Little Sissabagama Lake

Lake Shoreland & Shallows Habitat Monitoring

June 30, 2023

Prepared for:

Little Sissabagama Lake Shore Owners Association
Little Sissabagama Lake, Wisconsin

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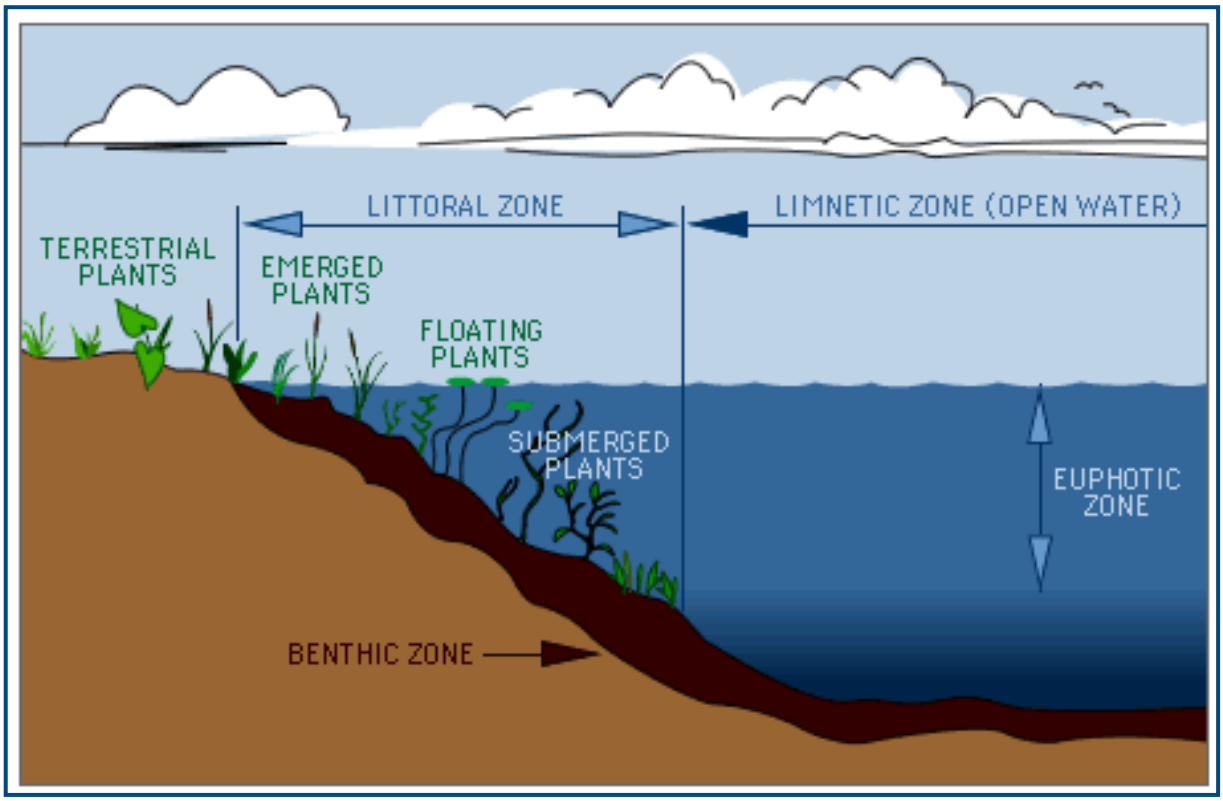
INTRODUCTION

In 2022, Ecological Strategies was contracted to conduct a Lake Shoreland & Shallow Habitat Monitoring survey to collect information needed to quantitatively assess the health of the Little Sissabagama shoreline. Shorelines are a good indictor of lake health and intact lake shore ecosystems are essential to a healthy lake. As development increases on lakes throughout the Midwest, any remaining undeveloped shoreline becomes even more critical for supporting biodiversity and maintaining lake water quality.

A shoreline vegetated with native plants will help protect lake water quality and provide critical wildlife habitat. Shoreline vegetation protects and promotes water quality in the lake by holding sediment from uplands in place and capturing nutrients from lawn or agricultural fertilizer. Capturing these nutrients can prevent algal blooms that result when these nutrients are allowed to reach the lake.

