OTTER LAKE, ANOKA COUNTY:
2025 AQUATIC VEGETATION REPORT

Report by the Invasive Species Program – Division of Ecological and Water Resources
Minnesota Department of Natural Resources

Lake: Otter (DOW# 02000300)

Lake Surface Area: 302 acres

Littoral Area: 299 acres

County: Anoka

Survey Type: Point-intercept

Date of Survey (most recent): July 22, 2025

Observer[s]: April Londo (MNDNR)
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2025 Summary:

The most recent aquatic vegetation point-intercept survey on Otter Lake (DOW #02000300) was completed jointly on July 22, 2025, by the Minnesota DNR (MNDNR) and the Rice Creek Watershed District (RCWD). Submersed aquatic plants were identified out to a maximum depth of 3.87 meters (12.7 feet). Within the littoral zone [zone in the lake from the 0 – 15-foot depth range (0 – 4.5 meters)], 98% of sampled survey points contained native taxa (groups of submersed aquatic plant species or genera native to Minnesota). Twenty-three submersed native taxa were observed during the 2025 survey, and the average number of taxa per sample point was 3.9. Additionally, two non-native taxa were observed, Eurasian watermilfoil (*Myriophyllum spicatum*) and curly-leaf pondweed (*Potamogeton crispus*).

Table 1 – Summary Table. Summary of aquatic submersed plants in Otter Lake, Anoka County, Minnesota (DOW# 02000300) as indicated by results of Point-Intercept surveys. Values were calculated from littoral depth range (0-15 feet).

PI Survey Date	% Frequency of EWM*	Max Depth of Growth in feet [95%] †	% Points w/ Native Submersed Taxa	Mean Native Submersed Taxa/ Point	# Submersed Taxa
JUL 16 2009**	62	20	99	-	14
JUN 10 2013**	5	14	99	-	16
JUL 12 2019**	39	-	98	-	25
JUL 22 2025	21	15	98	3.9	25

*EWM is short for Eurasian watermilfoil
** Survey Data collected and reported by the Rice Creek Watershed District
†95th percentile calculated based on all vegetated sampling points
Taxa refers to groups of submersed aquatic plant species or genera

Lake Description:

Otter Lake is a 302-acre lake located near Bald Eagle, Minnesota. It has two invasive aquatic plant species: Eurasian watermilfoil (*Myriophyllum spicatum*, abbreviated as EWM) and curly-leaf pondweed (*Potamogeton crispus*, abbreviated as CLP). The maximum depth in the lake is 6.4 meters (21 feet). Approximately 99% of the lake is littoral (the littoral zone is the area where submersed aquatic plants are likely to be found due to light penetration usually 0 to 15 feet). For information on Otter Lake water quality see https://webapp.pca.state.mn.us/surface-water/impairment/02-0003-00 and https://whaf-lakes.dnr.state.mn.us/lakedetails/02000300/topic/summary

