



# Chateaugay Lake Milfoil Monitoring Program: Project Update, Year 2017

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## List of Tables

Table 1. Density of Eurasian water milfoil (stems/acre) at each of the study locations, 2008-2017. BTL = NYS Boat Launch, CLN = Chateaugay Lake Narrows, CSI = South Inlet, ILL = Inlet to Lower Lake, SBR = Sand Bar Area.....	3
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## List of Figures

Figure 1. Study Locations on the Chateaugay Lakes, NY. ....	8
Figure 2. Detailed view of the underwater transects used in the study. The transects consist of a nylon rope that is anchored to the lake bottom between depths of 3 and 15 feet (red line). Each transect is divided into a number of 10' x 6' study segments. In each segment species occurrence is recorded and milfoil stems are enumerated.....	8
Figure 3 Average Eurasian water-milfoil density at the Narrows site during May (black bars) and August (grey bars), 2008-2017 Error bars represent standard error of the mean (n = 4 transects). ....	9
Figure 4. Percent frequency of occurrence of aquatic plant species on the study segments at the Chateaugay Lake Narrows, August 2017. ....	10
Figure 5. Average Eurasian water-milfoil density at the South Inlet site during May (black bars) and August (grey bars), 2008-2017. Error bars represent standard error of the mean (n = 4 transects). ....	11
Figure 6. Percent frequency of occurrence of aquatic plant species on the study segments at the South Inlet, August 2017.....	12
Figure 7. Average Eurasian water-milfoil density at the Lower Lake Inlet site during May (black bars) and August (grey bars), 2008-2017. Error bars represent standard error of the mean (n = 4 transects). ....	13
Figure 8. Percent frequency of occurrence of aquatic plant species on the study segments at the Lower Lake location, August 2017. ....	14
Figure 9. Average Eurasian water-milfoil density at the Sand Bar site during May (black bars) and August (grey bars), 2008-2017. Error bars represent standard error of the mean (n = 4 transects). ....	15
Figure 10. Percent frequency of occurrence of aquatic plant species on the study segments at the Sand Bar location, August 2017.....	16
Figure 11. Average Eurasian water-milfoil density at the NYS Boat Launch during May (black bars) and August (grey bars), 2008-2016. Error bars represent standard error of the mean (n = 4 transects). ....	17
Figure 12. Percent frequency of occurrence of aquatic plant species on the study segments at the NYS Boat Launch location, August 2017 .....	18

## Summary

Eurasian water-milfoil (*Myriophyllum spicatum*) was first identified in the Chateaugay Lake Chain in 1979, marking it one of the earliest detections of milfoil in the Adirondack region. After decades of proliferation, lake users began to take notice of the non-native plant in the early 2000's. A series of aquatic plant surveys conducted by Cedar Eden Environmental and the Paul Smith's College Adirondack Watershed Institute illustrated a 5-fold increase in milfoil cover across the lake chain between 2002 and 2006 (AWI – unpublished data). Coordinated control efforts in the form of hand harvesting and benthic barrier matting began in 2008 and were focused solely on the area around the NYSDEC boat Launch. Control efforts expanded to the areas around the sandbar and the inlet to the lower lake in 2009, and the Chateaugay Narrows in 2010.

In an effort to monitor the success of the management strategy the Chateaugay Lake Foundation contracted the Paul Smith's College Adirondack Watershed Institute to establish five underwater monitoring sites (Figure 1). At each site four permanent underwater transect lines (100 foot nylon ropes) were installed perpendicular to the shoreline, with the exception of the NYSDEC boat launch site which has three lines. Once in May and once in August a SCUBA diver swam each transect and recorded aquatic plant species presence as well as the number of milfoil stems in 6 feet wide by 10 feet long segments for the entire length of each transect line (Figure 2). This report serves as an update on the project for the year 2017. The objectives of this report are to summarize the 2017 data and analyze the historical milfoil abundance at the study sites. The proceeding information represents the primary findings of this study.



**Chateaugay Lake Foundation**

## Update of Results

**The Narrows** We estimated average milfoil density at the Narrows to be 3,140 stems/acre in May, and 6,008 stems/acre in August. Our estimates of stem density have increased at the Narrows for the past three years. The vast majority of milfoil stems encountered in 2017 were on the first 30 feet of the transects. Stem density was notably less towards the main channel and greatest area of boat traffic. We encountered 13 aquatic plant species at the narrows, with Canada waterweed, hornwort, and eelgrass being the most frequently occurring species. Eurasian water milfoil was the fifth most frequent plant, occupying 60% of the study segments.

*pg. 9-10*

**South Inlet** We estimated the average milfoil density at the South Inlet to be very similar to last year, with 490 stems/acre in May, and 1,271 stems/acre in August. There is a large amount a variability in these estimates due to the fact that milfoil is primarily encountered only on transects two and three, with low milfoil occurrence on transects one and four. We encountered 12 aquatic plant species at the south inlet, with Canada waterweed and hornwort being the most frequently occurring species. Eurasian water milfoil was the eighth most frequent plant, occupying 25% of the study segments.

*pg. 11-12*

**Inlet to Lower Lake** Average milfoil density at the inlet to Lower Chateaugay was estimated at 5,046 stems/acre in May, and 11,816 stems/acre in August. From 2009 – 2011, August milfoil densities were in the 15,000 to 20,000 stems/acre range. Over the past six years milfoil density at this location has been relatively stable. We encountered 10 aquatic plant species at the south inlet, with Canada waterweed and eelgrass being the most frequently occurring species. Eurasian water milfoil was the fifth most frequent plant, occupying 85% of the study segments.

*pg. 13-14*

**Sandbar** The sandbar area has the greatest milfoil density of the five study sites, with strikingly

*pg. 15-16* high stem density encountered in 2017. Density at transect #1 (directly adjacent to the sandbar) was particularly high, with over 1,000 stems enumerated in the 100' x 6' study area. We estimated average milfoil density to be 21,018 stems/acre in May, and 32,543 stems/acre in August. These are the highest densities observed since the project was initiated in 2008. We encountered 14 aquatic plant species around the sandbar, with Canada waterweed, water nymph, and eelgrass among the most frequently occurring species. Eurasian water milfoil was the third most frequent plant, occupying 85% of the study segments.

