



Invasive Plant and Macrophyte Survey Pilot
2014

Wizard Lake
2014 Macrophyte Survey Results

COMPLETED WITH SUPPORT FROM:



**TD Friends of the
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Foundation**

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Report prepared by Alyssa Cloutier

Site Information

Wizard Lake is a long, narrow lake located 67 km southwest of Edmonton. The lake lies in a steep, heavily forested basin surrounded by a large agricultural area. The eastern portion of the lake is the most heavily developed, with housing, campgrounds and a day use area. Wizard Lake is highly used for recreational activities such as water skiing, fishing and canoeing.

Water enters the lake through two small creeks and exits through Conjuring Creek¹. The lake covers 2.48 km², stretches 11.5 km and reaches 11m deep¹. The steep slope of the lake basin creates a steep drop off, which limits macrophyte growth to a thin band around the lake¹. Wizard Lake is considered highly productive, eutrophic and often sees cyanobacterial blooms².

Surveys in the 1970s and 1980s determined the dominant submerged macrophytes to be *Potamogeton* spp. as well as macro algae – *Chara* spp¹. Emergent species include Sedges (*Carex* spp.), Cattails (*Typha latifolia*) and Bulrushes (*Scirpus* spp.)¹. The two narrow ends of the lake have a greater amount of emergent and submerged vegetation¹.

Sampling procedure

Wizard Lake was the first to be sampled in this pilot project. Initially, samples were taken every 20 m in a grid throughout the littoral zone. This methodology was abandoned as it was very time consuming. The first survey continued in 100m intervals in a single path along the littoral zone. Only the south shore was surveyed on the first trip. In the second and third surveys, short transects were used every 200m. At each interval a shallow and deeper point was taken. Specimens were collected by throwing a double-sided rake off the side of the boat.

At each sampling point all macrophytes present were recorded and voucher samples were taken for each species on each trip. Water depth and temperature were recorded at each sampling site and a Secchi reading was taken at the deep point of the lake.

¹ University of Alberta Department of Biological Sciences. (2005). Atlas of Alberta Lakes. Retrieved 07 22, 2014, from <http://sunsite.ualberta.ca/Projects/Alberta-Lakes/>

² Alberta Lake Management Society. (2013). 2013 Wizard Lake Report. Retrieved 08 22, 2014, from ALMS Lakewatch: <http://alms.ca/wp-content/uploads/2014/07/Wizard-2013.pdf>

General Observations

Wizard Lake has a very narrow littoral zone with a sharp dropoff. The areas of the lake with a depth less than three meters host a variety of plant species. The far west end of the lake is shallow has dense macrophyte stands. The south shore has regions of larger rocks and gravel and less macrophyte growth. The far eastern end of the lake was not accessible to survey due to a shallow rocky band in its center.

Survey Results: June

Sampling was conducted on June 12, 2014. Wind speeds were averaging at 25 km/h on the date of sampling. A secchi disk reading was not taken as the disk drifted during the attempts, skewing any readings taken. Sampling began in the west-most point of the lake where there was thick bed of yellow pond lilies (*Nuphar variegatum*). Coontail (*Ceratophyllum demersum*) and Fries' pondweed (*Potamogeton friesii*) were by far the most abundant species in June. Other commonly found species were sheathing pondweed (*Potamogeton vaginatus*) and star duckweed, (*Lemna trisulca*), which was often entangled in other macrophytes. Samples were taken from 0.6 metres to 2.1 metres. Data is available for 70 GPS points from the June survey. There were 88 occurrences of macrophytes within these 70 points, as some points had multiple species observed. Ten different species were observed; no invasive species were detected.

Table 1.0. Macrophyte species detected in Wizard Lake on June 12, 2014.

