Context:
Natural History of Gabriola Island

Citation:
Doe N.A., Smith P., Gabriola's trees—a brief history, *SHALE* 2, pp.27–33, March 2001.

Copyright restrictions:

Errors and omissions:
None.

Later references:
None.

Date posted:
August 31, 2008.

Authors:
Nick Doe, 1787 El Verano Drive, Gabriola, BC, Canada V0R 1X6
Phone: 250-247-7858, FAX: 250-247-7859
E-mail: nickdoe@island.net

Paul Smith (contact Nick)

Gabriola's trees—a brief history

by Nick Doe and Paul Smith

What we have

When we think "trees", on Gabriola, what usually springs to mind are:

- Douglas-fir (*Pseudotsuga menziesii*)—by far the most common tall tree on the island. Easily identified by glancing down at the ground where there are sure to be a few cones lying about. Douglas-fir cones have characteristic three-pronged bracts, like the rear end of a mouse, poking out from between the scales. The cones also hang downward from the branches, which is unusual
- and red cedar (*Thuja plicata*)— with its familiar, canned-pea green, scale-like leaves. It's BC's provincial tree.

These are the coast-forest giants—the trees that grow as tall and straight as any sailing-ship builder could wish. They occur both in the second-growth and the small pockets of quiet carpeted old-growth that still do exist here and there on Gabriola. Rainforests are "the West's wooden cathedrals"—full of verticals and verdancy, damp decay, and pools of sunlight—the home of witch-hair lichens (*Alectoria* sp.), sword ferns (*Polystichum munitum*), beaked mosses (*Kindbergia* sp.), and the great-jam-making-berry plants—huckleberry (*Vaccinium* sp.), salal (*Gaultheria shallon*), and Oregon grape (*Mahonia nervosa*).

Two other tall trees that grow in our forests and are fairly common are:

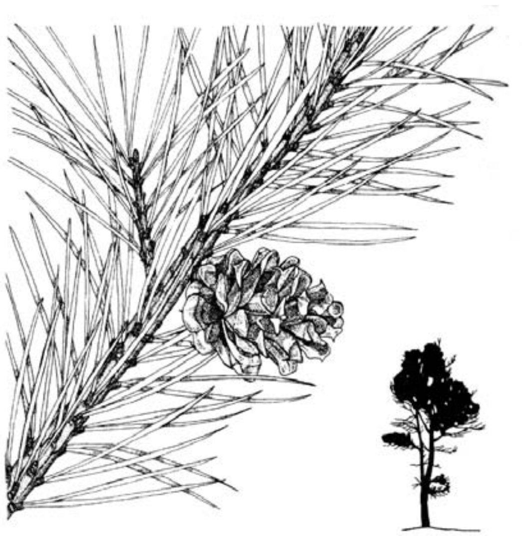
- the grand or balsam fir (*Abies grandis*). Grand firs may look at first glance like Douglas-firs, but their neat rows of dark-green needles give them away. The needles grow horizontally, from both sides of the twig, not from all around it. Unlike the heavier cedar boughs, the grand firs' flat foliage sometimes appears to be floating on unseen layers of air, like lily pads or wisps of cloud in mountain valleys
- the western hemlock (*Tsuga heterophylla*)—the one with the droopy top; numerous small cones; feathery sprays; and short, flat, unequal-length needles on the same twig. Hemlocks live on the north end of the island. Their natural habitat is older, denser forest, and they are consequently, much less noticeable from the roadside than the other three.

Some old trees that now grow in splendid isolation, or in small stands, were also once members of the forests of Gabriola. The big-leaf maple (*Acer macrophyllum*) is one we can count in with these.

Red alders (*Alnus rubra*) grow in wet places and on recently cleared land. They often have white-blotched bark, which makes them look like birch, though you can be sure they're not (alder leaves stay green in the fall, unlike birch). They are called "red", not because of their catkins, but because of their wood, which is orangy-red when freshly cut or freshly stripped of bark.

