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## COON LAKE WEST, ANOKA COUNTY: 2021 AQUATIC VEGETATION REPORT

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

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**Lake:** Coon (DOW# 2004200)

**Lake Surface Area:** 1,985 acres

**Littoral Area:** 1,332 acres

**County:** Anoka

**Survey Type:** Point-intercept

**Date of Survey (most recent):** August 2, 2021

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**Report updated:** December 27, 2021

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### 2021 Summary:

*The 2021 aquatic vegetation point-intercept survey of Coon Lake (DOW #02004200) was completed in the West Basin on August 2, 2021. Plants were present to a maximum depth of 9 feet (2.7 meters) and 91% of 167 sampled points contained native submersed vegetation. The Coon Lake Improvement District (CLID) has been managing the invasive plants curly-leaf pondweed (CLP) and Eurasian watermilfoil (EWM) for the past 10+ years at below the 15% littoral limit in both the East and West Basin. Due to an increase in nuisance Eurasian watermilfoil observed in the West Basin, a variance was issued to allow basin-wide use of fluridone in the spring of 2019. Low-dose fluridone treatments are effective at controlling Eurasian watermilfoil and often provide 3+ years of control.*

**Summary Table.** Summary of aquatic submersed plants in Coon Lake (West Basin), Anoka County, Minnesota (DOW# 2004200) as indicated by results of Point-Intercept surveys. Values were calculated from the littoral depth range (0-15 feet).

PI Survey Date	% Frequency of EWM*	Max Depth of Growth in feet [95%] <sup>†</sup>	% Points w/ Native Submersed Taxa	Mean Native Submersed Taxa/ Point	# Submersed Taxa
SEPT 2014	3	8.5	80	2.7	13
AUG 2018	39	8	93	3.4	25
JUN 2019	44	10	96	4.0	27
JUL 2020	1	9	91	2.9	23
AUG 2021	1	8	90	3.5	24

\*EWM is short for Eurasian watermilfoil

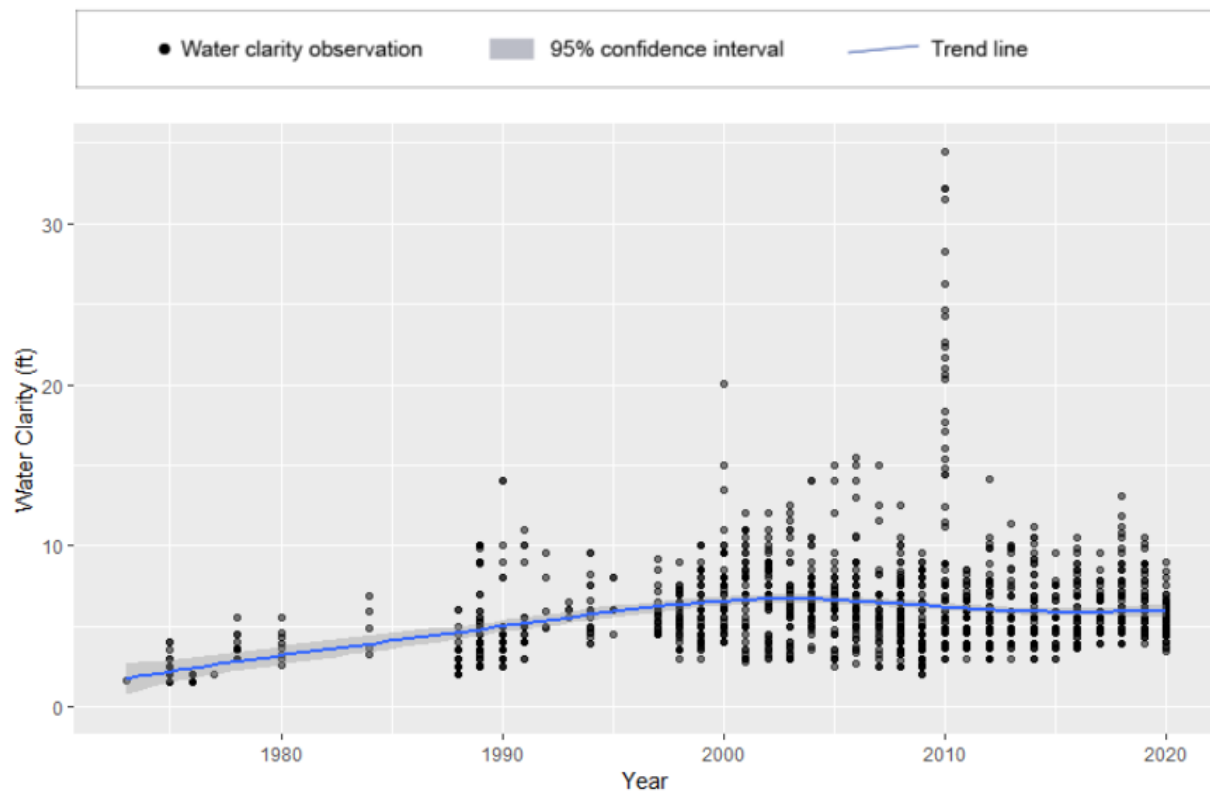
<sup>†</sup>95th percentile calculated based on all vegetated sampling points