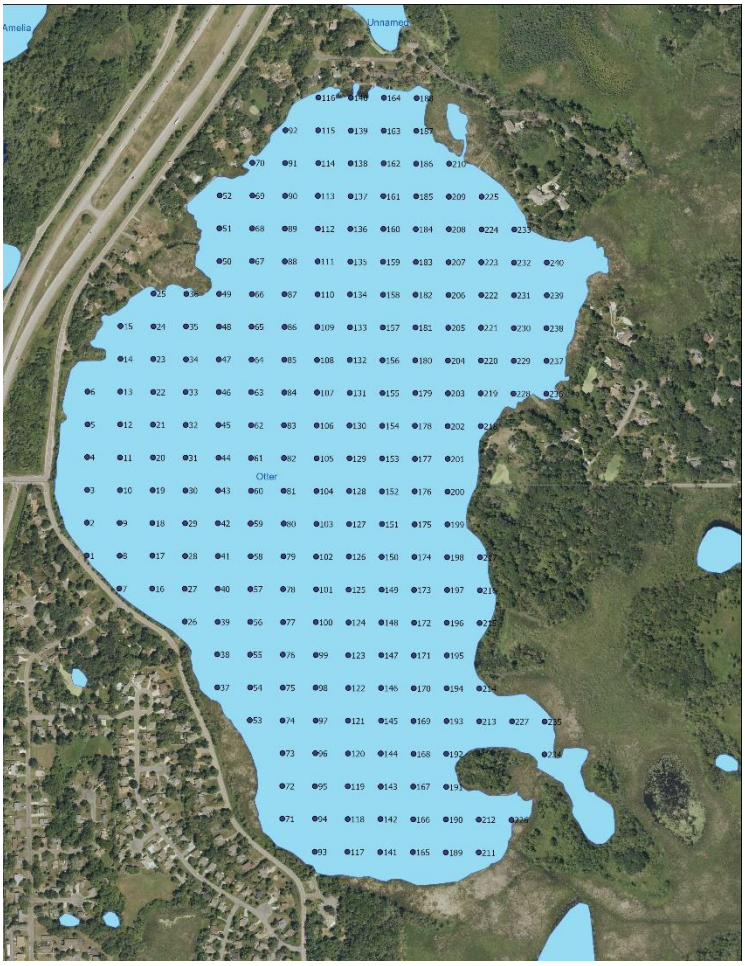
Management History:

While Curly-leaf pondweed and Eurasian watermilfoil are present in Otter Lake, no IAPM (Invasive Aquatic Plant Management) permits have been issued for offshore management of these species. The only IAPM permit issued was for 0.06 acres of non-native phragmites (*Phragmites australis subs. australis*) in 2010 with the herbicide Imazapyr.

Survey Objectives:

Point-intercept surveys were used to assess the distribution of submersed aquatic plants in Otter Lake. The primary purpose for this type of survey is to 1) develop baseline knowledge of the current plant community in a lake, and over time, 2) compare year-to-year plant variation (using plant presence and spatial location). Moreover, this survey will help the Minnesota Department of Natural Resources and our partners monitor native plant communities and evaluate possible responses from invasive aquatic plant management efforts. It is important to note that distributions of aquatic plants may vary from year to year due to biotic and abiotic factors, as well as the effects from management.

Survey Methods:



We used a point intercept survey method developed by John Madsen in "Aquatic Plant Control Technical Note MI-02, 1999". Survey points in 2025 were placed 70 meters apart using a Geographic Information System (GIS), allowing for the placement of 240 points. Plant samples were collected by throwing and dragging a double-sided rake along the lake bottom at each point for approximately 3 meters. Historically, plant samples were assessed by the Rice Creek Watershed District to determine species and rake fullness as a surrogate for density using a scale of zero [no plants] to 5 [dense, matted on the surface] from 2009 – 2013. From 2019 and beyond, both the RCWD and MnDNR use a zero to 3 scale. Frequency of occurrence percentages (i.e., how often a plant species was found in the lake) were calculated based on the littoral zone (the portion of the lake that is less than 15 feet in depth).

Survey Observation

Maximum depth of rooted aquatic vegetation ranged between 4.3 - 6.1 meters (14 - 20 feet) from 2009 to 2025. In 2025, native submerged plant diversity was recorded at 3.9 mean taxa per survey point. The frequency of occurrence (FOO) from 2009 to 2025 ranged from 98% to 99%. The number of submerged aquatic native plants observed has ranged from 12 to 23 species since 2009. The highest native species count within the last fourteen years was observed in 2019 and 2025, with a total of 23 submersed native aquatic plants identified. Refer to **Table 2 – Point Intercept Metrics** for historical point intercept survey metrics.

Historically, the native plant community has been dominated by coontail, Canadian waterweed, fern-leaf pondweed, and flat-stem pondweed. Two species that increased substantially in frequency in 2025 were Canadian waterweed and fern-leaf pondweed, which were up 33% and 31% from their previous highest FOOs, respectively **(see Table 3 – Plant Frequency of Occurrence)**. In contrast, this year's survey did not document slender naiad and sago pondweed, both of which have been identified in the previous three surveys. Despite the decline of these two species, the overall aquatic plant community in Otter Lake is abundant and diverse. In fact, in the 2025 survey water marigold, least spike rush, fries' pondweed, and variable-leaf pondweed were observed for the first time.

