August 28, 2009

Vincent Pagano, President LLHA
3466 County Route 26
Loon Lake, NY 12989

Dear Vince:

Enclosed is a map and reference materials relating to the aquatic plant survey of Loon Lake completed on August 5th 2009. The objectives of this survey where to (1) determine the location of any aquatic nuisance species, and (2) survey the native aquatic plant species and map the locations common macrophyte beds (dense plant aggregations), and (3) perform several underwater transect swims to ensure potential threats have not been overlooked.

The visibility in Loon Lake was excellent on the day of the survey. We are happy to report that presently there are no aquatic nuisance species present in Loon Lake. Please continue to take all the necessary precautions to prevent the introduction of the species that have caused problems in many of the lakes in the Adirondacks.

We found the plant community of Loon Lake to be typical of small, low alkaline lakes of the north-central Adirondacks. We identified 18 submerged aquatic plant species in the lake in the surface survey (Table 2), not including the numerous emergent and semi-aquatic species that fringe the pond margin. The pond supports 60 macrophyte beds comprising roughly 18 acres (Figure 1). The most common plants to occur in these beds are members of the pondweed genus *Potamogeton*. The species, *praelongus*, *amplifolius*, and *gramineus* are common throughout the lake and make up the majority of the offshore community. Several dense beds of *Potamogeton pusillus* were mapped; this native species does form dense beds. Nearshore species such as the bur-reed *Sparganium*, the white water lily *Nyphaea,* the spatterdock *Nuphar* and the arrowhead *Sagitaria* are scattered around the entire lake. The pipewort *Eriocaulon* is very common in the nearshore environment and occurs along most of the shoreline. Ten transect surveys were conducted (Figure 2). The results of the transect survey agreed with those from the surface survey (Table 1), which suggests that the surface survey was sufficient to detect and map the plants in Loon Lake.

We have included reference materials for each aquatic plant species to help your association build a better understanding of the plant community. A map showing the location of each aquatic plant species follows each description.

We recommend that association members visit the plant beds identified on the attached maps and use the descriptions to familiarize themselves with the plants in Loon Lake. We also recommend that the LLHA conduct annual volunteer plant monitoring through the Adirondack Park Invasive Plant Program (contact Hilary Oles-Smith, hsmith@tnc.org for more information). Annual plant monitoring by association volunteers, supplemented by periodic surveys by the AWI and coupled with prevention strategies (signage and education), are your best defense against an invasive species becoming established in Loon Lake.

It has been a great pleasure to work on this project and we look forward to assisting you with other endeavors in the future.

Sincerely,

Daniel L. Kelting
Executive Director
Adirondack Watershed Institute

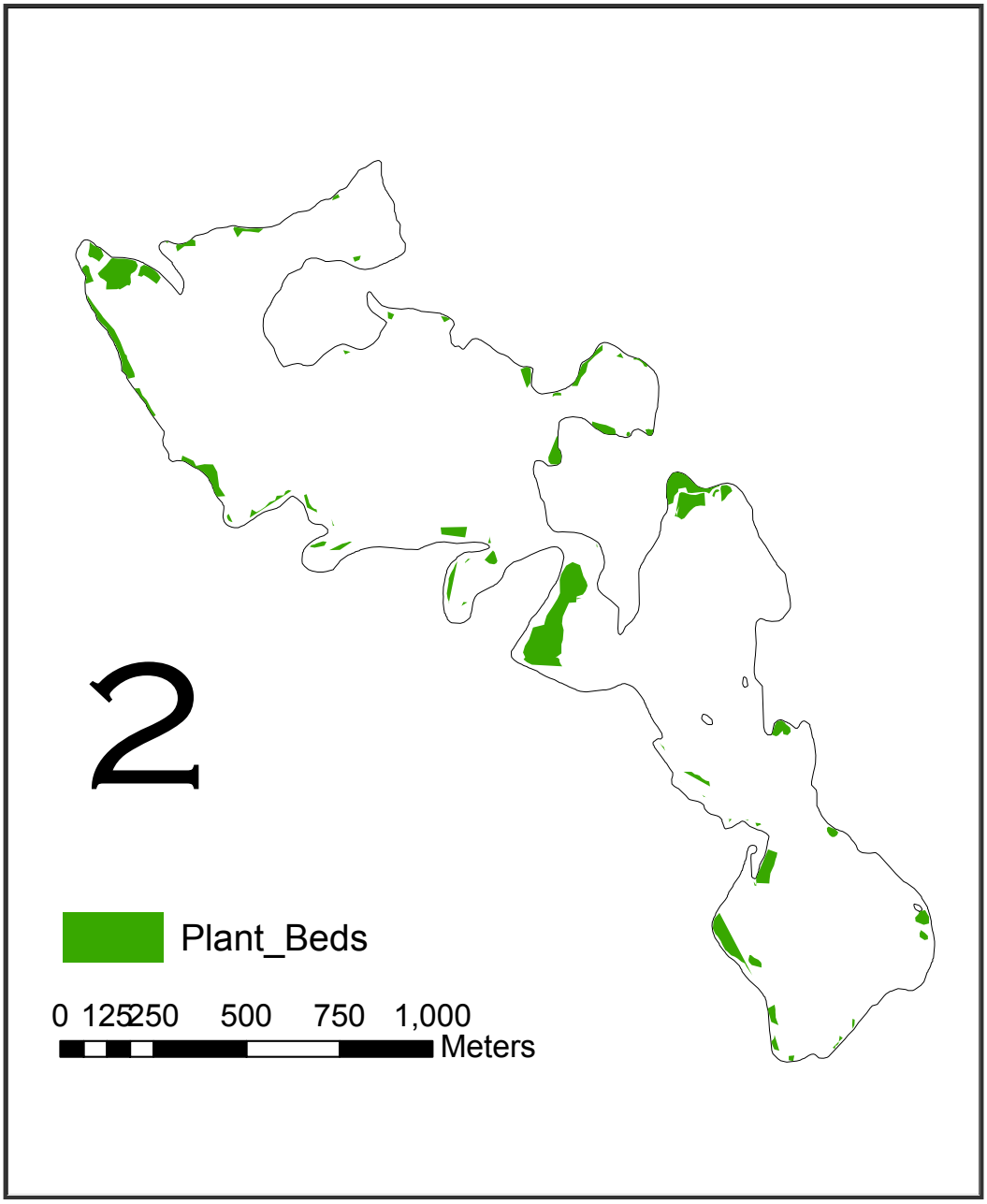


Figure 1. Distribution of aquatic plant beds encountered during the visual survey of Loon Lake conducted on August 5th 2009.

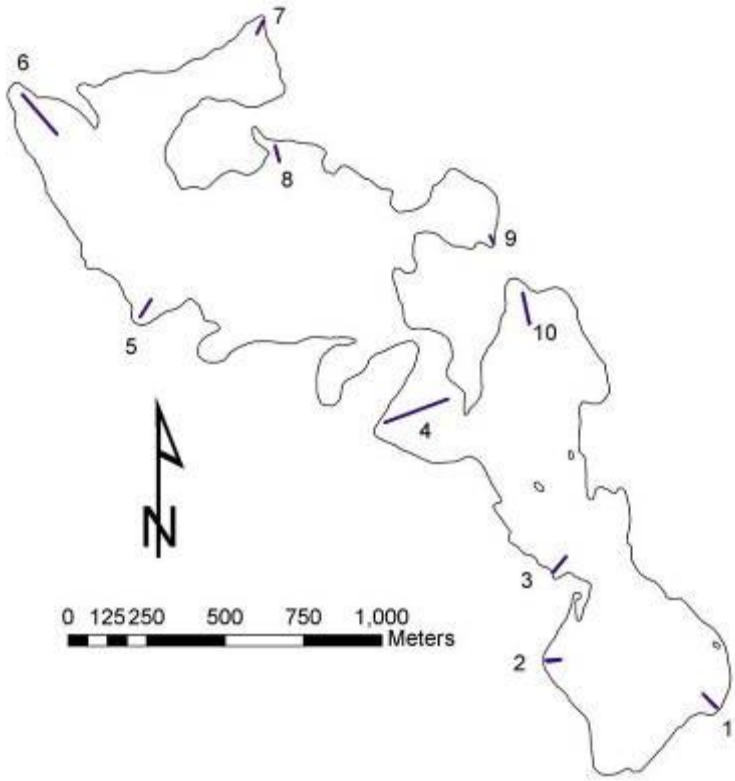


Figure 2. Locations of the ten transect lines surveyed in Loon Lake.

	Transect number									
Species	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**
ELCA										X
ISSP					X					
NASP		X						X		
POAM				X		X				
POEP									X	
POPU		X		X	X	X			X	X
PORO	X	X	X	X	X	X				X
VAAM	X			X		X	X		X	
POSPI			X	X				X	X	
POPR			X	X					X	
PONA				X						

Table 1. Aquatic plant species present at the 10 underwater transect locations. Species codes can be obtained from Table 2.

Code	Scientific Name	Common Name	Page #
BRSC	*Brasenia schreberi*	water shield	3
ELCA	*Elodea canadensis*	common water weed	5
ERAQ	*Eriocaulon aquaticum*	pipewort	7
ISSP	*Isoetes species*	quilwort	9
NAFL	*Najas species*	water naiad	11
NUVA	*Nuphar variegata*	spatterdock	13
NYOD	*Nymphaea odorata*	white water lilly	15
POAM	*Potamogeton amplifolius*	large- leaved pondweed	17
POEP	*Potamogeton epihydrus*	ribbon-leaved pondweed	19
POGR	*Potamogeton gramineus*	variable-leaved pondweed	21
PONA	*Potamogeton natans*	floating pondweed	23
POPE	*Potamogeton perfoliatus*	clasping-leaved pond weed	25
POPR	*Potamogeton praelongus*	white-stemed pondweed	27
POPU	*Potamogeton pusillus*	small pondweed	29
PORO	*Potamogeton robbinsii*	Robbins pondweed	31
POSP	*Potamogeton spirillus*	spiral-fruited pondweed	33
SPSP	*Sparganium species*	bur-reed	35
VAAM	*Vallisaneria americana*	eel-grass	37

Table 2. List of the aquatic plant species found in Loon Lake as well as their common names and USDA species code.

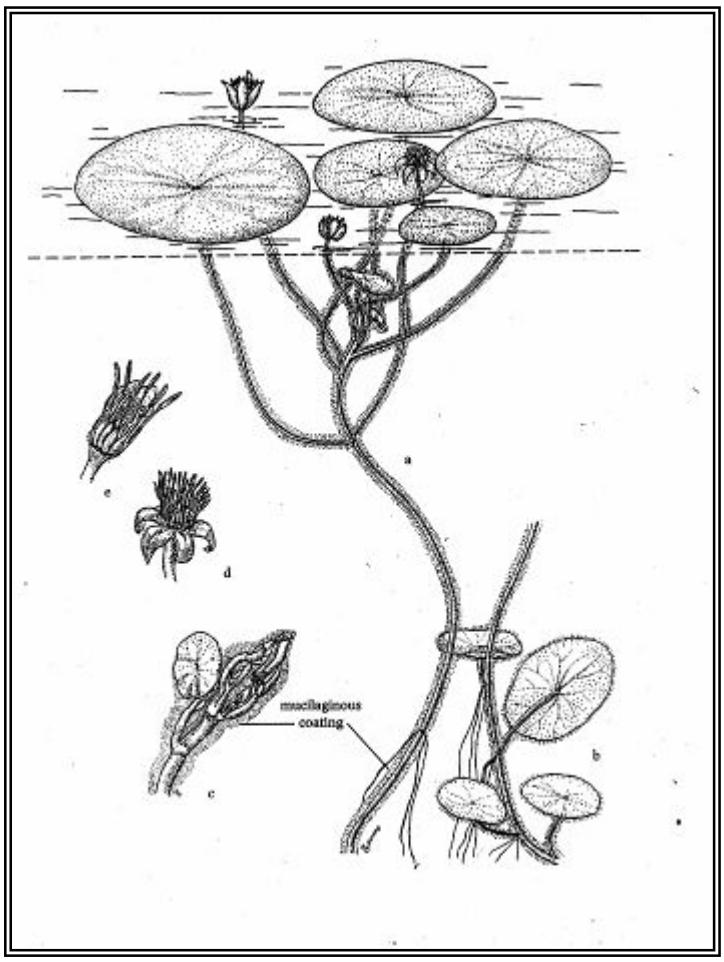
Brasenia schreberi

(Image from Crow and Hellquist 2000)

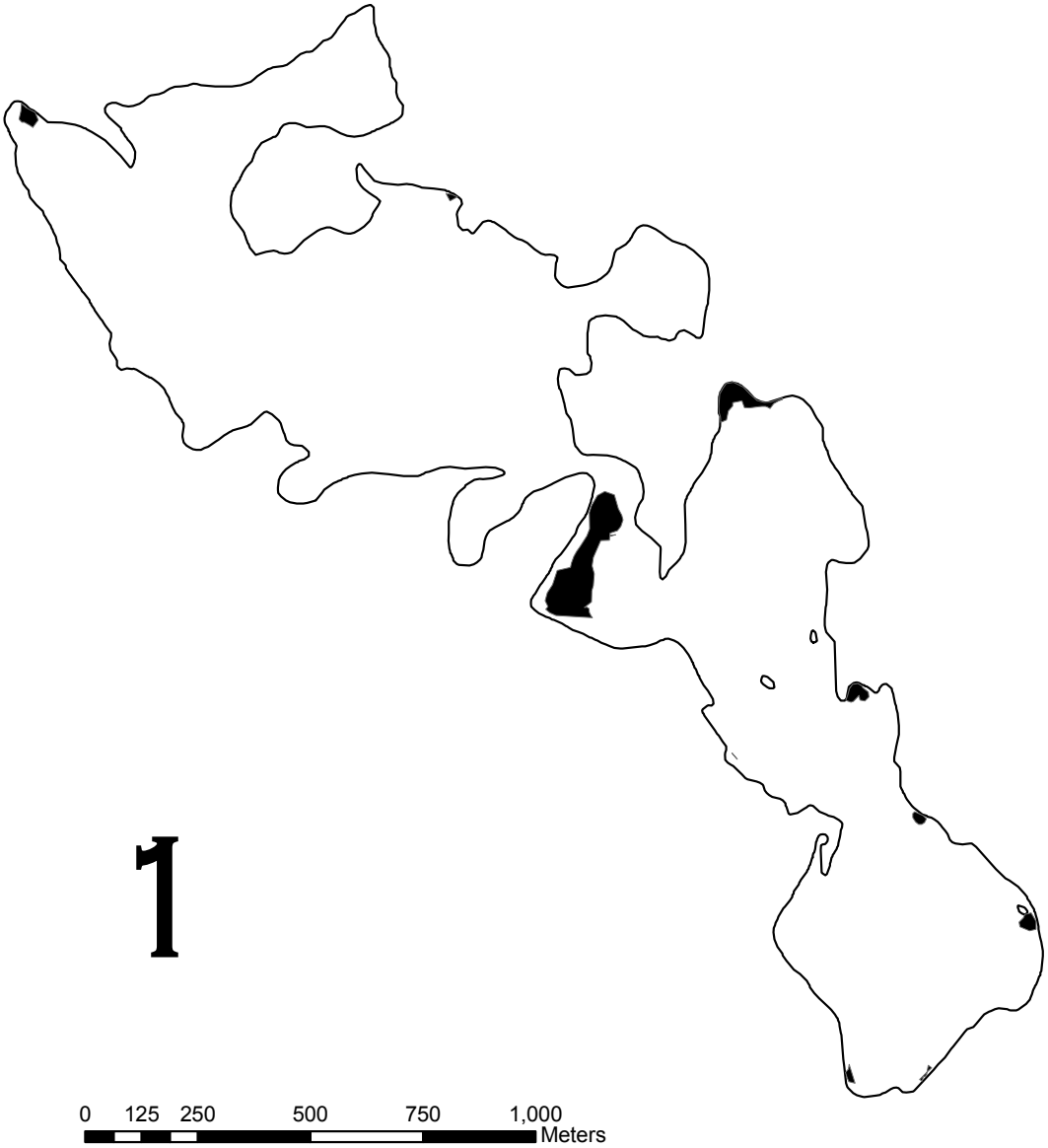
Common name: Water shield

Description: Water shield has an oval leaf blade up to 10 cm long, which floats on the surface of the water. The leaf is entire, and does not have a cleft at the base like the water lilies do. The petiole is attached at the center of the leaf blade. All submersed parts are covered in a thick, colorless mucus coating. Flowers are small, purple and relatively inconspicuous. The blades turn bright red in late summer.

