanilla Leaf	5	66
GOOB	Rattlesnake Plantain	1	66

Ranger Districts

Gasquet, Orleans, Ukonom

Environment

Distance to the Ocean: 13.5–24.5 miles

Elevation: 1800–3560'

Aspect: N., N.E.

Slope: 35–80%

Slope Position: lower, middle 1/3

Surface Rock: 1–35%

Soils

Pit Depth: 25–40"+

AWC: 2.1–5.2"

Parent Material: phyllite, schist

A Horizon—
- Coarse Frag: 25–60%
- Textures: gl
- Thickness: 1–9"
- pH: 5.5–6.5

Physical and Biological Environment

Distribution/Setting

This type was found on coastal sites where mean distance to the Pacific Ocean was 19.3 miles Elevation averaged 2894' and slopes were very steep, averaging 57%. Mean radiation index was 421

Soils

Soils were predominately mesic, deep (80%) to moderately deep (20%) and well drained. They formed in residuum, colluvium and sometimes alluvium The litter layer thickness averaged 0 8" at 89% cover. Surface rock averaged 12% cover The average surface horizon thickness was 5", texture was gravelly loam, coarse fragment content averaged 34% and pH averaged 5.9 (moderately acid).

Subsoil textures were predominately gravelly to very gravelly loams and very cobbly to extremely cobbly loams Subsoil coarse fragment content averaged 46% and ranged from 25% to 75% Subsurface pH averaged 6 1 (slightly acid) and ranged from 5.6 (medium acid) to 6.5 (slightly acid) The soils were 70% non-skeletal and 30% skeletal. Total soil AWC averaged 3 9" and ranged from 2 1" to 5.2". These soils were classified into the subgroup Dystric Xerochrepts.

Vegetation

The total vegetation cover was very high ranging from 98% to 99% with an average of 98%. Mean overstory tree cover was 83%. Overstory tree cover was split between conifers that averaged 65% cover and ranged from 44% to 75% and hardwoods that averaged 32% and ranged from 15% to 45% cover. The regeneration layer averaged 15% cover. Shrub cover was high with an average of 66% Forb cover was low and spotty with an average of 7% cover Grass cover was lacking with < 1% average cover.

Stand Structure

Late seral stands often had 4 or more layers of trees, while early mature and mid-mature stands usually had 2 or 3 layers In late seral stands the top 3 layers were dominated by Douglas-fir, while the lower layers was dominated by tanoak Large conifers dominated the top three layers with an average of 41 trees/acre > 25" d b h , 28 trees/acre > 30" d.b h and 18 trees/acre > 40" d.b.h Hardwoods dominated the lower layers and included 164 trees/acre > 5" d.b h and 6 trees/acre > 11" d.b.h. Hardwood density is much lower in this type due to the higher elevation sites and the lower soil temperatures resulting from elevation, slope shape and slope position.

The stand structure characteristics by layer were as follows. the top layer averaged 271 years old with an average diameter of 48" and average height of 190' The second layer had an average age of 226 years with a mean diameter of 40" and a mean height of 157'. The third layer averaged 293 years with a mean diameter of 27" and mean height of 107'. The fourth layer was dominated by tanoak, it had a mean diameter of 9" and mean height of 51'. Large numbers of small hardwoods were often found in the lower layers.

Overall biomass production (conifer + hardwoods + shrubs) was generally high Modal Dunning site class was 1A, with site index of 200 at 300 years Conifer productivity was generally high with an average volume of 12,854 cu. ft., it ranged from 9069 to 15,687 cu ft , due to the reduced cover of hardwoods. Softwood basal area averaged 335 sq. ft. and ranged from 280 to 413 sq ft Hardwood volume averaged 847 cu. ft. and ranged from 260 to 1300 cu. ft. Hardwood basal area averaged 56 sq. ft. and ranged from 13 to 80 sq. ft. Stand density index was 588, among the highest in the Tanoak Series.

Fire Regime

This type had a moderate-severity fire regime with infrequent fires of partial stand replacement nature, that may include areas of high and low intensity tree mortality It also experienced periodic creeping ground fires of low intensities with low overstory tree mortality.

Management Implications

This plant association can be found in riparian positions that limit management treatments.

Silvicultural Systems: Single tree selection is not recommended in late seral stands due to the high cover of hardwoods. No other restrictions were identified in this type.

Site Preparation: Moderate or high intensity broadcast burning normally leads to removal of the O horizon and on slopes > 25% may lead to significant soil loss from sheet erosion It may also lead to significant competition from snowbrush Broadcast burns should be designed to increase fuel consumption while maintaining O horizon cover Regeneration is more difficult here due to the high cover of Pacific rhododendron. Cutting Pacific rhododendron may reduce this problem. Tractor operations may result in soil compaction.

Regeneration: Salal and bracken fern can be significant competitors and could influence seedling survival

Release: Early release with multiple treatments are recommended due to high density of shrubs and moderate cover of hardwoods.

Animal Damage Control Problems: None known.

Stockability: Regional stocking guidelines are applicable

Species Considerations: Western hemlock and Pacific yew are infrequently found in this type that should be maintained in all management treatments

Cultural and Commercial: The important cultural species most frequently found in this plant association was of course, tanoak California hazelnut and beargrass, two cultural species were found infrequently here The most frequent commercial plant was salal (also a cultural species).

Insects and Disease: None known.

Fire Suppression: Confine and contain strategies using prescribed natural fire objectives are recommended A good opportunity exists here to use fire suppression strategies to meet other resource objectives. Costs of control tactics including line construction are high and may cause greater resource damage than the fire effects

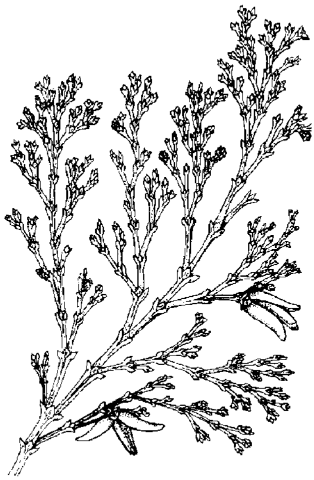
Prescribed Fire: Prescribed fire may be used to reduce natural fuels, enhance cultural species and may create regeneration sites in older stands Burning may be difficult after fall rains due to moist conditions and topographic shading.

Closely Related Types

The LIDE2/GASH–RHMA type may be replaced on wetter, lower elevation colluvial sites by the LIDE2/VAOV–RHMA and LIDE2–CHLA/VAOV–RHOC types and on drier upland sites by the LIDE2/GASH type. On rockier, drier, colluvial sites with lower AWC it is replaced by the LIDE2–QUCH2/BENE1–GASH type

Notes

Plant Association: Tanoak–Incense Cedar/California Fescue
EDP Code Name: LIDE2–CADE3/FECA
Eco-Code: HT0CCI11



Indicator species:
Incense cedar (*Calocedrus decurrens*–CADE3) was found on dry, warm, inland sites, with moderate slopes, serpentine soils, basic soil pH, low AWC, moderate tree cover and high grass cover.

Indicator species:
California fescue (*Festuca californica*–FECA) was found on warm, dry, inland sites, often on serpentine soils, with basic soil pH and low AWC.

Tanoak–Incense Cedar/California Fescue

LIDE2–CADE3/FECA Association
Eco-Code HT0CCI11

This open, inland type was found on steep, warm, south-facing slopes on serpentine soils. It is characterized by the presence of incense cedar and a high cover of California fescue.

Plant Association Summary

(Sample size: 7)		COVER	CON
Tree Overstory Layer			
PSME	Douglas-fir	46	100
CADE3	Incense Cedar	15	100
ARME3	Pacific Madrone	10	71
LIDE2	Tanoak	14	42
PILA	Sugar Pine	4	42
Tree Understory Layer			
LIDE2	Tanoak	10	100
PSME	Douglas-fir	2	71
CADE3	Incense Cedar	2	71
Shrubs			
QUVA	Huckleberry Oak	4	42
Herbs & Grasses			
FECA	California Fescue	23	71
IRI	Iris spp.	1	71
POMU1	Swordfern	2	57
GOOB	Rattlesnake Plantain	1	57
HIAL	White Hawkweed	1	57

Ranger Districts
Gasquet, Ukonom, Happy Camp, Orleans

Environment
Distance to the Ocean: 17.5–31.5 miles

Elevation: 1800–2880'

Aspect: S.W., N.

Slope: 30–62%

Slope Position: upper, middle 1/3

Surface Rock: 0–13%

Soils
Pit Depth: 23–40"+

AWC: 2.0–5.5"

Parent Material: serpentine

A Horizon—
- Coarse Frag: 10–60%
- Textures: gl, gsil, cl
- Thickness: 2–11"
- pH: 6.0–6.5

Physical and Biological Environment

Distribution/Setting

This type was found on inland sites where mean distance to the Pacific Ocean was 25 2 miles Elevation averaged 2534' and slopes were typically steep, averaging 36% Mean radiation index was a warm .500 due to southwest-facing aspects.

Soils

Soils were predominately mesic, deep (57%) and moderately deep (43%) and well drained They formed in residuum and colluvium The litter layer thickness averaged 1.6" at 85% cover Surface rock averaged 8% cover. The average surface horizon thickness was 7", textures were gravelly loam or silt loam or sandy clay loam, coarse fragment content averaged 31% and pH averaged 6 2 (slightly acid)

Subsoil textures were predominately very gravelly loam, or gravelly to very gravelly clay loam. Subsoil coarse fragment content averaged 29% and ranged from 10% to 38% Subsurface pH averaged 6.6 (neutral) and ranged from 6.2 (slightly acid) to 7.0 (neutral) The soils were 57% non-skeletal and 43% skeletal Total soil AWC averaged 3 2" and ranged from 2.0" to 5.5". These soils were classified into the subgroups Dystric Xerochrepts, Typic Haploxerults and Ultic Haploxeralfs

Vegetation

The total vegetation cover was very high ranging from 85% to 99% with an average of 94% Mean overstory tree cover was 87% Overstory tree cover was split between conifers that averaged 69% cover and ranged from 55% to 90% and hardwoods that averaged 32% and ranged from 22% to 56% cover The regeneration layer averaged 15% cover. Shrub cover was very low with an average cover of 4% Forb cover was also low with an average of 6% cover Grass cover was high with 28% average cover

Stand Structure

Stands structure here was irregular depending on the degree of soil serpentinization Late seral stands often had 5 or more layers of trees, while early mature and mid-mature stands usually had 2 or 3 layers In late seral stands the top 3 layers were dominated by Douglas-fir, incense cedar and sugar pine while the lower 2 layers were dominated by tanoak and Pacific madrone. Large conifers dominated the top three layers with an average of 34 trees/acre > 25" d.b h , 19 trees/acre > 30" d b.h. and 7 trees/acre > 40" d b h Hardwood density in the lower layers had the lowest density in the Tanoak Series due to serpentine soils. It included 72 trees/acre > 5" d.b.h., 15 trees/acre > 11" d b h and 3 trees/acre > 18" d.b.h.

The stand structure characteristics by layer were as follows the top layer averaged 254 years old with an average diameter of 46" and average height of 149' The second layer had an average age of 222 years with a mean diameter of 32" and a mean height of 121' The third layer had an average age of 320 years old, with a mean diameter of 40" and mean height of 107' The fourth layer was dominated by tanoak and Pacific madrone, it had a mean diameter of 14" and a mean height of 73' The fifth layer was dominated by tanoak, it averaged 9" in diameter and 51' in height

Overall biomass production (conifer + hardwoods + shrubs) was generally moderate Modal Dunning site class was 1, with site index of 175 at 300 years Conifer productivity was generally moderately high with an average volume of

8502 cu ft , it ranged from 5850 to a high of 11,310 cu ft , due to the variable cover of hardwoods and serpentine soils. Softwood basal area averaged 292 sq. ft. and ranged from 267 to 307 sq. ft Hardwood volume averaged 890 cu. ft. and ranged from 276 to 1320 cu ft. Hardwood basal area averaged 46 sq. ft. and ranged from 13 to 67 sq. ft Stand density index was 487 and fell in the middle group of the Tanoak Series

Fire Regime

This type had a moderate-severity regime with infrequent partial stand-replacing events, which includes significant areas of high and low tree mortality As well as frequent low intensity events with minimal overstory mortality The greatest potential for stand replacement events are in the early seral stages Later seral stages are associated with low to moderate intensity fires with fast rates of spread. Stand replacement in older seral stages is usually associated with drought

Management Implications

This type often contains rare or sensitive plants

Silvicultural Systems: Management options are limited where soils are highly serpentinized All silvicultural systems are applicable on better soils.

Site Preparation: Broadcast burning is recommended on better soils, but could lead to grass dominance on highly serpentinized soils.

Regeneration: Anticipate lower survival rates on sites with high grass cover.

Release: Manual release difficult in areas of high grass cover.

Animal Damage Control Problems: None known.

Stockability: Anticipate stocking levels below regional stocking guidelines on sites with highly serpentinized soils or those with high grass cover

Species Considerations: Incense cedar, black oak, and sugar pine are frequent components of this type that should be mantained in all management treatments.

Cultural and Commercial: The cultural species most frequently found were Pacific madrone and iris Beargrass, another cultural species was found infrequently here The most frequently occurring commercial plant species was incense cedar (also a cultural species). California bay (also a cultural species), another commercial species was found infrequently. .

Insects and Disease: Due to the potential for white pine blister rust, planting of rust resistant sugar pine should be considered

Fire Suppression: Line construction is generally easy here Contain and control strategies are recommended. Modified suppression tactics should be considered due to shallow serpentine soils High intensity fires have potential to sterilize soils

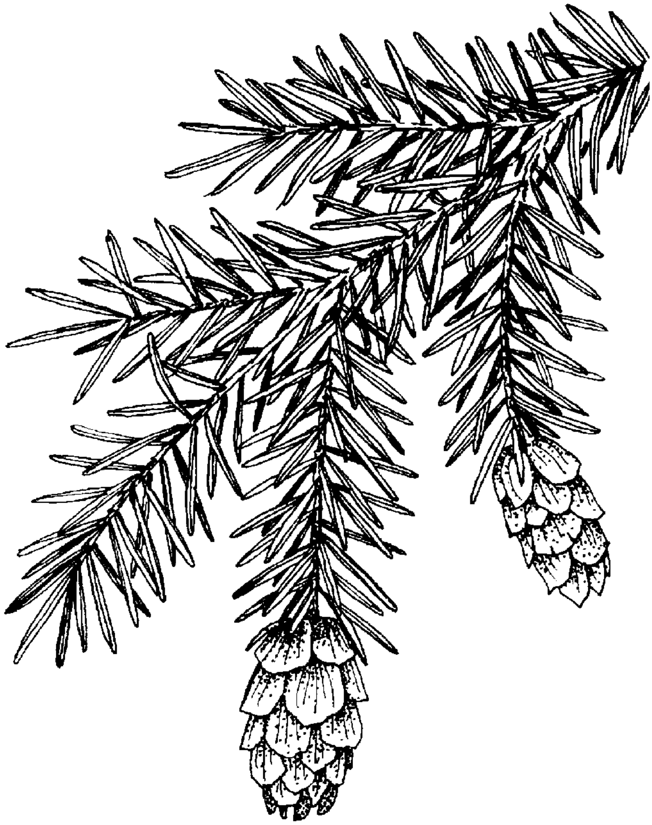
Prescribed Fire: Use of low to moderate intensity prescribed fires is recommended to reduce fuel accumulations, impede shrub growth, and provide diversity of herbaceous plants

Closely Related Types

The LIDE2–CADE3/FECA type may be replaced by the PSME–PIJE/FECA, PIJE–PSME/QUVA/FECA, or PIJE–CADE3/QUVA/XETE types depending on the degree of serpentinization and distance from the ocean.

Notes

Plant Association: Tanoak–Port Orford Cedar–Western Hemlock/Evergreen Huckleberry
EDP Code Name: LIDE2–CHLA–TSHE/VAOV
Eco-Code: HT0CCO19



Indicator species:

Western hemlock (*Tsuga heterophylla*–TSHE) was found on steep, lower third, low elevation, coastal sites, within the coastal fog belt, with high AWC and high tree cover.

Tanoak–Port Orford Cedar–Western Hemlock/ Evergreen Huckleberry

LIDE2–CHLA–TSHE/VAOV Association
Eco-Code HT0CCO19

This low elevation, riparian type had a limited extent on very steep cool slopes influenced by coastal fog. The soils were primarily moderately deep. It was characterized by the presence of Port Orford cedar, western hemlock and evergreen huckleberry.

Plant Association Summary

(Sample size: 15)

		COVER	CON
Tree Overstory Layer			
CHLA	Port Orford Cedar	30	100
PSME	Douglas-fir	34	100
LIDE2	Tanoak	23	100
TSHE	Western Hemlock	20	100
Tree Understory Layer			
LIDE2	Tanoak	7	100
TSHE	Western Hemlock	3	100
CHLA	Port Orford Cedar	2	80
Shrubs			
VAOV	Evergreen Huckleberry	47	100
RHMA	Pacific Rhododendron	12	73
BENE1	Dwarf Oregon-grape	4	53
Herbs & Grasses			
POMU1	Swordfern	10	80
GOOB	Rattlesnake Plantain	1	60
VAPL	Redwood Insideout Flower	2	40
TROV2	White Trillium	1	40

Ranger Districts

Gasquet, Orleans

Environment

Distance to the Ocean: 7.5 –21.5 miles

Elevation: 1300–2000'

Aspect: E.

Slope: 35–75%

Slope Position: lower, middle 1/3

Surface Rock: 1–4%

Soils

Pit Depth: 20–40"+

AWC: 1.8–5.6"

Parent Material: schist, phyllite, greenstone

A Horizon—
- Coarse Frag: 10–45%
- Textures: l
- Thickness: 2–9"
- pH: 5.0–6.3

Physical and Biological Environment

Distribution/Setting

This riparian type was of limited extent on National Forest Lands It was found on sites where coastal fog contributes moist conditions favorable to western hemlock. Mean distance to the Pacific Ocean was 18.8 miles Elevation averaged 1553' and slopes were typically very steep, averaging 46%. Mean radiation index was a cool .416.

Soils

Soils were predominately mesic, deep (37%) and moderately deep (53%) and well drained. They formed in residuum and colluvium. The litter layer thickness averaged 1.5" at 85% cover. Surface rock averaged 3% cover The average surface horizon thickness was 5", texture was loam, coarse fragment content averaged 34% and pH averaged 5.7 (moderately acid).

Subsoil textures were predominately loams to very gravelly loams and clay loams Subsoil coarse fragment content averaged 32% and ranged from 10% to 90% Subsurface pH averaged 5 7 (moderately acid) and ranged from 5.4 (strongly acid) to 6.1 (slightly acid). The soils were 82% non-skeletal and 18% skeletal. Total soil AWC averaged 3 1" and ranged from 1 8" to 5 6" These soils were classified into the subgroups Dystric Xerochrepts and Typic Haploxerults

Vegetation

The total vegetation cover was very high ranging from 90% to 99% with an average of 97%. Mean overstory tree cover was 92% Overstory tree cover was split between conifers that averaged 85% cover and ranged from 55% to 98% and hardwoods that averaged 28% and ranged from 10% to 45% cover. The regeneration layer averaged 12% cover. Shrub cover was high with an average cover of 64%. Forb cover was moderate with an average of 13% cover Grass cover was lacking with < 1% average cover

Stand Structure

Late seral stands often had 5 or more layers of trees, while early mature and mid-mature stands usually had 2 or 3 layers In late seral stands the top 3 layers were dominated by Douglas-fir, western hemlock and Port Orford cedar, while the lower 2 layers were dominated by tanoak and bigleaf maple Large conifers dominated the top three layers with an average of 29 trees/acre > 25" d b h , 20 trees/acre > 30" d.b.h. and 13 trees/acre > 40" d.b.h. Hardwoods dominated the lower layers and included 84 trees/acre > 5" d b.h , 14 trees/acre > 11" d.b.h. and 4 trees/acre > 18" d b h

The stand structure characteristics by layer were as follows. the top layer averaged 307 years old with an average diameter of 46" and average height of 196' The second layer had an average age of 261 years with a mean diameter of 36" and a mean height of 157'. The third layer had an average age of 234 years old, with a mean diameter of 33" and mean height of 119'. The fourth layer was dominated by tanoak, it had a mean diameter of 14" and a mean height of 73' The fifth layer was dominated by tanoak and bigleaf maple, it averaged 9" in diameter and 51' in height Large numbers of small hardwoods were often found in the lower layer

Overall biomass production (conifer + hardwoods + shrubs) was generally high Modal Dunning site class was 1A, with site index of 200 at 300 years Conifer productivity was generally high with an average volume of 10,743 cu. ft , it ranged from 6081 to 16,100 cu ft , due to the variable cover of hardwoods. Softwood basal area averaged 296 sq ft and ranged from 187 to 400 sq. ft Hardwood volume averaged 589 cu. ft. and ranged from 200 to 1050 cu. ft. Hardwood basal area averaged 39 sq. ft. and ranged from 5 to 80 sq. ft. Stand density index was 419 and fell about midway in the Tanoak Series.

Fire Regime

This type experiences a high-severity fire regime of very infrequent fires, usually of high-intensity, stand-replacing nature, associated with extended drought periods. Older seral stages experience infrequent low intensity fires that creep and burn occasional logs and accumulated fuels

Management Implications

This type is of very limited extent and only found in riparian positions where management options are limited. Port Orford cedar root disease is an issue here, therefore a risk assessment needs to be completed for any management activity

Silvicultural Systems: Salvage and sanitation salvage are available in riparian areas.

Site Preparation: Hand pile and jackpot burn are recommended in riparian areas.

Regeneration: Natural regeneration can be anticipated with adequate seed source, particularly from Port Orford cedar and western hemlock.

Release: Recommend wider spacing of Port Orford cedar during release and thinning

Animal Damage Control Problems: None known

Stockability: Regional stocking guidelines are applicable.

Species Considerations: Port Orford cedar, Pacific yew and western hemlock are important components of this type and should be maintained

Cultural and Commercial: Relatively few plants used for both cultural and commercial purposes were found in this plant association (Appendix VI). The cultural species most frequently found were tanoak, dwarf Oregon-grape and Pacific yew The most frequently occurring commercial plant species were Port Orford cedar and evergreen huckleberry (also cultural species)

Insects and Disease: Potential for Port Orford cedar root disease infection and/or subsequent spread is high due to proximity to free water and high density of Port Orford cedar Helicopter logging should be considered here to reduce the risk of disease spread.

Fire Suppression: Confine and contain strategies are recommended, with opportunities to use modified suppression tactics (light hand on the land). Control related suppression actions can have high costs and can be more detrimental than the fire effects. Fire equipment should be cleaned prior to and after use in areas with Port Orford cedar to avoid spreading root disease.

Prescribed Fire: Use of prescribed fire under low-moderate intensities is recommended to reduce fuel accumulations by jackpot burning Low intensity fires should be allowed to back into riparian areas

Closely Related Types

The LIDE2–CHLA–TSHE/VAOV type may be replaced on wetter streamside locations by the LIDE2–CHLA/ACCI type, on streamside terraces by the LIDE2–CHLA–UMCA/VAOV type and on drier upland sites by the LIDE2–CHLA/GASH type.

Notes

Plant Association: Tanoak–Port Orford Cedar–California Bay/ Evergreen Huckleberry
EDP Code Name: LIDE2–CHLA–UMCA/VAOV
Eco-Code: HT0CCO11

Indicator species:
California bay (*Umbellularia californica*–UMCA) was found on moist, low elevation, moderately steep sites, in streamside and lower third slope positions.

Indicator species:
Evergreen huckleberry (*Vaccinium ovatum*–VAOV) was found on moist, low elevation sites close to the Pacific Ocean or sites with coastal fog. Shrub cover here was low, while surface rock, A horizon thickness, and total basal area was also low.

Tanoak–Port Orford Cedar–California Bay/ Evergreen Huckleberry

LIDE2–CHLA–UMCA/VAOV Association
Eco-Code HT0CCO11

This coastal, riparian, low elevation type had slightly acid soils with high coarse fragment content and high AWC. It was characterized by the presence of Port Orford cedar, California bay, and evergreen huckleberry.

Plant Association Summary

(Sample size: 14)		COVER	CON
Tree Overstory Layer			
PSME	Douglas-fir	39	100
CHLA	Port Orford Cedar	33	100
LIDE2	Tanoak	30	100
UMCA	California Bay	12	71
Tree Understory Layer			
LIDE2	Tanoak	8	100
UMCA	California Bay	3	100
CHLA	Port Orford Cedar	3	92
PSME	Douglas-fir	1	64
Shrubs			
VAOV	Evergreen Huckleberry	40	100
COCOC	California Hazelnut	3	71
GASH	Salal	12	64
Herbs & Grasses			
POMU1	Swordfern	8	92
TROV2	White Trillium	1	85
ASCA2	Wild Ginger	2	57
OXOR1	Redwood Sorrel	7	50

Ranger Districts
Gasquet, Orleans

Environment
Distance to the Ocean: 7.5–22.5 miles
Elevation: 900–1600'
Aspect: W., N.E.
Slope: 10–75%
Slope Position: lower 1/3
Surface Rock: 0–4%

Soils
Pit Depth: 25–40"+
AWC: 2.3–4.0"
Parent Material: mafic, serpentine, greenstone, phyllite
A Horizon—
Coarse Frag: 40–85%
Textures: vgl, xgl, vgsl
Thickness: 3–14"
pH: 5.7–7.0

Physical and Biological Environment

Distribution/Setting

This type was found in riparian positions on coastal sites where mean distance to the Pacific Ocean was 15.5 miles. Elevation averaged 1232' and slopes were typically steep, averaging 37% Mean radiation index was a moderate .440, but was offset by topographic shading.

Soils

Soils were predominately mesic, deep (53%) and moderately deep (40%) and well drained. They formed in residuum, colluvium and alluvium The litter layer thickness averaged 2 3" at 75% cover Surface rock averaged 3% cover. The average surface horizon thickness was 8", texture varied from very gravelly to extremely gravelly loams and included very gravelly sandy loams, coarse fragment content averaged 51% and pH averaged 6 2 (slightly acid).

Subsoil textures were predominately gravelly to very gravelly loams and very gravelly clay loams. Subsoil coarse fragment content averaged 36% and ranged from 16% to 65%. Subsurface pH averaged 6.3 (moderately acid) and ranged from 5 8 (moderately acid) to 6 5 (slightly acid). The soils were 39% non-skeletal and 61% skeletal. Total soil AWC averaged 3.6" and ranged from 2.3" to 4.0". These soils were classified into the subgroups Dystric Xerochrepts and Typic Xerofluvents

Vegetation

The total vegetation cover was very high ranging from 98% to 99% with an average of 99%. Mean overstory tree cover was 92%. Overstory tree cover was split between conifers that averaged 68% cover and ranged from 30% to 95% and hardwoods that averaged 42% and ranged from 15% to 70% cover The regeneration layer averaged 16% cover Shrub cover was high with an average cover of 53%. Forb cover was high with an average of 21% cover Grass cover was lacking with 1% average cover

Stand Structure

Late seral stands often had 5 or more layers of trees, while early mature and mid-mature stands usually had 2 or 3 layers. In late seral stands the top 3 layers were dominated by Douglas-fir and Port Orford cedar, while the lower 2 layers were dominated by tanoak, California bay and bigleaf maple. Large conifers dominated the top three layers with an average of 29 trees/acre > 25" d b h , 20 trees/acre > 30" d.b.h. and 13 trees/acre > 40" d b h Hardwoods dominated the lower layers and included 222 trees/acre > 5" d b h , 19 trees/acre > 11" d b.h. and 3 trees/acre > 18" d.b.h.

The stand structure characteristics by layer were as follows: the top layer averaged 327 years old with an average diameter of 53" and average height of 178' The second layer had an average age of 285 years with a mean diameter of 42" and a mean height of 143'. The third layer had an average age of 219 years old, with a mean diameter of 31" and mean height of 124'. The fourth layer was dominated by tanoak, it had a mean diameter of 14" and a mean height of 73' The fifth layer was dominated by tanoak and California bay, it averaged 9" in diameter and 51' in height Large numbers of small hardwoods were often found in the lower layers

Overall biomass production (conifer + hardwoods + shrubs) was generally high Modal Dunning site class was 1A, with site index of 200 at 300 years. Conifer productivity was generally high with an average volume of 9092 cu. ft., it ranged 3021 to 12,824 cu ft , due to the variable cover of hardwoods. Softwood basal area averaged 231 sq ft and ranged from 93 to 320 sq. ft. Hardwood volume averaged 1011 cu. ft. and ranged from 259 to 1832 cu ft Hardwood basal area averaged 66 sq ft and ranged from 26 to 93 sq ft Stand density index was 473 and fell about midway in the Tanoak Series

Fire Regime

This type experiences a high-severity fire regime of very infrequent fires, usually of high-intensity, stand-replacing nature, associated with extended drought periods. Older seral stages experience infrequent low intensity fires that creep and burn occasional logs and accumulated fuels.

Management Implications

This type is often found in riparian positions that limit management activities Port Orford cedar root disease is an issue here, therefore a risk assessment needs to be completed for any management activity

Silvicultural Systems: Salvage and sanitation salvage are available in riparian areas, all other systems are available outside riparian areas.

Site Preparation: Hand pile and jackpot burn recommended in riparian areas. Outside riparian areas machine site preparation on gentle slopes and broadcast burning on steeper slopes.

Regeneration: Natural regeneration can be anticipated with adequate seed source, particularly from Port Orford cedar

Release: Early release with multiple treatments are recommended due to high density of hardwood stems. Recommend wider spacing of Port Orford cedar during release and thinning

Animal Damage Control Problems: None known.

Stockability: Regional stocking guidelines are applicable.

Species Considerations: Port Orford cedar and Pacific yew are important components of this type and should be maintained in all management treatments

Cultural and Commercial: The cultural species most frequently found were tanoak, California hazelnut, dwarf Oregon-grape and Pacific blackberry Beargrass, another cultural species was found infrequently The most frequently occurring commercial plant species were Port Orford cedar and California bay (also cultural species).

Insects and Disease: Potential for Port Orford cedar root disease infection and/or subsequent spread is high due to proximity to free water and high density of Port Orford cedar Helicopter logging should be considered here to reduce the risk of disease spread.

Fire Suppression: Confine and contain strategies are recommended, with opportunities to use modified suppression tactics (light hand on the land). Modified suppression tactics should be used where there are shallow serpentine soils. Control related suppression actions can have high costs and can be more detrimental than the fire effects Fire equipment should be cleaned prior to and after use in areas with Port Orford cedar to avoid spreading root disease

Prescribed Fire: Use of prescribed fire under low-moderate intensities is recommended to reduce fuel accumulations by jackpot burning. Low intensity fires should be allowed to back into riparian areas.

Closely Related Types

The LIDE2–CHLA–UMCA/VAOV type may be replaced on wetter streamside locations by the LIDE2–CHLA–ALRU2//Riparian type and on drier upland sites by the LIDE2–CHLA/VAOV type. On rockier, drier, upland sites it is replaced by the LIDE2–QUCH2/VAOV type

Notes

Plant Association: Tanoak–Port Orford Cedar/Evergreen Huckleberry–Western Azalea
EDP Code Name: LIDE2–CHLA/VAOV–RHOC
Eco-Code: HT0CCO12

Indicator species:
Evergreen huckleberry (*Vaccinium ovatum*–VAOV) was found on moist, low elevation sites close to the Pacific Ocean or sites with coastal fog. Shrub cover here was low, while surface rock, A horizon thickness, and total basal area was also low.

Indicator species:
Western azalea (*Rhododendron occidentale*–RHOC) was found on cool, wet sites in lower third slope positions, with concave shaped slopes, acidic surface soil horizon and high shrub cover.

Tanoak–Port Orford Cedar/Evergreen Huckleberry–Western Azalea

LIDE2–CHLA/VAOV–RHOC Association

EcoCode HT0CCO12

This coastal, riparian type was found on order 1 and 2 streams, where temperatures were offset by topographic shading. The soils were derived from serpentine parent material and were moderately deep with high AWC and neutral pH. It was characterized by the presence of Port Orford cedar, evergreen huckleberry, and western azalea.

Plant Association Summary

(Sample size: 10)		COVER	CON
Tree Overstory Layer			
PSME	Douglas-fir	37	100
CHLA	Port Orford Cedar	34	100
LIDE2	Tanoak	22	100
Tree Understory Layer			
LIDE2	Tanoak	8	100
CHLA	Port Orford Cedar	2	80
TABR	Pacific Yew	1	70
Shrubs			
VAOV	Evergreen Huckleberry	24	100
GASH	Salal	18	100
RHOC	Western Azalea	12	100
RHMA	Pacific Rhododendron	6	80
Herbs & Grasses			
POMU1	Swordfern	5	80
OXOR1	Redwood Sorrel	3	70
GOOB	Rattlesnake Plantain	1	70
WHMO	Western Modesty	2	60

Ranger Districts

Gasquet, Orleans

Environment

Distance to the Ocean: 8.5–21.5 miles

Elevation: 1210–2170'

Aspect: N., S.E.

Slope: 15–55%

Slope Position: lower, middle 1/3

Surface Rock: 0–7%

Soils

Pit Depth: 23–40"+

AWC: 2.1–5.1"

Parent Material: serpentine

A Horizon

Coarse Frag: 10–60%

Textures: l, gl, vgl

Thickness: 2–8"

pH: 6.5–7.0

Physical and Biological Environment

Distribution/Setting

This riparian type was found on coastal sites, adjacent to Order 1 and 2 class streams Mean distance to the Pacific Ocean was 15.3 miles Elevation averaged 1692' and slopes were typically steep, averaging 41%. Mean radiation index was a moderate 450, but was offset by topographic shading.

Soils

Soils were predominately mesic, deep (33%) and moderately deep (67%) and well drained They formed in colluvium and alluvium The litter layer thickness averaged 2.3" at 45% cover Surface rock averaged 2% cover The average surface horizon thickness was 4", texture varied from loams to very gravelly loam, coarse fragment content averaged 32% and pH averaged 6 8 (neutral)

Subsoil textures were predominately gravelly to very gravelly loam or clay loam Subsoil coarse fragment content averaged 35% and ranged from 5% to 50% Subsurface pH averaged 7 1 (neutral) and ranged from 6.9 (neutral) to 7 5 (mildly alkaline) The soils were 33% non-skeletal and 67% skeletal Total soil AWC averaged 4 0" and ranged from 2.1" to 5.1". These soils were classified into the subgroups Typic Xerochrepts, Typic Haploxerults and Ultic Haploxeralfs.

Vegetation

The total vegetation cover was very high ranging from 98% to 99% with an average of 99% Mean overstory tree cover was 85% Overstory tree cover was split between conifers that averaged 72% cover and ranged from 55% to 95% and hardwoods that averaged 29% and ranged from 5% to 45% cover The regeneration layer averaged 14% cover. Shrub cover was high with an average cover of 58%. Forb cover was moderate with an average of 13% cover Grass cover was low with 2% average cover and included California sweetgrass

Stand Structure

Late seral stands often had 5 or more layers of trees, while early mature and mid-mature stands usually had 2 or 3 layers. In late seral stands the top 3 layers were dominated by Douglas-fir and Port Orford cedar, while the lower 2 layers were dominated by tanoak and Pacific madrone Large conifers dominated the top three layers with an average of 50 trees/acre > 25" d b h , 8 trees/acre > 30" d b h and 4 trees/acre > 40" d b h Hardwoods dominated the lower layers and included 187 trees/acre > 5" d b h , 11 trees/acre > 11" d b h and 3 trees/acre > 18" d.b h

The stand structure characteristics by layer were as follows. the top layer averaged 279 years old with an average diameter of 33" and average height of 132' The second layer had an average age of 231 years with a mean diameter of 26" and a mean height of 104' The third layer had an average age of 177 years old, with a mean diameter of 18" and mean height of 94'. The fourth layer was dominated by tanoak, it had a mean diameter of 14" and a mean height of 73'. The fifth layer was dominated by tanoak and California bay, it averaged 9" in diameter and 51' in height Large numbers of small hardwoods were often found in the lower layers

Overall biomass production (conifer + hardwoods + shrubs) was generally high. Modal Dunning site class was 3, with site index of 125 at 300 years. Conifer productivity was generally moderate with an average volume of 7776 cu ft., it ranged from 5230 to 10,633 cu ft , due to the variable cover of hardwoods. Softwood basal area averaged 300 sq. ft. and ranged from 227 to 400 sq ft Hardwood volume averaged 906 cu ft and ranged from 263 to 1250 cu ft Hardwood basal area averaged 54 sq ft and ranged from 13 to 75 sq. ft Stand density index was 494 and fell in the upper end of the Tanoak Series.

Fire Regime

This type was most often disturbed by flooding but could experience a high-severity fire regime of very infrequent fires, usually of high-intensity, stand-replacing nature, associated with extended drought periods Older seral stages experience infrequent low intensity fires that creep and burn occasional logs and accumulated fuels.

Management Implications

This type is found primarily in riparian areas where management options are limited Port Orford cedar root disease is an issue here, therefore a risk assessment needs to be completed for any management activity

Silvicultural Systems: Salvage and sanitation salvage available in riparian areas

Site Preparation: Hand pile and jackpot burn recommended in riparian areas

Regeneration: Natural regeneration can be anticipated with adequate seed source, particularly from Port Orford cedar.

Release: Early release with multiple treatments are recommended due to the high density of hardwood stems Recommend wider spacing of Port Orford cedar during release and thinning

Animal Damage Control Problems: None known

Stockability: Regional stocking guidelines are applicable

Species Considerations: Port Orford cedar, sugar pine and Pacific yew are an important component of this type and should be maintained.

Cultural and Commercial: The cultural species most frequently found were tanoak, Pacific madrone, California hazelnut, beargrass and Pacific yew The most frequently occurring commercial plant species were Port Orford cedar and California bay, along with evergreen and red huckleberry (also cultural species)

Insects and Disease: Potential for Port Orford cedar root disease infection and/or subsequent spread is high due to proximity to free water and high density of Port Orford cedar Helicopter logging should be considered here to reduce the risk of disease spread. Due to the potential for white pine blister rust, planting of rust resistant sugar pine should be considered

Fire Suppression: Confine and contain strategies are recommended, with opportunities to use modified suppression tactics (light hand on the land) Modified suppression tactics should be used where there are shallow serpentine soils Control related suppression actions can have high costs and can be more detrimental than the fire effects. Fire equipment should be cleaned prior to and after use in areas with Port Orford cedar to avoid spreading Port Orford cedar root disease.

Prescribed Fire: Use of prescribed fire of low-moderate intensities are recommended to reduce fuel accumulations by jackpot burning Low intensity fires should be allowed to back into riparian areas.

Closely Related Types

The LIDE2–CHLA/VAOV–RHOC type may be replaced by the LIDE2–CHLA–ALRH//Riparian type on wetter streamside sites adjacent to Order 3–5 class streams On drier upland sites it is replaced by the LIDE2–CHLA/VAOV type On rockier, drier, upland sites it is replaced by the LIDE2–QUCH2/VAOV type.

Notes

Plant Association: Tanoak–Port Orford Cedar/ Evergreen Huckleberry
EDP Code Name: LIDE2–CHLA/VAOV
Eco-Code: HT0CCO13

Indicator species:

Evergreen huckleberry (*Vaccinium ovatum*–VAOV) was found on moist, low elevation sites close to the Pacific Ocean or sites with coastal fog. Shrub cover here was low, while surface rock, A horizon thickness, and total basal area was also low.

Tanoak–Port Orford Cedar/Evergreen Huckleberry

LIDE2–CHLA/VAOV Association
Eco-Code HT0CCO13

This low elevation type was often found in riparian positions on deep to moderately deep soils with moderately acid pH. It was characterized by the presence of Port Orford cedar and evergreen huckleberry.

Plant Association Summary

(Sample size: 21)

		COVER	CON
Tree Overstory Layer			
CHLA	Port Orford Cedar	36	100
PSME	Douglas-fir	35	100
LIDE2	Tanoak	26	100
Tree Understory Layer			
LIDE2	Tanoak	10	100
CHLA	Port Orford Cedar	3	100
PSME	Douglas-fir	1	52
Shrubs			
VAOV	Evergreen Huckleberry	31	100
GASH	Salal	16	95
BENE1	Dwarf Oregon-grape	3	76
RHMA	Pacific Rhododendron	9	47
Herbs & Grasses			
POMU1	Swordfern	4	85
GOOB	Rattlesnake Plantain	1	85

Ranger Districts

Gasquet, Orleans

Environment

Distance to the Ocean: 7.5–26.5 miles

Elevation: 1400–2660'

Aspect: N.E., N.W.

Slope: 0–70%

Slope Position: lower, middle 1/3

Surface Rock: 0–8%

Soils

Pit Depth: 23–40"+

AWC: 1.2–5.5"

Parent Material: phyllite, greenstone, serpentine, mafic

A Horizon—
Coarse Frag: 15–50%
Textures: gl, vgl
Thickness: 2–10"
pH: 5.3–6.8

Physical and Biological Environment

Distribution/Setting

This type was found in riparian positions on coastal and inland sites where mean distance to the Pacific Ocean was 18 0 miles. Elevation averaged 1983' and slopes were typically steep Mean radiation index was a moderate .418.

Soils

Soils were predominately mesic, deep (48%) and moderately deep (38%) and well drained They formed in residuum, colluvium and alluvium. The litter layer thickness averaged 1.7" at 75% cover. Surface rock averaged 6% cover The average surface horizon thickness was 5", texture varied from gravelly to very gravelly loams, coarse fragment content averaged 39% and pH averaged 6.0 (moderately acid)

Subsoil textures were predominately gravelly to very gravelly loams and occasionally very gravelly sandy loams Subsoil coarse fragment content averaged 43% and ranged from 5% to 95% Subsurface pH averaged 6.2 (slightly acid) and ranged from 5 4 (strongly acid) to 7.0 (neutral). The soils were 42% non-skeletal and 58% skeletal. Total soil AWC averaged 3.2" and ranged from 1 2" to 5 5" These soils were classified into the subgroups Dystric Xerochrepts, Typic Haploxerults and Typic Xerorthents

Vegetation

The total vegetation cover was very high ranging from 95% to 99% with an average of 98% Mean overstory tree cover was 88%. Overstory tree cover was split between conifers that averaged 69% cover and ranged from 40% to 95% and hardwoods that averaged 36% and ranged from 5% to 70% cover. The regeneration layer averaged 15 cover. Shrub cover was high with an average cover of 53% Forb cover was moderate with an average of 14% cover Grass cover was lacking with < 1% average cover

Stand Structure

Late seral stands often had 5 or more layers of trees, while early mature and mid-mature stands usually had 2 or 3 layers In late seral stands the top 3 layers were dominated by Douglas-fir and Port Orford cedar, while the lower 2 layers were dominated by tanoak, Pacific madrone and bigleaf maple. Large conifers dominated the top three layers with an average of 42 trees/acre > 25" d b h , 26 trees/acre > 30" d b h and 15 trees/acre > 40" d b h Hardwoods dominated the lower layers and included 159 trees/acre > 5" d b h , 12 trees/acre > 11" d.b.h. and 3 trees/acre > 18" d b h

The stand structure characteristics by layer were as follows: the top layer averaged 320 years old with an average diameter of 52" and average height of 183'. The second layer had an average age of 300 years with a mean diameter of 40" and a mean height of 147'. The third layer had an average age of 172 years old, with a mean diameter of 23" and mean height of 92' The fourth layer was dominated by tanoak, it had a mean diameter of 14" and a mean height of 73' The fifth layer was dominated by tanoak and California bay, it averaged 9" in diameter and 51' in height. Large numbers of small hardwoods were often found in the lower layers

Overall biomass production (conifer + hardwoods + shrubs) was generally high Modal Dunning site class was 1, with site index of 175 at 300 years. Conifer productivity was generally high with an average volume of 12,339 cu ft , it ranged from 5033 to 18,906 cu ft , due to the variable cover of hardwoods. Softwood basal area averaged 310 sq. ft. and ranged from 133 to 460 sq. ft Hardwood volume averaged 833 cu ft and ranged from 259 to 1505 cu ft Hardwood basal area averaged 57 sq. ft and ranged from 13 to 107 sq. ft Stand density index was 517 and fell among the highest in the Tanoak Series.

Fire Regime

This type experiences a high-severity fire regime of infrequent fires, usually of high-intensity, stand-replacing nature, associated with extended drought periods. Older seral stages experience infrequent low intensity fires that creep and burn occasional logs and accumulated fuels

Management Implications

This type is often found in riparian positions that limit management opportunities Port Orford cedar root disease is an issue here, therefore a risk assessment needs to be completed for any management activity.

Silvicultural Systems: Salvage and sanitation salvage available in riparian areas, all other systems available outside riparian areas

Site Preparation: Hand pile and jackpot burn are recommended in riparian areas Outside riparian areas moderate or high intensity broadcast burning may lead to removal of the O horizon and on slopes > 25% can lead to significant soil loss from sheet erosion Tractor operations may result in soil compaction on clay loam soils

Regeneration: Natural regeneration can be anticipated with adequate seed source, particularly from Port Orford cedar Artificial regeneration should be considered High soil coarse fragments may lead to plantability problems on selected sites

Release: Early release with multiple treatments are recommended due to high density of hardwood stems Recommend wider spacing of Port Orford cedar during release and thinning

Animal Damage Control Problems: None Known

Stockability: Regional stocking guidelines are applicable

Species Considerations: Port Orford cedar, sugar pine and Pacific yew are an important component of this type and should be maintained

Cultural and Commercial: The cultural species most frequently found were tanoak, California hazelnut and dwarf Oregon-grape The most frequently occurring commercial plant species were Port Orford cedar, salal, red huckleberry and evergreen huckleberry (also cultural species)

Insects and Disease: Potential for Port Orford cedar root disease infection and/or subsequent spread is moderate due to proximity to free water and low density of Port Orford cedar or limited proximity to free water and high density of Port Orford cedar Helicopter logging should be considered in riparian areas to reduce the risk of disease spread Conventional logging systems can be considered outside riparian areas Due to the potential for white pine blister rust, planting of rust resistant sugar pine should be considered

Fire Suppression: Confine and contain strategies are recommended, with opportunities to use modified suppression tactics (light hand on the land) Modified suppression tactics should be used where there are shallow serpentine soils Control related suppression actions can have high costs and can be more detrimental than the fire effects Fire equipment should be cleaned prior to and after use in areas with Port Orford cedar to avoid spreading root disease

Prescribed Fire: Use of prescribed fire under low-moderate intensities is recommended to reduce fuel accumulations by jackpot burning. Low intensity fires should be allowed to back into riparian areas.

Closely Related Types

The LIDE2–CHLA/VAOV type may be replaced on wetter streamside locations by the LIDE2–CHLA–UMCA/VAOV and LIDE2–CHLA–ALRU2//Riparian types On rockier, drier, upland sites it is replaced by the LIDE2–QUCH2/VAOV type

Plant Association: Tanoak–Port Orford Cedar–Red Alder// Riparian
EDP Code Name: LIDE2–CHLA–ALRU2//Riparian
Eco-Code: HT0CCO15

Indicator species:

Red alder (*Alnus rubra*–ALRU2) was found on wet, streamside, low elevation, coastal sites, with high surface rock.

Tanoak–Port Orford Cedar–Red Alder//Riparian

LIDE2–CHLA–ALRU2//Riparian Association

Eco-Code HT0CCO15

This coastal, riparian type was found on order 3 to 5 streams where slope temperatures were offset by topographic shading. The soils were derived from serpentine and mafic parent materials and had high AWC and neutral pH. It was characterized by the presence of Port Orford cedar and red alder.

Plant Association Summary

(Sample size: 10)		COVER	CON
Tree Overstory Layer			
CHLA	Port Orford Cedar	37	100
PSME	Douglas-fir	21	100
ALRU2	Red Alder	36	100
ACMA	Bigleaf Maple	4	60
Tree Understory Layer			
CHLA	Port Orford Cedar	4	100
LIDE2	Tanoak	14	100
ALRU2	Red Alder	7	100
QUCH2	Canyon Live Oak	1	50
Shrubs			
RUUR	Pacific Blackberry	2	100
GASH	Salal	11	80
ACCI	Vine Maple	39	70
RUPA2	Thimbleberry	3	50
Herbs & Grasses			
POMU1	Swordfern	5	90
ACTR	Vanilla Leaf	2	70
LIBOL	Twinflower	3	50
IRI	Iris spp.	1	50

Ranger Districts

Gasquet, Orleans, Ukonom, Happy Camp

Environment

Distance to the Ocean: 17.5–25.5 miles

Elevation: 1900–3520'

Aspect: E., S.E.

Slope: 10–50%

Slope Position: lower 1/3

Surface Rock: 0–70%

Soils

Pit Depth: 21–40"+

AWC: 1.6–5.7"

Parent Material: mafic, serpentine

A Horizon—

Coarse Frag: 30–37%

Textures: gl, vgl

Thickness: 0–6"

pH: 6.1–7.5

Physical and Biological Environment

Distribution/Setting

This riparian type was generally found along Order 3-5 class stream courses on inland sites where mean distance to the Pacific Ocean was 22.7 miles. Elevation averaged 2476' and slopes were typically moderately steep, averaging 27%. Mean radiation index was 453, but was offset by topographic shading

Soils

Soils were predominately mesic, deep (50%) and moderately deep (50%) and well drained. They formed in colluvium. The litter layer thickness averaged 1 8" at 65% cover Surface rock averaged 18% cover The average surface horizon thickness was 3", texture varied from gravelly to very gravelly loams, coarse fragment content averaged 35% and pH averaged 6 9 (neutral)

Subsoil textures were predominately gravelly to very gravelly loams and sandy loams Subsoil coarse fragment content averaged 49% and ranged from 40% to 65% Subsurface pH averaged 6 9 (neutral) and ranged from 5 9 (moderately acid) to 7.5 (mildly alkaline). The soils were 100% skeletal. Total soil AWC averaged 4 3" and ranged from 1 2" to 4 2" These soils were classified into the subgroups Dystric Xerochrepts and Typic Xerofluvents

Vegetation

The total vegetation cover for this type was very high ranging from 95% to 99% with an average of 97% Mean overstory tree cover was 85% Overstory tree cover was split between conifers that averaged 63% cover and ranged from 35% to 85% and hardwoods that averaged 52% and ranged from 5% to 87% cover The regeneration layer averaged 20% cover. Shrub cover was moderate with an average cover of 34% Forb cover was moderate with an average of 12% cover. Grass cover was lacking with 1% average cover.

Stand Structure

Late seral stands often had 4 or more layers of trees, while early mature and mid-mature stands usually had 2 or 3 layers In late seral stands the top 2 layers were dominated by Douglas-fir and Port Orford cedar, while the lower 2 layers were dominated by red alder, tanoak and bigleaf maple Large conifers dominated the top two layers with an average of 38 trees/acre > 25" d b h , 22 trees/acre > 30" d b h and 12 trees/acre > 40" d b h Hardwoods dominated the lower layers and included 85 trees/acre > 5" d b h

The stand structure characteristics by layer were as follows: the top layer averaged 324 years old with an average diameter of 35" and average height of 138' The second layer had an average age of 220 years with a mean diameter of 24" and a mean height of 85' The third layer was dominated by red alder, it had a mean diameter of 16" and a mean height of 78' The fourth layer was dominated by tanoak, it averaged 5" in diameter and 35' in height. Large numbers of small hardwoods were often found in the lower layer

Overall biomass production (conifer + hardwoods + shrubs) was generally moderate Modal Dunning site class was 3, with site index of 125 at 300 years. Conifer productivity was generally moderate with an average volume of 7866 cu ft , it ranged from 4734 to 9,695 cu. ft , due to the variable cover of hardwoods Softwood basal area averaged 218 sq ft and ranged from 147 to 307 sq ft Hardwood volume averaged 410 cu ft and ranged from 189 to 800 cu ft Hardwood basal area averaged 21 sq ft and ranged from 13 to 41 sq ft Stand density index was 406 and fell in the lower portion of the Tanoak Series

Fire Regime

The primary disturbance agent here was flooding In rare occasions it can experience a high-severity fire regime of very infrequent fires, usually of high-intensity, stand-replacing nature, associated with extended drought periods Older seral stages experience infrequent low intensity fires that creep and burn occasional logs and accumulated fuels.

Management Implications

This type is only found in riparian positions. Management options here are very limited. Port Orford cedar root disease is an issue here, therefore a risk assessment needs to be completed for any management activity

Silvicultural Systems: Management within riparian types, such as this one, is discouraged due to the high frequency of natural disturbance resulting from floods

Site Preparation: None

Regeneration: None

Release: None

Animal Damage Control Problems: None known

Stockability: None.

Species Considerations: Port Orford cedar and Pacific yew are an important component of this type and should be maintained in all management treatments

Cultural and Commercial: The cultural species most frequently found were tanoak, bigleaf maple, red alder, Pacific yew, thimbleberry and Pacific blackberry California hazelnut, also a cultural species was found infrequently here. The most frequently occurring commercial plant species were Port Orford cedar and salal (also cultural species)

Insects and Disease: Potential for Port Orford cedar root disease infection and/ or subsequent spread is high due to proximity to free water and high density of Port Orford cedar

Fire Suppression: Confine and contain strategies are recommended, with opportunities to use modified suppression tactics (light hand on the land) Modified suppression tactics should be used where there are shallow serpentine soils Control related suppression actions can have high costs and can be more detrimental than the fire effects Fire equipment should be cleaned prior to and after use in areas with Port Orford cedar to avoid spreading root disease.

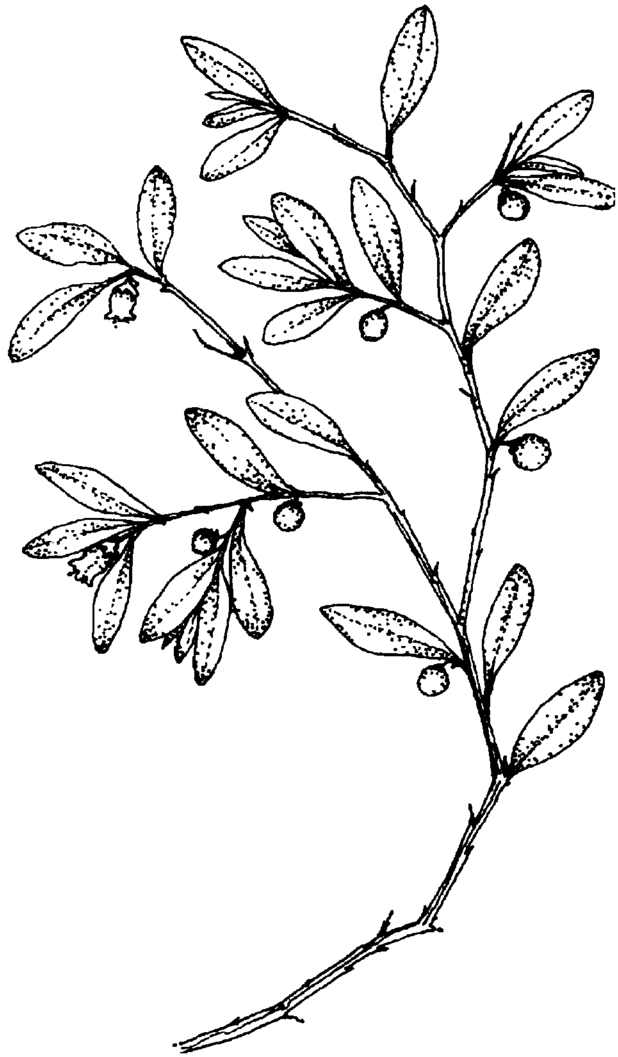
Prescribed Fire: Use of prescribed fire under low-moderate intensities is recommended to reduce fuel accumulations by jackpot burning Low intensity fires should be allowed to back into riparian areas

Closely Related Types

The LIDE2–CHLA–ALRU2//Riparian type may be replaced on upslope streamside locations by the LIDE2–CHLA–UMCA/VAOV type and on Order 1–2 class streams by the LIDE2–CHLA/VAOV–RHOC type. On drier upland sites it is replaced by the LIDE2–CHLA/VAOV type On rockier, drier, upland sites it is replaced by the LIDE2–QUCH2/VAOV type

Notes

Plant Association: Tanoak–Port Orford Cedar/ Red Huckleberry
EDP Code Name: LIDE2–CHLA/VAPA
Eco-Code: HT0CCO17



Indicator species:

Red huckleberry (*Vaccinium parvifolium*–VAPA) was found on cool, high elevation sites, often on serpentine soils, with moderate soil coarse fragments, high shrub cover and moderate forb and tree cover.

Tanoak–Port Orford Cedar/Red Huckleberry

LIDE2–CHLA/VAPA Association

Eco-Code HT0CCO17

This mid-elevation type was found on moderately steep, warm slopes. The soils were derived from serpentine parent material and were deep with high coarse fragment content and neutral pH. It was characterized by the presence of Port Orford cedar and red huckleberry.

Plant Association Summary

(Sample size: 10)		COVER	CON
Tree Overstory Layer			
CHLA	Port Orford Cedar	33	100
PSME	Douglas-fir	32	100
LIDE2	Tanoak	13	100
ARME3	Pacific Madrone	7	70
PILA	Sugar Pine	12	70
Tree Understory Layer			
LIDE2	Tanoak	30	90
CHLA	Port Orford Cedar	5	90
PSME	Douglas-fir	1	70
Shrubs			
VAPA	Red Huckleberry	9	100
ROGY	Wood Rose	1	60
GASH	Salal	5	50
VAOV	Evergreen Huckleberry	3	50
Herbs & Grasses			
XETE	Beargrass	4	90
WHMO	Western Modesty	1	70
CHUMO	Prince's Pine	2	60
POMU1	Swordfern	2	60

Ranger Districts

Gasquet, Orleans, Ukonom

Environment

Distance to the Ocean: 11.5–25.5 miles

Elevation: 1900–3200'

Aspect: N, E, S.E.

Slope: 5–35%

Slope Position: lower 1/3, middle 1/3

Surface Rock: 1–6%

Soils

Pit Depth: 30–40"+

AWC: 2.2–3.4"

Parent Material: serpentine

A Horizon—

- **Coarse Frag:** 35–60%
- **Textures:** vgsl
- **Thickness:** 2–7"
- **pH:** 6.0–7.8

Physical and Biological Environment

Distribution/Setting

This type was found on coastal and inland sites where mean distance to the Pacific Ocean was 19.1 miles Elevation averaged 2526' and slopes were typically moderately steep, averaging 20% Mean radiation index was a warm .455.

Soils

Soils were predominately mesic, deep (75%) and moderately deep (25%) and well drained. They formed in residuum and colluvium The litter layer thickness averaged 1 4" at 95% cover. Surface rock averaged 2% cover The average surface horizon thickness was 4", texture was very gravelly sandy loam, coarse fragment content averaged 45% and pH averaged 7 0 (neutral).

Subsoil textures were predominately very gravelly loams and very gravelly or very cobbly clay loams Subsoil coarse fragment content averaged 48% and ranged from 30% to 55% Subsurface pH averaged 7 2 (neutral) and ranged from 6 6 (neutral) to 7.6 (mildly alkaline) The soils were 25% non-skeletal and 75% skeletal Total soil AWC averaged 2 8" and ranged from 2.2" to 3.4". These soils were classified into the subgroup Typic Xerochrepts

Vegetation

The total vegetation cover was very high ranging from 90% to 99% with an average of 95% Mean overstory tree cover was 89%. Overstory tree cover was split between conifers that averaged 73% cover and ranged from 67% to 85% and hardwoods that averaged 35% and ranged from 30% to 50% cover The regeneration layer averaged 37% cover Shrub cover was low with an average cover of 17%. It was dominated by red huckleberry 9% cover, salal 5% cover and evergreen huckleberry 3% cover Forb cover was low with an average of 9% cover Grass cover was lacking with 1% average cover and dominated by sedges.

Stand Structure

Late seral stands often had 4 or more layers of trees, while early mature and mid-mature stands usually had 1 or 2 layers In late seral stands the top 2 layers were dominated by Douglas-fir, sugar pine and Port Orford cedar, while the lower 2 layers were dominated by tanoak and Pacific madrone Large conifers dominated the top three layers with an average of 47 trees/acre > 25" d b h , 19 trees/acre > 30" d b h. and 8 trees/acre > 40" d b.h Hardwoods dominated the lower layer and included 161 trees/acre > 5" d b h and 4 trees/acre > 11" d b h

The stand structure characteristics by layer were as follows. the top layer averaged 346 years old with an average diameter of 36" and average height of 158' The second layer had an average age of 323 years with a mean diameter of 36" and a mean height of 124' The third layer was dominated by tanoak, it had a mean diameter of 9" and a mean height of 51' The fourth layer was also dominated by tanoak, it averaged 5" in diameter and 35' in height Large numbers of small hardwoods were often found in the lower layer

Overall biomass production (conifer + hardwoods + shrubs) was generally high. Modal Dunning site class was 2, with site index of 150 at 300 years Conifer productivity was generally high with an average volume of 10,299 cu ft , it ranged from 8997 to 15,881 cu. ft., due to the variable cover of hardwoods. Softwood basal area averaged 302 sq ft and ranged from 220 to 400 sq. ft. Hardwood volume averaged 772 cu ft. and ranged from 276 to 1300 cu ft Hardwood basal area averaged 51 sq ft and ranged from 27 to 80 sq ft Stand density index was 533 and was among the highest in the Tanoak Series as a result of the high number of medium sized conifers

Fire Regime

This type experiences a high-severity fire regime of infrequent fires, usually of high-intensity, stand-replacing nature, associated with extended drought periods. Older seral stages experience infrequent low intensity fires that creep and burn occasional logs and accumulated fuels.

Management Implications

This type is occasionally found in riparian positions Port Orford cedar root disease is an issue here, therefore a risk assessment needs to be completed for any management activity

Silvicultural Systems: Salvage and sanitation salvage available in riparian areas, all other systems available outside riparian areas.

Site Preparation: Hand pile and jackpot burn are recommended in riparian areas Outside riparian areas machine site preparation on gentle slopes and broadcast burning on steeper slopes

Regeneration: Natural regeneration can be anticipated with adequate seed source, particularly from Port Orford cedar. Artificial regeneration should be considered.

Release: Early release with multiple treatments are recommended due to high density of hardwood stems Recommend wider spacing of Port Orford cedar during release and thinning

Animal Damage Control Problems: None known.

Stockability: Regional stocking guidelines are applicable.

Species Considerations: Port Orford cedar, sugar pine and Pacific yew are an important component of this type and should be maintained.

Cultural and Commercial: This plant association had the highest number of cultural and commercial plant species in the Tanoak Series (Appendix VI) The cultural species most frequently found were tanoak, Pacific madrone, sugar pine, chinquapin, California hazelnut, beargrass, princes pine, iris and western modesty The most frequently occurring commercial plant species were Port Orford cedar, salal, red huckleberry and evergreen huckleberry (also cultural species)

Insects and Disease: Potential for Port Orford cedar root disease infection and/or subsequent spread is moderate due to proximity to free water and low density of Port Orford cedar or limited proximity to free water and high density of Port Orford cedar. Due to the potential for white pine blister rust planting of rust resistant sugar pine should be considered

Fire Suppression: Confine and contain strategies are recommended, with opportunities to use modified suppression tactics (light hand on the land). Control related suppression actions can have high costs and can be more detrimental than the fire effects. Use of dozers and other heavy equipment to construct firelines should be avoided due to the potential for damage to serpentine soils Fire equipment should be cleaned prior to and after use in areas with Port Orford cedar to avoid spreading root disease

Prescribed Fire: Use of prescribed fire under low-moderate intensities is recommended to reduce fuel accumulations by jackpot burning. Low intensity fires should be allowed to back into riparian areas

Closely Related Types

The LIDE2–CHLA/VAPA type may be replaced on adjacent non-serpentine soils by the LIDE2–CHLA/GASH type and on wetter streamside locations by the LIDE2–CHLA/ACCI type

Plant Association: Tanoak–Port Orford Cedar/Salal
EDP Code Name: LIDE2–CHLA/GASH
Eco-Code: HT0CCO18

Indicator species:

Salal (*Gaultheria shalon*–GASH) was found on mid elevation sites with high shrub cover, moderate AWC and thin A horizons.

Tanoak–Port Orford Cedar/Salal

LIDE2–CHLA/GASH Association

Eco-Code HT0CCO18

This inland, mid-elevation was found moderately steep slopes where temperatures were moderated by topographic shading. The soils were primarily deep and had a thick A horizon with slightly acid pH. It was characterized by the presence of Port Orford cedar and salal.

Plant Association Summary

(Sample size: 10)

		COVER	CON
Tree Overstory Layer			
CHLA	Port Orford Cedar	29	100
PSME	Douglas-fir	48	100
LIDE2	Tanoak	20	100
CACH2	Canyon Live Oak	18	70
Tree Understory Layer			
CHLA	Port Orford Cedar	2	100
LIDE2	Tanoak	6	100
PSME	Douglas-fir	1	50
Shrubs			
GASH	Salal	70	100
RHMA	Pacific Rhododendron	8	60
BENE1	Dwarf Oregon-grape	7	60
VAPA	Red Huckleberry	2	40
Herbs & Grasses			
GOOB	Rattlesnake Plantain	1	80
CHUMO	Prince's Pine	2	70
XETE	Beargrass	1	60
VAPL	Redwood Insideout Flower	2	50
PTAQL	Bracken Fern	1	40

Ranger Districts

Orleans, Ukonom, Lower Trinity

Environment

Distance to the Ocean: 17.5–35.5 miles

Elevation: 1700–3540'

Aspect: N.E., E.

Slope: 5–35%

Slope Position: lower, middle1/3

Surface Rock: 0–3%

Soils

Pit Depth: 33–40"+

AWC: 2.0–6.6"

Parent Material: mafic, phyllite, schist, sandstone

A Horizon—
- Coarse Frag: 10–45%
- Textures: l, gl
- Thickness: 4–10"
- pH: 5.2–6.5

Physical and Biological Environment

Distribution/Setting

This type was found on inland sites where mean distance to the Pacific Ocean was 22 7 miles Elevation averaged 2668' and slopes were typically moderately steep, averaging 21%. Mean radiation index was 451, but was moderated by topographic shading

Soils

Soils were predominately mesic, deep (60%) and moderately deep (40%) and well drained They formed in residuum and colluvium. The litter layer thickness averaged 2 2" at 85% cover. Surface rock averaged 1% cover The average surface horizon thickness was 7", texture varied from loam to gravelly loam, coarse fragment content averaged 23% and pH averaged 6.1 (slightly acid)

Subsoil textures were predominately loams and very gravelly loams or clay loams. Subsoil coarse fragment content averaged 24% and ranged from 5% to 45% Subsurface pH averaged 6 2 (slightly acid) and ranged from 5.4 (strongly acid) to 6 5 (slightly acid) The soils were 80% non-skeletal and 20% skeletal Total soil AWC averaged 3.6" and ranged from 2 0" to 6 6" These soils were classified in the subgroups Dystric Xerochrepts and Ultic Haploxeralfs.

Vegetation

The total vegetation cover was very high ranging from 90% to 99% with an average of 97%. Mean overstory tree cover was 89% Overstory tree cover was split between conifers that averaged 80% cover and ranged from 60% to 92% and hardwoods that averaged 37% and ranged from 7% to 65% cover The regeneration layer averaged 11% cover. Shrub cover was very high with an average cover of 70%. Forb cover was very low with an average of 4% cover due to the high shrub cover Grass cover was absent in this type

Stand Structure

Late seral stands often had 5 or more layers of trees, while early mature and mid-mature stands usually had 2 or 3 layers In late seral stands the top 3 layers were dominated by Douglas-fir and Port Orford cedar, while the lower 2 layers were dominated by tanoak and chinquapin Large conifers dominated the top three layers with an average of 24 trees/acre > 25" d b h , 20 trees/acre > 30" d.b.h. and 14 trees/acre > 40" d b h Hardwoods dominated the lower layers and included 157 trees/acre > 5" d b h , 20 trees/acre > 11" d b.h and 8 trees/acre > 18" d b h

The stand structure characteristics by layer were as follows. the top layer averaged 489 years old with an average diameter of 51" and average height of 192' The second layer had an average age of 323 years with a mean diameter of 40" and a mean height of 150' The third layer had an average age of 179 years old, with a mean diameter of 27" and mean height of 124' The fourth layer was dominated by tanoak, it had a mean diameter of 14" and a mean height of 73' The fifth layer was dominated by tanoak and chinquapin, it averaged 9" in diameter and 51' in height Large numbers of small hardwoods were often found in the lower layers.

Overall biomass production (conifer + hardwoods + shrubs) was generally high Modal Dunning site class was 1, with site index of 175 at 300 years Conifer productivity was generally high with an average volume of 9109 cu. ft., it ranged from 6360 to 12,557 cu ft , due to the variable cover of hardwoods Softwood basal area averaged 235 sq ft and ranged from 173 to 320 sq. ft. Hardwood volume averaged 1121 cu. ft. and ranged from 220 to 2770 cu. ft. Hardwood basal area averaged 68 sq ft and ranged from 27 to 107 sq ft Stand density index was 444 and fell about midway in the Tanoak Series

Fire Regime

This type experiences a high-severity fire regime of infrequent fires, usually of high-intensity, stand-replacing nature, associated with extended drought periods Older seral stages experience infrequent low intensity fires that creep and burn occasional logs and accumulated fuels

Management Implications

This type is often found in riparian positions that limit management treatments Port Orford cedar root disease is an issue here, therefore a risk assessment needs to be completed for any management activity

Silvicultural Systems: Salvage and sanitation salvage available in riparian areas, all other systems available outside riparian areas

Site Preparation: Hand pile and jackpot burn recommended in riparian areas Outside riparian areas broadcast burning is recommended

Regeneration: Natural regeneration can be anticipated with adequate seed source, particularly from Port Orford cedar. Artificial regeneration should be considered

Release: Early release with multiple treatments are recommended due to high density of hardwood stems Recommend wider spacing of Port Orford cedar during release and thinning.

Animal Damage Control Problems: None known

Stockability: Regional stocking guidelines are applicable.

Species Considerations: Port Orford cedar is an important component of this type and should be maintained in all management treatments

Cultural and Commercial: The cultural species most frequently found were tanoak, chinquapin, dwarf Oregon-grape, beargrass and prince's pine California hazelnut, a cultural species was found infrequently here The most frequently occurring commercial plant species were Port Orford cedar, salal, red huckleberry and evergreen huckleberry (also cultural species).

Insects and Disease: Potential for Port Orford cedar root disease infection and/ or subsequent spread is moderate due to proximity to free water and low density of Port Orford cedar or limited proximity to free water and high density of Port Orford cedar. Helicopter logging should be considered here to reduce the risk of disease spread.

Due to the potential for white pine blister rust planting of rust resistant sugar pine should be considered.

Fire Suppression: Confine and contain strategies are recommended, with opportunities to use modified suppression tactics (light hand on the land). Control related suppression actions can have high costs and can be more detrimental than the fire effects. Fire equipment should be cleaned prior to and after use in areas with Port Orford cedar to avoid spreading root disease.

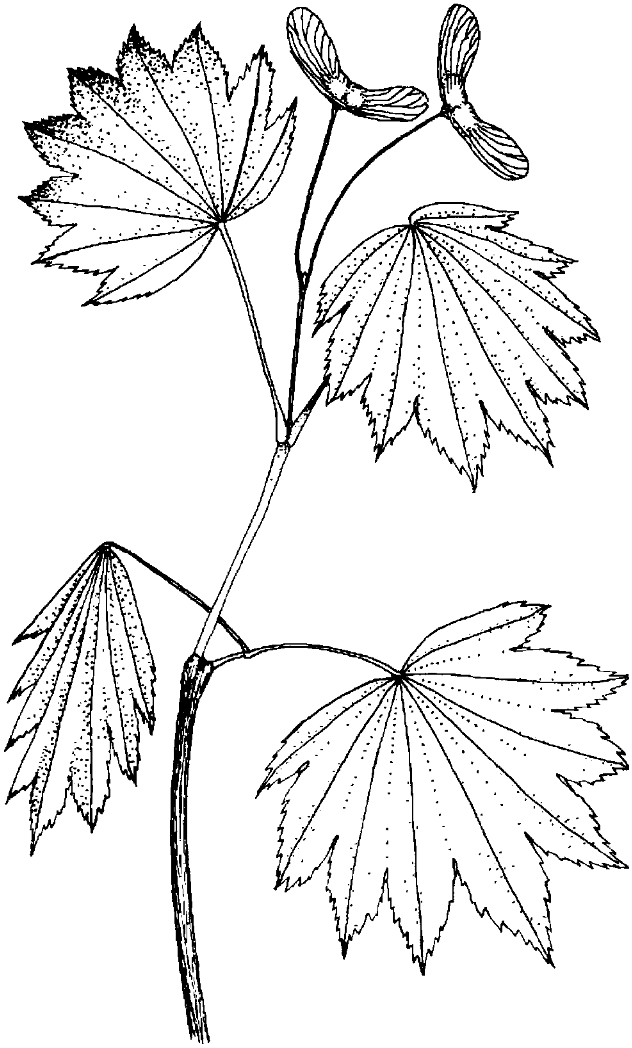
Prescribed Fire: Use of prescribed fire under low-moderate intensities is recommended to reduce fuel accumulations by jackpot burning Low intensity fires should be allowed to back into riparian areas

Closely Related Types

The LIDE2–CHLA/GASH type may be replaced on wetter streamside locations by the LIDE2–CHLA/ACCI type and on drier upland sites by the LIDE2–CHLA/ BENE1/LIBOL type.

Notes

Plant Association: Tanoak–Port Orford Cedar/Vine Maple
EDP Code Name: LIDE2–CHLA/ACCI
Eco-Code: HT0CCO16



Indicator species:

Vine maple (*Acer circinatum*–ACCI) was found on cool, lower third slopes, often in streamside positions, with thick A horizons, high AWC, high soil coarse fragments, moderate surface rock and high softwood basal area.

Tanoak–Port Orford Cedar/Vine Maple

LIDE2–CHLA/ACCI Association
Eco-Code HT0CCO16

This mid-elevation, riparian type was found along order 1 and 2 streams on cool, northwest facing slopes. The soils were deep to moderately deep with moderately acid pH. It was characterized by the presence of Port Orford cedar and vine maple.

Plant Association Summary

(Sample size: 10)		COVER	CON
Tree Overstory Layer			
PSME	Douglas-fir	36	100
CHLA	Port Orford Cedar	29	100
LIDE2	Tanoak	18	100
Tree Understory Layer			
LIDE2	Tanoak	10	100
CHLA	Port Orford Cedar	3	90
Shrubs			
ACCI	Vine Maple	55	100
BENE1	Dwarf Oregon-grape	12	90
Herbs & Grasses			
POMU1	Swordfern	4	90
LIBOL	Twinflower	10	60
WHMO	Western Modesty	4	60
ACTR	Vanilla Leaf	3	60

Ranger Districts
Gasquet, Orleans, Happy Camp

Environment
Distance to the Ocean: 14.5–29.5 miles

Elevation: 1400–2830'

Aspect: N.W.

Slope: 17–80%

Slope Position: lower 1/3

Surface Rock: 0–11%

Soils
Pit Depth: 34–40"+

AWC: 2.5–4.3"

Parent Material: mafic, greenstone

A Horizon—
- Coarse Frag: 30–70%
- Textures: xgsl, vgl
- Thickness: 1–6"
- pH: 5.5–6.5

Physical and Biological Environment

Distribution/Setting

This riparian type was generally found on Order 1 and 2 class streams on inland sites where mean distance to the Pacific Ocean was 22 0 miles Elevation averaged 2693' and slopes were typically steep, averaging 33% Mean radiation index was a cool 374 due to northwest facing aspects.

Soils

Soils were predominately mesic, deep (50%) and moderately deep (38%) and well drained They formed in residuum and colluvium. The litter layer thickness averaged 1 5" at 75% cover. Surface rock averaged 4% cover. The average surface horizon thickness was 7", texture varied from very gravelly loam to extremely gravelly sandy loam, coarse fragment content averaged 35% and pH averaged 5 7 (moderately acid).

Subsoil textures were predominately loam to extremely gravelly loam and gravelly clay loam or gravelly silt loam Subsoil coarse fragment content averaged 33% and ranged from 16% to 60% Subsurface pH averaged 5.9 (moderately acid) and ranged from 5.6 moderately acid to 6 2 (slightly acid) The soils were 75% non-skeletal and 25% skeletal Total soil AWC averaged 3.5" and ranged from 1 6" to 5 7" These soils were classified into the subgroup Dystric Xerochrepts.

Vegetation

The total vegetation cover was very high ranging from 90% to 99% with an average of 96%. Mean overstory tree cover was 73%,among the lowest in the Tanoak Series Overstory tree cover was split between conifers that averaged 61% cover and ranged from 30% to 90% and hardwoods that averaged 27% and ranged from 5% to 85% cover. The regeneration layer averaged 16% cover Shrub cover was high with an average cover of 67% Forb cover was moderate with an average of 12% cover Grass cover was low with 3% average cover and dominated by sedges.

Stand Structure

Late seral stands often had 4 or more layers of trees, while early mature and mid-mature stands usually had 2 or 3 layers In late seral stands the top 3 layers were dominated by Douglas-fir and Port Orford cedar, while the lower layer was dominated by tanoak Large conifers dominated the top three layers with an average of 38 trees/acre > 25" d b h., 32 trees/acre > 30" d.b.h and 20 trees/ acre > 40" d.b.h Hardwoods dominated the lower layers and included 153 trees/ acre > 5" d.b.h.

The stand structure characteristics by layer were as follows. the top layer averaged 315 years old with an average diameter of 49" and average height of 181' The second layer had an average age of 270 years with a mean diameter of 33" and a mean height of 138'. The third layer had an average age of 184 years old, with a mean diameter of 27" and mean height of 108'. The fourth layer was dominated by tanoak, it had a mean diameter of 5" and a mean height of 35' Large numbers of small hardwoods were often found in the lower layer

Overall biomass production (conifer + hardwoods + shrubs) was generally high Modal Dunning site class was 1, with site index of 175 at 300 years. Conifer productivity was generally very high with an average volume of 13,485 cu ft , it ranged from 6381 to 21,039 cu ft., due to the variable cover of hardwoods Softwood basal area averaged 334 sq ft and ranged from 173 to 467 sq ft Hardwood volume averaged 770 cu ft and ranged from 315 to 1500 cu ft

Hardwood basal area averaged 49 sq ft and ranged from 4 to 90 sq ft Stand density index was a low 358 and fell in the lower group in the Tanoak Series

Fire Regime

This type experiences a high-severity fire regime of very infrequent fires, usually of high-intensity, stand-replacing nature, associated with extended drought periods Older seral stages experience infrequent low intensity fires that creep and burn occasional logs and accumulated fuels

Management Implications

This type is most often found in riparian positions where management options are limited Port Orford cedar root disease is an issue here, therefore a risk assessment needs to be completed for any management activity

Silvicultural Systems: Salvage and sanitation salvage are available in riparian areas

Site Preparation: Hand pile and jackpot burn recommended in riparian areas

Regeneration: Natural regeneration can be anticipated with adequate seed source, particularly from Port Orford cedar.

Release: Early release with multiple treatments are recommended due to high density of hardwood stems Recommend wider spacing of Port Orford cedar during release and thinning

Animal Damage Control Problems: None known

Stockability: Regional stocking guidelines are applicable

Species Considerations: Port Orford cedar, sugar pine and Pacific yew are an important component of this type and should be maintained

Cultural and Commercial: The cultural species most frequently found were tanoak, dwarf Oregon-grape, Pacific blackberry, wild ginger and western modesty California hazelnut and beargrass, also cultural species, were found infrequently here The most frequently occurring commercial plant species were Port Orford cedar and salal (also cultural species)

Insects and Disease: Potential for Port Orford cedar root disease infection and/or subsequent spread is high due to proximity to free water and high density of Port Orford cedar Helicopter logging should be considered here to reduce the risk of disease spread Due to the potential for white pine blister rust, planting of rust resistant sugar pine should be considered

Fire Suppression: Confine and contain strategies are recommended, with opportunities to use modified suppression tactics (light hand on the land). Control related suppression actions can have high costs and can be more detrimental than the fire effects Fire equipment should be cleaned prior to and after use in areas with Port Orford cedar to avoid spreading root disease

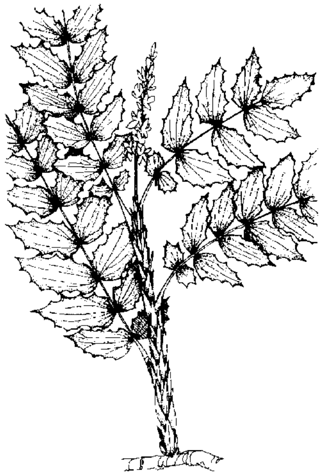
Prescribed Fire: Use of prescribed fire under low-moderate intensities is recommended to reduce fuel accumulations by jackpot burning. Low intensity fires should be allowed to back into riparian areas

Closely Related Types

The LIDE2–CHLA/ACCI type may be replaced on wet lower order stream courses by the LIDE2–CHLA–ALRU2//Riparian type and on moist upslope locations by the LIDE2–CHLA/GASH type

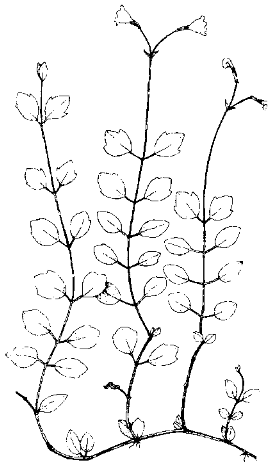
Notes

Plant Association: Tanoak–Port Orford Cedar/ Dwarf Oregon-grape/Twinflower
EDP Code Name: LIDE2–CHLA/BENE1/LIBOL
Eco-Code: HT0CCO14



Indicator species:

Dwarf Oregon-grape (*Berberis nervosa*–BENE1) was found on cool, steep, high elevation sites, with high softwood basal area, moderate shrub cover and low grass cover.



Indicator species:

Western twinflower (*Linnea borealis* var. *longiflora*–LIBOL) was found on mid elevation, cool, moist, lower and middle third moderately steep slopes.

Tanoak–Port Orford Cedar/Dwarf Oregon-grape/ Twinflower

LIDE2–CHLA/BENE1/LIBOL Association
Eco-Code HT0CCO14

This inland, mid-elevation type was found on very steep, cool, north facing slopes. The soils were primarily deep with moderately acid pH. It was characterized by the presence of Port Orford cedar and twinflower.

Plant Association Summary

(Sample size: 10)		COVER	CON
Tree Overstory Layer			
CHLA	Port Orford Cedar	40	100
PSME	Douglas-fir	38	100
LIDE2	Tanoak	8	100
Tree Understory Layer			
LIDE2	Tanoak	11	100
CHLA	Port Orford Cedar	3	100
PSME	Douglas-fir	1	80
Shrubs			
BENE1	Dwarf Oregon-grape	11	100
VAPA	Red Huckleberry	2	80
GASH	Salal	4	60
COCOC	California Hazelnut	2	60
Herbs & Grasses			
LIBOL	Twinflower	5	80
ACTR	Vanilla Leaf	3	80
TRLA3	Western Starflower	1	80
DIHO21	Hooker's Fairybell	1	70

Ranger Districts
Gasquet, Orleans, Happy Camp

Environment
Distance to the Ocean: 14.5–29.5 miles
Elevation: 2170–3150'
Aspect: N.
Slope: 22–70%
Slope Position: lower, middle 1/3
Surface Rock: 0–5%

Soils
Pit Depth: 23–40"+
AWC: 2.5–4.3"
Parent Material: schist, greenstone
A Horizon—
Coarse Frag: 20–43%
Textures: gl, vgl
Thickness: 1–6"
pH: 5.5–6.5

Physical and Biological Environment

Distribution/Setting

This type was found on inland sites where mean distance to the Pacific Ocean was 23 0 miles Elevation averaged 2815' and slopes were typically very steep, averaging 46% Mean radiation index was a cool 360, due to north facing aspects

Soils

Soils were predominately mesic, deep (73%) and moderately deep (18%) and well drained. They formed in residuum and colluvium. The litter layer thickness averaged 1.8" at 80% cover Surface rock averaged 2% cover The average surface horizon thickness was 3", texture varied from gravelly to very gravelly loams, coarse fragment content averaged 27% and pH averaged 6 2 (moderately acid).

Subsoil textures were predominately gravelly to very gravelly loams and clay loams Subsoil coarse fragment content averaged 36% and ranged from 0% to 55% Subsurface pH averaged 6 6 (neutral) and ranged from 5 8 moderately acid to 7 0 (neutral). The soils were 40% non-skeletal and 60% skeletal Total soil AWC averaged 3 1" and ranged from 2 5" to 4 3" These soils were classified into the subgroup Dystric Xerochrepts.

Vegetation

The total vegetation cover was very high ranging from 90% to 99% with an average of 95% Mean overstory tree cover was 90%. Overstory tree cover was split between conifers that averaged 77% cover and ranged from 65% to 90% and hardwoods that averaged 25% and ranged from 5% to 45% cover The regeneration layer averaged 18% cover Shrub cover was low with an average cover of 18% Forb cover was moderate with an average of 14% cover Grass cover was lacking with < 1% average cover.

Stand Structure

Late seral stands often had 4 or more layers of trees, while early mature and mid-mature stands usually had 2 or 3 layers. In late seral stands the top 2 layers were dominated by Douglas-fir and Port Orford cedar, while the lower 2 layers were dominated by tanoak and Pacific madrone Large conifers dominated the top three layers with an average of 40 trees/acre > 25" d.b.h., 24 trees/acre > 30" d.b.h. and 12 trees/acre > 40" d b h Hardwoods dominated the lower layers and included 214 trees/acre > 5" d b h and 6 trees/acre > 11" d b h

The stand structure characteristics by layer were as follows the top layer averaged 315 years old with an average diameter of 39" and average height of 157' The second layer had an average age of 287 years with a mean diameter of 30" and a mean height of 124'. The third layer was dominated by tanoak, it had a mean diameter of 9" and a mean height of 51'. The fourth layer was dominated by tanoak, it averaged 5" in diameter and 35' in height. Large numbers of small hardwoods were often found in the lower layer.

Overall biomass production (conifer + hardwoods + shrubs) was generally high Modal Dunning site class was 1, with site index of 175 at 300 years Conifer productivity was high with an average volume of 12,414 cu ft , it ranged from 6955 to 22,102 cu ft , due to the variable cover of hardwoods Softwood basal area averaged 325 sq ft and ranged from 200 to 347 sq. ft. Hardwood volume averaged 861 cu ft and ranged from 225 to 1500 cu ft Hardwood basal area averaged 57 sq ft and ranged from 27 to 107 sq ft. Stand density index was 517, among the highest in the Tanoak Series

Fire Regime

This type experiences a high-severity fire regime of infrequent fires, usually of high-intensity, stand-replacing nature, associated with extended drought periods Older seral stages experience infrequent low intensity fires that creep and burn occasional logs and accumulated fuels.

Management Implications

This type is often found in riparian positions that limit management options. Port Orford cedar root disease is an issue here, therefore a risk assessment needs to be completed for any management activity.

Silvicultural Systems: Salvage and sanitation salvage are available in riparian areas, all other systems are available outside riparian areas

Site Preparation: Hand pile and jackpot burn recommended in riparian areas Outside riparian areas machine site preparation on gentle slopes and broadcast burning on steeper slopes

Regeneration: Natural regeneration can be anticipated with adequate seed source, particularly from Port Orford cedar Artificial regeneration should be considered.

Release: Early release with multiple treatments are recommended due to high density of hardwood stems Recommend wider spacing of Port Orford cedar during release and thinning

Animal Damage Control Problems: None known

Stockability: Regional stocking guidelines are applicable

Species Considerations: Pacific yew and Port Orford cedar are an important component of this type and should be maintained in all management treatments

Cultural and Commercial: The cultural species most frequently found were tanoak, California hazelnut and dwarf Oregon-grape. Beargrass, another cultural species, was found infrequently. The most frequently occurring commercial plant species were Port Orford cedar, salal and red huckleberry (also cultural species).

Insects and Disease: Potential for Port Orford cedar root disease infection and/or subsequent spread is moderate due to proximity to free water and low density of Port Orford cedar or limited proximity to free water and high density of Port Orford cedar Helicopter logging should be considered here to reduce the risk of disease spread.

Fire Suppression: Confine and contain strategies are recommended, with opportunities to use modified suppression tactics (light hand on the land) Control related suppression actions can have high costs and can be more detrimental than the fire effects Fire equipment should be cleaned prior to and after use in areas with Port Orford cedar to avoid spreading root disease

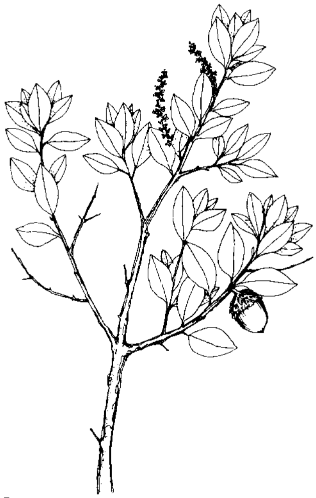
Prescribed Fire: Use of prescribed fire under low-moderate intensities is recommended to reduce fuel accumulations by jackpot burning Low intensity fires should be allowed to back into riparian areas.

Closely Related Types

The LIDE2–CHLA/BENE1/LIBOL type may be replaced on wetter streamside locations by the LIDE2–CHLA–ALRU2//Riparian type and on downslope moist sites by the LIDE2–CHLA/VAOV type On moist sites with serpentine soils it is often replaced by the LIDE2–CHLA/VAPA type

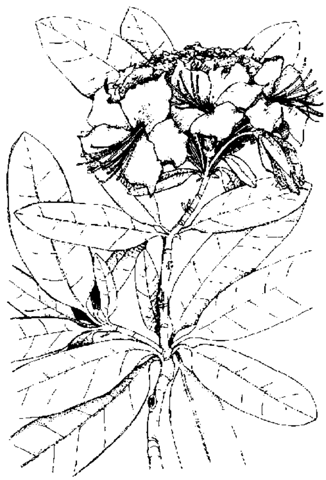
Notes

Plant Association: Tanoak/Huckleberry Oak–Pacific rhododendron
EDP Code Name: LIDE2/QUVA-RHMA
Eco-Code: HT0SOH11



Indicator species:

Huckleberry oak (*Quercus vaccinifolia*–QUVA) was found on high elevation sites, on serpentine soils, with basic soil pH, low AWC, moderate surface rock, high soil coarse fragments, low tree cover and softwood basal area and high shrub cover.



Indicator species:

Pacific rhododendron (*Rhododendron macrophyllum*–RHMA) was found on mid elevation, cool, moist sites, with high subsurface coarse fragments, close to the Pacific Ocean.

Tanoak/Huckleberry Oak–Pacific Rhododendron

LIDE2/QUVA–RHMA Association

Eco-Code HT0SOH11

This mid-elevation, coastal type was found in cool, riparian positions on serpentine soils. It is characterized by a very high shrub cover of Pacific rhododendron and huckleberry oak..

Plant Association Summary

(Sample size: 6)

		COVER	CON
Tree Overstory Layer			
PSME	Douglas-fir	32	100
LIDE2	Tanoak	14	100
PILA	Sugar Pine	5	100
ARME3	Pacific Madrone	3	66
CADE3	Incense Cedar	4	50
Tree Understory Layer			
LIDE2	Tanoak	19	83
PSME	Douglas-fir	3	83
QUCH2	Canyon Live Oak	2	66
Shrubs			
RHMA	Pacific Rhododendron	23	100
QUVA	Huckleberry Oak	9	100
GASH	Salal	17	83
VAPA	Red Huckleberry	9	83
BENE1	Dwarf Oregon-grape	8	83
ROGY	Wood Rose	3	83
Herbs & Grasses			
WHMO	Western Modesty	2	100
POMU1	Swordfern	2	83
XETE	Beargrass	2	83

Ranger Districts

Gasquet, Orleans

Environment

Distance to the Ocean: 18.5–24.5 miles

Elevation: 2320–3480'

Aspect: E., W.

Slope: 40–50%

Slope Position: lower, middle, upper 1/3

Surface Rock: 1–40%

Soils

Pit Depth: 24–32"+

AWC: 1.5–2.9"

Parent Material: serpentine

A Horizon—

Coarse Frag: 25–50 %

Textures: gl, vgl

Thickness: 4–10"

pH: 5.7–7.0

Physical and Biological Environment

Distribution/Setting

This type was often found in riparian positions on coastal sites where mean distance to the Pacific Ocean was 20 2 miles Elevation averaged 2662' and slopes were typically steep. Mean radiation index was a cool .401.

Soils

Soils were predominately mesic, deep (17%) to moderately deep (83%) and well drained They formed in residuum and alluvium The litter layer thickness averaged 2 5" at 83% cover. Surface rock averaged 15% cover. The average surface horizon thickness was 6", textures were predominately gravelly to very gravelly loam, coarse fragment content averaged 33% and pH averaged 6 3 (slightly acid)

Subsoil textures were predominately gravelly to extremely gravelly loam. Subsoil coarse fragment content averaged 51% and ranged from 32% to 68%. Subsurface pH averaged 6 8 (neutral) and ranged from 6 1 (slightly acid) to 7 5 (slightly alkaline) The soils were 33% non-skeletal and 67% skeletal Total soil AWC averaged 2 7" and ranged from 1 5" to 2 9" These soils were classified into the subgroups Typic and Dystric Xerochrepts

Vegetation

The total vegetation cover was very high ranging from 95% to 99% with an average of 98% Mean overstory tree cover was 75% Overstory tree cover was split between conifers that averaged 51% cover and ranged from 30% to 77% and hardwoods that averaged 21% and ranged from 10% to 50% cover The regeneration layer averaged 20% cover Shrub cover was very high and the dominant feature of this type with an average cover of 75% Forb cover was low and spotty with an average of 8% cover Grass cover was lacking with 1% average cover.

Stand Structure

Late seral stands often had 4 or more layers of trees, while early mature and mid-mature stands usually had 2 or 3 layers In late seral stands the top 2 layers were dominated by Douglas-fir, while layer three included a mixture of conifers and hardwoods and the lower layers were dominated by tanoak. Conifers dominated the top three layers with an average of 26 trees/acre > 25" d.b.h., 15 trees/acre > 30" d b h and 6 trees/acre > 40" d b h Hardwoods dominated the lower layers and included 225 trees/acre > 5" d b h , 2 trees/acre > 11" d b h

The stand structure characteristics were reduced here in comparison to the rest of the Tanoak Series, they are described by layer as follows the top layer averaged 327 years old with an average diameter of 40" and average height of 135'. The second layer had an average age of 222 years with a mean diameter of 26" and a mean height of 107' The third layer averaged 133 years with a mean diameter of 13" and mean height of 49'. The fourth layer was dominated by tanoak, it averaged 7" in diameter and 40' in height

Overall biomass production (conifer + hardwoods + shrubs) was generally moderate Modal Dunning site class was 3, with site index of 125 at 300 years Conifer productivity was generally moderate with an average volume of 6703 cu ft., it ranged from 1836 to 6767 cu ft , due to the variable cover of hardwoods Softwood basal area averaged 215 sq. ft and ranged from 73 to 253 sq. ft. Hardwood volume averaged 859 cu. ft and ranged from 155 to 1500 cu. ft. Hardwood basal area averaged 59 sq ft and ranged from 27 to 90 sq ft Stand density index was 460 and fell about midway in the Tanoak Series

Fire Regime

This type usually had a high-severity fire regime of infrequent high-intensity, stand-replacing events These events are associated with extended drought periods

Management Implications

Silvicultural Systems: Shelterwood, single tree selection and sanitation salvage are not recommended in late seral stands due to the high cover of hardwoods Sites on serpentine soils with low productivity should be carefully examined before treatment due to regeneration difficulties. Management here should be limited to periodic sanitation salvage

Site Preparation: Regeneration more difficult in this plant association due to the high cover of Pacific rhododendron Recommend cutting Pacific rhododendron to reduce competition High surface disturbance can lead to high competition from manzanita

Regeneration: Anticipate lower seedling survival rates due to serpentine soils and competition from shrubs. Natural regeneration requires disturbance in the shrub/ hardwood layer

Release: Early release with multiple treatments are recommended due to high density of shrubs

Animal Damage Control Problems: None known

Stockability: Anticipate stocking levels below regional stocking guidelines.

Species Considerations: Pacific yew and sugar pine are important components of this type and should be maintained in all management treatments

Cultural and Commercial: The cultural species most frequently found were tanoak, Pacific madrone, sugar pine, California hazelnut, Pacific blackberry, dwarf Oregon-grape, beargrass and prince's pine The frequently occurring commercial plant species were incense cedar, salal and red huckleberry (also cultural species)

Insects and Disease: Due to the potential for white pine blister rust, planting of rust resistant sugar pine should be considered

Fire Suppression: Contain and control strategies are recommended Huckleberry oak has a high resin content and under dry conditions, can be an explosive fuel During short windows in early spring and late summer extreme fire behavior can be expected Line construction in the shrub/forb, late mature and old growth seral stages are labor intensive. Modified suppression tactics should be considered due to shallow, serpentine soils

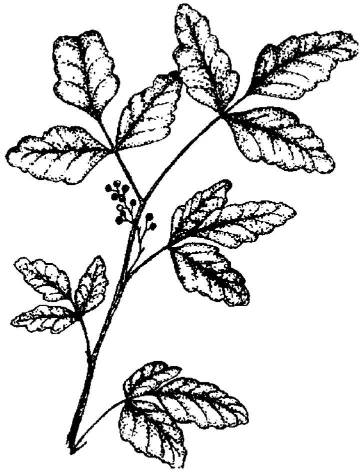
Prescribed Fire: Prescribed fire should be used here to reduce fuel loading and enhance herbaceous diversity.

Closely Related Types

The LIDE2/QUVA-RHMA type was replaced on moist sites, not on serpentine soils, by the LIDE2/GASH-RHMA type

Notes

Plant Association: Tanoak/Poison Oak–Pink Honeysuckle
EDP Code Name: LIDE2/RHDI–LOHIV
Eco-Code: HT0SD011



Indicator species:

Poison oak (*Rhus diversiloba*–RHDI) was found on steep, warm, low elevation, inland sites, with moderate soil coarse fragments and acidic soil pH.

Indicator species:

Pink honeysuckle (*Lonicera hispidula var. vacillans*–LOHIV) was found on low elevation, inland sites, with thick A horizons, low surface rock, moderate surface soil pH.

Tanoak/Poison Oak–Pink Honeysuckle

LIDE2/RHDI–LOHIV Association
Eco-Code HT0SD011

This inland type was found on steep, north facing slopes with deep soils that had high AWC. It is characterized by poison oak and pink honeysuckle. This type had very large tanoak and a subsequent high hardwood volume.

Plant Association Summary

(Sample size: 17)

		COVER	CON
Tree Overstory Layer			
LIDE2	Tanoak	44	100
PSME	Douglas-fir	37	100
ARME3	Pacific Madrone	6	76
Tree Understory Layer			
LIDE2	Tanoak	25	100
PSME	Douglas-fir	2	52
QUCH2	Canyon Live Oak	2	47
PILA	Sugar Pine	1	47
Shrubs			
RHDI	Poison Oak	3	94
LOHIV	Pink Honeysuckle	2	70
ROS	Rose spp.	1	64
Herbs & Grasses			
VAHE	Western Vancouveria	3	58
ARDI	Rayless Arnica	1	58
GOOB	Rattlesnake Plantain	1	47
CHME2	Little Prince's Pine	1	41
PTAQL	Bracken Fern	1	41

Ranger Districts

Ukonom, Happy Camp, Orleans, Lower Trinity

Environment

Distance to the Ocean: 28.5–46.5 miles

Elevation: 1140–2500'

Aspect: N.W., N.E., S.

Slope: 22–70%

Slope Position: lower, middle, upper 1/3

Surface Rock: 0–45%

Soils

Pit Depth: 20–40"+

AWC: 2.1–6.3"

Parent Material: granite, phyllite, schist, gneiss, greenstone

A Horizon—

Coarse Frag: 10–57 %
Textures: l, gl, vgl
Thickness: 4–16"
pH: 5.2–6.2

Physical and Biological Environment

Distribution/Setting

This type was found on inland sites where mean distance to the Pacific Ocean was 34 2 miles Elevation averaged 1969' and slopes were typically steep, averaging 46% Mean radiation index was .410 as a result of north aspects

Soils

Soils were predominately mesic, deep (69%) to moderately deep (31%) and well drained They formed in residuum and colluvium The litter layer thickness averaged 0.8" at 75% cover Surface rock averaged 8% cover. The average surface horizon thickness was 10", texture varied from loam to very gravelly loam, coarse fragment content averaged 29% and pH averaged 5 8 (moderately acid)

Subsoil textures were predominately sandy loams, loams, clay loams and gravelly loams Subsoil coarse fragment content averaged 30% and ranged from 5% to 40% Subsurface pH averaged 5.8 (moderately acid) and ranged from 5 2 (strongly acid) to 6 2 (slightly acid) The soils were 69% non-skeletal and 31% skeletal Total soil AWC averaged 4 2" and ranged from 2 1" to 6.3". These soils were classified into the subgroups Dystric Xerochrepts and Ultic Haploxeralfs.

Vegetation

The total vegetation cover was high ranging from 85% to 98% with an average of 92% Mean overstory tree cover was 86% Overstory tree cover was split between conifers that averaged 37% cover and ranged from 25% to 55% and hardwoods that averaged 60% and ranged from 33% to 90% cover. The regeneration layer averaged 29% cover Shrub cover was low with an average of 15%. Forb cover was low and spotty with an average of 7% cover Grass cover was lacking with < 1% average cover.

Stand Structure

Late seral stands often had 5 or layers of trees, while early mature and mid-mature stands usually had 2 or 3 layers. In late seral stands the top 2 layers were dominated by Douglas-fir, while the lower 3 layers were dominated by tanoak and Pacific madrone Large conifers dominated the top two layers with an average of 19 trees/acre > 25" d b h , 15 trees/acre > 30" d b h. and 8 trees/acre > 40" d.b.h. Hardwoods dominated the lower layers and included 189 trees/acre > 5" d b h , 39 trees/acre > 11" d b h and 11 trees/acre > 18" d.b.h.

The stand structure characteristics by layer were as follows: the top layer averaged 278 years old with an average diameter of 44" and average height of 178' The second layer had an average age of 239 years with a mean diameter of 40" and a mean height of 159' The third layer was dominated by tanoak, it had a mean diameter of 21" and a mean height of 96'. The fourth layer was also dominated by tanoak it had a mean diameter of 14" and a mean height of 73' The fifth layer was also dominated by tanoak, it averaged 9" in diameter and 51' in height Large numbers of small hardwoods were often found in the lower layers

Overall biomass production (conifer + hardwoods + shrubs) was generally high Modal Dunning site class was 1A or 1, with site index of 175-200 at 300 years Conifer productivity was generally moderate with an average volume of 7136 cu ft , it ranged from 3483 to 10,134 cu ft , due to the variable cover of hardwoods. Softwood basal area averaged 165 sq ft and ranged from 70 to 267 sq ft Hardwood volume averaged 2080 cu ft and ranged from 1096 to 2853 cu. ft Hardwood basal area averaged 109 sq ft and ranged from 40 to 180 sq. ft. Stand density index was 434 and fell about midway in the Tanoak Series.

Fire Regime

This type usually has a high-severity fire regime of infrequent high-intensity, stand-replacing events. These events are associated with extended drought periods

Management Implications

Silvicultural Systems: Shelterwood, single tree selection and sanitation salvage are not recommended in late seral stands due to the high cover of hardwoods

Site Preparation: Moderate or high intensity broadcast burning normally leads to removal of the O horizon and on slopes > 25% may lead to significant soil loss from sheet erosion It may also lead to significant competition from snowbrush and/or deerbrush Tractor operations may result in soil compaction

Regeneration: Sites are plantable

Release: Early release with multiple treatments are recommended due to high density of hardwoods and shrubs Tanoak is the primary competitor and deerbrush can be a significant competitor.

Animal Damage Control Problems: None known

Stockability: Anticipate lower stocking levels than regional stocking guidelines.

Species Considerations: Black oak and sugar pine are important components of this type and should be maintained in all management treatments

Culltural and Comercial: The cultural species most frequently found were tanoak and Pacific madrone Three other important cultural plants, Oregon white oak, black oak and California hazelnut, were found infrequently The commercial plant species, incense cedar and California bay were found intermittently (also cultural species)

Insects and Disease: Due to the potential for white pine blister rust planting of rust resistant sugar pine should be considered

Fire Suppression: Contain and control strategies are recommended Line construction in the shrub/forb, late mature and old growth seral stages are labor intensive

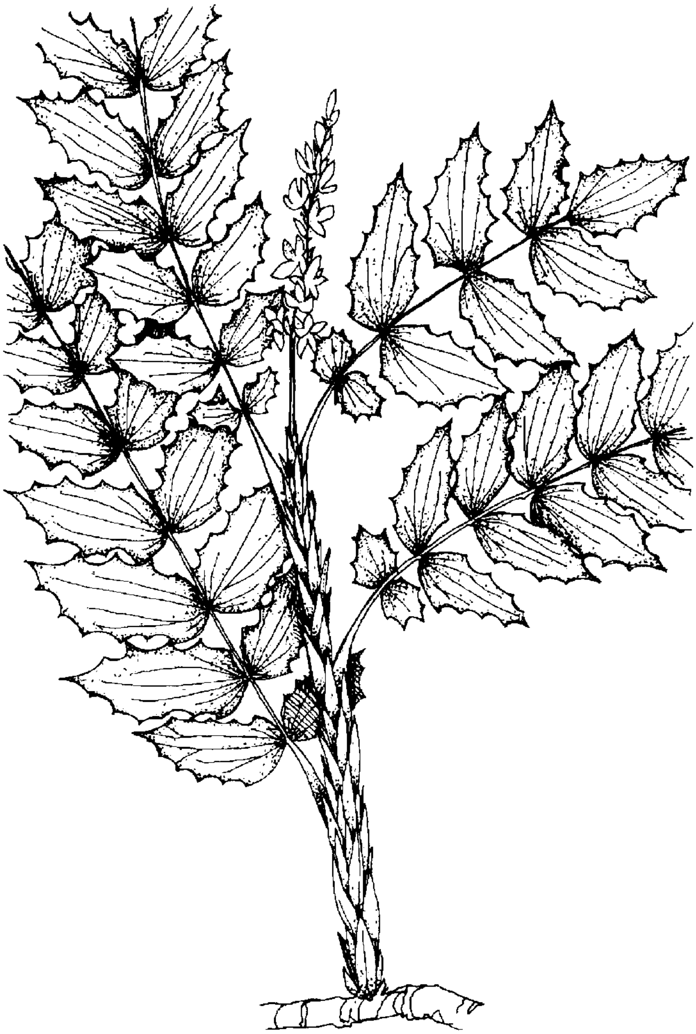
Prescribed Fire: Prescribed fire should be used here to reduce fuel loading.

Closely Related Types

The LIDE2/RHDI–LOHIV type is replaced by the LIDE2/COCOC type on moist, (sometimes alluvial) sites with lower productivity.

