English name: Macoun's Meadow-foam

Other English name: Macoun's Meadowfoam

Scientific name: *Limnanthes macounii* Trel.

Other scientific name: none

Family: *Limnanthaceae* (Meadow-foam Family)

Risk status

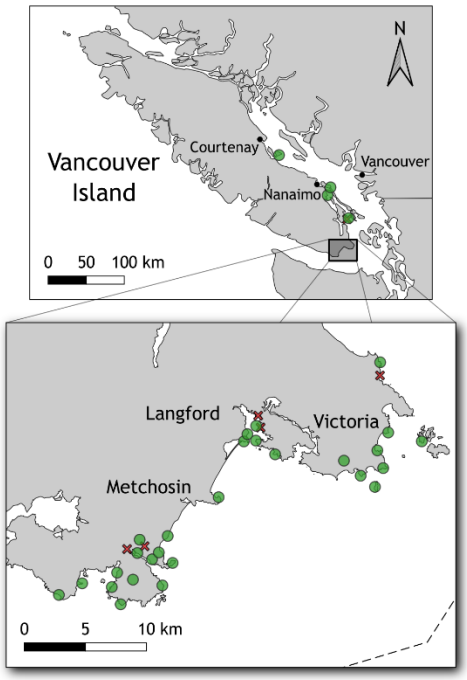
BC: imperilled (S2?); red-listed

Canada: Threatened

Global: imperilled (G2?)

Elsewhere: Macoun's Meadow-foam only occurs in BC, Canada

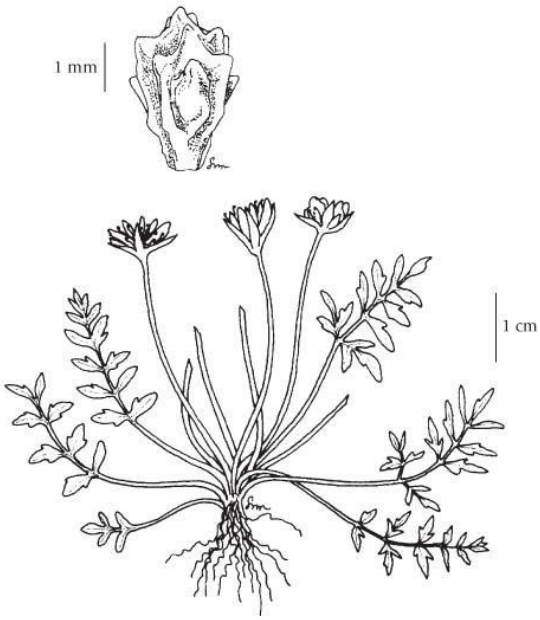
Range/Known distribution: Macoun's Meadowfoam is endemic to Vancouver Island and adjacent islands in British Columbia where it occurs in coastal locations from East Sooke Park to Victoria, Inskip, Chatham, and Trial Islands, to Yellow Point, Saltspring, Gabriola, and Hornby Islands. There are 37 reported occurrences, six of which appear to have been extirpated. Approximately 98% of the global population occurs at a single, disturbed site near Rocky Point. Ornduff's Meadowfoam (*Limnanthes douglasii* ssp. *ornduffii*), is a very similar taxon known from a single location near San Francisco, California. A genetic study is underway to determine how closely the two taxa are related.



Distribution of *Limnanthes macounii*
● Confirmed Sites
✖ Extirpated Sites

Field description: Macoun's Meadow-foam is a non-hairy, small, 2-5 (-15) cm tall annual herbaceous plant. Smaller plants grow upright, and taller ones tend to recline. Its stems may be unbranched or with one or more branches. It has basal leaves as well as leaves distributed alternately along the stem. The leaves are pinnate (leaflets arranged on each side of the leaf stalk), 1-7 cm long, with 3-13 toothed or lobed segments. The single flowers have four sepals and four petals (occasionally 5). The flowers are funnel or wheel-shaped, about 7-10 mm in diameter. The 3-4 mm long green sepals are ovate (egg-shaped and attached at the broad end) with a sharply pointed tip. The petals are obovate (egg-shaped and attached at the narrow end) and 4-5 mm long, with 2 rows of hairs at the base. Each flower produces 3-4 cone-shaped nutlets, with small bumps on the surface and 3 mm long, that are yellow-green when young and ripen to brown.

