2018 Pre-Treatment Survey of Eurasian Watermilfoil

Round & Little Round Lakes, Sawyer County, Wisconsin

-survey completed July 2018-

Project initiated by:
Round Lake Property Owners Association

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Survey and report completed by:
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ABSTRACT

A point-intercept aquatic plant survey was conducted July 13-15th 2018 in Round and Little Round Lakes, Sawyer County, Wisconsin, at targeted Eurasian watermilfoil (*Myriophyllum spicatum,* EWM) locations. The survey was intended to delineate EWM polygons and gauge EWM density, depth, whether the plants were canopied, and littoral frequency. The results were used to prioritize locations for diver assisted suction harvesting (DASH) of EWM in August 2018. Herbicide treatment was conducted in various locations as maps illustrate herein and although germane to the EWM control efforts overall, most herbicide treated areas are considered separate from this survey.

Methods of the survey followed WDNR guidelines including delineation of EWM beds while boating around the perimeter. Survey points at 20-meter grid resolution within those EWM beds were sampled using a double-sided rake on a telescopic pole and all species were recorded along with water depth and substrate.

Results of the survey found abundant EWM in Richardson's Bay of Round Lake (18 acres including areas treated with herbicide in 2018) and Little Round Lake (5.5 acres). Richardson's Bay was decidedly too abundant in EWM for DASH to be effective and plans will be developed for appropriate action in 2019. In the remaining areas of Round Lake (not including Richardson's Bay) there were a total of 8.4 acres, approximately half of which was treated with herbicide in 2018. DASH workers removed approximately 62,000 pounds of EWM with divers from two pontoon boats for 80 hours each in early August. The efficacy of these removal efforts will be measured during a follow-up post-DASH survey in 2019.

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INTRODUCTION

The Round Lake Property Owners Association (RLPOA) was awarded an Aquatic Invasive Species Established Population Control grant from the Wisconsin Department of Natural Resources (WDNR) in April 2018. This report and the 2018 survey are intended to fulfill part of the grant requirements, particularly pre/post-treatment surveys of Eurasian watermilfoil in Round and Little Round Lakes to gauge efficacy of diver assisted suction harvesting (DASH) efforts. The survey was completed July 13-15th, 2018 and the maps in this report were supplied to TSB Lakefront Restoration and Diving Services LLC (TSB) to guide removal of Eurasian watermilfoil from targeted locations. TSB performed DASH using two pontoons for 10 days between July 30th and August 10th. The results in this report serve as pre-DASH assessment. The results of 2018 DASH efforts will be assessed in 2019 and compared to this year's results.[1]

Study Site

Round Lake is a seepage lake located in Sawyer County, Wisconsin with a surface area of 3,324 acres. The maximum depth is 74 feet and the mean depth is 33 feet. Connected by a narrow channel to the south is Little Round Lake, also considered a seepage lake with a surface area of 179 acres, maximum depth of 38 feet and mean depth of 12 feet. Although the lakes have their own unique Water Body Identification Code (WBIC, Round 2395600, Little Round 2395500), they are sometimes referred to as the Round Chain and the Round Lake Property Owners Association serves both lakes. The lakes are situated approximately 7 miles east of Hayward, Wisconsin (Figure 1). Water clarity for Little Round Lake is moderately clear. Little Round Lake is considered mesotrophic and has abundant vegetation. Water clarity for Round Lake is very high and the lake is considered oligotrophic with low nutrients and sparse vegetation.

2018 Herbicide Treatment

Herbicide was applied at 9.24 acres in Round Lake early July 2018 by NEC Inc.

Table 1 – Herbicide Treatment Summary 2018

Round Lake EWM Polygon	Lake	Location	Acres	Herbicide Type
A-18	Round	Richardson's	2.90	2,4-D (Sculpin)
B-18	Round	Richardson's	0.70	Diquat & endothall (Aquastrike)
D-18	Round	Musky South	1.50	2,4-D (Sculpin)
E-18	Round	Marina	1.00	2,4-D (Sculpin)
F-18	Round	Schoolhouse	2.00	2,4-D (Sculpin)
Z-17	Round	Leder	0.13	2,4-D (Sculpin Granular)
AA-17	Round	Leder	1.01	Diquat
Total 2018 Herbicide 9.24 ac				

[1] EWM beds were also delineated in 2017 and DASH was performed afterward and solely funded by the RLPOA. Point-intercept surveys within the EWM beds were not completed at that time. Therefore, 2017 DASH results could not be assessed using the point-intercept method in 2018.

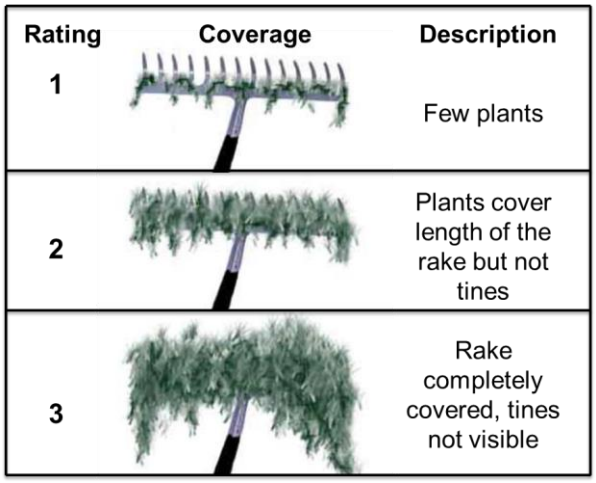
Figure 1 – Round Lakes Map

METHODS

Field Methods

Field methods followed the Aquatic Plant Treatment Evaluation document from Wisconsin Department of Natural Resources[2] and the surveys were completed July 13th-15th 2018. Target locations of Eurasian watermilfoil (EWM) were provided by the RLPOA. Boundaries of EWM beds were visually determined from a boat and mapped while navigating along the bed perimeter using and iPhone 5c and Avenza Maps Application. Each EWM bed was assigned a letter identifier followed by the year (e.g., A-18). Locations of sparse EWM (i.e., no more abundant than native species and spread out) were captured but polygons were not created in these locations because the EWM was not dense enough to justify herbicide or DASH treatments. A grid of survey points at 20-meter resolution within those EWM beds was created using QGIS (QGIS, 2018). Each survey point within the EWM beds was sampled following methods from Hauxwell (2010) A double-sided rake head on a telescopic pole was used to sample each point for aquatic plants, depth, and dominant sediment type (muck, rock, or sand). The rake fullness rating for total coverage of plants on the rake and a separate rake fullness rating for each species present were recorded (Figure 2). Any survey points that were inaccessible were recorded as such and no sample was taken. Aquatic plants found within 6 feet of the sample point but not found on the rake were counted as visual observations. Plant identification was verified using Skawinski (2014).

Figure 2 – Rake Fullness Illustration



[2] The protocol is available on the UW-Extension Lakes Aquatic Plant Management in Wisconsin webpage, Appendix D. https://www.uwsp.edu/cnr-ap/UWEXLakes/Pages/ecology/aquaticplants/default.aspx

Data Analysis Methods

Individual species statistics assess the plant species composition where surveys took place (Table 2). Aquatic plant data is presented in the results section according to map location in Figure 3.

