Questions from September 2010 Grand Lake St. Marys Community Update Meeting

Posted on October 20, 2010

On September 7, 2010, Ohio EPA and the Ohio departments of Natural Resources, Health and Agriculture hosted a meeting to update the Grand Lake St. Marys community about the state's actions to address the toxic algae problem. Many good questions were submitted and answered at the meeting; however, due to time constraints, the agencies were not able to address every question. The remaining questions are posted here along with the state agencies' responses.

Q) Why aren't you dredging instead of doing alum and sand treatments? Isn't this a waste of money?

A) Treating the lake with alum or silica (sand) is more cost-effective than dredging. The cost of dredging is extremely high, and it is difficult because there is a lack of immediately available disposal sites for the material. Estimated costs of dredging the entire lake are upwards of 10 times the expense of a whole-lake alum treatment.

Q) If alum puts phosphorus on the bottom, won't the algae grow back in a few years with even more phosphorus coming into the lake? How long will the alum treatment be effective?

A) The visible benefits of the demonstration projects are expected to last throughout the period of the demonstration (approximately 60 days). One of the objectives of the demonstration project is to help gather data that will be used to run a mass-balance model of the entire lake. Completion of this model will provide information that will help officials better understand how long to expect to see benefits from a whole-lake alum treatment. However, it is important to recognize that the duration of benefits from any in-lake alum treatment are directly proportionate to the speed with which external phosphorus loads entering the lake can be substantially reduced.

Once alum binds with the phosphorus in the water and sediment, the resulting materials are insoluble and permanently inactivated. It is this chemical reaction and the permanence of the bond that makes alum such an attractive treatment chemical. Once alum has been applied to Grand Lake, the resulting materials will be inert and therefore will no longer be available to fuel algae growth. One of the most important variables influencing the duration of any alum treatment is the amount of external nutrient loads. The phosphorus load from external sources in Grand Lake is very high. The duration of benefit realized by an alum treatment will be directly proportionate to the ability to substantially reduce these external loads.

Q) Why did you wait until the algae blooms were gone before starting the tests?

A) There were logistical issues to work through, including identifying funding, permitting and identification of the appropriate areas to test. The presence, or lack thereof, of algae blooms is not necessary to determine whether an alum treatment could be successful. The agencies worked to ensure that the testing could be conducted this year before the lake began to freeze to determine whether a whole-lake treatment would be beneficial next year.

Q) How does alum affect oxygen levels?

A) Alum does not directly affect dissolved oxygen levels within a lake. However, as algae numbers decline as the result of inactivating internal phosphorus levels, the biological demand on dissolved oxygen in a lake declines. This often results in measurable increases in dissolved oxygen levels.

Q) What impact, immediate and long-term, will alum treatment have on marine life?

A) The chemical aluminum sulfate (alum) has no impact on marine life (or humans), except when applied in extremely high levels and/or exposed in extremely high levels. Alum treatments that were completed in the 1970s and early 1980s were found to have effects on lake water pH, which in turn stressed some fish and benthic organisms. However, since these early treatments, alum is rarely applied without being accompanied with a buffering agent. In the case of the Grand Lake St. Marys alum demonstration projects, a buffering agent (sodium aluminate) was applied to maintain existing pH levels during the application. Monitoring of the sites following application confirmed that pH levels were maintained at levels that would not stress fish or benthic organisms.

Sensitive fish species may be affected at the time of an alum application if dissolved oxygen levels are quite low, or when fish are concentrated in shallow confined areas where sediments and silt can be stirred up during the application. For example, in GLSM channel areas during the alum application, the large alum barge stirred up big clouds of black muck (from the bottom) and resulted in the loss of a modest number of gizzard shad and some small panfish.

Q) Why not test the alum in the middle of the lake? All of your test spots are low-activity areas.

A) The pilot project areas offered a range of variables that would enable the state to better determine the proper dosing to enhance the potential effectiveness of any future whole lake alum treatments. The other goal of testing in the selected areas was to evaluate the effectiveness of alum treatment in reducing the internal phosphorus levels within the lake's water and sediments.