**NYSDEC**  
**Boat Launch**  
*pg. 17-18* We estimated average milfoil density around the NYS launch to be 2,759 stems/acre in May, and 6,313 stems/acre in August. Average August stem densities have ranged from 1,289 to 6,313 stems per acre between 2009 and 2017, substantially lower than the 38,000 stems per acre encountered in the summer of 2009. We encountered 14 aquatic plant species at the boat launch, with Canada waterweed, eel grass, and stargrass among the most frequent. Eurasian water-milfoil was the fourth most frequent plant, occupying 67% of the study segments.

Table 1. Estimated density of Eurasian water milfoil (stems/acre) and standard error at each of the study locations, 2008-2017. BTL = NYS Boat Launch, CLN = Chateaugay Lake Narrows, CSI = South Inlet, ILL = Inlet to Lower Lake, SBR = Sand Bar Area.

<b>SITE</b>	<b>YEAR</b>	<b>Month</b>	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>Average</b>	<b>SE</b>
<b>BTL</b>	2008	JULY	17351	98228	726		<b>38768</b>	<b>26080</b>
<b>BTL</b>	2009	MAY	10019	74705	2759		<b>29161</b>	<b>19805</b>
<b>BTL</b>	2009	AUGUST	3122	1815	3049		<b>2662</b>	<b>367</b>
<b>BTL</b>	2010	MAY	3703	3485	4138		<b>3775</b>	<b>166</b>
<b>BTL</b>	2010	AUGUST	2904	3412	3703		<b>3340</b>	<b>202</b>
<b>BTL</b>	2011	MAY	0	799	944		<b>581</b>	<b>254</b>
<b>BTL</b>	2011	AUGUST	944	2323	799		<b>1355</b>	<b>421</b>
<b>BTL</b>	2012	MAY	581	1670	1815		<b>1355</b>	<b>337</b>
<b>BTL</b>	2012	AUGUST	1960	5155	2468		<b>3194</b>	<b>858</b>
<b>BTL</b>	2013	MAY	508	1379	2468		<b>1452</b>	<b>491</b>
<b>BTL</b>	2013	AUGUST	1162		10309		<b>5735</b>	<b>2156</b>
<b>BTL</b>	2014	MAY	436	508	3703		<b>1549</b>	<b>933</b>
<b>BTL</b>	2014	AUGUST	653	871	6897		<b>2807</b>	<b>1772</b>
<b>BTL</b>	2015	MAY	1525	871	2251		<b>1549</b>	<b>399</b>
<b>BTL</b>	2015	AUGUST	2105	1234	8422		<b>3920</b>	<b>2267</b>
<b>BTL</b>	2016	MAY	0	0	1742		<b>581</b>	<b>581</b>
<b>BTL</b>	2016	AUGUST	1016	0	4138		<b>1718</b>	<b>1525</b>
<b>BTL</b>	2017	MAY	1089	0	7187		2759	2237
<b>BTL</b>	2017	AUGUST	3920	1379	13649		6316	3238
<b>CLN</b>	2010	MAY	29040	2178	24103	15101	<b>17606</b>	<b>3931</b>
<b>CLN</b>	2010	AUGUST	36590	2323	5881	9148	<b>13485</b>	<b>5218</b>
<b>CLN</b>	2011	MAY	8785	1307	10091	4283	<b>6117</b>	<b>1353</b>
<b>CLN</b>	2011	AUGUST	24539	581	7478	2251	<b>8712</b>	<b>3651</b>
<b>CLN</b>	2012	MAY	7986	3122	5735	4283	<b>5282</b>	<b>699</b>
<b>CLN</b>	2012	AUGUST	1452	1016	12850	5300	<b>5155</b>	<b>1827</b>
<b>CLN</b>	2013	MAY	8204	1089	4283	5155	<b>4683</b>	<b>976</b>
<b>CLN</b>	2013	AUGUST	436	2033	10527	6389	<b>4846</b>	<b>1137</b>
<b>CLN</b>	2014	MAY	363	0	6171	5445	<b>2995</b>	<b>1633</b>
<b>CLN</b>	2014	AUGUST	508	2251	9220	25337	<b>9329</b>	<b>5658</b>
<b>CLN</b>	2015	MAY	581	145	3557	5445	<b>2432</b>	<b>1258</b>
<b>CLN</b>	2015	AUGUST	2468	1162	0	3122	<b>1688</b>	<b>695</b>
<b>CLN</b>	2016	MAY	1525	2105	7623	7333	<b>4646</b>	<b>1640</b>
<b>CLN</b>	2016	AUGUST	2323	1960	4792	3267	<b>3086</b>	<b>632</b>
<b>CLN</b>	2017	MAY	2105	2396	4501	3557	3140	552
<b>CLN</b>	2017	AUGUST	7405	3340	7623	5663	6008	992
<b>CSI</b>	2009	AUGUST	16480	5227	4719	0	<b>6607</b>	<b>4937</b>
<b>CSI</b>	2010	MAY	3267	3340	2178	0	<b>2196</b>	<b>1107</b>
<b>CSI</b>	2010	AUGUST	3630	10745	12052	0	<b>6607</b>	<b>4792</b>
<b>CSI</b>	2011	MAY	2614	1888	1089	0	<b>1398</b>	<b>853</b>
<b>CSI</b>	2011	AUGUST	4719	10527	11979	73	<b>6824</b>	<b>1829</b>
<b>CSI</b>	2012	MAY	145	436	73	0	<b>163</b>	<b>64</b>
<b>CSI</b>	2012	AUGUST	1162	1597	1815	0	<b>1143</b>	<b>270</b>
<b>CSI</b>	2013	MAY	363	290	145		<b>266</b>	<b>55</b>
<b>CSI</b>	2013	AUGUST	726	871	726	73	<b>599</b>	<b>28</b>
<b>CSI</b>	2014	MAY	0	145	218	0	<b>91</b>	<b>54</b>

