SECTION 3

Wetland Plants and Plant Communities

I. Shallow, Open Water Communities

Shallow, open water plant communities generally have water depths of less than 6.6 feet (2 meters). Submergent, floating and floating-leaved aquatic vegetation including pondweeds, water-lilies, water milfoil, coontail and duckweeds characterize this wetland type. Size can vary from a one-quarter acre pond, to a long oxbow of a river, or shallow bay of a lake. The presence or absence of floating vegetation depends upon the effects of the season, wind, availability of nutrients, and aquatic weed control efforts.

Shallow, open water communities differ from deep and shallow marshes in that they are seldom, if ever, drawn down. As a result, persistent, emergent aquatic vegetation cannot become established.

Shallow, open water communities provide important habitat for waterfowl, terns, furbearers, fish, frogs, turtles, and aquatic invertebrates. For example, the submergent plants and aquatic invertebrates provide food for waterfowl, which is especially important during migration. The permanent to semi-permanent water regime of these deep-water wetlands results in their being especially important for waterfowl production in drought years when other wetlands have become dry. Also provided is habitat for spawning beds and nursery areas for both game and nongame fish. Finally, these areas of open water provide a valuable aesthetic resource important to municipalities and landowners.

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Franklin's gulls and white pelicans using habitat provided by a shallow, open water wetland.

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VEGETATION: White water-lily (*Nymphaea odorata*), yellow water-lily (*Nuphar lutea*), flat-stem pondweed (*Potamogeton zosteriformis*), curly pondweed (*Potamogeton crispus*), common water-milfoil (*Myriophyllum sibiricum*), coontail (*Ceratophyllum demersum*), common bladderwort (*Utricularia macrorhiza*), white water crowfoot (*Ranunculus longirostris*), water star-grass (*Heteranthera dubia*), elodea (*Elodea canadensis*), water smartweed (*Persicaria amphibia*), big duckweed (*Spirodela polyrrhiza*), lesser duckweed (*Lemna minor*), watermeal (*Wolffia columbiana*) and star duckweed (*Lemna trisulca*).

SOILS: Lacustrine deposits and sediments.

HYDROLOGY: Permanently inundated.

LOCATION: Lake Marion, Dakota County, Minnesota.

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VEGETATION: Water shield (*Brasenia schreberi*) is the dominant species. Also present are ribbon-leaved pondweed (*Potamogeton epihydrus*), flat-stem pondweed (*Potamogeton zosteriformis*), common water-milfoil (*Myriophyllum sibiricum*), coontail (*Ceratophyllum demersum*), water purslane (*Didiplis diandra*), common bladderwort (*Utricularia macrorhiza*), elodea (*Elodea canadensis*), big duckweed (*Spirodela polyrrhiza*), lesser duckweed (*Lemna minor*) and star duckweed (*Lemna trisulca*). A fringe of greenfruit bur-reed (*Sparganium emersum*) is present.

SOILS: One to 3 feet of peat over sand.

HYDROLOGY: Permanently inundated (a man-made impoundment of a tamarack swamp).

LOCATION: Jackson County, Wisconsin.

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VEGETATION: Long-leaf pondweed (*Potamogeton nodosus*), leafy pondweed (*Potamogeton foliosus*) and wild celery (*Vallisneria americana*) dominate this example. Also present are curly pondweed (*Potamogeton crispus*), slender naiad (*Najas flexilis*), common bladderwort (*Utricularia macrorhiza*), Eurasian water-milfoil (*Myriophyllum spicatum*), elodea (*Elodea canadensis*), coontail (*Ceratopyllum demersum*), big duckweed (*Spirodela polyrrhiza*), lesser duckweed (*Lemna minor*) and watermeal (*Wolffia columbiana*).

SOILS: Lacustrine and riverine sediments.

HYDROLOGY: Permanently inundated; impoundment of the Mississippi River.

LOCATION: Weaver Bottoms, Pool 5 of the Mississippi River, Wabasha County, Minnesota.

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SAGO PONDWEED

(*Stuckenia pectinatus* (L.) Boerner)

PONDWEED FAMILY (Potamogetonaceae) **C of C:** Native (3) **IND. STATUS:** OBL

SYNONYM: *Potamogeton pectinatus* L.

FIELD CHARACTERISTICS: An aquatic, perennial herb from rhizomes tipped with a tuber. Stems are 30-100 cm. long and 1-2 mm. wide. This pondweed has a bushy appearance because of its much-branched stems and numerous thread-like leaves spreading in a fan-like fashion. The leaves are all submerged and very narrow (0.2-1(1.7) mm. wide) tapering to sharply pointed tips. Flowers are in submergent, cylindrical spikes 1-5 cm. long with 2-5 whorls of flowers. Nutlets are (2.5)3-4.5 mm. long not including the tiny beak. In flower June-September.

ECOLOGICAL NOTES: Sago pondweed is found in marshes, lakes, streams and Mississippi River backwaters, usually at depths to 5 feet, rarely to 10 feet, especially in calcareous, mixosaline and saline waters. The pondweeds (*Stuckenia* spp. and *Potamogeton* spp.) in general are among the most important of all aquatic plants for wildlife food, and sago pondweed may be the most important because of its abundant production of fruit and tubers. The entire plant is relished as food by waterfowl and it provides good fish habitat.

SOURCE: Martin *et al.* (1951); Chadde (2002); and Voss (1972).

FLOATING-LEAVED PONDWEED

(*Potamogeton natans* L.)

PONDWEED FAMILY (Potamogetonaceae) **C of C:** Native (5) **IND. STATUS:** OBL

FIELD CHARACTERISTICS: An aquatic, perennial herb. Stems are usually unbranched and 50-200 cm. long and 1-2 mm. wide. The blades of the floating leaves are heart-shaped to somewhat heart-shaped at the base, and 2-4.7 cm. wide and (3.2)3.7-9(10) cm. long. The larger leaves have (18) 21-35 nerves. Submerged leaves are linear and 10-30 cm. long and 1-2 mm. wide. Flowers are on emerged, cylindrical spikes 2-5 cm. long. Mature nutlets are (3.6)3.7-4.5 mm. long (including the beak). In flower July-September.

ECOLOGICAL NOTES: Floating-leaved pondweed is found in marshes, lakes, rivers, ditches and bogs — typically in water depths to 5 feet — but it can be found at more than twice that depth. Good fish habitat is provided by this aquatic plant.

SOURCE: Voss (1972); and Gleason and Cronquist (1991).

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ILLINOIS PONDWEED

(*Potamogeton illinoensis* Morong)

PONDWEED FAMILY (Potamogetonaceae) **C of C:** Native (6) **IND. STATUS:** OBL

FIELD CHARACTERISTICS: An aquatic, perennial herb with stems to 2 m. long and 2-5 mm. wide. Submerged leaves are sessile or on petioles not over 2 cm. long. The submerged leaves are 0.8-3.2(5) cm. wide with (7)9-19 nerves and have a pointed tip that can be up to 4(5) mm. long. Floating leaves (if present) have blades 1.7-3(3.5) cm. wide with petioles that are shorter than the blades. Flowers are on emerged, cylindrical spikes 2-6 cm. long. The olive-green nutlets are 3-4 mm. long and somewhat sharply keeled. In flower July-September.

ECOLOGICAL NOTES: Illinois pondweed is found in lakes and rivers, especially calcareous waters, in depths to 15 feet.

SOURCE: Fernald (1970); Chadde (2002); and Voss (1972).

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LARGE-LEAVED PONDWEED

(*Potamogeton amplifolius* Tuckerman)

PONDWEED FAMILY (Potamogetonaceae) **C of C:** Native (7) **IND. STATUS:** OBL

FIELD CHARACTERISTICS: An aquatic, perennial herb with usually unbranched stems to 1 m. or more and 2-4 mm. wide. Fully developed submerged leaves have a characteristic quarter-moon shape because of their strongly-arched, folded condition. The submerged leaves are (2.5)3.5-7.2 cm. wide with 24-40(52) nerves. Floating leaves (if present) are elliptical, 4-10 cm. long with 28-50 nerves. Flowers are in denses cylindric spikes 3-6 cm. long. Nutlets are green brown to brown and 4-5 mm. long including the 1 mm. beak. In flower July-September.

ECOLOGICAL NOTES: Large-leaved pondweed is found in lakes and rivers, usually at depths less than 9 feet, but it has been found in waters to 18 feet in depth.

