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# *2006 Demonstration Project-Eagle Lake*

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**Selective Control of Eurasian Watermilfoil and Curly-leaf Pondweed Using Sonar™**

## EXECUTIVE SUMMARY

This is a six-year long project which began in May 2004 and is projected to end in winter 2009. It is being conducted at the request of the Eagle Lake Management District. Marine BioChemists, in cooperation with SePRO Corporation, with survey work by Aron & Associates and permit approval by the Wisconsin Department of Natural Resources, propose to treat approximately 515 acres with Sonar.

The goals of the project are:

- To eradicate to the greatest degree possible, *Myriophyllum spicatum (*Eurasian watermilfoil) and *Potamogeton crispus* (curly-leaf pondweed).
- To return the plant communities in the lake to one with greater diversity as was present in the early 1990s.
- To improve the water quality of the lake by opening up the water column .
- To minimize the amount of harvesting needed to control the nuisance conditions. The lake is currently dominated by Eurasian watermilfoil and curly-leaf pondweed.
- To maintain recreational use levels on Eagle Lake.
- To protect the fisheries quality by restoring native plant communities and improving water clarity.

This is the first whole-lake treatment of Eagle Lake.

Treatment is planned for late March to April 2006. It is estimated that 12.65 gallons of Sonar A.S. will be applied to achieve a target rate of 6 ppb in the lake. If the in-lake concentration drops below 3.5 ppb, a second treatment will be done to "bump" the concentrations back up to 6 ppb. SePRO guarantees at least 80% control of Eurasian watermilfoil in the treatment season. It is also expected to have close to 100% control of curly-leaf pondweed for the first year. Eurasian watermilfoil control should last 3 to 4

years. Curly-leaf pondweed control will last one year, however, densities in 2007 are expected to be 50% or less than current conditions.

PlanTEST™ will be used to identify the necessary treatment dosage. FasTEST™ analysis will be used to measure the level of Fluridone in the system after treatment. Samples will be collected 3, 15, 30, 45, 60, and 75 days post treatment. Samples will be collected at the deep hole. Additional samples will be done as needed. When the Fluridone level falls below 3.5 ppb, the lake will be re-treated to bring the levels back to 6 ppb.

Water quality and aquatic plant monitoring will be conducted during the project period. The sampling will follow the requirements in Guidelines for Whole-lake Fluridone Re-Treated Research Lake in Wisconsin, Potter and Random Lakes, April 2, 2004.

Aggressive monitoring will be used to quickly identify re-infestation of Eurasian watermilfoil and the plants will be treated as quickly as possible. The goal here is to extend the life of the project, and to lengthen the time until another whole-lake treatment is needed.

Non-target vegetation in the treatment area includes *Stuckenia pectinata* (sago pondweed), *P. foliosis* (leafy pondweed), *P. zosterformis* (flat-stem pondweed), *Chara* sp. (Chara), *Lemna minor* (duckweed), *Nuphar* sp. (yellow water lily), *Nymphaea* sp. (white water lily), *Elodea canadensis* (waterweed), *Ceratophyllum demersum* (coontail), and *Vallisneria americana* (wild celery). It is anticipated that the lower treatment dosage, and the early-season treatment will minimize any non-target impact to these species. White water lily and Chara are resistant to Fluridone and are not expected to be impacted with a treatment of this concentration.

- Product to be used: Sonar A.S.
- Active Ingredient: Fluridone
- Treatment Volume: 3120 acre feet
- Treatment Area: 515 acres, entire lake
- Rate of Application: 12.65 gallons
- Use Restrictions: 30 day irrigation precaution
- Manufacturer Guarantee: 80% control for one year on materials only
- Applicator Guarantee: Labor if re-treatment is needed
- Plants Likely Controlled: Eurasian water milfoil, curly-leaf pondweed
- Plants Possibly Injured: Elodea, coontail, wild celery

## PROJECT JUSTIFICATION

In 2003, WDNR began an investigation into the effectiveness and impacts of conducting whole-lake chemical treatments in Wisconsin targeting exotic species, specifically Eurasian watermilfoil. At that time, four whole-lake treatments had been conducted and two more were pending. DNR Bureau of Research conducted the investigation that led to the report *Whole-Lake Chemical Treatments for Eurasian Watermilfoil in Four Wisconsin Lakes: Effects on Vegetation and Water Quality, 2005* by J.Hauxwell etal. This report compiled and reviewed data on lakes that had undertaken a whole-lake treatments to determine the effectiveness and impacts, both negative and positive. In another

report, *Guidelines for Whole-Lake Fluridone Re-Treated Research Lakes in Wisconsin - Potters and Random Lakes, 2004*, J. Hauxwell etal. layed out parameters for sampling protocol for whole-lake treatments. This project considered all the recommendations and findings in those reports, as well as the findings of data collected on Eagle Lake in 2004: the 2004 aquatic plant survey and water quality data.

