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To: Round Lake Association  
Terry Schultz

Subject: Round Lake Curly Leaf Survey

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# Table of Contents

Introduction & Method..... 3

    Figure 1: 2022 CLP Survey Boat Track..... 3

Results..... 4

    Table 1: CLP 6-Year Comparison ..... 4

    Figure 2: 2022 CLP Areas..... 4

    Table 2: 2022 CLP Density, Stand Composition, and Acreage ..... 5

    Figure 3: Close-up of NW Treatment Area, 2022 Survey Results ..... 6

    Figure 4: 2021 CLP Areas..... 7

    Table 3: 2021 CLP Density, Stand Composition, and Acreage ..... 7

    Figure 5: 2020 CLP Area ..... 8

    Table 4: 2020 CLP Density, Stand Composition, and Acreage ..... 8

    Figure 6: 2019 CLP Area ..... 9

    Table 5: 2019 CLP Density, Stand Composition, and Acreage ..... 9

    Figure 7: 2018 CLP Area ..... 10

    Table 6: 2018 CLP Density, Stand Composition, and Acreage ..... 10

    Figure 8: 2017 CLP (DNR Survey) ..... 11

    Table 7: 2017 CLP Density, Stand Composition, and Acreage ..... 11

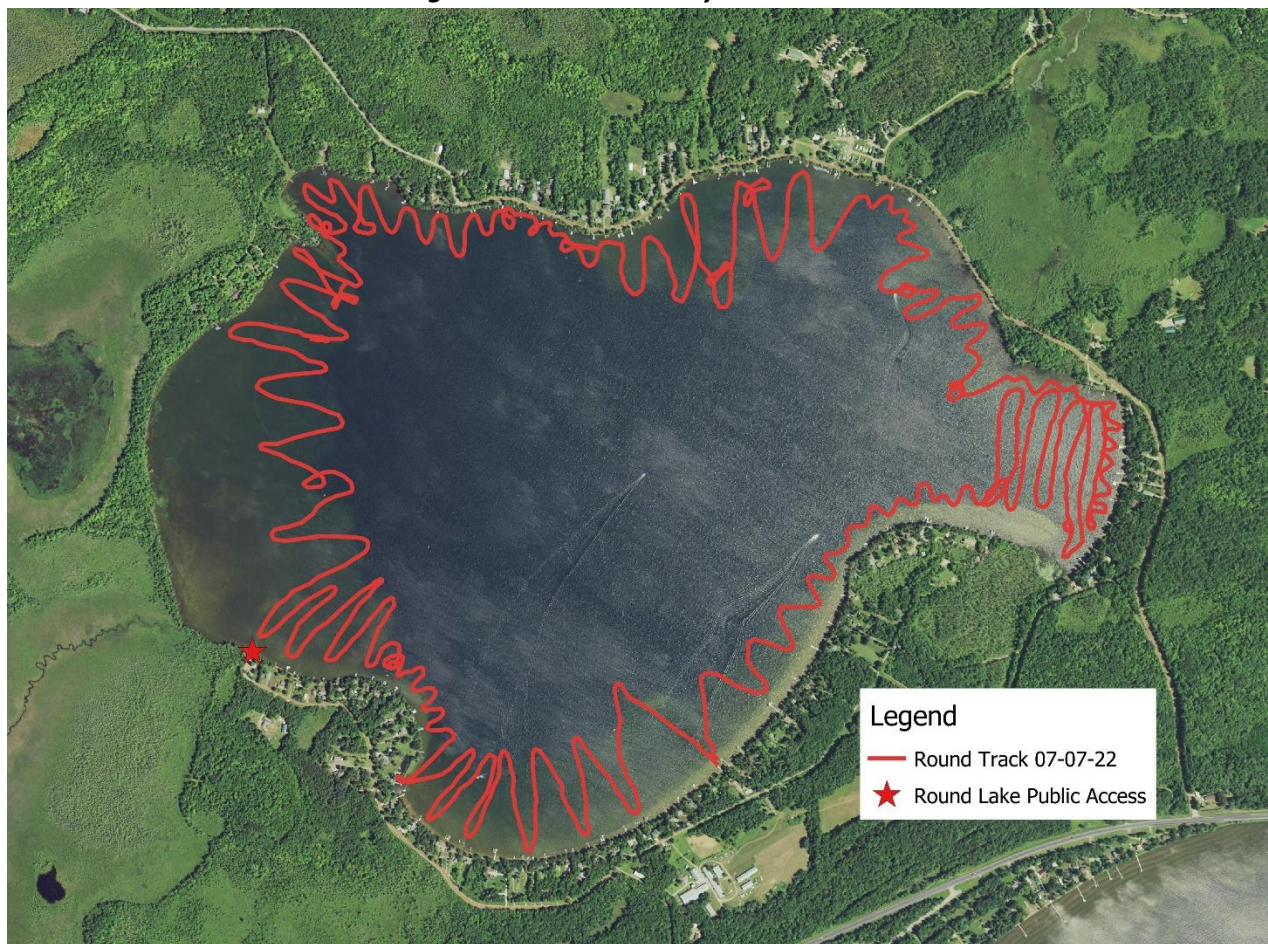
## Introduction & Method

Sarah Fogderud of A.W. Research Laboratories, Inc. (AWRL) completed a vegetation survey of Round Lake on July 7, 2022. The goal of the survey was to delineate areas of curly leaf pondweed (CLP) plant stands within the lake.