SITE	YEAR	Month	1	2	3	4	Average	SE
CSI	2014	AUGUST	0	1307	1162	0	<b>617</b>	<b>358</b>
CSI	2015	MAY	0	218	218	0	<b>109</b>	<b>63</b>
CSI	2015	AUGUST	0	1597	1234	0	<b>708</b>	<b>415</b>
CSI	2016	MAY	0	1162	871	0	<b>508</b>	<b>299</b>
CSI	2016	AUGUST	0	2251	2468	0	<b>1180</b>	<b>683</b>
CSI	2017	MAY	0	1742	218	0	490	421
CSI	2017	AUGUST	218	2033	2831	0	1271	692
ILL	2009	MAY	7550	5808	15827	18513	<b>11925</b>	<b>2065</b>
ILL	2009	AUGUST	31218	20110	11761	24539	<b>21907</b>	<b>2720</b>
ILL	2010	MAY	20546	14230	2105	41164	<b>19511</b>	<b>5446</b>
ILL	2010	AUGUST	14956	0	27878	22651	<b>16371</b>	<b>4045</b>
ILL	2011	MAY	11543	10164	1670	26354	<b>12433</b>	<b>3419</b>
ILL	2011	AUGUST	16117	20836	27806	21925	<b>21671</b>	<b>1601</b>
ILL	2012	MAY	2541	6824	2904	1234	<b>3376</b>	<b>803</b>
ILL	2012	AUGUST	10382	14593	9583	4792	<b>9837</b>	<b>1339</b>
ILL	2013	MAY	2686	6244	2178	1307	<b>3104</b>	<b>723</b>
ILL	2013	AUGUST	9728	12850	6897	6026	<b>8875</b>	<b>771</b>
ILL	2014	MAY	2105	3412	1162	1016	<b>1924</b>	<b>552</b>
ILL	2014	AUGUST	6970	10019	8131	10817	<b>8984</b>	<b>876</b>
ILL	2015	MAY	2323	3630	653	1815	<b>2105</b>	<b>617</b>
ILL	2015	AUGUST	7405	9075	4864	9946	<b>7823</b>	<b>1118</b>
ILL	2016	MAY	3485	6389	2468	7768	<b>5028</b>	<b>1235</b>
ILL	2016	AUGUST	8639	12342	5953	10454	<b>9347</b>	<b>1361</b>
ILL	2017	MAY	4574	7986	2468	5155	5046	1137
ILL	2017	AUGUST	14302	14520	7260	11180	11816	1699
SBR	2009	MAY	23885	54523	37171	31799	<b>36845</b>	<b>4329</b>
SBR	2009	AUGUST	10309	12995	6389	12052	<b>10436</b>	<b>973</b>
SBR	2010	MAY	13213	24466	3267	14375	<b>13830</b>	<b>2889</b>
SBR	2010	AUGUST	26935	12124	13358	11906	<b>16081</b>	<b>2421</b>
SBR	2011	MAY	3630	4211	1960	944	<b>2686</b>	<b>501</b>
SBR	2011	AUGUST	16045	6897	7841	12778	<b>10890</b>	<b>1432</b>
SBR	2012	MAY	22361	3557	7187	7333	<b>10110</b>	<b>2784</b>
SBR	2012	AUGUST	33396	11906	15464	16117	<b>19221</b>	<b>3210</b>
SBR	2013	MAY	21707	4937	8930	2831	<b>9601</b>	<b>4229</b>
SBR	2013	AUGUST	4211	14375	0	6244	<b>6207</b>	<b>2463</b>
SBR	2014	MAY	3122	2468	5082	3557	<b>3557</b>	<b>555</b>
SBR	2014	AUGUST	2468	5155	6026	7913	<b>5391</b>	<b>1131</b>
SBR	2015	MAY	2105	2033	2831	4937	<b>2977</b>	<b>678</b>
SBR	2015	AUGUST	3848	3775	3485	7260	<b>4592</b>	<b>893</b>
SBR	2016	MAY	32525	5518	2686	1016	<b>10436</b>	<b>7421</b>
SBR	2016	AUGUST	34703	10309	6752	1960	<b>13431</b>	<b>7294</b>
SBR	2017	MAY	45012	26572	2686	9801	21018	9436
SBR	2017	AUGUST	73108	32670	3194	21199	32543	14820

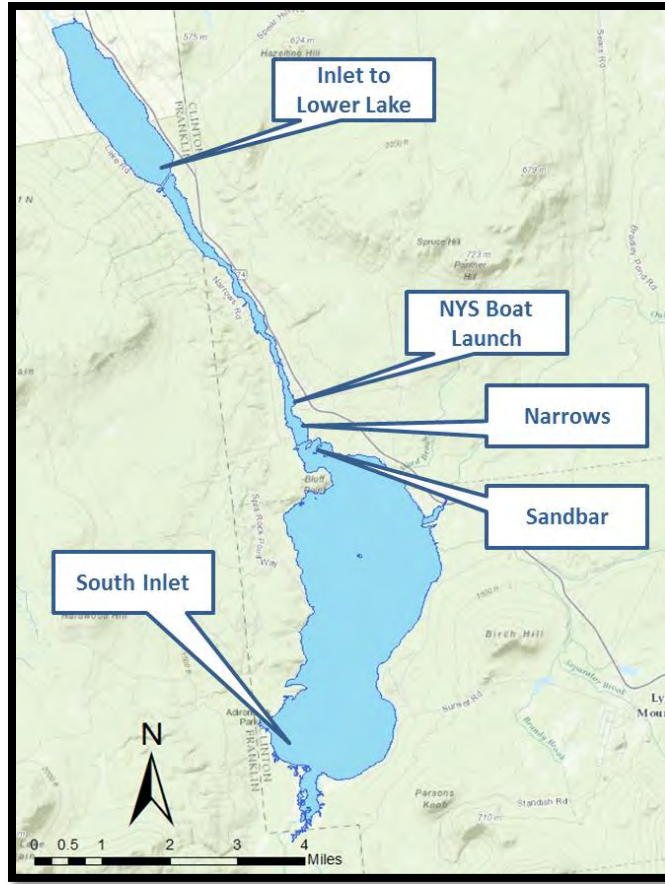


Figure 1. Study Locations on the Chateaugay Lakes, NY.

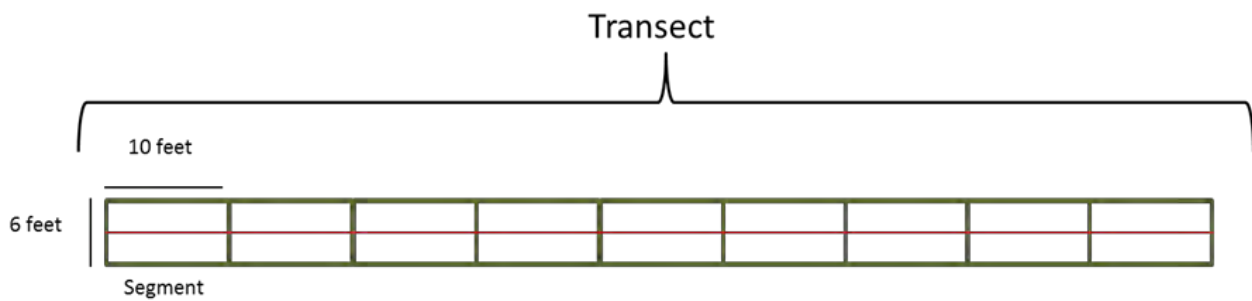


Figure 2. Detailed view of the underwater transects used in the study. The transects consist of a nylon rope that is anchored to the lake bottom between depths of 3 and 15 feet (red line). Each transect is divided into a number of 10' x 6' study segments. In each segment species occurrence is recorded and milfoil stems are enumerated.