Eurasian watermilfoil frequencies have varied greatly across the four survey years, from 5% to 62% FOO. In 2025, Eurasian watermilfoil was observed at 21% of survey sites, the second lowest FOO recorded **(**see **Table 3 – Plant Frequency of Occurrence).** There is no active management of EWM in Otter Lake, so FOO fluctuations are likely a product of seasonal habitat, environmental variability, and competition with native aquatic plants. Curly-leaf pondweed seems to be present but at low abundances, ranging from 1% to 4% FOO. This species is not properly documented in most PI surveys due to the timing of the survey and the natural early senescence of the species at the beginning of July.

Table 2 – Point Intercept Metrics. Summary of point intercept metrics for Otter Lake, Anoka County, Minnesota (DOW # 02000300). Shaded values were calculated from the littoral depth range (0 – 15 feet).

Survey Metrics	July 16, 2009	June 10, 2013	July 12, 2019	July 22, 2025
Treated (Y/N)	N	N	N	N
Surveyor	RCWD	RCWD	RCWD	MN DNR
Total # Points Sampled	185	220	231	240
Max Depth of Growth (95%)	20	14	-	15
# Point in Max Depth Range	-	-	-	201
# Points in Littoral (0-15 feet)	-	-	-	201
% Points w/ Submersed Native Taxa	99	99	98	98
Mean Submersed Native Taxa/ Point	-	-	-	3.9
# Submersed Native Taxa	12	14	23	23
# Submersed Non-Native Taxa	2	2	2	2

Table 3 – Plant Frequency of Occurrence. Historic percent frequency of occurrence for submersed aquatic vegetation within the littoral zone (0 – 15 feet) in Otter Lake, Anoka County, Minnesota (DOW # 02000300).

Taxonomic Name	Common Name	JUL 16 2009	JUN 10 2013	JUL 12 2019	JUL 22 2025
*Myriophyllum spicatum**	Eurasian watermilfoil*	62	5	39	21
*Potamogeton crispus**	Curly-leaf pondweed*	2	4	1	4
Ceratophyllum demersum	Coontail	83	46	76	61
Elodea canadensis	Canadian waterweed	16	17	56	89
Heteranthera dubia	Water Stargrass	-	-	5	15
Lychnothamus barbatus	Bearded Stonewort	-	-	1	5
Macroalgae	**Muskgrass/Stonewort (Combined*)**	6	24	6	16
Chara	Muskgrass	6	-	5	13
Nitella	Stonewort	-	-	1	3
Myriophyllum sibiricum	Northern watermilfoil	-	21	2	1
Najas flexilis	Slender Naiad	8	19	4	-
P. amplifolius	Large-leaf pondweed	-	11	12	9
P. illinoensis	Illinois Pondweed	-	-	8	2
P. nodosus	Longleaf Pondweed	29	-	-	-
P. praelongus	White-stem pondweed	27	23	20	18
P. richardsonii	Clasping-leaf pondweed	19	31	4	7
P. robbinsii	Fern-leaf pondweed	-	15	27	58
P. zosteriformis	Flat-stem pondweed	76	67	47	57
Ranunculus aquatilis	White Water Crowfoot	-	18	3	19
Stuckenia pectinata	Sago Pondweed	5	18	1	-
Uticularia sp.	Bladderwort	2	7	1	1
Vallisneria americana	Water celery	4	12	7	11

