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Wilson Lake aquatic plant management update

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**Kusel, Wilson, Round Lakes Protection
and Rehabilitation District**

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Introduction

The report entitled *Management of aquatic plants in Wilson Lake 2001-2006* outlined a course of action for controlling Eurasian water milfoil in Wilson Lake. The management plan recommended aggressively treating Eurasian water milfoil throughout the lake using Navigate® (2,4D). This report provides an update on the effectiveness of these treatments and the results of the post-treatment aquatic plant survey, and makes recommendations for future management efforts.

Summary of recent management activities

During May 2000 a whole-lake aquatic plant survey was conducted on Wilson Lake to provide baseline data on the lake's plant community and the distribution of Eurasian water milfoil. Shortly after the survey, Eurasian water milfoil was treated along the developed shorelines out to a distance of 150 feet – the maximum allowed by permit. The area of this treatment totaled 7.75 acres.

During May 2001 lake residents and ABI staff mapped the remaining Eurasian water milfoil growth. Dense Eurasian water milfoil was found growing in three different areas of the lake –totaling 10.2 acres (Figure 1.) As directed by the management plan, a permit was sought from the Department of Natural Resources to treat these 10.2 acres. The permit was issued on June 29th and the treatment was conducted on July 11th.

During September 2001 another aquatic plant survey was done on Wilson Lake. This survey utilized the exact methods and designs of the earlier survey. The purpose of this work was to evaluate the effectiveness of the treatments in controlling Eurasian water milfoil, and the impacts of the treatments on the native aquatic plant community.

Treatment Results

The May 2000 treatment was done along developed shorelines to provide nuisance relief while a management plan directed at controlling milfoil lake-wide was being developed. The 7.75 acres was treated with Navigate® at a rate of 100-lbs./ acre. No follow-up treatments were needed during 2000. When Eurasian water milfoil distribution was mapped during May 2001, no regrowth was found in the treatment area.

The 10.2 acres of Eurasian water milfoil mapped during the May 2001 survey was all located more than 150 feet from shore. These areas were also treated with Navigate® at a rate of 100-lbs./ acre. On July 31, 2001 lake residents

and ABI staff again inspected Wilson Lake for retreatment needs. One area of milfoil approximately 0.25 acres in size was found that was not killed by the initial treatment. This site was then retreated at the same rate.

Aquatic Plant Survey Results

The most dramatic result of the September 2001 aquatic plant survey was the decline in Eurasian water milfoil. The percent frequency of Eurasian water milfoil was 66.7% in the 2000 survey, but only 3.6% in the 2001 survey – a 95% decline. The positive response of native plants was also noteworthy. Pondweeds (*Potamogeton spp.*) overall increased from 34.9% frequency to 63.5% frequency – an 89% increase. Other significant increases included bushy pondweed by 49% and water celery by a whopping 2000%. Changes in the aquatic plant species composition are shown in Figure 2.

All species of rooted aquatic plants found in the 2000 survey were also found in the 2001 survey. Four additional species of plants – all *Potamogetons* – were found in 2001 that were not identified in 2000. Five types of algae that were found in 2000 were not found in 2001 (Table 1). One negative finding was the presence of curly leaf pondweed. Curly leaf pondweed is another invasive exotic plant that often reaches nuisance levels in lakes.

Data sets from the two surveys were analyzed to determine whether differences between the surveys were statistically significant. Paired t-tests were run on the data using 95% confidence limits. Results are given in Table 2. Species that were found to have statistically significant changes included Eurasian water milfoil (decreased), bushy pondweed, variable pondweed, and water celery (increased). Species found in Wilson Lake that may be susceptible to Navigate ® at higher concentrations include northern water milfoil, water stargrass, bladderwort, white water lily, spadderdock, water shield and coontail. The frequency of occurrence for all of these species however, was not significantly different from the pre-treatment survey.

Conclusions and recommendations

It appears that Navigate ® has been extremely effective in controlling Eurasian water milfoil in Wilson Lake. It also appears that the treatments have been highly selective to Eurasian water milfoil, and that negative impacts to native aquatic plants did not occur. Therefore Navigate ® should continue to be used to control Eurasian water milfoil.

