Wilkinson Deep Water Wetland

Macrophyte, Contour, Biovolume and Bottom Composition Survey 8/6/25

Wilkinson Deep Water Wetland, located in North Oaks, has a surface area of 2.9 acres and an average depth of 2.3 feet.

This document contains two reports of data collected on Wilkinson Deep Water Wetland. The first report details the methods and findings of a point intercept survey of macrophyte vegetation. The second report details the methods and results of a contour, vegetation bio-volume and bottom hardness (composition) survey.

Data collected and prepared by **Ramsey County** – **Parks & Recreation, Soil and Water Conservation Division** for

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Aquatic Macrophyte Point-Intercept Survey

8/6/25

Methods:

The point-intercept method incorporating aerial photography and a Lowrance Elite-7 TI2 Global Positioning System (GPS) were used to assess the aquatic macrophyte community on Wilkinson August 6, 2025. Samples were taken at 21 evenly spaced (50m) geo-referenced points (Figure 2). Data on depth, plant species and abundance rank were recorded as displayed in Tables 2 and 3 and in the maps of this report.

A double-tined metal rake attached to a 11-meter rope was used to collect specimens. At each point the device was thrown out approximately one meter and then dragged across the substrate for approximately one meter. Species were identified and given a ranking based on cover of rake tines (Table 1). Plant species that were floating in the water within one square meter of each collection point were also counted.

Table 1

Abundance rankings for percent cover of rake tines

Percent Cover of Tines	Abundance Ranking
41-100	3
21-40	2
1-20	1

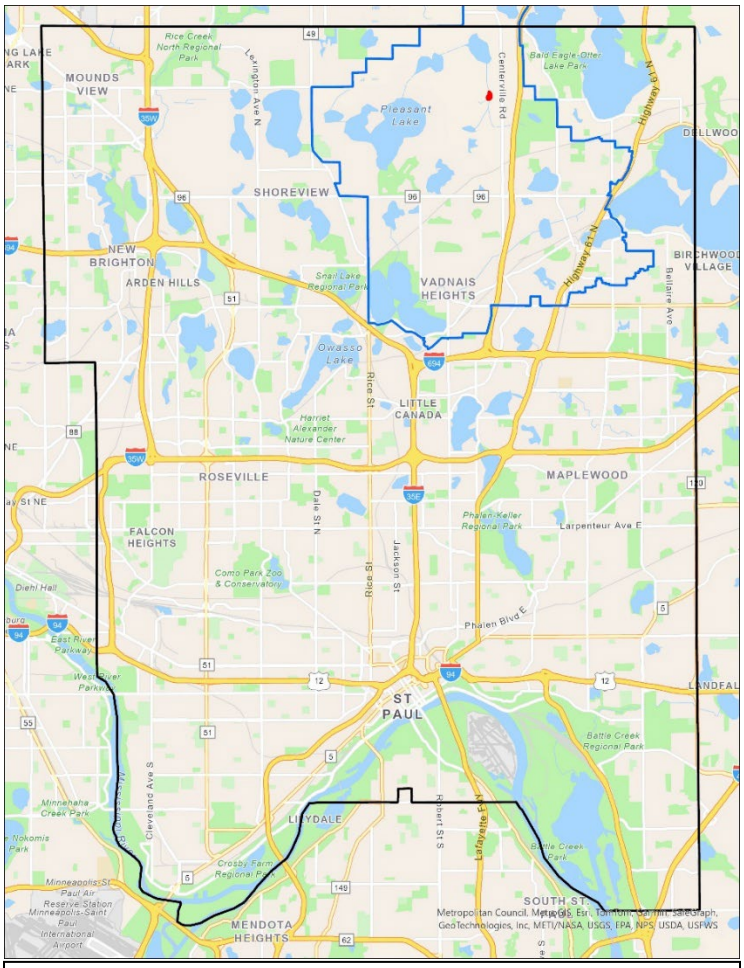

Figure 1. Location of Wilkinson Deep Water Wetland shown in red within Vadnais Lakes Watershed Management Organization and Ramsey County Boundaries.

