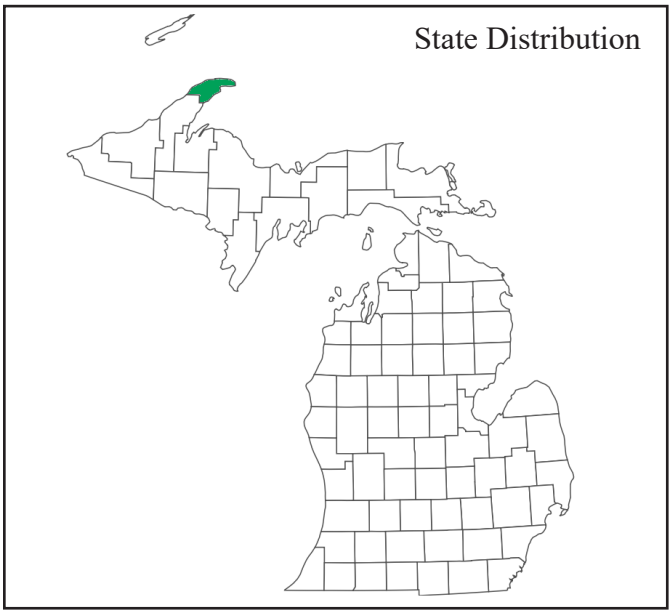
Utricularia ochroleuca R. W. Hartm. Northern bladderwort

Photograph by Adam Schneider



Best Survey Period

Legal status: State Threatened

Global and state rank: G4G5 (Apparently secure to secure) / SNR (Not ranked)

Other common name(s): yellowish-white bladderwort, cream-flowered bladderwort

Family: Lentibulariaceae

Synonyms: *Utricularia* x *ochroleuca* (a hybrid between *U. intermedia* and *U. minor*), *Utricularia occidentalis* A. Gray, *Utricularia stygia* G. Thor

Taxonomy: Northern bladderwort (*Utricularia ochroleuca*) is a member of the carnivorous plant family Lentibulariaceae. The family is comprised of the genera *Utricularia*, *Pinguicula* and *Genlisea* with the latter being the oldest of the three. There are about 285 accepted species and hybrids of bladderwort worldwide with twenty of those species present in North America and eleven in Michigan alone (Reznicek et. al. 2017, POWO 2025). The genus *Utricularia*, section *Utricularia* consists of most of our North American species. Other than northern bladderwort, there are two other species that are state listed in Michigan: floating bladderwort (*U. radiata*), State Endangered, and zigzag bladderwort(*U. subulata*), State Threatened.

The species status of northern bladderwort is often debated, with some botanists insisting it is its own species while others argue it is an asexual hybrid of flat-leaved bladderwort (*U. intermedia*) and small bladderwort (*U. minor*; Brobov et. al. 2022, Tippery et. al. 2024). Genetic studies have found northern bladderwort to be very closely related to both flat-leaved bladderwort and small bladderwort, although it appears to be more closely related to the latter. (Tippery et. al. 2024)

Northern bladderwort is also believed to be synonymous with arctic bladderwort (*U. stygia*), which has a stronger European distribution. There is some variability, however, as northern bladderwort possesses a high percentage of flat-leaved bladderwort genes and arctic bladderwort a higher percentage of small bladderwort (Brobov et. al. 2022)

Total Range: Northern bladderwort has a sparse and sporadic distribution across the globe with central Europe acting as the apparent stronghold

Michigan Natural Features Inventory
Phone: (517) 284-6200 Email: mnfi@msu.edu
Website: mnfi.anr.msu.edu

for the species (Bobrov et. al. 2022, iNaturalist 2023). It has a general circumboreal distribution across North America, Europe, and Asia where it is commonly found in montane regions, but records are relatively scarce, especially when compared to other bladderwort species. It is possible the lack of northern bladderwort records is due to the non-flowering individuals being virtually identical to flat-leaved bladderwort (Tippery et. al. 2024).

In North America, northern bladderwort occurs in nearly every Canadian Province except Newfoundland and Labrador. In the United States, it occurs as far west as California, as far south as Wyoming, and as far east as New York. It is listed as Possibly Extirpated (SH) in Ontario; Critically Imperiled (S1) in Alberta, New Brunswick, Nova Scotia, Alaska, Montana, Colorado, and New York; Imperiled (S2) in British Columbia and Colorado; Vulnerable (S3) in Yukon; Apparently Secure (S5) in Quebec, No Status Rank (SNR/SU,SNA) in the Northwest Territories, Nunavut, Manitoba, Washington, Oregon, Minnesota, Illinois, Michigan, and Ohio. It is listed as a hybrid in California. (NatureServe 2023)

State Distribution: This species was recently discovered at two sites in Keweenaw County, Michigan in 2019 (Routledge et. al. 2020). It is possible that it is more prevalent in the state, but more surveys are needed to make that determination.