Because Eurasian water milfoil still exists in Wilson Lake, significant regrowth is likely to occur. Active monitoring of milfoil should be done so

that re-treatments can be made before the plant again reaches nuisance levels.

While curly leaf pondweed commonly reaches nuisance proportions in many parts of the state, this exotic plant occurs in many Waushara County Lakes without reaching nuisance levels. None the less the status of this plant should be actively monitored in Wilson Lake as well.

Findings of the aquatic plant survey show that the native plants in Wilson Lake were able to quickly recolonize those areas where Eurasian water milfoil had been eliminated. The plant community also shifted from a predominance of low-value species, such as milfoil, to high value species such as pondweeds and water celery. This will likely be of great benefit to fish, waterfowl and water quality in the lake. One aspect in this shift in the plant community that has been less desirable to lakeshore property owners though, has been the increase in the density of bushy pondweed and coontail. While not nearly as detrimental as Eurasian water milfoil, these species can also form dense beds that inhibit boating, fishing and swimming.

If control of bushy pondweed, coontail or other native plants is needed in future seasons, several management techniques may be successfully used. For locations such as swim areas and boat docks, treatments with non-selective herbicides such as Reward ® may be most appropriate. DNR permits are required for these treatments. The herbicide must also be applied by a licensed applicator. If maintenance of boating channels is needed in mid lake areas. Plant control may be best accomplished by using a mechanical weed harvester. A weed harvester should only be set to make shallow cuts so that sufficient plant growth remains to maintain water quality and habitat values. Care should also be taken to avoid cutting any regrowth of Eurasian water milfoil, as this encourages spreading of the plant. DNR permits will also be required for using a weed harvester.

Management of aquatic plants in Wilson Lake 2001-2006 recommends conducting annual aquatic plant surveys. These surveys will be valuable in assessing changes in the plant community and identifying management needs. The next survey should be scheduled in May or June 2002. The Lake District should again apply for funding from the DNR's Lake Planning Grant Program to help pay for this survey.

For lake management activities anticipated for 2002, such as follow-up milfoil treatments, treatments around individual properties, and weed harvesting, applications for DNR permits should be made in advance. Completing and submitting applications during February and March will allow these activities to be done in a timely manner.

Figure 1.

Wilson Lake

Dense Eurasian water milfoil beds on May 28, 2001.

