

COMMON TREES



of BAINBRIDGE ISLAND

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BY
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This text set by the author in 10 point Scotch Modern using Apple Pages.

INTRODUCTION

I decided to write this booklet to share my knowledge of plants with those who live on or visit the Island. It is my hope that this will contribute in some small way to increasing appreciation for the natural world and the desire to protect and steward it.

The intent of this booklet is to focus on the most common trees of Bainbridge Island, but the vegetation of the surrounding area is very similar, so it should apply well to Seattle and the Kitsap Peninsula. My goal is to cover the species that are most likely to attract the attention of the average person. This is *not* intended to be a comprehensive guide; please consult the *References* section at the end for a list of more comprehensive works.

A fact of particular note about this region is how its conditions favor the evolution of large trees. With the exception of the Western White Pine, all the trees described herein are the largest in their genus, with the Douglas-Fir, Madrone, Red Alder, and Bigleaf Maple moreover being the largest in their respective families.

ABOUT THE ILLUSTRATIONS

Cover illustration is from William Jackson Hooker's *Flora Boreali-Americana*, published in 1840. It shows a Douglas-Fir branchlet which was collected by David Douglas himself and drawn by Hooker.

Body illustrations are photographs taken by the author or line drawings from George B. Sudworth's *Forest Trees of the Pacific Slope*, published in 1908 by the U.S. Forest Service. Bigleaf Maple line drawing by William Jackson Hooker.

ACKNOWLEDGEMENTS

Thanks to R.S. and S.W. for their helpful comments and constructive criticism.

THE CONE-BEARING TREES (CONIFERS)

The conifers are an ancient group, having evolved before the flowering plants appeared on the scene. In the present time, they tend to be most numerous in regions with climates too marginal for broadleaf trees to dominate the landscape.

That latter statement may come as a surprise to many, considering the mild coastal climate and abundant rainfall of this region. Surely this is not a marginal climate! In fact, for most broadleaf trees, it is, due to our seasonal rainfall pattern that leaves most of the frost-free growing season too dry for plant growth. Our conifers, being evergreen, have a distinct advantage over deciduous trees because they can photosynthesize and grow year-round, including during the cooler parts of the year when moisture is abundant.

DOUGLAS-FIR, *Pseudotsuga menziesii* Pine Family, Pinaceæ



Douglas-Fir, branch and cone.
(Also see front cover.)

Size: Large tree, up to nearly 90 m tall in favored situations and at great age. Most of the Island is second or third growth so ours are seldom even half that height. **Habitat:** Everywhere but the wettest areas. **Cones:** 6-10 cm long at maturity, reddish-brown with a distinct three-pronged bract between each scale, bearing winged seeds. **Bark:** Thick, rough to very rough, dark brown. **Leaves:** Deep yellowish-green needles 2-3 cm long.

This is easily the most common tree on the Island, though you have to get out of the Winslow area to appreciate its true abundance. It is well-adapted to our interior lowlands climate whose dry summers often make for periods of fire danger, as its bark can be over 30 cm thick in age, allowing mature trees to survive less-severe forest fires capable of killing thinner-barked species.

In fact, this species *requires* fire for its continued existence in natural conditions. Its seedlings are unable to tolerate shade, or to germinate well amongst accumulations of leaf litter. The sunny, bare

soil left after a fire clears the forest floor and kills less resistant trees is the perfect environment for its seedlings to sprout in. A woods without fire in this climate will eventually lose all its Douglas-Firs, becoming dominated by Western Hemlock and Western Red Cedar.

This tree figured prominently in the early economic history of the region, as its lumber was shipped south and helped build (and rebuild) San Francisco after its many fires during the California Gold Rush era. One of the world's largest sawmills was on Bainbridge Island at Port Blakely, and this was the tree it focused on turning into lumber.

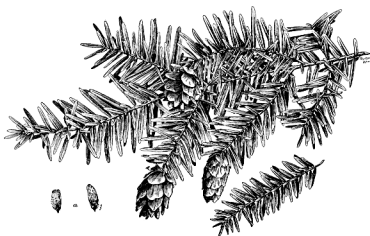
The largest Douglas-Firs on the Island are at Fort Ward and Grand Forest parks; they are some of the few that managed to escape the attention of the loggers when the Port Blakely mill was going.

