



AQUATIC INVASIVE PLANTS INFORMATION AND IDENTIFICATION TIPS



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INTRODUCTION

This document is intended to provide an identification resource for aquatic invasive plants and encourage Alberta lake-users to watch for these species.

The importance and issues associated with all aquatic plants are outlined and the implications of infestations of invasive species are discussed. We highlight four invasive aquatic plant species of concern for Alberta lakes:

- Hydrilla
- Curly-leafed Pondweed
- Eurasian Water milfoil
- Flowering Rush

Detailed information on the plant is included for each species as well as a comparison between the invasive species and a similar species native to Alberta. Major distinguishing characteristics are in blue font while glossary words are underlined.

If you believe you have found an invasive aquatic plant in your lake please contact us via www.alms.ca.

AQUATIC VEGETATION: BENEFITS AND ISSUES

What do aquatic plants do for the lake?

Aquatic vegetation has many important functions within an aquatic ecosystem. Many aquatic plants provide food for fish or aquatic invertebrates, and are a key member in the food chain for these ecosystems. Many small aquatic invertebrates feed from and lay their eggs on macrophytes. In addition to food sources, aquatic plants provide shelter for young and small fish from larger predators. They are also used as spawning areas for fish and amphibians. Emergent aquatic plant such as cattails, sedges and rushes improve shoreline stability and reduce shoreline erosion. The presence of these emergent plants as well as submerged varieties, aid improving water clarity due to the binding of roots with the lake's substrate.

Macrophytes use the same nutrients as the algae and cyanobacteria that can cause toxic blooms. Thus the removal of macrophytes from the lake increases the free nutrients in the water body. All plants produce oxygen while they photosynthesize. The addition of oxygen into a water-body can increase dissolved oxygen levels, especially during the daytime. Dissolved oxygen is an important factor for wildlife within a water-body.

Scientists are working on tying the presence of certain aquatic plant communities to water quality. As a plant community changes over the years it may indicate changes in water quality.

How much aquatic vegetation should I see in my lake?

Every lake is different. Depending on the geological history of the lake, the size of the watershed, the development within the watershed and many other factors your lake may naturally have many or few aquatic plants. A few factors:

- Lakes with large watershed areas in comparison to the water-body itself
- Sediments naturally rich in phosphorus,
- Lakes with shallow depths and
- Areas of high nutrient loading are more likely to see more aquatic plant growth.

Do not assume that because your lake has a large abundance of macrophytes, it is unhealthy.

Unwelcome growth of macrophytes may be in response to changes in your lake

Similar to algae, increased nutrient input in the watershed can cause a body of water to become over productive. As a lake ages and becomes more eutrophic, it becomes more productive, and thus more aquatic vegetation will be present. Lakes and their watersheds need to be proactively managed to reduce undesired macrophyte and algal growth.

Invasive Aquatic Plants

Invasive plants are species introduced to the ecosystem with few natural predators. Invasive plants tend to have an extremely prolific nature and tend to take over native plants, sometimes at a rapid

rate. The rapid reproduction of these plants produce large mono-specific stands that often do not provide the same forage quality or shelter as native plants do.

There are four major aquatic invasive plant species of most concern in Alberta: Eurasian Water-milfoil, Hydrilla, Flowering Rush and Curly Leaf Pondweed.

Issues with Aquatic plants

In large quantities aquatic plants can become undesirable by altering light penetration into the water, especially with large floating mats of vegetation. Large dense mats of macrophytes can clog inflows and outflows of the lake, especially any domestic water or irrigation intakes. These dense mats can impede water flow throughout the water body and make a more desirable breeding area for mosquitoes.

Large mono-specific stands can favour certain fish species, and can ultimately alter the fish population of the lake. When large amounts of aquatic vegetation die at once the water-body becomes loaded with organic matter. Decay of dead plants uses oxygen and may result in oxygen depletion in the water column and ultimately in fish kills. Die offs of aquatic plants may also alter the colour, odour, and temperature of the water. Early season invaders such as Curly-leaf Pondweed, often die off while the majority of native vegetation is beginning to grow, this can choke out the native plants and prevent them from growing at all.

