Lee Lake Survey Results and Recommendations
October 2010

Managing lakes since 1979

PLM Lake & Land Management
P.O Box 132
Caledonia, MI 49316
Phone: 800-382-4434
616-891-1294
Fax: 616-891-0371
Email: andyt@plmcorp.net

58.650
52 000

October 5, 2011

Lee Lake Association
Attn: Attn: Diane Inman
803 Clark Rd
Ceresco, MI 49033

PLM Lake & Land Management will provide a lake management program for the control of exotic weeds and/or algae in **Lee Lake for the 2012 thru 2016 seasons.** The program will (1) control exotic plant species, (2) control /algae, (3) monitor water quality, and (4) monitor the aquatic plant community.

This program is intended to be implemented in 2012 and will address exotic plant problems on Lee Lake. Based on the 2010 survey, problems with Eurasian watermilfoil and Phragmites were observed (see Survey Results and Recommendations Report). We recommend implementing spot treatment based program in 2012 using either contact or systemic herbicides. Water quality and survey data will be collected during the 2012 season fro a possible whole lake Sonar A.S. treatment in 2013. Sonar A.S. has the ability to control Eurasian watermilfoil on a lake wide basis and can provide 3-4 years of control. Following the Sonar A.S. application, management focus shifts toward monitoring and maintenance treatments on a smaller scale. Phragmites should be treated with the herbicide Habitat and AquaPRO as needed.

Management program for 2012:

Products to be applied: Navigate (granular 2,4-D), Renovate, Renovate Max G, Sculpin, Aquathol K, Hydrothol 191, Reward, Habitat, AquaPRO and non-water restrictive products such as Nautique, Copper Sulfate, Cutrine-Plus, Cygnet Plus and shade as a tracer.

2012 Unit cost per acre.

Systemic Herbicides:	
Navigate	$415.00
Renovate	$550.00
Renovate OTF	$475.00
Renovate Max G:	$420.00
Sculpin:	$375.00
Habitat/AquaPRO:	$475.00
Contact Herbicides:	
Reward	$225.00
Aquathol K/Hydrothol 191	$200.00
Algaecides	$45.00
Nautique	$390.00
Other Services:	
AVAS Survey:	$250.00
Water Quality:	$550.00

PO Box 132 · Caledonia, Michigan 49316
phone 616.891.1294 · fax 616.891.0371
www.plmcorp.net

Note: Treatment will be based on a spring survey. Cost estimate and treatment recommendations will be provided to the Lee Lake Association and conducted only with approval.

Estimated Budget for 2012: $10,500.00

Management program for 2013 using Fluridone (Sonar A.S.):

April/May of 2013: Weed treatment of entire lake, applying restrictive product Fluridone for the control of exotic plant species

Cost of Fluridone treatments at 6 ppb bump back to 6 ppb (ppb=parts per billion): $14,750.00

If the bump up treatment requires more than 3 ppb, then cost will be $1,600.00 per additional ppb.

Note: Treatments of Eurasian Watermilfoil for the following season will be limited and/or may not be required. Fluridone treatments may have residual effect on Milfoil growth two to four years after initial treatment. Curly Leaf Pondweed may require treatments the following seasons.

Note: Additional fees will be required based on DEQ policy when using Fluridone. The DEQ requires fastest (measurement of fluridone concentration), Lake Management Plans, permit fees, & surveys. Cost per fastest: $150.00 Cost per survey: $250.00, Permit fee: $1,500.00, LMP: $800.00

Suggested budget for 2013 using Fluridone:

April/May: Fluridone treatments 6ppb:	$14,750.00	$16,350.00
June, July, August: Algae treatment if required:	$700.00	$1,400.00
Additional requirements by DEQ: ~	$4,900.00	$4,900.00
Estimated total cost for 2013 treatments:	**$20,350.00**	**$22,650.00**

Management program for 2014/2015/2016:

Products to be applied: Navigate (granular 2,4-D), Renovate, Renovate Max G, Sculpin, Aquathol K, Hydrothol 191, Reward, Habitat, AquaPRO and non-water restrictive products such as Nautique, Copper Sulfate, Cutrine-Plus, Cygnet Plus and shade as a tracer.

2014/2015/2016 Unit cost per acre.

