Aquatic Macrophyte Assessment of Forest Lake, Fond Du Lac Co., WI

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Objectives: An informal assessment of the Forest Lake macrophyte community and general water conditions of Forest Lake was conducted on 18 July 2003. The objectives were to review water clarity, dissolved oxygen, and pH data collected for the lake and visually assess the effectiveness of an herbicide treatment used to reduce the growth of *Myriophyllum spicatum* (Eurasian Watermilfoil, hereafter termed milfoil). General observations of Forest Lake and its macrophyte community were made by boat with Mr. C. Kenziorski and in the water using snorkeling equipment.

Water Data: Water quality conditions in Forest Lake have changed over the last decade. **Water clarity** was noticeably reduced from years previous. From past July water quality data, secchi-depth readings were 3.4 m (1994), 3.8 – 3.9 m (1995), and 4.4 m (1996). Recent (July 2003) secchi-depth readings are < 3 m (Kenziorski, pers. comm.). Surface water **dissolved oxygen** (DO) measurements are lower for 2003 than in past years. Recorded in past July water quality surveys, surface water DO readings have been around 10 mg/l for 1994-1996. Recorded DO for 18 July 2003 (@ 25°C) was 8.8 mg/l. Surface water **pH** readings for 2003 are within the range of pH levels in the past. July pH levels have ranged from about 8.75 – 9.25 during 1994-1996. pH levels recorded for July 2003 range from 8.6 - 9.2. It was noted however that pH levels tend to spike (> 10 pH units) in the lake after rainfall (Kenziorski, pers. comm.). This may be due to rainwater filtering through large amounts of sand dumped along the lake shore, filtering through crushed limestone used around the lake, and/or from another source. To test the influence sand may have on pH levels, one sample of sand was collected along the shore from the north side of the lake and another from the south side. From each sample, 1.5 g of sand were tested for pH levels using a LaMotte Mode EL (Code 5679) Soil Test Kit. Sand tested from both the north and south side collection points had a pH level of 8.0 units. This suggests the sand is probably not a contributor to the pH spike seen following rainfall in the Forest Lake watershed.

Macrophytes: Aquatic macrophyte distribution and abundance have been formally assessed for Forest Lake in the past (see Gerber 2000). For this informal assessment, aquatic macrophytes were visually assessed from a boat at selected spots around the entire lake. Plants were viewed in the water using snorkeling equipment at four specific sites on the lake (see attached map, an * designates each site). Dead and decaying milfoil stems were found at all sites visited, however, it should be noted that many of the stems did still have some new shoot growth especially on the plants located on the west side of the lake. Located approximately 20 m from where the public access trail meets the lake shore, milfoil stems were collected at about 2 m depth. About 10% of the milfoil stems collected had new shoot (approx. 10-15 cm in length) growth. White root tissue from these collected plants looked healthy. A variety of native aquatics were also observed at each of the snorkel sites and around the entire lake in general. At the northern most site, *Najas* and *Chara* were dominant species. Presumably, these plants were progeny from the original transplants from 1993 plantings (see Gerber 1993). At the west side site, *Potamogeton amplifolius*, *P. zosteriformis*, *Najas*, *Valisneria americana*, and *Ceratophyllum demersum* were observed. At the southern site, *Najas* and *Potamogeton* spp were most common. These species and *Potamogeton pectinatus* were also observed

on the east side of the lake. The native milfoil, *Myriophyllum sibericum* however was not seen in the lake at any of the sites.

Conclusions: Water clarity and DO were low relative to previous years during the month of July (water quality data for 1994-1996). Presumably, these lower levels are due do herbicide treatments used to control milfoil growth. Large amounts of decaying plant material introduce both nutrients (e.g., nitrogen, phosphorus) and organics into the lake water, which encourages increased algae growth in the water column (reduced water clarity and light levels) and increased aerobic bacterial degradation (lower DO). Continued secchi-depth and DO monitoring is important.