Common Name	Species Name	Number of Occurrences
Coontail	<i>Ceratophyllum demersum</i>	16
Star Duckweed	<i>Lemna trisulca</i>	13
Northern Water-milfoil	<i>Myriophyllum sibiricum</i>	9
Yellow Pond Lily	<i>Nuphar variegatum</i>	1
Fries' Pondweed	<i>Potamogeton friesii</i>	17
Sago pondweed	<i>Potamogeton pectinatis</i>	4
Richardson's Pondweed	<i>Potamogeton richardsonii</i>	9
Sheathing pondweed	<i>Potamogeton vaginatus</i>	11
Flat stem pondweed	<i>Potamogeton zosteriformis</i>	4
Bladderwort	<i>Utricularia vulgaris</i>	4



Figure 1.1. Locations sampled in June with a presence of macrophytes. Refer to the appendix for a complete listing of species observed.

Survey Results: July

July sampling took place on July 15, 2014. This was the first survey that covered the entire perimeter of the lake. Over a month’s time Northern water-milfoil (*Myriophyllum sibiricum*) had grown substantially and was the second most abundant species. *Potamogeton friesii* remained dominant throughout the month of growth between sampling. Samples were taken from depths ranging from 0.8 metres to 7.4 metres. The secchi disk reading was 1.77 meters. In the second survey a total of 118 locations were sampled, with 143 occurrences of macrophytes. Nine different species were observed; no invasive species were detected.

Table 2.0. Macrophyte species detected in Wizard Lake on July 15, 2014.

Common Name	Species Name	Number of Occurrences
Coontail	<i>Ceratophyllum demersum</i>	15
Star Duckweed	<i>Lemna trisulca</i>	11
Northern Water-milfoil	<i>Myriophyllum sibiricum</i>	27
Yellow Pond Lily	<i>Nuphar variegatum</i>	1
Fries’ Pondweed	<i>Potamogeton friesii</i>	52
Sago Pondweed	<i>Potamogeton pectinatis</i>	18
Richardson’s Pondweed	<i>Potamogeton richardsonii</i>	8
Flat-stem pondweed	<i>Potamogeton zosteriformis</i>	9
Arrowhead	<i>Sagittaria cuneata</i>	2



Figure 2.1. Locations sampled in July with a presence of macrophytes. Refer to the appendix for a complete listing of species observed.

Survey Results: August

The final sampling trip for 2014 took place on August 13, 2014. Sampling started in the north-east, heading westward. A Secchi disk measurement was taken in the east portion of the lake, with a reading of 1 meter. The last sampling point was taken approximately halfway along the south shore. It appeared that the vegetation was beginning to senesce. Pondweed species were beginning to decay and were observed in much lower frequency than the previous surveys. Northern milfoil (*Myriophyllum sibiricum*) was becoming progressively more dense, especially along the north shore where there was a thick band stretching along where the lake narrows. Multiple samples were taken of the thick milfoil to ensure that it was indeed Northern milfoil and not Eurasian Watermilfoil (*Myriophyllum spicatum*). *Zanichellia palustris* and *Ranunculus circinatus* were found for the first time during this survey. A total of 56 locations were sampled. Of these 56 locations, there were 50 occurrences of macrophytes. Eleven different species were observed; no invasive species were detected.

Table 3.0. Macrophyte species detected in Wizard Lake on August 13, 2014.

Common Name	Species Name	Number of Occurrences
Coontail	<i>Ceratophyllum demersum</i>	4
Star Duckweed	<i>Lemna trisulca</i>	3
Northern Water-milfoil	<i>Myriophyllum sibiricum</i>	20
Yellow Pond Lily	<i>Nuphar variegatum</i>	2
Fries' Pondweed	<i>Potamogeton friesii</i>	1
Sago Pondweed	<i>Potamogeton pectinatis</i>	5
Richardson's Pondweed	<i>Potamogeton richardsonii</i>	2
Flat-stem Pondweed	<i>Potamogeton zosteriformis</i>	7
Fan-leaved Water Crowfoot	<i>Ranunculus circinatus</i>	2
Arrowhead	<i>Sagittaria cuneata</i>	2
Horned Pondweed	<i>Zannichellia palustris</i>	1



Figure 3.1. Locations sampled in August with a presence of macrophytes. Refer to the appendix for a complete listing of species observed.

