

June 15, 2010

Mr. Fred Innamorato  
Chairman, Lake Management Committee  
Roam Rock Association, Inc.  
P.O. Box 8  
Roam, Ohio 44085

Dear Fred:

As requested, I've reviewed the available information on the siphon system being proposed for Lake Roaming Rock. As you are aware, CT Consultants, Inc. (CT) was commissioned and recently completed a conceptual hydraulic study to develop alternatives to improve lake drawdown capabilities and provide a means for removing poor quality water from deep water areas near the dam.

During the CT study, five basic goals or objectives for the subsurface removal system were described. Four of these five objectives focused on providing additional capability to lower the lake level, either routinely (in response to storm events or to facilitate activities such as dock repair or dredging) or on an emergency basis. An additional objective was the ability to remove high nutrient and low dissolved oxygen from the deep areas of the lake.

Although the CT study appears to be well done, the technical merits of the engineering analysis they conducted are beyond EnviroScience's and my areas of expertise. Likewise, it is difficult for us to comment on the absolute need for improvement of existing drawdown capabilities as this is something that the Association needs to determine. I suspect that there are divergent opinions on the need for an annual drawdown, or periodic drawdowns of 10 feet or more.

I can comment, however, on the water quality aspects of the proposed siphon system. While I agree that removal of poor quality water from the deeper areas of the lake may be a good thing, too little information exists to conclude that removal of the water from the deep in the water column (hypolimnion) will produce a noticeable beneficial improvement in the upper reaches of the water column (the epilimnion) where residents come in contact with it. As we've discussed, the water in Lake Roaming Rock tends to stratify in the summer months. Colder water below 10-15 feet becomes anoxic. When this happens, phosphorus and sulfides are drawn out of the sediments. When the lake turns over in the fall, these nutrients are mixed in the water column where they can produce nuisance plant and algae growth.

Because there are very few of siphon systems in operation in the US, there is little hard information regarding the water quality impacts or benefits resulting from their operation. However, the potential



negative impacts associated with the discharge of the siphon system can be described and quantified. A rapid discharge of hypolimnetic water from a siphon system to Rock Creek can reasonably be expected to have serious negative impact on water quality and the biota downstream of the dam. The discharge of high levels of phosphorus to Rock Creek, the Grand River and ultimately Lake Erie is a concern given the State of Ohio's initiatives to reduce phosphorus loading to Lake Erie. For this reason the discharge could ultimately be regulated by Ohio EPA as part of the Grand River TMDL process.

A more immediate concern, however, is the potential impact that low DO and high sulfide water could have on the fishery in Rock Creek and the Grand River. In particular, hydrogen sulfide tends to be generated and released when this water comes in contact with air and small quantities of hydrogen sulfide (as low as 0.002ppm) can be lethal to fish.

I made several informal inquiries to the Ohio EPA Northeast District Office in Twinsburg regarding regulatory requirements that may come into play when installing and operating a siphon system such as the one being proposed for Lake Roaming Rock. Although the installation and operation of the system could be regulated under the National Pollutant Discharge Elimination System (NDPES) permit program, Ohio EPA has to date, elected not to do so. Rather, it appears that they take a 'wait and see' approach, allowing the installation and operation to proceed without regulatory permit or oversight.

Where the Agency definitely does exercise their regulatory authority is when the discharge from a siphon system results in documented water quality impairment and/or fish kills. In such cases they will issue administrative orders which will provide the responsible party with two choices: Permanently cease the discharge or install treatment to mitigate the problem. According to my contacts at Ohio EPA, this has already happened with several lakes in the state, including at least one in North East Ohio.

Although an evaluation of treatment options is well beyond the scope of this effort, I am quite certain that the cost of treating the discharge from the siphon system will likely far exceed the cost of the siphon system itself.

Given the questionable, or at least unquantified, environmental benefit of a siphon system, and the potential regulatory issues and costs associated with the discharge, I do not recommend that the Roam Rock Association move forward with the engineering design without a more complete evaluation of both the water quality benefits and downstream impacts associated with such a system.

Please don't hesitate to contact me should you require clarification or have further questions.

Sincerely;



Martin A. Hilovsky  
President