In addition to its wood being used for lumber, this tree's young needles can be harvested, dried, and used to make an herbal tea.

This tree's common name is spelled with a hyphen to indicate that it is not a true fir tree (genus *Abies*). It honors Scottish botanist David Douglas, who made two collecting trips to the Pacific Northwest for the Royal Horticultural Society. Douglas-Fir is the state tree of Oregon.

WESTERN HEMLOCK, *Tsuga heterophylla*

Pine Family, Pinaceæ



Western Hemlock, branch and cones.
40% life size.

Size: Large tree, up to 60 m tall (but usually shorter as second growth). **Habitat:** All parts of the Island. **Cones:** Small, 1.5-2.5 cm long, bearing winged seeds. **Bark:** Brown, furrowed, far less thick and rough than that of the Douglas-Fir. **Leaves:** Needles 1-2 cm long, flattened, whitish beneath.

Hemlock seedlings can survive in less light than those of any other tree in our area, and a hemlock

forest will cast some of the darkest shade of any type of forest. This makes Western Hemlock ideally situated to be a climax forest species if an area goes long enough without a fire (about 1,000 years). However, our dry summers tend to ensure a fire will interrupt and reset that process before it completes.

All of our coniferous trees require fungi to survive, because they have lost the ability to absorb water and nutrients effectively from their own roots. Both species typically benefit from the association, the fungus receiving sugars as food in return for furnishing its tree partner with water and minerals; fungi have fine threads called hyphæ which are far more effective at absorbing water and minerals than even the finest root hairs.

Western Hemlock takes that trick one step further; it has the ability to grab nutrients being recycled from dead trees first because it is one of the few trees capable of associating with wood-decay fungi instead of just soil fungi. A decaying log will often sprout hundreds of hemlock seedlings. Most will fail to reach maturity, but the ones that do will be growing in a straight line and standing on stilt-like roots which straddle the now-vanished log on which the trees began their lives.

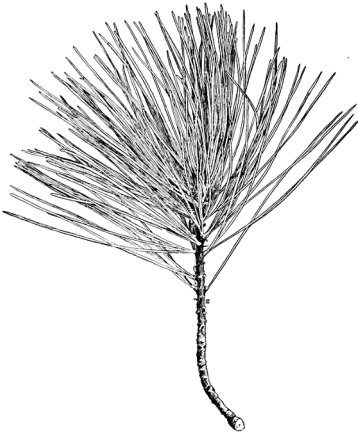
Western Hemlock is also one of the few trees that can survive in the highly acidic and nutrient-poor environment of a peat bog, though the lack of nutrients will severely stunt its growth in such a situation. The bog at IslandWood has hemlocks no taller than the average person despite their being 200 years old.

The hemlocks in the eastern USA are seriously threatened by the hemlock woolly adelgid, an insect pest accidentally introduced from Asia. Western Hemlock is much more resistant to the adelgid than the two eastern species, so does not appear to be seriously threatened. This fact might tempt one to conclude that our hemlock is more closely related to the Asian species; surprisingly, what genetic data there are suggest otherwise.

This tree has nothing to do with the highly toxic plants in the carrot family which bear the same name; in fact, it is possible to safely consume a tea brewed from the young foliage of this tree. The genus *Tsuga* is found in Asia and North America but not Europe, so there were no words in any European language for it when Europeans first arrived in what we now call New England. Etymologists believe the vague similarity of the foliage of the EASTERN HEMLOCK (*Tsuga canadensis*) when viewed at a distance to that of the Poison Hemlock that killed Socrates led to the common English name for trees in this genus. The name *Tsuga* comes from the Japanese word for one of their native hemlocks.

A distinctive characteristic of this tree is how the top leader tends to droop to one side instead of standing erect. Western Hemlock is the state tree of Washington.

WESTERN WHITE PINE, *Pinus monticola*
Pine Family, Pinaceæ



Western White Pine branch.
50% life size.

Size: Medium to large, to 40 m tall. **Cones:** Large, 15-25 cm long, bearing winged seeds. **Habitat:** Drier areas with poor soil. **Bark:** Grayish, smooth on younger trees, becoming distinctively rectangular-checked on older trees. **Leaves:** Slender, light bluish-green needles, in bundles of 5.

