Little Sand Lake Aquatic Vegetation Mapping and Monitoring –



Dan Kittilson, Jim Thomsen, and Vern Thompson

an ongoing project



Near Right: 2005 – 2008 180 points

WHY MONITOR AQUATIC PLANTS?

- Awareness of the Importance of Aquatic Plants
- Encourage Lakeshore Owners to Preserve Shoreline in a Natural State
- Provide Benchmark for Ongoing Monitoring of the Health of the Lake
- Detect Exotic Species (AIS)
- Detect Excessive Plant Removal



PURPOSE

- **Creates an AIS baseline**
- Identifies sensitive areas
- Provides a historical record
- Service to other environmental monitoring agencies such as UofM and DNR:
 - Minnesota Aquatic Invasive Species Research Center (MAISRC), University of Minnesota
 - DNR Fisheries



PROPERTY VALUES

Property values are impacted by Water quality / Water clarity

Having a healthy variety and quantity of vegetation contributes to higher water quality

Charles Parson, geography professor at BSU, and Patrick Welle, a BSU professor of economics and environmental studies, co-authored a study titled "Lakeshore Property Values and Water Quality" and released the findings in June 2011. Their conclusion: The better the water clarity in a lake, the higher the value of the land around that lake.

HISTORY and BACKGROUND

2004: LSL leaders attend "visioning" session.

2005 & 2006: LSL leaders create a "Lake Management Plan," and volunteers conduct initial aquatic plant inventory.

2006: HC COLA creates a plan to conduct aquatic plant mapping on selected lakes to determine a more in-depth analysis of each lake's ecosystem.

Little Sand, Bottle, Big Sand, and Potato participate.

2008: Vegetation mapping conducted (180 points) and plans for ongoing monitoring developed.

2015: "Lake Management Plan" (2005) is updated to create the "Little Sand Lake Stewardship Action Planning Guide."

2022: As follow-up to 2006 & 2008 mappings, LSLAA contracts with RMB Labs to conduct an updated Vegetation Survey (198 points).

Ongoing: LSL volunteers monitor lake for aquatic vegetation & AIS.

Aquatic Vegetation Mapping and Monitoring – an ongoing project METHOD



(From Dan Kittilson's presentation)

- "Circling the Bulrushes & Lily Pads"
- Three Old Codgers (Gone High Tech)
- Jim Thomsen, Vern Thompson & Dan Kittilson
- Throwing Rakes and Arguing about Plant ID While Sampling Submerged Vegetation
- Joint Partnership with DNR in 2005-06
- Joint Partnership with HC COLA & Other Area Lakes
- Utilizing GPS/GIS, Edie Evarts develops color-coded maps showing Emergent & Floating Leaf Vegetation



Aquatic Vegetation Mapping and Monitoring – an ongoing project 2022 – RMB Labs

- Followed RMBEL and DNR Standard Operating Procedures for Point Intercept Surveys.
- Points surveyed previously were projected in the boat's GPS syst
- Double-headed, weighted garden rake attached to a rope was used to survey vegetation.
- Observations also made visually and with sonar.
- Vegetation found under the surface by use of the rake was categorized as follows:
 - 0 = absent,
 - $1 = rare (\leq 1/3 \text{ of the rake head covered}),$
 - 2 = scattered (>1/3 but ≤ 2/3 of the rake head covered),
 - 3 = common (>2/3 of the rake head covered), and
 - 4 = abundant (plants over top of rake head).
- Plant identification followed Blickenderfer (2007)



Same high-tech dévice as used in 2008.

RESULTS/OBSERVATIONS – 2005-06

- With 409 acres, 74 are covered by emergent or floating leaf vegetation (18%)
- 79% of vegetation mapped was emergent and 21% was floating leaf types
- **Bulrush was most common (79% was Bulrush)**
- Yellow water lilies is next most common (21% of acreage)
- 70% of Little Sand's shoreline is vegetated with high quality vegetation that provides critical shoreline habitat for fish and wildlife.
- Bulrush, cattail, and water lilies dampen wave energy and help protect shorelines from erosion.
- Little Sand has 198 littoral acres from 0 to 20 ft. (where emergent vegetation or submerged vegetation can grow)

RESULTS - 2008

Little Sand Lake Emergent vegetation stands



Above: Density of emergent vegetation. *Right*: Density of main types/species of emergent vegetation.



RESULTS – 2022 Species Abundance



RESULTS – 2022 Species Abundance – Submerged, Floating, Emergent

Life Form	Common Name	Count		Frequency	
SUBMERGED -	Chara	89		45%	
ANCHORED – These	Canada Waterweed	64		32%	
plants grow primarily	Flatstem Pondweed	36		18%	
inder the water surface.	Northern Milfoil	28		14%	
Jpper leaves may float	Whitestem Pondweed	28		14%	
ear the surface and	Clasping Leaf Pondweed	17		9%	
lowers may extend	Coontail	7		4%	
bove the surface. Plants	Greater Bladderwort	4		2%	
re often rooted or	Narrow Leaf Pondweed	3		2%	
inchored to the lake	Whitewater Crowsfoot	3		2%	
pottom.	Illinois Pondweed	1		1%	
LOATING - LEAF -	Floating Leaf Pondweed	12		6%	
hese plant leaves float					
on water and are					
inchored to the bottom					
of the lake.					
EMERGENT – These	Bulrush	33		17%	
lants extend above the	Yellow Water Lily	8		4%	
vater surface and are	White Water Lily	1		1%	
ound in shallow water.	, Wild Rice	1		1%	
Total number of plants (species diversity for the lake)					
Total number of plant occurrences			355	355	
Total number of sites			109	198	

RESULTS – 2022: Abundance by Species Received maps by species that showed the density of the species at each point. A few examples:



SUMMARY – 2022



- The presence of plants and the depth at which one finds them is related to the water clarity.
- The Minnesota DNR lists the littoral area of Little Sand Lake to be approximately 36% of the total surface area, and the findings of this plant survey support these findings.
- In general, the littoral area is approximated as the area of the lake that is 15 feet deep or less; in this plant survey, no plants were found deeper than 16 feet.
- While sampling was focused in the littoral area, actual depths encountered ranged up to 20 feet.

GOING FORWARD

1. Continue vegetation and AIS monitoring of six sites on Little Sand that Marshall Howe and his team do each year. This team has a focus on monitoring for AIS. Marshall plans to do that 4X in 2023 and usually does it 3X each year.



- 2. Develop a Volunteer Shoreline Monitoring Program to detect AIS as early as possible. Plan to monitor aquatic vegetation around the lake two times per year. Little Sand will model this program after Belle Taine's program to the extent possible.
- 3. Contract to have a professional Aquatic Vegetation Survey done in 2033.

ACKNOWLEDGEMENTS

Thank you to...

- Our dedicated lake volunteers who initiated vegetation mapping starting in 2005 and worked with the DNR and HC COLA through 2008 to refine the process.
- Hubbard County COLA for providing a grant that helped support Little Sand Lake's contract with RMB Labs to conduct a professional aquatic vegetation survey in June 2022.
- Marshall Howe for years of leading Little Sand Lake's healthy lake initiatives, especially those pertaining to monitoring lake vegetation for AIS.
- Sharon Natzel, HC COLA President, and Marshall Howe for providing suggestions and guidance regarding ongoing monitoring of Little Sand Lake's aquatic vegetation.