SOURCE: Fernald (1970); Chadde (2002); and Voss (1972).

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LEAFY PONDWEED
(*Potamogeton foliosus* Raf.)

PONDWEED FAMILY (Potamogetonaceae) **C of C:** Native (6) **IND. STATUS:** OBL

FIELD CHARACTERISTICS: An aquatic, perennial herb growing to 80 cm. in length. Stems are only 1 mm. wide and slightly compressed. Leaves are all submersed, linear, 1.5-8 x 0.5-2 mm., 1- to 3-veined, with an acute tip. Stipules are free and 0.5-2 cm. long. Glands are usually absent at the base of stipules. Flowers are in rounded to short-cylindric spikes 2-7 mm. long with axillary stalks 5-15 mm. long. Nutlets (achenes) are green-brown, winged, 1.5-3 mm. long with a beak of 0.5 mm. In flower June-August.

ECOLOGICAL NOTES: Leafy pondweed is occasional to common in lakes, ponds, rivers and Mississippi River backwaters in water depths up to 12 feet.

SOURCE: Gleason and Cronquist (1991); Chadde (2002); and Voss (1972).

CURLY PONDWEED
(*Potamogeton crispus* L.)

PONDWEED FAMILY (Potamogetonaceae) **C of C:** Introduced, invasive (0) **IND. STATUS:** OBL

FIELD CHARACTERISTICS: An aquatic, perennial herb with stems growing to 80 cm. long and 1-2 mm. wide. Leaves are all submersed, oblong, 3-9 cm. long and 5-10 mm. wide, rounded at the tip, stalkless, 3-5 veined with wavy, crisped margins that are finely serrate. Stipules are 4-10 mm. long and joined at the base of the leaf. Flowers are in dense, cylindrical spikes 1-2 cm. long on stalks 2-6 cm. long. Nutlet (achene) is brown, ovoid, 3 mm. long, shallowly pitted, with 3 round, dorsal keels and a prominent beak 2-2.5 mm. long. In flower April-June, noticeably earlier than native pondweeds.

ECOLOGICAL NOTES: Curly pondweed is a native of Europe that has become widely established in our waters, especially those with high nutrient levels. It inhabits shallow to deep waters of lakes, ponds, rivers and ditches. This includes the Great Lakes and Mississippi River backwaters.

SOURCE: Gleason and Cronquist (1991); Chadde (2002); and Voss (1972).

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RIBBON-LEAVED PONDWEED

(*Potamogeton epihydrus* Raf.)

PONDWEED FAMILY (Potamogetonaceae) **C of C:** Native (8) **IND. STATUS:** OBL

FIELD CHARACTERISTICS: An aquatic, perennial herb to 2 m. in length. Leaves are of two types. Submersed leaves are linear, ribbon-like, 10-20 cm. long and 3-8 mm. wide with the midrib flanked by a pair of conspicuous bands of pale green to translucent cells. Stipules are 1-3 cm. long and not joined to the leaf. Floating leaves are usually present and are oval to obovate, 3-8 cm. long and 1-2 cm. wide, mostly obtuse to abruptly short-awned at the tip, and 11-25 veined. Stipules are 1-3 cm. long and free from the leaf. Flowers are in dense, cylindric spikes 2-3 cm. long on stalks 2-6 cm. long. Nutlets (achenes) are olive to brown, 2-3 mm. long, shallowly pitted, with three dorsal keels and a tiny beak. In flower July-September.

ECOLOGICAL NOTES: Ribbon-leaved pondweed is found in deep marshes, lakes, rivers, ponds and cranberry operation impoundments in water depths to 6 feet.

SOURCE: Gleason and Cronquist (1991); Chadde (2002); and Voss (1972).

Submersed leaf.

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LONG-LEAF PONDWEED
(Potamogeton nodosus Poir.)

PONDWEED FAMILY (Potamogetonaceae) **C of C:** Native (6) **IND. STATUS:** OBL

FIELD CHARACTERISTICS: An aquatic, perennial herb with stems to 2 m. in length and 1-2 mm. wide. Leaves are of two types. Larger submersed leaves with blades 1-2.5(3) cm. wide on petioles 4-11 cm. long, 7-15 veined, translucent and usually decayed by fruiting time. Floating leaves are oval, 5-12 cm. long and 1-5 cm. wide, tapered at both ends and many veined. Petioles are somewhat winged, 5-20 cm. long and 2-3 mm. wide. Stipules are not joined with the leaf. Flowers are in emergent, dense, cylindric spikes 2-6 cm. long on stalks 3-15 cm. long. Nutlets (achenes) are red-brown to brown, 3-4 mm. long with a short beak. In flower July-August.

ECOLOGICAL NOTES: Long-leaf pondweed is occasional to common in deep marshes, lakes and rivers to a depth of 6 feet.

SOURCE: Gleason and Cronquist (1991); Chadde (2002); and Voss (1972).

VASEY'S PONDWEED
(*Potamogeton vaseyi* J.W. Robbins)

PONDWEED FAMILY (Potamogetonaceae) **IND. STATUS:** OBL

C of C: Native (10), a species of special concern in Minnesota and Wisconsin

FIELD CHARACTERISTICS: An aquatic, annual herb with threadlike stems 20-100 cm. long. Leaves are of two types. Submersed leaves are linear, transparent, 2-6 cm. long, up to 1 mm. wide and tapered to a sharp tip. Stipules are free, linear, white and 1-2 cm. long. Floating leaves are sparingly produced on some plants of a colony. Blades of floating leaves are spatulate to obovate, 8-15 mm. long, 5-9 veined, leathery, the veins sunken on the underside. Flowers are in cylindric spikes 3-8 mm. long. Nutlets (achenes) are 2-3 mm. long with a short beak.

ECOLOGICAL NOTES: Vasey's pondweed is rare to uncommon in lakes in northern Minnesota and Wisconsin.

SOURCE: Gleason and Cronquist (1991); Chadde (2002); and Voss (1972).

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FLAT-STEM PONDWEED
(*Potamogeton zosteriformis* Fernald)

PONDWEED FAMILY (Potamogetonaceae) **IND. STATUS:** OBL

C of C: Native (6)

FIELD CHARACTERISTICS: An aquatic, perennial herb with strongly flattened, sometimes winged, stems to 1 m. long and 1-3 mm. wide. Leaves are all submersed and linear, 5-20 cm. long and 3-5 mm. wide, and taper to a tip or sharp point. Stipules are free, white and 1-4 cm. long. Flowers are in cylindric spikes 1-2.5 cm. long. Nutlets (achenes) dark green to brown, 4-5 mm. long with a short, blunt beak. In flower July-August.

ECOLOGICAL NOTES: Flat-stem pondweed is one of the most common and distinct pondweeds (Voss 1972). It is found in streams and shallow to deep lakes.

SOURCE: Gleason and Cronquist (1991); Chadde (2011); and Voss (1972).

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GRASS-LEAVED PONDWEED
(*Potamogeton gramineus* L.)

PONDWEED FAMILY (Potamogetonaceae) **IND. STATUS:** OBL

C of C: Native (7)

FIELD CHARACTERISTICS: An aquatic, perennial herb with slender stems to 80 cm. long and 1 mm. wide. Leaves are of two types. Submersed leaves are variable in shape from linear to lance-shaped to oblong lance-shaped, 3-9 cm. long and 3-12 mm. wide, with 3-7 veins. Floating leaves are oval, 2-6 cm. long and 1-3 cm. wide with 11-19 veins. Stipules are free, persistent and 1-4 cm. long. Flowers are in cylindric spikes 1.5-4 cm. long. Nutlets (achenes) are dull green and 2-3 mm. long. In flower June-August.

ECOLOGICAL NOTES: Grass-leaved pondweed is found in shallow to deep waters of ponds, lakes and streams.

SOURCE: Gleason and Cronquist (1991); Chadde (2011); and Voss (1972).

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CLASPING-LEAVED PONDWEED
(*Potamogeton richardsonii* (A.Benn.) Rydb.)