DNR conducted a rehabilitation project in 1991 to remove rough fish from Eagle Lake. After the rotenone project, DNR stocked game and pan fish. Early aquatic plant surveys conducted by Southeastern Wisconsin Regional Planning Commission and Aron & Associates, found a diverse plant population with 18 different species in 1992. By 1998, only 11 species were identified, two of them exotic species, Eurasian watermilfoil and curly-leaf pondweed. Between 1992 and 1998, Eurasian watermilfoil and curly-leaf pondweed increased each year, requiring more and more intensive management. This led to the creation of the lake district in 1995, and the acquisition of 2 harvesters. The nuisance conditions now dominate the entire lake. By June, more than 50% of the lake has Eurasian watermilfoil and curly-leaf pondweed to the surface, creating large dense, impenetrable mats. The mats collect debris and support high densities of filamentous algae. The District spends as much as $100,000 per year on aquatic plant management, using a combination of harvesting and chemical treatment.

Although the cost being spent annually would lead one to believe the nuisance conditions are being controlled, the opposite it true. Conditions by 2004 were seriously degraded. Eurasian watermilfoil, and to a lesser extent, curly-leaf pondweed, dominate the aquatic plant community. In depths between 3 feet and the maximum depth of the lake, these two plants occupy almost 90% of the water column. In the shallower depths, the situation is not quite as bad, with plant growth limited by the sandy soils.

With the carp gone and fisheries restoration complete, better water quality was expected. Water quality was monitored between 1991 and 1996, and again in 2004. The decline in water quality over that time was pretty significant as Figure 1 and Figure 2 show.