The entire littoral zone of the lake was surveyed visually following a zig-zag pattern (Figure 1). When CLP was spotted from the boat a GPS unit was used to mark the location or to trace the outline of larger areas. The density of each CLP stand was noted as either “sparse” or “common”. A sampling rake was used in some locations to confirm the presence of CLP and other plant species. Each CLP stand was labeled as either “mono” for a monoculture of CLP, or “mixed” to denote that a variety of species was present within the stand. In 2018, surveyors spent more time surveying the lake for additional plant species, while the surveys since 2019 have focused on only delineating the CLP in Round Lake.

Thank you to Terry Schultz and Becky Schultz for the use of their boat and for their assistance with the survey.

**Figure 1: 2022 CLP Survey Boat Track**



## Results

CLP was found at 19 locations on the lake for a total of 2.71 acres. In addition to CLP, several other native plant species were identified from the boat or using the sampling rake including northern milfoil, white water crowfoot, chara, white stem pondweed, clasping leaf pondweed, sago pondweed, and flatstem pondweed.

The results show that the total acreage of CLP in Round Lake decreased by 44% from a total of 4.88 acres in 2021 to 2.71 acres in 2022. Table 1 below displays a 6-year comparison of the CLP survey findings.

**Table 1: CLP 6-Year Comparison**

Year	# CLP Areas	Total Acres
2017	11	6.32
2018	9	3.42
2019	21	6.97
2020	23	3.28
2021	16	4.88
2022	19	2.71