In addition to affecting the lake's ecosystem, aquatic plants can impede recreational activities on the lake. Large floating mats and emergent vegetation can get tangled in boat motors. Swimmers are deterred from entering water filled with "weeds".

In most cases these issues do not occur with native aquatic plants, these issues are seen more so in situations where invasive species are present.

AQUATIC INVASIVE SPECIES

Hydrilla

Hydrilla verticillata

Summary: *Hydrilla verticillata* is an invasive species now infesting a number of states in the USA. Hydrilla is often used as an aquarium plant, and was likely introduced as such. Hydrilla forms large dense mats that float near the water's surface blocking out sunlight for other aquatic organisms. Unlike other similar looking species, Hydrilla, has white tubers upon its roots; a good indicator for identification.



Identification:

Leaves: *Hydrilla verticillata* has bright green leaves whorled at each node around the stem. Most Hydrilla has 5 leaves in each whorl but it is somewhat variable. Whorls are variously spaced along the stem. Leaves are 1-5mm wide and 6- 20 mm long. Edges of the leaves have sharp teeth visible to the eye. The midrib of each leaf is red in colour and also is toothed with spines.

Stem: Stem tends to be greatly branched at the lake bottom or the water's surface depending on whether the variety has male and female flowers on the same plant or on separate plants respectively.

HYDRILLA



ELODEA



Flowers: Flowers bloom in mid to late summer. Male flowers are produced in the axils of the leaves, break off and float upon the surface, they have 3 pink sepals and 3 reddish or whitish petals. Female flowers are small with 3 white petals and attached to the plant on a long slender pedicel.

Method of Distribution: Hydrilla will spread throughout the growing season by stolons and rhizomes. New plants are produced from plant fragments, tubers upon the roots, turions and occasionally by seed.

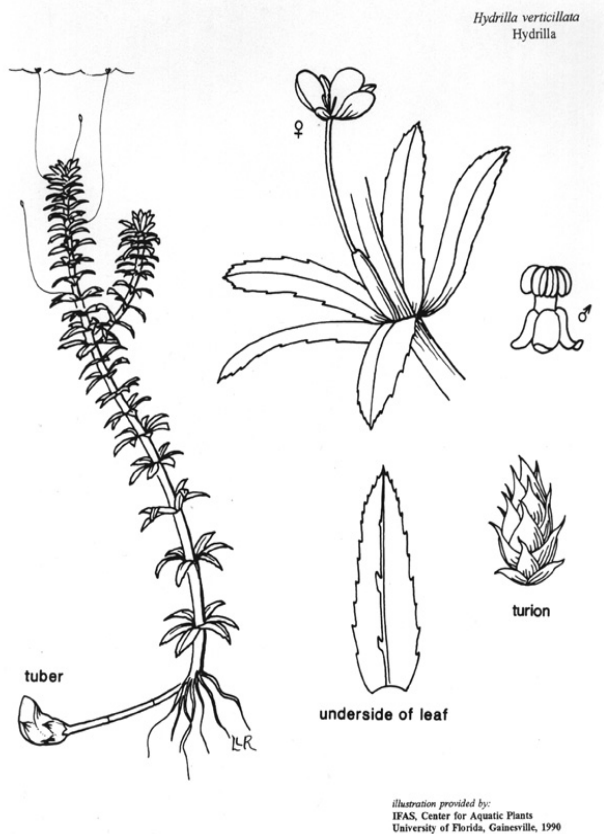
Similar Species:

Elodea Canadensis has small bright green leaves in whorls of 3 around the stem. Leaf tips are blunt and leaf serration is on visible under magnification. This species often does not flower but when it does, has 3 petals and 3 sepals on each flower.