Results:

Aquatic macrophytes were found at 29 of 31 points surveyed (Figure 2). The twelve species found on Wilkinson Lake were arrowhead *(Sagittaria spp.),* Canada Waterweed *(Elodea canadensis),* common bladderwort *(Utricularia macrorhiza),* coontail (*Ceratophyllum demersum*), filamentous algae (*Spirogyra/Cladophora spp.*), greater and lesser duckweed *(Lemna major and minor*), large-leaf pondweed *(Potamegeton amplifolius),* leafy pondweed *(Potamogeton foliosus*), long-leaf pondweed *(Potomogeton nodosus*), sago pondweed (*Stuckenia pectinata),* star duckweed *(Lemna triscula*), and water celery *(Vallisneria americana*). Flat-stem pondweed (*Potamogeton zosteriformis*), naiad (*Najas spp*.), needle spikerush (*Eleocharis acicularis*), Richardson's pondweed (*Potamogeton richardsonii*), and Robbins' pondweed (*Potamogeton robbinsii*) were observed visually in the lake but were not collected on the rake at any survey point. Frequency of occurrence and average abundance of each species can be found in Table 2.

No previous macrophyte survey of Wilkinson Deep Water Wetland has been conducted, so no comparative data are available.

Table 2. Frequency of occurrence & avg. abundance of aquatic plant taxa present during Wilkinson Wetland point-intercept surveys.

Species	Common Name	Scientific Name	Average Abundance 8/6/2025	Frequency of Occurrence 8/6/2025
1	Arrowhead	*Sagittaria spp.*	1	6%
2	Canada Waterweed	*Elodea canadensis*	1	6%
3	Common Bladderwort	*Utricularia macrorhiza*	2	6%
4	Coontail	*Ceratophyllum demersum*	2	84%
5	Filamentous Algae	*Spirogyra/Cladophora spp.*	1	52%
6	Greater and Lesser Duckweed	*Lemna major and L. minor*	1	68%
7	Large-leaf Pondweed	*Potamogeton amplifolius*	1	3%
8	Leafy Pondweed	*Potamogeton foliosus*	1	52%
9	Long-leaf Pondweed	*Potomogeton nodosus*	1	3%
10	Sago Pondweed	*Stuckenia pectinata*	2	6%
11	Star Duckweed	*Lemna triscula*	1	10%
12	Water Celery	*Vallisneria americana*	1	3%

Note: Frequency of Occurrence is the number of times a plant species was observed within the littoral zone divided by the total number of sample points within the littoral zone. Average abundance is calculated as the average of the abundance ranking for an individual species present.

Table 3. Depth, water temperature, and vegetation abundance point survey results on August 6, 2025

Sample ID	Depth (meters)	*Certophyllum demersum*	*Eleocharis acicularis*	*Elodea canadensis*	*Najas Spp.*	*Potamogeton amplifolious*	*Potamogeton foliosus*	*Potamogeton richardsonii*	*Potamogeton robbinsii*	*Potamogeton zosteriformis*	*Stuckenia pectinata*	*Utricularia macrorhiza*	*Vallisneria americana*	*Potamogeton nodosus*	*Sagittaria spp.*	*Lemna triscula*	Filamentous algae	*Lemna major & L. minor*
1	0.4	3															2	1
2	0.4	2		v			1		v								1	1
3	0.6	3															1	1
4	0.6	3					1						1				1	1
5	0.7	3			v		1										1	1
6	1.1	1					1											
7	0.1	3															1	1
8	1.5																	
9	1.1								v							1	1	1
10	1.1	3							v									1
11	1.1	1				v												
12	1.2	1	v			v												
13	2.1																	1
14	1.4	2				1								1				
15	0.2	3		v			v		v		v		v					
16	0.2	3				v	1	v				v		v	v		1	1
17	0.3	1					1				1				1		1	1
18	1.8			v			1											1
19	0.4	3		1			2		v	v			v	v			1	1
20	0.2	3					1	v				1						
21	0.1	3					1										1	1
22	0.7																	
23	0.5	3		1			1											
24	0.4	3		v			2				v	v					1	1
25	0.3	3				v						2					1	1
26	0.3	2					1									1		1
27	0.3	3					1										1	1

28	0.4	2					1									1		
29	0.3	3		v			2					v					1	1
30	0.3	1									3				1		1	1
31	0.3	3																1
Total Abundance		26	0	2	0	1	16	0	0	0	2	2	1	1	2	3	16	21
Count in Littoral zone (0-15ft)		26	0	2	0	1	16	0	0	0	2	2	1	1	2	3	16	21
Avg. Abundance		2	0	1	0	1	1	0	0	0	2	2	1	1	1	1	1	1
Frequency of Occurence		84	0	6	0	3	52	0	0	0	6	6	3	3	6	10	52	68
Water Temperature (C):	22.7																	

Note: Points where the species was noted visually in the water but was not found on the rake are marked with “v”.