Figure 3 – Round Lakes EWM Map Locations

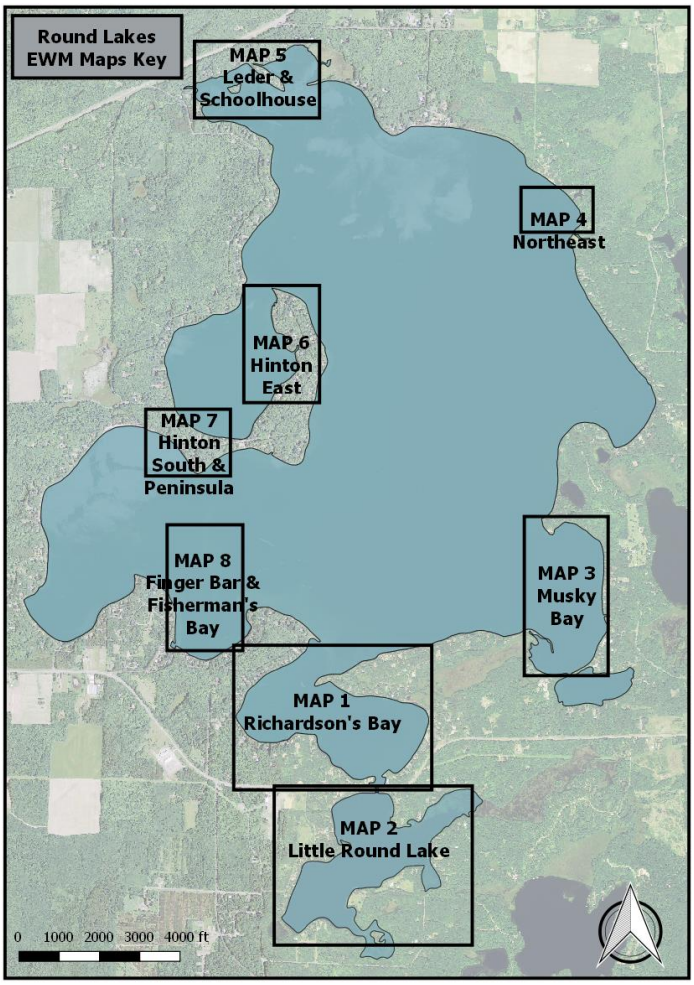


Table 2 – Aquatic Plant Species Statistics Explanations

Individual Statistic	Explanation
Average Rake Fullness	Mean rake fullness rating ranging from 1 to 3. See Rake Fullness Illustration.
Number of sites where a species was found	The total number of survey points where a particular species was found on the rake.
Number of visual sightings	The total number of times a particular species was visually observed within 6 feet of a sampling point, but not collected on the rake.
Frequency of Occurrence (split into two subcategories	a) Among vegetated sites only – The number of sites at which a particular species is found on the rake divided by the total number of vegetated sites (Table 2, #2).
	b) Among sites shallower than the maximum depth of plants – The number of sites at which a particular species is found on the rake divided by the total number of sites less than or equal to the maximum depth of plants (Table 2, #4).
Relative frequency (%)	This value represents the degree to which a particular species contributes to the total of all observations. The sum of all relative frequencies is 100%.

RESULTS

A total of 280 points were surveyed for aquatic plants among 31 EWM polygons (totaling 33 acres including Z17 and AA17) in Round and Little Round Lakes.

Map 1 – Richardson's Bay

There were a total of 147 survey points visited in polygons C18, G18, H18, I18, J18, and K18 (see Table 9 for acreage) with vegetation present at 144 of those survey points (Figure 4). Eurasian watermilfoil was present at 78 survey points and was a visual observation (not on the rake but within 6 feet of the survey point) at another 52 points. The overall littoral frequency of EWM in the polygons was 53%, this only includes sites were EWM was found on the rake. If visual observations are included in the calculation, the littoral frequency of EWM increases to 88%. EWM was dense and near the surface or canopied at all polygons with the exception of the northern half of K18. Sparse EWM was documented along the northwest and southwest shore, but these areas were not dense enough to create a polygon and conduct a point-intercept survey. Polygons A18, B18, and E18 were treated with herbicide in 2018 (see INTRODUCTION for more information). There were 25 native species found in Richardson's Bay and the three most common species were wild celery, fern pondweed, and common waterweed (Table 3). No DASH was done in Richardson's Bay in 2018.

