BLUE Water Science

Steve McCommas

Connor McCommas

Lake Frances LeSuer County 2017

Spring Lake Aquatic Plant 201

- Importance of Aquatic plants in the Lake
- Types of Aquatic Plants
- Spring Lake plant coverage
- What plants are found in Spring Lake
- How to identify aquatic lake plants
- Photos and descriptions of aquatic plants
- Aquatic Invasive Species
- Management of aquatic plants

SPRING LAKE
ASSOCIATION

PRIOR LAKE-SPRING LAKE
WATERSHED DISTRICT

Importance of Lake Plants

- Vegetation promotes water clarity
- Removing “weeds” can degrade water quality:
- The disturbed shoreline is great spot for invasive species to take hold.
- Nutrients are tied up in the plants themselves, nutrients are not available for algae to grow.
- Habitat for fish, plankton, etc

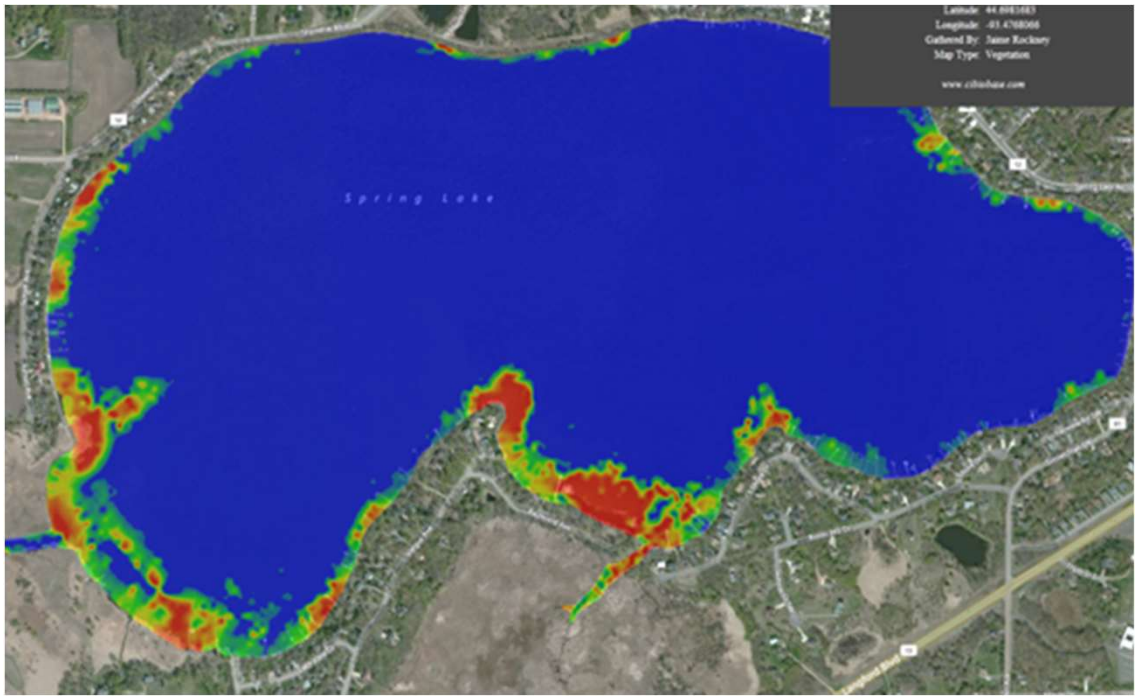
Importance of Aquatic Lake Plants

- A healthy lake requires 40 % plant coverage
- Vegetation promotes water clarity
- - Studies (Canfield and Hoyer, 1992) have shown that good water clarity can be sustained naturally in lakes with at least 40% of the lake bottom growing vegetation.
- PLSLWD monitors aquatic vegetation.

