

PROJECT UPDATE #19

April 15, 2016

Part of the Lake Restoration Project has been a four year pilot of aeration in the north lobe of the lake, with the objective of trying to determine how aeration could help to control growth of invasive weeds. This is the fourth year of the pilot.

Although the aeration has changed a number of water conditions in the north basin, the data has not shown a significant impact one way or the other on controlling growth of invasive weeds. In reviewing the data, questions have been raised about whether the aeration system has been designed and/or sized appropriately to get the desired results. Also, there are some questions about how the changes in the water column are affecting conditions in the north lobe.

Consequently, the decision has been made not to operate the aeration system for some time, possibly this entire season. This will allow analyses of water conditions without aeration to compare with similar analyses of the past three years. When these analyses are completed we hope to be in a better position to evaluate and decide the future use of aeration in Paw Paw Lake.

PROJECT UPDATE #18

October 26, 2015

STATUS REPORT

The Lake Restoration Project and Special Assessment District (SAD) were approved by the Coloma Township and Watervliet Township Boards in 2011. The project began in 2012 and is now completing the fourth year of its five year schedule.

Project Focus: The project is intended to control growth of invasive and nuisance weeds, notably Eurasian milfoil, through two project components. First is weed management using herbicides that specifically target the invasive/nuisance weeds. Second is a pilot aeration project in the north basin of the lake intended to reveal whether aeration prevents bottom sediment phosphorous from releasing into the water column to feed weed growth. Third is testing and analysis.

Project Cost: The estimated project cost was \$855,500, but it now appears that the project will be completed at lower cost, which should result in refunds to SAD participants after all project expenses have been paid. There will be more refund information in 2016.

Weed Management: There is a significant difference between the weed situation in 2011 and now.

- 2012 SONAR treatment halted growth of Eurasian milfoil throughout the lake.
- Periodic inspections and spot treatments of the lake (3 or 4 times a season) have kept invasive and nuisance weeds limited to small areas of the lake.
- 300 plus acres of weeds were treated in 2012; now 25 to 35 acres are being treated.
- Growth of native weeds has resumed.

Aeration: Results of the aeration pilot have been generally positive, but mixed. The measures of effectiveness established for the pilot are: 1) dissolved oxygen level throughout the water column; 2) weed growth; 3) water clarity; 4) fish activity; 5) sediment depth; and 6) algae blooms.

Dissolved Oxygen: Analyses of the aeration area show dissolved oxygen from the water surface down to the lake bottom. The non-aerated part of the lake has no oxygen below about 20 feet.

Weed Growth: Invasive/nuisance weeds are being controlled. But it is not yet clear to what extent the aeration is controlling weed growth.

Water Clarity: Water clarity tests reveal that clarity of the aerated and non-aerated parts of the lake are about the same. Analyses are being done to try to understand why.

Fishing activity: Good fishing depends on many factors (weather, water temperature, etc.) There have been no significant fish kills.

Sediment depth: Divers report that the soft organic sediment in the aeration area is breaking up. But there is no hard data to confirm this observation or measure how much the sediment thickness has been reduced.

Additional Concern:

Algae Blooms: There is always algae in Paw Paw Lake. It is a needed element of the lake ecosystem. But it's not usually visible. Algae becomes visible (blooms) when the combination of water temperature, air temperature, nutrients and still or slow-moving water

is optimum for a visible algae bloom. Algae blooms have occurred in Paw Paw Lake for many years, with the 2014 and 2015 blooms more intense and longer-lasting than customarily observed in the Lake. The same has been observed in many other lakes. Most algae blooms are not harmful, even though they look unattractive, but some may be harmful, especially some blue-green algae.

- Testing, analyses and treatment of algae blooms are not a specific component of the current project, but observation is being performed to get to the core of what is going on and what can be done about it.
- Aeration has been used effectively in many ponds, lakes and streams to help control algae blooms. But there is no solid evidence to conclude that aeration is mitigating blooms in the aerated part of the lake or that it is causing or contributing to the blooms.
- Paw Paw Lake Foundation is testing algae blooms for toxicity and working on efforts to reduce new nutrients from entering the lake from agricultural drains and other sources.

What's Next? As the project draws to a close, the Lake Restoration Advisory Committee is considering options for future lake restoration. The committee's focus is on goals, measures of success and estimated costs. Any future project will require public hearings and approval of both township's boards. The committee hopes to have goals, a project plan, success measures and estimated project term and costs identified by early Spring of 2016 so that public hearings can be held and board decisions can be made during the Summer of 2016. Please be assured that the Paw Paw Lake Restoration Committee, both Township Boards and the professionals assisting us are working hard to find solutions to issues of concern on the lake. We may not have all the answers today, but we are doing what can be done to get the answers and continue to improve the water quality of Paw Paw Lake. This will be a long-term effort that will require continuous diligence, work and patience.