Figure 4 – Richardson's Bay EWM Map

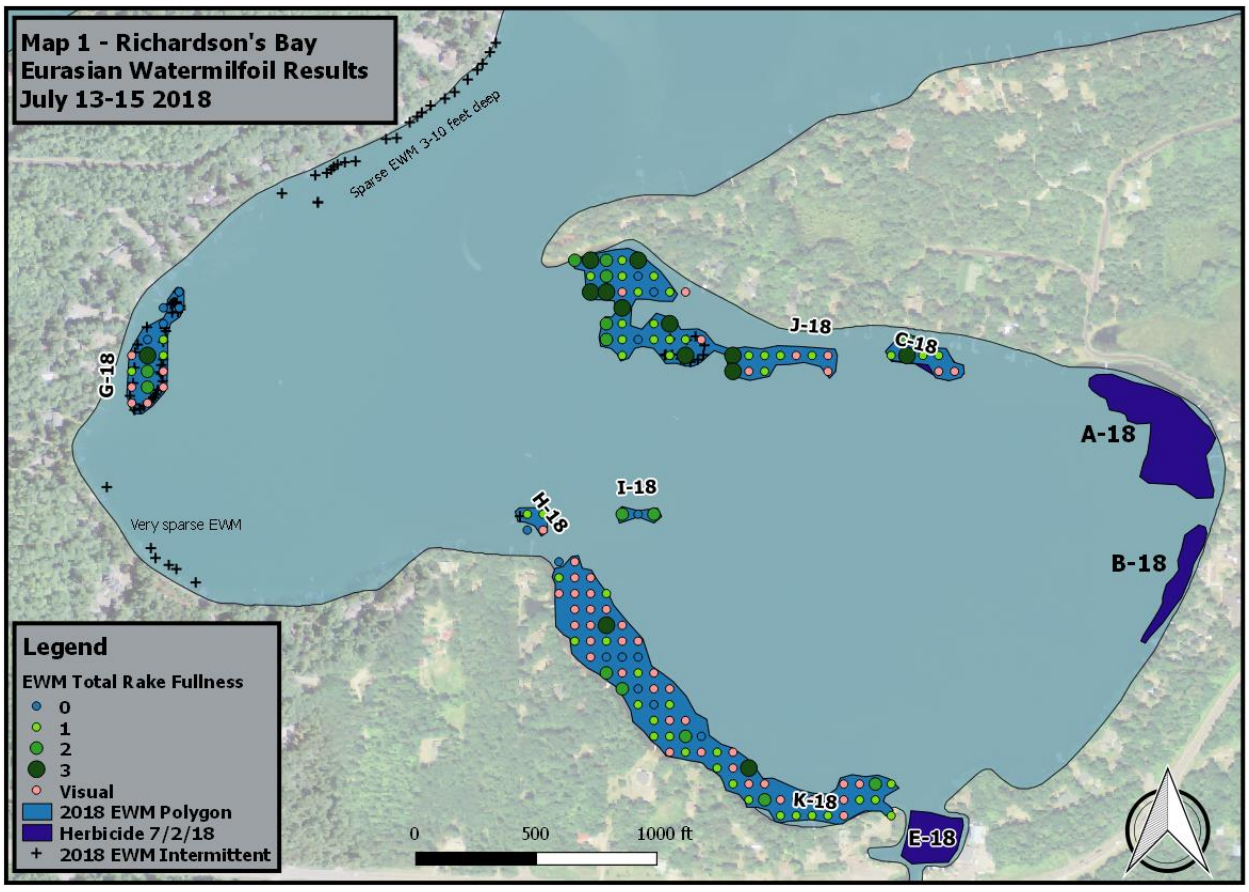


Table 3 – Richardson's Bay Plant Species List & Results

Common Name	Scientific Name	Relative Frequency (%)	Number of Sites	Number of Visual Sites	Frequency of Occurrence at Vegetated Sites	Littoral Frequency	Average Rake Fullness
Eurasian water milfoil	*Myriophyllum spicatum*	15.26	78	52	54.17	53.06	1.53
Wild celery	*Vallisneria americana*	14.48	74	0	51.39	50.34	1.04
Fern pondweed	*Potamogeton robbinsii*	12.33	63	0	43.75	42.86	1.11
Common waterweed	*Elodea canadensis*	10.76	55	0	38.19	37.41	1.00
Flat-stem pondweed	*Potamogeton zosteriformis*	7.05	36	7	25.00	24.49	1.17
Variable pondweed	*Potamogeton gramineus*	6.07	31	0	21.53	21.09	1.00
Coontail	*Ceratophyllum demersum*	4.89	25	0	17.36	17.01	1.08
Northern water-milfoil	*Myriophyllum sibiricum*	4.89	25	1	17.36	17.01	1.00
Slender naiad	*Najas flexilis*	3.91	20	0	13.89	13.61	1.00
Leafy pondweed	*Potamogeton foliosus*	3.72	19	0	13.19	12.93	1.05
Muskgrasses	*Chara sp.*	2.74	14	0	9.72	9.52	1.00
Needle spikerush	*Eleocharis acicularis*	2.35	12	0	8.33	8.16	1.00
Perfoliate pondweed	*Potamogeton perfoliatus*	2.35	12	0	8.33	8.16	1.00
Water marigold	*Bidens beckii*	1.57	8	0	5.56	5.44	1.00
Clasping-leaf pondweed	*Potamogeton richardsonii*	1.57	8	8	5.56	5.44	1.00
Water star-grass	*Heteranthera dubia*	1.37	7	0	4.86	4.76	1.00
Large-leaf pondweed	*Potamogeton amplifolius*	0.98	5	0	3.47	3.40	1.00
White-stem pondweed	*Potamogeton praelongus*	0.98	5	2	3.47	3.40	1.00
Small pondweed	*Potamogeton pusillus*	0.78	4	0	2.78	2.72	1.00
Vasey's pondweed	*Potamogeton vaseyi*	0.59	3	1	2.08	2.04	1.00
Waterwort	*Elatine minima*	0.39	2	0	1.39	1.36	1.00
Arrowhead	*Sagittaria sp.*	0.39	2	0	1.39	1.36	1.00
Spiny spored-quillwort	*Isoetes echinospora*	0.20	1	0	0.69	0.68	1.00
Nitella	*Nitella sp.*	0.20	1	0	0.69	0.68	1.00
Creeping spearwort	*Ranunculus flammula*	0.20	1	0	0.69	0.68	1.00
Filamentous algae	*Filamentous algae*		1	0	0.69	0.68	1.00

Map 2 – Little Round Lake

There were a total of 53 survey points visited in polygons V18, W18, X18, Y18, Z18, AA18, and BB18 (see Table 9 for acreage) with vegetation present at 52 of those survey points (Figure 5). Eurasian watermilfoil was present at 32 survey points and visually observed (not on the rake but within 6 feet of the survey point) at another 19 points. The overall littoral frequency of EWM in the polygons was 60%, this only includes sites were EWM was found on the rake. If visual observations are included in the calculation, the littoral frequency of EWM increases to 99%. EWM was canopied in some locations (especially AA18) but was also well below the surface in others while the density was high in most locations (see Table 9 for more on density and plant height). No herbicide treatment was done on Little Round Lake in 2018 or 2017. There were 31 native species documented in Little Round Lake and the three most common species were fern pondweed, common waterweed, and wild celery (Table 4). DASH technicians on two pontoons removed 30,660 pounds of EWM from Little Round Lake in 34 hours (68 DASH-boat hours).