  BioBase program locates and determines

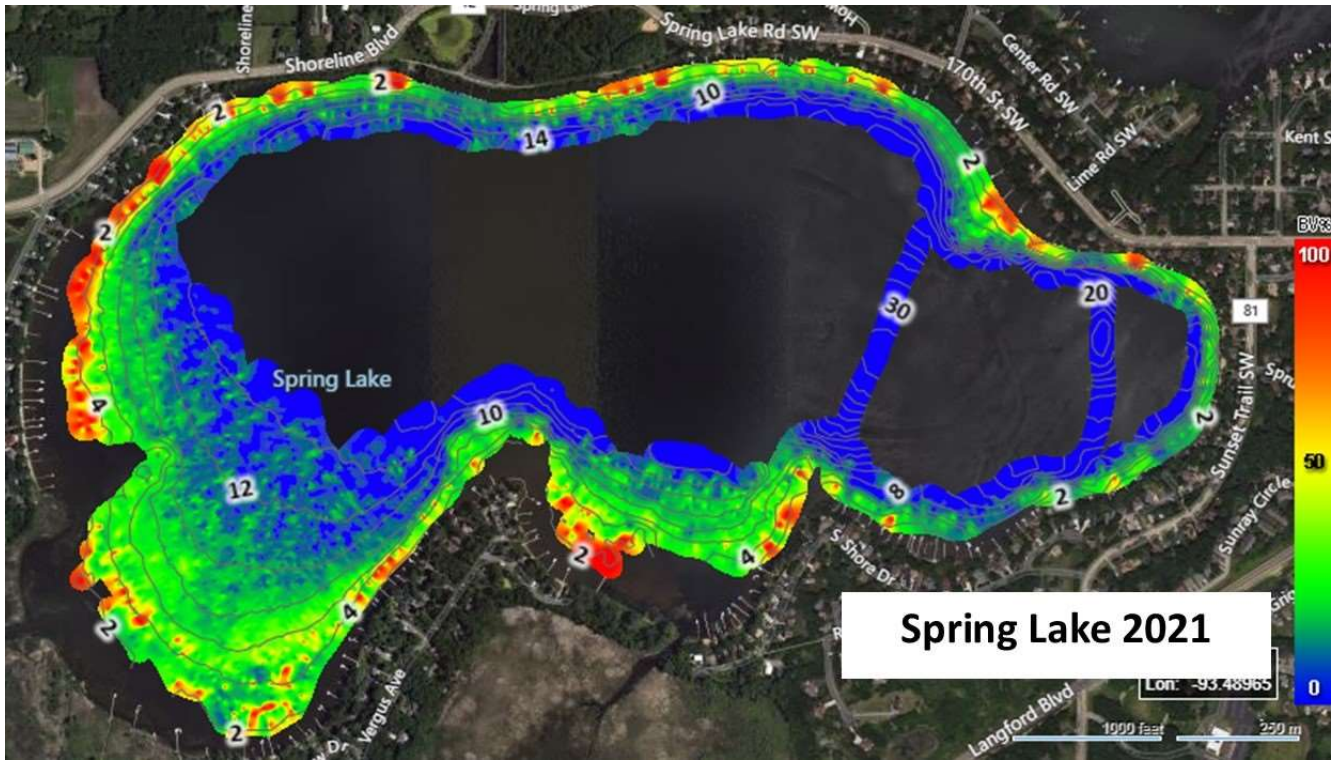
  trends in lake vegetation
- Spring Lake is improving currently at 27 %
- Upper Prior Lake is 30 % 2021
- Lower Prior Lake is 27 % 2020

BioBase Results 2013-Importance of Lake Plants



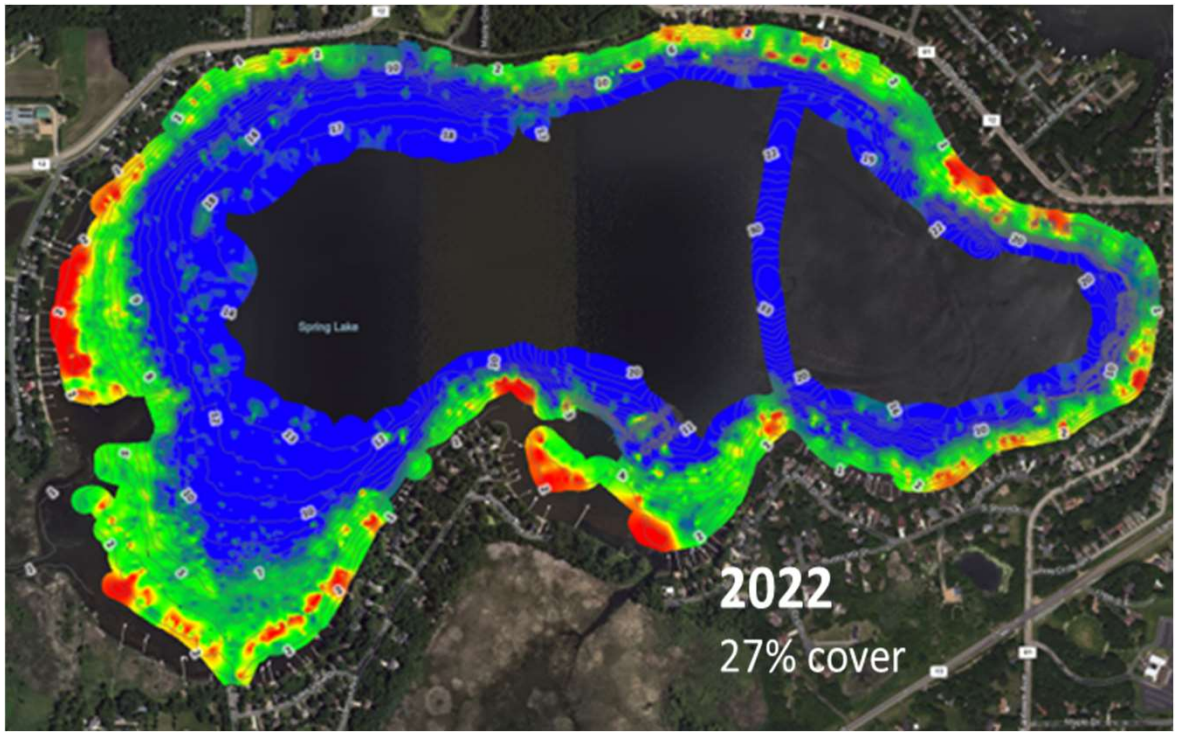
- In 2013 at 10 %
- Red areas indicate high density of plants
- Dark blue areas indicate the absence of plants.
- Greens and yellows show moderate levels of plant presence.

