

State of Wisconsin \ DEPARTMENT OF NATURAL RESOURCES

Jim Doyle, Governor
Matthew J. Frank, Secretary

2801 Progress Rd.
Madison, Wisconsin 53716
Telephone 608-221-6324
FAX 608-221-6353
TTY Access via relay - 711

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Dear Mr. Llyod Knope:

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.

Table 1: 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 at 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>	35.17
Wild celery	<i>Vallisneria americana</i>	27.93
Muskgrasses	<i>Chara</i> spp.	26.90
Common waterweed	<i>Elodea canadensis</i>	23.10
Common bladderwort	<i>Utricularia vulgaris</i>	8.28
Stoneworts	<i>Nitella</i> spp.	7.93
Creeping bladderwort	<i>Utricularia gibba</i>	7.59
Spatterdock	<i>Nuphar variegata</i>	6.21
Forked duckweed	<i>Lemna trisulca</i>	6.21
Variable pondweed	<i>Potamogeton gramineus</i>	5.52
Dwarf water milfoil	<i>Myriophyllum tenellum</i>	4.48
Clasping-leaf pondweed	<i>Potamogeton richardsonii</i>	4.48
Watershield	<i>Brasenia schreberi</i>	3.79
Northern water milfoil	<i>Myriophyllum sibiricum</i>	3.45
Twin-stemmed bladderwort	<i>Utricularia gemniscapa</i>	3.10
Eurasian water milfoil*	<i>Myriophyllum spicatum</i> *	2.76
Small pondweed	<i>Potamogeton pusillus</i>	2.76
Quillwort	<i>Isoetes</i> spp.	2.41
Water star-grass	<i>Heteranthera dubia</i>	2.07
White water lily	<i>Nymphaea odorata</i>	2.07
Illinois pondweed	<i>Potamogeton illinoensis</i>	1.72
Flat-leaf bladderwort	<i>Utricularia intermedia</i>	1.38
Needle spikerush	<i>Eleocharis acicularis</i>	1.03
Stiff pondweed	<i>Potamogeton strictifolius</i>	1.03
Sago pondweed	<i>Stuckenia pectinata</i>	0.69
Small purple bladderwort	<i>Utricularia resupinata</i>	0.69
Large-leaf pondweed	<i>Potamogeton amplifolius</i>	0.34
Coontail	<i>Ceratophyllum demersum</i>	0.34
Brown-fruited rush	<i>Juncus pelocarpus f. submersus</i>	0.34
Pipewort	<i>Eriocaulon aquaticum</i>	Visual
Swamp loosestrife	<i>Decodon verticillatus</i>	Visual
Pickerelweed	<i>Pontederia cordata</i>	Visual
Curly-leaf pondweed*	<i>Potamogeton crispus</i> *	General Survey
Water marigold	<i>Megalodonta beckii</i>	General Survey
Arrowhead	<i>Sagittaria</i> sp.	General Survey
Filamentous algae	Algae spp.	13.79
Aquatic moss	Moss spp.	8.62
Freshwater sponge	Porifera spp.	2.76

* = species non-native and potentially invasive in WI

Survey Summary

Total Number of Points	365
Navigable Points within Depth Range of Plant Growth	225
Maximum Depth of Plant Growth (feet)	10.00
Number of Species in Lake (including general survey)	38

Figure 1: Description of rake fullness ratings used during the point-intercept survey.




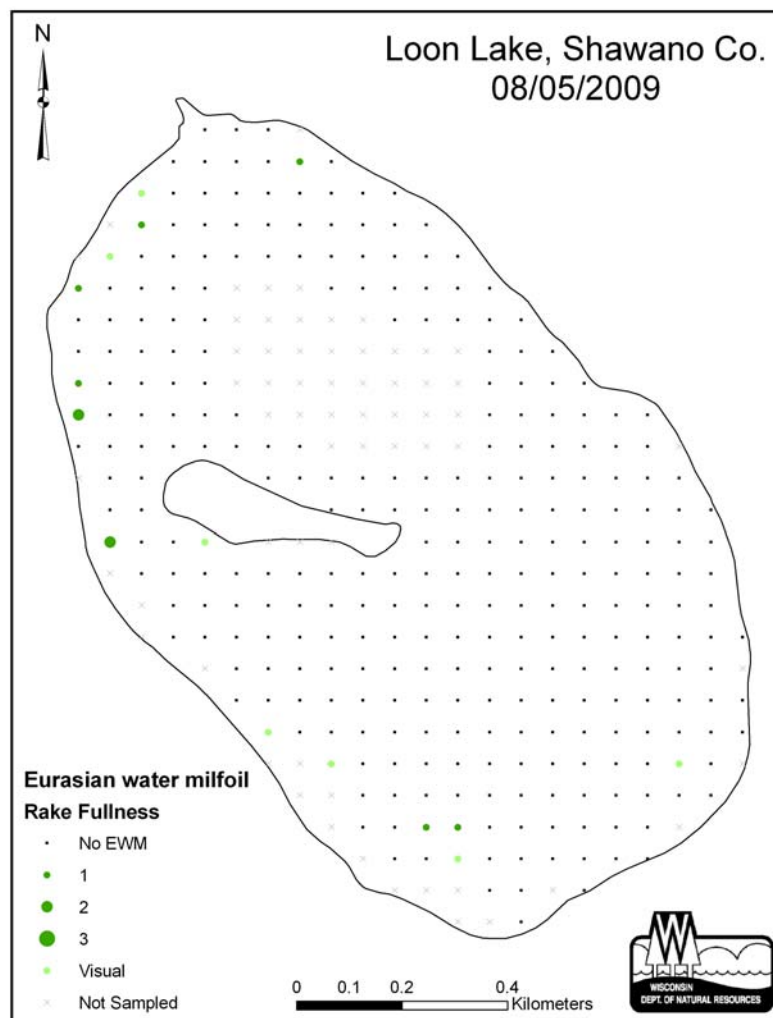
Fullness Rating	Coverage	Description
1		Only few plants on rake head.
2		Rake head is about half full; the rake is covered but the tines are still visible.
3		The rake is completely covered and tines are not visible.

Figure 2: A map of the approximate location of Eurasian water milfoil.



Please note that while this study conforms to statewide protocol and standards for baseline data collection, it may not be suitable for management purposes. For information as to whether this survey meets requirements for management plans or permitting requirements, please contact your local DNR lake manager.

If you have any additional questions regarding the DNR Research Bureau's survey or study, please feel free to contact us.

Sincerely,

Michelle Nault
Natural Resources Research Scientist
Wisconsin Department of Natural Resources
(608) 221-6359
Michelle.Nault@Wisconsin.gov

Alison Mikulyuk
Natural Resources Research Scientist
Wisconsin Department of Natural Resources
(608) 221-6324
Alison.Mikulyuk@Wisconsin.gov

Dr. Jennifer Hauxwell
Section Chief, Fish and Habitat Research
Wisconsin Department of Natural Resources
(608) 221-6373
Jennifer.Hauxwell@Wisconsin.gov