**Figure 2: 2022 CLP Areas**

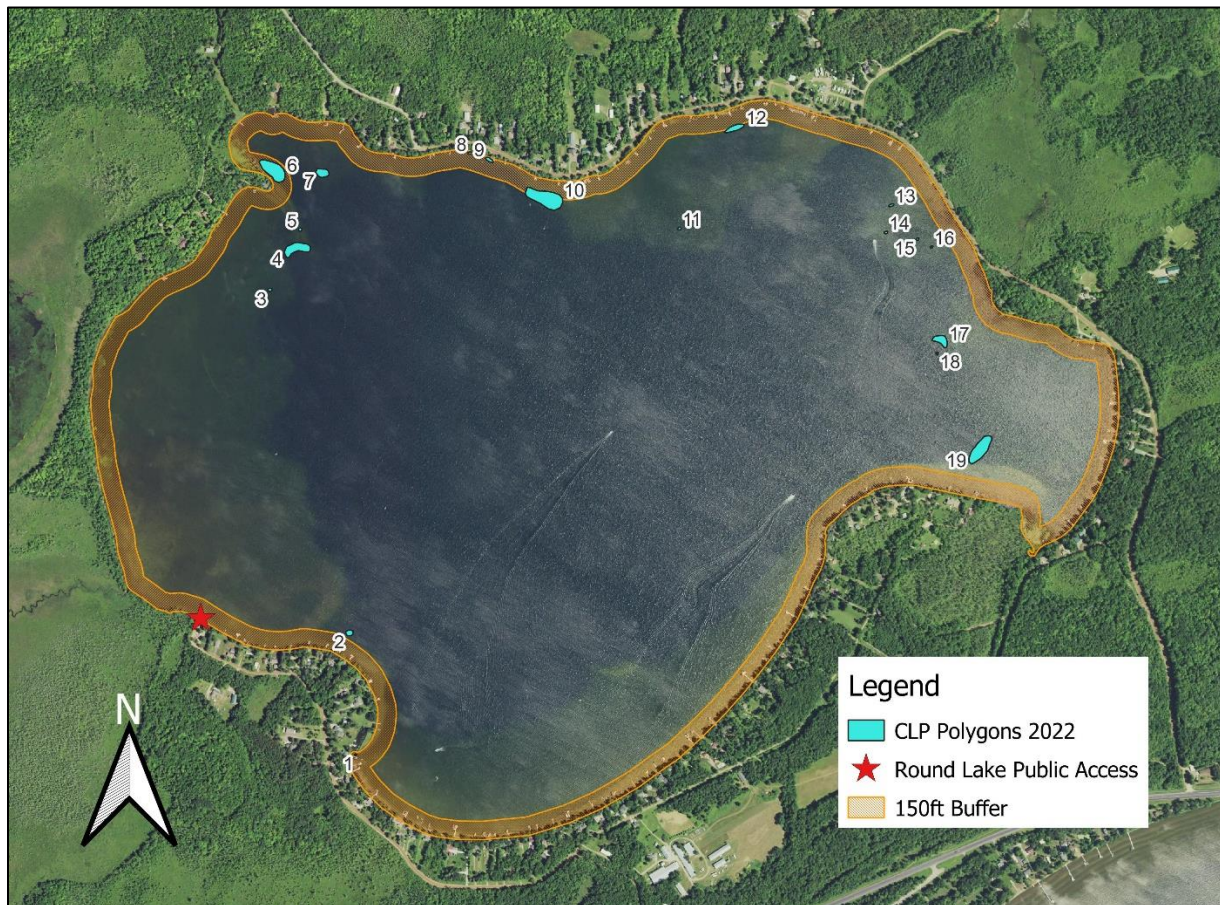


Table 2 below shows the CLP density, stand composition, and calculated acres for the 2022 survey. All sites with CLP present in 2022 had a mixed stand composition – meaning that we observed multiple plant species growing in addition to the CLP. This indicates that while there are areas where CLP is growing strongly, there are no monoculture areas of CLP in Round Lake.

The results of the 2022 survey show a continuing trend in the transition from common density to sparse. In 2019, 71% of the CLP stands had a “common” density rating. In 2022 we saw that improve to just 37% of stands with a “common” density rating: only 7 of the 19 polygons, a combined area of 1.3 acres. A rating of “common” means that CLP is the predominant species of plant growing in the area. Most of the CLP stands found in 2022 were rated with a “sparse” density of CLP. This means that CLP is not the predominant plant and is scattered thinly throughout the area. In many of the smaller stands (Polygon ID’s 1, 2, 11, 15, 16, and 18) there were just a handful of CLP plants growing.

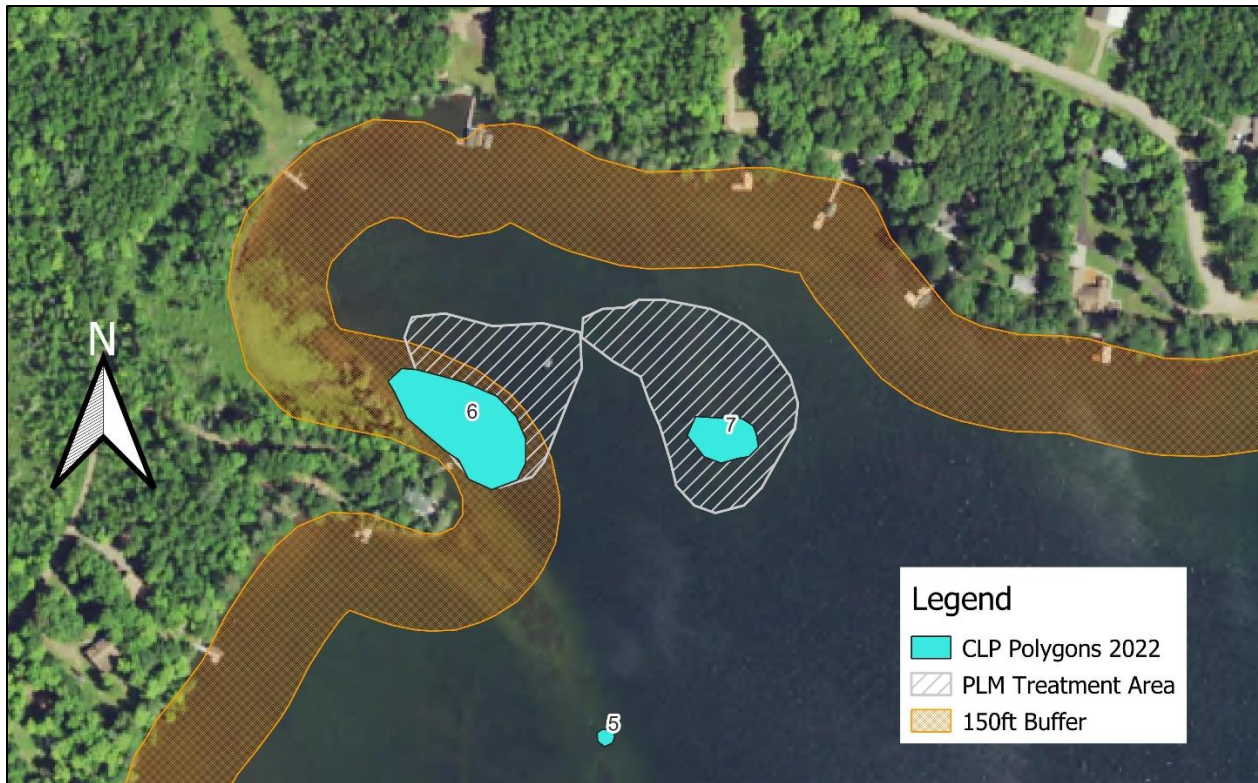
**Table 2: 2022 CLP Density, Stand Composition, and Acreage**

