

Rainbow Lake Plant Survey 2015

Adirondack Watershed Institute



Adirondack Watershed Institute

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The Adirondack Watershed Institute (AWI) is a program of Paul Smith's College that conducts work protecting and conserving water resources in the Adirondack Park. The Aquatic plant survey, GIS work, the narrative and results presented in this report were conducted and produced by Sean Regalado, AWI Research Assistant. The field work and reporting was done under the supervision of Daniel L Kelting, AWI Executive Director, with assistance from Corey Laxson, AWI Research Associate.



Rainbow Lake

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Elodea nuttallii (left) *Potamogeton praelongus* (right), colored pencil on mylar by Dr. Lee Ann Sporn

Summary

On August 25-26, 2015 Sean Regalado of the Adirondack Watershed Institute conducted an aquatic plant survey of Rainbow Lake. The objectives of the survey were to (1) perform a comprehensive investigation of the aquatic plant community of the lake to determine if any invasive or non-native plants have become established, and (2) map the native aquatic plant beds and quantify their species richness. We did not detect any non-indigenous species in the lake. We did encounter large amounts of southern naiad (*Najas guadalupensis*). This plant is native to some parts of the Northeast, but it is not certain if the Adirondacks are part of its native range. However, it is considered to be a nuisance by many New England states.

Methodology

We performed a whole lake aquatic plant survey of Rainbow Lake using a combination of visual surveys and rake tossing on August 25-26, 2015. We surveyed the entire littoral zone of the lake in a serpentine search pattern and mapped the location, species composition, and species % cover of all aquatic plant beds. Bed perimeters were mapped with a handheld GPS unit and field data were recorded on a datasheet. Visual surveys were supplemented by periodic rake tossing and snorkel using a consistent protocol. We snorkeled three random beds where the benthos cannot be seen as well as the boat launch. All field data were entered into ArcGIS to create aquatic plant maps for the lake using the NYS Area Hydrography 1:24,000 shapefile. The crew was equipped with a bathymetric map of the lake, portable depth sounder, handheld GPS unit, two-sided rake, and a digital camera. Depths were checked periodically while surveying to ensure that the far shore edge of the littoral zone was covered. A vertical plankton tow of a 600 μ m net through >15' of water column was done to monitor for invasive plankton.

Study Site

The Rainbow Lake Chain is a 767 acre lake system found in the Town of Brighton and in the Town of Rainbow Lake, within Franklin County, nested in the Saranac River watershed of northern New York