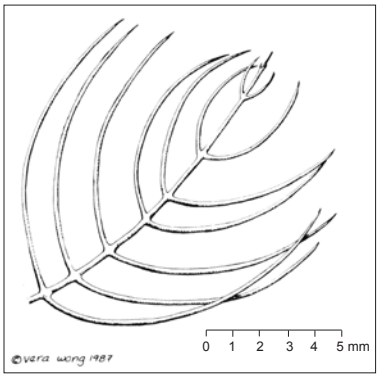
PONDWEED FAMILY (Potamogetonaceae) **IND. STATUS:** OBL

C of C: Native (5)

FIELD CHARACTERISTICS: An aquatic, perennial herb with round stems 30-100 cm. long and 1-2.5 mm. wide. Leaves are all submersed, lance-shaped, 5-12 cm. long and 1-2.5 cm. wide, with 13 or more prominent veins. Leaves have a heart-shaped base clasping the stem. Leaf margins are entire and wavy. Stipules are free, 1-2 cm. long, then shredding and persisting as fibers (stipular fibers). Flowers are in cylindric spikes 1.5-4 cm. long. Nutlets (achenes) green to brown, 2-4 mm. long, with a short beak. In flower July-August.

ECOLOGICAL NOTES: Clasping-leaved pondweed is found in shallow to deep waters of streams and lakes.

SOURCE: Gleason and Cronquist (1991); Chadde (2011); and Voss (1972).



Leaf shape.

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Emersed flower spikes.

COMMON WATER-MILFOIL

(*Myriophyllum sibiricum* Kom.)

WATER-MILFOIL FAMILY (Haloragaceae) **C of C:** Native (7) **IND. STATUS:** OBL

SYNONYM: *Myriophyllum exalbescens* Fernald

FIELD CHARACTERISTICS: A perennial, aquatic herb with stems 1 m. or more in length. Leaves are in whorls of 3-4, 1-4 cm. long, with mostly 5-10 thread-like segments on each side of the midrib. Flowers are in emerged spikes 4-10 cm. long. Flowers and bracts are whorled. Staminate and pistillate flowers are separate with the uppermost flower whorls being staminate and lower being pistillate. Staminate flowers have pinkish petals 2-3 mm. long. Floral bracts are much smaller than the leaves and are entire (not segmented). Fruit is 2-3 mm. long. In flower June-September.

ECOLOGICAL NOTES: Common water-milfoil is found in shallow to deep water of lakes, ponds, marshes, ditches and slow moving streams.

SOURCE: Gleason and Cronquist (1991); Swink and Wilhelm (1994); and Voss (1985).

EURASIAN WATER-MILFOIL

(*Myriophyllum spicatum* L.)

WATER-MILFOIL FAMILY (Haloragaceae) **IND. STATUS:** OBL

C of C: Introduced, invasive (0)

FIELD CHARACTERISTICS: A perennial, aquatic herb very similar to the native common water-milfoil (*M. sibiricum*). To distinguish the two species:

Leaves with 5-10 thread-like segments on each side of the midrib; submerged leaves stiff when removed from the water . . . . . *M. sibiricum*

Leaves with 12-22 thread-like segments on each side of the midrib; submerged leaves collapse when removed from the water . . . . . *M. spicatum*

ECOLOGICAL NOTES: Eurasian water-milfoil is found in shallow to deep water of lakes, ponds and Mississippi River backwaters. This highly invasive species can become a nuisance by forming dense mats that interfere with boating, fishing and swimming.

SOURCE: Gleason and Cronquist (1991); Chadde (2002); and Voss (1985).

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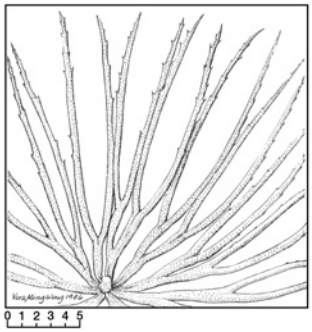
Nutlet, 4-6 mm. long, with one terminal and two basal spines.



Leaves

COONTAIL

(*Ceratophyllum demersum* L.)

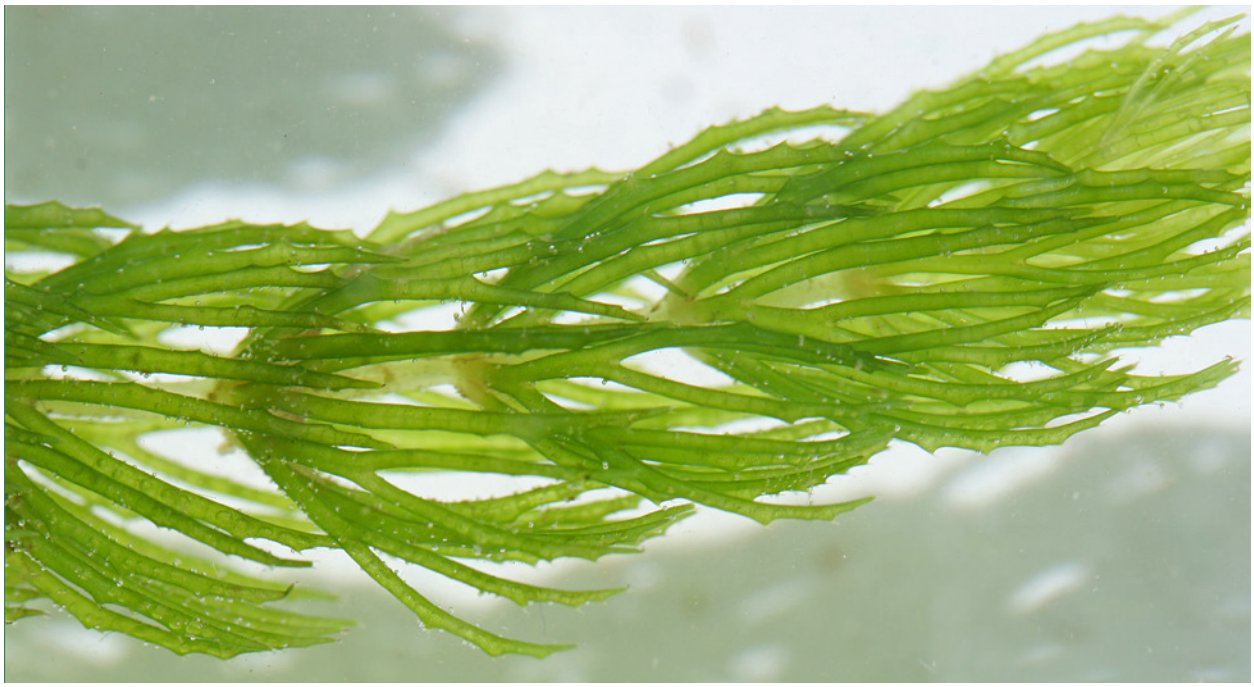
HORNWORT FAMILY (Ceratophyllaceae) **C of C:** Native (2) **IND. STATUS:** OBL

FIELD CHARACTERISTICS: A submerged herb lacking true roots, but may be anchored by modified leaves. The leaves are in whorls of 5-12 and are stiff and dichotomously forked. Leaves have thread-like divisions with teeth along one side. The leaves are usually much more crowded toward the tip; thus, the "coontail" appearance. There is great variability in the length and crowding of the leaves. The flowers are unisexual. Fruit is a nutlet 4-6 mm. long with two spines near the base and a terminal spine. In flower July-September.

ECOLOGICAL NOTES: Coontail is one of the most abundant submergent plants in lakes, streams, marshes, ditches and Mississippi River backwaters, in shallow water to depths of 18 feet. Coontail is tolerant of nutrient-rich water and fluctuating water levels. It can become a nuisance by forming thick masses that interfere with swimming, fishing and boating.

Most reproduction is by fragmentation of the stem. Pollination is by a unique method. The staminate flowers are released underwater and float to the surface. Pollen is then released and drifts downward through the water column where it may, by chance, land on a pistillate flower.

SOURCE: Fassett (1957); Gleason and Cronquist (1991); Martin *et al.* (1951); and Voss (1985).



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Coontail
(*Ceratophyllum demersum*)

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Nutlet, 4-6 mm. long, with many spines along the margin.