Figure 5 – Little Round Lake EWM Map

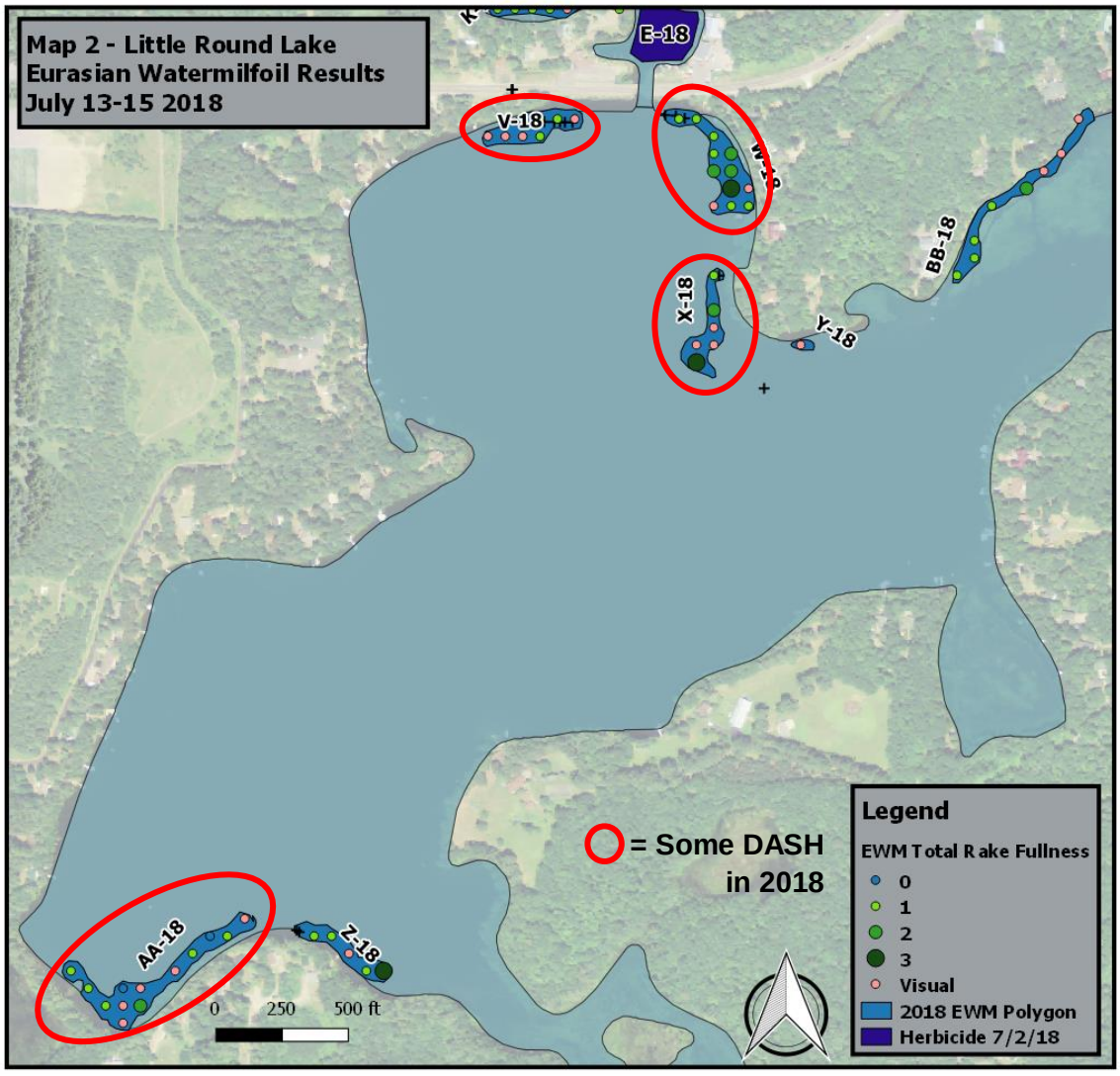


Table 4 – Little Round Lake Plant Species List & Results

Common Name	Scientific Name	Relative Frequency (%)	Number of Sites	Number of Visual Sites	Frequency of Occurrence at Vegetated Sites	Littoral Frequency	Average Rake Fullness
Eurasian water milfoil	*Myriophyllum spicatum*	14.68	32	19	61.54	60.38	1.38
Fern pondweed	*Potamogeton robbinsii*	13.30	29	0	55.77	54.72	1.28
Common waterweed	*Elodea canadensis*	11.01	24	0	46.15	45.28	1.00
Wild celery	*Vallisneria americana*	11.01	24	0	46.15	45.28	1.04
Coontail	*Ceratophyllum demersum*	6.88	15	0	28.85	28.30	1.00
Variable pondweed	*Potamogeton gramineus*	4.59	10	0	19.23	18.87	1.00
Large-leaf pondweed	*Potamogeton amplifolius*	4.13	9	0	17.31	16.98	1.00
Slender naiad	*Najas flexilis*	3.67	8	0	15.38	15.09	1.00
Flat-stem pondweed	*Potamogeton zosteriformis*	3.67	8	0	15.38	15.09	1.00
Northern water-milfoil	*Myriophyllum sibiricum*	2.29	5	0	9.62	9.43	1.00
Leafy pondweed	*Potamogeton foliosus*	2.29	5	0	9.62	9.43	1.00
Clasping-leaf pondweed	*Potamogeton richardsonii*	2.29	5	0	9.62	9.43	1.00
Water marigold	*Bidens beckii*	1.83	4	0	7.69	7.55	1.00
Spiny hornwort	*Ceratophyllum echinatum*	1.83	4	0	7.69	7.55	1.00
Water star-grass	*Heteranthera dubia*	1.83	4	0	7.69	7.55	1.00
Water bulrush	*Schoenoplectus subterminalis*	1.83	4	0	7.69	7.55	1.25
Perfoliate Pondweed	*Potamogeton perfoliatus*	1.83	4	0	7.69	7.55	1.00
Watershield	*Brasenia schreberi*	1.38	3	0	5.77	5.66	1.00
White water lily	*Nymphaea odorata*	1.38	3	3	5.77	5.66	1.00
Fries' pondweed	*Potamogeton friesii*	1.38	3	0	5.77	5.66	1.67
Small pondweed	*Potamogeton pusillus*	1.38	3	0	5.77	5.66	1.00
Muskgrasses	*Chara sp.*	0.92	2	0	3.85	3.77	1.00
Dwarf water-milfoil	*Myriophyllum tenellum*	0.92	2	0	3.85	3.77	1.00
Arrowhead	*Sagittaria sp.*	0.92	2	0	3.85	3.77	1.00
Brown-fruited rush	*Juncus pelocarpus f. submersus*	0.46	1	0	1.92	1.89	1.00
Nitella	*Nitella sp.*	0.46	1	0	1.92	1.89	1.00
Spatterdock	*Nuphar variegata*	0.46	1	1	1.92	1.89	1.00
Floating-leaf pondweed	*Potamogeton natans*	0.46	1	2	1.92	1.89	1.00
Blunt-leaf pondweed	*Potamogeton obtusifolius*	0.46	1	0	1.92	1.89	1.00
White-stem pondweed	*Potamogeton praelongus*	0.46	1	0	1.92	1.89	1.00

Map 3 – Musky Bay

There were a total of 18 survey points visited in polygons T18 and U18 (0.571 and 1.023 ac) with vegetation present at all survey points (Figure 6). Eurasian watermilfoil was present at 12 survey points and visually observed (not on the rake but within 6 feet of the survey point) at another 3 points. The overall littoral frequency of EWM in the polygons was 67%, this only includes sites were EWM was found on the rake. If visual observations are included in the calculation, the littoral frequency of EWM increases to 83%. The EWM plant height was well below the surface and density was estimated to be moderate-to-high. Herbicide treatment was done at polygon D18 (see INTRODUCTION for more information). There were 16 native species found and the three most common species were fern pondweed, common waterweed, and flat-stem pondweed. DASH technicians on two pontoons removed 11,410 pounds of EWM from Musky Bay in 16.5 hours (33 DASH-boat hours).

Figure 6 – Musky Bay EWM Map

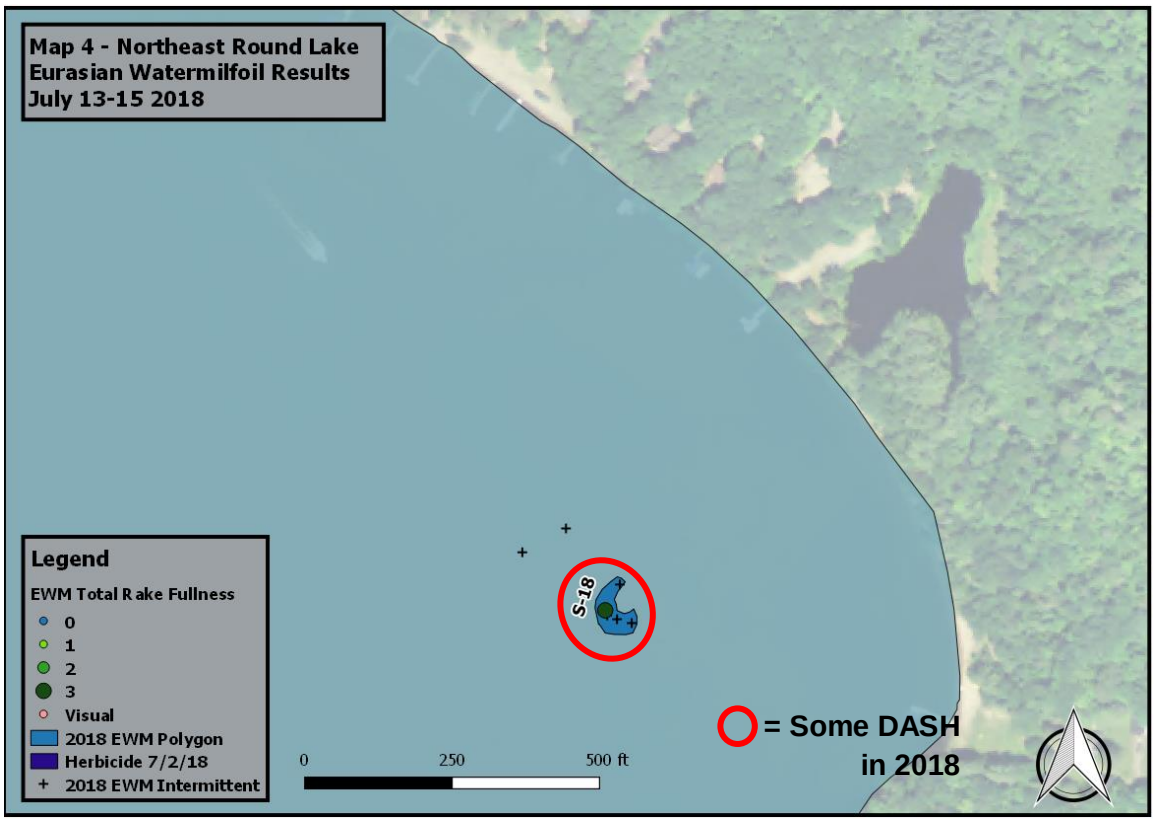
Table 5 – Musky Bay Plant Species List & Results

