

## *Callitriche marginata* – Winged Water-Starwort

**English name:** Winged Water-Starwort

**Other English names:** Long Stalk Water-Starwort

**Scientific name:** *Callitriche marginata* Torr.

**Other scientific names:** N/A

**Family:** *Plantaginaceae* (Plantain Family)

### Risk status

BC: Apparently secure (S3S4); yellow-listed (2109)

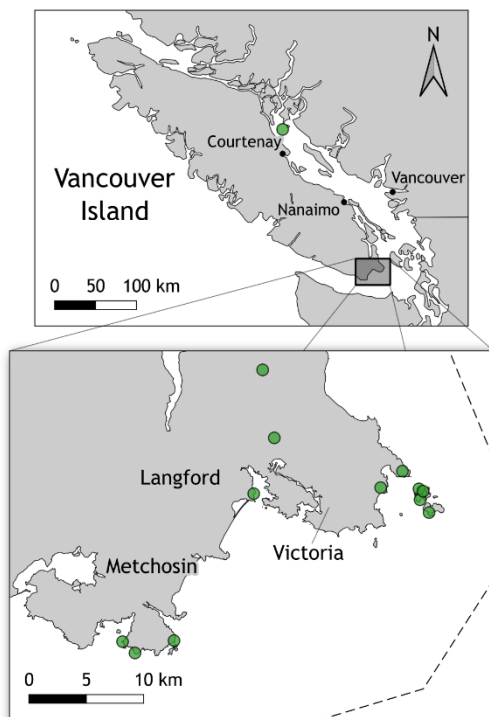
Canada: not assessed.

Global: apparently secure (G4)

Elsewhere: California – reported (SR); Washington – not of concern; Idaho – critically imperilled (S1); Oregon – imperilled (S2)

**Range/Known distribution:** Winged Water-starwort is endemic to western North America. In Canada it occurs in oceanside locations, primarily in the Greater Victoria area but with a disjunct population on Mitlenatch Island. Only twelve populations of Winged Water-starwort have been found in BC but reviewers downlisted it to the BC Blue List based on the recent discoveries of three populations in flooded agricultural fields, because this suggests that it may be more common than was previously believed.

Winged Water-Starwort has been found in a small, disjunct area known as the Palouse, in the Idaho Panhandle and adjacent Washington State. It occurs in some interior dry valleys of Oregon, and from the coast and Central valley of California south into Baja California.

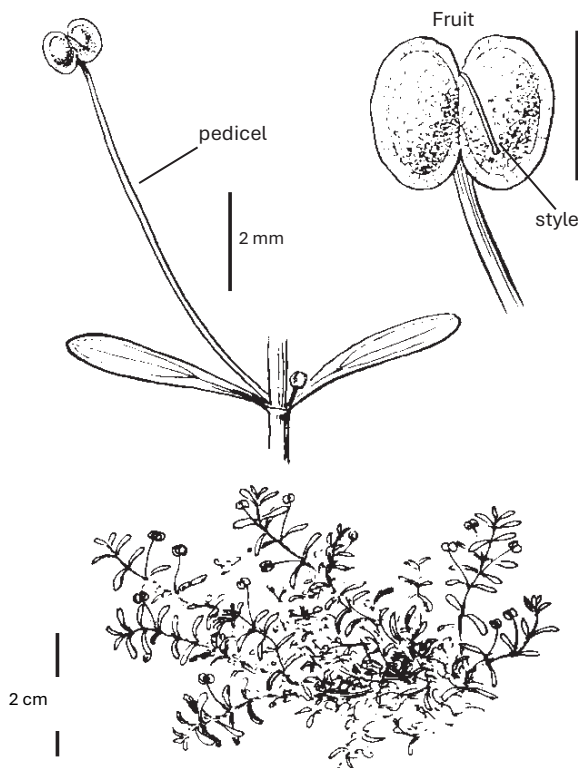


Distribution of *Callitriche marginata*  
● Confirmed Sites

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**Field description:** An aquatic or semi-aquatic annual herb found only in vernal pools. Slender stems, up to 10 cm long, are limp and matted, forming dense patches of numerous individuals with floating rosettes of leaves. All of the leaves are opposite. The submerged leaves are single-nerved and narrowly linear with a slight terminal notch, while emergent leaves are wider and incompletely 3-nerved. Plants growing in shallow vernal pools may not develop evident stems, instead appearing to form a mat on the soil surface. Leaf bases are joined by an **inconspicuous winged ridge**. The tiny flowers are aerial rather than submerged and are borne in leaf axils. The pedicels (stalks) of female flowers are **many times longer than the fruits**. Fruits are oval with winged margins and composed of four single-seeded nutlets.

**Identification tips:** This is the only *Callitriche* species in British Columbia that produces female flowers with styles that are bent sharply back and with conspicuous pedicels that are longer than the fruits. It has been called *C. longipedunculata* because of the long pedicels.



### *Callitriche marginata*

**Life history:** For much of the year, Winged Water-starwort exists only as dormant seeds in the soils of dry vernal pools. In British Columbia, seed germination occurs during December and January and appears to be highly sensitive to the timing of the first fall rains. Seedlings are readily uprooted and can float, a secondary method of plant dispersal. The plants tend to flower in April or early May

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depending on how early spring arrives. Pollen appears to be transferred by water, either floating on the surface if the plants are low and matted or in the water if the flowers are borne on submerged stems. Seeds are set by March and are forced into the drying soil as turgor pressure stiffens the fruiting pedicels. Fruiting usually ends when the vernal pool dries out, between mid May and mid June depending on the year. Seeds may be dispersed by waterfowl and small mammals foraging in the muddy vernal pool substrate.