SPINY COONTAIL

(*Ceratophyllum echinatum* A. Gray)

HORNWORT FAMILY (Ceratophyllaceae) **IND. STATUS:** OBL

C of C: Native (10), a species of special concern in Wisconsin

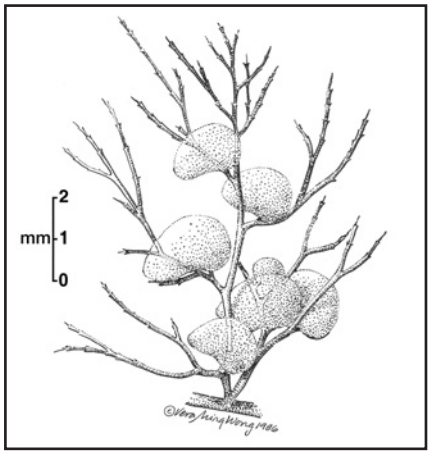
FIELD CHARACTERISTICS: A floating, perennial, rootless, aquatic herb with elongate stems. Much like coontail (*C. demersum*). To distinguish between the two species:

Leaves usually stiff, forked 1-2 times, margins coarsely toothed; nutlets with two basal spines .... *C. demersum*

Leaves limp, some larger leaves forked 3-4 times, margins not toothed; nutlets with several spines along each margin ..... *C. echinatum*

ECOLOGICAL NOTES: Spiny coontail is uncommon in lakes, ponds and quiet waters of rivers and streams, preferring acidic waters.

SOURCE: Gleason and Cronquist (1991); and Chadde (2002).



Leaf and bladders.

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COMMON BLADDERWORT

(*Utricularia macrorhiza* Le Conte)

BLADDERWORT FAMILY (Lentibulariaceae) **C of C:** Native (5) **IND. STATUS:** OBL

SYNONYM: *Utricularia vulgaris* L.

FIELD CHARACTERISTICS: An aquatic, free-floating herb. Leaves are numerous and highly dissected with bladders scattered throughout. The naked (leafless) stems are emergent, 6-20 cm. high, with 6-20 flowers. Flowers are bright yellow and composed of 2 lips 1-2 cm. long, and a short spur, which is about two-thirds as long as the lower lip. In flower June-August.

ECOLOGICAL NOTES: This bladderwort is found in quiet waters of lakes, rivers and marshes. Other species of bladderworts (*Utricularia* spp.) inhabit bogs and calcareous fens. See Appendix C for a key to bladderworts in our area. Bladderworts are insectivorous plants that derive their name from the small bladders used to capture minute animal life. The bladders have "trigger hairs" which, when brushed by a small aquatic invertebrate, cause the bladder to rapidly inflate and draw in the unfortunate organism. The victim is then "digested" as glands absorb nutrients and expel water.

SOURCE: Gleason and Cronquist (1991); and Kartesz (1994).

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SLENDER NAIAD

(*Najas flexilis* (Willd.) Rostkov & Schmidt)

WATER-NYMPH FAMILY (Najadaceae) **C of C:** Native (5) **IND. STATUS:** OBL

FIELD CHARACTERISTICS: An annual, aquatic herb with branched stems 5-40 cm. long. Leaves are linear, 1-4 cm. long and up to 0.5 mm. wide, densely clustered at the tips of stems. Margins of leaves have tiny serrations. Flowers are unisexual, separate on the same plant. Nutlets (achenes) are oval, olive-green to red, with a beak 1 mm. or more long. In flower July-September.

ECOLOGICAL NOTES: Slender naiad is found in shallow to deep water of lakes, ponds, streams and Mississippi River backwaters.

SOURCE: Gleason and Cronquist (1991); and Chadde (2002).

ELODEA

(*Elodea canadensis* Michaux)

FROG'S-BIT FAMILY (Hydrocharitaceae) **C of C:** Native (4) **IND. STATUS:** OBL

SYNONYM: *Anacharis canadensis* (Michaux) Rich

FIELD CHARACTERISTICS: A submerged, perennial herb with stems 20-100 cm. long. Leaves are whorled in 3's (rarely some opposite), 1.5-4(5) mm. wide (averaging about 2 mm.), entire and 2-5 times as long as wide. The plants are unisexual. Pistillate flowers are in spathes from upper leaf axils, the spathes 10-20 mm. long, and extended to the water's surface by a long, thread-like stalk. The staminate flowers are in an elongated spathe about 10 mm. long and 4 mm. wide that is also extended to the water's surface on a thread-like stalk. Fruit is a capsule 5-6 mm. long tapered to a beak 4-5 mm. long. In flower June-September.

ECOLOGICAL NOTES: Elodea is found in marshes, lakes, rivers and Mississippi River backwaters, often forming large masses. It has been recorded in water deeper than 25 feet.

The staminate flowers split open spreading pollen onto the water's surface where it drifts and may, by chance, reach a pistillate flower. Pollination occurs at the water's surface; however, most reproduction is vegetative by fragmentation of the stem.

SOURCE: Fernald (1970); Chadde (2002); and Voss (1972).

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MUSKGRASS

(*Chara vulgaris* L.)

MUSKGRASS FAMILY (Characeae) **IND. STATUS:** [OBL]

FIELD CHARACTERISTICS: A macroscopic alga with cylindrical, whorled branches. Each joint of the "stem" consists of a single cell. The common name comes from the strong, musk-like odor of this alga.

ECOLOGICAL NOTES: Muskgrass is almost always found in mineral-rich waters and these plants often have incrustations of lime. The muskgrasses (*Chara* spp.) are an important food for ducks, especially when they bear their microscopic, spore-like oogonia.

SOURCE: Fassett (1957); and Martin *et al.* (1951).

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WATER PURSLANE

(*Didiplis diandra* (Nutt. ex DC.) Wood)

LOOSESTRIFE FAMILY (Lythraceae) **IND. STATUS:** OBL

C of C: Native (5), a species of special concern in Wisconsin

FIELD CHARACTERISTICS: An aquatic, annual herb submersed or rooting in mud. Stems are weak and branched growing to 10-40 cm. in length. Leaves are of two types. Submersed leaves are linear, sessile, 1-2.5 cm. long and truncate at the base. Emersed leaves, if present, are shorter and more broad being narrowly elliptic, and tapering to the base. Minute greenish flowers are solitary in leaf axils. Fruit is a globose capsule. In flower July-August.

ECOLOGICAL NOTES: Water purslane occurs in quiet waters of lakes, impoundments and streams.

SOURCE: Gleason and Cronquist (1991); and Chadde (2002).

Staminate plant.

WILD CELERY

(*Vallisneria americana* Michaux)

FROG'S-BIT FAMILY (Hydrocharitaceae) **C of C:** Native (6) **IND. STATUS:** OBL

FIELD CHARACTERISTICS: An aquatic, perennial herb with long, ribbon-like leaves (mostly 3-11 mm. wide and 2 m. or more long) in a basal rosette. The leaves have a characteristic three-zoned appearance that distinguishes wild celery from other plants that produce rosettes of ribbon-like submerged leaves. The plants are unisexual. The pistillate flower is tubular and on a long stalk that carries it to the water's surface. Staminate flowers are densely packed in a spathe. In flower from July-October.

ECOLOGICAL NOTES: Wild celery is found in lakes, streams and Mississippi River backwaters, often in deep water (to 20 feet). It spreads by rhizomes with tuberous tips which, like the fruit and other parts of the plant, are relished as food by waterfowl, especially the canvasback (*Aythya valisineria*), as well as by fish. The staminate flowers are released under water each containing an air bubble that causes it to rise to the surface. Once on the surface, part of the flower opens and acts as a "sail." If the staminate flower randomly floats to a pistillate flower, pollination occurs at the water's surface. The long stalk of the pistillate flower then becomes coiled, pulling the flower below the surface where it develops into the mature fruit (see photograph on following page).

SOURCE: Fernald (1970); and Voss (1972).