Common Name	Scientific Name	Relative Frequency (%)	Number of Sites	Number of Visual Sites	Frequency of Occurrence at Vegetated Sites	Littoral Frequency	Average Rake Fullness
Eurasian water milfoil	*Myriophyllum spicatum*	21.43	12	3	66.67	66.67	1.42
Fern pondweed	*Potamogeton robbinsii*	14.29	8	0	44.44	44.44	1.25
Common waterweed	*Elodea canadensis*	12.50	7	0	38.89	38.89	1.00
Flat-stem pondweed	*Potamogeton zosteriformis*	8.93	5	1	27.78	27.78	1.00
Wild celery	*Vallisneria americana*	7.14	4	0	22.22	22.22	1.00
Coontail	*Ceratophyllum demersum*	5.36	3	0	16.67	16.67	1.00
Muskgrasses	*Chara sp.*	5.36	3	0	16.67	16.67	1.00
Slender naiad	*Najas flexilis*	3.57	2	0	11.11	11.11	1.00
Leafy pondweed	*Potamogeton foliosus*	3.57	2	0	11.11	11.11	1.00
Variable pondweed	*Potamogeton gramineus*	3.57	2	0	11.11	11.11	1.00
Small pondweed	*Potamogeton pusillus*	3.57	2	0	11.11	11.11	1.00
Clasping-leaf pondweed	*Potamogeton richardsonii*	3.57	2	0	11.11	11.11	1.00
Water marigold	*Bidens beckii*	1.79	1	0	5.56	5.56	1.00
Large-leaf pondweed	*Potamogeton amplifolius*	1.79	1	1	5.56	5.56	1.00
Creeping spearwort	*Ranunculus flammula*	1.79	1	0	5.56	5.56	1.00
Bur-reed	*Sparganium sp.*	1.79	1	0	5.56	5.56	1.00

Map 4 – Northeast Round Lake

The northeast area of Round is low in plant abundance with sand and rock substrate. Eurasian watermilfoil was found in a small but dense stand at polygon S18 where one survey point yielded EWM at a rake fullness of "3" but no native species. Another small, dense stand of EWM was likely present to the northwest of S18 ("+" signs in Figure 7) but could not be confirmed the day of surveying because anglers were using that location. Interestingly, an abundance of bait fish was observed at S18 since the EWM was providing structural habitat in an otherwise structure-limited area. These small but dense stands of EWM seem somewhat limited in the ability to expand because the surrounding substrate was rock. DASH technicians on one pontoon removed 490 pounds of EWM from S18 in 3 hours.

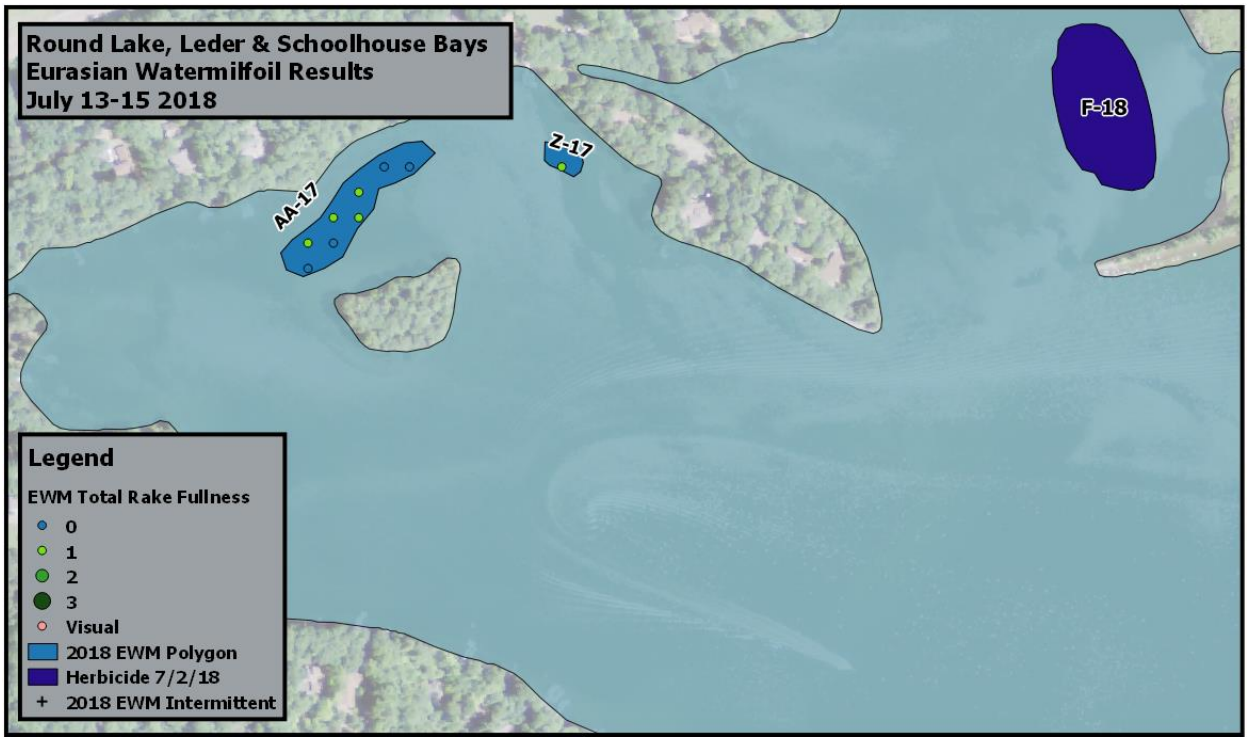
Figure 7 – Northeast Round Lake EWM Map



Map 5 – Leder & Schoolhouse Bays

There were a total of 9 survey points visited in polygons Z17 and AA17 (0.134 and 1.01 acres) with vegetation present at all survey points. The survey was completed on June 16th, 2018 in order to visit these locations before herbicides were applied. These were the only herbicide-treated areas surveyed because they were included in the grant-funded project. Eurasian watermilfoil was present at 5 survey points. The overall littoral frequency of EWM in the polygons was 56%. Herbicide treatment was done at polygons F18 (2 acres), Z17, and AA17 (see INTRODUCTION for more information). There were 3 native species found including coontail (1 site), common waterweed (5 sites), and fern pondweed (7 sites). No DASH was performed in Leder or Schoolhouse Bays in 2018.