This is the most common pine on the Island. Western White Pine is mostly an inland and mountain species, but its distribution reaches sea level in northern Washington and southern British Columbia. Particularly on younger trees, its branches grow in widely-spaced, regular tiers (whorls).

In our region, Western White Pine is an indicator of poor soils, typically hardpan consisting of highly-compacted glacial till. This mixture of sand, gravel, and clay can reach near-concrete-like consistency, as anyone who has attempted to dig in it can attest.

This species is a close relative of EASTERN WHITE PINE (*Pinus strobus*), and like that species its numbers have been reduced by the white pine blister rust, an introduced fungal parasite. Compared to its eastern cousin, the Western White Pine is a larger tree with slightly shorter, darker, denser foliage and larger cones. Visitors to IslandWood should note that this tree seems to be completely absent there, though it is common in the Winslow area.

Indigenous peoples used a tea brewed from the inner bark of this pine as a medicine. Western White Pine is the state tree of Idaho.

The related SHORE PINE, *Pinus contorta*, is not nearly so common on the Island. As its name implies, it is found near beaches. It is a two-needled pine with shorter, darker foliage and much smaller cones than the Western White Pine.

WESTERN RED CEDAR, *Thuja plicata*
Cypress Family, Cupressaceae



Western Red Cedar branch.
50% life size.

Size: Old-growth to 60 m tall, our second growth typically to half that. **Habitat:** Generally wetter areas, though there are often plenty in drier forests. **Cones:** Small, about 1 cm long, with 8-12 scales. **Bark:** Thin, fibrous, reddish-brown weathering to gray. **Leaves:** Minute, scale-like, on flattened branchlets.

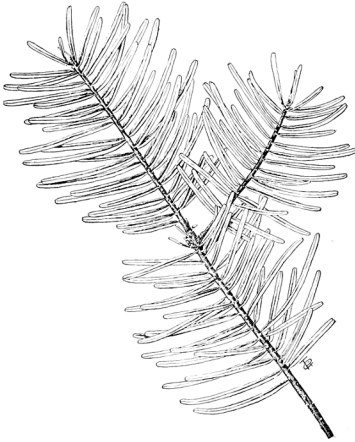
Western Red Cedar grows more slowly than most of our trees, but is capable of reaching great size and age. Cedars can live for over 1,000 years, developing irregularly-fluted trunks over 10 m in circumference. Their longevity is due in part to their aromatic, rot-resistant heartwood. Some of the Island's largest remaining cedars are found in the western part of the Grand Forest.

Strong, lightweight, and easily split into shingles or planks, cedar heartwood was used by Native Americans to construct their longhouses and canoes. Its fibrous bark was used to make garments and cordage. The typical Native American wood harvesting technique involved splitting planks from the heartwood of live, standing cedars, which normally survived the process.

Most of the cedar wood on the market today is from younger trees and is not nearly so rot-resistant as the heartwood of older trees. Due to that rot-resistance, in decades past virtually all exterior wood on houses in this region, even modest ones, was cedar heartwood. Such heartwood is now far too scarce and valuable to be used in such quantity. Western Red Cedar tends to fare poorly under modern "forest management," as its seedlings do not survive well in the full sun of clear cuts and it grows more slowly than the Douglas-Fir, thus making it uneconomical to replant. This has led to its increasing scarcity on the lumber market.

The thin bark of the Western Red Cedar leaves it vulnerable to fire. Western Red Cedar is the provincial tree of British Columbia.

GRAND FIR, *Abies grandis*
Pine Family, Pinaceae



Grand Fir, lower branch.
50% life size.

Size: Old growth to 70 m, in our second growth to about half that height. **Habitat:** Most forested areas. **Cones:** 6–12 cm long, borne erect on the topmost branches, disintegrating when ripe. **Bark:** Grayish, smooth with resin blisters on young trees (remaining so to a larger trunk diameter than the Douglas-Fir), moderately rough on older trees. **Leaves:** Flattened needles 3–6 cm long, dark glossy green above, two whitish stripes below, often in flattened sprays.