Appendix

Table A.1. Complete listing of plant species present in Wizard Lake during surveys June through August.

Point Name	GPS Location	Species Present	Total Species
W001	12 U 304260 5888964	<i>C. demersum</i> <i>P. friesii</i>	2
W002	12 U 304270 5888986	<i>P. friesii</i>	1
W003	12 U 304278 5888928	<i>C. demersum</i> <i>L. trisulca</i> <i>P. friesii</i> <i>U. vulgaris</i>	4
W004	12 U 304309 5888883	<i>C. demersum</i> <i>L. trisulca</i>	2
W005	12 U 304327 5888894	<i>P. friesii</i>	1
W006	12 U 304356 5888842	<i>C. demersum</i> <i>L. trisulca</i> <i>P. friesii</i>	3
W007	12 U 304468 5888795	<i>C. demersum</i> <i>P. friesii</i>	2
W008	12 U 304503 5888771	<i>M. sibiricum</i>	1
W009	12 U 304539 5888781	<i>C. demersum</i> <i>P. friesii</i> <i>P. zosterformis</i>	3
W010	12 U 304566 5888788	<i>C. demersum</i> <i>L. trisulca</i> <i>U. vulgaris</i>	3
W011	12 U 304615 5888807	<i>C. demersum</i>	1
W012	12 U 304652 5888793	<i>P. zosterformis</i> <i>P. friesii</i>	2
W013	12 U 304682 5888791	<i>C. demersum</i> <i>P. richardsonii</i>	2
W014	12 U 304693 5888754	<i>C. demersum</i> <i>N. variegatum</i>	2
W015	12 U 304688 5888712	<i>C. demersum</i> <i>P. friesii</i>	2
W016	12 U 304734 5888656	<i>C. demersum</i>	1
W017	12 U 304789 5888629	<i>C. demersum</i> <i>P. friesii</i> <i>P. zosterformis</i>	3
W018	12 U 304860 5888625	<i>P. friesii</i>	1
W019	12 U 305045 5888537	<i>M. sibiricum</i>	1
W020	12 U 305128 5888509	<i>P. vaginatus</i>	1
W021	12 U 305203 5888440	<i>P. friesii</i>	1
W022	12 U 305308 5888413	<i>P. vaginatus</i>	1
W023	12 U 305504 5888390	<i>P. richardsonii</i> <i>L. trisulca</i> <i>P. vaginatus</i>	3
W024	12 U 305566 5888362	<i>M. sibiricum</i>	1

