

SUBMERGED PLANTS

Species: *Callitriche hermaphroditica*, autumnal water-starwort, northern water-starwort

Callitriche stagnalis, Pondwater water-starwort

Family: Callitrichaceae

NATIVE

Leaf: Opposite. Pond: narrow submerged leaves (up to 10 mm wide) with one rounded leaf tip are sometimes present. Oval or spoon-shaped floating leaves are up to 10mm wide and are joined by tiny ridges at the base. Autumnal: all leaves are submerged, narrow and flat, 5 to 20 mm long, with inconspicuous white margins.

Leaf tips have two lobes forming a U-shape; leaf bases clasp the stem but are not joined by ridges.

Stem: Usually branched, rising to surface or sprawling.

Flower: Tiny flowers lack sepals and petals and are located at leaf bases on minute stalks. Pond: 2-4 tiny, whitish bracts emerge from the flower base. Autumnal: bracts absent.

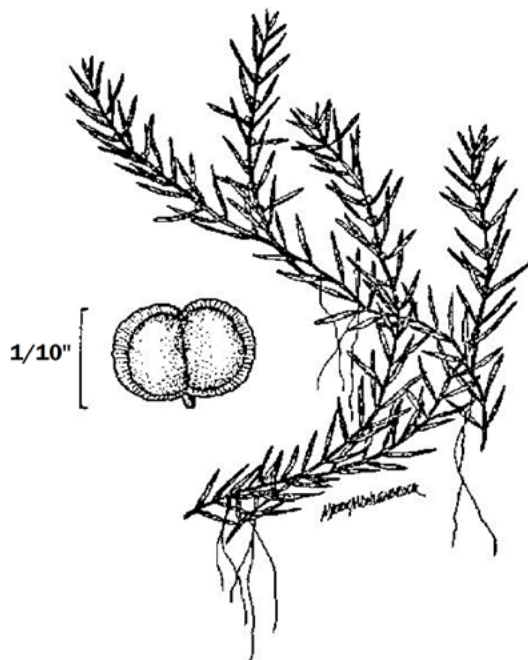
Fruit: Small, locate at leaf bases. Four compartments, each containing one seed. Pond: oval, 1.2-1.8 mm long, 1.2-1.7 mm wide, narrow margin all around (wing), bracts at base.

Autumnal: 1.1 to 1.6 mm long, 1.2 to 1.8 mm wide, no margin, fruit without bracts.

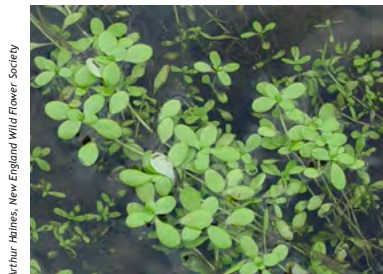
Root: Fibrous, from plant base or sprouting from stem joints.

Propagation: Plant fragments, seeds.

Habitat: Shallow water of lake margins and streams.



C. STAGNALIS



Arthur Holmes, New England Wild Flower Society

C. HERMAPHRODITICA



Gerald D. Carr, University of Oregon

SUBMERGED PLANTS

Species: *Callitriche heterophylla*, large water-starwort, different leaved water-starwort, twoheaded water-starwort

Callitriche palustris, (Synonym: *Callitriche verna*), vernal water-starwort

Family: Callitrichaceae

NATIVE

Leaf: Opposite. 2 types: submersed and floating. **Large:** Narrow submersed leaves are 0.5-2.5 cm long with two rounded leaf tip lobes; oval floating leaves (to 1 cm wide) are sometimes present and form rosettes on the water surface; leaf bases are joined by a wing-like ridge. **Vernal:** Narrow, pale-green, submersed leaves are 0.5-2 cm long and to 1 mm wide with a slight indentation at the tip; spoon-shaped floating, emergent, or terrestrial leaves are sometimes present, up to 4 mm wide, one rounded tip per leaf, with the leaf bases jointed by a wing-like ridge.

Stem: Thread-like, branched, vertical-to-trailing stem is usually less than 50 cm long.

Flower: Small flowers are located at leaf bases. They lack sepals or petals; instead, 2 small whitish bracts serve as 'petals'.

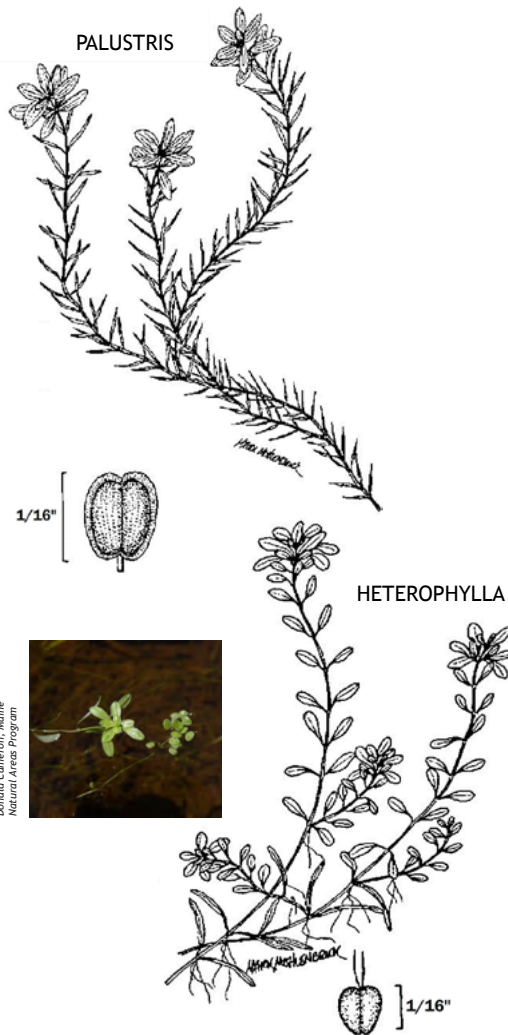
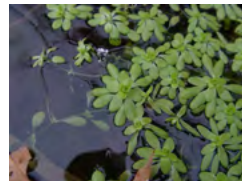
Fruit: Four tiny, nut-like fruits per flower; each containing one seed. **Large:** Heart shaped, with no narrow margin, 0.6-1.4 mm across. **Vernal:** Narrow margin all around, tiny pits create vertical line on surface, 0.9-1.4 mm long, 0.8-1.3 mm wide, generally wider above middle.

Root: Fibrous, from plant base, and loosely anchoring plants to the bottom.

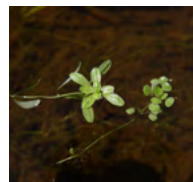
Propagation: Plant fragments, seeds.

Habitat: Lake margins and slow streams. May carpet the mud when water levels drop.