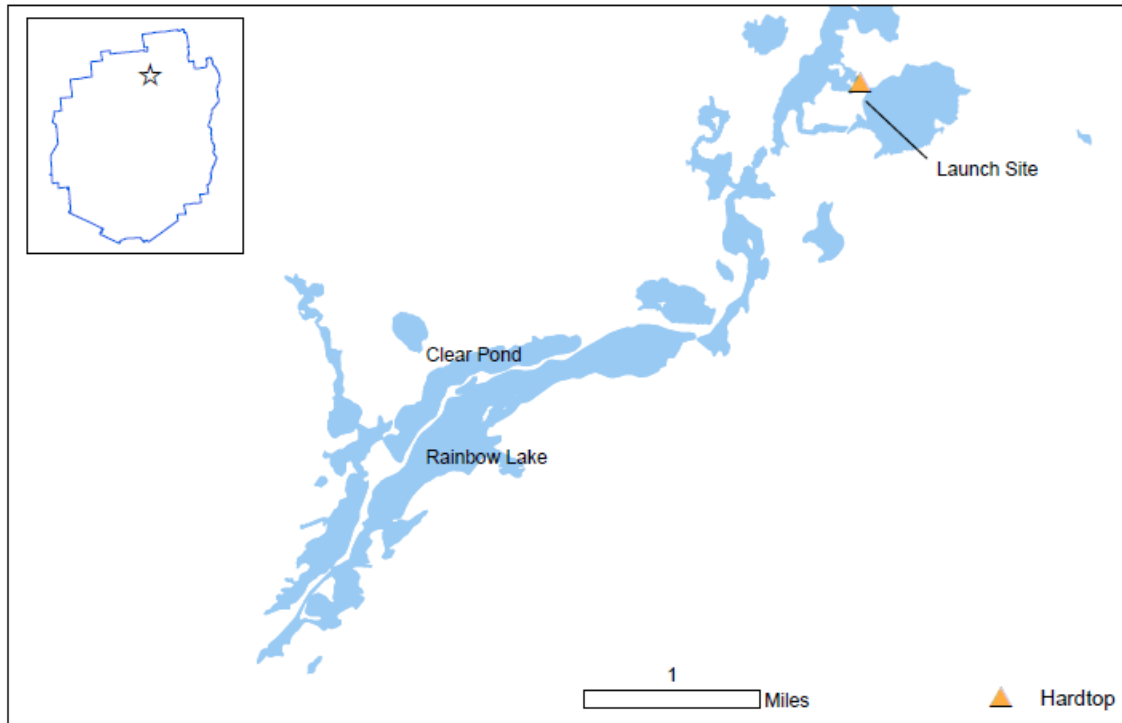


Figure 1 Location map for Rainbow Lake and location of launch site utilized.

Results

A total of 41 plant beds were mapped in the Rainbow Lake covering 171.7 acres, representing 22.3 % of the surface water. The most abundant taxa found were water shield (*Brasenia schreberi*), burr reed (*Sparganium sp*), and bass weed (*Potamogeton ampifolius*). The least abundant taxa found were coon tail (*Ceratophyllum demersum*), flat-stem pondweed (*Potamogeton zosteriformis*), and duck potato (*Sagittaria graminea*, Figure 2, Table 1). A total of 56 rakes were tossed, of which 19 returned plant specimens. The most abundant taxa returned by the rake were Robin's pondweed (*Potamogeton robbinsii*), eastern purple bladderwort (*Utricularia purpurea*), and southern naiad (*Najas guadalupensis*). The least abundant taxa returned by the rake coontail (*Ceratophyllum demersum*), floating heart (*Nymphoides cordata*) and common bladderwort (*Utricularia vulgaris*, Figure 3, Table 2). A total of 14 beds were found to have *N. guadalupensis* in them, covering 129.8 acres of surface water, representing 75.6% of plant bed area and 16.9% of surface water area (Figure 3, table 1).

