# Oregon Forest Types

## Douglas-Fir Forest

***Ecology:*** Douglas-fir forests are the most extensive in Oregon; they're also the most important for timber production. Although Douglas-fir is the dominant forest tree west of the crest of the Cascades, it is also an important component of eastside forests.

West of the Cascades, Douglas-fir often form vast, nearly pure stands, a result of both natural conditions and human management. Common associates include western hemlock (the climax species for much of this region), western redcedar, noble fir, bigleaf maple and red alder (the most common early successional species for most of this region).

East of the Cascades, common associates include incense-cedar, sugar pine, western white pine, ponderosa pine, grand fir, white fir and western larch, depending on moisture and stand history. Understories vary from dense to sparse depending on the availability of moisture, but are generally rich in shrubs and herbs. Douglas-fir is a long-lived, early- to mid-successional species. This means it can colonize recently disturbed sites, and continue to dominate them for hundreds of years.

***Climate:*** Douglas-fir forests grow under a wide variety of conditions. The climate of westside Douglas-fir forests ranges from wet and mild in the north to drier and warmer in the south. Eastside Douglas-fir forests are drier than those of southwestern Oregon and have more extreme temperature fluctuations, both daily and seasonally.

***Elevation:*** Douglas-fir forests can range from sea level up to 5,000 feet in elevation.

***Precipitation:*** The climate of Douglas-fir forests is varied; therefore, the precipitation range varies from a minimum of 35 inches to more than 160 inches of rain in the Coast Range.

## Hardwood Forest

***Ecology:*** Oregon has many species of broadleaf trees (hardwoods), but generally they occur as individuals and in small stands, rather than in expansive forests as they do in the eastern United States. As a result, hardwood forests in Oregon are not uniform, but vary by location, environment and stand history.

Oak-dominated woodlands are the principal hardwood type in Oregon, and they once spread across the Willamette, Umpqua and Rogue River valleys. Oregon white oak is the principal species in the north, and is joined by California black oak and canyon live oak farther south. Other common species include Pacific madrone and bigleaf maple. Historically these occurred as open woodlands, but with decades of fire suppression many stands have been invaded by more shade-tolerant conifers like Douglas-fir and incense-cedar. When this happens, the conifers commonly outgrow and shade-out the oaks.

Oregon ash, red alder, bigleaf maple and black cottonwood are common throughout much of Oregon. Along the southern coast, Oregon-myrtle and golden chinkapin join the mix.

East of the Cascades, birches, willows and cottonwoods are common. Oregon ash commonly dominates bottomlands where water stands during the winter, while cottonwoods prefer gravelly stream banks where water drains more effectively. Oregon's riparian forests are getting more attention as their vital contributions to water quality and fish habitat are better understood.

***Climate:*** The climates in which hardwood forests occur vary dramatically, from the wet, mild weather of northwestern Oregon to the warmer, drier weather of southwestern Oregon to the highly variable seasonality of eastern Oregon. Different species of hardwoods are adapted to different environmental conditions.

***Elevation:*** Each hardwood species has a range of elevation it is native to. Oregon white oak is usually found at lower elevations in the interior valleys. It grows from sea level to 3,800 feet in the north and at elevations of up to 7,500 feet at the southern end of its range.

***Precipitation:*** Hardwood forests and species are found from climate areas with less than 10 inches of precipitation in the high desert areas of Oregon to areas with more than 160 inches of precipitation.

## Klamath Mixed Conifer Forest

***Ecology:*** The Siskiyou and Cascade mountains of southwestern Oregon are occupied by a complex mix of forest types. Forests near the coast are dominated by conifers in the upper portion of the overstory and hardwoods in the lower portion of the overstory, while forests nearer the Cascades are dominated by conifers, with fewer hardwoods. There are relatively few pure stands of any single species. Because conifers are the commercially important species, these forests are often lumped together as "mixed conifer" forests.