Donald Cameron, Maine
Natural Areas Program



Donald Cameron, Maine
Natural Areas Program



SUBMERGED PLANTS

Species: *Ceratophyllum demersum*, coontail, common hornwort, coon's tail

Family: Ceratophyllaceae

NATIVE

Leaf: Leaves are forked into 2 (sometimes 4) flattened or linear segments with small teeth along one margin. Olive green to almost black leaves are 1.5-4 cm long and are often stiff or crunchy. Leaves are arranged in whorls of 5-12 leaves with the whorls becoming dense toward the stem tip.

Stem: Easily broken, freely branching stem is up to 3-4 m long.

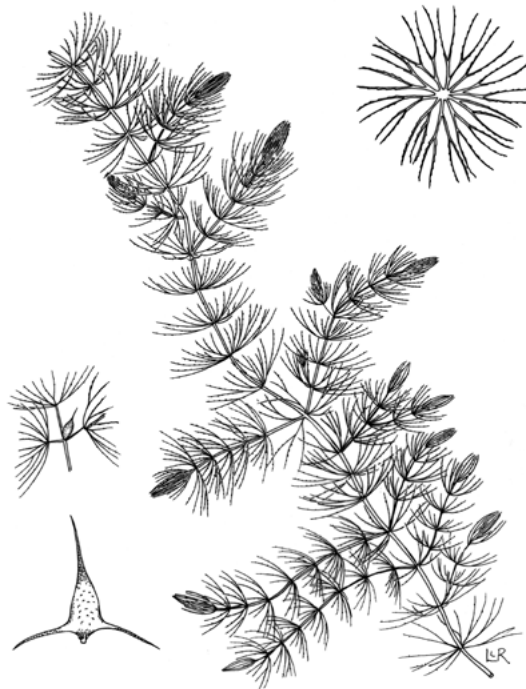
Flower: Tiny, submerged flowers are located at leaf bases. Petals are tiny green scales. Male and female flowers occur separately on the same plant. Male flowers occur in pairs on opposite sides of the stem while female flowers are solitary. Flowering occurs from June through September.

Fruit: Small (4-7 mm), hard, one seeded, egg-shaped fruit has 3 long spines (to 12 mm): 1 spine at the fruit tip and 2 at the base.

Root: Lacks roots. Floats freely below the surface, or is sometimes anchored to the bottom by modified leaves, especially in flowing water.

Propagation: Seeds, plant fragments.

Habitat: Ponds, lakes, and slow moving streams and rivers. Tolerant of hard water (high calcium content) and low light levels.



Donald Cameron, Maine Natural Areas Program

SUBMERGED PLANTS

Species: *Elodea canadensis*, common elodea, broad waterweed, common waterweed, Canadian waterweed

Elodea nuttallii, Nuttall's waterweed, western waterweed

Family: Hydrocharitaceae

NATIVE

Leaf: Mostly arranged in whorls of 3 (occasionally 4), but sometimes opposite on the lower portions of the stems. Leaves very finely toothed along the edges, but evident only with magnification. **Common:** 6-15 mm long and 1.5-4 mm wide; leaf tip tapered to a blunt point. **Western:** 6-13 mm long and less than 1.5 mm wide; leaf tip tapered to a slender point.

Stem: Long, slender, generally branched. Common waterweed is more sparingly branched than Western waterweed.

Flower: Often does not produce flowers. Small (8 mm across), white flowers occur at the ends of long, thread-like stalks and have 3 petals and usually 3 sepals. Male and female flowers occur on separate plants, but male flowers are rarely produced. Blooms from July to September. **Common:** sepals to 5 mm long, petals only on male flowers to 5 mm. **Western:** sepals to 2 mm long, petals tiny (0.5 mm) or absent. Male flowers detach and become free-floating.

Fruit: Capsules approximately 6 mm long, seeds about 4 mm long, but because of a shortage of male plants, seeds are seldom produced.

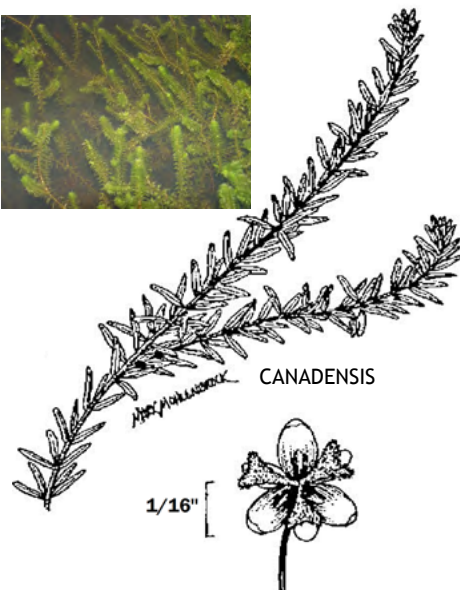
Root: Tufts of fibrous roots from nodes along the stem.

Propagation: Stem fragments, overwintering buds, and rarely by seeds.

Habitat: Lakes, rivers, ponds, and ditches.

Common: most Montana waters. **Western:** fresh to slightly brackish water.

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SUBMERGED PLANTS

Species: *Egeria densa* (Synonym: *Elodea densa*),
Brazilian elodea, anacharis, giant elodea

Family: Hydrocharitaceae

INVASIVE - NOT CURRENTLY FOUND IN MONTANA

Leaf: Bright to dark green leaves, 2-4 cm long and 2-5 mm wide, have minutely toothed edges and are closely spaced in whorls of 4-6 in the upper part of the plant, becoming more widely spaced whorls of 3 at the stem base.

Stem: Up to 3 m in length. Leaves occur along the entire length of the stem.

Flower: Fragrant white flowers have a yellow center with three, 7-9 mm long petals. Flowers float on the water surface and are attached at the base of leaf whorls by long slender stalks (to 6 cm). Two to three flower stalks may arise from the same whorl. Male and female flowers are produced on separate plants, but only male plants are found in the U.S. Plant flowers from late spring to early fall.

Fruit: Fruits and seeds have not been observed outside of its native range.

Root: Fibrous. Can produce white adventitious roots along the stem.

Propagation: Because only male plants are found in the U.S., propagation is from stem fragment and by collapsed stems that sprout roots and form the base of new plants. Dormant shoots develop in fall and overwinter in the sediment.

Habitat: Lakes, ponds, sloughs, streams.



Center for Aquatic Invasive Plants,
Institute of Food & Agricultural Sciences
University of Florida



Center for Aquatic Invasive
Plants, Institute of Food
& Agricultural Sciences
University of Florida



SUBMERGED PLANTS

Species: *Heteranthera dubia*, water star-grass, grassleaf mudplantain

Family: Pontederiaceae

NATIVE

Leaf: Narrow (2-6 mm wide), 10-15 cm long, deep green, grass-like leaves lack a distinct midvein. Base of the leaf is joined to a tubular sheath that wraps around the stem. Sheath has a membranous extension, rounded at first, but becoming divided with age.

Stem: Slender, branching stem is rounded or slightly flattened in cross section. Stem grows to 2 m, is more or less limp, and often forms profuse roots at the nodes.

