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SPL-011-01

MEMORANDUM

426 N.W. Cumberland St.
Berlin, WI 54923
(920) 361-4088

DATE: November 28, 2001

TO: GILBERT LAKE ADVANCEMENT ASSOCIATION

SUBJECT: 2001 Aquatic plant survey and milfoil treatment results

History

Eurasian watermilfoil was first documented in Gilbert Lake in 1994 during a survey conducted by the DNR. Milfoil was reportedly mature and well established at this time. A formal whole-lake plant survey was conducted in September 2000 by ABI in order to provide baseline data for the development of a five-year aquatic plant management plan. A total of 8.3 acres of milfoil was found during this survey. Eurasian watermilfoil growth was heaviest near the boat landing, but could be found in scattered areas throughout the littoral zone. The *Gilbert Lake Aquatic Plant Management Plan 2001 - 2005* established a goal of reducing Eurasian milfoil and maintaining it at sub-nuisance levels in the lake. The plan recommended treating the milfoil with the herbicide *Navigate*® (2,4D).

The Lake Association elected to treat all of the milfoil in Gilbert Lake during 2001. The initial treatment was done on May 23. Only 5.7 acres of milfoil growth were found and treated on this date. Reduced water clarity had apparently limited the deepwater extent of the plant. Due to the maturity of the milfoil and the calcium carbonate precipitate that formed on its leaves, most of the milfoil was treated at the higher labeled rate of 150 lbs./acre. Where milfoil was found growing adjacent to beds of water lilies, treatments were done at 75 lbs./acre. This was done to reduce any impacts to these moderately susceptible species.

A follow up assessment was done on June 26 in order to evaluate re-treatment needs. An extensive search of the entire littoral area however, turned up no trace of Eurasian watermilfoil. The initial treatment appeared to have been 100% successful.

Fall plant survey results

On September 4 a plant survey was done that reproduced the methodology used during the 2000 survey. The results are shown in Table 1. Again, no trace of Eurasian watermilfoil could be found in the lake. The percent frequency of native species was very similar between the two surveys. Spadderdock, water stargrass and northern watermilfoil were found at single

points along the 2000 survey transects, but were not found along the 2001 transects. Spadderdock and northern watermilfoil however, were observed outside of transect lines during the 2001 survey. Additionally, Illinois pondweed, elodea, coontail and filamentous algae were observed during 2001 but not in 2000.

Analyses were done on these data sets (paired *t*-tests) to determine whether differences between the two years were statistically significant (Table 2). Significant differences were found for musk grass, which had a 13% increase, and for Eurasian watermilfoil, which was completely absent. Differences for all other plants were not considered statistically significant. The pie charts shown in Figure 1 reflect these changes in plant species composition.

The following additional observations were made during the 2001 survey:

- The density and distribution of water lilies appeared unchanged from that found during pre-treatment surveys.
- There were no bare patches of lakebed where milfoil had been eradicated. Native plants recolonized all areas.
- Dense beds of native pondweeds were found in areas previously having dense beds of milfoil – indicating that no loss of fish habitat occurred.

Overall, it appears that native aquatic plants were either positively affected or unaffected by the herbicide treatment and resultant loss of Eurasian watermilfoil.

Future monitoring and management

The reoccurrence of Eurasian watermilfoil will be a continual threat for Gilbert Lake. Some regeneration of milfoil beds may occur – particularly those found in deep waters that were not directly treated. Milfoil may also be reintroduced from other lakes via boat traffic. Lake residents and other lake users should insure that boats and trailers are free of vegetation before and after launching boats into the lake.

The most effective tool for insuring that Eurasian watermilfoil is kept under control in Gilbert Lake will be active monitoring of aquatic plants. Any re-emergent milfoil can then be quickly removed or treated before it again reaches nuisance levels. With this in mind, I recommend that the annual plant surveys scheduled through 2005 be conducted in May instead of September. This will allow for in-season treatment of any milfoil re-growth.