Habitat and range: Water shield is pervasive along shorelines of neutral to highly acidic Adirondack lakes, pond bogs and slow moving rivers. Typically they occur in shallow water less then 5 feet.



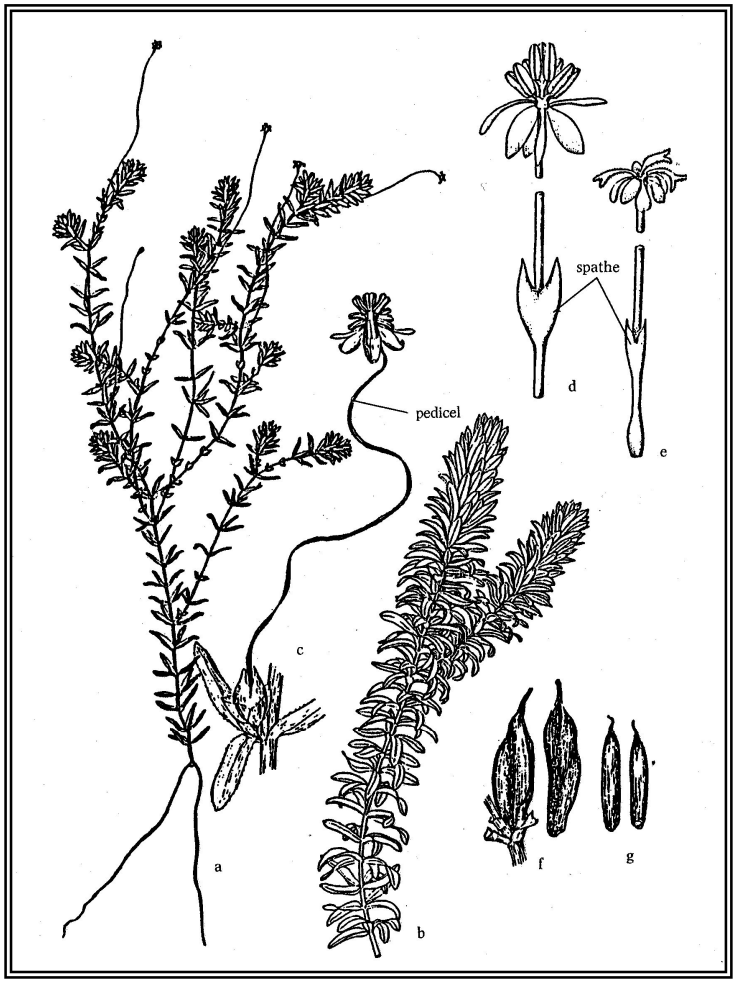
Brasenia schreberi



Elodea canadensis
Elodea nuttalia

(Image from Crow and Hellquist 2000)

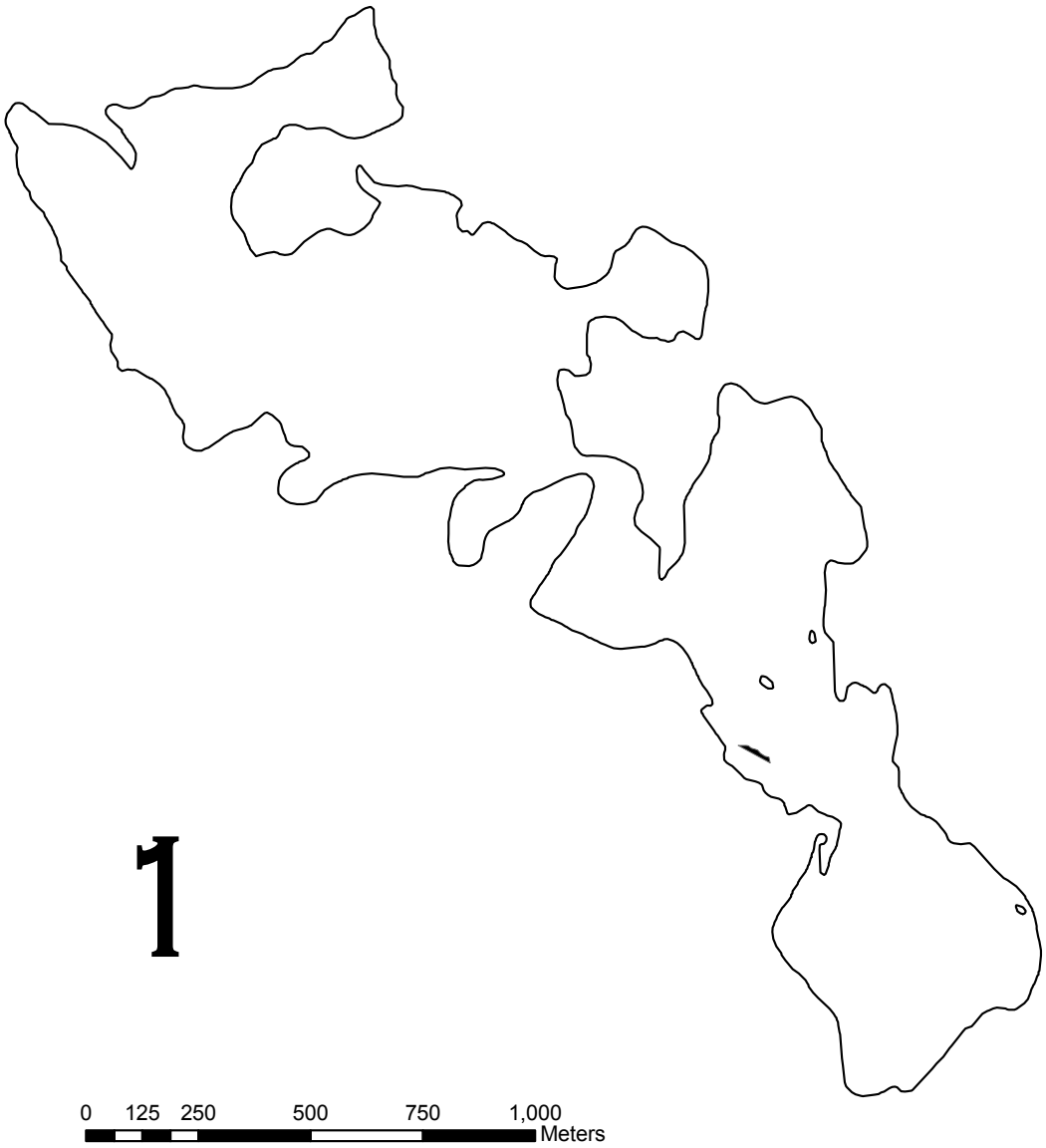
Names: Common waterweed



Description: Leaves of the common waterweed are 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. *canadensis:* 6-15 mm long and 1.5-4 mm wide; leaf tip tapered to a blunt point. *nuttalia*: 6-13 mm long and less than 1.5 mm wide; leaf tip tapered to a slender point. Stem is long, trailing and generally unbranched. 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.

Habitat and range: Common throughout North America. In the Adirondacks it is very common at various depths in lakes, ponds, rivers and ditches.

Elodea canadensis



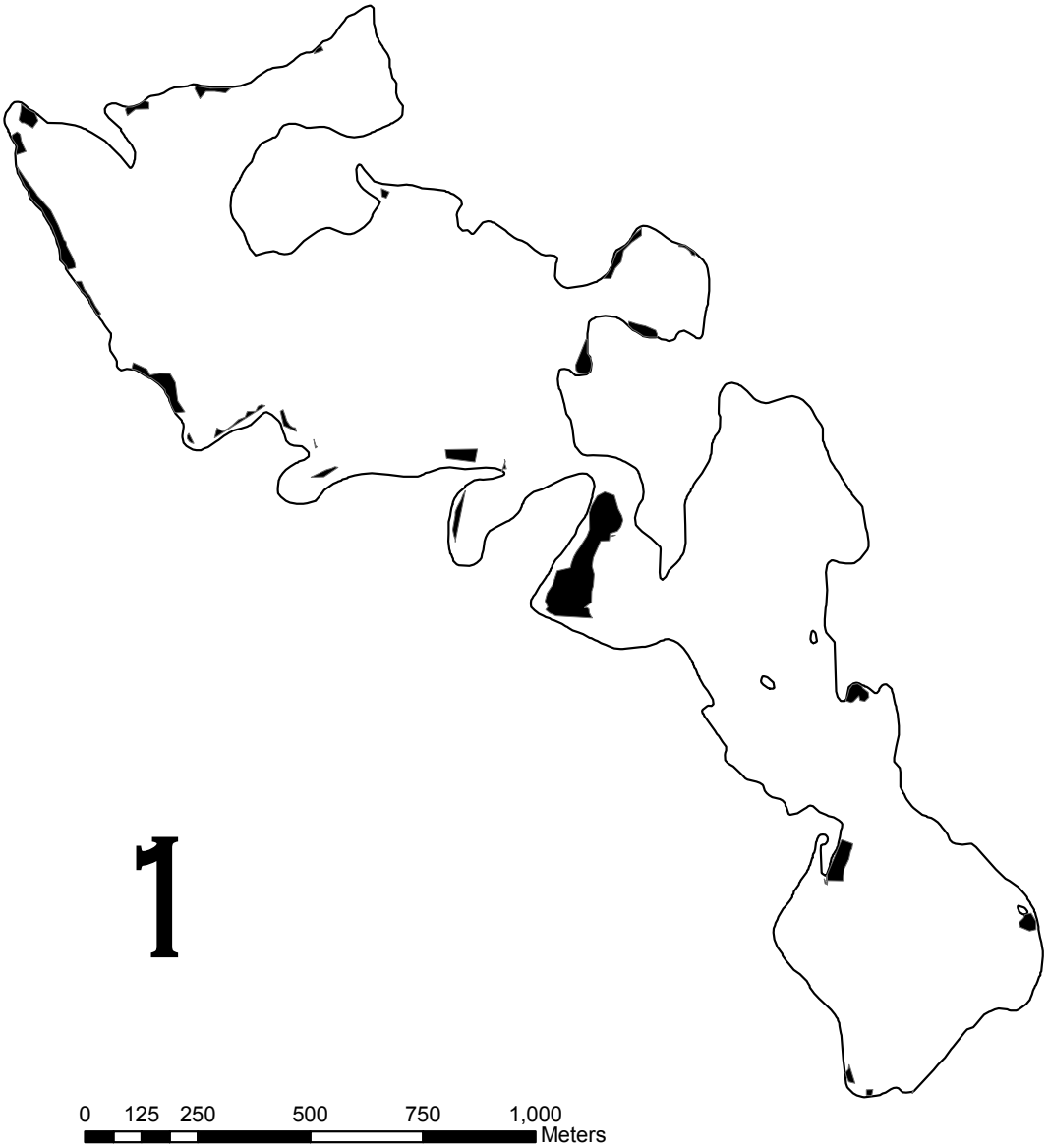
Eriocaulon Aquacitum

(Image from Bormann et. al.)

Description: Pipewort has translucent green leaves (2-5 cm long, 2-10 cm wide) that grow in a basal rosette. The leaves taper from the base to the tip and have a checkerboard appearance created by many short cross-viens. Each rossete produces a single flower stalk that ranges in size from a few cm to a couple of meters in length depending on water depth. The flower head is small and round (4-6 mm) with many small flowers packed together.

Habitat and Range: Pipewort is common to low alkaline lakes throughout the Adirondacks, it is usually found on sandy shorelines of clear water bodies.

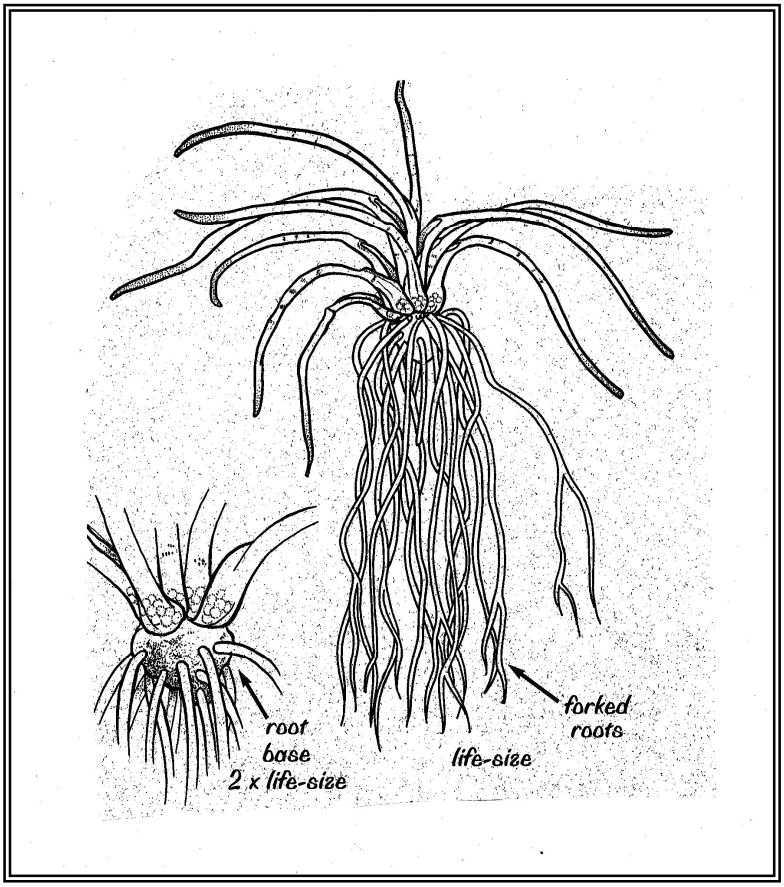
Eriocaulon Aquacitum



Isoetes species

(Image from Crow and Hellquist 2000)