We also encourage you to comment or ask any questions you may have about this communication or about the project. You can post comments and questions on the project website at this link: <http://www.pawpawlakerestoration.com/contactus.htm>. Or please feel free to send your comments or questions to Paw Paw Lake Restoration Advisory Committee, P.O. Box 563, Watervliet, MI 49098.

PROJECT UPDATE #17

November 24, 2014

SPECIAL ALGAE BLOOM UPDATE

Paw Paw Lake and Little Paw Paw Lake experienced an unusually severe and long-lasting algae bloom this year. Coincidentally, so did many other lakes in this part of Michigan. In addition to the algae bloom, there were a few areas on the lake that had a bacteria mass which floated on the lake surface.

When the bloom intensified and stayed longer than usual the Paw Paw Lake Foundation funded water testing to try to determine the cause. The lake foundation and lake association reviewed the test results at a meeting recently and discussed possible causes and actions that could be taken in the future.

The water tests revealed a high enough concentration of phosphorous to support algae growth. Oddly, a number of other lakes in the area have much higher concentrations but did not have alga blooms. This led the group to consider the possibility that the alga blooms could have been worsened by high levels of nitrogen in the lake water.

The analysis points to the nutrients coming into the lake by water run-off from agricultural drains and lakefront property. There was no evidence that the nutrients are coming to the surface from the lake bottom, especially in the part of the lake that is being aerated.

The consensus opinion of the group as to the cause of the severe bloom was that, this year, we experienced perhaps the worst possible convergence of elements for a severe algae bloom. First, high nutrient loading into the lakes from thaw of record snowfall and a number of heavy rains in the spring and early summer. Second, a cooler than normal summer caused the water below the surface to warm later than usual. When the nutrients, water temperature and sunlight reached the optimum mix, an algae bloom appears. And it stays until conditions change enough to stop continued algae growth.

Some species of algae are toxic and, if toxicity is high enough, dangerous to people if ingested. Although there is no widely-held standard for a danger level, the consensus of the scientists involved in the Paw Paw Lake water testing is that this summer's algae bloom did not pose a health threat.

Going forward, a plan for monitoring the lake for phosphorous, nitrogen and water temperature is being developed. In addition, a plan to analyze an algae bloom when it first appears and while it lasts is being prepared, including determining the type of bloom and its toxicity. The Paw Paw Lake Foundation will sponsor these analyses for the near future.

The Paw Paw lake Association is working to develop methods to inform lake property owners and lake users regarding algae blooms and, especially if one reaches a toxicity level that could pose a health threat.

Both the Paw Paw Lake Association and Paw Paw Lake Foundation continue to work to maintain a safe, clean and healthy lake for all to enjoy and appreciate.

PROJECT UPDATE #16

April 4, 2014

The four diffusers in the deepest parts of the north end of the lake were started on April 2, 2014. The remaining diffusers will be started the week of April 6. They are scheduled to operate continuously until November 1.

Biological treatment of the north bays will begin within the next month. There will be several applications of the biological organisms throughout the summer. These microorganisms help control weed growth by eating nutrients in the water column and at the lake bottom. Over time they should also reduce the amount of decayed organic material at the bottom of the lake. The organisms are not harmful to people, animals or plants.

Weed inspection and control will begin later in the spring, probably late May or early June. Sonar will not be used for weed control since the treatments will be localized. Only those areas where invasive weeds are found will be treated. Notices will be posted in those areas before a treatment is done and this website will also provide notice.

PROJECT UPDATE #15

August 12, 2013

Aeration is now in operation in the North basin of the lake. Lake Savers began a gradual start-up on Wednesday, August 7, and the system is now in full operation. There are still some adjustments to be made which will be done over the next couple weeks.

There are 25 air diffusers located throughout the North basin from Ellinee Bay to Sherwood Bay. The only thing visible on the water is a rippling on the surface above each diffuser. This rippling is normal and poses no problems for swimming, boating, skiing, fishing or other normal lake activities. The compressors that provide the air to the diffusers are in a shed located about 230 feet from the waterfront near Lake Avenue.

Periodic inspections will be made to measure the oxygen level in the water column, water clarity, weed growth, alga bloom frequency and intensity, sediment depth and fish activity. Because of the late start this year, we may see modest results in 2013 with more significant results expected in 2014.

PROJECT UPDATE #14

July 19, 2013

Professional Lake Management (PLM) inspected the lake on July 9. A summary of their report follows.

Native weeds are growing in the lake, including in areas previously dominated by Eurasian Milfoil. Many areas have Thinleaf and Seg pondweeds (both native weeds) growing between docks and near shore. These are common and may be removed manually if desired.