The selected sites were reflective of open-lake conditions without having to incur the high costs of curtaining off a 10-acre (or larger) site in the middle of the lake. For example, the West Bank marina demonstration site is a relatively large site (10 acres) that was readily able to be isolated, while at the same time providing information that would be similar and/or characteristic of open lake conditions.

Q) Are you going to do any dredging on the lake with the other testing you are doing?

A) Yes. ODNR has had a dredging program at Grand Lake St. Marys for a number of years, and that will continue. To help address water quality issues, though, the dredging will focus on areas near the lake's primary incoming tributaries to prevent nutrients from reaching the wider lake waters. ODNR is planning those dredging projects.

Q) Once the alum is placed in the lake what would happen if these sites were to be dredged? Would this stir up the phosphorus? Didn't this happen to the Hudson River after they tried this and ultimately had a reverse impact?

A) Once alum binds with the phosphorus in the water and sediment, the resulting materials are insoluble and permanently inactivated. It is this chemical reaction and the permanence of the bond that makes alum such an attractive treatment chemical. Once alum has been applied to GLSM, the resulting materials will be inert and therefore will not impede future dredging activities. In fact, strategic dredging of sediments near the mouths of tributaries is a specific action item within the state's plan for Grand Lake. Strategic dredging is an important tool for improving water quality within the lake.

Q) I hear the end product of a manure digester can be mixed with dredge material and sold commercially. This would also take care of manure in the watershed. Is this feasible?

A) Mixing dredge material with manure within a properly designed digester may be feasible. The Ohio Air Quality Development Authority has expressed interest in providing funding to the city of Celina for a digester that would convert manure into electricity. ODNR, Ohio EPA and the Ohio Department of Agriculture are also interested in this effort. More details must be addressed, and the type of digester that would be best needs to be determined; however, all parties are interested in exploring this option and whether it might address at least some of the manure issues, and perhaps some of the dredge material. It would be hard to determine how much of either material could be used annually, but this is a realistic option for handling some of it.

Q) I saw a show on the History Channel where algae was being harvested to make other products. Is this possible and has it been looked into?

A) It is possible for algae to be harvested and utilized as alternative products. However, how effective blue-green algae (which is really cyanobacteria, not algae) is in that endeavor is not clear to Ohio's state agencies. However, the Ohio Department of Agriculture has funded a pilot project with Algaeventure Systems at Grand Lake St. Marys to determine whether an alternative, non-harmful algae can be produced and harvested from the lake for alternative uses. This pilot project began in August 2010.

Q) If toxins are in the lake, where are they now? On the bottom? Suspended in the water? Where do they go? How can you tell when the water is safe?

A) When present, the toxins exist throughout the water column, which is why the state agencies have provided advisories to avoid contact with the water even when the algae are not visible. Through the water quality testing conducted on samples pulled from the lake, we know what level of toxin is in the lake at the time the samples were taken. All lake users are encouraged to read all advisory signs that are posted at the lake or on ODNR's website (**http://ohiodnr.com/tabid/22957/default.aspx**) or review the latest sampling results on Ohio EPA's website at **www.epa.ohio.gov/portals/35/inland_lakes/glsm_microcystin_data.pdf**.

Q) When will we be able to catch and eat fish?

A)Ohio EPA does not plan to lift the fish advisory until data show that Microcystin is not building up in fish fillets during the bloom cycles. The Agency is developing a plan to generate and collect that data; the earliest time there will be enough data to determine whether it would be safe to remove the fish advisory would be May 2011. A more realistic date would be sometime in late fall 2011, assuming the Agency receives funding to conduct the study during the next year.

Q) Why don’t the farmers have to pay heavier fines when caught dumping too much onto fields? Why doesn’t that money go to the lake for donations?

A) When manure enters Ohio’s waterways due to over-application to fields or other reasons, Ohio EPA investigates and determines the appropriate enforcement action. The first priority is to stop the contamination of the stream. Fines or other enforcement actions that result from a manure spill are evaluated on a case-by-case basis. State officials understand the desire for any fines collected to benefit the local watershed. Whenever possible, Ohio EPA tries to fund special environmental projects that will improve the watershed.

