

Grand Fir

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The FireWorks Notebook, in USFS WILDFIRE BOX

I am a tree. My scientific name is *Abies grandis*. I was named by David Douglas, an English explorer who took my seeds back from Oregon to England in 1830. I am found both along the coast and in the inland mountains of the Pacific Northwest.

Where do I live? Look for me in the coastal lowland forests from California to Canada. However, I'm much more common in the Cascade and Rocky Mountains of the inland Pacific Northwest. I can live in many kinds of forests. In the warm forests of the east-side of the Cascades, I grow with Douglas-fir, ponderosa pine, Western white pine. I also grow in cool forests with Western hemlock. I do best in forests that get at least 25 inches of precipitation/year.

What do I look like? I am an evergreen tree. I often grow close to other trees in thick groves. I have many dense branches all along my trunk, starting very near the ground.

I have a deep-growing tap root and also shallow roots that grow horizontally near the soil surface. My bark is very thin when I'm young, but gets much thicker as I grow.

My flat long needles grow right out of the twig, attached in two opposite rows. Some say they look like the teeth in a comb! My needles are shiny dark green on top and silvery-white on the bottom. I have very long needles (3-5 cm.) compared to other fir trees.

Growing up: I grow from seed. I grow best in bare mineral soil with some shade overhead. I may die if I don't get enough water as a seedling. I am the fastest growing fir tree in North America! I can reach over 160 feet tall in the inland forests and grow even taller



along the coast. I begin making seeds after age 20.

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Growing points: I have growing points inside my bark (in my cambium), at my very top, and at the tips of my branches and roots.

How do I reproduce? I am a *conifer*, which means I put my seeds in cones. People rarely see my cones because they sit upright near the top of the tree. Each big purple-green cone is shaped like a barrel and is 8-11 cm. tall. Still attached to the branch, ripe cones fall apart, letting the wind spread the seeds. My seeds are small and brown, with a paper-like "wing" that helps them float on the wind over 50 meters.

My calendar: It takes over one year for my cones to develop. Cone growth begins in summer and pollination happens the next spring. My ripe cones open in late summer, exposing the seeds to the September wind. The wind-spread seeds wait on the ground until then next spring to grow.

Am I useful? Many mammals and birds depend on me for food and shelter. My thick branches give hiding cover to grouse, woodpeckers, and squirrels. My needles are important food for grouse. Squirrels

and birds, like nuthatches and chickadees, eat my seeds. Pileated woodpeckers make holes in my trunk that flammulated owls use for nesting. In winter when food is scarce, mule deer feed on my needles. Grand fir makes good lumber and pulp for paper. I am grown for Christmas trees too. People in Hawaii and Europe plant me in gardens and enjoy my beauty.

I am prone to getting diseases, partly because I don't release much pitch to cover my wounds. I often am infected by Armillaria root rot fungus that spreads underground from roots to roots. A plant called mistletoe grows on me and sinks its roots into my branches and trunk to get nutrients. Many insects bore into my trunk and use me for food and shelter.

What does fire do to me? I catch on fire easily because of my many low dense branches and my thick cover of needles. Young trees have very thin bark and surface fires are often killing. These same surface fires don't kill ponderosa pine or douglas-fir trees. When surface fires come frequently, you'll find very few of me in the forest. My bark thickens as I grow, making me better able to survive a surface fire. If surface fires are prevented, my groves grow tall and thick, making the forest very shady so ponderosa and Douglas-fir seeds can't sprout.

When a fire does come, it becomes a crown fire thanks to the thick fuels I provide in my branches. I never survive crown fires. My branches act like a "ladder," carrying a surface fire up into my crown.

Ground fires burning in the duff injure my roots and often kill even big trees.

Life after fire . When I am damaged by fire, it is easy for disease-causing fungus to get in and make me even weaker.

Because fires have been suppressed in my forests where I grow, I am more abundant today than I was before 1900.

After a crown fire, new seeds are blown in by the wind and sprout on the bare soil. My seeds are more sensitive to lack of water compared to pine seeds, so my seedlings may die if it is a dry year.

ECOLOGICAL FACT: Since 1900 in the lower elevation east-side Cascade forests, wildfires have been suppressed and the largest ponderosa pines have been logged. This protected grand fir trees from death by wildfire. More grand fir seedlings and survived and grew to be trees because wildfires were stopped. Over a century, forest that used to be mostly ponderosa pine, changed into forests with fewer ponderosa pine and many more Douglas-fir and grand fir. It is hard for ponderosa pine to sprout in a shady forest of Douglas-fir or grand fir trees.

In the low-elevation east-side Cascade forests, we grand fir trees grow in thick groves in contrast to the more spaced out ponderosa pine and Douglas-fir trees. Now when wildfire comes, it quickly grows into a high-intensity crown fire instead of a low-intensity surface fire. If grand fir trees are removed from these forest, more sunlight hits the forest floor so ponderosa pine can sprout and grow. Ponderosa pine can survive low-intensity surface fires, if "ladder trees" like grand fir are not growing nearby.



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