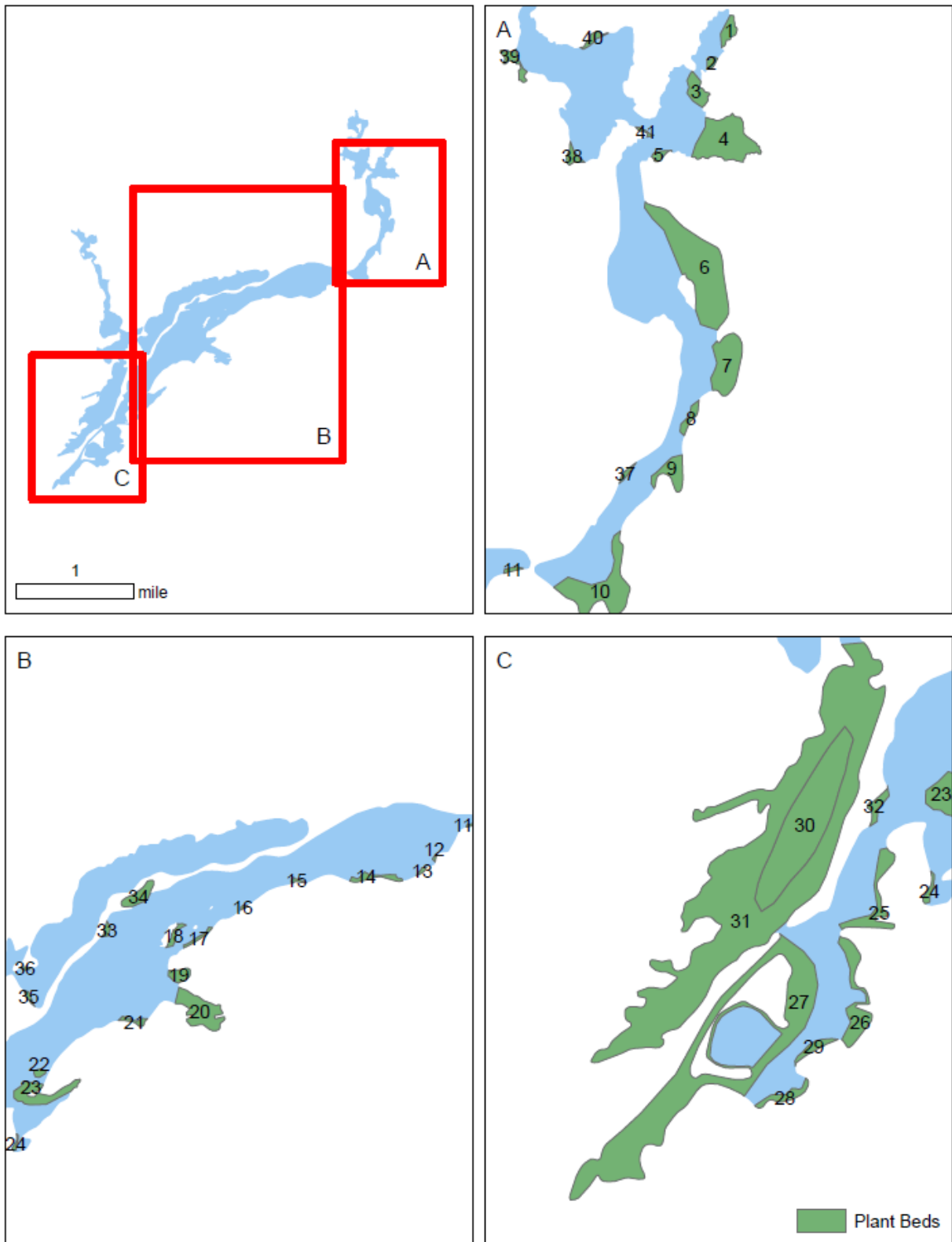


Figure 2 Plant bed map Rainbow Lake. Bed IDs correspond with Table 1

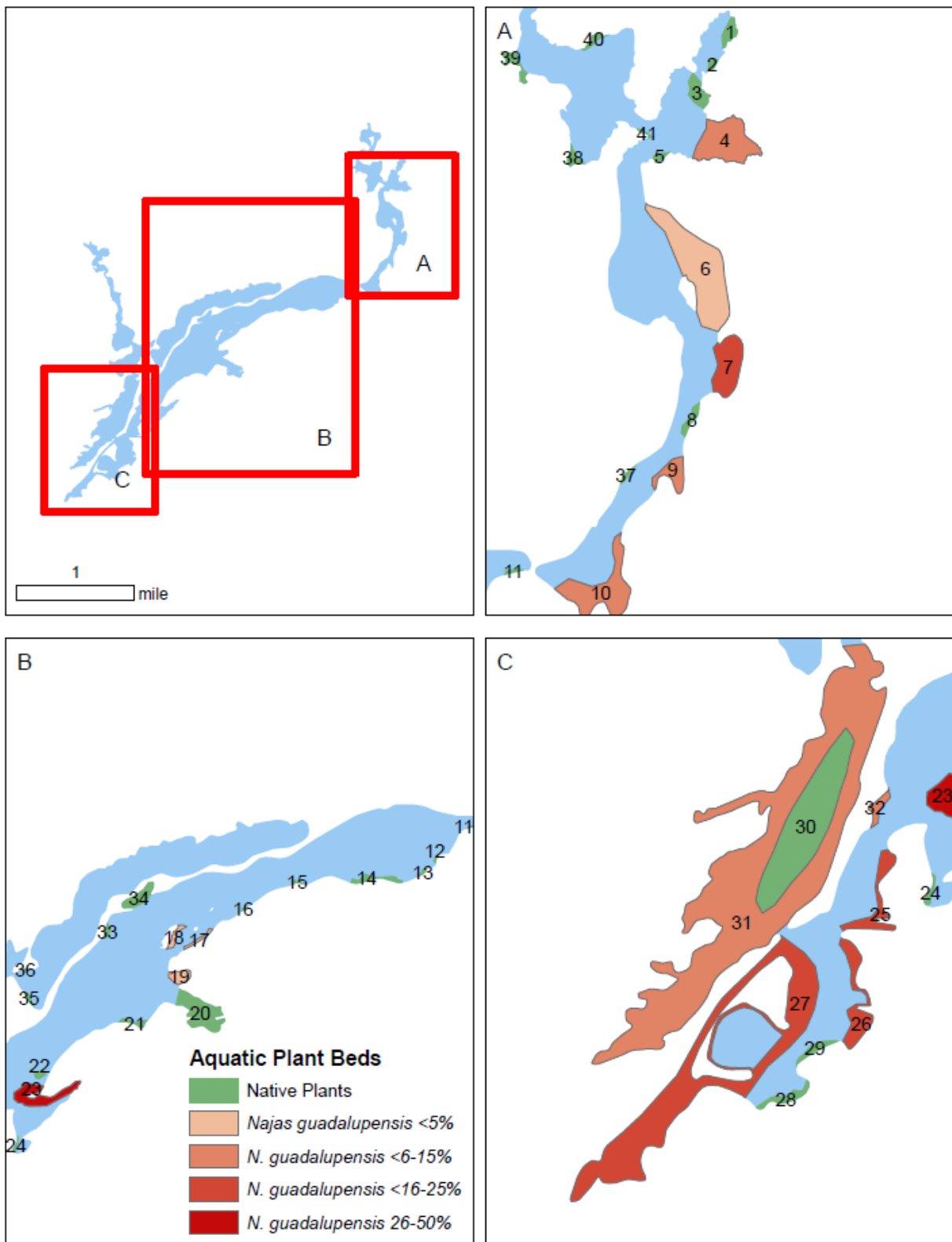


Figure 3 *N. guadalupensis* map for Rainbow Lake. Bed IDs correspond with Table 1

Table 1 Abundance of aquatic plant species detected in each plant bed in Rainbow Lake. Refer to Figure 2-3 for bed locations. 5 = Abundant (>50% cover), 4 = Common (25-50%), 3 = Present (15-25%), 2 = Occasional (5-15%), and 1 = Rare (<5%).

Species	Bed ID																			
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
<i>Brasenia schreberi</i>	2	0	3	2	2	1	2	2	2	0	0	0	0	3	3	0	0	5	0	0
<i>Ceratophyllum demersum</i>	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<i>Eleocharis parvula</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<i>Elodea canadensis</i>	0	0	0	0	0	3	0	0	1	0	0	0	0	0	0	0	0	0	0	3
<i>Elodea nuttallii</i>	0	0	1	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<i>Eriocaulon sp.</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<i>Lobelia dortmanna</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	0
<i>Myriophyllum sibiricum</i>	0	0	0	0	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	3
<i>Najas guadalupensis</i>	0	0	0	2	0	1	3	0	2	2	0	0	0	0	0	0	1	1	1	0
<i>Najas sp.</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