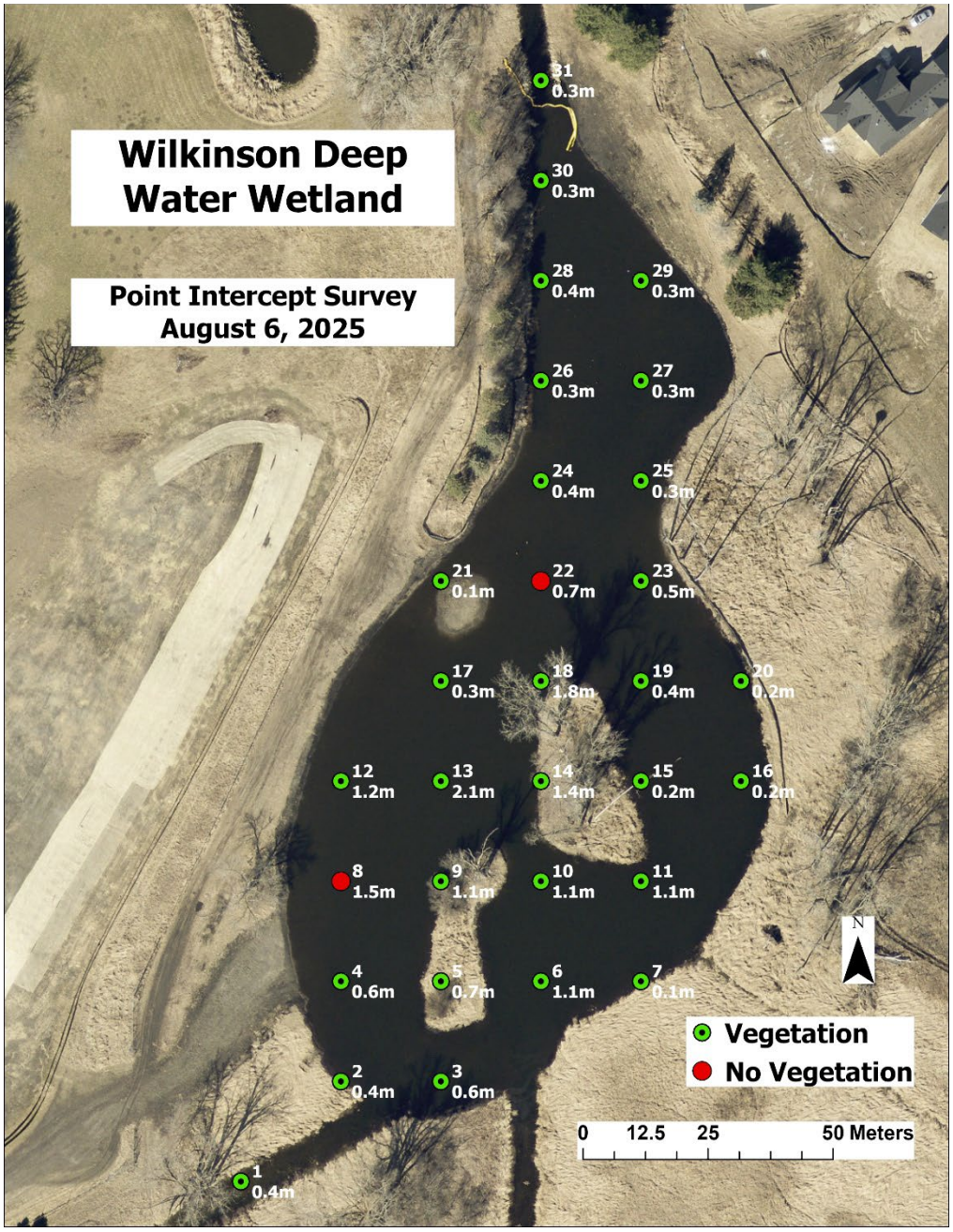

Figure 2. Wilkinson Wetland vegetation point intercept survey locations (N=31).