Notes

Plant Association: Tanoak/Dwarf Oregon-grape
EDP Code Name: LIDE2/BENE1
Eco-Code: HT0SD012



Indicator species:

Dwarf Oregon-grape (*Berberis nervosa*–BENE1) was found on cool, steep, high elevation sites, with high softwood basal area, moderate shrub cover and low grass cover.

Tanoak/Dwarf Oregon-grape

LIDE2/BENE1 Association
Eco-Code HT0SD012

This extensive, mid-elevation type was found primarily on inland sites on steep, cool slopes with primarily deep soils that had high AWC. Dwarf Oregon-grape was present with low cover in this type.

Plant Association Summary

(Sample size: 54)		COVER	CON
Tree Overstory Layer			
PSME	Douglas-fir	46	100
LIDE2	Tanoak	42	100
ARME3	Pacific Madrone	9	48
Tree Understory Layer			
LIDE2	Tanoak	23	98
PSME	Douglas-fir	2	61
Shrubs			
BENE1	Dwarf Oregon-grape	10	96
Herbs & Grasses			
WHMO	Western Modesty	3	61
PTAQL	Bracken Fern	1	57
ACTR	Vanilla Leaf	3	50
CHME2	Little Prince's Pine	1	50
POMU1	Swordfern	3	48

Ranger Districts

Gasquet, Lower Trinity, Orleans, Ukonom, Happy Camp

Environment

Distance to the Ocean: 12.5–44.5 miles

Elevation: 1900–3722'

Aspect: N.W., N.E., E., S.

Slope: 20–72%

Slope Position: middle, upper 1/3

Surface Rock: 1–20%

Soils

Pit Depth: 20–40"+

AWC: 1.6–7.1"

Parent Material: phyllite, schist, greenstone, sandstone

A Horizon—
Coarse Frag: 10–92 %
Textures: l, gl, gcl, gsl, vgcl
Thickness: 1–14"
pH: 5.1–7.1

Physical and Biological Environment

Distribution/Setting

This type is one of the most extensive types in the Tanoak Series. Mean distance to the Pacific Ocean was 29.7 miles. Elevation averaged 2789' and slopes were typically steep, averaging 49%. Mean radiation index was a cool 398

Soils

Soils were predominately mesic, deep (70%) to moderately deep (19%) and well drained They formed in residuum and colluvium. The litter layer thickness averaged 1 0" at 86% cover. Surface rock averaged 5% cover The average surface horizon thickness was 7", texture varied from loams to gravelly loams and gravelly to very gravelly clay loams, coarse fragment content averaged 36% and pH averaged 5 9 (moderately acid).

Subsoil textures were predominately clay loams to very gravelly clay loams and gravelly to very gravelly loams Subsoil coarse fragment content averaged 33% and ranged from 2% to 70% Subsurface pH averaged 6.1 (slightly acid) and ranged from 5.3 (strongly acid) to 6 9 (neutral) The soils were 45% non-skeletal and 55% skeletal. Total soil AWC averaged 4 1" and ranged from 1 6" to 7.1". These soils were classified into the subgroups Dystric Xerochrepts, Typic Haploxerults and Ultic Haploxeralfs

Vegetation

The total vegetation cover was high ranging from 80% to 99% with an average of 94% Mean overstory tree cover was 89% Overstory tree cover was split between conifers that averaged 47% cover and ranged from 14% to 75% and hardwoods that averaged 50% and ranged from 9% to 97% cover The regeneration layer averaged 29% cover Shrub cover was low with an average cover of 14% Forb cover was low and spotty with an average of 10% cover Grass cover was lacking with < 1% average cover

Stand Structure

Late seral stands often had 5 or more layers of trees, while early mature and mid-mature stands usually had 2 or 3 layers In late seral stands the top 2 layers were dominated by Douglas-fir, while the third layer included a mixture of Douglas-fir and tanoak and the lower 2 layers were dominated by tanoak and Pacific madrone Large conifers dominated the top three layers with an average of 26 trees/acre > 25" d b h , 19 trees/acre > 30" d b h and 11 trees/acre > 40" d b h Hardwoods dominated the lower layers and included 249 trees/acre > 5" d b.h., 24 trees/acre > 11" d.b.h. and 6 trees/acre > 18" d b h

The stand structure characteristics by layer were as follows the top layer averaged 311 years old with an average diameter of 48" and average height of 172' The second layer had an average age of 265 years with a mean diameter of 39" and a height of 140' The third layer was a mixture of conifers and hardwoods They had a mean diameter of 21" and mean height of 96'. The fourth layer was dominated by tanoak, it had a mean diameter of 14" and a mean height of 73' The fifth layer was also dominated by tanoak, it averaged 9" in diameter and 51' in height. Large numbers of small hardwoods were often found in the lower layers.

Overall biomass production (conifer + hardwoods + shrubs) was generally high Modal Dunning site class was 1A or 1, with site index of 175-200 at 300 years Conifer productivity was generally high with an average volume of 9125 cu ft , it ranged from 4003 to 15,640 cu ft , due to the variable cover of hardwoods. Softwood basal area averaged 224 sq. ft. and ranged from 120 to 350 sq ft.

Hardwood volume averaged 1446 cu. ft. and ranged from 310 to 2421 cu ft
Hardwood basal area averaged 88 sq. ft. and ranged from 26 to 160 sq ft Stand density index was 491 and fell about midway in the Tanoak Series

Fire Regime

This type usually has a high-severity fire regime of infrequent high-intensity, stand-replacing events. These events are associated with extended drought periods

Management Implications

Silvicultural Systems: Shelterwood, single tree selection and sanitation salvage not recommended in late seral stands due to the high cover of hardwoods

Site Preparation: Moderate or high intensity broadcast burning normally leads to removal of the O horizon and on slopes > 25% may lead to significant soil loss from sheet erosion It may also lead to significant competition from snowbrush and/or deerbrush. Tractor operations may result in soil compaction on soils with high clay content. Machine site preparation is an option on gentle slopes with low clay content.

Regeneration: Anticipate lower survival rates on sites with high soil coarse fragments.

Release: Early release with multiple treatments are recommended due to high density of tanoak stems and high cover of shrubs.

Competition is primarily from tanoak but high cover of snowbrush should be anticipated on coastal sites and high cover of deerbrush on inland sites

Animal Damage Control Problems: None known

Stockability: Anticipate stocking levels below regional stocking guidelines on sites with high soil coarse fragments

Species Considerations: None known

Cultural and Commercial: The cultural species most frequently found were tanoak, Pacific madrone, dwarf Oregon-grape and prince's pine California hazelnut and beargrass, two other cultural species, were found infrequently and with low cover The most frequently occurring commercial plant species was Douglas-fir (also a cultural species).

Insects and Disease: None known

Fire Suppression: Contain and control strategies are recommended Line construction in the shrub/forb, late mature and old growth seral stages are labor intensive

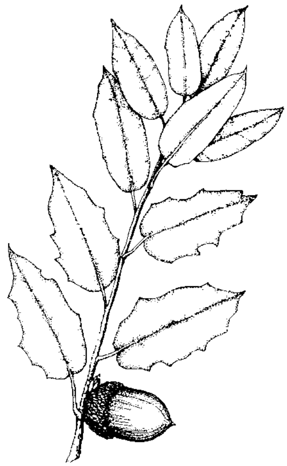
Prescribed Fire: Prescribed fire should be used here to reduce fuel loading.

Closely Related Types

The LIDE2/BENE1 type may be replaced on wetter sites by the LIDE2/GASH–BENE1 type On rockier, drier, colluvial sites it is replaced by the LIDE2–QUCH2/BENE1 type

Notes

Plant Association: Tanoak–Canyon Live Oak/ Evergreen Huckleberry
EDP Code Name: LIDE2–QUCH2/VAOV
Eco-Code: HT0HOL12



Indicator species:

Canyon live oak (*Quercus chrysolepis*–QUCH2) was found on steep, dry, rocky, warm sites

Indicator species:

Evergreen huckleberry (*Vaccinium ovatum*–VAOV) was found on moist, low elevation sites close to the Pacific Ocean or sites with coastal fog. Shrub cover here was low, while surface rock, A horizon thickness, and total basal area was also low.

Tanoak–Canyon Live Oak/Evergreen Huckleberry

LIDE2–QUCH2/VAOV Association

Eco-Code HT0HOL12

This mid-elevation type was found on steep, rocky south facing slopes where temperatures were modified by coastal fog. It is characterized by an overstory cover of canyon live oak and a moderately dense cover of evergreen huckleberry in the understory.

Plant Association Summary

(Sample size: 32)

		COVER	CON
Tree Overstory Layer			
LIDE2	Tanoak	34	100
QUCH2	Canyon Live Oak	19	100
PSME	Douglas-fir	44	96
ARME3	Pacific Madrone	9	90
Tree Understory Layer			
LIDE2	Tanoak	12	90
QUCH2	Canyon Live Oak	4	81
PSME	Douglas-fir	2	62
Shrubs			
VAOV	Evergreen Huckleberry	41	100
RHDI	Poison Oak	3	75
GASH	Salal	10	59
ROGY	Wood Rose	1	59
LOHIV	Pink Honeysuckle	2	46
BENE1	Dwarf Oregon-grape	4	46
Herbs & Grasses			
POMU1	Swordfern	4	68
GOOB	Rattlesnake Plantain	1	59
PTAQL	Bracken Fern	1	46

Ranger Districts

Gasquet, Orleans

Environment

Distance to the Ocean: 9.5–25.5 miles

Elevation: 820–2560'

Aspect: S.W., N., E.

Slope: 30–80%

Slope Position: middle, upper 1/3

Surface Rock: 0–20%

Soils

Pit Depth: 23–40"+

AWC: 1.4–5.3"

Parent Material: sandstone, mafic, greenstone

A Horizon—
- Coarse Frag: 25–78 %
- Textures: gl, vgl, xgl, vgsl
- Thickness: 2–11"
- pH: 5.2–7.0

Physical and Biological Environment

Distribution/Setting

This type was found on coastal and inland sites where mean distance to the Pacific Ocean was 19.8 miles. Elevation averaged 1718' and slopes were typically very steep, averaging 55% Mean radiation index was a 457 due to south facing aspects, but was moderated by coastal fog

Soils

Soils were predominately mesic, moderately deep (51%) and deep (39%) and well drained They formed in residuum and colluvium The litter layer thickness averaged 1 0" at 72% cover Surface rock averaged 6% cover The average surface horizon thickness was 5", texture varied from gravelly loams to extremely gravelly loam and very gravelly sandy loams, coarse fragment content averaged 47% and pH averaged 6 3 (slightly acid)

Subsoil textures were predominately gravelly to very gravelly loams and gravelly clay loams Subsoil coarse fragment content averaged 37% and ranged from 19% to 53%. Subsurface pH averaged 6.1 (slightly acid) and ranged from 5.3 (strongly acid) to 6 8 (neutral) The soils were 36% non-skeletal and 64% skeletal Total soil AWC averaged 2 9" and ranged from 1.4" to 5.3". These soils were classified into the subgroups Dystric Xerochrepts and Typic Haploxerults

Vegetation

The total vegetation cover was high ranging from 90% to 99% with an average of 98% Mean overstory tree cover was 87% Overstory tree cover was split between conifers that averaged 47% cover and ranged from 20% to 68% and hardwoods that averaged 62% and ranged from 26% to 95% cover The regeneration layer averaged 18% cover Shrub cover was very high with an average cover of 72% Forb cover was low with an average of 8% cover Grass cover was lacking with < 1% average cover

Stand Structure

Late seral stands often had 5 or more layers of trees, while early mature and mid-mature stands usually had 2 or 3 layers. In late seral stands the top 3 layers were dominated by Douglas-fir, with occasional large hardwoods found in the third layer The lower 2 layers were dominated by tanoak, canyon live oak and Pacific madrone Large conifers dominated the top three layers with an average of 22 trees/acre > 25" d b.h., 13 trees/acre > 30" d.b.h. and 7 trees/acre > 40" d b h Hardwoods dominated the lower layers and included 325 trees/acre > 5" d b h , 20 trees/acre > 11" d b h and 5 trees/acre > 18" d b h

The stand structure characteristics by layer were as follows the top layer averaged 250 years old with an average diameter of 42" and average height of 156' The second layer had an average age of 224 years with a mean diameter of 36" and a mean height of 130' The third layer had an average age of 140 years old, with a mean diameter of 23" and mean height of 94' The fourth layer was dominated by tanoak, canyon live oak and Pacific madrone, it had a mean diameter of 14" and a mean height of 73' The fifth layer was dominated by tanoak, it averaged 9" in diameter and 51' in height. Large numbers of small hardwoods were often found in the lower layers

Overall biomass production (conifer + hardwoods + shrubs) was generally moderate. Modal Dunning site class was 2, with site index of 150 at 300 years Conifer productivity was generally moderate with an average volume of 6347 cu. ft , it ranged from 3150 to 9592 cu ft , due to the variable cover of hardwoods.

Softwood basal area averaged 168 sq ft and ranged from 93 to 280 sq. ft Hardwood volume averaged 1051 cu ft and ranged from 522 to 1870 cu. ft. Hardwood basal area averaged 73 sq ft and ranged from 40 to 133 sq. ft. Stand density index was 415 and fell in the middle group of the Tanoak Series.

Fire Regime

This type was found in moist areas with coastal influence. It has a high-severity regime with infrequent fire events of high intensity and stand replacement, associated with periods of extended drought It also has occasional creeping fires of low intensity, burning areas with accumulated of fuels A potential for soil damage may result after the loss of the O horizon from moderate ~ high intensity fires

Management Implications

A full description of seral stage/successional pathways based on stand treatment are included in Jimerson (1990).

Silvicultural Systems: Shelterwood, single tree selection and sanitation salvage are not recommended in late seral stands due to the high cover of hardwoods

Site Preparation: Moderate or high intensity broadcast burning normally leads to removal of the O horizon and on slopes > 25% may lead to significant soil loss from sheet erosion. It may also lead to significant competition from snowbrush

Regeneration: Anticipate lower survival rates on sites with high competition from snowbrush and tanoak or in areas of high soil coarse fragments

Release: Early release with multiple treatments are recommended due to high density of hardwood stems and high snowbrush cover Competition can be reduced by using low intensity broadcast burns during site preparation.

Animal Damage Control Problems: None known.

Stockability: Anticipate stocking levels below regional stocking guidelines on sites with high soil coarse fragments.

Species Considerations: Sugar pine is frequently a component of this type and should be maintained in all management treatments

Cultural and Commercial: The cultural species most frequently found were tanoak and Pacific madrone. California hazelnut and beargrass, two cultural species were found infrequently here The most frequently occurring commercial plant species were salal and evergreen huckleberry (also cultural species).

Insects and Disease: Due to the potential for white pine blister rust, planting of rust resistant sugar pine should be considered.

Fire Suppression: Line construction is difficult here due to dense vegetation Confine and contain strategies are recommended. The cost of suppression actions may outweigh the potential resource damage

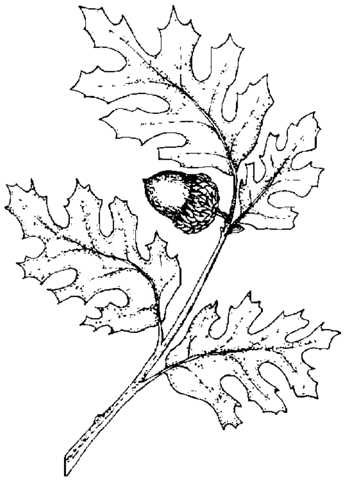
Prescribed Fire: Use prescribed fire to reduce fuel accumulations and provide regeneration sites The best opportunity for this is under drier conditions in the spring prior to green-up Burn prescriptions need to be designed to maintain the O horizon

Closely Related Types

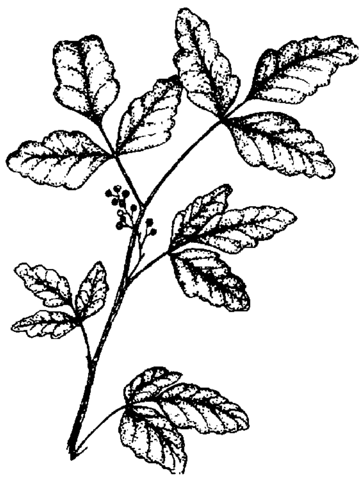
The LIDE2–QUCH2/VAOV type may be replaced on upland sites by the LIDE2–QUCH2/BENE1–GASH and on drier higher elevation sites (on soils formed from residuuum) by the LIDE2–QUCH2//Rockpile type On wetter sites with higher AWC this type is replaced by the LIDE2/VAOV type

Notes

Plant Association: Tanoak–Canyon Live Oak–Black Oak/ Poison Oak
EDP Code Name: LIDE2–QUCH2–QUKE/RHDI
Eco-Code: HT0HOL14



Indicator species:
Black oak (*Quercus kelloggii*–QUKE) was found on warm, inland, middle elevation sites, with low soil coarse fragments and moderately acidic soil pH.



Indicator species:
Poison oak (*Rhus diversiloba*–RHDI) was found on steep, warm, low elevation, inland sites, with moderate soil coarse fragments and acidic soil pH.

Tanoak–Canyon Live Oak–Black Oak/Poison Oak

LIDE2–QUCH2–QUKE/RHDI Association

Eco-Code HT0HOL14

This inland type was found on warm, south facing slopes with primarily deep soils and high AWC. These soil characteristics explain the presence of black oak. It is also characterized by the presence of canyon live oak and poison oak..

Plant Association Summary

(Sample size: 22)

		COVER	CON
Tree Overstory Layer			
PSME	Douglas-fir	40	100
QUKE	Black Oak	8	100
LIDE2	Tanoak	29	95
QUCH2	Canyon Live Oak	13	95
ARME3	Pacific Madrone	13	81
Tree Understory Layer			
LIDE2	Tanoak	13	95
QUCH2	Canyon Live Oak	4	86
PSME	Douglas-fir	4	77
Shrubs			
RHDI	Poison Oak	10	77
COCOC	California Hazelnut	2	31
LOHIV	Pink Honeysuckle	2	45
Herbs & Grasses			
PTAQL	Bracken Fern	1	50
CHME2	Little Prince's Pine	1	36
FEOC1	Western Fescue	1	31

Ranger Districts

Orleans, Happy Camp, Ukonom, Lower Trinity

Environment

Distance to the Ocean: 23.5–37.5 miles

Elevation: 1040–3100'

Aspect: S.,W., E.

Slope: 20–80%

Slope Position: middle, upper 1/3

Surface Rock: 0–15%

Soils

Pit Depth: 19–40"+

AWC: 1.8–6.4"

Parent Material: phyllite, greenstone, serpentine, mafic

A Horizon—
- Coarse Frag: 10–50 %
- Textures: gl, vgl, cl
- Thickness: 3–10"
- pH: 5.6–6.5

Physical and Biological Environment

Distribution/Setting

This type was found on inland sites where mean distance to the Pacific Ocean was 31.5 miles. Elevation averaged 2179' and slopes were typically very steep, averaging 50% Mean radiation index was a warm .492 due to south and west facing aspects

Soils

Soils were predominately mesic, deep (61%) and moderately deep (22%) and well drained They formed in residuum and colluvium. The litter layer thickness averaged 1 0" at 85% cover Surface rock averaged 8% cover The average surface horizon thickness was 7", texture varied from gravelly to very gravelly loams and clay loams, coarse fragment content averaged 32% and pH averaged 6 2 (slightly acid)

Subsoil textures were predominately gravelly, very gravelly, or cobbly loams, or gravelly to very gravelly clay loams Subsoil coarse fragment content averaged 41% and ranged from 17% to 76% Subsurface pH averaged 6 4 (slightly acid) and ranged from 5 8 (moderately acid) to 7 0 (neutral). The soils were 67% non-skeletal and 33% skeletal. Total soil AWC averaged 3 8" and ranged from 1 8" to 6.4". These soils were classified into the subgroups Dystric and Typic Xerochrepts, Ultic Haploxeralfs and Typic Haploxerults.

Vegetation

The total vegetation cover was high ranging from 80% to 95% with an average of 92% Mean overstory tree cover was 87% Overstory tree cover was split between conifers that averaged 49% cover and ranged from 20% to 65% and hardwoods that averaged 56% and ranged from 35% to 75% cover The regeneration layer averaged 26% cover. Shrub cover was low with an average of 13%. Forb cover was also low with an average of 4% Grass cover was low with 2% average cover

Stand Structure

Late seral stands often had 5 or more layers of trees, while early mature and mid-mature stands usually had 2 or 3 layers In late seral stands the top 3 layers were dominated by Douglas-fir with the third layer containing some large hardwoods The lower 2 layers were dominated by tanoak, canyon live oak, black oak and Pacific madrone. Large conifers dominated the top three layers with an average of 21 trees/acre > 25" d b h , 15 trees/acre > 30" d.b.h. and 7 trees/acre > 40" d.b.h. Hardwoods dominated the lower layers and included 201 trees/acre > 5" d b.h., 40 trees/acre > 11" d b h and 11 trees/acre > 18" d.b.h.

The stand structure characteristics by layer were as follows the top layer averaged 272 years old with an average diameter of 45" and average height of 170' The second layer had an average age of 230 years with a mean diameter of 40" and a mean height of 142'. The third layer had an average age of 209 years old, with a mean diameter of 34" and mean height of 123' The fourth layer was dominated by tanoak, canyon live oak, black oak and Pacific madrone, it had a mean diameter of 21" and a mean height of 92' The fifth layer was dominated by tanoak, it averaged 14" in diameter and 80' in height. Large numbers of small hardwoods were often found in the lower layer

Overall biomass production (conifer + hardwoods + shrubs) was generally moderate. Modal Dunning site class was 1, with site index of 175 at 300 years. Conifer productivity was generally moderate with an average volume of 7199 cu.

ft , it ranged from 5060 to 9427 cu. ft , due to the variable cover of hardwoods. Softwood basal area averaged 190 sq ft and ranged from 110 to 227 sq. ft. Hardwood volume averaged 1972 cu ft and ranged from 1202 to 3900 cu ft Hardwood basal area averaged 101 sq ft and ranged from 40 to 156 sq ft Stand density index was 464 and fell in the middle group of the Tanoak Series

Fire Regime

This type experiences a high-severity fire regime with very infrequent and usually high intensity fire events associated with drought periods In non-drought years this type has a moderate severity regime with periodic fires of various intensities. A potential for soil damage may result after loss of the O horizon from moderate to high intensity fires

Management Implications

Silvicultural Systems: All systems are applicable here

Site Preparation: Machine site preparation on clay loam soils can lead to compaction

Regeneration: None known

Release: Early release with multiple treatments are recommended due to high density of hardwood stems

Animal Damage Control Problems: None known.

Stockability: None known

Species Considerations: Black oak and sugar pine are an important component of this type and should be maintained in all management treatments

Cultural and Commercial: The cultural species most frequently found were tanoak, Pacific madrone, sugar pine and black oak California hazelnut, a cultural species, was found infrequently, while beargrass, another cultural species, was found intermittently here The commercial plant species, incense cedar and California bay (also cultural species) were found intermittently in the understory

Insects and Disease: Due to the potential for white pine blister rust, planting of rust resistant sugar pine should be considered

Fire Suppression: Line construction difficulty is dependent on the amount of brush cover. Because of potential soil damage control strategies are recommended

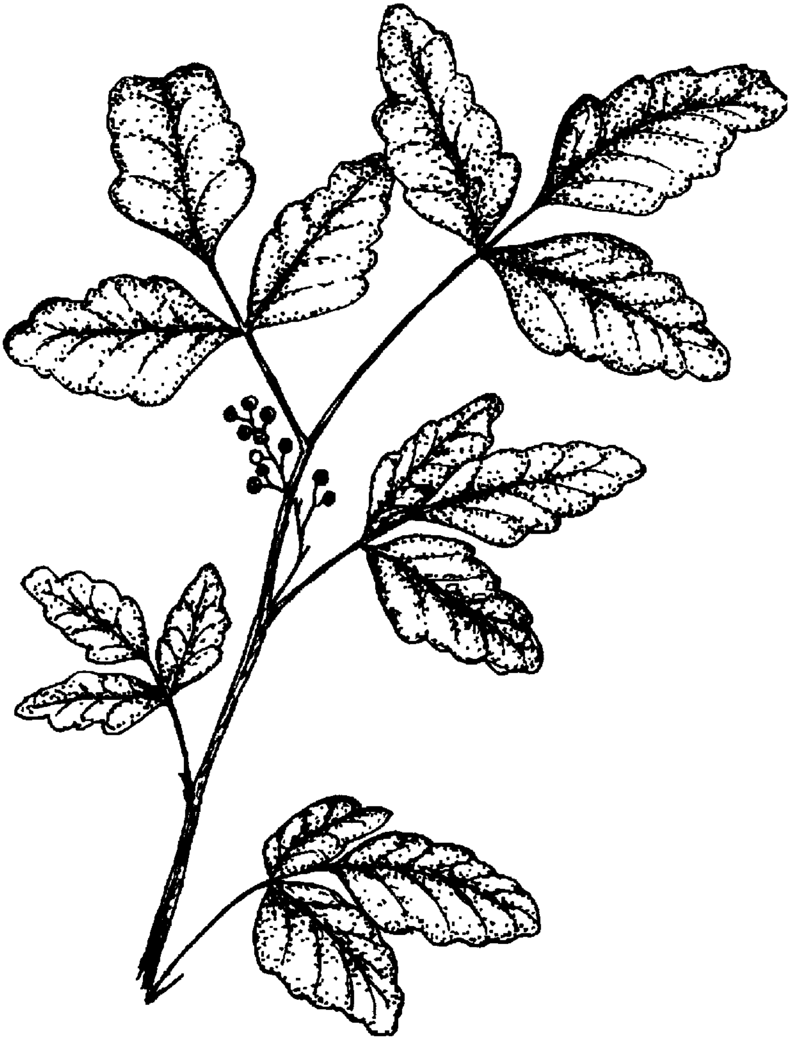
Prescribed Fire: Use prescribed fire to reduce fuel accumulations, under conditions that maintain soil properties. Burn prescriptions need to be designed to maintain the O horizon

Closely Related Types

The LIDE2–QUCH2–QUKE/RHDI type may be replaced on sites with better soils by the LIDE2–QUKE type and on moist higher elevation sites by the LIDE2–QUCH2/BENE1–GASH and on drier sites in ridgetop positions by the LIDE2–QUCH2//Rockpile type. On drier sites in inland positions the LIDE2–QUCH2/RHDI type replaces this type

Notes

Plant Association: Tanoak–Canyon Live Oak/Poison Oak
EDP Code Name: LIDE2–QUCH2/RHDI
Eco-Code: HT0HOL15



Indicator species:

Poison oak (*Rhus diversiloba*–RHDI) was found on steep, warm, low elevation, inland sites, with moderate soil coarse fragments and acidic soil pH.

Tanoak–Canyon Live Oak/Poison Oak

LIDE2–QUCH2/RHDI Association
Eco-Code HT0HOL15

This mid-elevation, inland type was found on warm, very steep, rocky, south facing slopes. It is characterized by the presence of canyon live oak and poison oak.

Plant Association Summary

(Sample size: 21)

		COVER	CON
Tree Overstory Layer			
PSME	Douglas-fir	33	100
QUCH2	Canyon Live Oak	29	100
LIDE2	Tanoak	36	95
Tree Understory Layer			
QUCH2	Canyon Live Oak	8	100
LIDE2	Tanoak	15	95
PSME	Douglas-fir	2	71
PILA	Sugar Pine	1	47
Shrubs			
RHDI	Poison Oak	4	100
LOHIV	Pink Honeysuckle	2	52
ROGY	Wood Rose	1	33
Herbs & Grasses			
IRI	Iris spp.	2	61
WHMO	Western Modesty	8	57
PTAQL	Bracken Fern	1	52
POMU1	Swordfern	1	52
CHME2	Little Prince's Pine	1	52

Ranger Districts

Gasquet, Orleans, Ukonom, Lower Trinity

Environment

Distance to the Ocean: 18.5–37.5 miles

Elevation: 1200–3400'

Aspect: S.W., S.E., N.W.

Slope: 43–82%

Slope Position: middle, upper 1/3

Surface Rock: 2–11%

Soils

Pit Depth: 24–40"+

AWC: 1.4–4.5"

Parent Material: phyllite, greenstone, sandstone, granite

A Horizon—

Coarse Frag: 25–95%

Textures: gl, xgl, vgsl, cosl

Thickness: 2–13"

pH: 5.3–6.6

Physical and Biological Environment

Distribution/Setting

This type was found on inland sites where mean distance to the Pacific Ocean was 30.7 miles Elevation averaged 2273' and slopes were typically very steep, averaging 61% Mean radiation index was 460

Soils

Soils were predominately mesic, deep (50%) and moderately deep (39%) and well drained They formed in residuum and colluvium The litter layer thickness averaged 0.9" at 75% cover Surface rock averaged 7% cover. The average surface horizon thickness was 9", texture varied from gravelly to extremely gravelly loams and very gravelly sandy loams, coarse fragment content averaged 50% and pH averaged 5 9 (moderately acid)

Subsoil textures were predominately gravelly to extremely gravelly loams, sandy loams, or clay loams. Subsoil coarse fragment content averaged 44% and ranged from 20% to 65%. Subsurface pH averaged 6.1 (slightly acid) and ranged from 5 8 moderately acid to 6 8 (neutral) The soils were 33% non-skeletal and 67% skeletal Total soil AWC averaged 2.9" and ranged from 1.4" to 4 5" These soils were classified into the subgroups Dystric and Typic Xerochrepts, Ultic Haploxeralfs and Typic Haploxerults

Vegetation

The total vegetation cover was high ranging from 80% to 98% with an average of 91%. Mean overstory tree cover was 82% Overstory tree cover was split between conifers that averaged 41% cover and ranged from 13% to 65% and hardwoods that averaged 66% and ranged from 47% to 90% cover The regeneration layer averaged 26% cover. Shrub cover was low with an average of 9%. Forb cover was moderate with an average of 12%. Grass cover was low with 2% average cover and usually included western fescue

Stand Structure

Late seral stands often had 5 or more layers of trees, while early mature and mid-mature stands usually had 2 or 3 layers In late seral stands the top 3 layers were dominated by Douglas-fir with the third layer containing some large hardwoods The lower 2 layers were dominated by tanoak, canyon live oak and Pacific madrone Large conifers dominated the top three layers with an average of 24 trees/acre > 25" d b.h , 14 trees/acre > 30" d b h and 5 trees/acre > 40" d b h Hardwoods dominated the lower layers and included 253 trees/acre > 5" d b.h., 19 trees/acre > 11" d b.h. and 5 trees/acre > 18" d b.h.

The stand structure characteristics by layer were as follows the top layer averaged 274 years old with an average diameter of 41" and average height of 151'. The second layer had an average age of 201 years with a mean diameter of 30" and a mean height of 121'. The third layer had an average age of 124 years old, with a mean diameter of 23" and mean height of 108' The fourth layer was dominated by tanoak, canyon live oak and Pacific madrone, it had a mean diameter of 14" and a mean height of 73' The fifth layer was dominated by tanoak, it averaged 9" in diameter and 51' in height. Large numbers of small hardwoods were often found in the lower layer

Overall biomass production (conifer + hardwoods + shrubs) was generally moderate Modal Dunning site class was 2, with site index of 150 at 300 years Conifer productivity was generally moderate with an average volume of 6701 cu ft., it ranged from 3155 to 9209 cu ft , due to the variable cover of hardwoods

Softwood basal area averaged 184 sq ft and ranged from 70 to 253 sq ft Hardwood volume averaged 1343 cu ft and ranged from 439 to 2780 cu. ft. Hardwood basal area averaged 78 sq ft and ranged from 40 to 150 sq. ft. Stand density index was 423 and fell in the lower group of the Tanoak Series.

Fire Regime

This type experiences a high-severity fire regime with very infrequent and usually high intensity fire events associated with drought periods In non-drought years this type has a moderate severity regime with periodic fires of various intensities. A potential for soil damage may result after loss of the O horizon from moderate to high intensity fires

Management Implications

Silvicultural Systems: Shelterwood, single tree selection and sanitation salvage are not recommended in late seral stands due to the high cover of hardwoods

Site Preparation: Moderate or high intensity broadcast burning normally leads to removal of the O horizon and on slopes > 25% may lead to significant soil loss from sheet erosion It may also lead to significant competition from snowbrush Tractor operations may result in soil compaction High manzanita cover may result from high surface disturbance.

Regeneration: Anticipate lower survival rates on sites with high soil coarse fragments and low available water holding capacity

Release: Early release with multiple treatments are recommended due to high density of hardwood stems

Animal Damage Control Problems: None known

Stockability: Anticipate stocking levels below regional stocking guidelines on sites with high soil coarse fragments and low available water holding capacity.

Species Considerations: Sugar pine is frequently found in this type and should be maintained in all management treatments.

Cultural and Commercial: The cultural species most frequently found were tanoak, Pacific madrone, prince's pine and western modesty. California hazelnut was found infrequently The commercial plant species, evergreen huckleberry (also a cultural species) was found intermittently

Insects and Disease: Due to the potential for white pine blister rust planting of rust resistant sugar pine should be considered

Fire Suppression: Line construction difficulty is dependent on the amount of brush cover Because of potential soil damage control strategies are recommended

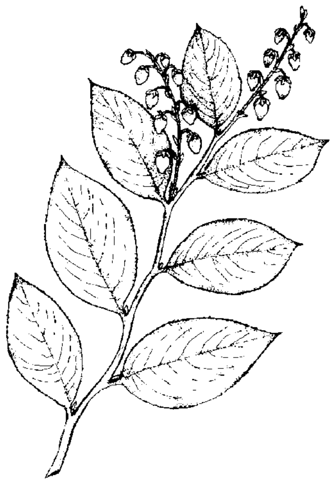
Prescribed Fire: Use prescribed fire to reduce fuel accumulations under conditions that maintain soil properties. Burn prescriptions need to be designed to maintain the O horizon

Closely Related Types

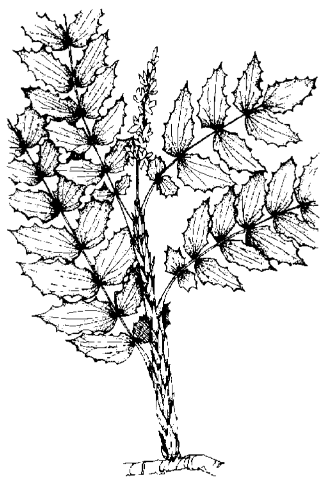
The LIDE2–QUCH2/RHDI type may be replaced on moist higher elevation sites (on soils formed from colluvium) by the LIDE2–QUCH2/BENE1–GASH and on drier sites in ridgetop positions by the LIDE2–QUCH2//Rockpile type On moist sites in coastal or inland positions the LIDE2–QUCH2–QUKE/RHDI type replaces this type

Notes

Plant Association: Tanoak–Canyon Live Oak/Salal–Dwarf Oregon-grape
EDP Code Name: LIDE2–QUCH2/GASH–BENE1
Eco-Code: HT0HOL13



Indicator species:
Salal (*Gaultheria shalon*–GASH) was found on mid elevation sites with high shrub cover, moderate AWC and thin A horizons.



Indicator species:
Dwarf Oregon-grape (*Berberis nervosa*–BENE1) was found on cool, steep, high elevation sites, with high softwood basal area, moderate shrub cover and low grass cover.

Tanoak–Canyon Live Oak/Salal–Dwarf Oregon-grape

LIDE2–QUCH2/GASH–BENE1 Association

Eco-Code HT0HOL13

This high elevation type was found on warm, steep south facing slopes with high surface rock. It is characterized by the presence of canyon live oak, salal, and high cover of dwarf Oregon-grape.

Plant Association Summary

(Sample size: 16)

		COVER	CON
Tree Overstory Layer			
PSME	Douglas-fir	48	100
LIDE2	Tanoak	27	100
QUCH2	Canyon Live Oak	17	100
ARME3	Pacific Madrone	9	75
Tree Understory Layer			
LIDE2	Tanoak	16	100
QUCH2	Canyon Live Oak	4	93
PSME	Douglas-fir	2	75
Shrubs			
GASH	Salal	22	100
BENE1	Dwarf Oregon-grape	14	100
ROGY	Wood Rose	1	62
Herbs & Grasses			
POMU1	Swordfern	2	75
WHMO	Western Modesty	3	75
CHUMO	Prince's Pine	2	68
GOOB	Rattlesnake Plantain	1	62

Ranger Districts

Gasquet, Orleans, Lower Trinity

Environment

Distance to the Ocean: 12.5–31.5 miles

Elevation: 2445–3680'

Aspect: S.W.,W.

Slope: 45–80%

Slope Position: lower, middle, upper 1/3

Surface Rock: 2–70%

Soils

Pit Depth: 24–40"+

AWC: 1.0–4.9"

Parent Material: phyllite, schist, sandstone

A Horizon—

- **Coarse Frag:** 28–95 %
- **Textures:** gl, vgl, xgl
- **Thickness:** 1–10"
- **pH:** 5.6–6.5

Physical and Biological Environment

Distribution/Setting

This type was found primarily on inland sites This type was characterized by high surface rock cover averaging 27% Mean distance to the Pacific Ocean was 21 6 miles Elevation averaged 3057' and slopes were typically very steep, averaging 66% Mean radiation index was a warm .475 due to the south and west facing aspects

Soils

Soils were predominately mesic, deep (61%) and moderately deep (31%) and well drained They formed in residuum, colluvium and sometime alluvium The litter layer thickness averaged 2 0" at 80% cover The average surface horizon thickness was 6", texture varied from gravelly to extremely gravelly loams, coarse fragment content averaged 55% and pH averaged 6.1 (moderately acid).

Subsoil textures were predominately very gravelly to extremely gravelly loams, silt loams, or clay loams. Subsoil coarse fragment content averaged 58% and ranged from 35% to 76% Subsurface pH averaged 6 2 (slightly acid) and ranged from 5 8 (moderately acid) to 6 5 (slightly acid) The soils were 31% non-skeletal and 69% skeletal Total soil AWC averaged 2.7" and ranged from 1.0" to 4.9". These soils were classified into the subgroup Dystric Xerochrepts

Vegetation

The total vegetation cover was high ranging from 90% to 99% with an average of 96%. Mean overstory tree cover was 88% Overstory tree cover was split between conifers that averaged 54% cover and ranged from 25% to 70% and hardwoods that averaged 58% and ranged from 30% to 70% cover. The regeneration layer averaged 29% cover. Shrub cover was moderately high with an average cover of 44% Forb cover was low with an average of 8% Grass cover was lacking with < 1% average cover

Stand Structure

Late seral stands often had 5 or more layers of trees, while early mature and mid-mature stands usually had 2 or 3 layers. In late seral stands the top 3 layers were dominated by Douglas-fir with occasional large hardwoods in the third layer. The lower 2 layers were dominated by tanoak, canyon live oak and Pacific madrone Large conifers dominated the top three layers with an average of 33 trees/acre > 25" d b h , 25 trees/acre > 30" d b h. and 14 trees/acre > 40" d.b h Hardwoods dominated the lower layers and included 147 trees/acre > 5" d b h , 15 trees/acre > 11" d.b.h. and 5 trees/acre > 18" d b h

The stand structure characteristics by layer were as follows the top layer averaged 263 years old with an average diameter of 45" and average height of 165' The second layer had an average age of 239 years with a mean diameter of 44" and a mean height of 137' The third layer had an average age of 280 years old, with a mean diameter of 35" and mean height of 105' The fourth layer was dominated by tanoak, canyon live oak and Pacific madrone, it had a mean diameter of 14" and a mean height of 73' The fifth layer was dominated by tanoak, it averaged 9" in diameter and 51' in height. Large numbers of small hardwoods were often found in the lower layer

Overall biomass production (conifer + hardwoods + shrubs) was generally high Modal Dunning site class was 1, with site index of 175 at 300 years Conifer productivity was generally high with an average volume of 9661 cu ft., it ranged from 3508 to 14,548 cu ft , due to the variable cover of hardwoods Softwood basal area averaged 271 sq ft and ranged from 107 to 413 sq. ft. Hardwood volume averaged 978 cu ft. and ranged from 262 to 1774 cu ft Hardwood basal area averaged 52 sq ft. and ranged from 13 to 93 sq ft Stand density index was 466 and fell in the middle group of the Tanoak Series.

Fire Regime

This type was found in moist areas with coastal influence. It has a high-severity regime with infrequent fire events of high intensity and stand replacement associated with periods of extended drought. It also has occasional creeping fires of low intensity and moderate intensity fires associated with higher fuel accumulations.

Management Implications

Silvicultural Systems: Shelterwood, single tree selection and sanitation salvage are not recommended in late seral stands due to the high cover of hardwoods

Site Preparation: Moderate or high intensity broadcast burning normally leads to removal of the O horizon and on slopes > 25% may lead to significant soil loss from sheet erosion It may also lead to significant competition from deerbrush. Tractor operations may result in soil compaction.

Regeneration: Anticipate lower survival rates on sites with high competition from snowbrush and tanoak or in areas of high soil coarse fragments

Release: Early release with multiple treatments are recommended due to high density of hardwood stems and high snowbrush cover Competition can be reduced by using low intensity broadcast burns during site preparation.

Animal Damage Control Problems: None known.

Stockability: Regional stocking guidelines are applicable.

Species Considerations: Sugar pine is an important component of this type and should be maintained in all management treatments

Cultural and Commercial: The cultural species most frequently found were tanoak, Pacific madrone and dwarf Oregon-grape Two other cultural species, California hazelnut an beargrass, were found intermittently and infrequently, respectively The most frequently occurring commercial plant species was salal (also a cultural species).

Insects and Disease: Due to the potential for white pine blister rust planting of rust resistant sugar pine should be considered

Fire Suppression: Line construction is difficult here due to dense vegetation Confine and contain strategies are recommended. The cost of control related suppression actions may outweigh the potential resource damage

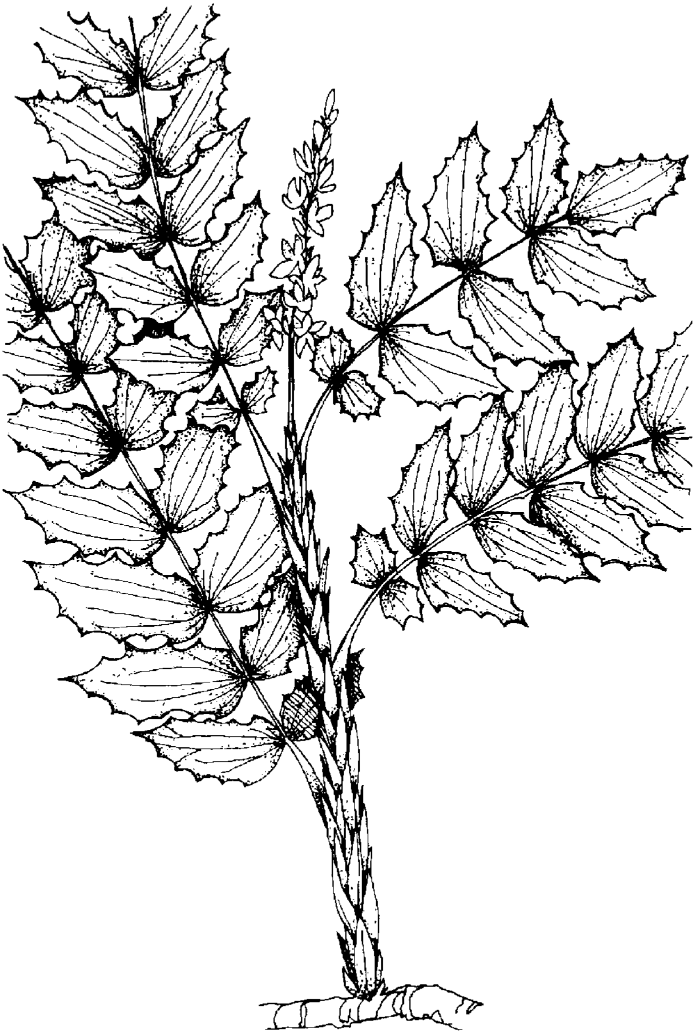
Prescribed Fire: Use prescribed fire to reduce fuel accumulations and provide regeneration sites. The best opportunity for this is under drier conditions in the spring prior to green-up.

Closely Related Types

The LIDE2–QUCH2/GASH–BENE1 type may be replaced on drier ridgetop sites (on soils formed from residuum) by the LIDE2–QUCH2//Rockpile and on lower elevation, moist, coastal sites by the LIDE2–QUCH2/VAOV type.

Notes

Plant Association: Tanoak–Canyon Live Oak/ Dwarf Oregon-grape
EDP Code Name: LIDE2–QUCH2/BENE1
Eco-Code: HT0HOL16



Indicator species:

Dwarf Oregon-grape (*Berberis nervosa*–BENE1) was found on cool, steep, high elevation sites, with high softwood basal area, moderate shrub cover and low grass cover

Tanoak–Canyon Live Oak/Dwarf Oregon-grape

LIDE2–QUCH2/BENE1 Association
Eco-Code HT0HOL16

This high elevation, inland type was found on very steep, rocky slopes. It was characterized by the presence of canyon live oak and dwarf Oregon grape.

Plant Association Summary

(Sample size: 19)

		COVER	CON
Tree Overstory Layer			
PSME	Douglas-fir	60	100
LIDE2	Tanoak	25	94
QUCH2	Canyon Live Oak	17	94
Tree Understory Layer			
LIDE2	Tanoak	13	94
QUCH2	Canyon Live Oak	5	94
PSME	Douglas-fir	2	68
Shrubs			
BENE1	Dwarf Oregon-grape	15	94
ROGY	Wood Rose	2	57
Herbs & Grasses			
WHMO	Western Modesty	4	73
PYPI2	Whiteveined Wintergreen	1	73
GOOB	Rattlesnake Plantain	1	68
CHUMO	Prince's Pine	5	63

Ranger Districts

Gasquet, Orleans, Ukonom, Lower Trinity

Environment

Distance to the Ocean: 11.5–33.5 miles
Elevation: 2040–4020'
Aspect: W., S.E., E., N.
Slope: 40–80%
Slope Position: middle, upper 1/3
Surface Rock: 1–10%, 25–95%

Soils

Pit Depth: 26–40"+
AWC: 1.3–3.9"
Parent Material: schist, mixed
A Horizon—
Coarse Frag: 25–80 %
Textures: l, gl, xgl, vgl
Thickness: 2–12"
pH: 5.4–6.5

Physical and Biological Environment

Distribution/Setting

This type was found primarily on inland sites This type was characterized by variable surface rock. Some sites had low rock 1-10% while others had surface rock as high as 25-95%. Mean distance to the Pacific Ocean was 23.0 miles Elevation averaged 3133' and slopes were typically very steep, averaging 60% Mean radiation index was .438.

Soils

Soils were predominately mesic, deep (53%) and moderately deep (40%) and well drained They formed in residuum and colluvium The litter layer thickness averaged 1 3" at 80% cover. The average surface horizon thickness was 7", texture varied from loams to extremely gravelly loams, coarse fragment content averaged 46% and pH averaged 5.9 (moderately acid)

Subsoil textures were predominately very gravelly to extremely gravelly loams and sandy loams Subsoil coarse fragment content averaged 59% and ranged from 30% to 90%. Subsurface pH averaged 6 0 (medium acid) and ranged from 5 7 moderately acid to 6.5 (slightly acid) The soils were 33% non-skeletal and 67% skeletal Total soil AWC averaged 2.7" and ranged from 1 3" to 3 9" These soils were classified into the subgroup Dystric Xerochrepts.

Vegetation

The total vegetation cover was high ranging from 90% to 98% with an average of 93% Mean overstory tree cover was 89% Overstory tree cover was split between conifers that averaged 63% cover and ranged from 21% to 85% and hardwoods that averaged 52% and ranged from 21% to 65% cover. The regeneration layer averaged 20% cover. Shrub cover was low with an average of 12% Forb cover was also low with an average of 7% cover Grass cover was spotty with < 1% average cover

Stand Structure

Late seral stands often had 5 or more layers of trees, while early mature and mid-mature stands usually had 2 or 3 layers In late seral stands the top 3 layers were dominated by Douglas-fir with the third layer containing some large hardwoods. The lower 2 layers were dominated by tanoak, canyon live oak and Pacific madrone. Large conifers dominated the top three layers with an average of 38 trees/acre > 25" d b h , 24 trees/acre > 30" d.b.h. and 12 trees/acre > 40" d b.h. Hardwoods dominated the lower layers and included 144 trees/acre > 5" d b h , 25 trees/acre > 11" d b.h. and 6 trees/acre > 18" d b h

The stand structure characteristics by layer were as follows: the top layer averaged 273 years old with an average diameter of 46" and average height of 158'. The second layer had an average age of 238 years with a mean diameter of 34" and a mean height of 123'. The third layer had an average age of 107 years old, with a mean diameter of 24" and mean height of 110' The fourth layer was dominated by tanoak, canyon live oak, black oak and Pacific madrone, it had a mean diameter of 14" and a mean height of 73' The fifth layer was dominated by tanoak, it averaged 9" in diameter and 51' in height. Large numbers of small hardwoods were often found in the lower layer

Overall biomass production (conifer + hardwoods + shrubs) was generally high Modal Dunning site class was 1, with site index of 175 at 300 years Conifer productivity was generally high with an average volume of 9703 cu. ft., it ranged from 4480 cu ft to 13,575 cu ft., due to the variable cover of hardwoods

Softwood basal area averaged 269 sq. ft and ranged from 147 to 360 sq. ft. Hardwood volume averaged 1080 cu ft and ranged from 129 to 1790 cu. ft Hardwood basal area averaged 62 sq ft and ranged from 13 to 107 sq ft Stand density index was 485 and fell in the middle group of the Tanoak Series

Fire Regime

This type had a high-severity fire regime with very infrequent and usually high intensity fire events associated with drought periods Typical fires (in non-drought years) are low intensity creeping fires that burn small pockets The potential for soil damage can result following the loss of the O horizon from moderate to high intensity fire

Management Implications

Silvicultural Systems: Shelterwood, single tree selection and sanitation salvage are not recommended in late seral stands due to the high cover of hardwoods

Site Preparation: Broadcast burning is recommended in this type but moderate or high intensity broadcast burns can lead to significant competition from deerbrush

Regeneration: Anticipate lower survival rates on sites with high soil coarse fragments and low available water holding capacity High surface rock on selected sites could lead to planting problems High cover of bracken fern or grass can lead to low regeneration success.

Release: Early release with multiple treatments are recommended due to high density of hardwood stems

Animal Damage Control Problems: None known.

Stockability: Anticipate stocking levels below regional stocking guidelines on sites with high surface rock and low site class

Species Considerations: Sugar pine is an important component of this type and should be maintained in all management treatments

Cultural and Commercial: The cultural species most frequently found were tanoak, Pacific madrone and prince's pine. California hazelnut and beargrass, two cultural species, were found infrequently. The commercial plant species, Port Orford cedar and evergreen huckleberry (also cultural species) were found intermittently

Insects and Disease: Due to the potential for white pine blister rust, planting of rust resistant sugar pine should be considered.

Fire Suppression: Line construction difficulty is dependent on shrub cover and amount of surface rock Soils damage can result from control strategies.

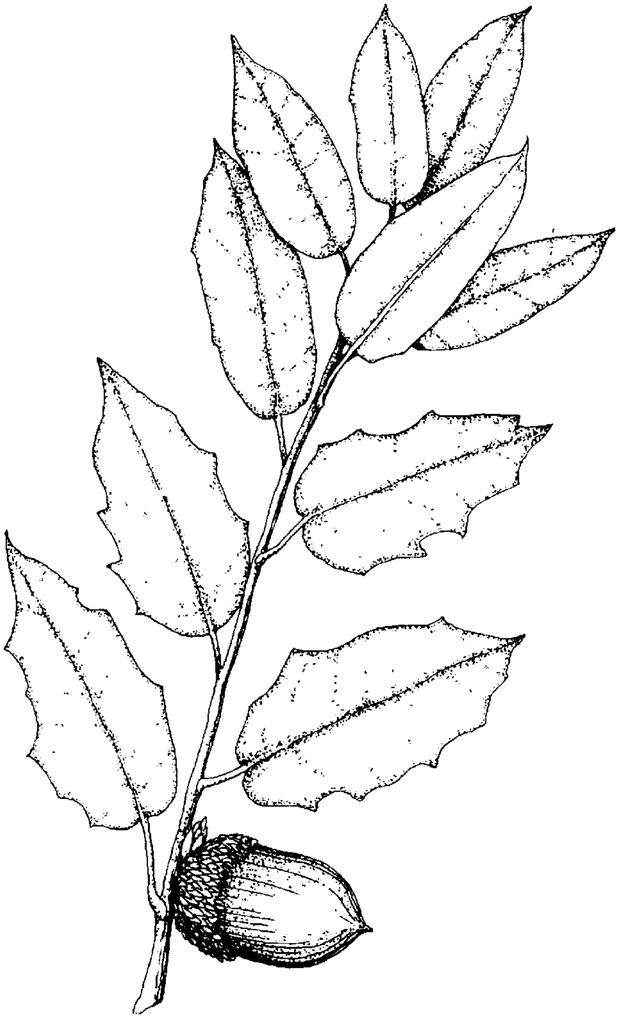
Prescribed Fire: Use prescribed fire to manage for cultural species and reduce fuel accumulations under more favorable conditions to maintain soil properties

Closely Related Types

The LIDE2–QUCH2/BENE1 type may be replaced on moist higher elevation sites by the LIDE2–QUCH2/GASH–BENE1 and on drier sites in ridgetop positions (on soils formed from residuum) by the LIDE2–QUCH2//Rockpile type

Notes

Plant Association: Tanoak–Canyon Live Oak//Rockpile
EDP Code Name: LIDE2–QUCH2//Rockpile
Eco-Code: HT0HOL11



Indicator species:

Canyon live oak (*Quercus chrysolepis*–QUCH2) was found on steep, dry, rocky, warm sites.

Tanoak–Canyon Live Oak//Rockpile

LIDE2–QUCH2//Rockpile Association

Eco-Code HT0HOL11

This inland type was found on very steep, warm, south facing slopes with a surface cover of rock mulch. It is characterized by the presence of canyon live oak.

Plant Association Summary

(Sample size: 15)

		COVER	CON
Tree Overstory Layer			
PSME	Douglas-fir	40	100
QUCH2	Canyon Live Oak	24	100
LIDE2	Tanoak	21	100
ARME3	Pacific Madrone	15	93
Tree Understory Layer			
LIDE2	Tanoak	12	100
QUCH2	Canyon Live Oak	5	100
PSME	Douglas-fir	2	66
Shrubs			
ROGY	Wood Rose	1	26
BENE1	Dwarf Oregon-grape	1	26
Herbs & Grasses			
CHUMO	Prince's Pine	2	60
CHME2	Little Prince's Pine	1	53
PTAQL	Bracken Fern	1	46
PYPI2	Whiteveined Wintergreen	1	40

Ranger Districts

Gasquet, Orleans, Ukonom, Lower Trinity

Environment

Distance to the Ocean: 18.5–36.5 miles

Elevation: 2560–3850'

Aspect: W., S.

Slope: 45–80%

Slope Position: ridgetop, upper 1/3

Surface Rock: 20–95%

Soils

Pit Depth: 19–40"+

AWC: 1.1–4.2"

Parent Material: granite, schist

A Horizon—

Coarse Frag: 10–60 %

Textures: gl, vgl

Thickness: 2–10"

pH: 5.5–6.5

Physical and Biological Environment

Distribution/Setting

This type was found on inland sites and characterized by a surface cover of rock scree averaging 43%. Mean distance to the Pacific Ocean was 24.4 miles. Elevation averaged 3220' and slopes were typically very steep, averaging 63% Mean radiation index was a warm 485 due to south facing aspects

Soils

Soils were predominately mesic, moderately deep (50%) and deep (44%) and well drained. They formed primarily in residuum and sometimes colluvium The litter layer thickness averaged 0 6" at 75% cover The average surface horizon thickness was 7", texture varied from gravelly loams to very gravelly loams, coarse fragment content averaged 33% and pH averaged 6 0 (moderately acid)

Subsoil textures were predominately extremely gravelly, stony, or cobbly loams. Subsoil coarse fragment content averaged 62% and ranged from 20% to 90% Subsurface pH averaged 6.1 (slightly acid) and ranged from 5.6 (medium acid) to 6.5 (slightly acid). The soils were 50% non-skeletal and 50% skeletal Total soil AWC averaged 2 7" and ranged from 1 1" to 4 2" These soils were classified into the subgroup Dystric Xerochrepts.

Vegetation

The total vegetation cover was moderate ranging from 75% to 99% with an average of 89% Mean overstory tree cover was 90% Overstory tree cover was split between conifers that averaged 50% cover and ranged from 20% to 81% and hardwoods that averaged 52% and ranged from 20% to 75% cover. The regeneration layer averaged 21% cover Shrub cover was very low with an average cover of 2% Forb cover was also low with an average of 3% cover. Grass cover was lacking with < 1% average cover

Stand Structure

Late seral stands often had 5 or more layers of trees, while early mature and mid-mature stands usually had 2 or 3 layers In late seral stands the top 3 layers were dominated by Douglas-fir, while the lower 2 layers were dominated by tanoak, canyon live oak and Pacific madrone. Large conifers dominated the top three layers with an average of 40 trees/acre > 25" d b h , 32 trees/acre > 30" d b h and 27 trees/acre > 40" d b h The number of large conifers varied along with slope and soil coarse fragments Hardwoods dominated the lower layers and included 227 trees/acre > 5" d b h , 27 trees/acre > 11" d b h and 3 trees/acre > 18" d b h

The stand structure characteristics by layer were as follows the top layer averaged 291 years old with an average diameter of 49" and average height of 161' The second layer had an average age of 188 years with a mean diameter of 34" and a mean height of 128' The third layer had an average age of 105 years old, with a mean diameter of 26" and mean height of 112' The fourth layer was dominated by tanoak, canyon live oak and Pacific madrone, it had a mean diameter of 14" and a mean height of 73' The fifth layer was dominated by tanoak, it averaged 9" in diameter and 51' in height. Large numbers of small hardwoods were often found in the lower layer

Overall biomass production (conifer + hardwoods + shrubs) was generally moderate. Modal Dunning site class was 2, with site index of 150 at 300 years. Conifer productivity was generally moderate with an average volume of 7252 cu ft , it ranged from 3462 to 10,636 cu ft , due to the variable cover of hardwoods

Softwood basal area averaged 204 sq. ft. and ranged from 80 to 267 sq ft Hardwood volume averaged 1451 cu ft and ranged from 417 to 2059 cu. ft. Hardwood basal area averaged 86 sq ft and ranged from 27 to 130 sq ft. Stand density index was 485 and fell in the middle group of the Tanoak Series

Fire Regime

This type had a moderate-severity regime with infrequent events of partial stand replacement with areas of high and low tree mortality as well as frequent low intensity events with minimal overstory mortality Moderate and high intensity fire may lead to loss of the O horizon and due to high rock content, may lead to soil damage This type tends to have a low natural frequency of ground fires as a result of high surface cover of rock.

Management Implications

Silvicultural Systems: Sites in this type are highly variable, silvicultural systems are dependent on the amount of surface rock and soil coarse fragments.

Site Preparation: Moderate or high intensity broadcast burns can lead to significant competition from snowbrush

Regeneration: Anticipate lower survival rates on sites with high surface rock or high soil coarse fragments Seedlings may need protection from rock on talus slopes Whitethorn, bitter cherry and occasional high cover of grass can affect regeneration success

Release: None

Animal Damage Control Problems: None known.

Stockability: Anticipate stocking levels below regional stocking guidelines on sites with high surface rock or high soil coarse fragments

Species Considerations: Sugar pine is an important component of this type and should be maintained in all management treatments

Cultural and Commercial: The cultural species most frequently found were tanoak, Pacific madrone and prince's pine California hazelnut and beargrass, two cultural species were also found intermittently here The commercial plant species, incense cedar, California bay and evergreen huckleberry (also cultural species) were found intermittently

Insects and Disease: Due to the potential for white pine blister rust, planting of rust resistant sugar pine should be considered

Fire Suppression: Line construction is difficult here due to high rock cover Because of potential soil damage, control strategies are recommended.

Prescribed Fire: Use prescribed fire to reduce fuel accumulations under more favorable conditions that maintain soil properties Burn prescriptions need to be designed to maintain the O horizon

Closely Related Types

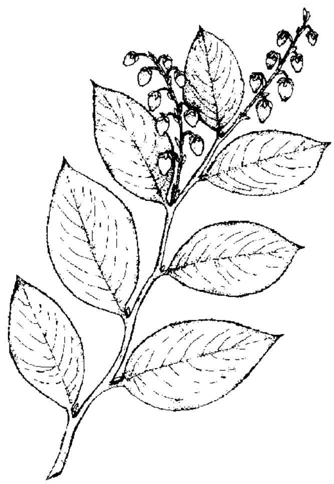
The LIDE2-QUCH2//Rockpile type may be replaced on moist colluvial sites by the LIDE2-QUCH2/BENE1-GASH and on lower elevation, moist, coastal (also colluvial) sites by the LIDE2-QUCH2/VAOV type

Notes

Plant Association: Tanoak–Chinquapin/
Evergreen Huckleberry–Salal
EDP Code Name: LIDE2–CACH2/VAOV–GASH
Eco-Code: HT0HGC16

Indicator species:

Evergreen huckleberry (*Vaccinium ovatum*–VAOV) was found on moist, low elevation sites close to the Pacific Ocean or sites with coastal fog. Shrub cover here was low, while surface rock, A horizon thickness, and total basal area was also low.



Indicator species:

Salal (*Gaultheria shalon*–GASH) was found on mid elevation sites with high shrub cover, moderate AWC and thin A horizons.

Tanoak–Chinquapin/ Evergreen Huckleberry–Salal

LIDE2–CACH2/VAOV–GASH Association
Eco-Code HT0HGC16

This inland, mid-elevation type was found on steep slopes with deep soils that had high AWC. It characterized by the presence of chinquapin, evergreen huckleberry and salal.

Plant Association Summary

(Sample size: 8)

		COVER	CON
Tree Overstory Layer			
LIDE2	Tanoak	35	100
PSME	Douglas-fir	34	100
CACH2	Chinquapin	14	100
ARME3	Pacific Madrone	7	50
Tree Understory Layer			
LIDE2	Tanoak	8	100
PSME	Douglas-fir	1	87
CACH2	Chinquapin	4	75
Shrubs			
VAOV	Evergreen Huckleberry	36	100
GASH	Salal	15	75
RHMA	Pacific Rhododendron	12	62
BENE1	Dwarf Oregon-grape	2	37
Herbs & Grasses			
PTAQL	Bracken Fern	2	62
XETE	Beargrass	3	50
VAPL	Redwood Insideout Flower	1	37

Ranger Districts

Gasquet, Orleans, Lower Trinity

Environment

Distance to the Ocean: 12.5–21.5 miles

Elevation: 1500–2470'

Aspect: variable, with topographic shading

Slope: 5–55%

Slope Position: middle 1/3

Surface Rock: 0–6%

Soils

Pit Depth: 27–40"+

AWC: 2.4–6.1"

Parent Material: phyllite, schist, greenstone

A Horizon—
Coarse Frag: 20–57 %
Textures: gl
Thickness: 2–8"
pH: 6.0–7.0

Physical and Biological Environment

Distribution/Setting

This type was found on coastal and inland sites where mean distance to the Pacific Ocean was 18.0 miles. Elevation averaged 1987' and slopes were typically steep, averaging 33%. Mean radiation index was .462, but probably is much cooler as a result of topographic shading.

Soils

Soils were predominately mesic, deep (80%) and moderately deep (20%) and well drained. They formed in residuum and colluvium. The litter layer thickness averaged 2 0" at 85% cover Surface rock averaged 3% cover. The average surface horizon thickness was 4", texture was gravelly loam, coarse fragment content averaged 26% and pH averaged 6.6 (neutral).

Subsoil textures were predominately gravelly clay loam, silt loam, or silty clay loam Subsoil coarse fragment content averaged 19% and ranged from 13% to 29% Subsurface pH averaged 6.4 (slightly acid) and ranged from 5.7 (moderately acid) to 7.0 (neutral). The soils were non-skeletal. Total soil AWC averaged 4.8" and ranged from 2 4" to 6.1". These soils were classified into the subgroup Typic Haploxerults.

Vegetation

The total vegetation cover was very high ranging from 98% to 99% with an average of 98% Mean overstory tree cover was 93% Overstory tree cover was split between conifers that averaged 65% cover and ranged from 40% to 90% and hardwoods that averaged 40% and ranged from 20% to 60% cover The regeneration layer averaged 14% cover. Shrub cover was high with an average cover of 61% Forb cover was low with an average of 6% cover Grass cover was spotty with < 1% average cover

Stand Structure

Late seral stands often had 3 or more layers of trees, while early mature and mid-mature stands usually had 2 or 3 layers In late seral stands the top 2 layers were dominated by Douglas-fir The lower layer was dominated by tanoak, chinquapin and Pacific madrone Large conifers dominated the top two layers with an average of 25 trees/acre > 25" d b h , 12 trees/acre > 30" d b h. and 6 trees/acre > 40" d b h Hardwoods dominated the lower layer and included 388 trees/acre > 5" d b h , 2 trees/acre > 11" d b.h.

The stand structure characteristics by layer were as follows: the top layer averaged 340 years old with an average diameter of 50" and average height of 160' The second layer had an average age of 244 years with a mean diameter of 27" and a mean height of 103' The third layer was dominated by tanoak, chinquapin and Pacific madrone, it had a mean diameter of 6" and a mean height of 40'. Large numbers of small hardwoods were found in the lower layers.

Overall biomass production (conifer + hardwoods + shrubs) was generally moderate. Modal Dunning site class was 2, with site index of 150 at 300 years Conifer productivity was generally moderate with an average volume of 5293 cu. ft , it ranged from 4925 to 5661 cu. ft., due to the variable cover of hardwoods Softwood basal area averaged 167 sq. ft. and ranged from 147 to 187 sq ft Hardwood volume averaged 892 cu. ft and ranged from 769 to 1010 cu ft Hardwood basal area averaged 66 sq. ft. and ranged from 53 to 80 sq. ft. Stand density index was 390 and fell in the lower group of the Tanoak Series

Fire Regime

This type had a high-severity fire regime with infrequent high-intensity stand-replacing fires during extended drought periods. Typical fires (in non-drought years) were slow moving, creeping ground fires, burning by opportunity (occasional logs and fuel accumulations), and scorching small pockets of the overstory.

Management Implications

Silvicultural Systems: Shelterwood, single tree selection and sanitation salvage are not recommended in late seral stands due to the high cover of hardwoods.

Site Preparation: Machine site preparation is applicable, moderate and high intensity broadcast burning may lead to high cover of snowbrush

Regeneration: Anticipate lower survival rates on sites with high soil coarse fragments or high cover of shrubs

Release: Early release with multiple treatments are recommended due to high density of hardwood stems and high cover of shrubs

Animal Damage Control Problems: None known.

Stockability: Regional stocking guidelines are applicable

Species Considerations: Sugar pine is an important component of this type and should be maintained in all management treatments.

Cultural and Commercial: The cultural species most frequently found were tanoak, Pacific madrone, chinquapin and beargrass The most frequently occurring commercial plant species were salal and evergreen huckleberry

Insects and Disease: Due to the potential for white pine blister rust, planting of rust resistant sugar pine should be considered

Fire Suppression: Line construction is labor intensive Fire suppression tactics using control strategies can be more detrimental than fire effects Opportunities exist to use modified suppression tactics (light hand on the land), confine and contain strategies Fires originating in this plant association will normally creep around and eventually come into contact with adjacent upslope fuels where it may become more intense

Prescribed Fire: Use fire to manage for cultural species and create openings for natural regeneration.

Closely Related Types

The LIDE2–CACH2/VAOV–GASH type may be replaced on moist sites (on soils formed from residuum) by the LIDE2–CACH2/GASH–RHMA and on higher elevation flattened ridgetops (also on soils formed from residuum) by the LIDE2–CACH2/RHMA/XETE type On higher elevation coastal sites it is replaced by the LIDE2–CACH2/GASH type

Notes

Plant Association: Tanoak–Chinquapin/Salal
EDP Code Name: LIDE2–CACH2/GASH
Eco-Code: HT0HGC11

Indicator species:

Salal (*Gaultheria shalon*–GASH) was found on mid elevation sites with high shrub cover, moderate AWC and thin A horizons.

Tanoak–Chinquapin/Salal

LIDE2–CACH2/GASH Association

Eco-Code HT0HGC11

This extensive type was found on cool, northerly slopes with primarily deep soils with high AWC. It is characterized by the presence of chinquapin and high cover of salal. The hardwood component varies with stand age.

Plant Association Summary

(Sample size: 25)		COVER	CON
Tree Overstory Layer			
PSME	Douglas-fir	49	100
CACH2	Chinquapin	19	100
LIDE2	Tanoak	34	96
ARME3	Pacific Madrone	8	72
Tree Understory Layer			
LIDE2	Tanoak	14	100
PSME	Douglas-fir	1	96
CACH2	Chinquapin	5	44
QUCH2	Canyon Live Oak	2	40
Shrubs			
GASH	Salal	51	100
BENE1	Dwarf Oregon-grape	10	84
ROGY	Wood Rose	1	36
Herbs & Grasses			
PTAQL	Bracken Fern	1	76
GOOB	Rattlesnake Plantain	1	56
CHUMO	Prince's Pine	2	48
POMU1	Swordfern	1	40
CHME2	Little Prince's Pine	1	40

Ranger Districts

Gasquet, Orleans, Ukonom

Environment

Distance to the Ocean: 11.5–30.5 miles

Elevation: 1840–3540'

Aspect: N.W., E

Slope: 0–75%

Slope Position: lower, middle, upper 1/3, flattened ridgetops

Surface Rock: 0–12%

Soils

Pit Depth: 23–40"+

AWC: 1.8–6.3"

Parent Material: sandstone, schist, phyllite

A Horizon—
- Coarse Frag: 10–90 %
- Textures: l, gl, vgl
- Thickness: 2–9"
- pH: 5.0–6.5

Physical and Biological Environment

Distribution/Setting

This type was found on coastal and inland sites where mean distance to the Pacific Ocean was 20.0 miles. Elevation averaged 2750' and slopes were typically steep, averaging 37%. Mean radiation index was .442.

Soils

Soils were predominately mesic, deep (79%) and moderately deep (17%) and well drained They formed in residuum and colluvium The litter layer thickness averaged 1.8" at 95% cover. Surface rock averaged 8% cover The average surface horizon thickness was 5", texture varied from loams to very gravelly loams, coarse fragment content averaged 36% and pH averaged 5.8 (moderately acid).

Subsoil textures were varied, mainly being gravelly to extremely gravelly and including loams, sandy loams, silt loams and clay loams Subsoil coarse fragment content averaged 37% and ranged from 8% to 55%. Subsurface pH averaged 6 0 (slightly acid) and ranged from 5.5 (strongly acid) to 6.5 (slightly acid) The soils were 50% non-skeletal and 50% skeletal Total soil AWC averaged 3.7" and ranged from 1.8" to 6.3". These soils were classified into the subgroups Dystric Xerochrepts and Typic Haploxerults.

Vegetation

The total vegetation cover was high ranging from 90% to 99% with an average of 97% Mean overstory tree cover was 88%. Overstory tree cover was split between conifers that averaged 52% cover and ranged from 25% to 75% and hardwoods that averaged 59% and ranged from 25% to 90% cover The regeneration layer averaged 20% cover Shrub cover was high with an average of 60% Forb cover was low with an average of 4% Grass cover was spotty with < 1% average cover

Stand Structure

Late seral stands often had 5 or more layers of trees, while early mature and mid-mature stands usually had 2 or 3 layers In late seral stands the top 3 layers were dominated by Douglas-fir, with occasional large hardwoods in the third layer. The lower 2 layers were dominated by tanoak, chinquapin and Pacific madrone Large conifers dominated the top three layers with an average of 35 trees/acre > 25" d b h , 25 trees/acre > 30" d b h and 17 trees/acre > 40" d.b.h. Hardwoods dominated the lower layers and included 183 trees/acre > 5" d b h , 24 trees/acre > 11" d b h and 6 trees/acre > 18" d.b.h.

The stand structure characteristics by layer were as follows the top layer averaged 269 years old with an average diameter of 46" and average height of 167' The second layer had an average age of 224 years with a mean diameter of 45" and a mean height of 139' The third layer had an average age of 131 years old, with a mean diameter of 35" and mean height of 101'. The fourth layer was dominated by tanoak, chinquapin and Pacific madrone, it had a mean diameter of 14" and a mean height of 73' The fifth layer was dominated by tanoak, it averaged 9" in diameter and 51' in height Large numbers of small hardwoods were often found in the lower layers.

Overall biomass production (conifer + hardwoods + shrubs) was generally high Modal Dunning site class was 1A or 1, with site index of 175 or 200 at 300 years. Conifer productivity was generally high with an average volume of 10,654 cu. ft., it ranged from 6504 to 15,615 cu ft , due to the variable cover of hardwoods.

Softwood basal area averaged 267 sq. ft. and ranged from 160 to 387 sq ft. Hardwood volume averaged 1142 cu. ft. and ranged from 464 to 1877 cu ft Hardwood basal area averaged 74 sq ft. and ranged from 27 to 75 sq ft Stand density index was 503 and fell in the upper group of the Tanoak Series

Fire Regime

This type had a high-severity fire regime with infrequent high-intensity stand-replacing fires during extended drought periods Typical fires (in non-drought years) were slow moving, creeping ground fires, burning by opportunity (occasional logs and fuel accumulations), and scorching small pockets of the overstory.

Management Implications

Productivity and competition can be high in this type

Silvicultural Systems: All silvicultural systems are applicable on higher sites. On low sites shelterwood, single tree selection and sanitation salvage are not recommended in late seral stands due to the high cover of hardwoods.

Site Preparation: Moderate or high intensity broadcast burning normally leads to removal of the O horizon and on slopes > 25% may lead to significant soil loss from sheet erosion It may also lead to significant competition from snowbrush. Tractor operations may result in soil compaction. High surface disturbance can lead to high cover of manzanita

Regeneration: Anticipate lower survival rates on sites with high soil coarse fragments or high cover of salal

Release: Early release with multiple treatments are recommended due to high density of hardwood stems and high cover of salal.

Animal Damage Control Problems: None known

Stockability: Anticipate stocking levels below regional stocking guidelines on sites with high soil coarse fragments

Species Considerations: Sugar pine is an important component of this type and should be maintained in all management treatments

Cultural and Commercial: The cultural species most frequently found were Pacific madrone, chinquapin, dwarf Oregon-grape and prince's pine California hazelnut and beargrass were found infrequently. The most frequently occurring commercial plant species was salal (also a cultural species)

Insects and Disease: Due to the potential for white pine blister rust, planting of rust resistant sugar pine should be considered

Fire Suppression: Line construction is labor intensive Fire suppression tactics using control strategies can be more detrimental than fire effects Opportunities exist to use modified suppression tactics (light hand on the land), confine and contain strategies. Fires originating in this plant association will normally creep around and eventually come into contact with adjacent upslope fuels where it may become more intense

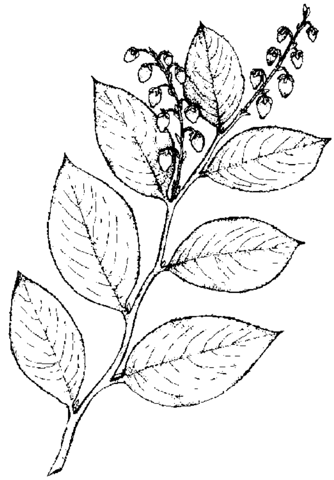
Prescribed Fire: Use fire to manage for cultural species and create openings to stimulate natural regeneration

Closely Related Types

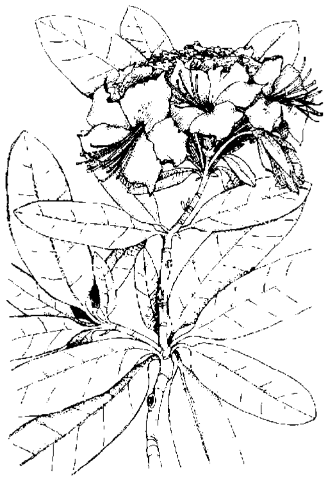
The LIDE2–CACH2/GASH type may be replaced on moist sites by the LIDE2–CACH2/GASH–RHMA and on higher elevation flattened ridgetops by the LIDE2–CACH2/RHMA/XETE type On lower elevation coastal sites it is replaced by the LIDE2–CACH2/VAOV–GASH type

Notes

Plant Association: Tanoak–Chinquapin/Salal–Pacific Rhododendron
EDP Code Name: LIDE2–CACH2/GASH–RHMA
Eco-Code: HT0HGC12



Indicator species:
Salal (*Gaultheria shalon*–GASH) was found on mid elevation sites with high shrub cover, moderate AWC and thin A horizons.



Indicator species:
Pacific rhododendron (*Rhododendron macrophyllum*–RHMA) was found on mid elevation, cool, moist sites, with high subsurface coarse fragments, close to the Pacific Ocean.

Tanoak–Chinquapin/Salal–Pacific Rhododendron

LIDE2–CACH2/GASH–RHMA Association
Eco-Code HT0HGC12

This mid-elevation type was found on moist, very steep, cool, north facing slopes with deep to moderately deep soils with high AWC. It is characterized by a very high shrub cover dominated by Pacific rhododendron and salal.

Plant Association Summary

(Sample size: 22)

		COVER	CON
Tree Overstory Layer			
PSME	Douglas-fir	50	100
LIDE2	Tanoak	27	100
CACH2	Chinquapin	21	100
ARME3	Pacific Madrone	8	45
Tree Understory Layer			
LIDE2	Tanoak	16	90
PSME	Douglas-fir	2	59
CACH2	Chinquapin	5	54
Shrubs			
GASH	Salal	65	100
RHMA	Pacific Rhododendron	32	100
BENE1	Dwarf Oregon-grape	6	95
Herbs & Grasses			
PTAQL	Bracken Fern	1	63
XETE	Beargrass	1	59
POMU1	Swordfern	2	54

Ranger Districts

Gasquet, Orleans

Environment

Distance to the Ocean: 9.5–27.5 miles

Elevation: 2460–3280'

Aspect: N.W., N.E

Slope: 35–70%

Slope Position: middle, upper 1/3

Surface Rock: 0–6%

Soils

Pit Depth: 28–40"+

AWC: 2.1–4.8"

Parent Material: phyllite, greenstone

A Horizon—

Coarse Frag: 10–75 %

Textures: gl, xgl, vgl

Thickness: 2–9"

pH: 5.3–6.0

Physical and Biological Environment

Distribution/Setting

This type was found on moist coastal and inland sites where mean distance to the Pacific Ocean was 20 2 miles Elevation averaged 2798' and slopes were typically very steep, averaging 46% Mean radiation index was a cool .350 as a result of north facing aspects

Soils

Soils were predominately mesic, deep (45%) and moderately deep (50%) and well drained. They formed primarily in residuum and sometimes colluvium The litter layer thickness averaged 1.6" at 85% cover. Surface rock averaged 3% cover. The average surface horizon thickness was 6", texture varied from gravelly to extremely gravelly loams, coarse fragment content averaged 39% and pH averaged 5 6 (moderately acid).

Subsoil textures were predominately gravelly to extremely gravelly loams and cobbly loams. Subsoil coarse fragment content averaged 38% and ranged from 19% to 70%. Subsurface pH averaged 6 0 (moderately acid) and ranged from 5 4 (strongly acid) to 6 5 (slightly acid). The soils were 50% non-skeletal and 50% skeletal. Total soil AWC averaged 3 4" and ranged from 2.1" to 4.8". These soils were classified into the subgroup Dystric Xerochrepts.

Vegetation

The total vegetation cover was very high ranging from 98% to 99% with an average of 99%. Mean overstory tree cover was 83%. Overstory tree cover was split between conifers that averaged 50% cover and ranged from 25% to 70% and hardwoods that averaged 52% and ranged from 22% to 77% cover The regeneration layer averaged 20% cover. Shrub cover was very high with an average cover of 89% and was a key characteristic of this type Forb cover was very low as a result of the dense shrub layer. Grass cover was spotty with < 1% average cover.

Stand Structure

Late seral stands often had 5 or more layers of trees, while early mature and mid-mature stands usually had 2 or 3 layers. In late seral stands the top 3 layers were dominated by Douglas-fir The lower 2 layers were dominated by tanoak, chinquapin and Pacific madrone Large conifers dominated the top three layers with an average of 29 trees/acre > 24" d b h , 25 trees/acre > 30" d.b.h. and 16 trees/acre > 40" d b h Hardwoods dominated the lower layers and included 262 trees/acre > 5" d.b.h., 26 trees/acre > 11" d.b.h. and 2 trees/acre > 18" d b h

The stand structure characteristics by layer were as follows the top layer averaged 299 years old with an average diameter of 47" and average height of 173' The second layer had an average age of 312 years with a mean diameter of 43" and a mean height of 145'. The third layer had an average age of 165 years old, with a mean diameter of 22" and mean height of 101'. The fourth layer was dominated by tanoak, chinquapin and Pacific madrone, it had a mean diameter of 14" and a mean height of 73' The fifth layer was dominated by tanoak, it averaged 9" in diameter and 51' in height Large numbers of small hardwoods were often found in the lower layers.

Overall biomass production (conifer + hardwoods + shrubs) was generally high Modal Dunning site class was 1, with site index of 175 at 300 years. Conifer productivity was generally high with an average volume of 10,624 cu. ft., it ranged from 5322 to 17,826 cu. ft., due to the variable cover of hardwoods. Softwood basal area averaged 259 sq. ft. and ranged from 147 to 400 sq. ft. Hardwood volume averaged 886 cu ft and ranged from 309 to 1335 cu ft Hardwood basal area averaged 68 sq ft and ranged from 27 to 107 sq ft. Stand density index was 517 and fell in the upper group of the Tanoak Series.

Fire Regime

This type had a high-severity fire regime with infrequent high-intensity stand-replacing fires during extended drought periods Typical fires (in non-drought years) were slow moving, creeping ground fires, burning by opportunity (occasional logs and fuel accumulations), and scorching small pockets of the overstory.

Management Implications

Productivity can be high here, while competition from Pacific rhododendron and salal can be severe

Silvicultural Systems: Shelterwood, single tree selection and sanitation salvage are not recommended in late seral stands due to the high cover of hardwoods

Site Preparation: Moderate or high intensity broadcast burning normally leads to removal of the O horizon and on slopes > 25% may lead to significant soil loss from sheet erosion It may also lead to significant competition from snowbrush. Site preparation is more difficult here due to Pacific rhododendron Cutting of Pacific rhododendron is recommended to reduce competition.

Regeneration: Anticipate lower survival rates on sites with high cover of Pacific rhododendron or salal

Release: Early release with multiple treatments are recommended due to the high density of hardwood stems and high cover of shrubs

Animal Damage Control Problems: None known

Stockability: Anticipate stocking levels below regional stocking guidelines on sites with high shrub competition.

Species Considerations: Sugar pine is an important component of this type and should be maintained in all management treatments

Cultural and Commercial: The cultural species most frequently found were tanoak, beargrass and chinquapin The commercial plant species, incense cedar was found intermittently.

Insects and Disease: Due to the potential for white pine blister rust planting of rust resistant sugar pine should be considered

Fire Suppression: Line construction is labor intensive Fire suppression tactics using control strategies can be more detrimental than fire effects. Opportunities exist to use modified suppression tactics (light hand on the land), confine and contain strategies Fires originating in this plant association will normally creep around and eventually come into contact with adjacent upslope fuels where it may become more intense

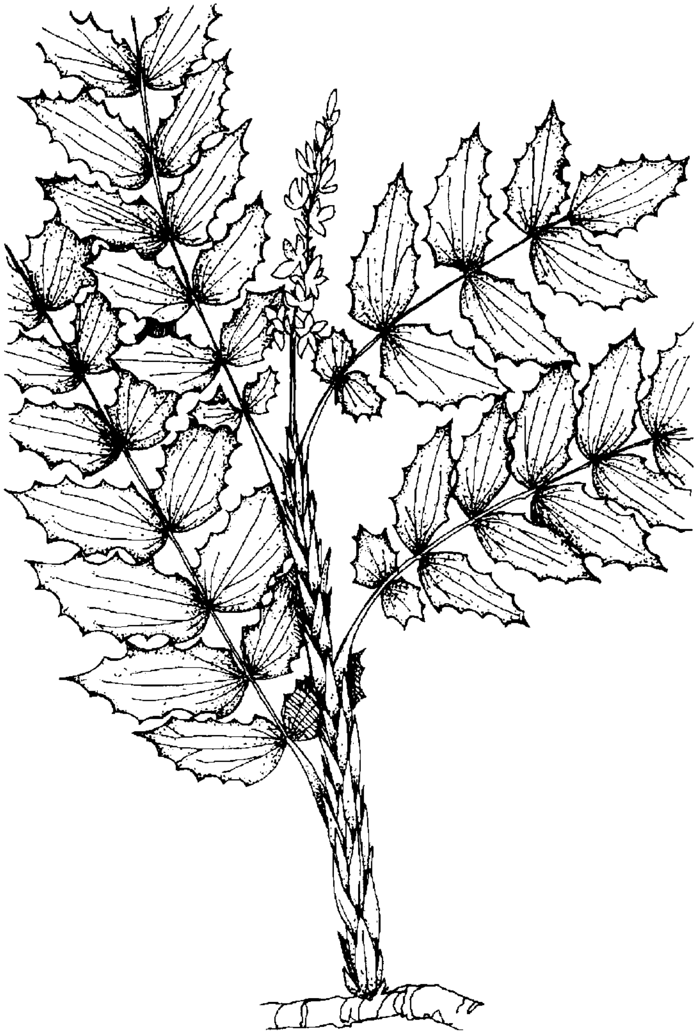
Prescribed Fire: Use fire to manage for cultural species and create openings to stimulate natural regeneration

Closely Related Types

The LIDE2–CACH2/GASH–RHMA type may be replaced on drier sites by the LIDE2–CACH2/GASH and on higher elevation flattened ridgetops by the LIDE2–CACH2/RHMA/XETE type On lower elevation coastal sites it is replaced by the LIDE2–CACH2/VAOV–GASH type

Notes

Plant Association: Tanoak–Chinquapin/Dwarf Oregon-grape
EDP Code Name: LIDE2–CACH2/BENE1
Eco-Code: HT0HGC15



Indicator species:

Dwarf Oregon-grape (*Berberis nervosa*–BENE1) was found on cool, steep, high elevation sites, with high softwood basal area, moderate shrub cover and low grass cover

Tanoak–Chinquapin/Dwarf Oregon-grape

LIDE2–CACH2/BENE1 Association

Eco-Code HT0HGC15

This inland type was found on very steep, cool, north facing slopes with primarily deep soils that had high AWC. It is characterized by the presence of chinquapin and dwarf Oregon-grape.

Plant Association Summary

(Sample size: 36)

		COVER	CON
Tree Overstory Layer			
PSME	Douglas-fir	42	100
LIDE2	Tanoak	37	100
CACH2	Chinquapin	10	100
ARME3	Pacific Madrone	9	55
Tree Understory Layer			
LIDE2	Tanoak	25	100
PSME	Douglas-fir	2	66
CACH2	Chinquapin	8	44
Shrubs			
BENE1	Dwarf Oregon-grape	9	100
ROS	Rose spp.	1	44
SYMO	Creeping Snowberry	1	36
Herbs & Grasses			
ACTR	Vanilla Leaf	4	61
PTAQL	Bracken Fern	1	58
CHME2	Little Prince's Pine	2	52
DIHO2	Hooker's Fairybell	1	52

Ranger Districts

Orleans, Lower Trinity, Ukonom, Happy Camp

Environment

Distance to the Ocean: 18.5–37.5 miles

Elevation: 1820–3770'

Aspect: N.W., N.E., S.E

Slope: 18–85%

Slope Position: middle, upper 1/3

Surface Rock: 0–20%

Soils

Pit Depth: 30–40"+

AWC: 2.2–6.6

Parent Material: phyllite, granite, sandstone, schist, mafic

A Horizon—

Coarse Frag: 10–50 %

Textures: l, gl, gsl, cosl, cl

Thickness: 2–16"

pH: 5.5–7.0

Physical and Biological Environment

Distribution/Setting

This type was found on inland sites where mean distance to the Pacific Ocean was 30.8 miles. Elevation averaged 2845' and slopes were typically very steep, averaging 46%. Mean radiation index was a cool .404 as a result of north facing aspects

Soils

Soils were predominately mesic, deep (71%) and moderately deep (23%) and well drained. They formed primarily in residuum and sometimes colluvium The litter layer thickness averaged 1 0" at 85% cover. Surface rock averaged 8% cover The average surface horizon thickness was 8", texture varied from loam to very gravelly loam and sandy loam to gravelly sandy loam, coarse fragment content averaged 26% and pH averaged 6 1 (slightly acid).

Subsoil textures were predominately loams to very gravelly loams, clay loams to gravelly clay loams and included some stony loams and cobbly loams Subsoil coarse fragment content averaged 30% and ranged from 5% to 57% Subsurface pH averaged 6.2 (slightly acid) and ranged from 5.4 (strongly acid) to 7 0 (neutral) The soils were 69% non-skeletal and 31% skeletal. Total soil AWC averaged 4.1" and ranged from 2.2" to 6.6". These soils were classified into the subgroups Dystric Xerochrepts, Typic Haploxerults and Ultic Haploxeralfs

Vegetation

The total vegetation cover was high ranging from 90% to 99% with an average of 93% Mean overstory tree cover was 87% Overstory tree cover was split between conifers that averaged 42% cover and ranged from 25% to 75% and hardwoods that averaged 58% and ranged from 16% to 95% cover. The regeneration layer averaged 33% cover Shrub cover was moderate with an average of 16% Forb cover was high with an average of 13% cover. Grass cover was spotty with < 1% average cover

Stand Structure

Late seral stands often had 5 or more layers of trees, while early mature and mid-mature stands usually had 2 or 3 layers. In late seral stands the top 3 layers were dominated by Douglas-fir, with occasional large hardwoods in the third layer The lower 2 layers were dominated by tanoak, chinquapin and Pacific madrone. Large conifers dominated the top three layers with an average of 22 trees/acre > 25" d.b.h., 16 trees/acre > 30" d b h and 10 trees/acre > 40" d b h. Hardwoods dominated the lower layers and included 209 trees/acre > 5" d.b h , 25 trees/acre > 11" d.b.h. and 7 trees/acre > 18" d b h.

The stand structure characteristics by layer were as follows. the top layer averaged 315 years old with an average diameter of 46" and average height of 174' The second layer had an average age of 228 years with a mean diameter of 34" and a mean height of 140' The third layer had an average age of 131 years old, with a mean diameter of 29" and mean height of 106'. The fourth layer was dominated by tanoak, chinquapin and Pacific madrone, it had a mean diameter of 14" and a mean height of 73' The fifth layer was dominated by tanoak, it averaged 9" in diameter and 51' in height. Large numbers of small hardwoods were often found in the lower layer

Overall biomass production (conifer + hardwoods + shrubs) was generally moderate Modal Dunning site class was 1, with site index of 175 at 300 years. Conifer productivity was generally moderate with an average volume of 7644 cu ft , it ranged from 3134 to 11,547 cu ft , due to the variable cover of hardwoods Softwood basal area averaged 190 sq ft and ranged from 80 to 307 sq ft Hardwood volume averaged 1452 cu ft and ranged from 340 to 3414 cu ft Hardwood basal area averaged 87 sq. ft. and ranged from 27 to 160 sq. ft. Stand density index was 432 and fell in the middle group of the Tanoak Series.

Fire Regime

This type experienced a moderate-severity fire regime with infrequent fire occurrence of partial stand replacement and frequent fires of low intensity with minimal overstory mortality

Management Implications

This type is occasionally found in upper third, southeast facing slope positions with shallow soils and low available water holding capacity These conditions limit management options

Silvicultural Systems: Shelterwood, single tree selection and sanitation salvage are not recommended in late seral stands due to the high cover of hardwoods

Site Preparation: Broadcast burning is recommended in this type

Regeneration: None

Release: Early release with multiple treatments are recommended due to high density of hardwood stems.

Animal Damage Control Problems: None known.

Stockability: Regional stocking guidelines are applicable

Species Considerations: Black oak and sugar pine are important components of this type and should be maintained in all management treatments

Cultural and Commercial: The cultural species most frequently found were tanoak, Pacific madrone, chinquapin, dwarf Oregon-grape and prince's pine California hazelnut and beargrass, two cultural species, were found infrequently here. The commercial plant species, red huckleberry (also a cultural species) was found infrequently.

Insects and Disease: Due to the potential for white pine blister rust, planting of rust resistant sugar pine should be considered.

Fire Suppression: Line construction difficulty is dependent on the amount of brush cover Opportunities to use modified suppression strategies (Confine and Contain) exist during the early portion of the fire season During drier periods, from August onwards, control strategies are recommended due to the inherent dry fuel moisture in this type

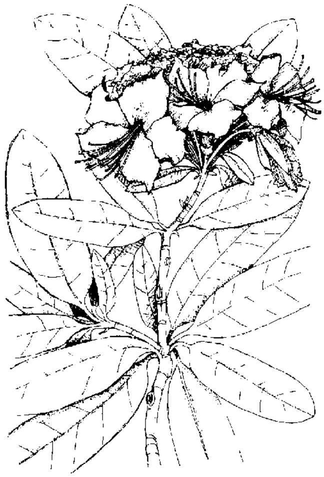
Prescribed Fire: Use prescribed fire to manage for cultural species and reduce fuel accumulations during favorable conditions

Closely Related Types

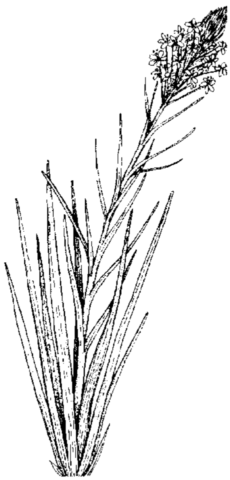
The LIDE2–CACH2/BENE1 type may be replaced on moist sites by the LIDE2–CACH2/GASH or LIDE2–CACH2/GASH–RHMA and on higher elevation flattened ridgetops by the LIDE2–CACH2/RHMA/XETE type.

Notes

Plant Association: Tanoak–Chinquapin/Pacific Rhododendron/Beargrass
EDP Code Name: LIDE2–CACH2/RHMA/XETE
Eco-Code: HT0HGC13



Indicator species:
Pacific rhododendron (*Rhododendron macrophyllum*–RHMA) was found on mid elevation, cool, moist sites, with high subsurface coarse fragments, close to the Pacific Ocean.



Indicator species:
Beargrass (*Xerophyllum tenax*–XETE) was found on high elevation, cool, coastal sites, with moderate slopes, high shrub cover and moderate tree cover.

Tanoak–Chinquapin/Pacific Rhododendron/ Beargrass

LIDE2–CACH2/RHMA/XETE Association

Eco-Code HT0HGC13

This inland, high elevation type was found on flattened ridgetops with primarily deep soils that had high AWC. It is characterized by the presence of chinquapin and moderate cover of Pacific rhododendron and beargrass.

Plant Association Summary

(Sample size: 12)		COVER	CON
Tree Overstory Layer			
PSME	Douglas-fir	42	100
CACH2	Chinquapin	23	100
LIDE2	Tanoak	11	100
PILA	Sugar Pine	18	50
ARME3	Pacific Madrone	6	50
Tree Understory Layer			
LIDE2	Tanoak	7	91
CACH2	Chinquapin	5	83
PSME	Douglas-fir	3	83
Shrubs			
RHMA	Pacific Rhododendron	23	100
VAPA	Red Huckleberry	5	83
Herbs & Grasses			
XETE	Beargrass	15	100
PTAQL	Bracken Fern	2	91
CHUMO	Prince's Pine	2	66
LIBOL	Twinflower	3	50

Ranger Districts

Orleans, Ukonom

Environment

Distance to the Ocean: 18.5–37.5 miles

Elevation: 2420–3700'

Aspect: N.W.,E

Slope: 5–60%

Slope Position: lower, middle, upper 1/3, flattened ridgetops

Surface Rock: 0–11%

Soils

Pit Depth: 21–40"+

AWC: 1.6–5.5"

Parent Material: phyllite, sandstone, schist

A Horizon—

Coarse Frag: 17–55 %

Textures: gl, xgl, vgl

Thickness: 4–10"

pH: 5.0–6.5

Physical and Biological Environment

Distribution/Setting

This type was found on inland sites on flattened ridgetops where mean distance to the Pacific Ocean was 25.8 miles. Elevation averaged 3214' and slopes were typically moderately steep, averaging 33%. Mean radiation index was .426.

Soils

Soils were predominately mesic, deep (67%) and moderately deep (25%) and well drained. They formed primarily in residuum and infrequently in colluvium The litter layer thickness averaged 1.4" at 95% cover Surface rock averaged 7% cover The average surface horizon thickness was 6", texture varied from gravelly to extremely gravelly loams, coarse fragment content averaged 35% and pH averaged 5 6 (moderately acid).

Subsoil textures were predominately gravelly to very gravelly loams, very stony loams, or gravelly to very gravelly clay loams Subsoil coarse fragment content averaged 37% and ranged from 20% to 60%. Subsurface pH averaged 6.1 (slightly acid) and ranged from 5 2 (strongly acid) to 6.5 (slightly acid) The soils were 58% non-skeletal and 42% skeletal Total soil AWC averaged 3.6" and ranged from 1.6" to 5.5". These soils were classified into the subgroups Dystric Xerochrepts and Ultic Haploxeralfs

Vegetation

The total vegetation cover was high ranging from 90% to 99% with an average of 96%. Mean overstory tree cover was 84%. Overstory tree cover was split between conifers that averaged 51% cover and ranged from 30% to 85% and hardwoods that averaged 33% and ranged from 17% to 40% cover The regeneration layer averaged 15% cover. Shrub cover was moderate with an average of 29% Forb cover was moderate with an average of 12%. Grass cover was spotty with < 1% average cover

Stand Structure

Late seral stands often had 3 or more layers of trees, while early mature and mid-mature stands usually had 1 or 2 layers In late seral stands the top 2 layers were dominated by Douglas-fir The lower layer was dominated by tanoak, chinquapin and Pacific madrone. Large conifers dominated the top two layers with an average of 22 trees/acre > 25" d b h , 15 trees/acre > 30" d b h and 9 trees/acre > 40" d.b.h. Hardwoods dominated the lower layer and included 101 trees/acre > 5" d b h and 9 trees/acre > 11" d.b h

The stand structure characteristics by layer were as follows the top layer averaged 330 years old with an average diameter of 43" and a height of 141' The second layer had an average age of 190 years with a diameter of 28" and a height of 117'. The third layer was dominated by tanoak, chinquapin and Pacific madrone, it had a mean diameter of 9" and a mean height of 51'.

Overall biomass production (conifer + hardwoods + shrubs) was generally moderate Modal Dunning site class was 2, with site index of 150 at 300 years Conifer productivity was generally moderate with an average volume of 7508 cu. ft , it ranged from 5007 to 9579 cu ft , due to the variable cover of hardwoods. Softwood basal area averaged 203 sq ft and ranged from 100 to 240 sq ft Hardwood volume averaged 654 cu. ft. and ranged from 155 to 1267 cu. ft. Hardwood basal area averaged 42 sq. ft. and ranged from 13 to 70 sq. ft Stand density index was a low 370 and was among the lowest in the Tanoak Series

Fire Regime

This type had a high-severity fire regime with infrequent high-intensity stand-replacing fires during extended drought periods Typical fires (in non-drought years) were slow moving, creeping ground fires, burning by opportunity (occasional logs and fuel accumulations), and scorching small pockets of the overstory.

Management Implications

An inverse relationship exists here between beargrass and Pacific rhododendron When Pacific rhododendron cover is low beargrass cover is high

Silvicultural Systems: Shelterwood, single tree selection and sanitation salvage are not recommended in late seral stands due to the high cover of hardwoods

Site Preparation: Moderate or high intensity broadcast burns can lead to significant competition from snowbrush Tractor operations may result in soil compaction

Regeneration: High cover of beargrass may result in reduced survival of conifers

Release: Early release with multiple treatments are recommended due to high density of hardwood stems and high cover of Pacific rhododendron. Manual treatment of beargrass may be difficult

Animal Damage Control Problems: None known

Stockability: Regional stocking guidelines are applicable.

Species Considerations: Sugar pine is an important component of this type and should be maintained in all management treatments Beargrass should also be maintained for both American Indian and commercial use

Cultural and Commercial: The cultural species most frequently found were tanoak, Pacific madrone, beargrass and sugar pine The most frequently occurring commercial plant species was red huckleberry (also a cultural species)

Insects and Disease: Due to the potential for white pine blister rust, planting of rust resistant sugar pine should be considered.

Fire Suppression: Line construction is labor intensive Fire suppression tactics using control strategies can be more detrimental than fire effects. Opportunities exist to use modified suppression tactics (light hand on the land), confine and contain strategies. Fires originating in this plant association will normally creep around and eventually come into contact with adjacent upslope fuels where it may become more intense

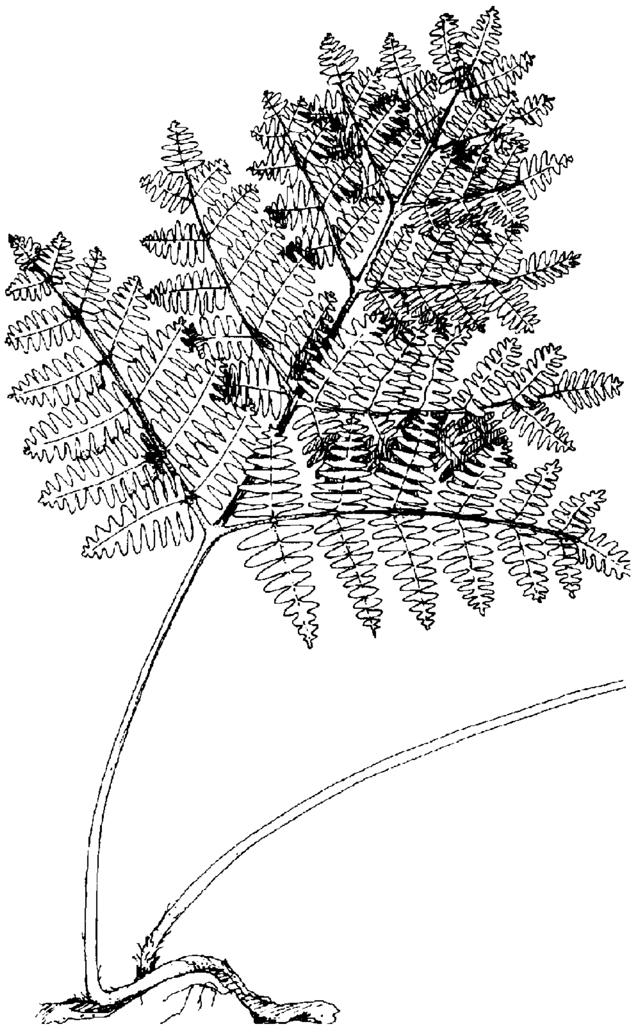
Prescribed Fire: Use fire to manage for cultural species (i e , beargrass) and create openings to stimulate natural regeneration

Closely Related Types

The LIDE2–CACH2/RHMA/XETE type may be replaced on moist sites by the LIDE2–CACH2/GASH–RHMA and on drier upland disturbed sites by the LIDE2–CACH2/PTAQL type On lower elevation, mesic, colluvial sites it is replaced by the LIDE2–CACH2/BENE1 type

Notes

Plant Association: Tanoak–Chinquapin/Bracken Fern
EDP Code Name: LIDE2–CACH2/PTAQL
Eco-Code: HT0HGC14



Indicator species:

Bracken fern (*Pteridium aquilinum* var. *lanuginosum*–PTAQL) was found on warm, disturbed sites, with high AWC and low grass cover.

Tanoak–Chinquapin/Bracken Fern

LIDE2–CACH2/PTAQL Association
Eco-Code HT0HGC14

This inland type was found on exposed mountain ridgetops with primarily deep soils. It is characterized by the presence of bracken fern, a disturbance indicator.

Plant Association Summary

(Sample size: 11)		COVER	CON
Tree Overstory Layer			
PSME	Douglas-fir	32	100
CACH2	Chinquapin	29	100
LIDE2	Tanoak	23	100
ARME3	Pacific Madrone	10	90
Tree Understory Layer			
LIDE2	Tanoak	11	100
PSME	Douglas-fir	4	100
CACH2	Chinquapin	6	63
Shrubs			
RUUR	Pacific Blackberry	1	54
VAPA	Red Huckleberry	13	27
ROGY	Rose spp.	1	27
Herbs & Grasses			
PTAQL	Bracken Fern	1	100
CHUMO	Prince's Pine	4	81
XETE	Beargrass	2	72
CHME2	Little Prince's Pine	1	63

Ranger Districts
Orleans, Ukonom

Environment
Distance to the Ocean: 17.5–30.5 miles

Elevation: 3160–3880'

Aspect: W.,S.E

Slope: 25–60%

Slope Position: upper 1/3, ridgetop

Surface Rock: 0–12%

Soils
Pit Depth: 22–40"+

AWC: 1.7–3.0"

Parent Material: sandstone, schist

A Horizon—
Coarse Frag: 15–42 %
Textures: gl, xgl, vgl
Thickness: 1–6"
pH: 5.4–6.5"

Physical and Biological Environment

Distribution/Setting

This type was found on inland sites on exposed, flattened ridgetops where mean distance to the Pacific Ocean was 22.5 miles. Elevation averaged 3366' and slopes were typically steep, averaging 39%. Mean radiation index was a warm 520 as a result of southeast and west aspects.

Soils

Soils were predominately mesic, deep (78%) and moderately deep (22%) and well drained They formed in residuum The litter layer thickness averaged 1.1" at 85% cover. Surface rock averaged 7% cover The average surface horizon thickness was 6", texture varied from gravelly to extremely gravelly loams, coarse fragment content averaged 39% and pH averaged 5.8 (moderately acid).

Subsoil textures were predominately very gravelly to extremely gravelly loams, extremely stony loams and gravelly to very gravelly clay loams. Subsoil coarse fragment content averaged 56% and ranged from 20% to 95%. Subsurface pH averaged 5.9 (moderately acid) and ranged from 5 4 (strongly acid) to 6.7 (neutral) The soils were 44% non-skeletal and 56% skeletal. Total soil AWC averaged 2.5" and ranged from 1.7" to 3.0". These soils were classified into the subgroup Dystric Xerochrepts

Vegetation

The total vegetation cover was high ranging from 90% to 99% with an average of 92% Mean overstory tree cover was 95% Overstory tree cover was split between conifers that averaged 38% cover and ranged from 7% to 70% and hardwoods that averaged 76% and ranged from 65% to 84% cover The regeneration layer averaged 20% cover Shrub cover was very low with an average 4% Forb cover was also low with an average of 6%. Grass cover was spotty with < 1% average cover

Stand Structure

Late seral stands often had 5 or more layers of trees, while early mature and mid-mature stands usually had 2 or 3 layers In late seral stands the top 2 layers were dominated by Douglas-fir The lower 3 layers were dominated by tanoak, chinquapin and Pacific madrone Large conifers dominated the top two layers with an average of 19 trees/acre > 25" d.b.h., 15 trees/acre > 30" d.b h and 8 trees/acre > 40" d b h Hardwoods dominated the lower layers and included 130 trees/acre > 5" d.b.h , 20 trees/acre > 11" d b h and 3 trees/acre > 18" d.b.h

The stand structure characteristics by layer were as follows: the top layer averaged 276 years old with an average diameter of 43" and average height of 157'. The second layer had an average age of 294 years with a mean diameter of 44" and a mean height of 133' The third layer was dominated by chinquapin it had a mean diameter of 21" and mean height of 91' The fourth layer was dominated by tanoak, chinquapin and Pacific madrone, it had a mean diameter of 14" and a mean height of 73'. The fifth layer was dominated by tanoak, it averaged 9" in diameter and 51' in height.

