



January 7, 2010

Dear Mr. Lijou Knapp:

This summer you requested information regarding an aquatic plant survey that staff from the Research Bureau of the Department of Natural Resources conducted on August 5th, 2009 on Loon Lake in Shawano County, WI. The plant survey was conducted as part of a statewide Eurasian water milfoil monitoring project. This data will be used by the Department to understand the variation in milfoil growth among lakes across the state, how aquatic plant populations respond to management regimes, and how plant communities change over time. Loon Lake is one of the lakes chosen for this project because they met certain physical criteria (size, region, presence of milfoil, timing of milfoil establishment, etc.) for this study.

Point-Intercept Sampling Method

Based on parameters specific to Loon Lake, we mapped a 365-point sampling grid over the entire lake. Using GPS technology, we navigated by boat to each of the pre-determined grid points. Of the 365 total points, we sampled 225 navigable points that fell within the depth range of plant growth (called *littoral area*). At each of these points we used a two-sided rake sampler to sample approximately 2.5 feet along the bottom. After pulling the plants to the surface, the rake was assigned a fullness rating of 1-3 to estimate density of plant growth (see Figure 1). Each individual plant species on the rake as well as any dislodged by the rake and floating were given similar fullness ratings to estimate abundance. We also recorded visual sightings of species within six feet of the sample point, and depth and substrate (lake bottom) type at each point. Any additional species seen in the lake during a general boat survey were recorded separately from the point-intercept data. In addition, quantitative biomass samples were taken at 10% of the points that fell within the littoral area. Biomass data is currently being processed in our lab.

Species frequencies of occurrence reflect the percentage of times a species was found out of a larger population of points sampled. Littoral frequency of occurrence (given in Table 1) indicates how often a species was found considering only areas that are less than or equal to the maximum depth of plant growth. Voucher specimens have been sent to the Stevens Point Herbarium, therefore all species identifications are subject to change pending verification.



Species Present

% Frequency of Occurrence (Littoral): This estimation of frequency of occurrence is calculated by taking the total number of times a species is sampled divided by the total number of points of which depth was less than or equal to the maximum depth of plant growth. Thus, we consider only sites in the lake at which, given light requirements, the growth of plants is possible.

Common Name	Scientific Name	% Frequency of Occurrence (Littoral)
Slender naiad	<i>Najas flexilis</i>	44.73
Common waterweed	<i>Elodea canadensis</i>	38.82
Wild celery	<i>Potamogeton americanus</i>	38.80
Nitella	<i>Nitella</i> spp.	37.55
Illinois pondweed	<i>Potamogeton illinoensis</i>	18.57
Muskgrasses	<i>Clava</i> spp.	18.14
Filamentous algae	<i>Ajuga</i> spp.	17.72
Hybrid water milfoil*	<i>Myriophyllum spicatum</i> X <i>sibiricum</i> *	13.88
Variable pondweed	<i>Potamogeton gracillimus</i>	9.70
Dwarf water milfoil	<i>Myriophyllum terrestre</i>	7.17
Crawling bladderwort	<i>Utricularia gibba</i>	7.17
Watershield	<i>Brasenia schreberei</i>	6.75
Common bladderwort	<i>Utricularia vulgaris</i>	6.33
Needle spikerush	<i>Eleocharis acicularis</i>	5.91
Water star-grass	<i>Heteranthera dubia</i>	5.49
White water lily	<i>Nymphaea odorata</i>	5.49
Forced duckweed	<i>Lemna trinitica</i>	5.06
Sagittaria	<i>Najas variegata</i>	4.22
Climbing-leaf pondweed	<i>Potamogeton richardsonii</i>	3.80
Small bladderwort	<i>Utricularia minor</i>	3.80
Moss	Moss spp.	3.38
Coontail	<i>Ceratophyllum demersum</i>	2.95
Small pondweed	<i>Potamogeton perfoliatus</i>	2.11
Sage pondweed	<i>Stachenia pectinata</i>	1.27
Quillwort	<i>Isoetes</i> sp.	1.27
Large-leaf pondweed	<i>Potamogeton amplifolius</i>	1.69
Flat-leaf bladderwort	<i>Utricularia lateralis</i>	0.81
Large purple bladderwort	<i>Utricularia purpurea</i>	0.81
Small purple bladderwort	<i>Utricularia recurvata</i>	0.81
White-stem pondweed	<i>Potamogeton proclivus</i>	0.47
Brown-fruited rush	<i>Juncus polycarpus</i> f. <i>submersus</i>	0.47
Pipewort	<i>Eriocaulon aquaticum</i>	0.42
Swamp loosestrife	<i>Decodon verticillatus</i>	Visual
Pickersweet	<i>Pontederia cordata</i>	Visual
Water marigold	<i>Aegialothis beckii</i>	GS
Ribbon-leaf pondweed	<i>Potamogeton epihydrus</i>	GS

* - species non-native and potentially invasive in WI

Survey Summary

Total Number of Points	362
Navigable Points within Depth Range of Plant Growth	217
Maximum Depth of Plant Growth (feet)	9.5
Number of Species in Lake (including general survey)	36