BioBase Results 2021-Importance of Lake Plants



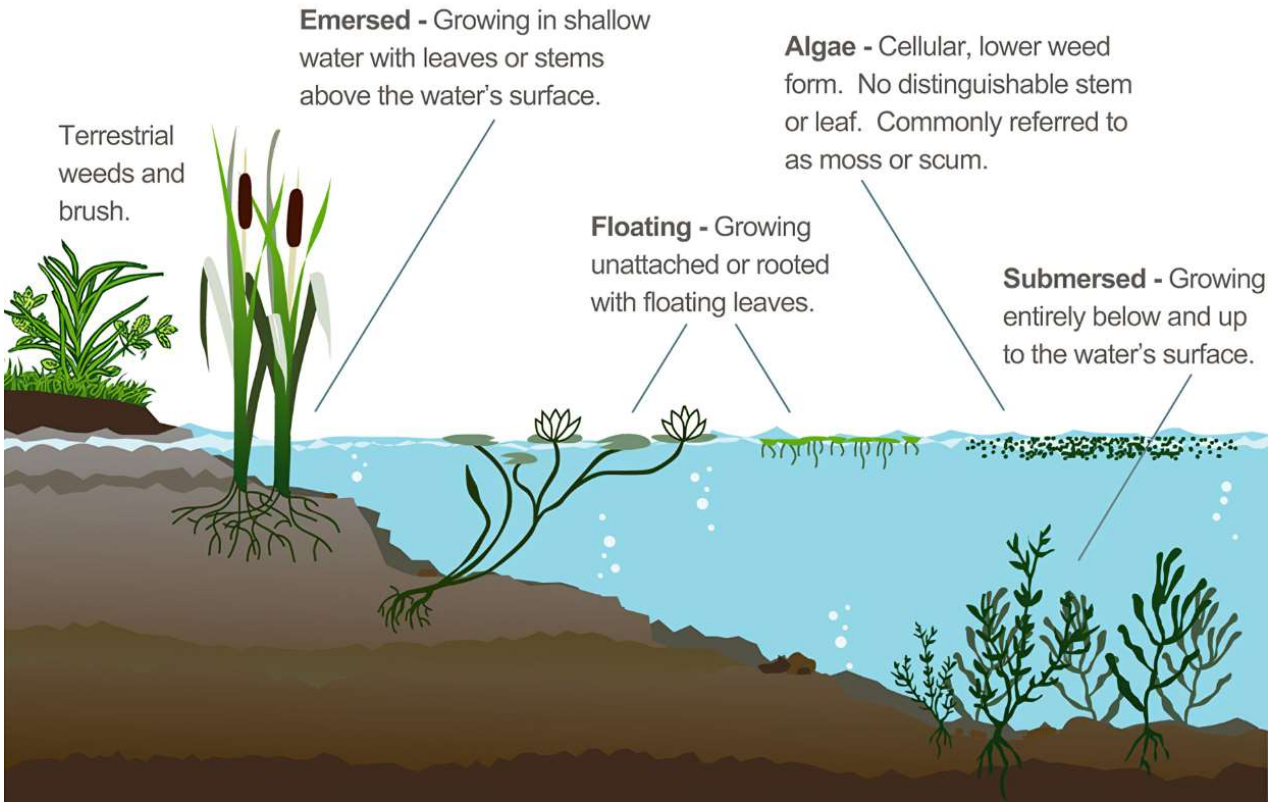
- 2021 now 34%
- Red areas indicate high density of plants
- Dark blue areas indicate the absence of plants.
- Greens and yellows show moderate levels of plant presence.

BioBase Results 2022 – 27% Cover



- Reasons for increased plant growth
- Lake water becoming clearer / Alum/Carp removal / Ferrous Chloride / Zebra Mussels?
- Lower lake levels
- Allow sunlight to reach deeper
- Plants filter pollutants
- Create valuable habitat/food for fish and aquatic creatures