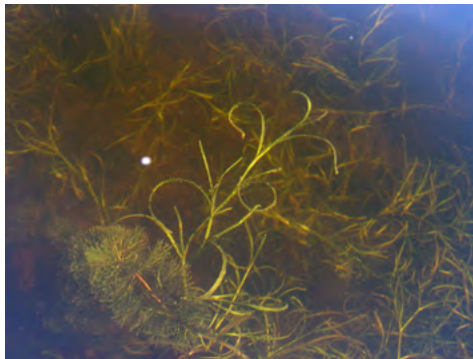
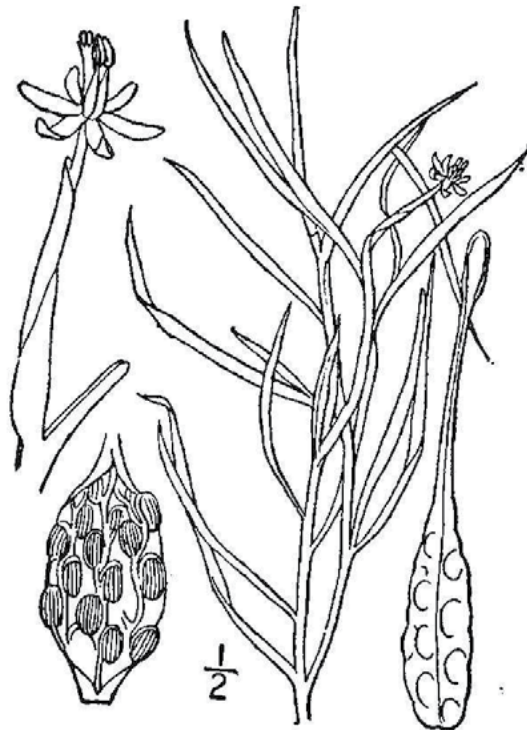
Flower: Bright yellow, tubular flowers have 6 'petals' (tepals) that form a star and rise just above the water surface. Flower tube is long and narrow, and the tepals are 5 mm long. Flowers sometimes do not open, self-pollinating in the bud instead. Water star-grass flowers infrequently in the Pacific Northwest.

Fruit: Fruits are oval capsules up to 1 cm long, containing several longitudinally ridged seeds.

Root: Roots are fibrous and grow from rhizomes. Stems often form roots at the nodes.

Propagation: Spreads from seeds dispersed by water and from rooted stem fragments.

Habitat: Grows in shallow water up to 1 m deep, including slow streams, rivers, lakes and ponds. It can survive on mud banks and is tolerant of alkaline water. This plant is rare in Montana, and may not flower in Montana.



Heteranthera dubia, by Donald Cameron, Maine Natural Areas Program

SUBMERGED PLANTS

Species: *Hydrilla verticillata*, caspary, hydrilla

Family: Hydrocharitaceae

INVASIVE - NOT CURRENTLY FOUND IN MONTANA

Leaf: Bright green leaves are 1-5 mm wide and 6-20 mm long with sharply toothed margins (visible without magnification). Reddish midrib often has small spines. Leaves grow in whorls of 3-10 along the stem, although 5 leaves per whorl is most common. Whorls can be closely spaced and bushy, or spaced widely apart along the stem.

Stem: Monoecious variety of hydrilla has a delicate sprawling growth form that freely branches at the lake bottom. Dioecious variety branches more at the water's surface.

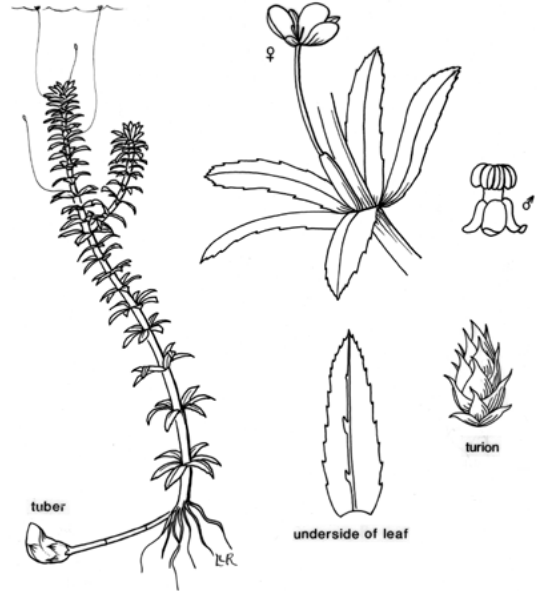
Flower: Monoecious hydrilla has male and female flowers on the same plant. Female has 3 small, translucent, white petals, 4-8 mm wide and 1-5 mm long, and is attached to the stem tip by a slender stalk. Male flowers are produced in the leaf axils, but detach and become free-floating. Blooms mid to late summer.

Fruit: Small, spindle-shaped fruits, 5-6 mm long.

Root: Fibrous rhizomes and above ground stolons. Peanut-sized tubers on the roots.

Propagation: Fragments, tubers, seeds (rarely), and scaly overwintering buds called turions.

Habitat: Lakes, river, ponds and ditches.



Center for Aquatic Invasive Plants, Institute of Food & Agricultural Sciences, University of Florida



Center for Aquatic Invasive Plants, Institute of Food & Agricultural Sciences, University of Florida



SUBMERGED PLANTS

Species: *Myriophyllum quitense* (Synonym: *M. elatinoides*), Andean water-milfoil, waterwort water-milfoil, elatine watermilfoil

Family: Haloragaceae

NATIVE

Leaf: Two types. Submerged leaves: feather-like and arranged in whorls of 2-4 (occasionally 5) around the stem. Leaves are 1.5-4 cm long to 2 cm wide with 5-10 leaflet pairs per leaf. First submerged leaves at the stem base of new shoots are small, entire, and opposite.

Emergent leaves: blue-green to reddish-tinted leaves are arranged in whorls of 3-4 leaves around the flower spike. Each is 0.5-1 cm long; oval to triangular shaped, and toothed along the leaf to halfway to the midrib, becoming less toothed toward the leaf tip.

Stem: Cylindrical stem is 1-4 m long and is 2-4 mm in diameter at the base. Each stem sometimes bears multiple flower stalks.

Flower: Tiny flowers (0.7-1.2 mm long) have 4 sepals and 4 petals and are located at the base of emergent leaves. Male flowers are near the top of the flower stalk; female flowers are near the base. Andean milfoil often flowers in August and

September, later than other aquatic milfoils.

Fruit: Olive brown, squarish fruit is 1.7 mm long and seldom found.

Root: Numerous whitish rhizomes form roots at the joints. Roots are very branched.

Propagation: Seeds and plant fragments. Andean milfoil will also produce winterbuds, although it overwinters in an evergreen condition.

Habitat: Freshwater lakes, rivers, and streams. Usually in cold nutrient-poor water. This plant is rare in Montana.