Contour, Biovolume and Bottom Composition Survey

8/6/25

Methods:

A Lowrance Elite-7 Ti2 Global Positioning System (GPS)-enabled depth finder was used to collect submerged aquatic vegetation biovolume, lake depth (bathymetry), and bottom hardness (composition) data on Wilkinson Lake on August 6, 2025. The lake was transected at a maximum distance of 20 meters between transects at a speed of no more than 5 miles per hour. Sonar log data were recorded using the Lowrance Elite-7 Ti2 Global Positioning System (GPS)-enabled depth finder. Transducer data were processed using Contour Innovations, LLC, BioBase software.

Results:

The results below were produced by exporting the processed data from the BioBase system and interpolating spatial data using ArcGIS software. Results include maps as well as statistics of biovolume distribution represented as total percent of water column occupied by plant matter ranging from zero to one hundred. Additional results include contour depth maps at 0.3-meter intervals as well as bottom hardness (composition) maps. Bottom hardness is represented as soft, medium, or hard; with soft bottoms characterized as muck, loose silt or sand and medium to harder bottoms characterized as compacted sand, gravel, or rock. More robust interactive contour and vegetation map data, including sonar log trip replays, can be viewed on the BioBase website: www.biobasemaps.com.

BIOBASE ANALYSIS REPORT

North Oaks Farms Pond, Ramsey County Minnesota

Report Time Stamp: 2025 August 11 - 04:14 (UTC) ... REPORT LINK

Survey Metadata	
Data Collector:	Ramsey Conservation District
Survey Time Stamp (UTC):	2025 August 06 - 15:38
Starting Location:	45.106118, -93.061010
Ending Location:	45.106270, -93.060713
Distance	0.818 km

Survey Statistics	
Average Water Temperature:	22.7 °C
Survey Area:	1.075 ha
Survey Volume:	7320.930 cu. m
Percent of Waterbody Surveyed:	92.8%
Waterbody Area:	1.158 ha
Estimated Waterbody Volume ?	7887.396 cu. m

Survey Settings	
Includes Edited Data:	Yes
Track Buffer:	25 m
BV Grid Cell Size:	5 m
BV Minimum Detection - Percent:	5.0%
BV Minimum Detection - Depth:	0.732 m
BV Maximum Detection - Depth:	6.096 m
BV Sonar Channel:	NA

Biovolume Summary

Type ?	PAC ?	Avg BVp ?	SD BVp ?	Avg BVw ?	SD BVw ?	Depth Range	Depth Avg	No. Depth Records
Point	46.9%	32.8%	± 33.6%	15.4%	± 28.7%	0.10 - 3.06 m	1.459 m	614
Grid	85.6%	39.3%	± 18.3%	33.6%	± 21.9%	0.01 - 2.50 m	0.681 m	857

Biovolume Analysis by Quintiles

Type ?	0 - 20%	20 - 40%	40 - 60%	60 - 80%	80 - 100%
Point	79.0%	8.1%	3.8%	0.6%	8.5%
Grid	32.0%	20.8%	38.6%	8.2%	0.5%

Biovolume Analysis by Depth

Type ?	Depth	Count	PAC ?	Avg BVp ?	SD BVp ?	Avg BVw ?	SD BVw ?
Point	0 - 1 m	51	89.5%	68.6%	± 42.9%	61.4%	± 42.3%
	1 - 2 m	125	59.2%	24.9%	± 26.3%	14.7%	± 24.3%
	2 - 3 m	45	22.2%	14.4%	± 13.4%	3.2%	± 7.5%
	3 - 4 m	0	0%	0%	± 0%	0%	± 0%
	4 - 5 m	0	0%	0%	± 0%	0%	± 0%
	5 - 6 m	0	0%	0%	± 0%	0%	± 0%
	6 - 7 m	0	0%	0%	± 0%	0%	± 0%
	7 - 8 m	0	0%	0%	± 0%	0%	± 0%
	8 - 9 m	0	0%	0%	± 0%	0%	± 0%
	9 m +	0	0%	0%	± 0%	0%	± 0%
Grid	0 - 1 m	624	96.8%	43.0%	± 16.9%	41.7%	± 18.2%
	1 - 2 m	173	67.2%	22.7%	± 14.2%	15.3%	± 15.8%
	2 - 3 m	60	21.3%	10.2%	± 4.8%	2.2%	± 4.7%
	3 - 4 m	0	0%	0%	± 0%	0%	± 0%
	4 - 5 m	0	0%	0%	± 0%	0%	± 0%
	5 - 6 m	0	0%	0%	± 0%	0%	± 0%
	6 - 7 m	0	0%	0%	± 0%	0%	± 0%
	7 - 8 m	0	0%	0%	± 0%	0%	± 0%
	8 - 9 m	0	0%	0%	± 0%	0%	± 0%
	9 m +	0	0%	0%	± 0%	0%	± 0%

