



A publication by:

## NORTHWEST WILDLIFE PRESERVATION SOCIETY

### Douglas Fir

*Pseudotsuga menziesii*



By: Jesse Langelier

The Douglas-fir is an evergreen conifer native to the west coast and Rocky Mountains of North America. There are two main varieties that differ in key characteristics such as height, growth rate, and habitat. The coastal variety (*menziesii*) can be found along the coast of British Columbia, Washington, Oregon, and northern California; while the interior variety (*gauca*) follows the contour of the Rocky Mountains from BC down to Colorado, and can be found as far south as the Mexican border. Contrary to what the name suggests, the Douglas-fir is not a true fir tree, and is even sometimes mistaken for a species of pine. This discrepancy is reflected in the fact that the name of the species is often hyphenated as Douglas-fir. Douglas-firs feature prominently in the local and historical culture where they are found, and are a common (and non-endangered) feature of the landscape.

### Characteristics

The Douglas-fir is a large and rapid growing species, with an average height of 60-75 metres and a base diameter of 1.5-2 metres; however, samples of up to 120 metres tall and 6 metres in diameter at the base have been recorded. It should be noted that the coastal variety grows larger and faster than the interior variety. It is speculated that the maximum height a Douglas-fir can grow to is approximately 140-145 metres before water will no longer be able to make itself to the high tops of the canopy. Despite this, in the fog-heavy environment of the Cascades rainshadow a sister species and the only conifer that has been known to grow taller, the western red cedar, gets its water needs supplied by the rolling fog coming in off the ocean. It is not out of the question that the needs of large Douglas-firs could be met by this same process, although no specimen larger than 142 metres has been recorded. The tallest living specimen of Douglas-fir is 99 metres and it can be found at East Fork Brummit

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Creek in Oregon. Douglas-firs are long-living species, and have a lifespan of anywhere between 500 and 1000 years, a miraculous feat for any organism!

The physical characteristics of the Douglas-fir evolve as the tree matures. When the tree is young, the bark is thin and smooth with a grey hue. As the tree matures the bark becomes thick with a cork-like inner layer and a scaly or ridged appearance. Branches remain low on younger trees and take roughly 70 years before they are 5 metres clear from the ground; however, between 70-100 years old the branches grow an additional 5 metres above the ground. In mature stands of Douglas-fir it is rare to see branches near ground level, and the canopies are often elevated high above the forest floor. Isolated trees not part of large Douglas-fir stands may retain their lower branches for longer than those that grow among other Douglas-firs in densely forested populations. The leaves, or needles, are bright green and arranged spirally on the branches, measuring 2-4 centimetres long. An easy way to identify a Douglas-fir is by the distinct citrus or grapefruit scent produced by the needles, especially when crushed. The buds of the Douglas-fir are narrow and conic in shape, with reddish-brown scales and are small - only about 4-8 millimetres long. Seed cones are 5-8 centimetres, while pollen

cones are smaller, measuring 2-3 centimetres in length. Cones are green when first produced in the spring, but mature to an orange-brown colour. Each seed cone contains 25-50 seeds, which are single-winged and wind dispersed in Autumn. The cones of a Douglas-fir are easily identified by the distinct protrusions (called bracts) in between the scales.

## Habitat

Douglas-firs are an integral part of two major British Columbian biogeoclimatic zones and a major population in a third; the Coastal Douglas-fir, Interior Douglas-fir, and Coastal Western Hemlock zones. The range of Douglas-firs is vast, covering the entirety of the northwest coastal regions of BC, Washington, and Oregon, as well as following the contours of the Rocky Mountains in the interior and eastern edges of BC down through to Colorado.