Systemic Herbicides:

Navigate	$415.00
Renovate	$550.00
Renovate OTF	$475.00
Renovate Max G:	$420.00
Sculpin:	$375.00
Habitat/AquaPRO:	$475.00

Contact Herbicides:

Reward	$225.00
Aquathol K/Hydrothol 191	$200.00
Algaecides	$45.00
Nautique	$390.00

Other Services:

AVAS Survey:	$250.00
Water Quality:	$550.00

PO Box 132 · Caledonia, Michigan 49316
phone 616.891.1294 · fax 616.891.0371
www.plmcorp.net

Estimated Budget 2012-2016:

2012 year:	**$10,500.00**
2013 year:	**$22,650.00**
2014 year:	**$7,500.00**
2015 year:	**$8,500.00**
2016 year:	**$9,500.00**

Estimated cost for treatments 2012 thru 2016: $56,350.00 to $58,650.00

Note: We estimate that the cost to monitor and treat your lake will fall within these ranges. Please note that the budget is an estimate. You will only be charged for the actual amount of control required, at the unit prices listed above. Treatment will be based on pre surveys and will be executed only with prior approval.

Note: Prior to each treatment and/or services performed by PLM Lake & Land Management will require prior approval by the Lee Lake Association. If the recommendation is outside the scope of the original plan then the townships approval will be required. This protocol allows the association to confirm budget/monies are being used efficiently and not exceeding recommendations.

Water Quality Program:
The water quality program consists of two samples, occurring in the spring, and late summer each season. Parameter such as secchi disc, pH, D.O., conductivity, alkalinity and nutrient sampling of total nitrogen and total phosphorus give us the ability to monitor lake trends more efficiently. This information will enable us to include the tropic status of your lake. The program also tests your water for Fecal bacteria (E. Coli), in mid-summer which can determine the condition of your lake and if the water is safe for swimming. If testing results indicate there is a immediate problem, the Saddle Lake Association will be notified immediately. Reports will be issued annually in the fall.

Contract Period:
Multiple Year Treatment Program: As an incentive to establish a multiple year agreement we will treat your lake or pond at the same price structure as 2012 for 2013!!! The remaining three years (2014, 2015 and 2016) will have cost increases of (3%) three percent per year or less. If total chemical cost increases 10% from the previous year a new agreement will have to be mutually acceptable. If during the life of the contract the DEQ or other regulatory agencies significantly change the approved treatment procedures, either party may terminate this agreement upon giving ninety (90) days advance written notice thereof.

One Year Treatment Program: Pricing is based on the type and the amount of vegetation or algae present at the time of treatment, as well as, the products applied. Unlike the multiple year program, an agreeable price structure is not contracted into a one-year program. Therefore, an increase in the cost of products, labor, or changes made by the DEQ or other regulatory agencies may have a drastic effect on the pricing for following years.

Permit Fee:
PLM Lake & Land Management is responsible for completing and submitting aquatic nuisance permit applications. PLM Lake & Land Management will send an invoice or statement for the yearly DEQ permit application fee. It is your responsibility to send a check made out to the "State of Michigan" to our office. We must include this check with the DEQ permit application. A non-refundable fee of $200.00 will be applicable if lake is not treated after obtaining the DEQ permit.

Posting of Treatment Areas:
Posting of shoreline treatment areas is the responsibility of PLM Lake & Land Management and will be conducted according to MIDEQ regulations. Signs will be attached to thick barked trees, posts or other suitable fixtures already on site. If homeowners wish to have signs posted in designated areas or on specific fixtures they must notify PLM Lake & Land Management, providing lake address, location of property, and where the signs are to be posted. Pictures are the most informative way to relay this information. Notification

of alternate posting must be made at least 14 days prior to treatment and additional fees may apply. The removal of posting signs after the restrictions have expired is the responsibility of the homeowner.

Notification of Treatments:
It is your responsibility to notify each resident within **100 feet** of the treatment area **at least seven days** in advance, **but no more than forty-five days** prior to the first treatment date, that products will be applied to the lake. This notification requirement **must** be administered to each and every property owner within 100 feet of any treatment area. PLM Lake & Land Management will provide a tentative treatment schedule and the **Notice** of proposed products to be used during the spring of each year. We will also notify resident within 100 feet of the treatment areas on the day of treatment.

Non-Target Species:
Please be aware that we only control weeds and algae **present** at time of treatment. Emergent vegetation (cattails, bulrush, purple loosestrife), lily pads, eel grass and sago pondweed require separate programs for control and are not addressed unless specifically mentioned in the management program. We have no control over future weed or algae growth based on the current chemicals registered for aquatic use in Michigan.

Invoicing and Payments:
PLM Lake & Land Management will submit an invoice following treatment that will include the following information; lake and/or pond(s) treated, date of treatment and type of treatment or acres treated. Monies will be due net fifteen (15) days after each treatment. Interest of 1.25% will be added to your bill for each additional sixty (60) days that payment is not received.

Liability Issues:
We are responsible for workman's compensation and liability insurance for the duration of the contracted period.

PLM Lake & Land Management is not responsible for fish loss due to low oxygen levels caused during warm water conditions.

Please sign, check multiple or one year program and return one copy of this proposal as our contract.

For further clarification or modifications please contact.