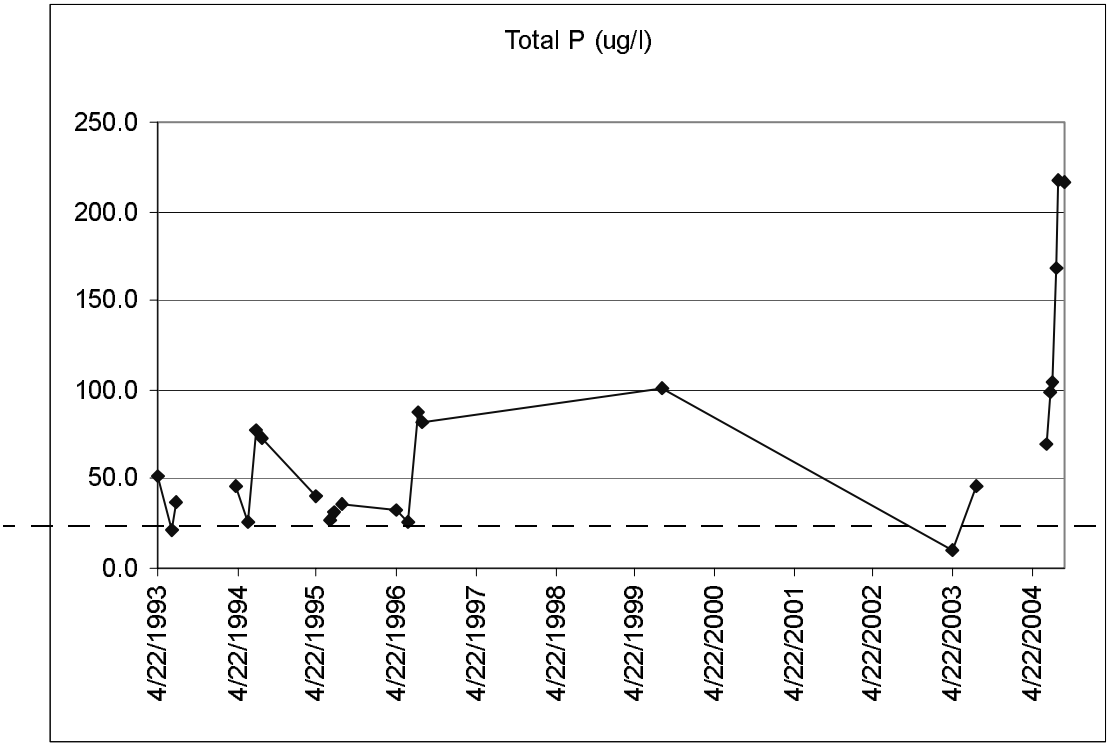


**FIGURE 1. Total Phosphorus - Eagle Lake, Racine County, Wisconsin**

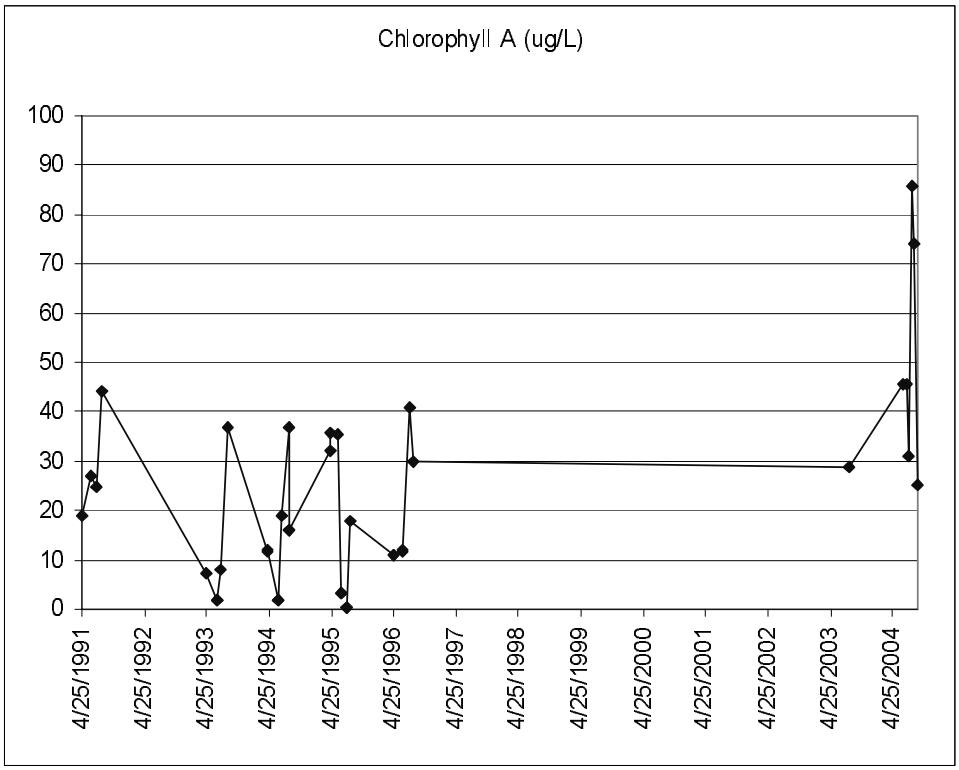


**FIGURE 2.** Chlorphyll A for Eagle Lake, Racine County, Wisconsin

**TABLE 1.** Secchi Disk Readings - Eagle Lake, 2004

| Date | Depth (ft) |
|---|---|
| 6-26-04 | 3.0 |
| 7-9-04 | 3.0 |
| 7-23-04 | 2.6 |
| 8-7-04 | 2.3 |
| 8-19-04 | 1.6 |
| 9-2-04 | 1.3 |
| 10-6-04 | 3.5 |

Usually lakes with high densities of aquatic plants have clearer water because the nutrients in the lake are used by the plants and are unavailable for algae. Lakes with few plants but high nutrients often have algae blooms. Removing too many plants from a lake, either by chemical treatment or harvesting might shift the lake to an algae-dominated system, rather than a plant-dominated lake.

Another situation that contributes to algae-dominated conditions is a high-density of curly-leaf pondweed. If curly-leaf pondweed is the primary plant species in a lake, algae problems may occur. Curly-leaf pondweed grows very early in spring, and begins to die off by mid-summer. That die-off can release a lot of nutrients into the water column where it may fuel algae growth.

Eagle Lake seems to be an exception to both of those situations.

- Eagle Lake has very high densities of aquatic plants, primarily Eurasian water milfoil with some curly-leaf pondweed. Looking at Table 1, the clarity level begins the summer with only 3 feet of clarity. When curly-leaf pondweed does die-off (in 2004 die-off occurred before the beginning of July), there is minimal change in clarity until much later in the summer.
- From the 3-foot depth out to the maximum depth of the lake, the water column is almost 100% filled with Eurasian watermilfoil and some curly-leaf pondweed. This topped-out condition exists from the end of May/beginning of June until the harvesters can remove the top 4 to 5 feet of plant material (mid-August).

