



Hairy Water-clover

Marsilea vestita

Marsileaceae (Water Clover Family)

- Status: Red / Not Assessed
- Best Survey Time: July to September
- General Habitat: Wetland

RANGE

- In western North America from British Columbia to Saskatchewan, south to California through Arkansas
- In B.C., known from four sites near Kamloops and three in the Okanagan Valley (two north of Kelowna, one along Osoyoos Lake); populations at two of the Okanagan sites may have been extirpated

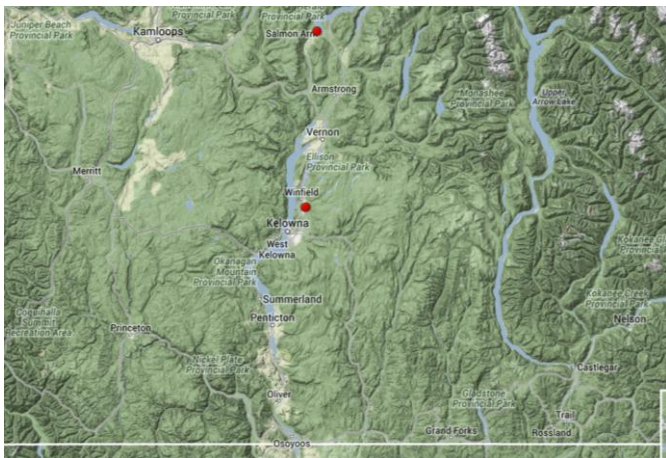


Figure 1 B.C. distribution of *Marsilea vestita* (BC CDC 2014)

HABITAT

- Seasonally submerged or wet, usually sand-rich soils of open depressions or floodplains alongside lakes and rivers in the Bunchgrass, Ponderosa Pine and Interior Douglas-fir Biogeoclimatic Zones
- Associates include spike-rushes, Engelmann's spike-rush (*Eleocharis engelmannii*), awned cyperus (*Cyperus squarrosus*), bentgrasses (*Agrostis* spp.), common witchgrass (*Panicum capillare*) and toothcup meadow-foam (*Rotala ramosior*)



Figure 2 Seasonally submerged open depression habitat



Figure 3 *Marsilea vestita* growing in open sandy substrate

LIFE HISTORY

- Perennial fern that annually grows vegetatively via rhizomes, forming small patches in open soil
- Sporocarps produced from summer into October
- When water conditions are favourable, sporocarp absorbs water and expels male spores (microspores) and female spores (megaspores)
- Spores germinate into tiny male and female plants, which produce sperm and eggs, respectively
- Female plant will form a gelatinous layer that traps sperm found in water surrounding plant
- When fertilization takes place, a young plant is formed that eventually produce fronds

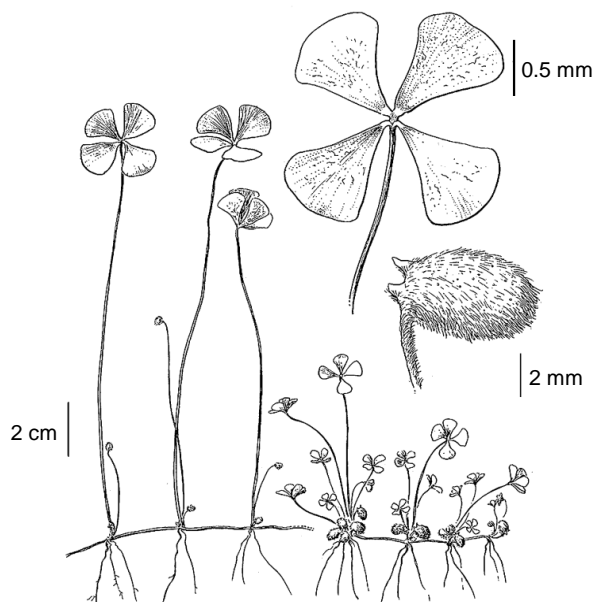


Figure 4 Illustration of *Marsilea vestita* by Jeanne R. Janish (Hitchcock et al. 1969)

Marsilea vestita (continued)

DESCRIPTION

General

- Semi-terrestrial, perennial fern
- Each plant composed of numerous, thread-like stems topped by 'four leaf clover'-like leaflets (fronds) that grow from buds along thin, creeping underground rhizomes

Leaves

- Individual leaflets wedge-shaped and rounded, from 0.5 to 3 cm long and wide
- When growing under water, leaves are either submerged or floating on water surface
- When terrestrial, following water drawdown, leaflets held above ground on often arching stems

Sporocarps

- Spores produced in distinctive pod-like sporocarps, which are clustered on short stalks at base of leaves
- Sporocarps 4 to 8 mm long and slightly hairy with two distinctive bumps at one end near stalk



Figure 5 Patch showing thread-like stems, creeping rhizomes and sporocarp (arrow); growing with red-listed *Eleocharis engelmannii*

IDENTIFICATION TIPS

- Readily identified by its 'four leaf clover'-like leaves
- Flowerless clovers (*Trifolium* spp.) are distinguished from *Marsilea vestita* by usually having three leaflets and growing from fibrous roots
- Except for clovers, which occasionally grow nearby, no other plant in the habitats where *Marsilea vestita* is found can be mistaken for it



Figure 6 Plants showing characteristic 'four leaf clover'-like leaflets

GENERAL THREATS AND GUIDANCE

- **Avoid development in areas with known occurrences of *Marsilea vestita* through project relocation or redesign**
- Protect seasonally submerged and wet habitat alongside lakes and rivers from disturbance and development, including exclusion of livestock and ATVs through fencing and/or signage, and consider restoration including invasive plant removal following professional advice
- Provincial methods for when and how to conduct rare plant surveys, as well as guidance on mitigation measures for this species can be found in *Guidance for Plant Species at Risk in the Okanagan: Foreshore, Riparian & Wetland Developments*
- Report any sightings to the BC Conservation Data Centre (cdccdata@gov.bc.ca) and MFLNRO Ecosystems Section (josie.symonds@gov.bc.ca)

REFERENCES

- BC Conservation Data Centre. 2014. <http://a100.gov.bc.ca/pub/eswp/>
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