Andy Tomaszewski, Ecologist
Southern Regional Manager
PLM Lake & Land Management Corp

For Lee Lake
Multiple Year Program:_____

_____ _____
Print Name **Date**

_____
Signature

PO Box 132 · Caledonia, Michigan 49316
phone 616.891.1294 · fax 616.891.0371
www.plmcorp.net

Current Conditions in Lee Lake

Aquatic Vegetation

The Lee Lake submersed plant community contains both native and exotic plant species. Native plants found in Lee Lake include Chara, Thinleaf pondweed, Eel grass, Variable pondweed, Largeleaf pondweed, and Naiad. Exotic plant species include Eurasian watermilfoil, Starry stonewort, and Phragmites.

The macrophyte community of Lee Lake is slightly diverse (Table 1). Of the plants listed in Table 1, all but Eurasian watermilfoil, Starry stonewort, and Phragmites are native North American species. These are non-indigenous aquatic nuisance species, i.e., plants from other places, which cause considerably more problems than most native species. Eurasian watermilfoil and Starry stonewort can attain nuisance levels of growth at almost any time of year. Phragmites typically becomes problematic mid to late summer.

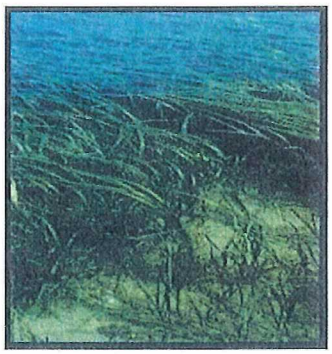
The native plant species in Lee Lake benefit the lake, performing such functions as stabilizing sediments and providing habitat for fish and other aquatic organisms. In general, native species cause substantially fewer problems than the exotic plant species. At the time of the October 2010 vegetation survey, Eurasian watermilfoil had become the most dominant submerged plant species in the lake. Starry stonewort was found in only a few locations which indicates that it is a recent introduction. Phragmites was found in most shoreline areas.

Table 1:Plant Species Found In Lee Lake

Common Name	Scientific Name
Submersed Plants (Exotic)	
Eurasian watermilfoil	*Myriophyllum spicatum* L.
Starry stonewort	*Nitellopsis obtusa*
Submersed Plants (Native)	
Muskgrass	*Chara sp*
Thinleaf pondweed	*Potamageton spp.*
Variable pondweed	*Potamageton grammineus*
Naiad	*Najas flexilis*
Eelgrass	*Vallisneria Americana*
Flatstem pondweed	*Potamageton spp.*
Water stargrass	*Heteranthera dubia*
Illinois pondweed	*Potamogeton illinoiensis*
Largeleaf pondweed	*Potogeton amplifolius*
Sago pondweed	*Potamogeton pectinatus*
Floating Leaf Plants	
Water Lily	*Nymphaea Odorata*
Spatterdock	*Nuphar spp.*
Emergent Plants	
Cattail	*Typha latifolia* L.
Bulrush	*Scirpus spp.*
Emergent Plants (Exotic)	
Phragmites	*Phragmites australis*

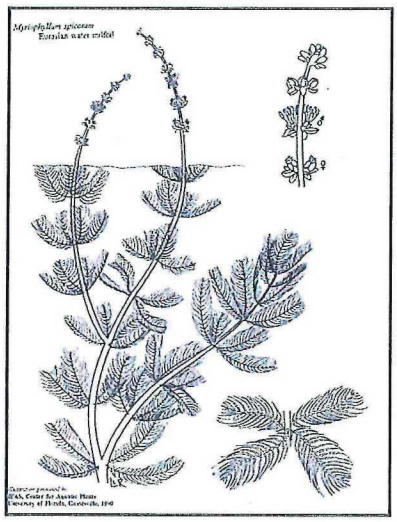
Native Plants present in Lee Lake

Chara

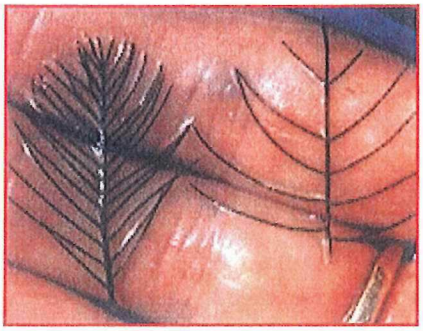


Wild Celery

Eurasian watermilfoil



EWM, an exotic species, is an extremely aggressive submerged aquatic plant that has the abilities to form a monoculture among vegetation. EWM spreads by fragmentation (every inch of plant can sprout new growth) and has a very strong root system. EWM forms a canopy above native plants, choking out the competition. EWM also has the ability to overwinter underneath the ice, allowing it to be present throughout the winter. This gives the plant a head start in growing during the spring and chokes out native plants very quickly. EWM should be controlled as soon as it is found within a waterbody to prevent further infestation and loss of native plant diversity. NOTE: Once a native plant is lost in a lake, there is no guarantee it will return.