Taxa refer to groups of submersed aquatic plant species or genera

## Lake Description:

Coon Lake is a 1,985-acre eutrophic (nutrient-rich) lake located in East Bethel, Anoka County, Minnesota. The lake is composed of two basins and for management, purposes are grouped into Coon East and Coon West which represent the main recreational bodies for the lake.

Both basins of Coon Lake are infested with two invasive aquatic plants: Eurasian watermilfoil (*Myriophyllum spicatum*, abbreviated as EWM) and curly-leaf pondweed (*Potamogeton crispus*, abbreviated as CLP). The maximum depth of water is located in the East Basin at 27 feet (8.2 meters). Approximately 67% of the lake is littoral (water depth zone from 0-15 feet where aquatic plants are likely to be found). Secchi disk averages (water transparency measurements) have remained consistent for the last 5 years (see below **Figure 1-Secchi Averages**). Water transparency data collected for the MPCA were from a variety of sample locations in both basins. These data were collected by Citizen Monitoring Groups. For more information concerning Coon Lake water quality, see <https://webapp.pca.state.mn.us/cmp/stations/02-0042-00-204/print>.



**Figure 1-Secchi Averages.** Secchi disk observations in meters for Coon Lake (both basins; DOW #02004200) from 1973 to 2020. Figure obtained from the Minnesota Pollution Control Agency (MPCA).

## Management History:

See below (**Table 1-Invasive Plant Management Summary**) for a recent history of herbicide treatments. Historically, the West Basin had more severe nuisance EWM growth thus the approved variance treatment utilizing fluridone. Fluridone is a selective herbicide that is applied at a low dose (2-4 parts per billion) throughout a growing season (90 days of exposure). Eurasian watermilfoil was not treated in 2021.

**Table 1-Invasive Plant Management Summary.** Characteristics and history of Eurasian watermilfoil herbicide treatment for Coon Lake (East and West, DOW# 02004200, Total acres: 1,984.7, Littoral acres: 1,331.9, 15% Littoral acres: 199.8). Acres treated includes both basins for each year unless otherwise noted.

Date	Treatment [W,P,N]	Target Species	Total Acres Treated	Herbicide	Applicator
JUN 2014*	P	EWM	10	2, 4-D	PLM Lake and Land Management Corp.
JUL 2015	P	EWM	26	2, 4-D	PLM Lake and Land Management Corp.
JUL 2016	P	EWM	111	2, 4-D	PLM Lake and Land Management Corp.
JUN 2017	P	EWM	30	2, 4-D	PLM Lake and Land Management Corp.
JUL 2018	P	EWM	13.07	Diquat (Tribune)	PLM Lake and Land Management Corp.
MAY 2019	W <sup>w</sup>	EWM/CLP	960	Fluridone (Sonar A.S)	PLM Lake and Land Management Corp.
AUG 2020	P <sup>w</sup>	EWM	3.4	Diquat (Tribune)	PLM Lake and Land Management Corp.
APR 2021	P <sup>w</sup>	CLP	26.2	Diquat (Tribune)	PLM Lake and Land Management Corp.

