Invasive Plant and Macrophyte Survey Pilot
2014

Chestermere Lake
2014 Macrophyte Survey Results

COMPLETED WITH SUPPORT FROM:

Alberta Government

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ACKNOWLEDGEMENTS:

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Report prepared by Alyssa Cloutier

Site Information

Chestermere Lake is an offstream reservoir located in the western irrigation district, 7 km east of Calgary. The major uses for the lake are for recreation and to provide water for irrigation. The lakefront is heavily developed with housing along most of the southern perimeter. Nearly all of the water in the lake (99%) is diverted from the Bow River, which enters through the southwest channel[1]. The lake is divided into two portions by the Highway 1A crossing. The north portion of the lake is less developed with more emergent vegetation to the far north (Figure 1.0). The oval shaped lake basin has an area of 2.65 km^2 and a maximum depth of 7 metres[1].

Chestermere Lake is a fairly clear, mesotrophic lake[2]. In historical surveys, the majority of the lake has macrophyte growth throughout with the exception of the deepest area in the southern portion of the lake[1]. Historical data indicates that the dominant group of macrophytes in the reservoir consists of *Potamogeton* spp[2]. In October of 2013, the Western Irrigation District (WID) noted numerous locations of Flowering Rush (*Butomus umbellatus*) growing around the lake (Figure 1.1). It was identified that the Flowering Rush amassed in disturbed areas such as resident boat docks, houses, and property shores. Flowering rush is an invasive species that can displace native vegetation and lead to reduced water quality[3]. During the summer months weed harvesters run daily to remove the top 3 feet of plant material in the lake. The cuttings are partly removed by the harvester and the remaining cuttings are collected and disposed of onshore by homeowners.

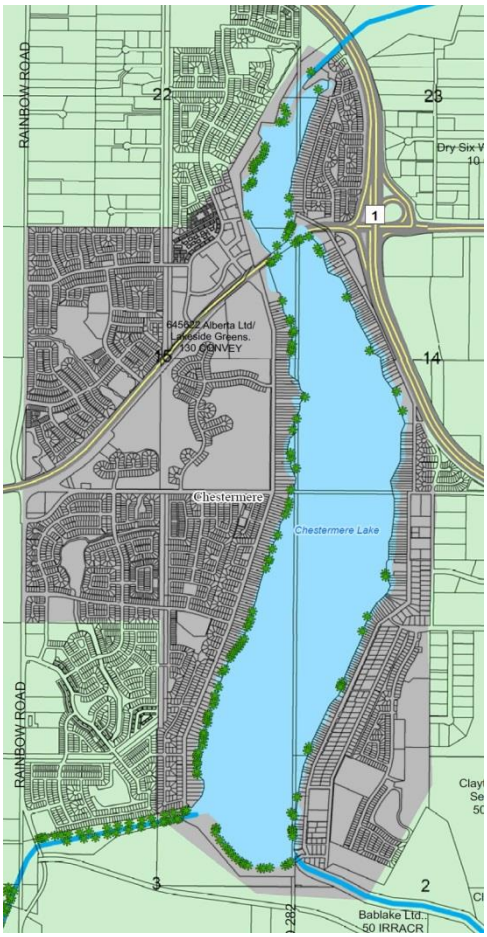

Figure 1.1 - Locations of Flowering Rush around Chestermere Lake, as indicated by WID. Credit: WID

[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 Chestermere Lake Report. Retrieved 08 22, 2014, from ALMS Lakewatch: http://alms.ca/wp-content/uploads/2014/07/Chestermere-2013.pdf

[3] Alberta Invasive Species Council. (2014). Flowering Rush Factsheet. Retrieved 01 16, 2015 from https://www.abinvasives.ca/fact-sheets#!prettyPhoto

Sampling procedure

The June survey was conducted by wading along the shoreline in high-risk areas. The boat launch north of Highway 1A was surveyed, as well as the beach at Millennium Park and the municipal boat launch along East Chestermere Drive.