Eurasian vs. Native watermilfoi

Algae

Algae are basically divided into planktonic, filamentous, and macroalgae forms. Planktonic algae are microscopic, free floating plants, often referred to as "water bloom". In large number, the algae can cause water to appear green, brown, yellow, or even red. Filamentous algae, commonly called "pond scum" can form raft-like masses over the water surface. Since they are vulnerable to winds and currents, they are generally restricted to bays, bayous, and sheltered shorelines. Filamentous algae can grow attached to the lake bottom, weeds, piers, and docks. The filamentous algae will frequently detach from the lake bottom and form floating mats. The macroalgae includes two types, chara and nitella. Chara grows like a carpet on the bottom of the lake. It is nature's water filter and is excellent for fish bedding. Chara grows approximately one inch a week during the summer months.

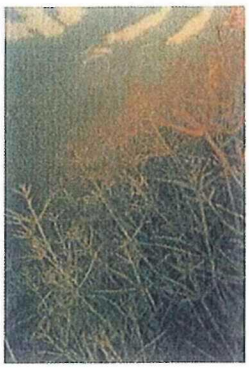
Lee Lake can grow algae throughout much of the lake. An over abundance of algae is an indicator that there is an excess amount of nutrients within the water column/lake, causing the waterbody to become overly productive. Algae are very beneficial in a lake ecosystem and can be thought of as the base of the food chain. Therefore, some alga are required. However, when algae reaches the point of hindering the use of the lake, control measures are available. Firstly, actions should be taken within the watershed to promote a healthy lake ecosystem and decrease nutrient loading, etc. However, no immediate change will be seen with these actions. Therefore, many lakes opt to include limited algae control within their management program. Algae control, using low dose Copper Sulfates treatments, can control nuisance algae in shoreline/developed areas only.

Phragmites

Phragmites (frag-MY-teez), unknown to many, is a silent invader closing the door to beloved lake views. Phragmites, also known as common reed, is a wetland grass that ranges in height from 6 to 15 feet tall. The plant creates dense stands and crowds out other beneficial native wetland vegetation. Phragmites typically grows in wetlands, lake shorelines, roadside ditches and other low, wet areas. The plant spreads rapidly by fragmentation and the extensive root system make it difficult to effectively control. Phragmites is of great concern for lake front properties where it can block shoreline views and greatly reduce access for swimming and fishing. Phragmites has flat green leaves that alternate along the stem and a distinctive purple-brown seed head with plumes appearing by late July. Phragmites can be controlled using herbicide treatments followed by mechanical removal (i.e. cutting, mowing) and annual maintenance. In Michigan, a permit is likely required to control this species. There is currently no biological control method for Phragmites.

Starry stonewort

Starry stonewort is in the same family as chara but is considered to be an exotic invasive species. Starry stonewort, which looks very similar to the beneficial species Chara, is appearing in more and more lakes. Chara is a highly desired plant because it is typically low growing, keeps the water clear and can slow down the invasion of exotic weed species. Starry stonewort also forms dense mats, but unlike chara, it can grow from 5 to 7 feet tall as evident on Wolverine Lake. Starry stonewort was first found in Lake St. Clair in the mid 1980's and has been moving west across the state. The plant is still considered "new" to Michigan and the State has not yet put it on the list of Noxious Invasive Species. Starry stonewort can be very detrimental to a lake's ecosystem and has the ability to kill off native plants and have a negative impact on the Wolverine Lake fisheries. It has been noted that in some lakes the bass have actually held their eggs and not released them due to inadequate spawning grounds. Positively identifying the chara as Starry stonewort does not change the management plan for the lake. The best management tool to control this species is a combination of Copper sulfate treatments and harvesting.



Starry stonewort

Lee Lake's Aquatic Vegetation Analysis

Lee Lake, Calhoun County located in Newton Township is approximately 116 surface acres.

The vegetative community within Lee Lake is slightly diverse however the greater the diversity the better. Ideally, having more species diversity would be beneficial long term. Lee Lake does have exotic species present that require immediate and continued management.

Eurasian watermilfoil as well as most submersed aquatic plants, growing underneath the surface of the water. These plants often go unnoticed until they reach the surface of the water and become an aesthetic and boating/recreational issue within the lake. However, the larger problem then the recreational issue with Eurasian watermilfoil is the drastic negative effects the plants have on the ecological processes within the lake. All exotic species within Lee Lake need to be controlled and managed as soon as possible.

