Technical Assistance Request

We would like to upscale the prototypes to control algae formation and raise dissolved oxygen concentrations above 2 mg/l on larger and deeper water bodies. The email correspondence below discusses the problem and a possible solution.

Hello Dr. Reutter. I saw an article in our local paper about the Lake Erie Dead Zone with the comment on "...there's no good easy way to get oxygen into the cold bottom layer.." I'm testing a prototype solar/battery powered pump on a tethered boat in a 0.4 acre pond in Indiana. The idea is to take the high surface DO water and mix with the bottom layer of the pond. I'm pumping down to about 12-14 feet with an off-the-shelf 750 gallon per hour pump and a weighted discharge hose. A trolling motor keeps the boat moving and the discharge hose has a t-split connection (maybe more mixing but also allows another exit port in the event one gets clogged). The boat was launched on May 3, 2018 - I plan to keep the boat out there through 9/30/18. I have seen the DO increase at depth since the launch date. The pond is 18 feet deep max in a very small area. DO numbers went from < 2 ppm at 7 feet (May) to 2-5 ppm at 10-13 feet (mid-June). Some of the DO could be due to veg growth/algae but I don't think all of it is. I've run the pump anywhere from 3-10 hours per day so far. I now have enough data that I can run closer to the 10 hours for the rest of the summer. I get to the pond every few weeks to check on the boat - so I'll collect some more data in August. I'll keep you posted if you are interested. Obviously, this prototype is small scale but I think there could be some upsizing (with solar/wind/wave power) on a platform for bigger ponds or lakes.

Tom Walsh
513-305-0538 (cell)

Tom,

Good to hear from you and sounds like you have developed a pretty ingenious device and strategy to add oxygen to the hypolimnion (cold bottom layer below the thermocline). There are a number of ways to do this in small lakes and ponds: pumping oxygenated water down, pumping air down to bubble up from the bottom, etc. These strategies can provide some great benefits, but can also cause some problems if they break up or eliminate the thermocline. Sometimes that doesn't create a problem, but it can cause a problem if you have critters living down there that need the colder temps.

While these strategies generally won't work on systems as large as Lake Erie, don't totally give up on the idea. If wind turbines are installed in Lake Erie, there may be a way to utilize them to in some way provide oxygen to the hypolimnion.

Jeff

Jeffrey M. Reutter, Ph.D., Retired Director

Ohio Sea Grant College Program

F.T. Stone Laboratory and the

Center for Lake Erie Area Research (CLEAR)
The Ohio State University

We would like to upscale the prototypes for use on larger water bodies to combat algae formation and keep dissolved oxygen concentrations above 2 mg/l in as large a surface area and depth as possible.