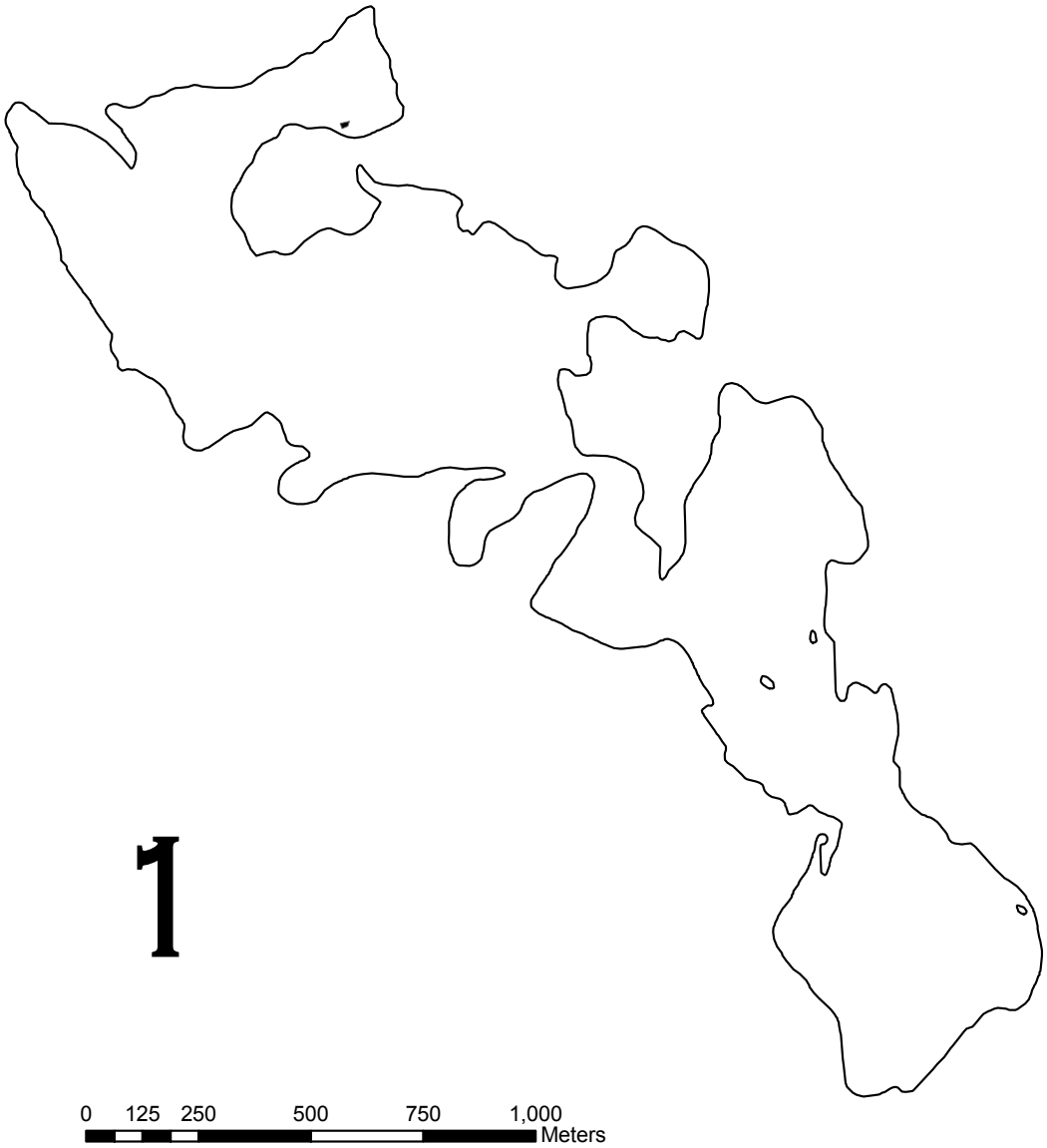
Common name: Quilwort



Descriptions: Each plant consists of a clump of 20-30 yellowish-green to dark green grass-like, hollow leaves that taper to a pointed tip. Each clump arises from a bulb-like base called a corm, which is a corky-brown, bulb-like underground structure with 2 or 3 lobes, resembling a small onion. Roots are unbranched or forked and grow in clusters from the base of the corm. Quilworts reproduce with spores, not flowers. Megaspores about the size of salt grains are located in a sac within the outer swollen leaf bases. Microspores, the size of powder, are located in inner leaf bases.

Habitat and range: Quilworts have a worldwide distribution. In the Adirondack region they are common in shallow to moderate depths of lakes and pond as well as slow moving rivers.

Isoetes species



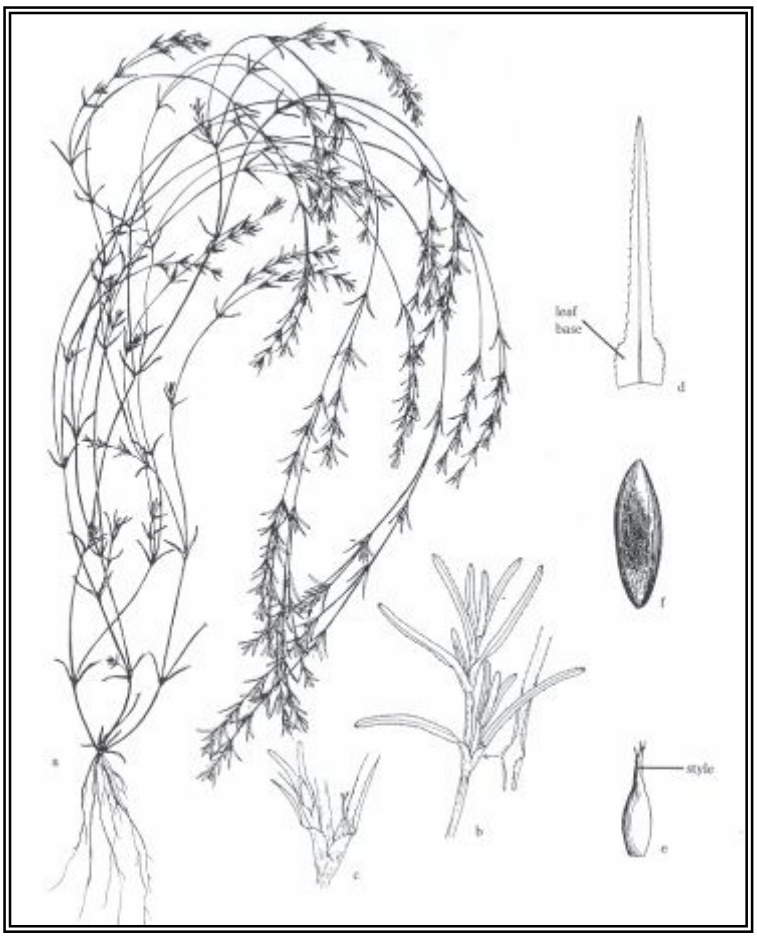
Najas flexis

(Image from Crow and Hellquist 2000)

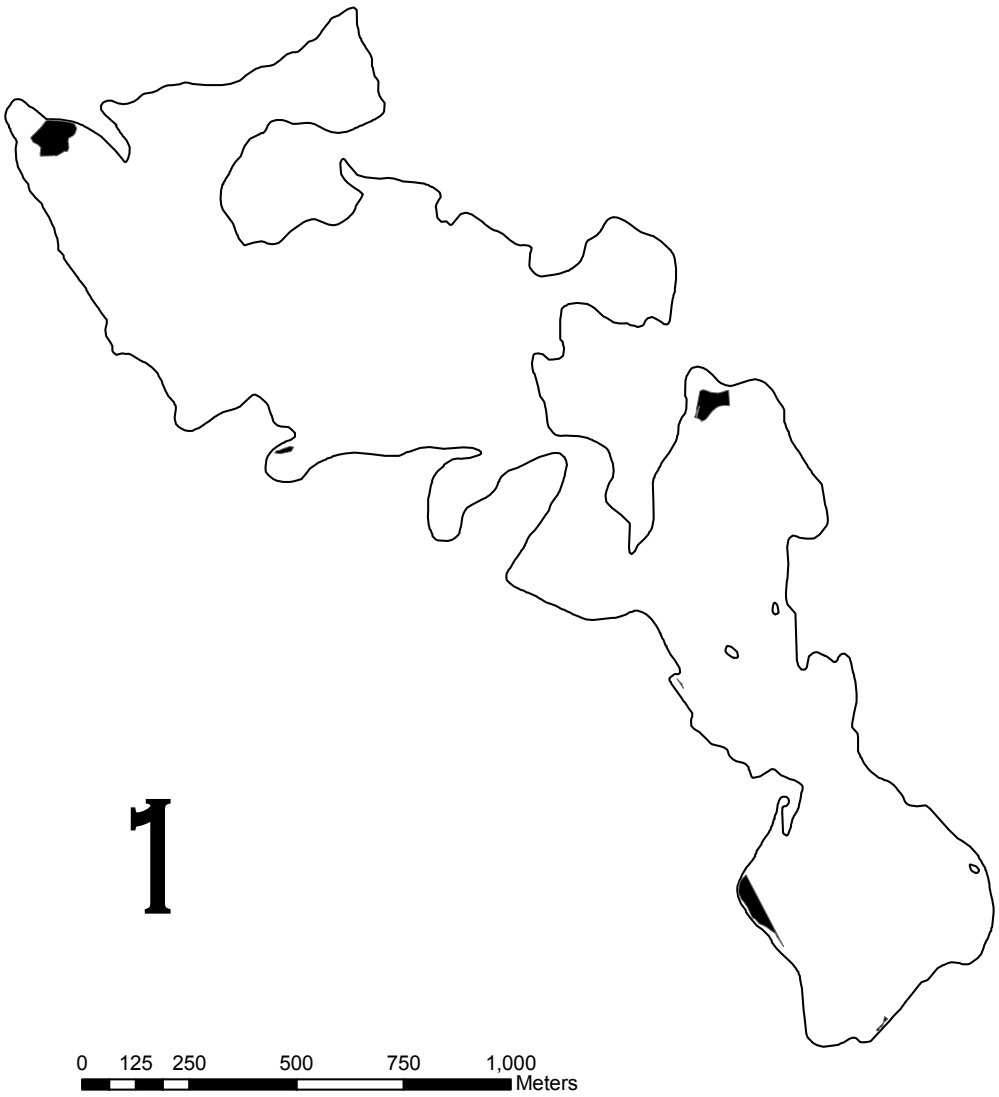
Common names: Naiad, slender water nymph

Description: The leaves are glossy green, finely toothed and are oppositely arranged, but appear to be whorled near ends of the stems. The leaves are long and narrow with broad bases that clasp the stem. The leaves of *N. flexis* taper to a long point and are 1-3 cm long and 1-2 mm wide. These plants have inconspicuous flowers and fruits that are almost completely hidden by the leaf bases.

Habitat and range: Native to Northern North America and Northern Europe. *N. flexis* is common in various depths of lakes and ponds, July – October.



Najas flexis



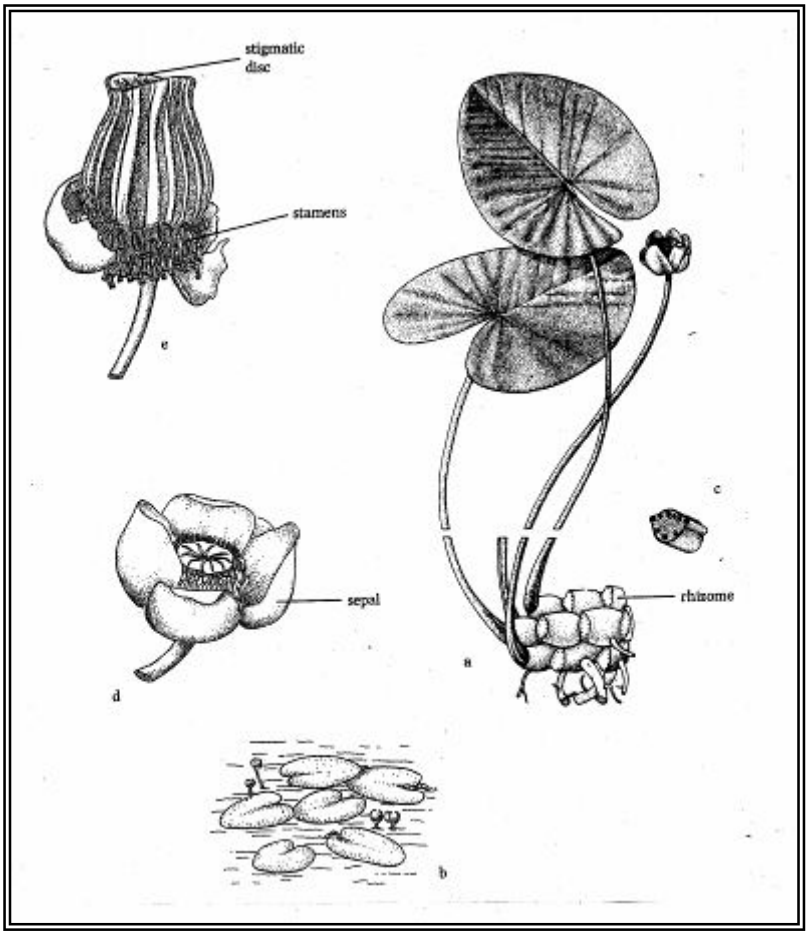
Nuphar veriegata

(Image from Crow and Hellquist 2000)

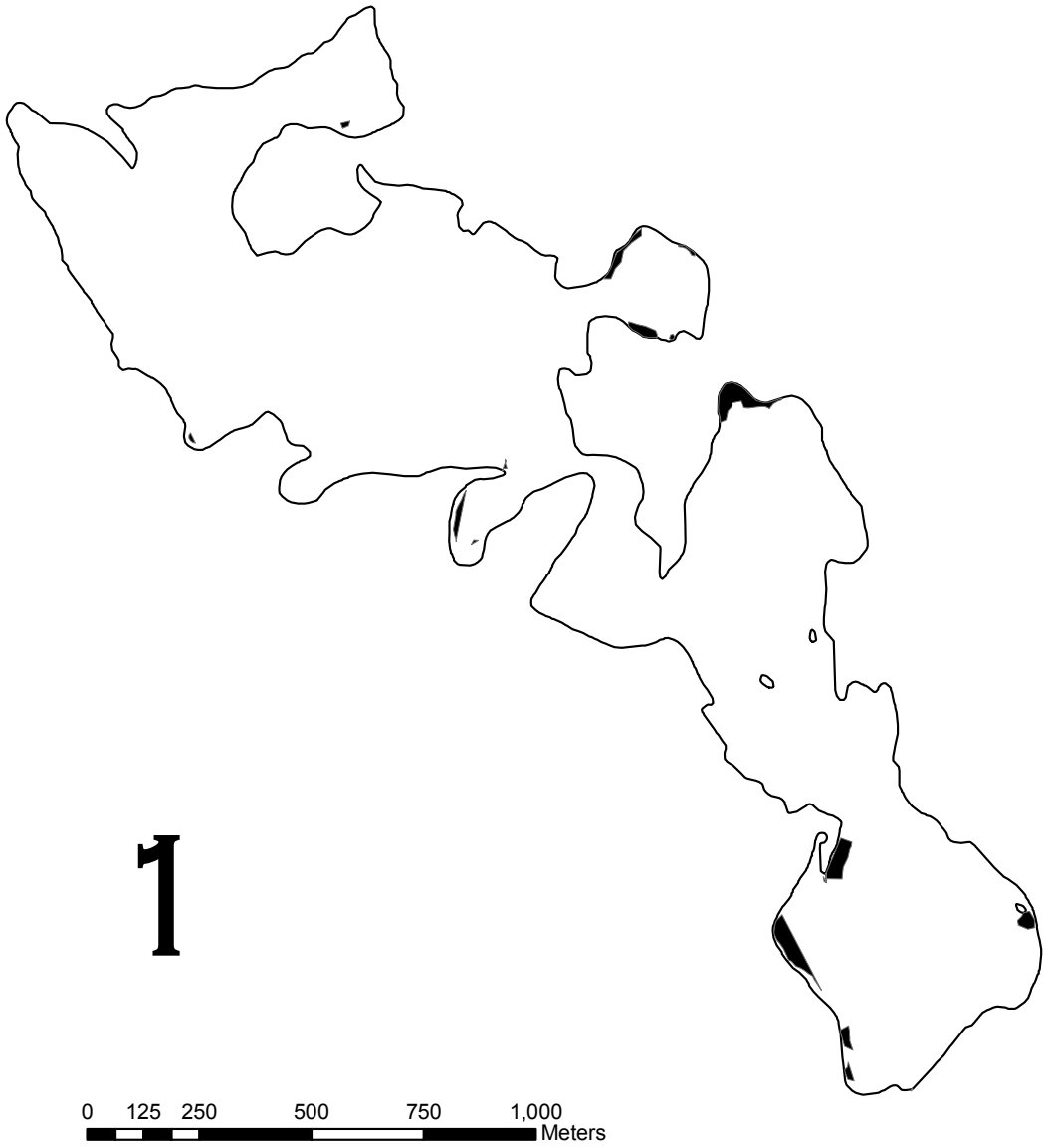
Common name: Spatterdock, bullhead pond lilly, yellow water lilly

Description: Leaf blades are leathery, heart shaped with a deep cleft. The veination on the leaf is pinnate, with the majority of veins originating off a central mid-rib. Flowers are large, globular and yellow on the inside. The leaf stalk is slightly winged in cross-section.

