Goose Lake

VLAWMO
Vadnais Lake Area
Water Management Organization

Macrophyte & Biovolume Analysis Survey 6/06/14

This document contains two reports of information collected on Goose Lake. The first report details the methods and findings of a point intercept survey of macrophyte vegetation and the second report details the methods and results of an aquatic vegetation biovolume data survey.

Data collected and prepared by **Ramsey Conservation District** for

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Goose Lake Macrophyte Survey

June 6, 2014

Methods:

The point intercept method incorporating a Global Positioning System (GPS) was used to assess the aquatic macrophyte community on Goose Lake on June 6, 2014. Samples were taken at evenly spaced (70 m) geo-referenced points. Data on depth, plant species, and abundance rank was recorded.

A double-tined metal rake attached to a rope was used to collect specimens. At each point the device was thrown out approximately 1 meter and then dragged across the substrate for approximately 1 meter. Species were identified and given a ranking based on cover of rake tines. Plant species that were floating in the water at the collection points were also counted. The table below includes the ranking system.

Percent Cover of Tines	Abundance Ranking
81-100	5
61-80	4
41-60	3
21-40	2
1-20	1

Results:

Data was collected at 94 points. Aquatic macrophytes were found at 24 points. Canada Waterweed (*elodea canadensis*) and Curly Pond Leafweed (*potomogeton crispus*) were the most common species. Also present was Leafy Pondweed (p*otamogeton foliosus.*). The Secchi disk reading was .3 m (.98 ft).

Depth measurements were taken at the 24 survey points where aquatic vegetation was found. Point number, depth, plant species and abundance ranking data is reported in the map and table included in this file.

Percent Occurrence and Average Abundance of Taxa at Goose Lake on 06/06/2014

Species	Common Name	Scientific Name	% Occurrence	Average Abundance
1	Canada Waterweed	*Elodea canadensis*	95.83%	1.61
2	Curly Leaf Pondweed	*Potomogeton crispus*	16.67%	2.00
3	Leafy Pondweed	*Potamogeton foliosus*	12.50%	1.33

Table 1. Summary of percent occurrence and average abundance for aquatic plant taxa encountered during a point-intercept survey conducted on Goose Lake.
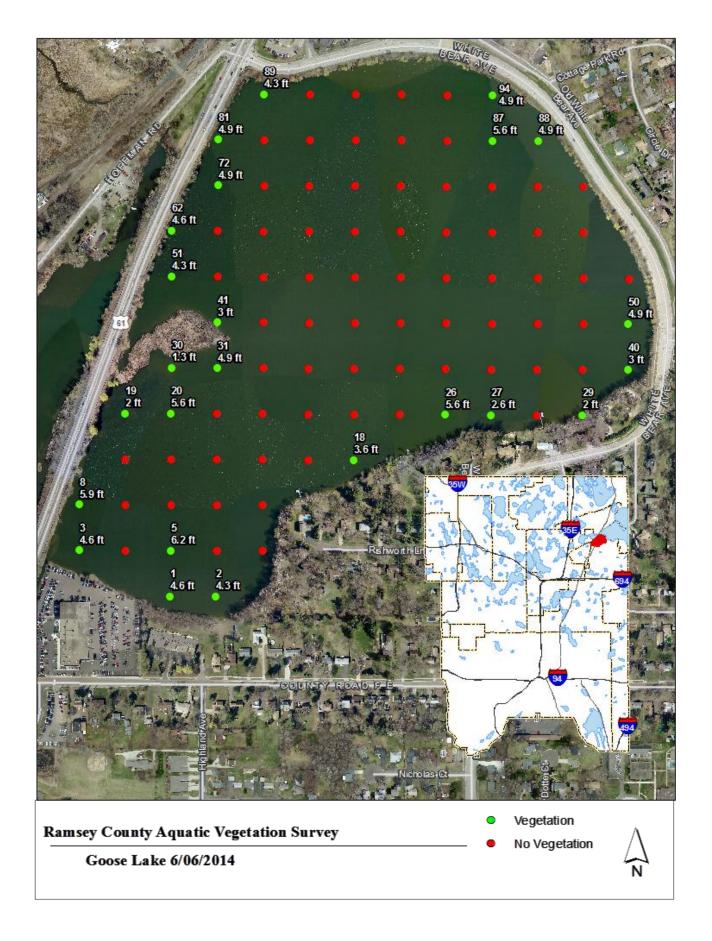
- Percent occurrence represents the number of times a plant species was observed divided by the number of total sample sites where vegetation was observed
- Average abundance is calculated as the average of the abundance ranking for an individual species present