Milfoil was present in the lake in the form of dead and decaying plants. Herbicide treatments appeared to be effective in reducing milfoil growth, at least for the short term. No large, healthy milfoil plants were observed during this brief assessment, however, it should be noted that small, healthy stem fragments (as described above) were found on the west side of the lake. Presumably, these fragments have the potential to recolonize the lake, therefore, their growth and distribution should be monitored. Monitoring milfoil sites using snorkeling or scuba equipment provides the best visual assessment of milfoil growth and distribution. Continued monitoring is important since, with the decrease in milfoil, large areas of the lake sediment are open for plants to colonize. If milfoil recolonizes disturbed areas, it can potentially become a nuisance in Forest Lake.

Milfoil management is a site specific process. Different treatment strategies (i.e., mechanical, chemical, biological) for milfoil have been outlined in Hoffman & Kearns (1997). Each strategy has its advantages and disadvantages (see attached copy of recommendations for Eurasian Watermilfoil). Each of these strategies have been used to manage milfoil in Forest Lake with varying degrees of success. Benthic barriers (mechanical) and hand cutting were used in the early 1990's. The hand cutting followed with benthic barriers was a very effective strategy for killing milfoil but the treatment area was small. Beetles were used (biological) with little success (Kenziorski, pers. comm.). Recent herbicide treatments (chemical) seem to be effective in the short term, however, note the associated disadvantages of chemical treatment (see Hoffman & Kearns 1997).

References:

Gerber, D.T. 2000. Floating-leafed and submersed aquatic macrophyte distribution and abundance with emphasis on Eurasian Watermilfoil (*Myriophyllum spicatum*) in Forest Lake, Fond Du Lac County, Wisconsin. Transactions 88: 57-66.

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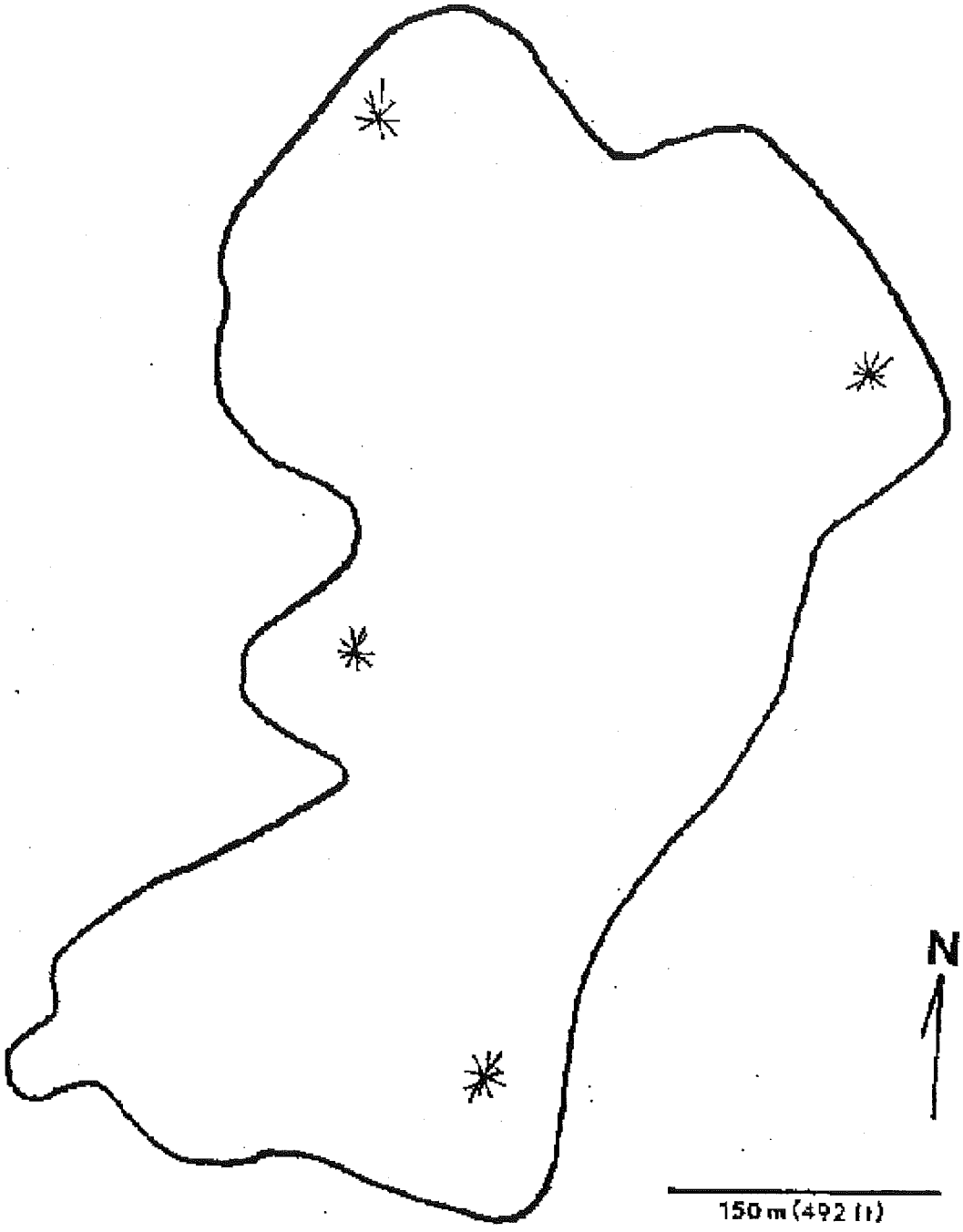
Hoffman, R. & K. Kearns (editors). 1997. Wisconsin manual of control recommendations for ecologically invasive plants. Revised edition. Bureau of Endangered Resources. Dept of Natural Resources. Madison, WI.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150 m (492 ft)