Jennifer Parsons, State of Washington Department of Ecology

SUBMERGED PLANTS

Species: *Myriophyllum sibiricum* (Synonym: *Myriophyllum exalbescens*), Northern watermilfoil, common watermilfoil, shortspike watermilfoil

Family: Haloragaceae

NATIVE

Leaf: Two types, submerged and emergent.

Submerged: feather-like olive-green, arranged in whorls of 3-4 with fewer than 14 leaflet pairs per leaf, each leaf to 4 cm long. Leaves usually do not collapse when removed from water. Leaflet pairs at the base of the leaf are much longer than those at the tip, giving the leaf a lance shape. **Emergent:** located beneath the flowers on the flower stalk and tiny (1-3 mm long). They are smooth edged to coarsely toothed and are shorter than the flowers.

Stem: Up to 3 m long stem is often reddish when fresh and usually is visible through the widely spaced leaves. Surface branching is sparse in water more than 1 m deep.

Flower: Tiny flowers occur on often red or reddish-purple emergent spikes up to 15 cm long. Female flowers lack petals; male flowers have 4 petals and 8 anthers.

Fruit: Nut-like, up to 3 mm in diameter, separating into 4 chambers, 1 seed per chamber.

Root: Fibrous, will sprout from fragments.

Propagation: From winter buds (turions), plant fragments, and seeds.

Habitat: Lakes, ponds, and rivers. Tolerant of nutrient-rich, alkaline, and brackish waters.



Donald Cameron, Maine Natural Areas Program



Donald Cameron, Maine Natural Areas Program

SUBMERGED PLANTS

Species: *Myriophyllum spicatum*, Eurasian watermilfoil, Eurasian water-milfoil

Family: Haloragaceae

INVASIVE

Leaf: Two types. **Submerged leaves:** 2-4 cm long, feather-like, arranged in whorls of 4 around the stem. Leaves are often square at the tip and typically have greater than 14 leaflet pairs per leaf. On mature plants the leaflets are closely crowded along the midrib. **Emergent leaves:** tiny (1-3 mm long), smooth edged to toothed, located on the flower spikes with one leaf beneath each flower, leaves shorter than flowers.

Stem: Long, often abundantly branched stems form a reddish or olive-green surface mat in summer.

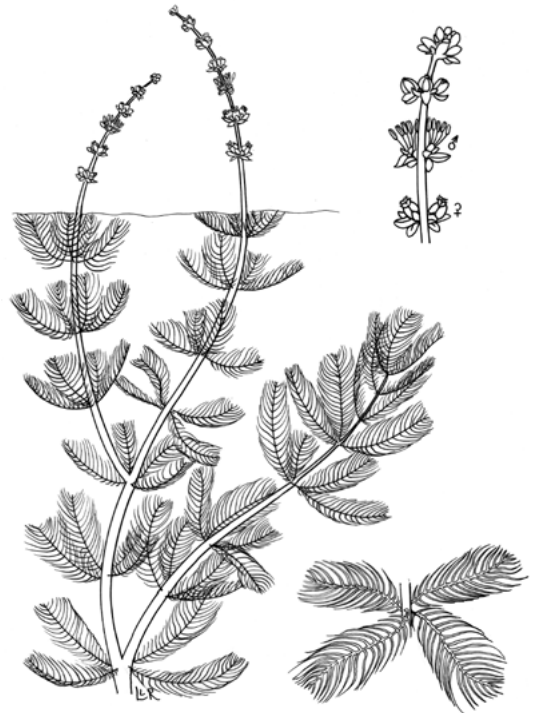
Flower: Tiny. On reddish emergent spikes 4-8 cm long. Female flowers lack petals, 4 petals on male flowers, 8 anthers.

Fruit: Up to 3 mm in diameter, divided into 4 chambers, with 1 seed per chamber.

Root: Many, fibrous, from the plant base. Roots often develop from plant fragments.

Propagation: Plant fragments; rhizomes. Sprouting from seed is rare.

Habitat: Lakes, rivers, and ponds. Tolerates a wide range of water conditions.



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SUBMERGED PLANTS

Species: *Myriophyllum verticillatum*, whorled water-milfoil, whorl-leaf watermilfoil

Family: Haloragaceae

NATIVE

Leaf: Two types: submerged and emergent.

Submerged: feather-like, 0.5-5 cm long and arranged in whorls around the stem with 4-5 leaves per whorl. Thread-like, paired leaflets are up to 10 mm long and range from 7-17 leaflets per leaf. **Emergent:** deeply-divided (on the flower stalk), arranged in whorls around the stalk and 2-10 mm long with the lower leaves usually larger than the leaves near the tip of the stalk. **Emergent:** longer than the flowers.

Stem: Stem is not highly branched and grows to 3 m long.

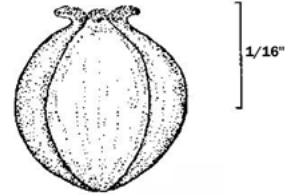
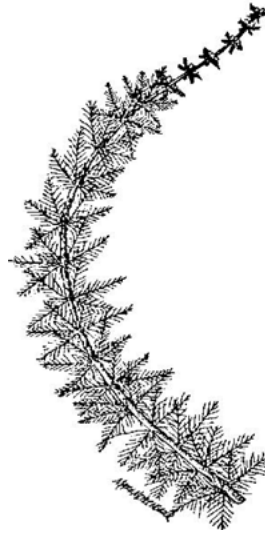
Flower: Tiny flowers have 4 petals and occur in the leaf bases on emergent stalks. Emergent flower spikes (stalks) are 5-12 cm long with male flowers located at the top of the spike, bisexual and female flowers below.

Fruit: Small fruit splits into 4 chambers with each chamber containing one seed.

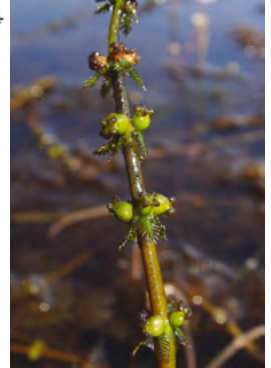
Root: Rhizomes give rise to numerous, smaller, thinner roots.

Propagation: Plant fragments, rhizomes, seeds, and club shaped winter buds.

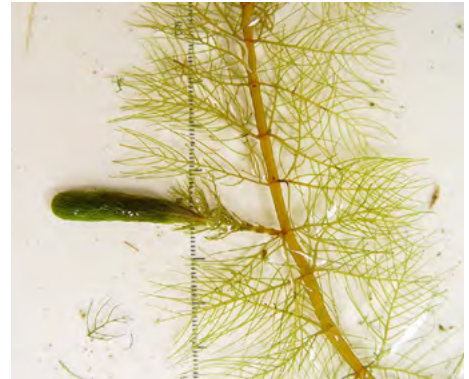
Habitat: Lakes, ponds, ditches, and small streams.