Polygon ID	CLP Density	CLP Stand	CLP Acres
1	Sparse	Mixed	0.0037
2	Sparse	Mixed	0.0520
3	Common	Mixed	0.0147
4	Sparse	Mixed	0.3372
5	Common	Mixed	0.0128
6	Common	Mixed	0.5148
7	Sparse	Mixed	0.1362
8	Sparse	Mixed	0.0133
9	Common	Mixed	0.0339
10	Common	Mixed	0.7439
11	Sparse	Mixed	0.0113
12	Sparse	Mixed	0.1288
13	Common	Mixed	0.0149
14	Common	Mixed	0.0111
15	Sparse	Mixed	0.0081
16	Sparse	Mixed	0.0069
17	Sparse	Mixed	0.1637
18	Sparse	Mixed	0.0061
19	Sparse	Mixed	0.4916
<b>TOTAL</b>			<b>2.71</b>

Figure 3 below shows the northwest portion of Round Lake with the CLP survey results for 2022. The northwest bay of the lake was treated by Professional Lake Management in May of 2020. This resulted in a large reduction in the CLP growth from 2019 to 2020. In 2021, we observed that the CLP had rebounded somewhat in these locations; however, the 2022 survey shows that the amount of CLP within the treatment northwest bay is 60% less than the area measured in 2021, and the stands remain mixed with

native plants growing alongside the CLP. Table 3 shows the acres of CLP measured in the treatment area from 2017 through 2022.

**Figure 3: Close-up of NW Treatment Area, 2022 Survey Results**



**Table 3: Acres of CLP in Treatment Area**

Year	CLP Acres	Treatment Notes
2017	1.67	Before treatment
2018	0.769	Before treatment
2019	2.66	Before treatment
2020	0.707	Year of treatment
2021	1.70	After treatment – year 1
2022	0.651	After treatment – year 2

Figures 4-8 show the CLP areas from the 2021, 2020, 2019, and 2018 surveys completed by AWRL and the 2017 survey completed by the MN Department of Natural Resources.

Tables 4-8 show the acreage for each CLP stand and the total acreage calculated for the lake in 2021, 2020, 2019, 2018 and 2017 respectively.