Two varieties of Douglas-fir occupy these areas and are the namesake of the two biogeoclimatic zones that they play a large roll in, commonly known as the interior Douglas-fir (*gaucua* variety) and the coastal Douglas-fir (*menziesii* variety). Throughout this extensive range Douglas-firs can be found



anywhere from sea level to 1800 metres above sea level in a variety of soil types. Both varieties of Douglas-fir prefer deep soils, but they won't shy away from steep or rocky slopes, as long as soil drainage is adequate to serve their high water needs. The taproots of the interior variety often are longer than the coastal variety in order to access the water table in what is often a drier climate, though the interior variety rarely grows to the same stature above ground as the coastal variety. The coastal Douglas-fir is well adapted to the mild and moist climate of the coast, and relies on heavy rainfall in order to grow to be a strong member of the second-tallest conifer species; this wet climate also allows for more rapid growth than the interior Douglas-fir.

The fauna supported by Douglas-fir populations is diverse, while it has a complicated relationship with the flora that shares its space. Douglas fir snags (standing dead or dying trees) provide valuable habitat for nesting birds; namely blue grouse and the red crossbill, which has specifically adapted to forage for Douglas-fir seeds. Within the canopies of Douglas-firs you will find nesting western spotted owls and red tree voles. Many rodent

species also are prominent features of the Douglas-fir landscape, including mice, shrews, and New World

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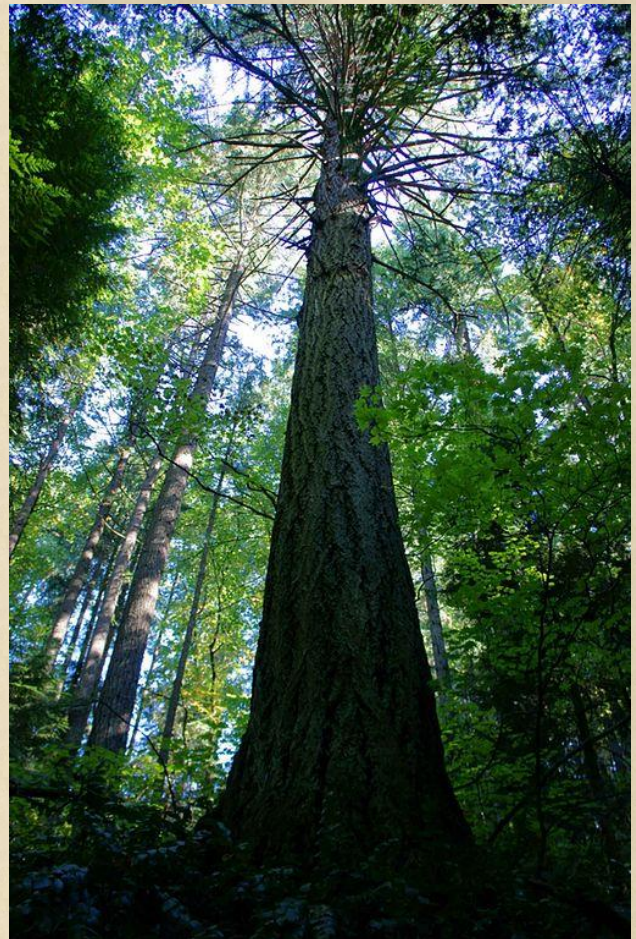
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porcupines. Some ungulates that grace the Douglas-fir dominant forests are elk and black-tailed deer, which graze on their foliage. Most of these species are attracted to the forest by the seeds of the Douglas-fir, and up to 65% of any given seed crop can be eaten by aforementioned forest residents. Other species, such as Douglas squirrels enjoy the mature pollen cones, young needles, and inner bark, while storing the seed cones for use in the winter. Douglas-fir is only one of many tree species that occupy the Northwest coast; it shares its space with a healthy mix of western hemlock, sitka spruce, bigleaf maple, and ponderosa pine throughout its Canadian range. Shrubs that are an important part of early successional stages of Douglas-fir biogeoclimatic zones are salal, oceanspray, snowberry, Oregon grape, and salmonberry, while mosses and lichens grow heavily on coastal Douglas-firs.