And, because Gabriola is a Gulf Island, if we think of trees at all, we cannot fail to think of those essential members of a Gulf-Island biotic zone—the evergreen arbutus or Pacific madrone (*Arbutus menziesii*) and the Garry oak (*Quercus garryana*).[1]

[1] If you want a complete list, which is not really the object here, we could add the "here-and-there"



Susan Laurie-Bourque

Shore pine, a Gabriola resident and close relative of the lodgepole, a species no longer here but one of the first trees on the island after the ice age.

After the ice

These tree species have not always been here. Not surprising really considering that Gabriola was once covered with ice and mostly below sea level. When the clams in the sandpit at the end of Dorby Way were alive, around 11 500 BC give or take a few hundred years, there wasn't much habitat here for trees. All the pre-glacial vegetation of the island had long-since gone.

After the glaciers had retreated, and the island had risen as high above the sea as it is today, the landscape hereabouts must have looked like tundra, or perhaps like the rocky and recently-deglaciated areas of Alaska today. Much of it would have been devoid of greenery; pocketed with silt, sand, and clay; or would be open meadows of grasses and mosses, or thickets of willows (*Salix* sp.) and the still-here-but-rare soopolallie (soapberry) (*Shepherdia canadensis*). What trees there were, would have been lodgepole pines (*Pinus contorta* var. *latifolia*) and trembling aspen (*Populus tremuloides*).

Lodgepole pines don't grow here anymore—nowadays they live in the sub-alpine, up north, or further east where winters are harsher—however, what you can find is the lodgepoles' near relative, the shore pine (*Pinus contorta* var. *contorta*). It grows on the exposed outer coast of Gabriola. An easy place to find them is along Berry Point Road near to Surf Lodge. Take a walk there when the wind is brisk, clouds are scudding, and the surf's up. You'll see why they're called "contorta".

We also still have here on the island at least three small clumps of trembling aspen. These are common in the Rocky Mountains, but very unusual this far west. If you drive by the junction of Peterson and Perry, spare a glance at the stand on the corner there—the aspen have heart-shaped leaves, smaller than cottonwood leaves, and without the saw-tooth edges of alder leaves. Quite possibly these trees and their ancestors go back further than any other kind of tree on the island. Only the shrub willows—Pacific (*Salix lucida* ssp. *lasiandra*), Scouler's (*Salix scouleriana*), and Sitka (*Salix sitchensis*)—might be able to compete.

The great warmup

From the end of the ice age, about 11000 BC,[2] up until between 10 and

species: white pine (*Pinus monticola*), black cottonwood (*Populus balsamifera* ssp. *trichocarpa*), western yew (*Taxus brevifolia*), flowering dogwood (*Cornus nuttallii*), Rocky Mountain juniper (rare) (*Juniperus scopulorum*), and shrub-trees like Douglas maple (*Acer glabrum*), bitter cherry (*Prunus emarginata*), oceanspray (*Holodiscus discolor*), Pacific ninebark (*Physocarpus capitatus*), mock-orange (*Philadelphus lewisii*), cascara (*Rhamnus purshiana*), crab apple (*Malus fusca*), and black hawthorn (*Crataegus douglasii*).

[2] A radiocarbon date of ca. 11000 years BP.

9000 BC, the local climate was cold and wet—colder and wetter than it had been while the ice was melting in earlier centuries. This cool period, which lasted 1300 years, is known as the Younger Dryas. Its end, as was its beginning, was marked by a major and abrupt change in climate. The average temperature of the atmosphere is believed to have risen several degrees Celsius over a period of a decade or so.

The changes that had led to the end of the ice age are pretty well understood—a more favourable earth orbit for gathering energy from the sun (the Milankovitch cycle); an increasing concentration of carbon dioxide and methane in the atmosphere (greenhouse gases); an increase in the amount of heat from the sun absorbed as the reflective snow melted; and possibly increased solar radiation. But why the atmosphere behaved so erratically at both ends of the Younger Dryas is not so clear, unless it was a sudden change in the course of ocean currents.