Elevation, distance from the ocean, fire history and past management practices all influence these forests. Near the coast, Douglas-fir and tanoak are the most important species. Golden chinkapin, Pacific madrone and canyon live oak are secondary hardwoods, while sugar pine, ponderosa pine and incense-cedar are secondary conifers. Port-Orford-cedar and bigleaf maple occur on moist sites, while Jeffrey pine is common on serpentine soils (high in magnesium). With increasing elevation, hardwoods become less common, and grand fir and white fir join the mix of conifers. Near the Cascades, forests are dominated by mixed stands of Douglas-fir, ponderosa pine, sugar pine, incense-cedar and white fir. This is the northernmost extension of the mixed-conifer forests that dominate the Sierra Nevada Mountains of California. Throughout the mixed conifer forests, understories are sparse and shrubby with lots of poison oak.

***Climate:*** Climates range from cool and moist near the coast to hot and dry in the interior. Complex topography creates a variety of microclimates that supports such diverse forests.

***Elevation:*** The geography of mixed conifer forests is diverse, and elevation ranges from 450 to 6,000 feet.

***Precipitation:*** The average precipitation ranges from 15 to 80 inches, depending on the elevation and microclimate.

## Lodgepole Pine Forest

***Ecology:*** Pure and nearly pure stands of lodgepole pine are found throughout central and eastern Oregon. Lodgepole pine is a pioneer species that rapidly colonizes disturbed sites and often gives way to more shade-tolerant species like ponderosa pine. Most lodgepole pine stands develop after fire or logging; however, they may form climax forests on sites with deep pumice and volcanic ash.

Lodgepole pine forests grow in dense stands with lots of dead trees. They are very susceptible to insect attacks, especially mountain pine beetles, and are frequently in danger from fire.

***Climate:*** Lodgepole pine is an adaptable species that often flourishes where other trees cannot. Lodgepole forests are found in climates with short, dry summers and snowy winters. They commonly occur in frost pockets and on both excessively wet and dry soils.

***Elevation:*** Lodgepole pine will grow from sea level to 11,000 feet elevation. The lodgepole pine forests in Eastern Oregon are generally below 6,000 feet.

***Precipitation:*** Precipitation levels range from less than 10 inches up to possibly 35 inches, with some variability.

## Ponderosa Pine Forest

***Ecology:*** Ponderosa pine forests are widely distributed in eastern Oregon, ranging in elevation from 2,500 to 6,000 feet. Ponderosa pine occurs in pure stands or may be mixed with lodgepole pine, grand fir, Douglas-fir, western larch, western white pine, incense-cedar, white fir and quaking aspen. Volcanic pumice soils often support pure stands of ponderosa pine. Ponderosa pine is also an important component of the mixed conifer forests of southwestern Oregon, but does not form pure stands there. The Willamette Valley of western Oregon also supports a native population of ponderosa pines.

***Climate:*** Ponderosa pine forests are the second-driest forests in Oregon; they thrive in climates with short, dry summers and cold, snowy winters. The range of these forests is closely tied to soil moisture.

***Elevation:*** Ponderosa pines will grow from sea level to about 9,000 feet.

***Precipitation:*** Ponderosa pines thrive in the dry climates of the high desert, ranging from less than 10 inches to around 35 inches of precipitation.

## Sitka Spruce/Western Hemlock Forest

***Ecology:*** Forests dominated by western hemlock and Sitka spruce hug the fog belt along the Oregon coast, seldom reaching more than a few miles inland or a few hundred feet above sea level. Both species are shade-tolerant, but Sitka spruce is more resistant to salt spray. Sitka spruce sometimes grows in pure stands but is more commonly mixed with western hemlock, western redcedar, Douglas-fir, red alder and lodgepole pine (commonly called shore pine along the coast).

Near the California border, Port-Orford-cedar, Oregon-myrtle (also called California-laurel) and coast redwood join the mix. Understories are typically dense with shrubs, ferns, herbs and epiphytes. Hemlock and spruce seedlings often establish on rotting tree logs called "nurse logs." Straight lines of trees originally established on the same log are commonly seen.

***Climate:*** The climate of this zone is wet and mild. Frequent and dense summer fog helps limit the evaporative power of the sun, while "fog drip" that condenses on tree crowns adds to soil moisture.

***Elevation:*** This forest starts near sea level and extends up to approximately 2,000 feet.

***Precipitation:*** Being located near the coastline, lodgepole pine forest precipitation is high, ranging from 65 to 165 inches.