Egeria densa generally has longer leaves than Hydrilla or Elodea, and is commonly found with leaves in whorls of 4. Whorls are spaced closely together at the top and sparser at the base. Flowers are fragrant and floating with 3 larger white petals and a yellow center.

One of the best ways to distinguish these species from Hydrilla is to look for tubers on the roots.

AQUATIC VEGETATION COMPARISON



Hydrilla verticillata

Hydrilla
Invasive Species

Leaf:

- In whorls of 5 around the stem
- 1-5 mm wide and 6-20 mm long
- Toothed edges, visible to the eye
- Reddish midrib with small spines

Stem:

- Highly branched either near the water's surface or at lake bottom

Flowers:

- Male flowers borne in leaf axils with 3 red-white petals and 3 pink sepals
- Female flowers attached to stem by long slender stalk with 3 white petals



Elodea canadensis

Common Waterweed
Similar Native Species

Leaf:

- In whorls of 3 around the stem
- 1.5-4 mm wide and 6-15mm long
- Finely toothed edges, only visible with magnification
- Tip is a blunt point

Stem:

- Slender
- Somewhat branched

Flowers:

- Often does not flower
- Small white flowers on long thread-like stems
- 3 petals and 3 sepals

Method of Spread:

- [Tubers on roots](#)
- Stem fragments
- Turions

Method of Spread:

- Stem fragments
- Turions

Curly-leaf Pondweed

Potamogeton crispus

Summary:

Curly leaf pondweed is an early season macrophyte, flowering in June. As an invasive species to Alberta, Curly-leaf Pondweed can reduce aquatic diversity in the lake and reduce its aesthetic value. It reproduces mainly by turions or winter buds which take root in the fall and over winter. The early spring die off of this species can reduce oxygen in a water body and



affect the viability of growth in other macrophytes.

Identification:

Leaves:

Leaves of *P. crispus* are stiff, translucent and oblong in shape. The edges are wavy and finely toothed. Leaf colour ranges from olive green to red brown in colour with a red midrib. The size of leaves range from 4 to 10 cm long and 5-12 mm wide. Leaves are arranged on the stem alternately and do not have stalks. Each leaf has 3 major parallel veins and perpendicular veins between the major veins.

Stem:

Stems are somewhat flattened, white-pink to red-brown in colour. Stems are somewhat branched, can grow up to 2 meters long.

Flowers:

Flowers develop in 3 to 5 whorls of flowers with 4 lobes on a spike 1-3 cm long. Flowers are not a highly distinguishing



feature of this plant.

Method of Distribution:

Curly leaf pondweed has the ability to produce massive quantities of seed but spread is generally attributed to the growth from winter buds. Spread of this invasive species may also occur from fragmented rhizomes and roots.

Similar Species:

Potamogeton richardsonii: Lance shaped leaves widest at the base. Leaf bases “clasp” or partially wrap around the stem. Leaves only have white parallel veins and are not toothed. Stems are round and often white-pink in colour. They are often confused as curly-leaf pond weed because they have a wavy appearance in the water.

What to look for: Parallel or perpendicular venation, color of leaf midrib, leaf margins (toothed or not toothed), stem shape (round or flat).

AQUATIC VEGETATION COMPARISON



Potamogeton crispus

Curly-leaf Pondweed
Invasive Species

Leaf:

- Alternately arranged leaves without stalks
- Wavy edges, oblong shape, finely toothed
- Red-brown in colour with a red midrib
- 4-10 cm long, 5 – 12 mm wide. Stiff, translucent
- Veins are perpendicular to 3 main parallel veins

Stem:

- Slightly branched
- Stem flattened, reddish brown
- Up to 2 metres long

Potamogeton richardsonii

Clasping-leaf Pondweed
Similar Native Species

Leaf:

- Alternately arranged without stalks
- Heart shaped leaves that slightly wrap around the stem at the base
- 2-13 cm long, 1-3 cm wide
- 7+ distinct parallel veins
- Leaf edges appear wavy, may curl back, not toothed.