  The very high concentration of nuisance plants prevent the natural mixing of the lake. Winds and waves cannot cool the water's surface. According to USGS data from 1993 through 1996, in 3 of the 4 years, the lake was completely mixed throughout the summer. This means the water temperature and dissolved oxygen was constant from the surface to the lake bottom. In 1995, the lake was stratified in June and July. The temperature and dissolved oxygen near the lake bottom was lower than the lake surface. Because phosphorus is released from the sediments during periods of anoxia (no dissolved oxygen) this produced high phosphorus levels in the bottom water in 1995. This was not seen in the other three sample years.

- There is growing evidence that the complete dominance of Eurasian watermilfoil can be a very serious problem for lakes and fisheries. There are studies that indicate Eurasian watermilfoil releases phosphorus into the water column (Carpenter, 1981). The dominance of Eurasian watermilfoil in Eagle Lake could produce as much as 1000 lbs of phosphorus input annually, almost half of the input from upland sources.

  Other research indicates that Eurasian watermilfoil is toxic to planktivores. E. Linden and M. Lehteniemi, 2005, found Eurasian watermilfoil was toxic to invertebrates, and caused the invertebrates to spend more time outside the plant beds, subjecting them to greater predation. This did not occur with native milfoil beds.

  This toxicity may explain why Eurasian watermilfoil supports fewer invertebrates

and therefore provides fewer benefits to fisheries. It also raises concerns about the long term effect on a healthy fisheries population in lakes dominated by Eurasian watermilfoil.

- This project is expected to dramatically improve the conditions on Eagle Lake for 3 to 5 years.

## PROJECT DESCRIPTION

### PROJECT GOALS

The goals of the project are:

- To eradicate to the greatest degree possible, Eurasian watermilfoil and curly-leaf pondweed.
- To return the plant communities in the lake to one with greater diversity as was present in the early 1990s.
- To improve the water quality of the lake by opening up the water column.
- To minimize the amount of harvesting needed to control the nuisance conditions. The lake is currently dominated by Eurasian watermilfoil and curly-leaf pondweed.
- To maintain recreational use levels on Eagle Lake.
- To protect the fisheries quality by restoring native plant communities and improving water clarity.

Eagle Lake anticipates that Sonar treatments will provide a cost-effective means for controlling nuisance plant species such as Eurasian watermilfoil on a large scale without the long term impacts to native plant species.

### REGULATORY CONTROL

The Wisconsin Department of Natural Resources (DNR) was given the responsibility of managing aquatic plants and organisms in the waters of the State under State Stats. 227.11. The directives were further defined in Admin. Rule NR 107. NR 107 requires that "chemical management shall be allowed in a manner consistent with sound ecosystem management and shall minimize the loss of ecological values in the water body". A number of species are identified in NR 107 as important species in the ecosystem. Sago pondweed, and wild celery are the only plants listed, that are found in Eagle Lake. This proposed treatment is not expected to be detrimental to these species because of the timing of the treatment and the dosage. The permit application and the treatment plan are designed to minimize the effects of the proposed treatment on the ecosystem.

### TREATMENT AREA

Approximately 515 acres are planned to be controlled with the Sonar treatment. Based on existing maps for Eagle Lake, the volume of the area affected by the treatment is approximately 3267 acre feet. 100% of the lake is available for aquatic plant growth. Maximum rooting depth in 2004 was 13 feet, the maximum depth of the lake. Sonar will be applied evenly to the entire lake.

### TARGET SPECIES

Eurasian watermilfoil is expected to be controlled by the treatment for at least three years. Curly-leaf pondweed is expected to be controlled for one year, with approximately 50% decrease in density the second year.

## TREATMENT STRATEGY

The treatment will be conducted in very early spring, 2006. The treatment will attempt to maintain a low dose of Sonar A.S. in the lake over at least a 45 to 60 day period, using a "bump" application if needed to maintain the proper dose. It is expected that Eagle Lake will be thoroughly mixed at the time of treatment. Therefore, the entire lake volume has been used to calculate the treatment dosage. 12.65 gallons of Sonar A.S. will be applied in a single treatment via subsurface injection.

The product will be applied approximately three feet below the surface using an injection boom with 8 six-foot long weighted drop lines. Three quarts of chemical will be pre-mixed with 50 gallons of water in a 65 gallon tank. A 5 HP centrifugal pump will be used to further dilute and then apply herbicide mix into the lake through the injection boom. A paddle wheel type digital flow meter will be used to monitor the flow of mix (in gallons per minute) from the mix tank into the pump. Rate will be regulated via a ball valve by the applicator.