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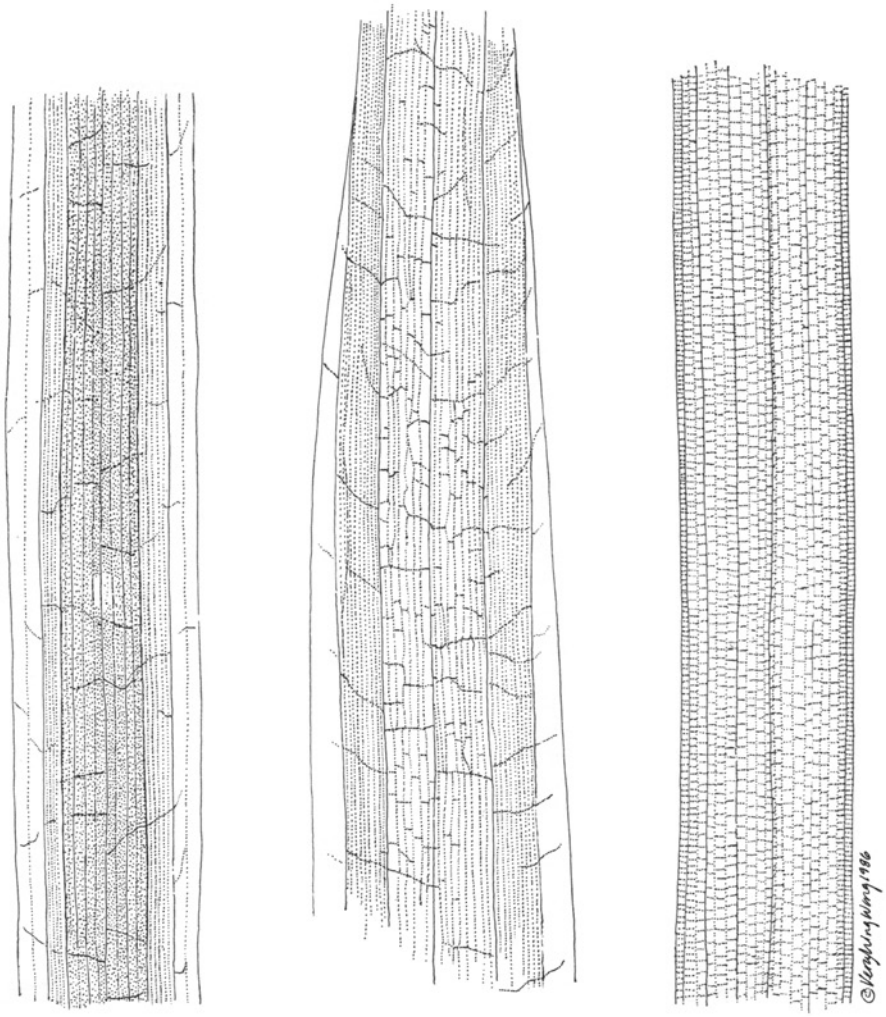
Staminate flowers.

Leaf and a pistillate flower maturing into fruit.

Wild Celery
(*Vallisneria americana*)

Comparison of Leaf Venation



0 .5 1 cm

Vallisneria americana

0 .5 1 cm

Sagittaria spp.

0 .5 1 cm

Sparganium spp.

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YELLOW WATER CROWFOOT

(*Ranunculus flabellaris* Raf.)

BUTTERCUP FAMILY (Ranunculaceae) **C of C:** Native (6) **IND. STATUS:** OBL

FIELD CHARACTERISTICS: An aquatic, perennial herb, either floating or submerged. The stem is hollow, smooth and elongate growing to 30-70 cm. in length. Leaves are highly variable. The submerged leaves are flattened and dissected into many segments 1-2 mm. wide. The emergent leaves, if present, are 3-parted. Flowers are on emergent, long, thick stalks. Petals number 5-8 and are (6.5)7-14(16) mm. long and golden yellow. Nutlets are 1.7-2.2 mm. long and are arranged in a densely-packed, fruiting head with 50-75 nutlets. The nutlets have a corky margin at maturity. In flower May-June.

ECOLOGICAL NOTES: Yellow water crowfoot is found in shallow, open water and in marshes; sometimes stranded on muddy shores.

SOURCE: Fernald (1970); Gleason and Cronquist (1991); and Voss (1985).

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WHITE WATER CROWFOOT

(*Ranunculus longirostris* Godr.)

BUTTERCUP FAMILY (Ranunculaceae) **C of C:** Native (8 WI)(7 MN) **IND. STATUS:** OBL

FIELD CHARACTERISTICS: An aquatic, perennial herb with submersed stems and leaves and emerged flowers. Leaves are highly dissected into filiform (thread-like) segments, 1-2 cm. long, relatively stiff, not collapsing when withdrawn from water. Flowers are white, 1-1.5 cm. wide; stamens number 10-20. Nutlets (achenes) number (7)15-25 per flower and are 0.7-1.5 mm. long with a straight, slender beak. In flower June-August.

ECOLOGICAL NOTES: White water crowfoot occurs in quiet waters of lakes and streams.

SOURCE: Gleason and Cronquist (1991); Chadde (2002); and Voss (1985).

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WATER MARIGOLD

(*Bidens beckii* Torr.)

ASTER FAMILY (Asteraceae or Compositae) **C of C:** Native (8) **IND. STATUS:** OBL

SYNONYM: *Megalodonta beckii* (Torr. ex Spreng.) Greene

FIELD CHARACTERISTICS: An aquatic, perennial herb from rhizomes. Stems grow 40-200 cm. long with little branching. Leaves are of two types. Submersed leaves are thread-like (filiform) and in whorls around the stem. Emersed leaves are simple, lanceolate to ovate, sessile, serrate and 2-4 cm. long. Flower heads are solitary and terminal with a disc 1 cm. wide. Rays are gold-yellow and 1-1.5 cm. long. Nutlets (achenes) are 10-14 mm. in length with 3-6 awns that are longer than the nutlet and retrorsely-barbed (i.e., barbs are backward facing).

ECOLOGICAL NOTES: Water marigold is infrequent in lakes, ponds and impoundments.

SOURCE: Gleason and Cronquist (1991); and Voss (1985).

WHITE WATER-LILY

(*Nymphaea odorata* Aiton)

WATER-LILY FAMILY (Nymphaeaceae) **C of C:** Native (6) **IND. STATUS:** OBL

SYNONYM: *Nymphaea tuberosa* Paine

FIELD CHARACTERISTICS: An aquatic, perennial herb with a thick rhizome with many tuber-like branches. Leaves float on the water's surface or are slightly elevated above it. Leaves are semi-circular with a narrow notch and palmate venation. Leaves can be up to 40 cm. wide. Flowers are white (sometimes pink), 10-20 cm. wide with many petals and float on the water's surface. Flowers are usually fragrant. In flower June-September.

ECOLOGICAL NOTES: White water-lily is common in lakes, ponds, marshes, slow moving streams and Mississippi River backwaters.

SOURCE: Fernald (1970); Gleason and Cronquist (1991); and Voss (1985).

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YELLOW WATER-LILY

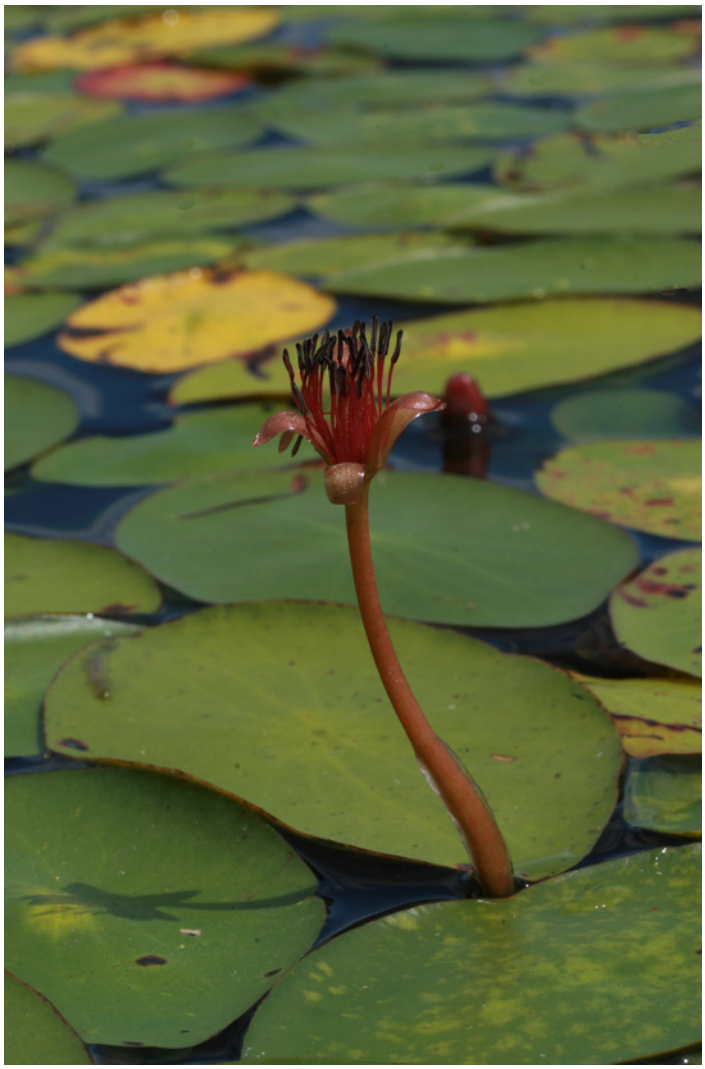
(*Nuphar lutea* (L.) Sm.)

