



GOLDEN SANDS

RESOURCE CONSERVATION & DEVELOPMENT COUNCIL, INC.

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Conservation That Works!

Pearl Lake, Waushara County Point Intercept Aquatic Plant Survey August 5th & 14th, 2019

Mr. Volden,

Golden Sands Resource Conservation & Development Council, Inc (RC&D) completed a Point Intercept Aquatic Plant Survey (PI survey) on Pearl Lake on August 5th & 14th, 2019. The survey was requested by the Pearl Lake Protection & Rehabilitation District. PI surveys capture the plant community and the density of any invasive species, like Eurasian watermilfoil (EWM). This monitoring data can be used to show progress over time and used by the Wisconsin Department of Natural Resources staff to understand what type of management is needed for EWM.

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

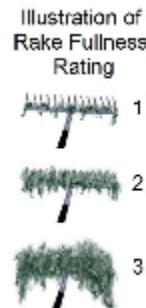
Aquatic invasive species (AIS) are plants or animals that are not native to a particular area and dominate an area where they are introduced. They can be very successful because they fill a niche that isn't occupied, are able to tolerate a wider range of living conditions, they don't have any natural 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. Pearl Lake contains 423 sample points, of those 172 sample points had vegetation. Using a GPS, staff traveled by kayak to each of the GPS points. 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 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 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. 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

Common Name	Scientific Name	Plant type: floating leaf, free floating, submergent, emergent	% Littoral Frequency of Occurrence
Nitella	<i>Nitella sp.</i>	submergent	50.00
Muskgrasses	<i>Chara sp.</i>	submergent	39.53
Slender naiad	<i>Najas flexilis</i>	submergent	23.84
Aquatic moss	-----	submergent	17.44
Variable pondweed	<i>Potamogeton gramineus</i>	submergent	11.05
Wild celery	<i>Vallisneria americana</i>	submergent	8.72

Filamentous algae	-----	free floating	3.49
Sago pondweed	<i>Stuckenia pectinata</i>	submergent	3.49
*Eurasian water-milfoil	<i>Myriophyllum spicatum</i>	submergent	2.91
Stiff pondweed	<i>Stuckenia strictifolius</i>	submergent	2.91
Common waterweed	<i>Elodea canadensis</i>	submergent	2.33
Flat-stem pondweed	<i>Potamogeton zosteriformis</i>	submergent	2.33
Small pondweed	<i>Potamogeton pusillus</i>	submergent	2.33
Coontail	<i>Ceratophyllum demersum</i>	free floating	1.16
Floating-leaf pondweed	<i>Potamogeton natans</i>	submergent	1.16
Leafy pondweed	<i>Potamogeton foliosus</i>	submergent	1.16
Nothern water-milfoil	<i>Myriophyllum sibiricum</i>	submergent	0.58
Fries pondweed	<i>Potamogeton friesii</i>	submergent	0.58

% 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.