<i>Nitella sp.</i>	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<i>Nuphar variegata</i>	0	0	1	1	0	0	0	0	0	2	0	0	0	0	0	1	0	1	0	0
<i>Nymphaea odorata</i>	0	1	0	1	3	3	0	2	0	0	0	0	0	0	0	0	2	0	2	0
<i>Nymphoides cordata</i>	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1
<i>Persicaria amphibia</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<i>Potamogeton amplifolius</i>	4	0	1	3	2	0	1	0	2	1	2	2	0	2	2	2	0	0	0	1
<i>Potamogeton epihydrus</i>	1	0	0	0	2	0	2	0	0	0	2	0	1	2	2	2	0	0	4	0
<i>Potamogeton gramineus</i>	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	2	0	0	0	1
<i>Potamogeton natans</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<i>Potamogeton pusillus</i>	0	0	0	1	0	1	0	0	0	0	0	0	0	0	0	0	1	0	0	0
<i>Potamogeton robbinsii</i>	0	0	1	1	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3
<i>Potamogeton zosteriformis</i>	0	0	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0
<i>Sagittaria graminea</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<i>Sparganium sp.</i>	1	1	2	0	2	0	2	1	2	3	0	0	1	3	3	0	3	1	3	2
<i>Utricularia intermedia</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
<i>Utricularia purpurea</i>	1	0	0	0	0	0	1	0	2	0	0	0	0	0	0	0	0	1	0	2
<i>Utricularia vulgaris</i>	0	0	0	3	2	2	2	1	2	3	0	0	0	0	0	0	0	0	0	5
<i>Vallisneria americana</i>	1	0	0	1	2	1	0	0	0	0	0	0	0	1	1	0	0	0	0	0
Area (acres)	0.7	0.2	1.1	5.0	0.3	9.8	3.4	0.5	1.4	5.4	0.1	0.1	0.3	2.0	0.3	0.1	0.8	1.2	2.1	10.0