Figure 4: 2021 CLP Areas

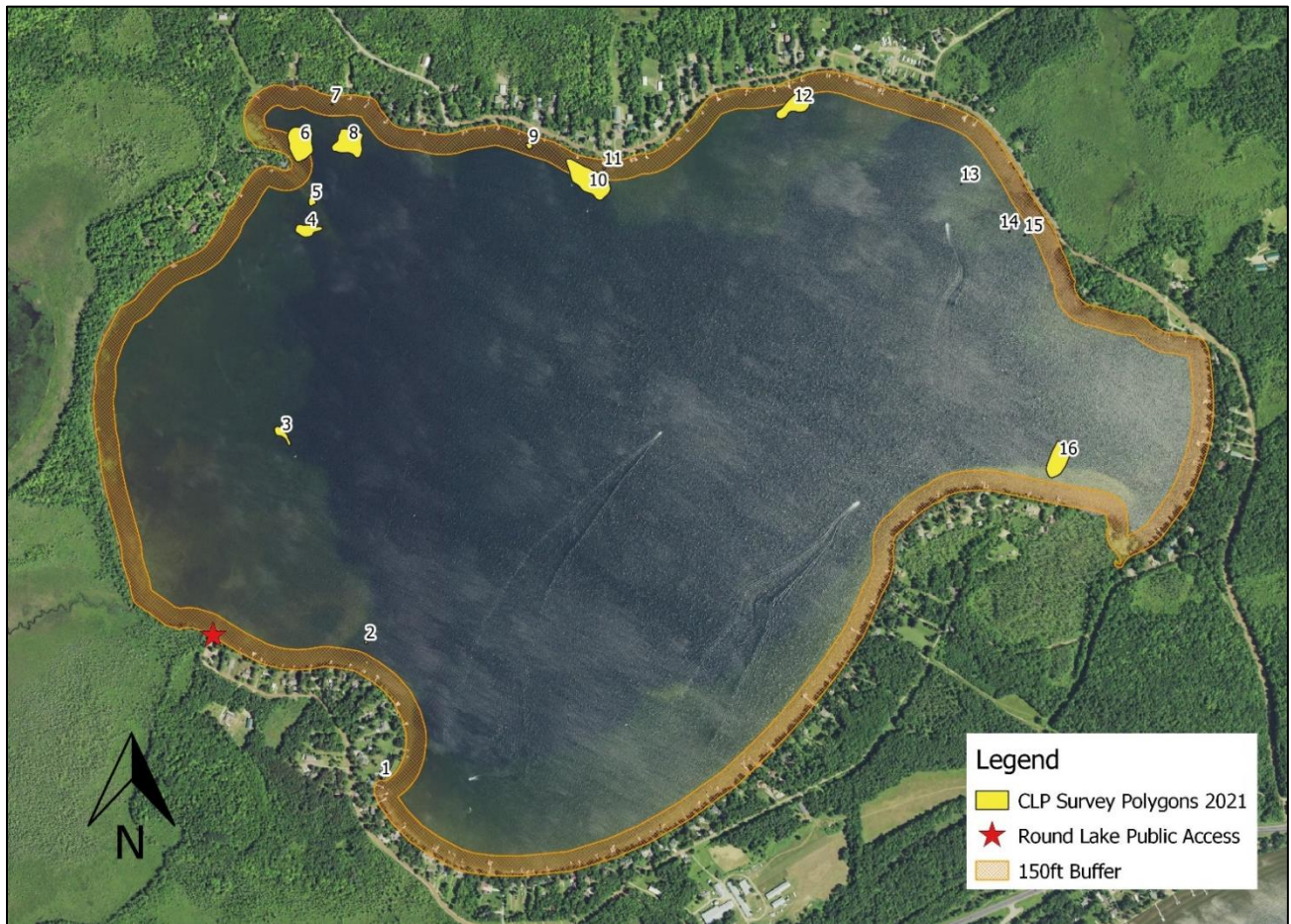


Table 4: 2021 CLP Density, Stand Composition, and Acreage

Polygon ID	CLP Density	CLP Stand	CLP Acres	Polygon ID	CLP Density	CLP Stand	CLP Acres
1	sparse	mixed	0.00408	11	sparse	mixed	0.00614
2	sparse	mixed	0.00842	12	common	mixed	0.59728
3	sparse	mixed	0.15292	13	sparse	mixed	0.00125
4	common	mixed	0.28801	14	sparse	mixed	0.00283
5	common	mixed	0.0601	15	sparse	mixed	0.00357
6	common	mixed	0.90371	16	common	mixed	0.79139
7	sparse	mixed	0.00222	<b>TOTAL</b>			<b>4.8817</b>
8	common	mixed	0.79791				
9	common	mixed	0.03705				
10	common	mixed	1.22481				