- The seasonal timing and water temperature on survey dates may have an influence on biodiversity as well as abundance and occurrence.
- Water was turbid at the time of vegetative survey during a time of above average rainfall.
- Goose Lake temperature average was 27.33° C (81.2° F) on the June 6, 2014 survey date.

Point Survey - Vegetation and Depth (06/06/2014)

Point #	Depth (ft)	Curly Leaf Pondweed	Canada Waterweed	Leafy Pondweed
1	4.6		2	
2	4.3		3	
3	4.6	2	1	
5	6.2		1	
8	5.9	3	1	
18	3.6		2	
19	2	2	1	1
20	5.6		1	
26	5.6		1	
27	2.6		1	
29	2		1	
30	1.3		1	2
31	4.9		1	
40	3		4	
41	3		1	1
50	4.9		3	
51	4.3		4	
62	4.6		3	
72	4.9		1	
81	4.9		1	
87	5.6		1	
88	4.9		1	
89	4.3		1	
94	4.9	1		

Total Abundance		8	37	4
Count	24	4	23	3
Avg Abundance		2.00	1.61	1.33
% Occurrence		16.67%	95.83%	12.50%

Secchi Depth	0.98

Ramsey County Aquatic Vegetation Survey

Goose Lake 6/06/2014

● Vegetation
● No Vegetation

N

Goose Lake Biovolume Analysis Survey
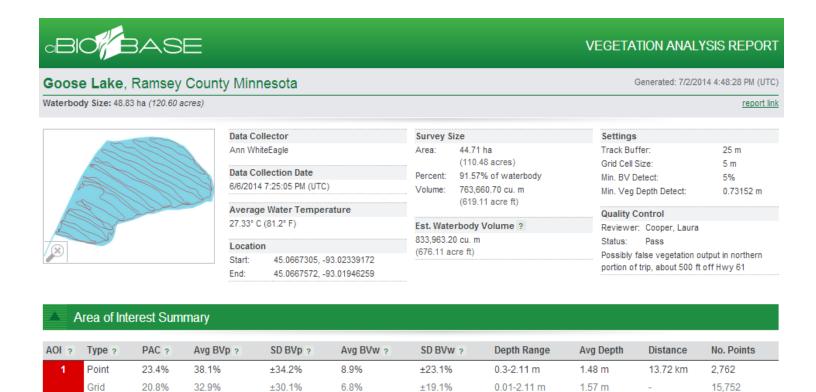
June 6, 2014

Methods:

A Lowrance HDS-5™ Global Positioning System (GPS) enabled depth finder was used to collect submerged aquatic vegetation and lake bottom data on Goose Lake on June 6, 2014. Evenly spaced transects were followed at a minimum distance of 40 meters at a speed of no more than 6 miles per hour. Sonar log data was recorded to assess data on depth (bathymetric) and biovolume.

Data was reprocessed using Contour Innovations, LLC, ciBioBase system to include areas of aquatic vegetation that were topped out at the surface within Goose Lake.