Overall biomass production (conifer + hardwoods + shrubs) was generally moderate. Modal Dunning site class was 1, with site index of 175 at 300 years. Conifer productivity was generally moderate with an average volume of 6534 cu ft , it ranged from 6134 to 7027 cu. ft., due to the variable cover of hardwoods. Softwood basal area averaged 170 sq ft and ranged from 93 to 267 sq. ft. Hardwood volume averaged 1198 cu ft and ranged from 155 to 2243 cu. ft.

Hardwood basal area averaged 72 sq ft and ranged from 27 to 120 sq ft Stand density index was 440 and fell in the middle group of the Tanoak Series

Fire Regime

This type experiences a combination of low-severity and moderate-severity fire regimes with infrequent fire occurrence of partial stand replacement and frequent fires of low intensity with minimal overstory mortality.

Management Implications

This type is often found in ridgetop positions with shallow soils and low available water holding capacity These conditions limit management options.

Silvicultural Systems: Shelterwood, single tree selection and sanitation salvage are not recommended in late seral stands due to the high cover of hardwoods

Site Preparation: Moderate or high intensity broadcast burning normally leads to removal of the O horizon and on slopes > 25% may lead to significant soil loss from sheet erosion It may also lead to significant competition from snowbrush Tractor operations may result in soil compaction High surface disturbance can lead to high cover of manzanita

Regeneration: Bracken fern can be a significant competitor on some sites.

Release: Early release with multiple treatments are recommended due to high density of hardwood stems. Bracken fern can be a problem in early seral stands

Animal Damage Control Problems: None known.

Stockability: Regional stocking guidelines are applicable

Species Considerations: Sugar pine is an important component and should be maintained in all management treatments

Cultural and Commercial: The cultural species most frequently found were tanoak, Pacific madrone, chinquapin, prince's pine, beargrass and Pacific blackberry California hazelnut, another cultural species was found intermittently. The commercial plant species, red huckleberry was found infrequently here

Insects and Disease: Due to the potential for white pine blister rust planting of rust resistant sugar pine should be considered

Fire Suppression: Line construction difficulty is dependent on the amount of brush cover Opportunities to use modified suppression strategies (Confine and Contain) exist during the early portion of the fire season During drier periods, from August onwards, control strategies are recommended due to the inherent dry fuel moisture in this type

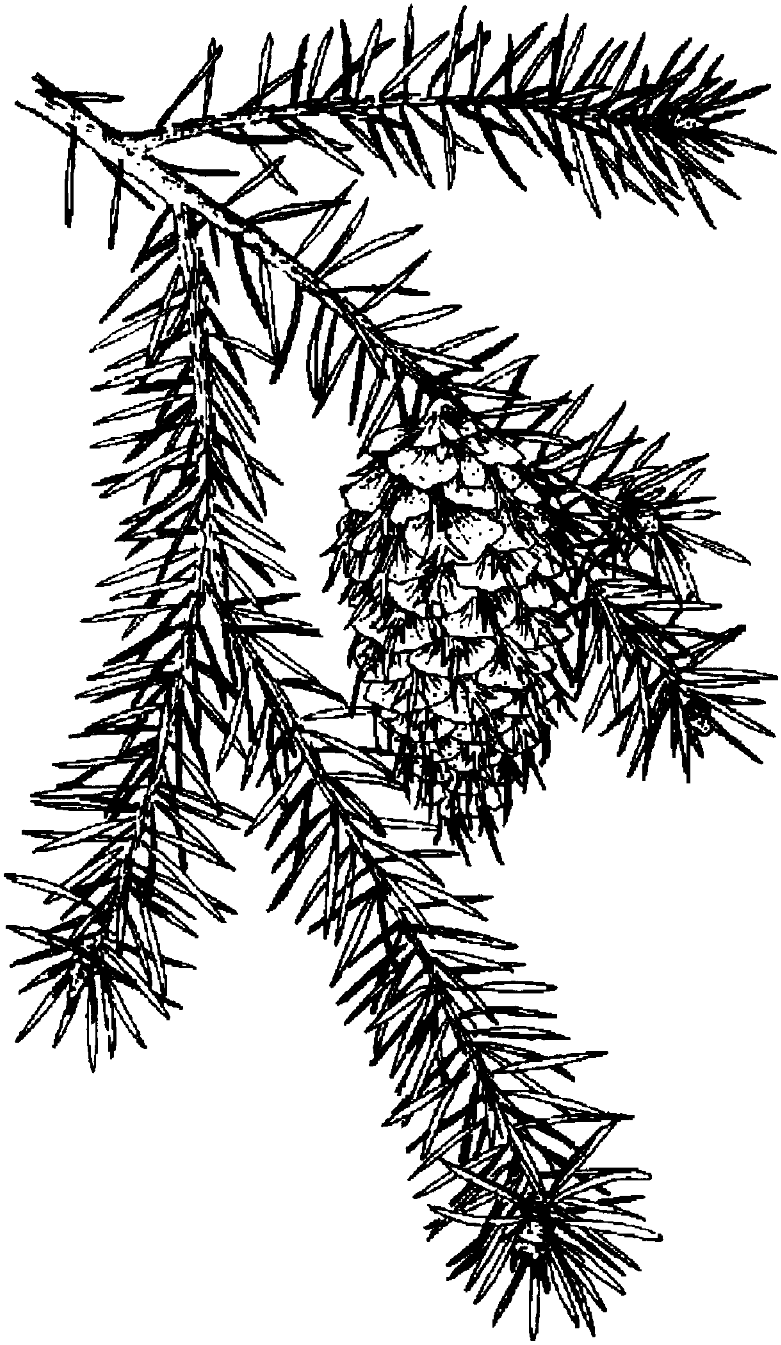
Prescribed Fire: Use prescribed fire to manage for cultural species and reduce fuel accumulations during favorable conditions

Closely Related Types

The LIDE2–CACH2/PTAQL type may be replaced on moist, colluvial sites by the LIDE2–CACH2/GASH or LIDE2–CACH2/GASH-RHMA and on higher elevation flattened ridgetops by the LIDE2–CACH2/RHMA/XETE type.

Notes

Douglas-fir Series



Douglas-fir Series

Douglas-fir Subseries Descriptions

The plant associations in the Douglas-fir Series were described using 487 ecology plots These plots were distributed from Del Norte County near the Oregon border to the Mendocino County line and extended from approximately 8 miles from the Pacific Ocean in Del Norte County to 54 miles inland in Trinity County The highest frequency of plots were sampled in Humboldt and Siskiyou Counties. A large number of plots were also sampled in Del Norte and Trinity Counties

Twelve subseries containing twenty-nine plant associations were described from the analysis of these plots (Table C.1). The twelve subseries were arranged along three primary environmental gradients. elevation, soil moisture and the chemical composition of the soil-forming parent rock. They are displayed by their relative relationship to one another in Figure C 1

The classification is described below by subseries and describes distinctive features of each subseries and differences between subseries Conifer productivity (based on softwood cubic volume) are rated as low (< 6000 cu. ft.), moderate (6000–9000 cu ft) or high (> 9000 cu ft) Structural diversity (based on the number of layers, diameter classes and height) are also rated as low, moderate, or high Also included are a list of plant associations in the subseries, a description of differences between them and a table of significant discriminant variables. Next, a description of wildlife expectations is described for each subseries. At the end of the subseries descriptions, plant associations described as riparian or found in riparian landscape positions are described and listed in Table C 10

Douglas-fir–California Bay (PSME–UMCA) Subseries

This subseries had the lowest mean elevation in the Douglas-fir Series. It was identified on cool, shaded, moist, lower and middle third slope positions with convex, linear and undulating micro-relief, usually in riparian positions. Conifer productivity and structural diversity were moderate This subseries was distinguished by the presence of California bay in the mid and regeneration layers, Pacific serviceberry and poison oak in the shrub layer and swordfern in the herb layer

The PSME–UMCA Subseries included two plant association types PSME–UMCA/RHDI and PSME–UMCA/HODI. The significant environment variables that distinguished between the two were elevation, slope, micro-position, distance to the Pacific Ocean, radiation index, total tree cover and A horizon thickness. Vegetation differences included presence of, or percent cover of oceanspray, wood rose, Pacific madrone, black oak and tanoak in the shrub layer (Table C.2).

Douglas-fir–Red Alder (PSME–ALRU2) Subseries

This riparian subseries had the highest mean cover of surface rock due to its narrow extent along order 3 and greater stream courses. It was found on low elevation, cool, shaded, moist, lower and middle third slope sites with convex, linear and undulating micro-relief, in close proximity to the Pacific Ocean Conifer productivity was the lowest in the Douglas-fir Series and structural diversity was also low. This subseries was distinguished by the presence of red alder in the mid and lower layers, thimbleberry in the shrub layer and high cover of candyflower and swordfern in the herb layer.

The PSME–ALRU2 Subseries included one plant association type: PSME–ALRU2/ACCI/MOSI The significant environment variables that distinguished between it and other plant associations were streamside micro-position, high surface rock, vertical micro-relief and distance to the Pacific Ocean Vegetation differences included the presence of, or percent cover of hardwoods, red alder, swordfern, thimbleberry, candyflower and total forb cover

Table C 1 Vegetation classification for the Douglas-fir Series

EDP Code:	Plant Association Name:
PSME–LIDE2 Subseries	**Douglas-fir–Tanoak Subseries**
PSME–LIDE2/WHMO	Douglas-fir–Tanoak/Western Modesty
PSME–LIDE2/QUVA–HODI	Douglas-fir–Tanoak/Huckleberry Oak–Oceanspray
PSME/Moist Shrub Subseries	**Douglas-fir/Moist Shrub Subseries**
PSME/COCOC	Douglas-fir/California Hazelnut
PSME–PIJE Subseries	**Douglas-fir–Jeffrey Pine Subseries**
PSME–PIJE/FECA	Douglas-fir–Jeffrey Pine/California Fescue
PSME–CADE3 Subseries	**Douglas-fir–Incense Cedar Subseries**
PSME–CADE3/FECA	Douglas-fir–Incense Cedar/California Fescue
PSME/QUVA Subseries	**Douglas-fir/Huckleberry Oak Subseries**
PSME/QUVA	Douglas-fir/Huckleberry Oak
PSME/QUVA–LIDEE	Douglas-fir/Huckleberry Oak–Dwarf Tanbark
PSME/QUVA–RHMA	Douglas-fir/Huckleberry Oak–Pacific Rhododendron
PSME–QUGA2 Subseries	**Douglas-fir–Oregon White Oak Subseries**
PSME–QUGA2/GRASS	Douglas-fir–Oregon White Oak/Grass
PSME–QUGA2/HODI	Douglas-fir–Oregon White Oak/Oceanspray
PSME–QUKE Subseries	**Douglas-fir–Black Oak Subseries**
PSME–QUKE//Metamorphic	Douglas-fir–Black Oak//Metamorphic
PSME–QUKE//Sandstone	Douglas-fir–Black Oak//Sandstone
PSME–QUKE–QUGA2/GRASS	Douglas-fir–Black Oak–Oregon White Oak/ Grass
PSME–QUCH2 Subseries	**Douglas-fir–Canyon Live Oak Subseries**
PSME–QUCH2//Rockpile	Douglas-fir–Canyon Live Oak//Rockpile
PSME–QUCH2–ARME3/RHDI	Douglas-fir–Canyon Live Oak–Pacific Madrone/Poison Oak
PSME–QUCH2–LIDE2	Douglas-fir–Canyon Live Oak–Tanoak
PSME–UMCA Subseries	**Douglas-fir–California Bay Subseries**
PSME–UMCA/RHDI	Douglas-fir–California Bay/Poison Oak
PSME–UMCA/HODI	Douglas-fir–California Bay/Oceanspray
PSME–CACH2 Subseries	**Douglas-fir–Chinquapin Subseries**
PSME–CACH2–LIDE2	Douglas-fir–Chinquapin–Tanoak
PSME–CACH2/XETE	Douglas-fir–Chinquapin/Beargrass
PSME–CACH2/RHMA–GASH	Douglas-fir–Chinquapin/Pacific Rhododendron–Salal
PSME–CACH2/RHMA–BENE1	Douglas-fir–Chinquapin/Pacific Rhododendron–Dwarf Oregon-grape
PSME–CACH2/RHMA–QUSA/XETE	Douglas-fir–Chinquapin/Pacific Rhododendron–Sadler Oak/Beargrass
PSME–CACH2–LIDE2/BENE1	Douglas-fir–Chinquapin–Tanoak/Dwarf Oregon–grape
PSME–CACH2/RHMA–QUSA–GASH	Douglas-fir–Chinquapin/Pacific Rhododendron–Sadler Oak–Salal
PSME–ALRU2 Subseries	**Douglas-fir–Red Alder Subseries**
PSME–ALRU2/ACCI/MOSI	Douglas-fir–Red Alder/Vine Maple/Candyflower
PSME–Maple Subseries	**Douglas-fir–Maple Subseries**
PSME–ACMA/POMU1	Douglas-fir–Bigleaf Maple/Swordfern
PSME–ACMA/PHLEG	Douglas-fir–Bigleaf Maple/Gordon Mock Orange
PSME/ACCI–BENE1	Douglas-fir/Vine Maple–Dwarf Oregon–grape

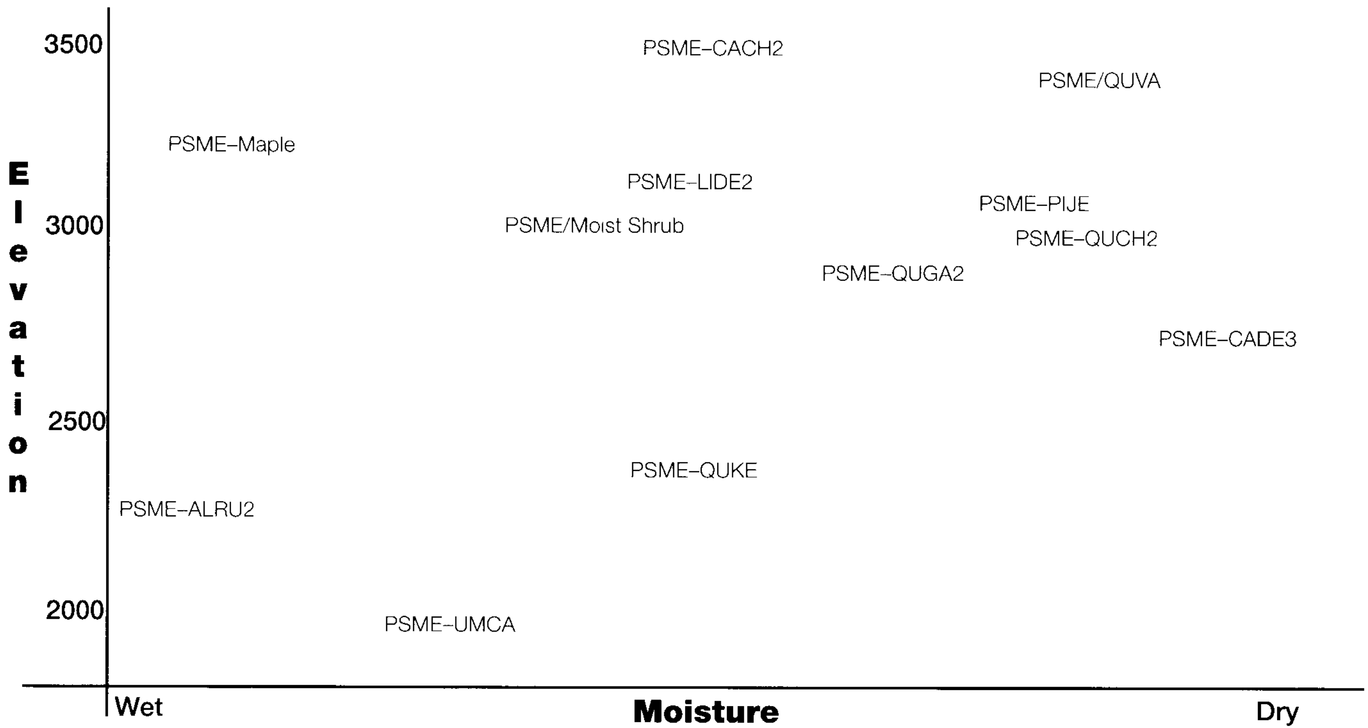


Figure C 1 Relative relationships of subseries in the Douglas-fir Series based on elevation and moisture

Table C 2 Significant discriminant variables in the late seral stands of the PSME–UMCA Subseries (+ = trace cover)

Variable:	PSME–UMCA/RHDI	PSME–UMCA/HODI
Elevation	1532'	2896'
Slope	36%	61%
Micro-position	middle/lower 1/3	intermittent stream
Distance (ocean)	29.6 miles	43 2 miles
Total basal area	224 sq ft	109 sq ft
Radiation index	473	.360
Total tree cover	81%	49%
A horizon thickness	6"	15"
wood rose	1%	4%
Understory tanoak	4%	0%
Pacific madrone	10%	0%
black oak	3%	0%
oceanspray	+%	9%

Douglas-fir–Black Oak (PSME–QUKE) Subseries

This subseries had the highest mean AWC in the Douglas-fir Series It was identified on mid elevation, warm, moist, inland sites, with moderate soil coarse fragments, in lower through upper third slope positions Conifer productivity and structural diversity were moderate. This subseries was distinguished by the presence of black oak in the mid layers

The PSME–QUKE Subseries included three plant association types. PSME–QUKE//Metamorphic, PSME–QUKE//Sandstone and PSME–QUKE–QUGA2/Grass. The significant environment variables that distinguished between the three were elevation, slope, horizontal and vertical micro-relief, distance to the Pacific Ocean, total forb cover, parent rock and surface pH. Vegetation differences included the presence of, or percent cover of Oregon white oak and wood rose (Table C 3)

Plant associations in this subseries experience frequent fire, which maintains relatively open understory conditions and may make them suitable for goshawk nesting

Oak mast production is an essential component to quail, scrub jay, acorn woodpecker, band-tailed pigeon and black-tailed deer Acorn production is generally cyclic taking two years to mature, every 2–3+ years and ranges from 0–1543 lb./acres Mast production in black oak stands is dependent on number, age/size and genetic capability of trees in a stand (Verner 1980) Mature black oak trees are not likely to be highly productive

Table C 3 Significant discriminant variables in the late seral stands of the PSME–QUKE Subseries (+ = trace cover)

Variable:	PSME–QUKE// Metamorphic	PSME–QUKE// Sandstone	PSME–QUKE–QUGA2/Grass
Elevation	2312'	3274'	2748'
Slope	46%	28%	39%
Micro-relief	linear	concave	undulating
Distance (ocean)	37 5 miles	45 2 miles	37 5 miles
Total forb cover	5%	7%	27%
Surface pH	6 2	5 6	6 3
Oregon white oak	1%	1%	9%
wood rose	+%	2%	+%

Douglas-fir–Incense Cedar (PSME–CADE3) Subseries

This subseries was identified on dry, upland, warm sites on serpentine soils It differed from the closely related PSME–PIJE Subseries by its lower elevation, mostly southerly aspect, higher surface rock and the absence of Jeffrey pine Conifer productivity and structural diversity were low This subseries was distinguished by the presence of incense cedar in the overstory and high cover of grass in the herb layer

The PSME–CADE3 Subseries included one plant association type. PSME–CADE3/FECA. The significant environment variables that distinguished between it and other plant associations were serpentine parent material, distance to the Pacific Ocean, surface pH and surface gravel. Vegetation differences included the presence of, or percent cover of total grass, California fescue, incense cedar and huckleberry oak

This subseries included grassland conditions which provide savannah or open woodland preferred by some wildlife species (i.e., deer, black bear, and elk)

Douglas-fir–Oregon White Oak (PSME–QUGA2) Subseries

This subseries had the highest mean radiation index, indicating the warm conditions here It was identified on mid elevation, warm, dry, upland sites, in upper and middle third slope positions, with linear and undulating micro-relief It had the highest mean distance from the Pacific Ocean of all subseries in the Douglas-fir Series Conifer productivity and structural diversity were low This subseries was distinguished by high radiation index, low tree cover, the presence of Oregon white oak in the mid layer, oceanspray, Pacific serviceberry and poison oak in the shrub layer.

The PSME–QUGA2 Subseries included two plant association types PSME–QUGA2/Grass and PSME–QUGA2/HODI. The significant environment variables that distinguished between the two were slope, micro-position, horizontal and vertical micro-relief, distance to the Pacific Ocean, total shrub cover and soil depth Vegetation differences included the presence of, or percent cover of oceanspray, rush and Pacific serviceberry (Table C 4)

The PSME–QUGA2/HODI type was found in riparian positions with subsurface water or seeps, which make it a likely candidate for supporting clouded, or southern torrent salamanders.

The PSME–QUGA2/Grass type included high grass cover which provides savannah or open woodland habitat preferred by some wildlife species Mast production is also important here for a variety of wildlife

Table C 4 Significant discriminant variables in the late seral stands of the PSME–QUGA2 Subseries (+ = trace cover)

Variable:	PSME–QUGA2/Grass	PSME–QUGA2/HODI
Slope	32%	59%
Micro-position	lower 1/3	intermittent stream
Micro-relief	undulating	concave
Distance (ocean)	34 8 miles	44 7 miles
Total shrub cover	18%	63%
Soil depth	39 5"	28 2"
oceanspray	2%	33%
rush	+%	7%
Pacific serviceberry	0%	6%

Douglas-fir–Canyon Live Oak (PSME–QUCH2) Subseries

This subseries was found on the steepest mean slopes, with the highest A horizon coarse fragments and second highest surface rock percent It was identified on mid elevation, warm, dry, upland, ridgetop, upper and middle third slope positions with convex, linear and undulating micro-relief. Conifer productivity and structural diversity were low to moderate depending on the percentage of canyon live oak present This subseries was distinguished by the presence of high surface gravel and rock, high radiation index, low AWC, high subsurface soil coarse fragments and canyon live oak in the mid and regeneration layers

The PSME–QUCH2 Subseries included three plant association types PSME–QUCH2/Rockpile, PSME–QUCH2–ARME3/RHDI and PSME–QUCH2–LIDE2 The significant environment variables that distinguished between the three were elevation, micro-position, horizontal micro-relief, vertical micro-relief, surface rock and gravel, distance to the Pacific Ocean, total shrub cover, A horizon thickness, A horizon coarse fragments, subsurface coarse fragments, AWC and surface pH. Vegetation differences included the presence of, or percent cover of tanoak in the shrub layer, poison oak, canyon live oak, Jeffrey pine and western modesty (Table C 5).

Table C 5 Significant discriminant variables in the late seral stands of the PSME–QUCH2 Subseries (+ = trace cover)

Variable:	PSME–QUCH2// Rockpile	PSME–QUCH2/ ARME3/RHDI	PSME–QUCH2– LIDE2
Elevation	3323'	2820'	2664'
Micro-position	upper 1/3	middle 1/3	upper 1/3
Micro-relief	linear	concave	linear
Gravel	19%	18%	4%
Rock	22%	14%	2%
Distance (ocean)	30 5 miles	40 9 miles	31 7 miles
Total shrub cover	19%	8%	6%
A horizon thickness	7"	10"	6"
A horizon coarse frag	51%	59%	36%
Subsurface co frag	63%	59%	48%
AWC	2 7"	2 2"	3 5"
Surface pH	5 9	6 3	6 0
Understory tanoak	+%	+%	6%
poison oak	+%	6%	3%
canyon live oak	28%	42%	23%
Jeffrey pine	0%	5%	0%
western modesty	6%	+%	6%

Plant associations in the PSME–QUCH2 Subseries tend to have high surface rock, high soil coarse fragments and older seral stages due to lower fire frequency They may be likely to support Del Norte salamanders, or in the Coast Range the California slender salamander. This subseries also included Pacific madrone which provide a berry crop that, while it may fluctuate from year to year, may support more abundant populations (i e., varied thrush and American robins) when the crop is heavy Raphael (1987a) found Pacific madrone provided important cavity-nesting opportunities, with a use that was much greater than their relative occurrence in a stand It's importance seems to parallel that of quaking aspen (*Populus tremuloides*), especially for hairy woodpecker and sapsucker populations Quaking aspen and Pacific madrone are similar in form, with smooth bark, long trunks relatively free of branches and wood that is similar in texture and hardness Both are susceptible to heartwood decay fungi with creates ideal conditions for excavating a cavity surrounded by a strong outerwall. This may explain the apparent preference for Pacific madrone and the high incidence of nests located in live trees Red-breasted sapsucker, hairy, downy and acorn woodpeckers most often excavated cavities in Pacific madrone, generally in trees > 12" d.b.h. and since the hairy woodpecker and red-breasted sapsucker are two of the most abundant species in the Douglas-fir Series, their preference for Pacific madrone may result in a higher proportion of abandoned cavities that would be available for secondary cavity nesting species

Douglas-fir–Jeffrey Pine (PSME–PIJE) Subseries

This subseries was identified on mid elevation, dry, warm upland sites, on serpentine soils, in upper and middle third slope positions with convex and undulating micro-relief Conifer productivity and structural diversity were low This subseries was distinguished by the presence of Jeffrey pine in the overstory, Pacific madrone in the regeneration layer, California bay in the shrub layer and California fescue in the herb layer

The PSME–PIJE Subseries included one plant association type. PSME–PIJE/FECA The significant environment variables that distinguished between it and other plant associations were serpentine parent material, micro-position, distance to the Pacific Ocean, surface gravel, AWC and surface pH Vegetation differences included the presence of, or percent cover of total grass cover, California fescue, Jeffrey pine, understory Pacific madrone, the shrub form of California bay, incense cedar and Pacific madrone

This subseries included grassland associations which provide savannah or open woodland habitat preferred by some wildlife species.

Douglas-fir/Moist Shrub (PSME/Moist Shrub) Subseries

This subseries was identified on steep, mid elevation, cool, shaded, moist, upland sites, in upper and middle third slope positions, on inland sites Conifer productivity and structural diversity were high This subseries was distinguished by low shrub cover, California hazelnut in the shrub layer and western modesty in the herb layer

The PSME/Moist Shrub Subseries included one plant association type PSME/COCOC Significant discriminant environment differences that distinguished between it and other plant associations were, distance to the Pacific Ocean, aspect, total basal area, bare ground cover and AWC. Vegetation differences included the presence or percent cover of California hazelnut and total tree cover.

The PSME/COCOC association of this subseries, had subsurface water or seeps, which make it a likely candidate for supporting clouded, Del Norte or southern torrent salamanders.

Douglas-fir–Tanoak (PSME–LIDE2) Subseries

This subseries was identified on mid elevation, cool, shaded, moist sites, in upper and middle third slope positions, at the upper elevation limit of tanoak Conifer productivity and structural diversity were moderate This subseries was distinguished by low AWC, high forb cover, the presence of tanoak in the regeneration layer, oceanspray and huckleberry oak in the shrub layer and western modesty in the herb layer This subseries was classified in the Douglas-fir Series based on the prescence of tanoak in shrub form, rather than tree form It appears that the upper elevation location of this subseries reduces soil temperature This restricts tanoak to early seral stages where canopy closure is low and soil temperatures are elevated

The PSME–LIDE2 Subseries included two plant association types: PSME–LIDE2/WHMO and PSME–LIDE2/QUVA–HODI The significant environment variables that distinguished between the two were horizontal micro-relief, surface rock, distance to the Pacific Ocean, total shrub cover, A horizon coarse fragments and AWC. Vegetation differences included the presence of, or percent cover of huckleberry oak, tanoak in the shrub layer, beargrass, oceanspray and Pacific madrone (Table C.6).

The PSME–LIDE2 Subseries is thought to contain habitat for ensatina, Del Norte, black and clouded salamanders plus the deer mouse, which appear to be tanoak associates. This subseries also included huckleberry oak which provides mast and foliage for wildlife Barret (1980) has documented moderate deer browsing on this species

Table C 6 Significant discriminant variables in the late seral stands of the PSME–LIDE2 Subseries (+ = trace cover)

Variable:	PSME–LIDE2/WHMO	PSME–LIDE2/QUVA–HODI
Micro-relief	concave	undulating
Rock	2%	41%
Distance (ocean)	31 2 miles	19 5 miles
Total shrub cover	18%'	76%
A horizon coarse fragment	34%	52%
AWC	2 7"	1 2"
huckleberry oak	+%	36%
Understory tanoak	5%	29%
beargrass	+%	2%
oceanspray	0%	9%
Pacific madrone	8%	+%

Douglas-fir–Maple (PSME–Maple) Subseries

This subseries had the highest mean conifer volume and deepest mean soil depth of all subseries It was found on steep, high elevation, wet, cool, shaded, lower third slope positions with linear, concave and undulating micro-relief, usually in close proximity to mountain streams Conifer productivity and structural diversity were high This subseries was distinguished by the presence of bigleaf or vine maple in the mid or lower layers and swordfern in the herb layer

The PSME–Maple Subseries included three plant association types: PSME–ACMA/POMU1, PSME–ACMA/PHLEG and PSME/ACCI–BENE1 The significant environment variables that distinguished between the three were elevation, slope, micro-position, horizontal micro-relief, distance to the Pacific Ocean, radiation index, total shrub and tree cover and surface and subsurface pH Vegetation differences included the presence or percent cover of vine maple, Gordon mock orange, Pacific rhododendron, dwarf Oregon-grape, salal, poison oak and wood rose (Table C 7)

The PSME–Maple Subseries is primarily a true riparian type In a riparian upland survey (Ralph et al 1995), identified the song sparrow, yellow warbler and yellow-breasted chat as "riparian specialists" and warbling vireo, Swainson's thrush, Wilson's warbler and MacGillivary's warbler as having a "riparian preference" In a follow up survey the warbling vireo and MacGillivary's warbler qualified as "riparian specialists", the Western wood-pewee, black-headed grosbeak and orange-crowned warbler showed a "riparian preference".

Table C 7 Significant discriminant variables in the late seral stands of the PSME–Maple Subseries. (+ = trace cover)

Variable:	PSME–ACMA/ POMU1	PSME/ACCI BENE1	PSME–ACMA/ PHLEG
Elevation	3350'	2882'	3266'
Slope	57%	29%	77%
Micro-position	middle 1/3	lower 1/3	streamside
Micro-relief	concave	undulating	linear
Total vegetation cover	95%	98%	90%
Distance (ocean)	29 4 miles	22.2 miles	52.8 miles
Total basal area	358 sq. ft.	337 sq. ft	89 sq ft
Radiation index	.442	469	261
Total grass cover	1%	+%	4%
Total shrub cover	6%	85%	33%
Total tree cover	89%	75%	45%
Surface pH	6 3	5 8	6 9
Subsurface pH	6.0	6.0	6 7
vine maple	0%	49 %	0%
Gordon mock orange	0%	0%	11%
Pacific rhododendron	+%	21%	0%
dwarf Oregon-grape	6%	30%	0%
salal	+%	43%	0%
poison oak	+%	0%	8%
wood rose	3%	+%	4%

Douglas-fir–Huckleberry Oak (PSME/QUVA) Subseries

This subseries had the lowest mean soil depth and lowest AWC in the Douglas-fir Series It was identified on high elevation, dry, rocky, upland sites on serpentine soils, in upper and middle third slope positions, with convex, linear and undulating micro-relief. Conifer productivity and structural diversity were low This subseries was distinguished by moderately deep soils, with low AWC, high soil pH and the presence of huckleberry oak, red huckleberry and dwarf tanbark in the shrub layer with western modesty in the herb layer.

The PSME/QUVA Subseries included three plant association types PSME/QUVA, PSME/QUVA-LIDEE and PSME/QUVA–RHMA The significant environment variables that distinguished between the three were surface rock, distance to the Pacific Ocean, aspect and total shrub cover. Vegetation differences included the presence of, or percent cover of Pacific rhododendron, dwarf tanbark, the shrub form of California bay and wood rose (Table C.8).

This subseries included huckleberry oak which provides mast and foliage for wildlife Barret (1980) has documented moderate deer browsing on this species

Table C 8 Significant discriminant variables in the late seral stands of the PSME/QUVA Subseries.

Variable:	PSME/QUVA	PSME/QUVA–LIDEE	PSME/QUVA–RHMA
Rock	6%	18%	7%
Distance (ocean)	30 7 miles	20 0 miles	22.5 miles
Transformed aspect	2 9	4 1	1 2
Total shrub cover	55 %	83%	77%
Pacific rhododendron	0%	0%	13%
dwarf tanbark	0%	18%	10%
California bay (shrub form)	0%	6%	10%
wood rose	+%	1%	3%

Douglas-fir–Chinquapin (PSME–CACH2) Subseries

This subseries had the highest mean elevation in the Douglas-fir Series It was identified on cool, moist, upland sites, where conifer productivity was often at its highest Conifer productivity and structural diversity ranged from moderate to high. This subseries was distinguished by its close proximity to the Pacific Ocean, low radiation index, low surface gravel and rock, low soil pH, the presence of chinquapin in the mid and regeneration layers, Pacific rhododendron, Sadler oak and salal in the shrub layer and beargrass in the herb layer

The PSME–CACH2 Subseries had the highest diversity of plant associations in the Douglas-fir Series. It included seven plant association types: PSME–CACH2–LIDE2, PSME–CACH2/XETE, PSME–CACH2/RHMA–GASH, PSME–CACH2/RHMA–BENE1, PSME–CACH2/RHMA–QUSA/XETE, PSME–CACH2–LIDE2/BENE1 and PSME–CACH2/RHMA–QUSA–GASH. The significant environment variables that distinguished between the seven were elevation, slope, micro-position, horizontal micro-relief, distance to the Pacific Ocean, radiation index, total forb, shrub and tree cover, soil depth, A horizon coarse fragments, subsurface coarse fragments and AWC Vegetation differences included the presence of, or percent cover of salal, beargrass, Pacific rhododendron, Sadler oak, tanoak in the shrub layer, dwarf Oregon-grape, chinquapin and red huckleberry (Table C 9)

The PSME–CACH2 Subseries included Sadler oak, which is documented as having heavy mast utilization by black bear (Barrett 1980) It also provides acorns in the summer and fall and browse in the spring, summer and fall for black-tailed deer.

Riparian Types

The Douglas-fir Series included a limited number of plant associations considered to be riparian or found in riparian landscape positions (Table C 10) True riparian types are described here as those directly associated with standing or running water Types found in riparian landscape positions are defined as those located within the riparian zone (FEIS ROD 1994). Preliminary results from the 1994–1995 Riparian Inventory on the Six Rivers National Forest show strong relationships between riparian type and parent rock type For example, the PSME/ACCI–BENE1 type was only found on soils derived from metamorphic parent material, while the PSME–QUGA2/HODI type was restricted to soils derived from sandstone parent material These relationships are reflected in the restriction of selected riparian types to the Klamath or Coast Range Mountains which are dominated by these rock types

The following are descriptions of plant associations in the Douglas-fir Series described as riparian types or identified in riparian landscape positions The PSME/COCOC type was found in riparian landscape positions, along order 1 and 2 stream courses in the Klamath Mountains. The PSME–QUGA2/HODI type was found along order 1 and 2 streams, in riparian landscape positions within the Coast Range Mountains. The PSME–ALRU2/ACCI/MOSI type is a true riparian type It was found along order 2–5 stream courses in the Klamath Mountains The PSME–ACMA/POMU1 type is one of the most widespread riparian types in the Klamath and Coast Range Mountains It was found along order 2–5 stream courses, most often in close proximity to mountain streams. The PSME–ACMA/PHLEG type is a true riparian type, found along order 3–5 streams in the Coast Range Mountains. The PSME/ACCI–BENE1 type was found in riparian landscape positions, often in headwater positions, in the Klamath Mountains The PSME–UMCA/RHDI type was found in riparian landscape positions, along order 3–5 streams, often on streamside benches, in the Klamath and Coast Range Mountains. The PSME–UMCA/HODI type was identified in riparian landscape positions, along order 1 and 2 streams, in the Coast Range Mountains

Table C 9 Significant discriminant variables in the late seral stands of the PSME-CACH2 subseries (+=tracecover)

Variable:	PSME-CACH2-LIDE2	PSME-CACH2 LIDE2/BENE1	PSME-CACH2/XETE	PSME-CACH2/RHMA-GASH	PSME-CACH2/RHMA-BENE1	PSME-CACH2/RHMA-QUSA/XETE	PSME-CACH2/RHMA-QUSA-GASH
Elevation	3458'	3303'	3640'	3002'	3365'	3907'	3442'
Slope	48%	35%	25%	49%	49%	38%	40%
Micro-position	upper1/3	middle1/3	ridgetop	mid, low1/3	upper1/3	upper, ridgetop	up, mid1/3
Micro-relief	concave	concave	concave	linear	linear, convex	linear, concave	linear, undulating
Total vegetation cover	91%	91%	95%	98%	92%	95%	98%
Distance(ocean)	25 8 miles	35 4 miles	20 5 miles	23 9 miles	21 9 miles	20.8 miles	20.5 miles
Transformed aspect	4 3	3 4	5 2	2 0	2 6	2.4	2.4
Radiation index	468	423	522	348	373	401	.388
Total forb cover	17%	18%	47%	8%	10%	18%	14%
Total shrub cover	19%	11%	6%	71%	66%	53%	81%
Total tree cover	75%	81%	85%	86%	68%	685	67%
Soil depth	33"	40"+	35"	30"	39"	36"	36"
A horizon thickness	6"	9"	10"	5"	8"	6"	6"
A horizon coarse fragment	31%	36%	19%	54%	29%	22%	30%
Subsurface coarse fragment	34%	27%	27%	46%	57%	52%	46%
AWC	3 2"	4 4"	3 7"	2 3"	4 0"	3 1"	3 2"
salal	0%	49%	0%	59%	+%	+%	48%
beargrass	0%	0%	11%	4%	3%	18%	12%
Pacific rhododendron	+%	21%	0%	36%	44%	40%	32%
Sadler oak	6%	30%	0%	0%	+%	15%	12%
Understory tanoak	+%	43%	0%	9%	10%	+%	5%
dwarf Oregon-grape	+%	0%	8%	7%	8%	6%	4%
chinquapin	3%	+%	4%	10%	12%	16%	21%
red huckleberry	4%	3%	1%	1%	5%	4%	6%

Table C 10 Plant associations in the Douglas-fir Series described as riparian or found in riparian landscape positions.

EDP Code:	Plant Association Name:
PSME/Moist Shrub Subseries	**Douglas-fir/Moist Shrub Subseries**
PSME/COCOC	Douglas-fir/California hazelnut
PSME–QUGA2 Subseries	**Douglas-fir–Oregon White Oak Subseries**
PSME–QUGA2/HODI	Douglas-fir–Oregon White Oak/ Oceanspray
PSME–ALRU2 Subseries	**Douglas-fir–Red Alder Subseries**
PSME–ALRU2/ACCI/MOSI	Douglas-fir–Red Alder/Vine Maple/ Candyflower
PSME–Maple Subseries	**Douglas-fir–Maple Subseries**
PSME–ACMA/POMU1	Douglas-fir–Bigleaf Maple/Swordfern
PSME–ACMA/PHLEG	Douglas-fir–Bigleaf Maple/ Gordon Mock Orange
PSME/ACCI–BENE1	Douglas-fir/Vine Maple– Dwarf Oregon-Grape
PSME/QUVA Subseries	**Douglas-fir/Huckleberry Oak Subseries**
PSME/QUVA–RHMA	Douglas-fir/Huckleberry Oak– Pacific Rhododendron
PSME–UMCA Subseries	**Douglas-fir–California Bay Subseries**
PSME–UMCA/RHDI	Douglas-fir–California Bay/Poison Oak
PSME–UMCA/HODI	Douglas-fir–California Bay/Oceanspray

Douglas-fir Series Keys and Plant Association Descriptions

Two keys are provided for your use: a Subseries Key and a Plant Association Key. The Plant Association Key includes both subseries and plant associations It is longer, but can be used without the Subseries Key The Subseries Key includes only subseries and is provided as a shortcut to plant associations. Steps in the Subseries Key included in brackets () refer to lines in the Plant Association Key. For example, if you answer yes to line 3a you would proceed to line 15 in the Plant Association Key If you answered no, you would proceed to line 3b, where a yes answer would refer you to line 4 of the Subseries Key

Please remember that these keys were developed from data collected in late seral stage stands If you are attempting to use them in younger stands you should expect changes in the percent cover of individual species. For instance, if you are attempting to use the keys in a 100 year old (early seral stage) PSME–CACH2/XETE type You should expect the cover of chinquapin (CACH2) will often be less than the 5% required to key to this subseries. By walking around in the stand prior to using the key you should have a good idea of what the subseries is. The point is, that the indicator species are almost always there, but their cover may vary

After you have run through the key and determined which plant association you are in, read through the Plant Association Summary Table for that plant association. There you will find a list of the species that were frequently found in that plant association and environmental variables associated with the plant association If you do not see the species you were looking for listed in the Plant Association Summary Table for that plant association, then look at the Vegetation Summary (Appendix VI), for a more complete list of plant species found in that type

Douglas-fir Subseries Key

1a Alder cover high usually > 50% . ... (2)

Douglas-fir–Red Alder Subseries

1b. Red alder absent or not as above 2

2a Jeffrey pine > 10% cover and California fescue > 2% cover (3)

Douglas-fir–Jeffrey Pine Subseries

2b. Jeffrey pine or California fescue absent or not as above ... 3

3a. Incense cedar > 10% cover and California fescue > 10% cover . ... (4)

Douglas-fir–Incense Cedar Subseries

3b Incense cedar or California fescue absent or not as above 4

4a Oregon white oak > 5% cover 5

Douglas-fir–Oregon White Oak Subseries

4b Oregon white oak absent or not as above 5

5a Canyon live oak present and > 10% cover .... (10)

Douglas-fir–Canyon Live Oak Subseries

5b Canyon live oak absent or not as above 6

6a Chinquapin present and > 5% cover .... (14)

Douglas-fir–Chinquapin Subseries

6b Chinquapin absent or not as above 7

7a California bay present and > 10% cover ... . (22)

Douglas-fir–California bay Subseries

7b California bay absent or not as above 8

8a Tanoak present and > 5% cover .... (24)

Douglas-fir–Tanoak Subseries

8b. Tanoak absent or not as above 9

9a Huckleberry oak present and > 5% cover .... (27)

Douglas-fir–Huckleberry oak Sub-series

9b. Huckleberry oak absent or not as above 10

10a Bigleaf or vine maple present and > 10% cover ..... . (29)

Douglas-fir–Maple Subseries

10a Vine maple absent or not as above 11

11a Black oak present and > 5% cover .... (33)

Douglas-fir–Black Oak Subseries

11b Black oak absent or not as above 12

12a California hazelnut present .... (35)

Douglas-fir/Moist Shrub Subseries

12b California hazelnut absent . ... Return to step 1 and try again

Douglas-fir Plant Association Key

1a Red alder cover high usually > 50% 2

Douglas-fir–Red Alder Subseries

2a Vine maple and candyflower present PSME–ALRU2/ACCI/MOSI (C–27)

2b. Vine maple or candyflower absent 3

1b Red alder absent or not as above 3

Douglas-fir–Jeffrey Pine Subseries

3a Jeffrey pine ≥ 10% cover and California fescue ≥ 2% cover .... PSME–PIJE/FECA (C–67)

3b. Jeffrey pine or California fescue absent or not as above 4

Douglas-fir–Incense Cedar Subseries

4a Incense cedar ≥ 10% cover and California fescue ≥ 10% cover PSME–CADE3/FECA (C–43)

4b Incense cedar or California fescue absent or not as above 5

Douglas-fir–Black Oak Subseries

5a Oregon white oak ≥ 5% cover 6

6a. Black oak ≥ 5% cover with grass PSME–QUKE–QUGA2/Grass (C–39)

6b. Black oak absent or not as above 7

Douglas-fir–Oregon White Oak Subseries

7a Oceanspray ≥ 10% cover PSME–QUGA2/HODI (C–51)

7b Oceanspray absent or not as above . . 8

8a. Grass cover ≥ 5% PSME–QUGA2/Grass (C–47)

8b. Grass absent or not as above 9

5b Oregon white oak absent or not as above 9

9a. Canyon live oak present and ≥ 10% cover 10

Douglas-fir–Canyon Live Oak Subseries

10a Pacific madrone and poison oak present, tanoak < 2% cover PSME–QUCH2–ARME3/RHDI (C–59)

10b Not as above 11

11a Surface rock ≥ 25% cover PSME–QUCH2//Rockpile (C–55)

11b Not as above 12

12a Tanoak cover ≥ 5% and exceeds chinquapin cover ... PSME–QUCH2–LIDE2 (C–63)

12b Not as above 13

9b Canyon live oak absent or not as above 13

13a. Chinquapin present and ≥ 5% cover 14

Douglas-fir–Chinquapin Subseries

14a Pacific rhododendron present and ≥ 10% cover 15

15a Sadler oak present and ≥ 10% cover 16

16a Salal ≥ 10% cover PSME–CACH2/RHMA–QUSA–GASH (C–127)

16b. Salal absent or not as above and beargrass present PSME–CACH2/RHMA–QUSA/XETE (C–131)

15b Sadler oak absent or not as above 17

17a. Salal ≥ 10% cover PSME–CACH2/RHMA–GASH (C–123)

17b. Salal absent or not as above and dwarf Oregon-grape present PSME–CACH2/RHMA–BENE1 (C–119)

14b Pacific rhododendron absent or not as above 18

18a Beargrass present and ≥ 10% cover PSME–CACH2/XETE (C–115)

18b Beargrass absent or not as above 19

19a Tanoak present and ≥ 5% cover 20

20a. White fir present and ≥ 5% cover and dwarf Oregon-grape present . PSME–CACH2–LIDE2/BENE1 (C–111)

20b. White fir absent or not as above PSME–CACH2–LIDE2 (C–107)

19b Tanoak absent or not as above 21

13b Chinquapin absent or not as above 21

Douglas-fir–California Bay Subseries

21a California bay (tree form) present and ≥ 10% cover 22

22a. Oceanspray present and ≥ 5% cover PSME–UMCA/HODI (C–23)

22b Oceanspray absent or not as above and poison oak present .... PSME–UMCA/RHDI (C–19)

21b California bay (tree form) absent or not as above 23

23a Tanoak present and ≥ 5% cover 24

Douglas-fir–Tanoak Subseries

24a Huckleberry oak present and ≥ 5% cover and oceanspray present PSME–LIDE2/QUVA–HODI (C–79)

24b Huckleberry oak absent or not as above 25

25a Western modesty present and ≥ 2% cover PSME–LIDE2/WHMO (C–75)

25b Western modesty absent or not as above 26

23b Tanoak absent or not as above .... .26

26a Huckleberry oak present and ≥ 5% cover . 27

Douglas-fir–Huckleberry Oak Subseries

27a Pacific rhododendron ≥10% cover .. .. PSME/QUVA–RHMA (C–103)

27b Pacific rhododendron absent or not as above 28

28a Dwarf tanbark present .... PSME/QUVA–LIDEE (C–99)

28b Dwarf tanbark absent .... PSME/QUVA (C–95)

26b Huckleberry oak absent or not as above 29

Douglas-fir–Maple Subseries

29a Vine maple present and ≥ 10% cover with dwarf Oregon-grape present PSME/ACCI–BENE1 (C–91)

29a. Vine maple absent or not as above 30

30a. Bigleaf maple present and ≥ 5% cover 31

31a Gordon mock orange present and $\geq$ 5% cover
.... PSME–ACMA/PHLEG (C–87)

31b Gordon mock orange absent or not as above and swordfern present PSME–ACMA/POMU1 (C–83)

30b. Bigleaf maple absent or not as above 32

Douglas-fir–Black Oak Subseries

32a Black oak present and $\geq$ 5% cover 33

33a Western modesty usually present, soils derived from sandstone parent material PSME–QUKE//Sandstone (C–35)

33b Poison oak usually present, soils derived from metamorphic parent material ....
. . .. PSME–QUKE//Metamorphic (C–31)

32b Black oak absent or not as above . 35

Douglas–fir//Moist Shrub Subseries

35a. California hazelnut present PSME/COCOC (C–71)

35b California hazelnut absent
Return to step 1 and try again

Plant Association: Douglas-fir–California Bay/Poison Oak
EDP Code Name: PSME–UMCA/RHDI
Eco-Code: CD0HBC11

Indicator species:

California bay (*Umbellularia californica*–UMCA) was found on moist, low elevation, moderately steep sites, in streamside and lower third slope positions.

Douglas-fir–California Bay/Poison Oak

PSME–UMCA/RHDI Association
Eco-Code CD0HBC11

This type is often found on older stream terraces. It is characterized by the presence of California bay and poison oak.

Plant Association Summary

(Sample Size:18)		COVER	CON
Tree Overstory Layer			
UMCA	California Bay	40	100
PSME	Douglas-fir	49	94
ARME3	Pacific Madrone	10	55
LIDE2	Tanoak	7	38
CADE3	Incense Cedar	5	27
Tree Understory Layer			
UMCA	California Bay	8	100
PSME	Douglas-fir	1	66
LIDE2	Tanoak	4	50
CADE3	Incense Cedar	1	38
Shrubs			
RHDI	Poison Oak	5	83
LOHIV	Pink Honeysuckle	3	66
COCOC	California Hazelnut	4	44
HEAR	Toyon	4	27
Herbs & Grasses			
POMU1	Swordfern	5	61
TRLA3	Western Starflower	1	50
WHMO	Western Modesty	7	38

Ranger Districts

Gasquet, Orleans,
Lower Trinity, Mad River
Ukonom

Environment

Distance to the Ocean: 17–43 miles

Elevation: 610–3580'

Aspect: S.W., N.E.

Slope: 20–70%

Slope Position: lower, middle 1/3

Surface Rock: 0–13%

Soils

Pit Depth: 23–40"+

AWC: 1.2–5.2"

Parent Material: serpentine, sandstone

A Horizon—
Coarse Frag: 7–90%
Textures: l, gl, vgl, vgsl
Thickness: 2–14"
pH: 5.7–7.2

Physical and Biological Environment

Distribution/Setting

This type was found on coastal and inland sites where mean distance to the Pacific Ocean was 28 0 miles. Elevation averaged 1647' and slopes were typically steep, averaging 39% Mean radiation index was a warm 484 due to the southwest aspects, but was moderated by topographic shading.

Soils

Soils in this type were deep (100%) and well drained to somewhat poorly drained. They formed in colluvium and residuum The litter layer had an average thickness of 1 2", at 55% cover. Surface rock fragments averaged 7% cover. The surface horizons had an average thickness of 15". They had loam and clay loam textures Coarse fragment content averaged 35% and pH averaged 6.5 (slightly acid)

The subsoils were predominately gravelly to very gravelly with clay loam textures. Subsoil coarse fragment content averaged 48% and ranged from 34% to 75%. Subsurface pH averaged 6.1 (slightly acid) and ranged from 6 0 (moderately acid) to 7 0 (neutral) The soils were 50% skeletal and 50% non-skeletal. Soil AWC averaged 3.0" and ranged from 1 2" to 5 2" These soils were classified into the subgroups Typic and Dystric Xerochrepts, Ultic Haploxeralfs and Typic Xerorthents

Vegetation

The total vegetation cover was moderate ranging from 75% to 98% with an average of 89% Mean overstory tree cover was 82%, it was dominated by conifers that averaged 68% cover and ranged from 57% to 85% It also included hardwoods that averaged 56% cover and ranged from 37% to 95% The regeneration layer averaged 9% cover. Shrub cover was moderate with an average of 20% cover. Forb cover was moderate with an average of 12% cover. Grass cover was low with 3% average cover and included a variety of grass species.

Stand Structure

Late seral stands in this type often had 3 or more layers of trees, while early mature and mid mature stands usually had 2 layers In late seral stands the top 2 layers were dominated by Douglas-fir, while the lower layer was dominated by California bay. Moderate sized conifers dominated the top two layers with an average of 22 trees/acre > 25" d b.h., 12 trees/acre > 30" d.b.h , and 5 trees/acre > 40" d.b.h. Hardwoods dominated the lower layer and included 207 trees/acre > 5" d.b.h. and 22 trees/acre > 11" d b h

The stand structure characteristics by layer were as follows. the top layer averaged 250 years old with an average diameter of 41" and average height of 165' The second layer had an average age of 260 years with a mean diameter of 39" and a mean height of 135'. The third layer had an average age of 105 years with a mean diameter of 26" and a mean height of 76'

Overall biomass production (conifer + hardwoods + shrubs) was generally moderate. Modal Dunning site class was 1A–2, with site index of 150–200 at 300 years. Conifer productivity was generally moderate with an average volume of 5683 cu ft , it ranged from 2630 to 9725 cu ft. Softwood basal area averaged 17 sq ft. and ranged from 80 to 307 sq ft Hardwood volume averaged 1116 cu ft and ranged from 850 to 2229 cu. ft. Hardwood basal area averaged 67 sq. ft and ranged from 20 to 120 sq. ft. Stand density index was 382 and fell in the lower end of the Douglas-fir Series.

Fire Regime

Due to moist site conditions this type is one of the oldest plant associations in the Douglas-fir Series. This indicates a high-severity fire regime with very infrequent and usually high intensity fire events associated with drought periods. High fuel moisture levels provide only a narrow window of opportunity for any fire behavior Periodic creeping fires can burn small pockets of fuel accumulations and occasional dry logs Large accumulations of dead fuel (logs) set the stage for high intensity fires during extended periods of drought

Management Implications

Silvicultural Systems: This type is often found in riparian positions on unstable ground or on stream terraces Management treatments are limited here due to the riparian nature of this type Salvage and sanitation salvage are available in riparian areas, all other systems are available outside riparian areas.

Site Preparation: Hand pile and jackpot burn recommended in riparian areas Outside riparian areas machine site preparation is recommended on gentle slopes and broadcast burning on steep slopes

Regeneration: Anticipate lower survival rates on sites with high soil coarse fragments Natural regeneration can be anticipated with adequate seed source. Artificial regeneration should be considered

Release: Early release with multiple treatments are recommended due to the high density of hardwood stems

Animal Damage Control Problems: None known

Stockability: Regional stocking guidelines are applicable.

Species Considerations: Sugar pine and black oak are important components of this type and should be maintained in all management treatments

Cultural and Commercial: The cultural species most frequently found was Pacific madrone California hazelnut, also a cultural species, was found infrequently. The most frequently occurring commercial plant species was California bay (also a cultural species)

Insects and Disease: Due to the potential for white pine blister rust, planting of rust resistant sugar pine should be considered

Fire Suppression: Line construction is extremely difficult and can be more detrimental than normal fire effects Use of confine and contain strategies with modified suppression tactics are recommended within riparian areas Containment and control strategies should be used in the adjoining plant associations Fires should be allowed to back into riparian areas to create openings for natural regeneration.

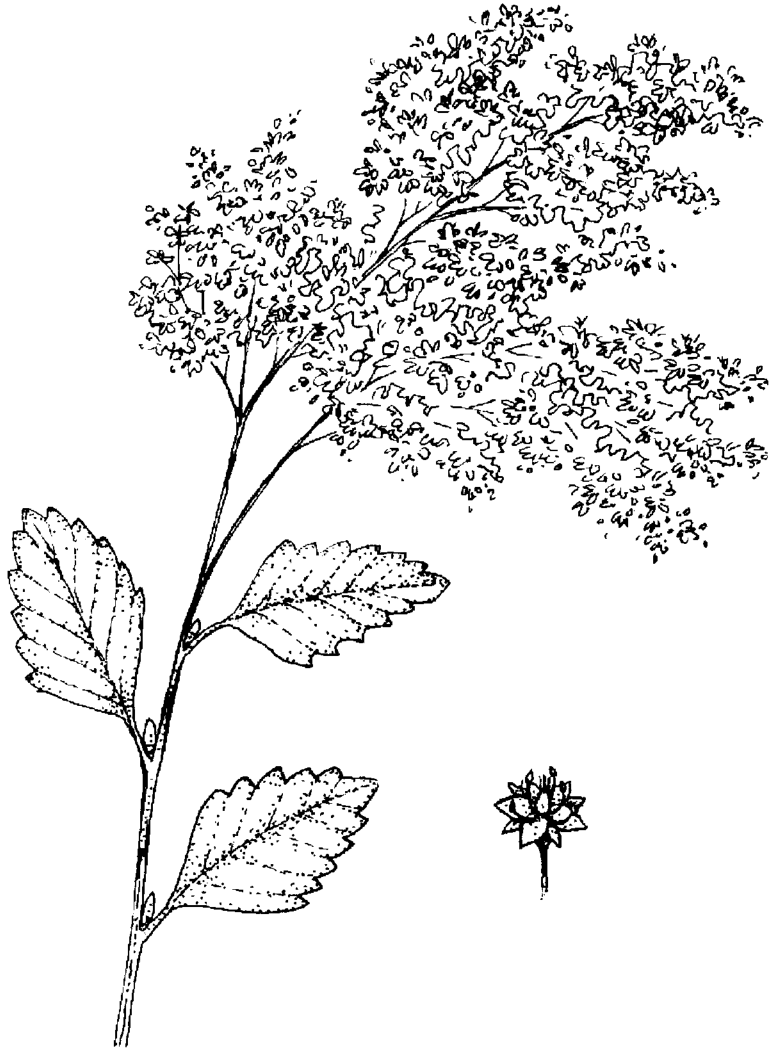
Prescribed Fire: Use prescribed fire to reduce pockets of fuel accumulations, manage cultural species and promote natural regeneration for stand age class diversity

Closely Related Types

The PSME–UMCA/RHDI type is closely related to the PSME–UMCA/HODI type which is found on lower order streams in upper slope positions on soils formed from colluvium

Notes

Plant Association: Douglas-fir–California Bay/Oceanspray
EDP Code Name: PSME–UMCA/HODI
Eco-Code: CD0HBC12



Indicator species:

Oceanspray (*Holodiscus discolor*–HODI) was found on cool, steep, mid elevation sites, with low AWC, moderate surface rock, moderate tree and grass cover

Douglas-fir–California Bay/Oceanspray

PSME–UMCA/HODI Association

Eco-Code CD0HBC12

This riparian type was found along order 1 and 2 streams. It is characterized by the presence of California bay and oceanspray.

Plant Association Summary

(Sample size: 13)

		COVER	CON
Tree Overstory Layer			
PSME	Douglas-fir	22	100
UMCA	California Bay	26	100
ACMA	Bigleaf Maple	9	53
Tree Understory Layer			
PSME	Douglas-fir	3	76
UMCA	California Bay	2	84
Shrubs			
RHDI	Poison Oak	5	92
HODI	Oceanspray	9	84
ROGY	Wood Rose	4	84
AMAL	Pacific Serviceberry	10	61
COCOC	California Hazelnut	4	61
SYMO	Creeping Snowberry	4	61
Herbs & Grasses			
POMU1	Swordfern	2	92
ADBI	Trailplant	1	76
TRLA3	Western Starflower	1	69

Ranger Districts

Mad River

Environment

Distance to the Ocean: 42–52 miles

Elevation: 2440–3640'

Aspect: N.E.

Slope: 30–90%

Slope Position: lower 1/3, streamside

Surface Rock: 10–20%

Soils

Pit Depth: 40"+

AWC: 3.3–6.4"

Parent Material: sandstone

A Horizon—
Coarse Frag: 12–85%
Textures: l, cl
Thickness: 6–22"
pH: 6.0–7.0

Physical and Biological Environment

Distribution/Setting

This riparian type was found on inland sites where mean distance to the Pacific Ocean was 44.5 miles. Elevation averaged 2866' and slopes were typically very steep, averaging 68% Mean radiation index was a cool .318 due to the northeast aspects and topographic shading

Soils

Soils in this type were predominately mesic, moderately deep (56%) to deep (44%) and well drained to somewhat poorly drained These soils formed in colluvium The litter layer had an average thickness of 1.4" at 86% cover. Surface rock fragments averaged 7% cover The surface horizons had an average thickness of 8" They were gravelly to very gravelly with loam and sandy loam textures Coarse fragment content averaged 35% and pH averaged 6 5 (slightly acid).

The subsoils were predominately gravelly to very gravelly with loam, clay loam and sandy clay loam textures Subsoil coarse fragment content averaged 33% and ranged from 14% to 58% Subsurface pH averaged 6.7 (neutral) and ranged from 5 7 (moderately acid) to 7 5 (slightly alkaline). The soils were 43% skeletal and 57% non-skeletal. Soil AWC averaged 3.0" and ranged from 3 3" to 6 4". These soils were classified into the subgroups Typic and Pachic Xerumbrepts, Ultic and Mollic Haploxeralfs

Vegetation

The total vegetation cover was moderate ranging from 75% to 95% with an average of 91% Mean overstory tree cover was 55%. Overstory tree cover of conifers was low It averaged 26% cover and ranged from 10% to 50% Hardwoods dominated these sites and averaged 43% cover and ranged from 12% to 61%. The regeneration layer averaged 5% cover Shrub cover was high with an average of 34% cover Forb cover was moderate with an average of 13% cover. Grass cover was low with 4% average cover

Stand Structure

Late seral stands often had 4 or more layers of trees, while early mature and mid-mature stands usually had 2 layers. In late seral stands the top 3 layers were dominated by Douglas-fir, while the lower layer was dominated by California bay Large conifers dominated the top two layers with an average of 36 trees/acre > 25" d b h , 18 trees/acre > 30" d b h and 10 trees/acre > 40" d.b.h. Hardwoods dominated the lower layer and included 234 trees/acre > 5" d b h and 21 trees/acre > 11" d.b.h.

The stand structure characteristics by layer were as follows: the top layer averaged 257 years old with an average diameter of 42" and average height of 155'. The second layer had an average age of 147 years with a mean diameter of 23" and a mean height of 115'. The third layer had an average age of 89 years with a mean diameter of 13" and a mean height of 76' The fourth layer was dominated by California bay, it averaged 9" in diameter and 51' in height.

Overall biomass production (conifer + hardwoods + shrubs) was generally high Modal Dunning site class was 2, with site index of 150 at 300 years Conifer productivity was generally high with an average volume of 8992 cu ft , it ranged from 5150 to 14,400 cu. ft. Softwood basal area averaged 258 sq. ft. and ranged from 147 to 364 sq ft Hardwood volume averaged 1004 cu. ft. and ranged from 100 to 1730 cu. ft. Hardwood basal area averaged 54 sq ft and ranged from 10 to 80 sq. ft Stand density index was 489 and fell in the upper end of the Douglas-fir Series.

Fire Regime

This type is subjected to a high-severity fire regime with very infrequent and usually high intensity fire events associated with drought periods High fuel moisture levels provide only a narrow window of opportunity for any fire behavior Periodic creeping fires can burn small pockets of fuel accumulations and occasional dry logs. Large accumulations of dead fuel (logs) set the stage for high intensity fires during extended periods of drought

Management Implications

Silvicultural Systems: This type is often found in riparian positions on unstable ground or on stream terraces that limit management treatments. Salvage and sanitation salvage are available in riparian areas

Site Preparation: Hand pile and jackpot burn recommended in riparian areas

Regeneration: Natural regeneration can be anticipated with adequate seed source

Release: None.

Animal Damage Control Problems: None known

Stockability: Regional stocking guidelines are applicable

Species Considerations: Oregon white oak is an important component of this type and should be maintained in all management treatments.

Cultural and Commercial: Only a few plants used for both cultural and commercial purposes were found in this plant association (Appendix VI) The cultural species most frequently found were bigleaf maple, California hazelnut, Gordon mock-orange and western Solomon-seal. The most frequently occurring commercial plant species was California bay (also a cultural species)

Insects and Disease: None known.

Fire Suppression: Line construction is extremely difficult and can be more detrimental than normal fire effects. Use of confine and contain strategies with modified suppression tactics are recommended within riparian areas. Containment and control strategies should be used in the adjoining plant associations Fires should be allowed to back into riparian areas to create openings for natural regeneration

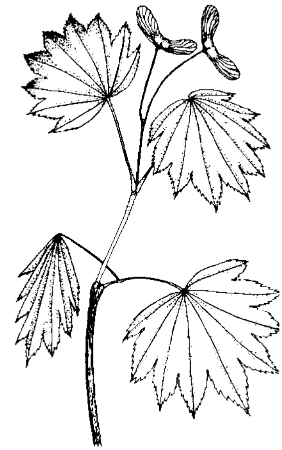
Prescribed Fire: Use prescribed fire to reduce pockets of fuel accumulations, manage cultural species and promote natural regeneration for stand age class diversity

Closely Related Types

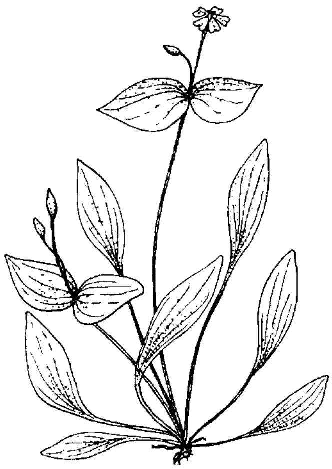
The PSME-UMCA/HODI type is closely related to the PSME-UMCA/RHDI type which is found on higher order streams in lower slope positions on soils formed from residuum and colluvium

Notes

Plant Association: Douglas-fir–Red Alder/Vine Maple/ Candyflower
EDP Code Name: PSME–ALRU2/ACCI/MOSI
Eco-Code: CD0HAR11



Indicator species:
Vine maple (*Acer circinatum*–ACCI) was found on cool, lower third slopes, often in streamside positions, with thick A horizons, high AWC, high soil coarse fragments, moderate surface rock and high softwood basal area.



Indicator species:
Candyflower (*Montia siberica*–MOSI) was found on moist to wet sites, in lower third slope positions, with gentle slopes, deep soils, moderate surface rock, high forb and tree cover

Douglas-fir–Red Alder/Vine Maple/Candyflower

PSME–ALRU2/ACCI/MOSI Association

Eco-Code CD0HAR11

This riparian type was found on order 3 to 5 stream courses. It was typically found on alluvial flats and stream terraces that are subject to disruption by periodic flooding. It is characterized by the presence of red alder, vine maple and candyflower.

Plant Association Summary

(Sample size: 5)

		COVER	CON
Tree Overstory Layer			
ALRU2	Red Alder	86	100
PSME	Douglas-fir	6	100
ACMA	Bigleaf Maple	8	40
Tree Understory Layer			
PSME	Douglas-fir	5	100
ACMA	Bigleaf Maple	2	100
Shrubs			
ACCI	Vine Maple	6	100
RUPA2	Thimbleberry	3	80
Herbs & Grasses			
MOSI	Candyflower	46	100
POMU1	Swordfern	7	100
DIFO	Bleeding Heart	6	80
OXOR1	Redwood Sorrel	20	60
NEPA	Smallflower Nemophila	8	60

Ranger Districts

Orleans

Environment

Distance to the Ocean: 18–20 miles

Elevation: 2360–2570'

Aspect: S.E.

Slope: 0–40%

Slope Position: streamside

Surface Rock: 60–70%

Soils

Pit Depth: 40"+

AWC: 0.9–2.9"

Parent Material: mixed

A Horizon—
- Coarse Frag: 28–70%
- Textures: gsl, xgsl
- Thickness: 2–4"
- pH: 5.5–6.5

Physical and Biological Environment

Distribution/Setting

This riparian type was found along order 2 and greater stream courses on coastal sites where mean distance to the Pacific Ocean was 18.7 miles Elevation averaged 2466' and slopes were typically strongly sloping, averaging 11% Mean radiation index was 456, but was moderated by topographic shading

Soils

Soils in this type were mesic, deep and well drained They formed primarily in mixed alluvium and infrequently in colluvium The litter layer had an average thickness of 0 2" at 76% cover Surface rock fragments averaged 65% cover The surface horizon thickness averaged 3". The surface horizons were gravelly to extremely gravelly with sandy loam textures. Coarse fragment content averaged 49% and pH averaged 6 0 (moderately acid).

The subsoils were gravelly to extremely cobbly with clay loam to sandy loam textures. Subsoil coarse fragment content averaged 57% and ranged from 30% to 85%. Subsurface pH averaged 6.2 (slightly acid) and ranged from 6 0 (moderately acid) to 6 5 (slightly acid) The soils were 50% non-skeletal and 50% skeletal Soil AWC averaged 1.9" and ranged from 0.9" to 2.9". These soils were classified into the subgroup Dystric Xerochrepts and Typic Xerofluvents.

Vegetation

The total vegetation cover was high ranging from 95% to 99% with an average of 98% Mean overstory tree cover was 93%. Overstory conifer cover was low. It averaged 10% cover and ranged from 5% to 15%. Hardwoods dominated these sites with an average cover of 89% and range of 80% to 95% cover. The regeneration layer averaged 9% cover. Shrub cover was moderate with an average cover of 16% Forb cover was high with an average of 80% cover Grass cover was low with 5% average cover and included a variety of sedges and grasses

Stand Structure

Stands in this type often had 3 or more layers of trees, while early mature and mid mature stands usually had 2 layers. In late seral stands the top 2 layers were dominated by Douglas-fir, the third layer was dominated by red alder Moderate sized conifers dominated the top two layers with an average of 10 trees/acre > 25" d.b.h., 5 trees/acre > 30" d.b h , and 2 trees/acre > 40" d b h Hardwoods dominated the lower layer and included 62 trees/acre > 5" d b h and 22 trees/acre > 11" d.b.h.

The stand structure characteristics by layer are as follows. The top layer averaged 273 years old with an average diameter of 39" and a height of 150' The second layer had an average age of 100 years with a diameter of 23" and a height of 105'. The third layer had an average age of 24 years with a diameter of 14" and a height of 55'

Overall biomass production (conifer + hardwoods + shrubs) was generally moderate Modal Dunning site class was 2,with site index of 150 at 300 years. Conifer productivity was generally low with an average volume of 2986 cu. ft., it ranged from a low of 1756 cu ft to a high of 5561 cu. ft. Softwood basal area averaged 32 sq ft and ranged from 5 to 82 sq. ft. Hardwood volume averaged 557 cu ft and ranged from 264 cu ft to 1386 cu. ft. Hardwood basal area averaged 31 sq ft and ranged from 29 to 36 sq. ft. Stand density index was 375 and fell in the lower group in the Douglas-fir Series.

Fire Regime

This type had a high severity fire regime but, flooding is the primary disturbance agent in this type High fuel moisture levels provide only a narrow window of opportunity for any fire behavior. Periodic low-intensity creeping fires can burn small pockets of accumulated fuels during drought periods. Large accumulations of dead fuel (logs) can set the stage for high intensity fires during extended periods of drought

Management Implications

Silvicultural Systems: Management within riparian types such as this one is discouraged due to the high frequency of natural disturbance resulting from flooding in these streamside positions

Site Preparation: None

Regeneration: None

Release: None.

Animal Damage Control Problems: None known.

Stockability: None

Species Considerations: None

Cultural and Commercial: Only a few plants used for cultural purposes were found in this plant association (Appendix VI) The cultural species most frequently found were red alder, thimbleberry, salmon berry and coltsfoot. No other important commercial plant species besides Douglas-fir were found

Insects and Disease: None known.

Fire Suppression: Line construction is difficult here and more detrimental than the fire effects Use of confine and contain strategies with modified suppression tactic is recommended within riparian areas Use adjoining plant associations in the containment and control strategies Let fires back into riparian areas to create pockets for natural regeneration High cover of herbaceous plants is not a factor in fire behavior here because of high moisture content.

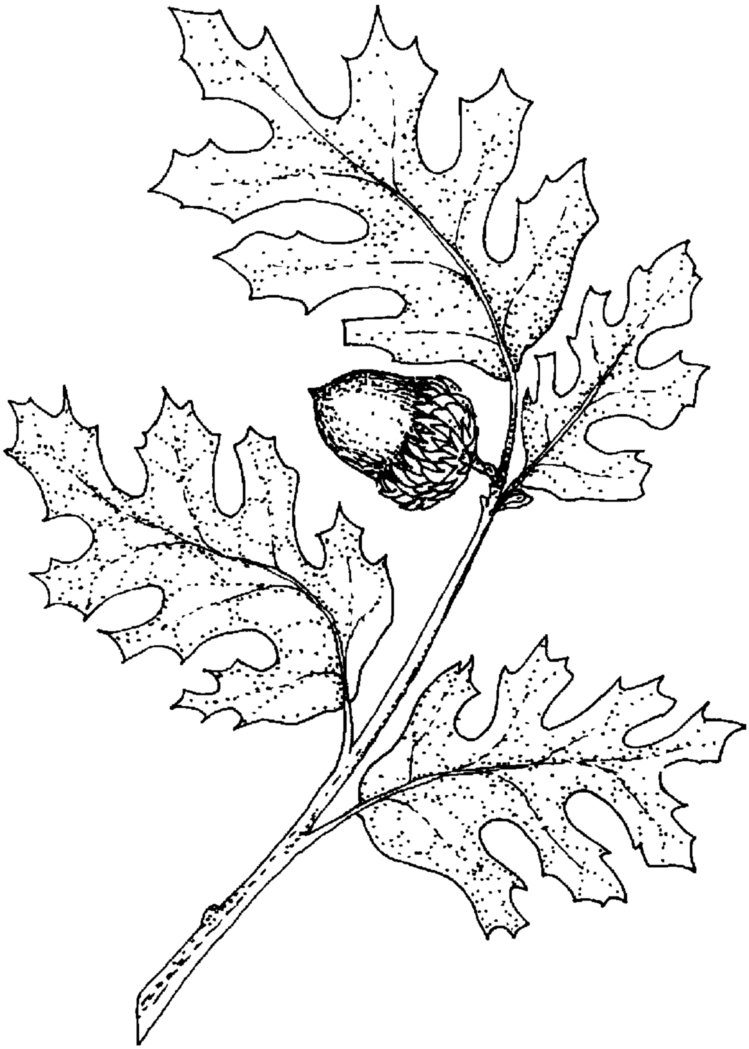
Prescribed Fire: Use prescribed fire to reduce pockets of fuel accumulations and promote natural regeneration for stand age class diversity

Closely Related Types

The PSME–ALRU2/ACCI/MOSI type is closely related to the PSME–ACMA/POMU1 type which was also found in riparian positions but on soils primarily formed from colluvium or residuum.

Notes

Plant Association: Douglas-fir–Black Oak//Metamorphic
EDP Code Name: PSME–QUKE//Metamorphic
Eco-Code: CD0HOB11



Indicator species:

Black oak (*Quercus kelloggii*–QUKE) was found on warm, inland, mid elevation sites, with low soil coarse fragments and moderately acidic soil pH.

Douglas-fir–Black Oak//Metamorphic

PSME–QUKE//Metamorphic Association
Eco-Code CD0HOB11

This mid-elevation, inland type was characterized by high productivity and southerly aspects as well as metamorphic parent material. It is usually found in the Klamath Mtns. and is characterized by the presence of black oak.

Plant Association Summary

(Sample size: 24)

		COVER	CON
Tree Overstory Layer			
PSME	Douglas-fir	48	100
QUKE	Black Oak	9	100
ARME3	Pacific Madrone	8	75
QUCH2	Canyon Live Oak	7	70
Tree Understory Layer			
PSME	Douglas-fir	7	95
QUCH2	Canyon Live Oak	5	75
PILA	Sugar Pine	1	75
Shrubs			
RHDI	Poison Oak	5	79
COCOC	California Hazelnut	2	54
Herbs & Grasses			
PTAQL	Bracken Fern	1	50
CHME2	Little Prince's Pine	1	41
HIAL	White Hawkweed	1	37
IRCH	Slender-tubed Iris	1	37
PYPI2	Whiteveined Wintergreen	1	37

Ranger Districts

Happy Camp, Ukonom, Salmon River

Environment

Distance to the Ocean: 24–51 miles

Elevation: 920–3540'

Aspect: S.E., S.W.

Slope: 20–75%

Slope Position: lower, middle, upper 1/3

Surface Rock: 0–18%

Soils

Pit Depth: 18–40"+

AWC: 2.5–6.5"

Parent Material: mafic, greenstone, granite

A Horizon—

Coarse Frag: 15–55%
Textures: l, gl, gcl, vgl, xgl
Thickness: 3–14"
pH: 5.1–7.0

Physical and Biological Environment

Distribution/Setting

This type was found on inland sites where mean distance to the Pacific Ocean was 37 5 miles Elevation averaged 2312' and slopes were typically steep, averaging 46% Mean radiation index was a warm 497 due to southwest and southeast aspects and exposed landscape positions.

Soils

Soils in this type were predominately mesic, deep (63%) to moderately deep (25%) and well drained. They formed in residuum, colluvium and occasionally alluvium The litter layer had an average thickness of 0.9" at 91% cover. Surface rock fragments averaged 5% cover The surface horizon had an average thickness of 6" The surface horizons were primarily loam to extremely gravelly loam and gravelly clay loam in texture Coarse fragment content averaged 33% and pH averaged 6 2 (slightly acid)

The subsoils were predominately clay loam to very gravelly clay loam and loam to very gravelly loam. Subsoil coarse fragment content averaged 32% and ranged from 10% to 68% Subsurface pH averaged 6.2 (slightly acid) and ranged from 5 7 (moderately acid) to 7.0 (neutral). The soils were 37% non-skeletal and 63% skeletal Soil AWC averaged 3.9" and ranged from 2.5" to 6 5" These soils were classified into the subgroups Dystric Xerochrepts, Ultic and Mollic Haploxeralfs and Typic Haploxerults

Vegetation

The total vegetation cover was moderately high ranging from 70% to 95% with an average of 86%. Mean overstory tree cover was 82%, it was dominated by conifers that averaged 49% cover and ranged from 24% to 80% It also included hardwoods that averaged 26% cover and ranged from 14% to 35% The regeneration layer averaged 15% cover Shrub cover low with an average cover of 7% Forb cover was low with an average of 5% cover. Grass cover was low with 3% average cover

Stand Structure

Late seral stands often had 4 or more layers of trees, while early mature and mid-mature stands usually had 2 layers. In late seral stands the top 3 layers were dominated by Douglas-fir, while the lower layer was dominated by black oak and Pacific madrone. Large conifers dominated the top three layers with an average of 18 trees/acre > 25" d b h , 14 trees/acre > 30" d.b.h. and 10 trees/acre > 40" d.b.h. Hardwoods dominated the lower layers and included 168 trees/acre > 5" d b h and 19 trees/acre > 11" d b h

The stand structure characteristics by layer were as follows: the top layer averaged 300 years old with an average diameter of 50" and average height of 165' The second layer had an average age of 259 years with a mean diameter of 44" and a mean height of 144' The third layer had an average age of 156 years with a mean diameter of 28" and a mean height of 113' The fourth layer was dominated by black oak and Pacific madrone, it had a mean diameter of 14" and a mean height of 73'

Overall biomass production (conifer + hardwoods + shrubs) was generally high Modal Dunning site class was 1, with site index of 175 at 300 years Conifer productivity was generally high with an average volume of 7524 cu ft., it ranged 5278 to 10,988 cu. ft., due to the variable cover of hardwoods Softwood basal area averaged 191 sq ft and ranged from 80 to 253 sq. ft Hardwood volume averaged 1288 cu ft and ranged from 461 to 2162 cu. ft. Hardwood basal area averaged 65 sq ft and ranged from 10 to 133 sq ft Stand density index was 412 and fell in the middle of the Douglas-fir Series

Fire Regime

This type had a moderate-severity fire regime which includes infrequent fires of partial stand replacement nature with areas of high and low tree mortality. This regime also includes frequent low intensity fires with minimal overstory mortality These low intensity fires reduce fuel accumulations and subsequent crown scorching from intense fires

Management Implications

Silvicultural Systems: All systems are applicable.

Site Preparation: All site preparation methods are applicable Tractor logging on clay loam soils may result in compaction

Regeneration: Artificial regeneration should be considered

Release: Early release with multiple treatments are recommended due to high density of hardwood stems

Animal Damage Control Problems: Deer browsing can reduce or eliminate the black oak component, particularly in early seral stages

Stockability: Regional stocking guidelines are applicable

Species Considerations: Black oak and sugar pine are important components of this type and should be maintained in all management treatments

Cultural and Commercial: The cultural species most frequently found were black oak, California hazelnut and Pacific madrone The commercial species, incense cedar, was found intermittently with low cover.

Insects and Disease: Due to the potential for white pine blister rust, planting of rust resistant sugar pine should be considered

Fire Suppression: Contain and control strategies are recommended. Indirect attack may be necessary using other vegetation types as control points High moss cover on trees could pose spotting problems

Prescribed Fire: Use prescribed fire in older stands to reduce fuel accumulations Also fire can be used to manage for California hazelnut, black oak acorns and is recommended to reduce insect infestations in acorns

Closely Related Types

The PSME–QUKE//Metamorphic type is closely related to the PSME–QUKE// Sandstone type which is found in more southerly locations in the Lower Trinity and Mad River Ranger Districts.

Notes

Plant Association: Douglas-fir–Black Oak//Sandstone
EDP Code Name: PSME–QUKE//Sandstone
Eco-Code: CD0HOB12

Indicator species:

Black oak (*Quercus kelloggii*–QUKE) was found on warm, inland, mid elevation sites, with low soil coarse fragments and moderately acidic soil pH.

Douglas-fir–Black Oak//Sandstone

PSME–QUKE//Sandstone Association
Eco-Code CD0HOB12

This high elevation, upland type was found on warm sites with southerly aspects and sandstone parent material. It was usually found in the North Coast Mountain Ranges and was characterized by the presence of black oak.

Plant Association Summary

(Sample size: 19)

		COVER	CON
Tree Overstory Layer			
PSME	Douglas-fir	65	100
QUKE	Black Oak	12	100
ARME3	Pacific Madrone	9	63
Tree Understory Layer			
PSME	Douglas-fir	4	100
QUKE	Black Oak	1	78
QUCH2	Canyon Live Oak	2	63
ARME3	Pacific Madrone	4	42
Shrubs			
ROGY	Wood Rose	2	57
SYMO	Creeping Snowberry	2	47
Herbs & Grasses			
GRAM	Grass spp.	3	66
WHMO	Western Modesty	3	36
ADBI	Trailplant	1	31
PYPI2	Whiteveined Wintergreen	1	26

Ranger Districts

Lower Trinity, Mad River

Environment

Distance to the Ocean: 29–50 miles

Elevation: 2380–3920'

Aspect: S.

Slope: 20–50%

Slope Position: middle, upper 1/3

Surface Rock: 0–15%

Soils

Pit Depth: 22–40"+

AWC: 2.4–7.1"

Parent Material: sandstone

A Horizon—

Coarse Frag: 12–50%

Textures: gl, vgl

Thickness: 3–12"

pH: 6.0–6.8

Physical and Biological Environment

Distribution/Setting

This type was found on inland sites where mean distance to the Pacific Ocean was 43 5 miles. Elevation averaged 3208' and slopes were typically moderately steep, averaging 29%. Mean radiation index was a warm .486 due to the south aspects and exposed landscape positions

Soils

Soils in this type were predominately mesic, deep (63%) to moderately deep (37%) and well drained They formed in residuum, colluvium and occasionally alluvium The litter layer had an average thickness of 0.8" at 81% cover Surface rock fragments averaged 10% cover The surface horizon had an average thickness of 8" The surface horizons were primarily gravelly loam and very gravelly loam in texture. Coarse fragment content averaged 29% and pH averaged 6.6 (neutral)

The subsoils were predominately clay loam to very gravelly clay loam and loam to very gravelly loam. Subsoil coarse fragment content averaged 35% and ranged from 20% to 45% Subsurface pH averaged 5 6 (moderately acid) and ranged from 5.0 (very strongly acid) to 6 1 (slightly acid). The soils were 50% non-skeletal and 50% skeletal Soil AWC averaged 4.3" and ranged from 2.4" to 7.1" These soils were classified into the subgroups Dystric Xerochrepts and Ultic Haploxeralfs

Vegetation

The total vegetation cover was moderately high ranging from 75% to 95% with an average of 91% Mean overstory tree cover was 83%, it was dominated by conifers that averaged 59% cover and ranged from 40% to 80% It also included hardwoods that averaged 33% cover and ranged from 12% to 60%. The regeneration layer averaged 10% cover. Shrub cover was low with an average of 7% cover. Forb cover was also moderate with an average of 12% cover. Grass cover was low with 7% average cover

Stand Structure

Late seral stands often had 4 or more layers of trees, while early mature and mid-mature stands usually had 2 layers. In late seral stands the top 2 layers were dominated by Douglas-fir, while the third layer included a combination of conifers and hardwoods and the lower layer was dominated by black oak and Pacific madrone Moderate sized conifers dominated the top three layers with an average of 19 trees/acre > 25" d b h , 5 trees/acre > 30" d.b.h and 2 trees/acre > 40" d b h Hardwoods dominated the lower layers and included 150 trees/acre > 5" d.b.h. and 25 trees/acre > 11" d.b.h.

The stand structure characteristics by layer were as follows: the top layer averaged 158 years old with an average diameter of 36" and average height of 148'. The second layer had an average age of 105 years with a mean diameter of 29" and a mean height of 119' The third layer had an average age of 110 years with a mean diameter of 21" and a mean height of 79' The fourth layer was dominated by black oak and Pacific madrone, it had a mean diameter of 9" and a mean height of 58'

Overall biomass production (conifer + hardwoods + shrubs) was generally high Modal Dunning site class was 1, with site index of 175 at 300 years Conifer productivity was generally moderate with an average volume of 5784 cu ft , it ranged from 4380 to a 10,110 cu ft , due to the variable cover of hardwoods Softwood basal area averaged 204 sq ft and ranged from 153 to 272 sq. ft. Hardwood volume averaged 1003 cu ft and ranged from 200 to 2780 cu ft. Hardwood basal area averaged 47 sq ft and ranged from 47 to 132 sq ft Stand density index was 416 and fell in the middle of the Douglas-fir Series

Fire Regime

This type had a moderate-severity fire regime which includes infrequent fires of partial stand replacement nature with areas of high and low tree mortality This regime also includes frequent low intensity fires with minimal overstory mortality These low intensity fires reduce fuel accumulations and subsequent crown scorching from intense fires. The dominance of smaller sized conifers in the lower layers is related to the higher frequency of fire found on the Mad River Ranger District

Management Implications

Silvicultural Systems: All systems are applicable

Site Preparation: All site preparation methods are applicable Moderate and high intensity broadcast burning may lead to significant competition from deerbrush

Regeneration: Artificial regeneration should be considered

Release: Early release with multiple treatments are recommended due to high density of shrubs

Animal Damage Control Problems: Deer browsing can reduce or eliminate the black oak component, particularly in early seral stages

Stockability: Regional stocking guidelines are applicable

Species Considerations: Black oak is an important component of this type and should be maintained

Cultural and Commercial: The cultural species most frequently found were black oak and Pacific madrone California hazelnut, also a cultural species, was found infrequently here. The commercial species, incense cedar, was found intermittently with low cover

Insects and Disease: None known

Fire Suppression: Contain and control strategies are recommended Indirect attack may be necessary using other vegetation types as control points High moss cover on trees could pose spotting problems

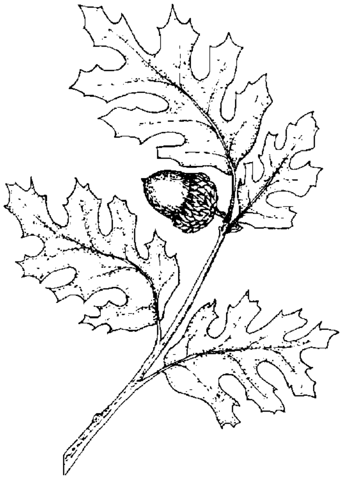
Prescribed Fire: Use prescribed fire in older stands to reduce fuel accumulations. Fire can also be used to manage for California hazelnut, black oak acorns and is recommended to reduce insect infestations in acorns.

Closely Related Types

The PSME–QUKE//Sandstone type is closely related to the PSME–QUKE//Metamorphic type which is found in more northerly locations on the Six Rivers and Klamath National Forests

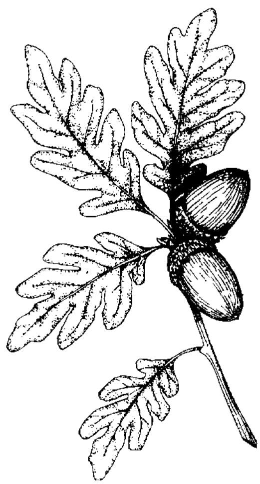
Notes

Plant Association: Douglas-fir–Black Oak–Oregon White Oak/ Grass
EDP Code Name: PSME–QUKE–QUGA2/Grass
Eco-Code: CD0HOB13



Indicator species:

Black oak (*Quercus kelloggii*–QUKE) was found on warm, inland, mid elevation sites, with low soil coarse fragments and moderately acidic soil pH.



Indicator species:

Oregon white oak (*Quercus garryana*–QUGA2) was found on dry, hot, inland sites, with undulating topography, low soil coarse fragments, basic soil pH and high grass cover

Douglas-fir–Black Oak–Oregon White Oak/Grass

PSME–QUKE–QUGA2/Grass Association

Eco-Code CD0HOB13

This inland, upland type was found on warm, southerly aspects on soils with high AWC and sandstone parent material. It is characterized by the presence of black oak, Oregon white oak and a mixture of grass species.

Plant Association Summary

(Sample size: 15)		COVER	CON
Tree Overstory Layer			
PSME	Douglas-fir	56	100
QUKE	Black Oak	16	100
Tree Understory Layer			
QUGA2	Oregon White Oak	10	100
PSME	Douglas-fir	2	86
Shrubs			
RHDI	Poison Oak	2	66
ROGY	Wood Rose	1	33
BEAQ	Hollyleaved Barberry	3	13
Herbs & Grasses			
OSCH	Mountain Sweet-cicely	3	66
SACR-2	Pacific Blacksnakeroot	3	66
MAMA1	Woodland Tarweed	2	40
POMU1	Swordfern	1	33

Ranger Districts

Lower Trinity, Mad River

Environment

Distance to the Ocean: 33–49 miles

Elevation: 2030–3680'

Aspect: S.

Slope: 30–50%

Slope Position: lower, middle 1/3

Surface Rock: 0–10%

Soils

Pit Depth: 33–40"+

AWC: 2.6–5.5"

Parent Material: sandstone

A Horizon—

Coarse Frag: 14–40%

Textures: gl, gcl, l

Thickness: 5–13"

pH: 6.2–7.0

Physical and Biological Environment

Distribution/Setting

This type was found on inland sites where mean distance to the Pacific Ocean was 37 3 miles Elevation averaged 2817' and slopes were typically steep, averaging 41% Mean radiation index was a warm .531 due to the south aspects and exposed landscape positions

Soils

Soils in this type were predominately mesic, moderately deep (60%) to deep (40%) and well to moderately well drained. They formed primarily in colluvium and infrequently in residuum. The litter layer had an average thickness of 1 1" at 90% cover Surface rock fragments averaged 3% cover. The surface horizon had an average thickness of 8" It was gravelly with loam and clay loam textures. Coarse fragment content averaged 28% and pH averaged 6.7 (neutral)

The subsoils were predominately gravelly to very gravelly with loam and clay loam textures. Subsoil coarse fragment content averaged 34% and ranged from 24% to 45% Subsurface pH averaged 6.3 (slightly acid) and ranged from 6 0 (moderately acid) to 6.5 (slightly acid) The soils were 40% non-skeletal and 60% skeletal Soil AWC averaged 4.0" and ranged from 2.6" to 5 5" These soils were classified into the subgroups Dystric Xerochrepts and Pachic Xerumbrepts.

Vegetation

The total vegetation cover was very high ranging from 95% to 99% with an average of 94% Mean overstory tree cover was 85%, it was dominated by conifers that averaged 66% cover and ranged from 45% to 80%. It also included hardwoods that averaged 27% cover and ranged from 14% to 30%. The regeneration layer averaged 5% cover. Shrub cover was low with an average of 5% cover. Forb cover was high with an average of 13% cover Grass cover was moderate with 13% average cover

Stand Structure

Late seral stands often had 3 or more layers of trees, while early mature and mid-mature stands usually had 2 layers In late seral stands the top 2 layers were dominated by Douglas-fir, the third layer included a combination of conifers and hardwoods dominated by black oak and Oregon white oak Moderate sized conifers dominated the top two layers with an average of 24 trees/acre > 25" d.b.h., 4 trees/acre > 30" d b.h. and 2 trees/acre > 40" d.b.h. Hardwoods dominated the lower layers and included 116 trees/acre > 5" d.b.h. and 16 trees/acre > 11" d b h

The stand structure characteristics by layer were as follows the top layer averaged 113 years old with an average diameter of 31" and average height of 115' The second layer had an average age of 93 years with a mean diameter of 20" and a mean height of 80' The third layer had an average age of 93 years with a mean diameter of 13" and a mean height of 58'.

Overall biomass production (conifer + hardwoods + shrubs) was generally moderate Modal Dunning site class was 2, with site index of 150 at 300 years Conifer productivity was generally moderate with an average volume of 3666 cu. ft., it ranged 2580 to 6631 cu. ft , due to the young age and variable cover of hardwoods Softwood basal area averaged 144 sq. ft. and ranged from 85 to 227 sq. ft. Hardwood volume averaged 1532 cu. ft. and ranged from 320 to 1847 cu. ft Hardwood basal area averaged 94 sq. ft. and ranged from 25 to 117 sq ft. Stand density index was 417 and fell in the upper group of the Douglas-fir Series.

Fire Regime

This type had a moderate-severity fire regime, which includes infrequent fires of partial stand replacement nature with areas of high and low tree mortality. This regime also includes frequent low intensity fires with minimal overstory mortality These low intensity fires reduce fuel accumulations and subsequent crown scorching from intense fires.

Management Implications

Silvicultural Systems: All systems are applicable.

Site Preparation: All site preparation methods are applicable, broadcast burning is recommended.

Regeneration: Natural regeneration can be anticipated following shelterwood harvest

Release: Manual release difficult in areas of high grass cover

Animal Damage Control Problems: A potential problem with deer browse damage on regeneration exists here. Deer browsing can also reduce or eliminate the black oak component, particularly in early seral stages.

Stockability: Regional stocking guidelines are applicable

Species Considerations: Black oak and Oregon white oak are important components of this type and should be maintained Their cover varies by seral stage Early seral stages can be dominated by grass

Cultural and Commercial: The cultural species most frequently found were black oak and Oregon white oak, California hazelnut, was found infrequently. Incense cedar, a commercial plant species was found infrequently

Insects and Disease: None known

Fire Suppression: Contain and control strategies are recommended Indirect attack may be necessary using other vegetation types as control points High moss cover on trees could pose spotting problems

Prescribed Fire: Use prescribed fire in older stands to reduce fuel accumulations and manage for black oak and Oregon white oak acorns Periodic fire is recommended to manage California hazelnut and reduce insect infestations in acorns Periodic fire may also reduce regeneration of Douglas-fir in early seral stages

Closely Related Types

The PSME–QUKE–QUGA2/Grass type is closely related to the PSME–QUGA2/Grass type which is found in drier landscape positions occasionally on alluvium

Notes

Plant Association: Douglas-fir–Incense Cedar/California Fescue
EDP Code Name: PSME–CADE3/FECA
Eco-Code: CD0CCI11

Indicator species:

California fescue (*Festuca californica*–FECA) was found on warm, dry, inland sites, often on serpentine soils, with basic soil pH and low AWC.

Douglas-fir–Incense Cedar/California Fescue

PSME–CADE3/FECA Association

Eco-Code CD0CCI11

This open, upland type was usually found on low productivity serpentine soils. It is characterized by the presence of incense cedar and a high cover of California fescue.

Plant Association Summary

(Sample Size:13)		COVER	CON
Tree Overstory Layer			
PSME	Douglas-fir	42	92
CADE3	Incense Cedar	18	84
ARME3	Pacific Madrone	10	61
Tree Understory Layer			
PSME	Douglas-fir	4	100
CADE3	Incense Cedar	2	92
QUCH2	Canyon Live Oak	1	61
LIDE2	Tanoak	2	61
UMCA	California Bay	2	53
Shrubs			
RHDI	Poison Oak	1	53
QUVA	Huckleberry Oak	2	23
Herbs & Grasses			
FECA	California Fescue	59	100
HIAL	White Hawkweed	1	84
IRI	Iris spp.	1	69
POMU1	Swordfern	1	53
WHMO	Western Modesty	5	46

Ranger District

Gasquet, Orleans, Ukonom, Happy Camp

Environment

Distance to the Ocean: 17–45 miles

Elevation: 1360–2750'

Aspect: S., W.

Slope: 10–65%

Slope Position: upper, middle 1/3

Surface Rock: 1–9%

Soils

Pit Depth: 23–40"+

AWC: 1.3–5.5"

Parent Material: serpentine

A Horizon—

Coarse Frag: 20–45%
Textures: vgl, gl, gsil
Thickness: 2–10"
pH: 6.0–7.0

Physical and Biological Environment

Distribution/Setting

This type was found on warm, coastal and inland sites where mean distance to the Pacific Ocean was 29 3 miles. Elevation averaged 2354' and slopes were typically moderately steep, averaging 39% Mean radiation index was a warm 461 due to the south and west aspects and exposed landscape positions.

Soils

Soils in this type were predominately mesic, deep (46%), moderately deep (31%) and shallow (23%) and well to moderately well drained They formed primarily in colluvium and less frequently in residuum The litter layer had an average thickness of 1 4" at 80% cover Surface rock fragments averaged 3% cover The surface horizon had an average thickness of 6". It was primarily gravelly to very gravelly with loam, clay loam and silt loam textures. Coarse fragment content averaged 28% and pH averaged 6 8 (neutral)

The subsoils were predominately gravelly clay loam and gravelly to very gravelly loam Subsoil coarse fragment content averaged 30% and ranged from 20% to 41%. Subsurface pH averaged 7 0 (neutral) and ranged from 6 3 (slightly acid) to 8 0 (moderately alkaline). The soils were 70% non-skeletal and 30% skeletal. Soil AWC averaged 2 5" and ranged from 1.3" to 5.5". These soils were classified into the subgroups Ultic Haploxeralfs, Typic Xerumbrepts, Typic Xerochrepts and Typic Xerorthents.

Vegetation

The total vegetation cover was high ranging from 70% to 99% with an average of 92% Mean overstory tree cover was 63%, it was dominated by conifers that averaged 60% cover and ranged from 35% to 83%. It also included hardwoods that averaged 13% cover and ranged from 0 to 36%. The regeneration layer averaged 11% cover. Shrub cover was very low with an average of 4% cover. Forb cover was also low with an average of 8% cover. Grass cover was very high with 68% average cover

Stand Structure

Late seral stands often had 2 or more layers of trees, while early mature and mid-mature stands usually had 1 or 2 layers. In late seral stands the top 2 layers were dominated by Douglas-fir and incense cedar, while the lower layer was dominated by Pacific madrone Moderate sized conifers dominated the top two layers with an average of 25 trees/acre > 25" d.b.h , 11 trees/acre > 30" d b h. and 4 trees/acre > 40" d b h Hardwoods dominated the lower layers and included 32 trees/acre > 5" d b h and 18 trees/acre > 11" d.b.h.

The stand structure characteristics by layer were as follows. the top layer averaged 253 years old with an average diameter of 38" and average height of 127'. The second layer had an average age of 270 years with a mean diameter of 29" and a mean height of 88'. The third layer was dominated by Pacific madrone, it had a mean diameter of 9" and a mean height of 51'

Overall biomass production (conifer + hardwoods + shrubs) was generally low. Modal Dunning site class was 3, with site index of 125 at 300 years. Conifer productivity was generally low with an average volume of 5558 cu ft , it ranged from 1640 to 9068 cu ft , due to the variable, harsh site conditions and high grass cover. Softwood basal area averaged 234 sq. ft. and ranged from 153 to 307 sq. ft. Hardwood volume averaged 586 cu ft and ranged from 0 to 1486 cu ft Hardwood basal area averaged 27 sq. ft and ranged from 0 to 80 sq. ft. Stand density index was 425 and fell in the middle of the Douglas-fir Series.

Fire Regime

This type had a moderate-severity fire regime, which includes infrequent fires of partial stand replacement nature with areas of high and low tree mortality This regime also includes frequent low intensity fires with minimal overstory mortality. Fire behavior here varies depending on fuel moisture Without periodic low intensity fire, regeneration forms ladder fuels would increase the risk of stand-replacing events

Management Implications

Silvicultural Systems: Management options are limited here due to the limited extent of this type, low productivity, high grass cover and serpentine soils This type may not be well suited to intensive forest management, management options are generally limited to sanitation salvage

Site Preparation: None.

Regeneration: Regeneration is more difficult in this plant association due to high grass cover Snowbrush, deerbrush and grass can be significant competitors in plantations

Release: Manual release can be difficult in areas of high grass cover.

Animal Damage Control Problems: None known

Stockability: Anticipate stocking levels below regional stocking guidelines on sites with highly serpentinized soils or those with high grass cover

Species Considerations: Incense cedar, sugar pine and Oregon white oak should be mantained in all management treatments

Cultural and Commercial: Stands are irregular in structure depending on the amount of serpentine and often contain rare or sensitive plants. The cultural species most frequently found were Pacific madrone and iris. California hazelnut, a cultural species, was found intermittently here The most frequently occurring commercial plant species, were incense cedar and California bay

Insects and Disease: Due to the potential for white pine blister rust, consider planting rust resistant sugar pine

Fire Suppression: Opportunity exists for use of all suppression strategies, confine, contain and control The strategy used is dependent on time of year Modified suppression tactics should be considered due to shallow, serpentine soils. Use of dozers should be reviewed carefully due to serpentine soils.

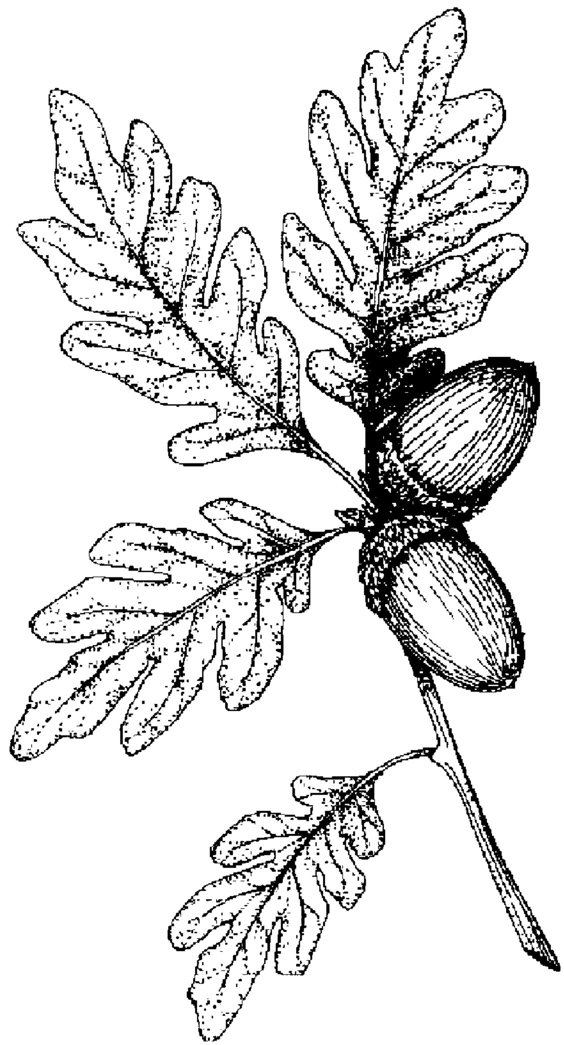
Prescribed Fire: Opportunities exist to produce low intensity fires and for periodic low intensity burns that mimic natural conditions Periodic fire may enhance herbaceous diversity, the cultural species California hazelnut and rare plant habitat. It will also reduce the build up of ladder fuels and reduce the potential for stand-replacing fires

Closely Related Types

The PSME–CADE3/FECA type is closely related to the PSME–PIJE/FECA type that is found on soils developed primarily from residuum. It is replaced on sites with higher serpentine influence by PSME/QUVA, PSME/QUVA–LIDEE or PIJE–PSME/FECA.

Notes

Plant Association: Douglas-fir–Oregon White Oak/Grass
EDP Code Name: PSME–QUGA2/Grass
Eco-Code: CD0HO011



Indicator species:

Oregon white oak (*Quercus garryana*–QUGA2) was found on dry, hot, inland sites, with undulating topography, low soil coarse fragments, basic soil pH and high grass cover.

Douglas-fir–Oregon White Oak/Grass

PSME–QUGA2/Grass Association

Eco-Code CD0HO011

This inland, upland type was found on warm sites with southerly aspects on sandstone parent material. It is characterized by the dominance of Oregon white oak in early seral stages (as pictured) and by Douglas-fir and Oregon white oak in later seral stages.

Plant Association Summary

(Sample size: 10)		COVER	CON
Tree Overstory Layer			
PSME	Douglas-fir	51	100
QUGA2	Oregon White Oak	22	100
ARME3	Pacific Madrone	6	30
Tree Understory Layer			
PSME	Douglas-fir	2	90
QUGA2	Oregon White Oak	1	60
Shrubs			
ROGY	Wood Rose	1	50
SYMO	Creeping Snowberry	1	50
Herbs & Grasses			
OSCH	Mountain Sweet-cicely	2	80
POMU1	Swordfern	1	80
HIAL	White Hawkweed	1	70
FRCA10	California Strawberry	1	50

Ranger Districts

Lower Trinity, Mad River

Environment

Distance to the Ocean: 33–37 miles

Elevation: 1920–4120'

Aspect: W., S.

Slope: 30–60%

Slope Position: middle 1/3

Surface Rock: 0–2%

Soils

Pit Depth: 36–40"+

AWC: 2.0–5.6"

Parent Material: sandstone

A Horizon—
- Coarse Frag:15–32%
- Textures: gl, gsl, l
- Thickness: 6–19"
- pH: 6.0–7.0

Physical and Biological Environment

Distribution/Setting

This type was found on inland sites where mean distance to the Pacific Ocean was 34 8 miles Elevation averaged 3007' and slopes were typically steep, averaging 32%. Mean radiation index was a warm 474 due to the south and west aspects and exposed landscape positions

Soils

Soils in this type were predominately mesic, deep (67%) to moderately deep (33%) and somewhat excessively to moderately well drained They formed primarily in colluvium and infrequently in residuum and alluvium The litter layer had an average thickness of 1 2" at 96% cover Surface rock fragments averaged 1% cover. The surface horizons had an average thickness of 11" They were gravelly with loam and sandy loam textures Coarse fragment content averaged 29% and pH averaged 6 7 (neutral)

The subsoils were predominately gravelly to very gravelly with loam and clay loam textures Subsoil coarse fragment content averaged 38% and ranged from 23% to 52%. Subsurface pH averaged 6 5 (slightly acid) and ranged from 6.3 (slightly acid) to 7 0 (neutral) The soils were 33% skeletal and 67% non-skeletal. Soil AWC averaged 3.7" and ranged from 2 0" to 5 6" These soils were classified into the subgroups Dystric Xerochrepts, Typic Haploxerults and Pachic Xerumbrepts.