Figure 5: 2020 CLP Area

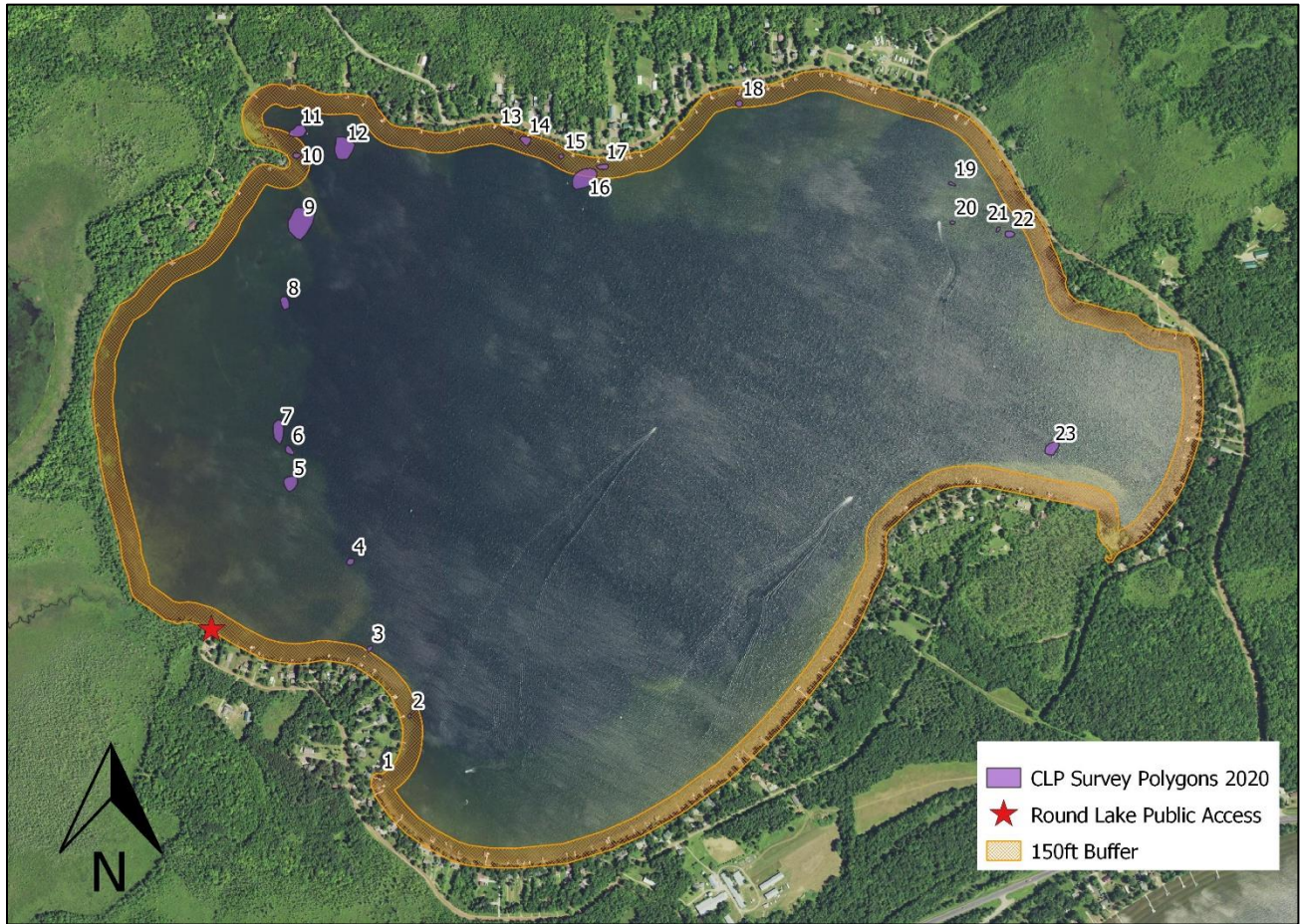


Table 5: 2020 CLP Density, Stand Composition, and Acreage

Polygon ID	CLP Density	CLP Stand	CLP Acres	Polygon ID	CLP Density	CLP Stand	CLP Acres
1	sparse	mixed	0.006447	14	sparse	mixed	0.091282
2	sparse	mixed	0.013510	15	sparse	mixed	0.023420
3	common	mixed	0.030067	16	common	mono	0.499388
4	common	mixed	0.051765	17	common	mono	0.065289
5	common	mono	0.210057	18	common	mixed	0.047357
6	sparse	mixed	0.067923	19	sparse	mixed	0.021309
7	common	mixed	0.251350	20	sparse	mixed	0.018298
8	common	mixed	0.114105	21	sparse	mixed	0.018082
9	common	mixed	0.800871	22	sparse	mixed	0.062166
10	common	mixed	0.042702	23	sparse	mixed	0.171703
11	sparse	mixed	0.197616	<b>Total</b>			<b>3.278146</b>
12	common	mixed	0.466590				
13	sparse	mixed	0.006849				