Donald Cameron, Maine Natural Areas Program



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SUBMERGED PLANTS

Species: *Najas flexilis*, slender water-nymph, nodding water-nymph

Najas guadalupensis, common water-nymph, southern water-nymph

Family: Najadaceae

NATIVE

Leaf: Glossy, green, and finely toothed leaves are oppositely arranged, but appear to be whorled near ends of the stems. Leaves are long and narrow with broad bases that clasp the stem. **Slender:** leaves taper to a long point and are 1-3 cm long and 1-2 mm wide. **Common:** the blunt-tipped leaves are generally shorter and narrower (1-2.5 cm long and 0.5-1 mm wide) than slender water-nymph leaves.

Stem: Slender, limp and branched stem is up to 2 m long and easily broken.

Flower: Inconspicuous, tiny (2-3 mm) flowers are located in clusters at the base of leaves. Male and female flowers occur separately on the same plant. Water-nymph pollen is transported by water currents.

Fruit: Small, oval-shaped fruit is located in the leaf bases. Each fruit contains one seed that is about 3 mm long. Fruit surface is smooth and flossy in slender water-nymph and is dull and pitted in common water-nymph. Fruits are present in late summer.

Root: Fibrous.

Propagation: Seeds, plant fragments.

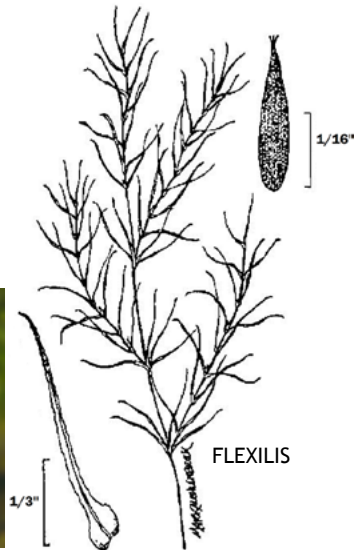
Habitat: Ponds, lakes, and sluggish streams to depths of 4 m. **Slender:** water-nymph tolerates brackish conditions.



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SUBMERGED PLANTS

Species: *Potamogeton crispus* , curlyleaf pondweed, curly pondweed

Family: Potamogetonaceae

INVASIVE

Leaf: Alternate, all submerged no leaf stalks. Oblong, stiff, translucent leaves (4-10 cm long, 5-10 mm wide) have distinctly wavy edges with fine teeth and 3 main veins. Sheaths (stipules) up to 1 cm long are free of the leaf base and disintegrate with age. This spp. looks similar to *P. richardsonii*.

Stem: Branched, up to 90 cm long, somewhat flattened.

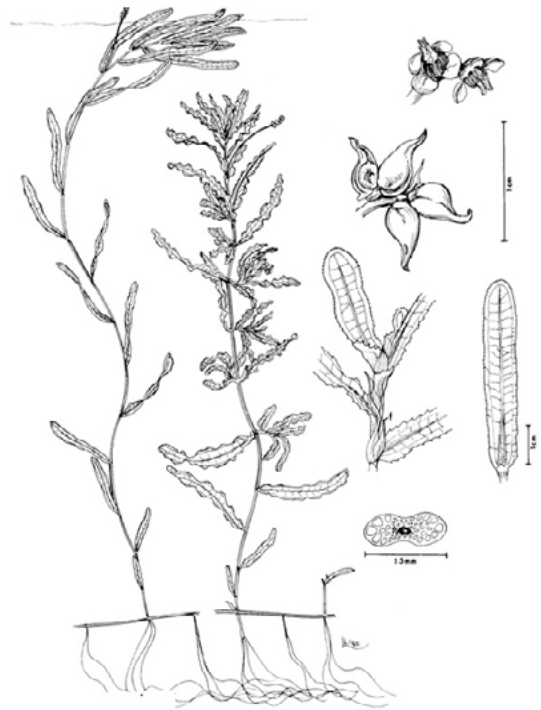
Flower: Tiny, with 4 petal-like lobes. In spikes 1-3 cm long on stalks up to 7 cm long.

Fruit: Seed-like achene, 4-6 mm long, including 2-3 mm beak, back ridged.

Root: Fibrous, from slender rhizomes.

Propagation: Seeds and creeping rhizomes, turions are hard, brown, bur-like buds with crowded, small holly-like leaves; produced in the spring and sprout in autumn.

Habitat: Shallow to deep still or flowing water, tolerant of disturbance.



Donald Cameron, Maine Natural Areas Program



Donald Cameron, Maine Natural Areas Program



SUBMERGED PLANTS

Species: *Potamogeton foliosus*, leafy pondweed

Potamogeton pusillus (Synonym:
Potamogeton berchtoldii), small pondweed

Family: Potamogetonaceae

NATIVE

Leaf: Submerged, alternate, stalk-less. Leafy: linear leaves, 2-10 cm long, 1-2.5 mm wide, have pointed tips and 1-5 veins. Sheaths (stipules) are free of the leaf-base with the lower portion forming a tube that eventually ruptures as new branches emerge. Small: linear leaves, 2-7 cm long, 0.5-2 mm wide, have pointed to rounded tips and 3 veins. Membranous tubular or open sheaths (stipules) are 1-3 cm long, free of the leaf base, and usually disintegrate before the leaves.

Stem: Slender and profusely branched. Leafy: slightly flattened, paired glands lacking. Small: often with small paired yellowish glands at leaf base.

Flower: Leafy: In 2-4 whorls on an initially crowded spike (1 cm) that elongates as the season progresses; stalk 1-3 cm long. Small: in 1-4 whorls on spikes measuring 3-15 mm long; spikes not always above the water; on stalks to 5 cm long, often curved at the base.

Fruit: Achenes. Leafy: to 2 mm long, with distinctively wavy ridged achene, beak 0.5 mm long. Small: 1.5-3 mm long, rounded

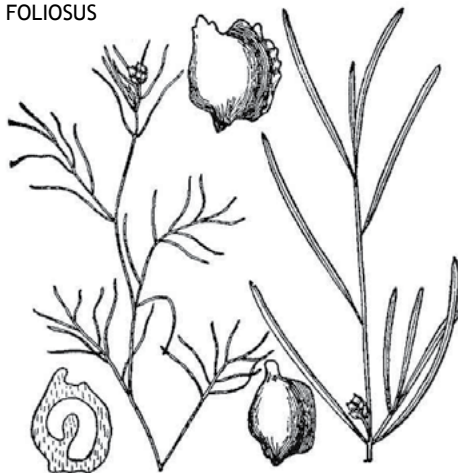
back, straight beak to 0.5 mm long.

Root: Leafy: fibrous, emerging from thread-like rhizomes. Small: fibrous, from base of plant; often non-rhizomatous.

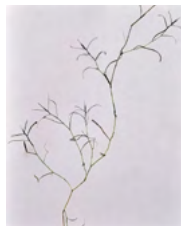
Propagation: Seeds and winter buds form at lateral branch tips and near leaf bases, also has rhizomes.