WATER-LILY FAMILY (Nymphaeaceae) **C of C:** Native (6) **IND. STATUS:** OBL

SYNONYM: *Nuphar variegata* Durand

FIELD CHARACTERISTICS: An aquatic, perennial herb. Leaves are elliptical with pinnate venation and a deep notch. The leaves can be floating, emerged or submerged. Floating leaves are 7-35 cm. long and 5-25 cm. wide. Flowers are yellow and (2.5)3.5-5 cm. wide. The sepals, usually 6, are petal-like and are usually red within at the base. The petals are small and scale-like. Petioles are flattened on the upper side or even winged. Rhizomes are very thick (to 10 cm.) and spongy with semi-circular to triangular scars of petioles and circular scars of flower stalks. In flower June-September.

ECOLOGICAL NOTES: Yellow water-lily is found in lakes, ponds, streams, marshes, bog ponds and Mississippi River backwaters. The flowers are a favorite food of muskrats. Other common names are cow-lily and spatter dock



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WATER SHIELD

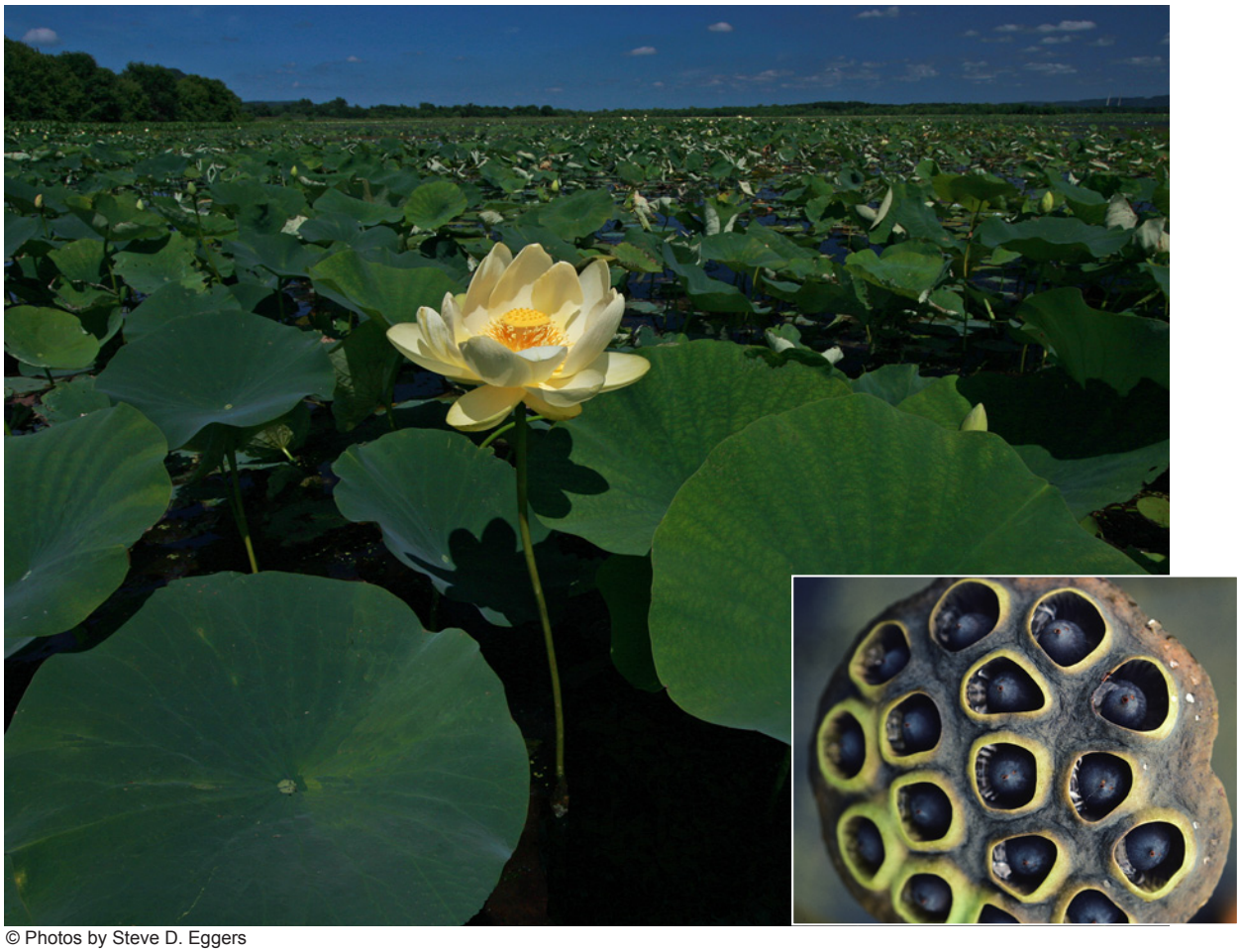
(*Brasenia schreberi* J.F. Gmelin)

WATER SHIELD FAMILY (Cabombaceae) **C of C:** Native (7) **IND. STATUS:** OBL

FIELD CHARACTERISTICS: An aquatic, perennial herb. The leaves are floating, lack a notch and have petioles that are attached at the middle of the blade. Leaves are 10 cm. or less in diameter and more or less elliptical, scattered on a stem that trails through the water. Flowers are dull purple and 2-3 cm. wide. Sepals and petals usually number 3, sometimes 4. In flower June-September.

ECOLOGICAL NOTES: Water shield is found in lakes, impoundments, marshes, and ponds, including bog ponds. A gelatinous coat covers the stem, petioles and lower surfaces of the leaves.

SOURCE: Fassett (1957); Fernald (1970); Gleason and Cronquist (1991); and Voss (1985).



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LOTUS

(*Nelumbo lutea* (Willd.) Pers.)

LOTUS-LILY FAMILY (Nelumbonaceae) **C of C:** Native (7) **IND. STATUS:** OBL

FIELD CHARACTERISTICS: An aquatic, perennial herb with very large leaves (30-70 cm. wide) that are normally emerged, but can be floating. The leaves are unnotched, bluish-green and semi-circular. The center of emerged leaves is cupped or depressed. Flowers are pale yellow, 15-25 cm. wide, with numerous petals and sepals, and elevated on emerged, stout stalks. Fruits, when mature, are acorn-like and embedded in a fleshy, top-shaped receptacle that later becomes dry and woody (inset photo). In flower July-August.

ECOLOGICAL NOTES: In Minnesota and Wisconsin, lotus is primarily found in backwaters of the Mississippi River and its major tributaries. However, it is also found in other rivers and scattered lakes; some of these stands may have been planted. It forms extensive colonies that can cover many acres. The leaves repel water.

SOURCE: Fernald (1970); and Gleason and Cronquist (1991).

THE DUCKWEED FAMILY

The duckweed family consists of floating plants, without leaves; instead they have a flattened or globose frond. Plants may or may not have roots. Most reproduction is vegetative by budding. However, the duckweeds do produce flowers and are the world's smallest flowering plants.

Key to the Genera of the Duckweed Family

1A. Roots are usually present and/or plants float beneath the surface. 2

2A. A single root per frond is usually present . . . . *Lemna*

2B. Several roots per frond are present . . . . *Spirodela*

1B. Roots are absent and plant floats at the surface 3

3A. Plants are globular, tiny (0.3-1 mm. long). . . . . *Wolffia*

3B. Plants are strap-shaped, larger (6-8 mm. long). . . . . *Wolffiella*

LESSER DUCKWEED

(*Lemna minor* L.)