W025	12 U 305635 5888341	<i>M. sibiricum</i> <i>L. trisulca</i> <i>P. richardsonii</i>	3
W026	12 U 305729 5888329	<i>P. vaginatus</i>	1
W027	12 U 305926 5888334	<i>M. sibiricum</i> <i>L. trisulca</i> <i>P. friesii</i>	3
W028	12 U 305993 5888336	<i>P. pectinatus</i>	1
W029	12 U 306055 5888303	<i>U. vulgaris</i>	1
W030	12 U 306415 5888285	<i>P. friesii</i> <i>P. vaginatus</i>	2
W031	12 U 306476 5888295	<i>P. friesii</i> <i>P. pectinatus</i> <i>P. zosterformis</i>	3
W032	12 U 306959 5888338	<i>L. trisulca</i>	1
W033	12 U 307032 5888325	<i>P. vaginatus</i>	1
W034	12 U 307226 5888365	<i>P. vaginatus</i>	1
W035	12 U 307261 5888375	<i>P. richardsonii</i> <i>P. vaginatus</i>	2
W036	12 U 307360 5888431	<i>C. demersum</i> <i>P. friesii</i> <i>P. richardsonii</i>	3
W037	12 U 307498 5888492	<i>L. trisulca</i>	1
W038	12 U 307620 5888511	<i>M. sibiricum</i> <i>P. vaginatus</i>	2
W039	12 U 307727 5888515	<i>P. pectinatus</i>	1
W040	12 U 308091 5888447	<i>P. richardsonii</i>	1
W041	12 U 308902 5888490	<i>L. trisulca</i>	1
W042	12 U 309355 5888378	<i>P. richardsonii</i> <i>P. vaginatus</i>	2
W043	12 U 309559 5888264	<i>P. friesii</i> <i>P. pectinatus</i> <i>P. richardsonii</i> <i>U. vulgaris</i>	4
W044	12 U 310677 5888032	<i>C. demersum</i> <i>L. trisulca</i> <i>M. sibiricum</i>	3
W045	12 U 310816 5887977	<i>C. demersum</i> <i>L. trisulca</i> <i>M. sibiricum</i>	3
W046	12 U 310818 5888012	<i>P. richardsonii</i> <i>L. trisulca</i> <i>M. sibiricum</i> <i>P. vaginatus</i>	4
W047	12 U 310585 5888064	<i>M. sibiricum</i>	1
W048	12 U 310255 5888294	<i>L. trisulca</i>	1
W049	12 U 310131 5888370	<i>M. sibiricum</i>	1
W050	12 U 309941 5888415	<i>P. friesii</i>	1
W051	12 U 309432 5888575	<i>L. trisulca</i> <i>M. sibiricum</i>	2
W052	12 U 308956 5888645	<i>M. sibiricum</i>	1
W053	12 U 308724 5888648	<i>P. friesii</i>	1

W054	12 U 308490 5888616	<i>P. pectinatus</i>				1
W055	12 U 308231 5888567	<i>L. trisulca</i>	<i>P. friesii</i>	<i>P. pectinatus</i>	<i>P. zosteriformis</i>	4
W056	12 U 307992 5888496	<i>P. friesii</i>				1
W057	12 U 307473 5888392	<i>P. friesii</i>				1
W058	12 U 307437 5888381	<i>P. friesii</i>				1
W059	12 U 307218 5888392	<i>M. sibiricum</i>				1
W060	12 U 306981 5888395	<i>S. cuneata</i>				1
W061	12 U 306762 5888357	<i>P. friesii</i>				1
W062	12 U 306525 5888356	<i>P. friesii</i>				1
W063	12 U 306254 5888357	<i>P. friesii</i>				1
W064	12 U 306225 5888366	<i>P. friesii</i>				1
W065	12 U 305971 5888425	<i>M. sibiricum</i>	<i>P. pectinatus</i>			2
W066	12 U 305765 5888463	<i>M. sibiricum</i>				1
W067	12 U 305489 5888469	<i>P. friesii</i>	<i>P. richardsonii</i>			2
W068	12 U 305222 5888591	<i>M. sibiricum</i>	<i>P. friesii</i>	<i>P. pectinatus</i>		3
W069	12 U 305199 5888594	<i>P. friesii</i>				1
W070	12 U 304997 5888703	<i>M. sibiricum</i>	<i>P. friesii</i>			2
W071	12 U 304788 5888798	<i>M. sibiricum</i>	<i>P. friesii</i>			2
W072	12 U 304556 5888976	<i>P. friesii</i>				1
W073	12 U 304552 5888980	<i>P. friesii</i>				1
W074	12 U 304368 5889111	<i>P. friesii</i>	<i>P. pectinatus</i>			2
W075	12 U 304343 5889111	<i>C. demersum</i>	<i>P. friesii</i>	<i>P. pectinatus</i>		3
W076	12 U 304227 5889240	<i>C. demersum</i>	<i>P. friesii</i>			2
W077	12 U 304194 5889245	<i>P. friesii</i>				1
W078	12 U 304016 5889358	<i>C. demersum</i>	<i>N. variegatum</i>			2
W079	12 U 303977 5889147	<i>C. demersum</i>				1
W080	12 U 304059 5889042	<i>C. demersum</i>	<i>L. trisulca</i>	<i>M. sibiricum</i>		3
W081	12 U 304082 5889041	<i>C. demersum</i>	<i>P. friesii</i>			2
W082	12 U 304244 5888866	<i>P. friesii</i>				1