Glossary

AOI

Area of Interest: Defines the transects or contiguous data samples as depicted by the colored 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.

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 irregularly spaced dataset that may have overlaps and/or gaps in the data resulting in a increased potential for error.

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 survey areas.

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.

Figure 3. Wilkinson Wetland BioBase survey summary statistics.

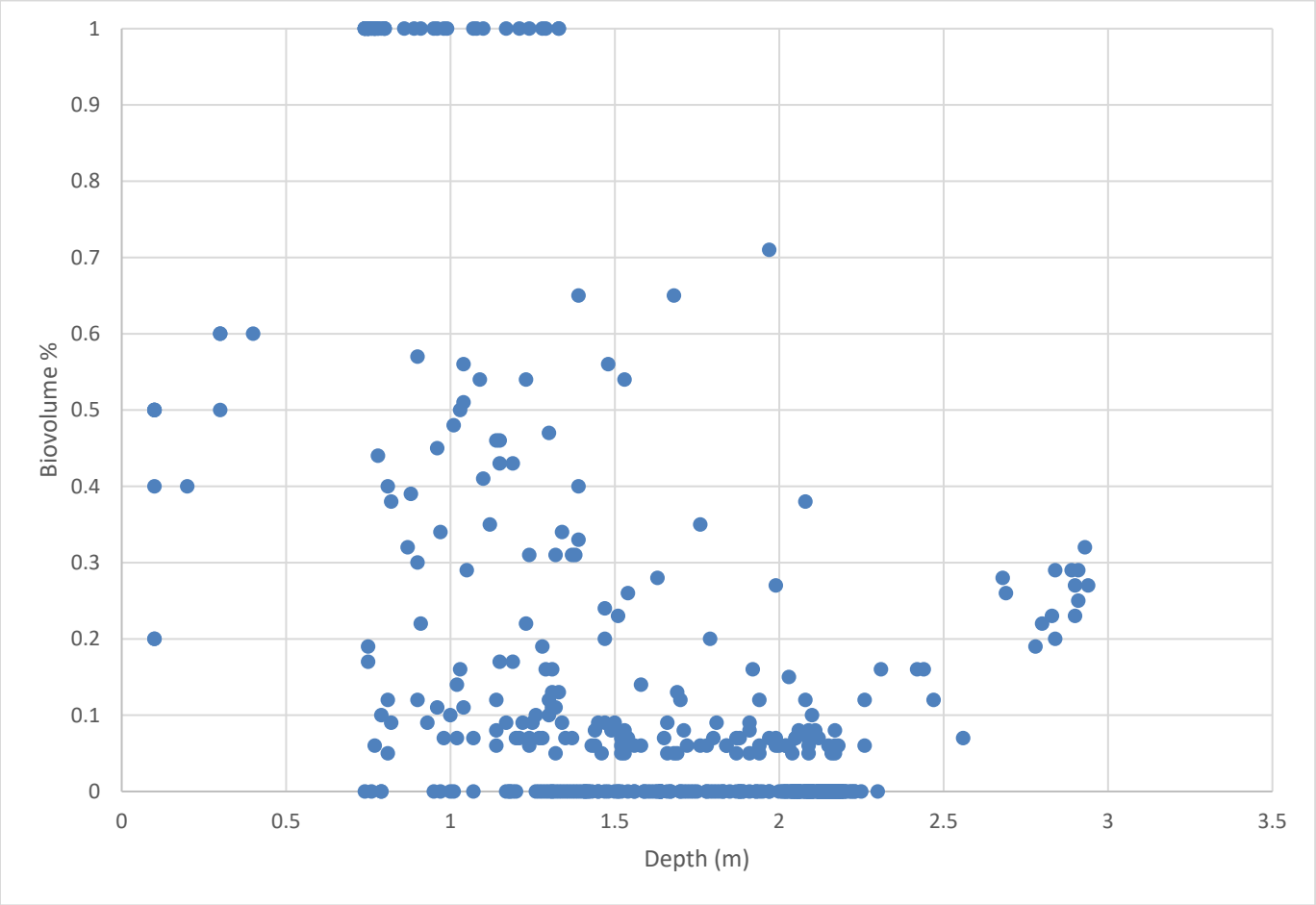

Figure 4. Wilkinson Wetland biovolume distribution scatter chart.

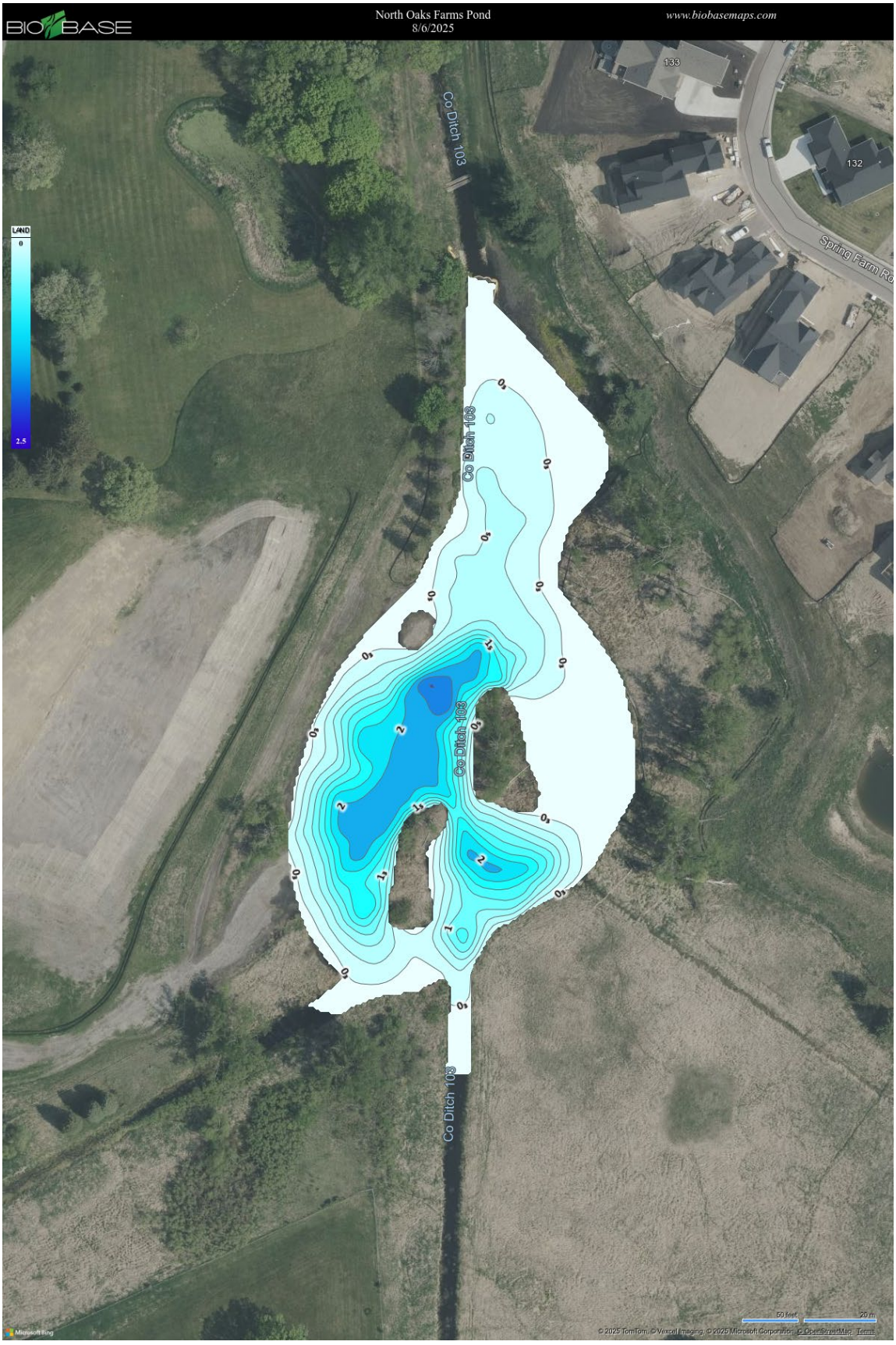

Figure 5. Wilkinson Wetland 0.3-m contours with depth in meters taken on August 6, 2025.