Results:

The results below were exported from Contour Innovations, LLC, ciBioBase system and include a map and statistics of biovolume information. More robust interactive contour and vegetation map data, including sonar log trip replays, can be viewed on the ciBioBase website: www.cibiobase.com

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cBIO BASE — VEGETATION ANALYSIS REPORT

Goose Lake, Ramsey County Minnesota

Generated: 7/2/2014 4:48:28 PM (UTC)

Waterbody Size: 48.83 ha *(120.60 acres)*

report link

Data Collector
Ann WhiteEagle

Data Collection Date
6/6/2014 7:25:05 PM (UTC)

Average Water Temperature
27.33° C (81.2° F)

Location
Start: 45.0667305, -93.02339172
End: 45.0667572, -93.01946259

Survey Size
Area: 44.71 ha
            (110.48 acres)
Percent: 91.57% of waterbody
Volume: 763,660.70 cu. m
            (619.11 acre ft)

Est. Waterbody Volume ?
833,963.20 cu. m
(676.11 acre ft)

Settings
Track Buffer: 25 m
Grid Cell Size: 5 m
Min. BV Detect: 5%
Min. Veg Depth Detect: 0.73152 m

Quality Control
Reviewer: Cooper, Laura
Status: Pass
Possibly false vegetation output in northern portion of trip, about 500 ft off Hwy 61

▲ Area of Interest Summary

AOI ?	Type ?	PAC ?	Avg BVp ?	SD BVp ?	Avg BVw ?	SD BVw ?	Depth Range	Avg Depth	Distance	No. Points
1	Point	23.4%	38.1%	±34.2%	8.9%	±23.1%	0.3-2.11 m	1.48 m	13.72 km	2,762
	Grid	20.8%	32.9%	±30.1%	6.8%	±19.1%	0.01-2.11 m	1.57 m	-	15,752

Biovolume Analysis by Quantity

AOI ?	0-5%	5-20%	20-40%	40-60%	60-80%	>80%
1	76.57%	11.44%	2.93%	2.5%	1.99%	4.56%

Biovolume Analysis by Depth

AOI ?	Depth	Type ?	Count	PAC ?	Avg BVp ?	SD BVp ?	Avg BVw ?	SD BVw ?
1	0-1m	Point	215	80%	65.9%	±34.7%	52.7%	±40.7%
	1-2m		2513	18.9%	28.1%	±27.9%	5.3%	±16.4%
	2-3m		34	0%	-	-	0%	±0%
	3-4m		0	-	-	-	-	-
	4-5m		0	-	-	-	-	-
	5-6m		0	-	-	-	-	-
	6-7m		0	-	-	-	-	-
	7-8m		0	-	-	-	-	-
	8-9m		0	-	-	-	-	-
	>9m		0	-	-	-	-	-
	0-1m	Grid	1669	77.3%	47.9%	±34.9%	37%	±36.6%
	1-2m		13798	14.4%	23.1%	±21.6%	3.3%	±11.5%
	2-3m		285	0%	-	-	0%	±0%
	3-4m		0	-	-	-	-	-
	4-5m		0	-	-	-	-	-
	5-6m		0	-	-	-	-	-
	6-7m		0	-	-	-	-	-
	7-8m		0	-	-	-	-	-
	8-9m		0	-	-	-	-	-
	>9m		0	-	-	-	-	-

Glossary

AOI

Area of Interest: Defines the individual transects or contiguous data samples as depicted by the color coding of each trip line. Seperate areas of interest can be generated through merging of multiple trips, appending data to a single sonar log or lapses in time (greater than five minutes) within a sonar log.

BVp

Biovolume (Plant):: Refers to the percentage of the water column taken up by vegetation when vegetation exists. Areas that do not have any vegetation are not taken into consideration for this calculation.

BVw

Biovolume (All water): Refers to the average percentage of the water column taken up by vegetation regardless of whether vegetation exists. In areas where no vegetation exists, a zero value is entered into the calculation, thus reducing the overall biovolume of the entire area covered by the survey.