**Habitat:** Winged Water-starwort can only grow in vernal pools or similar wetlands. In British Columbia, it is restricted to vernal pools in open, rocky, low-lying areas within Garry oak (*Quercus garryana*) and associated ecosystems. In general, vernal pools occur as small depressions with shallow soils underlain by bedrock. Sites are inundated by fall and winter rains and dry by late spring or early summer. Species most commonly associated with Winged Water-starwort in British Columbia include sedges (*Carex* spp.) and Scouler's Popcornflower (*Plagiobothrys scouleri*). The vernal pools inhabited by Winged Water-starwort tend to occur within open meadows or rocky bluffs dominated by native herbaceous plants.

Winged Water-starwort may be associated with a number of other red- or blue-listed species including Muhlenberg's Centaury (*Zeltnera muehlenbergii*), Macoun's Meadow-foam (*Limnanthes macounii*), Seaside Birds-foot Lotus (*Hosackia gracilis*), Bearded Owl-clover (*Triphysaria versicolor*), and Poverty Clover (*Trifolium depauperatum*). It is restricted to low elevations (under 25 m) in British Columbia.

Forest encroachment and the invasion of non-native species pose serious threats to the hydrology and light regimes of the open, well-lit vernal pools where Winged Water-starwort occurs, and also pre-empt the space where it germinates.. In the past, periodic natural or human-set fires controlled encroaching vegetation and maintained open habitats.

**Why the species is at risk:** Recent discoveries of populations in agricultural fields suggest that Winged Water-starwort may not actually be at risk, but further surveys are needed before this can be certain.

In the past, the greatest threat to Winged Water-starwort likely came from habitat conversion associated with residential and agricultural development. Over 95% of Garry Oak ecosystems have been lost since European settlement began in the 19th century. Given the preference Winged Water-starwort shows for shoreline areas, habitat loss for the species was probably even greater. Because it is a small, innocuous plant almost all of these populations likely disappeared without notice.

At present, the greatest threat appears to be associated with invasive species competing for space, water, and nutrients. Most MWinged Water-starwort populations grow on sites with a high proportion of invasive annuals plants such as hairgrasses\* (*Aira caryophyllea* and *A. praecox*), Parsley-piert\* (*Aphanes arvensis*), bittercresses\* (particularly *Cardamine hirsuta*), Sticky Chickweed\* (*Cerastium glomeratum*), Hedgehog Dogtail\* (*Cynosurus echinatus*), Common

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Stork's-bill\* (*Erodium cicutarium* ssp. *cutarium*), Dovefoot Geranium\* (*Geranium molle*), Charming Barley\* (*Hordeum murinum*), Toad Rush\* (*Juncus bufonius*), Annual Bluegrass\* (*Poa annua*), and Red Sand-spurry\* (*Spergularia rubra*). More recently, Bur-chervil\* (*Anthriscus caucalis*) and Carpet Burweed\* (*Soliva sessilis*) have become major competitors in habitat types favored by Winged Water-starwort. Perennial herbs have also become a major threat, sometimes creating thick mats which smother seedlings of Macoun's Meadow-foam, as well as competing for space, moisture, and nutrients. These include Creeping Bentgrass\* (*Agrostis stolonifera*), Sweet Vernal Grass\* (*Anthoxanthum odoratum*), Common Chickweed\* (*Stellaria media*), and Subterranean Clover\* (*Trifolium subterraneum*). Populations of this species on Mitlenatch Island are potentially threatened by eutrophication from seabird guano and encroachment by invasive species (particularly Himalayan blackberry\* *Rubus armeniacus*).

Recreational activities that lead to trampling, changes in hydrology, and erosion also threaten Winged Water-starwort.

The greatest threat facing Winged Water-starwort is climate change. The moist depressions where it occurs will dry out more quickly as summer droughts arrive earlier and last longer. While other areas - currently too wet for Winged Water-starwort - may become more suitable, its weak powers of dispersal may prevent it from reaching them in time

**What you can do to help this species:** Management practices should be tailored to the needs of the site. Potential management tools will depend on the specific circumstances and may require experimentation prior to implementation. Before taking any action, expert advice should be obtained, and no action taken without it.

Public and private landowners should be made aware of new populations of this species if they are discovered, and appropriate management practices suggested.

Protective agreements may be needed wherever it occurs, particularly on private lands. Populations should be protected from trampling where they occur in parks and other publicly accessible areas. It may be prohibitively expensive to control herbaceous weeds in all areas but weed competition should be monitored where smaller populations are at the greatest risk of extirpation. And experiments should be conducted to determine how replacement populations can be established to compensate for those lost, particularly to climate change.

Winged Water-starwort and other rare plants restricted to vernal pools and other ephemeral wetlands will benefit from actions that maintain these specialized habitats. Management recommendations include taking steps to preserve the hydrology of these sites. Urban sites could also be evaluated for the potential impacts of herbicide and fertilizer runoff, and those that are heavily used should be monitored for effects of trampling. The Mitlenatch Island population, if it still persists, could be managed for guano runoff, and encroaching Himalayan blackberry\* should be removed. Sites should be monitored for population trends and weed encroachment where possible.

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### References

Miller, M. 2002. Stewardship Account: *Callitriche marginata* (Winged Water-starwort). Garry Oak Ecosystems Recovery Team, Victoria, British Columbia.

Giblin, D.E. & B.S. Legler (eds.). 2003+. *Callitriche marginata*. In: WTU Image Collection Website: Vascular Plants, MacroFungi, & Lichenized Fungi of Washington State. University of Washington Herbarium. Accessed 29 Feb 2024.  
<https://burkeherbarium.org/imagecollection/>.

For further information, contact the Garry Oak Ecosystems Recovery Team, or see the web site at:  
[www.goert.ca](http://www.goert.ca)

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\*Refers to non-native species.