FOREST LAKE
Improvement Association, Inc.

RE Follow –up Aquatic Plant Survey of Forest Lake Aug 2003

On July 18,2003 , Forest Lake Assoc retained Prof. Tim Gerber, the aquatic biologist from the University of Wisconsin , to perform an unbiased underwater follow up survey of Forest Lake, to determine the effect of the 2,4-D treatment of Forest lake on May8 and May15, 2003, when 20 acres of the 36 acre littoral zone was treated at 100 lbs per acre.

As I have expressed previously, I feel that performing the survey at this time, while the milfoil is undergoing intense decomposition was premature. Nevertheless it was performed per DNR requirements.
In summary the study found that the heavy infestations were wiped out and there was no evidence of any missed areas. Unfortunately water clarity is significantly reduced due to the resultant excessive algae bloom, which makes plant locations, species identification and examination of milfoil regrowth extremely difficult.

Gerber located 2 inch long milfoil stems growing from root crowns and recommended that I continue to collect weekly samples by a throw out rake to approximate the milfoil regrowth. A week later I found 6 inch milfoil, week later 24 inch and week later 32 inch milfoil. They were very widely scattered and infrequent, and unable to be located from above water. Due to the small population sampling only rough estimates can be made of the milfoil re-growth. Rake samples also showed small populations of coontail, najas, and chara. Other species were conspicuous by their absence.

There is no way that touch up by additional 2,4-D could be accomplished (as offered by ABI) unless it was applied over the entire 20 acres, which is totally unacceptable, as it would further increase damage that may have been done to the lakes delicate ecological balance.

First let me say that the lake treatment was warranted due to the intensity of the milfoil.
It saddens me as one of the advocates and stewards of Forest lake, that I did not take a stronger position and insist, that since 20 acres of the 36 acre littoral zone (56%) was involved, and that Forest Lake is a delicate small (50 acres) landlocked lake, with no inlets or outlets, treatment should have broken down into smaller stages, and over wider time intervals , even years apart. Treatments 1 week apart are not prudent and it scares the hell out of me. Getting thru the winter without complete anoxia, which has occurred on other lakes, is also on my mind. It does not take much to quickly accelerate the eutrophication process.

Also we must not forget the aquatic organisms in the treated area. All plants serve a variety of important functions in the aquatic system. Ie. food shelter, nesting etc. We must be cognizant of the destruction of this habitat and resultant consequences to the inhabiting life forms.

We are presently considering a detailed aquatic plant survey in 2004, and are considering a USGS water quality monitoring, a lake sediment analysis, a sociological survey of the lake users and property owners, and a study of the septic systems.

Monitoring is going well, with no surprises, DO is 10, Secchi is 7 to 9 ft, pH is 8.6.

With the realization that the milfoil will never be totally eradicated we are looking forward to collaborating with the DNR to establish a long range aquatic plant management plan.

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