Vegetation

The total vegetation cover was very high ranging from 90% to 99% with an average of 96% Mean overstory tree cover was 72%, it was dominated by conifers that averaged 62% and ranged from 40% to 85%. It also included hardwoods that averaged 21% cover and ranged from 6% to 36%. The regeneration layer averaged 3% cover. Shrub cover was moderate with an average of 19% cover Forb cover was moderate with an average of 16% cover Grass cover was moderate with 18% average cover.

Stand Structure

Late seral stands often had 3 or more layers of trees, while early mature and mid-mature stands usually had 2 layers. In late seral stands the top 2 layers were dominated by Douglas-fir, while the lower layer was dominated by Oregon white oak and Pacific madrone Moderate sized conifers dominated the top two layers with an average of 29 trees/acre > 25" d b h , 4 trees/acre > 30" d.b.h. and 1 trees/acre > 40" d b h Hardwoods dominated the lower layer and included 67 trees/acre > 11" d.b.h.

The stand structure characteristics by layer were as follows: the top layer averaged 122 years old with an average diameter of 31" and a height of 96'. The second layer had an average age of 53 years with a mean diameter of 18" and a mean height of 69'. The third layer was dominated by Oregon white oak and Pacific madrone, it had a mean diameter of 15" and a mean height of 38'.

Overall biomass production (conifer + hardwoods + shrubs) was generally low. Modal Dunning site class was 2, with site index of 150 at 300 years. Conifer productivity was generally low with an average volume of 5335 cu ft , it ranged from a low of 2186 cu ft to a high of 8890 cu ft , due to the variable cover of hardwoods Softwood basal area averaged 207 sq ft and ranged from 113 to 360 sq. ft. Hardwood volume averaged 595 cu. ft. and ranged from 40 cu ft to 1993 cu ft Hardwood basal area averaged 32 sq. ft. and ranged from 10 to 93 sq ft Stand density index was 364 and fell in the lower end of the Douglas-fir Series

Fire Regime

This type had a moderate severity fire regime with frequent fire events of various levels of intensity A combination of high intensity, moderate intensity and low intensity events occur here High intensity events occur infrequently following periods of drought and lead to stand-replacing fires Moderate intensity events are infrequent and result in fires of a partial stand replacement nature and may include areas of high and low tree mortality. Pre-suppression fires were part of a low severity regime with with frequent low intensity fires

Management Implications

Silvicultural Systems: All systems are applicable.

Site Preparation: Low intensity broadcast burning is recommended. Moderate and high intensity broadcast burns can lead to significant competition from deerbrush

Regeneration: High cover of grass can effect regeneration success

Release: Manual release can be difficult in areas of high grass cover.

Animal Damage Control Problems: High potential for deer browse damage to regeneration.

Stockability: Regional stocking guidelines are applicable

Species Considerations: Oregon white oak cover varies with seral stage Early seral stages can be dominated by Oregon white oak and grass, while mature stages can have very low oak cover Late seral stages have a balanced distribution of oaks, grass and conifers

Cultural and Commercial: The cultural species most frequently found here were Pacific madrone, bigleaf maple and Oregon white oak. The most frequently occurring commercial plant species was California strawberry

Insects and Disease: Dwarf mistletoe can be a problem here

Fire Suppression: Increased resistance to control in older stands may result from heavy fuel accumulation, especially where fire has been excluded. Contain and control strategies are recommended Indirect attack may be necessary using other vegetation types as control points. Direct attack may warrant use of modified suppression tactics Avoid dozer use on sandy loam soils to avoid soil erosion. Aerial retardant use may be an alternative High moss cover on trees may pose a spotting problem.

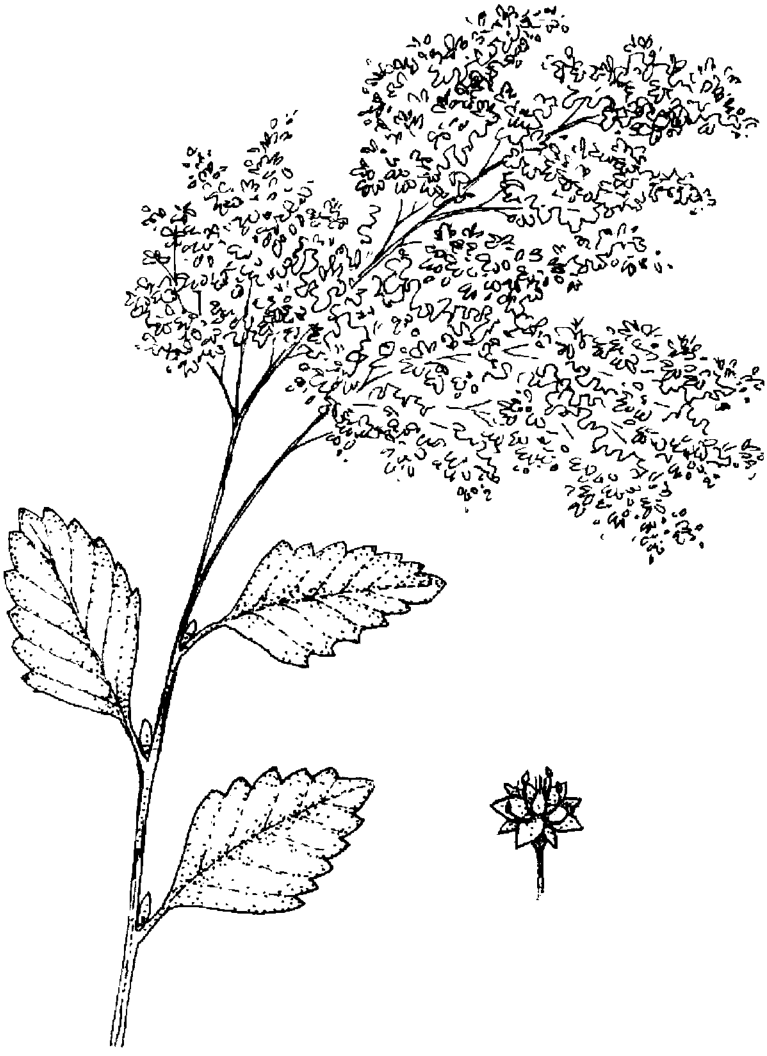
Prescribed Fire: Periodic low intensity fires are beneficial to this plant association. They reduce fuel accumulation, promote plant species diversity and reduce crown scorching from intense fires. Prescribed fire should limit disturbance time (duration of burn and frequency) Periodic burning in the early seral stages can reduce or eliminate the Douglas-fir component

Closely Related Types

The PSME–QUGA2/Grass type is closely related to the PSME–QUKE–QUGA2/ Grass type that is found on residual and colluvial soils It may be replaced in riparian sites on alluvial soils by PSME–QUGA2/HODI and on upland moist sites by the PSME–QUKE//Sandstone type

Notes

Plant Association: Douglas-fir–Oregon White Oak/Oceanspray
EDP Code Name: PSME–QUGA2/HODI
Eco-Code: CD0HO012



Indicator species:

Oceanspray (*Holodiscus discolor*–HODI) was found on cool, steep, mid elevation sites, with low AWC, moderate surface rock, moderate tree and grass cover.

Douglas-fir–Oregon White Oak/Oceanspray

PSME–QUGA2/HODI Association

Eco-Code CD0HO012

This warm, inland, riparian type was found along order 1 and 2 stream courses on sandstone parent material in the North Coast Mountain Ranges. It is characterized by the presence of Oregon white oak and oceanspray.

Plant Association Summary

(Sample size: 14)		COVER	CON
Tree Overstory Layer			
PSME	Douglas-fir	24	100
QUGA2	Oregon White Oak	19	100
Tree Understory Layer			
PSME	Douglas-fir	3	100
Shrubs			
HODI	Oceanspray	33	92
AMAL	Pacific Serviceberry	7	92
SYMO	Creeping Snowberry	2	85
Herbs & Grasses			
JUN-2	Rush spp.	7	100
CYEC	Dogtail Grass	2	64
FES3	Fescue spp.	3	57
ELGL	Blue Wild Rye	2	57

Ranger Districts

Mad River

Environment

Distance to the Ocean: 42–45 miles

Elevation: 2360–3380'

Aspect: E., S.

Slope: 35–90%

Slope Position: lower1/3, stream headwaters

Surface Rock: 10–20%

Soils

Pit Depth: 20–40"+

AWC: 2.7–5.2"

Parent Material: sandstone

A Horizon—
- Coarse Frag: 10–40%
- Textures: cl, gcl, gl, vgl
- Thickness: 6–16"
- pH: 6.5–7.0

Physical and Biological Environment

Distribution/Setting

This type was found on inland riparian sites where mean distance to the Pacific Ocean was 44.1 miles Elevation averaged 2839' and slopes were typically very steep, averaging 60%. Mean radiation index was a warm .525 due to the south and east aspects, but was moderated by topographic shading due to its streamside position

Soils

Soils in this type were predominately mesic, deep (40%) to moderately deep (40%) and somewhat excessively to moderately well drained They formed primarily in colluvium and infrequently in alluvium and residuum. The litter layer had an average thickness of 1 4" at 45% cover. Surface rock fragments averaged 12% cover The surface horizons had an average thickness of 10". They were gravelly to very gravelly, with loam and clay loam textures Coarse fragment content averaged 34% and pH averaged 6.8 (neutral).

The subsoils were predominately gravelly with loam and clay loam textures. Subsoil coarse fragment content averaged 41% and ranged from 16% to 50%. Subsurface pH averaged 6 4 (slightly acid) and ranged from 5.8 (moderately acid) to 7 0 (neutral). The soils were 40% skeletal and 60% non-skeletal Soil AWC averaged 3 4" and ranged from 2.7" to 5 2" These soils were classified into the subgroups, Dystric Xerochrepts and Mollic Haploxeralfs

Vegetation

The total vegetation cover was moderate ranging from 60% to 99% with an average of 88%. Mean overstory tree cover was 39%, it was split between conifers and hardwoods. Conifer cover averaged 24% and ranged from 5% to 31% Hardwood cover averaged 21% and ranged from 5% to 32%. The regeneration layer averaged 3% cover. Shrub cover was high with an average cover of 51% Forb cover was moderate with an average of 11% cover Grass cover was moderate with 15% average cover.

Stand Structure

Late seral stands often had 3 or more layers of trees, while early mature and mid-mature stands usually had 2 layers In late seral stands the top 2 layers were dominated by Douglas-fir, while the lower layer was dominated by Oregon white oak and Pacific madrone. Moderate sized conifers dominated the top two layers with an average of 26 trees/acre > 25" d b h , 17 trees/acre > 30" d b h and 7 trees/acre > 40" d.b.h. Hardwoods dominated the lower layer and included 90 trees/acre > 5" d.b h and 16 trees/acre > 11" d b h

The stand structure characteristics by layer were as follows: the top layer averaged 105 years old with an average diameter of 23" and a height of 109'. The second layer had an average age of 96 years with a mean diameter of 14" and a mean height of 67'. The third layer was dominated by Oregon white oak and Pacific madrone, it had a mean diameter of 9" and a mean height of 51'.

Overall biomass production (conifer + hardwoods + shrubs) was generally low Modal Dunning site class was 2, with site index of 150 at 300 years Conifer productivity was generally low with an average volume of 6138 cu. ft., it ranged from a low of 3490 cu ft to a high of 7150 cu ft , due to the variable cover of hardwoods Softwood basal area averaged 195 sq ft and ranged from 113 to 208 sq ft Hardwood volume averaged 786 cu. ft and ranged from 0 to 820 cu. ft. Hardwood basal area averaged 48 sq ft. and ranged from 0 to 61 sq ft Stand density index was 321 and fell in the lower end of the Douglas-fir Series.

Fire Regime

This type is represented by a high severity fire regime It rarely reaches late seral stages due to frequent fire events of various levels of intensities A combination of high intensity, moderate intensity and low intensity events occur here High intensity events occur infrequently and are preceded by drought periods. Moderate intensity events occur infrequently and are of partial stand-replacing nature Frequent low intensity fires are common here The intensity of fire events is dependent on fire frequency

Management Implications

Silvicultural Systems: Management treatments are limited here due to the riparian nature of this type

Site Preparation: None

Regeneration: None

Release: None.

Animal Damage Control Problems: Cattle utilize this type and heavy grazing can lead to bank sluffing and the deposition of sediment into the stream

Stockability: None

Species Considerations: Oregon white oak is an important component of this type and should be mantained in all management treatments

Cultural and Commercial: The cultural species most frequently found were Oregon white oak and California hazelnut, a cultural species was also found intermittently California bay, a commercial plant species, was found intermittently in this plant association

Insects and Disease: None known

Fire Suppression: Increased resistance to control should be expected in older stands due to high fuel loading, especially where fire has been excluded Contain and control strategies are recommended Indirect attack may be necessary using other vegetation types as control points Direct attack may warrant use of modified suppression tactics Avoid dozer use here due to riparian position and sandy, erodible soils Aerial retardant use may be an alternative. Heavy moss cover on trees may pose spotting problems

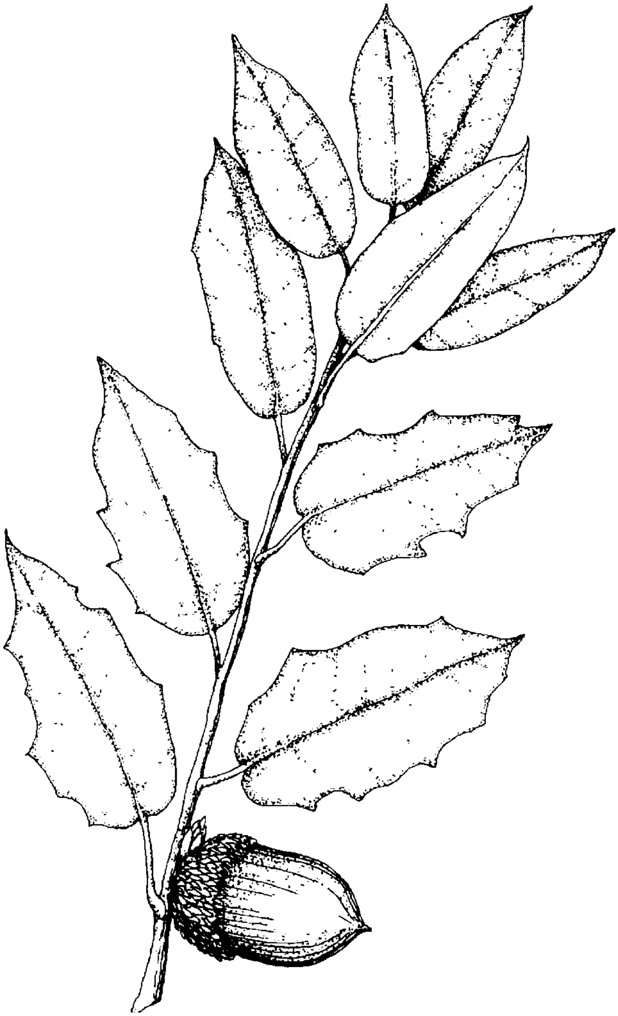
Prescribed Fire: Periodic low intensity fires are beneficial to this plant association They reduce fuel accumulations, promote plant species diversity, enhance the cultural species (i.e California hazelnut) and reduce crown scorching from intense fires Prescribed fire should limit disturbance time (duration of burn and frequency). Periodic burning in the early seral stages can reduce the Douglas-fir component.

Closely Related Types

The PSME–QUGA2/HODI type is closely related to the PSME–QUGA2/Grass type which is also occasionally found on alluvial soils. It is also related to the PSME–QUKE–QUGA2/Grass type which is more often found on colluvial and residual soils Both are found in upslope positions often adjacent to this type

Notes

Plant Association: Douglas-fir–Canyon Live Oak//Rockpile
EDP Code Name: PSME–QUCH2//Rockpile
Eco-Code: CD0HOL11



Indicator species:

Canyon live oak (*Quercus chrysolepis*–QUCH2) was found on steep, dry, rocky, warm sites.

Douglas-fir–Canyon Live Oak//Rockpile

PSME–QUCH2//Rockpile Association

Eco-Code CD0HOL11

This upland type was found on very steep, warm, rocky sites. The soil surface was typically covered by a rock mulch. It is characterized by a high cover of canyon live oak.

Plant Association Summary

(Sample size: 21)		COVER	CON
Tree Overstory Layer			
PSME	Douglas-fir	34	100
QUCH2	Canyon Live Oak	28	95
LIDE2	Tanoak	5	61
ARME3	Pacific Madrone	8	57
PILA	Sugar Pine	5	57
Tree Understory Layer			
QUCH2	Canyon LIve Oak	14	95
PSME	Douglas-fir	3	80
LIDE2	Tanoak	6	66
Shrubs			
RHDI	Poison Oak	3	33
Herbs & Grasses			
POMU1	Swordfern	2	47
WHMO	Western Modesty	6	42
CHUMO	Prince's Pine	2	42
CHME2	Little Prince's Pine	1	38
IRI	Iris spp.	1	38

Ranger Districts

Orleans, Gasquet, Ukonom Lower Trinity, Happy Camp

Environment

Distance to the Ocean: 17–42 miles

Elevation: 1600–4600'

Aspect: S.W., W.

Slope: 20–90%

Slope Position: middle, upper 1/3, ridgetop

Surface Rock: 10–90%

Soils

Pit Depth: 15–40"+

AWC: 1.1–4.6"

Parent Material: schist, semischist, phyllite

A Horizon—

Coarse Frag: 20–95%

Textures: gl, vgl, xgl, sl

Thickness: 5–13"

pH: 5.2–6.5

Physical and Biological Environment

Distribution/Setting

This type was found on coastal and inland sites normally below head scarps that contributed high surface rock in the form of a mulch Mean distance to the Pacific Ocean was 29.9 miles. Elevation averaged 3291' and slopes were typically very steep, averaging 64%. Mean radiation index was a warm 463

Soils

Soils in this type were predominately mesic, deep (42%), moderately deep (37%) and shallow (21%) and somewhat excessively to well drained. They formed primarily in residual and colluvial metamorphic rock The litter layer had an average thickness of 0.6" at 64% cover. The surface horizon had an average thickness of 7" It was primarily gravelly to extremely gravelly with loam and sandy loam textures. Coarse fragment content averaged 53% and pH averaged 5.9 (moderately acid).

The subsoils were predominately very gravelly to extremely gravelly loam or very cobbly to extremely cobbly loam Subsoil coarse fragment content averaged 63% and ranged from 35% to 90% Subsurface pH averaged 5.8 (moderately acid) and ranged from 4.9 (very strongly acid) to 6 3 (slightly acid). The soils were skeletal Soil AWC averaged 2.6" and ranged from 1 1" to 4 6" These soils were classified into the subgroup Dystric Xerochrepts.

Vegetation

The total vegetation cover was moderate ranging from 60% to 98% with an average of 85% Mean overstory tree cover was 77%, it was dominated by conifers that averaged 40% cover and ranged from 20% to 75%. It also included hardwoods that averaged 40% cover and ranged from 25% to 70% cover. The regeneration layer averaged 22% cover Shrub cover was low and spotty with an average of 10% cover Forb cover was also low and spotty with an average of 5% cover. Grass cover was very low with < 1% cover

Stand Structure

Late seral stands often had 4 or more layers of trees, while early mature and mid-mature stands usually had 2 layers. In late seral stands the top 2 layers were dominated by Douglas-fir, the lower two layers were dominated by canyon live oak, Pacific madrone and tanoak. Moderate sized conifers dominated the top two layers with an average of 22 trees/acre > 25" d.b h , 13 trees/acre > 30" d b.h. and 5 trees/acre > 40" d b h Hardwoods dominated the lower layers and included 126 trees/acre > 5" d.b.h and 22 trees/acre > 11" d b.h.

The stand structure characteristics by layer were as follows: the top layer averaged 312 years old with an average diameter of 40" and average height of 144'. The second layer had an average age of 258 years with a mean diameter of 32" and a mean height of 128'. The third layer had a mean diameter of 14" and a mean height of 78' The fourth layer had an average diameter of 9" and average height of 51'.

Overall biomass production (conifer + hardwoods + shrubs) was generally low. Site class was variable due to the harshness of these sites Modal Dunning site class was 4, with site index of 100 at 300 years. Conifer productivity was generally low with an average volume of 5944 cu ft , it ranged from 3898 to 8870 cu. ft., due to the harsh sites and variable cover of hardwoods Softwood basal area averaged 181 sq ft and ranged from 120 to 267 sq. ft. Hardwood volume averaged 1116 cu ft and ranged from 116 to 2321 cu ft. Hardwood basal area averaged 71 sq ft and ranged from 10 to 120 sq ft Stand density index was 364 and fell in the lower group in the Douglas-fir Series.

Fire Regime

The fire regime here is moderate-severity with infrequent fires that are partial stand replacement events They also may include areas of high and low tree mortality. Large down woody debris is absent here due to low stocking and steep slopes. This lack of large fuels reduces the fire intensity

Management Implications

Silvicultural Systems: Sites are highly variable, silvicultural systems are dependent on the amount of surface rock and soil coarse fragments

Site Preparation: All site preparation methods are applicable depending on site conditions.

Regeneration: High surface rock on selected sites could lead to planting problems Artificial regeneration should be considered. Seedlings may need protection from rock on talus slopes Anticipate lower survival rates on sites with high surface rock or high soil coarse fragments Moderate or high intensity broadcast burning could lead to significant competition from deerbrush or whitethorn

Release: Early release with multiple treatments are recommended due to the potential for high density of shrubs

Animal Damage Control Problems: None

Stockability: Anticipate stocking levels below regional guidelines on sites with high surface rock or high soil coarse fragments

Species Considerations: Sugar pine is an important component of this type and should be maintained in all management treatments

Cultural and Commercial: The cultural species most frequently found were Pacific madrone, Jeffrey pine and tanoak (in the understory) California hazelnut, a cultural species was also found infrequently. Few commercial species were found

Insects and Disease: Due to the potential for white pine blister rust planting of rust resistant sugar pine should be considered

Fire Suppression: Contain and control strategies are recommended Indirect attack may be necessary The high cover of surface rock makes line construction difficult. High moss cover on surface rock can be a carrier of ground fire. The potential exists for fire to escape fire lines when moss cover is exposed by hand line construction Each season conditions exist that produce extreme fire behavior and where control strategies are recommended.

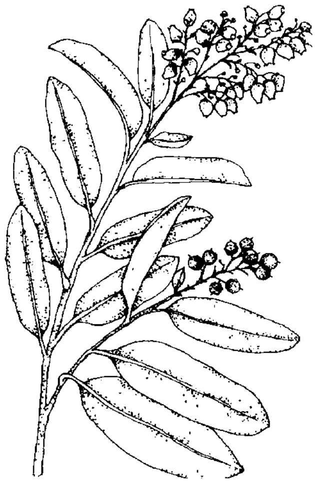
Prescribed Fire: Use prescribed fire in older stands to reduce fuel accumulations, promote stand diversity and manage for California hazelnut This plant association often includes habitat for sensitive salamander species Moderate-intensity fires can be destructive to salamander habitat Prescribed burning at low intensities is likely to allow salamanders to avoid fire impacts Early spring burning is recommended when soil moisture is high and salamanders may be in hibernation, otherwise late fall burns, when salamanders may be deeper in the ground, are recommended

Closely Related Types

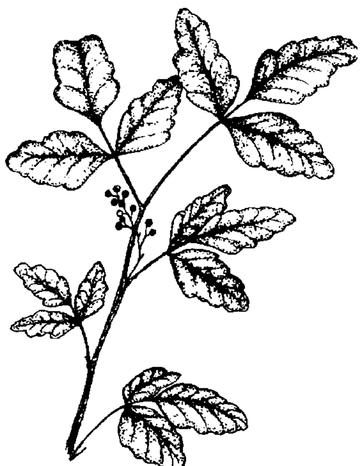
The PSME–QUCH2//Rockpile type is closely related to the PSME–QUCH2–ARME3/RHDI type which is generally found on better sites in lower slope positions.

Notes

Plant Association: Douglas-fir–Canyon Live Oak–Pacific Madrone/Poison Oak
EDP Code Name: PSME–QUCH2–ARME3/RHDI
Eco-Code: CD0HOL12



Indicator species:
Pacific Madrone *(Arbutus menziesii*–ARME3*)* was found on warm, mid elevation sites, with high tree cover and moderate shrub and forb cover



Indicator species:
Poison oak (*Rhus diversiloba*–RHDI) was found on steep, warm, low elevation, inland sites, with moderate soil coarse fragments and acidic soil pH.

Douglas-fir–Canyon Live Oak–Pacific Madrone/ Poison Oak

PSME–QUCH2–ARME3/RHDI Association
Eco-Code CD0HOL12

This inland type is found on dry, rocky sites and is characterized by the presence of canyon live oak, Pacific madrone, and poison oak.

Plant Association Summary

(Sample size: 31)		COVER	CON
Tree Overstory Layer			
QUCH2	Canyon Live Oak	42	100
PSME	Douglas-fir	36	100
ARME3	Pacific Madrone	8	89
ACMA	Bigleaf Maple	7	31
Tree Understory Layer			
QUCH2	Canyon Live Oak	9	100
PSME	Douglas-fir	4	89
ARME3	Pacific Madrone	1	62
Shrubs			
RHDI	Poison Oak	7	82
LOHIV	Pink Honeysuckle	1	31
Herbs & Grasses			
IRI	Iris spp.	1	41
POMU1	Swordfern	2	34
CHME2	Little Prince's Pine	1	34

Ranger Districts

Orleans, Gasquet, Mad River, Lower Trinity, Ukonom, Happy Camp

Environment

Distance to the Ocean: 27–42 miles

Elevation: 1120–4130'

Aspect: S.W., W.

Slope: 15–85%

Slope Position: lower, middle, upper 1/3

Surface Rock: 1–80%

Soils

Pit Depth: 13–40"+

AWC: 0.6–5.6"

Parent Material: schist, sandstone, phyllite

A Horizon—
Coarse Frag: 20–100%
Textures: gl, gsl, vgl, xgl
Thickness: 0–35"
pH: 5.5–7.0

Physical and Biological Environment

Distribution/Setting

This type is widespread and was found on inland sites where mean distance to the Pacific Ocean was 39.4 miles. Elevation averaged 2733' and slopes were typically very steep, averaging 59%. Mean radiation index was a warm 492, but was moderated somewhat by topographic shading

Soils

Soils in this type were predominately mesic, deep (57%) to moderately deep (26%) and well drained They formed primarily in residuum and colluvium The litter layer had an average thickness of 0.7" at 62% cover. The surface horizon had an average thickness of 10". It was gravelly to extremely gravelly with loam and sandy loam textures Coarse fragment content averaged 60% and pH averaged 6.3 (slightly acid).

The subsoils were predominately gravelly to extremely gravelly with sandy loam, loam and clay loam textures Subsoil coarse fragment content averaged 59% and ranged from 34% to 85% Subsurface pH averaged 6 2 (slightly acid) and ranged from 5 2 (strongly acid) to 7 3 (neutral) The soils were 4% non-skeletal and 96% skeletal Soil AWC averaged 2 2" and ranged from 0 6" to 5 6". These soils were classified into the subgroups Dystric Xerochrepts, Mollic Haploxeralfs and Typic Xerumbrepts.

Vegetation

The total vegetation cover was moderate ranging from 70% to 99% with an average of 85% Mean overstory tree cover was 82%, it was dominated by conifers that averaged 41% cover and ranged from 20% to 50%. It also included hardwoods that averaged 50% cover and ranged from 20% to 84%. The regeneration layer averaged 10% cover Shrub cover was low and spotty with an average of 8% cover Forb cover was also moderate with an average of 10% cover. Grass cover was very low with 1% average cover.

Stand Structure

Late seral stands often had 4 or more layers of trees, while early mature and mid-mature stands usually had 2 layers In late seral stands the top 2 layers were dominated by Douglas-fir, the lower two layers were dominated by dominated by canyon live oak, Pacific madrone and bigleaf maple Moderate sized conifers dominated the top two layers with an average of 20 trees/acre > 25" d.b.h., 13 trees/acre > 30" d b h and 4 trees/acre > 40" d.b.h. Hardwoods dominated the lower layers and included 110 trees/acre > 5" d b h and 34 trees/acre > 11" d b h

The stand structure characteristics by layer were as follows: the top layer averaged 278 years old with an average diameter of 41" and average height of 156'. The second layer had an average age of 200 years with a mean diameter of 30" and a mean height of 125'. The third layer had an average diameter of 14" and average height of 78'. The fourth layer had a mean diameter of 9" and a mean height of 51'

Overall biomass production (conifer + hardwoods + shrubs) was generally low Site class was variable due to the harshness of these sites Modal Dunning site class was 4, with site index of 100 at 300 years. Conifer productivity was generally low with an average volume of 5978 cu. ft., it ranged from a low of 2147 to 8777 cu ft , due to the harsh sites and variable cover of hardwoods. Softwood basal area averaged 159 sq ft. and ranged from 70 to 253 sq ft Hardwood volume averaged 1581 cu. ft. and ranged from 230 to 3905 cu ft. Hardwood basal area averaged 75 sq ft and ranged from 27 to 180 sq. ft Stand density index was 392 and fell in the lower group in the Douglas-fir Series.

Fire Regime

The normal fire regime here is moderate-severity with infrequent fires that are partial stand replacement events They also may include areas of high and low tree mortality Large down woody debris is absent here due to low stocking and steep slopes This lack of large fuels reduces the fire intensity.

Management Implications

Silvicultural Systems: Sites are highly variable, silvicultural systems are dependent on the amount of surface rock and soil coarse fragments

Site Preparation: All site preparation methods are applicable depending on site conditions.

Regeneration: High surface rock on selected sites could lead to planting problems Artificial regeneration should be considered. Seedlings may need protection from rock on talus slopes Anticipate lower survival rates on sites with high surface rock or high soil coarse fragments. Moderate or high intensity broadcast burning could lead to significant competition from deerbrush

Release: Early release with multiple treatments are recommended due to the potential for high density of shrubs

Animal Damage Control Problems: None known.

Stockability: Anticipate stocking levels below regional guidelines on sites with high surface rock or high soil coarse fragments

Species Considerations: Sugar pine and black oak are an important component of this type and should be maintained in all management treatments.

Cultural and Commercial: The cultural species most frequently found was Pacific madrone California hazelnut, a cultural species was also found infrequently here Few commercial species were found

Insects and Disease: None known.

Fire Suppression: Contain and control strategies are recommended Indirect attack may be necessary The high cover of surface rock makes line construction difficult This type often contains shallow rocky soils that are a major concern if mechanized equipment is used Each season conditions exist that produce extreme fire behavior where control strategies are recommended.

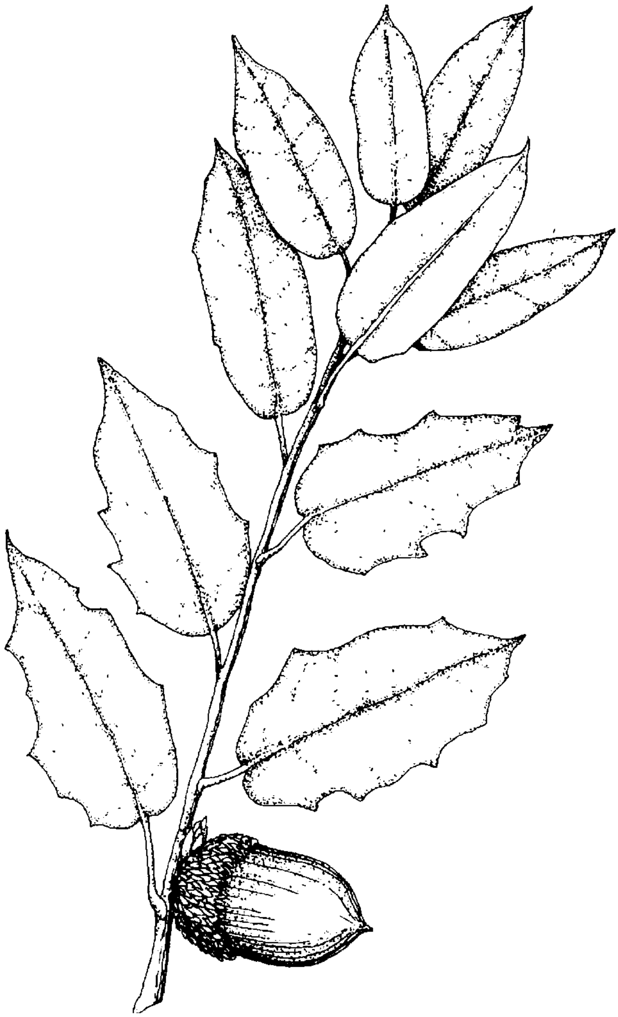
Prescribed Fire: Use prescribed fire in older stands to reduce fuel accumulations, manage California hazelnut and promote stand diversity

Closely Related Types

The PSME-QUCH2-ARME3/RHDI type is closely related to the PSME-QUCH2// Rockpile type which is generally found on poorer, upslope sites. On moister sites this type is replaced by LIDE2-QUCH2-QUKE/RHDI

Notes

Plant Association: Douglas-fir–Canyon Live Oak–Tanoak
EDP Code Name: PSME–QUCH2–LIDE2
Eco-Code: CD0HOL13



Indicator species:

Canyon Live oak (*Quercus chrysolepis*–QUCH2) was found on steep, dry, rocky, warm sites.

Douglas-fir–Canyon Live Oak–Tanoak

PSME–QUCH2–LIDE2 Association

Eco-Code CD0HOL13

This upland type is found on warm, south aspects with deep to moderately deep, rocky soils with high AWC. It is characterized by canyon live oak in the overstory and tanoak (in the shrub form).

Plant Association Summary

(Sample size: 23)

		COVER	CON
Tree Overstory Layer			
PSME	Douglas-fir	48	100
QUCH2	Canyon Live Oak	23	91
ARME3	Pacific Madrone	6	82
LIDE2	Tanoak	5	60
PILA	Sugar Pine	9	56
Tree Understory Layer			
LIDE2	Tanoak	6	100
QUCH2	Canyon Live Oak	10	95
PSME	Douglas-fir	6	86
PILA	Sugar Pine	2	66
Shrubs			
RHDI	Poison Oak	3	65
BENE1	Dwarf Oregon-grape	4	34
LOCI2	Orange Honeysuckle	1	26
Herbs & Grasses			
PTAQL	Bracken Fern	1	69
CHME2	Little Prince's Pine	1	60
WHMO	Western Modesty	6	52
IRI	Iris spp.	1	34

Ranger Districts

Orleans, Gasquet, Happy Camp, Ukonom

Environment

Distance to the Ocean: 17–43 miles

Elevation: 1280–3940'

Aspect: S.E., S.W.

Slope: 45–80%

Slope Position: lower, middle, upper 1/3

Surface Rock: 0–15%

Soils

Pit Depth: 22–40"+

AWC: 1.8–5.0"

Parent Material: mafic, schist, greenstone, phyllite

A Horizon—

Coarse Frag: 15–87%
Textures: l, gl, vgl, xgl
Thickness: 2–14"
pH: 5.3–6.7

Physical and Biological Environment

Distribution/Setting

This type was found on coastal and inland sites where mean distance to the Pacific Ocean was 31 2 miles Elevation averaged 2688' and slopes were typically very steep, averaging 58% Mean radiation index was a very warm .515 due to southerly aspects

Soils

Soils in this type were predominately mesic, deep (50%) to moderately deep (32%) and were somewhat excessively to well drained They formed primarily in residuum and less frequently in colluvium The litter layer averaged 0.7" thick at 87% cover Surface rock fragments averaged 6% cover. The surface horizon had an average thickness of 7". The surface horizon texture was predominately loam to extremely gravelly loam Coarse fragment content averaged 36% and pH averaged 6 0 (moderately acid)

The subsoils were predominately gravelly to extremely gravelly loam or clay loam Subsoil coarse fragment content averaged 48% and ranged from 10% to 90%. Subsurface pH averaged 6 1 (slightly acid) and ranged from 5 7 (moderately acid) to 6.4 (slightly acid). The soils were 46% non-skeletal and 54% skeletal Soil AWC averaged 3.4" and ranged from 1.8" to 5 0" These soils were classified into the subgroups Dystric Xerochrepts, Typic Haploxerults and Ultic Haploxeralfs

Vegetation

The total vegetation cover was moderate ranging from 80% to 98% with an average of 89%. Mean overstory tree cover was 81%, it was dominated by conifers that averaged 46% cover and ranged from 20% to 70% It also included hardwoods that averaged 32% cover and ranged from 17% to 47% cover The regeneration layer averaged 26% cover. Shrub cover was low and spotty with an average cover of 8% Forb cover was also low and spotty with an average of 7% cover Grass cover was low with 3% average cover

Stand Structure

Late seral stands often had 5 or more layers of trees, while early mature and mid-mature stands usually had 3 layers In late seral stands the top 2 layers were dominated by Douglas-fir, the third layer included a combination of conifers and hardwoods, while the lower two layers were dominated by canyon live oak, Pacific madrone and tanoak. Large sized conifers dominated the top two layers with an average of 22 trees/acre > 25" d b h , 16 trees/acre > 30" d.b h and 8 trees/acre > 40" d b.h Hardwoods dominated the lower layers and included 145 trees/acre > 5" d b h and 14 trees/acre > 11" d.b.h.

The stand structure characteristics by layer were as follows the top layer averaged 289 years old with an average diameter of 48" and average height of 156' The second layer had an average age of 209 years with a mean diameter of 39" and a mean height of 131'. The third layer had an average age of 181 years with a mean diameter of 25" and a mean height of 107' The fourth layer had an average diameter of 14" and average height of 78' The fifth layer had a mean diameter of 9" and a mean height of 51'.

Overall biomass production (conifer + hardwoods + shrubs) was generally moderate Modal Dunning site class was 2, with site index of 150 at 300 years Conifer productivity was generally moderate with an average volume of 7903 cu. ft , it ranged from 3854 to 10645 cu. ft., due to the variable cover of hardwoods. Softwood basal area averaged 212 sq ft and ranged from 130 to 300 sq ft.

Hardwood volume averaged 1108 cu ft. and ranged from 233 to 2166 cu ft Hardwood basal area averaged 58 sq ft and ranged from 8 to 120 sq ft Stand density index was 414 and fell in the middle group in the Douglas-fir Series

Fire Regime

This type had a moderate-severity fire regime with fires of various intensity and frequency. High intensity events are very infrequent and are stand-replacing Moderate intensity events are infrequent and partially stand-replacing. These fires often include significant areas of high and low tree mortality. Periodic ground fires of low intensity are the general rule .

Management Implications

Silvicultural Systems: Sites with high soil coarse fragments should be carefully examined before treatment due to regeneration difficulties.

Site Preparation: Moderate or high intensity broadcast burning normally leads to removal of the O horizon and on slopes > 25% may lead to significant soil loss and competition from deerbrush

Regeneration: Artificial regeneration should be considered Anticipate lower seedling survival rates due to high soil coarse fragments and competition from shrub form tanoak

Release: Early release with multiple treatments are recommended due to the potential for high density of tanoaks

Animal Damage Control Problems: None known.

Stockability: Anticipate stocking levels below regional guidelines on sites with high soil coarse fragments

Species Considerations: Sugar pine is an important component of this type and black oak is an occasional component, both should be maintained

Cultural and Commercial: The cultural species most frequently found were tanoak (in the understory), Pacific madrone, sugar pine and little prince's pine California hazelnut and beargrass, two cultural species were found infrequently Red huckleberry and incense cedar, two commercial plant species, were found intermittently

Insects and Disease: Due to the potential for white pine blister rust planting of rust resistant sugar pine should be considered.

Fire Suppression: Contain and control strategies are recommended. Each season conditions exist that produce extreme fire behavior where control strategies are recommended.

Prescribed Fire: Use prescribed fire in older stands to reduce fuel accumulations, manage the cultural species (i.e California hazelnut and beargrass) and promote stand diversity

Closely Related Types

The PSME–QUCH2–LIDE2 type is closely related to the PSME–QUCH2–ARME3/RHDI and PSME–QUCH2//Rockpile types which are generally found on rocky, drier, harsher sites

Notes

Plant Association: Douglas-fir–Jeffrey Pine/California Fescue
EDP Code Name: PSME–PIJE/FECA
Eco-Code: CD0CPJ11

Indicator species:

California fescue (*Festuca californica*–FECA) was found on warm, dry, inland sites, often on serpentine soils, with basic soil pH and low AWC.

Douglas-fir–Jeffrey Pine/California fescue

PSME–PIJE/FECA Association

Eco-Code CD0CPJ11

This mid-elevation, upland type was found on warm, open sites, on serpentine soils. It is characterized by the presence of Jeffrey pine and a high cover of California fescue.

Plant Association Summary

(Sample Size:12)		COVER	CON
Tree Overstory Layer			
PSME	Douglas-fir	40	100
PIJE	Jeffrey Pine	15	100
CADE3	Incense Cedar	13	83
ARME3	Pacific Madrone	8	66
Tree Understory Layer			
PSME	Douglas-fir	2	91
CADE3	Incense Cedar	2	83
UMCA	California Bay	6	50
PIJE	Jeffrey Pine	1	41
Shrubs			
RHDI	Poison Oak	3	50
ROGY	Wood Rose	1	33
SYMO	Creeping Snowberry	1	33
LOHIV	Pink Honeysuckle	1	33
Herbs & Grasses			
FECA	California Fescue	41	91
IRI	Iris spp.	1	75
HIAL	White Hawkweed	1	75
POMU1	Swordfern	2	50

Ranger Districts

Lower Trinity, Gasquet, Happy Camp, Ukonom

Environment

Distance to the Ocean: 26–42 miles

Elevation: 1740–4240'

Aspect: N.W., S.E., W.

Slope: 25–58%

Slope Position: upper, middle 1/3

Surface Rock: 0–4%

Soils

Pit Depth: 17–40"+

AWC: 1.7–3.2

Parent Material: serpentine

A Horizon—
- Coarse Frag: 15–49%
- Textures: l, gl, gcl, gsil
- Thickness: 2–11"
- pH: 5.5–7.3

Physical and Biological Environment

Distribution/Setting

This type was found on inland sites where mean distance to the Pacific Ocean was 35 8 miles Elevation averaged 2867' and slopes were typically moderately steep, averaging 38% Mean radiation index was a warm 452 due to the southeast and west aspects and exposed landscape positions

Soils

Soils in this type were predominately mesic, moderately deep (42%) to deep (42%) and well drained. They formed primarily in residuum and less frequently in colluvium The litter layer averaged 1 3" thick and 87% cover Surface rock fragments averaged 2% The surface horizon averaged 6" thick The surface horizon textures were predominately loam, gravelly loam, gravelly clay loam and gravelly silt loam Coarse fragment content averaged 27% and pH averaged 6.3 (slightly acid)

The subsoils were predominately gravelly or very gravelly with loam and clay loam texture Subsoil coarse fragment content averaged 37% and ranged from 24 to 49% Subsurface pH averaged 6 7 (neutral) and ranged from 5.9 (moderately acid) to 7 6 (mildly alkaline). The soils were 42% non-skeletal and 58% skeletal Soil AWC averaged 2 4" and ranged from 1.7" to 3 2" These soils were classified into the subgroups Typic Xerochrepts and Typic Xerumbrepts

Vegetation

The total vegetation cover was high ranging from 85% to 99% with an average of 92% Mean overstory tree cover was 76%, it was dominated by conifers that averaged 63% cover and ranged from 45% to 85%. It also included hardwoods that averaged 18% cover and ranged from 0 to 43% The regeneration layer averaged 10% cover and was dominated by tanoak 4% cover in shrub form Shrub cover was low with an average of 7% cover Forb cover was also low with an average of 6% cover. Grass cover was very high with 42% average cover and was dominated by California fescue 41% cover

Stand Structure

Late seral stands often had 3 or more layers of trees, while early mature and mid-mature stands usually had 1 or 2 layers. In late seral stands the top 2 layers were dominated by Douglas-fir and Jeffrey pine, while the lower layer was dominated by Pacific madrone Moderate sized conifers dominated the top two layers with an average of 24 trees/acre > 25" d b h , 4 trees/acre > 30" d b h and 1 trees/acre > 40" d.b.h. Hardwoods dominated the lower layers and included 51 trees/acre > 5" d b h and 25 trees/acre > 11" d b h

The stand structure characteristics by layer were as follows the top layer averaged 272 years old with an average diameter of 31" and average height of 121' The second layer had an average age of 200 years with a mean diameter of 28" and a mean height of 102' The third layer was dominated by Pacific madrone, it had a mean diameter of 14" and a mean height of 73'. Large numbers of small tanoaks in shrub form were often found in the lower layer

Overall biomass production (conifer + hardwoods + shrubs) was generally low. Modal Dunning site class was 2, with site index of 150 at 300 years Conifer with an average volume of 5580 cu ft , it ranged from 3304 to 8000 cu. ft., due to the harsh site conditions Softwood basal area averaged 193 sq ft and ranged from 120 to 227 sq ft Hardwood volume averaged 260 cu ft and ranged from 30 to

850 cu ft Hardwood basal area averaged 20 sq. ft. and ranged from 1 to 40 sq ft Stand density index was 339 and fell in the lower end of the Douglas-fir Series.

Fire Regime

This type experienced a moderate severity fire regime Due to high grass cover low intensity events were frequent with minimal overstory mortality Infrequent moderate intensity events lead to partial stand replacement, this included areas of both high and low tree mortality. Without periodic low intensity fire, regeneration forms ladder fuels which pose a high risk of stand-replacing events

Management Implications

Silvicultural Systems: Management options are limited where soils are highly serpentinized. Due to this and high grass cover this type may not be well suited to intensive forest management

Site Preparation: Broadcast burning or hand piling with jackpot burning are recommended Burning emphasis is on slash disposal

Regeneration: Regeneration more difficult in this plant association due to high grass cover

Release: Manual release can be difficult in areas of high grass cover

Animal Damage Control Problems: None known

Stockability: Anticipate stocking levels below regional stocking guidelines on sites with highly serpentinized soils or those with high grass cover.

Species Considerations: Incense cedar and Oregon white oak are important components and should be mantained in all management treatments.

Cultural and Commercial: The cultural species most frequently found were Pacific madrone, Jeffrey pine and iris California hazelnut, a cultural species was found infrequently here The most frequently occurring commercial plant species, were incense cedar and California bay (in the understory)

Insects and Disease: None known

Fire Suppression: Possibility exists for use of all suppression strategies, confine, contain and control They are dependent on time of year Consider modified suppression tactics because of shallow serpentine soils Use of dozers should be carefully examined due to the potential for soil damage Fire behavior here is dependent on fuel moisture

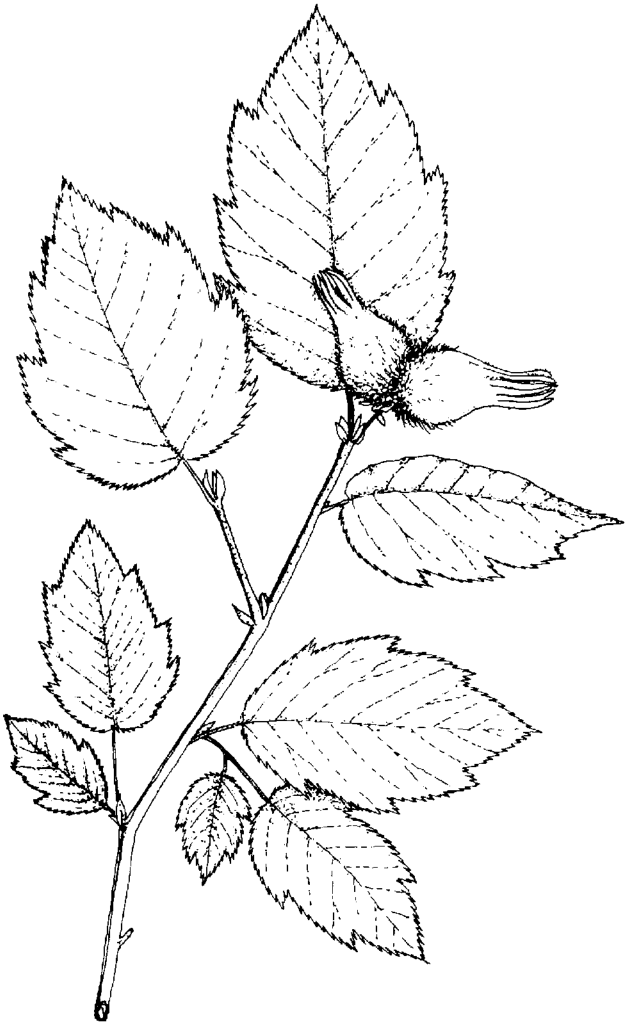
Prescribed Fire: Opportunities exist here to produce low intensity fires and for periodic burning to mimic pre-suppression conditions. This could enhance herbaceous diversity, maintain rare plants Low intensity fires can also reduce the build-up of ladder fuels and reduce the risk of stand-replacing events This type may be well suited to low ground fires and could act as a fuelbreak in landscape management

Closely Related Types

The PSME–PIJE/FECA type is closely related to the PSME–CADE3/FECA type which is found more frequently on soils formed from colluvium. It is replaced on sites with higher serpentine influence by PSME/QUVA, PSME/QUVA–LIDEE or PIJE–PSME/FECA

Notes

Plant Association: Douglas-fir/California Hazelnut
EDP Code Name: PSME/COCOC
Eco-Code: CD0SM011



Indicator species:

California hazelnut (*Corylus cornuta californica*–COCOC) was found on mid elevation, inland, steep, lower third slopes, with high forb cover and high soil coarse fragments.

Douglas-fir/California Hazelnut

PSME/COCOC Association

Eco-Code CD0SM011

This type was found in moist, riparian positions on inland sites with steep northerly aspects and high AWC. It is characterized by the presence of California hazelnut.

Plant Association Summary

(Sample size: 21)

		COVER	CON
Tree Overstory Layer			
PSME	Douglas-fir	63	100
QUCH2	Canyon Live Oak	4	42
Tree Understory Layer			
QUCH2	Canyon Live Oak	3	85
PSME	Douglas-fir	6	80
CONU	Pacific Dogwood	2	47
Shrubs			
COCOC	California Hazelnut	3	76
ROS	Wild Rose spp.	1	52
BENE1	Dwarf Oregon-grape	3	47
RHDI	Poison Oak	2	47
SYMO	Creeping Snowberry	1	47
Herbs & Grasses			
HIAL	White Hawkweed	1	76
DIHO2	Hooker's Fairybell	1	76
POMU1	Swordfern	1	71
PTAQL	Bracken Fern	1	61
WHMO	Western Modesty	13	57
ACTR	Vanilla Leaf	3	57

Ranger Districts

Orleans, Lower Trinity, Mad River, Ukonom, Happy Camp, Salmon River

Environment

Distance to the Ocean: 24–51 miles

Elevation: 2400–4100'

Aspect: N.E., N.W.

Slope: 24–80%

Slope Position: lower, middle, upper 1/3

Surface Rock: 0–30%

Soils

Pit Depth: 22–40"+

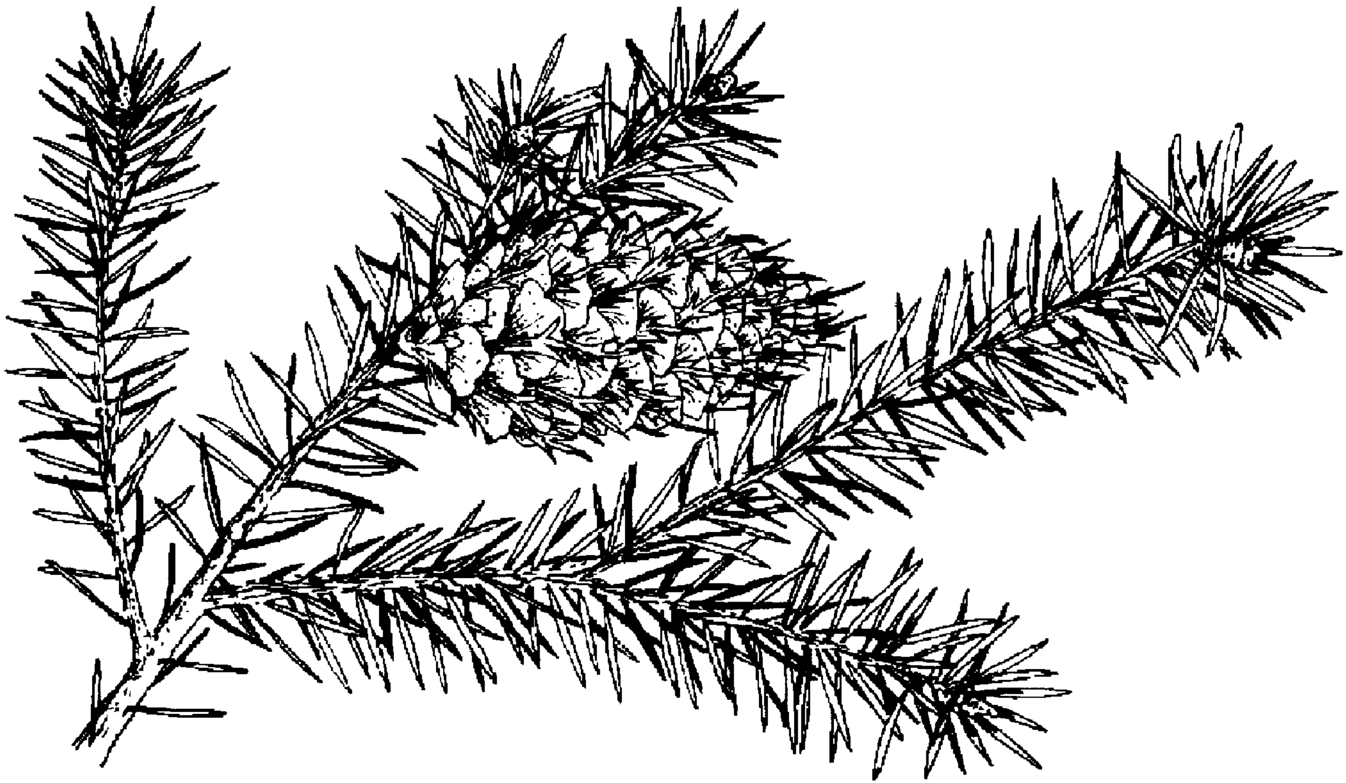
AWC: 2.1–5.7"

Parent Material: schist, phyllite, sandstone, greenstone

A Horizon—

Coarse Frag:10–65%
Textures: l, gl, vgl, sl
Thickness: 3–13"
pH: 5.7–7.1

Douglas-fir Series Key



Physical and Biological Environment

Distribution/Setting

This type was found in riparian positions on inland sites where mean distance to the Pacific Ocean was 40 2 miles. Elevation averaged 3174' and slopes were typically very steep, averaging 54% Mean radiation index was 400 due to northerly aspects and was further moderated by topographic shading

Soils

Soils in this type were predominately mesic, deep (64%) to moderately deep (36%) and well or somewhat excessively drained They formed in residuum, colluvium and occasionally alluvium The litter layer thickness averaged 0 8" at 79% cover Surface rock fragments averaged 12% cover. The surface horizon thickness averaged 7" The surface horizons were predominately gravelly or very gravelly with loam or sandy loam textures Coarse fragment content averaged 32% and pH averaged 6 3 (slightly acid).

The subsoils were gravelly to extremely gravelly with sandy loam, loam, or clay loam textures Subsoil coarse fragment content averaged 45% and ranged from 15% to 70% Subsurface pH averaged 6.2 (slightly acid) and ranged from 5.5 (strongly acid) to 6 5 (slightly acid). The soils were 41% non-skeletal and 59% skeletal. Soil AWC averaged 3 9" and ranged from 2 1" to 5 7" These soils were classified into the subgroups Dystric Xerochrepts, Ultic Haploxeralfs and Typic Xerumbrepts

Vegetation

The total vegetation cover was moderate ranging from 50% to 99% with an average of 87% Mean overstory tree cover was 77%, it was dominated by conifers that averaged 58% cover and ranged from 35% to 75% It also included hardwoods that averaged 9% cover and ranged from 3% to 14% The regeneration layer averaged 12 cover. Shrub cover was low with an average of 8% cover Forb cover was moderate with an average of 16% cover Grass cover was low with 2% average cover

Stand Structure

Late seral stands often had 4 or more layers of trees, while early mature and mid-mature stands usually had 2 layers. In late seral stands the top 3 layers were dominated by Douglas-fir, while the lower layer was included a variety of hardwood species. Large conifers dominated the top three layers with an average of 36 trees/acre > 25" d b.h., 18 trees/acre > 30" d b h and 10 trees/acre > 40" d b.h. Hardwoods dominated the lower layer and included 19 trees/acre > 5" d.b.h. and 4 trees/acre > 11" d b.h.

The stand structure characteristics by layer were as follows the top layer averaged 274 years old with an average diameter of 47" and average height of 181' The second layer had an average age of 259 years with a mean diameter of 44" and a mean height of 156' The third layer had an average age of 177 years with a mean diameter of 29" and a mean height of 124'. The fourth layer had an average diameter of 9" and average height of 51'

Overall biomass production (conifer + hardwoods + shrubs) was generally high Modal Dunning site class was 1A, with site index of 200 at 300 years. Conifer productivity was generally high with an average volume of 10,604 cu.ft , it ranged from 7460 to 13,174 cu.ft Softwood basal area averaged 276 sq.ft and ranged from 187 to 373 sq.ft. Hardwood volume was low and averaged 200 and ranged from 0 to 450 cu ft. Hardwood basal area averaged 12 sq ft and ranged from 0 to 27 sq.ft. Stand density index was 413 and fell in the middle of the Douglas-fir Series

Fire Regime

This type had a moderate severity fire regime which includes fires of various frequency and intensity Low intensity events are frequent with minimal overstory mortality. Very infrequent high intensity events that are stand replacing, follow drought periods or other major events such as, wind, disease, or insect infestation

Management Implications

Silvicultural Systems: All silvicultural systems are applicable

Site Preparation: Moderate or high intensity broadcast burning normally leads to removal of the O horizon and on slopes > 25%, may lead to significant soil loss from sheet erosion and significant competition from deerbrush

Regeneration: Natural regeneration can be anticipated with adequate seed source. Artificial regeneration should be considered.

Release: None.

Animal Damage Control Problems: None Known.

Stockability: Regional stocking guidelines are applicable

Species Considerations: Sugar pine is a minor component of this type, but should be maintained in all management treatments.

Cultural and Commercial: The cultural species most frequently found were prince's pine and California hazelnut Few commercial species were found

Insects and Disease: Due to the potential for white pine blister rust, planting of rust resistant sugar pine should be considered

Fire Suppression: The possibility exists here for use of confine and contain strategies Considered using natural barriers to reduce suppression costs in older stands

Prescribed Fire: Opportunities exist to produce lower intensity fires and use prescribed natural fire Periodic burning opportunities exist to enhance California hazelnut for use by American Indians as basket materials Lower elevation sites may provide the best material where plants are not damaged by snow

Closely Related Types:

The PSME/COCOC type is closely related to the PSME-QUCH2-ARME3/RHDI type which is found in dry, upslope positions.

Notes

Plant Association: Douglas-fir–Tanoak/Western Modesty
EDP Code Name: PSME–LIDE2/WHMO
Eco-Code: CD0HT011

Indicator species:

Western modesty (*Whipplea modesta*–WHMO) was found on steep sites, with moderately open canopies, with high herb and moderate shrub cover.

Douglas-fir–Tanoak/Western Modesty

PSME–LIDE2/WHMO Association

Eco-Code CD0HT011

This warm, high elevation, inland type was found on southwest aspects with deep soils. It is characterized by tanoak (in the shrub form) and western modesty in the herb layer.

Plant Association Summary

(Sample size: 10)		COVER	CON
Tree Overstory Layer			
PSME	Douglas-fir	54	90
ARME3	Pacific Madrone	8	80
LIDE2	Tanoak	3	60
PILA	Sugar Pine	4	50
Tree Understory Layer			
LIDE2	Tanoak	5	100
PSME	Douglas-fir	1	100
QUCH2	Chinquapin	6	70
PILA	Sugar Pine	1	60
Shrubs			
SYMO	Creeping Snowberry	1	80
RHDI	Poison Oak	4	60
ROGY	Wood Rose	2	60
Herbs & Grasses			
WHMO	Western Modesty	8	100
CHUMO	Prince's Pine	6	80
ACTR	Vanilla Leaf	3	80
CHME2	Little Prince's Pine	1	70

Ranger Districts

Gasquet, Orleans, Ukonom, Lower Trinity

Environment

Distance to the Ocean: 17–39 miles

Elevation: 2400–4080'

Aspect: S.W., E.

Slope: 35–75%

Slope Position: upper, middle 1/3

Surface Rock: 1–7%

Soils

Pit Depth: 15–40"+

AWC: 1.3–4.4"

Parent Material: schist, phyllite, serpentine

A Horizon—

Coarse Frag: 20–70%
Textures: gl, vgl, vgsl
Thickness: 2–14"
pH: 5.5–6.5

Physical and Biological Environment

Distribution/Setting

This type was found on warm, inland sites where mean distance to the Pacific Ocean was 31.2 miles. Elevation averaged 3164' and slopes were typically very steep, averaging 55%. Mean radiation index was a warm .462 due to the southwest aspects and exposed landscape positions.

Soils

Soils in this type were predominately mesic, moderately deep (24%) to deep (58%) and well drained They formed primarily in residuum and colluvium from metamorphic rock. The litter layer had an average thickness of 1.3" at 81% cover Surface rock fragments averaged 5% cover. The surface horizon averaged 5" thick It was gravelly to very gravelly with loam and sandy loam textures. Coarse fragment content averaged 36% and pH averaged 6 2 (slightly acid).

The subsoils were predominately gravelly to extremely gravelly loams Subsoil coarse fragment content averaged 42% and ranged from 20% to 75%. Subsurface pH averaged 6.2 (slightly acid) and ranged from 5 5 (strongly acid) to 7 1 (neutral). The soils were 50% non-skeletal and 50% skeletal Soil AWC averaged 2.6" and ranged from 1 3" to 4 4" These soils were classified into the subgroup Dystric Xerochrepts

Vegetation

The total vegetation cover was moderately high ranging from 70% to 99% with an average of 90% Mean overstory tree cover was 80%, it was dominated by conifers that averaged 52% cover and ranged from 30% to 91% It also included hardwoods that averaged 15% cover and ranged from 3% to 33% The regeneration layer averaged 16% cover and was dominated by tanoak 5% cover in shrub form Shrub cover was moderate with an average of 18% cover. Forb cover was high with an average of 23% cover Grass cover was usually low with 5% average cover, but can occasionally be high It included a variety of grass species

Stand Structure

Late seral stands often had 4 or more layers of trees, while early mature and mid-mature stands usually had 2 layers. In late seral stands the top 2 layers were dominated by Douglas-fir, while the lower 2 layers were dominated by tanoak and Pacific madrone Large conifers dominated the top two layers with an average of 35 trees/acre > 25" d.b.h., 24 trees/acre > 30" d b h and 12 trees/acre > 40" d b h Hardwoods dominated the lower layers and included 140 trees/acre > 5" d b h and 13 trees/acre > 11" d.b h

The stand structure characteristics by layer were as follows the top layer averaged 289 years old with an average diameter of 42" and average height of 150' The second layer had an average age of 211 years with a mean diameter of 33" and a mean height of 113' The third layer was dominated by Pacific madrone and tanoak, it had a mean diameter of 14" and a mean height of 73' The fourth layer was dominated by tanoak, it averaged 9" in diameter and 51' in height. Large numbers of small tanoaks in shrub form were often found in the lower layers.

Overall biomass production (conifer + hardwoods + shrubs) was generally high. Modal Dunning site class was 2, with site index of 150 at 300 years. Conifer productivity was generally high with an average volume of 9909 cu ft , it ranged from 4536 to 12,477 cu ft , due to the variable cover of hardwoods Softwood basal area averaged 266 sq. ft. and ranged from 107 to 413 sq ft Hardwood volume averaged 972 cu ft and ranged from 300 to 1088 cu. ft. Hardwood basal area averaged 49 sq ft and ranged from 5 to 53 sq ft. Stand density index was 451 and fell in the higher end of the Douglas-fir Series

Fire Regime

This type had a moderate severity fire regime which includes fires of various frequency and intensity. Low intensity events are frequent with low overstory tree mortality Infrequent moderate intensity events can lead to partial stand replacement and may include areas of both high and low tree mortality. Grass cover can occasionally be high and may act as a fuel source for ground fires

Management Implications

Silvicultural Systems: All systems are applicable Clearcut regeneration harvest could increase soil temperature and lead to tanoak dominance during early seral stages

Site Preparation: Moderate or high intensity broadcast burning may lead to removal of the O horizon and on slopes > 25% may lead to significant soil loss from sheet erosion These intensities may also stimulate buried seed and lead to significant competition from snowbrush

Regeneration: High cover of tanoak and or grass can effect regeneration success Artificial regeneration should be considered.

Release: Early release with multiple treatments are recommended due to high density of hardwood stems Manual release can be difficult in areas of high grass cover

Animal Damage Control Problems: None known.

Stockability: Regional stocking guidelines are applicable.

Species Considerations: Black oak and sugar pine are an important component of this type and should be maintained in all management treatments.

Cultural and Commercial: The cultural species most frequently found were Pacific madrone, tanoak, sugar pine, dwarf Oregon-grape, blackberry, California hazelnut, iris and prince's pine. Beargrass, another cultural species, was found infrequently. The commercial plant species, incense cedar, was found infrequently here California bay, another commercial species was found intermittently.

Insects and Disease: Due to the potential for white pine blister rust, planting of rust resistant sugar pine should be considered

Fire Suppression: Contain and control strategies are recommended here Fire behavior may warrant an indirect attack strategy.

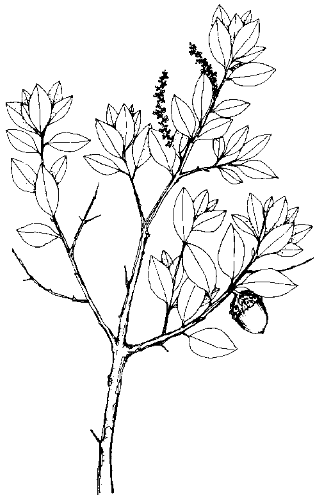
Prescribed Fire: Opportunities exist to produce low intensity burns

Closely Related Types

The PSME–LIDE2/WHMO type may be replaced on moist sites by the PSME–QUKE//Sandstone type and on wet sites by the PSME–ACMA/POMU1 type. On rockier, drier sites with lower AWC it is replaced by either the PSME–QUCH2–LIDE2, PSME–QUCH2//Rockpile or PSME–QUCH2–ARME3/RHDI type

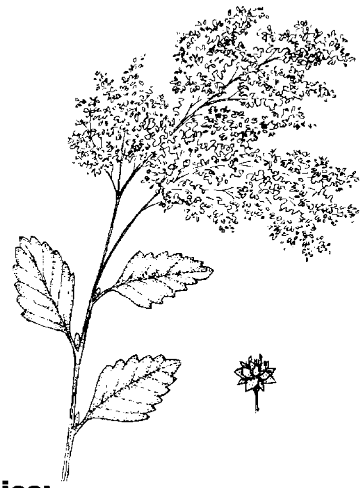
Notes

Plant Association: Douglas-fir–Tanoak/Huckleberry Oak–Oceanspray
EDP Code Name: PSME–LIDE2/QUVA–HODI
Eco-Code: CD0HT012



Indicator species:

Huckleberry oak (*Quercus vaccinifolia*–QUVA) was found on high elevation sites, on serpentine soils, with basic soil pH, low AWC, moderate surface rock, high soil coarse fragments, low tree cover and softwood basal area with high shrub cover.



Indicator species:

Oceanspray (*Holodiscus discolor*–HODI) was found on cool, steep, mid elevation sites, with low AWC, moderate surface rock, moderate tree and grass cover

Douglas-fir–Tanoak/Huckleberry Oak–Oceanspray

PSME–LIDE2/QUVA–HODI Association
Eco-Code CD0HT012

This high elevation, inland type was found on steep slopes with serpentine soils. These harsh sites had low conifer productivity and were characterized by the presence of tanoak (in the shrub form) and the shrubs, huckleberry oak and oceanspray.

Plant Association Summary

(Sample size: 6)		COVER	CON
Tree Overstory Layer			
PSME	Douglas-fir	66	100
ARME3	Pacific Madrone	4	50
PILA	Sugar Pine	18	33
CADE3	Incense Cedar	15	33
Tree Understory Layer			
LIDE2	Tanoak	29	100
PSME	Douglas-fir	1	100
Shrubs			
QUVA	Huckleberry Oak	36	100
BENE1	Dwarf Oregon-grape	2	100
HODI	Oceanspray	9	83
RHCA2	Coffeeberry	5	66
VAPA	Red Huckleberry	5	66
ROGY	Wood Rose	3	66
Herbs & Grasses			
XETE	Beargrass	2	100
POMU1	Swordfern	3	83
WHMO	Western Modesty	1	83
CHUMO	Prince's Pine	1	83
VAHE	Western Vancouveria	3	66

Ranger Districts
Gasquet, Orleans

Environment
Distance to the Ocean: 17–22 miles

Elevation: 2430–3600'

Aspect: S.W.

Slope: 20–60%

Slope Position: upper, middle 1/3

Surface Rock: 5–80%

Soils
Pit Depth: 27–40"+

AWC: 0.7–1.6"

Parent Material: serpentine

A Horizon—
- Coarse Frag: 35–75%
- Textures: gl, vgl
- Thickness: 4–7"
- pH: 6.0–6.5

Physical and Biological Environment

Distribution/Setting

This type was found on coastal and inland sites where mean distance to the Pacific Ocean was 20.5 miles. Elevation averaged 3112' and slopes were typically steep, averaging 41%. Mean radiation index was .428.

Soils

Soils in this type were predominately mesic, moderately deep (75%) to deep (25%) and well drained They formed in primarily colluvium and less frequently in residuum The litter layer thickness averaged 0 8" at 82% cover Surface rock fragments averaged 41% cover The surface horizon averaged 6" thick The surface horizons were gravelly to very gravelly with loam texture. Coarse fragment content averaged 52% and pH averaged 6.3 (slightly acid)

The subsoils were predominately very gravelly or very cobbly with loam or clay loam texture. Subsoil coarse fragment content averaged 62% and ranged from 50 to 75% Subsurface pH averaged 6.5 (slightly acid) and ranged from 6.0 (slightly acid) to 6 7 (slightly acid) The soils were skeletal Soil AWC averaged 1.2" and ranged from 0 7" to 1 6" These soils were classified into the subgroup Typic Xerochrepts

Vegetation

The total vegetation cover was high ranging from 85% to 96% with an average of 94% Mean overstory tree cover was 83%, it was dominated by conifers that averaged 75% cover and ranged from 67% to 90% It also included hardwoods that averaged 8% cover and ranged from 0 to 20% The regeneration layer averaged 35% cover and was dominated by tanoak 29% cover, in shrub form. Shrub cover was high with an average of 69% cover Forb cover was moderate, with an average of 7% cover Grass cover was spotty with 1% average cover.

Stand Structure

Late seral stands often had 2 or more layers of trees, while early mature and mid-mature stands usually had 1 layer In late seral stands the top 2 layers were dominated by Douglas-fir. Moderate sized conifers dominated the top two layers with an average of 30 trees/acre > 25" d b h , 11 trees/acre > 30" d.b h and 2 trees/acre > 40" d b h Hardwoods were sparse and normally found in the second layer.

The stand structure characteristics by layer were as follows: the top layer averaged 313 years old with an average diameter of 35" and average height of 126' The second layer had an average age of 217 years with a mean diameter of 20" and a mean height of 104' Large numbers of small tanoaks in shrub form were often included in the lower layer

Overall biomass production (conifer + hardwoods + shrubs) was generally moderate Modal Dunning site class was 3, with site index of 125 at 300 years. Conifer productivity was generally low with an average volume of 6476 cu. ft., it ranged from 3100 to 7890 cu. ft., due to variable, harsh site conditions. Softwood basal area averaged 229 sq. ft. and ranged from 173 to 306 sq ft Hardwood volume averaged 828 cu. ft and ranged from 10 to 1000 cu. ft. Hardwood basal area averaged 15 sq ft and ranged from 10 to 24 sq ft. Stand density index was 331 and fell in the lower end of the Douglas-fir Series

Fire Regime

This type had a moderate severity fire regime which includes fires of various frequency and intensity. Low intensity events are frequent with low overstory tree mortality Infrequent moderate intensity events are a major disturbance agent Dominance by small diameter trees between 100-125 years of age was caused by partial stand replacement fires Due to the explosive fire behavior of huckleberry oak, under drought conditions fires that would generally be partial stand-replacing may result in stand-replacing events.

Management Implications

Silvicultural Systems: Sites on serpentine soils with low productivity or those with high soil coarse fragments should be carefully examined before treatment due to regeneration difficulties Management here should be limited to periodic sanitation salvage.

Site Preparation: Site preparation methods are dependent on the degree of serpentinization and the amount of coarse fragments and should be carefully examined due to regeneration difficulties.

Regeneration: Anticipate regeneration difficulties due to harsh sites and high cover of huckleberry oak Natural regeneration should be considered

Release: Release treatments can be very difficult

Animal Damage Control Problems: None known.

Stockability: Anticipate stocking levels below regional stocking guidelines on sites with highly serpentinized soils.

Species Considerations: Sugar pine is a component of this type that should be maintained in all management treatments

Cultural and Commercial: The cultural species most frequently were Pacific madrone, tanoak (in the understory), sugar pine, dwarf Oregon-grape, beargrass and prince's pine California hazelnut, another cultural species, was found infrequently. The most frequently occurring commercial plant species, were incense cedar, salal and red huckleberry (salal and red huckleberry are also cultural species)

Insects and Disease: Due to the potential for white pine blister rust, planting of rust resistant sugar pine should be considered.

Fire Suppression: Contain and control strategies are recommended Use of dozers is not recommended due to serpentine soils Fire behavior may warrant an indirect attack strategy

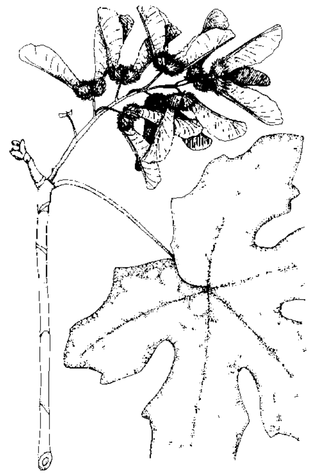
Prescribed Fire: Opportunities exist to produce low intensity fires when live fuel moisture is high that will benefit the cultural species (i.e beargrass). Caution should be taken with early spring burns while huckleberry oak is still in dormancy due to low live fuel moisture

Closely Related Types:

The PSME–LIDE2/QUVA–HODI type may be replaced on sites with soils formed from residual serpentine rock (which may result in a higher chemical imbalance in the soils) by the PSME/QUVA and PSME/QUVA–LIDEE types and on wet sites by the PSME/QUVA–RHMA type

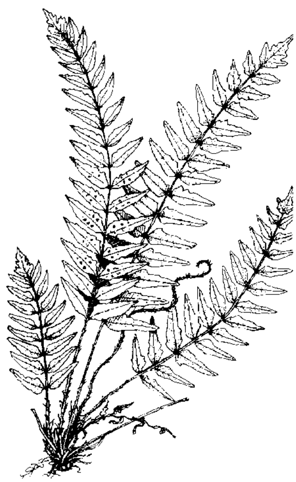
Notes

Plant Association: Douglas-fir–Bigleaf Maple/Swordfern
EDP Code Name: PSME–ACMA/POMU1
Eco-Code: CD0HMA11



Indicator species:

Bigleaf maple (*Acer macrophyllum*–ACMA) was found on moist, steep, lower third slope, mid elevation sites, with topographic shading, high surface gravel and rock, high soil coarse fragments, acidic soils and high softwood basal area



Indicator species:

Swordfern (*Polystichum munitum*–POMU1) was found on moist, cool, steep, lower third slope, mid elevation sites, with moderate AWC and soil coarse fragments

Douglas-fir–Bigleaf Maple/Swordfern

PSME–ACMA/POMU1 Association

Eco-Code CD0HMA11

This riparian type is typically found along stream courses and terraces. It is characterized by the presence of bigleaf maple (pictured) and swordfern.

Plant Association Summary

(Sample size: 40)		COVER	CON
Tree Overstory Layer			
PSME	Douglas-fir	54	100
ACMA	Bigleaf Maple	15	97
Tree Understory Layer			
PSME	Douglas-fir	4	72
QUCH2	Canyon Live Oak	3	40
TABR	Pacific Yew	3	35
Shrubs			
BENE1	Dwarf Oregon-grape	6	85
COCOC	California Hazelnut	6	85
RUUR	Pacific Blackberry	2	77
ROGY	Wood Rose	3	70
SYMO	Creeping Snowberry	8	62
Herbs & Grasses			
WHMO	Western Modesty	17	77
HIAL	White Hawkweed	2	77
TRLA3	Western Starflower	3	70
POMU1	Swordfern	4	65
DIHO2	Hooker's fairybell	2	65

Ranger Districts

Gasquet, Orleans, Lower Trinity, Mad River, Ukonom, Happy Camp, Salmon River

Environment

Distance to the Ocean: 24–45 miles

Elevation: 2500–4000'

Aspect: S.E., S.W., E.

Slope: 0–75%

Slope Position: lower 1/3, streamside

Surface Rock: 0–50%

Soils

Pit Depth: 30–40"+

AWC: 2.2–5.6"

Parent Material: mafic, phyllite, mixed

A Horizon—

Coarse Frag: 20–90%
Textures: l, gl, vgl, xgl
Thickness: 2–13"
pH: 5.8–6.5

Physical and Biological Environment

Distribution/Setting

This riparian type was found on inland sites where mean distance to the Pacific Ocean was 36 8 miles Elevation averaged 3273' and slopes were typically moderately steep, averaging 21% Mean radiation index was a warm .471 due to the southerly aspects, but was moderated by topographic shading.

Soils

Soils in this type were predominately mesic, deep (80%) to moderately deep (20%) and well drained to somewhat poorly drained. They formed in colluvium, residuum and occasionally alluvium from metamorphic rocks The litter layer had an average thickness of 1 0" at 80% cover. Surface rock fragments averaged 20% cover The surface horizons had an average thickness of 8" They were gravelly to extremely gravelly with loam textures. Coarse fragment content averaged 44% and pH averaged 6 3 (slightly acid)

The subsoils were predominately gravelly to very gravelly with loam, clay loam and sandy clay loam textures Subsoil coarse fragment content averaged 47% and ranged from 30% to 65%. Subsurface pH averaged 6 0 (moderately acid) and ranged from 5 5 (strongly acid) to 6 6 (neutral). The soils were 80% skeletal and 20% non-skeletal Soil AWC averaged 3 7" and ranged from 2 2" to 5.6". These soils were classified into the subgroup Dystric Xerochrepts

Vegetation

The total vegetation cover was low to high ranging from 30% to 99% with an average of 74% Mean overstory tree cover was 80%, it was dominated by conifers that averaged 62% cover and ranged from 39% to 92% It also included hardwoods that averaged 19% cover and ranged from 4% to 45%. The regeneration layer averaged 11 cover. Shrub cover was moderate with an average of 17% cover. Forb cover was high with an average of 50% cover Grass cover was low with 5% average cover.

Stand Structure

Late seral stands often had 4 or more layers of trees, while early mature and mid-mature stands usually had 2 layers. In late seral stands the top 3 layers were dominated by Douglas-fir, while the lower layer was dominated by bigleaf maple Large conifers dominated the top two layers with an average of 31 trees/acre > 25" d.b.h., 16 trees/acre > 30" d b.h and 8 trees/acre > 40" d b h Hardwoods dominated the lower layers and included 93 trees/acre > 5" d.b.h. and 16 trees/acre > 11" d b h

The stand structure characteristics by layer were as follows: the top layer averaged 349 years old with an average diameter of 54" and average height of 186' The second layer had an average age of 267 years with a mean diameter of 40" and a mean height of 151' The third layer had an average age of 107 years with a mean diameter of 17" and a mean height of 82' The fourth layer was dominated by bigleaf maple, it averaged 9" in diameter and 51' in height

Overall biomass production (conifer + hardwoods + shrubs) was generally high Modal Dunning site class was 1, with site index of 175 at 300 years. Conifer productivity was generally high with an average volume of 9511 cu ft , it ranged 7330 to 12,053 cu ft. Softwood basal area averaged 259 sq ft and ranged from 160 to 360 sq. ft. Hardwood volume averaged 788 cu ft and ranged from 100 to 2099 cu ft Hardwood basal area averaged 47 sq ft and ranged from 13 to 93 sq ft Stand density index was 389 and fell in the lower end of the Douglas-fir Series.

Fire Regime

This type had the oldest stand age in the Douglas-fir Series due to its moist riparian position Fire regime here is likely high-severity, with very infrequent and usually high intensity fire events associated with drought periods High fuel moisture levels provide only a narrow window of opportunity for any fire behavior. Periodic creeping fires can burn small pockets of fuel accumulations and occasional dry logs Large accumulations of dead fuel (logs) can set the stage for high intensity fires during extended periods of drought

Management Implications

Silvicultural Systems: This type is often found in riparian positions. Management treatments are limited here due to the riparian nature of this type Salvage and sanitation salvage are available in riparian areas, all other systems are available outside riparian areas.

Site Preparation: Outside riparian areas machine site preparation is recommended on gentle slopes and broadcast burning on steep slopes

Regeneration: Artificial regeneration should be considered Anticipate lower survival rates on sites with high surface rock or high soil coarse fragments Site preparation can lead to significant competition from bigleaf maple sprouting.

Release: Early release with multiple treatments are recommended due to high density of hardwood stems

Animal Damage Control Problems: None known

Stockability: Regional stocking guidelines are applicable

Species Considerations: Pacific yew is an important component of this type and should be maintained Swordfern is also a component of this type and is often utilized as a special forest product.

Cultural and Commercial: The cultural species most frequently found were bigleaf maple, California hazelnut, Pacific blackberry and dwarf Oregon-grape. Incense cedar, a commercial plant species was found intermittently

Insects and Disease: None known

Fire Suppression: Line construction is extremely difficult and can be more detrimental than fire effects. Use of confine and contain strategies with modified suppression tactics are recommended within riparian areas. Containment and control strategies should be used in the adjoining plant associations. Fires should be allowed to back into riparian areas to create openings for natural regeneration.

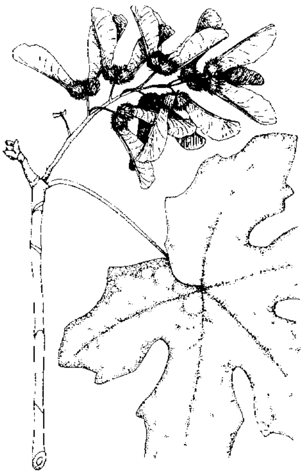
Prescribed Fire: Use prescribed fire to reduce pockets of fuel accumulations, promote natural regeneration for stand age class diversity and manage cultural species

Closely Related Types

The PSME–ACMA/POMU1 type is closely related to the PSME–ACMA/PHLEG type which is also found in riparian areas but more frequently on alluvial flats.

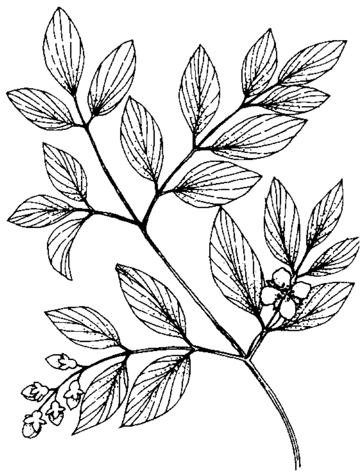
Notes

Plant Association: Douglas-fir–Bigleaf Maple/ Gordon Mock Orange
EDP Code Name: PSME–ACMA/PHLEG
Eco-Code: CD0HMA12



Indicator species:

Bigleaf maple (*Acer macrophyllum*–ACMA) was found on moist, steep, lower third slope, mid elevation sites, with topographic shading, high surface gravel and rock, high soil coarse fragments, acidic soils and high softwood basal area



Indicator species:

Gordon mock orange (*Philadelphus lewisii* var.*gordonianus*–PHLEG) was found on steep, cool, high elevation, inland sites, in streamside positions, with low tree cover.

Douglas-fir–Bigleaf Maple/Gordon Mock Orange

PSME–ACMA/PHLEG Association

Eco-Code CD0HMA12

This riparian type is located along streamside channels and is characterized by an overstory cover of bigleaf maple (background in the photo) and a moderate shrub cover of Gordon mock orange.

Plant Association Summary

(Sample Size:13)		COVER	CON
Tree Overstory Layer			
PSME	Douglas-fir	22	100
ACMA	Bigleaf Maple	14	100
QUCH2	Canyon Live Oak	6	53
Tree Understory Layer			
PSME	Douglas-fir	3	69
ACMA	Bigleaf Maple	3	38
QUCH2	Canyon Live Oak	2	46
Shrubs			
PHLEG	Gordon Mock Orange	11	100
ROGY	Wood Rose	4	84
SYMO	Creeping Snowberry	3	84
RHDI	Poison Oak	8	61
AMAL	Pacific Serviceberry	4	61
LOHIV	Pink Honeysuckle	2	46
Herbs & Grasses			
POMU1	Swordfern	2	76
FECA	California Fescue	2	69
TRLA3	Western Starflower	1	69

Ranger Districts

Mad River

Environment

Distance to the Ocean: 43–54 miles

Elevation: 2320–4075'

Aspect: N.W.

Slope: 70–100%

Slope Position: lower 1/3, streamside

Soils

Pit Depth:24–40"+

AWC: 4.6–6.1

Parent Material: sandstone

A Horizon—
- Coarse Frag: 12–30%
- Textures: cl, gcl, gl
- Thickness: 6–12"
- pH: 6.8–7.0

Physical and Biological Environment

Distribution/Setting

This riparian type was found on inland sites where mean distance to the Pacific Ocean was 52 1 miles Elevation averaged 3116' and slopes were typically very steep, averaging 81% Mean radiation index was a cool 290 due to the northwest aspects with topographic shading

Soils

Soils in this type were predominately mesic, deep (67%) to moderately deep (33%) and well drained to somewhat poorly drained They formed in alluvium and occasionally colluvium. The litter layer had an average thickness of 7" at 42% cover Surface rock fragments averaged 20% cover The surface horizons had an average thickness of 10" They were loam or gravelly loam with clay loam or sandy loam textures Coarse fragment content averaged 22% and pH averaged 6 9 (neutral)

The subsoils were predominately gravelly with loam, clay loam and sandy clay loam textures. Subsoil coarse fragment content averaged 32% and ranged from 16% to 45% Subsurface pH averaged 6.7 (neutral) and ranged from 6.5 (slightly acid) to 7 0 (neutral) The soils were 33% skeletal and 67% non-skeletal Soil AWC averaged 5 0" and ranged from 4 6" to 6 1" These soils were classified into the subgroups Typic Xerofluvents and Ultic Haploxeralfs

Vegetation

The total vegetation cover was moderate to high ranging from 80% to 95% with an average of 80% Mean overstory tree cover was 42%, it was dominated by conifers that averaged 24% cover and ranged from 11% to 40% It also included hardwoods that averaged 21% cover and ranged from 15% to 25%. The regeneration layer averaged 4% cover Shrub cover was moderate with an average of 31% cover. Forb cover was low with an average of 9% cover. Grass cover was low with 5% average cover.

Stand Structure

Late seral stands often had 4 or more layers of trees, while early mature and mid-mature stands usually had 2 layers In late seral stands the top 3 layers were dominated by Douglas-fir, while the lower layer was dominated by bigleaf maple Moderate sized conifers dominated the top two layers with an average of 13 trees/acre > 25" d b h , 6 trees/acre > 30" d b h. and 1 trees/acre > 40" d b h Hardwoods dominated the lower layer and included 235 trees/acre > 5" d b h and 11 trees/acre > 11" d b h

The stand structure characteristics by layer were as follows the top layer averaged 259 years old with an average diameter of 34" and average height of 129' The second layer had an average age of 139 years with a mean diameter of 119" and a mean height of 73'. The third layer had an average age of 82 years with an average diameter of 11" and average height of 67'. The fourth layer was dominated by bigleaf maple, it averaged 6" in diameter and 40' in height

Overall biomass production (conifer + hardwoods + shrubs) was generally low Modal Dunning site class was 2, with site index of 150 at 300 years. Conifer productivity was generally low with an average volume of 3637 cu ft , it ranged from 2580 to 4190 cu ft Softwood basal area averaged 147 sq. ft. and ranged from 120 to 173 sq. ft. Hardwood volume averaged 850 cu ft. and ranged from 370 to 1460 cu ft Hardwood basal area averaged 56 sq ft. and ranged from 27 to 87 sq. ft. Stand density index was 366 and fell in the lower end of the Douglas-fir Series.

Fire Regime

This type had a high-severity fire regime with very infrequent and usually high intensity fire events associated with drought periods. High fuel moisture levels provide only a narrow window of opportunity for any fire behavior. Periodic creeping low intensity fires can burn small pockets of fuel accumulations and occasional dry logs Large accumulations of dead fuel (logs) can set the stage for high intensity fires during extended periods of drought

Management Implications

Silvicultural Systems: Management treatments are limited here due to the riparian nature of this type

Site Preparation: None.

Regeneration: None

Release: None

Animal Damage Control Problems: None known

Stockability: None

Species Considerations: Oregon white oak is a minor, but important component of this type and should maintained in all management treatments.

Cultural and Commercial: Only a few plants used for both cultural and commercial purposes were found in this plant association (Appendix VI). The cultural species most frequently found were Gordon mock orange, California hazelnut and bigleaf maple California bay, a commercial plant species was found intermittently here.

Insects and Disease: None known.

Fire Suppression: Line construction is extremely difficult and can be more detrimental than fire effects Use of confine and contain strategies with modified suppression tactics are recommended within riparian areas Contain and control strategies should be used in the adjoining plant associations Fires should be allowed to back into riparian areas to create openings for natural regeneration

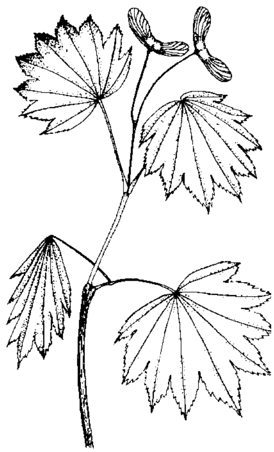
Prescribed Fire: Use prescribed fire to reduce pockets of fuel accumulations, manage cultural species and promote natural regeneration for stand age class diversity

Closely Related Types

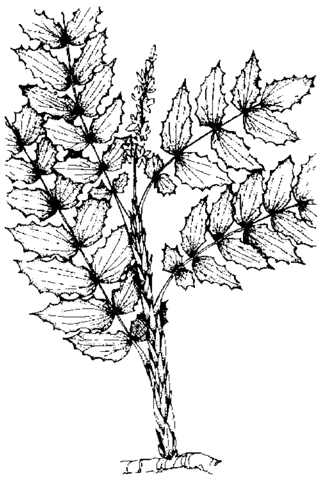
The PSME–ACMA/PHLEG type is closely related to the PSME–ACMA/POMU1 type which is also found in riparian areas but is often found on soils formed in colluvium and residuum

Notes

Plant Association: Douglas-fir/Vine Maple–Dwarf Oregon-grape
EDP Code Name: PSME/ACCI–BENE1
Eco-Code: CD0HMA13



Indicator species:
Vine maple (*Acer circinatum*–ACCI) was found on cool, lower third slopes, often in streamside positions, with thick A horizons, high AWC, high soil coarse fragments, moderate surface rock and high softwood basal area



Indicator species:
Dwarf Oregon-grape (*Berberis nervosa*–BENE1) was found on cool, steep, high elevation sites, with high softwood basal area, moderate shrub cover and low grass cover.

Douglas-fir/Vine Maple–Dwarf Oregon-grape

PSME/ACCI–BENE1 Association

Eco-Code CD0HMA13

This riparian type is characterized by a high cover of vine maple (pictured) and its streamside position.

Plant Association Summary

(Sample size: 9)

		COVER	CON
Tree Overstory Layer			
PSME	Douglas-fir	53	100
ABCO	White Fir	16	55
TABR	Pacific Yew	10	44
Tree Understory Layer			
PSME	Douglas-fir	1	77
TABR	Pacific Yew	2	44
ABCO	White Fir	1	55
Shrubs			
ACCI	Vine Maple	49	100
BENE1	Dwarf Oregon-grape	30	100
RUUR	Pacific blackberry	1	66
RHMA	Pacific Rhododendron	22	44
VAPA	Red Huckleberry	4	44
Herbs & Grasses			
CHUMO	Prince's Pine	4	88
WHMO	Western Modesty	3	66
VISE3	Redwood Violet	2	66
GOOB	Rattlesnake Plantain	1	66
POMU1	Swordfern	4	55
LIBOL	Twinflower	3	55

Ranger Districts

Gasquet, Orleans, Ukonom

Environment

Distance to the Ocean: 18–28 miles

Elevation: 2520–3150'

Aspect: E., W.

Slope: 5–60%

Slope Position: streamside

Surface Rock: 1–25%

Soils

Pit Depth: 40"+

AWC: 2.0–6.1

Parent Material: phyllite, schist, sandstone

A Horizon—

Coarse Frag: 28–67%

Textures: gl, gsil, xgl

Thickness: 3–8"

pH: 5.9–6.5

Physical and Biological Environment

Distribution/Setting

This riparian type was found on coastal and inland sites where mean distance to the Pacific Ocean was 23.1 miles Elevation averaged 2882' and slopes were typically moderately steep, averaging 29% Mean radiation index was a warm 469 due to the west aspects, but was moderated by topographic shading

Soils

Soils in this type were deep (100%) and well drained to somewhat poorly drained They formed in colluvium and less frequently in residuum. The litter layer had an average thickness of 1 6" at 87% cover Surface rock fragments averaged 9% cover The surface horizons had an average thickness of 6" They were gravelly to extremely gravelly with loam and silt loam textures. Coarse fragment content averaged 41% and pH averaged 6 1 (slightly acid)

The subsoils were predominately gravelly to very gravelly with loam, clay loam and sandy clay loam textures Subsoil coarse fragment content averaged 36% and ranged from 33% to 60% Subsurface pH averaged 6 1 (slightly acid) and ranged from 5 4 (strongly acid) to 6 5 (slightly acid). The soils were 50% skeletal and 50% non-skeletal Soil AWC averaged 4.4" and ranged from 2 0" to 6.1". These soils were classified into the subgroup Dystric Xerochrepts

Vegetation

The total vegetation cover was very high ranging from 90% to 99% with an average of 97% Mean overstory tree cover was 77%, it was dominated by conifers that averaged 72% cover and ranged from 50% to 90%. It also included hardwoods that averaged 6% cover and ranged from 0 to 16% The regeneration layer averaged 11% cover. Shrub cover was high with an average cover of 78%. Forb cover was low with an average of 11% cover Grass cover was low with 1% average cover

Stand Structure

Late seral stands often had 4 or more layers of trees, while early mature and mid-mature stands usually had 2 layers. In late seral stands the top 3 layers were dominated by Douglas-fir, while the lower layer was dominated by bigleaf maple Large conifers dominated the top two layers with an average of 31 trees/acre > 25" d b h , 16 trees/acre > 30" d.b h and 8 trees/acre > 40" d.b h Hardwoods dominated the lower layers and included 93 trees/acre > 5" d b h and 16 trees/acre > 11" d b.h

The stand structure characteristics by layer were as follows: the top layer averaged 349 years old with an average diameter of 54" and average height of 186' The second layer had an average age of 267 years with a mean diameter of 40" and a mean height of 151' The third layer had an average age of 107 years with a mean diameter of 17" and a mean height of 82' The fourth layer was dominated by bigleaf maple, it averaged 9" in diameter and 51' in height

Overall biomass production (conifer + hardwoods + shrubs) was generally high Modal Dunning site class was 1, with site index of 175 at 300 years. Conifer productivity was generally high with an average volume of 9511 cu ft , it ranged from 7330 to 12,053 cu ft Softwood basal area averaged 259 sq. ft. and ranged from 160 to 360 sq. ft. Hardwood volume averaged 788 cu. ft and ranged from 100 to 2099 cu. ft Hardwood basal area averaged 47 sq ft. and ranged from 13 to 93 sq ft Stand density index was 389 and fell in the lower end of the Douglas-fir Series

Fire Regime

This type is one of the oldest plant associations in the Douglas-fir Series This indicates a high-severity fire regime with very infrequent and usually high intensity fire events associated with drought periods High fuel moisture levels provide only a narrow window of opportunity for any fire behavior. Periodic creeping fires can burn small pockets of fuel accumulations and occasional dry logs. Large accumulations of dead fuel (logs) set the stage for high intensity fires during extended periods of drought

Management Implications

Silvicultural Systems: This type is often found in riparian positions Management treatments are limited here due to the riparian nature of this type Salvage and sanitation salvage are available in riparian areas, all other systems are available outside riparian areas

Site Preparation: Outside riparian areas machine site preparation is recommended on gentle slopes and broadcast burning on steep slopes

Regeneration: Natural regeneration can be anticipated with adequate seed source Regeneration more difficult in areas of high vine maple cover

Release: Manual release more difficult in areas of high vine maple cover.

Animal Damage Control Problems: None known.

Stockability: Regional stocking guidelines are applicable.

Species Considerations: Pacific yew is an important component of this type and should be maintained in all management treatments

Cultural and Commercial: Only a few plants used for both cultural and commercial purposes were found in this plant association (Appendix VI) The cultural species most frequently found were bigleaf maple, chinquapin, Pacific yew, dwarf Oregon-grape, prince's pine and Pacific blackberry The most frequently occurring commercial plant species were red huckleberry and salal

Insects and Disease: None known

Fire Suppression: Line construction is extremely difficult and can be more detrimental than fire effects Use of confine and contain strategies with modified suppression tactics are recommended within riparian areas. Containment and control strategies should be used in the adjoining plant associations Fires should be allowed to back into riparian areas to create openings for natural regeneration

Prescribed Fire: Use prescribed fire to reduce pockets of fuel accumulations and promote natural regeneration for stand age class diversity

Closely Related Types

The PSME/ACCI–BENE1 type is closely related to the PSME–ACMA/POMU1 which is found on higher order streams in lower slope positions occasionally on alluvial soils

Notes

Plant Association: Douglas-fir/Huckleberry Oak
EDP Code Name: PSME/QUVA
Eco-Code: CD0SOH11

Indicator species:

Huckleberry oak (*Quercus vaccinifolia*–QUVA) was found on high elevation sites, on serpentine soils, with basic soil pH, low AWC, moderate surface rock, high soil coarse fragments, low tree cover and softwood basal area with high shrub cover.

Douglas-fir/Huckleberry Oak
PSME/QUVA Association
Eco-Code CD0SOH11

This high elevation type was found on harsh sites with serpentine soils and low AWC with subsequent low conifer productivity. It is characterized by and open overstory and a dense shrub layer dominated by huckleberry oak.

Plant Association Summary

(Sample Size:27)		COVER	CON
Tree Overstory Layer			
PSME	Douglas-fir	35	100
PILA	Sugar Pine	12	88
CADE3	Incense Cedar	5	74
Tree Understory Layer			
PSME	Douglas-fir	2	85
CADE3	Incense Cedar	1	77
LIDE2	Tanoak	8	55
Shrubs			
QUVA	Huckleberry Oak	42	100
VAPA	Red Huckleberry	10	62
BENE1	Dwarf Oregon-grape	3	55
Herbs & Grasses			
CHUMO	Prince's Pine	2	74
WHMO	Western Modesty	6	70
XETE	Beargrass	5	62
TRLA3	Western Starflower	2	59
IRI	Iris spp.	1	55

Ranger Districts
Orleans, Gasquet, Happy Camp, Ukonom

Environment
Distance to the Ocean: 17–44 miles

Elevation: 2500–4440'

Aspect: N.W., E., S.W.

Slope: 10–70%

Slope Position: upper, middle, lower 1/3

Surface Rock: 1–35%

Soils
Pit Depth: 13–40"+

AWC: 0.7–4.3

Parent Material: mafic, serpentine, ultramafic, granite

A Horizon—
- Coarse Frag: 20–45%
- Textures: vgsl, vgl, gl, gsil
- Thickness: 2–8"
- pH: 5.6–7.2

Physical and Biological Environment

Distribution/Setting

This type was found primarily on inland sites where mean distance to the Pacific Ocean was 30 3 miles Elevation averaged 3393' and slopes were typically very steep, averaging 50% Mean radiation index was .376.

Soils

Soils in this type were predominately mesic, moderately deep (54%) to shallow (23%) and well or somewhat excessively drained They formed primarily in residuum and colluvium The litter layer thickness averaged 0 7" at 83% cover. Surface rock fragments averaged 10% cover The surface horizon averaged 5" thick The surface horizon textures were predominately gravelly to very gravelly loam, very gravelly sandy loam and gravelly silt loams Coarse fragment content averaged 36% and pH averaged 6 3 (moderately acid)

The subsoils were predominately gravelly to extremely gravelly with loam and clay loam textures. Subsoil coarse fragment content averaged 47% and ranged from 25 to 73% Subsurface pH averaged 6 8 (neutral) and ranged from 6 2 (slightly acid) to 7 0 (neutral) The soils were 24% non-skeletal and 76% skeletal. Soil AWC averaged 1.9" and ranged from 0 7" to 4 3" These soils were classified into the subgroups Ultic Haploxeralfs, Typic and Dystric Xerochrepts and Lithic Xerorthents

Vegetation

The total vegetation cover was high ranging from 80% to 99% with an average of 92%. Mean overstory tree cover was 59%, it was dominated by conifers that averaged 51% cover and ranged from 27% to 75% It also included hardwoods that averaged 7% cover and ranged from 0 to 28%. The regeneration layer averaged 14% cover Shrub cover was high with an average of 55% cover. Forb cover was moderate with an average of 14% cover Grass cover was spotty with 3% average cover

Stand Structure

Late seral stands often had 3 or more layers of trees, while early mature and mid-mature stands usually had 1 or 2 layers In late seral stands the top 3 layers were dominated by Douglas-fir and sugar pine Moderate sized conifers dominated the top two layers with an average of 27 trees/acre > 25" d b h , 12 trees/acre > 30" d b h and 3 trees/acre > 40" d b h.

The stand structure characteristics by layer were as follows the top layer averaged 314 years old with an average diameter of 35" and average height of 132' The second layer had an average age of 262 years with a mean diameter of 29" and a mean height of 102' The third layer averaged 190 years old with a mean diameter of 17" and a mean height of 67'.

Overall biomass production (conifer + hardwoods + shrubs) was generally low Modal Dunning site class was 3, with site index of 125 at 300 years Conifer productivity was generally low with an average volume of 6389 cu. ft., it ranged from 3301 cu ft to 9301 cu. ft , due to the variable harsh site conditions Softwood basal area averaged 209 sq ft. and ranged from 120 to 267 sq. ft. Hardwood volume averaged 190 cu ft and ranged from 0 to 599 cu. ft. Hardwood basal area averaged 51 sq ft and ranged from 27 to 75 sq ft Stand density index was 316 and fell in the lower end of the Douglas-fir Series

Fire Regime

This type had a high severity fire regime The high cover of knobcone pine, particularly in early seral stages, indicates a fire related plant association This combined with brush species of high resin content enhance explosive fire behavior which produces fire events of high intensities especially in early seral stages. Moderate intensity and low intensity fire events also occur in this type Moderate intensity fires result in partial stand replacement and may include significant areas of high and low tree mortality

Management Implications

Silvicultural Systems: Sites on serpentine soils with low productivity should be carefully examined before treatment due to regeneration difficulties. Management here should be limited to periodic sanitation salvage.

Site Preparation: Broadcast burning should be avoided here due to the potential for damage to serpentine soils.

Regeneration: Regeneration is more difficult in this plant association due to the high cover of huckleberry oak. Natural regeneration should be utilized If regeneration is required disturbance that effects the shrub layer is suggested.

Release: None.

Animal Damage Control Problems: None known

Stockability: Anticipate stocking levels below regional stocking guidelines on sites with highly serpentinized soils or those with high shrub cover.

Species Considerations: Sugar pine is an important component and should be maintained in all management treatments Knobcone pine is an early seral component of this type

Cultural and Commercial: The cultural species most frequently found were sugar pine, dwarf Oregon-grape, prince's pine, beargrass and iris California hazelnut, another cultural species was found infrequently. The most frequently occurring commercial plant species, were incense cedar and red huckleberry.

Insects and Disease: Due to the potential for white pine blister rust planting of rust resistant sugar pine should be considered

Fire Suppression: Contain and control strategies are recommended Increased resistance to control can result due to high cover of huckleberry oak Fire behavior is dependent on live fuel moisture. Huckleberry oak has the potential to be an explosive fuel and can be extremely hazardous when combined with manzanita Indirect attack may be necessary using other vegetation types as control points. Limit the use of dozers in this type due to serpentine soils

Prescribed Fire: Opportunities to produce lower intensity fires are limited and very dependent on live fuel moisture. Use low intensity fires to enhance cultural species (i e beargrass) Scorch height and bud damage to conifer species are major concerns here.

Closely Related Types

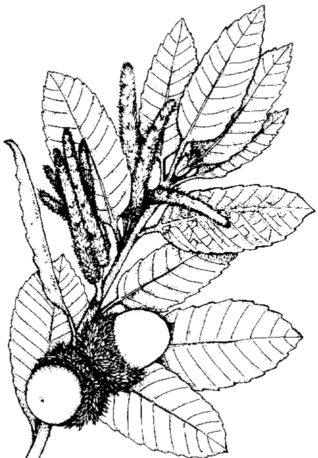
The PSME/QUVA type is closely related to the PSME/QUVA-LIDEE type. They differ in the closer proximity to the Pacific Ocean of the PSME/QUVA–LIDEE type The PSME/QUVA type is replaced on wetter sites by the PSME/QUVA–RHMA type and on sites with higher degrees of serpentinization by the PIJE–CADE3/ QUVA/XETE and PIJE–PSME/QUVA/FECA

Notes

Plant Association: Douglas-fir/Huckleberry Oak–Dwarf tanbark
EDP Code Name: PSME/QUVA–LIDEE
Eco-Code: CD0SOH12

Indicator species:

Huckleberry oak (*Quercus vaccinifolia*–QUVA) was found on high elevation sites, on serpentine soils, with basic soil pH, low AWC, moderate surface rock, high soil coarse fragments, low tree cover and softwood basal area with high shrub cover



Indicator species:

Dwarf tanbark (*Lithocarpus densiflorus* var. *echinoides*–LIDEE) was found on high elevation, coastal sites, on moderately deep, serpentine soils, with basic soil pH, low AWC, high soil coarse fragments, low tree cover and very high shrub cover.