Treatment: W (whole lake), P (partial lake), N (no treatment)

CLP is an abbreviation for curly-leaf pondweed. EWM is an abbreviation for Eurasian watermilfoil

Superscripts denote basin w(west) and E(east), no superscripts indicate total across both basins

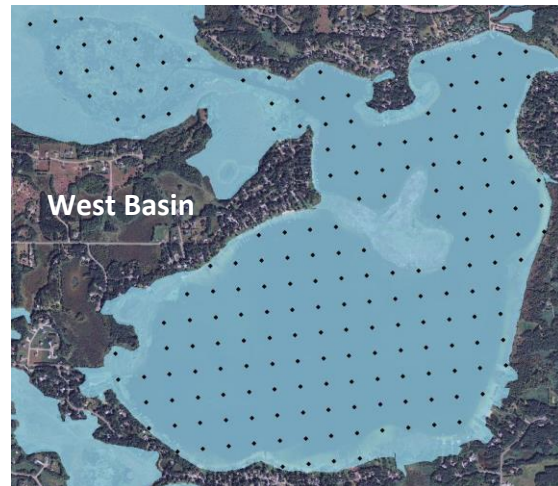
\* LVMP year

## Survey Objectives:

Point-intercept surveys were used to assess the distribution of aquatic plants in Coon 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 (in plant presence and spatial location). Moreover, this survey will help the DNR and our partners monitor native plant communities and evaluate possible responses to invasive aquatic plant management efforts. It is important to note that distributions of aquatic plants may vary from year to year due to effects such as differences in weather and the effects of 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 were placed 100 meters apart using a Geographic Information System (GIS). Note: surveys from 2010 were 175 meters apart, respectively. This spacing allowed for the placement of 162-170 points, depending on the year. Plant samples were collected by throwing and dragging a double-sided rake along the lake bottom



at each point for approximately 3 meters. Plant samples were assessed on the boat to determine species and rake fullness as a surrogate for density (scale of zero [no plants] to 3 [dense, matted on the surface]). Frequencies 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 is less than 15 feet in depth).

## Survey Observations:

The most recent Coon West point intercept survey was completed on August 2, 2021. The West Basin is shallow, allowing for 100% of the littoral points to be sampled unless areas are too shallow. Ten fewer points were sampled in the 2021 survey due to the low water conditions of the summer drought. The maximum depth during the 2021 survey was 8 feet although rooted plants were observed in 15 feet of water in previous years. From 2014 to 2018 native plants were stable while EWM expanded (from 3% FOO in 2014 to 39% FOO in 2018).

Since the fluridone treatment in spring 2019, a few plants were less abundant (coontail, naiad, and elodea) which is a consistent finding when compared to other fluridone-managed lakes. Of the eight native pondweeds observed in Coon West five native taxa remained stable or increased in frequency of occurrence from 2019 to 2021 (**Table 3**). Mean Native Taxa/Point has stayed constant and Coon Lake continues to be a diverse north metro lake (**Table 2**; 22 native submersed plant species observed in 2021). In addition, a less common native aquatic plant species to Minnesota, bearded stonewort (*Lychnothamnus barbatus*), was observed in the 2018 and 2021 surveys.

As part of a University of Minnesota/MAISRC study, hybrid milfoil (*Myriophyllum spicatum* [EWM] x *Myriophyllum sibiricum* [northern watermilfoil]) was confirmed in Coon Lake in 2018. In the 2021 survey, hybrid milfoil (interchangeably referred to as EWM in this report) was observed at significantly lower frequencies than in previous years (44% to 1% FOO respectively; **Table 3** and **Figure 3**). No significant observations of CLP were found in these surveys, as would be expected for this late timing as CLP senesces in early July. Subsequent surveys will document the presence of aquatic plants and temporal changes.

**Table 2- Point Intercept Metrics.** Summary of point intercepts metrics for Coon Lake (West Basin), Anoka County (DOW# 02004200). Values shaded in blue were calculated from the littoral depth range.

Survey Metrics	SEPT 2014	AUG 2018	JUL 2019	JUL 2020	AUG 2021
Treated (Y/N)	Y	Y	Y	Y	Y
Surveyor	MN DNR	MN DNR	MN DNR	MN DNR	MN DNR
Total # Points Sampled	166	166	166	167	153
Max Depth of Growth (95%) in feet	9	8	10	9	7.5
# Point in Max Depth Range	136	151	149	148	137
# Points in Littoral (0-15 feet)	164	166	165	167	153
% Points w/ Native Taxa	84	93	96	91	90
Mean Native Taxa/ Point	2.7	3.4	4.0	2.9	3.5
# Native Taxa	18	23	25	21	22
# Non-Native Taxa	1	2	2	2	2

**Table 3- Plant Frequency Occurrence.** Percent frequency of occurrence for submersed vegetation within the littoral zone (0-15 feet) in Coon Lake (West Basin), Anoka County (DOW# 02004200).