To facilitate even distribution, the spray boat will follow a pre-determined course. The applicator will establish waypoints to create transects approximately 200 feet apart using GPS. The on-board GPS will be used by the boat driver to accurately set speed and course. Water depth will be constantly monitored via a digital depth finder. Chemical flow rate will be adjusted according to the current depth and when needed, boat speed will be changed to keep the pumping rate of the herbicide mix to within the flow meter's working range of 1.5 to 10 gallons per minute.

This procedure has been used on four whole-lake treatments, resulting in very even distribution throughout the lake.

Both the applicator and boat driver are certified and licensed with the Wisc. Department of Agriculture in Category 5, Aquatics. They will be equipped with all applicable safety equipment, including face shields, rubber gloves, aprons and boots.

The key components of the application system include:

| | |
|---|---|
| Pump: | (1) 5 HP, Red Lion model #5RLGF-8 centrifugal pump, 134 GPM |
| GPS: | Garmin GP45, Accuracy, 15 meters, Speed measured to one-tenth mph |
| Flow meter: | Ecobal digital flow meter. Range 0-10 GPM to nearest one-tenth GPM |
| Tank: | Capacity, 65 U.S. gallons |
| Depth Recorded: | Lowrance X-20 LCG, Depth measured to nearest foot. |

The treatment is expected to take approximately 8 to 9 hours. The boat will not apply Sonar closer than 150 feet from shore. However, the material will disburse throughout the lake, even within the 150-foot shore zone.

The project is intended to distribute at a concentration of Sonar of 6 ppb. Maximum concentration in the lake is expected to peak about 6 to 7 ppb. Concentrations in the water column are expected to be at 3 ppb three weeks following treatment. At that time, a repeat or "bump" treatment will be conducted to boost the level back to 6 ppb.

The treatment area will be posted by Marine BioChemists. The application will be conducted by Marine BioChemists commercial applicators under contract with the District.

### WEATHER, WARRANTY

If weather-related problems occur that wash out the treatment, the treatment will be repeated at the District's expense. In the event the warranty is needed to be enforced, the lake will be re-treated at the manufacturer's and applicator's expense.

### PUBLIC INPUT/NOTICE

Landowners in the treatment area will be notified of the planned treatment. The District has approved the project, and the expenditure at the May 2005 Annual Meeting. The permit will be provided to all riparian landowners prior to treatment in compliance with NR107. The information will also state that the application and treatment plan will be at the Town Hall for anyone to review. Piers, trees and launch sites will be posted at least every 300 feet with the treatment notice. The District has published a notice in the local paper informing them of a potential treatment in 2006. The District will also publish a notice in the local paper in early spring of 2006.

The District will post the public launches as being closed during the treatment. To minimize conflict between lake use and the actual treatment time, property owners and the public will be asked to stay off the lake until the treatment is complete. This restriction should have minimal impact because of the time of year for the treatment.

The applicator will post a 24 hour advisory swimming precaution, however, according to the US EPA there are no restrictions on swimming, fishing or drinking immediately following treatment. An irrigation restriction will be posted.

## MONITORING

### AQUATIC PLANTS

A point-intercept plant survey will be conducted to survey the vegetation annually: the year-of-treatment and three years post-treatment. In addition to the point-intercept survey, general surveys will be done around the shoreline. The maximum rooting depth will also be identified.

The District intends to survey the lake, following the same protocol, to determine the effectiveness of the treatment, any impact on non-target plants and to identify any species not currently present in Eagle Lake. An annual report will be published providing the sampling data and a discussion of the results.

### DISSIPATION/ RESIDUE STUDY

Water samples will be collected and analyzed for Sonar A.S. concentrations using FasTEST™. Samples will be collected at the center of the lake for FasTEST™ analysis. Samples will be collected on day 3, 15, 30, 45, 60, and 75 days following treatment. Sampling will follow the SePRO protocol. Additional samples may be collected if needed.

The EffecTEST™ will be conducted 45 days post-treatment to verify the effectiveness of the treatment on Eurasian watermilfoil. SePRO has offered to pay for this test.

### WATER QUALITY

Samples will be collected in Spring turnover, mid-April, mid-June, every two weeks in July and August, mid-September, and fall turnover.

### FISHERIES

DNR fisheries staff has indicated their support for the project. They have been concerned about the density of the nuisance species, the poor water clarity, and the impact on the fisheries.

### RE-INFESTATION MONITORING

Eagle Lake will be inspected three times per season in 2007, 2008, and 2009 for re-infestation of Eurasian watermilfoil. Lake volunteers will check for the re-appearance of Eurasian watermilfoil whenever they are on the lake. The inspection should be conducted rapidly from a boat, using a rake when visual identification is not possible or to check for small seedlings. The area within 100 feet of the boat launches should be inspected thoroughly.