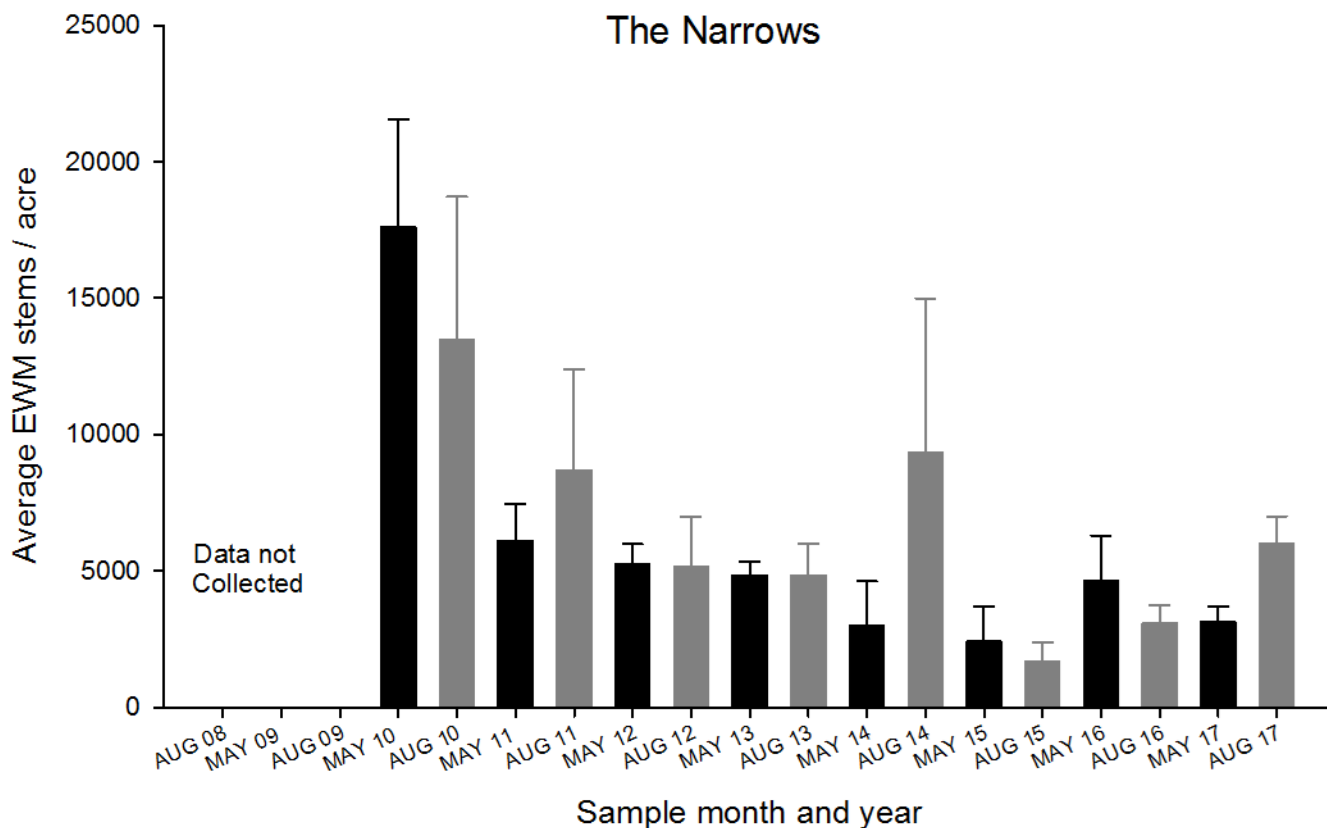


Figure 3 Average Eurasian water-milfoil density at the Narrows site during May (black bars) and August (grey bars), 2008-2017. Error bars represent standard error of the mean (n = 4 transects).

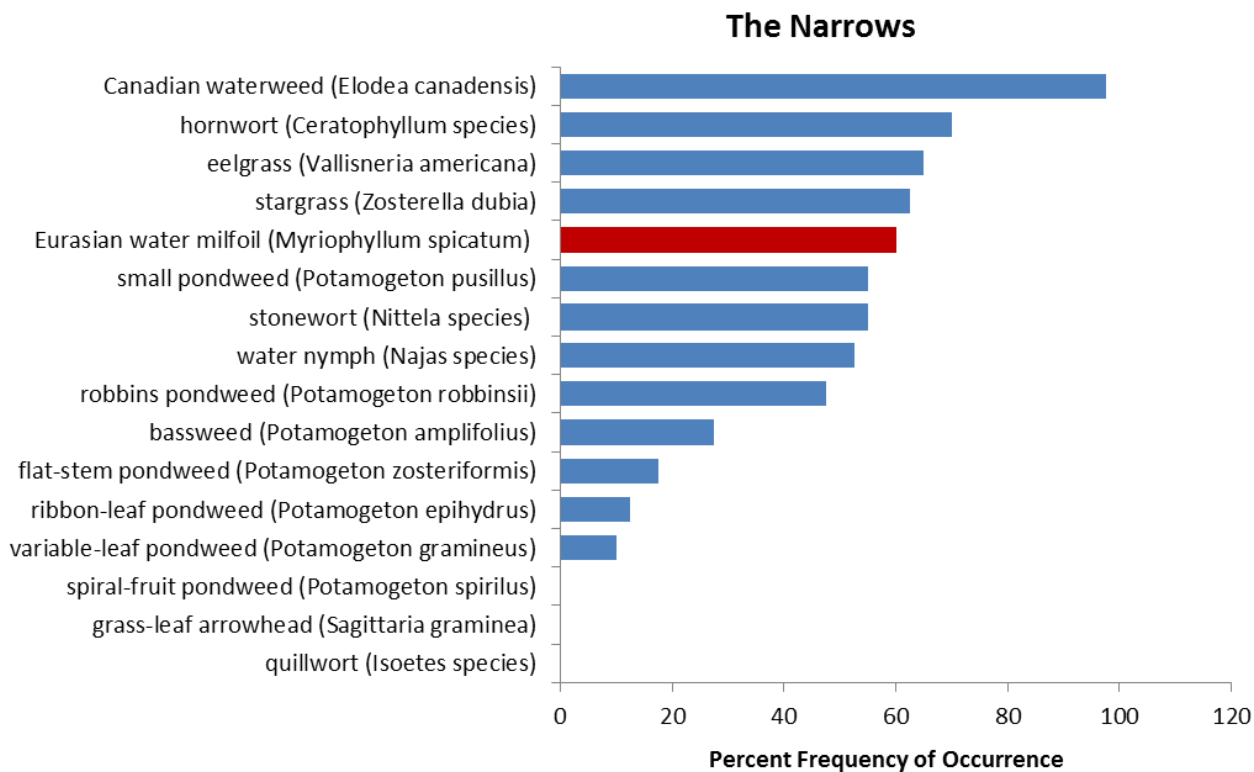


Figure 4. Percent frequency of occurrence of aquatic plant species on the study segments at the Chateaugay Lake Narrows, August 2017.