Table 2: Lake Survey Summary

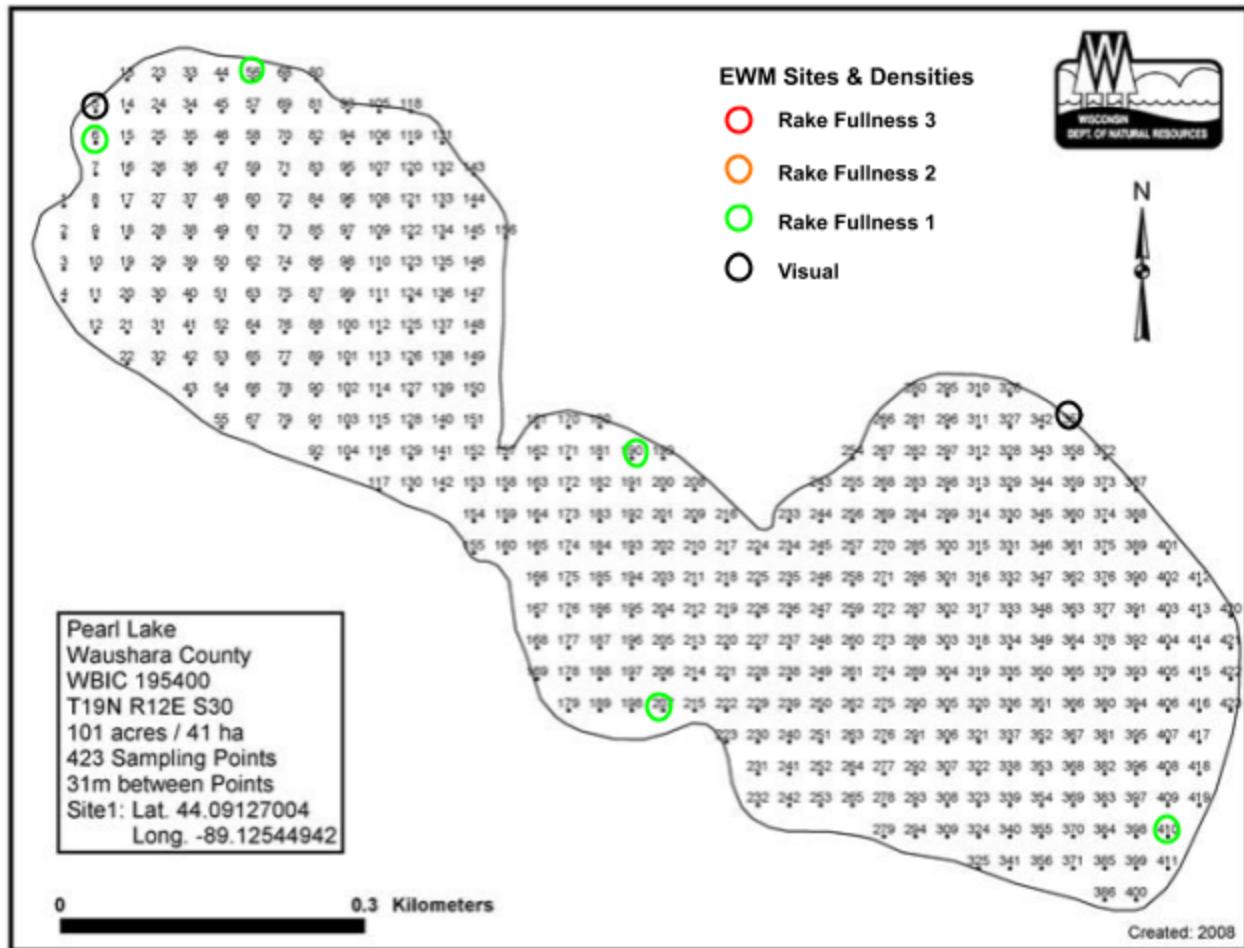
	Lake	Statewide Average	North Central Hardwoods Forests Ecoregion Average
Littoral Frequency of Occurrence (%)	63.5	74.3	76.0
Maximum Depth of Plant Growth	34	15.3	15.9
Species Richness	16	16.8	16.2
Floristic Quality Index (FQI)	22.7	24.1	23.3

Summary

Pearl Lake has a healthy diversity of native aquatic plants aligning with the State average. The aquatic plant community also shows a high FQI, meaning that the lake is closer to the quality of lakes that are left undisturbed. (See Table 2.) The only invasive species that was found during this survey was EWM; while it was present it was not widely distributed.

The other thing to note in regards to Table 2 is that while Pearl Lake falls amid the State averages for most of the categories, the "Maximum Depth of Plant Growth" was found to be 34 feet which is much deeper than that of the average. This is because nitella and aquatic moss were commonly found at depths 20 feet or deeper. Nitella in particular prefers deep waters, this paired with the clear water clarity of Pearl Lake allows for plants to grow at these depths.

Figure 1: EWM Sites and Densities



If there are any questions regarding the PI survey or results please contact Golden Sands RC&D, Anna Cisar, anna.cisar@goldensandsrcd.org (715) 343-6215