Douglas-fir/Huckleberry Oak–Dwarf tanbark

PSME/QUVA–LIDEE Association
Eco-Code CD0SOH12

This high elevation, coastal type was found on very steep slopes with rocky, serpentine soils. Sites here were harsh with an open overstory and dense shrub layer, dominated by huckleberry oak and dwarf tanbark.

Plant Association Summary

(Sample Size:11)		COVER	CON
Tree Overstory Layer			
PSME	Douglas-fir	32	100
PILA	Sugar Pine	14	72
ARME3	Pacific Madrone	4	27
Tree Understory Layer			
PSME	Douglas-fir	3	81
PILA	Sugar Pine	1	72
UMCA	California Bay	6	63
Shrubs			
QUVA	Huckleberry Oak	42	100
LIDEE	Dwarf Tanbark	18	100
VAPA	Red Huckleberry	15	100
AMAL	Pacific Serviceberry	5	72
Herbs & Grasses			
WHMO	Western Modesty	5	90
CHUMO	Prince's Pine	2	81
XETE	Beargrass	2	81
PYPID	Nootka Wintergreen	1	63

Ranger Districts

Gasquet

Environment

Distance to the Ocean: 8–22 miles

Elevation: 3220–4040'

Aspect: S.W., N.W.

Slope: 30–65%

Slope Position: upper, middle 1/3

Surface Rock: 2–26%

Soils

Pit Depth: 12–35"

AWC: 0.5–2.4"

Parent Material: serpentine, ultramafic

A Horizon—
- Coarse Frag: 20–72%
- Textures: vgl, gl
- Thickness: 2–8"
- pH: 5.5–6.4

Physical and Biological Environment

Distribution/Setting

This type was found on coastal sites where mean distance to the Pacific Ocean was 18 1 miles Elevation averaged 3521' and slopes were typically very steep, averaging 47% Mean radiation index was 444

Soils

Soils in this type were predominately mesic, moderately deep (78%) to shallow (22%) and well drained. They formed in residuum and colluvium. The litter layer thickness averaged 1.6" at 49% cover. Surface rock fragments averaged 17% cover The surface horizon thickness averaged 6" The surface horizons were predominately gravelly to very gravelly with loam textures. Coarse fragment content averaged 45% and pH averaged 6 0 (moderately acid).

The subsoils were gravelly to extremely gravelly with loam texture Subsoil coarse fragment content averaged 47% and ranged from 30% to 61% Subsurface pH averaged 6 3 (slightly acid) and ranged from 6.0 (moderately acid) to 6 4 (slightly acid). The soils were 33% non-skeletal and 67% skeletal Soil AWC averaged 1.6" and ranged from 0.5" to 2.4" These soils were classified into the subgroup Typic Xerochrepts

Vegetation

The total vegetation cover was very high ranging from 95% to 99% with an average of 97% Mean overstory tree cover was 48%, it was dominated by conifers that averaged 47% cover and ranged from 40% to 72% It also included scattered hardwoods that averaged 3% cover and ranged from 0% to 5%. The regeneration layer averaged 13% cover Shrub cover was very high with an average of 80% cover Forb cover was moderate with an average of 12% cover Grass cover was spotty with 2% average cover

Stand Structure

Late seral stands often had 3 or more layers of trees, while early mature and mid-mature stands usually had 1 or 2 layers In late seral stands the top 3 layers were dominated by Douglas-fir and sugar pine. Moderate sized conifers dominated the top two layers with an average of 25 trees/acre > 25" d b h , 10 trees/acre > 30" d.b.h. and 2 trees/acre > 40" d b h

The stand structure characteristics by layer were as follows. the top layer averaged 300 years old with an average diameter of 37" and average height of 116' The second layer had an average age of 265 years with a mean diameter of 26" and a mean height of 92' The third layer averaged 167 years old with a mean diameter of 18" and a mean height of 59'

Overall biomass production (conifer + hardwoods + shrubs) was generally low Modal Dunning site class was 3/4, with site index of 100/125 at 300 years Conifer productivity was generally low with an average volume of 6043 cu ft , it ranged from 3850 cu. ft. to 8958 cu ft , due to the harsh site conditions Softwood basal area averaged 212 sq ft and ranged from 107 to 267 sq ft Hardwood volume averaged 171 cu ft and ranged from 0 to 340 cu ft Hardwood basal area averaged 7 sq. ft. and ranged from 0 to 40 sq. ft. Stand density index was 272, lowest in the Douglas-fir Series

Fire Regime

This type had a high severity fire regime There is a high cover of knobcone pine in the early seral stages of this type This combined with brush species of high resin content enhance explosive fire behavior which produces fire events of high intensity especially in early seral stages However, the coastal position of this type limits the frequency of these events to drought periods where dry brush build up occurs. Moderate intensity events occur infrequently and result in fires of partial stand replacement nature and may include significant areas of high and low tree mortality. Fire behavior is dependent on live fuel moisture. Huckleberry oak and knobcone pine have the potential to be explosive A grass component is also present in all seral stages that can be a carrier of ground fire.

Management Implications

Silvicultural Systems: Sites on serpentine soils with low productivity should be carefully examined before treatment due to regeneration difficulties. Management here should be limited to periodic sanitation salvage

Site Preparation: Broadcast burning should be avoided here due to the potential for damage to serpentine soils.

Regeneration: Regeneration may be more difficult in this plant association due to the high cover of huckleberry oak Natural regeneration should be utilized If regeneration is required disturbance that effects the shrub layer is suggested

Release: None

Animal Damage Control Problems: None known

Stockability: Anticipate stocking levels below regional stocking guidelines on sites with highly serpentinized soils or those with high shrub cover

Species Considerations: Sugar pine is an important component and should be maintained in all management treatments Following stand-replacing wildfires knobcone pine can dominate these sites

Cultural and Commercial: The cultural species most frequently found were sugar pine, iris, prince's pine, beargrass and western modesty. The most frequently occurring commercial plant species, were California bay (in the understory) and red huckleberry (also cultural species)

Insects and Disease: Due to the potential for white pine blister rust planting of rust resistant sugar pine should be considered

Fire Suppression: Contain and control strategies are recommended. Increased resistance to control may result due to high cover of huckleberry oak, particularly after periods of drought. Indirect attack may be necessary using other vegetation types as control points Limit the use of dozers on serpentine soils to avoid soil damage

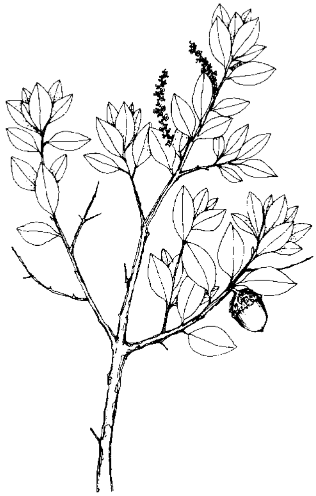
Prescribed Fire: Opportunities to produce lower intensity fires are limited and are dependent on live fuel moisture Use low intensity fires to enhance cultural species (i e beargrass) Scorch height and bud damage to conifers are major concerns here

Closely Related Types

The PSME/QUVA–LIDEE type is closely related to the PSME/QUVA type, which is normally found farther inland. The PSME/QUVA type is replaced on wetter sites by the PSME/QUVA–RHMA type and on sites with higher degrees of serpentinization by the PIJE–CADE3/QUVA/XETE and PIJE–PSME/QUVA/FECA

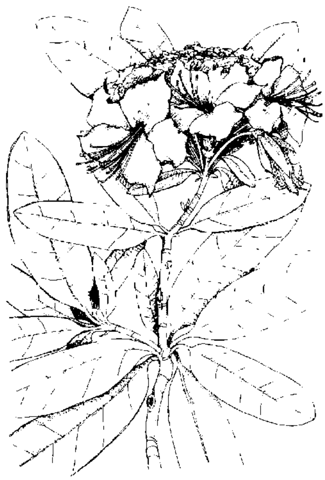
Notes

Plant Association: Douglas-fir/Huckleberry Oak–Pacific Rhododendron
EDP Code Name: PSME/QUVA–RHMA
Eco-Code: CD0SOH13



Indicator species:

Huckleberry oak (*Quercus vaccinifolia*–QUVA) was found on high elevation sites, on serpentine soils, with basic soil pH, low AWC, moderate surface rock, high soil coarse fragments, low tree cover and softwood basal area with high shrub cover.



Indicator species:

Pacific rhododendron (*Rhododendron macrophyllum*–RHMA) was found on mid elevation, cool, moist sites, with high subsurface coarse fragments, close to the Pacific Ocean.

Douglas-fir/Huckleberry Oak–Pacific Rhododendron

PSME/QUVA–RHMA Association

Eco-Code CD0SOH13

This cool, high elevation type was often found in riparian positions on very steep slopes. It is characterized by a dense shrub layer of huckleberry oak and Pacific rhododendron.

Plant Association Summary

(Sample size: 6)		COVER	CON
Tree Overstory Layer			
PSME	Douglas-fir	53	100
PIMO3	Western White Pine	5	83
PILA	Sugar Pine	7	50
Tree Understory Layer			
PSME	Douglas-fir	1	83
PIMO3	Western White Pine	1	50
Shrubs			
QUVA	Huckleberry Oak	24	100
VAPA	Red Huckleberry	17	100
RHMA	Pacific Rhododendron	15	100
LIDEE	Dwarf tanbark	10	83
ROGY	Wood Rose	3	66
BENE1	Dwarf Oregon-grape	2	66
Herbs & Grasses			
XETE	Beargrass	15	83
IRI	Iris spp.	1	66
GOOB	Rattlesnake Plantain	1	66

Ranger Districts

Orleans, Gasquet

Environment

Distance to the Ocean: 18–48 miles

Elevation: 2490–4240'

Aspect: N.E.

Slope: 45–65%

Slope Position: upper, lower 1/3

Surface Rock: 7–11%

Soils

Pit Depth: 15–20"+

AWC: 0.8–4.1"

Parent Material: serpentine, peridotite

A Horizon—

Coarse Frag: 10–55%

Textures: vgl, l

Thickness: 1–2"

pH: 5.7–6.5

Physical and Biological Environment

Distribution/Setting

This type was found on coastal and inland sites where mean distance to the Pacific Ocean was 30 9 miles. Elevation averaged 3245' and slopes were typically very steep. Mean radiation index was a cool 330 as a result of aspect and topographic shading

Soils

Soils in this type were predominately mesic, deep (50%) to moderately deep (25%) and well drained They formed primarily in residuum and colluvium. The litter layer had an average thickness of 0 8" at 82% cover Surface rock fragments averaged 9% cover The surface horizons had an average thickness of 1 inch They were loams or gravelly loam textures Coarse fragment content averaged 25% and pH averaged 6 3 (slightly acid)

The subsoils were predominately gravelly to extremely gravelly with loam texture Subsoil coarse fragment content averaged 43% and ranged from 15% to 70%. Subsurface pH averaged 6 7 (neutral) and ranged from 6 3 (slightly acid) to 7 0 (neutral). The soils were 50% non-skeletal and 50% skeletal Soil AWC averaged 2 5" and ranged from 0.8" to 4 1" These soils were classified into the subgroup Typic Xerochrepts.

Vegetation

The total vegetation cover was very high ranging from 85% to 99% with an average of 97% Mean overstory tree cover was 72%, it was dominated by conifers that averaged 54% cover and ranged from 30% to 80% It also included scattered hardwoods that averaged 6% cover and ranged from 0% to 11% The regeneration layer averaged 6% cover. Shrub cover was very high with an average of 72% cover Forb cover was moderate with an average of 17% cover. Grass cover was spotty with 2% average cover.

Stand Structure

Late seral stands often had 2 or more layers of trees, while early mature and mid-mature stands usually had 1 or 2 layers. In late seral stands the top 2 layers were dominated by Douglas-fir and sugar pine Large sized conifers dominated the top two layers with an average of 32 trees/acre > 25" d b h , 18 trees/acre > 30" d b h. and 9 trees/acre > 40" d.b.h.

The stand structure characteristics by layer were as follows: the top layer averaged 345 years old with an average diameter of 36" and average height of 122'. The second layer had an average age of 280 years with a mean diameter of 25" and a mean height of 85'

Overall biomass production (conifer + hardwoods + shrubs) was generally low. Modal Dunning site class was 3, with site index of 125 at 300 years Conifer productivity was generally low with an average volume of 6939 cu. ft , it ranged from 1640 to 7868 cu ft., due to the variable harsh site conditions. Softwood basal area averaged 253 sq ft and ranged from 67 to 360 sq ft. Hardwood volume averaged 100 cu ft and ranged from 0 to 300 cu ft Hardwood basal area averaged 7 sq ft and ranged from 3 to 13 sq. ft. Stand density index was 367 and fell in the lower end of the Douglas-fir Series

Fire Regime

This type had a moderate severity fire regime which includes fires of various frequency and intensity High intensity events are very infrequent and are usually stand-replacing. Moderate intensity events are infrequent and result in partial stand replacement and may include areas of high and low tree mortality

Management Implications

Silvicultural Systems: This type can be found in riparian positions that limit management options It is also found on serpentine soils with low productivity, which should be carefully examined before treatment, due to regeneration difficulties. Management options here should be limited to periodic sanitation salvage.

Site Preparation: Broadcast burning should be avoided here due to the potential for damage to serpentine soils

Regeneration: Regeneration more difficult in this plant association due to the high cover of Pacific rhododendron and huckleberry oak If regeneration is required disturbance that effects the shrub layer is suggested.

Release: None

Animal Damage Control Problems: None known

Stockability: Anticipate stocking levels below regional stocking guidelines on sites with highly serpentinized soils or those with high shrub cover.

Species Considerations: Sugar pine is an important component and should be maintained in all management treatments.

Cultural and Commercial: The cultural species most frequently found were Pacific madrone, sugar pine, dwarf Oregon-grape, beargrass and Pacific blackberry The most frequently occurring commercial plant species, were incense cedar, California bay, salal and red huckleberry

Insects and Disease: Due to the potential for white pine blister rust, planting of rust resistant sugar pine should be considered

Fire Suppression: Contain and control strategies are recommended. Fire behavior is dependent on live fuel moisture. Increased resistance to control may occur due to high cover of huckleberry oak, which has the potential to be an explosive fuel when dry Indirect attack may be necessary using other vegetation types as control points Limit use of dozers in this type due to serpentine soils

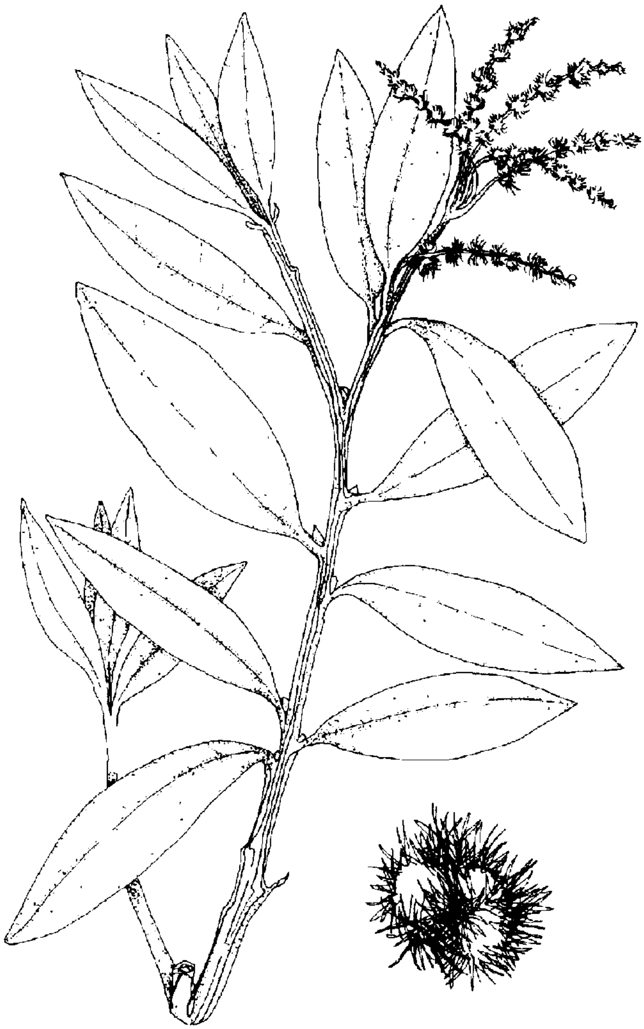
Prescribed Fire: Opportunities to produce lower intensity fires are limited and dependent on live fuel moisture Fire could be used to manage for cultural species (i.e beargrass). Scorch height and bud damage to conifers are major concerns

Closely Related Types

The PSME/QUVA–RHMA type is closely related to the PSME/QUVA and PSME/QUVA–LIDEE type. On sites with higher degrees of serpentinization by the PIJE–CADE3/QUVA/XETE and PIJE–PSME/QUVA/FECA

Notes

Plant Association: Douglas-fir–Chinquapin–Tanoak
EDP Code Name: PSME–CACH2–LIDE2
Eco-Code: CD0HGC11



Indicator species:

Chinquapin (*Castonopsis chrysophylla*–CACH2) was found on high elevation sites, with moderate slopes, high AWC, low grass cover and high softwood basal area.

Douglas-fir–Chinquapin–Tanoak

PSME–CACH2–LIDE2 Association
Eco-Code CD0HGC11

This high elevation, upland type was found on very steep slopes with southerly aspects. It is characterized by the presence of chinquapin and tanoak (in the shrub form).

Plant Association Summary

(Sample size: 24)

		COVER	CON
Tree Overstory Layer			
PSME	Douglas-fir	53	100
CACH2	Chinquapin	13	91
ARME3	Pacific Madrone	7	45
LIDE2	Tanoak	6	45
PILA	Sugar Pine	10	41
Tree Understory Layer			
CACH2	Chinquapin	8	83
PSME	Douglas-fir	3	83
LIDE2	Tanoak	8	75
PILA	Sugar Pine	1	58
Shrubs			
BENE1	Dwarf Oregon-grape	6	54
COCOC	California Hazelnut	3	50
Herbs & Grasses			
CHUMO	Prince's Pine	8	79
PTAQL	Bracken Fern	1	70
GOOB	Rattlesnake Plantain	1	62
XETE	Beargrass	4	50
WHMO	Western Modesty	3	50

Ranger Districts

Orleans, Gasquet, Ukonom, Happy Camp

Environment

Distance to the Ocean: 16–36 miles

Elevation: 2440–4440'

Aspect: W., S.W., E.

Slope: 10–80%

Slope Position: middle, upper 1/3

Surface Rock: 0–10%

Soils

Pit Depth: 23–40"+

AWC: 1.8–4.7"

Parent Material: mafic, phyllite, schist

A Horizon—

Coarse Frag: 10–50%
Textures: sl, gsl, gl, vgl
Thickness: 2–12"
pH: 5.2–6.5

Physical and Biological Environment

Distribution/Setting

This type was found on coastal and inland sites where mean distance to the Pacific Ocean was 25.8 miles Elevation averaged 3458' and slopes were typically very steep, averaging 48%. Mean radiation index was a warm 469 due to the southerly aspects

Soils

Soils in this type were predominately mesic, deep (50%) to moderately deep (38%) and well drained. They formed primarily in residuum and occasionally colluvium. The litter layer had an average thickness of 1 3" at 93% cover. Surface rock fragments averaged 5% cover The surface horizon had an average thickness of 6". They were gravelly to very gravelly with loam and sandy loam textures Coarse fragment content averaged 31% and pH averaged 5 7 (moderately acid)

The subsoils were predominately gravelly to very gravelly with loamy texture, including some with sandy loam, clay loam and silt loam textures. Subsoil coarse fragment content averaged 34% and ranged from 10% to 75% Subsurface pH averaged 5 9 (moderately acid) and ranged from 5 3 (strongly acid) to 7 0 (neutral) The soils were 63% non-skeletal and 37% skeletal Soil AWC averaged 3 2" and ranged from 1 8" to 4 7" These soils were classified into the subgroups Dystric Xerochrepts and Ultic Haploxeralfs

Vegetation

The total vegetation cover was moderate ranging from 80% to 99% with an average of 91% Mean overstory tree cover was 75%, it was dominated by conifers that averaged 54% cover and ranged from 24% to 75% It also included hardwoods that averaged 23% cover and ranged from 5% to 33% The regeneration layer averaged 21% cover Shrub cover was moderate cover with an average of 19% cover. Forb cover was also moderate with an average of 17% cover Grass cover was low with < 1% average cover

Stand Structure

Late seral stands often had 4 or more layers of trees, while early mature and mid-mature stands usually had 3 layers In late seral stands the top 2 layers were dominated by Douglas-fir, the third layer included a combination of conifers and hardwoods, while the lower layer was dominated by chinquapin, Pacific madrone and tanoak Large sized conifers dominated the top two layers with an average of 34 trees/acre > 25" d.b h , 23 trees/acre > 30" d.b.h and 15 trees/acre > 40" d.b.h. Hardwoods dominated the lower layers and included 115 trees/acre > 5" d b h and 12 trees/acre > 11" d b h

The stand structure characteristics by layer were as follows: the top layer averaged 371 years old with an average diameter of 49" and average height of 165' The second layer had an average age of 185 years with a mean diameter of 33" and a mean height of 138' The third layer had an average age of 162 years with a mean diameter of 23" and a mean height of 82' The fourth layer had an average diameter of 9" and average height of 51'

Overall biomass production (conifer + hardwoods + shrubs) was generally high Modal Dunning site class was 1, with site index of 175 at 300 years Conifer productivity was generally high with an average volume of 9346 cu ft , it ranged from 4492 to 6,741 cu ft , due to the variable cover of hardwoods. Softwood basal area averaged 242 sq ft and ranged from 133 to 373 sq ft Hardwood volume averaged 634 cu. ft. and ranged from 116 to 1342 cu. ft. Hardwood basal area averaged 41 sq ft and ranged from 13 to 80 sq ft Stand density index was 418 and fell in the middle group in the Douglas-fir Series.

Fire Regime

The fire regime is moderate-severity with infrequent fire events that are of partial stand replacement nature These events may include significant areas of high and low tree mortality Periodic ground fires of low intensity generally occur here

Management Implications

Silvicultural Systems: All silvicultural systems are applicable

Site Preparation: All site preparation methods are applicable however, moderate or high intensity broadcast burning normally leads to removal of the O horizon and on slopes > 25% may lead to significant soil loss

Regeneration: Artificial regeneration should be considered Anticipate significant competition from chinquapin, tanoak and other shrubs.

Release: Early release with multiple treatments are recommended due to the potential for high density of hardwoods and shrubs.

Animal Damage Control Problems: None known

Stockability: Regional stocking guidelines are applicable

Species Considerations: Sugar pine and Pacific yew are important components of this type and should be maintained in all management treatments.

Cultural and Commercial: The cultural species most frequently found were chinquapin, tanoak (in the understory), dwarf Oregon-grape, California hazelnut, beargrass and prince's pine Red huckleberry, a commercial plant species was found infrequently

Insects and Disease: Due to the potential for white pine blister rust planting of rust resistant sugar pine should be considered

Fire Suppression: Contain and control strategies are recommended. A window of opportunity exists each season where conditions exist to produce extreme fire behavior

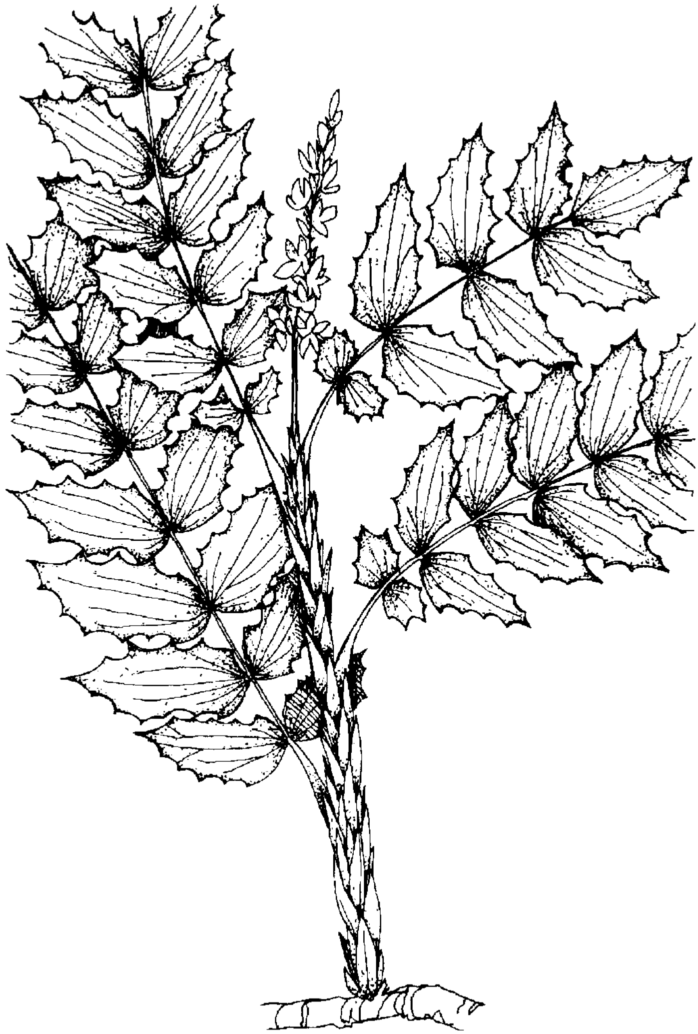
Prescribed Fire: Use prescribed fire in older stands to reduce fuel accumulations, manage for cultural species (i.e.California hazelnut and beargrass) and promote stand diversity Potential exists here to use fire to create pockets to promote natural regeneration and stand diversity

Closely Related Types

The PSME–CACH2–LIDE2 type is closely related to the PSME–CACH2–LIDE2/BENE1 type which was generally found on drier inland sites

Notes

Plant Association: Douglas-fir–Chinquapin–Tanoak/ Dwarf Oregon-grape
EDP Code Name: PSME–CACH2–LIDE2/BENE1
Eco-Code: CD0HGC16



Indicator species:

Dwarf Oregon-grape (*Berberis nervosa*–BENE1) was found on cool, steep, high elevation sites, with high softwood basal area, moderate shrub cover and low grass cover.

Douglas-fir–Chinquapin–Tanoak/Dwarf Oregon-grape

PSME–CACH2–LIDE2/BENE1 Association

Eco-Code CD0HGC16

This upland type was found on inland sites with deep, well drained soils. It is characterized by the presence of chinquapin and tanoak (in shrub form) and dwarf Oregon-grape.

Plant Association Summary

(Sample size: 15)

		COVER	CON
Tree Overstory Layer			
PSME	Douglas-fir	40	100
CACH2	Chinquapin	24	93
ABCO	White Fir	8	73
ARME3	Pacific Madrone	6	46
LIDE2	Tanoak	13	46
Tree Understory Layer			
ABCO	White fir	8	93
PSME	Douglas-fir	3	86
LIDE2	Tanoak	15	80
CACH2	Chinquapin	10	66
Shrubs			
BENE1	Dwarf Oregon-grape	5	80
Herbs & Grasses			
CHUMO	Prince's Pine	4	86
ACTR	Vanilla Leaf	5	80
PYPI2	Whiteveined Wintergreen	1	80
GOOB	Rattlesnake Plantain	1	73
WHMO	Western Modesty	8	66
LIBOL	Twinflower	3	60

Ranger Districts

Happy Camp, Ukonom, Orleans

Environment

Distance to the Ocean: 20–46 miles

Elevation: 3150–4060'

Aspect: N.W., E., W.

Slope: 18–57%

Slope Position: lower, middle, upper 1/3

Surface Rock: 0–6%

Soils

Pit Depth: 40"+

AWC: 2.0–5.9"

Parent Material: mafic, greenstone, granite

A Horizon—

Coarse Frag: 12–55%

Textures: l, gl, gcl, vgl, sl, vgsl

Thickness: 1–10"

pH: 2.0–5.9

Physical and Biological Environment

Distribution/Setting

This type was found on inland sites where mean distance to the Pacific Ocean was 35 2 miles. Elevation averaged 3305' and slopes were typically moderately steep, averaging 35% Mean radiation index was 416

Soils

Soils in this type were predominately mesic, deep (100%) and well drained They formed primarily in residuum and colluvium The litter layer averaged 1 2" thick at 86% cover. Surface rock fragments averaged 3% cover The surface horizon had an average thickness of 7" The surface horizon was predominately gravelly to very gravelly with loamy textures including some sandy loams. Coarse fragment content averaged 37% and pH averaged 6.0 (moderately acid).

The subsoils were predominately gravelly and very gravelly with loam, clay loam and sandy loam textures. Subsoil coarse fragment content averaged 29% and ranged from 15% to 50%. Subsurface pH averaged 6.2 (slightly acid) and ranged from 5.6 (moderately acid) to 6.5 (slightly acid) The soils were 60% non-skeletal and 40% skeletal. Soil AWC averaged 4.5" and ranged from 2.0" to 5 9" These soils were classified into the subgroups Dystric Xerochrepts, Typic Haploxerults and Ultic Haploxeralfs

Vegetation

The total vegetation cover was moderate ranging from 80% to 98% with an average of 92% Mean overstory tree cover was 82%, it was dominated by conifers that averaged 57% cover and ranged from 40% to 85% It also included hardwoods that averaged 28% cover and ranged from 11% to 40% The regeneration layer averaged 25% cover Shrub cover was low with an average of 11% cover Forb cover was moderate with an average of 17% cover. Grass cover was low with < 1% average cover.

Stand Structure

Late seral stands often had 5 or more layers of trees, while early mature and mid-mature stands usually had 3 layers In late seral stands the top 2 layers were dominated by Douglas-fir, the third layer included a combination of conifers and hardwoods, while the lower layers were dominated by chinquapin, Pacific madrone and tanoak Large sized conifers dominated the top two layers with an average of 27 trees/acre > 25" d.b.h., 20 trees/acre > 30" d.b h and 12 trees/acre > 40" d b h Hardwoods dominated the lower layers and included 111 trees/acre > 5" d b h and 32 trees/acre > 11" d b h.

The stand structure characteristics by layer were as follows: the top layer averaged 316 years old with an average diameter of 45" and average height of 171'. The second layer had an average age of 267 years with a mean diameter of 39" and a mean height of 143' The third layer had an average age of 191 years with a mean diameter of 22" and a mean height of 101' The fourth layer had a mean diameter of 14" and a mean height of 78' The fifth layer had an average diameter of 9" and average height of 51'

Overall biomass production (conifer + hardwoods + shrubs) was generally high. Modal Dunning site class was 1, with site index of 175 at 300 years Conifer productivity was generally high with an average volume of 9529 cu. ft , it ranged from a low of 6506 to 11,790 cu. ft., due to the variable cover of hardwoods Softwood basal area averaged 253 sq. ft and ranged from 173 to 267 sq ft. Hardwood volume averaged 1231 cu ft and ranged from 100 to 2848 cu. ft.

Hardwood basal area averaged 75 sq ft and ranged from 10 to 120 sq ft Stand density index was 491 and fell in the upper group in the Douglas-fir Series

Fire Regime

This type had a moderate severity fire regime with fires of various frequency and intensity. High intensity events are very infrequent and are stand-replacing Moderate intensity events are infrequent and partial stand-replacing in nature These fires may include areas of high and low tree mortality

Management Implications

Silvicultural Systems: All silvicultural systems are applicable.

Site Preparation: All site preparation methods are applicable however, tractor operations on clay loam soils may result in soil compaction

Regeneration: Artificial regeneration should be considered Anticipate significant competition from chinquapin, tanoak and other shrubs.

Release: Early release with multiple treatments are recommended due to the potential for high density of hardwoods and shrubs

Animal Damage Control Problems: None known.

Stockability: Regional stocking guidelines are applicable.

Species Considerations: Sugar pine and Pacific yew are important components of this type and should be maintained in all management treatments

Cultural and Commercial: The cultural species most frequently found were chinquapin, dwarf Oregon-grape and prince's pine California hazelnut and beargrass, two cultural species were found here infrequently The most frequently occurring commercial plant species was red huckleberry

Insects and Disease: Due to the potential for white pine blister rust planting of rust resistant sugar pine should be considered.

Fire Suppression: Contain and control strategies are recommended This plant association has the potential for extreme fire behavior

Prescribed Fire: Use prescribed fire in older stands to reduce fuel accumulations, manage for cultural species and promote stand diversity

Closely Related Types:

The PSME–CACH2–LIDE2/BENE1 type is closely related to the PSME–CACH2–LIDE2 type which was generally found on moist coastal sites

Notes

Plant Association: Douglas-fir–Chinquapin/Beargrass
EDP Code Name: PSME–CACH2/XETE
Eco-Code: CD0HGC12

Indicator species:

Beargrass (*Xerophyllum tenax*–XETE) was found on high elevation, cool, coastal sites, with moderate slopes, high shrub cover and moderate tree cover.

Douglas-fir–Chinquapin/Beargrass

PSME–CACH2/XETE Association
Eco-Code CD0HGC12

This upland type is found on cool, high elevation flattened ridgetops. It is characterized by the presence of chinquapin and high cover of beargrass. Beargrass is valued by American Indians for basket making.

Plant Association Summary

(Sample size: 10)		COVER	CON
Tree Overstory Layer			
PSME	Douglas-fir	58	100
CACH2	Chinquapin	33	90
ARME3	Pacific Madrone	7	60
Tree Understory Layer			
PSME	Douglas-fir	2	100
CACH2	Chinquapin	2	90
LIDE2	Tanoak	3	60
Shrubs			
QUSA	Sadler Oak	3	70
Herbs & Grasses			
XETE	Beargrass	55	90
PTAQL	Bracken Fern	2	60
CHUMO	Prince's Pine	1	60

Ranger Districts
Orleans, Ukonom

Environment
Distance to the Ocean: 17–26 miles
Elevation: 3500–3880'
Aspect: S.E., S.
Slope: 10–42%
Slope Position: upper 1/3, flattened ridges
Surface Rock: 0–10%

Soils
Pit Depth: 23–40"+
AWC: 2.5–6.9"
Parent Material: phyllite, schist
A Horizon—
Coarse Frag: 10–29%
Textures: l, gl, gsil
Thickness: 1–17"
pH: 5.5–6.5

Physical and Biological Environment

Distribution/Setting

This type was found on coastal and inland sites where mean distance to the Pacific Ocean was 21 5 miles Elevation averaged 3663' and slopes were typically moderately steep, averaging 26% Mean radiation index was a very warm 527 due to the southerly aspects and exposed landscape positions

Soils

Soils in this type were predominately mesic, deep (50%) to moderately deep (50%) and well drained. They formed in residuum from a metamorphic rock The litter layer thickness averaged 1 0" at 90% cover. Surface rock fragments averaged 8% cover. The surface horizon thickness averaged 10". The surface horizons were predominately gravelly with loam or silt loam textures. Coarse fragment content averaged 19% cover and pH averaged 6 0 (moderately acid)

The subsoils were predominately gravelly to extremely gravelly with silt loam, loam, or clay loam textures Subsoil coarse fragment content averaged 27% and ranged from 10% to 35% Subsurface pH averaged 5.9 (moderately acid) and ranged from 5 5 (strongly acid) to 6 5 (slightly acid) The soils were 85% non-skeletal and 15% skeletal Soil AWC averaged 3.7" and ranged from 2 5" to 6 9". These soils were classified into the subgroup Dystric Xerochrepts

Vegetation

The total vegetation cover was high ranging from 85% to 99% with an average of 96%. Mean overstory tree cover was 88%, it was dominated by conifers that averaged 58% cover and ranged from 25% to 90% It also included hardwoods that averaged 48% cover and ranged from 5% to 70% cover The regeneration layer averaged 5% cover. Shrub cover was low with an average of 5% cover Forb cover was very high with an average of 53% cover. Grass cover was low with < 1% average cover

Stand Structure

Late seral stands often had 4 or more layers of trees, while early mature and mid-mature stands usually had 3 layers. In late seral stands the top 2 layers were dominated by Douglas-fir, the third layer included a combination of conifers and hardwoods, while the lower layer was dominated by chinquapin and Pacific madrone Moderate sized conifers dominated the top two layers with an average of 16 trees/acre > 25" d.b.h., 9 trees/acre > 30" d b.h. and 8 trees/acre > 40" d b h Hardwoods dominated the lower layers and included 227 trees/acre > 5" d b h and 29 trees/acre > 11" d b h

The stand structure characteristics by layer were as follows the top layer averaged 320 years old with an average diameter of 56" and average height of 169' The second layer had an average age of 222 years with a mean diameter of 44" and a mean height of 140' The third layer had an average age of 77 years with a mean diameter of 14" and a mean height of 84'. The fourth layer had an average diameter of 9" and average height of 51'.

Overall biomass production (conifer + hardwoods + shrubs) was generally moderate Modal Dunning site class was 1, with site index of 175 at 300 years. Conifer productivity was generally moderate with an average volume of 7122 cu ft , it ranged from 4890 to 9569 cu. ft., due to the variable cover of hardwoods Softwood basal area averaged 190 sq. ft. and ranged from 140 to 227 sq ft Hardwood volume averaged 1350 cu ft and ranged from 100 to 2500 cu. ft. Hardwood basal area averaged 97 sq ft and ranged from 15 to 147 sq. ft. Stand density index was 445 and fell in the upper group in the Douglas-fir Series

Fire Regime

A moderate-severity regime with infrequent fire events that are of partial stand replacement nature is the general rule here Fire events may include significant areas of high and low tree mortality. Periodic ground fires of low intensity generally occur here

Management Implications

Silvicultural Systems: All silvicultural systems are applicable

Site Preparation: All site preparation methods are applicable

Regeneration: Artificial regeneration should be considered High cover of beargrass may result in reduced survival of conifers.

Release: Early release with multiple treatments are recommended due to the potential for high density of hardwoods Manual treatment of beargrass may be difficult

Animal Damage Control Problems: None known

Stockability: Regional stocking guidelines are applicable.

Species Considerations: Sugar pine and beargrass are important components of this type and should be maintained The beargrass component should be maintained for American Indian and commercial use

Cultural and Commercial: The cultural species most frequently found were chinquapin, Pacific madrone, beargrass and prince's pine Red huckleberry, a commercial plant species, was found infrequently

Insects and Disease: Due to the potential for white pine blister rust planting of rust resistant sugar pine should be considered.

Fire Suppression: Contain and control strategies are recommended A window of opportunity exists each season where conditions exist to produce extreme fire behavior

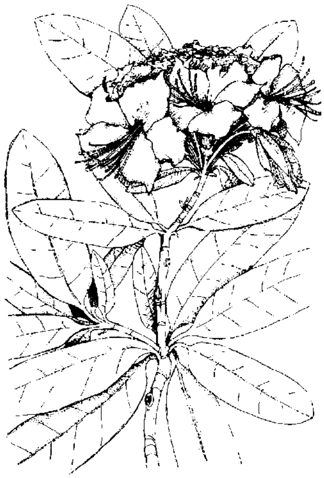
Prescribed Fire: Use prescribed fire in older stands to reduce fuel accumulations, manage beargrass for cultural purposes and promote stand diversity Potential exists here to use fire to create pockets to promote natural regeneration and stand diversity

Closely Related Types

The PSME–CACH2/XETE type is closely related to the PSME–CACH2/RHMA-BENE1 type which was generally found on adjacent cooler, wetter and steeper sites occasionally on colluvial soils

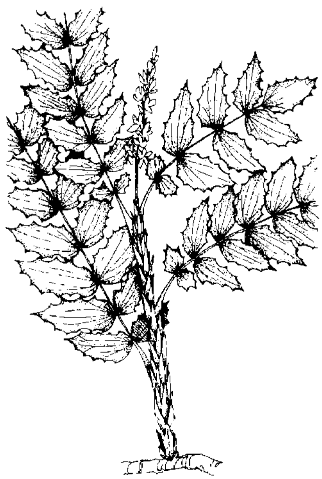
Notes

Plant Association: Douglas-fir–Chinquapin/Pacific Rhododendron–Dwarf Oregon-grape
EDP Code Name: PSME–CACH2/RHMA–BENE1
Eco-Code: CD0HGC14



Indicator species:

Pacific rhododendron (*Rhododendron macrophyllum*–RHMA) was found on mid elevation, cool, moist sites, with high subsurface coarse fragments, close to the Pacific Ocean.



Indicator species:

Dwarf Oregon-grape (*Berberis nervosa*–BENE1) was found on cool, steep, high elevation sites, with high softwood basal area, moderate shrub cover and low grass cover

Douglas-fir–Chinquapin/Pacific Rhododendron–Dwarf Oregon-grape

PSME–CACH2/RHMA–BENE1 Association
Eco-Code CD0HGC14

This type is found on cool, high elevation, moderately acid sites. The indicator species are chinquapin, Pacific rhododendron and dwarf Oregon-grape.

Plant Association Summary

(Sample size: 7)		COVER	CON
Tree Overstory Layer			
PSME	Douglas-fir	58	100
CACH2	Chinquapin	11	85
LIDE2	Tanoak	5	57
Tree Understory Layer			
LIDE2	Tanoak	10	85
CACH2	Chinquapin	4	57
PSME	Douglas-fir	1	57
QUCH2	Canyon Live Oak	1	42
Shrubs			
RHMA	Pacific Rhododendron	41	100
BENE1	Dwarf Oregon-grape	11	100
VAPA	Red Huckleberry	6	57
GAOV	Slender Salal	2	42
Herbs & Grasses			
WHMO	Western Modesty	2	85
PYPI2	Whiteveined Wintergreen	1	71
CHUMO	Prince's Pine	5	57
XETE	Beargrass	3	57

Ranger Districts
Orleans, Ukonom

Environment
Distance to the Ocean: 18–26 miles

Elevation: 2580–3900'

Aspect: N.E., N.W.

Slope: 25–73%

Slope Position: middle, upper 1/3

Surface Rock: 0–20%

Soils
Pit Depth: 28–40"+

AWC: 3.0–5.5"

Parent Material: phyllite, schist

A Horizon—
- **Coarse Frag:** 20–50%
- **Textures:** l, gl, vgl
- **Thickness:** 4–14
- **pH:** 5.5–6.1

Physical and Biological Environment

Distribution/Setting

This type was found on coastal and inland sites where mean distance to the Pacific Ocean was 21 9 miles. Elevation averaged 3365' and slopes were typically steep, averaging 49%. Mean radiation index was a cool .373 due to the north facing aspects

Soils

Soils in this type were predominately mesic, deep (83%) to moderately deep (17%) and somewhat excessively to moderately well drained. They formed primarily in residuum and colluvium The litter layer averaged 0 5" thick at 75% cover Surface rock fragments averaged 12% cover The surface horizon had an average thickness of 8" The surface horizon was predominately loam to very gravelly loam in texture Coarse fragment content averaged 29% and pH averaged 5 9 (moderately acid)

The subsoils were predominately very gravelly to extremely gravelly with loam or clay loam textures Subsoil coarse fragment content averaged 57% and ranged from 35% to 75%. Subsurface pH averaged 6.0 (moderately acid) and ranged from 5.6 (moderately acid) to 6.6 (neutral) The soils were 100% skeletal Soil AWC averaged 4.0" and ranged from 3 0" to 5.5". These soils were classified into the subgroup Dystric Xerochrepts

Vegetation

The total vegetation cover was high ranging from 85% to 98% with an average of 92%. Mean overstory tree cover was 68%, it was dominated by conifers that averaged 59% cover and ranged from 40% to 70% It also included hardwoods that averaged 17% cover and ranged from 0% to 25% cover The regeneration layer averaged 16% cover. Shrub cover was high with an average of 56% cover. Forb cover was moderate in cover with an average of 10% Grass cover was low with < 1% average cover

Stand Structure

Late seral stands often had 4 or more layers of trees, while early mature and mid-mature stands usually had 3 layers In late seral stands the top 3 layers were dominated by Douglas-fir, the fourth layer included a combination of conifers and hardwoods and was dominated by chinquapin and Pacific madrone Large sized conifers dominated the top three layers with an average of 42 trees/acre > 25" d b h , 20 trees/acre > 30" d b h and 7 trees/acre > 40" d b h Hardwoods dominated the lower layer and included 52 trees/acre > 5" d.b h and 3 trees/acre > 11" d b h

The stand structure characteristics by layer were as follows: the top layer averaged 301 years old with an average diameter of 40" and average height of 150' The second layer had an average age of 230 years with a mean diameter of 24" and a mean height of 125' The third layer had an average age of 313 years with a mean diameter of 33" and a mean height of 112'. The fourth layer had a mean diameter of 9" and a mean height of 51'

Overall biomass production (conifer + hardwoods + shrubs) was generally high. Modal Dunning site class was 2, with site index of 150 at 300 years. Conifer productivity was generally high with an average volume of 9170 cu ft , it ranged from 5057 to 12,350 cu ft Softwood basal area averaged 273 sq. ft. and ranged from 150 to 320 sq ft. Hardwood volume averaged 129 cu ft and ranged from 0 to 464 cu. ft Hardwood basal area averaged 12 sq ft. and ranged from 0 to 50 sq. ft Stand density index was 408 and fell in the middle group in the Douglas-fir Series

Fire Regime

This type experiences a high severity fire regime with very infrequent high intensity events of stand-replacing nature which are associated with extended periods of drought It also experiences low intensity, creeping ground fires, which occasionally burn dry logs

Management Implications

Silvicultural Systems: All silvicultural systems are applicable

Site Preparation: Moderate and high intensity broadcast burning can lead to significant competition from snowbrush

Regeneration: Artificial regeneration should be considered Regeneration more difficult here due to high cover of Pacific rhododendron and snowbrush Cutting rhododendron may reduce competition from this species

Release: Early release with multiple treatments are recommended due to the potential for high density of shrubs.

Animal Damage Control Problems: None known

Stockability: Regional stocking guidelines are applicable.

Species Considerations: Pacific yew is an important component of this type and should be maintained in all management treatments

Cultural and Commercial: The cultural species most frequently found were chinquapin, dwarf Oregon-grape, little prince's pine, prince's pine, beargrass and tanoak California hazelnut, another cultural species was found infrequently The most frequently occurring commercial plant species was red huckleberry.

Insects and Disease: None known

Fire Suppression: Confine, contain and control strategies are recommended depending on time of season and weather conditions Each season conditions exist that produce extreme fire behavior The impacts from line construction may be more detrimental than the fire effects

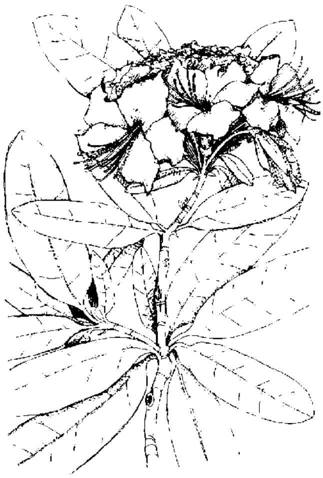
Prescribed Fire: Use prescribed fire in older stands to reduce fuel accumulations, manage cultural species and promote stand diversity. Use of fire to create pockets to promote natural regeneration for stand diversity is recommended

Closely Related Types:

The PSME–CACH2/RHMA–BENE1 type is closely related to the PSME–CACH2/XETE type found upslope on flattened ridgetops on residual soils and the PSME-CACH2/RHMA-GASH on moist sites

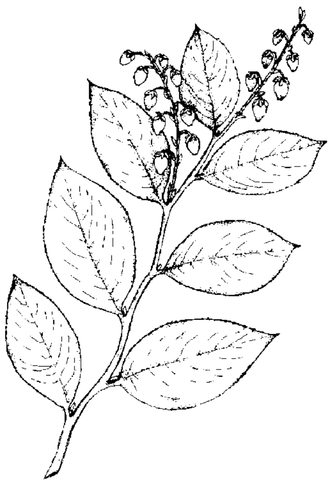
Notes

Plant Association: Douglas-fir–Chinquapin/Pacific Rhododendron–Salal
EDP Code Name: PSME–CACH2/RHMA–GASH
Eco-Code: CD0HGC13



Indicator species:

Pacific rhododendron (*Rhododendron macrophyllum*–RHMA) was found on mid elevation, cool, moist sites, with high subsurface coarse fragments, close to the Pacific Ocean



Indicator species:

Salal (*Gaulthria shalon*–GASH) was found on mid elevation sites with high shrub cover, moderate AWC and thin A horizons.

Douglas-fir–Chinquapin/Pacific Rhododendron–Salal

PSME–CACH2/RHMA–GASH Association

Eco-Code CD0HGC13

This type is found on cool, high elevation, moderately acid, rocky sites. It is characterized by the presence of chinquapin and high cover of Pacific rhododendron over a dense salal layer.

Plant Association Summary

(Sample size: 10)

		COVER	CON
Tree Overstory Layer			
PSME	Douglas-fir	66	100
CACH2	Chinquapin	9	100
PILA	Sugar Pine	6	60
Tree Understory Layer			
LIDE2	Tanoak	10	90
PSME	Douglas-fir	1	70
Shrubs			
GASH	Salal	59	100
RHMA	Pacific Rhododendron	36	100
BENE1	Dwarf Oregon-grape	7	100
VAPA	Red Huckleberry	2	60
Herbs & Grasses			
GOOB	Rattlesnake Plantain	1	90
XETE	Beargrass	5	70
CHUMO	Prince's Pine	2	70
VISE3	Redwood Violet	2	60

Ranger Districts

Gasquet, Orleans, Ukonom

Environment

Distance to the Ocean: 16–29 miles

Elevation: 2500–3600'

Aspect: N.E., N.W.

Slope: 22–65%

Slope Position: lower, middle, upper 1/3

Surface Rock: 0–5%

Soils

Pit Depth: 21–40"+

AWC: 0.7–5.1"

Parent Material: mafic, phyllite, schist

A Horizon—

Coarse Frag: 25–80%

Textures: l, gl, xgl

Thickness: 2–15"

pH: 5.0–6.3

Physical and Biological Environment

Distribution/Setting

This type was found on coastal and inland where mean distance to the Pacific Ocean was 23 4 miles. Elevation averaged 3124' and slopes were typically very steep, averaging 51%. Mean radiation index was a cool 351, due to the north facing aspects

Soils

Soils in this type were predominately mesic, deep (25%) to moderately deep (63%) and were well to moderately well drained. They formed primarily in colluvium and residuum. The litter layer averaged 1 9" thick at 84% cover Surface rock fragments averaged 2% cover The surface horizon had an average thickness of 6" The surface horizon was predominately gravelly to extremely gravelly with loam texture. Coarse fragment content averaged 48% and pH averaged 5 7 (moderately acid)

The subsoils were predominately gravelly to extremely gravelly with loam or clay loam textures. Subsoil coarse fragment content averaged 46% and ranged from 15% to 82% Subsurface pH averaged 6 0 (moderately acid) and ranged from 5.5 (slightly acid) to 6.3 (neutral) The soils were 43% non-skeletal and 57% skeletal. Soil AWC averaged 2 4" and ranged from 0 7" to 5 1" These soils were classified into the subgroups Dystric Xerochrepts and Typic Haploxerults.

Vegetation

The total vegetation cover was high ranging from 95% to 99% with an average of 98%. Mean overstory tree cover was 84%, it was dominated by conifers that averaged 73% cover and ranged from 50% to 85% It also included hardwoods that averaged 20% cover and ranged from 1% to 33% cover The regeneration layer averaged 10% cover. Shrub cover was high with an average of 76% cover Forb cover was moderate with an average of 10% cover. Grass cover was low with < 1% average cover.

Stand Structure

Late seral stands often had 4 or more layers of trees, while early mature and mid-mature stands usually had 3 layers In late seral stands the top 2 layers were dominated by Douglas-fir, the third layer included a combination of conifers and hardwoods, while the fourth layer was dominated by chinquapin and Pacific madrone Moderate sized conifers dominated the top two layers with an average of 21 trees/acre > 25" d b.h., 12 trees/acre > 30" d.b.h. and 5 trees/acre > 40" d.b h Hardwoods dominated the lower layer and included 22 trees/acre > 5" d b h. and 14 trees/acre > 11" d.b.h.

The stand structure characteristics by layer were as follows the top layer averaged 249 years old with an average diameter of 42" and average height of 172' The second layer had an average age of 168 years with a mean diameter of 36" and a men height of 146' The third layer had an average diameter of 14" and average height of 78' The fourth layer had a mean diameter of 9" and a mean height of 51'

Overall biomass production (conifer + hardwoods + shrubs) was generally moderate. Modal Dunning site class was 1, with site index of 175 at 300 years Conifer productivity was generally moderate with an average volume of 7295 cu. ft , it ranged from 4663 to 9474 cu. ft Softwood basal area averaged 216 sq ft. and ranged from 173 to 347 sq. ft. Hardwood volume averaged 568 cu. ft. and ranged from 100 to 790 cu. ft. Hardwood basal area averaged 31 sq. ft and ranged from 10 to 40 sq ft. Stand density index was 366 and fell in the lower group in the Douglas-fir Series

Fire Regime

This type experiences a moderate severity fire regime with very infrequent high intensity events of stand-replacing nature These infrequent events are associated with extended periods of drought. It also experiences low intensity, creeping ground fires, which occasionally burn dry logs.

Management Implications

Silvicultural Systems: Sites with high soil coarse fragments should be carefully examined before treatment due to regeneration difficulties.

Site Preparation: Moderate and high intensity broadcast burning can lead to significant competition from snowbrush

Regeneration: Artificial regeneration should be considered Regeneration more difficult here due to high cover of Pacific rhododendron, salal and snowbrush Cutting rhododendron may reducc competition from this species. Manual release difficulty increases when salal cover is high Sites are plantable, but high cover of salal may effect regeneration success

Release: Early release with multiple treatments are recommended due to the potential for high density of hardwoods and shrubs.

Animal Damage Control Problems: None known.

Stockability: Regional stocking guidelines are applicable

Species Considerations: Sugar pine is an important component of this type and should be maintained

Cultural and Commercial: The cultural species most frequently found were chinquapin, sugar pine, beargrass, dwarf Oregon-grape and prince's pine The most frequently occurring commercial plant species were red huckleberry and salal.

Insects and Disease: Due to the potential for white pine blister rust planting of rust resistant sugar pine should be considered.

Fire Suppression: Confine, contain and control strategies are recommended depending on time of season and weather conditions Each season conditions exist that produce extreme behavior. The impacts from line construction may be more detrimental than the fire effects

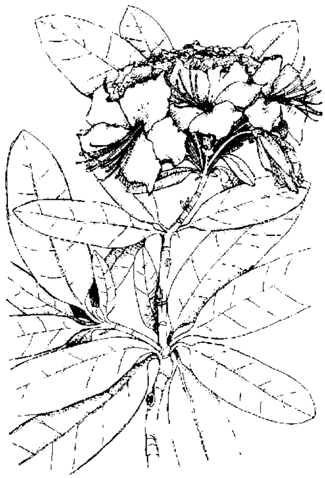
Prescribed Fire: Use prescribed fire in older stands to reduce fuel accumulations, manage cultural species and promote stand diversity. Use of fire to create pockets to promote natural regeneration for stand diversity is recommended.

Closely Related Types

The PSME-CACH2/RHMA-GASH type is closely related to the PSME-CACH2/RHMA-BENE1 type which was generally found on drier sites on residual soils. The PSME-CACH2/RHMA-GASH type was primarily found on colluvial soils

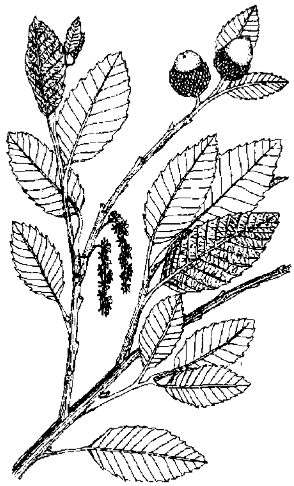
Notes

Plant Association: Douglas-fir–Chinquapin/Pacific Rhododendron–Sadler Oak–Salal
EDP Code Name: PSME–CACH2/RHMA–QUSA–GASH
Eco-Code: CD0HGC17



Indicator species:

Pacific rhododendron (*Rhododendron macrophyllum*–RHMA) was found on mid elevation, cool, moist sites, with high subsurface coarse fragments, close to the Pacific Ocean



Indicator species:

Sadler oak (*Quercus sadleriana*–QUSA) was found in moderately open stands, on high elevation, cool, moist sites, in upper third slope positions, with deep soils, high subsurface coarse fragments, close to the Pacific Ocean

Douglas-fir–Chinquapin/Pacific Rhododendron–Sadler Oak–Salal

PSME–CACH2/RHMA–QUSA–GASH Association
Eco-Code CD0HGC17

This upland type was found on cool, high elevation, coastal and inland sites with moderately acidic soils. The characteristic species are: chinquapin, Pacific rhododendron, Sadler oak, and salal.

Plant Association Summary

(Sample size: 21)		COVER	CON
Tree Overstory Layer			
CACH2	Chinquapin	21	100
PSME	Douglas-fir	42	95
PILA	Sugar Pine	12	85
Tree Understory Layer			
PSME	Douglas-fir	2	100
CACH2	Chinquapin	3	85
LIDE2	Tanoak	5	47
Shrubs			
GASH	Salal	48	100
RHMA	Pacific Rhododendron	32	100
QUSA	Sadler Oak	12	95
VAPA	Red Huckleberry	6	90
BENE1	Dwarf Oregon-grape	4	66
Herbs & Grasses			
XETE	Beargrass	12	100
CHUMO	Prince's Pine	2	38
PTAQL	Bracken Fern	1	33

Ranger Districts

Gasquet, Orleans, Ukonom

Environment

Distance to the Ocean: 16–24 miles

Elevation: 3040–3860'

Aspect: S.E., N.W., N.E.

Slope: 26–65%

Slope Position: lower, middle, upper 1/3

Surface Rock: 0–50%

Soils

Pit Depth: 26–40"+

AWC: 1.6–6.3"

Parent Material: schist, phyllite

A Horizon—

Coarse Frag: 10–50%

Textures: l, gl, gsil, vgl

Thickness: 1–11"

pH: 5.5–6.3"

Physical and Biological Environment

Distribution/Setting

This type was found on coastal and inland sites where mean distance to the Pacific Ocean was 20.5 miles Elevation averaged 3442' and slopes were typically steep, averaging 40%. Mean radiation index was a cool 388 due to the north-facing aspects.

Soils

Soils in this type were predominately mesic, deep (65%) and moderately deep (25%) and well drained to somewhat excessively drained They formed primarily in residuum and occasionally colluvium. The litter layer averaged 1 0" thick at 96% cover. Surface rock fragments averaged 14% cover. The surface horizon had an average thickness of 6". The surface horizon was predominately gravelly to very gravelly with loam and silt loam textures. Coarse fragment content averaged 30% and pH averaged 5 7 (moderately acid).

The subsoils were predominately gravelly to extremely gravelly or extremely cobbly with loam or sandy loam textures Subsoil coarse fragment content averaged 46% and ranged from 18% to 75% Subsurface pH averaged 5.8 (moderately acid) and ranged from 5.5 (strongly acid) to 6.6 (neutral). The soils were 40% non-skeletal and 60% skeletal Soil AWC averaged 3 2" and ranged from 1 6" to 6.3". These soils were classified into the subgroup Dystric Xerochrepts and Ultic Haploxeralfs

Vegetation

The total vegetation cover was high ranging from 90% to 99% with an average of 98%. Mean overstory tree cover was 67%, it was dominated by conifers that averaged 53% cover and ranged from 35% to 85% It also included hardwoods that averaged 24% cover and ranged from 5% to 45% cover. The regeneration layer averaged 11% cover. Shrub cover was very high with an average of 81% cover Forb cover was moderate with an average of 14% cover. Grass cover was low with < 1% average cover

Stand Structure

Late seral stands often had 4 or more layers of trees, while early mature and mid-mature stands usually had 3 layers In late seral stands the top 2 layers were dominated by Douglas-fir, the third layer included a combination of conifers and hardwoods, while the fourth layer was dominated by chinquapin and Pacific madrone Large sized conifers dominated the top two layers with an average of 37 trees/acre > 25" d.b.h., 19 trees/acre > 30" d b h and 11 trees/acre > 40" d.b h Hardwoods dominated the lower layer and included 70 trees/acre > 5" d.b h and 8 trees/acre > 11" d.b.h

The stand structure characteristics by layer were as follows the top layer averaged 327 years old with an average diameter of 54" and average height of 147' The second layer had an average age of 206 years with a mean diameter of 30" and a mean height of 121' The third layer had an average age of 135 years with a mean diameter of 16" and a mean height of 81'. The fourth layer had a mean diameter of 9" and a mean height of 51'

Overall biomass production (conifer + hardwoods + shrubs) was generally moderate. Modal Dunning site class was 2, with site index of 150 at 300 years Conifer productivity was generally moderate with an average volume of 7206 cu. ft., it ranged from 3992 to 10,290 cu ft. Softwood basal area averaged 209 sq ft and ranged from 80 to 307 sq. ft Hardwood volume averaged 317 cu. ft. and ranged from 100 to 968 cu ft Hardwood basal area averaged 32 sq. ft and ranged from 3 to 60 sq ft Stand density index was 355 and fell in the lower group in the Douglas-fir Series.

Fire Regime

This type had a moderate severity fire regime with fires of variable intensity and frequency. High intensity events are associated with periods of drought. They are very infrequent and can be stand-replacing High shrub cover increases the potential for partial stand-replacing fires. Moderate intensity events are infrequent and partial stand-replacing in nature. They may include significant areas of high and low tree mortality

Management Implications

Silvicultural Systems: Shelterwood, single tree selection and sanitation salvage are not recommended in late seral stands due to the high cover of shrubs

Site Preparation: Moderate and high intensity broadcast burning can lead to significant competition from snowbrush.

Regeneration: Artificial regeneration should be considered High surface rock on selected sites could lead to planting problems. Anticipate lower seedling survival rates due to high soil coarse fragments and competition from shrubs Regeneration more difficult here due to high cover of Pacific rhododendron, salal, Sadler oak and snowbrush Cutting rhododendron may reduce competition from this species. Manual release difficulty increases when salal cover is high Sites are plantable, but high cover of salal may effect regeneration success

Release: Early release with multiple treatments are recommended due to the potential for high density of hardwoods and shrubs Manual treatment of beargrass may be difficult

Animal Damage Control Problems: None known.

Stockability: Stocking levels may fall below regional stocking guidelines due to high shrub and hardwood competition

Species Considerations: Sugar pine and Pacific yew are important components of this type and should be maintained in all management treatments Beargrass is an important component in the herb layer that may be used for American Indian and commercial purposes.

Cultural and Commercial: The cultural species most frequently found were chinquapin, dwarf Oregon-grape, beargrass and sugar pine The most frequently occurring commercial plant species were red huckleberry and salal.

Insects and Disease: Due to the potential for white pine blister rust, planting of rust resistant sugar pine should be considered.

Fire Suppression: Confine, contain and control strategies are recommended and dependent on time of season and weather conditions Line construction has the potential to cause more damage than fire effects

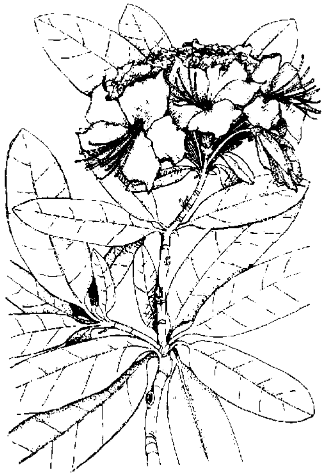
Prescribed Fire: Use prescribed fire in older stands to reduce fuel accumulations, manage cultural species, promote stand diversity and to create openings to promote natural regeneration

Closely Related Types

The PSME–CACH2/RHMA–QUSA–GASH type is closely related to the PSME–CACH2/RHMA–GASH type which was generally found on lower elevation sites on colluvial soils and the PSME–CACH2/RHMA–QUSA/XETE type which was found on higher elevation sites on residual soils.

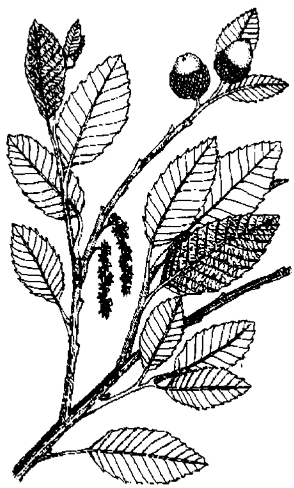
Notes

Plant Association: Douglas-fir–Chinquapin/Pacific Rhododendron–Sadler Oak/Beargrass
EDP Code Name: PSME–CACH2/RHMA–QUSA/XETE
Eco-Code: CD0HGC15



Indicator species:

Pacific rhododendron (*Rhododendron macrophyllum*–RHMA) was found on mid elevation, cool, moist sites, with high subsurface coarse fragments, close to the Pacific Ocean.



Indicator species:

Sadler oak (*Quercus sadleriana*–QUSA) was found in moderately open stands, on high elevation, cool, moist sites, in upper third slope positions, with deep soils, high subsurface coarse fragments, close to the Pacific Ocean.

Douglas-fir–Chinquapin/Pacific Rhododendron–Sadler Oak/Beargrass

PSME–CACH2/RHMA–QUSA/XETE Association
Eco-Code CD0HGC15

This type is found on cool, moist, north-facing, inland sites with moderately acid soils. It is characterized by the presence of chinquapin, Pacific rhododendron, Sadler oak, and beargrass.

Plant Association Summary

(Sample size: 39)		COVER	CON
Tree Overstory Layer			
PSME	Douglas-fir	52	100
CACH2	Chinquapin	16	89
PILA	Sugar Pine	12	56
Tree Understory Layer			
PSME	Douglas-fir	3	94
CACH2	Chinquapin	4	74
Shrubs			
QUSA	Sadler Oak	15	97
RHMA	Pacific Rhododendron	40	82
VAPA	Red Huckleberry	4	58
GAOV	Slender Salal	3	48
BENE1	Dwarf Oregon-grape	6	43
Herbs & Grasses			
XETE	Beargrass	18	87
CHUMO	Prince's Pine	2	71
CHME2	Little Prince's Pine	1	56

Ranger Districts

Orleans, Ukonom

Environment

Distance to the Ocean: 16–26 miles

Elevation: 2880–4560'

Aspect: N., E., W.

Slope: 4–70%

Slope Position: middle, upper 1/3, ridgetop

Surface Rock: 0–15%

Soils

Pit Depth: 10–40"+

AWC: 0.7–6.1"

Parent Material: phyllite, schist

A Horizon—

Coarse Frag: 0–65%
Textures: gl, vgl, xgl, stl, vstl
Thickness: 1–16"
pH: 5.0–6.7

Physical and Biological Environment

Distribution/Setting

This type was found on coastal and inland sites where mean distance to the Pacific Ocean was 20 8 miles. Elevation averaged 3907' and slopes were typically steep, averaging 38% Mean radiation index was a cool .401 due to the north-facing aspects

Soils

Soils in this type were predominately mesic, deep (69%) to moderately deep (20%) and well to moderately well drained. They formed primarily in residuum and occasionally colluvium. The litter layer averaged 0.7" thick at 96% cover Surface rock fragments averaged 9% cover. The surface horizon had an average thickness of 6". The surface horizon was predominately loam to very gravelly loam in texture with some silt loam textures. Coarse fragment content averaged 22% and pH averaged 5 6 (moderately acid)

The subsoils were predominately gravelly to extremely gravelly with loam, silt loam and clay loam textures. Subsoil coarse fragment content averaged 52% and ranged from 18% to 95% Subsurface pH averaged 5.9 (moderately acid) and ranged from 5.0 (very strongly acid) to 6.8 (neutral) The soils were 20% non-skeletal and 80% skeletal Soil AWC averaged 3 1" and ranged from 0 7" to 6.1". These soils were classified into the subgroup Dystric Xerochrepts and Ultic Haploxeralfs.

Vegetation

The total vegetation cover was high ranging from 80% to 99% with an average of 95% Mean overstory tree cover was 68%, it was dominated by conifers that averaged 59% cover and ranged from 38% to 88% It also included hardwoods that averaged 18% cover and ranged from 1% to 34% cover. The regeneration layer averaged 10% cover Shrub cover was high with an average of 53% cover. Forb cover was moderate with an average of 20% cover Grass cover was low with < 1% average cover

Stand Structure

Late seral stands often had 4 or more layers of trees, while early mature and mid-mature stands usually had 3 layers. In late seral stands the top 2 layers were dominated by Douglas-fir, the third layer included a combination of conifers and hardwoods, while the fourth layer was dominated by chinquapin Moderate sized conifers dominated the top two layers with an average of 26 trees/acre > 25" d b h., 12 trees/acre > 30" d.b h and 8 trees/acre >40" d b h Hardwoods dominated the lower layer and included 43 trees/acre > 5" d.b.h. and 12 trees/acre > 11" d b h

The stand structure characteristics by layer were as follows the top layer averaged 292 years old with an average diameter of 45" and average height of 144'. The second layer had an average age of 195 years with a mean diameter of 30" and a height of 110' The third layer had an average age of 108 years with a mean diameter of 20" and a mean height of 84'. The fourth layer had an average diameter of 9" and average height of 51'

Overall biomass production (conifer + hardwoods + shrubs) was generally moderate Modal Dunning site class was 2, with site index of 150 at 300 years Conifer productivity was generally low with an average volume of 5649 cu. ft , it ranged from 2540 to 8700 cu ft , due to the dense shrub layer. Softwood basal area averaged 180 sq. ft and ranged from 80 to 254 sq. ft. Hardwood volume averaged 434 cu. ft and ranged from 100 to 1442 cu ft Hardwood basal area averaged 32 sq ft and ranged from 2 to 90 sq ft Stand density index was 349 and fell in the lower group in the Douglas-fir Series.

Fire Regime

This type had a moderate-severity fire regime with infrequent fire events resulting in partial stand replacement events. Areas with high intensity fires may result from periods of drought Older seral stages exhibit periodic ground fires of low intensity.

Management Implications

Silvicultural Systems: Shelterwood, single tree selection and sanitation salvage are not recommended in late seral stands due to the high cover of shrubs. Sites with high soil coarse fragments should be carefully examined before treatment due to regeneration difficulties

Site Preparation: All methods are applicable, however moderate and high intensity broadcast burning can lead to significant competition from snowbrush

Regeneration: Artificial regeneration should be considered High surface rock on selected sites could lead to planting problems. Anticipate lower seedling survival rates due to high soil coarse fragments and competition from beargrass and shrubs Regeneration more difficult here due to high cover of Pacific rhododendron, Sadler oak, beargrass and snowbrush Cutting Pacific rhododendron may reduce competition from this species

Release: Early release with multiple treatments are recommended due to the potential for high density of shrubs Manual treatment of beargrass may be difficult

Animal Damage Control Problems: None known.

Stockability: Stocking levels may fall below regional stocking guidelines due to high shrub and forb competition.

Species Considerations: Sugar pine is an important component of this type and should be maintained Beargrass is an important component in the herb layer that may be used for American Indian and commercial purposes. An inverse relationship between beargrass and Pacific rhododendron was identified When beargrass was high, rhododendron was low and vice versa.

Cultural and Commercial: The cultural species most frequently found were chinquapin, sugar pine, little prince's pine, beargrass and prince's pine California hazelnut, another cultural species was found infrequently The most frequently occurring commercial plant species was red huckleberry

Insects and Disease: Due to the potential for white pine blister rust, planting of rust resistant sugar pine should be considered

Fire Suppression: Confine, contain and control strategies are recommended depending on time of season and weather conditions Litter is a major carrier of fire, but a narrow window of opportunity exists each season when extreme fire behavior may result. Fuel moisture is a major factor in fire potential The impacts of line construction may be more detrimental than the fire effects

Prescribed Fire: Use prescribed fire in older stands to reduce fuel accumulations, manage cultural species (i e , beargrass) and promote stand diversity. Use of fire is recommended to create pockets to promote natural regeneration for stand diversity.

Closely Related Types

The PSME–CACH2/RHMA–QUSA/XETE type is closely related to the PSME–CACH2/RHMA–QUSA–GASH and PSME–CACH2/RHMA–GASH types which were generally found on lower elevation sites.

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Appendices

Appendices

Appendix I: Plant and Animal Species List

Plant Species List

EDP Code:	Species:	Common Name:
	tree species	
ABCO	*Abies concolor*	white fir
ACMA	*Acer macrophyllum*	bigleaf maple
ALRH	*Alnus rhombifolia*	white alder
ALRU2	*Alnus rubra*	red alder
ARME3	*Arbutus menziesii*	Pacific madrone
CADE3	*Calocedrus decurrens*	incense cedar
CACH2	*Castanopsis chrysophylla*	chinquapin
CHLA	*Chamaecyparis lawsoniana*	Port Orford cedar
CONU4	*Cornus nuttallii*	Pacific dogwood
LIDE2	*Lithocarpus densiflorus*	tanoak
PIAT	*Pinus attenuata*	knobcone pine
PICO	*Pinus contorta*	lodgepole pine
PIJE	*Pinus jeffreyi*	Jeffrey pine
PILA	*Pinus lambertiana*	sugar pine
PIMO3	*Pinus monticola*	western white pine
PIPO	*Pinus ponderosa*	ponderosa pine
PISA	*Pinus sabiniana*	gray pine
POTR5	*Populus tremuloides*	quaking aspen
PSME	*Pseudotsuga menziesii*	Douglas-fir
QUCH2	*Quercus chrysolepis*	canyon live oak
QUGA2	*Quercus garryana*	Oregon white oak
QUKE	*Quercus kelloggii*	black oak
SESE	*Sequoia sempervirens*	redwood
TABR	*Taxus brevifolia*	Pacific yew
TSHE	*Tsuga heterophylla*	western hemlock
UMCA	*Umbellularia californica*	California bay
	shrub species	
ACCI	*Acer circinatum*	vine maple
ACGLT2	*Acer glabrum torreyi*	Torrey maple
AMAL	*Amelanchier alnifolia*	Pacific serviceberry
AMFL	*Amelanchier florida*	western serviceberry
AME	*Amelanchier* spp	serviceberry
ARCA2	*Aralia californica*	spikenard
ARCA5	*Arctostaphylos canescens*	hoary manzanita
ARCO6	*Arctostaphylos columbiana*	hairy manzanita
ARNE2	*Arctostaphylos nevadensis*	pinemat manzanita
ARPA9	*Arctostaphylos patula*	greenleaf manzanita
ARC5	*Arctostaphylos* spp	manzanita
ARUVC	*Arctostaphylos uva-ursi*	kinnikinnik
ARVI3	*Arctostaphylos viscida*	whiteleaf manzanita
BAPI	*Baccharis pilularis*	coyote bush
BEAQ	*Berberis aquifolium*	hollyleaved barberry
BENE1	*Berberis nervosa*	dwarf Oregon-grape
BEPI2	*Berberis piperiana*	Piper's mahonia
BEPU	*Berberis pumila*	pygmy hollygrape
BERE	*Berberis repens*	creeping Oregon-grape
CECO2	*Ceanothus cordulatus*	whitethorn
CECU	*Ceanothus cuneatus*	buckbrush

shrub species (cont.)

CEIN	*Ceanothus integerrimus*	deerbrush
CEPR	*Ceanothus prostratus*	squawcarpet
CEVE3	*Ceanothus velutinus*	snowbrush
COCOC	*Corylus cornuta* v *californica*	California hazelnut
COSE3	*Cornus sessilis*	blackfruit dogwood
CYSC	*Cytisus scoparius*	scotch broom
ERCA6	*Eriodictyon californicum*	yerba santa
EUOC3	*Euonymus occidentalis*	burning bush
GABU2	*Garrya buxifolia*	dwarf silktassel
GAOV	*Gaultheria ovatifolia*	slender salal
GASH	*Gaultheria shallon*	salal
HEAR2	*Heteromeles arbutifolia*	toyon
HODI	*Holodiscus discolor*	oceanspray
LIDEE	*Lithocarpus densiflorus* v *echinoides*	dwarf tanbark
LON	*Lonicera* spp	honeysuckle
LOCI2	*Lonicera ciliosa*	orange honeysuckle
LOHIV	*Lonicera hispidula vacillans*	pink honeysuckle
OSCE2	*Osmaronia cerasiformis*	osoberry
PAMY	*Paxistima myrsinites*	Oregon boxwood
PHLEG	*Philadelphus lewisii gordonianus*	Gordon mock-orange
PREM	*Prunus emarginata*	bitter cherry
QUSA	*Quercus sadleriana*	Sadler oak
QUVA	*Quercus vaccinifolia*	huckleberry oak
RHCA2	*Rhamnus californica*	coffeeberry
RHMA	*Rhododendron macrophyllum*	Pacific rhododendron
RHOC	*Rhododendron occidentale*	western azalea
RHDI	*Rhus diversiloba*	poison oak
RILO	*Ribes lobbii*	Lobb's gooseberry
RISA	*Ribes sanguineum*	red-flowering current
RIB	*Ribes* spp	current gooseberry
ROGY	*Rosa gymnocarpa*	wood rose
ROS	*Rosa* spp.	wild rose
RUB2	*Rubus* spp	blackberry
RULE	*Rubus leucodermis*	western raspberry
RUPA2	*Rubus parviflorus*	thimbleberry
RUSP2	*Rubus spectabilis*	salmon berry
RUUR	*Rubus ursinus*	Pacific blackberry
SAL11	*Salix* spp	willow
SACE3	*Sambucus caerulea*	blue elderberry
SYM3	*Symphoricarpus* spp	snowberry
SYMO	*Symphoricarpus mollis*	creeping snowberry
VAOV	*Vaccinium ovatum*	evergreen huckleberry
VAPA	*Vaccinium parvifolium*	red huckleberry
VAME	*Vaccinium membranaceum*	thinleaf huckleberry

herb and fern species

ACLA2	*Achillea lanulosa*	mountain yarrow
ACMI	*Achillea millefolium*	common yarrow
ACTR	*Achlys triphylla*	vanilla leaf
ADBI	*Adenocaulon bicolor*	trailplant
ADPEA	*Adiatum pedatum* v *aleuticum*	five-finger fern
ALVI2	*Allotropa virgata*	sugarstick

herb and fern species (cont.)

ANMA	*Anaphalis margaritacea*	western pearlyeverlasting
ANDE	*Anemone deltoidea*	threeleaf anemone
ANQUM	*Anemone quinequefolia* v. *minor*	wind flower
ANAR3	*Angelica arguta*	sharp toothed angelica
APAN	*Apocynum androsaemifolium*	spreading dogbane
APPU	*Apocynum pumilum*	mountain dogbane
APO	*Apocynum* spp	dogbane
ARDI3	*Arnica discoidea*	rayless arnica
ARN80	*Arnica* spp	arnica
ASCA2	*Asarum caudatum*	wild ginger
ASHA	*Asarum hartwegii*	marbled ginger
ASA	*Asarum* spp	ginger
AST81	*Aster* spp	aster
ATFIC3	*Athyrium felix-femina californicum*	common ladyfern
BLSP	*Blechnum spicant*	deer fern
BOST2	*Boschniakia strobilacea*	ground cone
BREL	*Brodiaea elegans*	harvest brodiaea
BRID	*Brodiaea ida-maia*	firecracker flower
BRO4	*Brodiaea* spp	brodiaea
CATO	*Calochortus tolmiei*	Tolmie's star tulip
CAL5	*Calochortus* spp.	mariposa lily
CABU2	*Calypso bulbosa*	fairy-slipper
CAPR6	*Campanula prenanthoides*	California harebell
CASC4	*Campanula scouleri*	Scouler's harebell
CAM3	*Campanula* spp.	harebell
CAS2	*Castilleja* spp	Indian paintbrush
CHME2	*Chimaphila menziesii*	little prince's pine
CHUMO	*Chimaphila umbellata* v *occidentalis*	prince's pine
CHPO1	*Chlorogalum pomeridiatum*	soap plant
CIDO	*Cicuta douglasii*	Douglas' water hemlock
CIALP2	*Circaea alpina pacifica*	small enchanter's nightshade
CIOC1	*Cirsium occidentale*	western thistle
CIR4	*Cirsium* spp	thistle
CIVU	*Cirsium vulgare*	bull thistle
CLUN2	*Clintonia uniflora*	Queen's cup
COL4	*Collinsia* spp	collinsia
COHE2	*Collomia heterophylla*	varied leaved collomia
COPO	*Convolvulus polymorphus*	false bindweed
CON6	*Convolvulus* spp	morning glory
COMA4	*Corallorhiza maculata*	spotted coral-root
COME	*Corallorhiza mertensiana*	western coral-root
COR2	*Corallorhiza* spp.	coral-root
COSTQ	*Corallorhiza striata*	striped coral-root
CYGR	*Cynoglossum grande*	Pacific hound's tongue
DECA4	*Dentaria californica*	California toothwort
DIFO	*Dicentra formosa*	bleeding heart
DIHO2	*Disporum hookeri*	Hooker's fairybell
DISM	*Disporum smithii*	Smith's fairybell
DIS3	*Disporum* spp	fairybell
DOD	*Dodecatheon* spp	shooting star
DRAR	*Dryopteris arguda*	California wood fern
EBAU	*Eburophyton austinae*	phantom orchid

herb and fern species (cont.)

EPMI	*Epilobium minutum*	small willowweed
EPI81	*Epilobium* spp	fireweed
EQAR	*Equisetum arvense*	field horsetail
ERLA6	*Eriophyllum lanatum*	woolly eriophyllum
ERCA-3	*Erythronium californicum*	California fawn-lily
ERY5	*Erythronium* spp.	Adder's tongue fawn-lily
FRCA10	*Fragaria californica*	California strawberry
FRI	*Fritillaria* spp	fritillary
GAAP2	*Galium aparine*	stickywilly
GABO	*Galium bolanderi*	Bolander's bedstraw
GACA3	*Galium californicum*	California bedstraw
GATRS2	*Galium trifidum subbiflorum*	threepetal bedstraw
GATR3	*Galium triflorum*	fragrant bedstraw
GAL2	*Galium* spp	bedstraw
GOOB	*Goodyera oblongifolia*	rattlesnake plantain
HAB	*Habenaria* spp	rein-orchid
HAUN	*Habeneria unalascensis*	Alaska bog-orchid
HECO1	*Hemitomes congestum*	gnome-plant
HELA4	*Heracleum lanatum*	common cowparsnip
HEMIE	*Heuchera micrantha* v. *erubescens*	smallflower alumroot
HIAL	*Hieracium albiflorum*	white hawkweed
HYD2	*Hydrophyllum* spp	waterleaf
HYPE	*Hypericum perforatum*	Klamath weed
IRCH	*Iris chrysophylla*	slender-tubed iris
IRIN	*Iris innominata*	Del Norte County iris
IRI	*Iris* spp	iris
IRTE3	*Iris tenuissima*	longtube iris
KEGA	*Kelloggia galioides*	milk kelloggia
LAT3	*Lathyrus* spp	pea
LIG	*Ligusticum* spp.	licoriceroot
LICA1	*Ligusticum californicum*	California licorice
LIBO1	*Lilium bolanderi*	Bolander's lily
LIL2	*Lilium* spp.	lily
LIWAP	*Lilium washingtonianum purpurescens*	Washington lily
LIBOL	*Linnaea borealis* v *longiflora*	twinflower
LICA4	*Listera caurina*	western twayblade
LOM2	*Lomatium* spp	lomatium
LOHIV	*Lonicera hispidula* v. *vacillans*	pink honeysuckle
LOCR	*Lotus crassifolius*	big deervetch
LOT81	*Lotus* spp.	lotus
LUP1	*Lupinus* spp.	lupine
MAMA1	*Madia madioides*	woodland tarweed
MAD3	*Madia* spp	tarweed
MESP2	*Mentha spicata* v *spicata*	spearmint
MIM81	*Mimulus* spp	monkeyflower
MIFL2	*Mimulus floribundus*	manyflowered monkeyflower
MIT	*Mitella* spp.	miterwort
MOOD	*Monardella odoratisima*	mountain pennyroyal
MOUNR	*Moneses uniflora* ssp *reticulata*	single delight
MOHY3	*Monotropa hypoithys*	pinesap
MOPE3	*Montia perfoliata*	miner's lettuce

herb and fern species (cont.)

MOSI	*Montia sibirica*	candyflower
NEPA	*Nemophila parviflora*	smallflower nemophila
NEPE	*Nemophila peduncularita*	meadow nemophila
OSCH	*Osmorhiza chilensis*	mountain sweet-cicely
OSM	*Osmorhiza* spp	sweet-cicely
OXOR1	*Oxalis oregana*	redwood sorrel
PEDE1	*Pedicularis densiflora*	Indian warrior
PEPA8	*Penstemon palmeri*	Palmer's penstemon
PEN2	*Penstemon* spp	penstemon
PER	*Perideridia* spp.	yampah
PEPA2	*Petasites palmatus*	western coltsfoot
PHAD2	*Phlox adsurgens*	woodland phlox
PICA9	*Pityopus californica*	California pinefoot
PLFI2	*Pleuricospora fimbriolata*	fringed pinesap
POCA8	*Polygala californica*	California milkwort
POCO6	*Polygala cornuta*	Sierra milkwort
POL15	*Polygala* spp	milkwort
POCA1	*Polypodium californicum*	California polypody
POGL1	*Polypodium glycyrrhiza*	licorice-fern
POMU1	*Polystichum munitum*	swordfern
POMUI	*Polystichum munitum* ssp *imbricans*	imbricate swordfern
POT4	*Potentilla* spp.	cinquefoil
PRVU	*Prunella vulgaris*	selfheal
PTAQL	*Pteridium aquilinum* v. *lanuginosum*	bracken fern
PTAN	*Pterospora andromedea*	pinedrops
PYASB	*Pyrola asarifolia* v *bracteata*	large wintergreen
PYPI2	*Pyrola picta*	whiteveined wintergreen
PYPIA	*Pyrola picta* ssp *aphylla*	leafless pyrola
PYPID	*Pyrola picta* ssp *dentata*	Nootka wintergreen
PYSE	*Pyrola secunda*	one sided wintergreen
PYR	*Pyrola* spp	wintergreen
RAN3	*Ranunculus* spp	buttercup
RUM3	*Rumex* spp	Dock, sorrel
SASA2	*Sagittaria sanfordii*	valley arrowhead
SACR2	*Sanicula crassicaulis*	Pacific blacksnakeroot
SASA3	*Sarcodes sanquinea*	snowplant
SADO1	*Satureja douglasii*	yerba buena
SAX3	*Saxifraga* spp	saxifrage
SED	*Sedum* spp	stonecrop
SESP	*Sedum spathulifolium*	spatula-leaf stonecrop
SIMA1	*Sidalcea malvaeflora*	checkermallow
SICA3	*Silene campanulata*	Red Mountain catchfly
SIHO	*Silene hookeri*	Hooker's silene
SIL3	*Silene* spp.	catchfly/campion
SMRAA	*Smilacina racemosa amplexicaulis*	western Solomon seal
SMST	*Smilacina stellata*	starry false Solomon seal
STAJ	*Stachys ajugoides*	bugle hedgenettle
STRI	*Stachys rigida*	marsh hedgenettle
STJA	*Stellaria jamesiana*	sticky starwort
TAOF	*Taraxacum officianale*	common dandelion
TEGR	*Tellima grandiflora*	Alaska fringecup
THMA	*Thermopsis macrophylla*	California goldenbanner

herb and fern species (cont.)

TIUN3	*Tiarella unifoliata*	oneleaf foamflower
TOME	*Tolmiea menziesii*	youth on age
TOJA	*Torilis japonica*	Japanese hedge parsley
TRLA3	*Trientalis latifolia*	western starflower
TRCH	*Trifolium chloropetalum*	clover
TRI11	*Trifolium* spp.	clover
TROV2	*Trillium ovatum*	white trillium
TRRI	*Trillium rivale*	Oregon trillium
TRI18	*Triteleia* spp	triteleia
VACH	*Vancouveria chrysantha*	yellow insideout flower
VAHE	*Vancouveria hexandra*	western vancouveria
VAPL	*Vancouveria planipetala*	redwood insideout flower
VECA1	*Veratrum californicum*	California false hellebore
VER1	*Veratrum* spp	false hellebore
VEAM2	*Veronica americana*	American speedwell
VICA1	*Vicia californica*	California vetch
VIC3	*Vicia* spp.	vetch
VIGL	*Viola glabella*	stream violet
VILO	*Viola lobata*	pine violet
VIOC	*Viola ocellata*	pinto violet
VISE	*Viola sempervirens*	redwood violet
VISH	*Viola sheltonii*	Shelton's violet
VIO3	*Viola* spp	violet
WHMO	*Whipplea modesta*	western modesty
WOFI	*Woodwardia fimbriata*	giant chainfern
XETE	*Xerophyllum tenax*	beargrass

grass, sedge and rush species

AGR4	*Agrostis* spp.	bentgrass
AIRA	*Aira caryophylla*	hairgrass
AREL1	*Arrhenatherum elatus*	tall oatgrass
BRCA1	*Bromus carinatus*	California brome
BRMA3	*Bromus mollis*	soft chess
BRO3	*Bromus* spp.	brome
BRTE	*Bromus tectorum*	cheatgrass
BRVU	*Bromus vulgaris*	Columbia brome
CAKO	*Calamagrostis koelerioides*	fire reedgrass
CABO2	*Carex bolanderi*	Bolander's sedge
CACO2	*Carex concinnoides*	northwestern sedge
CAR1	*Carex* spp.	sedge
CYEC	*Cynosurus echinatus*	dogtail grass
DAGL1	*Dactylis glomerata*	orchard grass
DEEL	*Deschampsia elongata*	slender hairgrass
ELGL	*Elymus glaucus*	blue wild rye
FEAR3	*Festuca arundinarea*	tall fescue
FECA	*Festuca californica*	California fescue
FEID	*Festuca idahoensis*	Idaho fescue
FEOC1	*Festuca occidentalis*	western fescue
FES3	*Festuca* spp	fescue
FESU1	*Festuca subulata*	bearded fescue
FESU2	*Festuca subuliflora*	crinkle-awn fescue

grass, sedge and rush species (cont.)

GLST	*Glyceria striata*	fowl mannagrass
GRAM	*Graminoid* spp	grass
HIOC	*Hierochloe occidentalis*	California sweetgrass
JUEFG	*Juncus effusus* v *gracilis*	common rush
JUN3	*Juncus* spp	rush
LUCO1	*Luzula comosa*	heath woodrush
MEL1	*Melica* spp.	oniongrass
MESU	*Melica subulata*	Alaska oniongrass
MUFI2	*Muhlenbergia filiformis*	pullup muhly
POPI	*Poa piperi*	timber bluegrass
POPR1	*Poa pratensis*	Kentucky bluegrass
POA3	*Poa* spp.	bluegrass
SCMI2	*Scirpus microcarpus*	panicled bulrush
STLE1	*Stipa lemmonii*	lemon stipa
TRCEC3	*Trisetum cernuum canescens*	tall oatgrass
VUMI	*Vulpia microstachys*	small fescue

Animal Species List

WHR ID:	Scientific Name:	Common Name:	TES Status:
	amphibians		
A002	*Ambystoma gracile*	northwestern salamander	
A004	*Dicamptodon ensatus*	pacific giant salamander	
A005	*Rhyacotriton olympicus*	olympic salamander	
A006	*Taricha granulosa*	rough-skinned newt	
A009	*Plethodon dunni*	dunn's salamander	
A010	*Plethodon elongatus*	del norte salamander	
A012	*Ensatina eschscholtzi*	ensatina	
A014	*Batrachoseps attenuatus*	california slender salamander	
A020	*Aneides flavipunctatus*	black salamander	
A021	*Aneides ferreus*	clouded salamander	
A022	*Aneides lugubris*	arboreal salamander	
A026	*Ascaphus truei*	tailed frog	
A032	*Bufo boreas*	western toad	
A039	*Hlya regilla*	pacific treefrog	
A043	*Rana boylei*	foothill yellow-legged frog	
A046	*Rana catesbeiana*	bullfrog	
	birds		
B051	*Ardea herodias*	great blue heron	
B052	*Casmerodius albus*	great egret	
B076	*Aix sponsa*	wood duck	
B079	*Anas platyrhynchos*	mallard	
B105	*Mergus merganser*	common merganser	
B108	*Cathartes aura*	turkey vulture	
B110	*Pandion haliaetus*	osprey	
B111	*Elanus caeruleus*	black-shouldered kite	
B113	*Haliaeetus leucocephalus*	bald eagle	FE
B114	*Circus cyaneus*	northern harrier	
B115	*Accipiter striatus*	sharp-shinned hawk	
B116	*Accipiter cooperii*	cooper's hawk	
B117	*Accipiter gentilis*	northern goshawk	FSS
B119	*Buteo lineatus*	red-shouldered hawk	
B123	*Buteo jamaicensis*	red-tailed hawk	
B125	*Buteo lagopus*	rough-legged hawk	
B126	*Aquila chrysaetos*	golden eagle	
B127	*Falco sparverius*	American kestrel	
B128	*Falco columbarius*	merlin	
B129	*Falco peregrinus*	peregrine falcon	FE
B131	*Falco mexicanus*	prairie falcon	
B134	*Dendragapus obscurus*	blue grouse	
B136	*Bonasa umbellus*	ruffed grouse	
B138	*Meleagris gallopavo*	turkey	
B140	*Callipepla californica*	california quail	
B141	*Oreortyx pictus*	mountain quail	
B240	*Brachyramphus marmoratus*	marbled murrelet	FE
B251	*Columba fasciata*	band-tailed pigeon	
B255	*Zenaida macroura*	mourning dove	
B260	*Geococcyx californianus*	greater roadrunner	

birds (con't.)

B262	*Tyto alba*	common barn owl	
B263	*Otus flammeolus*	flammulated owl	
B264	*Otus kennicottii*	western screech owl	
B265	*Bubo virginianus*	great horned owl	
B267	*Glaucidium gnoma*	northern pygmy owl	
B270	*Strix occidentalis*	spotted owl	FT
B271	*Strix nebulosa*	great gray owl	FSS
B274	*Aegolius acadicus*	northern saw-whet owl	
B276	*Chordeiles minor*	common nighthawk	
B277	*Phalaenoptilus nuttallii*	common poorwill	
B281	*Chaetura vauxi*	Vaux's swift	
B287	*Calypte anna*	Anna's hummingbird	
B289	*Stellula calliope*	calliope hummingbird	
B291	*Selasphorus rufus*	rufous hummingbird	
B292	*Selasphorus sasin*	Allen's hummingbird	
B293	*Ceryle alcyon*	belted kingfisher	
B294	*Melanerpes lewis*	Lewis' woodpecker	
B296	*Melanerpes formicivorus*	acorn woodpecker	
B299	*Sphyrapicus ruber*	red-breasted sapsucker	
B299	*Sphyrapicus ruber*	red-breasted sapsucker	
B302	*Picoides nuttallii*	nuttall's woodpecker	
B303	*Picoides pubescens*	downy woodpecker	
B304	*Picoides villosus*	hairy woodpecker	
B305	*Picoides albolarvatus*	white-headed woodpecker	
B307	*Colaptes auratus*	northern flicker	
B308	*Dryocopus pileatus*	pileated woodpecker	
B309	*Contopus borealis*	olive-sided flycatcher	
B311	*Contopus sordioulus*	western wood-pewee	
B317	*Empidonax hammondii*	hammonds' flycatcher	
B318	*Empidonax oberholseri*	dusky flycatcher	
B320	*Empidonax difficilis*	western flycatcher	
B321	*Sayornis nigricans*	black phoebe	
B326	*Myiarchus cinerascens*	ash-throated flycatcher	
B333	*Tyrannus verticalis*	western kingbird	
B337	*Eremophila alpestris*	horned lark	
B338	*Progne subis*	purple martin	
B339	*Tachycineta bicolor*	tree swallow	
B340	*Tachycineta thalassina*	violet-green swallow	
B341	*Stelgidopteryx serripennis*	northern rough-winged swallow	
B343	*Hirundo pyrrhonota*	cliff swallow	
B344	*Hirundo rustica*	barn swallow	
B345	*Perisoreus canadensis*	gray jay	
B346	*Cyanocitta stelleri*	steller's jay	
B348	*Aphelocoma coerulescens*	scrub jay	
B350	*Nucifraga columbiana*	clark's nutcracker	
B353	*Corvus brachyrhvnchos*	American crow	
B354	*Corvus corax*	common raven	
B355	*Parus atricapillus*	black-capped chickadee	
B356	*Parus gambeli*	mountain chickadee	
B357	*Parus rufescens*	chestnut-backed chickadee	
B358	*Parus inornatus*	plain titmouse	
B360	*Psaltriparus minimus*	bushtit	

birds (con't.)

B361	*Sitta canadensis*	red-breasted nuthatch
B362	*Sitta carolinensis*	white-breasted nuthatch
B363	*Sitta pygmaea*	pygmy nuthatch
B364	*Certhia* Americana	brown creeper
B366	*Salpinctes obsoletus*	rock wren
B367	*Catherpes mexicanus*	canyon wren
B368	*Thryomanes bewickii*	bewick's wren
B369	*Troglodytes aedon*	house wren
B370	*Troglodytes troglodytes*	winter wren
B373	*Cinclus mexicanus*	American dipper
B375	*Regulus satrapa*	golden-crowned kinglet
B376	*Regulus calendula*	ruby-crowned kinglet
B377	*Polioptila caerulea*	blue-gray gnatcatcher
B380	*Sialia mexicana*	western bluebird
B381	*Sialia currucoides*	mountain bluebird
B382	*Myadestes townsendi*	townsend's solitaire
B385	*Catharus ustulatus*	swainson's thrush
B386	*Catharus guttatus*	hermit thrush
B389	*Turdus migratorius*	American robin
B390	*Ixoreus naevius*	varied thrush
B391	*Chamaea fasciata*	wrentit
B407	*Bombycilla cedrorum*	cedar waxwing
B411	*Sturnus vulgaris*	european starling
B415	*Vireo solitarius*	solitary vireo
B417	*Vireo huttoni*	hutton's vireo
B425	*Vermivora celata*	orange-crowned warbler
B426	*Vermivora ruficapilla*	nashville warbler
B430	*Dendroica petechia*	yellow warbler
B435	*Dendroica coronata*	yellow-rumped warbler
B436	*Dendroica nigrescens*	black-throated gray warbler
B437	*Dendroica townsendi*	townsend's warbler
B438	*Dendroica occidentalis*	hermit warbler
B460	*Oporornis tolmiei*	macgillivray's warbler
B461	*Geothlypis trichas*	common yellowthroat
B463	*Wilsonia pusilla*	wilson's warbler
B467	*Icteria virens*	yellow-breasted chat
B471	*Piranga ludoviciana*	western tanager
B475	*Pheucticus melanocephalus*	black-headed grosbeak
B477	*Passerina amoena*	lazuli bunting
B482	*Pipilo chlorurus*	green-tailed towhee
B483	*Pipilo erythrophthalmus*	rufous-sided towhee
B484	*Pipilo fuscus*	brown towhee
B489	*Spizella passerina*	chipping sparrow
B495	*Chondestes grammacus*	lark sparrow
B504	*Passerella iliaca*	fox sparrow
B505	*Melospiza melodia*	song sparrow
B506	*Melospiza lincolnii*	lincoln's sparrow
B509	*Zonotrichia atricapilla*	golden-crowned sparrow
B510	*Zonotrichia leucophrys*	white-crowned sparrow
B512	*Junco hyemalis*	dark-eyed junco
B521	*Sturnella neglecta*	western meadowlark
B524	*Euphagus cyanocephalus*	brewer's blackbird

birds (con't.)

B528	*Molothrus ater*	brown-headed cowbird
B532	*Icterus galbula*	northern oriole
B536	*Carpodacus purpureus*	purple finch
B537	*Carpodacus cassinii*	Cassin's finch
B538	*Carpodacus mexicanus*	house finch
B539	*Loxia curvirostra*	red crossbill
B542	*Carduelis pinus*	pine siskin
B543	*Carduelis psaltria*	lesser goldfinch
B545	*Carduelis tristis*	American goldfinch
B546	*Coccothraustes vespertinus*	evening grosbeak
B547	*Passer domesticus*	house sparrow

mammals

M001	*Didelphis virginiana*	Virginia opossum
M003	*Sorex vagrans*	vagrant shrew
M005	*Sorex pacificus*	pacific shrew
M010	*Sorex palustris*	water shrew
M012	*Sorex trowbridgii*	Trowbridge's shrew
M015	*Neurotrichus gibbsii*	shrew-mole
M016	*Scapanus townsendii*	townsend's mole
M017	*Scapanus orarius*	coast mole
M018	*Scapanus latimanus*	broad-footed mole
M021	*Myotis lucifugus*	little brown myotis
M023	*Myotis yumanensis*	yuma myotis
M025	*Myotis evotis*	long-eared myotis
M026	*Myotis thysanodes*	fringed myotis
M027	*Myotis volans*	long-legged myotis
M028	*Myotis californicus*	California myotis
M030	*Lasionycters noctivagans*	silver-haired bat
M032	*Eptesicus fuscus*	big brown bat
M034	*Lasiurus cinereus*	hoary bat
M045	*Sylvilagus bachmani*	brush rabbit
M049	*Lepus americanus*	snowshoe hare
M051	*Lepus californicus*	black-tailed hare
M052	*Aplodontia rufa*	mountain beaver
M057	*Tamias senex*	Allen's chipmunk
M072	*Spermophilus beecheyi*	California ground squirrel
M077	*Sciurus griseus*	western gray squirrel
M079	*Tamiasciurus douglasii*	Douglas' squirrel
M080	*Glaucomys sabrinus*	northern flying squirrel
M081	*Thomomys bottae*	Botta's pocket gopher
M084	*Thomomys mazama*	western pocket gopher
M112	*Castor canadensis*	beaver
M113	*Reithrodontomys megalotis*	western harvest mouse
M120	*Peromyscus truei*	pinyon mouse
M127	*Neotoma fuscipes*	dusky-footed woodrat
M128	*Neotoma cinerea*	bushy-tailed woodrat
M129	*Clethrionomys californicus*	western red-backed vole
M132	*Phenacomys longicaudus*	red tree vole
M134	*Microtus californicus*	california vole
M136	*Microtus longicaudus*	long-tailed vole
M137	*Microtus oregoni*	creeping vole

mammals (con't.)