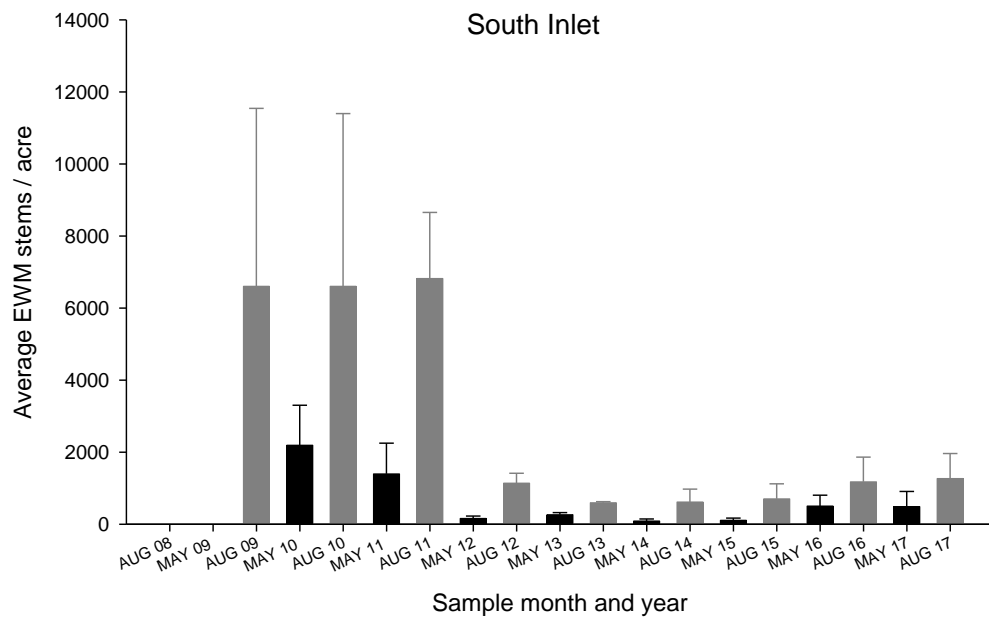


Figure 5. Average Eurasian water-milfoil density at the South Inlet site during May (black bars) and August (grey bars), 2008-2017. Error bars represent standard error of the mean (n = 4 transects).

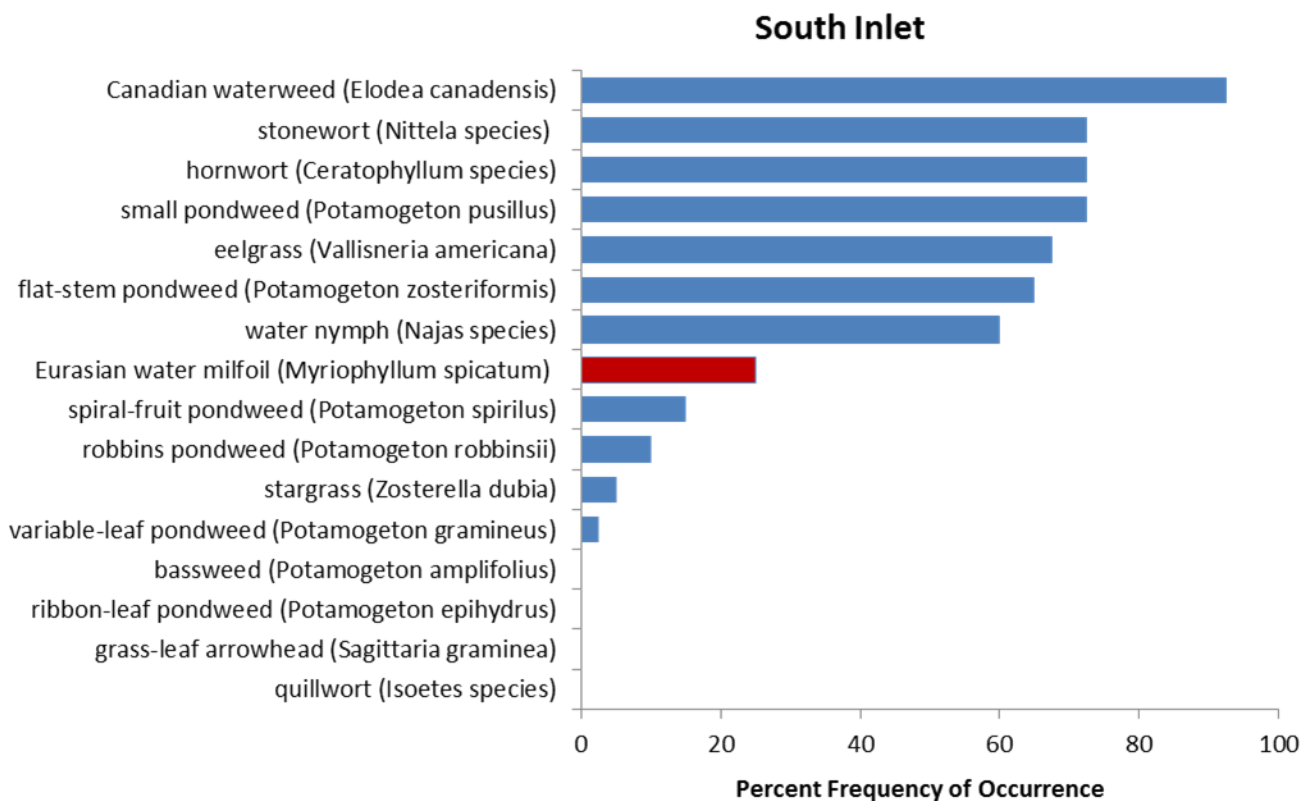


Figure 6. Percent frequency of occurrence of aquatic plant species on the study segments at the South Inlet, August 2017.