W083	12 U 304263 5888860	<i>P. friesii</i>				1
W084	12 U 304393 5888690	<i>P. friesii</i>	<i>P. pectinatus</i>			2
W085	12 U 304767 5888524	<i>M. sibiricum</i>				1
W086	12 U 304764 5888482	<i>C. demersum</i>	<i>M. sibiricum</i>	<i>P. friesii</i>	<i>P. zosteriformis</i>	4
W087	12 U 305030 5888401	<i>P. friesii</i>				1
W088	12 U 305282 5888236	<i>P. friesii</i>	<i>P. pectinatus</i>			2
W089	12 U 305568 5888189	<i>C. demersum</i>				1
W090	12 U 305707 5888124	<i>M. sibiricum</i>	<i>P. friesii</i>	<i>P. zosteriformis</i>		3
W091	12 U 305965 5888120	<i>P. friesii</i>	<i>P. zosteriformis</i>			2
W092	12 U 306260 5888076	<i>L. trisulca</i>	<i>P. friesii</i>			2
W093	12 U 306581 5888095	<i>M. sibiricum</i>	<i>P. richardsonii</i>			2
W094	12 U 306996 5888171	<i>P. pectinatus</i>				1
W095	12 U 307232 5888140	<i>P. pectinatus</i>				1
W096	12 U 307517 5888283	<i>P. pectinatus</i>	<i>P. richardsonii</i>			2
W097	12 U 307786 5888313	<i>P. pectinatus</i>				1
W098	12 U 307804 5888312	<i>P. friesii</i>				1
W099	12 U 307896 5888202	<i>P. friesii</i>	<i>P. pectinatus</i>			2
W100	12 U 308173 5888226	<i>P. richardsonii</i>	<i>S. cuneata</i>			2
W101	12 U 308416 5888248	<i>C. demersum</i>	<i>P. friesii</i>	<i>P. richardsonii</i>		3
W102	12 U 308652 5888249	<i>P. friesii</i>	<i>P. pectinatus</i>			2
W103	12 U 308901 5888262	<i>M. sibiricum</i>	<i>P. friesii</i>	<i>P. pectinatus</i>	<i>P. zosteriformis</i>	4
W104	12 U 309120 5888231	<i>P. richardsonii</i>	<i>P. zosteriformis</i>			2
W105	12 U 309391 5888161	<i>P. friesii</i>				1
W106	12 U 309570 5888075	<i>P. friesii</i>	<i>P. richardsonii</i>			2
W107	12 U 309570 5888095	<i>P. friesii</i>	<i>P. pectinatus</i>			2
W108	12 U 309769 5887983	<i>P. friesii</i>	<i>P. pectinatus</i>	<i>P. richardsonii</i>		3
W109	12 U 309770 5888000	<i>M. sibiricum</i>	<i>P. friesii</i>			2
W110	12 U 309990 5887844	<i>M. sibiricum</i>	<i>P. friesii</i>			2
W111	12 U 309993 5887872	<i>P. friesii</i>	<i>P. pectinatus</i>			2