Total area: 10.2 acres

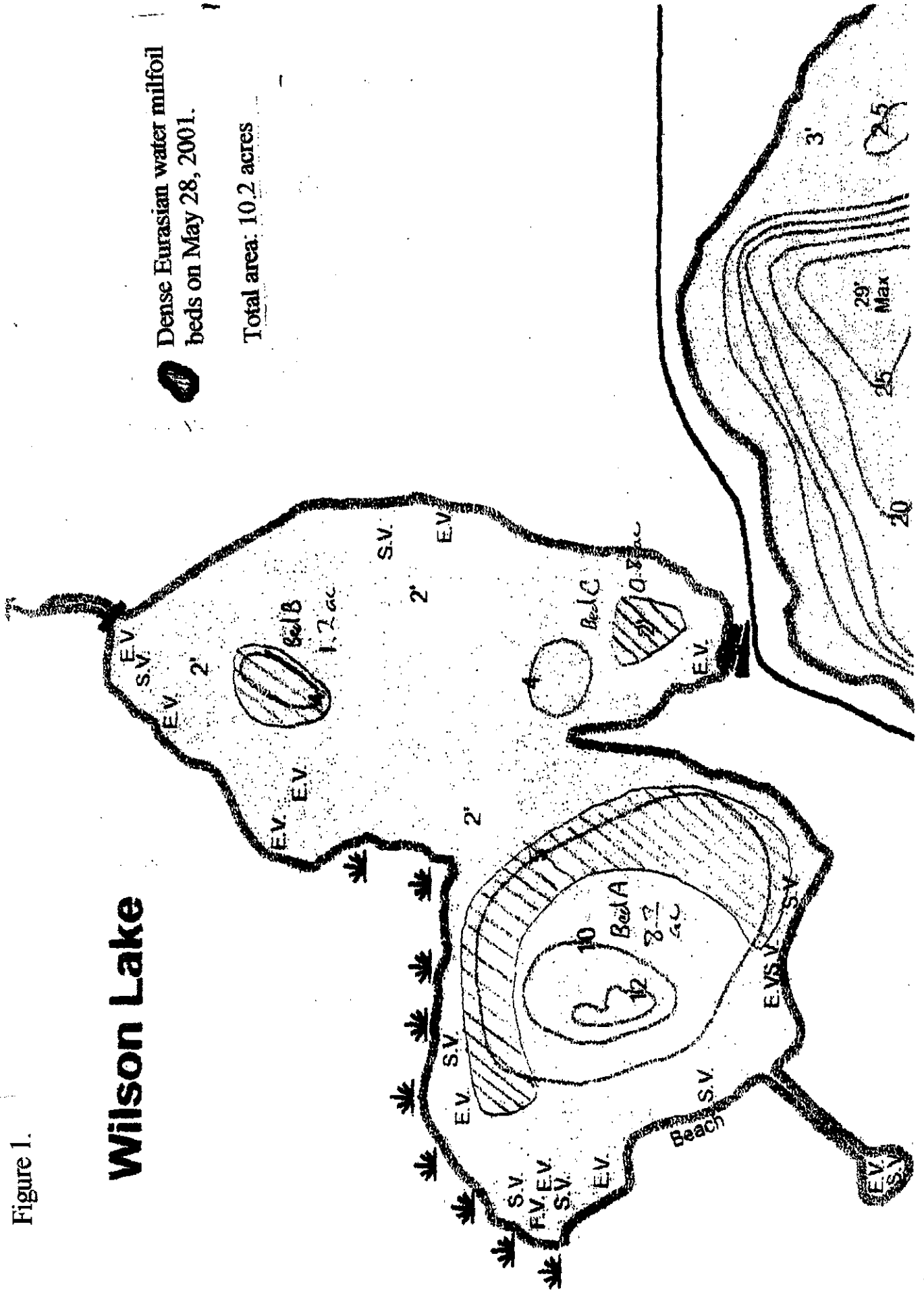


Figure 2. Changes in Wilson Lake's aquatic plant composition following Eurasian watermilfoil treatments.