To complete the survey, 100 m on either side of the high-risk location was to be surveyed as long as water depth was appropriate for wading. A double-sided rake was thrown in 10-metre intervals. Voucher specimens were collected for the species observed and submitted to the University of Alberta for archiving. The presence of species was recorded at each GPS point.

In July, rake sampling occurred at 200 m intervals with 2-3 points along each transect. Sampling time was limited and thus some transect points were eliminated in the later portion of the survey. Like the wading survey, voucher specimens were collected for each species observed. In the later sampling points only presence of species was recorded.

General Observations

Chestermere Lake has fairly clear water allowing macrophytes to grow deeper than the assumed 3-meter deep littoral zone. Throughout the lake the sediment is sandy and rather inorganic. The far south portion of the lake has a strong current which may limit macrophyte growth. The southwest channel, which serves as an inflow to the reservoir, is quite murky in comparison to the body of the lake. There is little macrophyte growth within the channel with the exception of the occasional reed and invasive Flowering Rush plants*.

Survey Results: June

Sampling was conducted on June 23, 2014. Two high-risk locations, both being boat launches, were selected to survey. The north, public boat launch had 3 different species present: Fries' Pondweed (*Potamogeton friesii*), Richardson's Pondweed (*Potamogeton richardsonii*) and Sheathing Pondweed (*Potamogeton vaginatus*). The municipal boat launch and beach at Millennium Park had four species present with *Potamogeton vaginatus* as the dominant species. A total of 31 points were surveyed with 34 observations of macrophytes present. Four different species were observed; no invasive species were detected (Table 1).

*Addendum: Discrepancies between our data and data from WID may be due to a number of reasons which include, and are not limited to; not being close enough to shore during sampling, misidentification of unflowered Flowering Rush plants, sampling soon after plant harvest.

Table 1.0. Macrophyte Species detected in Chestermere Lake on June 23, 2014.

Common Name	Species Name	Number of Occurrences
Fries' Pondweed	*Potamogeton friesii*	5
Richardson's Pondweed	*Potamogeton richardsonii*	7
Sheathing Pondweed	*Potamogeton vaginatus*	21
Flat-stem Pondweed	*Potamogeton zosteriformis*	1

Survey Results: July

Sampling took place on July 17, 2014. This was the only opportunity to survey the entire perimeter of the lake. Sheathing Pondweed was not found in the same abundance as the June survey, likely due to the difference in area sampled. There was a general absence of macrophytes in the southwest portion of the lake, where the sediment was very sandy. Richardson's Pondweed was the dominant species in the south portion of the lake and was found growing in water up to 4.5 metres deep. Samples were taken from 0.9 to 6.1 metres deep. A total of 42 points were surveyed with 45 occurrences of macrophytes, indicating multiple species observed at a single sampling point. A total of seven species were observed (Table 2)

During the boat portion of the sampling trip no Flowering Rush had been observed. The growth within the lake basin is quite minimal, especially with the reoccurring cutting done by the municipality's harvesters. It was only with further inspection into the southwest canal when Flowering Rush was observed. Two summer workers from the Western Irrigation District (WID) took the ALMS technicians on a tour of the canal to see the Flowering Rush infestation. Along the tour, three samples were retrieved and their GPS locations were recorded. It is important to note that this sampling was not done under regular protocol but to explore and determine the extent of the infestation.

Table 2.0. Macrophyte Species detected in Chestermere Lake on July 17, 2014.

Common Name	Species Name	Number of Occurrences
Flowering Rush	*Butomus umbellatus*	3
Star Duckweed	*Lemna trisulca*	1
Fries' Pondweed	*Potamogeton friesii*	1
Richardson's Pondweed	*Potamogeton richardsonii*	20
Sago Pondweed	*Potamogeton pectinatus*	11
Sheathing Pondweed	*Potamogeton vaginatus*	4
Flat-stem Pondweed	*Potamogeton zosteriformis*	2

*Invasive species highlighted in red.

Map of Results

Figure 1 depicts the locations that were sampled and had a positive presence of macrophytes. Blue flags indicate June survey points; green flags indicate July survey points. Exclamation points depict the presence of Flowering Rush. One additional point was surveyed much further down the canal and is not available on this map. Refer to the appendix for a complete listing of species observed and their locations.