Douglas-fir is a shade intolerant species, meaning it enjoys lots of sunlight. As the forest floor is always shaded, young seedlings in Douglas-fir dominated stands don't generally do well. This leaves room for other species, such as western hemlock, to take hold and quickly thrive when an opening occurs due to a felled tree due to their already established shade tolerant seedlings. However, Douglas-firs have a significant advantage in the case of a forest disturbance such as fire due to their thick bark and fast growth rate. As a result, Douglas-firs often dominate climax forests with high rates of disturbance, but in forests with minimal disturbance western hemlock or western red cedar are often the most frequently spotted species. This relationship is further complicated by the forests relationship to man in the past several centuries since colonization. Artificially created disturbances,



especially clear cut logging, has allowed the quick growing Douglas-fir to boom in some areas. As a result, the look of a forest in the now is intricately tied to the local history of the particular stand. This will be discussed further in the next section in regard to the role of fire in forest succession.



## Natural history

Douglas-firs are an important part of the local physical and cultural landscapes that they occupy. The history of an area can be determined by understanding the Douglas-fir and how it relates to its environment, while its presence has shaped the cultures here for centuries.

The importance of a species to local cultures can be exemplified by how it finds its way into popular folklore. The Douglas-fir has a prominent tale that serves the purpose of showcasing the species importance, while also allowing those who created the story to pass on important information about the species, such as its role in the ecosystem and how to identify it effectively and quickly. This story revolves around a mouse that is fleeing a forest fire. The mouse realizes it cannot outrun the fire, and must seek shelter to wait out the fire. The little mouse visits several other resident species of Douglas-fir biogeoclimatic zones, such as the western hemlock and bigleaf

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maple, only to discover that when asked these species cannot help the mouse survive the fire. Finally, the mouse comes across the Douglas-fir, and the tree invites the mouse to take shelter within its canopy, as its thick bark may allow it to survive the fire; the mouse, relieved, runs up the tree and takes refuge in the cones of the Douglas-fir. This is the origin of the bracts in between the scales of Douglas-fir cones. This simple story tells us many things about the Douglas-fir and its historical significance. Clearly, it was an important species to these cultures since they had a story that revolves around its identification and acknowledgement of its resilience to fire in relation to other species. When we look deeper into the indigenous relationship with the Douglas-fir, we discover many traditional uses for almost every part of the tree, further testifying to its significance. Along its range, Douglas-fir roots were used in basketry, bark and needles were made into teas and used to cure ailments of the stomach, the common cold, headaches, and rheumatism; salves, poultices, and sealants were made of the resin; and the wood itself was used to build canoes and other tools.

As has been alluded to in early sections of this article, the Douglas-fir has an important and complex relationship with fire that shapes the ecosystem in terms of biodiversity and a process called forest succession. The history of particular Douglas-fir stands is intricately tied to the history of fire in the region, and by understanding the genetic make-up of a Douglas-fir forest, one can better understand the historical pattern of fire in the area. In a healthy, but disturbance-free stand, there will be a more diverse species dispersal than in a Douglas-fir stand that has been frequently disturbed. This is because as a shade intolerant species, Douglas-fir seedlings do not do well in a crowded forest environment. Douglas-firs are effective pioneer species, and will outcompete other species if there is plenty of space and sunlight in which to grow. In a naturally progressing forest, sunlight and space are rare, so other species, such as western hemlock, are more effective at rooting healthy saplings on the forest floor. When an opening does occur, usually due to a fallen tree, this established sapling can easily outcompete a Douglas-fir sapling that must grow practically from seed. The result is that in a forest with minimal disturbance, you find a more biodiverse population. However, if a disturbance such as a fire tears through the forest, other species no longer have this growth advantage, and as new growth is established the faster growing Douglas-fir often outcompetes other species. This, coupled with the reality that often only mature Douglas-fir trees are able to



withstand the effects of the fire, means that Douglas-fir populations that see a high level of disturbance are often pure Douglas-fir stands, and significantly less diverse than those that see little disturbance. While this can be a good thing for Douglas-fir populations, it has a negative impact on biodiversity. This process is further exasperated by the increasing influence of man-made disturbances, such as clear cut logging, which have a similar effect. Thus, when you see a stand of pure Douglas-fir, you know you are in a place that has been historically and regularly ravaged by disturbance.