Table 1-cont. Abundance of aquatic plant species detected in each plant bed in Rainbow Lake. Refer to Figure 2-3 for bed locations. 5 = Abundant (>50% cover), 4 = Common (25-50%), 3 = Present (15-25%), 2 = Occasional (5-15%), and 1 = Rare (<5%).

Species	BED ID																				
	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41
<i>Brasenia schreberi</i>	3	2	3	3	0	3	3	3	1	0	0	0	0	2	2	2	2	3	2	3	1
<i>Ceratophyllum demersum</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<i>Eleocharis parvula</i>	0	2	0	0	1	0	4	0	0	0	2	1	0	0	0	0	0	0	0	0	0
<i>Elodea canadensis</i>	0	0	3	1	2	3	2	0	0	0	3	3	0	0	0	0	0	0	0	1	2
<i>Elodea nuttallii</i>	1	0	0	0	0	0	2	0	0	0	2	0	0	0	0	0	0	0	0	0	0
<i>Eriocaulon sp.</i>	0	0	0	0	0	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<i>Lobelia dortmanna</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<i>Myriophyllum sibiricum</i>	0	0	1	0	2	0	4	0	0	0	3	0	0	0	0	0	0	1	0	0	0
<i>Najas guadalupensis</i>	0	0	4	0	3	3	3	0	0	0	2	2	0	0	0	0	0	0	0	0	0
<i>Najas sp.</i>	0	0	0	0	0	0	2	0	0	4	0	0	0	0	0	0	0	0	0	0	0
<i>Nitella sp.</i>	0	0	0	0	0	0	0	0	0	4	0	0	0	1	0	0	0	0	0	0	0
<i>Nuphar variegata</i>	0	0	0	1	0	0	2	1	0	0	0	0	0	1	0	0	0	0	3	1	1
<i>Nymphaea odorata</i>	0	0	2	0	1	0	2	0	0	0	3	2	0	0	0	1	0	0	1	0	0
<i>Nymphoides cordata</i>	0	0	0	0	1	1	2	0	0	0	0	1	0	0	0	0	0	0	0	1	0
<i>Persicaria amphibia</i>	2	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<i>Potamogeton amplifolius</i>	3	3	4	2	2	0	3	1	2	0	3	0	0	1	0	0	2	0	0	0	0
<i>Potamogeton epihydrus</i>	3	1	3	0	0	2	0	0	0	0	3	0	0	0	0	0	0	1	0	0	1
<i>Potamogeton gramineus</i>	0	0	2	0	3	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<i>Potamogeton natans</i>	0	0	0	0	0	0	2	0	0	0	3	0	0	0	0	0	0	0	0	0	0
<i>Potamogeton pusillus</i>	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0
<i>Potamogeton robbinsii</i>	0	0	4	2	4	5	3	0	0	0	4	0	0	0	0	0	0	2	0	0	0
<i>Potamogeton zosteriformis</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<i>Sagittaria graminea</i>	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<i>Sparganium sp.</i>	2	1	2	3	1	2	0	0	2	0	2	2	1	0	0	0	2	2	1	2	2
<i>Utricularia intermedia</i>	0	0	1	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<i>Utricularia purpurea</i>	0	0	2	0	3	4	0	0	0	0	3	0	0	0	0	0	0	2	1	0	0
<i>Utricularia vulgaris</i>	0	3	0	0	2	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0
<i>Vallisneria americana</i>	0	2	0	0	0	0	0	2	1	0	0	0	0	0	0	0	0	0	0	0	0
Area (acres)	1.0	0.7	7.1	0.3	2.6	3.3	26.0	0.9	0.7	15.9	60.9	0.7	0.6	3.5	0.5	0.2	0.2	0.4	0.6	0.3	0.1



Figure 4 Rake toss map for Rainbow Lake. Rake IDs correspond with Table 2

Table 2 Species present on the rake at each of the rake toss locations and abundance 1 (<25% of rake), 2 (25-50 % of rake), 3 (50-75% of rake), and 4 (75-100% of rake) in Rainbow Lake. Refer to Figure 4 for Rake Toss locations.

