English name: Howell's Triteleia

Other English name: Bicolor Triteleia

Scientific name: *Triteleia howellii* (S. Wats.) Greene

Other scientific name: *Brodiaea howellii* S. Wats., *Triteleia grandiflora* Lindl. var *howellii* (S. Wats.) Hoover

Family: *Asparagaceae* (Asparagus Family)

Risk status

BC: critically imperilled (S1); red-listed

Canada: Endangered

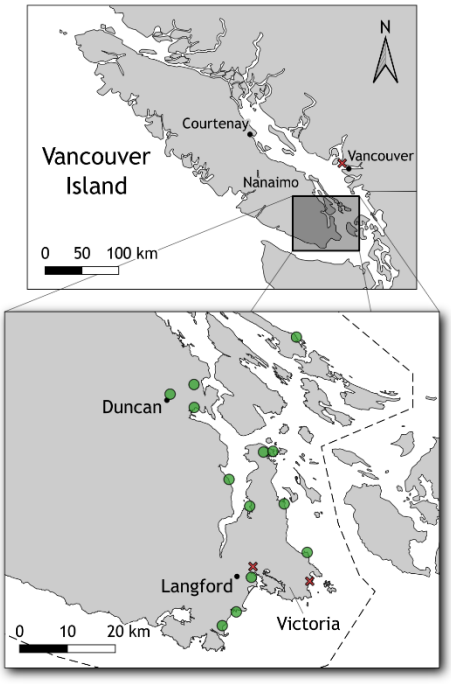
Global: vulnerable (G4G5T3T4Q)

Elsewhere: see taxonomic notes

Taxonomic notes: Howell's Triteleia is closely related to Large-flowered Triteleia (*Triteleia grandiflora*), and some authors do not even recognize it as a separate variety from typical Large-flowered Triteleia. Large-flowered Triteleia is frequent in south-central and southeast British Columbia and ranked secure (S5) in British Columbia. In the future, this may have implications for its status under the Canada Species-at-Risk Act.

Range/Known distribution: In Canada, Howell's Triteleia has been reported from twenty-three sites (4 extirpated) from the Cowichan Valley through the Victoria area to Metchosin, and on Galiano Island. There is also a 1916 collection from West Vancouver.

Large-flowered Triteleia is sold as an ornamental bulb so populations discovered in urban areas should be examined carefully.

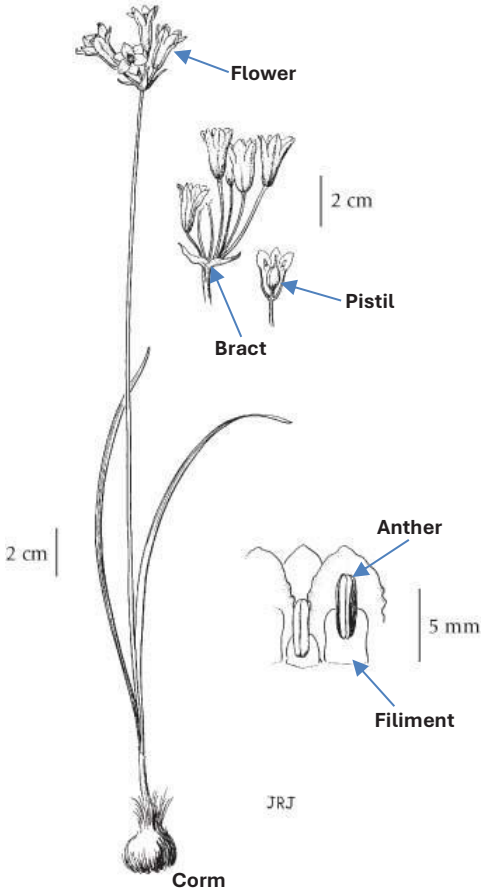


Distribution of *Triteleia howellii*
● Confirmed Sites
✖ Extirpated Sites

Field description: Howell's Triteleia is a 20-50 cm tall, lily-like perennial which has a single stem arising from a deep, globe-shaped, bulb-like corm. It has one or two thin, 10-40 cm long basal leaves which lack hairs or marginal teeth. The inflorescence is a simple umbel composed of numerous erect to ascending, long-stalked flowers. The vase-shaped flowers are blue or whitish-blue and 1.5-2.0 cm long. They have six fused segments which have free terminal lobes about the same length as the tube and are arranged in two distinct whorls. The six stamens have flattened filaments. There is a single style arising from a 3-chambered base. The capsules are egg-shaped and contain small, round, black seeds.

Identification tips: The filaments on the stamens of Large-flowered Triteleia are not flattened, although in some populations in the valley of the Columbia River some plants have flattened filaments and others do not. Other distinctions, like the size of the flowers and the way the stamens are attached to the perianth tube, are less reliable. Within its range in Canada, Howell's Triteleia is easily distinguished from Harvest Brodiaea (*Brodiaea coronaria* and B. *rosea*) because the latter are rarely more than 30 cm tall, their flower stalks are unequal in length, and they only have three stamens. Onions (*Allium* spp.) are also lily-like plants with flowers in umbels, but they have a distinct onion odour. White Triteleia (*Triteleia hyacinthina*) is distinguished by flower colour, and more shallowly-cupped flowers.