Figure 6: 2019 CLP Area

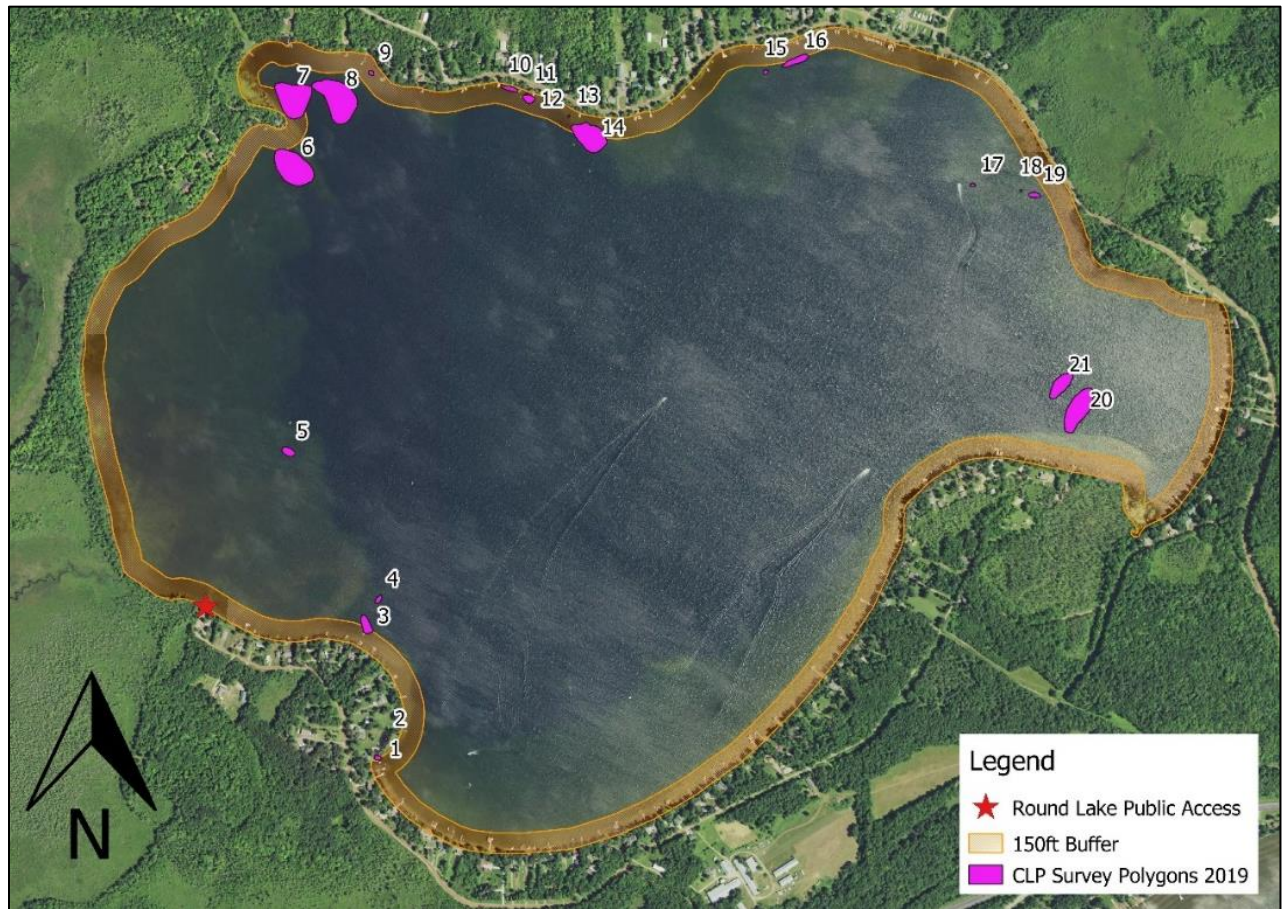
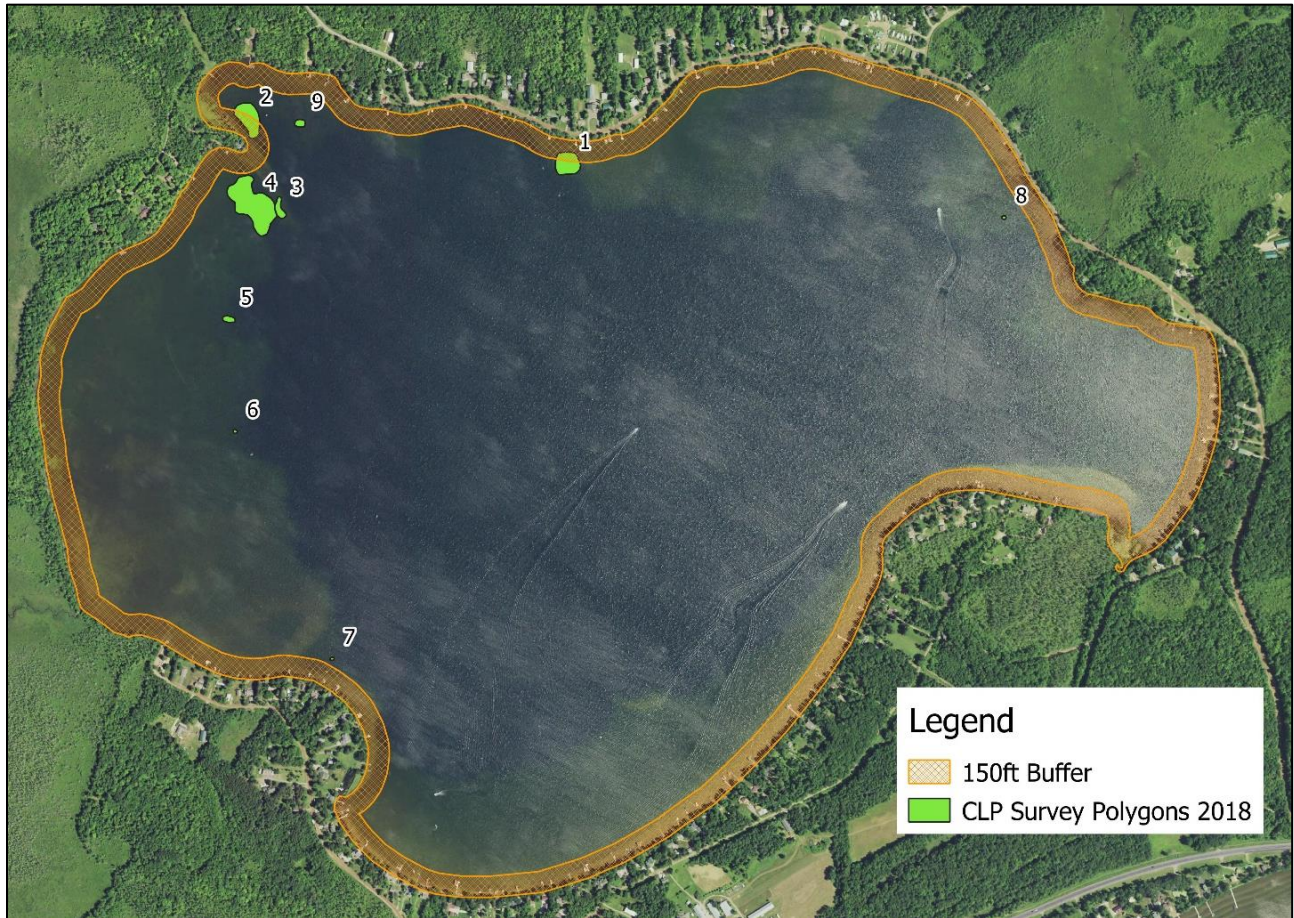


Table 6: 2019 CLP Density, Stand Composition, and Acreage

Polygon ID	CLP Density	CLP Stand	CLP Acres	Polygon ID	CLP Density	CLP Stand	CLP Acres
1	common	mixed	0.035489	12	common	mixed	0.097542
2	sparse	mixed	0.008602	13	sparse	mixed	0.005730
3	common	mixed	0.177208	14	common	mixed	0.857532
4	sparse	mixed	0.044047	15	sparse	mixed	0.023382
5	common	mixed	0.110292	16	common	mixed	0.181827
6	common	mixed	1.252249	17	sparse	mixed	0.018077
7	common	mono	1.182999	18	common	mono	0.006320
8	common	mixed	1.472460	19	sparse	mixed	0.059392
9	common	mixed	0.025741	20	common	mixed	0.929538
10	common	mono	0.069153	21	common	mixed	0.404821
11	common	mixed	0.003386	<b>Total</b>			<b>6.965787</b>

