



October 24, 2016

Sand Lake POA (Cambridge / Franklin Townships)
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The following are recommendations for the control of hybrid Eurasian watermilfoil in Sand Lake for the 2017 season. The cost estimates pertain only to milfoil and do not include management costs for starry stonewort or other aquatic plants and algae. Once an acceptable treatment protocol has been established, a full proposal will be provided for your approval.

Management program for 2017:

During the 2016 season, the hybrid milfoil in Sand Lake was again tested for its susceptibility to specific herbicides. As expected, the milfoil in Sand Lake was not very susceptible to 2,4-D, moderately susceptible to Renovate and exhibited “typical” susceptibility to Sonar. Based on these findings, it is the primary recommendation of PLM & SePRO to implement a Sonar treatment for the 2017 season. However, another option has been provided per your request and is noted below as Plan B.

Plan A: Sonar Treatment Including Guarantee

The Sonar treatment conducted during the 2013 season fell short of expectations of long-term milfoil control. Although the milfoil in Sand Lake was severely impacted by mid-summer, it regrew during the 2014 season. I believe several factors can be attributed to the less than desirable results. Below are two factors that I believe had the most impact on the 2013 Sonar treatment:

- 1) **Initial target concentrations were not achieved.** Based on MDEQ permit statute, initial concentration is to be calculated using the top 10 feet of the water column. If the thermocline is deeper than 10 feet at the time of treatment, or the thermocline fluctuates within the first two weeks of treatment, product can be lost to the deeper water reducing concentration in target areas. In addition, prior to PLM using the biobase technology to accurately map the lake contours, volume calculations were based on MDNR bathymetry data that have proven in some cases to be unreliable.
- 2) **Adequate contact time was not achieved for thorough kill.** Based on MDEQ permit statute, one bump-up treatment of Sonar may occur between 14-21 days post initial treatment. The bump-up treatment in 2013 brought the Sonar levels to target concentrations, but the first three weeks of the treatment period may have been below the lethal threshold reducing overall contact time at required concentrations.

In recent years, the MDEQ has given us the flexibility to alter Sonar treatment protocols using an “evaluation” treatment procedure. I believe this process will greatly reduce the chances of failure by allowing us to make two significant changes to the Sonar treatment protocol:

- 1) **Base initial Sonar concentrations on actual thermocline depth (Usually 15-17 feet) or use the whole-lake volume to achieve a total water volume target concentration.** New lake depth contour and volumes have been calculated using new technology to increase our ability to target specific concentrations.
- 2) **Flexible bump-up treatment schedule.** This allows bump-up treatment timing to be adjusted for actual in lake concentrations and allows for multiple bump-up treatments if required to maintain target concentrations for the required exposure time.

Given these two significant changes to the Sonar treatment protocol, the chances for success are greatly increased over previous methods. I am working with SePRO to obtain a guarantee of treatment effectiveness for this Sonar treatment protocol. Although complete control is expected during the treatment year as part of the guarantee, it is unclear what provisions for following years may be included.

Preliminary budget estimates for thermocline and whole-lake volumes are included below.

Sonar Treatment Based on Whole-Lake Volume

Initial Treatment @ 6 ppb (whole-lake volume):	\$39,847.50
Bump-Up Treatment @ 2ppb (thermocline):	\$10,645.55
Optional Bump-Up treatment @ 2ppb (thermocline):	\$10,645.55
DEQ Requirements:	<u>\$6,500.00</u>
Estimated Total:	\$56,993.05 - \$67,638.60

Sonar Treatment Based on Thermocline

Initial Treatment @ 6 ppb (Thermocline 15 feet):	\$31,950.00
Bump-Up Treatment @ 2ppb (thermocline):	\$10,645.55
Optional Bump-Up treatment @ 2ppb (thermocline):	\$10,645.55
DEQ Requirements:	<u>\$6,500.00</u>
Estimated Total:	\$49,095.05 - \$59,741.10

Note: DEQ requirements include 2017 permit (\$1500), Vegetation Survey (\$800), Water Quality Sampling (\$550), Lake Management Plan (\$1,250) & Sonar residue collection & analysis (\$2400).

Plan B: Combination of Renovate 3 @ 1.5 ppm & Renovate OTF @ 0.5 ppm (Limited guarantee)

Susceptibility testing of the Sand Lake milfoil has shown it to be relatively susceptible to Triclopyr (active ingredient in Renovate). The 2015 treatment with Renovate OTF was moderately successful initially, but regrowth of the milfoil had occurred by fall. This has been seen as somewhat typical with hybrid milfoils. Although target concentrations of Triclopyr were increased to produce lethal concentrations for the required contact time, it appears that the root crowns were not totally affected. This may be a result of the sediment type on the release of the Triclopyr from the carrier granule. It has been shown that sediment type and microbial composition can affect release and target concentrations of Triclopyr in the water column. As a result, we have experimented with a combination of liquid Triclopyr (Renovate 3) and the granular Renovate OTF. For such a strategy to succeed will require treating large areas around known HEWM infestations. The risk of dilution and loss of target concentration increase with smaller treatment areas.

Cost per Acre: \$850.00

Based on the attached map showing GPS location of milfoil beds in Sand Lake from 2014-2016, approximately 90-100 acres are considered for this type of treatment. Estimated budget to treat area within proposed polygons is \$76,500.00. Additional areas will be treated at the per acre cost.

The guarantee for this type of treatment would be limited in respect to results within four weeks post treatment and would not extend to year end results, or following years.

Options for a reduced treatment area are possible to work within established budgets.

Once you have had a chance to review, please feel free to contact me with any questions or concerns you may have. I will forward you the SePRO guarantee once I receive it. Also, keep in mind any deviation from standard DEQ protocol for Sonar treatments require approval of the permit application as an "evaluation" permit. Although we have obtained many evaluation permits for similar treatments with great success, I cannot guarantee approval of the permit application by the DEQ.

Sincerely,

Steve Hanson
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PLM Lake & Land Management

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