

Weather, Climate Zones, Plant Hardiness

by John Waddington

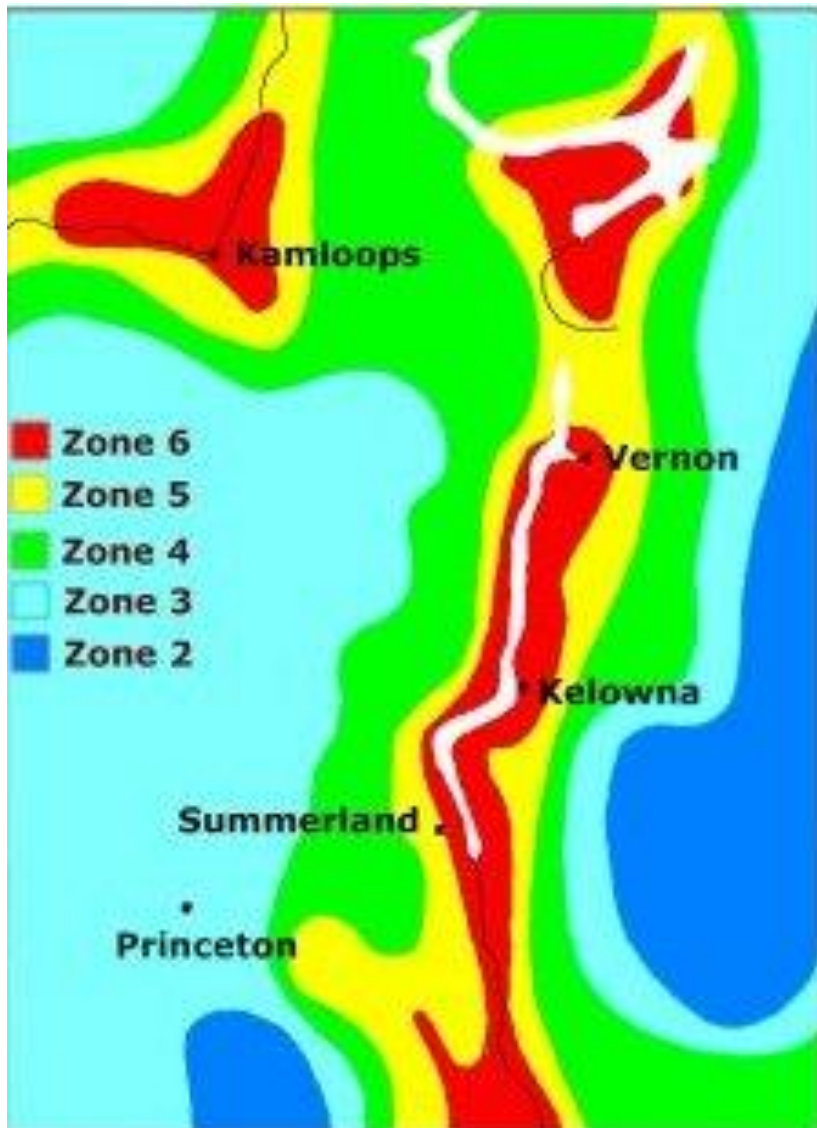
Gardeners in the Okanagan (and elsewhere in Canada) are usually presented with climate zone/plant hardiness information from either the U. S. Dept. of Agriculture or Environment Canada. As a lot of plant information in books and the internet is from the USA, the US zone map is commonly the one quoted. Fortunately the two are not that different.

The most recent USDA map appears to be from 2012, and is based on weather records over the period 1976-2005. The map is based on the average annual minimum winter temperature, divided into 10-degree F zones and further divided into 5-degree F half-zones (See <https://planthardiness.ars.usda.gov/> for details). To me this means they take the minimum temperature recorded that day for 30 years and average it for each of the 365 days of the year. Then they use the minimum one of those daily minimums, whatever day it is (probably in January) to draw the map. The latest map does not include Canada.