M139	*Ondatra zibethicus*	muskrat	
M142	*Mus musculus*	house mouse	
M144	*Zapus trinotatus*	pacific jumping mouse	
M145	*Erethizon dorsatum*	porcupine	
M146	*Canis latrans*	coyote	
M149	*Urocyon cinereoargenteus*	gray fox	
M151	*Ursus americanus*	black bear	
M152	*Bassariscus astutus*	ringtail	
M153	*Procyon lotor*	raccoon	
M154	*Martes americana*	marten	FSS
M155	*Martes pennanti*	fisher	FSS
M156	*Mustela erminea*	ermine	
M157	*Mustela frenata*	long-tailed weasel	
M158	*Mustela vison*	mink	
M160	*Taxidea taxus*	badger	
M161	*Spilogale gracilis*	western spotted skunk	
M162	*Mephitis mephitis*	striped skunk	
M163	*Lutra canadensis*	river otter	
M165	*Felis concolor*	mountain lion	
M166	*Felis rufus*	bobcat	
M176	*Sus scrofa*	wild pig	
M177	*Cervus elaphus*	roosevelt elk	
M181	*Odocoileus hemionus*	mule deer	
M181	*Odocoileus hemionus columbianus*	black - tailed deer	

reptiles

R004	*Clemmys marmorata*	western pond turtle	FSS
R022	*Sceloporus occidentalis*	western fence lizard	
R023	*Sceloporus graciosus*	sagebrush lizard	
R036	*Eumeces skiltonianus*	western skink	
R040	*Gerrhonotus multicarinatus*	southern alligator lizard	
R042	*Gerrhonotus coeruleus*	northern alligator lizard	
R046	*Charina bottae*	rubber boa	
R048	*Diadophis punctatus*	ringneck snake	
R049	*Contia tenuis*	sharp-tailed snake	
R051	*Coluber constrictor*	racer	
R057	*Pituophis melanoleucus*	gopher snake	
R058	*Lampropeltis getulus*	common kingsnake	
R061	*Thamnophis sirtalis*	common garter snake	
R062	*Thamnophis elegans*	western terrestrial garter snake	
R063	*Thamnophis couchi*	western aquatic garter snake	
R064	*Thamnophis ordinoides*	northwestern garter snake	
R076	*Crotalus viridis*	western rattlesnake	

TES Status:

FE=Federally Endangered
FT=Federally Threatened
FSS=Forest Service Sensitive

Appendix II: Descriptive Variables, Logs and Snags data for Seral Stages in the Tanoak and the Douglas-fir Series

Descriptive Variables for Seral Stages in theDouglas-fir Series

	Seral Stages											
Variables:	Shrub/Forb Mean/SE		Pole Mean/SE		Early Mature Mean/SE		Mid-Mature Mean/SE		Late Mature Mean/SE		Old Growth Mean/SE	
Stand Height (ft.)												
T1	21	3	36	3	109	5	117	5	143	5	157	2
T2	10	1	25	2	50	6	67	7	63	16	86	8
Diameter Classes (#)												
Conifers	1.2	0.1	2.0	0.1	4.0	0.2	4.5	0.2	4.7	0.1	4.4	0.1
Totals	1.9	0.1	2.9	0.2	5.6	0.3	5.6	0.3	5.9	0.3	6.0	0.1
Softwood Trees/Acre												
(1-5.9")	311	103	197	40	17	6	25	8	21	10	52	9
(6-10.9")	10	3	146	34	13	21	118	18	63	11	38	5
(11-17.9")	0	0	5	2	47	7	48	7	28	4	15	1
(18-24.9")	0	0	1	1	9	2	14	3	9	2	8	1
(25-29.9")	0	0	0	0	21	4	22	3	20	3	10	1
(30-39.9")	0	0	0	0	2	1	4	1	8	1	8	1
(>40")	0	0	0	0	1	1	2	1	3	1	9	1
Hardwood Trees/Acre												
(1-5.9")	189	44	193	44	18	8	5	4	37	13	41	6
(6-10.9")	3	2	5	2	79	16	42	9	16	5	32	4
Total	192	45	198	46	114	17	57	11	63	16	86	8
Basal Area (sq. ft.)												
Softwood	11	2	53	7	172	14	219	15	21[illegible]	16	224	5
Hardwood	8	2	7	2	61	10	37	7	30	5	41	3
Total	19	3	60	8	233	15	256	13	246	16	265	5

Volume (cu ft)												
Softwood	91	47	411	98	4492	413	6494	549	6872	567	7948	223
Hardwood	58	23	32	8	765	134	524	131	479	103	691	64
Total	149	61	444	97	5256	421	7018	520	7351	571	8639	222
Vegetation Cover(%)												
Grass	6	2	10	3	5	2	10	3	5	2	4	1
Forb	24	3	15	3	14	3	10	2	12	2	14	1
Shrub	55	4	39	5	23	4	20	4	29	5	32	2
Conifer	25	3	50	5	62	3	66	3	58	3	56	1
Hardwood	13	2	9	2	27	3	26	4	25	4	26	1

Snag Characterisitics for Seral Stages in the Douglas-fir Series

	Seral Stages											
	Shrub/Forb		Pole		Early Mature		Mid-Mature		Late Mature		Old Growth	
Variables:	Mean/SE		Mean/SE		Mean/SE		Mean/SE		Mean/SE		Mean/SE	
Snag Density (snags/acre)												
(> 20" & > 50')	0 0	0 0	0 0	0 0	0.6	0.4	0.3	0 2	0 9	0 5	2 4	0 3
(> 20" & 20-50')	0 0	0 0	0.0	0.0	3 1	1 7	0.7	0.5	0 5	0 4	1 3	0.3
(> 20" & > 20')	0 0	0.0	0 0	0 0	3.7	1.7	1 0	0 5	1 5	0 7	3 6	0 4
(> 5 " & > 1')	9.3	3.7	3 1	1 7	37.5	6 6	23 4	4 0	17 5	4 2	19 7	1 6
Snag Diameter (inches)												
(> 20" & > 50')	0.0	0.0	0 0	0 0	32 5	4 8	24 2	3 5	33 3	5 2	34.1	1 4
(> 20" & 20-50')	0 0	0 0	0 0	0 0	42 0	2 3	36 5	4 4	34.2	3.1	36.5	3.7
(> 20" & > 20')	0 0	0 0	0 0	0 0	38 8	2 4	32.4	3.7	33.8	4 5	34.3	1 3
(> 5" & > 1')	14 2	4 6	6 3	2 8	13 1	2 5	14.2	2.1	12 1	1.8	20 9	1 2
Snag Height (feet)												
(> 20" & > 50')	0	0	0	0	103	12	66	4	82	16	99	3
(> 20" & 20-50')	0	0	0	0	34	3	27	2	38	11	33	2
(> 20" & > 20')	0	0	0	0	57	10	40	7	75	16	86	4
(> 5" & > 1')	6	4	4	2	21	3	19	2	21	5	38	3
Decay Class (Hard vs Soft %)												
(> 20")	71	29	50	50	12	88	30	70	42	56	51	49
(< 20")	50	50	100	0	72	28	72	28	47	73	52	48

Log Characterisitics for Seral Stages in the Douglas-fir Series

	Seral Stages											
	Shrub/Forb		Pole		Early Mature		Mid-Mature		Late Mature		Old Growth	
Variables:	Mean/SE		Mean/SE		Mean/SE		Mean/SE		Mean/SE		Mean/SE	
Log Density (logs/acre)												
(> 30")	8.1	2.5	4 9	2 0	12 0	5 8	2.1	1.2	0.7	0.7	3 8	1 0
(> 20" & < 30")	17.8	4 2	7.4	3 0	11 3	4.8	4 1	1 3	6.3	1 9	6.9	1 8
(> 15" & < 20")	19.6	3.5	5.6	1.8	11 8	3 9	6 5	1 5	3.3	1.6	6.3	1 2
(> 10" & < 15")	26 4	5.9	8 3	2.9	15 3	4 2	10.5	2 4	19 3	5.7	12 7	2.0
Log Volume (ft ^{3})												
(> 10" & > 1')	2003	430	1705	457	2892	1157	662	176	622	189	1564	230
Log Weight (tons/acre)												
(> 10" & > 1')	32 3	6 8	26.4	7 1	44 8	17.9	10 3	2.3	9 6	2 9	24.2	3 6

Descriptive Variables for Seral Stages in the Tanoak Series

	Seral Stages											
Variables:	Shrub/Forb Mean/SE		Pole Mean/SE		Early Mature Mean/SE		Mid-Mature Mean/SE		Late Mature Mean/SE		Old Growth Mean/SE	
Stand Height (ft)												
T1	24	1	40	2	113	4	154	5	170	3	178	1
T2	15	1	27	2	66	6	92	9	1098121		3	
Diameter Classes (#)												
Conifers	2 8	0.1	5 1	0 3	14 8	0 8	20.2	1 4	25 2	1 1	27.9	0 5
Hardwoods	2.3	0 1	3 3	0 2	8 2	0.6	8 2	0 5	10 4	0.6	10 1	0 3
Softwood Trees/Acre												
(1-5 9")	257	16	188	21	22	8	29	13	24	10	15	3
(6-10.9")	20	3	88	10	107	20	59	13	24	4	30	3
(11-17 9")	0	0	4	2	34	5	22	3	13	3	10	1
(18-24 9")	0	0	0	0	14	3	14	2	7	1	5	1
(25-29.9")	0	0	0	0	14	2	18	3	13	2	9	0.5
(30-39.9")	0	0	0	0	2	0 5	6	1	9	1	8	0 3
(> 40")	0	0	0	0	20 7	7	2	9	1	1	2	0 6
Hardwood Trees/Acre												
(1-5 9")	651	37	535	56	110	26	162	25	93	21	101	7
(6-10 9")	13	4	57	11	221	37	127	20	61	8	76	4
(11-17 9")	0	0	1	1	16	3	17	4	14	2	15	1
(18-24 9")	0	0	0	0	0 6	0.4	2.5	0 9	3	1	3	0.3
(25-29.9")	0	0	0	0	2 5	0 9	1 6	0.6	2.5	0 6	2	0.3
(> 30")	0	0	0	0	0	0	0	0	0 3	0 1	0.3	05

Basal Area (sq. ft.)												
Softwood	13	1	40	5	154	10	203	17	230	15	228	5
Hardwood	19	2	37	5	93	10	93	9	71	5	73	2
Total	32	3	77	7	246	11	296	17	301	14	301	4
Volume (cu ft)												
Softwood	109	20	616	175	4416	306	6483	568	8710	586	8807	199
Hardwood	67	9	284	82	1462	173	1566	189	1242	118	1237	43
Total	177	25	900	203	5878	286	8049	602	9953	554	10,043	191
Vegetation Cover (%)												
Grass	2	1	3	1	<1	<1	<1	<1	1	1	<1	<1
Forb	13	1	7	1	4	1	6	1	6	1	11	1
Shrub	42	2	23	2	27	4	26	4	35	4	40	2
Conifer	17	1	30	2	56	3	58	3	57	3	54	1
Hardwood	39	2	42	3	57	3	52	4	47	3	53	1

Snag Characterisitics for Seral Stages in the Tanoak Series

	Seral Stages											
	Shrub/Forb		Pole		Early Mature		Mid-Mature		Late Mature		Old Growth	
Variables:	Mean/SE		Mean/SE		Mean/SE		Mean/SE		Mean/SE		Mean/SE	
Snag Density (snags/acre)												
(> 20" & > 50')	0.0	0.0	0.0	0.0	0.6	0.3	1.6	0.7	0.6	0.2	1.6	0.2
(> 20" & 20-50')	0.0	0.0	0.0	0.0	1.4	0.6	1.9	0.8	0.8	0.4	1.8	0.2
(> 20" & > 20')	0.0	0.0	0.0	0.0	2.0	0.7	3.3	1.0	1.2	0.4	3.4	0.3
(> 5" & >1')	34.0	8.0	10.0	4.0	28.0	4.0	28.0	4.0	19.0	2.0	16.0	1.0
Snag Diameter (inches)												
(> 20" & >50')	0.0	0.0	0.0	0.0	30.2	2.8	28.4	1.8	43.7	8.4	36.6	0.9
(> 20" & 20-50')	0.0	0.0	0.0	0.0	40.5	4.4	22.7	1.9	34.3	0.6	31.9	1.1
(> 20" & > 20')	0.0	0.0	0.0	0.0	34.1	2.6	26.3	1.5	41.6	6.6	35.0	0.7
(> 5" & > 1')	20.8	1.2	27.9	2.9	12.9	0.7	13.4	0.7	15.5	1.0	20.9	0.5
Snag Height (feet)												
(> 20" & > 50')	0	0	0	0	78	7	88	6	110	16	101	3
(> 20" & 20-50')	0	0	0	0	28	3	30	3	34	12	31	1
(> 20" & > 20')	0	0	0	0	60	8	67	8	93	11	77	3
(> 5" & > 1')	3	1	5	1	25	1	28	2	20	2	31	1
Decay Class (Hardwood vs Softwood %)												
(> 20")	75	25	46	54	27	73	48	52	26	74	40	60
(< 20")	85	15	71	29	66	34	54	46	48	52	43	57

Log Characterisitics for Seral Stages in the Tanoak Series

	Seral Stages											
	Shrub/Forb		Pole		Early Mature		Mid-Mature		Late Mature		Old Growth	
Variables:	Mean/SE		Mean/SE		Mean/SE		Mean/SE		Mean/SE		Mean/SE	
Log Density (logs/acre)												
(> 30")	5 6	2.2	8.1	2.8	5.3	2.1	1.8	0.9	0.2	0.2	3.9	0.5
(> 20" & < 30")	8.9	2.8	10.9	3.1	5.4	1.9	4 8	2 1	1 8	0.9	6.5	0.7
(> 15" & < 20")	8 9	2.3	7.9	2.4	3.1	1.1	6.7	2.6	3.1	1.1	6 2	0 7
(> 10" & < 15")	20.0	4.1	16.4	4.2	8.1	1.6	27.8	6.1	14 4	2 5	15 7	1 5
Log Volume (cu. ft.)												
(> 10" & > 1')	1286	412	1387	378	1657	453	810	248	661	302	1537	132
Log Weight (tons/acre)												
(> 10" & > 1')	19 9	6 4	21 5	5 8	25 7	7 0	12 5	3 8	10 1	4 7	23.8	2.0

Appendix III: Environmental Summary

Tanoak Series Environmental Summary

PLANT ASSOCIATION:	ELEVATION mean/range	ASPECT mean/range	PERCENT SLOPE mean/range	SLOPE POSITION mean/range	RADIATION INDEX	SURFACE ROCK	DIST. TO OCEAN (miles)
LIDE2-UMCA/VAOV	1548 (1100-2300)	W., E.	39 (7-70)	low 1/3,strm	.436(.383-.564)	2 (2-4)	15
LIDE2-UMCA/RHDI	1810 (1140-2580)	S W , E	47 (14-68)	low,mid 1/3	467(354-.599)	1 (0-2)	33 3
LIDE2/VAOV-RHMA	1158 (300-1910)	N E , N.W.	50 (20-80)	low,mid 1/3	381(.272-.500)	4 (1-5)	13 1
LIDE2/VAOV-GASH	1618 (400-2400)	S.E.,S W ,E ,N W	51 (20-75)	low,mid,up 1/3	.443(260- 582)	9 (0-40)	18 6
LIDE2/VAOV	1624 (820-2100)	W., N.W., E., S E	39 (0-75)	low,mid,up 1/3	.461(304-.580)	5 (0-10)	18.9
LIDE2/COCOC	1880 (710-3740)	W , N W	42 (26-67)	low,mid 1/3	400(239-.542)	5 (0-8)	28.4
LIDE2-QUKE	2385 (1600-3400)	N., N.W., E., S.	35 (10-56)	low,mid,up 1/3	.477(.334-.585)	6 (0-15)	31.6
LIDE2/ACCI-GASH	2226 (1060-2880)	S.E., N.W	49 (40-80)	strm	432(307- 476)	18 (0-2, 20-85)	21.3
LIDE2-ACMA/POMU1	2249 (890-3400)	S.E., N W., N.E.	57 (5-90)	low,mid,up 1/3,strm	416(208-.597)	15 (1-30)	31 3
LIDE2/ACCI	2981 (2340-3320)	N.W.,N.E.	52 (20-80)	low,mid 1/3,strm	.368(.208- 500)	28 (0-5,25-80)	32 3
LIDE2/GASH	2345 (1625-3100)	W., N.E., N.W.	63 (40-85)	low,mid,up 1/3	.364(.224-.473)	6 (0-11)	20.9
LIDE2/GASH-BENE1	2580 (1560-3650)	N E , N W	54 (33-70)	low,mid,up 1/3	379(.298- 569)	6 (1-5)	22 5
LIDE2/GASH-RHMA	2894 (1800-3560)	N., N.E.	57 (35-80)	low,mid 1/3	.421(.208-.574)	12 (1-35)	19.3
LIDE2-CADE3/FECA	2534 (1800-2880)	S W , N	36 (30-62)	up,mid 1/3	500(371- 561)	8 (0-13)	25.2
LIDE2-CHLA-TSHE/VAOV	1553 (1300-2000)	E	46 (35-75)	mid,low 1/3	.416 (.336-.569)	2 (1-4)	18.8
LIDE2-CHLA-UMCA/VAOV	1232 (900-1600)	W.,N.E.	37 (10-75)	low 1/3	440(383- 591)	2 (0-4)	15.5
LIDE2-CHLA/VAOV-RHOC	1692 (1210-2170)	N.,S.E.	41 (15-55)	mid,low 1/3	450(.383-.523)	3 (0-7)	15.3
LIDE2-CHLA/VAOV	1983 (1400-2660)	N.E.,N.W	35 (0-70)	mid,low 1/3	.418 (.248- 475)	3 (0-8)	18 0
LIDE2-CHLA-ALRH//Riparian	2476 (1900-3520)	E.,S E..	27 (10-50)	low 1/3	453 (.368-.536)	27 (0-65)	22.7

LIDE2-CHLA/VAPA	2526	(1900-3200)	S.E., N., E	20	(5-35)	mid,low 1/3	455 (406- 561)	3 (1-6)	19 1
LIDE2-CHLA/GASH	2668	(1700-3540)	N.E.,E.	21	(5-35)	mid,low 1/3	.451 (.435-.524)	1 (0-3)	22 7
LIDE2-CHLA/ACCI	2693	(1400-2830)	N W	33	(17-80)	low 1/3	374 (.208-.470)	8 (0-11)	22.0
LIDE2-CHLA/BENE1/LIBOL	2815	(2170-3150)	N.	46	(22-70)	mid,low 1/3	.360(.247-.470)	3 (0-5)	23.0
LIDE2/QUVA-RHMA	2662	(2320-3480)	E., W.	45	(40-50)	low,mid,up 1/3	.401(.301-.470)	15 (1-40)	20 2
LIDE2/RHDI-LOHIV	1969	(1140-2500)	N.E., N.W., S.,	46	(22-70)	low,mid,up 1/3	.410(.242-.586)	8 (0-45)	34.2
LIDE2/BENE1	2789	(1900-3722)	N W , N E , E , S	49	(20-72)	mid,up 1/3	398(236- 597)	5 (1-20)	29.7
LIDE2-QUCH2/VAOV	1718	(820-2560)	S.W., N., E.	55	(30-80)	mid,up 1/3	.457(.301-.592)	6 (0-20)	19.8
LIDE2-QUCH2-QUKE/RHDI	2179	(1040-3100)	S., W., E.	50	(20-80)	mid,up 1/3	492(383-.594)	8 (0-15)	31 5
LIDE2-QUCH2/RHDI	2273	(1200-3400)	S.W., S.E., N.W.	61	(43-82)	mid,up 1/3	.460(.293-.583)	7 (2-11)	30.7
LIDE2-QUCH2/GASH-BENE1	3057	(2445-3680)	S.W., W.	66	(45-80)	low,mid,up 1/3	.475(.365-.600)	27 (2-70)	21 6
LIDE2-QUCH2/BENE1	3133	(2040-4020)	S.E., E., W., N.	60	(40-80)	mid,up 1/3	.438(.383-.599)	30 (1-10, 25-95)	23.0
LIDE2-QUCH2//Rockpile	3220	(2560-3850)	S , W	63	(45-80)	up 1/3, ridge	485(385- 600)	43 (20-95)	24.4
LIDE2-CACH2/VAOV-GASH	1987	(1500-2470)	topo	33	(5-55)	mid 1/3	.462(.438-.518)	3 (0-6)	18.0
LIDE2-CACH2/GASH	2750	(1840-3540)	E., N W.	37	(0-75)	low,mid,up 1/3, ridge	442(342- 599)	8 (0-12)	20.0
LIDE2-CACH2/GASH-RHMA	2798	(2460-3280)	N.E., N.W.	46	(35-70)	mid,up 1/3	.350(.227-.471)	3 (0-6)	20.2
LIDE2-CACH2/BENE1	2845	(1820-3770)	N E , N W , S E	46	(18-85)	mid,up 1/3	.404(.272-.587)	8 (0-20)	30 8
LIDE2-CACH2/RHMA/XETE	3214	(2420-3700)	E., N.W.	33	(5-60)	low,mid,up 1/3, ridge	426(.326-.468)	7 (0-11)	25.8
LIDE2-CACH2/PTAQL	3366	(3160-3880)	S.E., W.	39	(25-60)	up 1/3, ridge	.520(.451-.576)	7 (0-12)	22 5

Douglas-fir Series Environmental Summary

PLANT ASSOCIATION:	ELEVATION mean/range	ASPECT mean/range	PERCENT SLOPE mean/range	SLOPE POSITION mean/range	RADIATION INDEX	SURFACE ROCK	DIST. TO OCEAN (miles)
PSME-UMCA/RHDI	1647 (610-3580)	S.W.,N.E.	39 (20-70)	mid,low1/3	.484(.406-.587)	7 (0-13)	28.0
PSME-UMCA/HODI	2866 (2440-3640)	N E	68 (30-90)	strm, lower 1/3	318(.194-.456)	-- (--)	44 5
PSME-ALRU2/ACCI/MOSI	2466 (2360-2570)	S.E.	11 (0-40)	streamside	.456(.370- 499)	65 (60-70)	18 7
PSME-QUKE//Metamorphic	2312 (920-3540)	S.W ,S E	46 (20-75)	low, mid, up 1/3	497(248- 596)	5 (0-18)	37.5
PSME-QUKE//Sandstone	3208 (2380-3920)	S.	29 (20-50)	mid, up 1/3	.486(.308-.583)	10 (0-15)	43.5
PSME-QUKE-QUGA2/GRASS	2817 (2030-3680)	S	41 (30-50)	low,mid 1/3	.531(.471- 583)	3 (0-10)	37 3
PSME-CADE3/FECA	2470 (1360-2750)	S.,W.	39 (10-65)	up,mid1/3	.461 (.336-.582)	3 (1-9)	29.3
PSME-QUGA2/GRASS	3007 (1920-4120)	S.,W	32 (30-60)	mid 1/3	474(346-.589)	1 (0-2)	34 8
PSME-QUGA2/HODI	2839 (2360-2380)	S.,E.	60 (35-90)	low 1/3 strm hdwaters	.525(.462-.596)	-- (--)	44 1
PSME-QUCH2//Rockpile	3291 (1600-4600)	S.W.,W	64 (20-90)	mid, up 1/3 ridge	.463(227-.601)	46 (10-90)	29.9
PSME-QUCH2-ARME3/RHDI	2733 (1120-4130)	S.W., W	59 (15-85)	low, mid, up 1/3	.492(.239-.591)	34 (1-80)	39.4
PSME-QUCH2-LIDE2	2688 (1280-3940)	S W , S.E.	58 (45-80)	low, mid, up 1/3	.515(457- 596)	6 (0-15)	31 2
PSME-PIJE/FECA	2867 (1740-4240)	N.W.,S.E.,W.	38 (25-58)	up,mid1/3	.452(.326-.547)	2 (0-4)	35.8
PSME/COCOC	3174 (2400-4100)	N E ,N W	54 (24-80)	low, mid, up 1/3	400(.227- 591)	12 (0-30)	40 2
PSME-LIDE2/WHMO	3164 (2400-4080)	S W ,E.	55 (35-75)	mid, up 1/3	.462(.264-.580)	5 (1-7)	31.2
PSME-LIDE2/QUVA-HODI	3112 (2430-3600)	N.E.,S.W ,N	41 (20-60)	up, mid1/3	428(272-.537)	41 (5-80)	20 5
PSME-ACMA/POMU1	3273 (2500-4000)	S.W.,S.W.,E.	21 (0-75)	low 1/3, strm	.471(.208-.580)	20 (0-50)	36.8
PSME-ACMA/PHLEG	3116 (2320-4075)	N.W.	81(70-100)	low 1/3 strm	290(.203-.459)	-- (--)	52.1
PSME/ACCI-BENE1	2882 (2520-3150)	E.,W	29 (5-60)	strm	.469(.394-.508)	9 (1-25)	23 1

PSME/QUVA	3393	(2500-4440)	N W ,E ,S W	50	(10-70)	up,mid,low1/3	376 (.239-.569)	10	(1-35)		30 3
PSME/QUVA-LIDEE	3521	(3220-4040)	S.W.,N.W.	47	(30-65)	up,mid1/3	.444(.260-.542)	17	(2-26)		18.1
PSME/QUVA-RHMA	3245	(2490-4240)	N.E.	55	(45-65)	up,low1/3	330(247- 413)	9	(7-11)		30.9
PSME-CACH2-LIDE2	3458	(2440-4440)	W., S.W., E.	48	(10-80)	mid, up 1/3	.469(.380-.590)	5	(0-10)		25.8
PSME-CACH2-LIDE2/BENE1	3305	(3150-4060)	N W.,E ,W.	35	(18-57)	low, mid, up 1/3	416(321- 536)	3	(0-6)		35 2
PSME-CACH2/XETE	3663	(3500-3880)	S., S.E.	26	(10-42)	ridges, up 1/3	.527(.489-.569)	8	(0-10)		21.5
PSME-CACH2/RHMA-BENE1	3365	(2580-3900)	N W , N E	49	(25-73)	mid, up 1/3	373(272- 473)	12	(0-20)		21.9
PSME-CACH2/RHMA-GASH	3124	(2500-3600)	N.W., N.E.	51	(22-65)	low, mid, up 1/3	.351(.260-.464)	2	(0-5)		23.4
PSME-CACH2/RHMA-QUSA-GASH	3442	(3040-3860)	N W.,N.E.,S.E	40	(26-65)	low, mid, up 1/3	388(.239-.473)	14	(0-50)		20.5
PSME-CACH2/RHMA-QUSA/XETE	3907	(2880-4560)	N.,W.,E.	38	(4-70)	mid, up 1/3, ridge	.401(.254-.517)	9	(0-15)		20.8

Appendix IV: Soil Summary

Tanoak Series Soil Summary

PLANT ASSOCIATION:	SOIL DEPTH mean/range	AWC	A-HORIZON THICKNESS mean/range	A-HORIZON COARSE FRAG mean/range	A-HORIZON TEXTURE** mean/range	PARENT MATERIAL*	SURFACE pH
LIDE2-UMCA/VAOV	40"+ (0-40+)	2.7" (2.0-3.1)	10" (2-14)	64% (43-75)	vgl, xgl	san,phy	6.1
LIDE2-UMCA/RHDI	38" (31-40+)	4 2" (3.1-6.0)	5" (3-7)	33% (16-50)	gl, vgl	maf,grn,serp	6.7
LIDE2/VAOV-RHMA	35" (27-40+)	3.3" (2.1-5.1)	7" (3-11)	52% (20-85)	gl, xgl	phy,grn	6.0
LIDE2/VAOV-GASH	33" (20-40+)	3 7" (2 0-6 1)	4" (1-8)	43% (15-70)	gl, vgl, xgl	phy,maf,sch	6.1
LIDE2/VAOV	37" (22-40+)	4.2" (1.8-6.0)	7" (2-11)	36% (20-65)	gl, vgl, xgl, gcl	phy,maf	5.9
LIDE2/COCOC	39" (26-40+)	3 7" (2 4-5 6)	7" (3-14)	38% (18-65)	gl, xgl	phy,sch	6 0
LIDE2-QUKE	40" (36-40+)	5.1" (2.5-7.0)	7" (3-10)	34% (10-70)	gl, xgl, gcl, gsl	phy,sch,grn	6.0
LIDE2/ACCI-GASH	38" (30-40+)	3.6" (1.1-5 6)	7" (3-11)	46% (25-68)	gl, vgl, xgl	san,sch,phy,mix	6 1
LIDE2-ACMA/POMU1	35" (21-40+)	3.7" (1.1-5.4)	6" (1-17)	38% (13-65)	gl,vgl,gsl,vgsl,cosl	grn,sch,gran,san,maf	6.2
LIDE2/ACCI	34" (21-40+)	3.6" (1.9-4.4)	7" (3-10)	46% (25-70)	gl, xgl	gran,mix,phy	6 3
LIDE2/GASH	34" (20-40+)	2.9" (1.0-3.9)	6" (3-8)	46% (30-70)	vgl, xgl	phy,sch,san	5.9
LIDE2/GASH-BENE1	34" (21-40+)	3 8" (1.0-4.9)	6" (2-13)	33% (8-51)	vgl, gl, l	phy,sch,san,grn	5.8
LIDE2/GASH-RHMA	38" (25-40+)	3.9" (2.1-5.2)	5" (1-9)	34% (25-60)	gl	phy,sch	5 9
LIDE2-CADE3/FECA	34" (23-40+)	3 2" (2 0-5.5)	7" (2-11)	31% (10-60)	gl, gsil, cl	serp	6.2
LIDE2-CHLA-TSHE/VAOV	33" (20-40)	3.1" (1.8-5.6)	6" (2-9)	34% (10-45)	l	phy,sch,grn	5.7
LIDE2-CHLA-UMCA/VAOV	35" (25-40+)	3 6" (2 3-4.0)	8" (3-14)	51% (40-85)	vgl, xgl, vgsl	maf,grn,serp,phy	6.2
LIDE2-CHLA/VAOV-RHOC	34" (23-40+)	4.0" (2.1-5.1)	4" (2-8)	32% (10-60)	l, gl, vgl	serp	6.8
LIDE2-CHLA/VAOV	32" (23-40+)	3 2" (1 2-5.5)	5" (2-10)	39% (15-50)	vgl, gl	phy,grn,serp,maf	6.0
LIDE2-CHLA-ALRH//Riparian	32" (21-40+)	3.0" (1.2-4.2)	3" (0-6)	35% (30-37)	gl, vgl	maf,serp	6.9

LIDE2-CHLA/VAPA	38"	(30-40+)	2 8"	(2 2-3 4)	4"	(2-7)	45%	(35-60)	vgsl	serp	7 0
LIDE2-CHLA/GASH	36"	(33-40+)	3.6"	(2.0-6.6)	7"	(4-10)	23%	(10-45)	gl, l	maf,phy,sch,san	6.1
LIDE2-CHLA/ACCI	35"	(34-40+)	3.5"	(1.6-5.7)	7"	(1-6)	35%	(30-70)	vgl, xgsl	maf,grn	5.7
LIDE2-CHLA/BENE1/LIBOL	34"	(23-40+)	3.1"	(2.5-4.3)	3"	(1-6)	27%	(20-43)	vgl, gl	sch,grn	6.2
LIDE2/QUVA-RHMA	29"	(24-32)	2.7"	(1.5-2.9)	6"	(4-10)	33%	(25-50)	vgl, gl	serp	6.3
LIDE2/RHDI-LOHIV	36"	(20-40+)	4.2"	(2.1-6.3)	10"	(4-16)	29%	(10-57)	vgl, gl, l	phy,sch,san,grn,gne	5.8
LIDE2/BENE1	36"	(20-40+)	4 1"	(1 6-7 1)	7"	(1-14)	36%	(10-92)	gcl, vgcl, gl, l, gsl	phy,sch,san,grn	5 9
LIDE2-QUCH2/VAOV	32"	(23-40+)	2.9"	(1.4-5.3)	5"	(2-11)	47%	(25-78)	gl, vgl, xgl, vgsl	san,maf,grn	6.3
LIDE2-QUCH2-QUKE/RHDI	34"	(19-40+)	3 8"	(1 8-6 4)	7"	(3-10)	32%	(10-50)	gl, vgl, cl	phy,grn,serp,maf	6 2
LIDE2-QUCH2/RHDI	31"	(24-40+)	2.9"	(1.4-4.5)	9"	(2-13)	50%	(25-95)	gl, xgl, vgsl, cosl	phy,grn,san,gran	5.9
LIDE2-QUCH2/GASH-BENE1	35"	(24-40+)	2.7"	(1.0-4.9)	6"	(1-10)	55%	(28-95)	gl, vgl, xgl	phy,sch,san	6.1
LIDE2-QUCH2/BENE1	36"	(26-40+)	2.7"	(1.3-3.9)	7"	(2-12)	46%	(25-80)	l, gl, vgl, xgl	sch,mix	5.9
LIDE2-QUCH2//Rockpile	33"	(19-40+)	2.7"	(1.1-4.2)	7"	(2-10)	33%	(10-60)	vgl, gl	gran,sch	6.0
LIDE2-CACH2/VAOV-GASH	37"	(27-40+)	4.8"	(2 4-6.1)	4"	(2-8)	26%	(20-57)	gl	grn,sch,phy	6.6
LIDE2-CACH2/GASH	37"	(23-40+)	3 7"	(1 8-6 3)	5"	(2-9)	36%	(10-90)	gl, vgl, l	phy,grn	5.8
LIDE2-CACH2/GASH-RHMA	34"	(28-40+)	3.4"	(2.1-4.8)	6"	(2-9)	39%	(10-75)	gl, vgl, xgl	phy,grn	5.6
LIDE2-CACH2/BENE1	37"	(30-40+)	4 1"	(2.2-6.6)	8"	(2-16)	26%	(10-50)	l, gl, gsl, cosl, cl	phy,gran,maf,sch,san	6 1
LIDE2-CACH2/RHMA/XETE	34"	(21-40+)	3.6"	(1.6-5.5)	6"	(4-10)	35%	(17-55)	gl, vgl, xgl	phy,sch,san	5.6
LIDE2-CACH2/PTAQL	30"	(22-40+)	2.5"	(1.7-3.0)	6"	(1-6)	39%	(15-42)	gl, vgl, xgl	sch,san	5.8

*Parent material abbreviations gne=gneiss, gran=granite, grn=greenstone, maf=mafic, mix=mixed, per=peridotite, phy=phyllite, san=sandstone, sch=schist, serp=serpentine, ult=ultramafic

**Texture l=loam, sl=sandy loam, cl=clay loam, gl=gravelly loam, vgl=very gravelly loam, xgl=extremely gravelly loam, vgsl=very gravelly sandy loam, gcl=gravelly clay loam, gsl=gravelly sandy loam, gsil=gravelly silty loam, cosl=coarse sandy loam, stl=silty loam, vstl=very silty loam

Douglas-fir Series Soil Summary

PLANT ASSOCIATION:	SOIL DEPTH mean/range	AWC	A-HORIZON THICKNESS mean/range	A-HORIZON COARSE FRAG mean/range	A-HORIZON TEXTURE** mean/range	PARENT MATERIAL*	SURFACE pH
PSME-UMCA/RHDI	36" (23-40+)	3.0" (1.2-5.2)	8" (2-14)	35% (7-90)	l, gs, vg, vgsl	serp,san	6 5
PSME-UMCA/HODI	40+" (40+)	4 2" (3 3-6 4)	8" (2-14)	35% (12-85)	l, cl	san	6.5
PSME-ALRU2/ACCI/MOSI	40"+ (0-40+)	1.9" (.9-2.9)	3" (2-4)	49% (28-70)	gsl,xgsl	mix	6.0
PSME-QUKE//Metamorphic	34" (18-40+)	3.9" (2.5-6 5)	6" (3-14)	33% (15-55)	l, gl, gcl, vgl, xgl	maf,grn,gran	6 2
PSME-QUKE//Sandstone	35" (22-40+)	4.3" (2.4-7.1)	8" (3-12)	29% (12-50)	gl, vgl	san	6.6
PSME-QUKE-QUGA2/GRASS	34" (33-40+)	4 0" (2.6-5.5)	8" (5-13)	28% (14-40)	gl, l, gcl	san	6 7
PSME-CADE3/FECA	31" (23-40+)	2.5" (1.3-5.5)	6" (2-10)	28% (20-45)	gl, vgl, gsil	serp	6.8
PSME-QUGA2/GRASS	39" (36-40+)	3.7" (2.0-5.6)	11" (6-19)	29% (15-32)	gl, gsl, l	san	6.7
PSME-QUGA2/HODI	28" (20-40)	3.4" (2.7-5.2)	10" (6-16)	34% (10-40)	gl, vgl, cl, gcl	san	6.8
PSME-QUCH2//Rockpile	31" (15-40+)	2 6" (1 1-4 6)	7" (5-13)	53% (20-95)	gl, vgl, xgl, sl	sch,semi,phy	5.9
PSME-QUCH2-ARME3/RHDI	33" (13-40+)	2.2" (0.6-5.6)	10" (0-35)	60% (20-100)	gl,xgl,vgl,gsl	san,sch,phy	6.3
PSME-QUCH2-LIDE2	33" (22-40+)	3 4" (1 8-5 0)	7" (2-14)	36% (15-87)	l, gl, vgl, xgl	phy,maf,grn,sch	6.0
PSME-PIJE/FECA	31" (17-40+)	2.4" (1.7-3.2)	6" (2-11)	27% (15-49)	l, gl, gsil, gcl	serp	6.3
PSME/COCOC	36" (22-40+)	3.9" (2 1-5 7)	7" (3-13)	32% (10-65)	l, gl, vgl, sl	phy,sch,san,grn	6.3
PSME-LIDE2/WHMO	33" (15-40+)	2.6" (1.3-4.4)	5" (2-14)	36% (20-70)	gl, vgl, vgsl	phy,sch,serp	6.2
PSME-LIDE2/QUVA-HODI	34" (27-40+)	1.2" (0 7-1 6)	6" (4-7)	52% (35-75)	gl, vgl	serp	6.3
PSME-ACMA/POMU1	39" (30-40+)	3.7" (2.2-5.6)	8" (2-13)	44% (20-90)	l, gl, vgl, xgl	phy,maf,mix	6.3
PSME-ACMA/PHLEG	35" (24-40)	5" (4 6-6 1)	10" (6-12)	22% (12-30)	gl, cl, gcl	san	6.9
PSME/ACCI-BENE1	40"+ (0-40+)	4.4" (2.0-6.1)	6" (3-8)	41% (28-67)	gl,xgl,gsil	phy,sch,san	6.1

PSME/QUVA	28"	(13-40+)	1 9"	(0.7-4.3)	5"	(2-8)	45%	(20-72)	vgl, gl, vgsl, gsil	maf,serp,ult,gran	6 3
PSME/QUVA-LIDEE	24"	(12-35)	1.6"	(0.5-2.4)	6"	(2-8)	45%	(20-72)	vgl, gl	ult,serp	6.0
PSME/QUVA-RHMA	17"	(15-20)	2 5"	(0 8-4 1)	1"	(1-2)	25%	(10-55)	l, vgl	serp, per	6 3
PSME-CACH2-LIDE2	33"	(23-40+)	3.2"	(1.8-4.7)	6"	(2-12)	31%	(10-50)	gl, vgl, sl, gsl	phy,maf,sch	5.7
PSME-CACH2-LIDE2/BENE1	40"+	(0-40+)	4 5"	(2 0-5 9)	7"	(1-10)	37%	(12-55)	l, gl, vgl, vsgl, sl, gcl	grn,maf,gra	6.0
PSME-CACH2/XETE	35"	(23-40+)	3 7"	(2.5-6.9)	10"	(1-17)	19%	(10-29)	gl, l, gsil	phy,sch	6.0
PSME-CACH2/RHMA-BENE1	39"	(28-40+)	4.0"	(3.0-5.5)	8"	(4-14)	29%	(20-50)	l, gl, vgl	phy, sch	5 9
PSME-CACH2/RHMA-GASH	27"	(21-40+)	2.4"	(0.7-5.1)	6"	(2-15)	48%	(25-80)	l, gl, xgl	phy,maf,sch	5.7
PSME-CACH2/RHMA-QUSA-GASH	36"	(26-40+)	3 2"	(1 6-6 3)	6"	(1-11)	30%	(10-50)	l, gl, vgl, gsil	phy,sch	5 7
PSME-CACH2/RHMA-QUSA/XETE	36"	(10-40+)	3.1"	(0.7-6.1)	6"	(1-16)	22%	(0-65)	gl, vgl, xgl, stl, vstl	phy,sch	5.6

*Parent material abbreviations. gne=gneiss, gran=granite, grn=greenstone, maf=mafic, mix=mixed, per=peridotite, phy=phyllite, san=sandstone, sch=schist, serp=serpentine, ult=ultramafic.

**Texture. l=loam, sl=sandy loam, cl= clay loam, gl=gravelly loam, vgl=very gravelly loam, xgl=extremely gravelly loam, vgsl=very gravelly sandy loam, gcl=gravelly clay loam, gsl=gravelly sandy loam, gsil=gravelly silty loam, cosl=cosl=coarse sandy loam, stl=silty loam, vstl=very silty loam

Appendix V: Productivity and Stand Structure Summaries

V

Tanoak Series Productivity Summary

PLANT ASSOCIATION	CUBIC VOLUME (ft.^{3}) SOFTWOOD mean/SE	CUBIC VOLUME (ft.^{3}) HARDWOOD mean/SE	BASAL AREA (ft.^{2}) SOFTWOOD mean/SE	BASAL AREA (ft.^{2}) HARDWOOD mean/SE	DUNNING SITE CLASS mode/range	STAND DENSITY INDEX mean/SE
LIDE2-UMCA/VAOV	6183 (1196)	1336 (793)	165 (29)	71 (32)	1 (1-2)	382 (53)
LIDE2-UMCA/RHDI	6611 (1710)	2882 (779)	164 (35)	127 (37)	1 (1)	421 (96)
LIDE2/VAOV-RHMA	5620 (937)	1464 (266)	147 (19)	92 (13)	1 (1A-2)	394 (31)
LIDE2/VAOV-GASH	7307 (708)	1589 (242)	193 (16)	93 (11)	1 (1A-2)	456 (23)
LIDE2/VAOV	7392 (598)	1781 (186)	180 (13)	109 (8)	1A,1 (1A-2)	472 (23)
LIDE2/COCOC	4601 (1420)	2834 (436)	112 (32)	117 (14)	2 (1-2)	350 (36)
LIDE2-QUKE	8876 (925)	1805 (374)	227 (22)	94 (16)	1A, 1 (1A-1)	506 (40)
LIDE2/ACCI-GASH	9653 (925)	1052 (142)	258 (24)	63 (7)	1 (1A-1)	500 (36)
LIDE2-ACMA/POMU1	7844 (744)	1466 (172)	215 (21)	82 (9)	1A (1A-2)	471 (30)
LIDE2/ACCI	8692 (1252)	626 (181)	225 (29)	50 (11)	2 (1A-2)	423 (39)
LIDE2/GASH	9932 (922)	1045 (215)	249 (22)	65 (11)	1A (1A-1)	485 (34)
LIDE2/GASH-BENE1	9210 (1223)	1631 (362)	221 (27)	88 (13)	1A,1 (1A-2)	463 (30)
LIDE2/GASH-RHMA	12686 (1067)	888 (128)	333 (17)	58 (8)	1A (1A-1)	588 (35)
LIDE2-CADE3/FECA	8743 (896)	754 (219)	284 (10)	40 (12)	1 (1A-2)	487 (48)
LIDE2-CHLA-TSHE/VAOV	9589 (2971)	339 (537)	286 (83)	24 (26)	1 (1A-2)	419 (75)
LIDE2-CHLA-UMCA/VAOV	10658 (1305)	974 (197)	261 (21)	60 (11)	1A (1A-2)	476 (37)
LIDE2-CHLA/VAOV-RHOC	8089 (1035)	381 (304)	295 (43)	23 (18)	3 (3-4)	494 (45)
LIDE2-CHLA/VAOV	12780 (1035)	567 (151)	320 (25)	40 (9)	1 (1A-1)	515 (37)

LIDE2-CHLA-ALRH//Riparian	8532	(2003)	235	(94)	233	(37)	17	(3)	3	(3)	406	(45)
LIDE2-CHLA/VAPA	11458	(1542)	69	(69)	329	(26)	7	(7)	1A	(1A-1)	533	(32)
LIDE2-CHLA/GASH	10083	(901)	486	(178)	262	(26)	47	(12)	1	(1A-2)	444	(36)
LIDE2-CHLA/ACCI	8679	(2039)	511	(169)	204	(40)	38	(14)	1	(1A-1)	358	(68)
LIDE2-CHLA/BENE1/LIBOL	12678	(1881)	254	(121)	331	(40)	17	(7)	1	(1A-2)	517	(53)
LIDE2/QUVA-RHMA	6703	(1944)	859	(269)	215	(51)	59	(11)	3	(2-5)	460	(77)
LIDE2/RHDI-LOHIV	7025	(849)	2076	(265)	162	(18)	113	(16)	1A,1	(1A-1)	434	(27)
LIDE2/BENE1	9150	(691)	1437	(181)	225	(17)	87	(8)	1A-1	(1A-2)	491	(24)
LIDE2-QUCH2/VAOV	6682	(954)	1034	(163)	175	(22)	71	(10)	2	(1A-4)	415	(30)
LIDE2-QUCH2-QUKE/RHDI	6601	(600)	2068	(347)	175	(15)	103	(13)	1	(1A-2)	464	(35)
LIDE2-QUCH2/RHDI	6055	(978)	1476	(228)	165	(28)	87	(12)	2	(1A-2)	423	(40)
LIDE2-QUCH2/GASH-BENE1	9357	(1372)	949	(147)	265	(31)	51	(7)	1	(1-2)	466	(48)
LIDE2-QUCH2/BENE1	9474	(851)	1041	(204)	268	(23)	60	(11)	1	(1A-3)	485	(36)
LIDE2-QUCH2//Rockpile	7252	(1044)	1451	(167)	204	(26)	86	(9)	2	(1-3)	485	(31)
LIDE2-CACH2/VAOV-GASH	6283	(1013)	853	(79)	169	(12)	58	(12)	2	(1-2)	390	(61)
LIDE2-CACH2/GASH	10275	(1059)	1159	(128)	258	(27)	73	(8)	1A,1	(1A-2)	503	(36)
LIDE2-CACH2/BENE1	7815	(609)	1382	(167)	194	(14)	82	(9)	1A	(1A-1)	432	(19)
LIDE2-CACH2/GASH-RHMA	10624	(1323)	886	(142)	259	(24)	68	(8)	1A	(1A-2)	517	(35)
LIDE2-CACH2/RHMA/XETE	7508	(1270)	654	(170)	203	(29)	42	(9)	2	(1-2)	370	(49)
LIDE2-CACH2/PTAQL	7460	(1389)	987	(310)	214	(37)	57	(16)	1	(1)	440	(47)

Douglas-fir Series Productivity Summary

PLANT ASSOCIATION:	CUBIC VOLUME (ft.^{3}) SOFTWOOD mean/SE	CUBIC VOLUME (ft.^{3}) HARDWOOD mean/SE	BASAL AREA (ft.^{2}) SOFTWOOD mean/SE	BASAL AREA (ft.^{2}) HARDWOOD mean/SE	DUNNING SITE CLASS mode/range	STAND DENSITY INDEX mean/SE
PSME-UMCA/RHDI	5683 (915)	1116 (232)	170 (21)	67 (10)	1 (1A-3)	382 (24)
PSME-UMCA/HODI	8992 (871)	1004 (270)	258 (24)	54 (9)	2 (1-2)	489 (15)
PSME-ALRU2/ACCI/MOSI	2986 (514)	567 (111)	32 (5)	31 (10)	1 (1-2)	375 (55)
PSME-QUKE//Metamorphic	7512 (633)	1235 (192)	195 (15)	61 (9)	1A (1-2)	412 (22)
PSME-QUKE//Sandstone	5784 (692)	1003 (187)	204 (20)	47 (8)	1 (1A-1)	416 (37)
PSME-QUKE-QUGA2/GRASS	3666 (428)	1532 (230)	144 (14)	94 (12)	2 (1A-3)	417 (36)
PSME-CADE3/FECA	5940 (758)	488 (245)	251 (33)	23 (11)	3 (2-4)	425 (52)
PSME-QUGA2/GRASS	5335 (1525)	595 (284)	207 (67)	32 (11)	2 (2-3)	364 (78)
PSME-QUGA2/HODI	6138 (756)	786 (225)	195 (27)	48 (15)	2 (1-2)	321 (32)
PSME-QUCH2//Rockpile	5215 (669)	844 (242)	172 (15)	55 (13)	4 (2-4)	364 (30)
PSME-QUCH2-ARME3/RHDI	4696 (808)	1320 (268)	139 (21)	94 (13)	1,2 (1A-4)	392 (28)
PSME-QUCH2-LIDE2	7412 (657)	1120 (176)	201 (19)	58 (8)	1 (1A-2)	414 (26)
PSME-PIJE/FECA	6098 (826)	212 (120)	210 (28)	14 (6)	2 (1-3)	339 (43)
PSME/COCOC	10764 (712)	212 (107)	282 (16)	12 (4)	1A (1A-1)	413 (24)
PSME-LIDE2/WHMO	9909 (1641)	972 (439)	266 (39)	49 (22)	1 (1-2)	451 (56)
PSME-LIDE2/QUVA-HODI	5325 (990)	157 (91)	210 (32)	13 (1)	3 (1-3)	331 (48)
PSME-ACMA/POMU1	9526 (746)	760 (288)	251 (22)	43 (10)	1 (1A-1)	389 (24)
PSME-ACMA/PHLEG	3637 (433)	850 (120)	147 (31)	56 (11)	2 (2-3)	366 (21)

PSME/ACCI-BENE1	11032	(380)	149	(86)	306	(18)	28	(10)	1A	(1A-2)	470	(60)
PSME/QUVA	6259	(547)	178	(79)	213	(14)	8	(3)	3	(1-5)	316	(21)
PSME/QUVA-LIDEE	5263	(869)	140	(86)	188	(24)	6	(4)	4	(3-5)	272	(34)
PSME/QUVA-RHMA	4754	(31)	150	(150)	200	(133)	7	(7)	3	(3-4)	295	(170)
PSME-CACH2-LIDE2	9129	(850)	502	(138)	250	(22)	35	(6)	1	(1A-2)	418	(36)
PSME-CACH2-LIDE2/BENE1	9132	(834)	1286	(331)	240	(17)	79	(16)	1	(1A-2)	355	(23)
PSME-CACH2/XETE	6909	(884)	1415	(405)	180	(15)	100	(22)	1	(1A-1)	445	(52)
PSME-CACH2/RHMA-BENE1	9170	(2064)	129	(71)	276	(66)	12	(8)	1	(1A-3)	408	(78)
PSME-CACH2/RHMA-GASH	7295	(1070)	568	(295)	216	(31)	31	(12)	1	(1A-2)	366	(42)
PSME-CACH2/RHMA-QUSA-GASH	6993	(790)	303	(143)	206	(19)	31	(8)	1	(1-2)	355	(23)
PSME-CACH2/RHMA-QUSA/XETE	5805	(462)	364	(178)	190	(12)	28	(8)	2	(1-3)	349	(26)

Tanoak Series Structural Comparison By Layer

PLANT ASSOCIATION:	AGE T1	DBH T1	HEIGHT T1	AGE T2	DBH T2	HEIGHT T2
LIDE2-UMCA/VAOV	291 (43)	49.6 (6.4)	156 (30)	314 (112)	39.3 (10.9)	136 (15)
LIDE2-UMCA/RHDI	249 (40)	65.2 (8.2)	189 (6)	135 (21)	38.7 (7.1)	153 (14)
LIDE2/VAOV-RHMA	314 (19)	46.1 (2.3)	171 (58)	271 (58)	33.2 (6.9)	131 (14)
LIDE2/VAOV-GASH	286 (14)	40 (2.1)	174 (5)	220 (24)	41.2 (3.1)	144 (6)
LIDE2/VAOV	326 (15)	50.3 (1.8)	176 (4)	262 (33)	37.2 (3.1)	136 (6)
LIDE2/COCOC	313 (37)	46.0 (3.7)	171 (13)	209 (102)	38.5 (11.5)	152 (13)
LIDE2-QUKE	274 (21)	52.8 (5.9)	183 (6)	204 (19)	42.1 (3.4)	157 (7)
LIDE2/ACCI-GASH	334 (21)	50.7 (2.3)	188 (5)	291 (30)	44.1 (4.4)	159 (9)
LIDE2-ACMA/POMU1	269 (11)	46.3 (1.4)	181 (3)	242 (17)	39.5 (2.0)	151 (5)
LIDE2/ACCI	293 (19)	44.0 (2.0)	177 (6)	339 (41)	45.5 (5.5)	163 (14)
LIDE2/GASH	270 (14)	50.4 (2.2)	188 (5)	233 (22)	38.7 (2.5)	154 (5)
LIDE2/GASH-BENE1	271 (16)	49.0 (2.4)	191 (6)	235 (35)	40.2 (4.0)	158 (8)
LIDE2/GASH-RHMA	271 (18)	48.5 (1.9)	190 (4)	226 (24)	39.7 (3.7)	157 (7)
LIDE2-CADE3/FECA	254 (50)	46.1 (6.5)	149 (18)	222 (48)	32.1 (4.2)	121 (12)
LIDE2-CHLA-TSHE/VAOV	307 (26)	46.4 (2.6)	196 (6)	261 (34)	36.3 (3.6)	157 (7)
LIDE2-CHLA-UMCA/VAOV	327 (24)	52.8 (2.6)	178 (6)	285 (30)	42.0 (3.1)	143 (7)
LIDE2-CHLA/VAOV-RHOC	279 (20)	32.6 (3.0)	132 (15)	231 (50)	25.9 (6.1)	104 (10)
LIDE2-CHLA/VAOV	320 (15)	52.0 (2.4)	183 (5)	300 (28)	40.0 (2.3)	147 (6)
LIDE2-CHLA-ALRH//Riparian	324 (37)	34.6 (2.7)	138 (6)	220 (107)	24.2 (10.3)	85 (14)
LIDE2-CHLA/VAPA	346 (44)	36.3 (2.0)	158 (16)	323 (67)	35.6 (3.6)	124 (13)
LIDE2-CHLA/GASH	489 (42)	50.8 (3.1)	196 (6)	323 (69)	40.3 (4.8)	150 (10)
LIDE2-CHLA/ACCI	315 (20)	48.9 (3.9)	181 (8)	270 (31)	33.5 (5.7)	138 (13)
LIDE2-CHLA/BENE1/LIBOL	315 (26)	38.9 (2.6)	157 (10)	359 (58)	34.8 (4.4)	131 (10)

LIDE2/QUVA-RHMA	327	(25)	39 5	(2 7)	135	(8)	222	(87)	26.5	(4.8)	107	(15)
LIDE2/RHDI-LOHIV	278	(16)	43.9	(2.2)	178	(6)	239	(19)	40.2	(2.3)	159	(7)
LIDE2/BENE1	311	(12)	47.6	(1 3)	172	(3)	265	(25)	38 8	(2 3)	140	(5)
LIDE2-QUCH2/VAOV	250	(20)	42.2	(1.9)	156	(6)	224	(22)	35.6	(2.1)	130	(7)
LIDE2-QUCH2-QUKE/RHDI	272	(14)	44.9	(1 3)	170	(5)	230	(27)	39 6	(2 0)	142	(7)
LIDE2-QUCH2/RHDI	274	(18)	40.7	(2.0)	151	(6)	201	(27)	30.5	(3.1)	121	(9)
LIDE2-QUCH2/GASH-BENE1	263	(15)	45 2	(2 1)	165	(3)	239	(30)	43.8	(3.3)	137	(5)
LIDE2-QUCH2/BENE1	273	(17)	46.4	(2.7)	158	(4)	238	(50)	34.0	(4.2)	123	(9)
LIDE2-QUCH2//Rockpile	291	(20)	48 8	(2 7)	161	(4)	188	(34)	34 2	(3 6)	128	(7)
LIDE2-CACH2/VAOV-GASH	340	(36)	50.1	(3.8)	160	(9)	244	(124)	27.2	(2.4)	103	(7)
LIDE2-CACH2/GASH	269	(21)	46.1	(1.5)	167	(4)	224	(38)	44 7	(4.8)	139	(5)
LIDE2-CACH2/GASH-RHMA	299	(13)	46.7	(1.7)	173	(6)	312	(20)	43.0	(3.6)	145	(11)
LIDE2-CACH2/BENE1	315	(20)	45.5	(1.5)	174	(3)	228	(21)	33 8	(1 8)	140	(5)
LIDE2-CACH2/RHMA/XETE	330	(43)	39.9	(3.0)	141	(11)	190	(33)	27 9	(5.6)	117	(15)
LIDE2-CACH2/PTAQL	276	(16)	42 6	(2 2)	157	(6)	294	(44)	52.6	(4.8)	133	(8)

Douglas-fir Series Structural Comparison By Layer

PLANT ASSOCIATION:	AGE T1		DBH T1		HEIGHT T1		AGE T2		DBH T2		HEIGHT T2	
PSME-UMCA/RHDI	250	(17)	41.3	(1 8)	165	(7)	260	(35)	38.7	(6.1)	135	(10)
PSME-UMCA/HODI	257	(34)	41 7	(2 7)	155	(8)	147	(26)	23 2	(2 4)	115	(7)
PSME-ALRU2/ACCI-MOSI	67	(36)	16 3	(4.3)	68	(17)	39	(20)	11 6	(1.2)	59	(6)
PSME-QUKE//Metamorphic	300	(18)	50.2	(1 7)	165	(5)	259	(51)	44.5	(4 2)	144	(10)
PSME-QUKE//Sandstone	158	(19)	36 2	(3.0)	148	(4)	105	(7)	28.8	(3.0)	119	(5)
PSME-CADE3/FECA	253	(15)	37.8	(2.4)	127	(6)	270	(54)	29 2	(5 9)	88	(12)
PSME-QUKE-QUGA2/GRASS	113	(10)	30 6	(1 6)	115	(4)	93	(6)	19.8	(1.8)	80	(5)
PSME-QUGA2/GRASS	122	(31)	31 3	(3 2)	96	(5)	53	(2)	17 8	(1 9)	69	(5)
PSME-QUGA2/HODI	105	(6)	22.7	(1.0)	109	(7)	96	(15)	14.4	(2.4)	67	(13)
PSME-QUCH2//Rockpile	312	(22)	39 5	(2 0)	144	(5)	258	(44)	32 4	(4 2)	128	(14)
PSME-QUCH2-ARME3/RHDI	278	(16)	41.2	(1.9)	156	(8)	200	(43)	30 5	(5.8)	120	(24)
PSME-QUCH2-LIDE2	289	(17)	48.3	(2.0)	156	(4)	209	(25)	39.3	(2.8)	131	(5)
PSME-PIJE/FECA	272	(32)	31.4	(2.8)	121	(5)	200	(56)	27.7	(6.9)	102	(11)
PSME/COCOC	274	(16)	46.7	(2.3)	181	(4)	259	(34)	44 3	(4 6)	156	(8)
PSME-LIDE2/WHMO	289	(16)	42 5	(2.2)	150	(5)	211	(40)	32.7	(4.9)	113	(16)
PSME-LIDE2/QUVA-HODI	313	(56)	34 8	(2 7)	126	(4)	217	(2)	20 1	(2 9)	104	(12)
PSME-ACMA/POMU1	349	(28)	54.3	(5 8)	186	(6)	267	(58)	39.9	(3.6)	151	(4)
PSME-ACMA/PHLEG	259	(45)	34 4	(4 0)	129	(8)	139	(36)	18 6	(3 4)	73	(11)
PSME/ACCI-BENE1	318	(42)	44.4	(4.9)	173	(9)	302	(94)	36.2	(13)	127	(31)
PSME/QUVA	314	(15)	35.4	(1 5)	132	(5)	262	(23)	28.8	(2 1)	102	(6)
PSME/QUVA-LIDEE	300	(27)	36.6	(2.2)	116	(6)	265	(26)	26.4	(1 8)	92	(3)
PSME/QUVA-RHMA	345	(36)	36 1	(5 2)	122	(11)	280	(80)	25.0	(11.4)	85	(24)
PSME-CACH2-LIDE2	371	(26)	48 6	(6.3)	165	(6)	185	(28)	33.0	(1.7)	138	(9)

PSME-CACH2-LIDE2/BENE1	316	(24)	44.9	(1 8)	171	(40)	267	(40)	38 8	(2 8)	143	(4)
PSME-CACH2/XETE	320	(44)	56.4	(3.5)	169	(6)	222	(68)	44.2	(9.9)	140	(14)
PSME-CACH2/RHMA-BENE1	301	(33)	39 6	(4 7)	150	(5)	230	(45)	24 3	(3.5)	125	(6)
PSME-CACH2/RHMA-GASH	249	(23)	42.1	(2.9)	172	(3)	168	(13)	35.9	(7)	146	(8)
PSME-CACH2/RHMA-QUSA-GASH	327	(26)	44 9	(1 8)	147	(5)	206	(15)	29 9	(2 2)	121	(6)
PSME-CACH2/RHMA-QUSA/XETE	292	(16)	44.6	(2.0)	144	(4)	195	(23)	30.3	(2.9)	110	(7)

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Appendix VI: Vegetation Summary

VI

Tanoak Series Vegetation Summary

PLANT ASSOCIATION.	LIDE2/VAOV		LIDE2/ VAOV-GASH		LIDE2/ VAOV-RHMA		LIDE2/ GASH-RHMA		LIDE2/GASH		LIDE2/ GASH-BENE1	
	n = 36		n = 27		n = 14		n = 12		n = 19		n = 18	
					% COVER							
TOTAL COVER	95		97		97		98		98		96	
FORB COVER	4		8		2		7		6		5	
GRASS COVER	<1		1		<1		<1		<1		<1	
SHRUB COVER	58		63		77		66		67		35	
TREE COVER	87		89		89		83		91		90	
TREE OVERSTORY:					% COVER (CONSTANCY)							
white fir (ABCO)	-	-	-	-	-	-	1	(8)	-	-	1	(11)
bigleaf maple (ACMA) +	6	(13)	3	(29)	2	(7)	9	(41)	5	(10)	12	(5)
alder (ALRU2 or ALRH) +	4	(5)	6	(7)	4	(14)	-	-	-	-	10	(5)
Pacific madrone (ARME3) +	12	(77)	8	(66)	5	(57)	4	(25)	5	(84)	7	(55)
incense cedar (CADE3) +	10	(5)	15	(3)	25	(14)	-	-	-	-	20	(5)
chinquapin (CACH2) +	6	(13)	8	(14)	4	(50)	4	(16)	5	(26)	5	(38)
Port Orford cedar (CHLA) +	2	(2)	4	(7)	1	(7)	5	(8)	5	(5)	2	(5)
Pacific dogwood (CONU1)	3	(36)	7	(37)	5	(21)	5	(41)	6	(21)	3	(22)
tanoak (LIDE2) +	59	(100)	50	(100)	47	(100)	26	(91)	45	(100)	42	(94)
knobcone pine (PIAT)	-	-	-	-	-	-	-	-	-	-	-	-
Jeffrey pine (PIJE) +	-	-	3	(3)	-	-	-	-	-	-	-	-
sugar pine (PILA) +	13	(16)	12	(14)	10	(21)	3	(8)	12	(15)	2	(11)
ponderosa pine (PIPO) +	-	-	-	-	-	-	-	-	-	-	-	-
Douglas-fir (PSME) +	40	(100)	42	(100)	43	(100)	61	(100)	53	(100)	52	(100)
canyon live oak (QUCH2)	1	(2)	-	-	2	(21)	4	(25)	2	(15)	-	-
Oregon white oak (QUGA2) +	-	-	-	-	-	-	-	-	-	-	-	-
black oak (QUKE) +	-	-	-	-	-	-	-	-	-	-	-	-
Pacific yew (TABR) +	1	(2)	2	(3)	2	(7)	9	(16)	2	(5)	-	-
western hemlock (TSHE)	-	-	-	-	2	(7)	15	(16)	-	-	-	-
California bay (UMCA) +	12	(11)	-	-	1	(7)	-	-	-	-	-	-

PLANT ASSOCIATION:	LIDE2/ VAOV	LIDE2/ VAOV-GASH	LIDE2/ VAOV-RHMA	LIDE2/ GASH-RHMA	LIDE2/ GASH	LIDE2/ GASH-BENE1
TREE UNDERSTORY:			% COVER (CONSTANCY)			
white fir (ABCO)	1 (2)	- -	- -	1 (8)	1 (5)	1 (11)
bigleaf maple (ACMA) +	1 (5)	1 (3)	- -	- -	- -	1 (5)
alder (ALRU22 or ALRH) +	- -	- -	- -	- -	- -	- -
Pacific madrone (ARME3) +	1 (22)	- -	1 (14)	- -	- -	- -
incense cedar (CADE3) +	3 (8)	- -	- -	- -	- -	1 (5)
chinquapin (CACH2) +	2 (11)	- -	2 (42)	3 (16)	2 (15)	5 (38)
Port Orford cedar (CHLA) +	- -	1 (11)	1 (7)	- -	1 (5)	13 (5)
Pacific dogwood (CONU1)	2 (16)	2 (33)	- -	- -	1 (10)	5 (22)
tanoak (LIDE2) +	9 (100)	13 (96)	8 (85)	14 (100)	25 (94)	28 (100)
knobcone pine (PIAT)	- -	- -	- -	- -	- -	- -
Jeffrey pine (PIJE) +	- -	- -	- -	- -	- -	- -
sugar pine (PILA) +	1 (25)	1 (18)	1 (7)	1 (8)	1 (5)	2 (16)
ponderosa pine (PIPO) +	- -	- -	- -	- -	- -	- -
Douglas-fir (PSME) +	1 (69)	1 (59)	1 (42)	1 (66)	3 (73)	3 (38)
canyon live oak (QUCH2)	1 (8)	1 (14)	1 (21)	2 (41)	1 (36)	4 (11)
Oregon white oak (QUGA2) +	- -	- -	- -	- -	- -	- -
black oak (QUKE) +	- -	- -	- -	- -	- -	- -
Pacific yew (TABR) +	- -	3 (7)	1 (21)	1 (16)	1 (15)	- -
western hemlock (TSHE)	1 (2)	1 (3)	- -	1 (8)	- -	- -
California bay (UMCA) +	2 (13)	2 (25)	1 (14)	10 (8)	3 (5)	- -
SHRUBS:			% COVER (CONSTANCY)			
vine maple (ACCI)	1 (2)	1 (3)	- -	3 (8)	- -	8 (5)
Pacific serviceberry (AMAL)	- -	- -	- -	- -	- -	1 (5)
greenleaf manzanita (ARPA9) +	- -	- -	- -	- -	- -	- -
hollyleaved barberry (BEAQ) +	- -	- -	- -	- -	- -	- -
dwarf Oregon-grape (BENE1) +	7 (36)	3 (44)	1 (21)	10 (91)	4 (68)	13 (100)
California hazelnut (COCOC) +	4 (13)	4 (48)	35 (7)	1 (8)	6 (10)	2 (33)
slender salal (GAOV)	- -	- -	- -	- -	- -	- -

+ = plants used for cultural or commercial purposes

PLANT ASSOCIATION:	LIDE2/ VAOV		LIDE2/ VAOV-GASH		LIDE2/ VAOV-RHMA		LIDE2/ GASH-RHMA		LIDE2/ GASH		LIDE2/ GASH-BENE1	
SHRUBS:	% COVER (CONSTANCY)											
salal (GASH) +	3	(58)	23	(100)	13	(92)	40	(100)	57	(100)	23	(100)
toyon (HEAR2)	-	-	-	-	-	-	-	-	-	-	-	-
oceanspray (HODI)	-	-	1	(3)	-	-	-	-	2	(5)	1	(16)
dwarf tanbark (LIDEE)	-	-	-	-	-	-	-	-	-	-	-	-
pink honeysuckle (LOHIV)	1	(27)	-	-	2	(14)	-	-	1	(15)	1	(5)
Gordon mock-orange (PHLEG) +	-	-	-	-	-	-	-	-	-	-	-	-
Sadler oak (QUSA)	-	-	-	-	-	-	-	-	-	-	1	(5)
huckleberry oak (QUVA)	-	-	-	-	-	-	-	-	-	-	-	-
coffeeberry (RHCA2)	-	-	-	-	1	(7)	-	-	-	-	-	-
Pacific rhododendron (RHMA)	2	(11)	5	(14)	24	(100)	25	(100)	3	(15)	2	(11)
western azalea (RHOC)	4	(3)	-	-	-	-	-	-	-	-	1	(5)
poison oak (RHDI)	2	(58)	2	(66)	9	(28)	-	-	2	(57)	3	(16)
wood rose (ROGY)	1	(13)	1	(40)	1	(21)	2	(50)	1	(57)	1	(38)
rose (ROS)	1	(8)	1	(7)	-	-	-	-	1	(5)	-	-
western raspberry (RULE) +	-	-	-	-	-	-	-	-	-	-	1	(5)
thimbleberry (RUPA2) +	-	-	2	(7)	2	(7)	-	-	1	(10)	1	(5)
salmon berry (RUSP2) +	-	-	-	-	-	-	-	-	-	-	-	-
Pacific blackberry (RUUR) +	1	(22)	1	(37)	1	(7)	1	(25)	1	(42)	1	(33)
willow (SAL11) +	-	-	-	-	-	-	-	-	-	-	-	-
creeping snowberry (SYMO)	1	(5)	1	(3)	-	-	-	-	-	-	1	(16)
evergreen huckleberry (VAOV) +	50	(100)	41	(100)	51	(100)	4	(41)	6	(57)	1	(16)
red huckleberry (VAPA) +	1	(5)	1	(11)	1	(14)	-	-	2	(15)	1	(27)
HERBS & FERNS:	% COVER (CONSTANCY)											
vanilla leaf (ACTR)	1	(13)	1	(22)	-	-	5	(66)	1	(63)	2	(38)
trailplant (ADBI)	1	(2)	1	(11)	-	-	1	(16)	1	(10)	1	(5)
mountain dogbane (APPU)	1	(2)	-	-	-	-	-	-	1	(10)	1	(5)
rayless arnica (ARDI3)	1	(2)	-	-	1	(7)	-	-	-	-	1	(5)
marbled ginger (ASHA) +	-	-	-	-	1	(7)	-	-	-	-	1	(11)

PLANT ASSOCIATION:	LIDE2/ VAOV		LIDE2/ VAOV-GASH		LIDE2/ VAOV-RHMA		LIDE2/ GASH-RHMA		LIDE2/ GASH		LIDE2/ GASH-BENE1	
HERBS & FERNS:	% COVER (CONSTANCY)											
ground cone (BOST2)	1	(2)	1	(11)	-	-	-	-	1	(10)	-	-
fairy-slipper (CABU2)	1	(2)	-	-	-	-	-	-	1	(5)	1	(5)
little prince's pine (CHME2) +	1	(36)	1	(22)	1	(14)	1	(14)	1	(57)	1	(50)
western prince's pine (CHUMO) +	2	(11)	2	(22)	-	-	2	(50)	2	(42)	2	(50)
Pacific hound's tongue (CYGR)	-	-	-	-	-	-	-	-	-	-	-	-
California toothwort (DECA4)	-	-	1	(3)	-	-	-	-	1	(15)	-	-
bleeding heart (DIFOO)	-	-	-	-	-	-	-	-	-	-	-	-
Hooker's fairybell (DIHO2)	1	(13)	1	(25)	1	(7)	1	(16)	1	(31)	1	(33)
California strawberry (FRCA1) +	-	-	-	-	-	-	-	-	-	-	-	-
stickywilly (GAAP2)	1	(2)	1	(3)	-	-	1	(8)	-	-	1	(5)
fragrant bedstraw (GATR3)	-	-	1	(3)	-	-	-	-	-	-	1	(11)
bedstraw (GAL2)	-	-	-	-	-	-	1	(8)	-	-	-	-
rattlesnake plantain (GOOB)	1	(41)	1	(18)	-	-	1	(66)	1	(68)	1	(44)
white hawkweed (HIAL)	-	-	2	(3)	-	-	-	-	1	(5)	1	(5)
iris (IRI) +	1	(11)	1	(7)	-	-	1	(8)	1	(26)	1	(11)
western twinflower (LIBOL)	4	(8)	5	(11)	2	(7)	4	(25)	5	(10)	1	(16)
woodland tarweed (MAMA1)	-	-	-	-	-	-	-	-	-	-	-	-
candyflower (MOSI)	-	-	-	-	-	-	-	-	-	-	-	-
mountain sweet-cicely (OSCH)	-	-	-	-	-	-	-	-	-	-	-	-
redwood sorrel (OXOR1) +	1	(5)	2	(14)	11	(21)	-	-	4	(10)	1	(11)
western coltsfoot (PEPA2) +	-	-	-	-	-	-	-	-	-	-	-	-
Sierra milkwort (POCO6)	1	(2)	-	-	-	-	-	-	-	-	-	-
swordfern (POMU1)	3	(50)	4	(66)	8	(92)	8	(75)	3	(78)	2	(72)
bracken fern (PTAQL)	1	(63)	5	(62)	1	(28)	2	(41)	1	(52)	1	(61)
white veined wintergreen (PYPI)	1	(25)	1	(22)	-	-	-	-	1	(26)	1	(38)
western Solomon seal (SMRAA) +	1	(8)	-	-	1	(7)	1	(16)	1	(5)	1	(11)
western starflower (TRLA3)	1	(11)	1	(22)	-	-	1	(8)	1	(15)	1	(16)
white trillium (TROV2)	-	-	1	(11)	1	(7)	1	(25)	1	(10)	1	(5)

+ = plants used for cultural or commercial purposes

PLANT ASSOCIATION:	LIDE2/ VAOV	LIDE2/ VAOV-GASH	LIDE2/ VAOV-RHMA	LIDE2/ GASH-RHMA	LIDE2/ GASH	LIDE2/ GASH-BENE1
HERBS & FERNS.			% COVER (CONSTANCY)			
western vancouveria (VAHE)	1 (13)	2 (3)	- -	3 (8)	1 (15)	2 (61)
Oregon trillium (TRRI)	1 (2)	1 (11)	1 (7)	1 (8)	1 (10)	1 (5)
small inside-out flower (VAPL)	1 (22)	2 (25)	2 (28)	2 (8)	1 (5)	2 (5)
pinto violet (VIOC)	- -	- -	- -	- -	- -	- -
redwood violet (VISE3)	1 (8)	1 (18)	3 (28)	1 (66)	1 (31)	2 (16)
western modesty (WHMO) +	1 (38)	3 (33)	1 (14)	1 (41)	1 (47)	1 (33)
giant chainfern (WOFI) +	- -	- -	- -	1 (33)	- -	- -
beargrass (XETE) +	1 (13)	2 (22)	4 (21)	1 (33)	7 (15)	1 (16)
GRASSES, SEDGES & RUSHES			% COVER (CONSTANCY)			
brome (BRO3)	- -	- -	- -	- -	- -	1 (5)
sedge (CAR1)	- -	- -	- -	- -	- -	- -
dogtail grass (CYEC)	- -	- -	- -	- -	- -	- -
California fescue (FECA)	- -	- -	- -	- -	- -	- -
Idaho fescue (FEID)	- -	1 (3)	- -	- -	- -	- -
western fescue (FEOC1)	- -	- -	- -	1 (8)	1 (10)	1 (16)
fescue (FES3)	1 (2)	- -	- -	1 (8)	1 (5)	- -
bearded fescue (FESU2)	- -	1 (3)	- -	- -	- -	- -
California sweetgrass (HIOC)	- -	2 (11)	1 (7)	- -	- -	- -
rush (JUN3)	- -	- -	- -	- -	- -	- -

PLANT ASSOCIATION:	LIDE2/COCOC	LIDE2/ RHDI-LOHIV	LIDE2/ QUVA-RHMA	LIDE2/BENE1	LIDE2-CHLA- UMCA/VAOV	LIDE2-CHLA/ VAOV-RHOC
	n = 8	n = 17	n = 6	n = 54	n = 14	n = 10
			% COVER			
TOTAL COVER	88	92	98	94	99	99
FORB COVER	10	7	8	10	21	13
GRASS COVER	1	<1	1	<1	1	2
SHRUB COVER	22	15	75	14	53	58
TREE COVER	81	86	75	89	92	85
TREE OVERSTORY:			% COVER (CONSTANCY)			
white fir (ABCO)	- -	- -	2 (16)	5 (7)	- -	- -
bigleaf maple (ACMA) +	- -	2 (17)	- -	3 (7)	8 (57)	- -
alder (ALRU2 or ALRH) +	- -	- -	- -	- -	9 (21)	4 (20)
Pacific madrone (ARME3) +	11 (100)	6 (76)	3 (66)	9 (48)	1 (7)	3 (50)
incense cedar (CADE3) +	- -	2 (5)	4 (50)	- -	2 (7)	10 (10)
chinquapin (CACH2) +	40 (12)	5 (17)	5 (33)	4 (3)	- -	7 (20)
Port Orford cedar (CHLA) +	- -	- -	- -	8 (3)	33 (100)	34 (100)
Pacific dogwood (CONU1)	4 (37)	3 (29)	- -	5 (27)	3 (64)	3 (30)
tanoak (LIDE2) +	41 (100)	44 (100)	14 (100)	42 (100)	30 (100)	22 (100)
knobcone pine (PIAT)	- -	- -	- -	- -	- -	- -
Jeffrey pine (PIJE) +	- -	- -	- -	- -	- -	- -
sugar pine (PILA) +	4 (25)	20 (23)	5 (100)	9 (18)	1 (7)	4 (40)
ponderosa pine (PIPO) +	- -	10 (5)	- -	- -	- -	- -
Douglas-fir (PSME) +	42 (100)	37 (100)	32 (100)	46 (100)	39 (100)	37 (100)
canyon live oak (QUCH2)	3 (25)	4 (11)	4 (33)	3 (7)	- -	2 (10)
Oregon white oak (QUGA2) +	- -	3 (5)	- -	- -	- -	- -
black oak (QUKE) +	- -	5 (35)	- -	4 (9)	- -	- -
Pacific yew (TABR) +	- -	3 (5)	13 (33)	8 (5)	5 (35)	3 (40)
western hemlock (TSHE)	- -	- -	- -	- -	- -	- -
California bay (UMCA) +	- -	- -	5 (16)	2 (3)	12 (71)	5 (30)

+ = plants used for cultural or commercial purposes

PLANT ASSOCIATION:	LIDE2/ COCOC	LIDE2/ RHDI-LOHIV	LIDE2/ QUVA-RHMA	LIDE2/ BENE1	LIDE2-CHLA-UMCA/VAOV	LIDE2-CHLA/ VAOV-RHOC
TREE UNDERSTORY:			% COVER (CONSTANCY)			
white fir (ABCO)	- -	- -	- -	2 (9)	- -	- -
bigleaf maple (ACMA) +	2 (12)	- -	- -	1 (3)	1 (14)	- -
alder (ALRU2 or ALRH) +	- -	- -	1 (16)	- -	2 (14)	1 (10)
Pacific madrone (ARME3) +	1 (12)	- -	- -	1 (3)	1 (14)	1 (10)
incense cedar (CADE3) +	- -	- -	1 (50)	1 (5)	- -	- -
chinquapin (CACH2) +	- -	1 (11)	1 (33)	6 (14)	- -	2 (20)
Port Orford cedar (CHLA) +	- -	- -	2 (16)	- -	3 (92)	2 (80)
Pacific dogwood (CONU1)	3 (37)	2 (17)	- -	2 (24)	2 (50)	2 (20)
tanoak (LIDE2) +	33 (100)	25 (100)	19 (83)	23 (98)	8 (100)	8 (100)
knobcone pine (PIAT)	- -	- -	- -	- -	- -	- -
Jeffrey pine (PIJE) +	- -	- -	- -	- -	- -	- -
sugar pine (PILA) +	2 (25)	1 (47)	1 (33)	1 (18)	- -	- -
ponderosa pine (PIPO) +	- -	1 (5)	- -	- -	- -	- -
Douglas-fir (PSME) +	2 (75)	2 (52)	3 (83)	2 (61)	1 (64)	2 (50)
canyon live oak (QUCH2)	2 (25)	2 (47)	2 (66)	4 (27)	- -	1 (10)
Oregon white oak (QUGA2) +	- -	- -	- -	- -	- -	- -
black oak (QUKE) +	- -	1 (11)	- -	1 (11)	- -	- -
Pacific yew (TABR) +	- -	- -	2 (33)	- -	2 (21)	1 (70)
western hemlock (TSHE)	- -	- -	- -	- -	- -	- -
California bay (UMCA) +	1 (12)	2 (5)	4 (33)	2 (3)	3 (100)	2 (50)
SHRUBS:			% COVER (CONSTANCY)			
vine maple (ACCI)	- -	- -	8 (33)	2 (7)	5 (21)	- -
Pacific serviceberry (AMAL)	2 (12)	- -	1 (16)	- -	- -	1 (20)
greenleaf manzanita (ARPA9) +	- -	- -	20 (16)	- -	- -	- -
hollyleaved barberry (BEAQ) +	2 (12)	1 (17)	- -	2 (1)	- -	- -
dwarf Oregon-grape (BENE1) +	1 (12)	1 (5)	8 (83)	10 (96)	2 (57)	1 (10)
California hazelnut (COCOC) +	3 (100)	1 (23)	1 (16)	2 (20)	3 (71)	2 (30)
slender salal (GAOV)	- -	- -	- -	- -	- -	- -
salal (GASH) +	- -	- -	17 (83)	1 (1)	12 (64)	18 (100)

PLANT ASSOCIATION:	LIDE2/ COCOC	LIDE2/ RHDI-LOHIV	LIDE2/ QUVA-RHMA	LIDE2/ BENE1	LIDE2-CHLA-UMCA/VAOV	LIDE2-CHLA/ VAOV-RHOC
SHRUBS:			% COVER (CONSTANCY)			
toyon (HEAR2)	- -	- -	- -	- -	- -	- -
oceanspray (HODI)	2 (25)	1 (5)	2 (16)	3 (7)	- -	- -
dwarf tanbark (LIDEE)	- -	- -	13 (33)	- -	- -	- -
pink honeysuckle (LOHIV)	2 (50)	2 (70)	1 (33)	1 (18)	1 (14)	1 (30)
Gordon mock-orange (PHLEG) +	- -	- -	- -	- -	- -	- -
Sadler oak (QUSA)	- -	- -	- -	1 (1)	- -	- -
huckleberry oak (QUVA)	- -	- -	9 (100)	4 (3)	2 (7)	2 (40)
coffeeberry (RHCA2)	- -	- -	7 (50)	- -	- -	- -
Pacific rhododendron (RHMA)	- -	- -	23 (100)	5 (3)	1 (7)	6 (80)
western azalea (RHOC)	- -	- -	- -	- -	- -	12 (100)
poison oak (RHDI)	4 (37)	3 (94)	1 (16)	2 (33)	1 (7)	5 (20)
wood rose (ROGY)	1 (37)	- -	3 (83)	1 (22)	1 (21)	1 (10)
rose (ROS)	1 (25)	1 (64)	- -	1 (38)	- -	
western raspberry (RULE) +	- -	- -	- -	1 (3)	1 (7)	1 (10)
thimbleberry (RUPA2) +	- -	1 (5)	1 (16)	2 (3)	1 (21)	3 (10)
salmon berry (RUSP2) +	- -	- -	- -	- -	- -	- -
Pacific blackberry (RUUR) +	1 (12)	1 (5)	1 (83)	1 (22)	1 (57)	1 (40)
willow (SAL11) +	- -	- -	- -	2 (1)	- -	- -
creeping snowberry (SYMO)	2 (37)	2 (47)	- -	1 (33)	- -	- -
evergreen huckleberry (VAOV) +	- -	- -	23 (33)	1 (1)	40 (100)	24 (100)
red huckleberry (VAPA) +	- -	- -	9 (83)	6 (11)	6 (28)	3 (60)
HERBS & FERNS:			% COVER (CONSTANCY)			
vanilla leaf (ACTR)	2 (62)	1 (29)	1 (33)	3 (50)	1 (10)	3 (10)
trailplant (ADBI)	1 (37)	1 (11)	- -	1 (5)	- -	- -
mountain dogbane (APPU)	1 (12)	2 (5)	- -	1 (1)	- -	- -
rayless arnica (ARDI3)	- -	1 (58)	- -	1 (18)	1 (20)	- -
marbled ginger (ASHA) +	- -	1 (5)	- -	- -	2 (57)	1 (10)
ground cone (BOST2)	1 (12)	1 (5)	- -	1 (7)	- -	- -

+ = plants used for cultural or commercial purposes

PLANT ASSOCIATION:	LIDE2/ COCOC	LIDE2/ RHDI-LOHIV	LIDE2/ QUVA-RHMA	LIDE2/ BENE1	LIDE2-CHLA-UMCA/VAOV	LIDE2-CHLA/ VAOV-RHOC
HERBS & FERNS:			% COVER (CONSTANCY)			
fairy-slipper (CABU2)	- -	- -	- -	1 (3)	- -	1 (30)
little prince's pine (CHME2) +	1 (75)	1 (41)	1 (50)	1 (50)	1 (10)	- -
western prince's pine (CHUMO) +	1 (12)	1 (17)	1 (50)	2 (42)	1 (7)	3 (30)
Pacific hound's tongue (CYGR)	- -	- -	- -	- -	- -	- -
California toothwort (DECA4)	1 (50)	- -	- -	1 (1)	2 (14)	1 (10)
bleeding heart (DIFOO)	- -	- -	- -	- -	- -	- -
Hooker's fairybell (DIHO2)	1 (75)	1 (29)	- -	1 (40)	1 (35)	1 (10)
California strawberry (FRCA1) +	- -	- -	- -	- -	- -	- -
stickywilly (GAAP2)	- -	- -	- -	1 (1)	- -	- -
fragrant bedstraw (GATR3)	3 (12)	1 (11)	- -	1 (3)	- -	- -
bedstraw (GAL2)	- -	- -	1 (16)	1 (1)	3 (10)	- -
rattlesnake plantain (GOOB)	1 (50)	1 (47)	1 (50)	1 (42)	1 (42)	1 (70)
white hawkweed (HIAL)	2 (12)	2 (5)	- -	1 (9)	- -	- -
iris (IRI) +	1 (25)	1 (41)	8 (66)	1 (14)	1 (7)	1 (30)
western twinflower (LIBOL)	- -	- -	1 (66)	6 (18)	3 (42)	3 (30)
woodland tarweed (MAMA1)	1 (12)	- -	- -	- -	- -	- -
candyflower (MOSI)	- -	- -	- -	- -	- -	- -
mountain sweet-cicely (OSCH)	- -	- -	- -	- -	- -	- -
redwood sorrel (OXOR1) +	- -	- -	2 (33)	1 (9)	7 (50)	3 (70)
western coltsfoot (PEPA2) +	- -	- -	- -	- -	- -	- -
Sierra milkwort (POCO6)	- -	- -	- -	- -	- -	- -
swordfern (POMU1)	1 (50)	3 (35)	2 (83)	3 (48)	8 (92)	5 (80)
bracken fern (PTAQL)	2 (62)	1 (41)	1 (33)	1 (57)	2 (14)	1 (10)
white veined wintergreen (PYPI)	1 (50)	1 (17)	1 (16)	1 (44)	1 (14)	1 (10)
western Solomon seal (SMRAA) +	- -	- -	1 (16)	1 (12)	1 (21)	- -
western starflower (TRLA3)	1 (25)	1 (17)	1 (50)	1 (31)	1 (50)	1 (40)
white trillium (TROV2)	- -	- -	1 (16)	1 (7)	1 (85)	1 (10)
Oregon trillium (TRRI)	- -	- -	- -	1 (1)	1 (21)	1 (30)
western vancouveria (VAHE)	2 (25)	3 (58)	- -	2 (35)	2 (42)	4 (30)

PLANT ASSOCIATION:	LIDE2/ COCOC		LIDE2/ RHDI-LOHIV		LIDE2/ QUVA-RHMA		LIDE2/ BENE1		LIDE2-CHLA-UMCA/VAOV		LIDE2-CHLA/ VAOV-RHOC	
HERBS & FERNS:					% COVER (CONSTANCY)							
small inside-out flower (VAPL)	-	-	-	-	2	(50)	1	(9)			2	(30)
pinto violet (VIOC)	-	-	-	-	-	-	-	-	-	-	-	-
redwood violet (VISE3)	-	-	-	-	1	(16)	1	(11)	2	(21)	-	-
western modesty (WHMO) +	12	(37)	6	(23)	2	(100)	3	(61)	4	(42)	2	(60)
giant chainfern (WOFI) +	-	-	-	-	-	-	-	-	-	-	-	-
beargrass (XETE) +	-	-	-	-	2	(83)	2	(14)	2	(7)	2	(50)
GRASSES, SEDGES & RUSHES					% COVER (CONSTANCY)							
brome (BRO3)	-	-	1	(5)	-	-	1	(3)	-	-	-	-
sedge (CAR1)	-	-	-	-	-	-	1	(1)	1	(21)	2	(40)
dogtail grass (CYEC)	-	-	-	-	-	-	-	-	-	-	-	-
California fescue (FECA)	-	-	-	-	5	(16)	-	-	-	-	-	-
Idaho fescue (FEID)	-	-	1	(5)	-	-	-	-	-	-	-	-
western fescue (FEOC1)	-	-	-	-	2	(16)	1	(11)	2	(7)	-	-
fescue (FES3)	1	(12)	-	-	1	(16)	1	(3)	1	(37)	-	-
bearded fescue (FESU2)	4	(12)	-	-	-	-	-	-	-	-	-	-
California sweetgrass (HIOC)	-	-	-	-	-	-	-	-	2	(35)	2	(40)
rush (JUN3)	-	-	-	-	-	-	-	-	-	-	-	-

+ = plants used for cultural or commercial purposes

PLANT ASSOCIATION:	LIDE2-CHLA/ VAOV n = 21	LIDE2-CHLA/ BENE1/LIBOL n = 10	LIDE2-CHLA- ALRU2//Riparian n = 10	LIDE2-CHLA/ ACCI n = 10	LIDE2-CHLA/ VAPA n = 10	LIDE2-CHLA/ GASH n = 10
			% COVER			
TOTAL COVER	98	95	97	96	95	97
FORB COVER	14	14	12	12	9	4
GRASS COVER	<1	<1	1	3	1	0
SHRUB COVER	53	18	34	67	17	70
TREE COVER	88	90	85	73	89	89
TREE OVERSTORY:			% COVER (CONSTANCY)			
white fir (ABCO)	- -	3 (18)	5 (10)	3 (10)	- -	5 (10)
bigleaf maple (ACMA) +	5 (38)	7 (27)	4 (60)	11 (30)	- -	3 (10)
alder (ALRU2 or ALRH) +	12 (9)	2 (18)	36 (100)	25 (10)	- -	- -
Pacific madrone (ARME3) +	5 (42)	13 (27)	5 (10)	5 (10)	7 (70)	3 (20)
incense cedar (CADE3) +	- -	- -	- -	- -	11 (30)	- -
chinquapin (CACH2) +	4 (23)	5 (18)	1 (10)	2 (40)	- -	18 (70)
Port Orford cedar (CHLA) +	36 (100)	40 (100)	37 (100)	29 (100)	33 (100)	29 (100)
Pacific dogwood (CONU1)	4 (14)	2 (27)	6 (20)	3 (50)	- -	3 (10)
tanoak (LIDE2) +	26 (100)	8 (100)	11 (90)	18 (100)	13 (100)	20 (100)
knobcone pine (PIAT)	- -	- -	- -	- -	- -	- -
Jeffrey pine (PIJE) +	- -	- -	- -	- -	- -	- -
sugar pine (PILA) +	3 (23)	3 (18)	1 (10)	12 (80)	12 (70)	- -
ponderosa pine (PIPO) +	- -	- -	- -	- -	- -	- -
Douglas-fir (PSME) +	35 (100)	38 (100)	21 (100)	36 (100)	32 (100)	48 (100)
canyon live oak (QUCH2)	2 (4)	5 (18)	- -	- -	8 (10)	- -
Oregon white oak (QUGA2) +	- -	- -	- -	- -	- -	- -
black oak (QUKE) +	- -	- -	- -	- -	- -	- -
Pacific yew (TABR) +	6 (19)	2 (36)	10 (50)	3 (30)	5 (30)	- -
western hemlock (TSHE)	- -	- -	- -	- -	- -	- -
California bay (UMCA) +	1 (4)	- -	- -	3 (10)	1 (10)	- -

PLANT ASSOCIATION:	LIDE2-CHLA/ VAOV	LIDE2-CHLA/ BENE1/LIBOL	LIDE2-CHLA- ALRU2//Riparian	LIDE2-CHLA/ ACCI	LIDE2-CHLA/ VAPA	LIDE2-CHLA/ GASH
TREE UNDERSTORY:			% COVER (CONSTANCY)			
white fir (ABCO)	- -	1 (45)	1 (20)	4 (10)	1 (10)	- -
bigleaf maple (ACMA) +	- -	- -	3 (30)	1 (10)	- -	- -
alder (ALRU2 or ALRH) +	3 (9)	- -	- -	5 (10)	- -	- -
Pacific madrone (ARME3) +	1 (4)	1 (9)	- -	1 (10)	1 (30)	- -
incense cedar (CADE3) +	- -	- -	- -	- -	- -	- -
chinquapin (CACH2) +	1 (28)	1 (9)	1 (10)	2 (40)	1 (50)	2 (40)
Port Orford cedar (CHLA) +	3 (100)	3 (100)	4 (100)	3 (90)	5 (90)	2 (100)
Pacific dogwood (CONU1)	3 (4)	1 (9)	1 (20)	2 (50)	- -	1 (10)
tanoak (LIDE2) +	10 (100)	11 (100)	14 (100)	10 (100)	30 (90)	6 (100)
knobcone pine (PIAT)	- -	- -	- -	- -	- -	- -
Jeffrey pine (PIJE) +	- -	- -	- -	- -	- -	- -
sugar pine (PILA) +	- -	- -	- -	- -	- -	- -
ponderosa pine (PIPO) +	- -	- -	- -	- -	- -	- -
Douglas-fir (PSME) +	1 (52)	1 (80)	2 (50)	2 (40)	1 (70)	1 (50)
canyon live oak (QUCH2)	1 (19)	2 (36)	1 (50)	1 (10)	8 (20)	- -
Oregon white oak (QUGA2) +	- -	- -	- -	- -	- -	- -
black oak (QUKE) +	- -	- -	- -	- -	- -	- -
Pacific yew (TABR) +	1 (23)	1 (36)	1 (50)	- -	1 (40)	1 (10)
western hemlock (TSHE)	- -	- -	- -	- -	- -	- -
California bay (UMCA) +	2 (14)	1 (9)	1 (10)	2 (20)	2 (20)	1 (10)
SHRUBS:			%COVER (CONSTANCY)			
vine maple (ACCI)	- -	1 (27)	39 (70)	55 (100)	- -	- -
Pacific serviceberry (AMAL)	- -	8 (9)	1 (10)	- -	- -	- -
greenleaf manzanita (ARPA9) +	- -	- -	- -	- -	- -	- -
hollyleaved barberry (BEAQ) +	- -	- -	- -	- -	- -	- -
dwarf Oregon-grape (BENE1) +	3 (76)	11 (100)	2 (20)	12 (90)	1 (10)	7 (60)
California hazelnut (COCOC) +	2 (19)	2 (60)	4 (10)	5 (50)	- -	1 (10)
slender salal (GAOV)	- -	- -	11 (80)	- -	- -	- -

+ = plants used for cultural or commercial purposes

PLANT ASSOCIATION:	LIDE2-CHLA/ VAOV	LIDE2-CHLA/ BENE1/LIBOL	LIDE2-CHLA- ALRU2//Riparian	LIDE2-CHLA/ ACCI	LIDE2-CHLA/ VAPA	LIDE2-CHLA/ GASH
SHRUBS:			%COVER (CONSTANCY)			
salal (GASH) +	16 (95)	4 (60)	11 (70)	39 (60)	5 (50)	70 (100)
toyon (HEAR2)	- -	- -	- -	- -	- -	- -
oceanspray (HODI)	- -	- -	- -	- -	- -	- -
dwarf tanbark (LIDEE)	- -	- -	- -	- -	- -	- -
pink honeysuckle (LOHIV)	1 (4)	- -	- -	- -	- -	- -
Gordon mock-orange (PHLEG) +	- -	- -	- -	- -	- -	- -
Sadler oak (QUSA)	- -	- -	- -	- -	- -	- -
huckleberry oak (QUVA)	- -	2 (9)	- -	- -	2 (30)	- -
coffeeberry (RHCA2)	- -	- -	- -	- -	- -	- -
Pacific rhododendron (RHMA)	9 (47)	5 (18)	2 (20)	8 (40)	2 (20)	8 (60)
western azalea (RHOC)	- -	4 (18)	12 (20)	2 (10)	2 (10)	2 (20)
poison oak (RHDI)	1 (14)	- -	12 (10)	- -	1 (10)	1 (10)
wood rose (ROGY)	1 (23)	1 (63)	1 (10)	3 (50)	1 (60)	1 (20)
rose (ROS)	- -	- -	- -	- -	- -	- -
western raspberry (RULE) +	- -	- -	- -	1 (10)	15 (10)	- -
thimbleberry (RUPA2) +	1 (14)	4 (50)	3 (50)	1 (10)	1 (10)	- -
salmon berry (RUSP2) +	- -	- -	- -	- -	- -	- -
Pacific blackberry (RUUR) +	2 (47)	1 (36)	2 (50)	1 (50)	1 (10)	1 (10)
willow (SAL11) +	- -	- -	- -	- -	- -	- -
creeping snowberry (SYMO)	- -	- -	- -	- -	- -	- -
evergreen huckleberry (VAOV) +	31 (100)	2 (9)	- -	- -	3 (50)	3 (40)
red huckleberry (VAPA) +	4 (57)	2 (80)	1 (30)	2 (40)	9 (100)	2 (40)
HERBS & FERNS:			%COVER (CONSTANCY)			
vanilla leaf (ACTR)	- -	3 (80)	2 (70)	3 (60)	1 (10)	3 (10)
trailplant (ADBI)	1 (14)	1 (9)	- -	1 (20)	- -	- -
mountain dogbane (APPU)	- -	- -	- -	- -	- -	- -
rayless arnica (ARDI3)	- -	1 (18)	- -	- -	1 (20)	- -
marbled ginger (ASHA) +		- -	1 (20)	1 (50)	- -	1 (10)
ground cone (BOST2)	- -	- -	- -	- -	- -	- -

PLANT ASSOCIATION: HERBS & FERNS:	LIDE2-CHLA/ VAOV	LIDE2-CHLA/ BENE1/LIBOL	LIDE2-CHLA- ALRU2//Riparian	LIDE2-CHLA/ ACCI	LIDE2-CHLA/ VAPA	LIDE2-CHLA/ GASH
	%COVER (CONSTANCY)					
fairy-slipper (CABU2)	1 (4)	1 (27)	- -	1 (30)	1 (30)	- -
little prince's pine (CHME2) +	1 (9)	1 (18)	- -	- -	2 (20)	1 (20)
western prince's pine (CHUMO) +	1 (19)	1 (36)	1 (10)	2 (40)	2 (60)	2 (70)
Pacific hound's tongue (CYGR)	- -	- -	- -	- -	- -	- -
California toothwort (DECA4)	2 (4)	- -	- -	- -	- -	- -
bleeding heart (DIFOO)	- -	- -	- -	- -	- -	- -
Hooker's fairybell (DIHO2)	1 (33)	1 (70)	1 (10)	1 (10)	1 (20)	- -
California strawberry (FRCA1) +	- -	- -	- -	- -	- -	- -
stickywilly (GAAP2)	- -	- -	- -	- -	- -	- -
fragrant bedstraw (GATR3)	- -	- -	- -	- -	- -	- -
bedstraw (GAL2)	- -	- -	1 (20)	1 (50)	3 (10)	- -
rattlesnake plantain (GOOB)	1 (85)	1 (54)	- -	- -	1 (66)	1 (80)
white hawkweed (HIAL)	- -	- -	- -	- -	- -	- -
iris (IRI) +	1 (4)	1 (45)	1 (50)	1 (50)	- -	- -
western twinflower (LIBOL)	11 (23)	5 (80)	3 (50)	10 (60)	2 (20)	3 (10)
woodland tarweed (MAMA1)	- -	- -	- -	- -	- -	- -
candyflower (MOSI)	- -	- -	- -	- -	- -	- -
mountain sweet-cicely (OSCH)	- -	- -	- -	- -	- -	- -
redwood sorrel (OXOR1) +	8 (42)	3 (18)	- -	4 (10)	- -	- -
western coltsfoot (PEPA2) +	- -	- -	- -	- -	- -	- -
Sierra milkwort (POCO6)	- -	- -	- -	- -	- -	- -
swordfern (POMU1)	4 (85)	3 (72)	5 (90)	4 (90)	2 (60)	1 (40)
bracken fern (PTAQL)	1 (42)	1 (20)	1 (20)	1 (10)	1 (40)	1 40
white veined wintergreen (PYPI)	1 (4)	1 (27)	1 (10)	2 (40)	1 (10)	1 (20)
western Solomon seal (SMRAA) +	1 (14)	1 (27)	1 (10)	1 (10)	1 (30)	- -
western starflower (TRLA3)	1 (38)	1 (80)	2 (20)	1 (10)	1 (30)	1 (10)
white trillium (TROV2)	1 (33)	1 (9)	1 (40)	1 (50)	- -	1 (20)
Oregon trillium (TRRI)	2 (19)	- -	- -	1 (20)	- -	- -

+ = plants used for cultural or commercial purposes

PLANT ASSOCIATION:	LIDE2-CHLA/ VAOV		LIDE2-CHLA/ BENE1/LIBOL		LIDE2-CHLA- ALRH//Riparian		LIDE2-CHLA/ ACCI		LIDE2-CHLA/ VAPA		LIDE2-CHLA/ GASH	
HERBS & FERNS:	%COVER (CONSTANCY)											
western vancouveria (VAHE)	2	(38)	2	(36)	-	-	-	-	1	(50)	2	(60)
small inside-out flower (VAPL)	1	(28)	2	(9)	1	(20)	2	(20)	1	(10)	2	(50)
pinto violet (VIOC)	-	-	-	-	-	-	-	-	-	-	-	-
redwood violet (VISE3)	1	(10)	1	(27)	-	-	1	(20)	-	-	1	(10)
western modesty (WHMO) +	2	(38)	3	(72)	2	(20)	3	(60)	1	(70)	4	(20)
giant chainfern (WOFI) +	-	-	-	-	-	-	-	-	-	-	-	-
beargrass (XETE) +	2	(28)	1	(18)	-	-	1	(20)	4	(90)	1	(60)
GRASSES, SEDGES & RUSHES	%COVER (CONSTANCY)											
brome (BRO3)	-	-	-	-	-	-	-	-	-	-	-	-
sedge (CAR1)	2	(9)	-	-	2	(50)	1	(40)	1	(60)	1	(10)
dogtail grass (CYEC)	-	-	-	-	-	-	-	-	-	-	-	-
California fescue (FECA)	-	-	-	-	-	-	-	-	-	-	-	-
Idaho fescue (FEID)	-	-	-	-	-	-	-	-	-	-	-	-
western fescue (FEOC1)	1	(9)	1	(9)	-	-	-	-	1	(20)	-	-
fescue (FES3)	2	(14)	-	-	-	-	-	-	1	(30)	-	-
bearded fescue (FESU2)	-	-	-	-	-	-	-	-	-	-	-	-
California sweetgrass (HIOC)	2	(4)	-	-	-	-	-	-	-	-	-	-
rush (JUN3)	-	-	-	-	-	-	-	-	-	-	-	-

PLANT ASSOCIATION:	LIDE2-CHLA-TSHE/VAOV n = 15	LIDE2-QUKE/ n = 20	LIDE2-CADE3/ FECA n = 7	LIDE2-QUCH2// Rockpile n = 15	LIDE2-QUCH2/ VAOV n = 32	LIDE2-QUCH2/ GASH-BENE1 n = 16
			%COVER			
TOTAL COVER	97	95	94	89	98	96
FORB COVER	13	6	6	2	8	8
GRASS COVER	<1	<1	28	<1	<1	<1
SHRUB COVER	64	4	3	4	72	44
TREE COVER	92	86	87	90	87	88
TREE OVERSTORY:			%COVER (CONSTANCY)			
white fir (ABCO)	- -	- -	- -	- -	- -	- -
bigleaf maple (ACMA) +	8 (20)	- -	1 (14)	5 (6)	2 (15)	5 (25)
alder (ALRU2 or ALRH) +	15 (10)	- -	- -	- -	- -	- -
Pacific madrone (ARME3) +	- -	10 (65)	10 (71)	15 (93)	9 (90)	9 (75)
incense cedar (CADE3) +	- -	2 (5)	15 (100)	- -	6 (6)	- -
chinquapin (CACH2) +	- -	- -	1 (14)	10 (40)	7 (34)	11 (43)
Port Orford cedar (CHLA) +	30 (100)	- -	- -	- -	- -	3 (6)
Pacific dogwood (CONU1)	5 (10)	5 (30)	- -	- -	7 (40)	4 (25)
tanoak (LIDE2) +	23 (100)	39 (100)	14 (42)	21 (100)	34 (100)	27 (100)
knobcone pine (PIAT)	- -	- -	30 (14)	- -	- -	- -
Jeffrey pine (PIJE) +	- -	- -	1 (14)	- -	- -	- -
sugar pine (PILA) +	- -	2 (5)	4 (42)	5 (33)	6 (40)	12 (25)
ponderosa pine (PIPO) +	- -	- -	- -	- -	- -	- -
Douglas-fir (PSME) +	34 (100)	49 (100)	46 (100)	40 (100)	44 (96)	48 (100)
canyon live oak (QUCH2)	- -	4 (20)	2 (28)	24 (100)	19 (100)	17 (100)
Oregon white oak (QUGA2) +	- -	- -	- -	2 (6)	- -	- -
black oak (QUKE) +	- -	7 (100)	12 (28)	- -	- -	5 (6)
Pacific yew (TABR) +	6 (50)	- -	- -	- -	- -	2 (6)
western hemlock (TSHE)	20 (100)	- -	- -	- -	- -	- -
California bay (UMCA) +	- -	- -	32 (28)	- -	4 (15)	5 (12)

+ = plants used for cultural or commercial purposes

PLANT ASSOCIATION:	LIDE2-CHLA-TSHE/VAOV	LIDE2-QUKE/	LIDE2-CADE3/FECA	LIDE2-QUCH2//Rockpile	LIDE2-QUCH2/VAOV	LIDE2-QUCH2/GASH-BENE1
TREE UNDERSTORY:			%COVER (CONSTANCY)			
white fir (ABCO)	- -	- -	- -	1 (6)	- -	1 (12)
bigleaf maple (ACMA) +	- -	1 (5)	- -	1 (6)	1 (6)	1 (6)
alder (ALRU2 or ALRH) +	- -	- -	- -	- -	- -	1 (6)
Pacific madrone (ARME3) +	- -	- -	1 (4)	1 (6)	1 (21)	1 (18)
incense cedar (CADE3) +	- -	1 (5)	2 (71)	1 (6)	1 (6)	- -
chinquapin (CACH2) +	- -	2 (14)	- -	1 (6)	2 (15)	8 (25)
Port Orford cedar (CHLA) +	2 (80)	- -	- -	- -	- -	1 (6)
Pacific dogwood (CONU1)	1 (10)	3 (14)	- -	1 (6)	2 (21)	1 (12)
tanoak (LIDE2) +	7 (100)	20 (100)	10 (100)	12 (100)	12 (90)	16 (100)
knobcone pine (PIAT)	- -	- -	- -	- -	- -	- -
Jeffrey pine (PIJE) +	- -	- -	- -	- -	- -	- -
sugar pine (PILA) +	- -	1 (14)	1 (42)	1 (13)	1 (43)	1 (37)
ponderosa pine (PIPO) +	- -	- -	- -	1 (6)	- -	- -
Douglas-fir (PSME) +	2 (20)	2 (80)	1 (71)	2 (66)	2 (62)	2 (75)
canyon live oak (QUCH2)	- -	1 (35)	1 (28)	5 (100)	4 (81)	4 (93)
Oregon white oak (QUGA2) +	- -	- -	- -	- -	- -	- -
black oak (QUKE) +	- -	1 (35)	2 (14)	- -	- -	- -
Pacific yew (TABR) +	1 (30)	- -	- -	1 (6)	1 (9)	1 (12)
western hemlock (TSHE)	3 (100)	- -	- -	- -	- -	- -
California bay (UMCA) +	- -	1 (10)	3 (42)	1 (6)	2 (21)	25 (6)
SHRUBS:			%COVER (CONSTANCY)			
vine maple (ACCI)	- -	- -	- -	- -	2 (6)	- -
Pacific serviceberry (AMAL)	- -	- -	- -	- -	1 (3)	1 (12)
greenleaf manzanita (ARPA9) +	- -	- -	- -	- -	- -	3 (6)
hollyleaved barberry (BEAQ) +	- -	2 (14)	- -	- -	1 (3)	- -
dwarf Oregon-grape (BENE1) +	4 (53)	2 (10)	2 (28)	1 (26)	4 (46)	14 (100)
California hazelnut (COCOC) +	- -	2 (30)	- -	- -	6 (31)	1 (6)
slender salal (GAOV)	- -	- -	- -	- -	- -	- -
salal (GASH) +	4 (40)	1 (5)	1 (14)	1 (6)	10 (59)	22 (100)

PLANT ASSOCIATION:	LIDE2-CHLA-TSHE/VAOV		LIDE2-QUKE/		LIDE2-CADE3/FECA		LIDE2-QUCH2//Rockpile		LIDE2-QUCH2/VAOV		LIDE2-QUCH2/GASH-BENE1	
SHRUBS:	%COVER (CONSTANCY)											
toyon (HEAR2)	-	-	-	-	-	-	-	-	-	-	-	-
oceanspray (HODI)	-	-	-	-	1	(28)	-	-	1	(15)	3	(25)
dwarf tanbark (LIDEE)	-	-	-	-	-	-	-	-	-	-	5	(6)
pink honeysuckle (LOHIV)	1	(14)	-	-	3	(28)	-	-	2	(46)	-	-
Gordon mock-orange (PHLEG) +	-	-	-	-	-	-	-	-	-	-	-	-
Sadler oak (QUSA)	-	-	-	-	-	-	-	-	-	-	-	-
huckleberry oak (QUVA)	-	-	-	-	4	(42)	-	-	2	(3)	11	(12)
coffeeberry (RHCA2)	-	-	-	-	-	-	-	-	6	(6)	-	-
Pacific rhododendron (RHMA)	12	(73)	-	-	1	(14)	-	-	5	(15)	10	(6)
western azalea (RHOC)	-	-	-	-	-	-	-	-	10	(3)	18	(18)
poison oak (RHDI)	-	-	2	(55)	3	(28)	3	(13)	3	(75)	4	(31)
wood rose (ROGY)	-	-	2	(65)	1	(14)	-	-	1	(59)	1	(62)
rose (ROS)	-	-	2	(25)	1	(14)	1	(26)	-	-	-	-
western raspberry (RULE) +	-	-	1	(40)	-	-	-	-	1	(6)	-	-
thimbleberry (RUPA2) +	1	(20)	-	-	-	-	-	-	-	-	-	-
salmon berry (RUSP2) +	-	-	-	-	-	-	-	-	-	-	-	-
Pacific blackberry (RUUR) +	10	(10)	1	(25)	1	(14)	1	(20)	1	(25)	1	(25)
willow (SAL11) +	-	-	-	-	-	-	-	-	-	-	-	-
creeping snowberry (SYMO)	1	(35)	-	-	-	-	1	(33)	-	-	1	(31)
evergreen huckleberry (VAOV) +	47	(100)	1	(35)	3	(28)	2	(6)	41	(100)	1	(12)
red huckleberry (VAPA) +	1	(20)	-	-	2	(14)	-	-	1	(3)	2	(25)
HERBS & FERNS:	%COVER (CONSTANCY)											
vanilla leaf (ACTR)	-	-	1	(20)	-	-	-	-	1	(18)	2	(56)
trailplant (ADBI)	-	-	1	(5)	-	-	-	-	-	-	1	(6)
mountain dogbane (APPU)	-	-	1	(5)	-	-	1	(20)	1	(3)	1	(18)
rayless arnica (ARDI3)	-	-	1	(10)	-	-	-	-	1	(3)	-	-
marbled ginger (ASHA) +	1	(10)	-	-	-	-	-	-	1	(9)	-	-
ground cone (BOST2)	-	-	1	(10)	-	-	1	(6)	1	(6)	1	(12)