Stem:

- Branched
- Round stem
- Up to 1 m long

Habitat:

- Shallow-deep water
- Still or flowing water
- Disturbance tolerant

Method of Spread:

- Grow from turion buds in fall
- Some propagation by seed
- Rhizomes

Habitat:

- Shallow to deep water
- Often in alkaline waters (characteristic of most of Alberta)

Method of Spread:

- Seeds
- Rhizomes



Eurasian Watermilfoil

(*Myriophyllum spicatum*)

Provincial Designation: Prohibited Noxious

Overview:

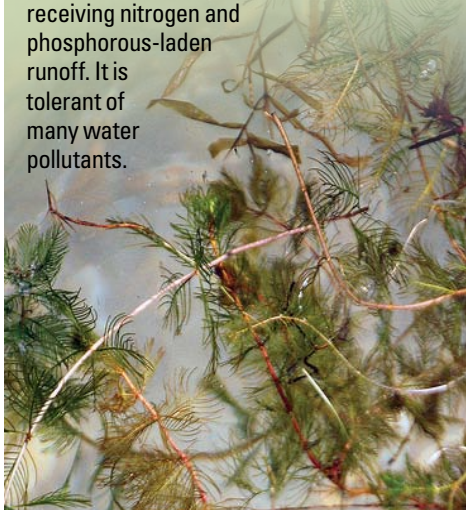
Eurasian watermilfoil is a perennial, aquatic, submersed herb introduced from Eurasia. It forms large, floating mats that prevent light penetration into water bodies, thus out-shading native plants. In lakes or other aquatic areas where native aquatic plants are not well established, the Eurasian plant can quickly spread.

It does produce seed, however germination rates are poor. It reproduces rapidly through stem fragmentation and underground runners. Plant fragments can attach to boats, trailers, or animals and be moved from one body of water to another. A single segment of stem and leaves can form a new colony.

There are native watermilfoils, and just like the Eurasian plant, all have submersed stems, feathery leaves, and tiny flowers produced above the water surface.

Habitat:

Native to Eurasia and Africa, it grows best in fertile, fine-textured, inorganic sediments. It prefers highly disturbed lake beds, or lakes receiving nitrogen and phosphorous-laden runoff. It is tolerant of many water pollutants.



Identification:

Stems: Stems are long, slender, branching, hairless, and become leafless towards the base. The plant usually grows between 1-4 m but can extend up to 10 m. Each floating node can take root if it comes into contact with mud. Stems are usually pale pink to reddish brown.

Leaves: Leaves are grayish-green and occur in whorls of 3 or 4 with 12-16 pairs of fine, thin leaflets up to 35 mm long. Eurasian watermilfoil has 12- 21 pairs of leaflets while North American watermilfoil only has 5-9 pairs.

When the leaves are taken out of the water they lose their stability and collapse around the stem.

Flowers: Small, yellow, 4 petals and 4 sepals produced on a spike 5-10 cm above the water surface. Flowers are alternate and attached directly to the stem.

Seed: The fruit is a hard, segmented capsule containing 4 seeds.

Prevention:

Eurasian watermilfoil is spread by primarily by boats and to a lesser extent, water birds. When leaving any water source, thoroughly inspect and remove all vegetative debris from boats and trailers.

Control:

Cultivation: The British Columbia Ministry of Environment developed a barge mounted roto-tilling machine called a rotoator to remove Eurasian watermilfoil roots. Underwater tiller blades churn up to 8 inches into the sediment and dislodge buoyant Eurasian watermilfoil roots. Floating roots may then be collected from the water. Control with rotoation, generally extends 2 or more growing seasons.



Mechanical: A hand rake can be used for smaller areas, such as around docks and swimming areas. One raking per season should be done at the peak of growing. Otherwise multiple rakings are most effective. Be sure to remove all fragments.

Where manipulation of water levels is possible, watermilfoil can be 'drowned' or dehydrated, and at the right time of year frozen to death, by raising or lowering the water level.