Recognition: Northern bladderwort can be identified by its **yellow flowers, alternate and many-forked leaves, bladder location, and dimorphic shoots** (i.e., one green and photosynthetic with well-developed leaves and one pale white and non-photosynthetic with reduced leaves). Stems vary in length but usually do not exceed 30 cm (1.2 in). Plants lack true roots, but may form rhizoids, or root-like structures used for anchoring. The flowers are bilaterally symmetrical and range from 10–15 mm (0.4–0.6 in) in total length. Leaves are 5–15 mm (0.2–0.6 in) wide, flat and many-forked with sporadic, minute teeth along the margins. Flowers have a distinctive spur located on the lower lip that ranges from 2.2–3.5 mm (0.09–0.14 in) in length. Flowers are born on a 5–15 cm (0.2–0.6 in) raceme.

Northern bladderwort is most likely to be confused for flat-leaved bladderwort, and the two species can be difficult to distinguish in the field. Both species' vegetative shoots are virtually identical, although northern bladderwort will bear **bladders on both its non-photosynthetic shoots and its photosynthetic shoots**, unlike flat-leaved bladderwort. The most prominent differentiating characteristic between the two species is the flower spur. The spur is about **half as long as the lower lip** in northern bladderwort while it nearly equals the length of the lower lip in flat-leaved bladderwort.

Another method of distinguishing species involves looking at the microscopic four-pronged glandular trichomes, known as quadrifids, that line the interior of the bladders, which is the only reliable diagnostic trait when plants are not flowering (Routledge et. al. 2020, Bobrov et. al. 2022). The angle between the **short arms of the quadrifids of northern bladderwort is obtuse** ranging from 110° to 180° while those of flat-leaved bladderwort are acute (i.e., less than 42).

Best survey time/phenology:This species flowers across its range from early June to late September, which is the optimal survey period for field identification. The timing may be more locally specific in Michigan populations. It is vegetatively indistinguishable from flat-leaved bladderwort without a microscopic dissection of bladders.

Habitat: Outside of Michigan, bladderwort has been observed growing in shallow and acidic water, on the margins of peaty lakes, and in depressions within bogs and fens (Adamec 2020, Rice 2024). In Michigan, northern bladderwort was growing at the edge of an old beaver flooding in association with spike-rush (*Eleocharis acicularis*), common horsetail (*Equisetum arvense*), water horsetail (*E. fluviatile*), jointed rush (*Juncus articulatis*), nodding beggar-ticks (*Bidens cernua*), cut grass (*Leersia oryzoides*), spotted touch-me-not (*Impatiens*

capensis), chickweed (*Cerastium* sp.), smartweed (*Persicaria* sp.), broad-leaved cat-tail (*Typha latifolia*), water hemlock (*Cicuta bulbifera*), ticklegrass (*Agrostis* spp.), flat-leaved bladderwort, and small bladderwort (Routledge et. al. 2020).

Biology: Northern bladderwort is a carnivorous, aquatic perennial. Its prey is captured in complex, intricate bladder structures, or utricles. When prey trigger hairs at the entrance of the bladder, there is a sudden burst of negative hydrostatic pressure that sucks in and traps prey within milliseconds. This reaction has been documented as the fastest capturing mechanism amongst carnivorous plants (Poppinga 2015). Once captured, prey is digested by enzymes that are produced by the quadrifids, which are modified trichomes. Interestingly, bladderworts appear to host a microbiome of facultative anaerobic organisms that assist in digesting bladder contents (Adamec 2020). In some instances, bladderworts have also been noted digesting algae and other plant material found within the water column (Peroutka 2008).

Northern bladderwort most often reproduces clonally from vegetation segments and turions (i.e., overwintering buds). Turions are formed in fall when temperatures cool and then sink to bottom of their home water body where they are protected from freezing. When conditions warm in the spring, the turions float back to the surface and form new plants.

Little is known about northern bladderwort's floral ecology or seed dispersal mechanisms. Sexual reproduction many not be as vital to the species' proliferation (Bobrov 2022). Flowering may be triggered by low water levels (0–5 cm, 0–2 in) and high water temperatures. It may not occur every year if conditions are not right (Adamec 2020). The yellow flower and presence of a floral spur indicate plants are likely pollinated by long-tonged insects. Northern bladderwort fruits are dry, round, dehiscent capsules, although they have not been observed setting seeds (Adamec 2020).

Figure 1. Leaves northern bladderwort.

Conservation/management: Little is known about the natural history and statewide distribution of northern bladderwort. To develop a comprehensive conservation plan, more surveys are needed to better understand the species' prevalence and ecology in Michigan.

As an aquatic species, northern bladderwort is likely vulnerable to interruptions to hydrological regimes, pollution from runoff, and aggressive wetland species such as invasive cat-tail (*Typha* spp.) or common reed (*Phragmites australis* ssp. *australis*). Nutrient overabundance may also lead to unchecked algae growth that can smother northern bladderwort, and traditional algae removal methods can be more harmful than beneficial. Introducing *Daphnia* and amphibian tadpoles as biological control is the only method that is not detrimental to bladderworts (MNHP 2025).