<b>Taxonomic Name</b>	<b>Common Name</b>	<b>SEPT 2014</b>	<b>AUG 2018</b>	<b>JUL 2019</b>	<b>JUL 2020</b>	<b>AUG 2021</b>
<b>SUBMERSED PLANTS</b>						
<i>Myriophyllum spicatum</i> *	Eurasian watermilfoil	3	39	44	1	1
<i>Potamogeton crispus</i> *	Curly-leaf pondweed		1	4	5	1
<i>Ceratophyllum demersum</i>	Coontail	45	54	61	26	29
<i>Macroalgae</i>	Muskgrass and Stonewort	9	14			
<i>Chara spp.</i>	Muskgrass			19	27	23
<i>Nitella spp.</i>	Stonewort			18	16	8
<i>Elodea canadensis</i>	Canadian waterweed	35	30	51	4	3
<i>Megalodonta beckii</i>	Water marigold	5	1	1	-	-
<i>Myriophyllum sibiricum</i>	Northern watermilfoil	-	8	-	-	-
<i>Najas sp</i>	Naiad	45	72	51	18	42
<i>Potamogeton amplifolius</i>	Large-leaf pondweed	5	8	12	15	23
<i>Potamogeton foliosus</i>	Leafy pondweed	-	8	8	14	26
<i>Potamogeton gramineus</i>	Variable-leaf pondweed	5	8	8	5	10
<i>Potamogeton illnoensis</i>	Illinois pondweed	23	12	12	6	23
<i>Potamogeton praelongus</i>	White-stem pondweed	4	3	5	-	1
<i>Potamogeton richardsonii</i>	Clasping-leaf pondweed	5	9	15	4	28
<i>Potamogeton robbinsii</i>	Fern pondweed	20	28	31	42	29
<i>Potamogeton zosteriformis</i>	Flat-stem pondweed	29	31	66	70	71
<i>Utricularia gibba</i>	Creeping bladderwort	5	9	4	12	1
<i>Vallisneria americana</i>	Water celery	27	30	28	25	26
Floating and emergent plants observed: <i>Brasenia schreberi</i> (Watershield), <i>Juncus pelocarpus</i> (Brown-fruited rush), <i>Lemna minor</i> (Small duckweed), <i>Lemna trisulca</i> (Star duckweed), <i>Nuphar advena</i> (Yellow pond lily), <i>Nuphar variegata</i> (Bullhead pond lily), <i>Nymphaea odorata</i> (White water lily), <i>Sagittaria spp.</i> (Arrowheads), <i>Schoenoplectus acutus</i> (Hardstem bulrush), <i>Schoenoplectus americanus</i> (Olney's three-square bulrush), <i>Schoenoplectus subterminalis</i> (Water bulrush), <i>Schoenoplectus tabernaemontani</i> (Softstem bulrush), <i>Typha spp.</i> (Cattails).						
Less common (<5% frequency) submersed vegetation observed: <i>Utricularia macrorhiza</i> (Common bladderwort) in 2010, 2014, 2019-2020, <i>Ranunculus aquatilis</i> (White water crowfoot) in 2010, 2014, 2018 and 2020, <i>Heteranthera dubia</i> (Water stargrass) and <i>Stuckenia pectinata</i> (Sago pondweed) in 2010, 2014, 2018-2021, <i>Eleocharis acicularis</i> (Needle spikerush) in 2014, 2018-2021, <i>Lychnothamnus barbatus</i> (Bearded stonewort) in 2018 and 2021, <i>Potamogeton friesii</i> (Fries' pondweed) in 2018 and 2020, <i>Potamogeton pusillus</i> (Small pondweed) and <i>Potamogeton strictifolius</i> (Stiff pondweed) in 2019, and <i>Utricularia minor</i> (Lesser bladderwort) in 2020.						