Types of Aquatic Lake Plants



Terrestrial

- weeds brush

Emergent

- shallow water stems, leaves above surface

Floating

- Growing unattached or rooted with floating leaves

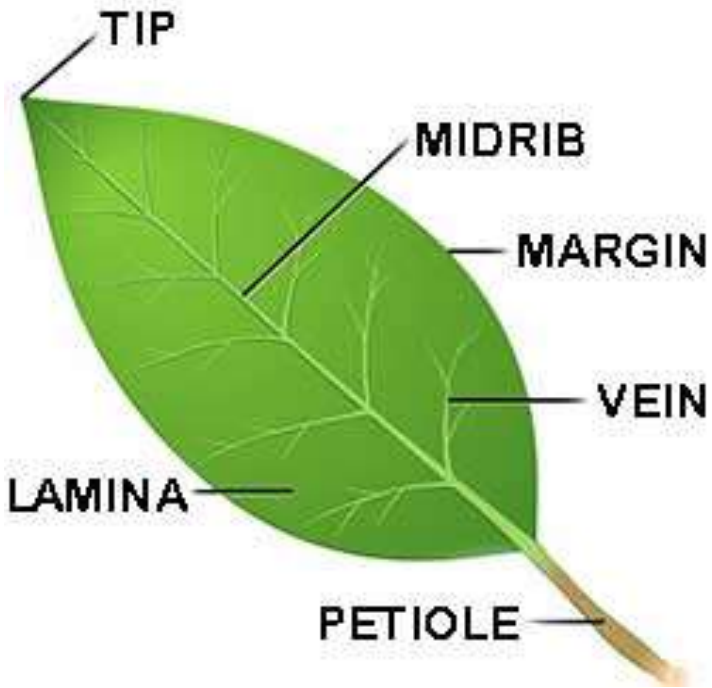
Algae

- Cellular lower weed form no distinguishable form

Submerged

- Growing entirely below surface

Leaf Terminology



Leaf Shape Categories

- **Heart Shaped**
  - Those that resemble a heart pond lilies make up much of this category

- **Round or oblong**
  - Those that are circular or oblong in shape

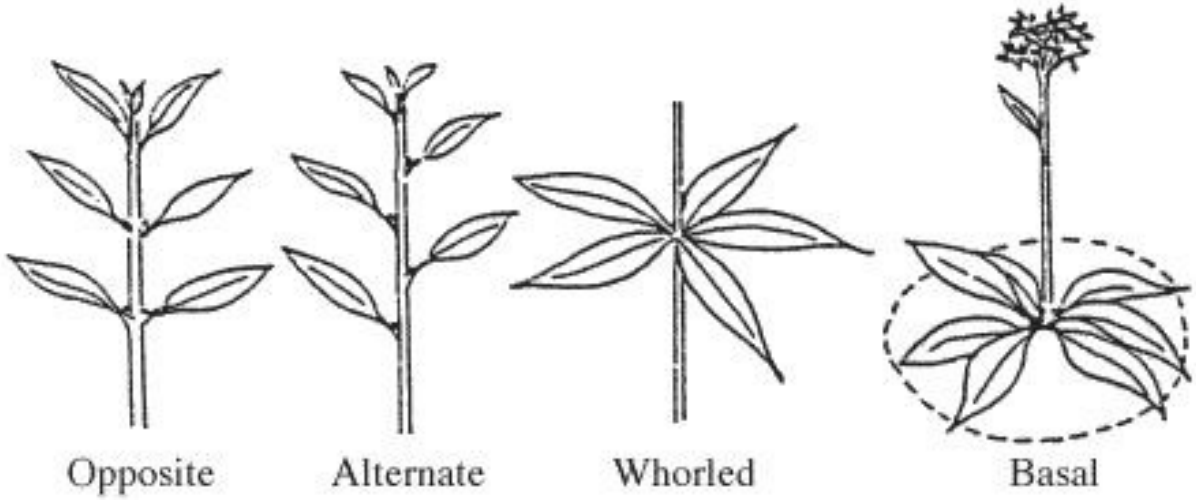
Leaf Shape Categories

- **Branched or Feathery -**
  - dissected into smaller leaves called leaflets and may resemble a feather.

- **Lance shaped or linear leaves**
  - much longer than wide and may be pointed at the end

Leaf Arrangement

- Opposite leaves – leaves are in pairs from stem
- Alternate leaves –leaves alternating on sides of stem
- Whorled leaves – leaves occur in sets of three or more at each point on the stem
- Basal leaves- all leaves originate from the base of the plant



What type of Plants are in Spring Lake

	July 12, 2021 Spring Lake Plant Survey		
	All Stations, n=377		
	Occur	% Occur	Average Density
Coontail	197	52	1.3
Clasping Pondweed	85	23	1.4
Water Celery	85	23	1.3
Naidas	84	22	1.0
Sago Pondweed	83	22	1.2
Stargrass	78	21	1.2
Stringweed Pondweed	72	19	1.1
Chara	52	14	1.1
Curley Pondweed	28	7	1.0
Elodea	23	6	1.0

- July 12, 2021 Survey by Blue Water Science

- Coontail
- Clasping Pondweed
- Water Celery
- Naidas
- Sago Pondweed
- Water Stargrass
- Stringy Pondweed
- Curly Pondweed
- Elodea

What of plants are in Spring Lake (cont'd)

	July 12, 2021 Spring Lake Plant Survey		
	All Stations, n=377		
	Occur	% Occur	Average Density
Northern Milfoil	7	2	1.1
Eurasian Milfoil	3	1	1.0
Cattails	1	1	3.0
Watershield	1	1	1.0
White Water Lilies	1	1	1.0
Fries Pondweed	1	1	1.0
Floating Pondweed	1	1	1.0
Flagstem Pondweed	1	1	1.0

Aquatic Invasive Species

- Eurasian Milfoil
- Curly Leaf Pondweed
- Non-native
- Have potential to create recreational nuisance
- Reduce native plant diversity
- Can potentially create recreational nuisances to lakes
- May create economic or environment damage

Coontail (*Ceratophyllum demersum*)

- Location: Submerged
- Perenial
- Identification: Branched or Feathery, Often heavily branched, to 2 M tall. light green branches once or twice. Tip of plant often very bushy, Flowers if present are small and located in the leaf axils in early summer. May be a dominant species in nutrient rich water as in Spring Lake.