You will never find the cones of a Grand Fir littering the ground as you do for most of our other conifers. Like all true firs (and unlike the Douglas-Fir), the Grand

Fir's cones are borne erect, perched like candles on the upper branches; they disintegrate on the tree when ripe. This is thought to be a characteristic evolved to ensure that all seeds are shed while a cone is still on the tree, being held well-aloft so as to maximize the distance the wind will carry them.

There are other true firs native to Washington, but this is the only one native in the lowlands. If planted, the mountain firs will do fine in the lowlands at first, but within a few decades tend to get sickly and die.

The most distinctive characteristic of this tree is the appealing citrus-like aroma of its crushed foliage. This property is shared by the very different-appearing WHITE FIR (*Abies concolor*) of California and the Rocky Mountains; genetic analysis has revealed that the two species are closely related. In fact, the two species intergrade, and in the vicinity of Crater Lake it is possible to see a variety of fir trees whose form is intermediate between the two archetypes.

The needles of the Grand Fir tend to be borne in flattened sprays, particularly in shaded areas; this is an adaptation to maximize the amount of light that can be captured.

THE BROADLEAF TREES

The broadleaf trees evolved after the conifers, and in many regions of the world are the dominant (and often the only) tree species present. Although the conifers dominate our forests, we still do have a number of common broadleaf trees.

That is to say that *in natural conditions* the conifers dominate here. Many of our broadleaf trees tend to be pioneer or successional species; moreover, ours tend not to have lumber as valuable as our conifers. Both factors combine to mean that in urbanized areas, which were first extensively logged of conifers then subject to persistent disturbance, broadleaf species tend to be at an advantage. This is why, across the Sound, Seattle's greenbelts have predominately broadleaf trees.

MADRONE, *Arbutus menziesii* Heath Family, Ericaceae



Madrone, flowers and foliage.

Size: Medium, to 30 m in exceptional cases, more typically to about 20 m. **Habitat:** Drier areas. **Flowers:** Small (under 1 cm wide and long), white, bell-like, borne in large showy clusters in mid-late spring. **Fruit:** Orange to red berries, approximately 1 cm in diameter, ripening in autumn. **Leaves:** Thick, glossy, evergreen, oblong, 7-15 cm long. **Bark:** Thin, smooth, deciduous, renewing yearly, emerging green and ripening reddish-orange, scaly on the oldest trunks.

This is easily our most distinctive broadleaf tree; it looks like it belongs in a climate much warmer than ours. There is a grain of truth in that impression; this is basically a Mediterranean climate plant, and we are near the northern end of its range. The coast west of the Olympic Range is too wet for this species, and anyplace far from the moderating influence of salt water tends to be too cold for it at this latitude. Thus, the coast of the Salish Sea, rain-shadowed by mountains to the west, is the only place where it is common in the Pacific

Northwest. Even in this favored environment, it is prone to suffering damage in our coldest winters.

Why should we have this Mediterranean climate outlier here, and not other trees such as live oaks, California Laurel, and Coast Redwoods (all of which grow fine when planted in this climate)? The answer may lie in how this species' seeds are dispersed: by birds. Relying on squirrels or wind gusts was nowhere near as effective a means for rapid range expansion in the wake of the ice ages. This theory is bolstered by how POISON-OAK, *Toxicodendron diversilobum*, a Mediterranean climate shrub which is also bird-dispersed, can also be found in this region.

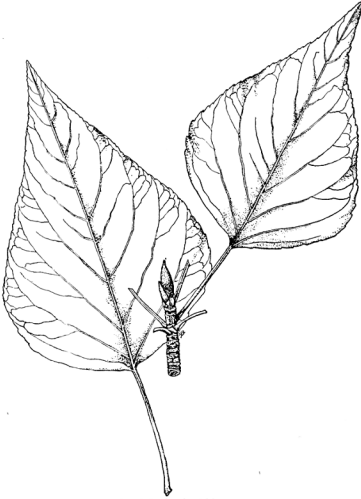
This is a particularly attractive tree, with its flowers, colorful (and color-changing) bark, sinuous branches, decorative fruit, and evergreen leaves. It is difficult to transplant, which restricts its use as an ornamental. Its fruits are edible, but have an unappealing mealy texture and not much flavor.