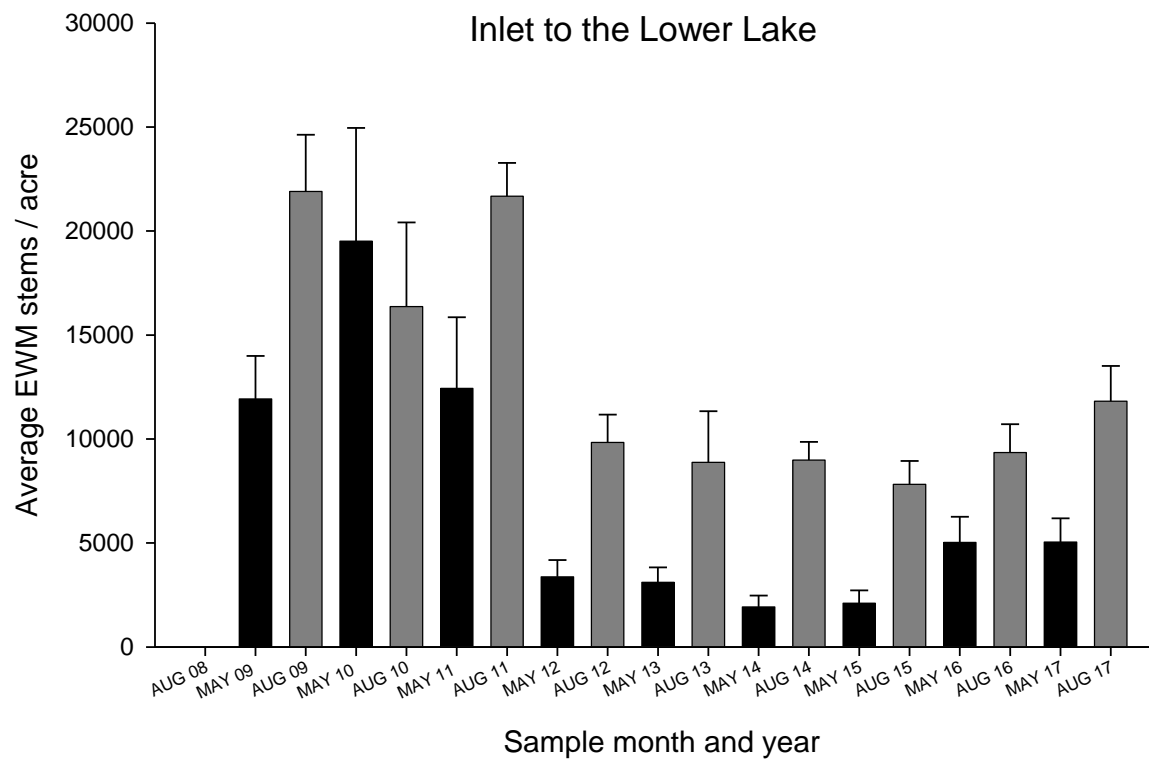


Figure 7. Average Eurasian water-milfoil density at the Lower Lake Inlet site during May (black bars) and August (grey bars), 2008-2017. Error bars represent standard error of the mean ( $n = 4$  transects).

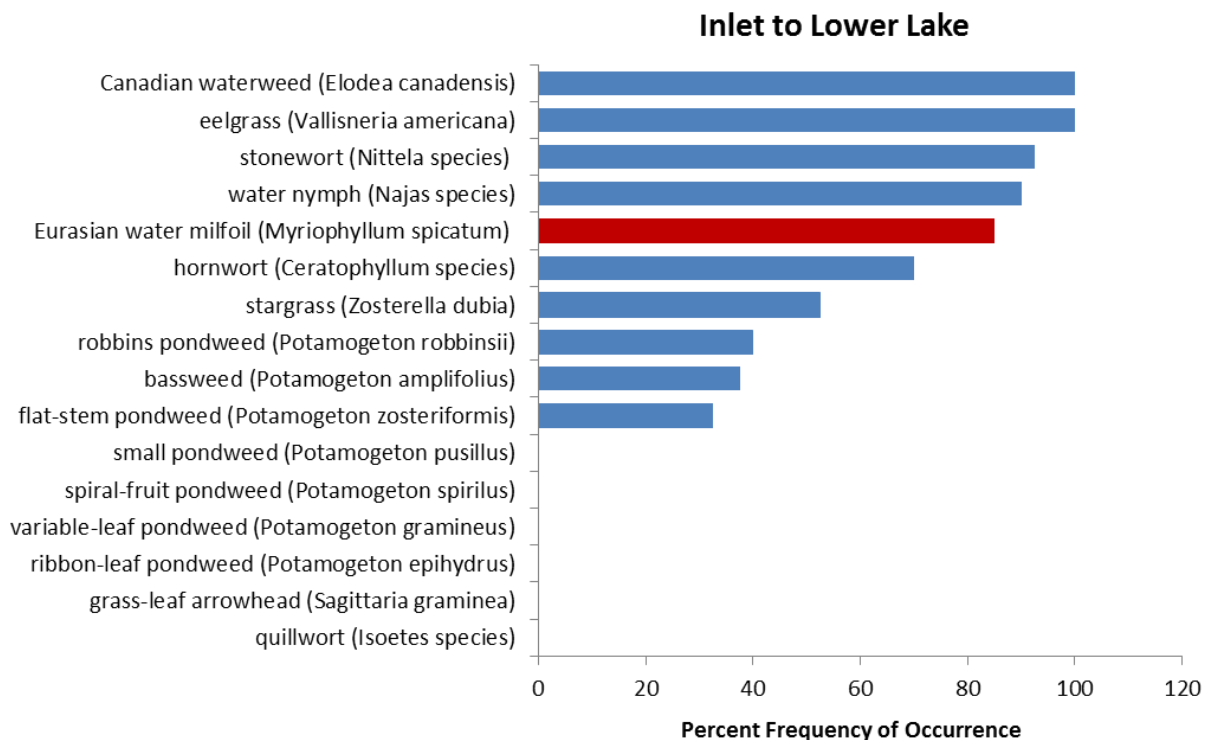


Figure 8. Percent frequency of occurrence of aquatic plant species on the study segments at the Lower Lake location, August 2017.