Now that Gilbert Lake's milfoil problem has been brought under control, the greatest threat to the lake's fishery, water quality and ecological health may be the loss of emergent aquatic plants. Anecdotal evidence suggests that Gilbert Lake once possessed extensive beds emergent vegetation along its shores. These shallow water plants provide critical habitat for many species of invertebrates, fish, birds and mammals. They protect shorelines from erosion and improve water clarity by stabilizing bottom sediments. They also protect water quality by capturing sediments and nutrients carried by overland runoff. At present, these emergent plant species are severely limited in Gilbert Lake.

Lakeshore property owners should recognize the value of these plants to the long-term health of the lake. I encourage property owners to allow emergent and "wet edge" plants to grow along the lakeshore in areas not directly used for swimming and boat access. Along with the benefits to the lake, many people feel these aquatic gardens enhance the aesthetic value of their frontage.

In recent years there have been many advances in lakeshore habitat restoration. Several biodegradable materials, such as Bio-logs™, make excellent wave breaks that allow new plantings to become established. ABI has been providing shoreline plant restoration services for clients for the last several years. These projects can be done on a property by property basis, and can be tailored to suite individual tastes and budgets. I would be happy to talk to anyone interested in restoring lakeshore plants. An excellent reference book for this is *Lakescaping for Wildlife and Water Quality* published by the Minnesota DNR. The book is available through Minnesota's Bookstore. Call 1-800-657-3757 to order.

I am very pleased with the success we have so far in managing aquatic plants in Gilbert Lake. I hope to continue helping you achieve your lake management goals in the years to come.

Sincerely,



Chad Cason,
ABI Staff Biologist

cc: Mary Gansberg
Al Niebur

"The quality of water reflects the quality of management"

Table 1. Percent Frequency of aquatic plants found in Gilbert Lake during the September 2000 survey and the September 2001 survey.

| Species | | 2000 | 2001 |
|------------------------|----------------------------------|-------------|-------------|
| Musk Grass | <i>Chara spp.</i> | 80.9 | 91.4 |
| Bushy Pondweed | <i>Najas flexilis</i> | 31.8 | 35.5 |
| Variable Pondweed | <i>Potamogeton gramineus</i> | 30.5 | 19.1 |
| Eurasian Water Milfoil | <i>Myriophyllum spicatum</i> | 20.9 | 0.0 |
| Floating Leaf Pondweed | <i>Potamogeton natans</i> | 6.4 | 4.1 |
| Flatstem Pondweed | <i>Potamogeton zosteriformis</i> | 4.5 | 5.5 |
| Sago Pondweed | <i>Potamogeton pectinatus</i> | 3.6 | 6.4 |
| Large Leaf Pondweed | <i>Potamogeton amplifolius</i> | 2.7 | 0.9 |
| Water Smartweed | <i>Polygonum amphibium</i> | 1.8 | 0.9 |
| Water Stargrass | <i>Zosterella dubia</i> | 0.9 | 0.0 |
| Spadderdock | <i>Nuphar variegata</i> | 0.5 | 0* |
| White Water Lily | <i>Nymphaea odorata</i> | 0.5 | 0.9 |
| Northern Water Milfoil | <i>Myriophyllum sibiricum</i> | 0.5 | 0* |
| Illinois Pondweed | <i>Potamogeton illinoensis</i> | 0.0 | 6.4 |
| Filamentous Algae | <i>Pithophora spp.</i> | 0.0 | 2.7 |
| Elodea | <i>Elodea canadensis</i> | 0.0 | 0.5 |
| no plants found | | 1.8 | 3.2 |
| n = | | 13 | 12 |

* Spadderdock, northern milfoil and coontail (*Ceratophyllum demersum*) were observed outside of transects during the 2001 survey, and were not recorded in data.