DUCKWEED FAMILY (Lemnaceae) **C of C:** Native (5) **IND. STATUS:** OBL

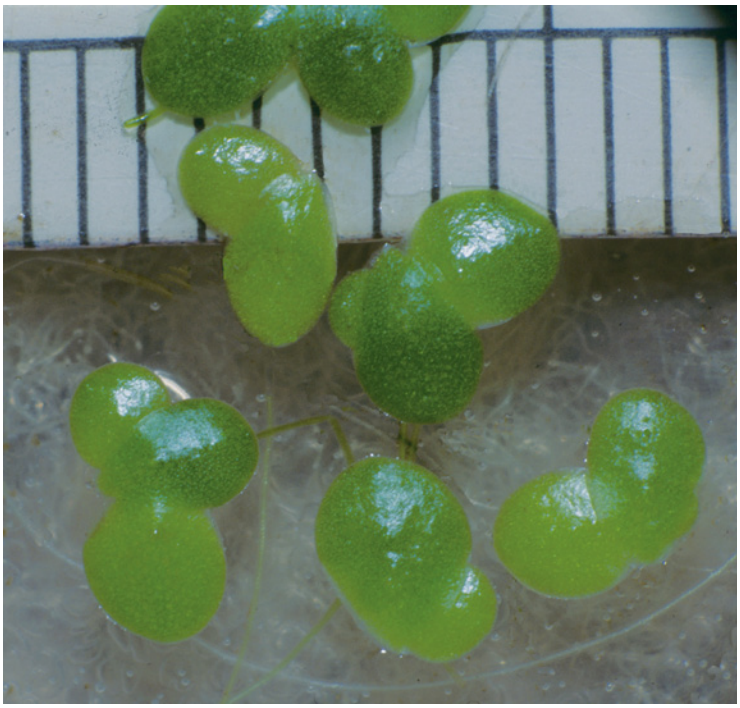
FIELD CHARACTERISTICS: This duckweed has flattened fronds 2-5 mm. long with 3-5 nerves. Frond surfaces are green above and below. Each frond has a single root. Microscopic flowers occur in small pouches on the edge of the frond or on its upper surface

ECOLOGICAL NOTES: Lesser duckweed is found in quiet waters, frequently associated with big duckweed (*Spirodela polyrrhiza*) and watermeal (*Wolffia* spp.) forming thick mats on the water's surface.

Waterfowl feed on the duckweeds, probably obtaining substantial numbers of minute animal organisms associated with the plants. Some authorities have split *L. minor* into multiple additional species; however, other authorities have not adopted this approach. See discussion in Swink and Wilhelm (1994).

SOURCE: Fassett (1957); Gleason and Cronquist (1991); Swink and Wilhelm (1994) and Martin *et al.* (1951).

A pond covered with duckweeds (*Lemna minor* and *Wolffia columbiana*) in late summer.



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Lesser duckweed (*Lemna minor*)
The scale is in mm.

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STAR DUCKWEED

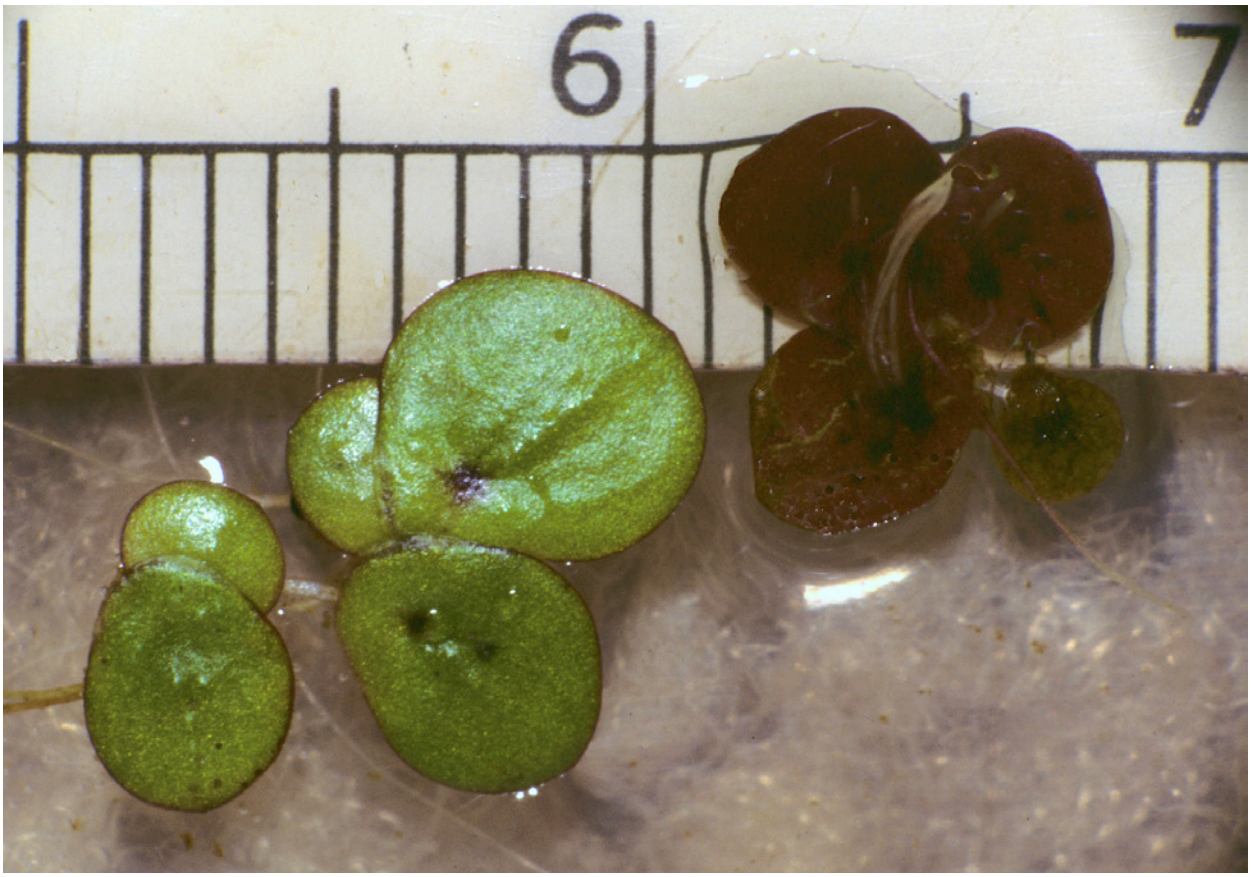
(*Lemna trisulca* L.)

DUCKWEED FAMILY (Lemnaceae) **C of C:** Native (5) **IND. STATUS:** OBL

FIELD CHARACTERISTICS: Star duckweed floats just beneath the surface and has fronds shaped like canoe paddles. The fronds often lack roots and are 4-10 mm. long, tapering to a 4-16 mm. stipe that remains attached to the parent plant.

ECOLOGICAL NOTES: Star duckweed is found in quiet waters of lakes, impoundments and marshes. It commonly forms tangled colonies beneath the water's surface. Another name is forked duckweed.

SOURCE: Fassett (1957); Gleason and Cronquist (1991); and Martin *et al.* (1951).



© Steve D. Eggers

Scale is in cm./mm.

BIG DUCKWEED

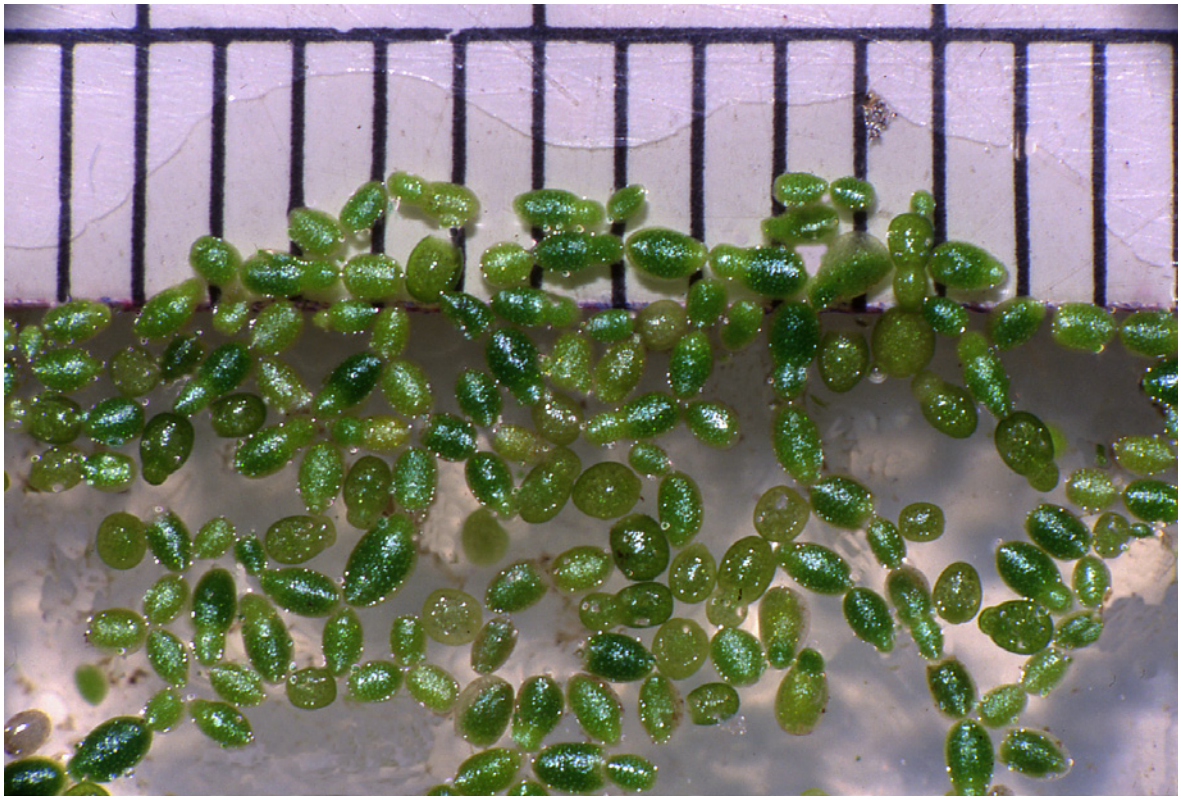
(*Spirodela polyrrhiza* (L.) Schleiden)