The evidence however for the end of the cool period is abundant. There were sudden changes in the ocean's population of foraminifera—single-celled creatures with microscopic shells—indicating a sharp rise in ocean temperature. Pollen and fossil analysis shows that numerous plants and animals rapidly extended their range northward, in some cases even further north than is their range today. Fossil logs in the mountains of BC indicate higher timberlines than at present.

It was around the time of this "great warming", that many species of mammals disappeared from North America—giant beavers the size of a bear, the western camel, ground sloths, mammoths, mastodons, sabre-tooth tigers, and over thirty more, including a species of bison that grazed in the fields of southern Vancouver Island where Victoria is now. Some say it was the change in climate that did them in; others that they were hunted to extinction by newly-arrived humans (a theory less popular these days than in the past); while others conjecture that the sudden extinctions were caused by the spread of as-yet-unknown diseases.

The climate change brought noticeable changes in the local landscape. Both red alder and the Douglas-fir first make their appearance here around 10 000 BC. The lodgepole pines' days were numbered, but it was not yet the time of the great coastal forests. The landscape became like a park—a savanna—with grasses, sagebrush, and wildflowers everywhere.

Susan Laurie-Bourque

Douglas-fir—a long-time resident of Gabriola

The modern "cool and wet"

The climate remained thus until about 4500 BC[3] when the hitherto warm, dry

[3] A radiocarbon date of ca. 5700 years BP. Dateable locally by the advance of glaciers on Mount Garibaldi. This account simplifies somewhat the climate changes that have occurred during the Holocene.

climate, the "hypsithermal", became cooler and wetter—like the climate we have today. Again, the change in climate brought great changes in the local vegetation. First hemlock, and then cedar appeared. They had probably been on southern Vancouver Island all along, but confined to alpine areas on moist, north-facing slopes. With their appearance in the lowland, many meadows turned into rain forest. Cedar remained for two to five thousand years (until about 1400 AD at the start of the "little ice age"), the most common tree around. The time of the cedar was also the time of the salmon, and, not coincidentally of course, the time during which Coast Salish culture first arose and flourished.

Garry oaks, which probably first arrived here about 7000 BC, were once abundant all over southern BC, sharing the landscape with the Douglas-fir. When the climate became cooler and wetter, they withdrew to small, warm, dry spots on the Gulf Islands and on the southeast tip of Vancouver Island, where they remained very common until shortly before 0 AD. Today, although they are still here, especially on the south-facing slopes overlooking the ocean, their heartland is further south; they grow all along the US coast down to the border with Mexico.

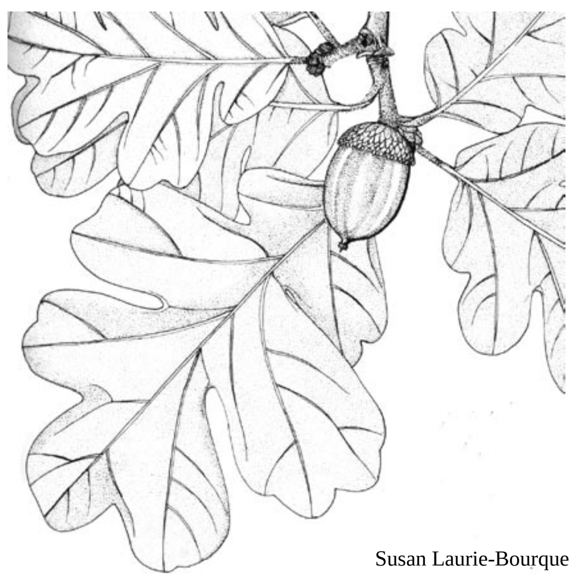
What is to come?

If this had been written a decade ago, we might have ended our list of climatic changes here. But today we know there is more change to come. Global warming, driven by fossil-fuel consumption, combined with a lower water-table as a result of drilling wells and clearcutting, will dramatically reduce the number of hemlocks and cedars[4] here within the next hundred years. These trees are less tolerant of drought than the Douglas-fir.