Native species diversity and richness has likely already been altered already by the infestation of Eurasian watermilfoil which can in turn affect the fisheries and overall aquatic ecosystem. Recreational use of the lake has also been affected by the growth of Eurasian watermilfoil. Once the plant(s) reach the surface of the water the property values on the lake will likely be negatively

affected. An infestation of this magnitude should be controlled to the fullest extent possible. Native plant control can be targeted for control if approved/desired as part of the program.

Management Strategies for Lee Lake

Management Goals

- The primary goal of aquatic plant management should be to control exotic aquatic plants. The exotic plant species, Eurasian watermilfoil, should be controlled throughout Lee Lake. The abundance of these species should be reduced to the maximum extent possible, and efforts should be made to reduce the plant recovery after treatment.
- Species diversity and sufficient cover of native plants to provide fish habitat shall be maintained in the lake. Native plants should be managed to encourage the growth of plants that support the Lee Lake fishery (by creating structure and habitat) provided that they do not interfere with recreational uses of the lake (e.g., swimming, water skiing, boating, and sailing) in high-use areas. Where they must be managed, management techniques that reduce the stature of plants without killing them (e.g., harvesting, contact herbicides) should be used whenever possible. Specific areas should be set aside where native plants will not be managed, to provide habitat for fish and other aquatic organisms. Muskgrass (*Chara*) should be allowed to grow throughout the lake, except where it grows so tall as to interfere with boating and swimming. Muskgrass is a natural filter throughout the waterbody and is extremely beneficial as a habitat and food source.
- Conditions in Lee Lake should not be allowed to deteriorate below present levels. Efforts to reduce nutrient and sediment loading should begin, with the realization that they will help prevent further deterioration but probably not improve water quality. Expansion of aquatic plant problems should trigger an adjustment in the aquatic vegetation management strategy. To support such responses, an annual record of vegetation, water quality and management should be maintained.

Strategies for Achieving Lake Management Goals

Aquatic Plant Management

Areas of the lake that support vegetation *will* grow plants, despite intense efforts to remove them. The goal of aquatic plant management is not to remove all vegetation, but to control the types of plants that grow in the lake and the height of plants, to minimize interference with human activities. In general, native plants interfere less with recreation and other human activities than exotic species. In addition, native vegetation provides important benefits to a lake, including stabilizing sediments, providing habitat for fish and other aquatic organisms, and slowing the spread of exotic plant species.

The non-native plant species, Eurasian watermilfoil, should be controlled wherever present, using selective methods that minimize damage to native aquatic vegetation. This exotic species concentrate its biomass at the water surface where it strongly interferes with boating, swimming and other human activities. This growth form also allows exotic plants to displace native plants and form a monospecific (i.e., single species) plant community, which provides lower quality habitat than that provided by a diverse community of native plants. Control of exotic plant species will minimize interference of plant growth with human activities and allow recovery of the native vegetation of the lake.

Aquatic herbicides currently represent the most reliable, effective means for controlling Eurasian watermilfoil. There are currently three systemic herbicides, trychlopyr (Renovate), 2,4-D (Navigate) and fluridone (Sonar) that can be used to achieve long-term, selective control of Eurasian watermilfoil. Systemic herbicides are capable of killing the entire plant. Several contact herbicides, including diquat (Reward) can also provide short-term control of Eurasian watermilfoil. These herbicides kill only the shoots of the plant, and plants regrow relatively rapidly from their unaffected belowground parts.

Harvesting of Eurasian watermilfoil is not recommended. This plant spreads by fragmentation and regrows significantly more rapidly than most native plant species; thus continued harvesting typically leads to nearly complete domination of the aquatic vegetation by Eurasian watermilfoil.

Native plants provide many important benefits to lakes, including stabilizing sediments and providing habitat for fish and other aquatic organisms. Many of the native species are difficult to control using herbicides, and the MI-DEQ is reluctant to issue permits for their control. If successful control of Eurasian watermilfoil results in an expansion of native plants to the point where control is required, harvesting would be the best control method. Unlike Eurasian watermilfoil, most native plants do not regrow rapidly after harvesting, and a single harvest is often sufficient to control them for the entire summer. Normally low-growing species, such as muskgrass (Chara) should not be controlled unless unusually fertile growing conditions allow them to grow tall in areas of high recreational use.