Chemical:¹ There are selective herbicides for Eurasian watermilfoil. Consult your local Agricultural Fieldman, Certified Pesticide Dispenser, or Alberta Environment for more information.

Biological: Although triploid grass carp will eat Eurasian watermilfoil, it is not a highly palatable or preferred species. To achieve control of Eurasian watermilfoil generally means the total removal of more palatable native aquatic species before the grass carp will consume Eurasian watermilfoil. In situations where Eurasian watermilfoil is the only aquatic plant species in the lake, this may be acceptable. However, generally grass carp are not recommended for Eurasian watermilfoil control. For more information: [http://www1.agric.gov.ab.ca/\\$Department/deptdocs.nsf/all/agdex3446](http://www1.agric.gov.ab.ca/$Department/deptdocs.nsf/all/agdex3446)

¹ Always follow the product labels. The use of pesticides in any manner not published on the label or registered under the *Minor Use of Pesticides* regulation constitutes an offence under both the *Federal Pest Control Products Act* and *Alberta's Environmental Protection and Enhancement Act*.

AQUATIC VEGETATION COMPARISON



Myriophyllum spicatum L.

Myriophyllum spicatum Eurasian Water-milfoil Invasive Species

Leaf:

Submersed Leaves:

- Divided, appearing feather-like, 2-4 cm long
- Greater than 14 pairs of leaflets
- Leaflets similar lengths giving square appearance at the tip
- Whorls of 4 around the stem
- Nodes approx. 1cm apart

Emergent Leaves:

- Small, 1-3mm long
- Entire (not divided), toothed or smooth
- One leaf beneath each flower



Myriophyllum sibiricum Northern Water-milfoil Similar Native Species

Leaf:

Submersed Leaves:

- Divided, feather-like up to 4 cm long
- Fewer than 14 pairs of leaflets
- Leaflets are longer at the base giving lance shape
- Whorls of 3 – 4 around stem
- Leaves somewhat stiff, don't collapse when removed from water

Emergent Leaves:

- Small, 1-3 mm long
- Entire, toothed or smooth
- Beneath flowers

Stem:

- Long, branching, often forming dense mats
- Red-brown to white-pink
- Stem width near doubles below inflorescence

Flower:

- Tiny flowers in whorls of 4
- Reddish emergent stalks (4-8cm long)

Habitat:

- Tolerant to various water conditions

Method of Spread:

- Plant fragments
- Rhizomes
- Rarely by seeds

Myriophyllum species are difficult to distinguish; often DNA analysis is needed to determine species. Call us if you need assistance with identification.

Stem:

- Up to 3m long, reddish
- Surface branching limited in water deeper than 1m

Flower:

- Tiny flowers on red-purple emergent stalks (to 15cm long)

Habitat:

- Tolerant to nutrient rich and alkaline waters (characteristic of Alberta)

Method of Spread:

- Turions
- Plant fragments
- Seeds



Last Updated 12-13-2011

Flowering rush (*Butomus umbellatus*)

aka grassy rush, water gladiolus

Provincial Designation: Prohibited Noxious

Overview:

Flowering rush is a cattail-like perennial of freshwater wetlands. It is native to Africa, Asia and Europe¹ and was likely introduced to North America as an ornamental plant. It is the only member of the Butomaceae family and is able to reproduce both by seed and vegetatively (rhizomatous roots form bulbils which separate from the parent plant³). Flowering rush infestations can displace native vegetation and result in reduced water quality which may disrupt valuable fish and wildlife habitat. Dense stands in irrigation ditches can reduce water availability, and in lakes can interfere with boat propellers and swimming.³ Plants flower summer to fall.¹ Flowers are hermaphroditic (contain both male and female organs) and are pollinated by bees, flies and butterflies.²

Habitat:

Flowering rush can grow on water margins or as a submerged plant with flexible leaves suspended in deeper water (3-6 m).³ It is widely tolerant of soil types (sandy to clay) and soil acidity, but does require wet soil and full sun.⁴ It is hardy to Zone 2 in Canada.²