Clasping Pondweed(*Potamogeton richardsonii)*

- Location: Submerged
- Perennial
- Identification: Lance or Linear shaped
- Leaves- Alternate

Leaves alternate(see lower photo) with a prominent midvein 13-33 veins usually with 3-5 stronger veins, wavy edges and coming to a sharp point.. Leaves clasp (partially wrap around)the stem. No floating leaves are produced. Fruits are 2-4 mm, Stipules are 1-2 cm long and free from the leaf, which disintegrate into fibers by midsummer.

Water Celery *(Vallisneria americana)*

- Location: Submerged
- Perenial
- Identification: Lance or Linear
- Leaves – Basal

Water celery grows in basal rosette form, with long this leaves up to 2 meter long and 1 cm wide that stream along the surface. Plants are connected by rhizomes. The edge of the leaf may be wavy. Leaves have a wide stripe of large cells down the middle that often appear shiny or silver. Veins contain a mucus that is visible if broken.

Naidas(*Najas sp*)

- Location: Submerged
- Shape: Lance Shaped or Linear Leaves
- Perennial
- Identification:
- Leaves are opposite / may appear loosely whorled, about 2.5 cm long, .2 – 2 mm wide, with toothed edges 20-100 teeth per side and no petiole. Leaf is blunt And abruptly acute and the base has a slight shoulder at the intersection with the stem. Seeds are dull, 1..2 – 2.5 mm long and have 20-40 rows of 4-6 angled pits.

Sago Pondweed(*Myriophyllum sibiricum*)

- Location: Submerged
- Perenial
- Shape: Lance Shaped or Linear Leaves
- Perennial
- Identification: Stems slightly zig-zagged

Originating from a white rhizome.
1 – 1.5 cm tubers are produced at the end of rhizomes. Late in the season and in calm water, leaves branch profusely like a wide fan, often spreading out along the surface. Leaves have one vein and come to a pointed tip. Stipules clasp for 1-3 cm, the tip free from the leaf 2-10 mm. Flower spikes are produced underwater. Fruits are egg shaped, 3 -4.5 mm long with a short beak and 1 – 3 low ridges. Is a valued food source for waterfowl.

Water Stargrass s (*Heteranthera dubia*)

- Location: Submerged
- Shape: Lance shaped or linear Leaves
- Perennial
- Identification: Slightly flattened

Stems originate from rhizomes, Long linear leaves(to 15 cm long, have no leaf stalk, no dominant midvein. It produces yellow flowers with 6 tepals which are similar to pedals which are produced if the plant is stranded on shore or in shallow water and are held slightly above the water surface. Flowers are 1 - 2 cm in diameter.

Stringy pondweed(small pondweed)
(*Potamogeton pusillus*)

- Location: Submerged
- Shape: Lance shaped or Linear
- Perennial
- Identification: Slender stems

Connected by rhizomes, branching repeatedly. Leaves with a prominent midvein.
3 – 5 veins, and a pointed tip.
Tiny glands usually present at base of leaves. No floating leaves are produced.

Chara, species(Muskgrass, Stonewort, sand grass) (*Chara sp)*

- Location: Submerged
- Shape: Lance or linear - whorled
- Perennial
- Identification: An advanced form of algae

Commonly up to 60 cm tall, but can be larger, with a distinctive odor. Typically, gray green, may be covered with calcium deposits, resulting in a gritty feel.

Curly Leaf Pondweed(*Aquatic Invasive Species*)

(*non-native)(Potamogeton crispus*)

- Location: Submerged
- Shape: Lance or Linear leaves - Alternate
- Perennial
- Identification: Stem partially flattened

Often confused with Clasping Pondweed

Originating from a slender rhizome. Leaves wavy when mature with serrated edges, a prominent midvein, 3-5 veins, no petiole, and blunt tipped. Tolerates cold water. The flower stalk grows up above the water surface, typically in June. It grows to about one inch tall and appears reddish-brown in the water but is actually green when examined closely. First pondweed to come up in spring. Dies off in mid summer, may cause algae bloom. Often confused with Clasping Pondweed

Elodea(common waterweed)

(*elodea canadensis)*

- Location: Submerged
- Shape: Lance/Linear - Whorled
- Perennial
- Identification: Leaves are flat ant pointed in whorls of 3 or rarely 4.