Monitoring

It is important to maintain a record of lake conditions and management activities. Vegetation surveys monitor types and locations of plants in the lake, providing information that is essential to the administration of efficient, cost-effective control measures. Vegetation surveys also document the success or failure of management actions and the amount of native vegetation being maintained in the lake. Water quality monitoring can identify trends in water quality before conditions deteriorate to the point where remediation is prohibitively expensive or impossible. Records of past conditions and management activities also help to keep management consistent despite changes in the membership of the Lake Board. Records should include (at a minimum):

- Temperature, dissolved oxygen and Secchi disk depth should be measured in the lake and canals. Temperature and dissolved oxygen profiles should be obtained in the deep hole, so as to monitor the timing and extent of oxygen depletion in the hypolimnion (i.e., bottom water).
- Total phosphorus and nitrates should be measured in the surface and bottom water at least twice per season (spring and late summer) to monitor nutrient accumulation in the hypolimnion.
- Chlorophyll should be measured in at least one location to provide a better measure of algal (phytoplankton) growth in the lake.
- Lake vegetation should be surveyed and mapped at least twice a year (late-spring and late summer/early fall) to document the results of plant management efforts and provide information necessary for planning future management.

Nutrient Loading Abatement

Lakeshore property owners should be encouraged to use phosphorus-free fertilizers on lawns and other areas that drain into Lee Lake or the adjacent wetlands. Lakeshore residents should also be encouraged to manage their waterside landscapes according to the recommendations outlined in publications on this topic available from the MSU Extension.

It is also important to remember that rooted plants derive most of their key nutrients from the sediments; thus they respond slowly, if at all, to reductions in nutrient loading. In fact, if reductions in nutrient loading lead to improved water clarity, the growth of rooted plants will probably increase.

Prevention

Eurasian watermilfoil was almost certainly introduced to Lee Lake by plant fragments carried on boats and/or boat trailers. A variety of other troublesome exotic plants and animals can be introduced to Lee Lake this way. Preventing their inadvertent introduction to Lee Lake can significantly lower the cost of future lake management. Education can be an effective preventative measure. Newsletter articles should alert lake residents to the threat from exotic nuisance plants and animals. Warning signs should be erected at the boat launch that encourages boaters to clean boats and trailers when launching or removing watercraft from the lake.

Aquatic Plant Management Options

Management options are dependent on many factors, including but not limited too, species abundance (density), species richness, species location and many lake characteristics. Whenever an exotic species is found within an aquatic environment, action needs to be taken to prevent long term ecological damage as well as recreational and aesthetic loss that will take place.

Submersed Aquatic Plants (Eurasain watermilfoil)

Option 1 — Spring Fluridone (Sonar) Application

Sonar aquatic herbicide (active ingredient, fluridone), applied to Lee Lake on a whole-lake basis, would provide control of Eurasian watermilfoil. This strategy is expected to dramatically reduce Eurasian watermilfoil abundance to a maintenance level in the lake. The low dosage rate allowed in Michigan can provide selective control of Eurasian watermilfoil with little or no damage to beneficial native plant species. To implement this option, a year of water quality and vegetation monitoring is required.

Option 2 — Conventional Herbicide treatments

Treatments with the herbicides, Triclopyr and 2,4-D, in localized treatment areas to slow the spread of Eurasian watermilfoil should be conducted. The herbicides Triclopyr and 2,4-D, control Eurasian watermilfoil with little or no impact on most native plant species. Since they are selective, systemic herbicides, they can actually kill Eurasian watermilfoil plants. Under ideal conditions, several consecutive annual applications of Renovate or 2,4-D can reduce Eurasian watermilfoil to a maintenance (low) abundance. For this strategy to succeed, it is necessary to treat all the Eurasian watermilfoil in the lake each time they are applied. Recent Michigan regulation restricting 2,4-D use in the vicinity of drinking water wells may result in the inability to apply 2,4-D near the shoreline of the lake.

Triclopyr is a systemic herbicide with selectivity very similar to 2,4-D. Triclopyr is not subject to the well setback restrictions that currently affect 2,4-D. Therefore, triclopyr can be used to control Eurasian watermilfoil in near shore areas. A combination of both systemic herbicides in Lee Lake could greatly reduce the growing Eurasian watemilfoil problem.

Several contact herbicides, including diquat (Reward) can also provide short-term control of Eurasian watermilfoil. These herbicides kill only the shoots of the plant, and plants regrow relatively rapidly from their unaffected belowground parts.

Mechanically harvesting nuisance native vegetation is environmentally safe and can provide immediate relief from dense native vegetation that impedes recreational activities and aesthetic values. **Mechanical harvesting should not be conducted near or in any area infested with Eurasian watermilfoil.**

Nuisance native plant management can also be initiated into a lake management program with conventional herbicide treatments if desired. Native plant treatments are completed using only contact herbicides in beach areas. Contact herbicides will not target the root system of the plant. Native plant management is completely optional.

Emergent Plants (Phragmites)

Option 1 — Fall Habitat/AquaPRO Application

To achieve the best control of Phragmites, applications should be conducted late summer or early fall. Increased translocation of product this time of year ensures that product enters the root system where it can provide longer term control. A significant reduction in Phragmites should be observed

after the initial treatment but smaller scale maintenance treatments will most likely be required each season.