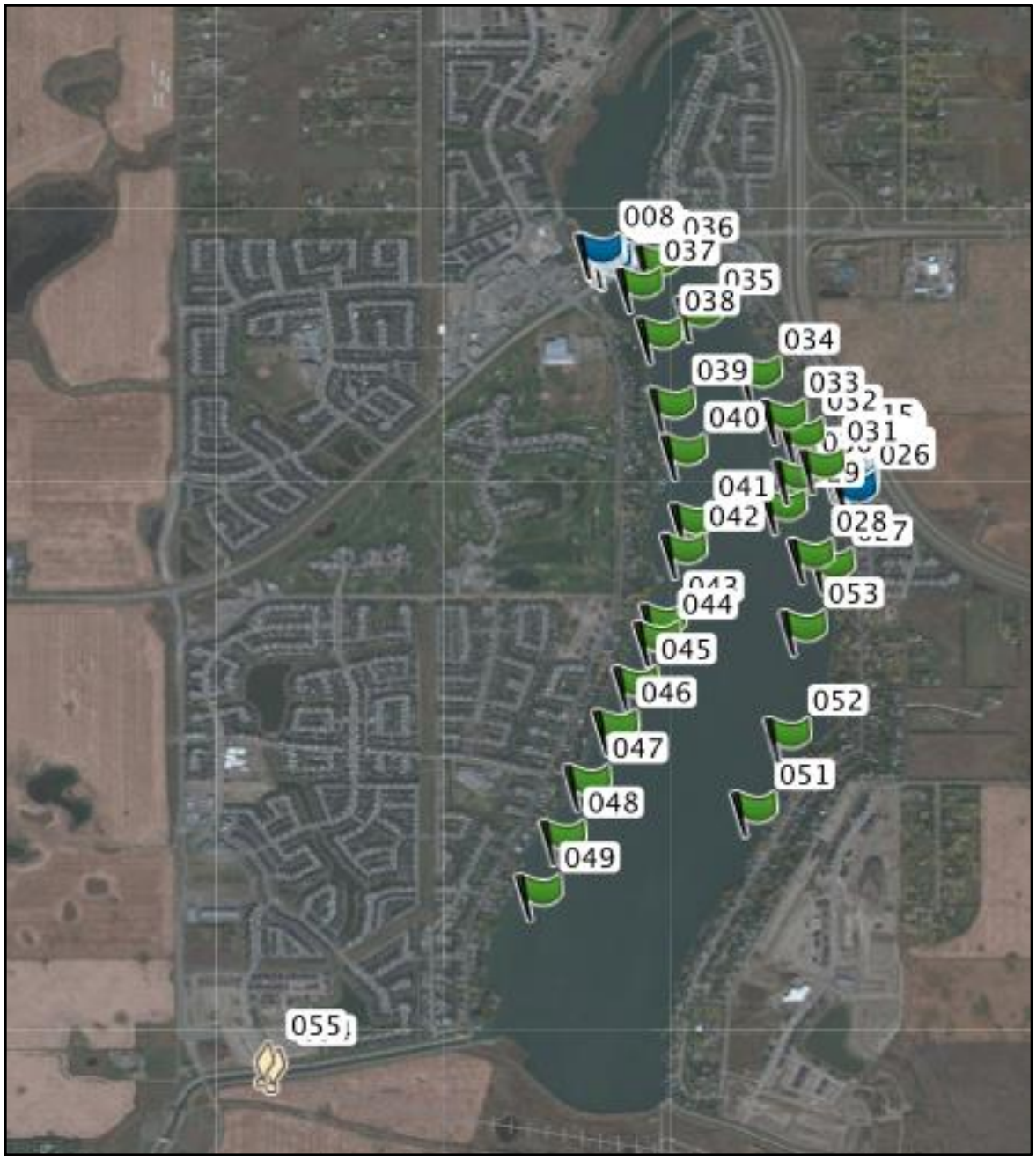

Figure 1.0. Locations sampled with a presence of macrophytes.