Leaf width is 1.75 – 4 mm wide and 2 – 5 times as long. Bushy near the top of each branch. Tiny female flowers are white to pink, produced on long, thread like stalks that reach to the surface.

Northern Milfoil(*myriophyllum sibiricum)*

- Location: Submerged
- Shape:
- Perennial
- Identification: Leaves are whorled

Similar to Eurasian Milfoil but is a native Species. Stem whitish or tan, usually fairly stout., somewhat stiff, with 4 – 11 pairs of leaflets. Leaves tend to hold their shape out of water. Forms winter buds in early fall, which appear as small, condensed areas of leaves. This hybridizes with Eurasian Water Milfoil and may show intermediate characteristics.

Eurasian Water Milfoil *Aquatic Invasive Species*

(*myriophyllum spicattum*)

- Location: Submerged
- Shape: Branched or feathery leaves.
- Perenial
- Identification: Delicate whorled leaves

Stem is thin, flexible, often pinkish red. Whorled leaves are delicate, usually spaced 2 – 3 cm apart with 12 – 20 pairs of leaflets per leaf. The tip of the plant is often red in summer. No winter buds are produced. Flower spike emergent with whorled flowers and tiny Smooth bracts. May reproduce with fragments. First identified in Spring Lake 2021

EWM in Spring Lake

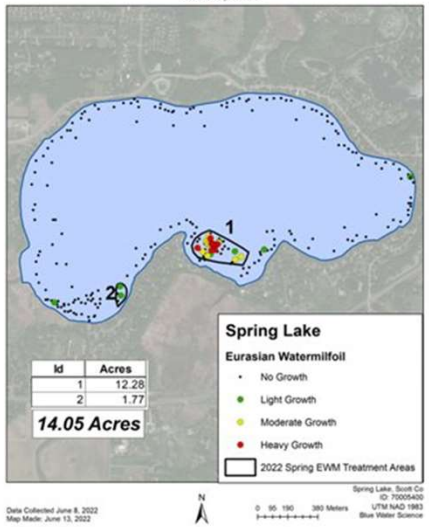
2021

- EWM found in 2021 by Blue Water Science
- Blue Water Science/DNR conducted hand pulling.
- Infestation larger than first thought.
- SLA funded treatment of 8 Acres at a cost of $5000

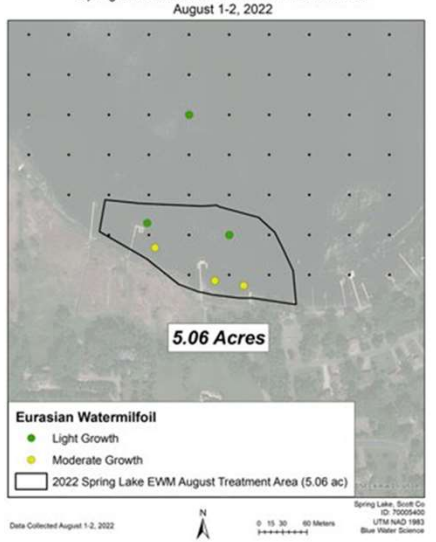
2022

- Three surveys, 2 treatments completed at a cost of $27,000.
- Approximately 20 Acres were identified for treatment.
- DNR Grant Funded Survey and Treatments

Spring Lake Eurasian Watermilfoil Growth
June 8, 2022



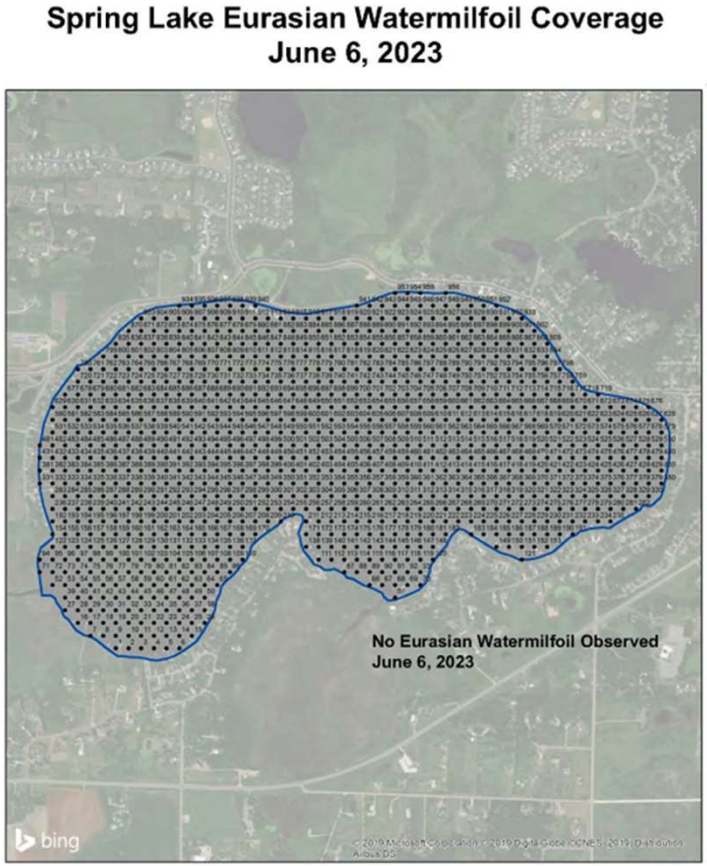
Spring Lake Eurasian Watermilfoil Treatment Area
August 1-2, 2022



2023 EWM Status on Spring Lake

- Three Lake Surveys in 2023
- April BWS / SLA
  Curly Leaf Pondweed Survey
- June 6 BWS / SLA Point
  Intercept Survey
- June 14 SLA Member Survey
- No EWM was identified.

