

Mixed Coniferous/Deciduous Forest

Description

The mixed coniferous/deciduous forest is a common upland plant community in the north Willamette Valley. Douglas-fir is the most common tree and is generally the tallest species found in the valley. These forests differ from bottomland riparian forests by their location above the floodplain on well-drained soils.

Like other forest types, these forests provide the following benefits:

- Filter drinking water;
- Provide habitat for a diverse array of plants and animals;
- Supply oxygen;
- Moderate temperatures; and
- Store carbon.



Figure 1. Mixed coniferous/deciduous forest near Ridgetop Overlook. L to R. grand fir, western redcedar, bigleaf maple, grand fir (2) and Douglas-fir.

Older Douglas-fir forests (hundreds of years old) develop unique characteristics valuable to many species of wildlife, birds, and plants. Thus, the Oregon Conservation Strategy lists these older forests as a Strategy Habitat. These older forests are limited to the West Cascades and Coast Range and no longer exist in the Willamette Valley. Less than 1% of Valley forests are over 120 years old.

In addition to Douglas-fir, the mixed coniferous/deciduous forests, including the 49 acres on the Refuge, include the following plant species:

- Canopy (tallest trees) - bigleaf maple, grand fir, Oregon white oak, madrone, and western redcedar;
- Subcanopy (trees underneath the canopy trees) – Beaked hazelnut, cascara, red alder, Pacific yew, black hawthorn, vine maple, and serviceberry; and
- Shrubs - snowberry, sword fern, red-flowering currant, salal, mock orange, and Indian plum.

Site conditions and management practices influence the plant species present. Here are three examples:

- Prolonged fire suppression allows Douglas-fir to take over prairie, oak savanna, and woodland sites. The result is a forest of Douglas-fir with overtopped oak and few other species.
- Emphasis on future timber production produces a forest primarily of Douglas-fir. Plant diversity is limited and there are few standing dead trees (snags) and downed logs.
- Finally, naturally established forests produce greater plant diversity, more snags, and more downed wood.

History

Willamette Valley Land surveys conducted between 1851 and 1910 show upland forest covering 26% of the area, second only in acreage to prairie at 31%. Most of the upland forest was coniferous or mixed forest. The surveys found a variety of tree sizes and ages. Large old-growth trees did not dominate the area. Burned areas were 10% of the upland forest acreage. Natural causes or people likely started these fires. Consistent, rotational burning by Native Americans ended with increasing settlement from the United States in the 1850s. Native Americans burned areas within the Willamette Valley to provide better habitat for food resources, such as oak trees (acorns) and deer.

Wildlife Use

To be useful to wildlife, a forest must provide food and cover. Each species has unique requirements. Conditions favorable for a wildlife species may exist only at a particular age of a forest. However, recent research shows that with the presence of some key features, wildlife can live in a particular forest over a wider range of ages. Four key forest features are: large trees, snags, downed logs, and diverse tree and shrub species, as described below:

Large trees develop large limbs, deformed or broken tops, decayed wood, deep fissured bark, and loose bark. Flying squirrels, owls, and raptors use large limbs and deformed or broken tops as nesting and resting platforms. Large trees support epiphytes (plants living on other plants), which provide food, nest material, and habitat for insects. Birds eat the insects. Decay leads to the formation of hollows and cavities that Pileated woodpeckers can excavate. These cavities

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provide roosting, nesting, and feeding sites for the Pileated, and for other animals such as smaller woodpeckers, kestrels, small owls, brown creepers, squirrels, and bats. Bark on large trees becomes thick and furrowed. The deeper crevices provide more habitat for insects. Insect eaters such as creepers, nuthatches, chickadees, and woodpeckers eat insects from branches and trunks of large trees. Creepers, pacific-slope flycatchers, and bats use loose bark for nest sites.

Snags and downed logs provide important wildlife habitat in both upland and riparian forests. Snags are standing dead trees. An estimated one hundred wildlife species in western Oregon and Washington use snags. Cavity-nesting birds account for 30-45% of bird population in many forests. Birds and small mammals, such as squirrels, use snags for nests, food sources (insects), and food storage. Snags also provide protection from weather. Wood decomposition determines a snag's suitability for nesting and foraging. Insects, fungi, bacteria, and weather decompose the snag's wood.

The Pileated woodpecker is a key species interconnected with snags. Along with the beaver, Pileated woodpeckers are "ecosystem engineers" because they alter their environment. The Pileated excavates large cavities in trees and new snags that contain a limited amount of rotten wood. These cavities provide roosting, nesting, and feeding sites for the Pileated. Smaller woodpeckers, kestrels, small owls, brown creepers, squirrels, and bats also use these cavities. In addition, the openings expose wood to decomposition by fungi, which provides additional habitat for insects.



Figure 2. Western redcedar snag used by Pileated woodpeckers

Once a snag or tree falls it becomes a log on the forest floor. Logs provide many habitat needs for wildlife, including travel ways, perches, food sources (insects), hiding cover, and nest sites. In addition, logs recycle nutrients, provide sites for tree seedlings to grow, and provide sites for fungi beneficial for living trees. Larger diameter logs and snags provide better and longer lasting nest sites, mammal dens, and moist cover for amphibians.

Hardwood trees and shrubs provide both food and cover in mixed coniferous/deciduous forests. Salmonberry, red huckleberry, and Oregon grape provide fruit for thrushes, waxwings, and small mammals. Hummingbirds get nectar from currant and salmonberry flowers. Warblers and vireos eat insects and spiders, which often live on deciduous shrubs. Low shrubs and herbs provide hiding and nesting cover for chipmunks, voles, mice, and pacific wrens. Black-tailed deer live along forest edges and feed on a variety of plants including trailing blackberry, red huckleberry, thimbleberry, acorns, and lichens. Deciduous trees, such as bigleaf maple, Oregon white oak, and madrone form cavities in the center of the tree before the outer wood decays. These cavities provide stronger and more secure nesting and roosting sites.

Conservation Status

Compared to other plant communities, upland forests have lost the least acreage. In western Washington and Oregon, 90% of the acreage reported in the first Forest Service inventories in the 1930s is still forested. In the Willamette Valley, there are currently 1,111,300 acres of forest of which 65% are Douglas-fir. In the Willamette Valley all other habitat types have declined since 1850. The greatest threat to forests is conversion to urban residential or agricultural uses.

Refuge Specific Management

Refuge management of mixed coniferous/deciduous forest includes: control invasive species; plant and protect native species; manage the size and number of snags; and use prescribed fire and mechanical removals to create variable age structure. The refuge has successfully completed mixed-forest plantings in the past 5 years, adding approximately 50 acres of mix-forest habitat.

Fun Facts

- Willamette Valley forests are young; with 24% aged 0 to 19 years and 58% aged 20 to 59 years.
- Forests occupy 53% (245,000 acres) of Washington County, mostly in the north and west.
- Thinning removes some trees to increase growth in the remaining trees. Thinning also improves wildlife habitat by increasing understory shrub growth and creating irregular spacing of trees for cover.

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