Q) Why hasn't the waterfowl kill been attributed to the algae toxins?

A) Given the patterns of the deaths, the waterfowl kill was most likely the result of botulism, not algae toxins. Similar waterfowl deaths from botulism have occurred in previous years at Grand Lake St. Marys and other Ohio water bodies when cyanobacteria/blue-green algae blooms did not occur. Botulism has caused waterfowl deaths throughout North America for more than a century.

Avian botulism is a disease caused by ingestion of a toxin produced by the bacteria, Clostridium botulinum. This bacteria is widespread in soil and requires warm temperatures, a protein source and an anaerobic (no oxygen) environment in order to become active and produce toxin. Decomposing vegetation and invertebrates combined with warm temperatures can provide ideal conditions for the botulism bacteria to activate and produce toxin. When ingested, the bacteria cause paralysis and death in waterfowl.

Q) How do we protect the citizens from Alzheimer's disease if too much aluminum is added to the lake? Why is a toxic solution like alum even being considered?

A) None of the compounds used in the lake treatment pose a hazard to human and/or pet health provided that they are applied according to the recommendations. The alum applicators used protective gear such as eyewear and gloves during the pilot demonstration; however this was simply a precaution from their extended exposure to the compounds because they are salts. People on shore have no risk from the alum that is being applied in the demonstration areas.

Concerns about a connection between aluminum and Alzheimer's have been debated for some time. More recent research points to a gene rather than aluminum as the cause. In addition, aluminum is found naturally in the environment. Some foods, such as tea, spinach and other leafy green vegetables, are high in aluminum. Use of aluminum cookware has not been found to contaminate food sources.

Q) With regard to regulating manure application on frozen ground, two years seems too long. What will you do this winter to control runoff?

A) The proposed ODNR rules in regard to manure application, if approved by the Joint Committee on Agency Rule Review (a legislative oversight committee), would require compliance with USDA's 633 Standard this winter and next winter before the prohibition on winter application would apply. The 633 Standard is a series of best management practices for manure application that reduces how the manure runs off of property. For example, the 633 Standard includes setback provisions for how close manure could be applied to streams. Currently, the 633 Standard recommends measures that are voluntary. Where the 633 Standard has been utilized, it has been effective in reducing the amount of nutrient runoff.

Ohio officials expect that for the next two years there will be a decline in nutrient runoff as the 633 Standard is used, prior to the prohibition of winter application. The two-year phase-in will allow operators the time necessary to raise the capital and build proper storage facilities to house the manure produced throughout the winter.

Q) With regard to the U.S. Geological Survey (USGS) report on the Big Chickasaw Creek, is there more data to make seasonal comparisons from 2009 to 2010?As of two weeks ago, there were only data from the first year of sampling.

A) This may be bettered answered by USGS; however, ODNR is only aware of the first year of data which has been released.

Q) Will GLSM be given as much federal money as Guntersville Street Park in Alabama?

A) GLSM has benefited from a considerable amount of federal funding. The U.S. Department of Agriculture has invested about $3 million for work utilizing agricultural best management practices. In addition, U.S. EPA provided $1.5 million for in-lake and near-lake water quality improvement projects. For information about these projects, see **www.epa.ohio.gov/portals/47/nr/2010/september/GLSMSeptember7.pdf**. State agencies will continue to work with the relevant federal agency partners as well as Ohio's Congressional members to continue to draw appropriate federal resources to restoring Grand Lake St. Marys.

Q) Is Congressman Boehner working to get funds to solve this problem?

A) Ohio EPA and ODNR are not aware of any specific actions by Congressman Boehner’s office. You can contact his Miami County district office for further information at (937) 339-1524.

Q) When did Ohio EPA start measuring toxin levels in Ohio reservoirs?

A) Ohio EPA began testing inland lakes for algal toxins in 2007 when the Agency received limited funding from U.S. EPA. Grand Lake St. Marys was one of the lakes tested in that initial project.