These changes will mean that our forests will become much more open than those we are accustomed to. On dark winter evenings, it may be comforting to contemplate the return of the hypsithermal and with it the Garry oaks and the meadows of wildflowers they thrive in. But whether the oaks return or not, will in part depend on not just the climate. There are other things, such as the deer, to consider.

The deer

I've never been able to figure out exactly what the relationship of the deer and the elk with the oak must have been in the past. Deer would have destroyed many saplings and kept the oak forests open. But, as any gardener will attest, if there had been even slightly too many, it's hard to see how any oak trees would have survived at all.



Susan Laurie-Bourque

Garry oak—a hot-dry-summer survivor

I can only imagine that in the past, the population of deer on Gabriola was very variable. You can see the possible pattern of the fluctuations in the populations of deer

[4] …of salmon too.

Royal Canadian Air Force Photograph A4504.36. Courtesy Geographic Information Centre, UBC.

An aerial photograph of False Narrows taken in 1932. Mudge Island is shown in the bottom half of the picture. Visible are farms, orchards, the Dominion Brick Company factory, and South Road. Notice how open the landscape is. Trees were more widely spaced then than they are today.

on the islands of the central coast of BC today. Some islands have lots of deer, but no wolves; others have lots of wolves but no deer. It is a classical predator-prey story. The prey species (the deer) thrives and multiplies—the predators (the wolves) move in and live well for a while until all the prey have been consumed—the predators then starve or depart, leaving behind an island without either. Gradually the prey species returns and the cycle begins again. Perhaps it was while the deer went missing that a few of the saplings had a window of opportunity to grow big enough to be able to survive their unwelcome, grazing attention.

We can be sure too that the Snunéymux^{w}, who lived on Gabriola in later years, also had a hand in controlling the deer and elk population. That, and the fires, many deliberately-set, might have maintained a delicate balance that was good for the oaks; and good too for the meadows of camas (*Camassia quamash*) and other lilies, which once were abundant here and an important food source for the Native people.[5]

Growing up together

It is easy to imagine that the local forests do and did contain trees of all ages, but I suspect that this picture is wrong. When I first came to Gabriola to live on El Verano, I was struck by the fact that many of the twenty or so big-leaf maples that grow just above the tideline along the beach at False Narrows, all appeared to be roughly the same age. I counted the rings on some of the stumps; there were about 120 of them on several different stumps. It was as if, sometime in the 1870s, somebody had planted them all. Yet, we know from historical records and from the oral history of the Snunéymux^{w} that the maples were here before any European settlers came.

Later, I found that the "similar-age" phenomenon is common. When they were cutting the trees close to the school on North Road recently, I noticed that two or three of the oldest trees—Douglas-firs—according to my ring counts, all appeared to be about 175 years old. That's going back to the 1820s, several decades before any clearing for farming was done. This pattern in unlogged forests is also not unusual; a large old veteran tree standing head-and-shoulders above its entourage of younger trees—all of similar age, and all undoubtedly the veteran's offspring.

Landscape design

The island's forests of the past, it seems, may not have been as dense as we might think. It's hard to imagine pioneers clearing the land, by hand, if they were. Aerial photographs of Gabriola and Mudge, taken in the 1930s, before the big fire of '38, show open stands and parklike spaces everywhere. Logging would of course account for some of that, perhaps even most of it, but it seems, looking at these pictures, that the survival rate of saplings was low everywhere. Forest fires must have had a hand in that. Only now and then would circumstances have been favourable for saplings to survive, and when they were, a whole host of trees would have grown to maturity together.