The most recent Canadian plant hardiness map uses 1981-2010 weather data, and includes several more measurements, and more manipulation than simple minimum temperature. See <http://planthardiness.gc.ca/?m=15&lang=en/> for the measurements and formula used. I do not know if they used the original formula from the 1931-1960 data, or recalculated it with the more recent weather values. Environment Canada have also produced a map using the USDA minimum temperature approach.

The problem with all these maps is that BC consists of mostly narrow north-south-facing valleys: enlarging the maps doesn't produce the details we need. The best I could find is one from West Coast Seeds, and it looks remarkably like the one in "Gardening in the Dry Interior of British Columbia", 2003, ed. Anne Ginns, page 206. I suspect that this map is based on the original plant hardiness map from Agriculture Canada based on weather data 1931-1960. When the map based on the years 1981-2010 is used, most places in the valley have gone half a level warmer – Kelowna to 7a, Summerland to 6a, etc. Perhaps when the map for 1991-2020 comes out the Okanagan may be still another level warmer. I haven't changed the numbers on the map below. They are the ones on the original map. And a word of caution. Although the weather is getting warmer, it is also getting more variable, so the minimum at sunrise some future January morning may be just as cold as in the past, and just as damaging to a sensitive plant.

A further problem is that there aren't enough weather recording locations in the valley to produce a good map. Consequently we have to rely on the fact that climate gets colder the higher the elevation and draw the zone boundaries accordingly. As most of us live near the valley floor where most of the weather stations are it probably doesn't matter much anyway.



Also, there is a relationship between altitude and latitude: 100 m altitude equals roughly 100 km latitude. That is when I climb 100 m up a mountain, the climate cools roughly as if I had travelled 100 km north. Obviously, this is very approximate. Local conditions such as sunshine, daylength, wind, etc. affect this relationship. But it does explain why plants native in Arizona can be hardy in the Okanagan, and in one case that I am aware of, a plant from southern Colorado that is hardy in Swift Current!

Plants are adapted to a certain range of weather and climate conditions. For some, the range is fairly narrow, for others remarkably wide. This includes drought-tolerance too. Some of those with a wide range of adaptation can look somewhat different at the two extremes, and be considered by some taxonomists as separate species. It was bad enough when only a plant's appearance was used to define what species a plant was. But now that we have genetic details to use, some relationships have seen major revisions and changes in their scientific names, with no change whatsoever in the plant's appearance. For a gardener this doesn't matter much except that you may have the same plant in separate nurseries with a different name, depending on whether the nursery chooses to use the new name or keep the old one. So if the variety name is the same but the scientific name is different, do you have one variety with two species names or two different species with the same variety name?

Plants with tolerance for a wide range of environmental conditions are a boon to the nursery trade because opportunities for sales are open to gardeners in a wider range of climates and conditions. But also it can be a problem because a plant from one end of its range may behave quite differently at the other end of its range. For example, Oceanspray (*Holodiscus discolor*) grows from sea level at our west coast to the Okanagan and central Idaho, much drier locations. At the coast the plant grows about 2m tall with solitary leaves fairly widely spaced. In the interior it grows about 1 m tall with the leaves much closer together, almost in groups. The taxonomists are still arguing over whether the interior version should be considered a different species (*Holodiscus dumosus*). The one I had obtained from one of our local nurseries always had a lot of dead wood every spring: the local one on Mt. Boucherie did not. Was this because the commercial one that I had was from a less drought-tolerant locale?

Another example, Scarlet Mallow (*Sphaeralcea coccinea* or if you prefer *Malvastrum coccineum*). A drought-tolerant plant with attractive clusters of brick-coloured flowers. The gardens brought it in from New Mexico in 1993. It grew about 50 cm (2 ft) tall and spread around via rhizomes over much of the xeriscape area which was a problem because it shaded out shorter plants that we wanted to keep. We had to take it out. I brought in the same plant from Saskatchewan where it grows only 10 cm (4 in) high. In my garden it spread as before by rhizomes, but in my garden everything else shaded it out so it remained an attractive ground cover occupying space between taller plants and causing no problems at all.

There is a third example in the cactus article. There the situation is even more complex because of the difficulty in identifying different species which intercross with

gay abandon producing intermediate plants both in appearance and hardiness.