W112	12 U 310307 5887870	<i>L. trisulca</i>	<i>M. sibiricum</i>	<i>P. friesii</i>		3	
W113	12 U 310307 5887902	<i>M. sibiricum</i>	<i>P. friesii</i>			2	
W114	12 U 310495 5887845	<i>M. sibiricum</i>	<i>P. friesii</i>	<i>P. zosteriformis</i>		3	
W115	12 U 310501 5887825	<i>C. demersum</i>	<i>L. trisulca</i>	<i>M. sibiricum</i>	<i>P. friesii</i>	4	
W116	12 U 310723 5887832	<i>C. demersum</i>	<i>L. trisulca</i>	<i>M. sibiricum</i>	<i>P. friesii</i>	<i>P. zosteriformis</i>	5
W117	12 U 310739 5887829	<i>C. demersum</i>	<i>M. sibiricum</i>	<i>P. friesii</i>	<i>P. zosteriformis</i>	4	
W118	12 U 310823 5887792	<i>C. demersum</i>	<i>L. trisulca</i>	<i>M. sibiricum</i>	<i>P. friesii</i>	4	
W119	12 U 310789 5887973	<i>C. demersum</i>	<i>L. trisulca</i>	<i>M. sibiricum</i>	<i>P. friesii</i>	4	
W120	12 U 310769 5887977	<i>C. demersum</i>	<i>L. trisulca</i>	<i>M. sibiricum</i>	<i>P. friesii</i>	4	
W121	12 U 310643 5888031	<i>M. sibiricum</i>				1	
W122	12 U 309989 5888384	<i>M. sibiricum</i>				1	
W123	12 U 309758 5888470	<i>M. sibiricum</i>				1	
W124	12 U 309292 5888623	<i>M. sibiricum</i>				1	
W125	12 U 309033 5888630	<i>L. trisulca</i>				1	
W126	12 U 308811 5888694	<i>L. trisulca</i>				1	
W127	12 U 308588 5888585	<i>M. sibiricum</i>	<i>P. richardsonii</i>			2	
W128	12 U 308332 5888616	<i>L. trisulca</i>	<i>M. sibiricum</i>			2	
W129	12 U 307310 5888414	<i>M. sibiricum</i>	<i>P. zosteriformis</i>			2	
W130	12 U 307077 5888406	<i>Z. palustris</i>				1	
W131	12 U 306082 5888409	<i>M. sibiricum</i>				1	
W132	12 U 305808 5888469	<i>M. sibiricum</i>	<i>P. pectinatus</i>			2	
W133	12 U 305583 5888485	<i>P. pectinatus</i>	<i>R. circinatus</i>	<i>S. cuneata</i>		3	
W134	12 U 305586 5888469	<i>P. richardsonii</i>				1	
W135	12 U 305320 5888555	<i>M. sibiricum</i>	<i>P. zosteriformis</i>			2	
W136	12 U 305069 5888707	<i>M. sibiricum</i>	<i>P. zosteriformis</i>			2	
W137	12 U 304864 5888783	<i>M. sibiricum</i>	<i>R. circinatus</i>			2	
W138	12 U 304855 5888775	<i>M. sibiricum</i>	<i>N. variegatum</i>	<i>P. zosteriformis</i>		3	
W139	12 U 304503 5889047	<i>M. sibiricum</i>	<i>P. pectinatus</i>	<i>S. cuneata</i>		3	
W140	12 U 304284 5889176	<i>S. cuneata</i>				1	

W141	12 U 304131 5889315	<i>C. demersum</i>	<i>M. sibiricum</i>	<i>P. pectinatus</i>	3
W142	12 U 303980 5889106	<i>C. demersum</i>			1
W143	12 U 304142 5888960	<i>C. demersum</i>	<i>M. sibiricum</i>	<i>N. variegatum</i>	3
W144	12 U 304327 5888758	<i>C. demersum</i>	<i>M. sibiricum</i>		2
W145	12 U 304760 5888513	<i>M. sibiricum</i>	<i>P. zosteriformis</i>		2
W146	12 U 304882 5888434	<i>M. sibiricum</i>	<i>P. friesii</i>	<i>P. zosteriformis</i>	3
W147	12 U 305424 5888223	<i>M. sibiricum</i>	<i>P. pectinatus</i>	<i>P. zosteriformis</i>	3