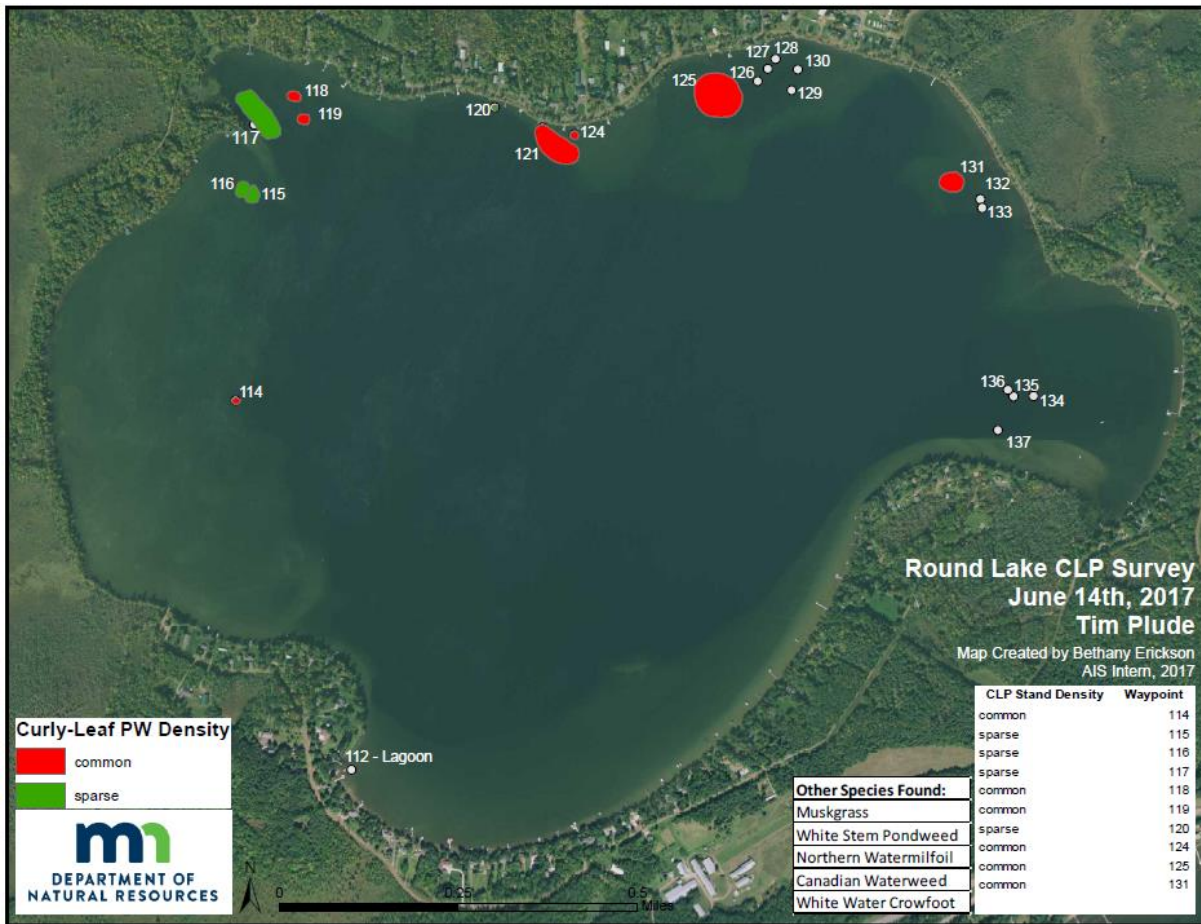
**Figure 7: 2018 CLP Area**



**Table 7: 2018 CLP Density, Stand Composition, and Acreage**

Polygon ID	CLP Density	CLP Stand	CLP Acres
1	sparse	mixed	0.56201
2	sparse	mixed	0.690959
3	common	mono	0.157249
4	sparse	mixed	1.809224
5	common	mixed	0.076469
6	common	mixed	0.014868
7	sparse	mixed	0.012031
8	sparse	mixed	0.014204
9	sparse	mixed	0.078131
<b>Total</b>			<b>3.415145</b>

**Figure 8: 2017 CLP (DNR Survey)**



**Table 8: 2017 CLP Density, Stand Composition, and Acreage**

Polygon ID	CLP Density	CLP Stand	Acres
114	common	mixed	0.055579
115	sparse	mixed	0.269351
116	sparse	mixed	0.238363
117	sparse	mixed	1.372634
118	common	mono	0.151252
119	common	mono	0.141498
120	sparse	mixed	0.026865
121	common	mixed	1.32868
124	common	mono	0.071838
125	common	mixed	2.158212
131	common	mono	0.501635
<b>Total</b>			<b>6.315907</b>