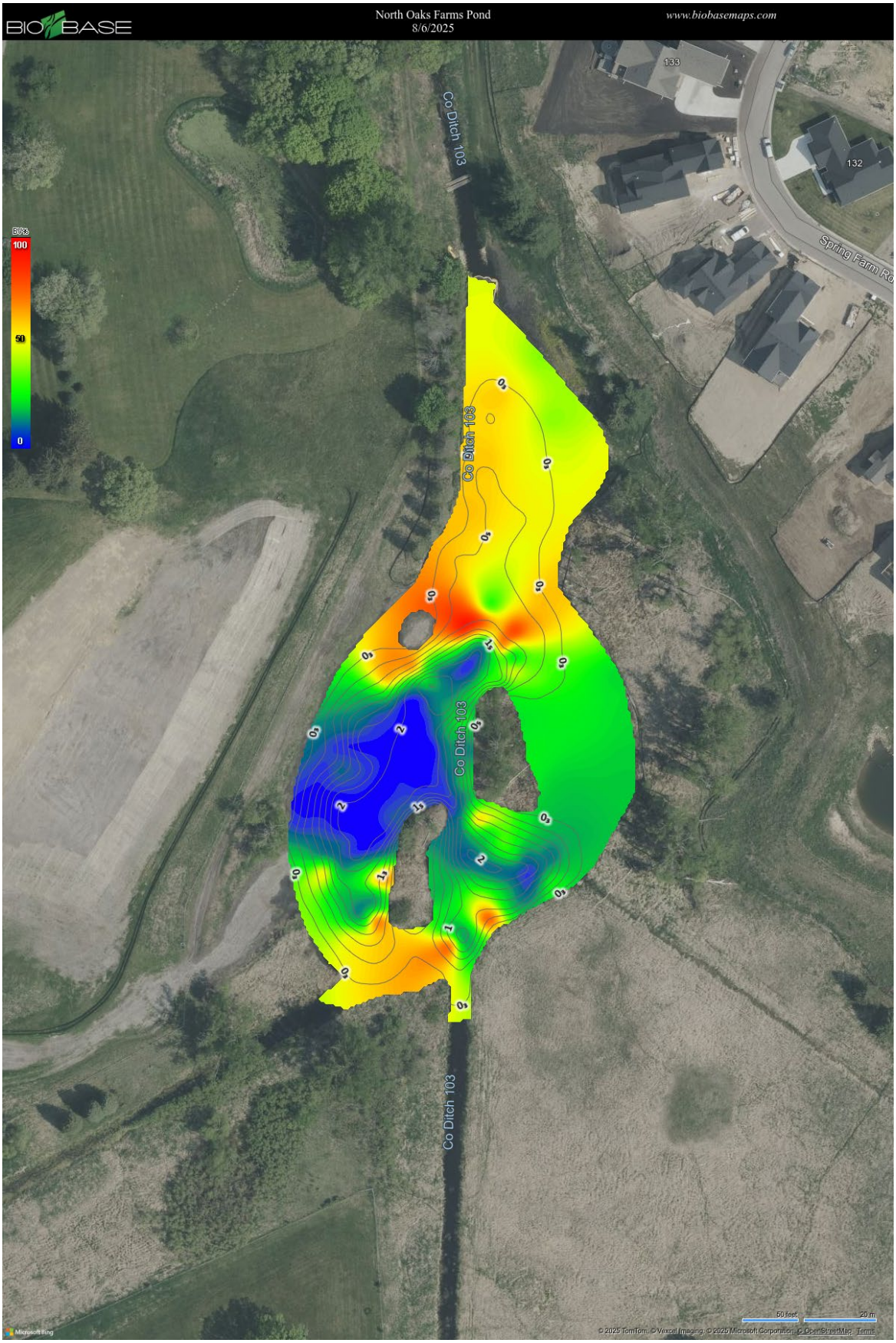

Figure 6. Wilkinson Wetland vegetation biovolume with 0.3-m contours taken on August 6, 2025. Percent values range from zero to one hundred; Blue = 0%, Yellow = 50% and Red = 100%.