Local citizens and volunteers should report any re-appearance of Eurasian watermilfoil. The public boat launches should be posted with a description of the project and the procedure to follow if Eurasian watermilfoil is found.

## PROJECT IMPACTS

### TARGET SPECIES

Eurasian watermilfoil is expected to be controlled by the treatment for at least three years. Curly-leaf pondweed is expected to be controlled for one year. A 50% reduction in curly-leaf pondweed from pre-treatment levels is expected the year after treatment.

### NON-TARGET IMPACTS

It is anticipated that there may be impacts to non-target plants in the Sonar treatment area. Non-target vegetation in the treatment area includes: sago pondweed, leafy pondweed, flat-stem pondweed, Chara, duckweed, yellow water lily, white water lily, waterweed, coontail, and wild celery. It is anticipated that the lower treatment dosage, and the early-season treatment will minimize any non-target impact to these species. The abundance of these species in the lake is very low compared to the Eurasian watermilfoil and curly-leaf pondweed. Waterweed, flat-stem pondweed, and wild celery are currently present only in a couple of locations and have decreased since the early 1990s. The native plants are expected to re-vegetate in the lake following the treatment.

Chara and sago pondweed are listed as tolerant. White water lily and wild celery are listed as intermediate.

### EFFECT ON LANDOWNERS

According to Sonar A.S. label precautions, there should be no irrigation from the lake for 30 days following a treatment of over 10 ppb. This treatment will be at 6 ppb, however, a precautionary restriction of 24 hours will be posted. Water from the lake should not be used to water vegetables and annuals for at least 14 days. Landowners should be advised to not use treated plant debris for mulch. There are no swimming or fishing restrictions following treatment with Sonar. Lake use in very early spring is expected to be minimal. The closest residence to the treatment area is approximately 75 feet. There should be no affect on ground water from the treatment.

Because the treatment will be conducted very early in the season, plant biomass is expected to be low. This will minimize the plant debris problem for landowners that has occurred on other project lakes when plant densities are very high.

### AFFECT ON FISH, WILDLIFE

It is possible that predation on bluegills will increase because there will be less cover than exists currently in the dense Eurasian watermilfoil beds. This would lead to an increase in the size of bluegills remaining. Fish may be more difficult to catch. The reduced structure in the lake may make fish harder to find.

When chemicals are applied according to label precautions, there should be no adverse impacts to fish and wildlife. There are no angling restrictions or precautions following treatment with Sonar A.S.

### AERATION PLAN

One concern usually associated with chemical treatment of aquatic plants is the loss of dissolved oxygen in the water when the plants decompose. When treated with chemicals with the active ingredients Diquat and 2,4-D, vegetation dies quickly, often within 7-10 days. The rapid decomposition depletes the oxygen concentrations in the water column. This condition can stress or kill fish.

Treatments using Sonar usually take 60-90 days to produce results, allowing dissolved oxygen levels to remain stable. Sonar controls aquatic vegetation slowly, without oxygen deprivation.

As a precaution, in the unlikely event dissolved oxygen levels should fall below safe levels, an aeration system may be installed until oxygen concentrations rebound.

Rotary vane style compressors, combined with air diffusers will be used in the event that aeration of the lake is necessary. This type of equipment has been used successfully in private ponds throughout Wisconsin. Pike Lake (Marathon County, WI) has also used this type of destratification equipment with satisfactory results. Four diffusers, placed in 25 feet of water and powered by (2) 3/4 HP high-pressure rotary vane style air compressors have prevented or greatly reduced the severity of winterkills in that lake.

Each diffuser is sufficient to maintain approximately 6400 square feet of open water during ice cover when placed at a depth of 15 feet. In this case, the diffusers will provide aeration to the immediate open water area. Sixteen diffusers will be placed close together in 15 feet of water. Air will be supplied to the diffusers via 1/2 inch polyethylene tubing from the compressors, which can be operated from standard household current (120 volts). Continued oxygen monitoring will indicate if the system provides the desired result. Additional equipment will be readily available (in inventory) if needed.

Equipment:

| | |
|---|---|
| Air compressor: | Gast Model #1023-101Q-G608X. Performance: 9.5 CFM at 5.0 PSI |
| Air diffuser: | Ceramic stone style. Pore size: 140 microns. Bubble size 1-3 mm<br>or<br>Flexible membrane style. Bubble size: approx. 3 mm |

## ANTICIPATED RESULTS

A control of 100% is expected for at least 2 years, with 80% control expected for at least 3 years.