Submersed Aquatic Plants (Starry stonewort)

Option 1 — Applications using Hydrothol 191 and Copper sulfate

Starry stonewort cannot be eliminated using chemical or mechanical methods. Treatments can significantly reduce its stature but will not eliminate this species. A combination of Hydrothol 191 and Copper sulfate is currently the most effective means of controlling this species. Treatments are required every 3-4 weeks to provide control throughout the growing season.

Final Recommendations

Based on the current density of Eurasian watermilfoil and the presence of Starry stonewort and Phragmites, management options should be considered to protect the recreational and ecological values of Lee Lake, as well as property values surrounding Lee Lake. It is most likely that Eurasian watermilfoil densities will quickly expand if left unmanaged. A management program should allow for management on a lake wide basis. A majority of the Eurasian watermilfoil is growing near the drop-off where water depths quickly increase. Plants in this area often go unnoticed to recreational users until they reach the surface. Eurasian watermilfoil will quickly reach the surface and continue to spread and inhibit fishing/boating/swimming, etc as well as having long term negative effects on the ecological habitat. Control needs to start as soon as possible.

All available tools and options should be evaluated when making management decisions. In order to provide lake wide management, a Special Assessment District (SAD) should be established to ensure adequate funding and permissions and for MNDRE permit approval. Otherwise, lake wide permissions have to be supplied to PLM in order to apply for the permit. Consulting services as well as assistance with the SAD process and determining the most appropriate management options is available as a no-cost service offered to PLM customers. This will allow PLM to provide any and all services available in aquatic management as well as making it specific to the needs and wishes of the Lee Lake Association. Please contact PLM at any time for assistance with your program.