Habitat: Leafy: Marshes and shallow standing water. Small: wide tolerance of habits, including brackish conditions.

FOLIOSUS



Donald Cameron, Maine
Natural Areas Program



Gerald D. Carr, University of Oregon

PUSILLUS

SUBMERGED PLANTS

Species: *Potamogeton pectinatus*, (Synonym: *Stuckenia pectinata*), sago pondweed

Potamogeton filiformis (Synonym: *Stuckenia filiformis*), slender-leaved pondweed, slender pondweed, fineleaf pondweed

Potamogeton vaginatus (Synonym: *Stuckenia vaginata*), sheathing pondweed, sheathed pondweed

Family: Potamogetonaceae

NATIVE

Leaf: Alternate, thin, submerged with stipules fused to leaf base for most of their length. **Sago:** 2-15 cm long, to 1mm wide leaves have pointed tips and 1 (sometimes 3) veins. Sheath (stipules) 2-5 cm long. **Slender:** brownish leaves, to 12 cm long, 0.5-1.5 mm wide, have pointed tips and 1 vein. Sheath (stipules) to 3 cm are tubular when young, later splitting. **Sheathing:** often dark-brown leaves, to 10 cm long, 1-2 mm wide, have rounded tips and 1-3 veins. Sheaths (stipules) on main stem leaves are twice as wide as the stem, margins free.

Stem: **Sago & Slender:** thread-like, branched. **Sheathing:** stout below, slender above, can have 2-3 branches emerging at each node.

Flower: **Sago:** 2-7 whorls in spikes 1-3 cm long, usually float horizontally just beneath the water. Stalk 3-12 sm.

Slender: 2-5 whorls on open 2.5 cm spikes; the lowest whorl sometimes remote from the others. Stalk to 15 cm. **Sheathing:** 5-9 evenly spaced whorls on long-stalks to 12 cm.

Fruit: Achenes. **Sago:** 3-5 mm long, plump, back rounded, reddish-brown when ripe, beak to 0.7 mm long. **Slender:** 2-3 mm long, broad oval, back rounded, tiny beak (0.3 mm). **Sheathing:** 3-4 mm long, broad oval, rounded or slightly ridged, no beak.

Root: Fibrous, from plant base and rhizomes. Sago and Slender produce tubers from rhizome tips.

Propagation: Seeds and rhizomes. **Sago & Slender:** also from tubers.

Habitat: **Sago:** tolerates a wide range of conditions, including brackish, alkaline, or nutrient-rich water. **Slender:** often in shallows of hard water lakes. **Sheathing:** cold, often deep water.



VAGINATA



FILIFORMIS



PECTINATA



Donald Cameron, Maine Natural Areas Program



Donald Cameron, Maine Natural Areas Program

SUBMERGED PLANTS

Species: *Potamogeton obtusifolius*,
blunt-leaved pondweed

Family: Potamogetonaceae

NATIVE

Leaf: Submerged, alternate, linear, stalkless.
Green to reddish translucent leaves to 10 cm long, 4 mm wide, have 3 veins and rounded or sometimes pointed tips. Translucent sheaths (stipules) to 3 cm long are open to the base, free of the leaf base, and shred into fibers.

Stem: Branching. Pairs of bump-like glands occur at leaf bases. Cylindrical to flattened, to 2 m long, slightly zigzag, with irregularly shaped glands.

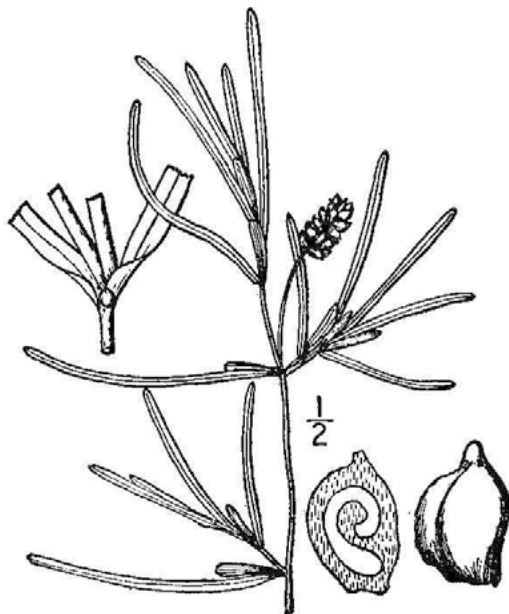
Flower: Small, densely packed on spikes 1-2 cm long; straight, short stalks to 2 cm.

Fruit: Achene. 3-4 mm long, round or slightly ridged straight beak to 0.7 mm long.

Root: Fibrous.

Propagation: Seeds; dense, leafy winter buds (turions).

Habitat: Shallow lakes and ponds. Occurs in fresh water, not saline or alkaline water.



Donald Cameron, Maine Natural Areas Program



SUBMERGED PLANTS

Species: *Potamogeton praelongus*, white-stemmed pondweed, whitestem pondweed

Family: *Potamogetonaceae*

NATIVE

Leaf: Submerged, alternate, stalk less, with heart shaped bases clasping the stem. Shiny leaves, 5-35 cm long, 1.5-2.5 cm wide, often appear wavy or twisted, with hooded or prow-shaped leaf tips. Leaves are widest below the middle of the leaf with 5 or more distinct veins. Sheaths (stipules) are stiff, whitish, 3-10 cm long, and arise from leaf bases.

Stem: Whitish, zigzag branching toward the top, to 3 m long, 2-3 mm thick.

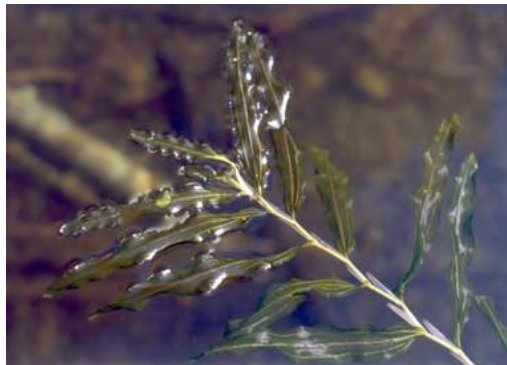
Flower: Small, clustered on whorls on emergent spikes. In 6-12 whorls on spikes up to 5 cm long; flower stalks to 0.5 m long.

Fruit: Achene 0.4-6 mm long, including stout beak, ridged on the back.

Root: Fibrous, from stout rhizomes. Rhizomes of white-stemmed pondweed are brown-spotted with numerous air cavities.

Propagation: Seeds, rhizomes, forms winter buds.

Habitat: Deep, clear lakes, in up to 6 m of water.