* Denotes an invasive aquatic plant
\- Denotes no detection during the survey

Floating, Free-floating & Emergent plants observed: Filamentous algae 2013 and 2019, *Lemna trisulca* (Star Duckweed) 2019 and 2025, *Nuphar variegata* (Yellow Waterlily) 2013, 2019, and 2025, *Nymphaea odorata* (White Waterlily) 2009, 2013, 2019, and 2025, *Scirpus validus* (Soft-stem Bulrush) 2013 and 2019, *Spirodela polyrhiza* (Greater Duckweed) 2013 and 2019, *Wolffia sp.* (Watermeal)
Less common (< 5% frequency) submersed vegetation observed: *Bidens beckii* (Water Marigold) 2025, *Eleocharis acicularis* (Least Spike Rush) 2025, *Myriophyllum sbiricum* (Northern Watermilfoil) 2019 and 2025, *Najas spp.* (Naiads) 2025, *Potamogeton foliosus* (Leafy pondweed) 2019 and 2025, Potamogeton friesii (Fries' Pondweed) 2025, *Potamogeton gramineus* (Variable-Leaf Pondweed) 2025, *Potamogeton guadalupensis* (Bushy Pondweed) 2019, *Potamogeton illinoensis* (Illinois Pondweed) 2025, *Potamogeton natans* (Floating Pondweed) 2019 and 2025, *Potamogeton pusillus* (Small Pondweed) 2019 and 2025, *Utricularia vulgaris* (Common bladderwort) 2025

Photos 1 & 2 - Left (1): Area of abundant floating-leaf pondweed (*Potamogeton natans*). **Right (2):** Diverse rake toss that captured species such as white-stem pondweed, flat-stem pondweed, Canadian waterweed, white water crowfoot, and others. Photos taken by MNDNR staff on July 22, 2025, at Otter Lake, Anoka County, Minnesota (DOW #02000300).

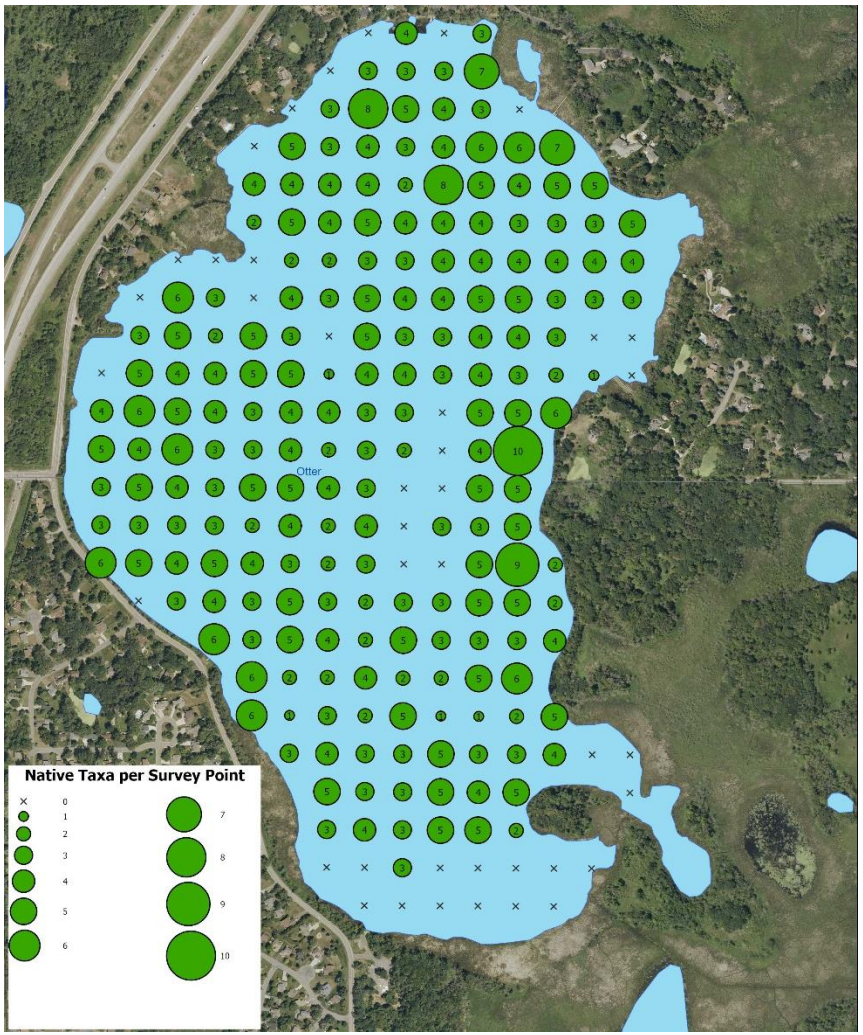


Figure 1 – Native Species Density. Spatial distribution and species richness (# of native species per sample point) for submersed native aquatic plants sampled during the 2025 point intercept survey. The survey was jointly conducted by the Minnesota Department of Natural Resources (MNDNR) and Rice Creek Watershed District (RCWD). Otter Lake, Anoka County, Minnesota (DOW #02000300)