Many wildlife species use aquatic and lakeshore plant beds for food and nesting areas. In particular, fish spawn in areas with sedges and emergent plants. In fact, 90 percent of lake life is born raised and fed in the area where land and water meet (Wisconsin Lakes Partnership; Figure below: http://waterontheweb.org/under/lakeecology/10_biological_lakezones.html).

The focus of the this shoreline survey was to quantify and describe vegetation in the littoral zone from the lake edge to where floating plants occur and inland 35 feet. Information on structures and activities that might have negative impacts on the lakeshore, such as trails and bare soil, was also gathered.



Lakezones

METHODS

The methods employed for completing the shoreline assessment were those detailed in the Lake Shoreland & Shallow Habitat Monitoring Field Protocol, Wisconsin Department of Natural Resources, July 20, 2020. To clarify elements of the protocol methods, the contractor had several email and phone conversations with Katie Hien, WI DNR.

In preparation for field work, satellite imagery and a GIS shapefile of parcel boundaries were obtained. In ARCGIS the data layers were checked to make sure the parcel layer was properly georeferenced with the satellite imagery and/or coordinate systems were the same. These images and data sets were then brought into the ESRI Field Maps application and accessed using a PC tablet. Also in Field Maps, a data entry form with the necessary fields was created so that data could be entered directly into the tablet. The data fields matched those on pages 32 and 33 (Form EGAD # 3400-2020-19, 2 pages) of the WI DNR Lake Shoreland & Shallow Habitat Monitoring Field Protocol document.

Shoreline sampling was done between the 7th and 19th of September, 2022 by Cynthia Lane (Ecological Strategies) and Jean Accola (Little Sissabagama Lake Shore Owners Association. The first step was to complete the recommended Quality Assurance practices. As recommended, colored flags were placed along the shoreline for 100' at five, 10' intervals, one 50-foot interval, and one 100 foot interval. Flags were also placed 35' inland from the shoreline at three places along the 100 foot line. As described in the Field Protocol document, distance and shoreline length were visually estimate three times and then measured on shore to determine the actual length. The rangefinder was tested for accuracy by estimating feet using the range finder and then measuring the actual distance with the tape measure. The completed Quality Assurance form is shown in Appendix A.

A pontoon boat was used to collect shoreline data. One person stood in the bow of the boat to take photos, while the second person drove the pontoon with a goal of keeping the boat 50 feet from the shore. Photos were taken with the aim of capturing floating vegetation and upland areas to at least 35' inland. Photos were taken farther than 50' from shore where the water depth was too shallow for the boat or there were underwater obstacles such as rocks and downed trees. Digital photos were taken with the PC tablet which has a built in GPS and collects GIS points for each photo taken. The accuracy of the Samsung Tablet GPS is known to generally range from 2-5 m, depending on time of day, cloud cover and canopy cover.

Initially the sampling team tried to take photos and collect shoreline data in one pass. However, in order to keep the boat at the proper distance to the shore and take photos, it was not possible to collect data at the same time. For this reason, the team made two passes around the lake. We started the survey in the morning when there was sufficient light for photographs. We found that when the sun was behind the shoreline and/or there was a high level of reflection on the water, it was not possible to get photos of acceptable quality. For this reason, we skipped some sections of shoreline and then returned to those areas when the light was more conducive to photographing. For narrow peninsulas, i.e. those less than 70' wide, the team completed one data sheet per parcel and took photos around the entire shoreline.

METHODS

Over 1100 photos were taken for the survey. The field protocol states that each photo should be labeled with WBIC_YYYYMMDD_photoid. WBIC is the Water Body Identification Code. Also, a crosswalk table providing the coordinates for each photo was specified. Labeling the large number of photos for this project in this way would have been time and cost prohibitive. With approval from Katie Hein, Ecological Strategies developed an alternative method for cataloging and labeling photos.

The first step was to assign each photo to a parcel using ARCGIS tools. For each photo there were X and Y data on location so mapping the photos was fairly straightforward. Ecological Strategies' GIS specialist, Rubin Siefert, used an ARCGIS Pro tool 'GeoTagged Photos to Points.' The tool is located in ArcToolbox: Data Management / Photos / GeoTagged Photos to points.