Donald Cameron, Maine Natural Areas Program

SUBMERGED PLANTS

Species: *Potamogeton richardsonii*,
Richardson's pondweed, redheadgrass,
red-head pondweed

Family: Potamogetonaceae

NATIVE

Leaf: Submerged, alternate, stalk less, with heart-shaped bases clasping the stem. Densely spaced, lance-shaped leaves, 2-13 cm long, 1-3 cm wide, have wavy or crinkled margins often curved backwards, with 7 or more veins. Membranous sheaths (stipules) less than 2 cm long arise from leaf bases, disintegrating or becoming fibrous early in the growing season. This plant can be confused with *P. crispus* because of the wavy margined leaves.

Stem: Often branched, rarely zigzagged, to 1 m long.

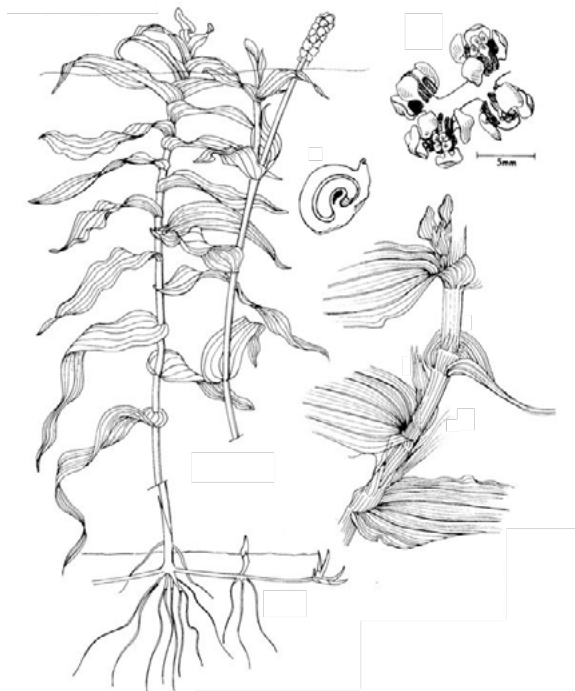
Flower: 4-12 whorls on short spikes 2-4 cm long; flower stalks generally just longer than the spike, but sometimes much longer.

Fruit: Achene. 2.5-4 cm long, including 0.5-1 mm long beak, usually not ridged.

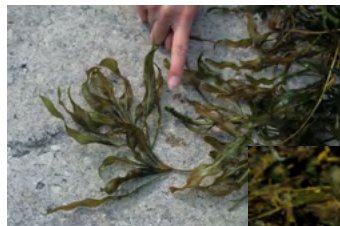
Root: Fibrous from stout rhizomes.

Propagation: Seeds, rhizomes.

Habitat: Shallow to deep (0.5-3.5 m) water, often in alkaline lakes and marl encrusted.



Center for Aquatic Invasive Plants,
Department of Biological
Sciences University of Florida



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Department of Biological
Sciences University of Florida



SUBMERGED PLANTS

Species: *Potamogeton robbinsii*, flatleaf pondweed, fern-leaf pondweed, Robinson's pondweed, Robbins' pondweed, flat-leaved pondweed

Family: Potamogetonaceae

NATIVE

Leaf: All submerged leaves. Olive green to brown stiff leaves are linear, minutely toothed, and are attached about halfway along the stipular sheaths, which are then attached to the stem. Leaves measure up to 12 cm long and 6 mm wide and have many parallel veins. Leaves form a rigid flattened spray that resembles the leaf arrangement of a palm frond or a sword fern. White sheaths (stipules) are less than 3 cm long with the lower 10-15 mm fused to the blade; the sheath tip shreds into fibers.

Stem: Fern-leaf pondweed has stout stems up to 3 m long that often creep along the bottom and will root at the lower nodes.

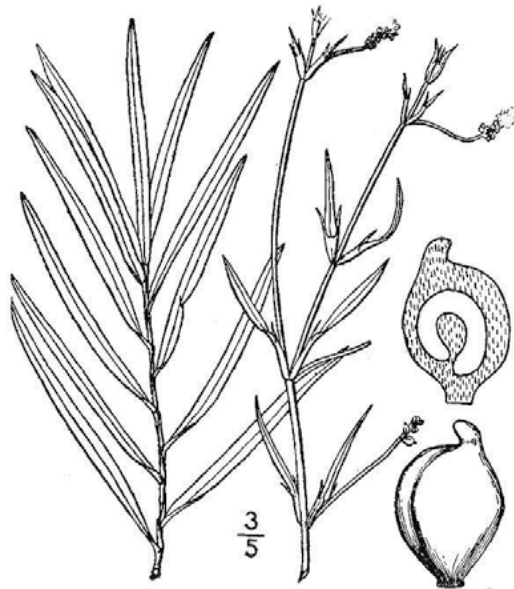
Flower: Small flowers with 4 petal-like lobes occur on spikes near the water surface. Up to 2 cm long spikes occur on flat, stiff stalks with widely spaced leaves.

Fruit: Achenes are up to 4 mm long, are keeled, and have a curved beak to 1 mm long.

Root: Fibrous roots emerge from slender rhizomes and the lower stem.

Propagation: Seeds, rhizomes, winter buds.

Habitat: Shallow to deep water, usually with low alkalinity.



Donald Cameron, Maine Natural Areas Program



SUBMERGED PLANTS

Species: *Potamogeton zosteriformis*,
flatstem pondweed, flat-stem
pondweed, eelgrass pondweed

Family: Potamogetonaceae

NATIVE

Leaf: Alternate, all submerged no leaf stalks. Smooth edged leaves (5-20 cm long, 2-5 mm wide) have many veins. Sheaths (stipules) 2-6 cm long are free of the leaf base and become fibrous with age.

Stem: Few branched, up to 2 m long, 0.7-4 mm wide, flattened, with sharp edges.

Flower: Tiny with 4 petal-like lobes, in spikes up to 3 cm long on stalks up to 10 cm long.

Fruit: Seed-like achene, approximately 5 mm long, sharp ridge on back, short beak (to 1 mm).

Root: Fibrous, from slender rhizomes.

Propagation: Seeds and creeping rhizomes. Overwinters as leafy buds.

Habitat: Ponds, lakes, 1-2.5 m deep.



Donald Cameron, Maine Natural Areas Program



SUBMERGED PLANTS

Species: *Ranunculus aquatilis* (Synonyms: *R. longirostris*, *R. subrigidus*, *R. circinatus*, *R. trichophyllus*), white water-buttercup, white water buttercup, water crowfoot

Family: Ranunculaceae

NATIVE

Leaf: Leaf form is variable depending on the season and growing conditions, but leaves are always alternately arranged on the stem. Submerged leaves are branched into more than 20 thread-like segments. These fan-shaped leaves are 1-4 cm wide and are attached to the stem by 1-2 cm long leaf stalks. These underwater leaves generally collapse when removed from the water. When growing on mud, more compact versions of the submerged leaf will form. Floating leaves are often absent. When present, these scalloped leaves (0.5-2 cm long) are flat and have 3 to 5 main lobes.

Stem: Long, smooth, or slightly hairy stem can grow to 1 m and is weak, branched, and rooting at the lower nodes.