	Rake ID																			
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
Depth (ft)	10.5	2.9	7.4	9	5.1	7	7.9	9.1	6.1	8	5.8	8.5	5.1	7.1	4.5	5.1	8.3	6.1	10.1	8.1
Presence/absence	0	1	1	0	1	1	0	1	1	0	1	0	0	0	1	0	0	0	0	0
<i>Ceratophyllum demersum</i>	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<i>Eleocharis parvula</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<i>Elodea nuttallii</i>	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<i>Myriophyllum sibiricum</i>	0	0	0	0	0	0	0	0	4	0	0	0	0	0	0	0	0	0	0	0
<i>Najas guadalupensis</i>	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1	0	0	0	0	0
<i>Najas sp.</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<i>Nitella sp.</i>	0	0	0	0	1	1	0	0	0	0	1	0	0	0	0	0	0	0	0	0
<i>Nymphoides cordata</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<i>Potamogeton epihydrus</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<i>Potamogeton pusillus</i>	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0
<i>Potamogeton robbinsii</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<i>Potamogeton zosteriformis</i>	0	0	0	0	0	0	0	0	0	0	3	0	0	0	0	0	0	0	0	0
<i>Utricularia minor</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<i>Utricularia purpurea</i>	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0
<i>Utricularia vulgaris</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0
<i>Vallisneria americana</i>	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Rake ID																			
	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40
Depth (ft)	6.3	7.7	6.8	5.4	6.1	5.7	7.3	4.2	3.5	3.5	3.4	7.2	5.1	4.9	7.9	5.2	6.2	2.9	3.8	5.6
Presence/absence	1	0	0	0	1	1	0	0	1	1	1	0	0	1	0	1	1	1	0	0
<i>Ceratophyllum demersum</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<i>Eleocharis parvula</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	2	2	0	0
<i>Elodea nuttallii</i>	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<i>Myriophyllum sibiricum</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<i>Najas guadalupensis</i>	3	0	0	0	0	0	0	0	0	2	1	0	0	0	0	1	0	0	0	0
<i>Najas sp.</i>	1	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<i>Nitella sp.</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

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Table 2 – cont.

	Rake ID																			
	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40
<i>Nymphoides cordata</i>	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0
<i>Potamogeton epihydrus</i>	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0
<i>Potamogeton pusillus</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<i>Potamogeton robbinsii</i>	0	0	0	0	1	4	0	0	4	0	4	0	0	4	0	0	0	0	0	0
<i>Potamogeton zosteriformis</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<i>Utricularia minor</i>	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0
<i>Utricularia purpurea</i>	0	0	0	0	0	0	0	0	0	4	0	0	0	1	0	0	3	0	0	0
<i>Utricularia vulgaris</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<i>Vallisneria americana</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0
	Rake ID																			
	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56				
Depth (ft)	4.2	5.1	3.4	2.7	4.2	10.9	3.4	6	4.2	6	5.2	6.7	4.5	3.3	4.9	7.9				
Presence/absence	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0				
<i>Ceratophyllum demersum</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0				
<i>Eleocharis parvula</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0				
<i>Elodea nuttallii</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0				
<i>Myriophyllum sibiricum</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0				
<i>Najas guadalupensis</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0				
<i>Najas sp.</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0				
<i>Nitella sp.</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0				
<i>Nymphoides cordata</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0				
<i>Potamogeton epihydrus</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0				
<i>Potamogeton pusillus</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0				
<i>Potamogeton robbinsii</i>	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0				
<i>Potamogeton zosteriformis</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0				
<i>Utricularia minor</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0				
<i>Utricularia purpurea</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0				
<i>Utricularia vulgaris</i>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0				