Lake: Lee County: Calhoun Survey Date: 10/4/10

Standard Aquatic Vegetation Summary Sheet

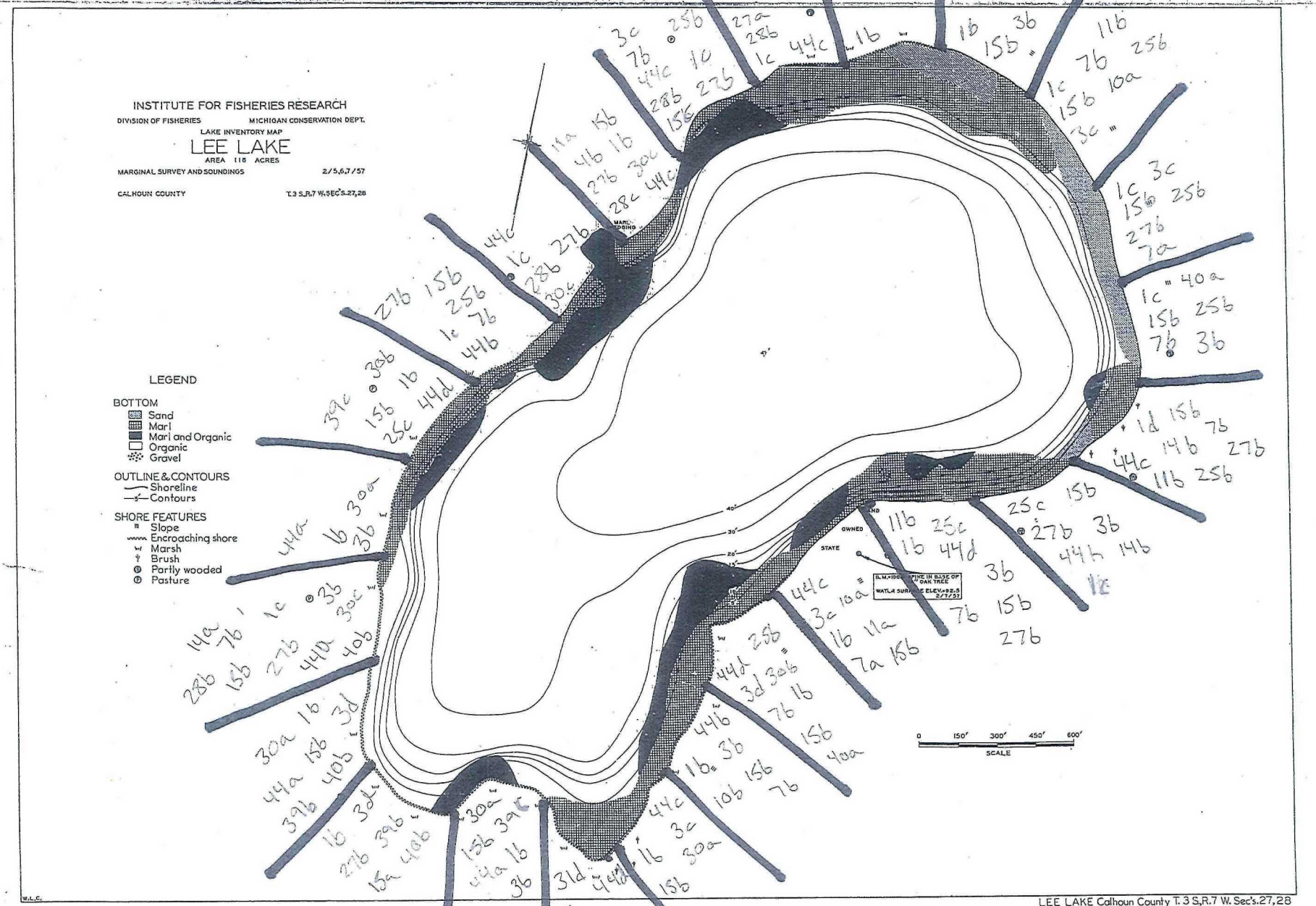
		Total number of AVAS's for each Density Category				Calculations				Sum of Columns 5-8	Total No. of AVAS	Col 9 divided by Col 10
Code No	Plant Name	A 1	B 2	C 3	D 4	A x 1 5	B x 10 6	C x 40 7	D x 80 8	9	10	11
1	Eurasian watermilfoil	0	14	9	1	0	140	360	80	580	24	24.17
2	Curly leaf pondweed	0	0	0	0	0	0	0	0			
3	Chara	0	10	6	3	0	100	240	240	580	24	24.17
4	Thinleaf pondweed	0	1	0	0	0	10	0	0	10	24	0.42
5	Flatstem pondweed	0	0	0	0	0	0	0	0			
6	Robbins pondweed	0	0	0	0	0	0	0	0			
7	Variable pondweed	2	10	0	0	2	100	0	0	102	24	4.25
8	White stem pondweed	0	0	0	0	0	0	0	0			
9	Richardsons pondweed	0	0	0	0	0	0	0	0			
10	Illinois pondweed	2	4	0	0	2	40	0	0	42	24	1.75
11	Large leaf pondweed	3	3	0	0	3	30	0	0	33	24	1.38
12	American pondweed	0	0	0	0	0	0	0	0			
13	Floating leaf pondweed	0	0	0	0	0	0	0	0			
14	Water stargrass	1	1	0	0	1	10	0	0	11	24	0.46
15	Wild celery	1	18	1	0	1	180	40	0	221	24	9.21
16	Sagittaria (submersed)	0	0	0	0	0	0	0	0			
17	Northern watermilfoil	0	0	0	0	0	0	0	0			
18	Green watermilfoil	0	0	0	0	0	0	0	0			
19	Two-leaved watermilfoil	0	0	0	0	0	0	0	0			
20	Coontail	0	0	0	0	0	0	0	0			
21	Elodea	0	0	0	0	0	0	0	0			
22	Bladderwort	0	0	0	0	0	0	0	0			
23	Mini Bladderwort	0	0	0	0	0	0	0	0			
24	Buttercup	0	0	0	0	0	0	0	0			
25	Naiad	0	8	3	0	0	80	120	0	200	24	8.33
26	Brittle naiad	0	0	0	0	0	0	0	0			
27	Sago Pondweed	1	10	0	0	1	100	0	0	101	24	4.21
28	Starry stonewort	0	5	1	0	0	50	40	0	90	24	3.75
29	Cabomba	0	0	0	0	0	0	0	0			
30	Water Lily	4	3	3	0	4	30	120	0	154	24	6.42
31	Spatterdock	0	0	0	1	0	0	0	80	80	24	3.33
32	Water shield	0	0	0	0	0	0	0	0			
33	Lemna minor	0	0	0	0	0	0	0	0			
34	Greater duckweed	0	0	0	0	0	0	0	0			
35	Watermeal	0	0	0	0	0	0	0	0			
36	Arrowhead	0	0	0	0	0	0	0	0			
37	Pickerelweed	0	0	0	0	0	0	0	0			
38	Arrow arum	0	0	0	0	0	0	0	0			
39	Cattail	0	3	2	0	0	30	80	0	110	24	4.58
40	Bulrush	2	3	0	0	2	30	0	0	32	24	1.33
41	Iris	0	0	0	0	0	0	0	0			
42	Swamp loosestrife	0	0	0	0	0	0	0	0			
43	Purple loosestrife	0	0	0	0	0	0	0	0			
44	Phragmites	4	3	7	5	4	30	280	400	714	24	29.75
45		0	0	0	0	0	0	0	0			

Total cumulative cover **127.50**

Nitellopsis obtusa

55°, Sunny

10:00 am



LEE LAKE Calhoun County T. 3 S,R.7 W. Sec's.27,28

28 - stormy afternoon