Flower: Single flowers on stalks (1-6 cm long) rise above the water surface. Each flower is 1-2 cm across, has a yellow center, and 5 white petals. As the fruit matures, the petals detach and the flower stalks tend to curve away from the stem. A more commonly found plant that can be confused with this species is *Ranunculus gmelinii*, which is

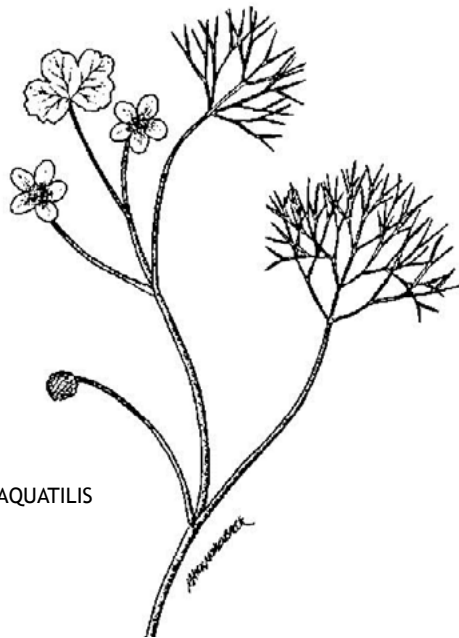
a floating buttercup species that has yellow flowers.

Fruit: Clusters of 10 to 20 achenes per flower. Each achene is 1.5 to 2.5 mm long, has a pointed end, and often has cross ridges.

Root: Fibrous roots often emerge from nodes on lower portions of the stems.

Propagation: Seeds and stem fragments.

Habitat: Ponds, lake margins, rivers, slow-moving streams or ditches.



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SUBMERGED PLANTS

Species: *Ruppia maritima*, (Synonyms: *R. cirrhosa*, *R. spiralis*) widgeongrass, ditch-grass

Family: Potamogetonaceae

NATIVE

Leaf: Long, narrow, alternate leaves are less than 1 mm wide. Stipular sheaths, less than 7 cm long, are completely fused to the leaf and often broadly clasp the stem.

Stem: Many branched stems, to 0.5 m long, less than 1 mm wide, root at the nodes and often have a zigzag appearance. Produces slender horizontal rhizomes.

Flower: Tiny flowers (3-5 mm across) lack petals and sepals, and occur in pairs on stalks. Pollination often occurs underwater or at the water surface. Once pollinated, the flower stalk coils.

Fruit: Dark colored, egg to pear-shaped, symmetrical to highly asymmetrical achene is 1.5-2 mm long and occurs in a cluster. Each fruit is on individual stalks, but all are connected to a long flowering stalk (peduncle).

Root: Fibrous. From lower nodes of erect stems and shallowly buried rhizomes.

Propagation: Seeds, fragments, rhizomes; occasionally produces overwintering buds.

Habitat: Alkaline lakes.



Donella Cameron, Maine Natural Areas Program

SUBMERGED PLANTS

Species: *Utricularia minor*, lesser bladderwort

Utricularia macrorhiza (Synonym: *U. vulgaris*), common bladderwort, greater bladderwort

Family: Lentibulariaceae

NATIVE

Leaf: No true leaves. Green, highly branched, finely divided underwater leaf-like stems with small seed-like bladders are present. Bladderworts often appear dense and bushy underwater. **Lesser:** leaves are 3-30 mm long, 3-parted at the base and are irregularly forked into 1-3 forks. Maximum number of leaf segments is less than 16, leaves are flat and linear.

Stem: Branched stem is up to 2 m long and can be floating, submersed, or partly creeping on the sediment, sometimes anchored at the base by root-like structures. **Lesser:** floating stems with leaves that contain bladders, creeping stems have fewer leaves and contain less bladders.

Flower: Yellow, snapdragon-like flowers occur above the water. **Common bladderwort:** flowers to 25 mm wide on stout stalks, with a prominent spur projecting below the lower lip of the flower. Flower often have faint purple-brown stripes. Flowers July to August. **Lesser:** flowers are 5-8 cm long with two lips, lower lip is twice the length of the upper lip.

Fruit: Capsule contains many seeds. **Common bladderwort:** pedicel to 20 mm long. **Lesser:** Seed is not winged.

Root: Absent.

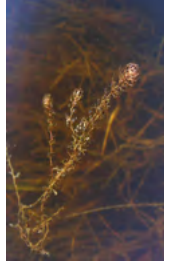
Propagation: Fragments, seeds. **Common bladderwort:** may form very large (4-5 cm across) bright green winterbuds.

Habitat: Floating freely in shallow water or loosely attached to sediment. **Lesser:** low nutrient lakes.

MINOR



Donald Cameron, Maine Natural Areas Program



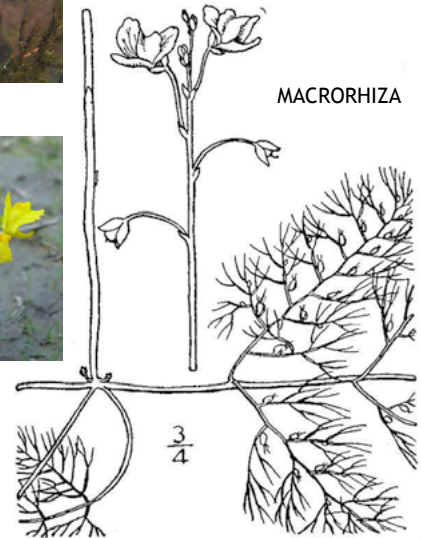
Donald Cameron, Maine Natural Areas Program



Arthur Haines, New England Wild Flower Society



MACRORHIZA



SUBMERGED PLANTS

Species: *Zannichellia palustris*, horned pondweed

Family: *Zannichelliaceae*

NATIVE

Leaf: Submerged thread-like, smooth edged leaves are oppositely arranged (occasionally appearing whorled), and each leaf has a central vein. Leaves are 2-10 cm long and less than 1 mm wide. A flared, transparent, membranous sheath surrounds the stem at the leaf base.

Stem: Completely submerged weak stems are branched, thin and thread-like.

Flower: Flowers are small, lack sepals and petals, and are solitary or clustered at the leaf bases. Male and female flowers are separate, but grow on different parts of the same plant, although often both occur together in the leaf bases. Female flowers are surrounded by a sheathing bract. Because the flowers remain entirely underwater, pollination occurs in the water. Flowers from June through August.

Fruit: Tiny banana-shaped achenes occur in clusters. Each achene is 2 to 4 mm long and has a conspicuous hooked beak measuring 1-1.5 mm long. A distinctive toothed ridge develops along the outer edge of the achene.

Root: Roots from slender creeping rhizomes.

Propagation: By seeds and rhizomes.

Habitat: Shallow freshwater, alkali, or brackish lakes, ponds, ditches, and streams.



Donald Cameron, Maine Natural Areas Program