Habitat and range: Common along shorelines of lakes, ponds and slow moving streams. Shows a preference for soft sediment and shallow water



Nuphar veriegata



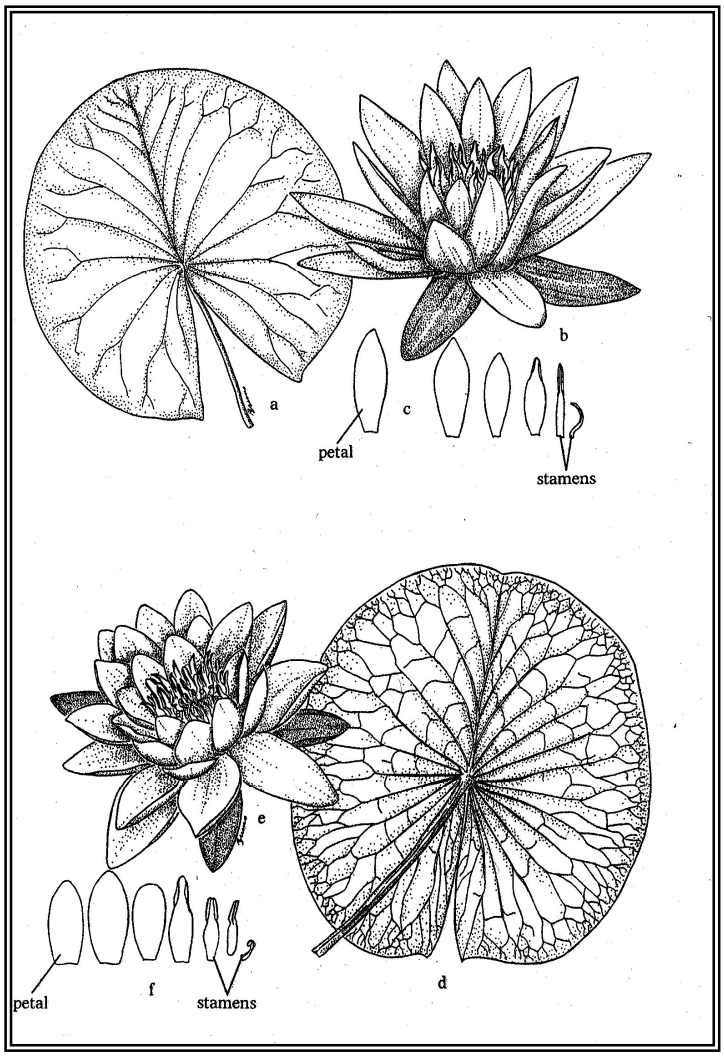
Nymphaea odorata

(Image from Crow and Hellquist 2000)

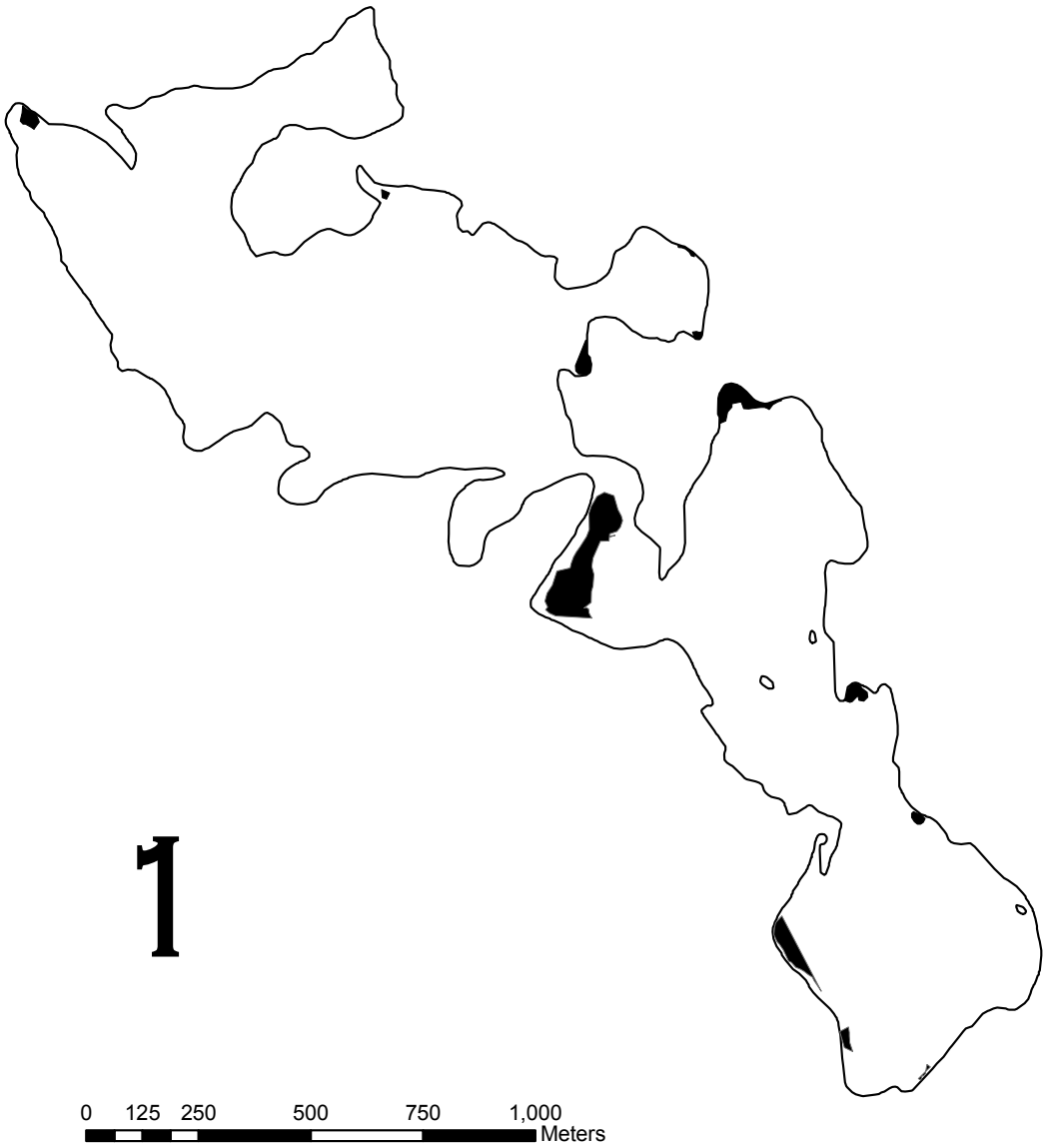
Common name: White water lily

Description: Leaf blades are circular or nearly circular and may be up to 40 cm in diameter. Veination on the leaf is palmate, with the majority of the veins radiating from a central point. The leaf is deeply cleft at the base. Underside of the leaf is red or brown and is rarely green. Flowers are showy and are typically white, but may be yellow, pink, or blue.

Habitat and range: Very common along the shoreline of lakes and ponds, may also be encountered in slow moving rivers and ditches.

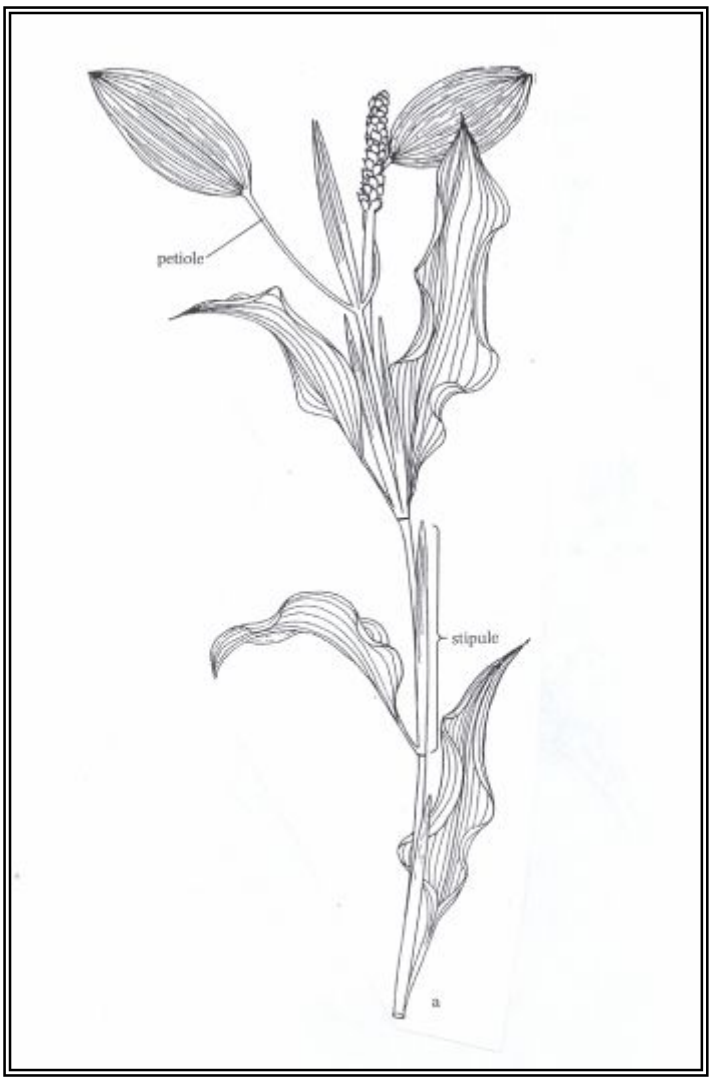


Nymphaea odorata



Potamogeton amplifolius

(Image from Crow and Hellquist 2000)

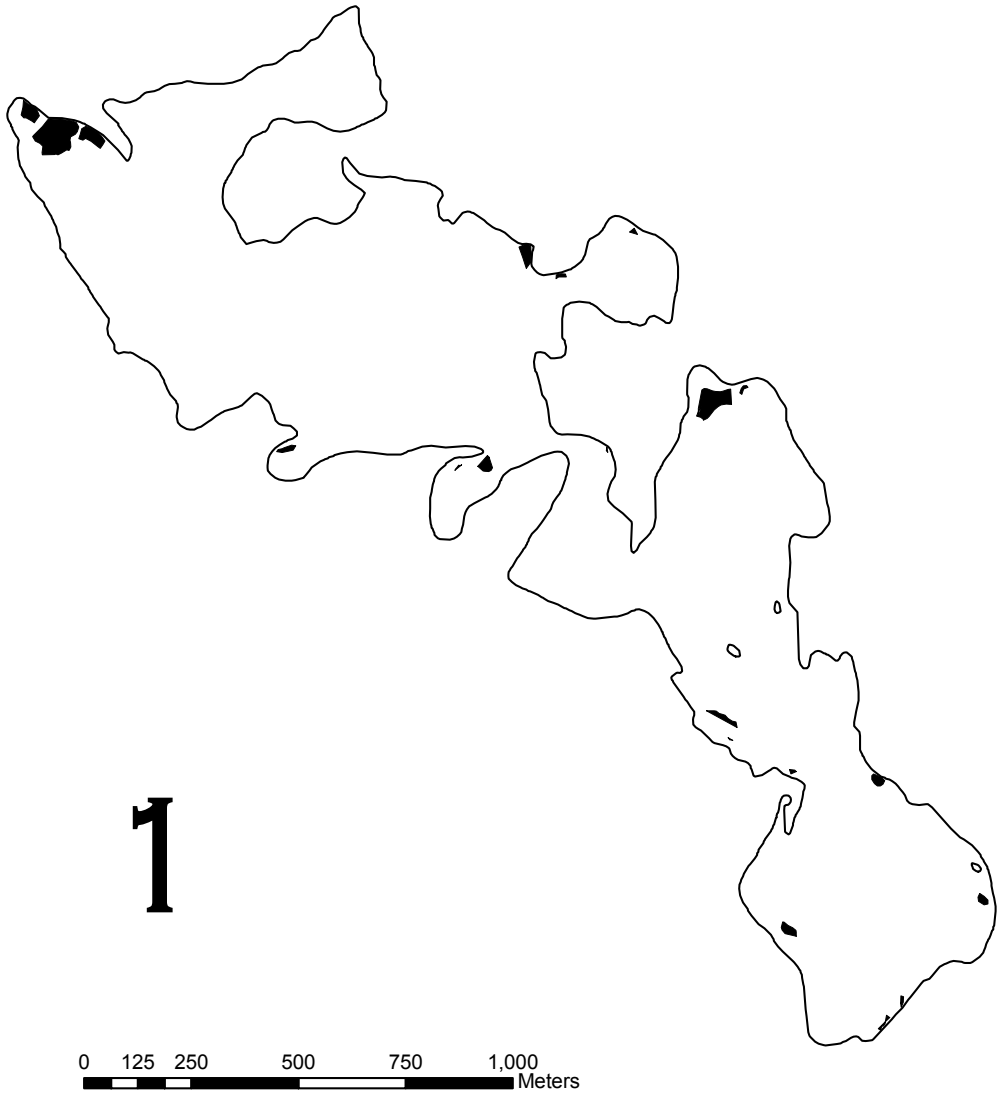


Common name: Bassweed, big-leaf pondweed

Description: Submersed leaves: bright to dark green, translucent, 8-20 cm long and 2-7.5 cm wide, folded along the midrib, curved backwards into a banana-shape, and sometimes with wavy margins. They have short stalks (1-2cm) and 19-45 lengthwise veins. These leaves often decay in late summer. Floating leaves: often absent. The opaque, leathery, oval leaves taper at both ends and are 5-10 cm long and 2.5-5 cm wide. They have 25-45 veins and 3-10 cm long stalks that are generally longer than the floating leaves. Sheaths (stipules) are up to 10 cm long, whitish, translucent, occur at leaf bases, but are not attached to the leaves. They become stringy with age. Stem may be long (up to 5 m) and is usually unbranched.

Habitat and range: Common through out all of North America with the exception of the Southeast. This pondweed is very common in acidic lakes and ponds of the Adirondack region, rarely found in flowing water.