Once the photos were converted to points, Rubin completed a spatial join using the match option 'closest.' The search radius will need to be specified and may vary from project to project. The point symbology was colored according to the parcel ID to more easily QA/ QC the points and adjust parcel Id's as needed. Rubin then created a python script to create the parcel ID folder and move the corresponding photos to the new folder.

Photos within each folder, labeled with parcel ID number, were then renamed with the parcel ID number and an additional number sequentially staring with one. A table with parcel ID, date photo was taken, parcel owners name and X and Y coordinates was created to accompany the photo folders.

RESULTS

Data was collected for 80 parcels and over 1100 photos of the shoreline take and cataloged. The data will be analyzed by the Wisconsin Department of Natural Resources using established protocols and methods. An initial overview of the data found that the average tree cover over all parcels was 82%, with 62 parcels having over 85% cover. Shrub and ground cover vegetation had similar high cover. Only a handful of parcels had large amounts of bare ground or lawn.

The few areas with erosion and runoff issues are associated with impervious ground cover and a large boat launch or associated with a nearby road.

As described in the methods, where properties have two shorelines on either side of a peninsula, separate data sheets were completed and photos taken for both sides. There were two small islands with no parcel numbers that were not included in the assessment. A few properties are missing photos where the conditions for photographing was poor and when the team returned to the area to fill in gaps a few sites were missed.

The assessment data, photos and photo table were submitted in a digital format to Katie Hein at the Wisconsin Department of Natural Resources.

Methods challenges and learnings:

Pontoon provided a steady platform to take photos and complete data sheets/entry. A kayak could access shallower water, but would be hard to keep steady and maintain a consistent distance from shore. A small pontoon or flat bottom boat might be ideal. Sampling was done when there was little wind, windy days would make getting good photos difficult! In order to take photos only at the optimal times of day will require allotting additional field time for each site to allow for times of day when the glare or backlighting is an issue.

A three person team would be ideal as then one pass could be made to do photos and complete the shoreline data assessment. In this case using the digital data entry form would be ideal as it has drop down menus and reminders, also data can easily be downloaded into Excel instead of hand entry (which time consuming and there is the potential for entry error). A supplementary antennae could be affixed to the boat to increase GPS point accuracy. Looking at the points after sampling, it was clear some appeared off and this was likely due to temporary poor satellite reception.

The method used to organize and label photos saved an immense amount of time! Even so, managing over 1100 was time consuming. Future time estimates to complete the assessment should consider this photo management time.

APPENDIX A

QUALITY ASSURANCE DATA SHEET

EGAD # 3400-2020-19

Data Sheets

Quality Assurance

Date 7SEP22 Lake name LITTLE SISSABAGAMA WBIC 2394100

Observers C. VANE, TEAM ACCOA

Present water level is ☑ Below ☐ At ☐ Above the High Water Level (approx. 1' lower)

Riparian Distance (landward)

Replicate	Estimated	Measured
1	35	30
2	35	45
3	35	34

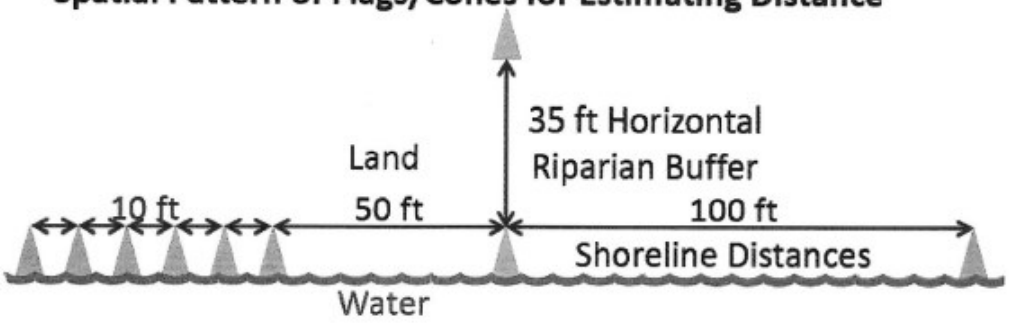
Shoreline Length

Replicate	Estimated	Measured
1	100	94
2	100	99
3	100	96

Rangefinder Calibration

Replicate	Rangefinder	Tape Measure
1	35.4	35'
2	51.0	50'
3	105.3	100'

Spatial Pattern of Flags/Cones for Estimating Distance



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