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Conservation That Works!

Spring Lake, Waushara County
Point Intercept Aquatic Plant Survey
August 9th & 10th, 2021

To whom it may concern,

Golden Sands Resource Conservation & Development Council, Inc (RC&D) completed a Point Intercept Aquatic Plant Survey (PI Survey) on Spring Lake on August 9th & 10th, 2021. The survey was completed by Golden Sands staff Chris Hamerla and Ricky Xiong.

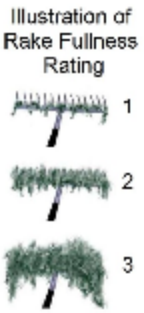
Benefits of Aquatic Plants

Aquatic plants are an important part of the state's wet ecosystems. They produce oxygen and help protect water quality. They help clarify water in wetlands, lakes and rivers by using nutrients like phosphorus and nitrogen that might otherwise be used to produce algal blooms. Aquatic plants help reduce wave action and current flow which reduces shoreland erosion and helps stabilize sediments in the waterbody. Perhaps most apparent, plants provide food, shelter and habitat for fish, invertebrates and all sorts of wildlife. Finally, diverse, healthy plant communities can help prevent invasive species from establishing. Invasive species are more likely to become established in disturbed areas.

Aquatic Invasive Species

Aquatic invasive species (AIS) are plants or animals that are not native to a particular area and dominate an area where they are introduced. They can be very successful because they fill a niche that isn't occupied, are able to tolerate a wider range of living conditions, they don't have any natural predators or diseases or perhaps they begin growing earlier. EWM, curly leaf pondweed and purple loosestrife are common examples of AIS. AIS can threaten an area both ecologically and economically. They can disrupt food chains and degrade habitat which negatively impacts fish, invertebrates and wildlife. Nuisance levels of AIS can reduce or even prevent recreational opportunities like fishing, boating, wildlife watching, etc... These reduced recreational opportunities have negative impacts to the local and statewide economy. AIS such as zebra mussels can negatively impact water quality, food chains, aquatic habitat, recreation and industry. Unfortunately the effects of AIS are difficult to foresee since the degree of impact can vary greatly from one place to another. One system may be completely taken over by AIS while AIS in another nearby system may become a part of the community and have little to no negative effects.

Point Intercept Aquatic Plant Surveys



Point intercept (PI) surveys are completed by traveling to predetermined GPS points across the lake. Each PI lake map is based on the area and depth specific to that lake. The maps with GPS coordinates are obtained through the WDNR. Spring Lake contains 222 sample points. Using a GPS, staff traveled by kayak to 210 of the 222 GPS points. The 12 points not traveled to where non-navigable due to land or thick emergent plants in shallow water. At each point a two-sided rake was used to sample roughly a one foot area of the lake bottom. Sediment type (sand, rock or muck), water depth in half foot increments and the aquatic plant community was recorded. Once the rake is brought to the surface the amount of plant material on the rake is assessed and recorded. The overall fullness of plants on the rake is rated a one, two or three (see illustration to the left). Then the individual species are ranked using a one, two or three. All data is recorded on the PI worksheet. Plants seen within six feet of the sample point are recorded as a "visual". (Figure 1 shows map with survey points and EWM locations.) Other plants seen on the lake are recorded as a "boat survey". To learn more about PI sampling methods and how data is collected please visit: http://www.uwsp.edu/cnr-ap/UWEXLakes/Documents/ecology/Aquatic%20Plants/PL-Protocol-2010.pdf

Frequency of of occurrence is the percentage of time a species is found out of the total number of points sampled. Not all sample points are capable of supporting plant growth. *Littoral frequency of occurrence* is how often a species is found out of the total number of points that support plant growth. (Shown in Table 1) The deepest depth where plant growth is found is called *maximum depth of plant growth*. *Species richness* is the the total number of different species found on the rake while sampling points. *Floristic Quality Index (FQI)* is the ranking of the plants in the lake that compares to an undisturbed lake. The higher the FQI the closer the plant community is to that of an undisturbed system. Approximately 250 lakes across Wisconsin are used to calculate the statewide and ecoregion averages for comparison. Table 2 summarizes the lake's littoral frequency of occurrence, maximum depth of plant growth, species richness and FQI.

It should be noted that plant species may differ from year to year on the following Table 1. GPS coordinates are accurate only within twenty feet and plant communities can shift. Table 1 represents only those species which were detected on the rake during the survey.

Table 1: **Species Present**

% Littoral frequency of occurrence: This is calculated by taking the total number of times a species is recorded divided by the total number of points in the lake where plant growth is possible.