Identification:

Flowering rush can be confused with sedges when not in bloom but is usually a much larger plant.³

Stems: Stems are erect and triangular near the base. Plants grow to 150 cm¹



PHOTO: www.vashsad.us

Leaves: Leaves are green and sword-shaped,⁵ originate from base of plant,² and are triangular in cross-section, twisted toward the tip, and feel spongy when compressed.³

Flowers: Flowers are 2-2.5 cm wide with 3 slightly greenish sepals and 3 petals.³ Twenty to fifty pink through white flowers are borne on umbrella shaped clusters³. Anthers are red.⁵ There are 9 stamens arranged in an inner whorl of 3 and outer whorl of 6.³

Prevention:

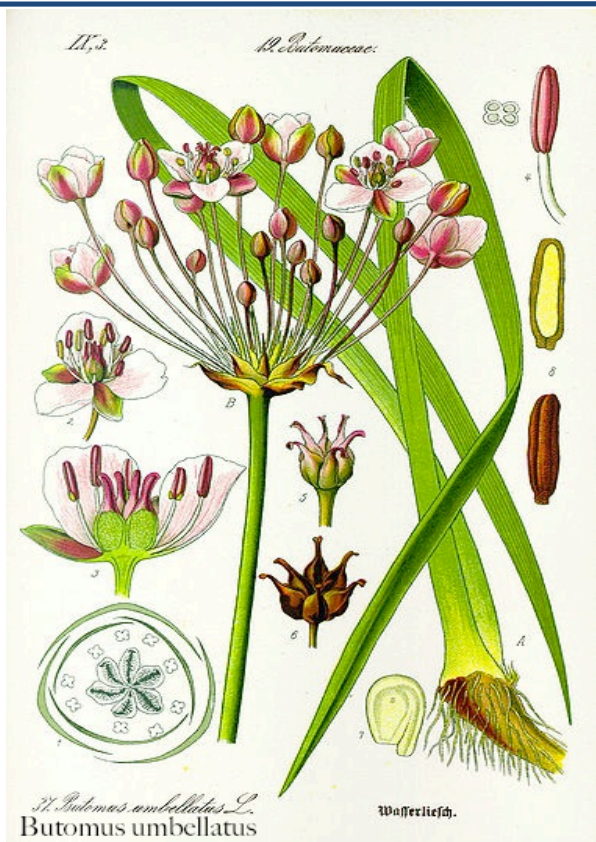
Do not use in water gardens – talk to your local nursery about non-invasive alternatives. Flowering rush can spread by seed or root fragments so care must be taken with attempts to remove existing plants. It has been observed to invade aquatic areas with existing vegetation more slowly³ – maintain existing stands and prevent disturbance.

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PHOTO: Alvin Mitchell, Salish Kootenai College

AQUATIC VEGETATION COMPARISON



Butomus umbellatus

Flowering Rush
Invasive Species

Leaf:

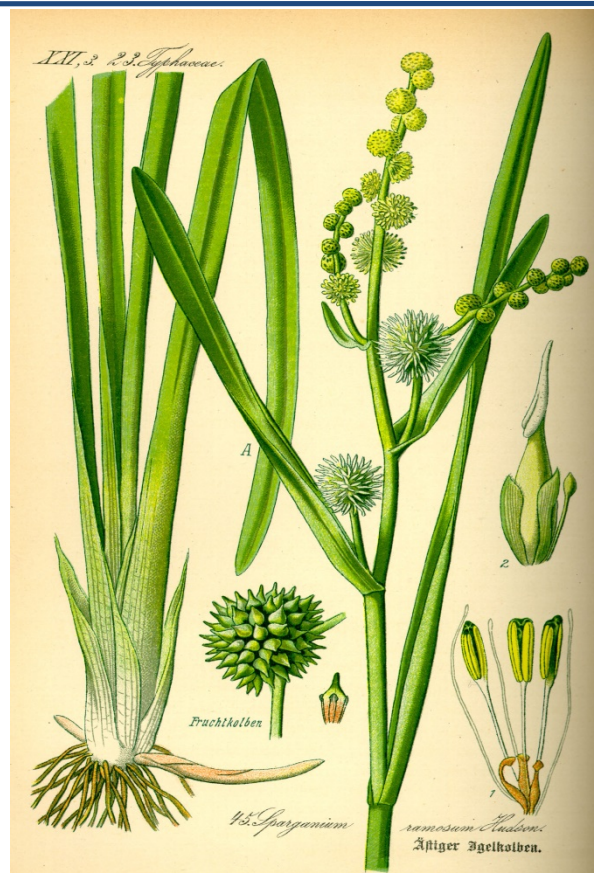
- Triangular in cross section,
- Basal, ensiform leaves
- Leaves feel spongy when compressed
- Up to 2.7m long, 0.5-1 cm wide
- Leaves twist near tip