Madrones grow too crookedly to have much use as a lumber source, but their burls find some use in decorative applications. The hard, dense wood makes an excellent fuel, giving a long-lasting bed of coals and producing relatively little ash. It has been used for making charcoal.

This tree's common name comes from the Spanish *madroño*, bestowed upon it by explorers of California who immediately recognized its similarity to the STRAWBERRY TREE, *Arbutus unedo* (also called *madroño*), found in their native Spain. One of the latter may be seen planted on Winslow Way outside Blackbird Bakery.

The scientific names of both this tree and the Douglas-Fir honor Archibald Menzies, who served as surgeon and botanist on the Vancouver Expedition (1791-1795).

BLACK COTTONWOOD, *Populus trichocarpa*
Willow Family, Salicaceae



Black Cottonwood, bud and leaves.
40% life size.

Size: To 50 m. **Habitat:** Often found along creeks, but sometimes found away from them. **Flowers:** Inconspicuous male and female flowers borne in catkins. **Fruit:** Pea-sized capsules each containing many tiny seeds covered with cottony hairs. **Bark:** Gray, initially smooth, becoming thick and fissured on old trees. **Leaves:** Triangular, 7-15 cm long (longer on vigorous young shoots).

In spring, as the large, sticky buds of the Black Cottonwood open, they exude a fragrant balsam that perfumes the air. This sticky substance was used by indigenous peoples to make salves and ointments. The male and female catkins also emerge at this time.

By late spring or early summer female trees are releasing the clouds of the cottony seeds which give this species its common name. Cottonwood seeds have some of the fastest germination times of all seeds, sprouting within 24 hours of landing on bare, wet soil. They also have one of the shortest viability times, perishing within a month unless they sprout. A single tree can make tens of millions of seeds per season.

Like most poplars, this is a fast-growing tree that prefers to be near a source of water. It is a pioneering tree; some of the first trees to re-vegetate the area devastated by Mt. St. Helens were Black Cottonwoods. Hybrids of this species with those found in Europe or the Eastern US are even faster-growing; many of these are now being farmed commercially for their pulp. It can take as little as a dozen years for a hybrid poplar to grow to harvestable size.

Lovers of the built environment tend to have issues with this tree, as its strong roots are prone to break up pavements and invade sewer lines.

BIGLEAF MAPLE, *Acer macrophyllum*

Maple Family, Aceraceae



Bigleaf Maple foliage, flower, and fruit. 20% life size.

Size: To 45 m, more commonly to 20 m. **Habitat:** Most wooded areas. **Flowers:** Greenish-yellow, borne in pendulous clusters in mid-spring. **Fruit:** The typical winged “maple seed.” **Bark:** gray-brown, ridged, often covered with moss. **Leaves:** Typical lobed maple leaves, but much larger than the leaves of other maples, to 30 cm or more across.

Of all our trees, the Bigleaf Maple tends to be the one most heavily festooned and encrusted with epiphytes (plants that grow on other plants). It is often possible to glance up into an old maple and see gardens of ferns and mosses 15 meters (50 feet) or more up.

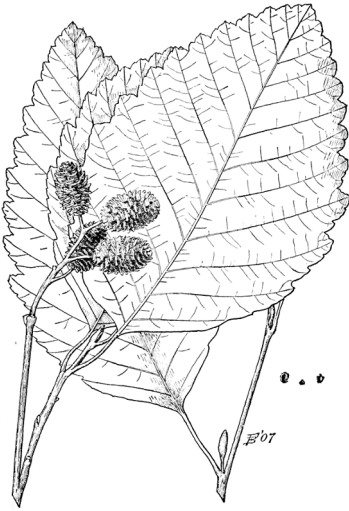
Epiphytes use other plants as a perch to grow on but unlike mistletoe are not parasites; they extract no nutrients or water from their host tree. In fact, things are the other way 'round with the Bigleaf Maple: some of the mosses it hosts are capable of fixing nitrogen from the air, and this maple will grow aerial roots into them to absorb it.