Potamogeton amplifolius



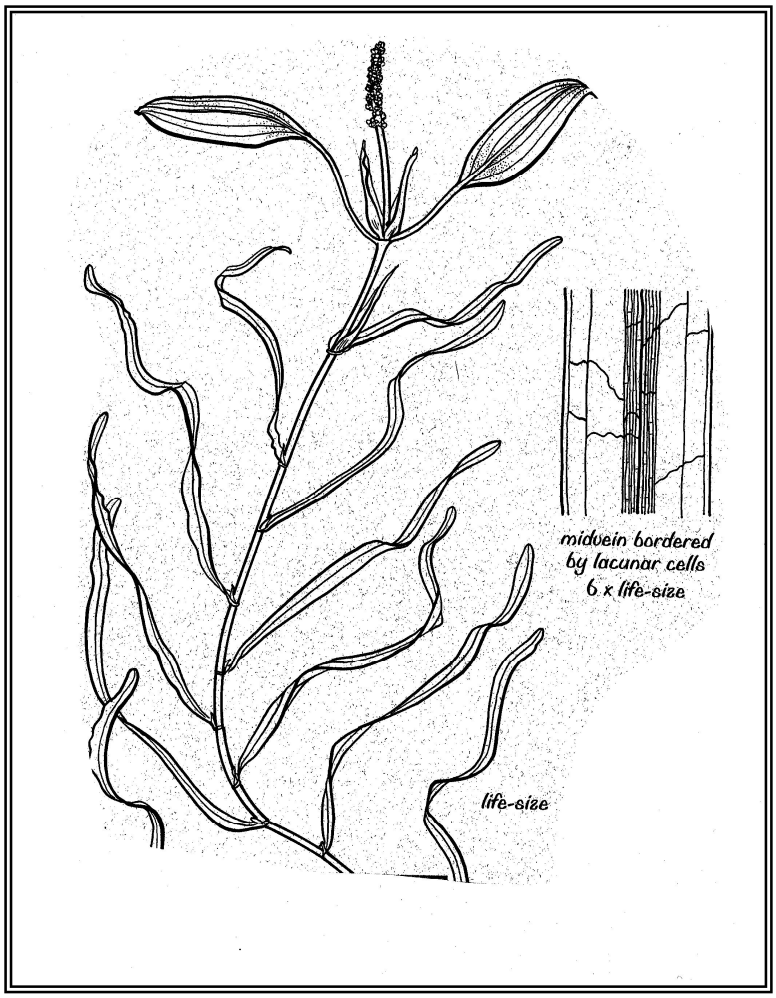
Potamogeton epihydrus

(Image from Crow and Hellquist 2000)

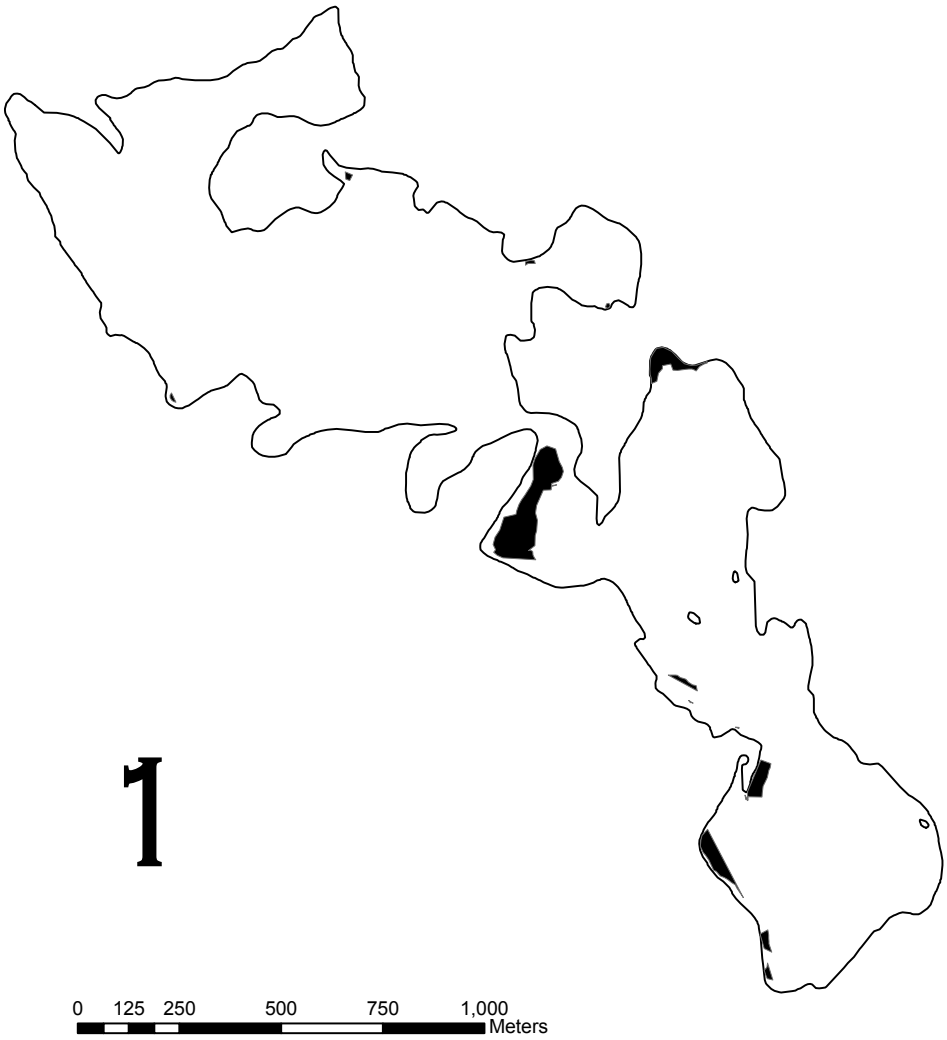
Common names: Ribbon-leaf pondweed

Description: Leaves alternate, limp, ribbon-like, 5-25 cm long, 0.2-1 cm wide, light-green to brown with a light colored center stripe (1-1.5 mm broad), submersed leaves lack petioles. Floating leaves: leathery, appear opposite, 2-8 cm long and 1.5-3.5 cm wide on long flattened leaf stalks. The stem is simple and typically does not branch.

Habitat and range: Common across most of North America. In the Adirondacks it is common in slow moving stream as well as lakes and ponds.



Potamogeton epihydrus



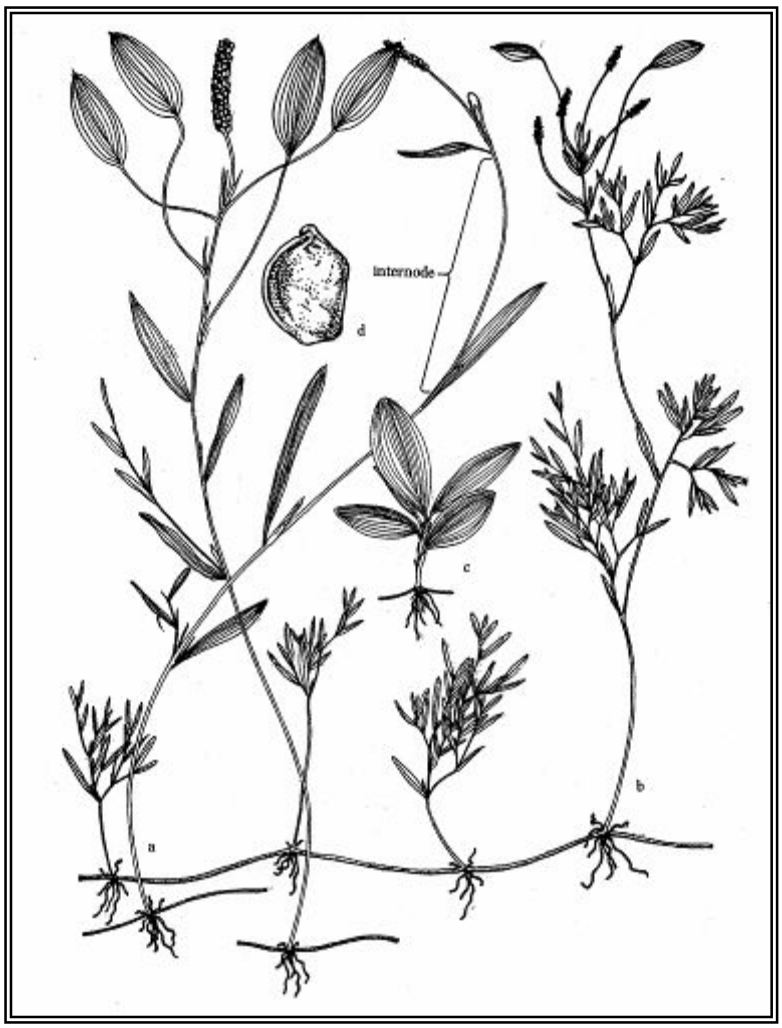
Potamogeton gramineus

(Image from Crow and Hellquist 2000)

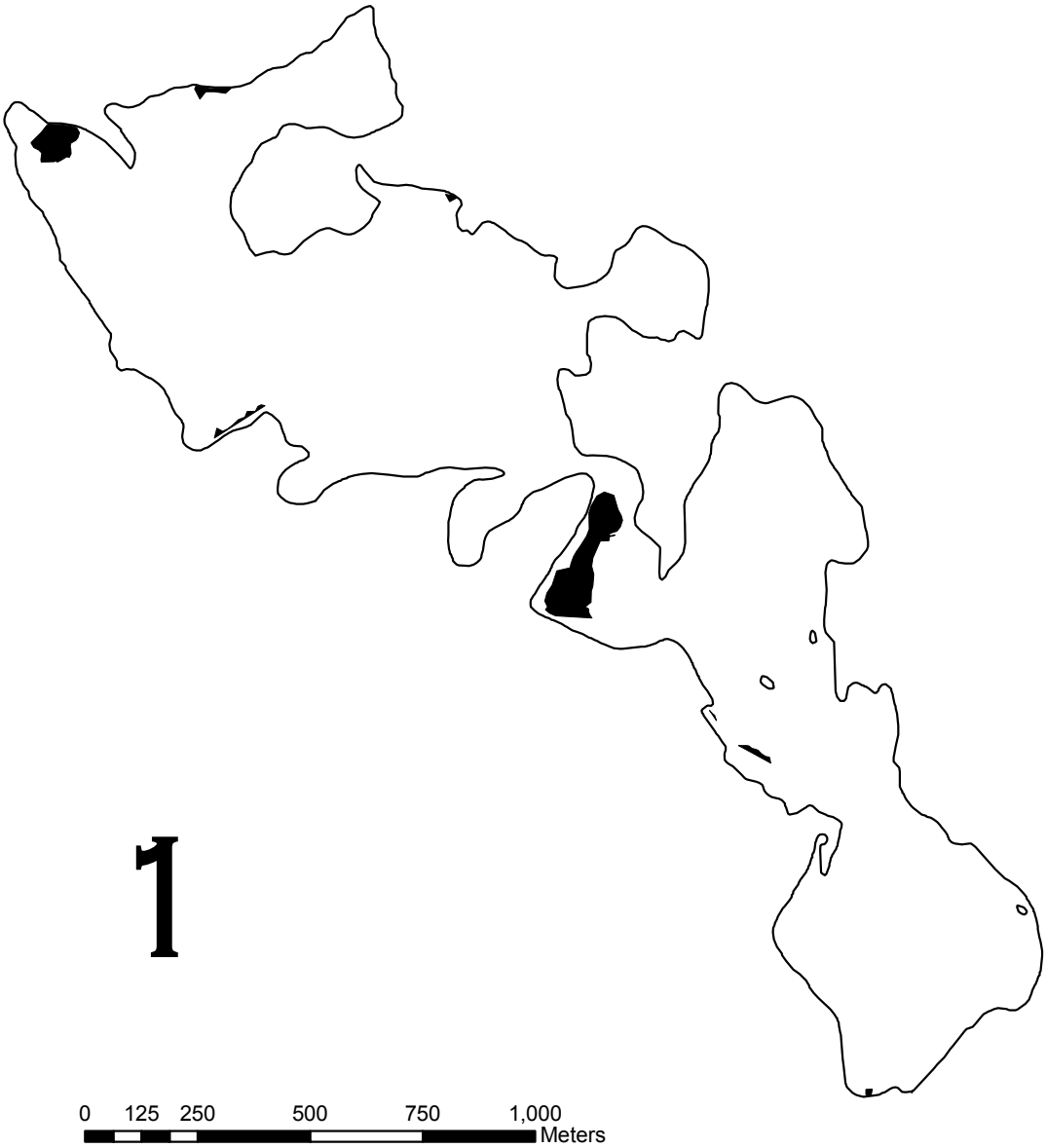
Common Name: Grass -leaved pondweed, variable pondweed

Description: The submersed leaves are green-to-reddish, 13 cm long by 1.2 cm wide, have pointed tips, 3-9 veins and no petiole. Floating leaves: 1.5-7 cm long and 1-3 cm wide are on stalks longer than the blades. Sheaths (stipules) to 3 cm long are persistent and free of the leaf base. Stem is green and usually forms many short branches.

Habitat and range: Occurs throughout the northern hemisphere. In the Adirondacks it is found in alkaline to acidic lakes and ponds.



Potamogeton gramineus

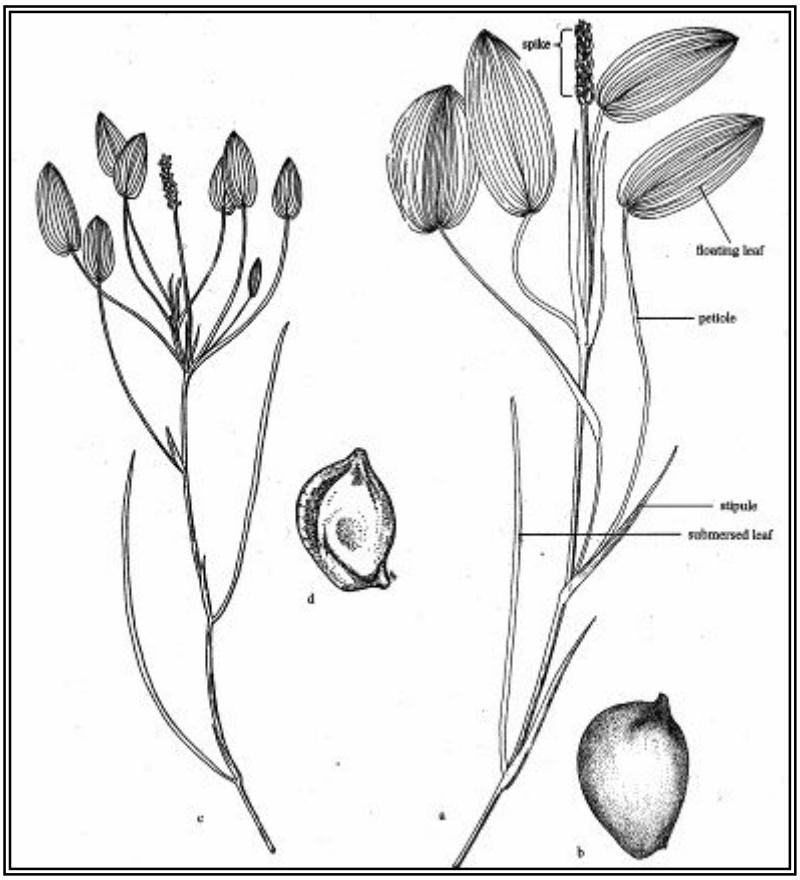


Potamogeton oakesianus / Potamogeton natans

(Image from Crow and Hellquist 2000)