Appendix

Table A.1. Complete listing of plant species present in Chestermere Lake throughout June and July surveys.

Point number	GPS	Species present	Total Species
1	12 U 302338 5659076	*P. vaginatus*	1
2	12 U 302333 5659082	*P. friesii* *P. richardsonii* *P. vaginatus*	3
3	12 U 302327 5659087	*P. friesii*	1
4	12 U 302306 5659102	*P. friesii*	1
5	12 U 302305 5659112	*P. friesii*	1
6	12 U 302302 5659121	*P. vaginatus*	1
7	12 U 302298 5659126	*P. richardsonii* *P. vaginatus*	2
8	12 U 302293 5659130	*P. friesii* *P. richardsonii*	2
9	12 U 303092 5658150	*P. vaginatus*	1
10	12 U 303092 5658159	*P. vaginatus*	1
11	12 U 303093 5658169	*P. vaginatus*	1
12	12 U 303086 5658187	*P. vaginatus*	1
13	12 U 303080 5658196	*P. vaginatus*	1
14	12 U 303075 5658205	*P. vaginatus*	1
15	12 U 303070 5658215	*P. vaginatus*	1
16	12 U 303087 5658133	*P. vaginatus*	1
17	12 U 303086 5658123	*P. vaginatus*	1
18	12 U 303084 5658112	*P. vaginatus*	1
19	12 U 303084 5658100	*P. vaginatus*	1
20	12 U 303097 5658085	*P. vaginatus*	1
21	12 U 303112 5658081	*P. richardsonii* *P. vaginatus*	2
22	12 U 303120 5658087	*P. zosteriformis*	1
23	12 U 303119 5658073	*P. vaginatus*	1
24	12 U 303119 5658062	*P. richardsonii* *P. vaginatus*	2
25	12 U 303119 5658044	*P. richardsonii* *P. vaginatus*	2
26	12 U 303117 5658034	*P. richardsonii* *P. vaginatus*	2
27	12 U 303028 5657695	*P. richardsonii* *P. pectinatus*	2
28	12 U 302960 5657741	*P. richardsonii* *P. vaginatus*	2
29	12 U 302876 5657964	*P. richardsonii*	1
30	12 U 302924 5658095	*P. vaginatus*	1

31	12 U 303012 5658142	*P. richardsonii*	*P. pectinatus*	2
32	12 U 302949 5658282	*P. friesii*		1
33	12 U 302892 5658365	*P. pectinatus*		1
34	12 U 302814 5658560	*P. vaginatus*		1
35	12 U 302621 5658835	*P. richardsonii*	*P. vaginatus*	2
36	12 U 302492 5659073	*P. richardsonii*		1
37	12 U 302425 5658973	*L. trisulca*		1
38	12 U 302484 5658745	*P. richardsonii*	*P. pectinatus*	2
39	12 U 302514 5658433	*P. richardsonii*	*P. pectinatus*	2
40	12 U 302547 5658221	*P. pectinatus*		1
41	12 U 302567 5657912	*P. richardsonii*		1
42	12 U 302530 5657780	*P. richardsonii*	*P. pectinatus*	2
43	12 U 302448 5657467	*P. richardsonii*	*P. pectinatus*	2
44	12 U 302425 5657391	*P. richardsonii*		1
45	12 U 302345 5657193	*P. richardsonii*	*P. zosteriformis*	2
46	12 U 302270 5657002	*P. richardsonii*		1
47	12 U 302164 5656758	*P. pectinatus*		1
48	12 U 302072 5656517	*P. richardsonii*	*P. zosteriformis*	2
49	12 U 301982 5656275	*P. richardsonii*		1
50	12 U 301853 5656716	*P. richardsonii*	*P. pectinatus*	2
51	12 U 302724 5656618	*P. richardsonii*		1
52	12 U 302850 5656945	*P. richardsonii*	*P. pectinatus*	2
53	12 U 302921 5657421	*P. richardsonii*		1
54	12 U 301061 5655537	*B. umbellatus*		1
55	12 U 301028 5655562	*B. umbellatus*		1
56	12 U 299325 5652978	*B. umbellatus*		1