Triteleia howellii



Life history: Howell's Triteleia reproduces by seeds and by the division of its corm and the proliferation of cormlets. Seeds probably germinate in March or April and both seedlings and cormlets tend to produce a single leaf in their first year of growth. It may take them three to four years to reach flowering size. In British Columbia, it flowers in late May or June and is pollinated by bees. Fertile plants probably produce ripe seed by the end of June, as the summer drought deepens and the shoots wither and die. The seeds lack any structures to aid in long-distance dispersal and seedlings are often densely-clustered around the parent plants.

Howell's Triteleia occurs as diploids, triploids, tetraploids, pentaploid, hexaploids and heptaploids. The ploidy levels present in Canadian populations has not been investigated, but plants at some sites (e.g., Cowichan Garry Oak Preserve) appear to produce little or no seed. That may be because they have an odd numbered ploidy level and therefore are generally unable to reproduce sexually. Polyploid individuals tend to produce more cormlets and their corms tend to be more deeply buried than diploids. Deeper corms are more likely to survive fires and are less likely to be pulled up and consumed when grazing animals feed on the shoots.

Habitat: In Canada, Howell's Triteleia grows best in Garry Oak (*Quercus garryana*) woodlands, open shrub thickets, and associated meadows, primarily in deep, rich soil. It also occurs in rocky areas and talus where there are fissures or voids that allow it to root deeply.

The tree cover, when present, may be composed of Garry Oak, Arbutus (*Arbutus menziesii*), and Douglas-fir (*Pseudotsuga menziesii*). The native shrub layer, when present, is usually composed of Tall Oregon-grape (*Berberis aquifolium*), Common Snowberry (*Symphoricarpos albus*), Nootka Rose (*Rosa nutkana*), and Ocean-spray (*Holodiscus discolor*). The native species in the herb layer are primarily forbs such as Pacific Sanicle (*Sanicula crassicaulis*), Common Camas (*Camassia quamash*), Great Camas (*C. leichtlinii*), Common Strawberry (*Fragaria virginiana*), Western Buttercup (*Ranunculus occidentalis*), White Triteleia (*Triteleia hyacinthina*), Hooker's Onion (*Allium hookeri*), and Barestem Desert-parsley (*Lomatium nudicaule*). Native grasses, generally less abundant, include Alaska Onion-grass (*Melica subulata*), California Brome (*Bromus carinatus*), and Blue Wildrye (*Elymus glaucus*). Mosses and lichens are rarely abundant.

Why this species is at risk: Over 95% of Garry Oak and associated ecosystems have been lost to development since European settlement began in the 19th century and a similar proportion of Howell's Triteleia populations were likely lost in the process. Populations along roads and on private property remained threatened by development.

Fire suppression, and concomitant forest and shrubland ingrowth, appears to be a threat to some of the remaining populations.

The most serious contemporary threat comes from invasive species. These include shrubs such as Scotch Broom* (*Cytisus scoparius*), Spurge-laurel* (*Daphne laureola*), and English Ivy* (*Hedera helix*), the last of which forms creeping mats; and a diverse assemblage of forbs including Hairy

Cat's-ear* (*Hypochaeris radicata*), Ribwort Plantain* (*Plantago lanceolata*), Sheep Sorrel* (*Rumex acetosella*), and Common Vetch* (*Vicia sativa*); and several grasses including Orchard Grass* (*Dactylis glomerata*), Common Velvet Grass* (*Holcus lanatus*), Kentucky Bluegrass* (*Poa pratensis*), Sweet Vernal Grass* (*Anthoxanthum odoratum*), Soft Brome* (*Bromus hordeaceus*), Ripgut Brome* (*Bromus diandrus* ssp. *rigidus*), Barren Brome* (*Bromus sterilis*), Hedgehog Dogtail* (*Cynosurus echinatus*), and Perennial Ryegrass* (*Lolium perenne*). Timothy* (*Phleum pratense*) is a particular threat at one site.

Similarly, predator control and the associated increase in deer have probably increased grazing pressure, and some sites were grazed by livestock in the past. Some populations are located near trails, where they may be damaged by recreational users through soil compaction and picking of flowers, both of which may prevent reproduction and recruitment.

Multiple factors may interact to suppress Howell's Triteleia. In an experiment at Cowichan Garry Oak Preserve, mowing, raking up thatch, and deer exclusion led to a remarkable increase in the abundance and vigour of Howell's Triteleia.

Barriers to seed production, whether because of grazing or the inherent reproductive success of polyploids, may limit the ability of Howell's Triteleia to spread to new areas.

What you can do to help this species: Existing populations, especially where they occur on private lands, require improved protection if they are to persist. All populations should be monitored, and it should be noted that corms may remain dormant for one or more years so the absence of shoots in a given year does not mean the population has been lost.

Invasive species should be controlled. This includes removing invasive shrubs but may also include mowing invasive grasses and raking the thatch. Mowing and raking should not be done until after thorough consideration of the pros and cons, as it could have undesirable impacts on native species including other rare plants unless conducted properly.

The identity of all populations should be confirmed by checking to see if they bear stamens with flattened filaments. If not, then the population may consist of introduced horticultural stock.

The ploidy levels should be checked in populations which appear to produce little viable seed. It may be that those populations are composed primarily or exclusively of odd-numbered ploidy levels. In populations with mixed ploidy levels, the number of seed-producing diploids and tetraploids may naturally increase if grazing is excluded.

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For further information, contact the Garry Oak Ecosystems Recovery Team, or see the web site at: www.goert.ca

*Refers to non-native species