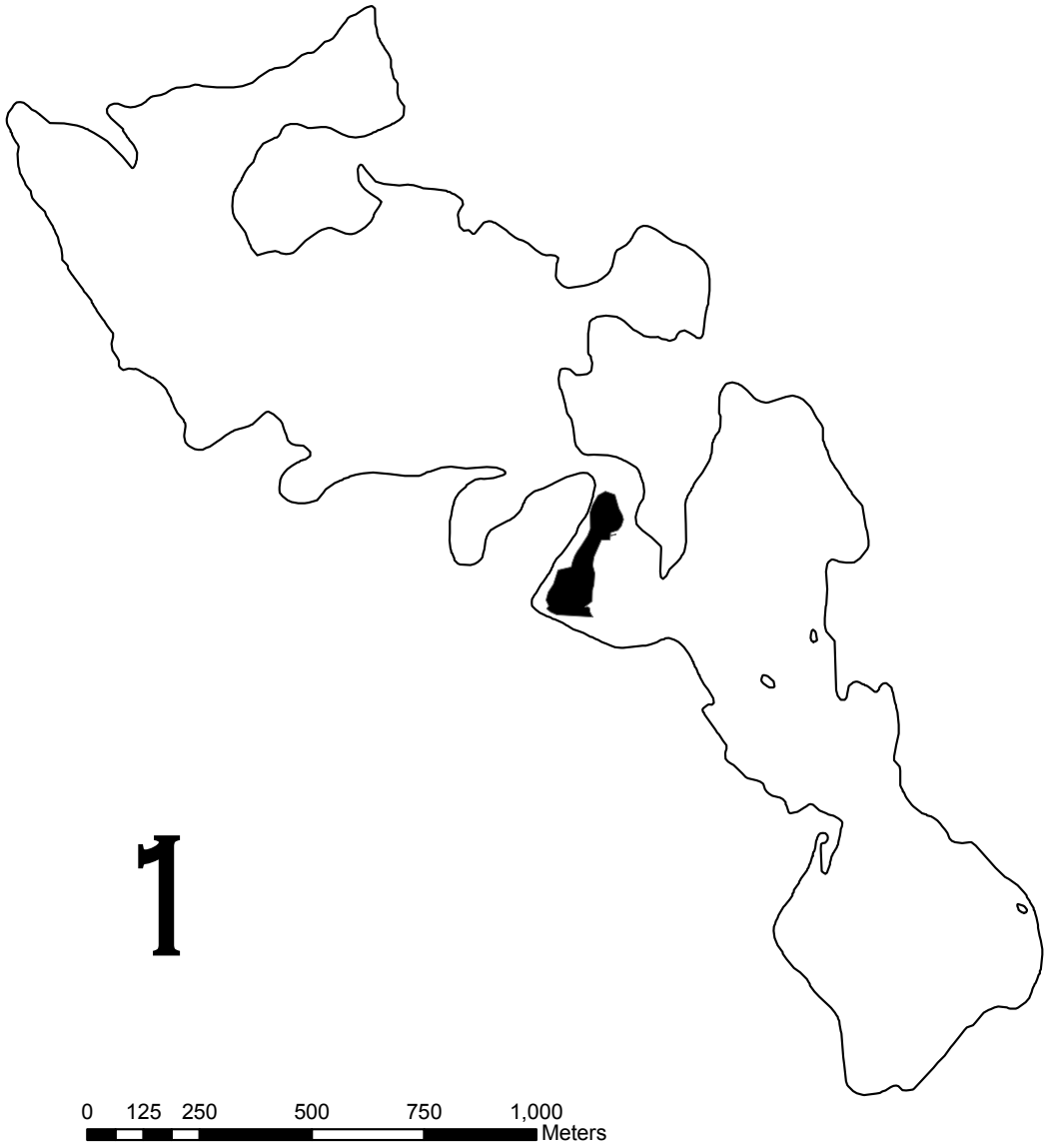
Common Names: *P. oakesianus* –Oak's pondweed (left image), *P. natans* – floating pondweed (right image).

Description: Both *P. oakesianus* and *P. natans* are easily identified by their phylloidial submersed leaves. *P. natans* has larger submersed leaves (0.8-2 mm), the floating leaves are typically cordate, heart shaped at the base with a petiole that is pale at the junction of the blade. *P. oakesianus* submersed leaves are smaller (0.3-1 mm), the pale petiole at the blade junction is absent.



Habitat and range: Both of these species are considered to be circumpolar, and are particularly prevelant in the Northeastern North America. In the Adirondack region they are found in low alkaline slow moving rivers, ponds and bogs.

Potamogeton natans

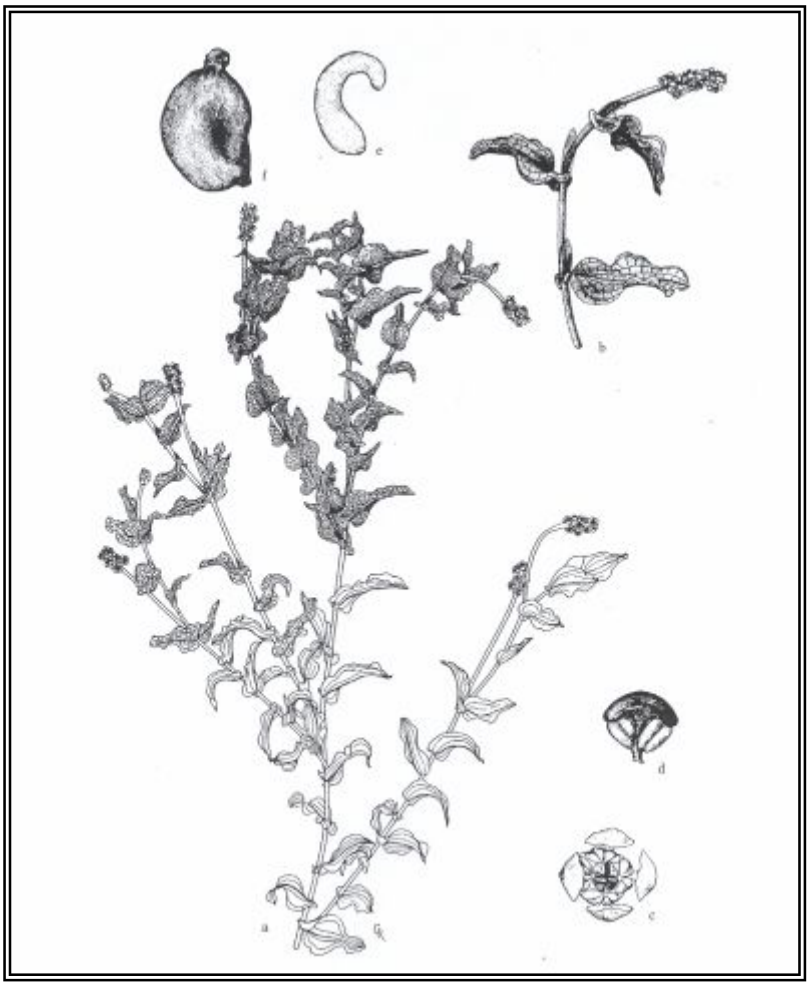


Potamogeton perfoliatus

(Image from Crow and Hellquist 2000)

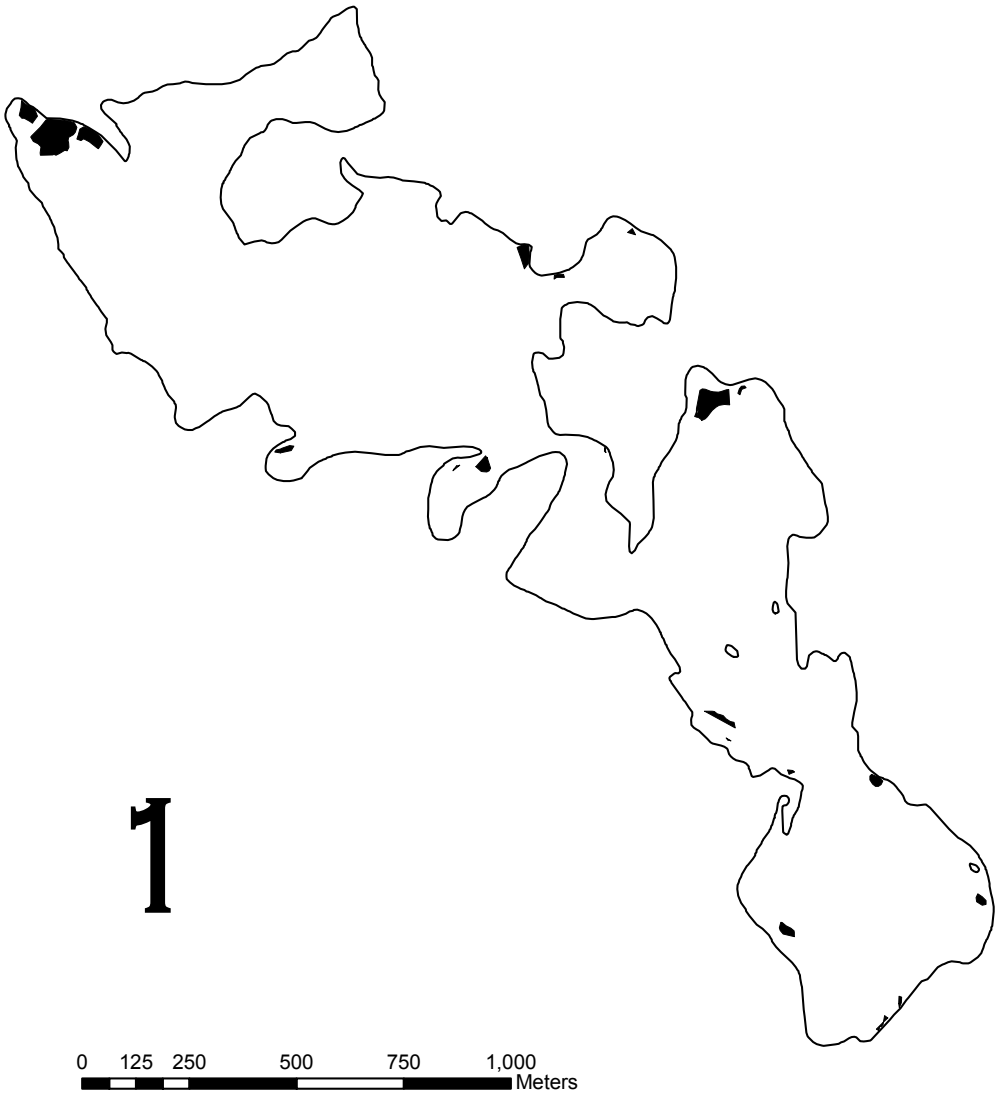
Common name: Clasping leaf pondweed, redhead grass

Description: Clasping leaf pondweed is highly variable in its appearance and, in fact, two stems on a single plant may appear to be separate species. Leaves are flat and oval-shaped, 1-7 cm long and 1-4 cm wide with parallel veination. Leaf margins are slightly crisped and basal parts of leaves clasp the step. Floating leafs are completely absent from this species.



Habitat and range: *P. perfoliatus* exists throughout North America and Europe. In the Adirondacks it is incredibly abundant lakes, ponds and rivers of various alkalinities.

Potamogeton perfoliatus



Potamogeton prealongus

(Image from Crow and Hellquist 2000)

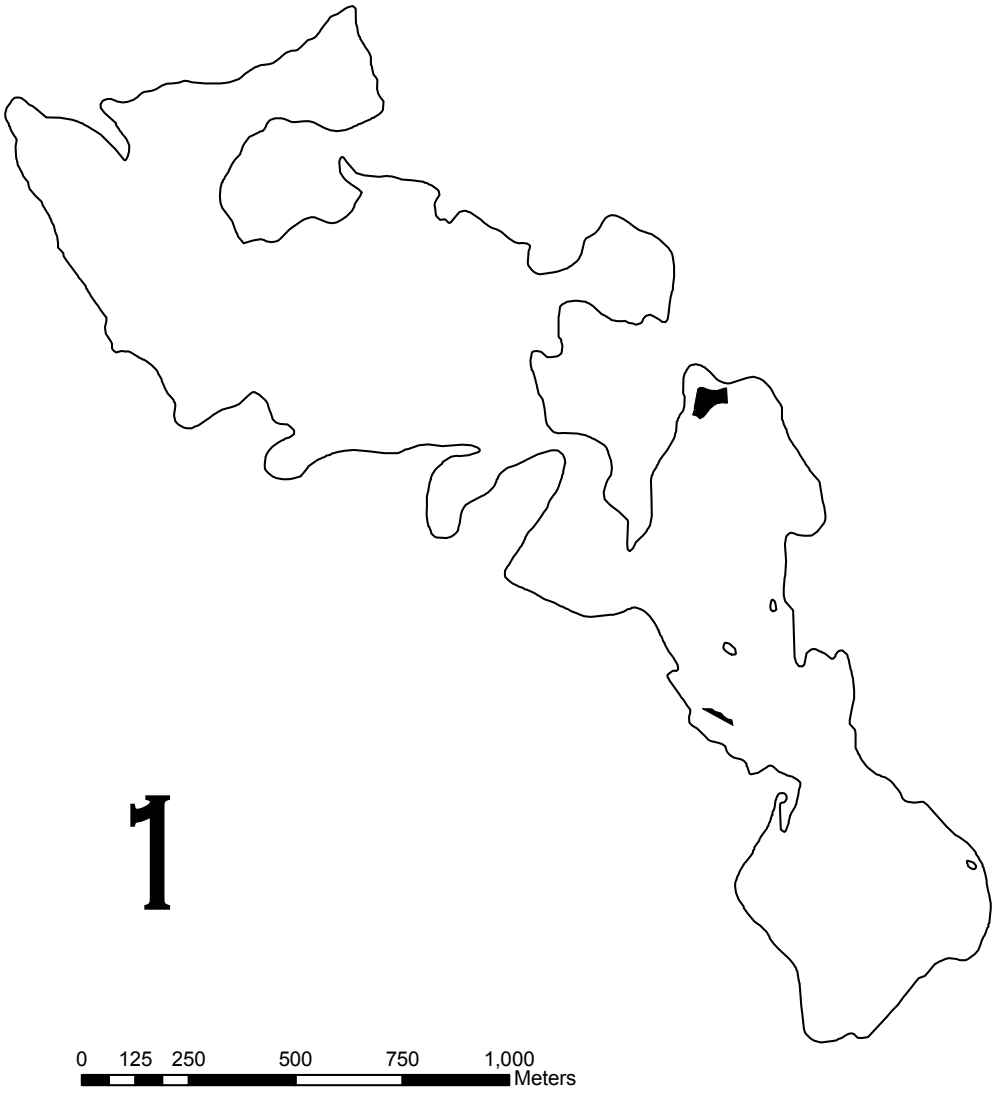
Common name: White-stemmed pondweed

Description: This plant has shiny green leaves; 5-35 cm long and 1.5-2.5 cm wide, often appear wavy or twisted with a boat shaped apex. There are no floating leaves present with this species. The leaf stipules persist throughout the season and are translucent to white and very large (3-10 cm long). The stem is whitish, zig-zag and often branches near the top.

Habitat and range: White-stemmed pondweed is common through out North America. In the Adirondack region it is fairly common in acidic water and has the ability to form small but dense beds in relatively deep water.

May be confused with: This plant is distinct, other pondweeds with clasping leaves posses floating leaves.