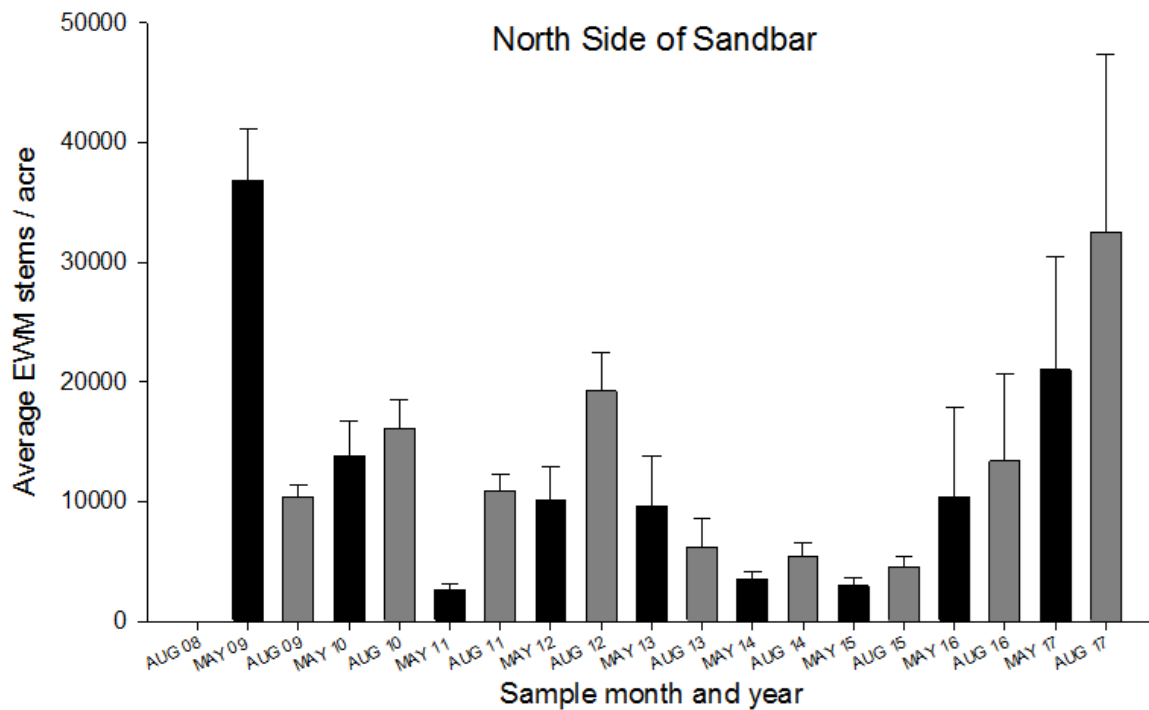


Figure 9. Average Eurasian water-milfoil density at the Sand Bar site during May (black bars) and August (grey bars), 2008-2017. Error bars represent standard error of the mean (n = 4 transects).

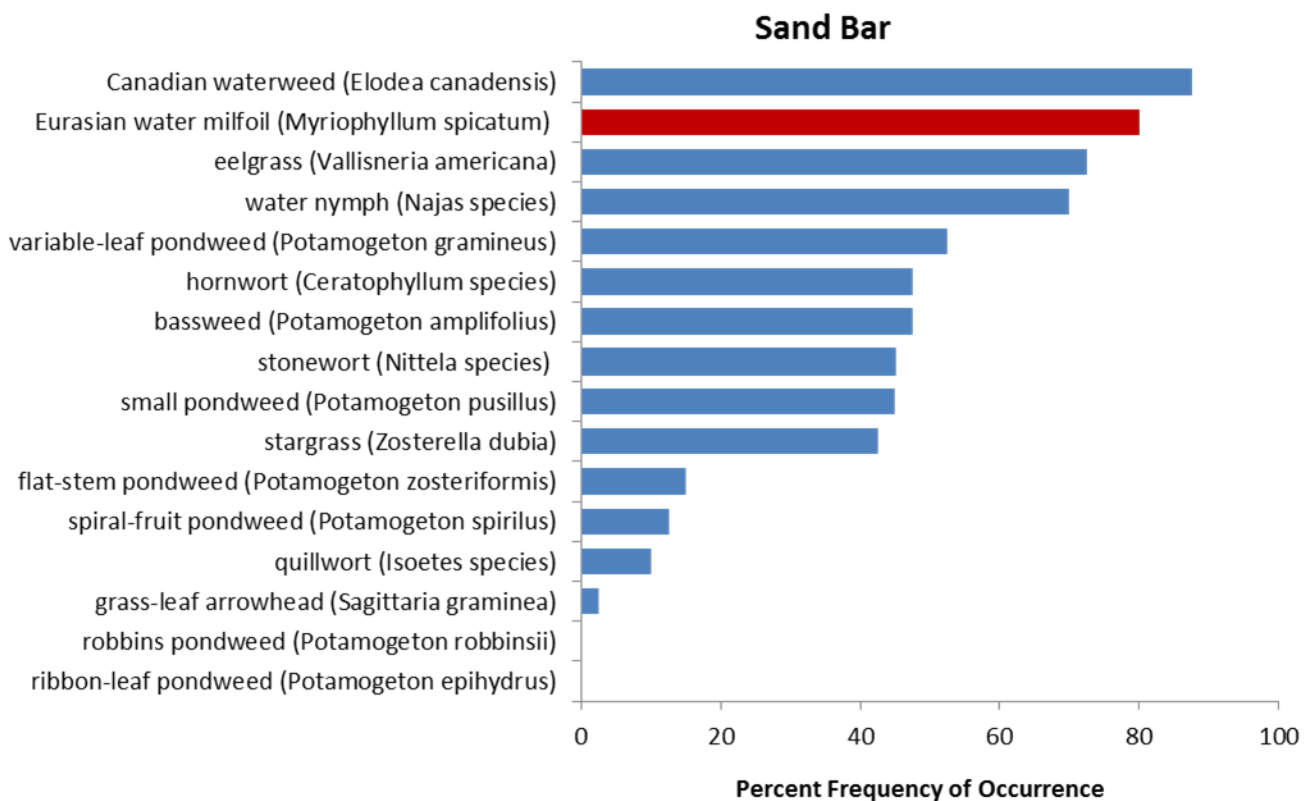


Figure 10. Percent frequency of occurrence of aquatic plant species on the study segments at the Sand Bar location, August 2017.