This complex relationship to fire and spread of pure Douglas-fir stands has led to an additional problem in terms of ecosystem-wide biodiversity. In addition to clearing forest

underbrush, regular anthropogenic fire disturbance has historically been used throughout the Douglas-fir's range in order to establish and maintain productive meadow and shrub ecosystems (see also: Garry oak[add link]). With the increasing rarity of regular fire disturbance due to proliferation of fire suppression techniques since colonization the Douglas-fir has been provided the opportunity to expand into these ecosystems, displacing early successional species and slowly converting these clearings into established stands of mature Douglas-firs. These newly established mature stands are then better able to withstand natural fire disturbances when they do occur, effectively further expanding the natural range of the Douglas-fir at the direct expense of other, more endangered species. Historically, humans have been stewards and participants of the ecosystems that they inhabit, but a shift

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in worldview leads us to increasingly see ourselves as the masters of mother nature, often bringing unwanted or unintended consequences, characterized in this example by a loss of biodiversity.

## Threats

The Douglas-fir has a well established and stable population, and as such does not make any endangered species lists within its natural range. In fact, due to its high demand and commercial viability as a commodity for a number of industries, the Douglas-fir is unlikely to ever make an endangered species list. However, this does not mean that the species is without its share of pests and threats to its overall health. Two of the most prominent pest in various regions throughout the Douglas-firs range are the woolly conifer aphid and the bark beetle. However, these pests are little more than small nuisances to the overall Douglas-fir population, and cause minimal damage that is rarely severe. However, even though the damage to the species is not extensive, it is important to be aware of the pests and their effects on the Douglas-fir so they can be better managed should an uncharacteristic pest population boom occur, similar to what has occurred with the pine beetle epidemic in Canadian boreal forests.



As with many wild flora and fauna species, human influence plays an ever-increasing and direct roll in population stability. While ecosystem encroachment by humans is always an issue, the usefulness of Douglas-fir timber poses a more imminent problem to some populations. Douglas-fir is an extremely popular timber species, and as such is vulnerable to commercial logging interests. Old growth populations are of particular concern, as when old growth and surviving wild populations are cut down valuable habitat for many other creature, most notably the northern spotted owl, is lost.

## What we can do to help

Fortunately, there are many organizations in both Canada and the United States that are focused on old growth forest protection and working with logging corporations to ensure forest vitality is of equal concern to the profit margin. Through public education and advocacy programs, pressuring local and regional governments, and various public events, organizations are giving a voice to the numerous old growth species that cannot speak for themselves. Some of the most prominent organizations doing this work are listed below; we encourage you to find out about their ongoing programs and campaigns to discover where your support can make the most difference.

- Northwest Wildlife Preservation Society (NWPS)
- Ancient Forest Alliance (AFA)
- Nature Conservancy of Canada (NCC)
- Conservation Northwest
- Old-Growth Forest Network (US east coast based)

## Quick facts

- The Douglas-fir is the most common type of tree grown and used as Christmas trees in North America.
- Due to their rapid growth rate, Douglas-firs are one of the most important species for lumber worldwide. They have been exported to European nations such as Germany and the UK in order to bolster their logging equity.
- The tallest tree in the UK is a coastal Douglas-fir, despite the species being native to North America.
- Douglas-firs also feature prominently as a popular ornamental species for large parks and gardens, due both to its visual appeal and quick growth rate.
- Indigenous Hawaiians used Douglas-firs that had washed ashore to make sturdy double-hulled canoes.
- The Douglas-fir has a dual namesake: David Douglas, a scottish botanist widely credited with 'discovering' the species; and Archibald Menzies, a rival naturalist that first documented the tree on Vancouver Island in 1791.