The flowers of most maples fail to attract much attention (a pity, as some of them can be quite attractive close up), but the Bigleaf Maple's flowers are borne in big enough clusters to be showy. The flowers are edible and can be used in salads, cooked in pancakes, or dragged through batter and fried as fritters.

It is possible to boil down the spring sap of this maple and make syrup from it, although this is seldom done. It takes significantly more Bigleaf Maple sap to make a given volume of syrup than it does Sugar Maple sap.

This tree is well-named, as it has the largest leaves of any maple.

RED ALDER, *Alnus rubra*
Birch Family, Betulaceæ



Red Alder, fruit and leaves.
40% life size.

Size: Medium, to 30 m tall.
Habitat: stream banks, areas recovering from disturbance.
Flowers: Individual flowers tiny, on catkins borne in early spring. **Fruit:** A cone-like catkin which persists after opening and shedding seeds.
Bark: Gray, smooth except on the oldest trees. **Leaves:** 7-15 cm long with distinctive edges that are slightly curled under.

Red Alder is the most noteworthy early successional tree in our region, quickly colonizing land that has been stripped of its forest cover. It also grows along rivers and streams, colonizing areas of abandoned riverbed after a stream changes course.

This tree is uniquely well-suited to colonizing raw, disturbed areas, as its roots associate with nitrogen-fixing

bacteria, nitrogen being the nutrient typically most deficient in mineral soil. Alders thereby enrich the soil, leading the way for other trees to grow. The wealth of nitrogen in an established alder forest often leads to such places hosting nitrogen-loving plants such as stinging nettles.

Red Alder bark will bruise bright orangish-red if injured, and a red dye can be extracted from it, hence both its common and scientific names. The bark is frequently colonized by lichens which are significantly lighter in color than the bark itself, giving such trees a birch-like appearance. This resemblance is not entirely coincidental, as birches and alders are in the same family.

Red Alder is the favored wood for smoking salmon meat.

PACIFIC DOGWOOD, *Cornus nuttallii*
Dogwood Family, Cornaceae



Pacific Dogwood in bloom.

Size: Small-medium, to 20 m tall. **Habitat:** Moist but well-drained sites. **Flowers:** The flowers proper are small, greenish, and inconspicuous, borne in clusters; however, those clusters are surrounded 4-6 white bracts, giving an overall appearance of a single large, showy flower about 15 cm across. **Fruit:** A tightly-packed cluster of red berries, ripening in the autumn. **Bark:** Thin, smooth, and grayish-black, becoming furrowed on

the oldest trees. **Leaves:** To 10 cm long, with prominent curving parallel veins.

For much of the year, the Pacific Dogwood is an easy-to-overlook understory tree in our forests, but when in bloom they can be spectacular. This species is similar to the eastern FLOWERING DOGWOOD (*Cornus florida*), but in all respects (leaves, flowers, overall size) is larger. The main blooming season is in April, sometimes with a secondary lesser blooming in August or September. As if the flowers and colorful fruit weren't enough, this tree ends the growing season with beautiful display of pink to red foliage.

All the above characteristics might have one thinking this would be a popular and prized ornamental, but the Pacific Dogwood does not transplant well and tends to be fussy about growing conditions.

The bark was boiled by indigenous people to make a medicine for fever. There are now fewer Pacific Dogwoods than there used to be, due to dogwood anthracnose, an introduced fungal parasite, having reduced this tree's numbers.

Pacific Dogwood is the provincial flower of British Columbia.

REFERENCES

Pojar, Jim and MacKinnon, Andy. *Revised Plants of the Pacific Northwest Coast: Washington, Oregon, British Columbia and Alaska*. Vancouver: Lone Pine Publishing, 2004. This is a good all-around field guide.

Gilkey, Helen and Dennis, La Rey. *Handbook of Northwestern Plants (revised edition)*. Corvallis: Oregon State University Press, 2001. This is used as a textbook for teaching botany students how to identify plants via dichotomous keys, and is a good introduction to using the technique for those who wish to learn it. A downside is that this book tends to be sparsely-illustrated.

Hitchcock, C. Leo and Cronquist, Arthur. *Flora of the Pacific Northwest*. Seattle: University of Washington Press, 1973. The technical flora for this region; assumes prior botanical knowledge. (A revised version of this book is due to be released in 2018.)

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