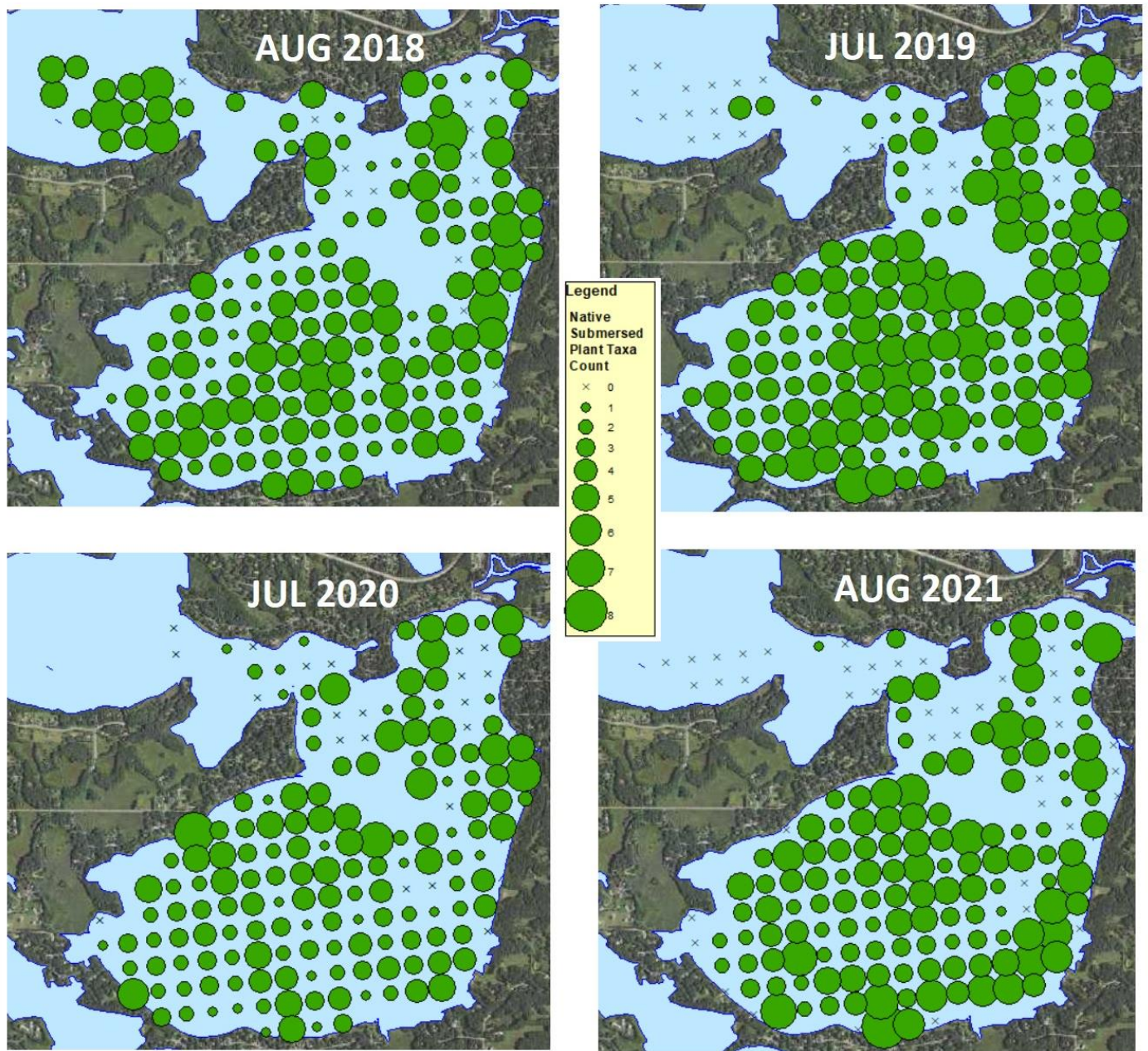




**Photo 1.** Rake throw showing EMW growing in high densities in 2018. **Photo 2.** Aug 2021- Diverse native plants during the summer survey. **Photo 3.** July 2019 - Plants showing signs of degradation and discoloration impacted by the fluridone treatment Coon Lake, West Basin, Anoka County.