DUCKWEED FAMILY (Lemnaceae) **C of C:** Native (5) **IND. STATUS:** OBL

FIELD CHARACTERISTICS: This duckweed has flattened fronds 3-10 mm. long, usually with 7 nerves (but can be 5-15 nerved). Frond surfaces are green above and purplish below. Each frond has several to many roots. Flowers are produced in reproductive pouches.

ECOLOGICAL NOTES: Big duckweed occurs in quiet waters of lakes and marshes, frequently forming thick, floating mats with lesser duckweed (*Lemna minor*) and watermeal (*Wolffia* spp.).

SOURCE: Fassett (1957); Gleason and Cronquist (1991); and Martin *et al.* (1951).



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Scale is in mm.

WATERMEAL

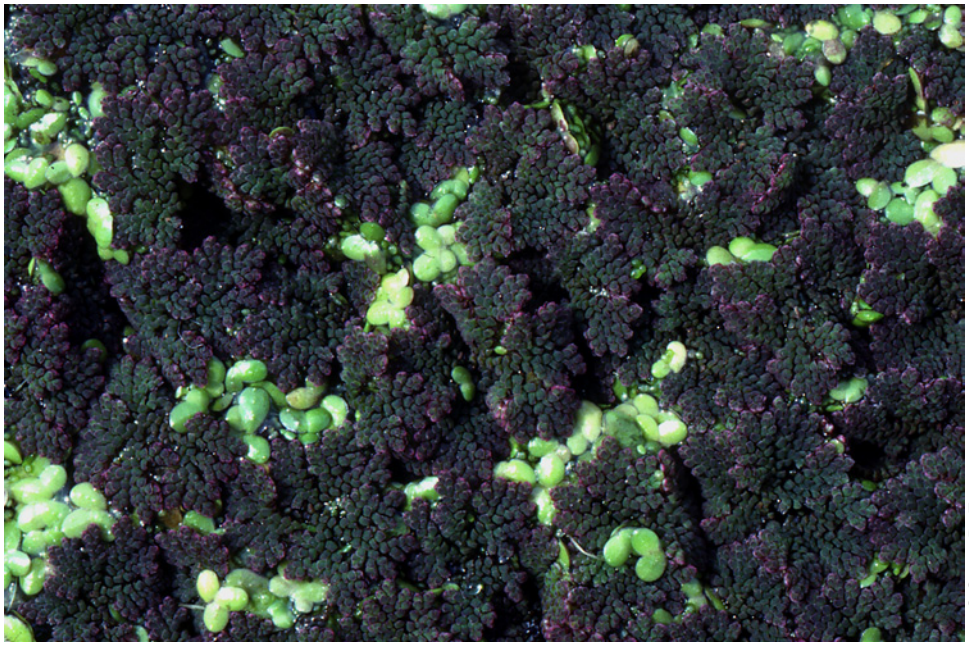
(*Wolffia columbiana* Karsten)

DUCKWEED FAMILY (Lemnaceae) **C of C:** Native (5) **IND. STATUS:** OBL

FIELD CHARACTERISTICS: Tiny plants with a globular frond just 0.3-1 mm. long and floating partially above and partially below the water's surface.

ECOLOGICAL NOTES: Watermeal is common in quiet waters of lakes and marshes, frequently associated with other members of the duckweed family. This genus is the world's smallest flowering plants.

SOURCE: Fassett (1957); Gleason and Cronquist (1991); and Martin *et al.* (1951).



A floating mat consisting of mosquito fern (dark green and purple) and lesser duckweed (bright green).

MOSQUITO FERN
(*Azolla microphylla* Kaul.)

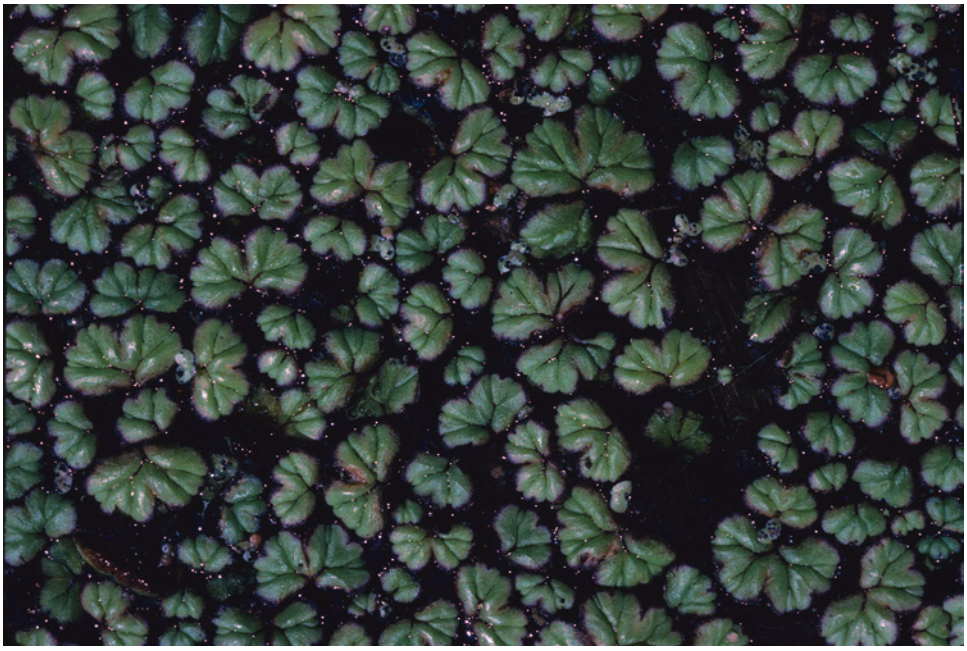
MOSQUITO FERN FAMILY (Azollaceae) **C of C:** Native (10 WI)(3 MN) **IND. STATUS:** OBL

SYNONYM: *Azolla mexicana* Schlecht. & Cham. ex K. Presl

FIELD CHARACTERISTICS: A tiny, annual, aquatic fern that is free-floating (often forming mats) or stranded on mud. Stems are flat and 1-1.5 cm. long, dark green or red, and covered with two rows of overlapping leaves. Upper lobes of leaves are above the water line while lower leaves are larger and below the water line. Roots are few and unbranched.

ECOLOGICAL NOTES: In Minnesota and Wisconisn, mosquito fern is an uncommon species that primarily occurs in quiet backwaters of the Mississippi River downstream of St. Paul, Minnesota.

SOURCE: Fassett (1957); Gleason and Cronquist (1991); and Tyron (1980).



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PURPLE-FRINGED RICCIA

(*Ricciocarpus natans* (L.) Corda)

THALLOSE LIVERWORT FAMILY (Ricciaceae) **IND. STATUS:** [OBL]

FIELD CHARACTERISTICS: A free-floating liverwort with fan-shaped leaves (thallus) to 1 cm. long. Leaves are deeply furrowed above and have scalloped edges. Numerous dangling, purplish, root-like structures (rhizoids) are present.

ECOLOGICAL NOTES: Purple-fringed riccia is a non-vascular plant that reproduces by spores and budding. This species frequently occurs with duckweeds (*Lemna, Spirodela, Wolffia*), none of which have the purplish rhizoids. Purple-fringed riccia is found in quiet waters of lakes, ponds and backwaters of streams.

No C of C values have been assigned to this species by either Minnesota or Wisconsin.

SOURCE: Fassett (1957); and State of Washington, Department of Ecology.