PAC

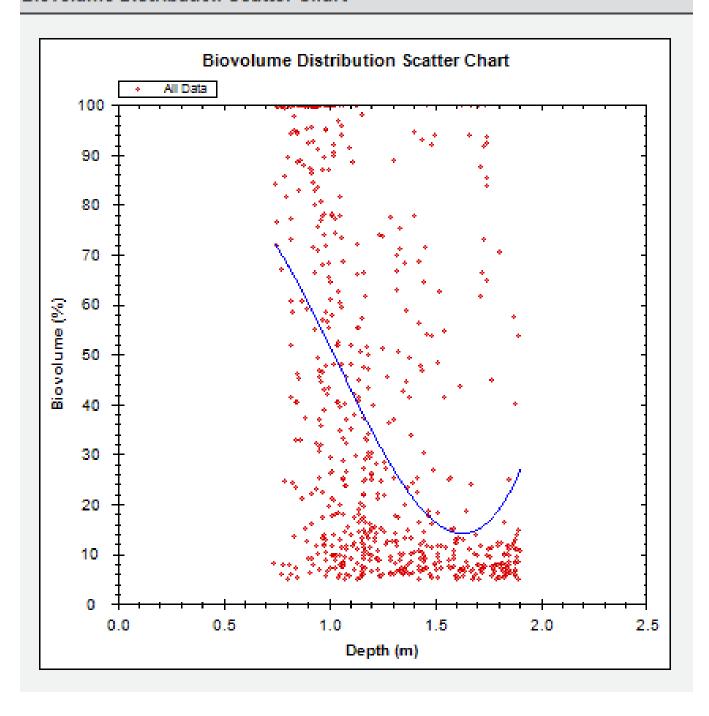*Percent Area Covered:* Refers to the overall surface area that has vegetation growing.

Grid

Geostatistical Interpolated Grid: Interpolated and evenly spaced values representing kriged (smoothed) output of aggregated data points. The gridded data is most accurate summary of individual survey areas.
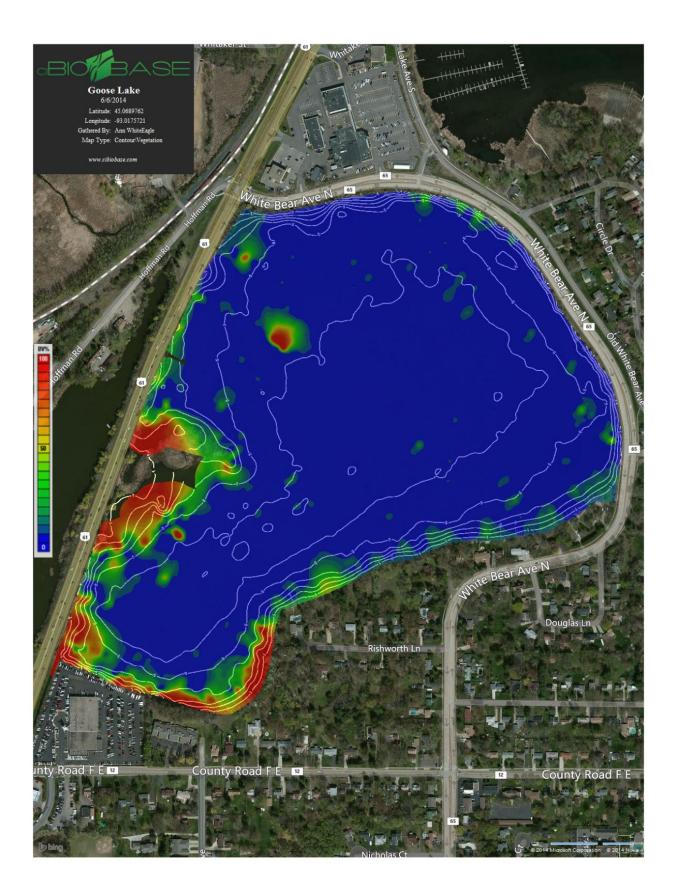
Point

Individual Coordinate Point: A single point represents a summary of sonar pings and the derived bottom and canopy depths. Individual point data create an irregularily spaced dataset that may have overlaps and/or gaps in the data resulting in a increased potential for error.

Biovolume Distribution Scatter Chart

Goose Lake Contour Map (1 foot intervals)

Macrophyte survey points overlaid on Biovolume map

Point #	Depth (ft)	Curley Leaf Pondweed	Canada Waterweed	Leafy Pondweed
1	4.6		2	
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72	4.9		1	
81	4.9		1	
87	5.6		1	
88	4.9		1	
89	4.3		1	
94	4.9	1		

● Vegetation
○ No Vegetation

Ramsey County Aquatic Vegetation Survey

Goose Lake 6/6/2014

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