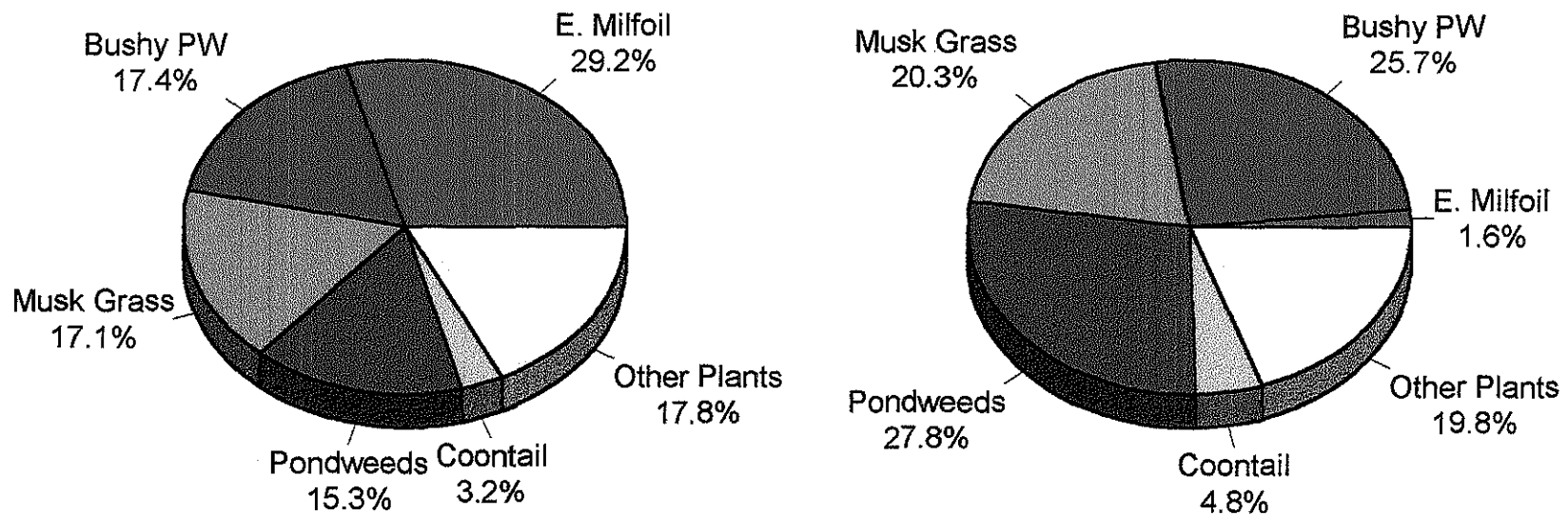


Table 1. Comparison of 2000 and 2001 Wilson Lake aquatic plant survey data.

| Species | | 2000 | 2001 |
|------------------------|----------------------------------|------------------------------|------------------------------|
| | | Percent Frequency | Percent Frequency |
| Common name | Scientific name | | |
| Eurasian Water Milfoil | <i>Myriophyllum spicatum</i> | 66.7 | 3.6 |
| Bushy Pondweed | <i>Najas flexilis</i> | 39.6 | 58.9 |
| Musk Grass | <i>Chara spp.</i> | 39.1 | 46.4 |
| Illinois Pondweed | <i>Potamogeton illinoensis</i> | 20.3 | 17.7 |
| Common Waterweed | <i>Elodea canadensis</i> | 10.9 | 9.9 |
| Flatstem Pondweed | <i>Potamogeton zosteriformis</i> | 10.4 | 9.4 |
| no plants found | | 7.8 | 13.5 |
| Coontail | <i>Ceratophyllum demersum</i> | 7.3 | 10.9 |
| Northern Water Milfoil | <i>Myriophyllum sibiricum</i> | 6.3 | 2.6 |
| White Water Lily | <i>Nymphaea odorata</i> | 5.2 | 6.8 |
| Watershield | <i>Brasenia schreberi</i> | 3.6 | 1.0 |
| Small Pondweed | <i>Potamogeton pusillus</i> | 3.1 | 2.1 |
| Stonewort | <i>Nitella spp.</i> | 2.6 | 0.0 |
| Water Stargrass | <i>Zosterella dubia</i> | 2.6 | 1.6 |
| Hardstem Bullrush | <i>Scirpus acutus</i> | 2.1 | 0.5 |
| Green Algae spp. | <i>Lynbya spp.</i> | 1.0 | 0.0 |
| Horse Hair Algae | <i>Pithophora spp.</i> | 1.0 | 0.0 |
| Green Algae spp. | <i>Spirogyra spp.</i> | 1.0 | 0.0 |
| Water Celery | <i>Valisneria americana</i> | 1.0 | 20.8 |
| Green Algae spp. | <i>Cladophora spp.</i> | 0.5 | 0.0 |
| Spadderdock | <i>Nuphar variegata</i> | 0.5 | 0.5 |
| Floating Leaf Pondweed | <i>Potamogeton natans</i> | 0.5 | 4.2 |
| White-stem Pondweed | <i>Potamogeton praelongus</i> | 0.5 | 0.5 |
| Bladderwort | <i>Utricularia vulgaris</i> | 0.5 | 1.6 |
| Variable Pondweed | <i>Potamogeton gramineus</i> | 0.0 | 20.3 |
| Clasping Pondweed | <i>Potamogeton richardsonii</i> | 0.0 | 5.2 |
| Sago Pondweed | <i>Potamogeton pectinatus</i> | 0.0 | 3.1 |
| Curly Leaf Pondweed | <i>Potamogeton crispus</i> | 0.0 | 1.0 |

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 | | |
| Spaddeedock | 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