WE ARE CAUTIOUSLY
OPTIMISTIC ABOUT
MITIGATION EFFORTS



Cattails(*Typha latifolia*)

- Location: Emergent
- Shape: Lance shaped or linear
- Perennial
- Identification:

Grows above water surface; is thickly rooted; has long, slender stalks growing 3 to 10 feet high; flower consists of a cigar-shaped "cattail", which is green during early summer and turns brown and fuzzy in the fall and following spring. Look for the fuzzy brown "cattail" near the top of the stalk. Leaves are long, flat, and about 1-inch wide. Note: The DNR permits the removal of these plants only in a small area to provide boat access to deeper lake water.

Water Shield (*Brasenia schreberi*)

- Location: Floating
- Shape: Round
- Perennial
- Identification:

Elastic stems up to 2 meters long, attached to center of leaf underside. Stems and underside of leaf usually covered in a clear, slimy coating. Veins radiating outward from center of leaf, mainly floating 5 – 15 cm long, but young leaves may be submergent along the stem. Flowers 6 – 8 parted, red-purple 2 cm wide, held above the water surface.

White Water Lilies (*Nymphaea odorata*)

- Location: Emergent
- Shape: Round
- Perenial
- Identification:

Large round green-purple leaves with a narrow notch from the edge of the to nearly the center, floating up to 30 cm in diameter, with 6 – 27 veins radiating away from the petiole. Delicate submergent leaves may be seen the the base of the plant. Flowers white with a yellow center, floating, 6 – 19 cm across with 17 43 petals and 35 – 120 stamens. Seeds are 1.5 2.5 cm. Spreads by spongy rhizomes up to 5 cm in diameter. Provides important habitat for largemouth bass and sunfish and its seeds are eaten by waterfowl.

Fries Pondweed(*Potamogeton friesii*)

- Location: Submerged
- Shape: Lanced shape/linear leaves- Alternate
- Perennial
- Identification: Delicate flattened stems

Originating from a rhizome. Leaves alternate, with no petiole, 5 – 7 veins, one row of lacunar cells on each side of the midvein and a rounded tip with a short bristle or beak. Tiny bumps present at leaf nodes. Stipules are white, wrapped around the stem and may be fibrous late in the season. Flowers produced on a flattened stalk.

Floating Pondweed(*Potamogeton natans)*

- Location: Floating, submergent
- Shape: Round
- Perennial
- Identification: Alternate, floating leaves

Held on long petiole,
5 – 10 cm long with 17 -37 veins, smooth margins, and a slightly heart shaped base. Leaves usually held at a 90 degree angle to the Petiole. Submergent leaves are linear 1 -2 mm wide with 3 – 5 veins and may be partially floating. Floating leaves may not be present until early summer. 2 – 5 cm flower spike held above water.

Flatstem Pondweed(*Potamogeton zosteriformis)*

- Location: Submerged
- Shape: Lance shaped o
- Perennial
- Identification Stem flattened,

Leaves up to 20 cm long, pointed with a midvein. 3 – 5 prominent veins, with many finer veins, up to 35 total. No floating leaves are produced.

Zebra Mussels(recently found in Spring Lake)

Aquatic Invasive Species

HOW TO Identify

- D-shaped
- Sits flat on its side
- Color varies but is usually light brown to white with brown/black stripes
- Size: 0-1.25 inches in length
- Difficult to manage / mitigate per DNR
- Follow Clean, Drain, Dispose policy

Starry Stonewart(*Aquatic Invasive Species*) (*Nitellopsis obtuse*)Not found in Spring Lake

- Appearance

Starry stonewort is a bushy, bright green macro-algae. It produces a characteristic star-shaped bulbil.

- Leaves and Stem

Thin, bright green branchlets (branch-like structures) can be variable in length and are arranged in whorls (radiating out from a single point) around the stem. Branchlets typically extend in acute angles away from the stem nodes. Tips of the branchlets may have irregularly-lengthed forks or divisions.

Spiny Water Flea(*Aquatic Invasive Species*)
Not found in Spring Lake

- Spiny waterfleas are microscopic animals, also known as zooplankton, that live in open water. Adults range from one-quarter to five-eighths inches long and are opaque in color. They have a single long tail with one to four spines and have one large, distinctive black eyespot. The spiny waterflea is often found on fishing line or other equipment in clumps that resemble a gelatinous blob with a texture of wet cotton.