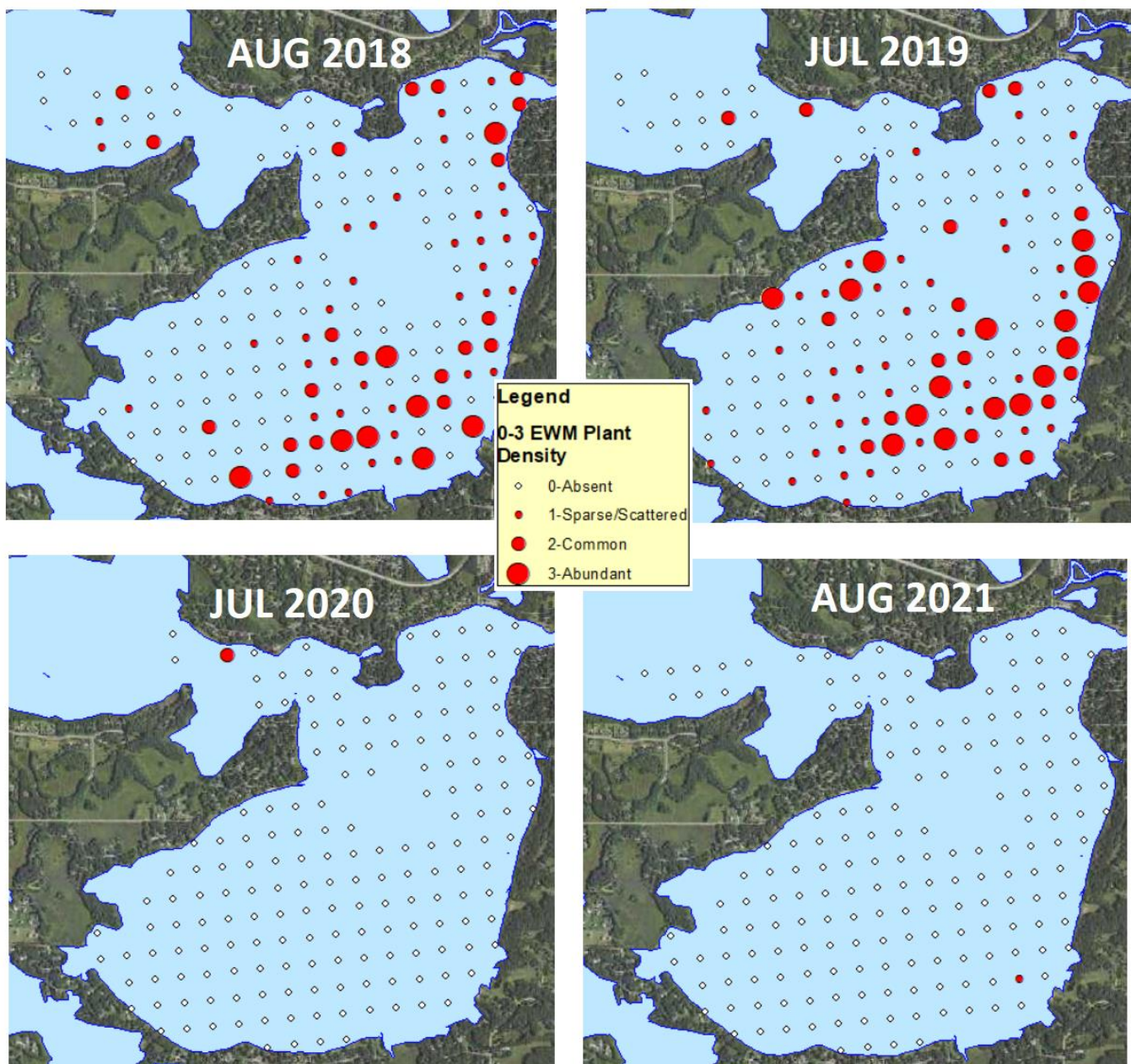






**Figure 2.** Spatial distribution and species richness (# of native submersed taxa per sample point) in the West Basin. Dates correspond to the month of point intercept survey. Coon Lake, Anoka County (DOW # 02004200).





**Figure 3.** Spatial distribution and density of Eurasian watermilfoil per sample point for 2018-2021 in the West Basin. Dates correspond to the month of point intercept survey. Density rake was rated on a 1-3 density rake rating. Coon Lake, Anoka County

This information can be made available in alternative formats such as large print, braille or audiotape by emailing [info.dnr@state.mn.us](mailto:info.dnr@state.mn.us) or by calling 651-259-5016.