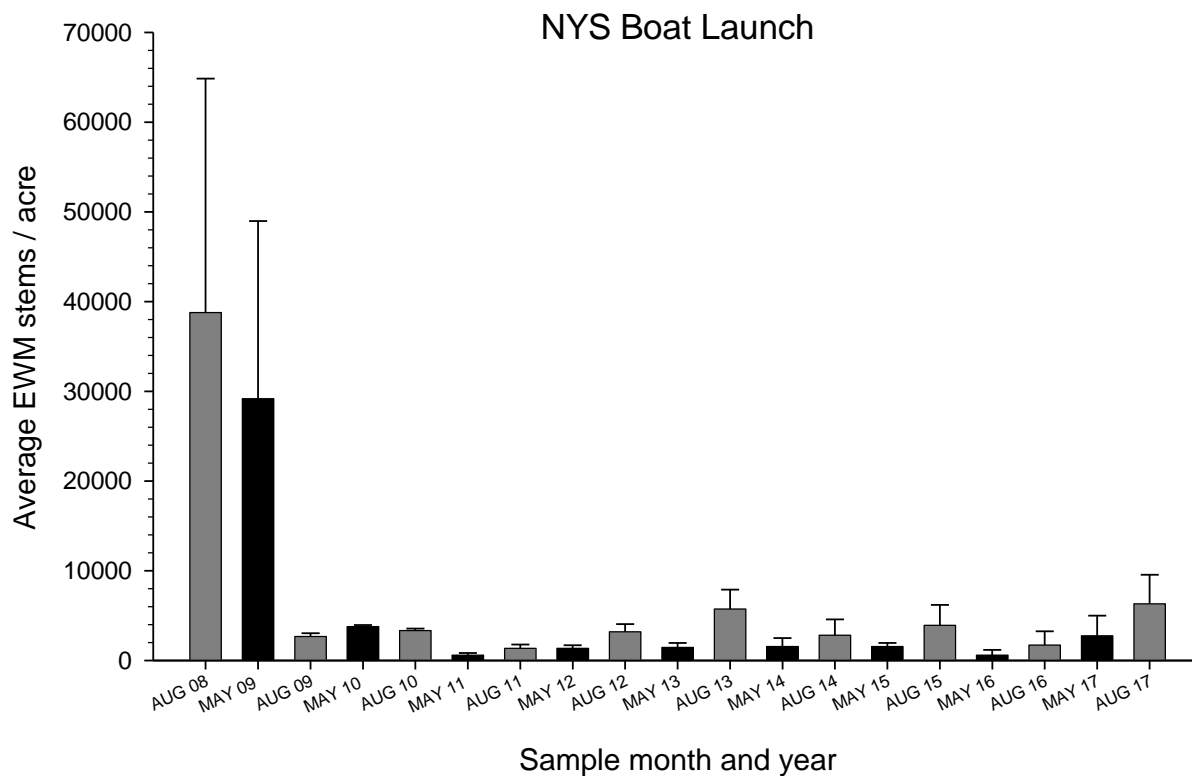


Figure 11. Average Eurasian water-milfoil density at the NYS Boat Launch during May (black bars) and August (grey bars), 2008-2016. Error bars represent standard error of the mean (n = 4 transects).

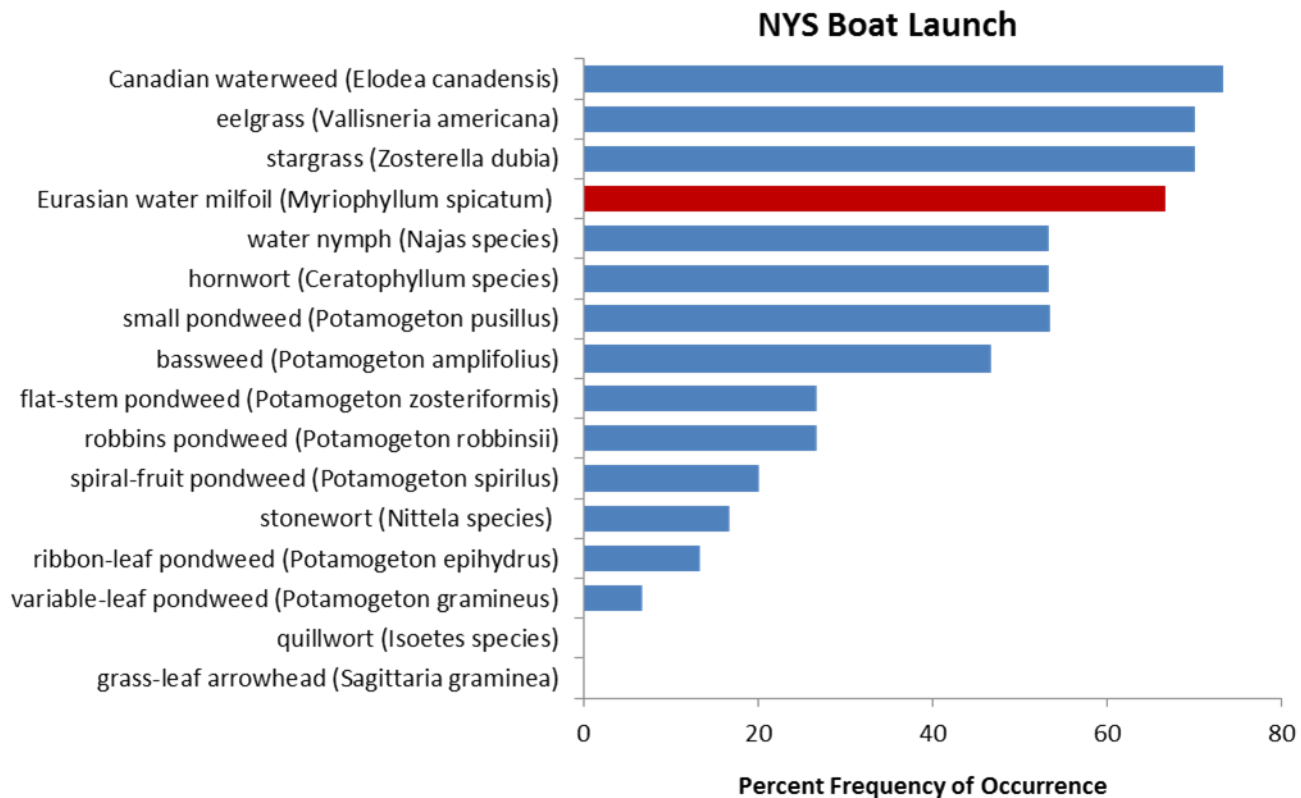


Figure 12. Percent frequency of occurrence of aquatic plant species on the study segments at the NYS Boat Launch location, August 2017