Management of Aquatic Plants

Spring Lake 2000

- Under Minnesota law, aquatic plants growing in public waters are the property of the State.
- Landowner responsible for Shoreline out to 150 ft
- Prior Lake Spring Lake Watershed District manages Curly Leaf Pondweed each year
- Lake surveys done every year in Spring

Management of Aquatic Plants

- At times, Excessive Aquatic Plants may need to be managed but may require a DNR permit
- Is a permit required?
  - Is the aquatic vegetation interfering with access, swimming, or other water recreation activities?
  - Is the vegetation emergent or floating-leaf?
  - Answer is Yes
  - A permit is likely required.
  - **A permit is required anytime a Herbicide is Used**

Spring Lake 2000

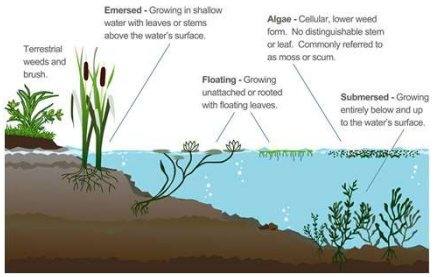
Management of *Emergent* Aquatic Plants

- Any removal of emergent vegetation REQUIRES A PERMIT
  "think Cattails"

- However, a permit of continuing duration to maintain a channel to open water may be obtained, under the following conditions:

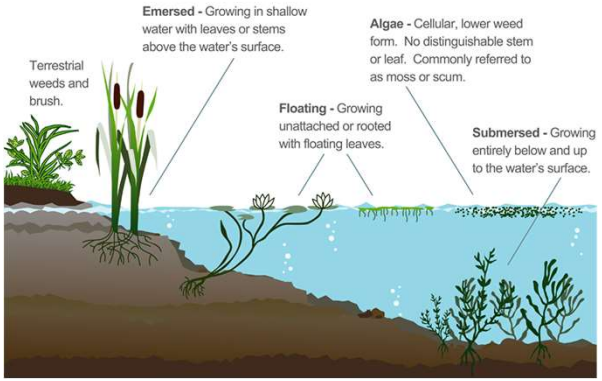
  - The channel is no more than 15 feet wide
  - After the first year the channel is maintained mechanically (cutting or pulling) the channel remains in the same location from year to year

- These permits are not transferable



Management of *Floating* Leaf Aquatic Plants

- FLOATING LEAF VEGETATION
  - 15-foot-wide channel may be ***mechanically*** maintained through floating leaf vegetation extending to open water without a permit.
- Any removal greater than 15 foot will require a permit.
- Herbicide use to control vegetation always requires a permit



Management of Submerged Aquatic Plants
When permit is not needed

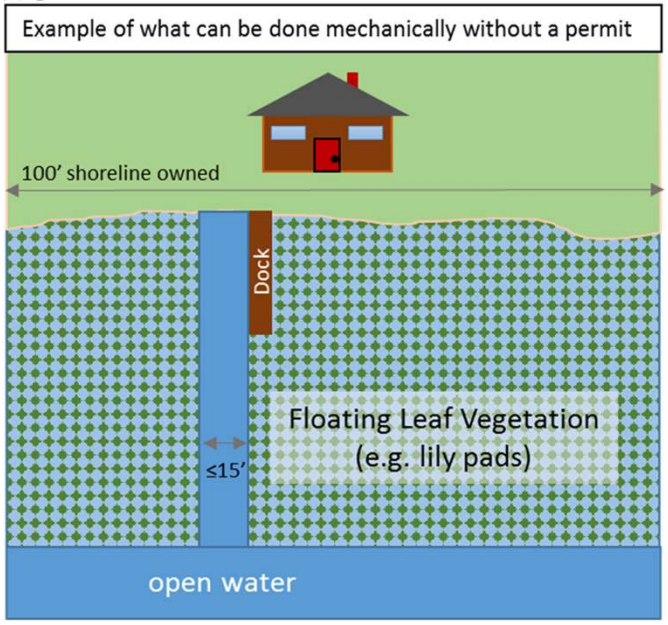
Lakeshore owner may mechanically remove submerged vegetation provided:

- Removed Submerged Vegetation area is under 2500 square feet
- Cleared area does not extend more than 50 feet along shoreline or one half the length of shoreline.
- The channel is 15 feet wide or less.
- Plant removal does not significantly alter the lake bottom.
- Removed vegetation is deposited on land

If Herbicide is to be used a DNR Permit is required.

More information, refer to the link below.

https://www.dnr.state.mn.us/shorelandmgmt/apg/index.html



SPRING LAKE
ASSOCIATION

Thank You!

PRIOR LAKE-SPRING LAKE
WATERSHED DISTRICT

Reference: Aquatic Plants of the Midwest, Fourth Edition,

Paul M. Skawinski

Reference:

https://www.dnr.state.mn.us/shorelandmgmt/apg/index.html

https://www.plslwd.org/wp-content/uploads/2021/03/Spring-Lake-2020-CLP-Surveys-and-aquatic-plant-report_-3-10-21.pdf