## Subalpine Fir Forest

***Ecology:*** Subalpine forests are a combination of several forest types, all occurring above 4,500 feet in the Cascade, Siskiyou and Wallowa mountains. These forests vary widely depending on stand age, fire history and local conditions. Common trees include Pacific silver fir, California red fir, noble fir, white fir, subalpine fir, western hemlock, mountain hemlock, Douglas-fir, Alaska-cedar, incense-cedar, lodgepole pine, western white pine, Engelmann spruce and quaking aspen. Many species of huckleberries occur in the understories.

***Climate:*** These forests occur in cold climates with heavy winter snowpacks and short growing seasons. At their upper limit, they form open park-like forests and merge with alpine meadows.

***Elevation:*** These forests start at 4,500 feet and extend up to the end of forest zones on the alpine level.

***Precipitation:*** These forests are covered in snow for several months. Precipitation is usually over 100 inches per year.

## Western Juniper Forest

***Ecology:*** Western juniper "forests" are the driest forests in the Pacific Northwest. In Oregon they're found primarily east of the Cascades, although they also grow on hot, dry, low-elevation sites in southwestern Oregon. Due to intense competition for water and an extreme aversion to shade, western junipers grow in open, park-like stands. The widely spaced juniper trees are typically surrounded by big sagebrush, bitterbrush and grasses. Juniper trees grow on rocky outcrops in eastern Oregon. Ponderosa pines often occupy canyons and moist, north-facing slopes within these forests. Western junipers also occupy shallow-soil areas within other eastside forest types. Prior to European settlement and fire suppression, western juniper forests were primarily limited to shallow soils and rimrock, where vegetation was too sparse to carry fire. Fire suppression has permitted western juniper to expand rapidly into traditional rangeland, where it competes with native grasses for water and nutrients.

***Climate:*** Western juniper forests are found in climates with hot, dry summers and cold, dry winters. Most precipitation falls during the winter.

***Elevation:*** Western juniper can grow from 500 to over 10,000 feet in elevation. Most of the forests are found in the high desert areas of Oregon.

***Precipitation:*** The western juniper tree is a large consumer of water, but often grows in areas with precipitation of less than 30 inches per year.

## Western Larch Forest

***Ecology:*** The western larch, one of the world's few deciduous conifers, is noted for its brilliant golden autumn colors. Rather than forming extensive forests, stands of western larch commonly develop within Douglas-fir, grand fir and ponderosa pine forests following fire or major disturbance from wind, soil movement or logging. Without periodic disturbance, larch stands will eventually be taken over by Douglas-fir on drier sites or grand fir on milder sites. Lodgepole pine, western hemlock, western white pine and Engelmann spruce also occur in this forest type.

***Climate:*** Western larch prefer cool, moist sites and depend on frequent disturbance.

***Elevation:*** Western larch grow primarily on the east side, at elevations up to 6,000 feet.

***Precipitation:*** The climates of western larch forests vary and depend on location in Eastern Oregon. Precipitation ranges from 15 to 65 inches per year.

## Urban Forest

***Ecology:*** By definition, urban forests occur near or within urban boundaries. Although they sometimes include remnant stands of native forests, more often they're a mix of native and introduced trees that have been planted along streets and in parks for recreational and landscaping purposes. Without careful tending urban forests would perish, or be overrun by native

forests. As Oregon communities grow in area and population, urban forests will play an increasingly significant role in our lives.

These are not the forests we escape to for the weekend; they are the forests that enrich our daily lives where we work and live.

***Climate:*** With appropriate care, urban forests can be maintained in almost any climate. Rather than being a product of the climate in which they occur, they are often valued for the climate they help create. Their canopies reduce air pollution, filter rainwater and create shade that cools city temperatures.

***Elevation:*** The elevation of urban forests varies by each area. Many are close to sea level or just a few hundred feet above sea level.

***Precipitation:*** Most urban areas within the Willamette Valley have precipitation of 35 to 65 inches per year on average.

Source: Forest type information adapted from "Forests of Oregon," Oregon State College of Forestry. http://www.cof.orst.edu/cof/newfmc/product_examples/forestlearn/watershed/forest_types/mixed.htm.

Source: "Average annual precipitation – Oregon (1981-2010)," Oregon State University. Prism Climate Group.

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