The tree most able to withstand high-severity fires is the unmistakable arbutus, its bare wood, smooth and tanned; its

---

[5] Now very seldom seen, but still here, are the chocolate lily (*Fritillaria lanceolata*) and white-fawn lily (*Erythronium oregonum*). The bulbs of the former were eaten, but the latter probably not. The very patchy distribution on Gabriola of the poisonous meadow death camas (*Zigadenus venenosus*) must be a result of Snunéymux^{w} semi-cultivation of the camas meadows. One of the Flat Top Islands is called Lily Island. Spring-gold (*Lomatium utriculatum*) and sea blush (*Plectritis congesta*) often flower here along with the lilies.

deciduous bark, the colour of chartreuse smudged with cinnabar, or old, peeling, and russet. Stands of arbutus are often there because of fires set by loggers to burn the slash. The fires kill off any of the Douglas-fir that have not been logged, but not the arbutus. Arbutus are unlike other trees. They're related to heather. They sprout freely from scorched stumps and root fragments left below burnt soil and they need no older, mature trees as sources of seed for regeneration.

Band-tailed pigeons (*Columbia fasciata*) are said to be particularly fond of arbutus, so it's a simple, yet surprising equation, typical of ecosystem interdependencies: slash-burning = more pigeons. There must be many more such unsuspected relationships.

It is interesting how much we probably change the look of our island by saving the deer, putting out the forest fires, and filling the tanks of our cars and trucks with gasoline. It's not just logging and the introduction of exotic and invasive species like the Scotch broom (*Cytisus scoparius*), Himalayan blackberry (*Rubus procerus*), and periwinkle (*Vinca major*) that does it, though they of course, certainly help.

Times—they always are a'changing. ◊

Acknowledgements

Although this is written in the first person singular (Nick Doe), most of the ideas in this paper have arisen in discussions with Paul Smith who knows Gabriola's trees very well.

Help was also received from Phyllis Fafard. Phyllis works with the museum on their outdoor native plants display. She also maintains, as a labour of love, a database of Gabriola's flora.

Thanks are also due to Richard Hebda at the Royal BC Museum in Victoria whose pioneering work in the field of climate change and its effect on the ecology of southern Vancouver Island I have depended on a great deal.

Illustrations

Illustrations by Susan Laurie-Bourque are from Identification Guide to the Trees of Canada *by Jean Lauriault of the National Museum of Natural Sciences (now the Canadian Museum of Nature), Fitzhenry & Whiteside, 1989. Courtesy the Canadian Museum of Nature.*

Sources

Jim Pojar & Andy MacKinnon (ed.), *Plants of Coastal British Columbia—including Washington, Oregon & Alaska*, Lone Pine Publishing, 1994.

C.P. Lyons, *Trees, Shrubs and Flowers to know in British Columbia*, Dent & Sons, first pub. 1952.

Phyllis Fafard & Jane James, *Plant list for Gabriola*, unpublished database, February 2001.

E.C. Pielou, *After the Ice Age—the Return of Life to Glaciated North America*, University of Chicago Press, 1991.

Paul Mayewski & Michael Bender, *The GISP2 Ice Core Record—Paleoclimate Highlights*, Rev. Geophys. Vol. 33 Suppl., American Geophysical Union, 1995.

Richard Hebda, *Atmospheric Change, Forests, and Biodiversity*, Royal BC Museum Research Papers, August 30, 1996.

Richard Hebda, *Origin and History of the Garry Oak-Meadow System*, Proceedings of the Garry Oak-Meadow Colloquium, Victoria 1993, Garry Oak Meadow Preservation Society.

Ministry of Environment, Lands, and Parks pamphlet, *Ecosystems at Risk: Coastal Douglas-fir Ecosystems*, 1999.

Ministry of Environment, Lands, and Parks pamphlet, *Ecosystems at Risk: Garry Oak Ecosystems*, 1993.

Gabriola Museum indoor displays: *The Arbutus*. [Museum Director Jacquie Sutton, who is in charge of displays, reports that it will be the turn of *The Garry Oak* later this year.]

Andrew Scott, *The Arbutus*, in "Secret Coastline—Journeys and Discoveries along BC's shores", pp.100–105, Whitecap Books, Vancouver, 2000.

John Clague, *Global Warming—The Perspective of Past Climate Change*, GSC, Vancouver Natural History Society, Discovery, Sept. 1995.