Table 2. Analysis of statistically significant differences between 2000 (top row) and 2001 (bottom row) plant survey data.

| Species | samples collected by transect | | | | | | | | | | | | | | | | | | t-value* | significant difference |
|------------------------|-------------------------------|---|----|----|---|---|----|----|----|----|----|----|---|----|----|----|----|----|--------------|------------------------|
| | A | B | C | D | E | F | G | H | I | J | K | L | M | N | O | P | Q | R | | |
| Musk Grass | 12 | 8 | 7 | 12 | 7 | 6 | 12 | 12 | 14 | 12 | 11 | 12 | 7 | 10 | 11 | 10 | 11 | 4 | -2.31 | yes |
| | 16 | 8 | 11 | 12 | 6 | 8 | 12 | 12 | 12 | 12 | 16 | 12 | 8 | 11 | 10 | 12 | 12 | 11 | | |
| Eurasian Water Milfoil | 5 | 1 | 5 | 0 | 0 | 1 | 0 | 1 | 2 | 0 | 11 | 0 | 3 | 0 | 2 | 1 | 0 | 14 | 2.72 | yes |
| | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | |
| Northern Water Milfoil | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 1 | no |
| | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | |
| Bushy Pondweed | 11 | 5 | 5 | 6 | 6 | 4 | 2 | 3 | 7 | 0 | 1 | 1 | 5 | 3 | 4 | 1 | 4 | 2 | -0.72 | no |
| | 7 | 6 | 4 | 3 | 6 | 6 | 2 | 0 | 7 | 0 | 4 | 4 | 1 | 5 | 7 | 5 | 5 | 6 | | |
| Spadderdock | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | no |
| | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | |
| White Water Lily | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | -1 | no |
| | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | |
| Water Smartweed | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 4 | 0 | 0 | 1 | no |
| | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 0 | 0 | | |
| Large Leaf Pondweed | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 4 | 0 | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 1.29 | no |
| | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | |
| Variable Pondweed | 8 | 1 | 5 | 4 | 3 | 4 | 3 | 5 | 8 | 1 | 6 | 2 | 5 | 2 | 5 | 2 | 0 | 3 | 2.01 | no |
| | 5 | 2 | 0 | 1 | 3 | 2 | 0 | 0 | 8 | 0 | 3 | 1 | 0 | 3 | 5 | 6 | 1 | 5 | | |
| Floating Leaf Pondweed | 3 | 2 | 3 | 0 | 0 | 0 | 0 | 0 | 3 | 0 | 0 | 0 | 2 | 0 | 1 | 0 | 0 | 0 | 1.16 | no |
| | 1 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 4 | 0 | 0 | 0 | 2 | 0 | 1 | 0 | 0 | 0 | | |
| Sago Pondweed | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 2 | 1 | 1 | 1 | 0 | 0 | 0 | -1.1 | no |
| | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 3 | 0 | 0 | 3 | 2 | 3 | 0 | 0 | | |

Table 2. Continued

| | | | | | | | | | | | | | | | | | | | | |
|-------------------|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|--------------|-----------|
| Flatstem Pondweed | 2 | 0 | 0 | 0 | 2 | 0 | 0 | 1 | 5 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | -0.8 | no |
| | 2 | 0 | 0 | 0 | 1 | 1 | 0 | 0 | 6 | 0 | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | | |
| Water Stargrass | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | no |
| | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | |
| Illinois Pondweed | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | -1.77 | no |
| | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 5 | 0 | 3 | 0 | 0 | 0 | 6 | 0 | 0 | 0 | | |
| Elodea | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | -1 | no |
| | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | |
| Filamentous Algae | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | -1.84 | no |
| | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 0 | 0 | 0 | 2 | 0 | 0 | 2 | | |
| No Plants Found | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 0 | 1 | 0 | 0 | -0.59 | no |
| | 0 | 0 | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 4 | 0 | 0 | 0 | 0 | 1 | | |
| | | | | | | | | | | | | | | | | | | | | |

* Paired two sample for means *t* - test; 95% Confidence limit, df = 17, t = 2.11

Figure 1. Relative abundance of aquatic plants found in Gilbert Lake