Figure 8 – Leder & Schoolhouse Bays EWM Map



Maps 6 and 7 – Hinton Bay and Peninsula South

In Hinton Bay there were 30 survey points in polygons N18, O18, P18, Q18, and R18 (see Table 9 for acreage) with vegetation present at 29 points (Figure 9 & Figure 10). Eurasian watermilfoil was present at 6 survey points yielding littoral frequency of EWM in the polygons of 20%. The EWM was found growing at low densities and below the lake surface at most polygons with the exceptions of Q18 and R18, which were high density with EWM near the surface. There were 16 native species found and the three most common species were fern pondweed, northern watermilfoil, and wild celery (Table 6). DASH technicians on two pontoons removed 14,770 pounds of EWM from Hinton Bay in 19.5 hours (39 DASH-boat hours).

There were seven survey points in polygon CC18 located south of the Peninsula (Figure 10) and vegetation was present at all 7 sites (Table 7). Eurasian watermilfoil was found at 2 sites at low density and well below the lake surface. DASH technicians on two pontoons removed 2,940 pounds of EWM from CC18 in 5.5 hours (11 DASH-boat hours).

Figure 9 – Hinton Bay East EWM Results

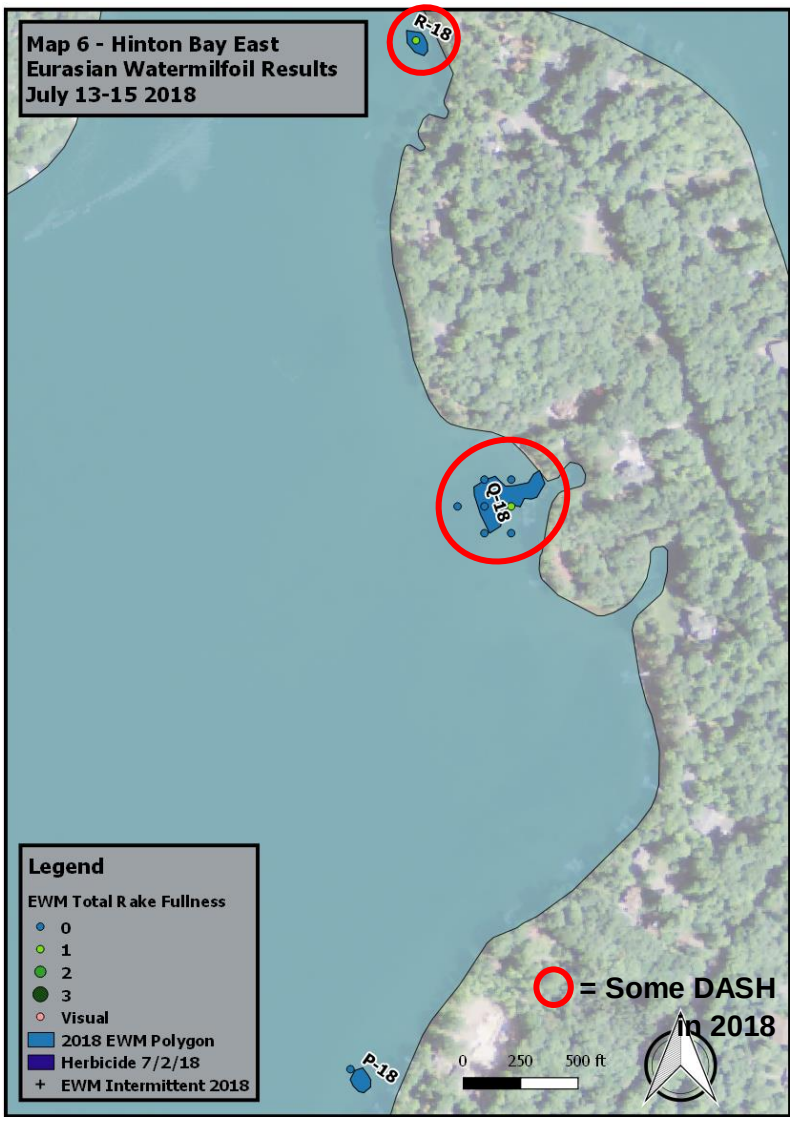


Figure 10 – Hinton Bay South & Peninsula South

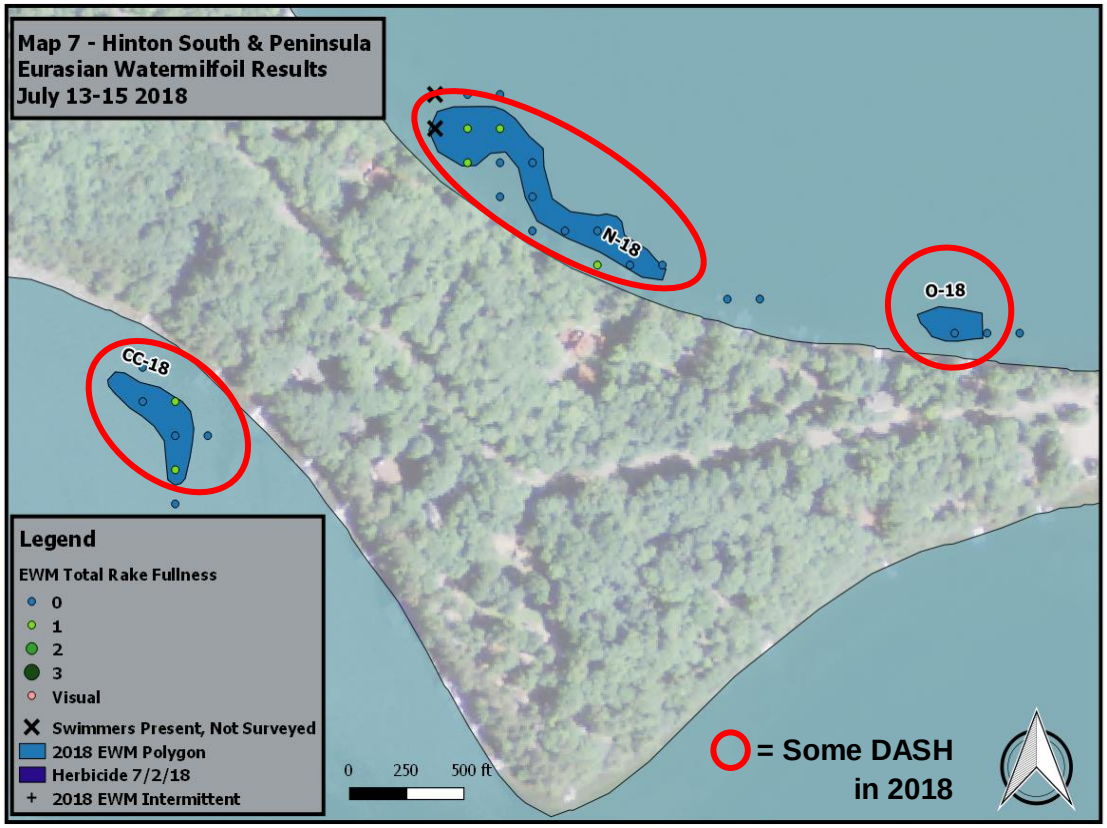


Table 6 – Hinton Bay Species List & Results

Common Name	Scientific Name	Relative Frequency (%)	Number of Sites	Number of Visual Sites	Frequency of Occurrence at Vegetated Sites	Littoral Frequency	Average Rake Fullness
Fern pondweed	*Potamogeton robbinsii*	22.62	19	0	65.52	63.33	1.26
Northern water-milfoil	*Myriophyllum sibiricum*	13.10	11	0	37.93	36.67	1.00
Wild celery	*Vallisneria americana*	10.71	9	0	31.03	30.00	1.00
Variable pondweed	*Potamogeton gramineus*	8.33	7	0	24.14	23.33	1.00
Eurasian water milfoil	*Myriophyllum spicatum*	7.14	6	0	20.69	20.00	1.00
Common waterweed	*Elodea canadensis*	7.14	6	0	20.69	20.00	1.00
Slender naiad	*Najas flexilis*	5.95	5	0	17.24	16.67	1.00
Flat-stem pondweed	*Potamogeton zosteriformis*	4.76	4	0	13.79	13.33	1.00
Perfoliate pondweed	*Potamogeton perfoliatus*	4.76	4	0	13.79	13.33	1.00
Water marigold	*Bidens beckii*	3.57	3	0	10.34	10.00	1.00
Muskgrasses	*Chara sp.*	3.57	3	0	10.34	10.00	1.00
Clasping-leaf pondweed	*Potamogeton richardsonii*	3.57	3	0	10.34	10.00	1.00
Coontail	*Ceratophyllum demersum*	1.19	1	0	3.45	3.33	1.00
Needle spikerush	*Eleocharis acicularis*	1.19	1	0	3.45	3.33	1.00
Nitella	*Nitella sp.*	1.19	1	0	3.45	3.33	1.00
Large-leaf pondweed	*Potamogeton amplifolius*	1.19	1	0	3.45	3.33	1.00

Table 7 – Peninsula South Species List & Results

Common Name	Scientific Name	Relative Frequency (%)	Number of Sites	Number of Visual Sites	Frequency of Occurrence at Vegetated Sites	Littoral Frequency	Average Rake Fullness