Identification tips: Macoun's Meadow-foam is unmistakable in flower or fruit but otherwise can be confused with four other plants that occur in Garry Oak and associated ecosystems: Menzies Pepperwort (*Lepidium virginicum* ssp. *menziesii*), bittercresses (*Cardamine* spp.), Small-flowered Nemophila (*Nemophila parviflora*), and Meadow Nemophila (*Nemophila pedunculata*). Menzies Pepperwort and bittercresses have taproots and larger individuals have an erect form, unlike the sprawling look of larger Macoun's Meadow-foams. The two Nemophila species have pinnatisect rather than truly pinnate leaves, which are evidently hairy.



Limnanthes macounii

Life history: Macoun's Meadow-foam is a winter annual, germinating in the fall and winter and growing slowly during the coldest months. It easily survives light frosts, but many plants may die when temperatures drop more than five degrees below zero. In years with periods of significantly lower temperatures, early germinating plants may suffer very high mortality and most of the spring cohort is derived from seeds that germinated after the cold snap has ended. Vegetative growth accelerates in February and March. It may begin to flower as early as late March and flowering may continue into early May. It produces fruit in late April and May and quickly dies when dry weather returns in late May or June. Most species of meadow-foam are insect-pollinated, but Macoun's Meadow-foam appears to be self-pollinated, likely because insect pollinators are limited when it flowers in late winter. Its heavy fruits have no evident adaptations to aid in long-distance dispersal so most remain close to their parent plant. Seeds may occasionally move greater distances if they are embedded in mud that sticks to the feet and feathers of birds.

Habitat: Macoun's Meadow-foam occurs on shallow (< 30 cm deep) soils in open vernally moist seeps, wet depressions, and pools. It often occurs within a matrix vegetation of drier meadows but sometimes occurs in small openings in woodlands and forests. Its habitat is characterized by saturated or even inundated conditions for significant periods in the winter (which upland herbaceous species find difficult to handle, and extremely dry conditions in summer (which is unsuitable for true wetland plants). It generally occurs less than 25 metres asl but in one instance it grows at almost 200 asl.

It is found in conjunction with many native annuals including Small-flowered Nemophila, Small-leaved Monkey-flower (Erythranthe microphylla), Blinks (*Montia fontana*), Howell's Montia (*Montia howellii*), Narrow-leaved Montia (*Montia linearis*), Scouler's Popcornflower (*Plagiobothrys scouleri*), Sea Blush (*Plectritis congesta*), and various native annual clovers including White-lipped Clover (*Trifolium variegatum*). Native perennials, including Nuttall's Quillwort (*Isoetes nuttallii*), White Triteleia (*Triteleia hyacinthina*), Pretty Shootingstar (*Primula pauciflora* var. *pauciflora*), camas (*Camassia* spp.), Harvest Brodiaea (*Brodiaea coronaria*) and Hooker's Onion (*Allium acuminatum*) tend to be less abundant and are often concentrated around the margins of the vernally moist sites.

Why this species is at risk: In the past, the greatest threat to Macoun's Meadow-foam 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 Macoun's Meadow-foam 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 Macoun's Meadow-foam 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

Stork's-bill* (*Erodium cicutarium* ssp. *cicutarium*), Dovefoot Geranium* (*Geranium molle*), Charming Barley* (*Hordeum murinum*), Toad Rush* (*Juncus bufonius*), Annual Bluegrass* (*Poa annua*), Common Groundsel* (*Senecio vulgaris*), Small-flowered Catchfly* (*Silene gallica*), and Red Sand-spurry* (*Spergularia rubra*). More recently, Bur-chervil* (*Anthriscus caucalis*) and Carpet Burweed* (*Soliva sessilis*) have become major competitors in some populations. 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*), Hairy Cat's-ear* (*Hypochaeris radicata*), Kentucky Bluegrass* (*Poa pratensis*), Common Chickweed* (*Stellaria media*), and Subterranean Clover* (*Trifolium subterraneum*).

Recreational activities that lead to trampling, changes in hydrology, and erosion also threaten Macoun's Meadow-foam.

The greatest threat facing Macoun's Meadow-foam is climate change. The seeps and 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 Macoun's Meadow-foam - 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 are 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.

References

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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