There should be no control of Chara in the lake. There may be some impact on white water lily, pondweeds, waterweed and coontail.

The treatment as planned will not produce the quick control that is usually associated with Diquat and 2,4-D treatments. Early season treatment, before the water column is dominated with vegeation, is needed to maximize the control with the least amount of disruption for lake users. Control will occur very gradually over 60-120 days.

Water clarity in Eagle Lake has been poor. The Sonar treatment is anticipated to improve clarity by improving the circulation and mixing in the lake. However, an overall decrease in vegetation biomass in the lake is likely to occur, which may result in a short-term increased algae concentration and reduced clarity.

Phosphorus concentrations in Eagle Lake have been monitored by a volunteer. Because there have been good populations of native plants prior to the dominance of Eurasian watermilfoil, it is unlikely that the lake would be pushed toward one dominated by algae rather than plants.

Because Sonar is highly fluid, it can be quickly diluted and flushed from a treatment area. Because the Eagle Lake watershed is small, Sonar is expected to remain at stable conditions for sufficient time to control Eurasian watermilfoil. Very heavy rains around the time of the treatment could affect in-lake concentrations of Fluridone.

Eurasian watermilfoil competes by growing earlier and faster, then shades out native plants. It is anticipated that species diversity will increase post-treatment. Existing native plants are expected to increase in density after the treatment.

## REINFESTATION PLAN

### LAKE INSPECTIONS

Based on the results of other whole-lake treatments, eventual re-infestation is expected. To minimize the impact, and to extend the life of the whole-lake treatment as long as possible, regular inspections will be conducted. Inspections in 2007, 2008, and 2009 will be done in late May, mid-summer, and mid-August. Areas supporting high densities of Eurasian watermilfoil, and the boat launches will be inspected regularly. A lake-wide boat inspection with random rake tosses will also be done.

### SPOT TREATMENTS

Although the Sonar treatment is expected to provide at least 80% control, the District is prepared for reinfestation. Eurasian watermilfoil will likely continue to be a potential problem for the lake even with a successful treatment. The high level of lake use, including transient boaters, increases the likelihood of new introductions of Eurasian watermilfoil as well as the spread of plants already in the lake. A viable seed bed may contribute to the reinfestation of Eurasian watermilfoil.

Small isolated areas of Eurasian watermilfoil, especially those found along the shoreline zone, will be hand pulled or treated using a 2,4-D product. The sites should be re-inspected following treatment or removal to ensure complete control or removal of the plants. Eurasian watermilfoil may be harvested when levels again reach nuisance conditions.

No chemical treatment or harvesting of vegetation in the lake should be conducted without an inspection or survey. This will ensure that the conditions are documented, that sites are documented to allow re-inspection. The results should be included in the analysis of the overall project.

The community may continue to handpull or rake swimming areas on a limited basis. Educational efforts of the District should emphasize protection of native plants. The role of aquatic plants in the complete lake system should also be stressed. Public access sites should maintain informational postings to educate users. Trailers should be thoroughly cleaned of all vegetation. Educational efforts and messages should be repeated regularly.

**COMMUNITY EDUCATION**

The District will have volunteers inspect boat trailers and provide informational material to lake users at the boat launch. The focus of this project component will be to minimize any re-introduction through the use of the launch site.

Additional informational material will continue to be provided to residents and lake users through the newsletters and other informational means.