Variable pondweed	Potamogeton gramineus	26.32	5	0	71.43	71.43	1.00
Slender naiad	Najas flexilis	21.05	4	0	57.14	57.14	1.00
Eurasian water milfoil	Myriophyllum spicatum	10.53	2	0	28.57	28.57	1.00
White-stem pondweed	Potamogeton praelongus	10.53	2	0	28.57	28.57	1.00
Coontail	Ceratophyllum demersum	5.26	1	0	14.29	14.29	1.00
Muskgrasses	Chara sp.	5.26	1	0	14.29	14.29	1.00
Needle spikerush	Eleocharis acicularis	5.26	1	0	14.29	14.29	1.00
Brown-fruited rush	Juncus pelocarpus f. submersus	5.26	1	0	14.29	14.29	1.00
Nitella	Nitella sp.	5.26	1	0	14.29	14.29	1.00
Wild celery	Vallisneria americana	5.26	1	0	14.29	14.29	1.00

Map 8 – Finger Bar & Fisherman's Bay

There were a total of 8 survey points visited in and near polygon L18 (Finger Bar, 0.21 ac) with vegetation present at 6 of those points. Eurasian watermilfoil was present at 2 survey points with moderate density and no plants were canopied at the surface. There were 4 native species found including chara (1 site), variable pondweed (1 site), flat-stem pondweed (1 sites), and perfoliate pondweed (1 site). DASH technicians on one pontoon removed 910 pounds of EWM from L18 in 3 hours (3 DASH-boat hours).

There were 7 survey points in and around polygon M18 (Fisherman's Bay, 0.21 ac) with vegetation present at 6 of those points. Eurasian watermilfoil was found at one survey point at low density and not easily visible from the lake surface (i.e. not hindering navigation or recreation). There were 12 native species found in and around M18 (Table 8). DASH technicians on one pontoon removed 840 pounds of EWM from M18 in 3 hours (3 DASH-boat hours).

Figure 11 – Finger Bar & Fisherman's Bay EWM Map

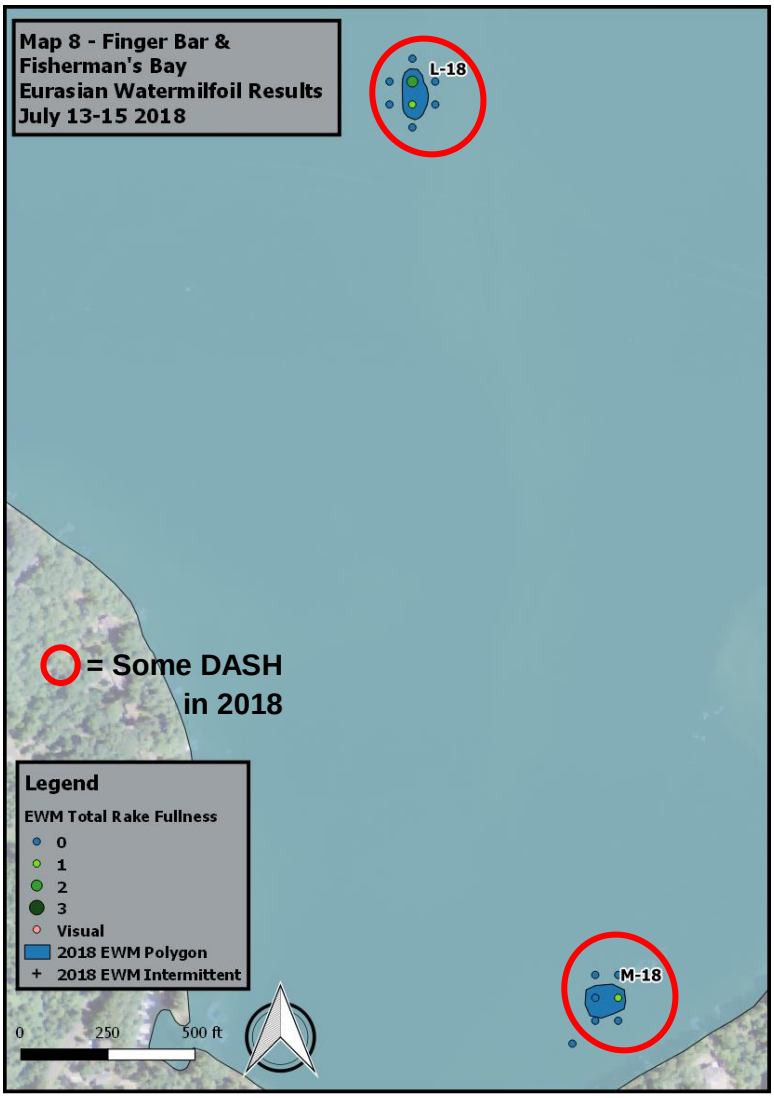


Table 8 – Fisherman's Bay Plant Species List & Results

Common Name	Scientific Name	Relative Frequency (%)	Number of Sites	Number of Visual Sites	Frequency of Occurrence at Vegetated Sites	Littoral Frequency	Average Rake Fullness
Variable pondweed	*Potamogeton gramineus*	15.79	3	0	50	50	1.00
Fern pondweed	*Potamogeton robbinsii*	15.79	3	0	50	50	1.00
Common waterweed	*Elodea canadensis*	10.53	2	0	33	33	1.00
Slender naiad	*Najas flexilis*	10.53	2	0	33	33	1.00
Small pondweed	*Potamogeton pusillus*	10.53	2	0	33	33	1.00
Eurasian water milfoil	*Myriophyllum spicatum*	5.26	1	0	17	17	1.00
Water marigold	*Bidens beckii*	5.26	1	0	17	17	1.00
Muskgrasses	*Chara sp.*	5.26	1	0	17	17	1.00
Northern water-milfoil	*Myriophyllum sibiricum*	5.26	1	0	17	17	1.00
Flat-stem pondweed	*Potamogeton zosteriformis*	5.26	1	0	17	17	1.00
Wild celery	*Vallisneria americana*	5.26	1	0	17	17	1.00
Perfoliate pondweed	*Potamogeton perfoliatus*	5.26	1	0	17	17	1.00