***** means a non-native species, potentially invasive.

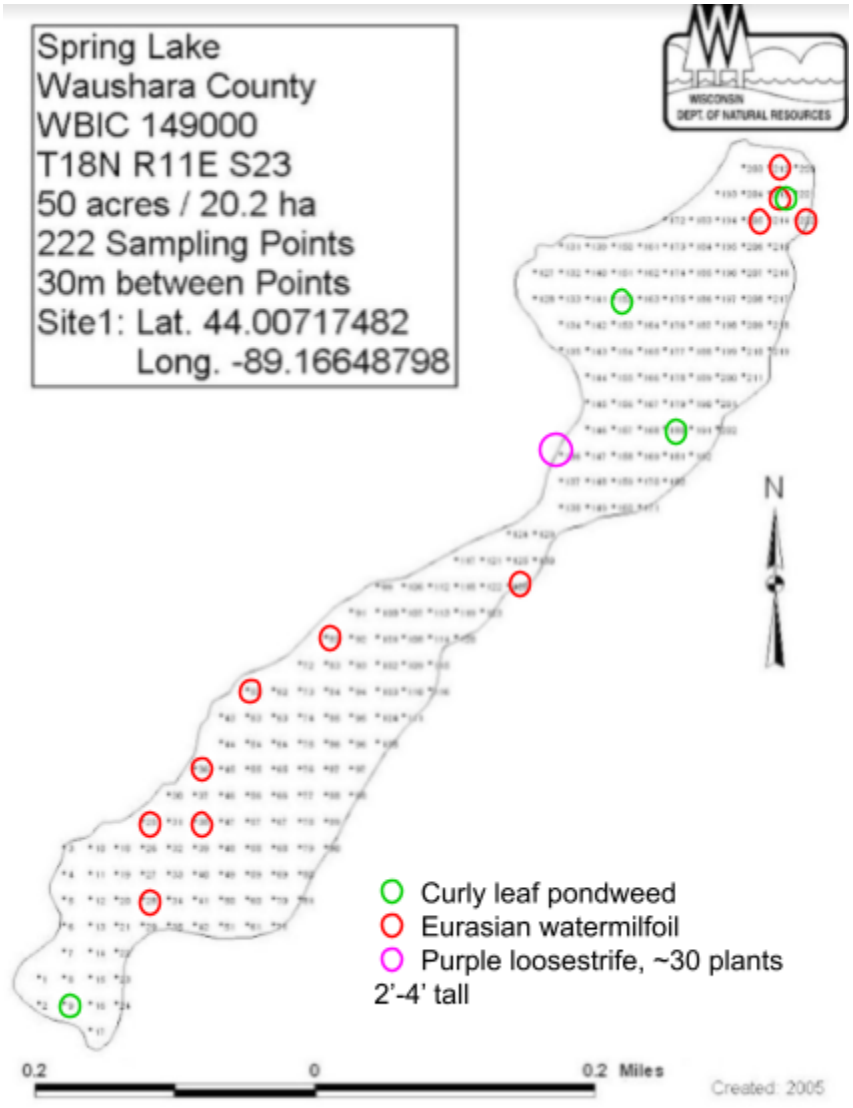
Common Name	Scientific Name	Plant type: floating leaf, free floating, submergent, emergent	% Littoral Frequency of Occurrence
Eurasian water milfoil*	*Myriophyllum spicatum*	submergent	4.49
Curly-leaf pondweed*	*Potamogeton crispus*	submergent	1.12
Coontail	*Ceratophyllum demersum*	submergent	14.04
Muskgrasses	*Chara*	submergent	58.99
Common waterweed	*Elodea canadensis*	submergent	5.62
Water star-grass	*Heteranthera dubia*	submergent	4.49

Small duckweed	*Lemna minor*	free floating	1.69
Northern water-milfoil	*Myriophyllum sibiricum*	submergent	19.10
Whorled water-milfoil	*Myriophyllum verticillatum*	submergent	0.56
Slender naiad	*Najas flexilis*	submergent	15.17
Southern naiad	*Najas guadalupensis*	submergent	2.25
Nitella	*Nitella sp.*	submergent	2.81
Spatterdock	*Nuphar variegata*	floating leaf	0.56
White water lily	*Nymphaea odorata*	floating leaf	5.06
Leafy pondweed	*Potamogeton foliosus*	submergent	5.06
Fries' pondweed	*Potamogeton friesii*	submergent	1.12
Variable pondweed	*Potamogeton gramineus*	submergent	4.49
Illinois pondweed	*Potamogeton illinoensis*	submergent	1.69
Long-leaf pondweed	*Potamogeton nodosus*	submergent	1.69
Small pondweed	*Potamogeton pusillus*	submergent	0.56
Common arrowhead	*Sagittaria latifolia*	emergent	Visual
Hardstem bulrush	*Schoenoplectus acutus*	emergent	3.37
Water bulrush	*Schoenoplectus subterminalis*	emergent	0.56
Softstem bulrush	*Schoenoplectus tabernaemontani*	emergent	0.56
Large duckweed	*Spirodela polyrhiza*	free floating	Visual
Sago pondweed	*Stuckenia pectinata*	submergent	7.87
Narrow-leaved cattail	*Typha angustifolia*	emergent	Visual
Creeping bladderwort	*Utricularia gibba*	free floating	0.56
Small purple bladderwort	*Utricularia resupinata*	free floating	2.25
Common bladderwort	*Utricularia vulgaris*	free floating	2.81
Wild celery	*Vallisneria americana*	submergent	1.69
Horned pondweed	*Zannichellia palustris*	submergent	1.69
Aquatic moss	----------	submergent	1.12
Filamentous algae	----------	free floating	1.69
Native phragmites	*Phragmites australis spp. americanus*	emergent	Visual

Table 2: **Lake Survey Summary**

	Spring Lake	Statewide Average	North Central Hardwoods Forests Ecoregion Average
Littoral Frequency of Occurrence (%)	**78.65**	**74.3**	**76.0**
Maximum Depth of Plant Growth	**23**	**15.3**	**15.9**
Species Richness	**29**	**16.8**	**16.2**
Floristic Quality Index (FQI)	**32.9**	**24.1**	**23.3**

Figure 1: **Eurasian watermilfoil (EWM) and curly-leaf pondweed (CLP) sites**



If there are any questions regarding the PI survey or results please contact Golden Sands RC&D, Chris Hamerla, chris.hamerla@goldensandsrcd.org (715) 343-6215 ext. 704