GOLDEN SANDS
RESOURCE CONSERVATION & DEVELOPMENT COUNCIL, INC.
1100 Main Street, Suite #150
Stevens Point, WI 54481
(715) 343-6215
https://www.goldensandsrcd.org/
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Conservation That Works!

# Grand Lake, Green Lake County WBIC #161100
# Point Intercept Aquatic Plant Survey
# June, 27 & 28, 2022

Golden Sands Resource Conservation & Development Council, Inc (RC&D) completed a Point Intercept Aquatic Plant Survey (PI Survey) on Grand Lake on June 27 & 28, 2022. The survey was completed by Golden Sands RC&D staff Chris Hamerla and Green Lake Land Conservation staff, Jocelyn Pausma. The survey was completed to assess native and invasive plant species distribution and abundance. This data will assist in potential lake management planning and decision making. Grand Lake is listed at 242 acres and has an approximate maximum depth of 8 feet.

## Benefits of Aquatic Plants

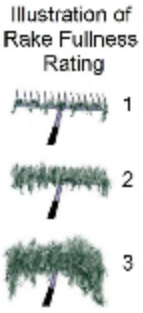
Aquatic plants are an important part of the state's wet ecosystems. They produce oxygen and help protect water quality. They help clarify water in wetlands, lakes and rivers by using nutrients like phosphorus and nitrogen that might otherwise be used to produce algal blooms. Aquatic plants help reduce 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. Eurasian watermilfoil, 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. Grand Lake contains 423 sample points. 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 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 a 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: https://dnr.wi.gov/lakes/plants/research/project.aspx?project=96832337

*Frequency of occurrence* is the percentage of time a species is found on the rake 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. Only species which were found on the rake during the PI survey are used to calculate FQI and species richness. This helps to standardize surveyor efforts across the entire state and is why visual observations are not included. Table 2 summarizes the lake's littoral frequency of occurrence, maximum depth of plant growth, species richness and FQI. It should be noted that a lake falling below the statewide average for that ecoregion isn't necessarily "disturbed". Many influences play a role in determining the species and abundance of plants in a lake. Water chemistry, acidity, hardness, clarity and bottom sediment are examples of natural influences. Increased nutrient runoff, use of chemicals, development and water control structures are examples of human influences.

It should also 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 this 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. ------ means not found that year.

The 2016 PI data is shown in the far right column. It should be noted that the much lower CLP % is likely in part due to that survey being completed on September 6 and 9, 2016. Much of the CLP may have died off by that point in the year. Differences in data from year to year may be due to temperature, shifting plant communities, GPS location tolerances or other factors.