+ = plants used for cultural or commercial purposes

PLANT ASSOCIATION:	LIDE2-CHLA-TSHE/VAOV		LIDE2-QUKE/		LIDE2-CADE3/FECA		LIDE2-QUCH2//Rockpile		LIDE2-QUCH2/VAOV		LIDE2-QUCH2/GASH-BENE1	
HERBS & FERNS:	%COVER (CONSTANCY)											
fairy-slipper (CABU2)	-	-	1	(5)	-	-	-	-	-	-	1	(6)
little prince's pine (CHME2) +	1	(10)	1	(60)	-	-	1	(53)	1	(28)	1	(31)
western prince's pine (CHUMO) +	2	(20)	2	(35)	-	-	2	(60)	1	(34)	2	(68)
Pacific hound's tongue (CYGR)	-	-	-	-	1	(28)	-	-	-	-	-	-
California toothwort (DECA4)	-	-	1	(5)	-	-	1	(6)	1	(9)	-	-
bleeding heart (DIFOO)	-	-	-	-	-	-	-	-	-	-	-	-
Hooker's fairybell (DIHO2)	-	-	1	(30)	1	(28)	1	(6)	1	(18)	1	(31)
California strawberry (FRCA1) +	-	-	-	-	-	-	-	-	-	-	-	-
stickywilly (GAAP2)	-	-	-	-	1	(14)	-	-	1	(3)	-	-
fragrant bedstraw (GATR3)	-	-	1	(14)	-	-	-	-	-	-	-	-
bedstraw (GAL2)	-	-	1	(10)	1	(14)	-	-	1	(3)	1	(6)
rattlesnake plantain (GOOB)	1	(60)	1	(45)	1	(57)	1	(26)	1	(59)	1	(62)
white hawkweed (HIAL)	-	-	1	(5)	1	(57)	-	-	1	(9)	1	(43)
iris (IRI) +	-	-	1	(20)	1	(71)	1	(20)	1	(21)	3	(43)
western twinflower (LIBOL)	-	-	-	-	-	-	1	(6)	4	(12)	2	(12)
woodland tarweed (MAMA1)	-	-	-	-	1	(14)	-	-	1	(3)	1	(6)
candyflower (MOSI)	-	-	-	-	-	-	-	-	-	-	-	-
mountain sweet-cicely (OSCH)	-	-	1	(5)	-	-	-	-	-	-	-	-
redwood sorrel (OXOR1) +	75	(10)	-	-	5	(14)	-	-	4	(9)	-	-
western coltsfoot (PEPA2) +	-	-	-	-	-	-	-	-	-	-	-	-
Sierra milkwort (POCO6)	-	-	-	-	1	(28)	-	-	-	-	-	-
swordfern (POMU1)	10	(80)	1	(14)	2	(57)	2	(13)	4	(68)	2	(75)
bracken fern (PTAQL)	1	(10)	1	(50)	1	(14)	1	(46)	1	(46)	1	(43)
white veined wintergreen (PYPI)	1	(30)	1	(40)	-	-	1	(40)	1	(21)	1	(37)
western Solomon seal (SMRAA) +	1	(10)	1	(5)	1	(14)	-	-	1	(3)	1	(18)
western starflower (TRLA3)	1	(10)	1	(30)	1	(14)	1	(13)	1	(34)	1	(31)
white trillium (TROV2)	1	(40)	1	(5)	-	-	-	-	1	(3)	1	(12)
Oregon trillium (TRRI)	2	(10)	-	-	1	(14)	-	-	-	-	1	(6)
western vancouveria (VAHE)	1	(40)	1	(35)	-	-	1	(6)	1	(18)	2	(12)

PLANT ASSOCIATION:	LIDE2-CHLA-TSHE/VAOV	LIDE2-QUKE/	LIDE2-CADE3/FECA	LIDE2-QUCH2//Rockpile	LIDE2-QUCH2/VAOV	LIDE2-QUCH2/GASH-BENE1
HERBS & FERNS:			%COVER (CONSTANCY)			
small inside-out flower (VAPL)	2 (40)	- -	- -	- -	2 (37)	2 (12)
pinto violet (VIOC)	- -	- -	- -	- -	- -	- -
redwood violet (VISE3)	1 (10)	- -	- -	- -	- -	1 (18)
western modesty (WHMO) +	1 (30)	6 (20)	7 (42)	1 (20)	4 (40)	3 (75)
giant chainfern (WOFI) +	- -	- -	- -	- -	- -	- -
beargrass (XETE) +	- -	1 (5)	1 (14)	1 (6)	1 (28)	3 (25)
GRASSES, SEDGES & RUSHES			%COVER (CONSTANCY)			
brome (BRO3)	- -	1 (5)	- -	- -	2 (3)	- -
sedge (CAR1)	- -	- -	- -	- -	- -	- -
dogtail grass (CYEC)	- -	- -	- -	- -	5 (3)	- -
California fescue (FECA)	- -	1 (5)	23 (71)	- -	- -	- -
Idaho fescue (FEID)	- -	- -	- -	- -	- -	- -
western fescue (FEOC1)	- -	1 (5)	2 (28)	2 (6)	1 (12)	2 (12)
fescue (FES3)	- -	1 (10)	- -	1 (13)	- -	1 (6)
bearded fescue (FESU2)	- -	- -	- -	- -	- -	- -
California sweetgrass (HIOC)	- -	- -	1 (14)	- -	1 (3)	- -
rush (JUN3)	- -	- -	- -	- -	- -	- -

+ = plants used for cultural or commercial purposes

PLANT ASSOCIATION:	LIDE2-QUCH2-QUKE/RHDI n = 22	LIDE2-QUCH2/RHDI n = 21	LIDE2-QUCH2/BENE1 n = 19	LIDE2-CACH2/GASH n = 25	LIDE2-CACH2/GASH-RHMA n = 22	LIDE2-CACH2/RHMA/XETE n = 12
			%COVER			
TOTAL COVER	92	91	93	98	99	96
FORB COVER	4	12	7	4	1	12
GRASS COVER	2	2	<1	<1	<1	<1
SHRUB COVER	13	9	12	60	89	29
TREE COVER	87	82	89	88	83	84
TREE OVERSTORY:			%COVER (CONSTANCY)			
white fir (ABCO)	- -	- -	6 (15)	- -	1 (9)	1 (8)
bigleaf maple (ACMA) +	4 (9)	2 (4)	5 (31)	6 (16)	2 (9)	- -
alder (ALRU2 or ALRH) +	- -	- -	- -	2 (4)	2 (4)	- -
Pacific madrone (ARME3) +	13 (81)	10 (80)	8 (68)	8 (72)	8 (45)	6 (50)
incense cedar (CADE3) +	- -	- -	- -	2 (4)	1 (4)	5 (8)
chinquapin (CACH2) +	5 (4)	3 (4)	8 (31)	19 (100)	21 (100)	23 (100)
Port Orford cedar (CHLA) +	- -	- -	8 (5)	5 (7)	2 (4)	- -
Pacific dogwood (CONU1)	3 (9)	3 (14)	6 (36)	4 (24)	4 (27)	- -
tanoak (LIDE2) +	29 (95)	36 (95)	25 (94)	34 (96)	27 (100)	11 (100)
knobcone pine (PIAT)	- -	- -	- -	- -	- -	- -
Jeffrey pine (PIJE) +	3 (4)	- -	- -	4 (4)	- -	- -
sugar pine (PILA) +	12 (50)	8 (38)	3 (26)	10 (32)	5 (27)	18 (50)
ponderosa pine (PIPO) +	- -	10 (4)	- -	- -	- -	- -
Douglas-fir (PSME) +	40 (100)	33 (100)	60 (100)	49 (100)	50 (100)	42 (100)
canyon live oak (QUCH2)	13 (95)	29 (100)	17 (94)	4 (16)	1 (9)	8 (25)
Oregon white oak (QUGA2) +	5 (9)	- -	- -	- -	- -	- -
black oak (QUKE) +	8 (100)	- -	3 (5)	- -	- -	- -
Pacific yew (TABR) +	- -	- -	- -	2 (7)	2 (13)	1 (8)
western hemlock (TSHE)	- -	- -	- -	- -	- -	- -
California bay (UMCA) +	- -	- -	- -	- -	- -	- -

PLANT ASSOCIATION:	LIDE2-QUCH2-QUKE/RHDI	LIDE2-QUCH2/RHDI	LIDE2-QUCH2/BENE1	LIDE2-CACH2/GASH	LIDE2-CACH2/GASH-RHMA	LIDE2-CACH2/RHMA/XETE
TREE UNDERSTORY:			%COVER (CONSTANCY)			
white fir (ABCO)	- -	1 (4)	1 (15)	1 (7)	1 (13)	- -
bigleaf maple (ACMA) +	- -	1 (9)	- -	1 (4)	- -	- -
alder (ALRU2 or ALRH) +	- -	- -	- -	2 (4)	- -	- -
Pacific madrone (ARME3) +	1 (22)	1 (42)	1 (5)	1 (12)	1 (22)	- -
incense cedar (CADE3) +	1 (4)	- -	1 (10)	- -	1 (4)	- -
chinquapin (CACH2) +	2 (13)	1 (4)	2 (10)	5 (44)	5 (54)	5 (83)
Port Orford cedar (CHLA) +	- -	- -	2 (10)	2 (7)	1 (4)	1 (8)
Pacific dogwood (CONU1)	- -	3 (14)	3 (10)	2 (12)	1 (4)	- -
tanoak (LIDE2) +	13 (95)	15 (95)	13 (94)	14 (100)	16 (90)	7 (91)
knobcone pine (PIAT)	- -	- -	- -	- -	- -	- -
Jeffrey pine (PIJE) +	- -	- -	- -	- -	- -	- -
sugar pine (PILA) +	1 (40)	1 (47)	2 (10)	1 (28)	1 (9)	1 (41)
ponderosa pine (PIPO) +	1 (4)	- -	- -	- -	- -	- -
Douglas-fir (PSME) +	4 (77)	2 (71)	2 (68)	1 (96)	2 (59)	3 (83)
canyon live oak (QUCH2)	4 (86)	8 (100)	5 (94)	2 (40)	2 (13)	1 (25)
Oregon white oak (QUGA2) +	- -	- -	- -	- -	- -	- -
black oak (QUKE) +	1 (31)	- -	- -	- -	- -	- -
Pacific yew (TABR) +	- -	- -	1 (5)	2 (12)	1 (18)	1 (16)
western hemlock (TSHE)	- -	- -	- -	- -	- -	- -
California bay (UMCA) +	1 (13)	1 (4)	- -	2 (7)	- -	- -
SHRUBS:			%COVER (CONSTANCY)			
vine maple (ACCI)	- -	- -	4 (10)	20 (4)	8 (9)	2 (16)
Pacific serviceberry (AMAL)	1 (4)	1 (4)	1 (5)	- -	- -	- -
greenleaf manzanita (ARPA9) +	- -	2 (4)	1 (5)	- -	- -	1 (8)
hollyleaved barberry (BEAQ) +	2 (4)	2 (4)	1 (5)	- -	- -	- -
dwarf Oregon-grape (BENE1) +	11 (18)	- -	15 (94)	10 (84)	6 (95)	4 (25)
California hazelnut (COCOC) +	2 (31)	2 (23)	1 (26)	1 (7)	- -	- -
slender salal (GAOV)	- -	- -	- -	- -	4 (33)	

+ = plants used for cultural or commercial purposes

PLANT ASSOCIATION:	LIDE2-QUCH2-QUKE/RHDI	LIDE2-QUCH2/RHDI	LIDE2-QUCH2/BENE1	LIDE2-CACH2/GASH	LIDE2-CACH2/GASH-RHMA	LIDE2-CACH2/RHMA/XETE
SHRUBS:			%COVER (CONSTANCY)			
salal (GASH) +	- -	- -	- -	51 (100)	65 (100)	13 (33)
toyon (HEAR2)	- -	- -	- -	- -	- -	- -
oceanspray (HODI)	1 (4)	3 (14)	2 (10)	1 (4)	- -	- -
dwarf tanbark (LIDEE)	- -	- -	- -	- -	- -	- -
pink honeysuckle (LOHIV)	2 (45)	2 (52)	1 (10)	1 (4)	- -	- -
Gordon mock-orange (PHLEG) +	- -	- -	- -	- -	- -	- -
Sadler oak (QUSA)	- -	- -	1 (5)	1 (4)	- -	4 (66)
huckleberry oak (QUVA)	- -	- -	1 (5)	1 (7)	- -	13 (25)
coffeeberry (RHCA2)	- -	- -	- -	- -	- -	- -
Pacific rhododendron (RHMA)	- -	- -	- -	1 (16)	32 (100)	23 (100)
western azalea (RHOC)	- -	- -	- -	- -	- -	20 (8)
poison oak (RHDI)	10 (77)	4 (100)	2 (26)	1 (12)	2 (18)	1 (16)
wood rose (ROGY)	1 (18)	1 (33)	2 (57)	1 (36)	- -	1 (16)
rose (ROS)	1 (22)	2 (14)	2 (5)	2 (7)	- -	- -
western raspberry (RULE) +	- -	1 (9)	1 (5)	1 (4)	- -	- -
thimbleberry (RUPA2) +	- -	1 (4)	1 (5)	- -	- -	- -
salmon berry (RUSP2) +	- -	- -	- -	- -	- -	- -
Pacific blackberry (RUUR) +	1 (4)	1 (9)	1 (36)	1 (28)	1 (13)	2 (16)
willow (SAL11) +	- -	- -	1 (5)	- -	- -	- -
creeping snowberry (SYMO)	1 (22)	1 (23)	1 (31)	- -	- -	1 (25)
evergreen huckleberry (VAOV) +	- -	2 (9)	- -	6 (24)	16 (45)	- -
red huckleberry (VAPA) +	- -	- -	1 (10)	1 (20)	2 (27)	5 (83)
HERBS & FERNS:			%COVER (CONSTANCY)			
vanilla leaf (ACTR)	2 (13)	1 (33)	2 (52)	1 (32)	1 (22)	1 (8)
trailplant (ADBI)	- -	- -	2 (21)	1 (4)	- -	- -
mountain dogbane (APPU)	1 (4)	1 (28)	1 (5)	1 (4)	1 (8)	- -
rayless arnica (ARDI3)	1 (22)	1 (19)	2 (10)	1 (4)	1 (8)	- -
marbled ginger (ASHA) +	1 (4)	1 (4)	- -	- -	- -	- -
ground cone (BOST2)	1 (4)	1 (4)	1 (15)	- -	- -	- -

PLANT ASSOCIATION: HERBS & FERNS:	LIDE2-QUCH2-QUKE/RHDI	LIDE2-QUCH2/RHDI	LIDE2-QUCH2/BENE1	LIDE2-CACH2/GASH	LIDE2-CACH2/GASH-RHMA	LIDE2-CACH2/RHMA/XETE
	%COVER (CONSTANCY)					
fairy-slipper (CABU2)	- -	- -	2 (5)	- -	- -	- -
little prince's pine (CHME2) +	1 (36)	1 (52)	1 (52)	1 (40)	1 (18)	6 (16)
western prince's pine (CHUMO) +	- -	2 (33)	5 (63)	2 (48)	1 (22)	2 (66)
Pacific hound's tongue (CYGR)	- -	- -	- -	- -	- -	- -
California toothwort (DECA4)	- -	- -	- -	- -	- -	- -
bleeding heart (DIFOO)	- -	- -	- -	- -	- -	- -
Hooker's fairybell (DIHO2)	1 (18)	1 (23)	1 (36)	1 (7)	1 (4)	- -
California strawberry (FRCA1) +	- -	- -	- -	- -	- -	- -
stickywilly (GAAP2)	1 (4)	- -	1 (5)	- -	- -	- -
fragrant bedstraw (GATR3)	1 (18)	2 (9)	- -	1 (4)	- -	- -
bedstraw (GAL2)	- -	1 (4)	1 (15)	1 (7)	- -	- -
rattlesnake plantain (GOOB)	1 (13)	1 (4)	1 (68)	1 (56)	1 (45)	1 (33)
white hawkweed (HIAL)	1 (27)	1 (19)	1 (15)	1 (4)	- -	- -
iris (IRI)	1 (27)	1 (61)	1 (26)	2 (4)	1 (4)	1 (8)
western twinflower (LIBOL)	- -	- -	5 (5)	12 (7)	- -	3 (50)
woodland tarweed (MAMA1)	1 (4)	1 (4)	- -	- -	- -	- -
candyflower (MOSI)	- -	- -	- -	- -	- -	- -
mountain sweet-cicely (OSCH)	1 (4)	1 (4)	- -	- -	- -	- -
redwood sorrel (OXOR1) +	- -	1 (4)	- -	- -	- -	- -
western coltsfoot (PEPA2) +	- -	- -	- -	- -	- -	- -
Sierra milkwort (POCO6)	- -	1 (4)	- -	- -	- -	- -
swordfern (POMU1)	2 (31)	1 (52)	2 (57)	1 (40)	2 (54)	- -
bracken fern (PTAQL)	1 (50)	1 (52)	2 (15)	1 (76)	1 (63)	2 (91)
white veined wintergreen (PYPI)	1 (27)	1 (14)	1 (73)	1 (12)	1 (13)	1 (25)
western Solomon seal (SMRAA) +	- -	- -	1 (21)	- -	- -	- -
western starflower (TRLA3)	1 (18)	1 (33)	1 (31)	1 (12)	- -	1 (8)
white trillium (TROV2)	- -	- -	1 (10)	1 (4)	1 (4)	1 (8)
Oregon trillium (TRRI)	- -	- -	1 (5)	- -	- -	- -

+ = plants used for cultural or commercial purposes

PLANT ASSOCIATION:	LIDE2-QUCH2-QUKE/RHDI		LIDE2-QUCH2/RHDI		LIDE2-QUCH2/BENE1		LIDE2-CACH2/GASH		LIDE2-CACH2/GASH-RHMA		LIDE2-CACH2/RHMA/XETE	
HERBS & FERNS:	%COVER (CONSTANCY)											
western vancouveria (VAHE)	1	(9)	2	(33)	1	(31)	-	-	-	-	2	(58)
small inside-out flower (VAPL)	-	-	2	(9)	1	(5)	1	(16)	1	(4)	-	-
pinto violet (VIOC)	-	-	-	-	-	-	-	-	-	-	-	-
redwood violet (VISE3)	-	-	-	-	1	(21)	1	(24)	1	(13)	2	(16)
western modesty (WHMO) +	1	(13)	8	(57)	4	(73)	6	(20)	-	-	-	-
giant chainfern (WOFI) +	-	-	-	-	-	-	-	-	-	-	-	-
beargrass (XETE) +	1	(13)	-	-	1	(15)	1	(36)	1	(59)	15	(100)
GRASSES, SEDGES & RUSHES	%COVER (CONSTANCY)											
brome (BRO3)	-	-	1	(9)	-	-	-	-	-	-	-	-
sedge (CAR1)	1	(4)	-	-	-	-	-	-	-	-	-	-
dogtail grass (CYEC)	-	-	-	-	-	-	-	-	-	-	-	-
California fescue (FECA)	4	(9)	13	(9)	3	(5)	-	-	-	-	-	-
Idaho fescue (FEID)	-	-	1	(4)	-	-	-	-	-	-	-	-
western fescue (FEOC1)	1	(31)	1	(23)	1	(15)	-	-	-	-	-	-
fescue (FES3)	1	(4)	-	-	1	(10)	1	(4)	1	(4)	-	-
bearded fescue (FESU2)	1	(4)	-	-	1	(5)	-	-	-	-	-	-
California sweetgrass (HIOC)	-	-	-	-	-	-	-	-	-	-	-	-
rush (JUN3)	-	-	-	-	-	-	-	-	-	-	-	-

PLANT ASSOCIATION:	LIDE2-CACH2/ PTAQL n = 11	LIDE2-CACH2/ BENE1 n = 36	LIDE2-CACH2/ VAOV-GASH n = 8	LIDE2-ACMA/ POMU1 n = 35	LIDE2/ ACCI-GASH n = 17	LIDE2/ ACCI n = 12
			%COVER			
TOTAL COVER	92	93	98	93	97	94
FORB COVER	4	13	6	11	21	11
GRASS COVER	<1	<1	<1	<1	<1	<1
SHRUB COVER	6	16	61	17	64	22
TREE COVER	95	87	93	89	77	81
TREE OVERSTORY:			%COVER (CONSTANCY)			
white fir (ABCO)	- -	20 (2)	- -	- -	- -	- -
bigleaf maple (ACMA) +	- -	3 (2)	1 (12)	14 (100)	7 (76)	13 (33)
alder (ALRU2 or ALRH) +	2 (9)	- -	- -	12 (8)	9 (23)	- -
Pacific madrone (ARME3) +	10 (90)	9 (55)	7 (50)	8 (57)	6 (17)	3 (25)
incense cedar (CADE3) +	5 (9)	- -	- -	11 (18)	8 (5)	1 (8)
chinquapin (CACH2) +	29 (100)	10 (100)	14 (100)	10 (5)	14 (17)	13 (41)
Port Orford cedar (CHLA) +	2 (9)	- -	8 (12)	- -	3 (5)	- -
Pacific dogwood (CONU1)	4 (9)	7 (33)	1 (12)	7 (40)	5 (51)	4 (66)
tanoak (LIDE2) +	23 (100)	37 (100)	35 (100)	36 (100)	27 (100)	28 (91)
knobcone pine (PIAT)	9 (36)	- -	- -	- -	- -	- -
Jeffrey pine (PIJE) +	- -	- -	- -	- -	- -	- -
sugar pine (PILA) +	15 (45)	7 (22)	27 (37)	11 (20)	5 (11)	6 (33)
ponderosa pine (PIPO) +	5 (9)	- -	- -	- -	- -	- -
Douglas-fir (PSME) +	32 (100)	42 (100)	34 (100)	44 (100)	49 (100)	47 (100)
canyon live oak (QUCH2)	6 (45)	4 (8)	1 (25)	5 (40)	7 (29)	14 (33)
Oregon white oak (QUGA2) +	- -	- -	- -	- -	- -	- -
black oak (QUKE) +	- -	6 (19)	- -	4 (20)	- -	- -
Pacific yew (TABR) +	- -	2 (5)	- -	6 (11)	8 (41)	5 (8)
western hemlock (TSHE)	- -	- -	- -	- -	16 (11)	- -
California bay (UMCA) +	- -	- -	- -	5 (8)	6 (11)	- -

+ = plants used for cultural or commercial purposes

PLANT ASSOCIATION:	LIDE2-CACH2/ PTAQL	LIDE2-CACH2/ BENE1	LIDE2-CACH2/ VAOV-GASH	LIDE2-ACMA/ POMU1	LIDE2/ ACCI-GASH	LIDE2/ ACCI
TREE UNDERSTORY:			%COVER (CONSTANCY)			
white fir (ABCO)	- -	1 (11)	- -	- -	- -	- -
bigleaf maple (ACMA) +	- -	1 (2)	- -	1 (31)	2 (17)	- -
alder (ALRU2 or ALRH) +	- -	- -	- -	3 (5)	2 (11)	- -
Pacific madrone (ARME3) +	- -	1 (5)	1 (25)	2 (8)	1 (5)	1 (8)
incense cedar (CADE3) +	1 (9)	3 (13)	1 (12)	1 (8)	5 (5)	- -
chinquapin (CACH2) +	6 (63)	8 (44)	4 (75)	1 (8)	2 (29)	3 (41)
Port Orford cedar (CHLA) +	- -	- -	3 (12)	- -	1 (17)	- -
Pacific dogwood (CONU1)	5 (9)	2 (36)	1 (12)	2 (25)	3 (35)	1 (16)
tanoak (LIDE2) +	11 (100)	25 (100)	8 (100)	16 (100)	7 (94)	15 (100)
knobcone pine (PIAT)	- -	- -	- -	- -	- -	- -
Jeffrey pine (PIJE) +	- -	- -	- -	- -	- -	- -
sugar pine (PILA) +	1 (27)	1 (27)	1 (12)	1 (17)	1 (11)	1 (25)
ponderosa pine (PIPO) +	- -	- -	- -	- -	- -	- -
Douglas-fir (PSME) +	4 (100)	2 (66)	1 (87)	3 (60)	2 (94)	1 (41)
canyon live oak (QUCH2)	5 (54)	2 (25)	1 (12)	3 (48)	3 (52)	2 (50)
Oregon white oak (QUGA2) +	- -	- -	- -	- -	- -	- -
black oak (QUKE) +	- -	1 (11)	- -	1 (5)	- -	- -
Pacific yew (TABR) +	- -	1 (11)	1 (12)	2 (20)	3 (70)	1 (16)
western hemlock (TSHE)	- -	- -	- -	- -	2 (11)	- -
California bay (UMCA) +	- -	- -	1 (12)	3 (8)	2 (17)	- -
SHRUBS:			%COVER (CONSTANCY)			
vine maple (ACCI)	5 (9)	2 (5)	- -	- -	21 (100)	16 (100)
Pacific serviceberry (AMAL)	- -	2 (2)	- -	- -	- -	1 (8)
greenleaf manzanita (ARPA9) +	2 (18)	1 (2)	2 (25)	- -	- -	- -
hollyleaved barberry (BEAQ) +	- -	- -	- -	1 (2)	- -	- -
dwarf Oregon-grape (BENE1) +	- -	9 (100)	2 (37)	9 (65)	14 (88)	10 (75)
California hazelnut (COCOC) +	2 (9)	3 (25)	- -	3 (45)	3 (64)	3 (50)
slender salal (GAOV)	- -	2 (2)	5 (12)	- -	2 (5)	2 (8)
salal (GASH) +	- -	1 (2)	15 (75)	16 (11)	30 (100)	- -

PLANT ASSOCIATION:	LIDE2-CACH2/ PTAQL	LIDE2-CACH2/ BENE1	LIDE2-CACH2/ VAOV-GASH	LIDE2-ACMA/ POMU1	LIDE2/ ACCI-GASH	LIDE2/ ACCI
SHRUBS:			%COVER (CONSTANCY)			
toyon (HEAR2)	- -	- -	- -	- -	- -	- -
oceanspray (HODI)	- -	- -	- -	- -	2 (11)	2 (16)
dwarf tanbark (LIDEE)	- -	- -	- -	- -	- -	- -
pink honeysuckle (LOHIV)	- -	1 (19)	1 (12)	2 (31)	1 (5)	- -
Gordon mock-orange (PHLEG) +	- -	- -	- -	- -	- -	- -
Sadler oak (QUSA)	1 (18)	- -	- -	- -	2 (5)	- -
huckleberry oak (QUVA)	2 (9)	- -	- -	- -	- -	- -
coffeeberry (RHCA2)	- -	- -	- -	- -	- -	- -
Pacific rhododendron (RHMA)	1 (9)	- -	12 (62)	- -	18 (41)	- -
western azalea (RHOC)	- -	- -	- -	3 (5)	- -	- -
poison oak (RHDI)	- -	3 (22)	2 (25)	2 (68)	1 (17)	3 (16)
wood rose (ROGY)	1 (27)	- -	1 (25)	1 (37)	2 (35)	- -
rose (ROS)	- -	1 (44)	- -	1 (22)	1 (11)	1 (33)
western raspberry (RULE) +	- -	- -	5 (12)	1 (8)	1 (17)	- -
thimbleberry (RUPA2) +	- -	1 (2)	1 (12)	2 (5)	1 (5)	- -
salmon berry (RUSP2) +	- -	- -	- -	- -	- -	- -
Pacific blackberry (RUUR) +	1 (54)	1 (27)	1 (12)	1 (34)	1 (47)	1 (25)
willow (SAL11) +	- -	- -	- -	- -	- -	- -
creeping snowberry (SYMO)	1 (18)	1 (36)	- -	1 (28)	1 (5)	1 (33)
evergreen huckleberry (VAOV) +	- -	1 (2)	36 (100)	17 (11)	14 (47)	- -
red huckleberry (VAPA) +	13 (27)	4 (19)	8 (12)	1 (2)	3 (70)	7 (33)
HERBS & FERNS			%COVER (CONSTANCY)			
vanilla leaf (ACTR)	1 (9)	4 (61)	1 (12)	- -	2 (70)	2 (58)
trailplant (ADBI)	- -	2 (5)	- -	1 (20)	1 (17)	1 (16)
mountain dogbane (APPU)	- -	1 (11)	- -	1 (2)	- -	1 (16)
rayless arnica (ARDI3)	1 (9)	1 (11)	- -	2 (11)	1 (5)	1 (16)
marbled ginger (ASHA) +	- -	1 (2)	- -	2 (8)	- -	- -
ground cone (BOST2)	1 (18)	- -	- -	1 (2)	- -	- -

+ = plants used for cultural or commercial purposes

PLANT ASSOCIATION:	LIDE2-CACH2/ PTAQL		LIDE2-CACH2/ BENE1		LIDE2-CACH2/ VAOV-GASH		LIDE2-ACMA/ POMU1		LIDE2/ ACCI-GASH		LIDE2/ ACCI	
HERBS & FERNS:	%COVER (CONSTANCY)											
fairy-slipper (CABU2)	-	-	-	-	-	-	1	(2)	1	(17)	-	-
little prince's pine (CHME2) +	1	(63)	2	(52)	1	(25)	1	(45)	2	(23)	1	(50)
western prince's pine (CHUMO) +	4	(81)	4	(50)	1	(12)	2	(22)	1	(29)	2	(41)
Pacific hound's tongue (CYGR)	-	-	-	-	-	-	1	(5)	-	-	-	-
California toothwort (DECA4)	-	-	1	(2)	-	-	-	-	1	(17)	-	-
bleeding heart (DIFOO)	-	-	-	-	-	-	-	-	-	-	-	-
Hooker's fairybell (DIHO2)	1	(18)	1	(52)	-	-	1	(34)	1	(29)	1	(41)
California strawberry (FRCA1) +	-	-	-	-	-	-	-	-	-	-	-	-
stickywilly (GAAP2)	-	-	-	-	-	-	1	(2)	1	(11)	-	-
fragrant bedstraw (GATR3)	-	-	1	(8)	-	-	1	(14)	-	-	1	(16)
bedstraw (GAL2)	-	-	-	-	-	-	1	(8)	1	(11)	1	(8)
rattlesnake plantain (GOOB)	-	-	1	(44)	1	(25)	1	(40)	1	(41)	1	(41)
white hawkweed (HIAL)	-	-	1	(2)	1	(12)	1	(25)	1	(23)	-	-
iris (IRI) +	1	(27)	1	(25)	1	(25)	1	(22)	2	(23)	1	(8)
western twinflower (LIBOL)	-	-	6	(19)	-	-	1	(11)	3	(29)	9	(25)
woodland tarweed (MAMA1)	-	-	-	-	-	-	1	(2)	-	-	-	-
candyflower (MOSI)	-	-	1	(2)	-	-	-	-	-	-	-	-
mountain sweet-cicely (OSCH)	-	-	-	-	-	-	3	(11)	8	(35)	-	-
redwood sorrel (OXOR1) +	-	-	-	-	-	-	-	-	-	-	-	-
western coltsfoot (PEPA2) +	-	-	-	-	-	-	-	-	-	-	-	-
Sierra milkwort (POCO6)	-	-	-	-	1	(12)	-	-	-	-	-	-
swordfern (POMU1)	-	-	1	(30)	2	(25)	3	(85)	11	(94)	2	(50)
bracken fern (PTAQL)	1	(100)	1	(58)	2	(62)	1	(28)	2	(47)	1	(8)
white veined wintergreen (PYPI)	1	(54)	1	(50)	1	(12)	1	(20)	1	(5)	1	(58)
western Solomon seal (SMRAA) +	2	(18)	1	(8)	-	-	1	(14)	1	(41)	1	(8)
western starflower (TRLA3)	1	(18)	1	(25)	1	(12)	1	(40)	1	(47)	1	(41)
white trillium (TROV2)	-	-	1	(2)	-	-	1	(8)	1	(58)	1	(16)
Oregon trillium (TRRI)	-	-	-	-	-	-	1	(5)	-	-	-	-
western vancouveria (VAHE)	1	(36)	2	(36)	1	(12)	1	(25)	4	(5)	2	(66)

PLANT ASSOCIATION:	LIDE2-CACH2/ PTAQL	LIDE2-CACH2/ BENE1	LIDE2-CACH2/ VAOV-GASH	LIDE2-ACMA/ POMU1	LIDE2/ ACCI-GASH	LIDE2/ ACCI
HERBS & FERNS:			%COVER (CONSTANCY)			
small inside-out flower (VAPL)	1 (9)	1 (5)	1 (37)	2 (14)	2 (17)	1 (8)
pinto violet (VIOC)	- -	- -	- -	- -	- -	- -
redwood violet (VISE3)	- -	1 (13)	1 (12)	1 (8)	2 (41)	2 (25)
western modesty (WHMO) +	2 (27)	4 (38)	4 (12)	7 (48)	4 (52)	2 (58)
giant chainfern (WOFI) +	- -	- -	- -	3 (8)	2 (11)	- -
beargrass (XETE) +	2 (72)	9 (11)	3 (50)	1 (2)	1 (5)	1 (8)
GRASSES, SEDGES & RUSHES			%COVER (CONSTANCY)			
brome (BRO3)	- -	- -	1 (12)	- -	- -	- -
sedge (CAR1)	- -	- -	- -	2 (5)	2 (5)	- -
dogtail grass (CYEC)	- -	- -	- -	- -	- -	- -
California fescue (FECA)	- -	1 (2)	- -	2 (2)	- -	- -
Idaho fescue (FEID)	- -	1 (2)	- -	- -	- -	- -
western fescue (FEOC1)	1 (9)	1 (5)	- -	1 (11)	1 (5)	- -
fescue (FES3)	- -	1 (2)	1 (12)	1 (2)	1 (17)	- -
bearded fescue (FESU2)	- -	- -	- -	5 (2)	- -	- -
California sweetgrass (HIOC)	- -	- -	- -	1 (2)	3 (5)	- -
rush (JUN3)	- -	- -	- -	- -	- -	- -

+ = plants used for cultural or commercial purposes

PLANT ASSOCIATION:	LIDE2-UMCA/ RHDI n = 5	LIDE2-UMCA/ VAOV n = 6
	%COVER	
TOTAL COVER	92	98
FORB COVER	11	13
GRASS COVER	<1	<1
SHRUB COVER	15	67
TREE COVER	87	94
TREE OVERSTORY:	%COVER (CONSTANCY)	
white fir (ABCO)	- -	- -
bigleaf maple (ACMA) +	8 (40)	10 (60)
alder (ALRU2 or ALRH) +	- -	5 (20)
Pacific madrone (ARME3) +	23 (80)	- -
incense cedar (CADE3) +	- -	- -
chinquapin (CACH2) +	- -	- -
Port Orford cedar (CHLA) +	- -	- -
Pacific dogwood (CONU1)	3 (40)	5 (40)
tanoak (LIDE2) +	34 (100)	25 (100)
knobcone pine (PIAT)	- -	- -
Jeffrey pine (PIJE) +	15 (20)	- -
sugar pine (PILA) +	- -	- -
ponderosa pine (PIPO) +	- -	- -
Douglas-fir (PSME) +	45 (100)	47 (100)
canyon live oak (QUCH2)	5 (20)	- -
Oregon white oak (QUGA2) +	3 (20)	5 (20)
black oak (QUKE) +	3 (60)	- -
Pacific yew (TABR) +	- -	3 (20)
western hemlock (TSHE)	- -	10 (20)
California bay (UMCA) +	23 (100)	20 (100)

PLANT ASSOCIATION:	LIDE2-UMCA/ RHDI	LIDE2-UMCA/ VAOV
TREE UNDERSTORY:	%COVER (CONSTANCY)	
white fir (ABCO)	1 (20)	- -
bigleaf maple (ACMA) +	- -	2 (40)
alder (ALRU2 or ALRH) +	- -	1 (20)
Pacific madrone (ARME3) +	- -	- -
incense cedar (CADE3) +	1 (20)	- -
chinquapin (CACH2) +	- -	- -
Port Orford cedar (CHLA) +	- -	1 (20)
Pacific dogwood (CONU1)	1 (40)	1 (20)
tanoak (LIDE2) +	14 (100)	22 (100)
knobcone pine (PIAT)	- -	- -
Jeffrey pine (PIJE) +	- -	- -
sugar pine (PILA) +	1 (40)	- -
ponderosa pine (PIPO) +	- -	- -
Douglas-fir (PSME) +	3 (60)	1 (40)
canyon live oak (QUCH2)	1 (40)	- -
Oregon white oak (QUGA2) +	- -	- -
black oak (QUKE) +	- -	- -
Pacific yew (TABR) +	- -	1 (40)
western hemlock (TSHE)	- -	2 (20)
California bay (UMCA) +	7 (100)	9 (100)
SHRUBS:	%COVER (CONSTANCY)	
vine maple (ACCI)	- -	- -
Pacific serviceberry (AMAL)	- -	- -
greenleaf manzanita (ARPA9) +	- -	1 (20)
hollyleaved barberry (BEAQ) +	- -	- -
dwarf Oregon-grape (BENE1) +	3 (40)	2 (80)

+ = plants used for cultural or commercial purposes

PLANT ASSOCIATION:	LIDE2-UMCA/ RHDI		LIDE2-UMCA/ VAOV	
SHRUBS:	%COVER (CONSTANCY)			
California hazelnut (COCOC) +	6	(60)	2	(60)
slender salal (GAOV)	-	-	-	-
salal (GASH) +	-	-	11	(80)
toyon (HEAR2)	-	-	-	-
oceanspray (HODI)	-	-	-	-
dwarf tanbark (LIDEE)	-	-	-	-
pink honeysuckle (LOHIV)	1	(60)	1	(20)
Gordon mock-orange (PHLEG) +	-	-	-	-
Sadler oak (QUSA)	-	-	-	-
huckleberry oak (QUVA)	-	-	-	-
coffeeberry (RHCA2)	-	-	2	(20)
Pacific rhododendron (RHMA)	-	-	20	(20)
western azalea (RHOC)	-	-	15	(20)
poison oak (RHDI)	7	(80)	-	-
wood rose (ROGY)	2	(40)	-	-
rose (ROS)	1	(20)	-	-
western raspberry (RULE) +	-	-	1	(20)
thimbleberry (RUPA2) +	-	-	-	-
salmon berry (RUSP2) +	-	-	-	-
Pacific blackberry (RUUR) +	-	-	2	(40)
willow (SAL11) +	-	-	-	-
creeping snowberry (SYMO)	1	(20)	-	-
evergreen huckleberry (VAOV) +	-	-	36	(100)
red huckleberry (VAPA) +	-	-	5	(60)
HERBS & FERNS:	%COVER (CONSTANCY)			
vanilla leaf (ACTR)	-	-	1	(20)
trailplant (ADBI)	-	-	24	(20)
mountain dogbane (APPU)	-	-	-	-
rayless arnica (ARDI3)	1	(20)	-	-

PLANT ASSOCIATION:	LIDE2-UMCA/ RHDI		LIDE2-UMCA/ VAOV	
HERBS & FERNS:	%COVER (CONSTANCY)			
marbled ginger (ASHA) +	-	-	-	-
ground cone (BOST2)	-	-	-	-
fairy-slipper (CABU2)	-	-	-	-
little prince's pine (CHME2) +	1	(60)	1	(60)
western prince's pine (CHUMO) +	1	(60)	-	-
Pacific hound's tongue (CYGR)	3	(20)	-	-
California toothwort (DECA4)	1	(20)	-	-
bleeding heart (DIFOO)	-	-	-	-
Hooker's fairybell (DIHO2)	1	(40)	-	-
California strawberry (FRCA1) +	-	-	-	-
stickywilly (GAAP2)	-	-	1	(20)
fragrant bedstraw (GATR3)	1	(20)	-	-
bedstraw (GAL2)	-	-	-	-
rattlesnake plantain (GOOB)	-	-	2	(20)
white hawkweed (HIAL)	-	-	-	-
iris (IRI) +	1	(20)	-	-
western twinflower (LIBOL)	-	-	-	-
woodland tarweed (MAMA1)	-	-	-	-
candyflower (MOSI)	-	-	-	-
mountain sweet-cicely (OSCH)	-	-	4	(20)
redwood sorrel (OXOR1) +	1	(20)	-	-
western coltsfoot (PEPA2) +	-	-	-	-
Sierra milkwort (POCO6)	-	-	-	-
swordfern (POMU1)	1	(60)	16	(80)
bracken fern (PTAQL)	1	(60)	1	(20)
white veined wintergreen (PYPI)	1	(20)	-	-
western Solomon seal (SMRAA) +	1	(20)	1	(20)
western starflower (TRLA3)	1	(80)	-	-

+ = plants used for cultural or commercial purposes

PLANT ASSOCIATION:	LIDE2-UMCA/ RHDI		LIDE2-UMCA/ VAOV	
HERBS & FERNS:	%COVER (CONSTANCY)			
white trillium (TROV2)	-	-	1	(40)
Oregon trillium (TRRI)	-	-	-	-
western vancouveria (VAHE)	6	(40)	2	(20)
small inside-out flower (VAPL)	-	-	-	-
pinto violet (VIOC)	-	-	-	-
redwood violet (VISE3)	-	-	1	(20)
western modesty (WHMO) +	1	(20)	1	(20)
giant chainfern (WOFI) +	5	(20)	1	(20)
beargrass (XETE) +	-	-	2	(40)
GRASSES, SEDGES & RUSHES	%COVER (CONSTANCY)			
brome (BRO3)	-	-	-	-
sedge (CAR1)	-	-	-	-
dogtail grass (CYEC)	-	-	-	-
California fescue (FECA)	-	-	-	-
Idaho fescue (FEID)	-	-	-	-
western fescue (FEOC1)	-	-	-	-
fescue (FES3)	-	-	-	-
bearded fescue (FESU2)	-	-	-	-
California sweetgrass (HIOC)	-	-	1	(20)
rush (JUN3)	-	-	-	-

Douglas-fir Series Vegetation Summary

PLANT ASSOCIATION:	PSME-LIDE2/ WHMO n = 10	PSME-LIDE2/ QUVA-HODI n = 6	PSME-PIJE/ FECA n = 12	PSME/QUVA n = 27	PSME/ QUVA-LIDEE n = 11	PSME/ QUVA-RHMA n = 6
			%COVER			
TOTAL COVER	90	94	92	92	97	97
FORB COVER	23	7	6	14	12	17
GRASS COVER	5	1	342	3	2	2
SHRUB COVER	18	69	7	55	80	75
TREE COVER	80	83	76	59	48	72
TREE OVERSTORY:			%COVER (CONSTANCY)			
white fir (ABCO)	2 (40)	- -	6 (16)	3 (14)	2 (18)	- -
bigleaf maple (ACMA) +	2 (10)	- -	- -	2 (3)	- -	- -
alder (ALRU2 or ALRH) +	- -	- -	- -	- -	- -	- -
Pacific madrone (ARME3) +	8 (80)	4 (50)	8 (66)	5 (40)	4 (27)	3 (50)
incense cedar (CADE3) +	13 (40)	15 (33)	13 (83)	5 (74)	1 (18)	5 (50)
chinquapin (CACH2) +	2 (20)	2 (16)	- -	4 (18)	- -	3 (25)
Port Orford cedar (CHLA) +	3 (10)	- -	1 (8)	2 (3)	- -	1 (25)
Pacific dogwood (CONU1)	3 (10)	1 (16)	- -	4 (14)	- -	- -
tanoak (LIDE2) +	3 (60)	16 (20)	10 (33)	1 (33)	- -	- -
knobcone pine (PIAT)	- -	- -	- -	- -	3 (18)	- -
Jeffrey pine (PIJE) +	3 (10)	- -	15 (100)	4 (25)	10 (9)	- -
sugar pine (PILA) +	4 (50)	18 (33)	1 (8)	12 (88)	14 (72)	7 (50)
ponderosa pine (PIPO) +	1 (20)	- -	- -	- -	- -	- -
Douglas-fir (PSME) +	54 (90)	66 (100)	40 (100)	35 (100)	32 (100)	53 (100)
canyon live oak (QUCH2)	10 (30)	- -	14 (25)	1 (7)	10 (9)	5 (25)
Oregon white oak (QUGA2) +	- -	- -	3 (33)	- -	- -	- -
black oak (QUKE) +	12 (20)	- -	5 (16)	3 (7)	- -	- -
Pacific yew (TABR) +	- 2	(16) -	- -	2 (11)	- -	- -
California bay (UMCA) +	1 (10)	- -	5 (16)	- -	- -	- -

+ = plants used for cultural or commercial purposes

PLANT ASSOCIATION:	PSME-LIDE2/ WHMO	PSME-LIDE2/ QUVA-HODI	PSME-PIJE/ FECA	PSME/ QUVA	PSME/ QUVA-LIDEE	PSME/ QUVA-RHMA
TREE UNDERSTORY:			%COVER (CONSTANCY)			
white fir (ABCO)	8 (10)	- -	1 (25)	2 (33)	1 (18)	1 (50)
bigleaf maple (ACMA) +	1 (10)	- -	- -	1 (3)	- -	- -
alder (ALRU2 or ALRH) +	- -	- -	- -	- -	- -	- -
Pacific madrone (ARME3) +	2 (40)	- -	7 (41)	1 (29)	1 (9)	- -
incense cedar (CADE3) +	2 (40)	2 (33)	2 (83)	1 (77)	1 (9)	1 (50)
chinquapin (CACH2) +	3 (20)	- -	- -	5 (29)	- -	1 (25)
Port Orford cedar (CHLA) +	1 (10)	- -	1 (8)	1 (3)	- -	- -
Pacific dogwood (CONU1)	1 (30)	- -	- -	1 (3)	- -	- -
tanoak (LIDE2) +	5 (100)	29 (100)	4 (66)	8 (55)	17 (18)	- -
knobcone pine (PIAT)	- -	- -	- -	- -	- -	- -
Jeffrey pine (PIJE) +	- -	- -	1 (41)	1 (22)	1 (9)	- -
sugar pine (PILA) +	1 (60)	1 (33)	1 (25)	1 (51)	1 (72)	1 (25)
ponderosa pine (PIPO) +	1 (10)	- -	- -	- -	- -	- -
Douglas-fir (PSME) +	1 (100)	1 (100)	2 (91)	2 (85)	3 (81)	1 (83)
canyon live oak (QUCH2)	6 (70)	- -	2 (41)	11 (7)	10 (9)	- -
Oregon white oak (QUGA2) +	- -	- -	1 (16)	- -	- -	- -
black oak (QUKE) +	1 (30)	- -	- -	1 (7)	- -	- -
Pacific yew (TABR) +	- -	2 (33)	1 (8)	7 (22)	1 (9)	- -
California bay (UMCA) +	2 (20)	1 (16)	6 (50)	1 (7)	6 (63)	10 (50)
SHRUBS:			%COVER (CONSTANCY)			
vine maple (ACCI)	- -	- -	- -	- -	1 (9)	- -
Pacific serviceberry (AMAL)	- -	2 (50)	1 (25)	2 (33)	5 (72)	3 (50)
greenleaf manzanita (ARPA9) +	- -	1 (16)	4 (16)	2 (22)	- -	- -
hollyleaved barberry (BEAQ) +	3 (20)	- -	- -	1 (7)	- -	- -
dwarf Oregon-grape (BENE1) +	4 (50)	2 (100)	2 (16)	3 (55)	5 (18)	2 (66)
California hazelnut (COCOC) +	3 (50)	1 (16)	1 (25)	3 (14)	- -	- -
slender salal (GAOV)	- -	- -	- -	- -	- -	- -
salal (GASH) +	6 (20)	2 (33)	- -	- -	9 (18)	13 (50)
toyon (HEAR2)	- -	- -	- -	- -	- -	- -

PLANT ASSOCIATION:	PSME-LIDE2/ WHMO	PSME-LIDE2/ QUVA-HODI	PSME-PIJE/ FECA	PSME/ QUVA	PSME/ QUVA-LIDEE	PSME/ QUVA-RHMA
SHRUBS:			%COVER (CONSTANCY)			
oceanspray (HODI)	4 (80)	9 (83)	10 (8)	2 (14)	2 (45)	15 (25)
dwarf tanbark (LIDEE)	- -	- -	- -	- -	18 (100)	10 (83)
pink honeysuckle (LOHIV)	1 (30)	- -	1 (33)	- -	1 (9)	- -
Gordon mock-orange (PHLEG) +	- -	- -	- -	- -	- -	- -
Sadler oak (QUSA)	- -	- -	- -	- -	- -	5 (25)
huckleberry oak (QUVA)	11 (30)	34 (100)	5 (25)	42 (100)	42 (100)	24 (100)
coffeeberry (RHCA2)	- -	5 (100)	1 (25)	3 (18)	2 (63)	- -
Pacific rhododendron (RHMA)	- -	- -	- -	- -	6 (18)	15 (100)
western azalea (RHOC)	- -	- -	- -	- -	7 (27)	- -
poison oak (RHDI)	4 (60)	- -	3 (50)	- -	- -	- -
wood rose (ROGY)	2 (60)	3 (66)	1 (33)	- -	1 (72)	3 (66)
rose (ROS)	1 (30)	- -	1 (2)	1 (37)	1 (18)	- -
western raspberry (RULE) +	2 (10)	- -	2 (16)	- -	- -	- -
thimbleberry (RUPA2) +	- -	1 (50)	1 (2)	1 (3)	- -	- -
salmon berry (RUSP2) +	- -	- -	- -	1 (3)	- -	- -
Pacific blackberry (RUUR) +	1 (50)	- -	1 (8)	- -	1 (27)	1 (50)
willow (SAL11) +	- -	- -	- -	- -	- -	- -
creeping snowberry (SYMO)	1 (80)	- -	1 (25)	- -	1 (9)	- -
evergreen huckleberry (VAOV) +	3 (10)	- -	- -	- -	7 (18)	- -
red huckleberry (VAPA) +	1 (10)	5 (66)	- -	10 (62)	15 (100)	17 (100)
HERBS & FERNS:			%COVER (CONSTANCY)			
vanilla leaf (ACTR)	3 (80)	1 (25)	1 (8)	2 (33)	- -	1 (25)
trailplant (ADBI)	3 (40)	1 (25)	1 (16)	- -	- -	- -
mountain dogbane (APPU)	1 (10)	- -	1 (16)	1 (18)	1 (9)	- -
rayless arnica (ARDI3)	1 (10)	- -	- -	2 (14)	2 (36)	- -
marbled ginger (ASHA) +	- -	- -	- -	- -	- -	1 (25)
ground cone (BOST2)	1 (10)	- -	- -	- -	- -	- -

+ = plants used for cultural or commercial purposes

PLANT ASSOCIATION:	PSME-LIDE2/ WHMO	PSME-LIDE2/ QUVA-HODI	PSME-PIJE/ FECA	PSME/ QUVA	PSME/ QUVA-LIDEE	PSME/ QUVA-RHMA
HERBS & FERNS:			%COVER (CONSTANCY)			
fairy-slipper (CABU2)	- -	- -	- -	- -	1 (9)	- -
little prince's pine (CHME2) +	1 (70)	- -	1 (33)	1 (37)	1 (9)	3 (50)
western prince's pine (CHUMO) +	6 (80)	1 (83)	2 (25)	2 (74)	2 (81)	- -
Pacific hound's tongue (CYGR)	- -	- -	- -	- -	- -	- -
California toothwort (DECA4)	- -	- -	- -	- -	- -	- -
bleeding heart (DIFOO)	- -	- -	- -	- -	- -	1 (25)
Hooker's fairybell (DIHO2)	1 (60)	- -	1 (25)	1 (25)	1 (27)	1 (50)
California strawberry (FRCA1) +	1 (10)	- -	- -	- -	- -	- -
stickywilly (GAAP2)	- -	- -	- -	- -	- -	- -
fragrant bedstraw (GATR3)	- -	- -	- -	- -	- -	- -
bedstraw (GAL2)	1 (10)	1 (50)	- -	1 (25)	1 (18)	- -
rattlesnake plantain (GOOB)	1 (30)	- -	1 (16)	1 (29)	2 (54)	1 (66)
white hawkweed (HIAL)	1 (50)	- -	1 (75)	2 (25)	1 (9)	- -
iris (IRI) +	2 (50)	- -	1 (75)	1 (55)	1 (54)	1 (66)
western twinflower (LIBOL)	2 (30)	1 (25)	- -	6 (33)	2 (9)	1 (25)
woodland tarweed (MAMA1)	1 (10)	- -	- -	- -	- -	- -
candyflower (MOSI)	- -	- -	- -	- -	- -	- -
mountain sweet-cicely (OSCH)	1 (10)	- -	1 (8)	- -	- -	- -
redwood sorrel (OXOR1) +	- -	- -	- -	- -	1 (9)	- -
western coltsfoot (PEPA2) +	- -	- -	- -	- -	- -	- -
Sierra milkwort (POCO6)	1 (10)	- -	1 (25)	1 (3)	- -	- -
swordfern (POMU1)	1 (30)	3 (83)	2 (50)	2 (14)	4 (27)	2 (75)
bracken fern (PTAQL)	3 (50)	1 (25)	1 (25)	1 (11)	1 (9)	- -
white veined wintergreen (PYPI)	1 (30)	1 (50)	1 (16)	1 (33)	1 (63)	- -
western Solomon seal (SMRAA) +	1 (10)	1 (75)	1 (8)	1 (33)	1 (45)	1 (25)
western starflower (TRLA3)	1 (40)	1 (75)	1 (41)	2 (59)	1 (45)	1 (50)
white trillium (TROV2)	- -	- -	1 (8)	1 (7)	1 (9)	1 (25)
Oregon trillium (TRRI)	- -	- -	- -	2 (7)	1 (9)	1 (50)
western vancouveria (VAHE)	3 (20)	3 (66)	1 (8)	1 (11)	- -	- -

PLANT ASSOCIATION:	PSME-LIDE2/ WHMO	PSME-LIDE2/ QUVA-HODI	PSME-PIJE/ FECA	PSME/ QUVA	PSME/ QUVA-LIDEE	PSME/ QUVA-RHMA
HERBS & FERNS:			%COVER (CONSTANCY)			
small inside-out flower (VAPL)	1 (20)	- -	- -	- -	1 (9)	- -
pinto violet (VIOC)	- -	- -	- -	- -	- -	- -
redwood violet (VISE3)	- -	- -	- -	- -	- -	- -
western modesty (WHMO) +	8 (100)	1 (83)	6 (16)	6 (70)	5 (90)	2 (50)
giant chainfern (WOFI) +	- -	- -	- -	- -	- -	- -
beargrass (XETE) +	3 (30)	2 (100)	2 (8)	5 (62)	2 (81)	15 (83)
GRASSES, SEDGES & RUSHES			%COVER (CONSTANCY)			
brome (BRO3)	2 (10)	- -	2 (16)	8 (11)	- -	- -
sedge (CAR1)	1 (10)	- -	- -	1 (7)	- -	- -
dogtail grass (CYEC)	- -	- -	- -	- -	- -	- -
California fescue (FECA)	- -	- -	41 (91)	35 (3)	20 (9)	2 (25)
Idaho fescue (FEID)	- -	- -	5 (8)	- -	1 (9)	- -
western fescue (FEOC1)	1 (30)	- -	3 (33)	1 (22)	1 (27)	1 (50)
fescue (FES3)	- -	1 (33)	1 (33)	- -	- -	1 (25)
bearded fescue (FESU2)	- -	- -	5 (8)	- -	- -	- -
California sweetgrass (HIOC)	- -	- -	- -	- -	- -	- -
rush (JUN3)	- -	- -	- -	- -	- -	- -

+ = plants used for cultural or commercial purposes

PLANT ASSOCIATION:	PSME-ALRU2/ ACCI/MOSI n = 5	PSME-QUGA2/ GRASS n = 10	PSME-QUKE- QUGA2/GRASS n = 15	PSME-QUGA2/ HODI n = 14	PSME-QUKE// METAMORPHIC n = 24	PSME-QUKE// SANDSTONE n = 19
			%COVER			
TOTAL COVER	98	96	94	88	86	91
FORB COVER	80	16	13	11	5	12
GRASS COVER	5	18	13	15	3	7
SHRUB COVER	16	19	5	51	7	7
TREE COVER	93	72	85	39	82	83
TREE OVERSTORY:			%COVER (CONSTANCY)			
white fir (ABCO)	- -	5 (10)	10 (6)	- -	3 (8)	5 (5)
bigleaf maple (ACMA) +	8 (40)	11 (30)	5 (6)	5 (7)	5 (4)	7 (15)
alder (ALRU2 or ALRH) +	86 (100)	- -	- -	- -	- -	- -
Pacific madrone (ARME3) +	- -	6 (30)	4 26	4 (21)	8 (75)	9 (63)
incense cedar (CADE3) +	- -	2 (30)	2 (13)	- -	3 (4)	- -
chinquapin (CACH2) +	- -	- -	- -	- -	5 (8)	1 (5)
Port Orford cedar (CHLA) +	5 (20)	- -	- -	- -	- -	- -
Pacific dogwood (CONU1)	- -	- -	- -	- -	10 (4)	- -
tanoak (LIDE2) +	- -	3 (10)	2 6	- -	4 (29)	3 (15)
knobcone pine (PIAT)	- -	- -	- -	- -	- -	- -
Jeffrey pine (PIJE) +	- -	2 (10)	- -	- -	6 (8)	- -
sugar pine (PILA) +	- -	- -	1 (6)	- -	10 (45)	- -
ponderosa pine (PIPO) +	- -	1 (10)	4 (33)	1 (7)	3 (8)	3 (31)
Douglas-fir (PSME) +	6 (100)	51 (100)	56 (100)	24 (100)	48 (100)	65 (100)
canyon live oak (QUCH2)	- -	5 (10)	4 (33)	1 (7)	7 (70)	7 (26)
Oregon white oak (QUGA2) +	- -	22 (100)	14 (100)	19 (100)	3 (4)	1 (5)
black oak (QUKE) +	- -	3 (20)	16 (100)	- -	9 (100)	12 (100)
Pacific yew (TABR) +	- -	- -	- -	- -	- -	- -
California bay (UMCA) +	- -	5 (10)	- -	1 (7)	5 (4)	- -

PLANT ASSOCIATION:	PSME-ALRU2/ ACCI/MOSI	PSME-QUGA2/ GRASS	PSME-QUKE- QUGA2/GRASS	PSME-QUGA2/ HODI	PSME-QUKE// METAMORPHIC	PSME-QUKE// SANDSTONE
TREE UNDERSTORY:			%COVER (CONSTANCY)			
white fir (ABCO)	- -	1 (30)	1 (6)	2 (12)	- -	1 (15)
bigleaf maple (ACMA) +	2 (100)	1 (20)	- -	- -	1 (8)	1 (10)
alder (ALRU2 or ALRH) +	2 (40)	- -	- -	1 (14)	- -	- -
Pacific madrone (ARME3) +	- -	1 (10)	1 (6)	- -	1 (33)	4 (42)
incense cedar (CADE3) +	- -	1 (40)	4 (13)	- -	1 (4)	1 (5)
chinquapin (CACH2) +	- -	- -	- -	- -	1 (4)	1 (5)
Port Orford cedar (CHLA) +	5 (20)	- -	- -	- -	- -	- -
Pacific dogwood (CONU1)	- -	- -	- -	- -	2 (25)	1 (5)
tanoak (LIDE2) +	- -	1 (10)	2 (6)	- -	5 (54)	3 (36)
knobcone pine (PIAT)	- -	- -	- -	- -	- -	- -
Jeffrey pine (PIJE) +	- -	- -	- -	- -	- -	- -
sugar pine (PILA) +	- -	- -	1 (6)	- -	1 (75)	1 (10)
ponderosa pine (PIPO) +	- -	1 (10)	1 (26)	1 (7)	1 (4)	1 (31)
Douglas-fir (PSME) +	5 (100)	2 (90)	2 (86)	3 (100)	7 (95)	4 (100)
canyon live oak (QUCH2)	- -	2 (50)	1 (46)	1 (7)	5 (75)	2 (63)
Oregon white oak (QUGA2) +	- -	1 (60)	10 (100)	- -	3 (4)	- -
black oak (QUKE) +	- -	1 (20)	1 (66)	- -	1 (37)	1 (78)
Pacific yew (TABR) +	- -	1 (10)	- -	- -	- -	- -
California bay (UMCA) +	- -	- -	1 (6)	1 (7)	1 (12)	1 (10)
SHRUBS:			%COVER (CONSTANCY)			
vine maple (ACCI)	6 (100)	- -	- -	- -	- -	- -
Pacific serviceberry (AMAL)	- -	- -	1 (6)	7 (92)	1 (12)	1 (10)
greenleaf manzanita (ARPA9) +	- -	- -	10 (26)	- -	- -	1 (10)
hollyleaved barberry (BEAQ) +	- -	2 (20)	3 (13)	- -	1 (12)	5 (5)
dwarf Oregon-grape (BENE1) +	2 (40)	1 (20)	- -	1 (7)	1 (4)	1 (26)
California hazelnut (COCOC) +	- -	2 (10)	2 (13)	1 (7)	2 (54)	5 (42)
slender salal (GAOV)	- -	- -	- -	- -	- -	- -
salal (GASH) +	2 (20)	- -	- -	- -	- -	- -

+ = plants used for cultural or commercial purposes

PLANT ASSOCIATION:	PSME-ALRU2/ ACCI/MOSI	PSME-QUGA2/ GRASS	PSME-QUKE- QUGA2/GRASS	PSME-QUGA2/ HODI	PSME-QUKE// METAMORPHIC	PSME-QUKE// SANDSTONE
SHRUBS.			%COVER (CONSTANCY)			
toyon (HEAR2)	- -	- -	- -	- -	- -	- -
oceanspray (HODI)	- -	2 (20)	1 (6)	33 (92)	1 (4)	- -
dwarf tanbark (LIDEE)	- -	- -	- -	- -	- -	- -
pink honeysuckle (LOHIV)	- -	1 (10)	1 (26)	1 (7)	2 (25)	2 (26)
Gordon mock-orange (PHLEG) +	- -	15 (10)	- -	- -	1 (4)	- -
Sadler oak (QUSA)	1 (20)	- -	- -	- -	- -	- -
huckleberry oak (QUVA)	- -	- -	- -	- -	- -	- -
coffeeberry (RHCA2)	- -	- -	- -	- -	- -	- -
Pacific rhododendron (RHMA)	- -	- -	- -	- -	- -	- -
western azalea (RHOC)	- -	- -	- -	- -	- -	- -
poison oak (RHDI)	- -	22 (40)	2 (66)	7 (78)	5 (79)	4 (57)
wood rose (ROGY)	2 (40)	1 (50)	1 (33)	3 (78)	1 (16)	2 (57)
rose (ROS)	- -	- -	- -	- -	1 (29)	- -
western raspberry (RULE) +	2 (40)	- -	- -	1 (14)	1 (4)	1 (10)
thimbleberry (RUPA2) +	3 (80)	- -	- -	- -	1 (4)	- -
salmon berry (RUSP2) +	5 (80)	- -	- -	- -	- -	- -
Pacific blackberry (RUUR) +	- -	1 (10)	- -	- -	1 (4)	2 (5)
willow (SAL11) +	- -	- -	- -	23 (14)	- -	- -
creeping snowberry (SYMO)	- -	1 (50)	1 (20)	2 (85)	1 (8)	2 (47)
evergreen huckleberry (VAOV) +	- -	- -	- -	- -	- -	- -
red huckleberry (VAPA) +	- -	- -	- -	- -	- -	- -
HERBS & FERNS:			%COVER (CONSTANCY)			
vanilla leaf (ACTR)	- -	- -	- -	- -	3 (12)	- -
trailplant (ADBI)	1 (20)	1 (30)	1 (20)	- -	1 (8)	1 (31)
mountain dogbane (APPU)	- -	- -	- -	- -	1 (8)	- -
rayless arnica (ARDI3)	- -	- -	- -	- -	1 (16)	- -
marbled ginger (ASHA) +	1 (20)	- -	- -	- -	1 (12)	- -
ground cone (BOST2)	- -	- -	- -	- -	- -	- -
fairy-slipper (CABU2)	- -	- -	- -	1 (14)	- -	- -

PLANT ASSOCIATION: HERBS & FERNS:	PSME-ALRU2/ ACCI/MOSI	PSME-QUGA2/ GRASS	PSME-QUKE- QUGA2/GRASS	PSME-QUGA2/ HODI	PSME-QUKE// METAMORPHIC	PSME-QUKE// SANDSTONE
			%COVER (CONSTANCY)			
little prince's pine (CHME2) +	- -	- -	1 (6)	- -	1 (41)	1 (10)
western prince's pine (CHUMO) +	- -	- -	1 (6)	- -	2 (16)	- -
Pacific hound's tongue (CYGR)	- -	1 (70)	3 (33)	- -	1 (4)	2 (10)
California toothwort (DECA4)	- -	- -	- -	1 (14)	1 (12)	- -
bleeding heart (DIFOO)	6 (80)	- -	- -	- -	- -	- -
Hooker's fairybell (DIHO2)	- -	- -	1 (6)	- -	- -	1 (21)
California strawberry (FRCA1) +	- -	1 (50)	1 (20)	1 (28)	- -	2 (31)
stickywilly (GAAP2)	- -	1 (10)	- -	1 (14)	- -	- -
fragrant bedstraw (GATR3)	- -	1 (30)	5 (20)	1 (7)	1 (12)	1 (5)
bedstraw (GAL2)	3 (30)	2 (40)	2 (53)	- -	1 (4)	4 (57)
rattlesnake plantain (GOOB)	- -	- -	1 (6)	- -	1 (12)	1 (15)
white hawkweed (HIAL)	- -	1 (70)	1 (26)	1 (35)	1 (37)	2 (57)
iris (IRI)	- -	2 (20)	1 (13)	- -	1 (37)	1 (10)
western twinflower (LIBOL)	- -	- -	- -	- -	- -	- -
woodland tarweed (MAMA1)	- -	3 (50)	2 (40)	- -	1 (8)	4 (21)
candyflower (MOSI)	46 (100)	- -	- -	- -	- -	- -
mountain sweet-cicely (OSCH)	- -	2 (80)	3 (66)	1 (35)	1 (4)	4 (57)
redwood sorrel (OXOR1) +	20 (60)	- -	- -	- -	- -	- -
western coltsfoot (PEPA2) +	5 (60)	- -	- -	- -	- -	- -
Sierra milkwort (POCO6)	- -	- -	- -	- -	- -	- -
swordfern (POMU1)	7 (100)	1 (80)	1 (33)	1 (50)	1 (29)	1 (21)
bracken fern (PTAQL)	2 (80)	- -	20 (6)	1 (42)	1 (50)	1 (15)
white veined wintergreen (PYPI)	- -	- -	1 (6)	- -	1 (37)	1 (26)
western Solomon seal (SMRAA) +	1 (60)	2 (20)	1 (6)	1 (7)	1 (4)	- -
western starflower (TRLA3)	- -	2 (20)	1 (13)	1 (28)	1 (33)	2 (31)
white trillium (TROV2)	- -	- -	- -	1 (28)	- -	- -
Oregon trillium (TRRI)	- -	- -	- -	- -	- -	- -
western vancouveria (VAHE)	- -	- -	- -	- -	1 (8)	1 (5)

+ = plants used for cultural or commercial purposes

PLANT ASSOCIATION:	PSME-ALRU2/ ACCI/MOSI	PSME-QUGA2/ GRASS	PSME-QUKE-QUGA2/GRASS	PSME-QUGA2/ HODI	PSME-QUKE// METAMORPHIC	PSME-QUKE// SANDSTONE
HERBS & FERNS:			%COVER (CONSTANCY)			
small inside-out flower (VAPL)	- -	- -	- -	- -	- -	- -
pinto violet (VIOC)	- -	- -	- -	1 (50)	- -	- -
redwood violet (VISE3)	- -	- -	- -	- -	- -	- -
western modesty (WHMO) +	- -	10 (30)	2 (6)	1 (7)	6 (12)	3 (36)
giant chainfern (WOFI) +	- -	- -	- -	- -	- -	- -
beargrass (XETE) +	- -	- -	- -	- -	- -	- -
GRASSES, SEDGES & RUSHES			%COVER (CONSTANCY)			
brome (BRO3)	- -	3 (10)	- -	1 (7)	1 (8)	- -
sedge (CAR1)	4 (60)	1 (20)	- -	5 (21)	- -	1 (5)
dogtail grass (CYEC)	- -	6 (20)	10 (26)	2 (64)	- -	5 (5)
California fescue (FECA)	- -	20 (50)	11 (60)	10 (28)	6 (33)	3 (52)
Idaho fescue (FEID)	- -	- -	- -	- -	1 (4)	- -
western fescue (FEOC1)	- -	2 (20)	4 (26)	- -	1 (20)	11 (15)
fescue (FES3)	2 (40)	1 (10)	- -	3 (57)	1 (4)	1 (5)
bearded fescue (FESU2)	- -	2 (40)	8 (20)	- -	- -	- -
California sweetgrass (HIOC)	- -	- -	- -	- -	- -	- -
rush (JUN3)	- -	1 (10)	- -	7 (100)	- -	5 (26)

PLANT ASSOCIATION:	PSME-CADE3/ FECA n = 13	PSME-QUCH2// Rockpile n = 21	PSME-QUCH2- ARME3/RHDI n = 31	PSME-QUCH2- LIDE2 n = 23	PSME-CACH2- LIDE2 n = 24	PSME-CACH2/ XETE n = 10
			%COVER			
TOTAL COVER	92	85	85	89	91	96
FORB COVER	8	5	10	7	17	53
GRASS COVER	68	<1	1	3	<1	<1
SHRUB COVER	4	10	8	8	19	5
TREE COVER	63	77	82	81	75	88
TREE OVERSTORY:			%COVER (CONSTANCY)			
white fir (ABCO)	1 (7)	8 (9)	- -	1 (4)	2 (29)	- -
bigleaf maple (ACMA) +	- -	9 (19)	7 (31)	4 (8)	2 (8)	- -
alder (ALRU2 or ALRH) +	- -	- -	- -	- -	- -	- -
Pacific madrone (ARME3) +	10 (61)	8 (57)	8 (89)	6 (82)	7 (45)	7 (60)
incense cedar (CADE3) +	18 (84)	- -	- -	4 (4)	3 (4)	- -
chinquapin (CACH2) +	- -	8 (28)	8 (6)	4 (13)	13 (91)	33 (90)
Port Orford cedar (CHLA) +	- -	- -	- -	2 (4)	- -	- -
Pacific dogwood (CONU1)	- -	2 (4)	- -	2 (4)	4 (16)	3 (20)
tanoak (LIDE2) +	2 (30)	5 (61)	3 (24)	5 (60)	6 (45)	5 (20)
knobcone pine (PIAT)	- -	- -	- -	- -	- -	- -
Jeffrey pine (PIJE) +	5 (30)	- -	10 (24)	- -	- -	1 (10)
sugar pine (PILA) +	3 (38)	5 (57)	7 (20)	9 (56)	10 (41)	9 (40)
ponderosa pine (PIPO) +	12 (7)	- -	5 (3)	- -	- -	10 (10)
Douglas-fir (PSME) +	42 (92)	34 (100)	36 (100)	48 (100)	53 (100)	58 (100)
canyon live oak (QUCH2)	2 (30)	28 (95)	42 (100)	23 (91)	2 (12)	- -
Oregon white oak (QUGA2) +	9 (30)	- -	6 (10)	- -	- -	- -
black oak (QUKE) +	1 (7)	8 (14)	9 (24)	4 (34)	3 (4)	- -
Pacific yew (TABR) +	- -	- -	- -	- -	- -	- -
California bay (UMCA) +	2 (23)	- -	- -	- -	- -	- -

+ = plants used for cultural or commercial purposes

PLANT ASSOCIATION:	PSME-CADE3/ FECA	PSME-QUCH2// Rockpile	PSME-QUCH2- ARME3/RHDI	PSME-QUCH2- LIDE2	PSME-CACH2- LIDE2	PSME-CACH2/ XETE
TREE UNDERSTORY.			%COVER (CONSTANCY)			
white fir (ABCO)	1 (7)	1 (9)	5 (3)	1 (8)	3 (37)	1 (10)
bigleaf maple (ACMA) +	- -	2 (14)	1 (6)	- -	- -	- -
alder (ALRU2 or ALRH) +	- -	- -	- -	- -	- -	- -
Pacific madrone (ARME3) +	1 (30)	1 (23)	1 (62)	1 (17)	1 (16)	1 (10)
incense cedar (CADE3) +	2 (92)	- -	1 (3)	- -	1 (20)	- -
chinquapin (CACH2) +	- -	4 (28)	4 (6)	3 (17)	8 (83)	2 (90)
Port Orford cedar (CHLA) +	- -	- -	- -	- -	- -	- -
Pacific dogwood (CONU1)	- -	1 (9)	2 (6)	1 (4)	2 (29)	- -
tanoak (LIDE2) +	2 (61)	6 (66)	3 (24)	6 (100)	8 (75)	3 (60)
knobcone pine (PIAT)	- -	- -	- -	- -	- -	- -
Jeffrey pine (PIJE) +	1 (15)	- -	1 (17)	- -	- -	2 (10)
sugar pine (PILA) +	2 (30)	1 (28)	1 (17)	2 (66)	1 (58)	1 (20)
ponderosa pine (PIPO) +	- -	- -	5 (3)	- -	- -	- -
Douglas-fir (PSME) +	4 (100)	3 (80)	4 (89)	6 (86)	3 (83)	2 (100)
canyon live oak (QUCH2)	1 (61)	14 (95)	9 (100)	10 (95)	4 (41)	1 (14)
Oregon white oak (QUGA2) +	1 (30)	- -	2 (10)	- -	- -	1 (20)
black oak (QUKE) +	1 (7)	- -	1 (13)	1 (4)	1 (4)	- -
Pacific yew (TABR) +	- -	1 (4)	- -	2 (4)	1 (29)	- -
California bay (UMCA) +	2 (53)	- -	1 (3)	3 (8)	- -	- -
SHRUBS:			%COVER (CONSTANCY)			
vine maple (ACCI)	- -	- -	- -	2 (4)	7 (8)	- -
Pacific serviceberry (AMAL)	1 (15)	1 (4)	- -	- -	2 (4)	- -
greenleaf manzanita (ARPA9) +	2 (7)	17 (14)	5 (3)	- -	1 (8)	- -
hollyleaved barberry (BEAQ) +	1 (7)	- -	- -	- -	- -	- -
dwarf Oregon-grape (BENE1) +	2 (7)	2 (19)	1 (20)	4 (34)	6 (54)	2 (30)
California hazelnut (COCOC) +	1 (7)	11 (19)	4 (31)	2 (13)	3 (50)	- -
slender salal (GAOV)	- -	- -	- -	- -	12 (8)	- -
salal (GASH) +	- -	11 (9)	- -	8 (4)	14 (12)	6 (20)
toyon (HEAR2)	- -	- -	- -	- -	- -	- -

PLANT ASSOCIATION:	PSME-CADE3/ FECA	PSME-QUCH2// Rockpile	PSME-QUCH2- ARME3/RHDI	PSME-QUCH2- LIDE2	PSME-CACH2- LIDE2	PSME-CACH2/ XETE
SHRUBS:			%COVER (CONSTANCY)			
oceanspray (HODI)	3 (15)	2 (19)	- -	- -	3 (12)	- -
dwarf tanbark (LIDEE)	- -	- -	- -	- -	- -	- -
pink honeysuckle (LOHIV)	1 (15)	1 (9)	1 (31)	1 (13)	- -	- -
Gordon mock-orange (PHLEG) +	- -	- -	- -	- -	- -	- -
Sadler oak (QUSA)	- -	10 (14)	- -	30 (8)	6 (16)	3 (70)
huckleberry oak (QUVA)	2 (23)	17 (14)	10 (3)	25 (4)	8 (20)	- -
coffeeberry (RHCA2)	- -	- -	- -	- -	- -	- -
Pacific rhododendron (RHMA)	- -	10 (4)	- -	- -	15 (8)	2 (30)
western azalea (RHOC)	- -	- -	- -	- -	- -	- -
poison oak (RHDI)	1 (53)	3 (33)	6 (82)	3 (65)	- -	- -
wood rose (ROGY)	1 (30)	1 (9)	1 (13)	1 (4)	1 (20)	2 (10)
rose (ROS)	- -	1 (14)	- -	1 (21)	2 (29)	- -
western raspberry (RULE) +	2 (7)	- -	1 (3)	1 (4)	- -	- -
thimbleberry (RUPA2) +	- -	1 (4)	- -	- -	2 (12)	- -
salmon berry (RUSP2) +	- -	- -	- -	- -	- -	- -
Pacific blackberry (RUUR) +	1 (7)	1 (9)	1 (6)	1 (13)	5 (41)	1 (30)
willow (SAL11) +	- -	- -	- -	- -	- -	- -
creeping snowberry (SYMO)	- -	1 (19)	1 (17)	1 (8)	5 (33)	1 (20)
evergreen huckleberry (VAOV) +	- -	- -	- -	- -	- -	- -
red huckleberry (VAPA) +	- -	- -	- -	1 (4)	4 (37)	2 (20)
HERBS & FERNS:			%COVER (CONSTANCY)			
vanilla leaf (ACTR)	- -	4 (19)	1 (3)	3 (4)	5 (45)	- -
trailplant (ADBI)	2 (7)	- -	1 (6)	1 (4)	1 (8)	- -
mountain dogbane (APPU)	- -	1 (9)	1 (20)	1 (8)	1 (20)	1 (14)
rayless arnica (ARDI3)	1 (15)	1 (14)	1 (6)	2 (17)	1 (12)	- -
marbled ginger (ASHA) +	- -	1 (14)	- -	1 (4)	1 (4)	- -
ground cone (BOST2)	- -	1 (4)	- -	- -	1 (4)	- -
fairy-slipper (CABU2)	- -	- -	- -	- -	- -	- -

+ = plants used for cultural or commercial purposes

PLANT ASSOCIATION:	PSME-CADE3/ FECA	PSME-QUCH2// Rockpile	PSME-QUCH2- ARME3/RHDI	PSME-QUCH2- LIDE2	PSME-CACH2- LIDE2	PSME-CACH2/ XETE
HERBS & FERNS:			%COVER (CONSTANCY)			
little prince's pine (CHME2) +	1 (23)	1 (38)	1 (34)	1 (60)	1 (37)	1 (30)
western prince's pine (CHUMO) +	2 (7)	2 (42)	2 (10)	2 (17)	8 (79)	1 (60)
Pacific hound's tongue (CYGR)	- -	- -	1 (13)	- -	- -	- -
California toothwort (DECA4)	- -	- -	- -	1 (4)	- -	- -
bleeding heart (DIFOO)	- -	- -	- -	- -	- -	- -
Hooker's fairybell (DIHO2)	- -	- -	1 (3)	1 (4)	1 (29)	- -
California strawberry (FRCA1) +	- -	- -	1 (3)	- -	1 (4)	- -
stickywilly (GAAP2)	- -	- -	1 (10)	- -	- -	- -
fragrant bedstraw (GATR3)	- -	- -	1 (6)	1 (13)	1 (4)	- -
bedstraw (GAL2)	1 (15)	1 (14)	1 (20)	1 (13)	- -	- -
rattlesnake plantain (GOOB)	1 (23)	1 (9)	2 (6)	1 (21)	1 (62)	1 (20)
white hawkweed (HIAL)	1 (84)	1 (33)	1 (44)	1 (39)	1 (29)	- -
iris (IRI) +	1 (69)	1 (38)	1 (41)	1 (34)	1 (33)	1 (10)
western twinflower (LIBOL)	- -	- -	- -	3 (4)	5 (37)	- -
woodland tarweed (MAMA1)	1 (7)	- -	1 (3)	- -	- -	- -
candyflower (MOSI)	- -	- -	- -	- -	- -	- -
mountain sweet-cicely (OSCH)	1 (23)	- -	1 (13)	- -	- -	- -
redwood sorrel (OXOR1) +	- -	- -	- -	- -	- -	- -
western coltsfoot (PEPA2) +	- -	- -	- -	- -	- -	- -
Sierra milkwort (POCO6)	1 (7)	- -	- -	- -	- -	- -
swordfern (POMU1)	1 (53)	2 (47)	2 (34)	1 (39)	1 (20)	- -
bracken fern (PTAQL)	- -	1 (23)	1 (20)	1 (69)	1 (70)	2 (60)
white veined wintergreen (PYPI)	1 (7)	1 (9)	1 (13)	1 (17)	1 (45)	1 (30)
western Solomon seal (SMRAA) +	- -	1 (4)	1 (3)	- -	1 (12)	- -
western starflower (TRLA3)	1 (30)	1 (4)	1 (10)	1 (13)	1 (12)	- -
white trillium (TROV2)	- -	- -	- -	- -	1 (4)	- -
Oregon trillium (TRRI)	- -	- -	- -	- -	- -	- -
western vancouveria (VAHE)	1 (7)	1 (9)	- -	- -	2 (25)	15 (10)

PLANT ASSOCIATION:	PSME-CADE3/ FECA	PSME-QUCH2// Rockpile	PSME-QUCH2- ARME3/RHDI	PSME-QUCH2- LIDE2	PSME-CACH2- LIDE2	PSME-CACH2/ XETE
HERBS & FERNS:			%COVER (CONSTANCY)			
small inside-out flower (VAPL)	- -	- -	- -	2 (4)	2 (4)	- -
pinto violet (VIOC)	- -	- -	- -	- -	- -	- -
redwood violet (VISE3)	- -	- -	1 (3)	1 (4)	1 (29)	1 (10)
western modesty (WHMO) +	5 (46)	6 (42)	7 (20)	6 (52)	3 (50)	- -
giant chainfern (WOFI) +	- -	- -	- -	- -	- -	- -
beargrass (XETE) +	- -	- -	- -	1 (4)	4 (50)	55 (90)
GRASSES, SEDGES & RUSHES			%COVER (CONSTANCY)			
brome (BRO3)	4 (30)	- -	- -	4 (4)	1 (4)	- -
sedge (CAR1)	2 (15)	- -	- -	- -	1 (4)	- -
dogtail grass (CYEC)	- -	- -	- -	- -	- -	- -
California fescue (FECA)	59 (100)	- -	1 (17)	21 (8)	- -	- -
Idaho fescue (FEID)	- -	- -	- -	1 (4)	- -	- -
western fescue (FEOC1)	- -	1 (4)	1 (10)	1 (8)	1 (12)	- -
fescue (FES3)	- -	1 (4)	2 (3)	6 (4)	- -	- -
bearded fescue (FESU2)	3 (7)	- -	1 (6)	- -	- -	- -
California sweetgrass (HIOC)	- -	- -	- -	- -	- -	- -
rush (JUN3)	- -	- -	- -	- -	- -	- -

+ = plants used for cultural or commercial purposes

PLANT ASSOCIATION:	PSME-CACH2/ RHMA-GASH n = 10	PSME-CACH2/ RHMA-BENE1 n = 7	PSME-CACH2/ RHMA-QUSA/XETE n = 39	PSME-CACH2- LIDE2/BENE1 n = 15	PSME-CACH2/ RHMA-QUSA-GASH n = 21	PSME-ACMA/ POMU1 n = 40
	% COVER					
TOTAL COVER	98	92	95	92	98	74
FORB COVER	10	10	20	17	14	50
GRASS COVER	<1	<1	<1	<1	<1	5
SHRUB COVER	76	56	53	11	81	17
TREE COVER	84	68	67	82	68	80
TREE OVERSTORY:	%COVER (CONSTANCY)					
white fir (ABCO)	1 (10)	8 (28)	6 (25)	8 (73)	- -	5 (2)
bigleaf maple (ACMA) +	5 (20)	10 (14)	- -	2 (6)	- -	15 (97)
alder (ALRU2 or ALRH) +	5 (10)	- -	- -	- -	- -	15 (32)
Pacific madrone (ARME3) +	4 (20)	10 (14)	3 (12)	6 (46)	4 (23)	3 (14)
incense cedar (CADE3) +	1 (10)	- -	3 (5)	3 (26)	10 (4)	15 (2)
chinquapin (CACH2) +	9 (100)	11 (85)	16 (89)	24 (93)	21 (100)	5 (2)
Port Orford cedar (CHLA) +	3 (30)	2 (14)	5 (2)	- -	- -	- -
Pacific dogwood (CONU1)	10 (20)	- -	2 (5)	3 (40)	4 (14)	3 (10)
tanoak (LIDE2) +	5 (40)	5 (57)	7 (12)	13 (46)	6 (23)	5 (12)
knobcone pine (PIAT)	- -	- -	- -	- -	- -	- -
Jeffrey pine (PIJE) +	- -	- -	3 (2)	1 (6)	- -	- -
sugar pine (PILA) +	6 (60)	8 (28)	12 (56)	12 (33)	12 (85)	8 (2)
ponderosa pine (PIPO) +	- -	- -	- -	3 (6)	5 (4)	- -
Douglas-fir (PSME) +	66 (100)	58 (100)	52 (100)	40 (100)	42 (95)	54 (100)
canyon live oak (QUCH2)	4 (20)	- -	4 (5)	- -	3 (9)	7 (12)
Oregon white oak (QUGA2) +	- -	- -	- -	- -	- -	- -
black oak (QUKE) +	- -	- -	- -	3 (13)	- -	2 (2)
Pacific yew (TABR) +	2 (10)	5 (14)	7 (5)	11 (13)	- -	20 (30)
California bay (UMCA) +	- -	- -	- -	- -	- -	- -

PLANT ASSOCIATION:	PSME-CACH2/ RHMA-GASH	PSME-CACH2/ RHMA-BENE1	PSME-CACH2/ RHMA-QUSA/XETE	PSME-CACH2- LIDE2/BENE1	PSME-CACH2/ RHMA-QUSA-GASH	PSME-ACMA/ POMU1
TREE UNDERSTORY:			%COVER (CONSTANCY)			
white fir (ABCO)	1 (30)	1 (28)	1 (25)	8 (93)	1 (33)	1 (12)
bigleaf maple (ACMA) +	2 (10)	- -	- -	- -	- -	9 (50)
alder (ALRU2 or ALRH) +	- -	- -	- -	- -	- -	10 (14)
Pacific madrone (ARME3) +	1 (10)	1 (14)	1 (7)	1 (13)	1 (9)	2 (12)
incense cedar (CADE3) +	1 (10)	1 (14)	1 (5)	1 (26)	- -	1 (10)
chinquapin (CACH2) +	2 (50)	4 (57)	4 (74)	10 (66)	3 (85)	5 (5)
Port Orford cedar (CHLA) +	1 (20)	1 (14)	1 (2)	1 (6)	1 (4)	- -
Pacific dogwood (CONU1)	1 (10)	- -	- -	1 (53)	- -	2 (12)
tanoak (LIDE2) +	10 (90)	10 (85)	2 (25)	15 (80)	5 (47)	3 (20)
knobcone pine (PIAT)	- -	- -	- -	- -	- -	- -
Jeffrey pine (PIJE) +	- -	- -	- -	1 (6)	- -	- -
sugar pine (PILA) +	1 (30)	1 (14)	2 (38)	1 (33)	2 (61)	1 (2)
ponderosa pine (PIPO) +	- -	- -	1 (2)	- -	- -	1 (2)
Douglas-fir (PSME) +	1 (70)	1 (57)	3 (94)	3 (86)	2 (100)	4 (72)
canyon live oak (QUCH2)	2 (20)	1 (42)	2 (20)	1 (6)	1 (28)	3 (40)
Oregon white oak (QUGA2) +	- -	- -	- -	- -	- -	- -
black oak (QUKE) +	- -	- -	- -	1 (6)	- -	1 (2)
Pacific yew (TABR) +	1 (10)	1 (28)	2 (5)	1 (33)	1 (19)	3 (35)
California bay (UMCA) +	- -	- -	- -	- -	- -	- -
SHRUBS:			%COVER (CONSTANCY)			
vine maple (ACCI)	1 (10)	30 (14)	- -	2 (26)	- -	- -
Pacific serviceberry (AMAL)	- -	- -	- -	- -	- -	3 (27)
greenleaf manzanita (ARPA9) +	- -	- -	3 (15)	- -	1 (4)	- -
hollyleaved barberry (BEAQ) +	- -	- -	- -	- -	- -	- -
dwarf Oregon-grape (BENE1) +	7 (100)	11 (100)	6 (43)	5 (80)	4 (66)	6 (85)
California hazelnut (COCOC) +	- -	3 (28)	1 (12)	2 (20)	- -	6 (85)
slender salal (GAOV)	- -	2 (42)	3 (48)	1 (6)	5 (42)	- -
salal (GASH) +	59 (100)	5 (14)	3 (15)	2 (6)	48 (100)	1 (2)

+ = plants used for cultural or commercial purposes

PLANT ASSOCIATION:	PSME-CACH2/ RHMA-GASH	PSME-CACH2/ RHMA-BENE1	PSME-CACH2/ RHMA-QUSA/XETE	PSME-CACH2- LIDE2/BENE1	PSME-CACH2/ RHMA-QUSA-GASH	PSME-ACMA/ POMU1
SHRUBS:			%COVER (CONSTANCY)			
toyon (HEAR2)	- -	- -	- -	- -	- -	- -
oceanspray (HODI)	- -	1 (14)	1 (15)	- -	2 (9)	2 (5)
dwarf tanbark (LIDEE)	- -	- -	- -	- -	5 (4)	- -
pink honeysuckle (LOHIV)	- -	- -	- -	- -	- -	- -
Gordon mock-orange (PHLEG) +	- -	- -	- -	- -	- -	- -
Sadler oak (QUSA)	- -	1 (28)	15 (97)	4 (6)	12 (95)	- -
huckleberry oak (QUVA)	20 (10)	- -	4 (5)	7 (13)	1 (4)	2 (2)
coffeeberry (RHCA2)	- -	- -	- -	- -	- -	- -
Pacific rhododendron (RHMA)	36 (100)	41 (100)	40 (82)	7 (6)	32 (100)	1 (5)
western azalea (RHOC)	- -	- -	- -	1 (6)	10 (4)	- -
poison oak (RHDI)	- -	- -	- -	2 (6)	- -	- -
wood rose (ROGY)	1 (50)	5 (14)	- -	1 (6)	1 (14)	3 (70)
rose (ROS)	1 (10)	1 (28)	1 (5)	1 (53)	- -	1 (7)
western raspberry (RULE) +	- -	- -	- -	1 (13)	- -	1 (7)
thimbleberry (RUPA2) +	- -	- -	1 (2)	1 (13)	- -	1 (32)
salmon berry (RUSP2) +	- -	- -	- -	- -	- -	- -
Pacific blackberry (RUUR) +	1 (30)	1 (14)	1 (38)	1 (20)	1 (14)	2 (77)
willow (SAL11) +	- -	- -	1 (2)	- -	2 (4)	3 (7)
creeping snowberry (SYMO)	1 (10)	- -	1 (10)	1 (26)	1 (4)	8 (62)
evergreen huckleberry (VAOV) +	1 (10)	- -	5 (2)	1 (6)	- -	2 (30)
red huckleberry (VAPA) +	2 (60)	6 (57)	4 (58)	4 (40)	6 (90)	1 (2)
HERBS & FERNS:			%COVER (CONSTANCY)			
vanilla leaf (ACTR)	1 (50)	1 (42)	1 (17)	5 (80)	1 (14)	10 (12)
trailplant (ADBI)	- -	1 (14)	- -	1 (20)	- -	2 (60)
mountain dogbane (APPU)	- -	1 (14)	- -	1 (20)	- -	1 (7)
rayless arnica (ARDI3)	1 (10)	- -	1 (7)	1 (6)	- -	1 (2)
marbled ginger (ASHA) +	- -	- -	- -	- -	- -	2 (25)
ground cone (BOST2)	- -	- -	- -	- -	- -	- -
fairy-slipper (CABU2)	- -	- -	1 (2)	- -	- -	- -

PLANT ASSOCIATION:	PSME-CACH2/ RHMA-GASH	PSME-CACH2/ RHMA-BENE1	PSME-CACH2/ RHMA-QUSA/XETE	PSME-CACH2- LIDE2/BENE1	PSME-CACH2/ RHMA-QUSA-GASH	PSME-ACMA/ POMU1
HERBS & FERNS:			%COVER (CONSTANCY)			
little prince's pine (CHME2) +	1 (20)	1 (42)	1 (56)	2 (13)	1 (23)	1 (7)
western prince's pine (CHUMO) +	2 (70)	5 (57)	2 (71)	4 (86)	2 (38)	1 (5)
Pacific hound's tongue (CYGR)	- -	- -	- -	- -	- -	- -
California toothwort (DECA4)	- -	- -	- -	- -	- -	1 (2)
bleeding heart (DIFOO)	- -	- -	- -	- -	- -	- -
Hooker's fairybell (DIHO2)	1 (10)	1 (14)	1 (7)	1 (46)	1 (9)	2 (65)
California strawberry (FRCA1) +	1 (10)	- -	- -	- -	- -	1 (32)
stickywilly (GAAP2)	- -	- -	- -	- -	- -	4 (55)
fragrant bedstraw (GATR3)	- -	- -	- -	1 (6)	- -	1 (2)
bedstraw (GAL2)	- -	- -	- -	- -	- -	2 (17)
rattlesnake plantain (GOOB)	1 (90)	1 (42)	1 (30)	1 (73)	1 (19)	1 (40)
white hawkweed (HIAL)	1 (20)	1 (14)	1 (10)	1 (13)	- -	2 (77)
iris (IRI) +	1 (30)	- -	1 (5)	1 (33)	1 (9)	1 (20)
western twinflower (LIBOL)	3 (50)	2 (42)	1 (10)	3 (60)	1 (4)	13 (7)
woodland tarweed (MAMA1)	- -	- -	- -	- -	- -	1 (5)
candyflower (MOSI)	1 (10)	- -	- -	- -	- -	3 (2)
mountain sweet-cicely (OSCH)	1 (10)	- -	- -	1 (6)	- -	1 (52)
redwood sorrel (OXOR1) +	- -	- -	- -	- -	- -	1 (2)
western coltsfoot (PEPA2) +	- -	- -	- -	- -	- -	- -
Sierra milkwort (POCO6)	- -	- -	- -	- -	- -	- -
swordfern (POMU1)	2 (40)	1 (42)	1 (2)	1 (13)	1 (14)	4 (65)
bracken fern (PTAQL)	1 (40)	2 (28)	5 (35)	1 (40)	1 (33)	3 (14)
white veined wintergreen (PYPI)	1 (10)	1 (71)	1 (43)	1 (80)	1 (14)	1 (22)
western Solomon seal (SMRAA) +	1 (10)	1 (28)	1 (5)	1 (33)	1 (4)	1 (42)
western starflower (TRLA3)	1 (20)	1 (14)	1 (7)	1 (40)	- -	3 (70)
white trillium (TROV2)	1 (30)	- -	- -	1 (13)	- -	1 (10)
Oregon trillium (TRRI)	- -	- -	- -	- -	- -	1 (2)
western vancouveria (VAHE)	3 (20)	5 (28)	2 (10)	1 (26)	1 (14)	2 (2)

+ = plants used for cultural or commercial purposes

PLANT ASSOCIATION:	PSME-CACH2/ RHMA-GASH	PSME-CACH2/ RHMA-BENE1	PSME-CACH2/ RHMA-QUSA/XETE	PSME-CACH2- LIDE2/BENE1	PSME-CACH2/ RHMA-QUSA-GASH	PSME-ACMA/ POMU1
HERBS & FERNS:			%COVER (CONSTANCY)			
small inside-out flower (VAPL)	- -	- -	1 (7)	2 (6)	6 (9)	5 (35)
pinto violet (VIOC)	- -	- -	- -	- -	- -	- -
redwood violet (VISE3)	2 (60)	1 (57)	1 (17)	1 (33)	1 (4)	10 (2)
western modesty (WHMO) +	1 (30)	1 (85)	1 (2)	8 (66)	2 (9)	17 (77)
giant chainfern (WOFI) +	- -	- -	- -	- -	- -	- -
beargrass (XETE) +	5 (70)	3 (57)	18 (87)	3 (13)	12 (100)	- -
GRASSES, SEDGES & RUSHES			%COVER (CONSTANCY)			
brome (BRO3)	- -	- -	- -	- -	- -	1 (7)
sedge (CAR1)	- -	1 (2)	- -	- -	- -	2 (32)
dogtail grass (CYEC)	- -	- -	- -	- -	- -	- -
California fescue (FECA)	- -	- -	- -	- -	- -	2 (20)
Idaho fescue (FEID)	- -	- -	- -	- -	- -	- -
western fescue (FEOC1)	1 (20)	- -	- -	2 (13)	- -	3 (40)
fescue (FES3)	- -	1 (2)	- -	- -	- -	1 (10)
bearded fescue (FESU2)	- -	- -	- -	1 (6)	- -	- -
California sweetgrass (HIOC)	- -	- -	- -	- -	- -	- -
rush (JUN3)	- -	- -	- -	- -	- -	1 (10)

PLANT ASSOCIATION:	PSME/ACCI-BENE1 n = 9	PSME-ACMA/PHLEG n = 13	PSME-UMCA/RHDI n = 18	PSME-UMCA/HODI n = 13	PSME/COCOC n = 21
			%COVER		
TOTAL COVER	97	80	89	91	87
FORB COVER	11	9	12	13	16
GRASS COVER	1	5	3	4	2
SHRUB COVER	78	31	20	34	8
TREE COVER	77	43	82	55	77
TREE OVERSTORY:			%COVER (CONSTANCY)		
white fir (ABCO)	16 (55)	1 (7)	- -	- -	2 (4)
bigleaf maple (ACMA) +	4 (22)	14 (100)	5 (27)	9 (53)	3 (28)
alder (ALRU2 or ALRH) +	- -	- -	- -	- -	- -
Pacific madrone (ARME3) +	- -	2 (38)	10 (55)	3 (38)	2 (9)
incense cedar (CADE3) +	2 (11)	1 (7)	5 (27)	- -	5 (4)
chinquapin (CACH2) +	3 (33)	- -	1 (5)	- -	4 (14)
Port Orford cedar (CHLA) +	- -	- -	- -	- -	- -
Pacific dogwood (CONU1)	8 (33)	- -	10 (5)	5 (7)	3 (38)
tanoak (LIDE2) +	5 (11)	- -	7 (38)	- -	2 (14)
knobcone pine (PIAT)	- -	- -	- -	- -	- -
Jeffrey pine (PIJE) +	- -	- -	15 (11)	- -	- -
sugar pine (PILA) +	10 (11)	- -	3 (16)	- -	12 (19)
ponderosa pine (PIPO) +	- -	- -	6 (11)	- -	- -
Douglas-fir (PSME) +	53 (100)	22 (100)	49 (94)	22 (100)	63 (100)
canyon live oak (QUCH2)	- -	6 (53)	4 (11)	3 (30)	4 (42)
Oregon white oak (QUGA2) +	- -	7 (30)	2 (16)	4 (23)	- -
black oak (QUKE) +	- -	- -	3 (33)	- -	2 (14)
Pacific yew (TABR) +	10 (44)	- -	12 (11)	- -	2 (4)
California bay (UMCA) +	- -	10 (7)	40 (100)	26 (100)	5 (4)

+ = plants used for cultural or commercial purposes

PLANT ASSOCIATION:	PSME/ACCI-BENE1		PSME-ACMA/PHLEG		PSME-UMCA/RHDI		PSME-UMCA/HODI		PSME/COCOC	
TREE UNDERSTORY:					%COVER (CONSTANCY)					
white fir (ABCO)	1	(55)	1	(7)	-	-	-	-	1	(33)
bigleaf maple (ACMA) +	-	-	3	(38)	1	(5)	2	(23)	1	(14)
alder (ALRU2 or ALRH) +	-	-	-	-	-	-	5	(7)	-	-
Pacific madrone (ARME3) +	-	-	1	(7)	1	(22)	1	(7)	1	(14)
incense cedar (CADE3) +	-	-	1	(15)	1	(38)	-	-	1	(4)
chinquapin (CACH2) +	7	(11)	-	-	-	-	-	-	1	(19)
Port Orford cedar (CHLA) +	-	-	-	-	-	-	-	-	-	-
Pacific dogwood (CONU1)	3	(22)	-	-	2	(11)	-	-	2	(47)
tanoak (LIDE2) +	2	(44)	-	-	4	(50)	2	(28)	-	-
knobcone pine (PIAT)	-	-	-	-	-	-	-	-	-	-
Jeffrey pine (PIJE) +	-	-	-	-	1	(5)	-	-	-	-
sugar pine (PILA) +	-	-	-	-	1	(11)	-	-	1	(23)
ponderosa pine (PIPO) +	-	-	-	-	1	(5)	-	-	1	(9)
Douglas-fir (PSME) +	1	(77)	3	(69)	1	(66)	3	(76)	6	(80)
canyon live oak (QUCH2)	1	(22)	2	(46)	1	(33)	2	(46)	3	(85)
Oregon white oak (QUGA2) +	-	-	-	-	1	(11)	-	-	-	-
black oak (QUKE) +	-	-	-	-	1	(16)	-	-	1	(19)
Pacific yew (TABR) +	2	(44)	-	-	1	(5)	-	-	-	-
California bay (UMCA) +	-	-	-	-	8	(100)	2	(84)	2	(4)
SHRUBS.					%COVER (CONSTANCY)					
vine maple (ACCI)	49	(100)	-	-	8	(5)	-	-	3	(4)
Pacific serviceberry (AMAL)	-	-	4	(61)	3	(11)	10	(61)	1	(3)
greenleaf manzanita (ARPA9) +	-	-	-	-	1	(11)	-	-	-	-
hollyleaved barberry (BEAQ) +	-	-	-	-	1	(5)	-	-	-	-
dwarf Oregon-grape (BENE1) +	30	(100)	-	-	8	(11)	3	(46)	3	(47)
California hazelnut (COCOC) +	6	(33)	3	(38)	4	(44)	4	(61)	3	(76)
slender salal (GAOV)	-	-	-	-	-	-	-	-	-	-
salal (GASH) +	43	(33)	-	-	-	-	-	-	-	-
toyon (HEAR2)	-	-	-	-	4	(27)	-	-	-	-

PLANT ASSOCIATION:	PSME/ACCI-BENE1	PSME-ACMA/PHEEG	PSME-UMCA/RHDI	PSME-UMCA/HODI	PSME/COCOC
SHRUBS:			%COVER (CONSTANCY)		
oceanspray (HODI)	- -	9 (30)	5 (11)	9 (84)	2 (9)
dwarf tanbark (LIDEE)	- -	- -	- -	- -	- -
pink honeysuckle (LOHIV)	- -	2 (46)	3 (66)	1 (53)	1 (9)
Gordon mock-orange (PHLEG) +	- -	11 (100)	- -	5 (53)	- -
Sadler oak (QUSA)	1 (11)	- -	- -	- -	6 (9)
huckleberry oak (QUVA)	- -	- -	- -	- -	- -
coffeeberry (RHCA2)	- -	1 (7)	1 (5)	- -	- -
Pacific rhododendron (RHMA)	22 (44)	- -	- -	- -	- -
western azalea (RHOC)	2 (11)	- -	5 (11)	- -	- -
poison oak (RHDI)	- -	8 (61)	5 (83)	5 (92)	2 (47)
wood rose (ROGY)	1 (11)	4 (84)	1 (22)	4 (84)	1 (14)
rose (ROS)	1 (25)	- -	- -	- -	1 (52)
western raspberry (RULE) +	1 (25)	1 (23)	1 (11)	1 (7)	1 (23)
thimbleberry (RUPA2) +	- -	1 (7)	- -	2 (30)	1 (14)
salmon berry (RUSP2) +	- -	- -	- -	- -	- -
Pacific blackberry (RUUR) +	1 (66)	- -	1 (5)	1 (7)	1 (14)
willow (SAL11) +	- -	3 (15)	- -	30 (7)	14 (4)
creeping snowberry (SYMO)	1 (11)	3 (84)	1 (5)	4 (61)	1 (47)
evergreen huckleberry (VAOV) +	- -	- -	75 (5)	- -	- -
red huckleberry (VAPA) +	4 (44)	- -	- -	- -	- -
HERBS & FERNS:			%COVER (CONSTANCY)		
vanilla leaf (ACTR)	2 (33)	- -	2 (11)	- -	3 (57)
trailplant (ADBI)	1 (11)	2 (30)	1 (16)	1 (76)	1 (47)
mountain dogbane (APPU)	- -	- -	- -	- -	1 (4)
rayless arnica (ARDI3)	- -	- -	1 (5)	- -	1 (28)
marbled ginger (ASHA) +	1 (11)	- -	- -	- -	1 (4)
ground cone (BOST2)	- -	- -	- -	- -	- -
fairy-slipper (CABU2)	- -	- -	- -	- -	- -

+ = plants used for cultural or commercial purposes

PLANT ASSOCIATION:	PSME/ACCI-BENE1	PSME-ACMA/PHLEG	PSME-UMCA/RHDI	PSME-UMCA/HODI	PSME/COCOC
HERBS & FERNS:			%COVER (CONSTANCY)		
little prince's pine (CHME2) +	1 (11)	- -	1 (11)	- -	3 (23)
western prince's pine (CHUMO) +	4 (88)	- -	2 (11)	- -	1 (52)
Pacific hound's tongue (CYGR)	- -	- -	1 (5)	- -	1 (4)
California toothwort (DECA4)	- -	- -	- -	- -	- -
bleeding heart (DIFOO)	- -	- -	- -	1 (7)	- -
Hooker's fairybell (DIHO2)	- -	1 (23)	2 (16)	1 (84)	1 (76)
California strawberry (FRCA1) +	- -	1 (7)	- -	1 (7)	- -
stickywilly (GAAP2)	- -	1 (61)	- -	1 (61)	- -
fragrant bedstraw (GATR3)	1 (11)	1 (7)	- -	1 (23)	1 (47)
bedstraw (GAL2)	1 (11)	- -	1 (16)	- -	1 (9)
rattlesnake plantain (GOOB)	1 (66)	- -	1 (16)	1 (7)	1 (52)
white hawkweed (HIAL)	- -	1 (7)	2 (22)	1 (15)	1 (76)
iris (IRI) +	- -	- -	2 (16)	- -	1 (42)
western twinflower (LIBOL)	3 (55)	- -	1 (5)	- -	8 (9)
woodland tarweed (MAMA1)	- -	- -	- -	- -	1 (4)
candyflower (MOSI)	- -	- -	- -	- -	- -
mountain sweet-cicely (OSCH)	- -	1 (15)	- -	1 (61)	5 (4)
redwood sorrel (OXOR1) +	- -	- -	1 (5)	- -	- -
western coltsfoot (PEPA2) +	- -	- -	- -	- -	- -
Sierra milkwort (POCO6)	- -	- -	1 (27)	- -	
swordfern (POMU1)	4 (55)	2 (76)	5 (61)	2 (92)	1 (71)
bracken fern (PTAQL)	1 (22)	1 (38)	1 (16)	3 (46)	1 (61)
white veined wintergreen (PYPI)	1 (33)	- -	1 (16)	- -	1 (47)
western Solomon seal (SMRAA) +	1 (11)	1 (15)	1 (5)	1 (61)	1 (4)
western starflower (TRLA3)	1 (22)	1 (69)	1 (50)	1 (69)	1 (47)
white trillium (TROV2)	1 (22)	- -	- -	- -	1 (4)
Oregon trillium (TRRI)	- -	- -	- -	- -	1 (4)
western vancouveria (VAHE)	2 (22)	- -	1 (5)	- -	1 (23)

PLANT ASSOCIATION:	PSME/ACCI-BENE1		PSME-ACMA/PHLEG		PSME-UMCA/RHDI		PSME-UMCA/HODI		PSME/COCOC	
HERBS & FERNS:					%COVER (CONSTANCY)					
small inside-out flower (VAPL)	-	-	-	-	1	(5)	-	-	-	-
pinto violet (VIOC)	-	-	-	-	-	-	2	(46)	-	-
redwood violet (VISE3)	2	(66)	-	-	2	(5)	-	-	1	(4)
western modesty (WHMO) +	3	(66)	1	(15)	7	(38)	1	(23)	13	(57)
giant chainfern (WOFI) +	-	-	-	-	-	-	-	-	-	-
beargrass (XETE) +	-	-	-	-	-	-	-	-	-	-
GRASSES, SEDGES & RUSHES					%COVER (CONSTANCY)					
brome (BRO3)	-	-	1	(7)	1	(11)	5	(30)	1	(23)
sedge (CAR1)	2	(22)	14	(23)	2	(5)	-	-	1	(4)
dogtail grass (CYEC)	-	-	-	-	1	(5)	-	-	-	-
California fescue (FECA)	-	-	2	(69)	2	(22)	1	(38)	3	(9)
Idaho fescue (FEID)	-	-	-	-	1	(5)	-	-	-	-
western fescue (FEOC1)	-	-	-	-	1	(16)	-	3	(47)	
fescue (FES3)	2	(11)	1	(23)	1	(5)	1	(23)	1	(4)
bearded fescue (FESU2)	1	(11)	-	-	4	(11)	-	-	10	(4)
California sweetgrass (HIOC)	-	-	-	-	-	-	-	-	-	-
rush (JUN3)	-	-	1	(7)	-	-	1	(15)	-	-

+ = plants used for cultural or commercial purposes

Appendix VII: Fuel Models by Seral Stage

VII

Fuel Models by Seral Stage

For this guide, seral stages in each plant association were assigned fire behavior fuel models (Anderson 1982) based on fire expertise These fuel models are used as input to mathematical calculations of fire spread and intensity Fuel models are tools to help estimate fire behavior. Fire behavior fuel models are weighted to the fine fuels (1 hour time lag fuel)

Where there were distinct distribution differences of fuels within a seral stage of a plant association a two fuel model concept was used (Andrews 1986) When two fuel models were used, the percentage of an area that applies to each fuel model is also given For example 70% of an area covered by a plant association may apply to one fuel model and 30% of the area to another model. The two fuel models will account for changes in the fuel bed in the horizontal dimension altering the fire spread as the fire encounters significantly different fuels Rate of spread (ROS) calculations are weighted by these percentages Flame length is represented by the fuel model with the highest percentage of covered area

VII

Tanoak Series Fuel Model by Seral Stage

PLANT ASSOCIATION:	SERAL STAGE: shrub/forb	pole	early mature	mid-mature	late mature	old growth
	FUEL MODEL# (% of plant association area affected)					
LIDE2-UMCA/VAOV	-	-	8(100)	8(100)	8(100)	8(100)
LIDE2-UMCA/RHDI	-	-	8(100)	8(100)	8(100)	8(100)
LIDE2/VAOV-RHMA	8(100)	8(100)	8(100)	8(100)	8(100)	8(100)
LIDE2/VAOV-GASH	8(100)	8(100)	8(100)	8(100)	8(100)	8(100)
LIDE2/VAOV	8(100)	8(100)	8(100)	8(100)	8(100)	8(100)
LIDE2/COCOC	8(100)	8(100)	8(100)	8(100)	8(100)	8(100)
LIDE2-QUKE	6(100)	6(100)	9(51)	9(51)	9(80)	9(80)
	-	-	11(49)	11(49)	11(20)	11(20)
LIDE2/ACCI-GASH	8(100)	8(100)	8(100)	8(100)	8(100)	8(100)
LIDE2-ACMA/POMU1	8(100)	8(100)	8(100)	8(100)	8(100)	8(100)
LIDE2/ACCI	8(100)	8(100)	8(100)	8(100)	8(100)	8(100)
LIDE2/GASH	8(100)	8(100)	8(100)	8(100)	8(100)	8(100)
LIDE2/GASH-BENE1	8(100)	8(100)	8(100)	8(100)	8(100)	8(100)
LIDE2/GASH-RHMA	8(100)	8(100)	8(100)	8(100)	8(100)	8(100)
LIDE2-CADE3/FECA	2(51)	8-60	8(100)	8(100)	8(80)	8(80)
	5(49)	2(40)	-	-	11(20)	11(20)
LIDE2-CHLA-TSHE/VAOV	8(100)	8(100)	8(100)	8(100)	8(100)	8(100)
LIDE2-CHLA-UMCA/VAOV	8(100)	8(100)	8(100)	8(100)	8(100)	8(100)
LIDE2-CHLA/VAOV-RHOC	8(100)	8(100)	8(100)	8(100)	8(100)	8(100)
LIDE2-CHLA/VAOV	8(100)	8(100)	8(100)	8(100)	8(100)	8(100)
LIDE2-CHLA-ALRH//Riparian	8(100)	8(100)	8(100)	8(100)	8(100)	8(100)

LIDE2-CHLA/VAPA	8(100)	8(100)	8(100)	8(100)	8(100)	8(100)
LIDE2-CHLA/GASH	8(100)	8(100)	8(100)	8(100)	8(100)	8(100)
LIDE2-CHLA/ACCI	8(100)	8(100)	8(100)	8(100)	8(100)	8(100)
LIDE2-CHLA/BENE1/LIBOL	8(100)	8(100)	8(100)	8(100)	8(100)	8(100)
LIDE2/QUVA-RHMA	8(75)	8(75)	8(75)	8(75)	8(75)	8(75)
LIDE2/RHDI-LOHIV	9(100)	9(100)	9(100)	9(100)	10(100)	10(100)
LIDE2/BENE1	9(100)	9(100)	9(100)	9(100)	10(100)	10(100)
LIDE2-QUCH2/VAOV	8(100)	8(100)	8(100)	8(100)	8(100)	8(100)
LIDE2-QUCH2-QUKE/RHDI	5(100)	8(100)	8(100)	9(70)	9(70)	9(70)
LIDE2-QUCH2/RHDI	-	-	-	11(30)	11(30)	11(30)
LIDE2-QUCH2/GASH-BENE1	8(100)	8(100)	8(100)	8(100)	8(100)	8(100)
LIDE2-QUCH2/BENE1	5(100)	8(100)	9(80)	9(80)	9(80)	5(80)
	-	-	5(20)	11(20)	11(20)	11(20)
LIDE2-QUCH2//Rockpile	5(100)	8(100)	8(100)	8(70)	8(70)	8(70)
	-	-	-	11(30)	11(30)	11(30)
LIDE2-CACH2/VAOV-GASH	8(100)	8(100)	8(100)	8(100)	8(100)	8(100)
LIDE2-CACH2/GASH	8(100)	8(100)	8(100)	8(100)	8(100)	8(100)
LIDE2-CACH2/GASH-RHMA	8(100)	8(100)	8(100)	8(100)	8(100)	8(100)
LIDE2-CACH2/BENE1	6(100)	8(100)	9(80)	9(80)	9(80)	5(80)
	-	-	5(20)	11(20)	11(20)	2(20)
LIDE2-CACH2/RHMA/XETE	5(80)	5(80)	2(100)	2(100)	5(51)	5(51)
	7(20)	7(20)	-	-	2(49)	2(49)
LIDE2-CACH2/PTAQL	6(100)	8(100)	9(80)	9(80)	9(80)	5(80)
	-	-	5(20)	11(20)	11(20)	2(20)

Douglas-fir Series Fuel Model by Seral Stage

PLANT ASSOCIATION:	SERAL STAGE: shrub/forb	pole	early mature	mid-mature	late mature	old growth
	FUEL MODEL# (% of plant association area affected)					
PSME-UMCA/RHDI	8(100)	8(100)	8(100)	8(100)	8(100)	8(100)
PSME-UMCA/HODI	8(100)	8(100)	8(100)	8(100)	8(100)	8(100)
PSME-ALRU2/ACCI/MOSI	8(100)	8(100)	8(100)	8(100)	8(100)	8(100)
PSME-QUKE//Metamorphic	2(80)	8(80)	9(80)	9(80)	10(80)	10(80)
	5(20)	2(20)	10(20)	10(20)	9(20)	9(20)
PSME-QUKE//Sandstone	2(80)	8(80)	9(80)	9(80)	10(80)	10(80)
	5(20)	2(20)	10(20)	10(20)	9(20)	9(20)
PSME-QUKE-QUGA2/GRASS	2(80)	8(80)	9(80)	9(80)	10(80)	10(80)
	5(20)	2(20)	10(20)	10(20)	9(20)	9(20)
PSME-CADE3/FECA	2(100)	9(51)	9(80)	9(80)	2(70)	2(70)
	-	2(49)	2(20)	2(20)	10(30)	10(30)
PSME-QUGA2/GRASS	2(100)	2(51)	9(80)	9(80)	9(80)	9(80)
	5(20)	9(49)	2(20)	2(20)	10(20)	10(20)
PSME-QUGA2/HODI	2(80)	2(51)	9(80)	9(80)	9(80)	9(80)
	5(20)	9(49)	2(20)	2(20)	9(20)	9(20)
PSME-QUCH2//Rockpile	5(51)	8-60	8(80)	8(80)	8(51)	8(51)
	2(49)	2(40)	11(20)	11(20)	12(49)	12(49)
PSME-QUCH2-ARME3/RHDI	5(51)	8-60	8(80)	8(80)	8(51)	8(51)
	5(49)	2(40)	11(20)	11(20)	12(49)	12(49)
PSME-QUCH2-LIDE2	2(51)	8-60	8(80)	8(80)	8(51)	8(51)
	5(49)	2(40)	11(20)	11(20)	12(49)	12(49)

PSME-PIJE/FECA	2(100) -	9(51) 2(49)	9(80) 10(20)	9(80) 10(20)	2(70) 10(30)	2(70) 10(30)
PSME/COCOC	9(100) -	9(100) -	9(80) 10(20)	9(80) 10(20)	9(80) 10(20)	9(80) 10(20)
PSME-LIDE2/WHMO	6(100) -	9(70) 11(30)	9(100) -	9(100) -	9(100) -	9(100) -
PSME-LIDE2/QUVA-HODI	6(100)	6(100)	6(100)	6(100)	6(100)	6(100)
PSME-ACMA/POMU1	8(100)	8(100)	8(100)	8(100)	8(100)	8(100)
PSME-ACMA/PHLEG	8(100)	8(100)	8(100)	8(100)	8(100)	8(100)
PSME/ACCI-BENE1	8(100)	8(100)	8(100)	8(100)	8(100)	8(100)
PSME/QUVA	6(80) 2(20)	6(80) 2(20)	6(100) -	6(100) -	6(100) -	6(100) -
PSME/QUVA-LIDEE	6(80) 2(20)	6(80) 2(20)	6(100) -	6(100) -	6(100) -	6(100) -
PSME/QUVA-RHMA	6(80) 2(20)	6(80) 2(20)	6(100) -	6(100) -	6(100) -	6(100) -
PSME-CACH2-LIDE2	5(51) 8(49)	5(51) 8(49)	6(51) 8(49)	6(51) 8(49)	8(51) 10(49)	8(51) 10(49)
PSME-CACH2-LIDE2/BENE1	5(51) 8(49)	5(51) 8(49)	6(51) 8(49)	6(51) 8(49)	8(51) 10(49)	8(51) 10(49)
PSME-CACH2/XETE	5(51) 8(49)	5(51) 8(49)	6(51) 8(49)	6(51) 8(49)	8(51) 10(49)	8(51) 10(49)
PSME-CACH2/RHMA-BENE1	5(51) 8(49)	5(51) 8(49)	6(51) 8(49)	6(51) 8(49)	8(51) 10(49)	8(51) 10(49)
PSME-CACH2/RHMA-GASH	5(51) 8(49)	5(51) 8(49)	6(51) 8(49)	6(51) 8(49)	8(51) 10(49)	8(51) 10(49)

PLANT ASSOCIATION:	shrub/forb	pole	early mature	mid-mature	late mature	old growth
	SERAL STAGE: FUEL MODEL# (% of plant association area affected)					
PSME-CACH2/RHMA-QUSA-GASH	5(51)	5(51)	6(51)	6(51)	8(51)	8(51)
	8(49)	8(49)	8(49)	8(49)	10(49)	10(49)
PSME-CACH2/RHMA-QUSA/XETE	5(51)	5(51)	6(51)	6(51)	8(51)	8(51)
	8(49)	8(49)	8(49)	8(49)	10(49)	10(49)

Appendix VIII: Fire Environmental Parameters

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Fire Environmental Parameters

Weather parameters greatly affect the ability of fuel to burn, the amount of material consumed by a fire, fire intensities and smoke dispersal. High temperatures and low relative humidity over extended periods dry out fuels Weather parameters that represent August weather conditions were used to represent fire behavior for all fuel models These fires would have the greatest potential of escaping initial attack suppression actions and the greatest adverse fire effects to the plant association.