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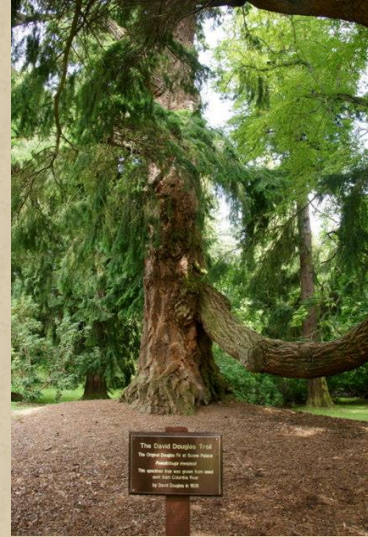
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- Many parts of the Douglas-fir have a history of being used as natural remedies for ailments such as stomach and headaches, rheumatism, and the common cold.

## Where to view

Luckily for those wishing to view the Douglas-fir in person, they are widespread and easy to find if you live on the west coast. A simple excursion into your local forest will most likely allow you to view this lumbering and majestic species. Some of the more popular parks and public spaces with Douglas-fir growth are:

- Stanley Park (Vancouver)
- Pkols (Mount Douglas; Victoria)
- Cathedral Grove (Vancouver Island)
- Mystic Vale (UVic, Victoria)
- Capilano Suspension Bridge Park (Vancouver)



## Bibliography

Anderson, M. Kat. "DOUGLAS-FIR (*Pseudotsuga Menziesii*)." *USDA NRCS Plant Guide*. USDA NRCS National Plant Data Center. Web. 23 Feb. 2016. <[http://plants.usda.gov/plantguide/pdf/cs\\_psme.pdf](http://plants.usda.gov/plantguide/pdf/cs_psme.pdf)>.

Bohan, Heidi. "The Mouse, Douglas Fir and the Great Forest Fire." Starflower Foundation, 2006. Web. 23 Feb. 2016. <[http://www.wnps.org/education/resources/documents/K-5\\_Q&E/2nd\\_grade/2-2b.pdf](http://www.wnps.org/education/resources/documents/K-5_Q&E/2nd_grade/2-2b.pdf)>.

"Douglas-Fir." *Douglas-Fir - NWF*. National Wildlife Foundation, n.d. Web. 23 Feb. 2016. <<https://www.nwf.org/Wildlife/Wildlife-Library/Plants/Douglas-Fir.aspx>>.

"Douglasfir." *Douglasfir on the Tree Guide*. Arbor Day Foundation, n.d. Web. 23 Feb. 2016. <<http://www.arborday.org/trees/treeguide/TreeDetail.cfm?ItemID=836>>.

"Fire Ecology: Douglas-fir." *Point Reyes National Seashore*. National Park Service, n.d. Web. 23 Feb. 2016. <[http://www.nps.gov/pore/learn/management/firemanagement\\_fireecology\\_vegtypes\\_douglasfir.htm](http://www.nps.gov/pore/learn/management/firemanagement_fireecology_vegtypes_douglasfir.htm)>.

Hermann, Richard K., and Denis P. Lavender. "Douglas-Fir." *Pseudotsuga Menziesii*. USDA Forest Service, n.d. Web. 23 Feb. 2016. <[http://www.na.fs.fed.us/pubs/silvics\\_manual/Volume\\_1/pseudotsuga/menziesii.htm](http://www.na.fs.fed.us/pubs/silvics_manual/Volume_1/pseudotsuga/menziesii.htm)>.

Uchytel, Ronald J. "Pseudotsuga Menziesii Var. Menziesii." *Fire Effects Information System*. USDA Forest Service, 1991. Web. 23 Feb. 2016. <<http://www.fs.fed.us/database/feis/plants/tree/psemenm/all.html>>.

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