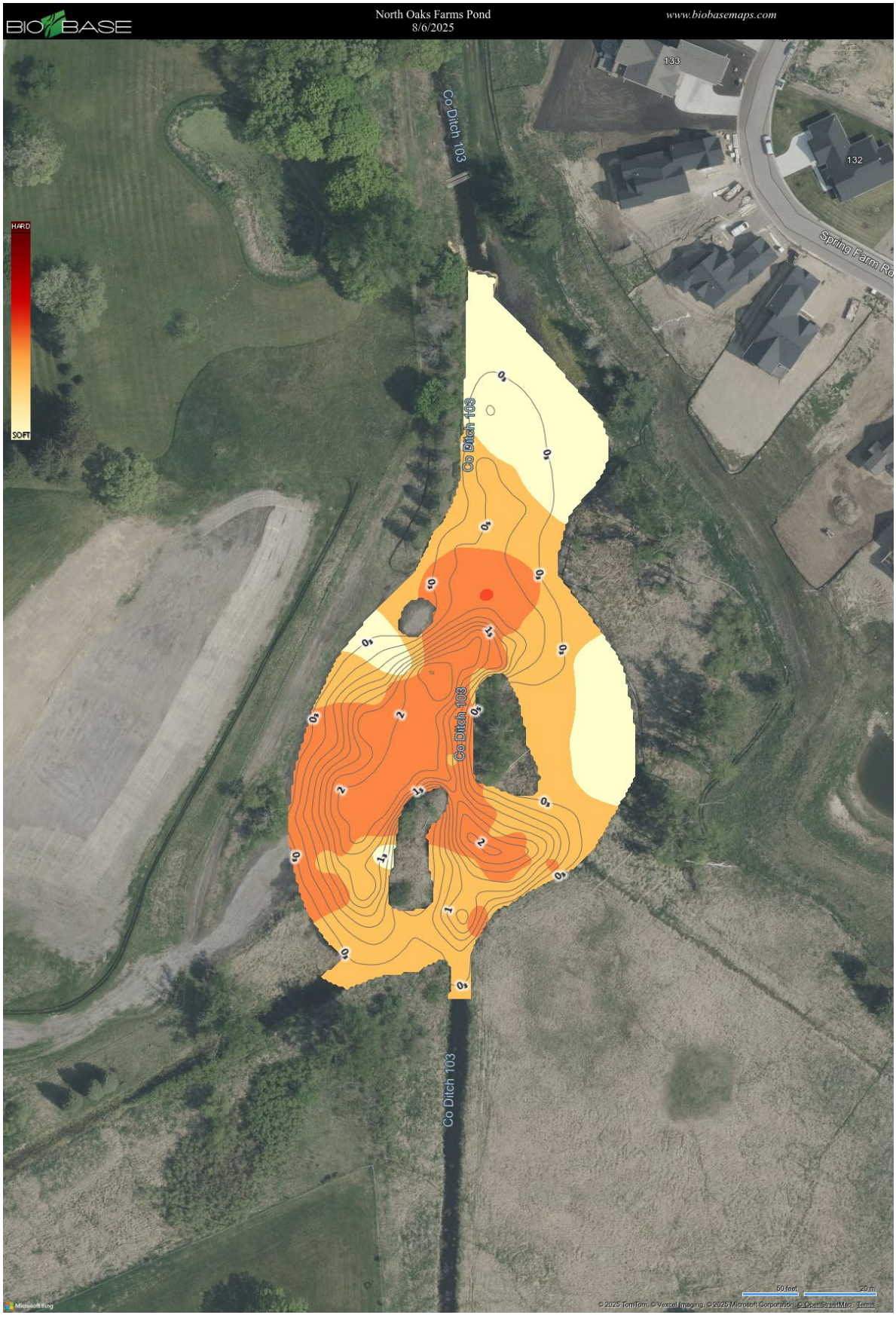

Figure 7. Wilkinson Wetland bottom composition values with 0.3-m contours taken on August 6, 2025.