If northern bladderwort is indeed a hybrid, there is still value in its conservation. While hybrids of an anthropogenic origin are potentially harmful, natural hybrids can act as a genetic reservoirs for beneficial adaptations, provide unique resources for wildlife, and overall add to diversity within dynamic natural systems (Witham and Maschinski 1995).

Comments: The name of the family Lentibulariaceae is derived from 'lentil' in reference to the shape of bladderwort bladder traps.

Figure 2. Vegetative leaves of northern bladderwort.

Related abstracts: Emergent marsh

Research needs: There is little biological research on northern bladderwort, especially North American populations, and much of the information presented here is generalized for bladderworts or derived from European studies. Research into floral ecology, fruit development, seed dispersal methods, and faunal relationships are desirable for this species. More research is needed to determine if northern bladderwort is truly a sterile hybrid of flat-leaved bladderwort and small bladderwort as this determination may affect its status.

Selected references:

Adamec, L. 2020. Biological flora of Central Europe: *Utricularia intermedia* Heyne, *U. ochroleuca* R. W. Hartm., *U. stygia* Thor and *U. bremii* Heer *ex* Kölliker. Perspectives in Plant Ecology, Evolution, and Systematics 44: 1-20.

Bobrov, A. A., P. A. Volkova, Y. O. Kopylov-Guskov, O. A. Mochalova, A. E. Kravchuk, and D. M. Nekrasova. 2022. Unknown Sides of *Utricularia* (Lentibulariaceae) Diversity in East Europe and North Asia or How Hybridization Explained Old Taxonomic Puzzles. Perspectives in Plant Ecology, Evolution, and Systematics 54: 1-19.

iNaturalist. 2025. Available from <https://www.inaturalist.org>. Accessed 12 September 2025.

[MNHP] Montana Natural Heritage Program. 2025. Northern Bladderwort — Utricularia ochroleuca. Montana Field Guide. Available from <https://fieldguide.mt.gov/>. Accessed 9 September, 2025.

NatureServe. 2023. NatureServe Network Biodiversity Location Data accessed through NatureServe Explorer Web. <https://explorer.natureserve.org/>. Accessed 3 March, 2025.

Peroutka, M., W. Adlassnig, M. Volgger, T. Lendl, W. G. Url, and I. K. Lichtsheidl. 2008. *Utricularia*: A Vegetarian Carnivorous Plant? Plant Ecology 199: 153-192.

Poppinga, S., C. Weisskopf, A. S. Westermeier, T. Masselter, and T. Speck. 2015. Fastest predators in the plant kingdom: functional morphology and biomechanics of suction traps found in the largest genus of carnivorous plants. AoB Plants 8: 1-25.

POWO. 2025. Plants of the World Online. Royal Botanic Gardens, Kew. <http://www.plantsoftheworldonline.org>. Accessed 31 March, 2025.

Reznicek, A. A., E. G. Voss, and B. S. Walters. 2011. Michigan Flora Online. University of Michigan. Web. <https://michiganflora.net/>. Accessed 31 March 2025.

Rice, B. A. .2024. *Utricularia ochroleuca*, in Jepson Flora Project (eds.) Jepson eFlora, Revision 13. <https://ucjeps.berkeley.edu/eflora/>. Accessed on 9 September 2025.

Routledge, R., A. Graeff, and G. E. Crow. 2020. The Discovery of *Utricularia ochroleuca* (Lentibulariaceae), Yellowish-white Bladderwort, in Michigan. The Great Lakes Botanist 59: 239-245).

Stevens, P. F. 2017. Angiosperm Phylogeny Website, Version 14. <www.mobot.org/mobot/research/apweb/>. Accessed 31 March 2025.

Tippery, N. P., J. Moreland, T. Wild, G. J. Bugbee, S. E. Stebbins, J. G. Mickley, A. R. Franck, K. M. Wefferling, and M. J. Warman. 2024. Toward a Comprehensive Phylogeny of North American Bladderworts (*Utricularia*, Lentibulariaceae). Aquatic Botany 195: 1-14.

Whitham, T. G. and J. Maschinski. 1995. Current Hybrid Policy and the Importance of Hybrid Plants in Conservation. Pages 103-112 *in* Southwestern Rare and Endangered Plants: Proceedings of the Second Conference. Maschinski, J., H. D. Hammond, and L. Holter, tech. eds. U.S. Forest Service General Technical Report RM-GTR-283, Fort Collins, CO, U.S.A.

Abstract citation:

Smith., D. E. and R. A. Hackett. 2025. Species Abstract for *Utricularia ochroleuca* (northern bladderwort). Michigan Natural Features Inventory, Lansing, Michigan, USA.

Funding for this project was through the Michigan Department of Natural Resources' State Wildlife Grant T-9-T in cooperation with the U.S. Fish and Wildlife Service, Office of Conservation Investment.

Figure 3. The spur on the flower of northern bladderwort