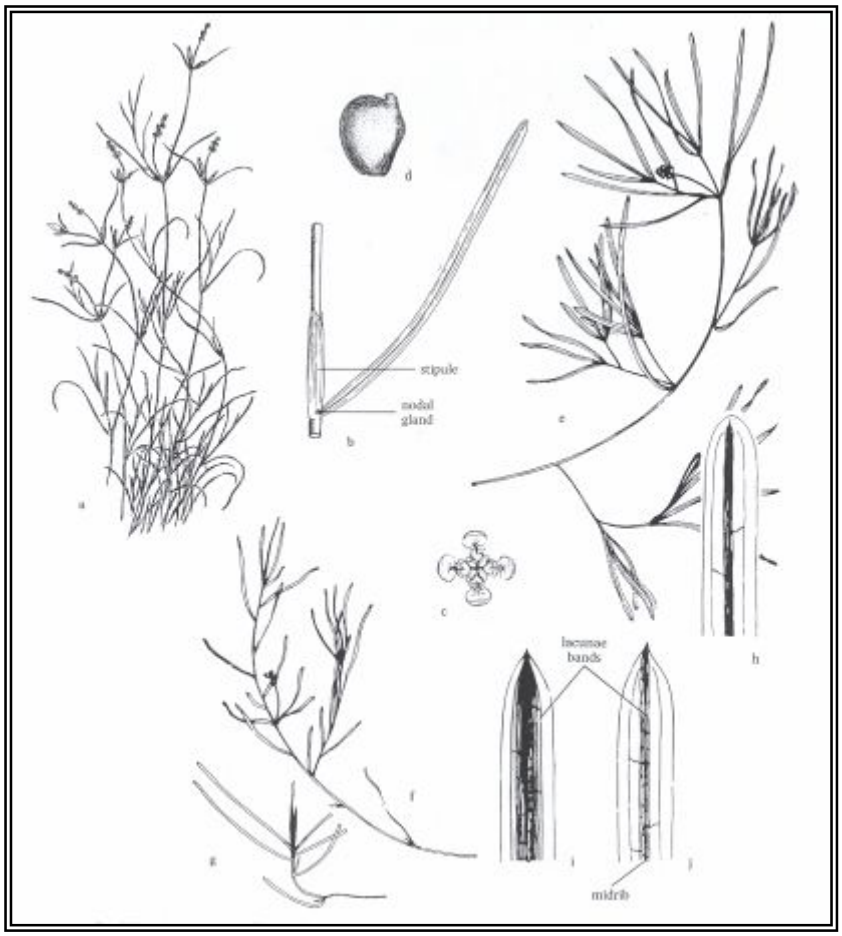
Potamogeton prealongus



Potamogeton pusillus

(Image from Crow and Hellquist 2000)

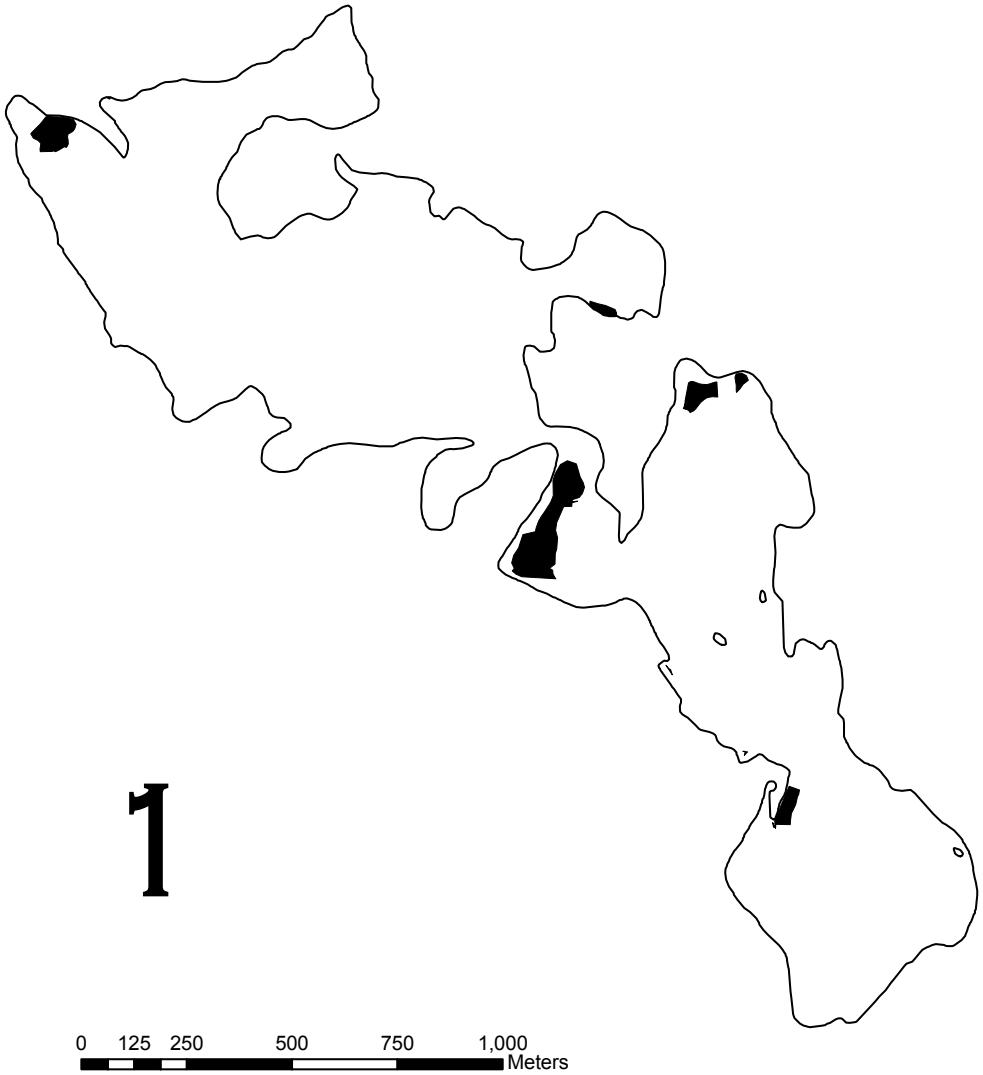
Common name:
Slender pondweed



Description:
Submersed, alternate, lacking a petiole. Linear leaves, 2-7 cm long, 0.5-2 mm wide, have pointed to rounded tips and 3 veins. Leaves have two broad bands or two narrow bands of lacune on either side of the midrib. Membranous tubular or open sheaths (stipules) are 1-3 cm long, free of the leaf base, and usually disintegrate before the leaves. Stem is slender and profusely branched, often with small paired yellowish nodal glands at leaf base.

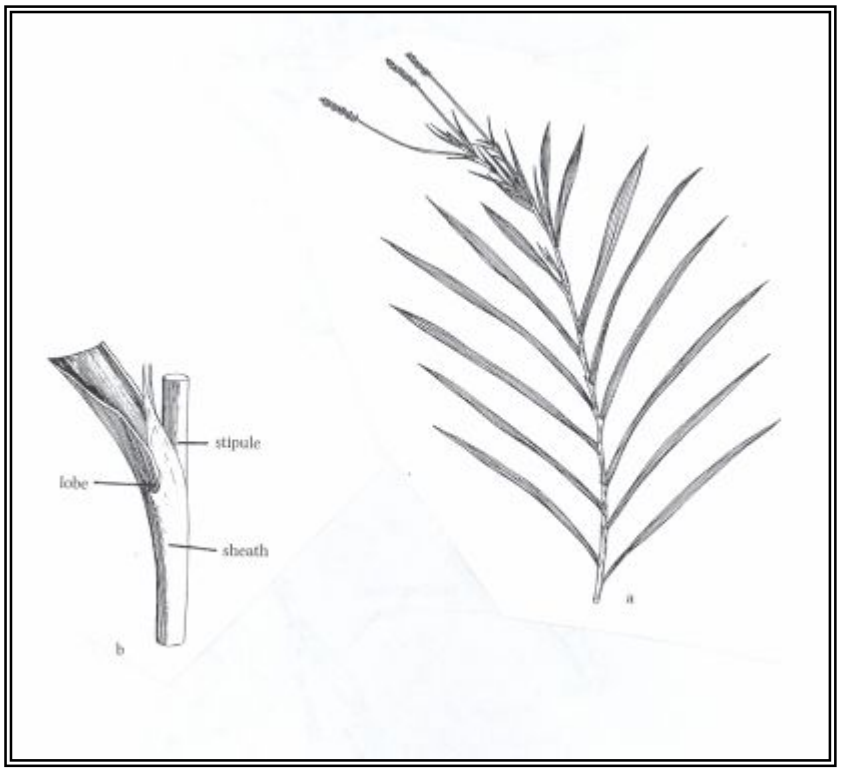
Habitat and range: P. pusillus is widespread throught the northern hemisphere. In the Adirondacks it is widespread in both alkaline and acidic waters.

Potamogeton pusillus



Potamogeton robinsii

(Image from Crow and Hellquist 2000)

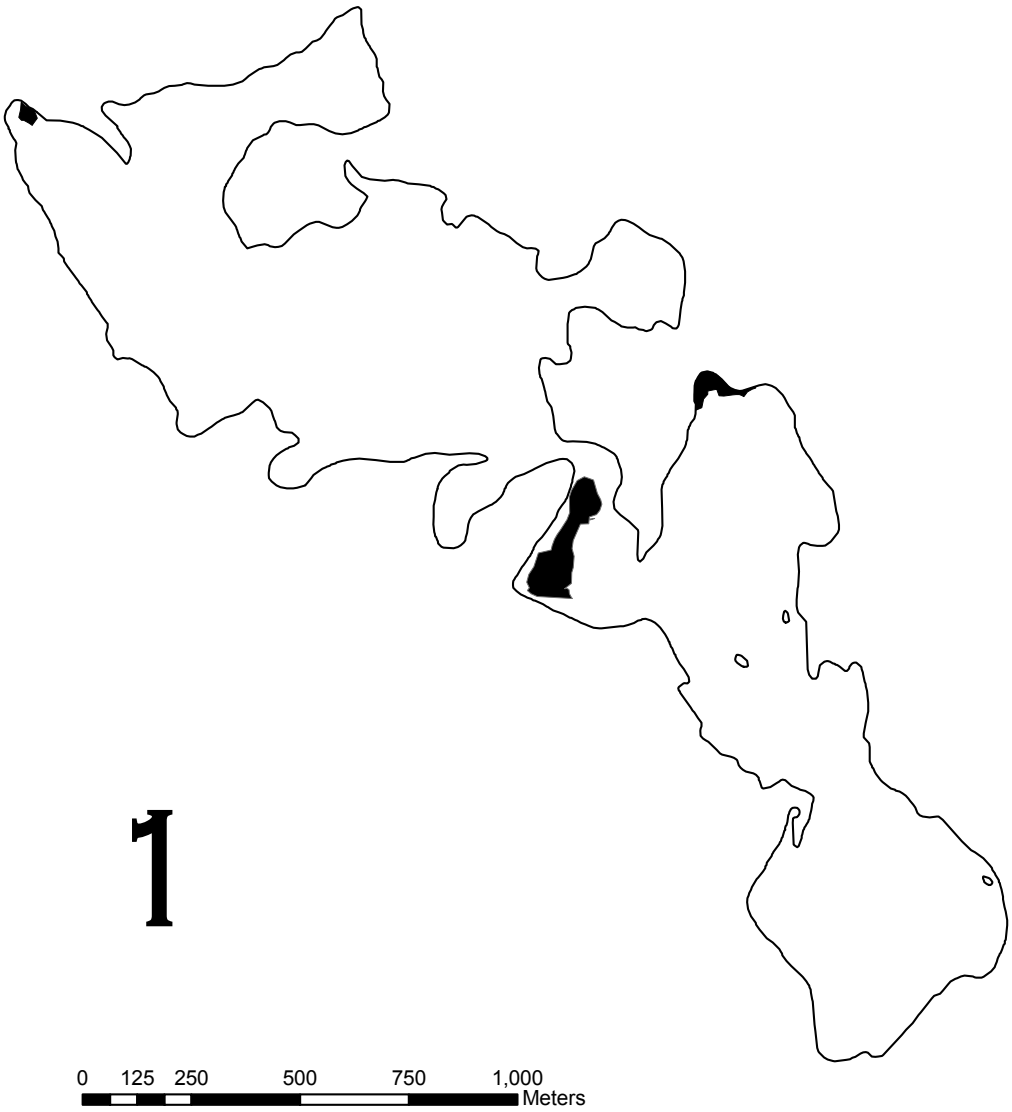


Common Name: Robins Pondweed, fern-like pondweed

Description: Robin's pondweed is easily recognized because its dark green, closely spaced leaves are arranged in a rigid, flattened spray, giving it a fern-like appearance. The plant usually a low-growing plant and only approaches the water surface when flowering. The flowering stalks have more widely spaced leaves that are less fan-like in appearance. Like other pondweeds, fern-leaf pondweed has membranous appendages (stipules) at the leaf bases. Stipules form a short sheath around the stem and are partially fused to the leaf blades causing the leaves to seem jointed or bent at the base if they are pulled from the stem.

Habitat and range: Native to Northern North America. In the Adirondacks is very abundant in lakes and ponds of low alkalinity.

Potamogeton robinsii



Potamogeton spirillus

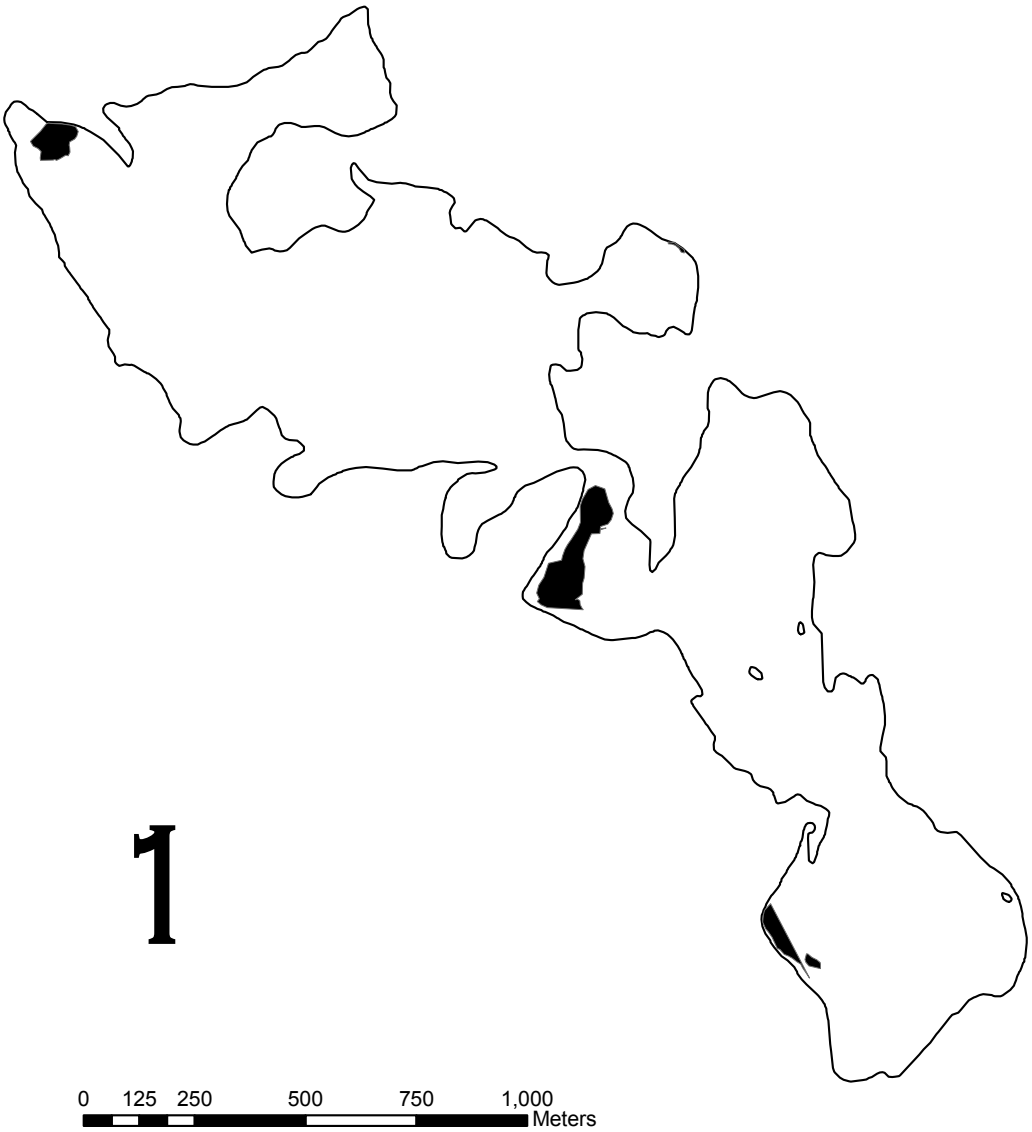
(Image from Crow and Hellquist 2000)

Common name: Spiral fruit pondweed, snail seed pondweed

Description: A small highly branching pondweed with lax leaves, stipules that are adnate to the leaf base for half of their length. Seeds develop in clusters at the attachment of the blade and stem. The seeds are small, keeled and shaped like a snail shell.