Although a definition of slope and aspect as they pertain to fire are described below the data for these variables can be found in the plant association description Windspeed and fuel moisture are the two environmental variables provided in this Appendix

Slope· Slope, serves much the same purpose as wind, angling the flame nearer fuels in the fire's path and preheating the receptive fuelbed. The ecological classification of each plant association has identified a range of slopes and a mean slope The mean slope for each plant association was used for the fire behavior models

Aspect: Aspect is the direction or exposure in which a slope faces. Aspect functions to orient the land and fuels to solar radiation, which affects both fuel temperature and moisture South-facing aspects are usually warmer and drier, while northerly aspects being shaded most of the day, have lower temperatures and higher humidities. These attributes are critical determinants of how fire behaves Aspect also influences natural vegetation Southerly aspects generally have sparser, lighter fuels while northerly aspects generally have more and heavier fuels (including brush). Fire behavior on northerly aspects may have lower rates of spread but high intensities. The high intensities combined with greater amounts of fuel present greater resistance to control.

Windspeed: Windspeed has the most direct effect on fire behavior of all weather variables. It not only dries out fuels but increases oxygen It also enables a surface fire to enter the canopy producing a crown fire Fire Behavior models typically use a midflame windspeed A midflame wind speed of 7 mph was used to represent a typical August up slope wind Other factors could increase the wind speed.

Fuel Moisture: Fuel moisture is simply the amount of water in a fuel, either live or dead, expressed as a percentage of the oven dry weight, which is in a form usable for calculating fire behavior. Fuel moisture is the result of past and present weather conditions Some fuel models contain both living and dead fuels, consequently, the moisture of each must be employed

The amount of moisture contained in wildland fuels is a critical determinant of fire intensity and the heat required to bring the fuel ahead of a spreading fire up to ignition temperature. The moisture condition of the fine fuels is important in determining the rate of a fire's spread Fuel moisture also has a direct relationship to fuel and duff consumption, and smoke emissions It is variable with weather, time of year, dormancy of vegetation, elevation and aspect. Extended years of drought have a cumulative effect on live fuel moisture and the larger dead/down fuels (logs).

Dead Fuel Moisture: Dead fuels respond to diurnal and hourly changes in the microclimate surrounding the fuel particle. The moisture in these fuels are characterized based on time lag, expressed in hours, which indicates the time it takes for the fuel to achieve equilibrium with environmental conditions (i.e , temperature, relative humidity, solar radiation). For input to fire modeling, fuels are divided into different time lags as shown in Table VIII 1

Live Fuel Moisture: Live fuel moisture is the moisture content of living, growing fuels and is a component for some fuel models affecting their fire behavior Live fuel moisture values are a result of physiological changes in the plant These are mainly due to time of the season, precipitation events, the temperature trend and the species Values can range as low as 1–2% in extreme drought conditions to more than 200% during the spring Weather affects live fuel moisture quite differently than dead fuels, therefore, methods for estimating their values are different Live fuel moisture may be detected in three ways 1) sampling and measurement; 2) from a current record at a NFDR station; and 3) estimation from observations and a table of indicators and values

Table VIII.1 Time lag fuel descriptors.

Time Lag	Size	Definition
1 hour	0–1/4"	Fuels consisting of dead herbaceous plants and roundwood less than one fourth inch in diameter Included is the upper most layer of litter on the forest floor
10 hour	1/4"–1 0"	Dead fuels consisting of roundwood one fourth inch to one inch in diameter, and very roughly, the layer of litter extending from just below the surface to three-fourths inch below the surface.
100 hour	1 1"–3 0"	Dead fuels consisting of roundwood in the size range on one to three inches in diameter, and very roughly the forest floor from three-fourths and inch to four inches below the surface
1000 hour	3 1" +	Dead fuels consisting of roundwood three to eight inches in diameter or the layer of the forest floor greater than four inches below the surface or both

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Table VIII.2 Dead fuel moisture inputs representing August conditions for dry (southerly slopes) and wetter (northerly slopes and areas of coastal influence) sites

	Fuel Moisture (%)	
Size Class	**Wet Site**	**Dry Site**
1hr	6	2
10 hr	7	4
100 hr.	12	8

Live herbaceous fuel moisture: Herbaceous plants (grasses, forbs and ferns) do not develop persistent woody tissues When the live fuel moisture falls below 30 percent, herbaceous plants are considered cured and the moisture content defaults to that of the 1-hour timelag fuels, that is, these fuels will behave as if they were dead fuels This is significant, because it represents an increase in available fuel, and a greater probability of higher flame lengths and potential crown fire

Live woody fuel moisture: This represents the moisture content of the foliage and small twigs less than 1/4" of living plants Live fuel moisture ranges seasonally from around 70% representing dormancy, to 200–300% during spring conditions with new leaf formation

	Dry	Wet
Live woody	70	110
Live Herb	30	60

Tanoak Series Fire Environmental Parameters

PLANT ASSOCIATION:	Mid-flame windspeed (mph)	FUEL MOISTURE: 1-hour	10-hour	100-hour	live herbaceous	live woody
LIDE2-UMCA/VAOV	7	6	8	12	-	-
LIDE2-UMCA/RHDI	7	2	4	8	-	-
LIDE2/VAOV-RHMA	7	6	8	12	-	-
LIDE2/VAOV-GASH	7	2	4	8	-	-
LIDE2/VAOV	7	2	4	8	-	-
LIDE2/COCOC	7	2	4	8	-	-
LIDE2-QUKE	7	2	4	8	30	70
LIDE2/ACCI-GASH	7	6	8	12	-	-
LIDE2-ACMA/POMU1	7	6	8	12	-	-
LIDE2/ACCI	7	6	8	12	-	-
LIDE2/GASH	7	6	8	12	-	-
LIDE2/GASH-BENE1	7	6	8	12	-	-
LIDE2/GASH-RHMA	7	6	8	12	-	-
LIDE2-CADE3/FECA	7	2	4	8	30	70
LIDE2-CHLA-TSHE/VAOV	7	6	8	12	-	-
LIDE2-CHLA-UMCA/VAOV	7	6	8	12	-	-
LIDE2-CHLA/VAOV-RHOC	7	6	8	12	-	-
LIDE2-CHLA/VAOV	7	6	8	12	-	-
LIDE2-CHLA-ALRH//Riparian	7	6	8	12	-	-
LIDE2-CHLA/VAPA	7	6	8	12	-	-
LIDE2-CHLA/GASH	7	6	8	12	-	-
LIDE2-CHLA/ACCI	7	6	8	12	-	-

LIDE2-CHLA/BENE1/LIBOL	7	6	8	12	-	-
LIDE2/QUVA-RHMA	7	6	8	12	60	110
LIDE2/RHDI-LOHIV	7	2	4	8	70	
LIDE2/BENE1	7	2	4	8	70	
LIDE2-QUCH2/VAOV	7	6	8	12	-	-
LIDE2-QUCH2-QUKE/RHDI	7	2	4	8	70	
LIDE2-QUCH2/RHDI	7	2	4	8	70	
LIDE2-QUCH2/GASH-BENE1	7	6	8	12	-	-
LIDE2-QUCH2/BENE1	7	2	4	8	70	
LIDE2-QUCH2//Rockpile	7	2	4	8	70	
LIDE2-CACH2/VAOV-GASH	7	6	8	12	-	-
LIDE2-CACH2/GASH	7	6	8	12	-	-
LIDE2-CACH2/GASH-RHMA	7	6	8	12	-	-
LIDE2-CACH2/BENE1	7	2	4	8	30	70
LIDE2-CACH2/RHMA/XETE	7	6	8	12	60	110
LIDE2-CACH2/PTAQL	7	2	4	8	30	70

Douglas-fir Series Fire Environmental Parameters

PLANT ASSOCIATION:	Mid-flame windspeed (mph)	FUEL MOISTURE: 1-hour	10-hour	100-hour	live herbaceous	live woody
PSME-UMCA/RHDI	7	6	8	12	60	110
PSME-UMCA/HODI	7	6	8	12	60	110
PSME-ALRU2/ACCI/MOSI	7	6	8	12	60	110
PSME-QUKE//Metamorphic	7	2	4	8	30	70
PSME-QUKE//Sandstone	7	2	4	8	30	70
PSME-QUKE-QUGA2/GRASS	7	2	4	8	30	70
PSME-CADE3/FECA	7	2	4	8	30	70
PSME-QUGA2/GRASS	7	2	4	8	30	70
PSME-QUGA2/HODI	7	2	4	8	30	70
PSME-QUCH2//Rockpile	7	2	4	8	30	70
PSME-QUCH2-ARME3/RHDI	7	2	4	8	30	70
PSME-QUCH2-LIDE2	7	2	4	8	30	70
PSME-PIJE/FECA	7	2	4	8	30	70
PSME/COCOC	7	6	8	12	60	110
PSME-LIDE2/WHMO	7	2	4	8	30	70
PSME-LIDE2/QUVA-HODI	7	2	4	8	30	70
PSME-ACMA/POMU1	7	6	8	12	60	110
PSME-ACMA/PHLEG	7	6	8	12	60	110
PSME/ACCI-BENE1	7	6	8	12	60	110
PSME/QUVA	7	2	4	8	30	70
PSME/QUVA-LIDEE	7	2	4	8	30	70
PSME/QUVA-RHMA	7	6	8	12	60	110

PSME-CACH2-LIDE2	7	2	4	8	30	70
PSME-CACH2-LIDE2/BENE1	7	2	4	8	30	70
PSME-CACH2/XETE	7	2	4	8	30	70
PSME-CACH2/RHMA-BENE1	7	6	8	12	60	110
PSME-CACH2/RHMA-GASH	7	6	8	12	60	110
PSME-CACH2/RHMA-QUSA-GASH	7	6	8	12	60	110
PSME-CACH2/RHMA-QUSA/XETE	7	6	8	12	60	110

Appendix IX: Fire Behavior

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Fire Behavior

Programs that enable us to detect fire behavior and fire effects are all models and have some limitations in their use Monitoring and actual observations are needed to validate them. Validation was provided from fire and fuels personnel over time. These modules are tools that can be used to help managers achieve desired effects. Not all programs mentioned in this section are included in this Appendix. These other programs require specific information such as tree species, tree diameter and tree height.

Rates of spread Fire behavior predictions used the BEHAVE program (Andrews 1986) to calculate Rates of Spread (ROS) in chains/hour (displayed in feet/minute) and Flame Length (FL) in feet for each individual fuel model or fuel model combination Rates of spread are weighted by percentage of each individual fuel model. Flame length is represented by the fuel model with the greatest percentage

Flame lengths Flame lengths have a direct relationship to suppression resource ability to suppress a wildfire and/or contain an escaped prescribed fire The following table represents this relationship:

Table IX. Fire suppression capabilities as defined by flame lengths.

Flame Length	Fire Suppression Interpretations
0–4'	Fires can generally be attacked at the head or flanks by persons using handtools **Handline should hold the fire.**
4–8'	Fires are too intense for direct attack on head by persons using handtools Handline cannot be relied on to hold fire Equipment such as dozers, engines, and retardant should be used aircraft can be effective
8-11'	Fires may present serious control problems - torching out, crowning and spotting. Control efforts at the head of the fire will probably be ineffective
11'+	Crowning, spotting and major runs are common Control efforts at the head of the fire are ineffective.

Flame length and rate of spread are used to determine fireline intensity (FLI) FLI is an important output of the fire behavior model used to account for fire behavior and fire effects A different combination of variables (rate of spread and fuel consumption), may produce the same fire intensities but different fire effects Fires with a high rate of spread are generally associated with low fuel consumption while fires with low rates of spread are generally associated with high fuel consumption, yet both have similar fire intensities Fires with the same intensity may be experienced with entirely different fire effects FLI and rate of spread can be used with the combination of tree height and bark thickness to determine which trees have the greatest chance of mortality from a fire

Scorch height: The fuel model programs predict lethal crown scorch height from flame length, ambient air temperature, and windspeed. The scorch height represents the maximum height in a convection column at which the lethal temperature for live crown foliage is reached. This output of the BEHAVE program is included in the Appendix.

Crown Scorch: Crown scorch models are not included in this Appendix and require specific data on tree species. Crown scorch (browning of needles or leaves in the crown of a tree caused by heat from a fire) can be determined from the fire behavior model. Flame length is particularly important in determining tree mortality. There is a direct relationship between flame length, crown scorch and tree mortality Mortality is related to crown scorch of trees based on height of the tree and percentage of crown scorched

Cambial death: Another model available enables managers to determine woody plants that may be killed by cambial death Rate of spread and bark thickness can be used to determine the time to reach lethal temperature resulting in cambial death

Duff consumption: Duff consumption is another variable equated to the effects of fire behavior which has an available model. Duff consumption is the result of glowing combustion and is primarily determined by its moisture content The assumptions of the models provide a good approximation of duff consumption Duff consumption will affect the survival of plants rooted in the duff as well as the viable seeds found in the duff Duff consumption also determines the extent of exposure of mineral soil, which affects the seedbed for colonizing species and fire induced germination of brush species (*Ceanothus velutinus, Ceanothus spp ,* *Arctostaphylos* spp)

IX

Tanoak Series Fire Behavior Characteristics

PLANT ASSOCIATION:	FIRE BEHAVIOR:	SERAL STAGE: Shrub/forb	Pole	Early mature	Mid-mature	Late mature	Old growth
LIDE2-UMCA/VAOV	Rate of spread (ft/min)	-	-	4	4	4	4
	Flame length (ft)	-	-	1 4	1.4	1.4	1.4
	Ambient air temp (F)	-	-SCORCH HEIGHT (ft)		-	-	-
	90	-	-	1	1	1	1
	95	-	-	1	1	1	1
	100	-	-	2	2	2	2
LIDE2-UMCA/RHDI	Rate of spread (ft/min)	-	-	6	6	6	6
	Flame length (ft)	-	-	2	2	2	2
	Ambient air temp (F):	-	-SCORCH HEIGHT (ft)		-	-	-
	90	-	-	3	3	3	3
	95	-	-	3	3	3	3
	100	-	-	4	4	4	4
LIDE2/VAOV-RHMA	Rate of spread (ft/min)	4	4	4	4	4	4
	Flame length (ft)	1 5	1 5	1 5	1.5	1 5	1.5
	Ambient air temp (F):	-	-SCORCH HEIGHT (ft)		-	-	-
	90	1	1	1	1	1	1
	95	2	2	2	2	2	2
	100	2	2	2	2	2	2
LIDE2/VAOV-GASH	Rate of spread (ft/min)	5	5	5	5	5	5
	Flame length (ft)	1.9	1.9	1.9	1.9	1.9	1.9
	Ambient air temp (F):	-	-SCORCH HEIGHT (ft)		-	-	-
	90	3	3	3	3	3	3
	95	3	3	3	3	3	3
	100	3	3	3	3	3	3

LIDE2/VAOV	Rate of spread (ft/min)	5	5	5	5	5	5
	Flame length (ft)	1 9	1.9	1.9	1.9	1.9	1 9
	Ambient air temp (F).	-	-SCORCH HEIGHT (ft)		-	-	-
	90	3	3	3	3	3	3
	95	3	3	3	3	3	3
	100	3	3	3	3	3	3
LIDE2/COCOC	Rate of spread (ft/min)	6	6	6	6	6	6
	Flame length (ft)	2	2	2	2	2	2
	Ambient air temp (F):	-	-SCORCH HEIGHT (ft)		-	-	-
	90	3	3	3	3	3	3
	95	3	3	3	3	3	3
	100	3	3	3	3	3	3
LIDE2-QUKE	Rate of spread (ft/min)	88	88	20	20	23	23
	Flame length (ft)	10 7	10.7	5 7	5 7	5.7	5 7
	Ambient air temp (F).	-	-SCORCH HEIGHT (ft)		-	-	-
	90	107	107	32	32	32	32
	95	118	118	35	35	35	35
	100	133	133	40	40	40	40
LIDE2/ACCI-GASH	Rate of spread (ft/min)	4	4	4	4	4	4
	Flame length (ft)	1.5	1.5	1.5	1.5	1.5	1.5
	Ambient air temp (F):	-	-SCORCH HEIGHT (ft)		-	-	-
	90	1	1	1	1	1	1
	95	2	2	2	2	2	2
	100	2	2	2	2	2	2
LIDE2-ACMA/POMU1	Rate of spread (ft/min)	4	4	4	4	4	4
	Flame length (ft)	1 5	1 5	1 5	1.5	1.5	1.5
	Ambient air temp (F):	-	-SCORCH HEIGHT (ft)		-	-	-
	90	1	1	1	1	1	1
	95	2	2	2	2	2	2
	100	2	2	2	2	2	2

PLANT ASSOCIATION:	FIRE BEHAVIOR	SERAL STAGE: Shrub/forb	Pole	Early mature	Mid-mature	Late mature	Old growth
LIDE2/ACCI	Rate of spread (ft/min)	4	4	4	4	4	4
	Flame length (ft)	1.5	1.5	1.5	1.5	1.5	1.5
	Ambient air temp (F).	-	-SCORCH HEIGHT (ft)		-	-	-
	90	1	1	1	1	1	1
	95	2	2	2	2	2	2
	100	2	2	2	2	2	2
LIDE2/GASH	Rate of spread (ft/min)	4	4	4	4	4	4
	Flame length (ft)	1.5	1.5	1.5	1.5	1.5	1.5
	Ambient air temp (F):	-	-SCORCH HEIGHT (ft)		-	-	-
	90	2	2	2	2	2	2
	95	2	2	2	2	2	2
	100	2	2	2	2	2	2
LIDE2/GASH-BENE1	Rate of spread (ft/min)	4	4	4	4	4	4
	Flame length (ft)	1.5	1.5	1.5	1.5	1.5	1.5
	Ambient air temp (F).	-	-SCORCH HEIGHT (ft)		-	-	-
	90	2	2	2	2	2	2
	95	2	2	2	2	2	2
	100	2	2	2	2	2	2
LIDE2/GASH-RHMA	Rate of spread (ft/min)	4	4	4	4	4	4
	Flame length (ft)	1.5	1.5	1.5	1.5	1.5	1.5
	Ambient air temp (F):	-	-SCORCH HEIGHT (ft)		-	-	-
	90	2	2	2	2	2	2
	95	2	2	2	2	2	2
	100	2	2	2	2	2	2
LIDE2-CADE3/FECA	Rate of spread (ft/min)	100	55	5	5	7	7
	Flame length (ft)	12.8	12.8	1.9	1.9	5.7	5.7
	Ambient air temp (F)	-	-SCORCH HEIGHT (ft)		-	-	-
	90	146	146	3	3	33	33
	95	162	162	3	3	36	36
	100	182	182	3	3	41	41

LIDE2-CHLA-TSHE/VAOV	Rate of spread (ft/mın)	4	4	4	4	4	4
	Flame length (ft)	1.4	1.4	1.4	1 4	1.4	1.4
	Ambıent air temp (F):	-	-SCORCH HEIGHT (ft)		-	-	-
	90	1	1	1	1	1	1
	95	1	1	1	1	1	1
	100	2	2	2	2	2	2
LIDE2-CHLA-UMCA/VAOV	Rate of spread (ft/mın)	4	4	4	4	4	4
	Flame length (ft)	1 4	1 4	1 4	1 4	1 4	1 4
	Ambıent aır temp (F)·	-	-SCORCH HEIGHT (ft)		-	-	-
	90	1	1	1	1	1	1
	95	1	1	1	1	1	1
	100	2	2	2	2	2	2
LIDE2-CHLA/VAOV-RHOC	Rate of spread (ft/mın)	4	4	4	4	4	4
	Flame length (ft)	1.5	1.5	1.5	1.5	1.5	1.5
	Ambient air temp (F):	-	-SCORCH HEIGHT (ft)		-	-	-
	90	1	1	1	1	1	1
	95	1	1	1	1	1	1
	100	2	2	2	2	2	2
LIDE2-CHLA/VAOV	Rate of spread (ft/mın)	4	4	4	4	4	4
	Flame length (ft)	1.4	1.4	1 4	1 4	1.4	1.4
	Ambıent aır temp (F)		SCORCH HEIGHT (ft)				
	90	1	1	1	1	1	1
	95	1	1	1	1	1	1
	100	2	2	2	2	2	2
LIDE2-CHLA-ALRH//Riparian	Rate of spread (ft/mın)	3	3	3	3	3	3
	Flame length (ft)	1.4	1.4	1.4	1.4	1.4	1.4
	Ambient air temp (F):		SCORCH HEIGHT (ft)				
	90	1	1	1	1	1	1
	95	1	1	1	1	1	1
	100	2	2	2	2	2	2

PLANT ASSOCIATION:	FIRE BEHAVIOR	SERAL STAGE: Shrub/forb	Pole	Early mature	Mid-mature	Late mature	Old growth
LIDE2-CHLA/VAPA	Rate of spread (ft/min)	3	3	3	3	3	3
	Flame length (ft)	1.4	1 4	1.4	1 4	1.4	1.4
	Ambient air temp (F)		SCORCH HEIGHT (ft)				
	90	1	1	1	1	1	1
	95	1	1	1	1	1	1
	100	2	2	2	2	2	2
LIDE2-CHLA/GASH	Rate of spread (ft/min)	4	4	4	4	4	4
	Flame length (ft)	1.5	1.5	1.5	1.5	1.5	1.5
	Ambient air temp (F):		SCORCH HEIGHT (ft)				
	90	1	1	1	1	1	1
	95	1	1	1	1	1	1
	100	2	2	2	2	2	2
LIDE2-CHLA/ACCI	Rate of spread (ft/min)	4	4	4	4	4	4
	Flame length (ft)	1.4	1.4	1.4	1 4	1.4	1 4
	Ambient air temp (F)		SCORCH HEIGHT (ft)				
	90	1	1	1	1	1	1
	95	1	1	1	1	1	1
	100	2	2	2	2	2	2
LIDE2-CHLA/BENE1/LIBOL	Rate of spread (ft/min)	4	4	4	4	4	4
	Flame length (ft)	1.5	1.5	1.5	1.5	1.5	1.5
	Ambient air temp (F):		SCORCH HEIGHT (ft)				
	90	1	1	1	1	1	1
	95	1	1	1	1	1	1
	100	2	2	2	2	2	2
LIDE2/QUVA-RHMA	Rate of spread (ft/min)	36	36	36	36	36	36
	Flame length (ft)	25.2	25 2	25 2	25 2	25 2	25.2
	Ambient air temp (F):		SCORCH HEIGHT (ft)				
	90	419	419	419	419	419	419
	95	465	465	465	465	465	465
	100	523	523	523	523	523	523

LIDE2/RHDI-LOHIV	Rate of spread (ft/min)	27	27	27	27	26	26
	Flame length (ft)	5.6	5.6	5.6	5.6	9.4	9.4
	Ambient air temp (F):		SCORCH HEIGHT (ft)				
	90	32	32	32	32	85	85
	95	35	35	35	35	95	95
	100	40	40	40	40	107	107
LIDE2/BENE1	Rate of spread (ft/min)	28	28	28	28	26	26
	Flame length (ft)	5.7	5.7	5.7	5.7	9.5	9.5
	Ambient air temp (F)		SCORCH HEIGHT (ft)				
	90	32	32	32	32	87	87
	95	36	36	36	36	97	97
	100	40	40	40	40	109	109
LIDE2-QUCH2/VAOV	Rate of spread (ft/min)	4	4	4	4	4	4
	Flame length (ft)	1.5	1.5	1.5	1.5	1.5	1.5
	Ambient air temp (F):		SCORCH HEIGHT (ft)				
	90	1	1	1	1	1	1
	95	2	2	2	2	2	2
	100	2	2	2	2	2	2
LIDE2-QUCH2-QUKE/RHDI	Rate of spread (ft/min)	75	6	6	24	24	24
	Flame length (ft)	11.3	2	2	6	6	6
	Ambient air temp (F):		SCORCH HEIGHT (ft)				
	90	117	3	3	36	36	36
	95	130	3	3	40	40	40
	100	146	4	3	45	45	45
LIDE2-QUCH2/RHDI	Rate of spread (ft/min)	82	7	7	27	27	27
	Flame length (ft)	11.7	2.1	2.1	6.3	6.3	6.3
	Ambient air temp (F):		SCORCH HEIGHT (ft)				
	90	126	3	3	39	39	39
	95	139	4	4	44	44	44
	100	157	4	4	49	49	49

PLANT ASSOCIATION:	FIRE BEHAVIOR	SERAL STAGE: Shrub/forb	Pole	Early mature	Mid-mature	Late mature	Old growth
LIDE2-QUCH2/GASH-BENE1	Rate of spread (ft/min)	4	4	4	4	4	4
	Flame length (ft)	1.6	1 6	1 6	1.6	1 6	1 6
	Ambient air temp (F):		SCORCH HEIGHT (ft)				
	90	2	2	2	2	2	2
	95	2	2	2	2	2	2
	100	2	2	2	2	2	2
LIDE2-QUCH2/BENE1	Rate of spread (ft/min)	82	7	41	28	28	69
	Flame length (ft)	11.7	2.1	11.7	6.2	6.2	11.7
	Ambient air temp (F):		SCORCH HEIGHT (ft)				
	90	125	3	125	39	39	125
	95	139	4	139	43	43	139
	100	156	4	156	49	49	156
LIDE2-QUCH2//Rockpile	Rate of spread (ft/min)	84	7	7	10	10	10
	Flame length (ft)	11 8	2.1	2 1	6.3	6 3	6 3
	Ambient air temp (F):		SCORCH HEIGHT (ft)				
	90	127	3	3	40	40	40
	95	141	4	4	44	44	44
	100	159	4	4	49	49	49
LIDE2-CACH2/VAOV-GASH	Rate of spread (ft/min)	4	4	4	4	4	4
	Flame length (ft)	1.4	1.4	1.4	1.4	1.4	1.4
	Ambient air temp (F):		SCORCH HEIGHT (ft)				
	90	1	1	1	1	1	1
	95	2	2	2	2	2	2
	100	2	2	2	2	2	2
LIDE2-CACH2/GASH	Rate of spread (ft/min)	4	4	4	4	4	4
	Flame length (ft)	1 4	1 4	1.4	1 4	1.4	1.4
	Ambient air temp (F):		SCORCH HEIGHT (ft)				
	90	1	1	1	1	1	1
	95	2	2	2	2	2	2
	100	2	2	2	2	2	2

LIDE2-CACH2/GASH-RHMA	Rate of spread (ft/mın)	4	4	4	4	4	4
	Flame length (ft)	1.5	1.5	1.5	1.5	1.5	1.5
	Ambient air temp (F):		SCORCH HEIGHT (ft)				
	90	1	1	1	1	1	1
	95	2	2	2	2	2	2
	100	2	2	2	2	2	2
LIDE2-CACH2/BENE1	Rate of spread (ft/mın)	105	7	44	28	28	96
	Flame length (ft)	11 6	2.1	11 7	6.2	6.2	13 7
	Ambient air temp (F)		SCORCH HEIGHT (ft)				
	90	123	3	125	39	39	163
	95	137	4	139	43	43	181
	100	154	4	156	43	43	204
LIDE2-CACH2/RHMA/XETE	Rate of spread (ft/min)	33	33	80	80	55	55
	Flame length (ft)	7.4	7.4	9.3	9.3	9.3	9.3
	Ambient air temp (F):		SCORCH HEIGHT (ft)				
	90	55	55	83	83	83	83
	95	61	61	92	92	92	92
	100	68	68	104	104	104	104
LIDE2-CACH2/PTAQL	Rate of spread (ft/min)	90	5	35	24	24	82
	Flame length (ft)	10 8	1 9	10 9	5.7	5 7	12.8
	Ambient aır temp (F)		SCORCH HEIGHT (ft)				
	90	109	3	110	33	33	146
	95	121	3	122	36	36	162
	100	136	3	138	41	41	182

Douglas-fir Series Fire Behavior Characteristics

PLANT ASSOCIATION:	FIRE BEHAVIOR	SERAL STAGE: Shrub/forb	Pole	Early mature	Mid-mature	Late mature	Old growth
PSME-UMCA/RHDI	Rate of spread (ft/min)	4	4	4	4	4	4
	Flame length (ft)	1.4	1.4	1.4	1.4	1.4	1.4
	Ambient air temp (F):		SCORCH HEIGHT (ft)				
	90	1	1	1	1	1	1
	95	1	1	1	1	1	1
	100	1	1	1	1	1	1
PSME-UMCA/HODI	Rate of spread (ft/min)	5	5	5	5	5	5
	Flame length (ft)	1.6	1.6	1.6	1.6	1.6	1.6
	Ambient air temp (F):		SCORCH HEIGHT (ft)				
	90	2	2	2	2	2	2
	95	2	2	2	2	2	2
	100	2	2	2	2	2	2
PSME-ALRU2/ACCI/MOSI	Rate of spread (ft/min)	3	3	3	3	3	3
	Flame length (ft)	1.4	1.4	1.4	1.4	1.4	1.4
	Ambient air temp (F):		SCORCH HEIGHT (ft)				
	90	1	1	1	1	1	1
	95	1	1	1	1	1	1
	100	1	1	1	1	1	1
PSME-QUKE//Metamorphic	Rate of spread (ft/min)	123	32	27	27	26	26
	Flame length (ft)	11.1	13.1	9.4	9.4	9.4	9.4
	Ambient air temp (F):		SCORCH HEIGHT (ft)				
	90	114	114	85	85	85	85
	95	127	127	95	95	95	95
	100	143	143	107	107	107	107

PSME-QUKE//Sandstone	Rate of spread (ft/min)	112	29	24	24	23	23
	Flame length (ft)	12.5	12.5	8.9	8.9	8.9	8.9
	Ambient air temp (F):		SCORCH HEIGHT (ft)				
	90	140	140	78	78	78	78
	95	155	155	86	86	86	86
	100	175	175	97	97	97	97
PSME-QUKE-QUGA2/GRASS	**Rate of spread (ft/min)**	**119**	**31**	**26**	**26**	**25**	**25**
	Flame length (ft)	**12.9**	**12.9**	**9.3**	**9.3**	**9.7**	**9.7**
	Ambient air temp (F):		**SCORCH HEIGHT (ft)**				
	90	**147**	**147**	**83**	**83**	**90**	**90**
	95	**163**	**163**	**92**	**92**	**100**	**100**
	100	**184**	**184**	**104**	**104**	**112**	**112**
PSME-CADE3/FECA	Rate of spread (ft/min)	129	76	47	47	98	98
	Flame length (ft)	12.8	12.8	12.8	12.8	12.8	12.8
	Ambient air temp (F):		SCORCH HEIGHT (ft)				
	90	145	145	145	145	145	145
	95	161	161	161	161	161	161
	100	181	181	181	181	181	181
PSME-QUGA2/GRASS	**Rate of spread (ft/min)**	**131**	**80**	**47**	**47**	**26**	**26**
	Flame length (ft)	**12.9**	**12.9**	**12.9**	**12.9**	**9.3**	**9.3**
	Ambient air temp (F):		**SCORCH HEIGHT (ft)**				
	90	**147**	**147**	**147**	**147**	**147**	**147**
	95	**163**	**163**	**163**	**163**	**92**	**92**
	100	**184**	**184**	**184**	**184**	**104**	**104**
PSME-QUGA2/HODI	Rate of spread (ft/min)	137	92	54	54	127	127
	Flame length (ft)	13.7	13.7	13.7	13.7	13.7	13.7
	Ambient air temp (F):		SCORCH HEIGHT (ft)				
	90	163	163	163	163	163	163
	95	181	181	181	181	181	181
	100	204	204	204	204	204	204

PLANT ASSOCIATION:	FIRE BEHAVIOR	SERAL STAGE: Shrub/forb	Pole	Early mature	Mid-mature	Late mature	Old growth
PSME-QUCH2//Rockpile	Rate of spread (ft/min)	121	66	9	9	24	24
	Flame length (ft)	14	14	6 4	6.4	15.2	15.2
	Ambient air temp (F):		SCORCH HEIGHT (ft)				
	90	167	167	41	41	41	41
	95	186	186	45	45	213	213
	100	209	209	51	51	239	239
PSME-QUCH2-ARME3/RHDI	Rate of spread (ft/min)	116	49	9	9	22	22
	Flame length (ft)	13.7	12.1	6.2	6.2	14.8	14.8
	Ambient air temp (F):		SCORCH HEIGHT (ft)				
	90	162	162	39	39	184	184
	95	180	180	43	43	205	205
	100	203	203	48	48	230	230
PSME-QUCH2-LIDE2	Rate of spread (ft/min)	115	63	9	9	22	22
	Flame length (ft)	13 6	13.6	6 2	6 2	14 8	14.8
	Ambient air temp (F).		SCORCH HEIGHT (ft)				
	90	161	161	38	38	183	183
	95	179	179	43	43	203	203
	100	201	201	48	48	229	229
PSME-PIJE/FECA	Rate of spread (ft/min)	129	76	47	47	98	98
	Flame length (ft)	12.8	12.8	12.8	12.8	12.8	12.8
	Ambient air temp (F):		SCORCH HEIGHT (ft)				
	90	145	145	145	145	145	145
	95	161	161	161	161	161	161
	100	181	181	181	181	181	181
PSME/COCOC	Rate of spread (ft/min)	19	19	18	18	18	18
	Flame length (ft)	4 2	4 2	6 9	6 9	6 9	6.9
	Ambient air temp (F)		SCORCH HEIGHT (ft)				
	90	17	17	47	47	47	47
	95	18	18	52	52	52	52
	100	21	21	59	59	59	59

PSME-LIDE2/WHMO	Rate of spread (ft/min)	101	25	29	29	29	29
	Flame length (ft)	11.4	6.1	5.8	5.8	5.8	5.8
	Ambient air temp (F):		SCORCH HEIGHT (ft)				
	90	119	37	34	34	34	34
	95	133	41	38	38	38	38
	100	149	47	42	42	42	42
PSME-LIDE2/QUVA-HODI	Rate of spread (ft/min)	91	91	91	91	91	91
	Flame length (ft)	10.9	10.9	10.9	10.9	10.9	10.9
	Ambient air temp (F):		SCORCH HEIGHT (ft)				
	90	110	110	110	110	110	110
	95	122	122	122	122	122	122
	100	137	137	137	137	137	137
PSME-ACMA/POMU1	Rate of spread (ft/min)	3	3	3	3	3	3
	Flame length (ft)	1.4	1.4	1.4	1.4	1.4	1.4
	Ambient air temp (F):		SCORCH HEIGHT (ft)				
	90	1	1	1	1	1	1
	95	1	1	1	1	1	1
	100	1	1	1	1	1	1
PSME-ACMA/PHLEG	Rate of spread (ft/min)	5	5	5	5	5	5
	Flame length (ft)	1.6	1.6	1.6	1.6	1.6	1.6
	Ambient air temp (F):		SCORCH HEIGHT (ft)				
	90	2	2	2	2	2	2
	95	2	2	2	2	2	2
	100	2	2	2	2	2	2
PSME/ACCI-BENE1	Rate of spread (ft/min)	3	3	3	3	3	3
	Flame length (ft)	1.4	1.4	1.4	1.4	1.4	1.4
	Ambient air temp (F):		SCORCH HEIGHT (ft)				
	90	1	1	1	1	1	1
	95	1	1	1	1	1	1
	100	1	1	1	1	1	1

PLANT ASSOCIATION:	FIRE BEHAVIOR	SERAL STAGE: Shrub/forb	Pole	Early mature	Mid-mature	Late mature	Old growth
PSME/QUVA	Rate of spread (ft/min)	106	106	97	97	97	97
	Flame length (ft)	13.3	13.3	11 2	11 2	11.2	11.2
	Ambient air temp (F):			SCORCH HEIGHT (ft)			
	90	154	154	116	116	116	116
	95	171	171	129	129	129	129
	100	192	192	145	145	145	145
PSME/QUVA-LIDEE	Rate of spread (ft/min)	106	106	97	97	97	97
	Flame length (ft)	13.3	13.3	11.2	11.2	11.2	11.2
	Ambient air temp (F):			SCORCH HEIGHT (ft)			
	90	154	154	116	116	116	116
	95	171	171	129	129	129	129
	100	192	192	145	145	145	145
PSME/QUVA-RHMA	Rate of spread (ft/min)	72	72	67	67	67	67
	Flame length (ft)	9.9	9.9	8 3	8.3	8.3	8.3
	Ambient air temp (F):			SCORCH HEIGHT (ft)			
	90	93	93	68	68	68	68
	95	104	104	76	76	76	76
	100	117	117	86	86	86	86
PSME-CACH2-LIDE2	Rate of spread (ft/min)	41	41	52	52	16	16
	Flame length (ft)	11.2	11.2	11.1	11.1	9.5	9.5
	Ambient air temp (F):			SCORCH HEIGHT (ft)			
	90	116	116	114	114	87	87
	95	129	129	127	127	96	96
	100	145	145	143	143	108	108
PSME-CACH2-LIDE2/BENE1	Rate of spread (ft/min)	37	37	47	47	14	14
	Flame length (ft)	10.8	10 8	10 7	10.7	9 1	9 1
	Ambient air temp (F):			SCORCH HEIGHT (ft)			
	90	108	108	107	107	80	80
	95	120	120	118	118	89	89
	100	135	135	133	133	100	100

PSME-CACH2/XETE	Rate of spread (ft/min)	42	42	53	53	16	16
	Flame length (ft)	11.3	11.3	11.2	11.2	9.6	9.6
	Ambient air temp (F):		SCORCH HEIGHT (ft)				
	90	118	118	116	116	88	88
	95	131	131	129	129	98	98
	100	147	147	146	146	111	111
PSME-CACH2/RHMA-BENE1	Rate of spread (ft/min)	19	19	34	34	10	10
	Flame length (ft)	6 3	6.3	8.2	8 2	6 7	6.7
	Ambient air temp (F)		SCORCH HEIGHT (ft)				
	90	39	39	66	66	45	45
	95	44	44	73	73	50	50
	100	49	49	82	82	57	57
PSME-CACH2/RHMA-GASH	Rate of spread (ft/min)	19	19	35	35	10	10
	Flame length (ft)	6.3	6.3	8.2	8.2	6 8	6.8
	Ambient air temp (F):		SCORCH HEIGHT (ft)				
	90	40	40	67	67	46	46
	95	44	44	74	74	51	51
	100	50	50	83	83	57	57
PSME-CACH2/RHMA-QUSA-GASH	Rate of spread (ft/min)	18	18	32	32	9	9
	Flame length (ft)	6 1	6.1	7 9	7 9	6 5	6.5
	Ambient air temp (F).		SCORCH HEIGHT (ft)				
	90	37	37	62	62	42	42
	95	41	41	69	69	47	47
	100	46	46	78	78	53	53
PSME-CACH2/RHMA-QUSA/XETE	Rate of spread (ft/min)	17	17	31	31	9	9
	Flame length (ft)	6	6	7.8	7.8	6.4	6.4
	Ambient air temp (F):		SCORCH HEIGHT (ft)				
	90	36	36	60	60	41	41
	95	40	40	67	67	46	46
	100	45	45	76	76	51	51

Appendix X: Resistence to Fire Control

X

Resistance to Control

Resistance to Control: Fire suppression efforts are concerned with the ability to construct fireline to control a wildfire Fireline generally consists of an area 6-8' wide where all vegetation above the forest floor is removed and a 12-18" wide strip or area is dug down to mineral soil next to the fire's perimeter. Two major factors influence the ability to construct fireline, fire behavior and vegetation

Fire Behavior: This has been rated from Low to Extreme for two of the fire behavior model outputs rates of spread and flame length. The rates of spread and flame length have an impact on how fast fire line can be constructed to encompass a fire by flanking two sides of the fire. Flame length affects the physical ability of firefighters to construct fireline close to the fire

Fire Intensity Level (FIL) is used in National Fire Management Analysis Systems (NFMAS), as a measure of potential fire severity It is based on the flame length as calculated in the fire behavior model The suppression effectiveness of local initial attack suppression resources with relationship to FIL, rates of spread and flame length has been estimated as follows:

Value	FIL	Rate of Spread (Chains/hr)	(ft/min)	Flame Length (feet)	Suppression Effectiveness
Low	1	0–5.5	0–5	0–2	3-person handcrew or engine
Moderate	2	5 6–11.1	5 1–11	2 1–4	5-person handcrew or engine
High	3	11 2–24 2	11.1–22	4 1–62	5-person engines, 20-person handcrew, water tender, aerial support.
Very High	4	24 3–36 3	22.1–33	6 1–8	All of the above plus dozers and additional aerial support
Extreme	5	36 4+	33.1+	8 1+	Beyond initial attack capabilities, into extended attack

Note: These rates are used to estimate initial action productivity only with respect to local conditions (fuel types, slopes and soil conditions) These DO NOT estimate sustained fireline construction, burn out, and holding productivity or control tactics Initial actions consist of containment tactics of wet line, scratch line construction and hotspotting

X

Vegetation: This has been rated from Low to Extreme as related to fuel accumulation, brush component and soil conditions Vegetation greatly affects the fire fighter and equipment's ability to construct fireline. Firefighters can construct fireline much faster in leaf litter than in a riparian area of thick evergreen huckleberry and Pacific rhododendron shrubs

Tanoak Series Resistance to Fire Control

PLANT ASSOCIATION:	RESISTENCE TO CONTROL:	SERAL STAGE: shrub/forb	pole	early mature	mid-mature	late mature	old growth
LIDE2-UMCA/VAOV	rate of spread	-	-	L	L	L	L
	flame length	-	-	L	L	L	L
	vegetation	-	-	H-E	H-E	H-E	H-E
LIDE2-UMCA/RHDI	rate of spread	-	-	L-M	L-M	L-M	L-M
	flame length	-	-	L	L	L	L
	vegetation	-	-	H-E	H-E	H-E	H-E
LIDE2/VAOV-RHMA	rate of spread	L	L	L	L	L	L
	flame length	L	L	L	L	L	L
	vegetation	H-E	H-E	H-E	H-E	H-E	H-E
LIDE2/VAOV-GASH	rate of spread	L	L	L	L	L	L
	flame length	L	L	L	L	L	L
	vegetation	H-E	H-E	H-E	H-E	H-E	H-E
LIDE2/VAOV	rate of spread	L	L	L	L	L	L
	flame length	L	L	L	L	L	L
	vegetation	H-E	H-E	H-E	H-E	H-E	H-E
LIDE2/COCOC	rate of spread	M	M	M	M	M	M
	flame length	L	L	L	L	L	L
	vegetation	H-E	H-E	H-E	H-E	H-E	H-E
LIDE2-QUKE	rate of spread	E	E	E	E	E	E
	flame length	E	E	E	E	E	E
	vegetation	M-VH	M-VH	M-VH	M-VH	M-VH	M-VH
LIDE2/ACCI-GASH	rate of spread	L	L	L	L	L	L
	flame length	L	L	L	L	L	L
	vegetation	H-E	H-E	H-E	H-E	H-E	H-E
LIDE2-ACMA/POMU1	rate of spread	L	L	L	L	L	L
	flame length	L	L	L	L	L	L
	vegetation	H-E	H-E	H-E	H-E	H-E	H-E

LIDE2/ACCI	rate of spread	L	L	L	L	L	L
	flame length	L	L	L	L	L	L
	vegetation	H-E	H-E	H-E	H-E	H-E	H-E
LIDE2/GASH	rate of spread	L	L	L	L	L	L
	flame length	L	L	L	L	L	L
	vegetation	H-E	H-E	H-E	H-E	H-E	H-E
LIDE2/GASH-BENE1	rate of spread	L	L	L	L	L	L
	flame length	L	L	L	L	L	L
	vegetation	H-VH	H-VH	H-VH	H-VH	H-VH	H-VH
LIDE2/GASH-RHMA	rate of spread	L	L	L	L	L	L
	flame length	L	L	L	L	L	L
	vegetation	H-E	H-E	H-E	H-E	H-E	H-E
LIDE2-CADE3/FECA	rate of spread	E	E	L	L	VH	VH
	flame length	E	E	L	L	H	H
	vegetation	L-H	L-H	L	L	L-M	L-M
LIDE2-CHLA-TSHE/VAOV	rate of spread	L	L	L	L	L	L
	flame length	L	L	L	L	L	L
	vegetation	L-M	L-M	L-M	L-M	L-M	L-M
LIDE2-CHLA-UMCA/VAOV	rate of spread	L	L	L	L	L	L
	flame length	L	L	L	L	L	L
	vegetation	H-E	H-E	H-E	H-E	H-E	H-E
LIDE2-CHLA/VAOV-RHOC	rate of spread	L	L	L	L	L	L
	flame length	L	L	L	L	L	L
	vegetation	H-E	H-E	H-E	H-E	H-E	H-E
LIDE2-CHLA/VAOV	rate of spread	L	L	L	L	L	L
	flame length	L	L	L	L	L	L
	vegetation	H-E	H-E	H-E	H-E	H-E	H-E
LIDE2-CHLA-ALRH//Riparian	rate of spread	L	L	L	L	L	L
	flame length	L	L	L	L	L	L
	vegetation	H-E	H-E	H-E	H-E	H-E	H-E
LIDE2-CHLA/VAPA	rate of spread	L	L	L	L	L	L
	flame length	L	L	L	L	L	L
	vegetation	H-E	H-E	H-E	H-E	H-E	H-E

PLANT ASSOCIATION:	RESISTENCE TO CONTROL:	SERAL STAGE: shrub/forb	pole	early mature	mid-mature	late mature	old growth
LIDE2-CHLA/GASH	rate of spread	L	L	L	L	L	L
	flame length	L	L	L	L	L	L
	vegetation	H-E	H-E	H-E	H-E	H-E	H-E
LIDE2-CHLA/ACCI	rate of spread	L	L	L	L	L	L
	flame length	L	L	L	L	L	L
	vegetation	H-E	H-E	H-E	H-E	H-E	H-E
LIDE2-CHLA/BENE1/LIBOL	rate of spread	L	L	L	L	L	L
	flame length	L	L	L	L	L	L
	vegetation	H-E	H-E	H-E	H-E	H-E	H-E
LIDE2/QUVA-RHMA	rate of spread	E	E	E	E	E	E
	flame length	E	E	E	E	E	E
	vegetation	H-E	H-E	H-E	H-E	H-E	H-E
LIDE2/RHDI-LOHIV	rate of spread	VH	VH	VH	VH	VH	VH
	flame length	H	H	H	H	E	E
	vegetation	H-VH	H	M	M	H-VH	H-VH
LIDE2/BENE1	rate of spread	VH	VH	VH	VH	VH	VH
	flame length	H	H	H	H	E	E
	vegetation	H-VH	H	M	M	H-VH	H-VH
LIDE2-QUCH2/VAOV	rate of spread	L	L	L	L	L	L
	flame length	L	L	L	L	L	L
	vegetation	H-E	H-E	H-E	H-E	H-E	H-E
LIDE2-QUCH2-QUKE/RHDI	rate of spread	E	M	M	VH	VH	VH
	flame length	E	L	L	VH	VH	VH
	vegetation	VH-E	H	H	M-H	M-H	M-H
LIDE2-QUCH2/RHDI	rate of spread	E	M	M	VH	VH	VH
	flame length	E	M	M	VH	VH	VH
	vegetation	H-E	H-VH	H-VH	M-H	M-H	M-H

LIDE2-QUCH2/GASH-BENE1	rate of spread	L	L	L	L	L	L
	flame length	L	L	L	L	L	L
	vegetation	H-E	H-E	H-E	H-E	H-E	H-E
LIDE2-QUCH2/BENE1	rate of spread	E	M	E	VH	VH	E
	flame length	E	M	E	VH	VH	E
	vegetation	H-E	H-VH	M-VH	M-H	M-H	M-H
LIDE2-QUCH2//Rockpile	rate of spread	E	M	M	M	M	M
	flame length	E	M	M	VH	VH	VH
	vegetation	H-E	H-VH	M-VH	M-H	M-H	M-H
LIDE2-CACH2/VAOV-GASH	rate of spread	L	L	L	L	L	L
	flame length	L	L	L	L	L	L
	vegetation	H-E	H-E	H-E	H-E	H-E	H-E
LIDE2-CACH2/GASH	rate of spread	L	L	L	L	L	L
	flame length	L	L	L	L	L	L
	vegetation	H-E	H-E	H-E	H-E	H-E	H-E
LIDE2-CACH2/GASH-RHMA	rate of spread	L	L	L	L	L	L
	flame length	L	L	L	L	L	L
	vegetation	H-E	H-E	H-E	H-E	H-E	H-E
LIDE2-CACH2/BENE1	rate of spread	E	M	E	VH	VH	E
	flame length	E	M	E	VH	VH	E
	vegetation	M-H	M-H	M-H	M-H	M-H	M-H
LIDE2-CACH2/RHMA/XETE	rate of spread	VH	VH	E	E	E	E
	flame length	VH	VH	E	E	E	E
	vegetation	H-E	H-E	H-E	H-E	H-E	H-E
LIDE2-CACH2/PTAQL	rate of spread	E	L	VH	H	H	E
	flame length	E	L	E	H	H	E
	vegetation	M-H	M-H	M-H	M-H	M-H	M-H

Douglas-fir Series Resistance to Fire Control

PLANT ASSOCIATION:	RESISTANCE TO CONTROL:	SERAL STAGE: shrub/forb	pole	early mature	mid-mature	late mature	old growth
PSME-UMCA/RHDI	rate of spread	L	L	L	L	L	L
	flame length	L	L	L	L	L	L
	vegetation	M	M	M	M	M	M
PSME-UMCA/HODI	rate of spread	L	L	L	L	L	L
	flame length	L	L	L	L	L	L
	vegetation	M	M	M	M	M	M
PSME-ALRU2/ACCI/MOSI	rate of spread	L	L	L	L	L	L
	flame length	L	L	L	L	L	L
	vegetation	H-E	H-E	H-E	H-E	H-E	H-E
PSME-QUKE//Metamorphic	rate of spread	E	VH	VH	VH	VH	VH
	flame length	E	E	E	E	E	E
	vegetation	M	L	M	M	H	H
PSME-QUKE//Sandstone	rate of spread	E	VH	VH	VH	VH	VH
	flame length	E	E	E	E	E	E
	vegetation	M	L	M	M	H	H
PSME-QUKE-QUGA2/GRASS	rate of spread	E	VH	VH	VH	VH	VH
	flame length	E	E	E	E	E	E
	vegetation	M	L	M	M	H	H
PSME-CADE3/FECA	rate of spread	E	E	E	E	E	E
	flame length	E	E	E	E	E	E
	vegetation	L-M	M	L	L	L-M	L-M
PSME-QUGA2/GRASS	rate of spread	E	E	E	E	VH	VH
	flame length	E	E	E	E	E	E
	vegetation	M	L-M	M	M	M-H	M-H
PSME-QUGA2/HODI	rate of spread	E	E	E	E	E	E
	flame length	E	E	E	E	E	E
	vegetation	M	L-M	L-M	L-M	M-H	M-H

PSME-QUCH2//Rockpile	rate of spread	E	E	M	M	H	H
	flame length	E	E	VH	VH	E	E
	vegetation	H-VH	H-VH	M-H	M-H	H-VH	H-VH
PSME-QUCH2-ARME3/RHDI	rate of spread	E	E	M	M	H	H
	flame length	E	E	VH	VH	E	E
	vegetation	H-VH	H-VH	M-H	M-H	H-VH	H-VH
PSME-QUCH2-LIDE2	rate of spread	E	E	M	M	H	H
	flame length	E	E	VH	VH	E	E
	vegetation	H-VH	H-VH	M-H	M-H	H-VH	H-VH
PSME-PIJE/FECA	rate of spread	E	E	E	E	E	E
	flame length	E	E	E	E	E	E
	vegetation	L-M	M	L	L	L-M	L-M
PSME/COCOC	rate of spread	H	H	H	H	H	H
	flame length	H	H	VH	VH	VH	VH
	vegetation	L-M	L	L	L	L-M	L-M
PSME-LIDE2/WHMO	rate of spread	E	VH	VH	VH	VH	VH
	flame length	E	VH	H	H	H	H
	vegetation	H-VH	M-VH	L-H	L-H	M-H	M-H
PSME-LIDE2/QUVA-HODI	rate of spread	E	E	E	E	E	E
	flame length	E	E	E	E	E	E
	vegetation	H-E	VH-E	VH-E	VH-E	VH-E	VH-E
PSME-ACMA/POMU1	rate of spread	L	L	L	L	L	L
	flame length	L	L	L	L	L	L
	vegetation	H-E	H-E	H-E	H-E	H-E	H-E
PSME-ACMA/PHLEG	rate of spread	L	L	L	L	L	L
	flame length	L	L	L	L	L	L
	vegetation	H	H	H	H	H	H
PSME/ACCI-BENE1	rate of spread	L	L	L	L	L	L
	flame length	L	L	L	L	L	L
	vegetation	H-E	H-E	H-E	H-E	H-E	H-E

PLANT ASSOCIATION:	RESISTANCE TO CONTROL:	SERAL STAGE: shrub/forb	pole	early mature	mid-mature	late mature	old growth
PSME/QUVA	rate of spread	E	E	E	E	E	E
	flame length	E	E	E	E	E	E
	vegetation	VH-E	VH-E	VH-E	VH-E	VH-E	VH-E
PSME/QUVA-LIDEE	rate of spread	E	E	E	E	E	E
	flame length	E	E	E	E	E	E
	vegetation	VH-E	VH-E	VH-E	VH-E	VH-E	VH-E
PSME/QUVA-RHMA	rate of spread	E	E	E	E	E	E
	flame length	E	E	E	E	E	E
	vegetation	VH-E	VH-E	VH-E	VH-E	VH-E	VH-E
PSME-CACH2-LIDE2	rate of spread	E	E	E	E	E	E
	flame length	E	E	E	E	E	E
	vegetation	H-VH	H-VH	H-VH	H-VH	H-VH	H-VH
PSME-CACH2-LIDE2/BENE1	rate of spread	E	E	E	E	H	H
	flame length	E	E	E	E	E	E
	vegetation	M-H	M-H	H-E	H-E	H-VH	H-VH
PSME-CACH2/XETE	rate of spread	E	E	E	E	E	E
	flame length	E	E	E	E	E	E
	vegetation	H-VH	H-VH	H-VH	H-VH	H-VH	H-VH
PSME-CACH2/RHMA-BENE1	rate of spread	H	H	VH	VH	M-H	M-H
	flame length	VH	VH	VH	VH	VH	VH
	vegetation	M-H	M-H	H-E	H-E	M-H	M-H
PSME-CACH2/RHMA-GASH	rate of spread	H	H	VH	VH	M	M
	flame length	VH	VH	VH	VH	VH	VH
	vegetation	H-VH	H-VH	H-VH	H-VH	H-VH	H-VH
PSME-CACH2/RHMA-QUSA-GASH	rate of spread	H	H	VH	VH	M	M
	flame length	VH	VH	VH	VH	VH	VH
	vegetation	M-H	M-H	H-E	H-E	M-H	M-H
PSME-CACH2/RHMA-QUSA/XETE	rate of spread	H	H	VH	VH	M	M
	flame length	H	H	VH	VH	VH	VH
	vegetation	M-H	M-H	H-E	H-E	M-H	M-H

Appendix XI: Wildlife Associated with the Tanoak and the Douglas-fir Series

XI

Wildlife Associated with the Tanoak and the Douglas-fir Series

	young	mature	old growth
northwestern salamander	p?	p?	p?
Pacific giant salamander	p	p	p +
Olympic salamander	p	p	*
rough-skinned newt	p	p	p
Dunn's salamander	p?	p?	+?
Del norte salamander	p	p	*
ensatina	p	p	+
California slender salamander	p	+	+
black salamander	p	p	p
clouded salamander	p	p	+
tailed frog	p	*	*
western toad	?	?	?
Pacific treefrog	p	p	p
foothill yellow-legged frog	p	p	p
red-legged frog	+?	P?	p?
vagrant shrew	p?	p?	p?
Pacific shrew	p	p	p
Trowbridge's shrew	p	p	p
shrew-mole	p?	+?	+?
coast mole	p?	p?	p?
broad-footed mole	?	?	?
fringed myotis	p?	p?	*?
long-legged myotis	p?	p?	*?
silver-haired bat	p?	p?	*?
big brown bat	p?	p?	*?
hoary bat	?	?	?
Douglas' squirrel	p	+	+
northern flying squirrel	p?	p?	+?
western red-backed vole	p	+	+
red tree vole	p	p	+
deer mouse	p	p	p
pinon mouse	p	p	p
creeping vole	?	?	?
Pacific jumping mouse	?	?	?
fisher	p	p	+
ermine	?	?	?
blue grouse	p?	p?	p?
ruffed grouse	p?	p?	p?
mountain quail	p	p	p
band-tailed pigeon	p?	p?	p?
marbled murrelet	p	p	*
barred owl	?	?	?
northern pygmy owl	p?	+?	+?
spotted owl	p	+	*
Allen's hummingbird	p	p	+
Vaux's swift	p?	p?	*?
downy woodpecker	p?	p?	p?
hairy woodpecker	p	p	*

	young	mature	old growth
northern flicker	p	p	p
pileated woodpecker	p	+	+
red-breasted sapsucker	p	p	p
Hammonds' Flycatcher	p	p	p
olive-sided flycatcher	p	p	p
western flycatcher	p	+	*
western wood-pewee	p	p	p
common raven	p	p	p
gray jay	p?	p?	p?
Steller's jay	p	p	p
chestnut-backed chickadee	p	+	+
red-breasted nuthatch	p	p	p
white-breasted nuthatch	p?	p?	p?
brown creeper	p	+	*
house wren	p	+	*
winter wren	+	p	+
golden-crowned kinglet	?	?	?
ruby-crowned kinglet	p?	p?	p?
American robin	p	+	+
hermit thrush	p	p	p
Swainson's thrush	p?	p?	p?
Townsend's solitaire	+	p	p
varied thrush	p	p	p
wrentit	p	p	+
black-throated gray warbler	+	+	p
hermit warbler	p	+	+
Macgillivray's warbler	p?	p?	p?
Nashville warbler	p	p	p
orange-crowned warbler	p	p	p
Townsend's warbler	?	?	?
Wilson's warbler	p	p	p
yellow-rumped warbler	p	p	p
solitary vireo	p	+	+
Hutton's vireo	p	p	p
warbling vireo	p	p	p
western tanager	p	+	+
chipping sparrow	p?	p?	p?
dark-eyed junco	p	p	p
rufous-sided towhee	p	p	p
song sparrow	p?	p?	p?
black-headed grosbeak	p	+	+
evening grosbeak	p	p	p
pine siskin	p	p	p
purple finch	p	p	p
red crossbill	p	p	p

Legend: *=closely associated, p=present, +=associated, -=none, ?=unknown

XI

Appendix XII: Plants Gathered by American Indians in the Tanoak and the Douglas-fir Series

XII

Plants Gathered in the Tanoak and the Douglas-fir Series by the Hupa

Basketry:	Subsistence:	Medicines:	Crafts:	Ceremonial:
alder [1] (ALRU2, ALRH)	Yurba Buena (SADO1)	alder [1] (ALRU2)	cedar [2] (CADE3)	cedar [7] (CADE3)
beargrass (XETE)	huckleberry [5] (VAOV, VAPA)	cascara [1] (*Rhamnus purshiana*)	hazelnut [2] (COCOC)	manzanita [2] (ARC5)
hazel [3] (COCOC)	madrone [5] (ARME3)	yew [1] (TABR)	mock orange [2] (PHLEG)	wild iris (IRI)
maidenhair fern (ADPEA)	blackberry [5] (RUUR)	cedar [1, 7] (CADE3)	Jeffrey pine [5] (PIJE)	yew [2] (TABR)
woodwardia fern (WOFI)	elderberry [5] (SACE3)	madrone [1, 7] (ARME3)	yew [2] (TABR)	madrone [2] (ARME3)
ponderosa pine [4] (PIPO)	manzanita [5] (ARC5)	cow parsnip (HELA)	grape vine (*Vitis* sp.)	sugar pine [5] (PILA)
wolf moss (*Latharina vulpina*)	salmon seal [5] (RUSP)	horsetail (EQAR)	sugar pine [5] (PILA)	Jeffrey pine [5] (PIJE)
sugar pine [4] (PILA)	gooseberry [5] (RIB)	juneberry (AME)	beargrass (XETE)	wild ginger (ASA)
red willow [4] (*Salix laevigata*)	blackcap [5] (RULE)	wild ginger (ASA)	manzanita [2] (ARC5)	tanoak [5] (LIDE2)
Oregon-grape [4] (BENE1)	pepperwood [5] (UMCA)	mountain balm (ERCA6)	madrone [2] (ARME3)	beargrass (XETE)
	chinquapin [5] (CACH2)	yarrow (ACMI)		juneberry (AME)
	hazelnut (COCOC)	nettles (*Urtica gracilis*)		tobacco (*Nicotiana bigelovii*)
	tanoak [5] (LIDE2)	Oregon-grape [4] (BENE1)		
	black oak [5] (QUKE)	prince's pine (CHME2, CHUMO)		
	white oak [5] (QUGA2)	willow [1,7] (SAL11)		
	mountain balm (ERCA6)	salal [7] (GASH)		
	mushrooms	soap [4] (CHPO1)		
	sugar pine [5] (PILA)			
	Jeffrey pine [5] (PIJE)			
	clover [6] (TRI11)			
	spearmint [6] (MESP2)			

1=bark 2=wood 3=sticks 4=root 5=nut, berries, acorns, fruits 6=tea 7=leaves, needles, tips ()=EDP Code (Appendix I) or scientific name

Note: This table reflects only data gathered in Forest Service interviews and is not all inclusive as to plants gathered contemporarily or historically. The scientific name is in parenthesis when the plant was not found on the species list (Appendix I) or in the data set used in this guide.

Plants Gathered in the Tanoak and the Douglas-fir Series by the Karuk

Basketry:	Subsistence:	Medicines:	Crafts:	Ceremonial:
alder [1] (ALRU2 or ALRH)	hazelnut (COCOC)	alder [1] (ALRU2,ALRH)	mock orange (PHLEG)	wild iris (IRI)
Oregon-grape [4] (BENE1)	Ossoberry [5] (OSCE2)	maidenhair fern [7] (ADPEA)	hazelnut [2] (COCOC)	tobacco (*Nicotiana bigelovii*)
beargrass (XETE)	blackberry [5] (RUUR)	barberry (BENE1)	yew [2] (TABR)	manzanita [2] (ARC5)
maidenhair fern (ADPEA)	huckleberry [5] (VAOV, VAPA)	wild Carraway (PER)	beargrass (XETE)	yew [2] (TABR)
woodwardia fern (WOFI)	black cap [5] (RULE)	coyote mint (MOOD)	pine [5] (PIN-2)	tanoak [5] (LIDE2)
hazelnut [3] (COCOC)	salmonberry [5] (RUSP)	calypso orchid (CABU)	Port Orford cedar (CHLA)	beargrass (XETE)
Jeffrey pine [4] (PIJE)	manzanita [5] (ARC5)	colts foot (PEPA2)	manzanita [2] (ARC5)	alder [1] (ALRH,ALRU2)
gray willow (*Salix hindsiana*)	labrador tea (*Ledum glandulosum*)	Douglas-fir [7] (PSME)	madrone [2] (ARME3)	madrone [2] (ARME3)
yellow moss (*Usnea trichodea*)	mushrooms	chinquapin [5] (CACH2)	wild ginger (ASA)	pine [5] (PIN-2)
yellow pine [4] (PIPO)	wild caraway (PER)	mallow (SIMA1)		
red willow [4] (*Salix laevigata*)	tanoak [5] (LIDE2)	mint (*Mentha* sp.)		
	black oak [5] (QUKE)	mountain balm (ERCA6)		
	white oak [5] (QUGA2)	mullen (*Verbascum thapsis*)		
		ninebark (*Physocarpus capitatus*)		
		prince's pine (CHME2, CHUMO)		
		Solomon's seal (SMRAA)		
		yarrow (ACMI)		
		chitem [1] (*Rhamnus purshiana*)		
		wild dandelions (*Agroseris aurantiaca*)		
		pepperwood [5,7] (UMCA)		
		black oak [1] (QUKE)		
		yew [1] (TABR)		

1=bark 2=wood 3=sticks 4=root 5=nut, berries, acorns, fruits 6=tea 7=leaves, needles, tips ()=EDP Code (Appendix I) or scientific name

Note. This table reflects only data gathered in Forest Service interviews and is not all inclusive as to plants gathered contemporarily or historically. The scientific name is in parenthesis when the plant was not found on the species list (Appendix I) or in the data set used in this guide.

Plants Gathered in the Tanoak and the Douglas-fir Series by the Tolowa

Basketry:	Subsistence:	Medicines:	Crafts:	Ceremonial:
beargrass (XETE)	tanoak [5] (LIDE2)	madrone [1,5] (ARME3)	yew [2] (TABR)	tanoak [5] (LIDE2)
Douglas-fir [7] (PSME)	black oak [5] (QUKE)	Indian paintbrush (CAS2)	mock orange (PHLEG)	wild iris (IRI)
maidenhair fern (ADPEA)	white oak [5] (QUGA2)	mountain balm (ERCA6)	beargrass (XETE)	pine [5] (PIN-2)
woodwardia fern (WOFI)	chinquapin [5] (CACH2)	Oregon balm (BENE1)	pine [5] (PIN-2)	yew [2] (TABR)
hazelnut [3] (COCOC)	salmonberry [5] (RUSP)	Oregon-grape [4] (BENE1)	manzanita [2] (ARC5)	beargrass (XETE)
yellow pine [4] (PIPO)	huckleberry [5] (VAOV, VAPA)	prince's pine (CHME2, CHUMO)		tobacco (*Nicotiana bigelovii*)
sugar pine [4] (PILA)	blackcap [5] (RULE)	wormwood (*Artemisia douglasiana*)		
alder [1] (ALRU2)	manzanita [5] (ARC5)			
Oregon-grape [4] (BENE1)	blackberry [5] (RUUR)			
wolf moss (*Latharina vulpina*)	Yurba Buena (SADO1)			
wild lilac [3] (*C. thrysiflorus*)	labrador (*Ledum glandulosum*)			
	Indian potatoes (BREL)			
	mushrooms			
	myrtle [5] (UMCA)			
	Jeffrey pine [5] (PIJE)			

1=bark 2=wood 3=sticks 4=root 5=nut, berries, acorns, fruits 6=tea 7=leaves, needles, tips ()=EDP Code (Appendix I) or scientific name

Note: This table reflects only data gathered in Forest Service interviews and is not all inclusive as to plants gathered contemporarily or historically. The scientific name is in parenthesis when the plant was not found on the species list (Appendix I) or in the data set used in this guide.

Plants Gathered in the Tanoak and the Douglas-fir Series by the Yurok

Basketry:	Subsistence:	Medicines:	Crafts:	Ceremonial:
alder [1] (ALRU2 or ALRH)	black oak [5] (QUKE)	mountain balm (ERCA6)	sugar pine [5] (PILA)	tobacco (*Nicotiana bigelovii*)
red willow (*Salix laevigata*)	gooseberry (RIB)	Oregon-grape [4] (BENE1)	manzanita [2] (ARC5)	beargrass (XETE)
beargrass (XETE)	salmonberry (RUSP)	chinquapin [5] (CACH2)	yew [2] (TABR)	wild ginger (ASA)
woodwardia fern (WOFI)	huckleberry (VAOV, VAPA)	Prince's pine (CHME2,CHUMO)	beargrass (XETE)	wild iris (IRI)
maidenhair fern (ADPEA)	blackcap (RULE)	wild ginger (ASA)	mock orange (PHLEG)	yew [2] (TABR)
Oregon-grape [4] (BENE1)	manzanita (ARC5)	wild celery (*Lomatium californicum*)	manzanita [2] (ARC5)	redwood (SESE)
sugar pine [4] (PILA)	blackberry (RUUR)			sugar pine [5] (PILA)
yellow pine [4] (PIPO)	mountain balm (ERCA6)			mock orange (PHLEG)
yellow moss (*Usnea trichodea*)	mushrooms			oaks[5](LIDE2, QUKE, QUGA2)
wild lilac [3] (*C. thrysiflorus*)	hazelnut (COCOC)			
Jeffrey pine [4] (PIJE)	white oak [5] (QUGA2)			
gray willow [3] (*Salix hindsiana*)	tiger lily bulbs (*Lilium pardalinum*)			
	tanoak [5] (LIDE2)			
	scrub oak [5] (*Quercus dumosa*)			
	wild onions (*Allium bolanderi*)			
	pepperwood [5] (UMCA)			
	wild potatoes (BREL)			
	sugar pine [5] (PILA)			
	labrador (*Ledum glandulosum*)			

1=bark 2=wood 3=sticks 4=root 5=nut, berries, acorns, fruits 6=tea 7=leaves, needles, tips ()=EDP Code (Appendix I) or scientific name
Note: This table reflects only data gathered in Forest Service interviews and is not all inclusive as to plants gathered contemporarily or historically. The scientific name is in parenthesis when the plant was not found on the species list (Appendix I) or in the data set used in this guide.

Appendix XIII: Glossary

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Glossary

The following are definitions of terms used throughout this field guide. They are included here to standardize the approach to hierarchical vegetation classification in the Pacific Southwest Region

A HORIZON: The surface horizon of a mineral soil having a maximum organic matter accumulation, maximum biological activity and/ or eluviation of materials such as iron and aluminum oxides and silicate clays.

ALLUVIUM: A general term for all detrital deposits resulting from the operations of modern rivers, thus including the sediments laid down in river beds, flood plains, lakes, fans at the foot of mountain slopes and estuaries

AVAILABLE WATER HOLDING CAPACITY (AWC): The portion of water in a soil that can be readily absorbed by plant roots The amount of water released between field capacity and the permanent wilting point Usually measured as a function of soil texture, coarse fragment content and soil depth.

BROADCAST BURN: Prescribed burning in which a controlled fire is allowed to burn over a designated area for reduction of hazardous accumulations of debris (fuel) and/or as a silvicultural treatment Usually used to remove logging slash and competing vegetation from a harvested area on slopes > 30%

BURNING INDEX: A number (output of NDFRS) related to the contribution that fire behavior makes to the amount or effort needed to contain a fire in a particular fuel type within a specified area. Scale predicted flame length (Flame length = 1/10 X Burning Index)

CHAIN: A standard unit of linear measurement, equal to 66 feet, used in surveying

CHARACTERISTIC COVER: The percent cover one could expect to find in a plant association if a species were present. It is calculated by summing percent cover and dividing by the number of plots containing the species.

CLEARCUT HARVEST: Clearcut harvest is the removal of the entire stand in one cutting. Regeneration is obtained artificially or by natural seeding from adjacent stands and usually results in an even-aged stand

COARSE FRAGMENTS (soil): Particles in the soil that are greater than 2.0 mm and less than 25 cm in diameter

COARSE FILTER ANALYSIS: A type of ecological analysis that focuses on entire communities of organisms, rather than individual ones.

COLLUVIUM: Unconsolidated earth material deposited on or at the base of steep slopes by mass wasting (direct gravitational action) and local unconcentrated runoff

CONSTANCY: The percent of times a species was found to occur in a plant association, expressed as a percentage

DUNNING SITE CLASS: A particular measure of 'site class' based on the height of the dominant trees in a stand at a given age For example, if the average height attained by dominant and co-dominant trees in a fully stocked stand at the age of 100 years is 125 ft. then the site class is '1' This site class is based on the Dunning site index curves for height at 300 years.

ECO CODE: A code provided by the Forest Service Regional Office which is specific to each plant association and allows for common identification of each plant association

ECOSYSTEM MANAGEMENT: The skillful, integrated use of ecological knowledge at various scales to produce desired resource values, products, services and conditions in ways that also sustain the diversity and productivity of ecosystems.

ECOLOGICAL TYPE: A category of land having a unique combination of potential natural community, soil, landscape features, climate, and usually differing from other ecological types in its ability to produce vegetation and respond to management.

EDP CODE: A 4 or 5 letter code used to abbreviate the species name of vascular plants in California These codes are created through Electronic Data Processing (EDP). The codes use the first two letters of the genus and the first two letters of the specific epithet to distinguish species If the plant is a variety a fifth letter will be added at the end. If the plant has a code that is the same as another species then a number will be added at the end

ENDEMIC: A taxonomic category of organisms whose natural occurrence is confined to a certain region and whose distribution is relatively limited.

EVEN-AGED MANAGEMENT: A silvicultural technique, which involves maintenance of forest stands that contain trees of essentially the same age or less than 3 distinct age classes.

FINE FILTER ANALYSIS: A type of ecological analysis that focuses on conserving individual species, rather than on entire communities of organisms.

FIRE BEHAVIOR: The manner in which a fire reacts to the variables of fuel, weather and topography.

FIRE CONTAINMENT: Restricting the spread of fire under prevailing conditions using natural barriers and/or constructed control lines to surround the fire and any spot fires.

FIRE CONTROL: Completion of a control line around a fire, any spot fires, and any interior "islands" to be saved; burning out of any unburned areas adjacent to the fire side of the control lines, cooling down all hot spots that are an immediate threat to the control lines until they can reasonably be expected to hold fire under foreseeable conditions.

FIRE EFFECTS: The positive and negative consequences of fire on the land and land resources, over its range of expected behavior.

FIRE SUPPRESSION: All the work and activities connected with extinguishing a fire, beginning with discovery and continuing until the fire is completely extinguished.

FUEL ACCUMULATIONS: Concentration of fuel which is susceptible to ignition and combustion, generally expressed in tons per acre.

FUEL MODEL: A simulated fuel complex for which all the fuel descriptors required for the solution of a mathematical fire spread model have been specified

HELICOPTER LOGGING: Use of rotary aircraft to remove logs during a harvest operation Generally utilized on steeper ground where access by roads is limited or where resource concerns limit road building or other ground yarding systems

HERPETOFAUNA: Amphibians, reptiles and turtles.

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INDICATOR SPECIES: A species which is sensitive to important environment features of a site such that its constancy or abundance reflects significant changes in the environment.

INDIRECT ATTACK: A method of fire suppression in which the control line is located along natural firebreaks, favorable breaks in topography, or at a considerable distance from the fire, and the intervening fuel is backfired or burned out. The strip to be backfired is wider than in the parallel method and usually allows a choice of the time when backfiring will be done

JACKPOT BURN: Prescribed fire technique used in areas to reduce numerous individual concentrations of debris or hazardous fuels reducing fire hazard and/or creating regeneration sites.

LINE CONSTRUCTION: Manually or mechanically preparing a strip clear of flammable materials and exposing mineral soil to control a wildland fire.

LITTER: The top layer of the forest floor, typically composed of loose debris such as branches, twigs and recently fallen leaves or needles. Its structure is little altered by decomposition.

LOAM: The textural class name for soil having a moderate amount of sand, silt, and clay. Loam soils contain 7-27% clay, 28-50% silt, and 23-52% sand

MACHINE PILING: Use of machinery such as dozers and excavators, for site preparation on slopes < 30%, to remove and consolidate fuel accumulations and/or competing vegetation following harvest to reduce fire hazard and/or promote regeneration.

MANUAL RELEASE: Manual release is the physical removal of competing vegetation in young forest stands by grubbing, snipping, or cutting with hand tools or chainsaw Used to promote rapid growth of desirable vegetation and prevent unacceptable loss of growth and mortality

MAST PRODUCTION: The development of acorns from various species of oak, a product of hardwood species, which are consumed by animals.

MESIC (soil): A soil temperature regime where the mean annual soil temperature is 8 C or higher but lower than 15 C, and the difference between mean summer and mean winter soil temperatures is more than 5 C either at a depth of 50 cm from the soil surface or at a lithic or paralithic contact, whichever is shallower.

MICRO-POSITION: The relative topographic location of a site on the landscape The terms used in this guide are: ridge, summit, crest, upper one-third slope, middle one-third slope, lower one-third slope, toeslope, bottom, basin edge, and draw, intermittent stream bottom

MICRO-RELIEF: The shape of the slope along both the vertical and horizontal contour The terms for micro-relief in this guide are convex, linear, concave, undulating, hummocky, mounded, and other.

NATIONAL FIRE DANGER RATING SYSTEM (NFDRS): A system that produces indices that measure relative fire potentials, based on the fire behavior components of spread , energy release, ignition, and risk

PARENT MATERIAL (soils): The horizon of weathered rock or partly weathered soil material from which the soil is formed

pH (soil): The negative logarithm of the hydrogen ion activity (concentration) of a soil The degree of acidity (of alkalinity) of a soil as determined by means of a suitable electrode or indicator at a specific moisture content or soil/water ratio and expressed in terms of the pH scale.

PLANT ASSOCIATION: A potential natural plant community of definite floristic composition and uniform appearance that repeats itself across the landscape and takes the name of the projected climax type.

POTENTIAL NATURAL VEGETATION: The biotic community that would be established if all successional sequences of its ecosystem were completed without additional human-caused disturbance under present environmental conditions.

PRESCRIBED BURNING: Skillful application of fire to wildland fuels in either their natural or modified state, under specified environmental conditions to produce heat intensities and rate of spread required to accomplish certain planned benefits to meet resource management objectives

PRESCRIBED NATURAL FIRE: A wildland fire ignited by natural sources such as lightning. These fires are allowed to burn in designated areas under carefully established conditions to provide for safety and fire control If these conditions are exceeded, or predicted to worsen, a fire is reclassified as a wildfire and suppressed.

PRIMARY REGENERATING SPECIES: The species which is higher in cover or in number of individual stems, than any other species of the principle vegetation layer.

PROVINCE: A province is a region with relatively similar bedrock, geologic structure and climate resulting in a unified geomorphic history. Its patterns of landforms and topography differ substantially from adjoining provinces (American Geological Institute, 1972)

RADIATION INDEX: The ratio of total annual radiation on a given aspect and slope to total annual radiation received on a flat surface for a given latitude (Frank and Lee 1966). See the introduction for index classes and the upper and lower index values.

RARE PLANT: A term applied to California native plant species that are limited in their distribution or population abundance.

RATE-OF-SPREAD: The increase in the perimeter, area, or advance of a fire as a function of time, usually expressed in chains per hour (1 chain = 66 feet) or acres per hour.

REGENERATION: The renewal of a tree crop, whether by natural or artificial means The act of replacing trees.

REPRODUCING SUCCESSFULLY: The species is present throughout the structural layers which are represented in the late seral stand

RESIDUUM (Residual soil): Soil formed in places by the disintegration and decomposition of rocks and the consequent weathering of the mineral materials Presumably developed from the same kind of rock as that on which it lies.

RESISTANCE TO CONTROL: The relative difficulty of constructing and holding a control line as affected by fuel, topography and soil, and by fire behavior

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RIPARIAN: Pertaining to the land, next to water, where plants dependent on a perpetual source of water occur

ROTATION: In an even-aged system, the length of time between establishment of a new stand of trees and final harvest

SALVAGE HARVEST: The removal of trees that have been or are in imminent danger of being killed or damaged by injurious agents other than competition between trees.

SANITATION HARVEST: The removal of trees as a precaution to reduce the spread of damaging organisms to the remaining stand. It can be undertaken in anticipation of future damage or to reduce or prevent the establishment of damaging agents

SCORCH HEIGHTS: The maximum vertical height at which lethal scorching of foliage occurs Below this height, all needles are brown and dead, above it, live and green.

SELECTION HARVEST: Selection harvest is the removal of the mature timber, usually the oldest or largest trees, either as single scattered individuals (single tree selection) or in small groups (group selection) at relatively short intervals, repeated indefinitely, by means of which the continuous establishment of reproduction is encouraged and an uneven-aged stand is maintained. Intermediate cuttings may be made among younger trees at the same time older and larger trees are removed.

SENSITIVE PLANT: A USDA Forest Service term used to designate plant species known or suspected to occur on National Forest System Lands. This typically includes rare species included on Federal or State lists and/or the California Native Plant Society list 1B

SERAL STAGE (SERE): A step or identifiable stage of a successional sequence (i e., shrub/forb, pole, early mature, mid-mature, late mature, and old growth.

SERIES: An aggregation of taxonomically related plant associations which takes the name of the (climatic) climax species that dominate (or have the potential to dominate) the principal vegetation layer in a time frame appropriate to the vegetation or taxonomic group under consideration

SHELTERWOOD HARVEST: A regeneration method under an even-aged silvicultural system in which a portion of the mature stand is retained as a source of seed and/or protection during the period of regeneration Shelterwood harvesting involves a series of cuttings, which extend over a relatively short portion of the rotation, by means of which the establishment of essentially even-aged reproduction under partial shelter of seed trees is encouraged Removal of the overstory trees usually occurs after adequate regeneration has occurred

SILVICULTURE: The art and science of establishing, tending, and protecting forests to produce desired vegetation conditions. This can include the production of wood fiber and/or controlling the establishment and composition of forests to meet specific management goals such as watershed protection, wildlife habitat, and recreation or scenic values.

SITE PREPARATION: The pre-reforestation removal of competing vegetation and logging debris following harvest or natural disturbance

SITE CLASS: A measure of the relative productive capacity of a site for the crop or stand under study, based on volume, height, dominant, co-dominant, and mean or maximum mean annual increment that is attained or attainable at a given age.

SKELETAL: A soil with 35% or more (by volume) rock fragments (>2 mm) and 10% or more (by volume) particles less than 2.0 mm in diameter Depending on the soil texture or percent clay, a soil can be described as sandy-skeletal, loamy-skeletal or clayey-skeletal

SPECIALIST: A species adapted for life in a particular environment

STAND: Vegetation occupying a specific area and sufficiently uniform in species composition, age arrangement, structure and condition as to be distinguished from the vegetation on adjoining areas.

STREAM ORDER: A systematic numbering of streams according to flow levels and size In the most widely used numbering system "1" refers to intermittent streams or smaller streams and "5" refers to rivers or main channels.

STRUCTURE: The size and arrangement (both vertically and horizontally) of trees within a forested stand.

SUBSOIL/SUBSURFACE: The soil layers underneath the topsoil These layers are not seen from the surface and are not usually disturbed by soil tillage.

SURFACE HORIZON (soils): The upper 12-18 cm of soil that is usually manipulated when an area is plowed or cultivated.

SUBSERIES: An aggregation of taxonomically related plant associations within a series that takes the name of that series followed by related species that are dominant or have indicator value across multiple plant associations

TOPOGRAPHIC SHADING: The blocking of sunlight by surrounding slopes and hillsides, usually affecting vegetation in valley bottoms and riparian areas.

TRACTOR OPERATIONS: Harvest or site preparation operations that uses track mounted machinery, such as dozers and excavators Generally limited to slopes less than 35% and to selected soil moisture conditions

UNEVEN-AGED MANAGEMENT: Maintenance of forest stands that contain trees of at least 3 distinct age classes, usually greater than 30 years apart

1-HOUR TIME LAG FUELS: Fuels consisting of dead herbaceous plants and roundwood less than 25" in diameter. Also considered a 1-hour time lag fuels is the upper most layer of litter on the forest floor.

10-HOUR TIME LAG FUELS: Dead fuels consisting of roundwood one fourth inch to 1.0" in diameter. Also considered a 10-hour fuel component is very roughly, the layer of litter extending from just below the surface to .75" below the surface.

100-HOUR TIME LAG FUELS: Dead fuels consisting of roundwood in the size range of 1–3" in diameter Also considered a 100-hour fuel component is very roughly, the forest floor from three fourths 1–4" below the surface

1,000-HOUR TIME LAG FUELS: Dead fuels consisting of roundwood 3–8" in diameter Also considered as a 1,000-hour fuel component is the layer the forest floor >4" below the surface or both

Appendix XIV: Eco-Codes

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Tanoak Series Ecoclass Codes

Ecoclass Code:	EDP Code:	Plant Association Name:
HT0SEH00	LIDE2/VAOV Subseries	Tanoak/Evergreen Huckleberry Subseries
HT0SEH11	LIDE2/VAOV	Tanoak/Evergreen Huckleberry
HT0SEH12	LIDE2/VAOV-GASH	Tanoak/Evergreen Huckleberry-Salal
HT0SEH13	LIDE2/VAOV-RHMA	Tanoak/Evergreen Huckleberry-Pacific Rhododendron
HT0SSG00	LIDE2/GASH Subseries	Tanoak/Salal Subseries
HT0SSG11	LIDE2/GASH	Tanoak/Salal
HT0SSG12	LIDE2/GASH-RHMA	Tanoak/Salal-Pacific Rhododendron
HT0SSG13	LIDE2/GASH-BENE1	Tanoak/Salal-Dwarf Oregon-grape
HT0SM000	LIDE2/Moist Shrub Subseries	Tanoak/Moist Shrub Subseries
HT0SM011	LIDE2/COCOC	Tanoak/Hazelnut
HT0SD000	LIDE2/Dry Shrub Subseries	Tanoak/Dry Shrub Subseries
HT0SD011	LIDE2/RHDI-LOHIV	Tanoak/Poison Oak-Pink Honeysuckle
HT0SD012	LIDE2/BENE1	Tanoak/Dwarf Oregon-grape
HT0SOH00	LIDE2/QUVA Subseries	Tanoak/Huckleberry oak Subseries
HT0SOH11	LIDE2/QUVA-RHMA	Tanoak/Huckleberry Oak-Pacific Rhododendron
HT0CCO00	LIDE2-CHLA Subseries	Tanoak-Port Orford cedar Subseries
HT0CCO11	LIDE2-CHLA-UMCA/VAOV	Tanoak-Port-Orford Cedar-California Bay/Evergreen Huckleberry
HT0CCO12	LIDE2-CHLA/VAOV-RHOC	Tanoak-Port-Orford Cedar/Evergreen Huckleberry-Western Azalea
HT0CCO13	LIDE2-CHLA/VAOV	Tanoak-Port-Orford Cedar/Evergreen Huckleberry
HT0CCO14	LIDE2-CHLA/BENE1/LIBOL	Tanoak-Port-Orford Cedar/Dwarf Oregon-grape/Twinflower
HT0CCO15	LIDE2-CHLA-ALRH//Riparian	Tanoak-Port-Orford Cedar-Alder//Riparian
HT0CCO16	LIDE2-CHLA/ACCI	Tanoak-Port-Orford Cedar/Vine Maple
HT0CCO17	LIDE2-CHLA/VAPA	Tanoak-Port-Orford Cedar/Red Huckleberry
HT0CCO18	LIDE2-CHLA/GASH	Tanoak-Port-Orford Cedar/Salal
HT0CCO19	LIDE2-CHLA-TSHE/VAOV	Tanoak-Port-Orford Cedar-Western Hemlock/Evergreen Huckleberry

HT0H0B00	LIDE2-QUKE Subseries	Tanoak-Black Oak Subseries
HT0H0B11	LIDE2-QUKE	Tanoak-Black Oak
HT0CCI00	LIDE2-CADE3 Subseries	Tanoak-Incense Cedar Subseries
HT0CCI11	LIDE2-CADE3/FECA	Tanoak-Incense Cedar/California Fescue
HT0HOL00	LIDE2-QUCH2 Subseries	Tanoak-Canyon Live Oak Subseries
HT0HOL11	LIDE2-QUCH2//Rockpile	Tanoak-Canyon Live Oak//Rockpile
HT0HOL12	LIDE2-QUCH2/VAOV	Tanoak-Canyon Live Oak/Evergreen Huckleberry
HT0HOL13	LIDE2-QUCH2/GASH-BENE1	Tanoak-Canyon Live Oak/Salal-Dwarf Oregon-grape
HT0HOL14	LIDE2-QUCH2-QUKE/RHDI	Tanoak-Canyon Live Oak-Black Oak/Poison Oak
HT0HOL15	LIDE2-QUCH2/RHDI	Tanoak-Canyon Live Oak/Poison Oak
HT0HOL16	LIDE2-QUCH2/BENE1	Tanoak-Canyon Live Oak/Dwarf Oregon-grape
HT0HGC00	LIDE2-CACH2 Subseries	Tanoak-Chinquapin Subseries
HT0HGC11	LIDE2-CACH2/GASH	Tanoak-Chinquapin/Salal
HT0HGC12	LIDE2-CACH2/GASH-RHMA	Tanoak-Chinquapin/Salal-Pacific Rhododendron
HT0HGC13	LIDE2-CACH2/RHMA/XETE	Tanoak-Chinquapin/Pacific Rhododendron/Beargrass
HT0HGC14	LIDE2-CACH2/PTAQL	Tanoak-Chinquapin/Bracken Fern
HT0HGC15	LIDE2-CACH2/BENE1	Tanoak-Chinquapin/Dwarf Oregon-grape
HT0HGC16	LIDE2-CACH2/VAOV-GASH	Tanoak-Chinquapin/Evergreen Huckleberry-Salal
HT0HM000	LIDE2/ACMA Subseries	Tanoak-Maple Subseries
HT0HM011	LIDE2-ACMA/POMU1	Tanoak-Bigleaf Maple/Swordfern
HT0HM012	LIDE2/ACCI-GASH	Tanoak/Vine Maple-Salal
HT0HM013	LIDE2/ACCI	Tanoak/Vine Maple
HT0HBC00	LIDE2-UMCA Subseries	Tanoak-California Bay Subseries
HT0HBC11	LIDE2-UMCA/RHDI	Tanoak-California Bay/Poison Oak
HT0HBC12	LIDE2-UMCA/VAOV	Tanoak-California Bay/Evergreen Huckleberry

Douglas-fir Ecoclass Codes

Eco- Code:	EDP Code:	Plant Association Name:
CD0HT000	PSME-LIDE2 Subseries	Douglas-fir-Tanoak Subseries
CD0HT011	PSME-LIDE2/WHMO	Douglas-fir-Tanoak/Western Modesty
CD0HT012	PSME-LIDE2/QUVA-HODI	Douglas-fir-Tanoak/Huckleberry Oak-Oceanspray
CD0SM000	PSME/Moist Shrub Subseries	Douglas-fir/Moist Shrub Subseries
CD0SM011	PSME/COCOC	Douglas-fir/Hazelnut
CD0CPJ00	PSME-PIJE Subseries	Douglas-fir-Jeffrey Pine Subseries
CD0CPJ11	PSME-PIJE/FECA	Douglas-fir-Jeffrey Pine/California Fescue
CD0CCI00	PSME-CADE3 Subseries	Douglas-fir-Incense Cedar Subseries
CD0CCI11	PSME-CADE3/FECA	Douglas-fir-Incense Cedar/California Fescue
CD0SOH00	PSME/QUVA Subseries	Douglas-fir/Huckleberry Oak Subseries
CD0SOH11	PSME/QUVA	Douglas-fir/Huckleberry Oak
CD0SOH12	PSME/QUVA-LIDEE	Douglas-fir/Huckleberry Oak-Dwarf Tanbark
CD0SOH13	PSME/QUVA-RHMA	Douglas-fir/Huckleberry Oak-Pacific Rhododendron
CD0HOC00	PSME-QUGA2 Subseries	Douglas-fir-White Oak Subseries
CD0HOC11	PSME-QUGA2/GRASS	Douglas-fir-White Oak/Grass
CD0HOC12	PSME-QUGA2/HODI	Douglas-fir-White Oak/Oceanspray
CD0HOB00	PSME-QUKE Subseries	Douglas-fir-Black Oak Subseries
CD0HOB11	PSME-QUKE//Metamorphic	Douglas-fir-Black Oak//Metamorphic
CD0HOB12	PSME-QUKE//Sandstone	Douglas-fir-Black Oak/Sandstone
CD0HOB13	PSME-QUKE-QUGA2/GRASS	Douglas-fir-Black Oak-White Oak/Grass
CD0HOL00	PSME-QUCH2 Subseries	Douglas-fir-Canyon Live Oak Subseries
CD0HOL11	PSME-QUCH2//Rockpile	Douglas-fir-Canyon Live Oak//Rockpile
CD0HOL12	PSME-QUCH2-ARME3/RHDI	Douglas-fir-Canyon Live Oak-Pacific Madrone/Poison Oak
CD0HOL13	PSME-QUCH-LIDE2	Douglas-fir-Canyon Live Oak-Tanoak

CD0HGC00	PSME-CACH2 Subseries	Douglas-fir-Chinquapin Subseries
CD0HGC11	PSME-CACH2-LIDE2	Douglas-fir-Chinquapin-Tanoak
CD0HGC12	PSME-CACH2/XETE	Douglas-fir-Chinquapin/Beargrass
CD0HGC13	PSME-CACH2/RHMA-GASH	Douglas-fir-Chinquapin/Pacific Rhododendron-Salal
CD0HGC14	PSME-CACH2/RHMA-BENE1	Douglas-fir-Chinquapin/Pacific Rhododendron-Dwarf Oregon-grape
CD0HGC15	PSME-CACH2/RHMA-QUSA/XETE	Douglas-fir-Chinquapin/Pacific Rhododendron-Sadler Oak/Beargrass
CD0HGC16	PSME-CACH2-LIDE2/BENE1	Douglas-fir-Chinquapin-Tanoak/Dwarf Oregon-grape
CD0HGC17	PSME-CACH2/RHMA-QUSA-GASH	Douglas-fir-Chinquapin/Pacific Rhododendron-Sadler Oak-Salal
CD0HAB00	PSME-ALRU2 Subseries	Douglas-fir-Alder Subseries
CD0HAB11	PSME-ALRU2/ACCI/MOSI	Douglas-fir-Red Alder/Vine Maple/Candyflower
CD0HMA00	PSME-MAPLE Subseries	Douglas-fir-Maple Subseries
CD0HMA11	PSME-ACMA/POMU1	Douglas-fir-Bigleaf Maple/Swordfern
CD0HMA12	PSME-ACMA/PHLEG	Douglas-fir-Bigleaf Maple/Mock Orange
CD0HMA13	PSME/ACCI-BENE1	Douglas-fir/Vine Maple-Dwarf Oregon-grape
CD0HBC00	PSME-UMCA Subseries	Douglas-fir-California Bay Subseries
CD0HBC11	PSME-UMCA/RHDI	Douglas-fir-California Bay/Poison Oak
CD0HBC12	PSME-UMCA/HODI	Douglas-fir-California Bay/Oceanspray

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