## BUDGET

**Table 2 - Eagle Lake Whole-lake Treatment Budget**

| Project Components | | Total Costs | Local Share 75% Grant | Local Share 50% Grant |
|---|---|---|---|---|
| Permit Development | | | | |
| | Public Notice | 50.00 | 12.50 | 25.00 |
| | Permit Fee | 1270.00 | 317.50 | 635.00 |
| | Permit Writing | N/C | | |
| Grant Application | | N/C | | |
| Water Quality Monitoring - Volunteer Monitoring | | | | |
| | 2005 | 2400.00 | 600.00 | 1200.00 |
| (year-of-treatment) | 2006 | 2400.00 | 600.00 | 1200.00 |
| | 2007 | 2400.00 | 600.00 | 1200.00 |
| | 2008 | 2400.00 | 600.00 | 1200.00 |
| | 2009 | 2400.00 | 600.00 | 1200.00 |
| Sonar Treatment (2 treatments at 6/6) | | | | |
| | Application | 59353.00 | 14838.25 | 29676.50 |
| additional if needed | EffecTEST (1) | 250.00 | 62.50 | 125.00 |
| additional if needed | FasTEST (6) | 510.00 | 127.50 | 255.00 |
| | Shipping | 300.00 | 75.00 | 150.00 |
| Sample Collection | | 1500.00 | 375.00 | 750.00 |
| Contingency treatment (rainout, etc) | | 26569.00 | 6642.25 | 13284.50 |
| Plant Monitoring | | | | |
| | 2006 | 5700.00 | 1425.00 | 2850.00 |
| | 2007 | 5800.00 | 1450.00 | 2850.00 |
| | 2008 | 5900.00 | 1475.00 | 2850.00 |
| | 2009 | 6000.00 | 1500.00 | 2850.00 |
| Lake Inspections (Re-infestation) | | | | |
| | 3 times in 2007 | 1500.00 | 375.00 | 750.00 |
| | 3 times in 2008 | 1750.00 | 437.50 | 218.75 |
| | 3 times in 2009 | 2000.00 | 500.00 | 1000.00 |
| Spot Treatments | | | | |
| | 2007 | 2000.00 | 500.00 | 1000.00 |
| | 2008 | 4000.00 | 1000.00 | 2000.00 |
| | 2009 | 7000.00 | 1750.00 | 3500.00 |
| Aerator Contingency | | 5000.00 | 1250.00 | 2500.00 |
| Watercraft Inspection, 2007, 2008, 2009 | | 7500.00 | 1875.00 | 3750.00 |
| | | **Total** | **Local with 75% grant** | **Local with 50% grant** |
| **TOTAL PROJECT COSTS** | | 155952.00 | 38988.00 | 77976.00 |
| | DNR Grant Share | | 116964.00 | 77976.00 |

**Table 3 - Eagle Lake Whole-lake Treatment Cost Breakdown by Year**

| Project Components | 2005 | 2006 | 2007 | 2008 | 2009 |
|---|---|---|---|---|---|
| Public Notice | 50.00 | | | | |
| Permit Fee | 1,270.00 | | | | |
| Water Q. Monitoring | 2,400.00 | 2,400.00 | 2,400.00 | 2,400.00 | 2,400.00 |
| Treatment | | 59,353.00 | | | |
| Contingency treatment | | 26,569.00 | | | |
| | | | | | |
| EffecTESTS | | 250.00 | | | |
| FasTESTS | | 510.00 | | | |
| Shipping | | 300.00 | | | |
| Sample collection | | 1,500.00 | | | |
| Plant Monitoring | | 5,700.00 | 5,800.00 | 5,900.00 | 6,000.00 |
| Lk Inspections | | | 1,500.00 | 1,750.00 | 2,000.00 |
| | | | | | |
| Spot treatments | | | 2,000.00 | 4,000.00 | 7,000.00 |
| Aerator contingency | | 5,000.00 | | | |
| | | | | | |
| Watercraft inspection | | | 2,500.00 | 2,500.00 | 2,500.00 |
| | | | | | |
| **Total Costs per Year (Worst Case)** | 3,720.00 | 101,582.00 | 14,200.00 | 16,550.00 | 19,900.00 |
| **Total Cost Per Year Without Contingencies** | 3,720.00 | 70,013.00 | 14,200.00 | 16,550.00 | 19,900.00 |
| **Portion Paid by 50% Grant** | 1,860.00 | 35,006.50 | 7,100.00 | 8,275.00 | 9,950.00 |
| **Portion Paid by 75% Grant** | 2,790.00 | 52,509.75 | 10,650.00 | 12,412.50 | 14,925.00 |

**Table 4 - Eagle Lake Whole-lake Treatment Cost-Benefit Analysis**

| | | | | | |
|---|---|---|---|---|---|
| **Cost Savings Per Year*** | -3,720.00 | 29,987.00 | 85,800.00 | 83,450.00 | 80,100.00 |
| *Based on 2005 budget of $100,000, W/O contingencies, no grant rec'd | | | | | |
| **Cost Savings Per Year**** | -3,720.00 | -1,582.00 | 85,800.00 | 83,450.00 | 80,100.00 |
| **Based on 2005 budget of $100,000, W contingencies, no grant rec'd | | | | | |
| **Cost Savings Per Year ***** | -1,860.00 | 64,993.50 | 92,900.00 | 91,725.00 | 90,050.00 |
| ***Based on 2005 budget of $100,000, W/O contingencies 50% grant rec'd | | | | | |

**ATTACHMENTS:**

Map Eagle Lake
Guidelines for Whole-Lake Fluridone Re-Treated Research Lakes in Wisconsin - Potters and Random Lakes
Eagle Lake Aquatic Plant Management Plan, 2005
SePRO Warranty for Potters Lake treatment, 2004.