Stem:

- Triangular in cross section at the base, round in the upper portion of the stem
- May be submerged, never floating. Grow to 1.5 m tall

Flower:

- Male and female in the same flower
- Flowers in an umbrella like formation
- Two whorls of tepals: inner – white to



Sparganium eurycarpum

Giant Bur-reed
Similar Native Species

Leaf:

- Triangular in cross section near base
- Long, basal, narrow and thick leaves
- Spongy near the base
- 2.5 m long, 0.6-2cm wide

Stem:

- Slightly branched and zig-zaging to support flowering stalks
- Mainly round
- Emergent, up to 2.5 m tall

Flower:

- Male and female flowers separate
- Female flowers form spiny round balls
- Smaller male flowers located above the

pink, outer - greenish

- [Anthers red](#)
- [Only flowers in shallow water](#)

Habitat:

- Can emerge from water up to 2 m deep.
- Intolerant of saline/brackish water
- Thrives in full sunlight
- Tolerant to a variety of sediment types

Method of Spread:

- Fragmented stems and rhizomes
- [Bulbils formed on rhizomes](#)
- Seed

[female head on stem branches](#)

- On round stems

Habitat:

- Shallow waters (1-2.5m)
- Streams
- Lake edges

Method of Spread:

- Rhizomes
- Seeds
- Tubers

Other Sparganium species may resemble Flowering Rush, most characteristics are similar

GLOSSARY

Alternate leaves – a single leaf borne at each node.

Axil – the upper angle between the stem and the leaf.

Basal – arising from the base of the plant

Bulbils – a small bulb

Cyanobacteria – also known as blue-green algae. Several photosynthesizing bacterial species known to occur in water bodies in Alberta. Several species produce toxins dangerous to humans and wildlife. They produce large blooms under warm, high nutrient conditions.

Divided leaf – a single leaf split to the midrib into multiple leaflets.

Ensiform – sword shaped

Eutrophic – refers to the state of productivity of a lake. Eutrophic lakes are generally shallow, high in nutrients and have a large amount of plant life.

Leaflets – a portion of a divided or compound leaf

Macrophyte – an aquatic plant, either submerged, floating or emergent, large enough to be seen by the naked eye.

Midrib – the center vein or “rib” in a leaf

Mono-specific – consisting of a single species

Nodes – the location on a stem where other organs (leaves, branches) originate

Pedice – a stalk that supports a flower

Prolific – reproducing in large quantities

Rhizomes – an underground lateral stem.

Spike – an inflorescence consisting of a long unbranched flowering stalk and flowers without stems (sessile flowers)

Stolons – a horizontal stem located near the base of the plant, which sits along the substrate with the ability to root into a new plant at the nodes or stem tip.