DISCUSSION

Aquatic Plants are Necessary for Healthy Lakes

Aquatic plants serve important functions in lake systems. They provide structural habitat for small invertebrates that are an important food source for juvenile game fish and adult panfish. Plants also provide structural habitat for juvenile and small fish to hide from predators and vice versa as larger predators may lurk in the shadows of plants in wait of forage. Aquatic plants also provide foraging and/or hiding structure for reptiles, amphibians, and waterfowl. The shorelines of lakes are buffered from wave action when aquatic plants absorb some of the wave energy. Aquatic plants are important consumers of nutrients that would otherwise be available for nuisance algal growth. For these reasons, native aquatic plants should be protected in lakes and a healthy aquatic plant community should be promoted. Native aquatic plants were found in most polygons and species lists are included in the results section.

EWM Removal by DASH in 2018

After this survey took place, maps were shared with RLPOA representatives and TSB Lakefront Restoration and Diving Services LLC (TSB). A version of Table 9 was also included in the preliminary report to RLPOA providing a snapshot of EWM height, density, depth, and estimated size based on bed delineation from the lake surface. EWM in Richardson's Bay was estimated at 18 acres and was decidedly too abundant for DASH to be effective. Herbicide treatment had been done in eastern Richardson's Bay and Marina Bay at 3.6 of those acres before the survey took place (see INTRODUCTION for more information). Discussions among RLPOA representatives, DNR staff, herbicide applicator, and hired consultant will take place over winter 2018-19 to determine the best course of action for EWM control in Richardson's Bay in 2019. DASH work was focused on areas outside of Richardson's Bay in Round Lake and in Little Round Lake. Technicians on two DASH pontoons worked 80 hours per boat (160 DASH boat hours) and removed 62,020 pounds of EWM from locations identified in Table 9. The greatest amount of EWM removal occurred in Hinton Bay, Musky Bay, and Little Round Lake. A post-DASH survey in 2019 will help better understand efficacy of DASH as a management technique for EWM control.

Table 9 – EWM Survey Summary & DASH Work 2018

EWM Polygon	Lake	Location	Acres	Depth Range (ft)	EWM Height*	EWM Density	EWM Removed by DASH	DASH Hours**
A-18	Round	Richardson's	2.900		Canopied	High	Herbicide 7/2/2018	
B-18	Round	Richardson's	0.700		Canopied	High	Herbicide 7/2/2018	
C-18	Round	Richardson's	0.682	6	Below & Near	High	0	0
D-18	Round	Musky South	1.500				Herbicide 7/2/2018	
E-18	Round	Marina	1.000				Herbicide 7/2/2018	
F-18	Round	Schoolhouse	2.000		Below	High	Herbicide 7/2/2018	
G-18	Round	Richardson's	1.417	8	Near	High	0	0
H-18	Round	Richardson's	0.227	9	Near	HIgh	0	0
I-18	Round	Richardson's	0.210	9	Near	High	0	0
J-18	Round	Richardson's	4.342	3-15	Near & Canopied	High	0	0
K-18	Round	Richardson's	7.528	3-9	Below & Near	Low north, High isouth	0	0
L-18	Round	Finger Bar	0.210	10	Below	Medium	910	3
M-18	Round	Fisherman's	0.210	10	Below	Low	840	3
N-18	Round	Hinton South	0.922	6-9	Below	Low	7,420	17
O-18	Round	Hinton South	0.161	6	Below	Low	980	5
P-18	Round	Hinton East	0.051	6	Below	Low	0	0
Q-18	Round	Hinton East	0.282	5	Near	High	5,880	15
R-18	Round	Hinton East	0.052	7	Near	High	490	2
S-18	Round	Northeast	0.101	9	Near	High	490	3
T-18	Round	Musky North	0.571	6-13	Below	Medium	420	3
U-18	Round	Musky South	1.023	3-9	Below	High	10,990	30
V-18	Little Round		0.738	6	Below	High	2,310	5
W-18	Little Round		1.094	3-6	Near & Canopied	High	10,500	23
X-18	Little Round		0.650	8	Near	High	16,590	36
Y-18	Little Round		0.065	8	Below	Medium	0	0
Z-18	Little Round		0.589	7	Near	High	0	0
AA-18	Little Round		1.517	6-12	Near & Canopied	High	1,260	4
BB-18	Little Round		0.859	3	Near	Low	0	0
CC-18	Round	Peninsula So.	0.361	9	Below	Low	2,940	11
		TOTALS	31.962				62,020	160

*EWM is ***canopied*** at the surface, ***near*** the surface (approx. 2 feet below), or well ***below*** the surface (greater than 2 feet below). **The number of hours for one DASH pontoon working on site (If two pontoons worked for 5 hours, it would be recorded here as 10 hours).

Prioritizing EWM Control

Unfortunately, complete EWM eradication is not a realistic management goal. It is important to identify EWM locations, bed size, density, and plant height to help prioritize EWM management actions. One possible strategy is to target locations that are of greatest impact to recreation, or in other words, EWM beds that are most dense with plants near the surface or canopied. This strategy would also help address human-induced spread of EWM caused by boat motors chopping the plants and carrying them to new locations. This method of prioritization may call for leaving locations of low density EWM growing well below the surface for close monitoring and future control when the EWM bed becomes larger, taller, or resources are available.

Another strategy is to measure littoral frequency, as was done in this survey, and identify trigger levels in the polygons or on a bay-wide scale. For example, Little Round and Musky Bays had high EWM littoral frequencies of 60% and 67%, respectively, and were worthwhile locations for DASH workers. On the other hand, Hinton Bay had only 20% littoral frequency of EWM but still yielded high EWM removal by DASH workers. A shortfall of this strategy is that some of the EWM polygons are very small with few points. For example, polygon S18 in northeast Round Lake was only large enough to have one survey point. That single survey point had EWM and therefore yielded a littoral frequency of 100%. Littoral frequencies can be helpful in prioritizing EWM control efforts and tracking change over time, but are not as helpful in very small polygons.

Table 10 - Management Recommendations

1. Protect native aquatic plants as they provide important structural habitat and contribute to a healthy lake system.
2. Determine appropriate EWM control methods for 2019, especially for EWM control in Richardson's Bay and Little Round Lake.
3. Continue to use DNR grant funds for pre/post-DASH surveys in 2019. This will provide valuable information for management decisions in future efforts to control EWM.
4. Continue to use DNR grant funds to perform remaining DASH in 2019. There are funds to cost-share another 80 DASH boat hours.
5. Volunteers monitor and report EWM locations. This will help prioritize areas that should be surveyed and where EWM control should occur.

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