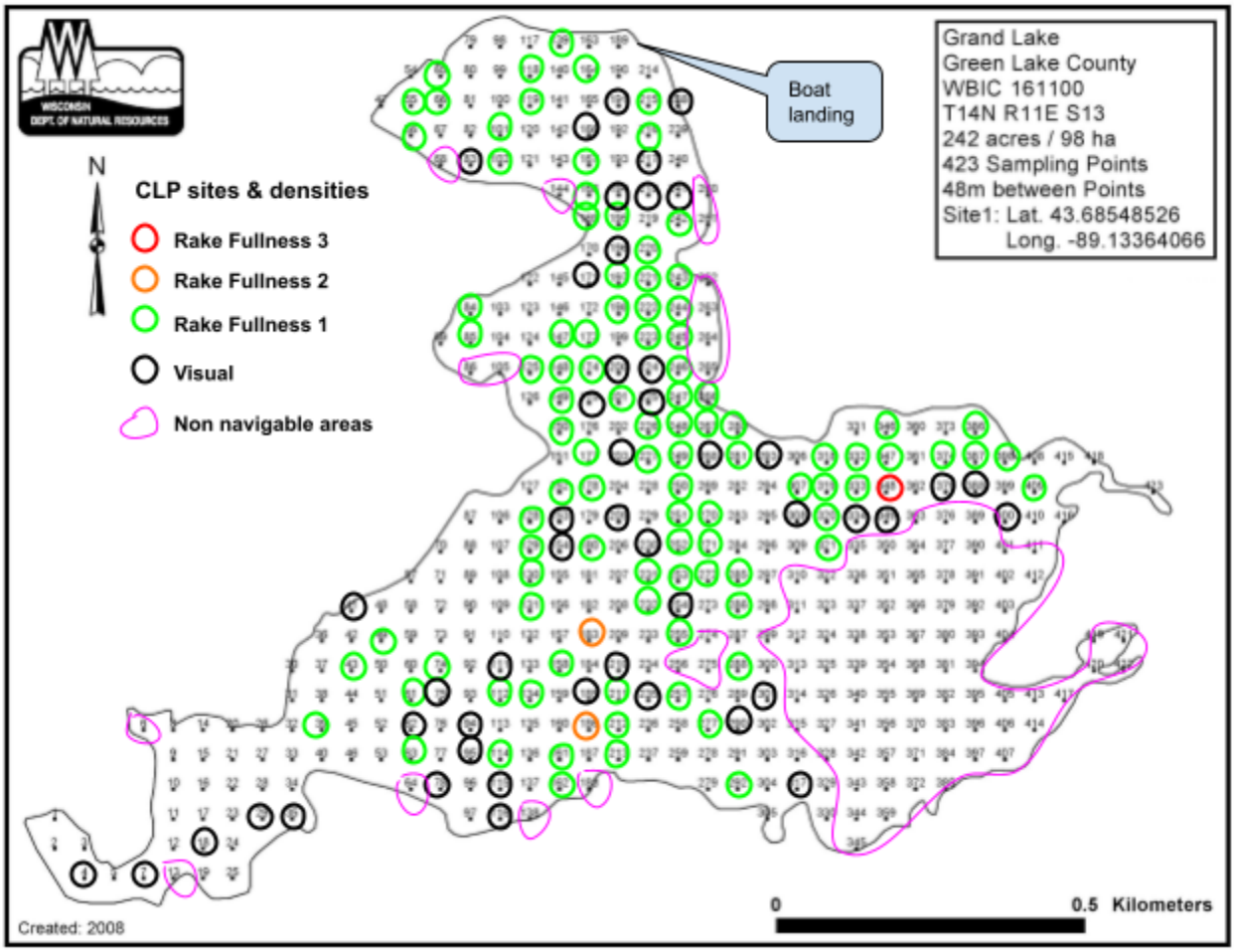
| Common Name | Scientific Name | Plant type: floating leaf, free floating, submergent, emergent | % Littoral Frequency of Occurrence | 2016 survey % |
|---|---|---|---|---|
| *Eurasian watermilfoil | *Myriophyllum spicatum* | submergent | 2.84 | 1.18 |
| *Curly leaf pondweed | *Potamogeton crispus* | submergent | 31.89 | 5.29 |
| Coontail | *Ceratophyllum demersum* | submergent | 76.46 | 60 |
| Muskgrass | *Chara spp* | submergent | 1.24 | 3.24 |
| Common waterweed | *Elodea canadensis* | submergent | 66.87 | 41.76 |
| Small duckweed | *Lemna minor* | free floating | 47.06 | 58.24 |
| Northern watermilfoil | *Myriophyllum sibiricum* | submergent | .31 | _____ |
| Whorled watermilfoil | *Myriophyllum verticillatum* | submergent | 6.19 | 1.76 |
| Leafy pondweed | *Potamogeton foliosus* | submergent | 2.48 | _____ |
| Fries pondweed | *Potamogeton friesii* | submergent | 12.07 | 2.06 |
| Long-leaf pondweed | *Potamogeton nodosus* | submergent | 4.02 | .29 |
| Flat-stem pondweed | *Potamogeton zosteriformis* | submergent | 2.48 | _____ |
| White water crowfoot | *Ranunculus aquatilis* | submergent | 14.55 | 5.59 |
| Arrowhead | *Sagittaria spp* | submergent/emerge | .31 | _____ |

| | | | | |
|---|---|---|---|---|
| | | nt | | |
| Bur-reed | *Sparganium spp* | emergent | .32 | _____ |
| Large duckweed | *Spirodela polyrhiza* | free floating | 1.58 | _____ |
| Sago pondweed | *Stuckenia pectinata* | submergent | 21.67 | 2.94 |
| Common bladderwort | *Utricularia vulgaris* | free floating | .32 | _____ |
| Watermeal | *Wolffia spp* | free floating | 12.38 | _____ |
| Wild rice | *Zizania spp* | emergent | 3.10 | .29 |
| Filamentous algae | ---------- | ---------- | 26.01 | _____ |

Table 2: **Lake Survey Summary** (filamentous algae and visuals are not included in species richness) Grand Lake is listed at 242 acres with a maximum depth of aprox 8 ft.

| | **Lake** | **Statewide Average** | **Southeastern WI Till Plains Eco Average** | **2016 Average** |
|---|---|---|---|---|
| Littoral Frequency of Occurrence (%) | **98.14** | **74.3** | **79.4** | **84.41** |
| Maximum Depth of Plant Growth | **6.5** | **15.3** | **13.6** | **6** |
| Species Richness | **20** | **16.8** | **16.7** | **13** |
| Floristic Quality Index (FQI) | **23.5** | **24.1** | **14.5** | **Not available** |

Figure 1: **Curly-leaf Pondweed Sites and Densities**




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