Tepals – a segment of the perianth that is not differentiated as a sepal or a petal (both whorls are identical)

Turions – a small shoot that often overwinters

Tuber – a rhizome modified for food storage

Whorl – an arrangement of parts in a ring along a single node



ADDITIONAL RESOURCES AND REFERENCES

Alberta Invasive Plant Council - <https://www.abinvasives.ca/>

Alberta Invasive Plant Identification Guide -
<http://www.wheatlandcounty.ca/DocumentCenter/View/12>

State of Washington Department of Ecology – An Aquatic Plant Identification Manual -
<http://www.ecy.wa.gov/PROGRAMS/wq/plants/plantid2/index.html>

State of Washington Department of Ecology – Native Freshwater plants
<http://www.ecy.wa.gov/programs/wq/plants/native/index.html>

Global Invasive Species Database - <http://www.issg.org/database/welcome/>

Alberta Weed Monitoring Network – Weed Information Home Page
[http://www1.agric.gov.ab.ca/\\$Department/deptdocs.nsf/All/prm13875](http://www1.agric.gov.ab.ca/$Department/deptdocs.nsf/All/prm13875)

PHOTO CREDITS

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Flowering Rush:

- Illustration by Tina Bone:
http://www.artistsandillustrators.co.uk/uploads/portfolio/6733/42554/portfolio_public_large/68d4eccef7b69a64dc8f327ae52a23b3814f8d82.jpg
- Public Image, wikimedia commons:
http://upload.wikimedia.org/wikipedia/commons/thumb/9/9a/Illustration_Butomus_umbellatus1.jpg/380px-Illustration_Butomus_umbellatus1.jpg

Sparganium:

- Public Image, wikimedia commons:
http://upload.wikimedia.org/wikipedia/commons/0/0c/Illustration_Sparganium_erectum0.jpg

Hydrilla:

- Boat Texas Study Guide: http://www.boat-ed.com/texas/studyGuide/Common-Nuisance-Species/10104501_700060007
- Public Image, wikimedia commons:
http://upload.wikimedia.org/wikipedia/commons/a/ab/Hydrilla_USGS.jpg

- Ithaca West Invasive Species: <http://ithacawest.org/wp/wp-content/uploads/2011/08/Hydrilla-Elodea-graphic-MI Lake Info.jpg>
- IFAS Center for Aquatic Plants, University of Florida: <http://www.dep.state.fl.us/coastal/images/articles/0807 WaterWeeds il hydrilla.jpg>

Elodea:

Public Image, wikimedia commons:

- [http://upload.wikimedia.org/wikipedia/commons/e/e3/482_Elodea canadensis.jpg](http://upload.wikimedia.org/wikipedia/commons/e/e3/482_Elodea_canadensis.jpg)

Eurasian Milfoil:

- Public Image, wikimedia commons:

<http://www.pfaf.org/Admin/PlantImages/MyriophyllumSpicatum.jpg>

Northern Milfoil:

- KLSA'S Guide to the Watermilfoil Weevil, Drawing by Colleen and Jessica Middleton: <http://klsa.wordpress.com/resources/projects/milfoil-weevil-guide/>

Curly leaf Pondweed:

- Rice Lake Area Association: <http://ricelake.homestead.com/2012-Curlyleaf-Pondweed.html>
- Crow Wing Lakes Association: <http://crowwing11.org/wp-content/uploads/2010/04/Curly-Leaf-Pond-week-detail.jpg>
- Public Image, wikimedia commons: [http://upload.wikimedia.org/wikipedia/commons/thumb/f/fa/BB-0191_Potamogeton crispus.png/505px-BB-0191_Potamogeton crispus.png](http://upload.wikimedia.org/wikipedia/commons/thumb/f/fa/BB-0191_Potamogeton_crispus.png/505px-BB-0191_Potamogeton_crispus.png)

Clasping leaf Pondweed:

- Public Image, wikimedia commons: [http://upload.wikimedia.org/wikipedia/commons/thumb/5/5c/BB-0188_Potamogeton perfoliatus.png/513px-BB-0188_Potamogeton perfoliatus.png](http://upload.wikimedia.org/wikipedia/commons/thumb/5/5c/BB-0188_Potamogeton_perfoliatus.png/513px-BB-0188_Potamogeton perfoliatus.png)