PLM found one small patch of Eurasian Milfoil in the channel behind the aeration shed. They also found several patches of Curlyleaf pondweed, a non-native invasive that is not as nasty as Eurasian Milfoil, but still a weed that should be controlled.

The Eurasian Milfoil will be treated using Renovate OTF and the Curlyleaf pondweed will be treated using Diquat, both herbicides approved for use by the MDEQ. These are applied only where the weeds exist. Treatment should be done the week of July 28, 2013. Properties where treatment is applied and nearby properties will be posted when the treatment is done. The posting will include suggestions for limiting swimming, fishing and watering.

In the Weed Control section of this website you will find the PLM report and a map showing the location of the Eurasian Milfoil and Curlyleaf pondweed. If a patch is located near you, please be watchful for the treatment posting.

PROJECT UPDATE #13

June 24, 2013

Professional Lake Management (PLM) conducted their first evaluation of the lake on May 27 and found no signs of eurasian milfoil. They will evaluate again in early July, late July, and late August. If they see patches of milfoil they will treat that area at the time of, or shortly after, the evaluation. Only isolated patches of milfoil will be treated, there will not be a lakewide treatment. If a treatment is applied, all nearby properties will have a notice posted that informs that a treatment has been made and includes recommendations regarding swimming, watering, fishing, etc.

Please be alert around these times. If your property is posted, please follow the suggestions on the posting. If you have a sprinkling system, you may want to turn it off for several days around these dates. Likewise, if you have a lawn service you may want to instruct them to not water around these dates.

More information is contained in the 2013 Weed Control Evaluation-Survey Notice that is posted on this website. If you have questions contact us through the www.pawpawlakerestoration.com site.

PROJECT UPDATE #12

October 31, 2012

Carno/JFNew has conducted the annual vegetation survey of Paw Paw Lake. In the survey report it states that, "The previous vegetation report depicted Eurasian milfoil throughout the entire littoral zone all the way around the lake." The current report states that, "No Eurasian milfoil was observed during the aquatic vegetation survey Cardno/JFNew completed at Paw Paw Lake on September 25, 2012."

A number of native plant species were identified, but no "exotic" plants were found.

A follow-up survey will be conducted next in May 2012 to determine if any Eurasian milfoil is evident in the lake. This information will be used to determine what, if any, localized weed control will be necessary.

PROJECT UPDATE #11

July 11, 2012

Professional Lake Management inspected the lake on July 10 and reported that almost all the milfoil has dropped out and only a few dead milfoil stems remain. They should drop very soon. They did find one stretch of shoreline near the yacht club with some distinguishable milfoil which is in very poor condition and should drop soon as well. They will inspect again in a couple weeks.

There is some planktonic alga which gives the water a green hue. This is expected given the heat and lack of rain. This alga is not harmful and treatment would probably provide no relief.

PROJECT UPDATE #10

June 25, 2012

Professional Lake Management was on the lake on Thursday, June 22, to assess the condition of the milfoil. They have reported that the milfoil is dying as expected. The condition of the milfoil is poor, the stems are white and the leaves are dropping. The leaves that are present are brown and have a “tattered” appearance. Instead of having thick, bushy plants they are reduced. These are all normal things expected from a successful treatment and when the plants are on their “last legs”. The milfoil should continue to drop out in the next few weeks. PLM will assess conditions again in a couple weeks.

PROJECT UPDATE #9

June 8, 2012

The bump treatment was done on Tuesday, May 29. Water samples were collected on Wednesday, June 6. The results were sent to us today, showing that concentrations are below 5ppb at all of the locations sampled. Water from the lake should be safe to use for watering lawns and gardens. It is suggested, however, that you use the minimum water necessary for the next few weeks. The reason is that any phosphorous in the soil that gets washed into the lake from over-watering could cause issues with the Sonar and potentially could contribute to algae blooms. However, lake water is now okay to use.

PROJECT UPDATE #8

May 29, 2012

The bump treatment was applied today throughout the lake. Because the Sonar is slow-acting, it may be two to three weeks before we see major results. It is suggested that water from the lake not be used for watering lawns and gardens beginning today until the water is tested on June 7. This website will be updated as soon as the result of the testing is known.

PROJECT UPDATE #7

May 24, 2012

We have been advised by Professional Lake Management that the Sonar concentrations are below 5ppb now, so it will be safe to use lake water for watering lawns and gardens between today and next Tuesday, May 29, when the bump treatment is done. Then it would be advisable to not use lake water until the water is analyzed and the concentrations are again below 5ppb.