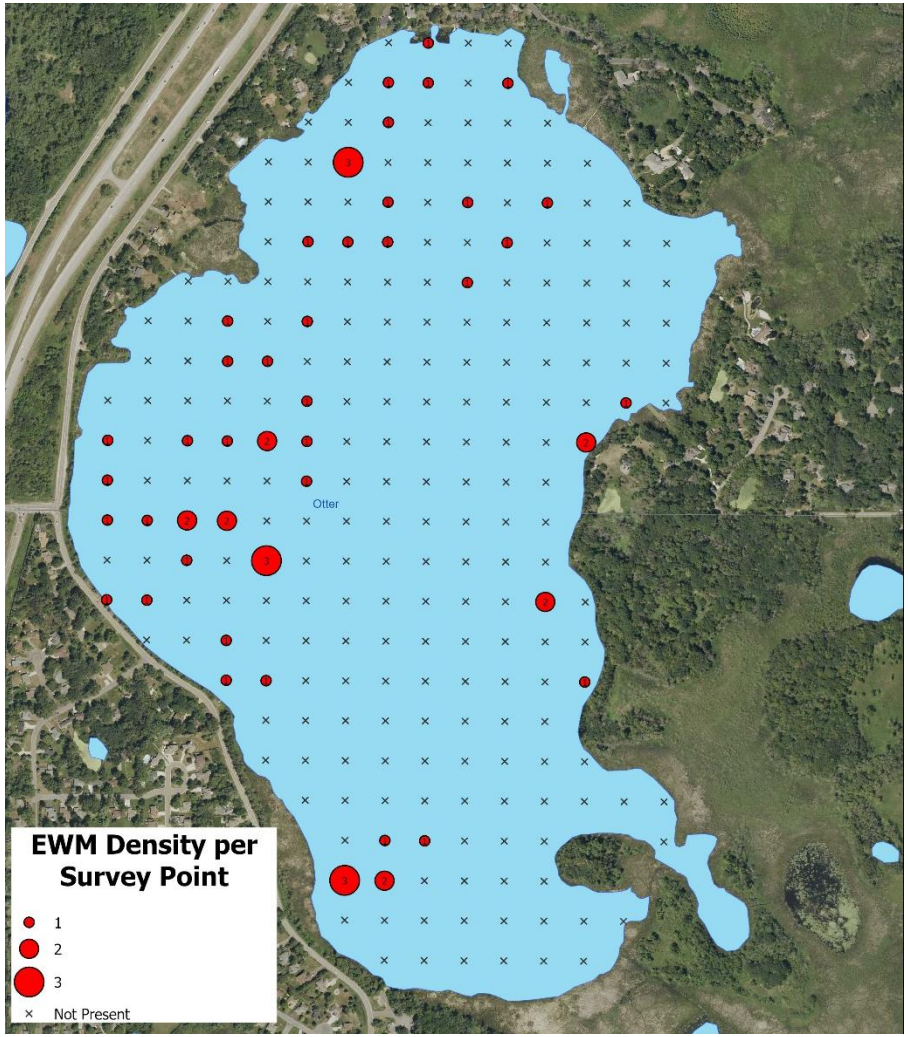


Figure 2 – Eurasian Watermilfoil Density (EWM). Spatial distribution and rake density per sample point for submersed Eurasian watermilfoil sampled during the 2025 point intercept survey. The survey was jointly conducted by the Minnesota Department of Natural Resources (MNDNR) and Rice Creek Watershed District (RCWD). Otter Lake, Anoka County, Minnesota (DOW #02000300).

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