Habitat and range: Native to Northeastern North America. In the Adirondacks it is common in acidic to slightly alkaline waters at various depths.

Potamogeton spirillus



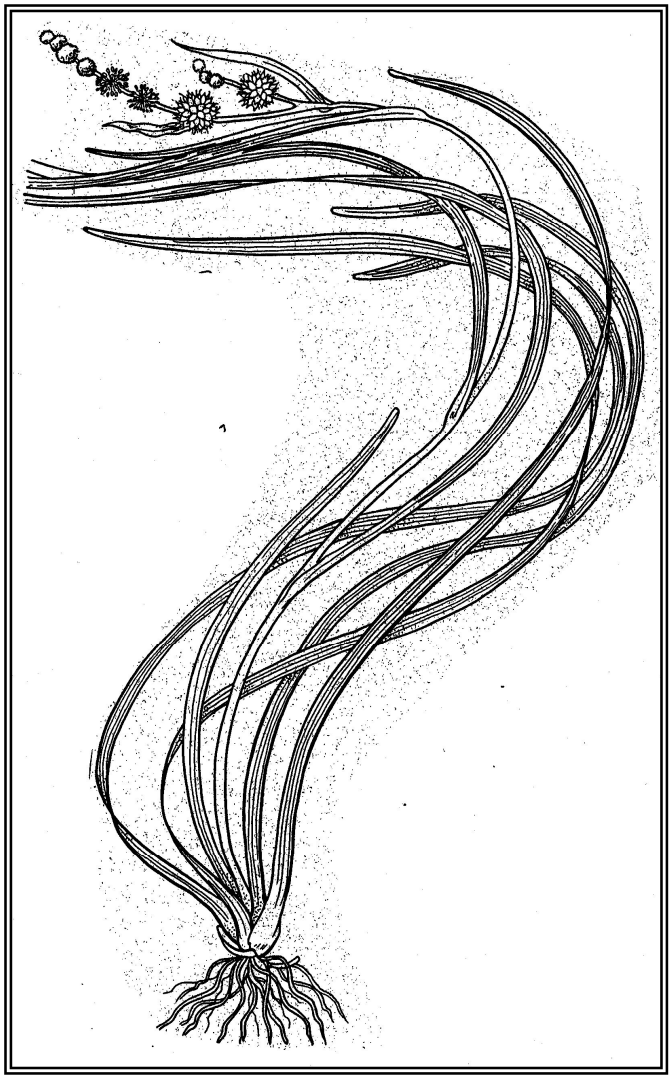
Sparganium species

(Image from Crow and Hellquist 2000)

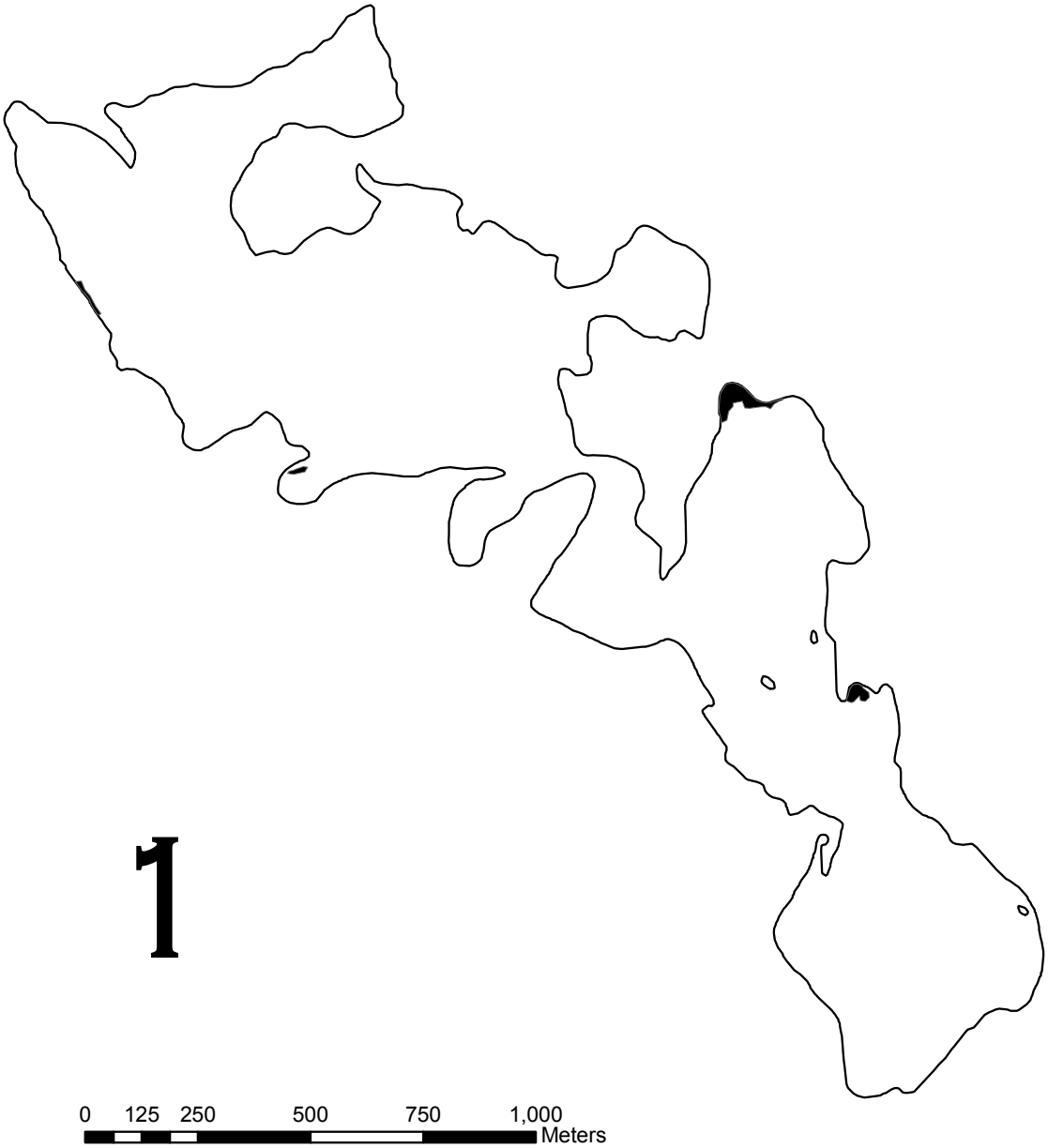
Common names: Bur-reed, *Sparganium* is derived from the Latin word *sparganon* "a swaddling band", named for the strap-shaped leaves.

Description: Long (0.5-2 m) strap like leaves that are somewhat convex, keeled or v-shaped. The leaves lack a lacunae band and have a spongy consistency at the margins and near the base. Submersed leaves typically bent at the waters surface and float. Female flower heads are spiny, round balls that turn from green to brown as they mature. Small male flower heads are located above female heads.

Habitat and range: *Sparganium* species are widespread in the Northern Hemisphere. In the Adirondacks it is common in shallow water (1-2.5 m) of streams and lake margins.

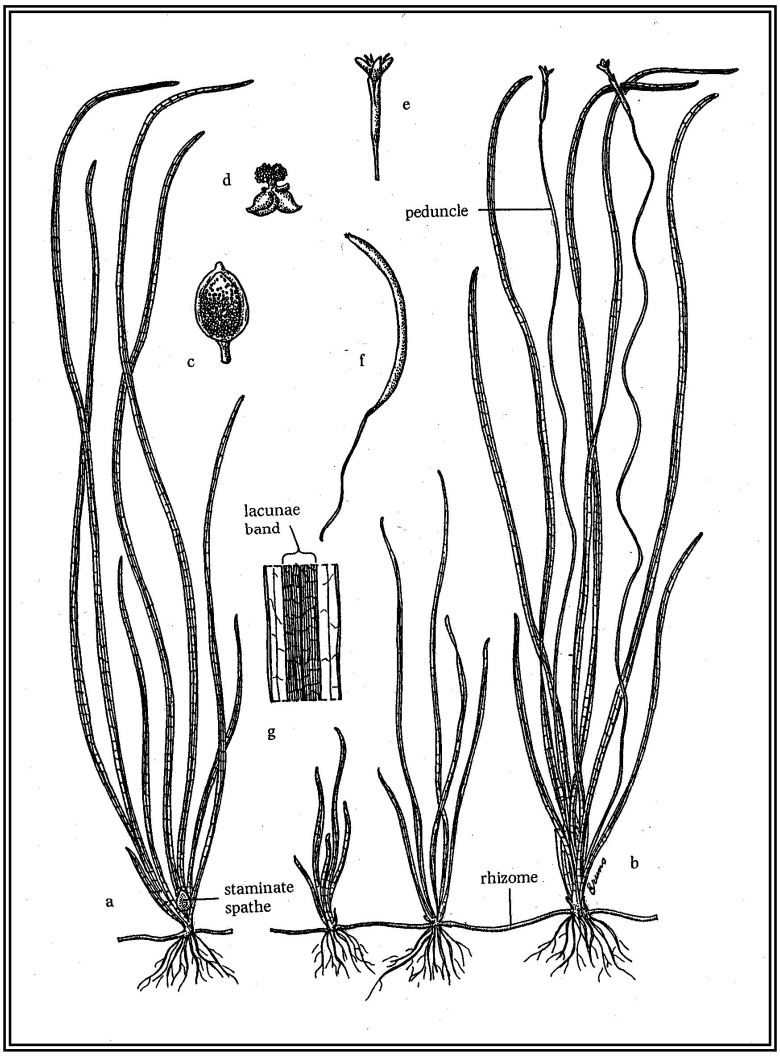


Sparganium species



Vallisneria americana

(Image from Crow and Hellquist 2000)

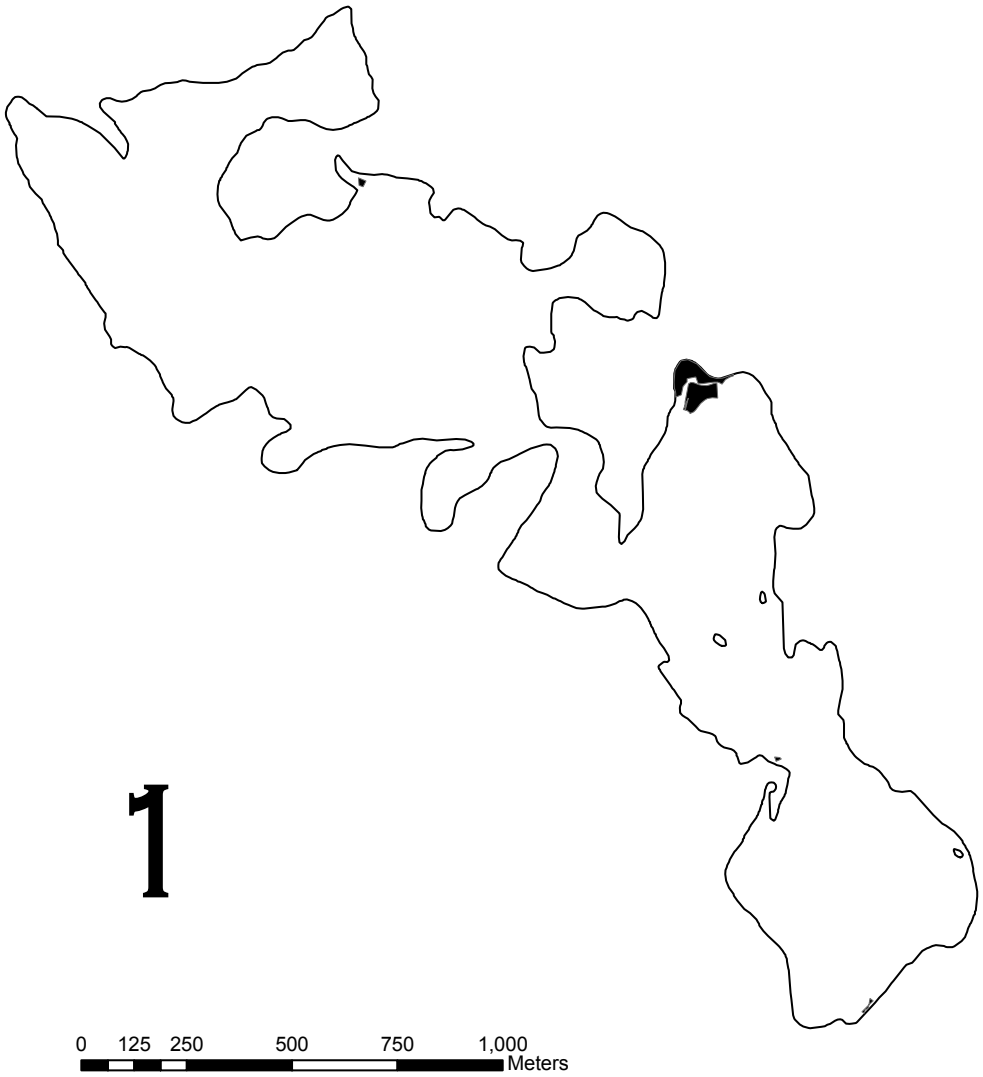


Common names: Eelgrass, tapegrass, watercelery

Description: *Vallisneria i*s a completely underwater perennial macrophyte with long, narrow, ribbon like leaves growing from underwater rhizomes. The leaves end in a blunt tip and have a broad white band along the midvein (lacunae band). Plants occur as either males or females. Male flowers are small (1 mm) and produced near the bottom of the plant, when they are mature they are released and float at the waters surface. Female flowers float on the surface attached to long thin stalks that coil up after pollination has occurred.

Habitat and range: Vallisneria is native to the eastern North America, Central America and the Caribbean. In the Adirondack region it is very common in ponds, lakes and quite streams.

Vallisneria americana



Sources of Images and Descriptions

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