PROJECT UPDATE #6

May 24, 2012

The result of the water analyses has determined that a bump treatment will be necessary. This treatment is scheduled to be done on Tuesday, May 29. If weather does not allow it to be done on the 29th it will be done on Wednesday, May 30. This schedule ensures that the lake will be fine for swimming, boating, skiing and all lake activities. The Sonar manufacturer recommends not using lake water for watering lawns and gardens for 30 days or until the concentration level drops to 5ppb or less. The lake will be tested on June 5 or 6 and the results will be known within 48 hours. There is a high probability that concentrations will be below 5ppb at that time. This website will be updated as soon as the analyses are known.

PROJECT UPDATE #5

May 10, 2012

Professional Lake Management (PLM) has provided us with the following information. They applied the first flourodone (Sonar) treatment to the entire lake on Wednesday, May 9. On Friday, May 11, Cardno/JFNew will collect water samples to be analyzed to determine the concentration of Sonar (it is supposed to be 6 parts per billion). Samples will again be taken on May 22. The analyses of these will determine whether or not a second application (a "bump") will be necessary. The bump treatment must be completed no later than May 30.

Sonar works on the eurasion milfoil plants over a 45-60 day period. Within two to three weeks there should be evidence, such as whitening of the stems, that the milfoil has been penetrated. The Sonar usually has accomplished complete control of the milfoil in six to eight weeks.

Additional water samples will be collected between June 7-9 and July 6-8.

The manufacturer of Sonar has recommended that lake water not be used for lawn and plant irrigation for 30 days after this initial treatment. We recognize this will be an inconvenience for some, but we encourage you to follow this suggestion. PLM has advised us that, once the Sonar concentration falls below 5 parts per billion, the watering restriction may be lifted. We will update this website as soon as PLM has notified us that it is safe to use lake water for lawn and plant irrigation.

If you have questions or comments, please use the “Contract Us” page of the lake restoration website (pawpawlakerestoration.com).

PROJECT UPDATE #4

May 7, 2012

Professional Lake Management will do the first application of Sonar on Wednesday, May 9, provided the weather is acceptable. If they cannot treat on Wednesday they will return Thursday to treat. A notice of treatment will be attached to piers or trees or posts to let you know that the treatment has occurred and inform you of the suggested limitations. On Friday, May 11, the first water samples will be collected for analysis to determine if a second treatment will be necessary. The results of these analyses will be available within 10 days of treatment. We will update this website to confirm when treatment has been done and when the results of the analyses have been completed.

PROJECT UPDATE #3

April 30, 2012

The lake temperature has stratified – but the thermocline, at 21 to 24 feet, is deeper than PLM would like. This condition increases the risk for hitting lower concentrations of Sonar and therefore a potential for reduced effectiveness. Lower concentrations would mean more Sonar would be needed for the bump, thereby increasing the cost. Also, the plants are not quite active enough. Since milfoil must be present for the Sonar to effectively take, it is best to treat when active growth coincides with the temperature profile where concentrations can be maintained at the highest level between the initial treatment and two weeks after the bump. The decision was made to schedule treatment for the week of May 7. We will update this website again next week.

PROJECT UPDATE #2

April 20, 2012

Professional Lake Management (PLM) has inspected the lake each week in April to test water temperature and Eurasian milfoil activity. Each week so far they have reported that the water temperature gradient is not optimal (it is too cold) for treatment and treatment results. They will test again late in the week of April 23 and advise us. They feel that the week of April 30 might be a go. When we have received their report we will update the website.

PROJECT UPDATE #1

April 6, 2012

The first application of Sonar to the lake will be done the week of April 16 at the earliest, weather and lake conditions permitting. It is quite likely that the lake water temperature and Milfoil growth will not be where it needs to be that week. If they are not, treatment will be done as soon as conditions are right. After this testing will be done to determine whether the Sonar concentration is at the prescribed six parts per billion (6ppb). If the concentration falls below 6ppb a second, or "bump-up", application will be made in late April or early May.

Professional Lake Management (PLM) has sent a notification to every property owner in the Special Assessment Districts. We understand that some have not received one. The notification can be found on this website as a selection on the Weed Control page (Notice of Weed Treatment - 2012).

Contained in the notification are suggested restrictions required to be included by the MDEQ and the manufacturer as a precaution, including restrictions for swimming and using lake water for lawn and landscaping irrigation. Neither Sonar nor any other herbicide has a suggested restriction on fishing.

A question has been raised about the 30-day restriction on irrigation. PLM has advised us that in more than 30 years of applying Sonar they have had no instances where a lawn or landscaping has been killed from using treated lake water. A lawn or landscaping would have to be watered 24/7 for several weeks to receive enough Sonar exposure to kill it. PLM does, however, suggest some period of time to not use lake water for irrigation. The watering restriction is only applicable when Sonar

concentrations are above 5ppb. PLM recommends not using lake water for irrigation until concentration levels drop below the 5ppb level. As the lake is tested following Sonar application we will put a project update on this site to inform you that the watering restriction no longer applies.