

Submission number: HP4-A8SR-86DBG, Bear Lake Aeration

Comments from Gary Kohlhepp, Lake Michigan Unit, SWAS, EGLE

We have reviewed the data submitted by applicant and its consultant. We concur with the detailed comments submitted by Eric Calabro of the Wetlands, Lakes, and Streams Unit on June 25, 2021. Our comments below are largely consistent with those we provided as part of a July 11, 2019, email from Mike Worm to Travis Boeskool on possible Bear Lake aeration.

Several of the core samples collected from Bear Lake found elevated levels of oil-based product in the sediments, and the consultant noted petroleum-like odors in some benthic samples. The 2019 Bear Lake Baseline Report indicates that a primary objective of the aerations is to reduce sediment petroleum, but it is not clear that aeration will be able to accomplish that. An obvious concern with installing aerators is the potential for stirring up oils that are currently below the sediment surface and reintroducing it to the water column. Aeration also would be likely to move the petroleum product more widely around the lake. The resuspension and broader distribution of the oil-based product could directly affect fish populations. Fish can be impacted directly through uptake by the gills, ingestion of oil or oiled prey, and effects on eggs and larval survival. Oil has the potential to impact spawning success as eggs and larvae of many fish species are highly sensitive to oil. Resuspension also can indirectly affect other aquatic life such as algae, zooplankton, and invertebrates that fish rely on for food, as these organisms are known to be sensitive to petroleum-based products.

The materials provided with the application indicate that one of the primary objectives of aeration would be to address the blue-green algae blooms. One of the reports mentions that phosphorus, which at high levels can contribute to algal blooms, is mobilized from the lake bottom in conditions with low or no dissolved oxygen (DO), which is generally true. Data were collected from two sites, identified as Deep Basin 1 and Deep Basin 2. The former is eight meters in depth and essentially anoxic at the bottom, while the latter 3.5 meters deep with DO levels above 5 mg/L at the bottom. However, phosphorus levels are very similar between the two sites at the three depths at which they were measured. This would seem to undercut the suggestion that aeration would reduce phosphorus levels, since one of the sites is already well aerated but has similar phosphorus concentrations as other sites. The applicant might suggest that phosphorus mobilized from anoxic areas migrates to other parts of the lake, which may be the case. Without knowing how much area of the lake is anoxic versus oxygenated at the bottom, we cannot confirm or refute that. The DO results also indicate that aeration is not necessary at some sites. There is not much benefit to aerating locations that are already well oxygenated.