Silver Lake water quality improves due to aeration system

By PHIL KEREN
Editor

SILVER LAKE — Residents who use Silver Lake on a regular basis have likely noticed that the body of water looks cleaner and clearer.

That's no accident as efforts to reduce the amount of blue-green algae blooms and the algal toxins in the lake have been successful, according to a trustee with the Silver Lake Estates Board of Trustees.

About 2 1/2 years ago, a new aeration system was installed in an effort to improve the quality of the 100-acre lake, according to Rick Lubinski, president of the Silver Lake Estates Board of Trustees.

In 2012, blue-green algae blooms began forming more often and the color of the lake started to change.

"It looked like chocolate milk," said Lubinski.

This discoloration was caused by a build-up of blue-green algae which came from an increase in phosphorus due to fertilizers used on lawns and from stormwater runoff, said Lubinski.

But it wasn't just a cosmetic issue.

In a report that it issued to the Board of Trustees in November 2016, EnviroScience noted that from 2012 to 2014, "blooms of blue-green algae, or cyanobacteria, were becoming increasingly common and levels of microcystin (a cyanotoxin) were routinely exceeding state and federal recreational standards."

"Levels of microcystin were always at least an order of magnitude higher than the World Health Organization guideline of 1 part per billion in drinking water," said Martin Hilovsky, chief executive officer for EnviroScience. "They were also several times higher than a guideline of 6 parts per billion that I recall Ohio EPA using."

Hilovsky said microcystin is the toxin produced by blue-green algae. Microcystin is a hepatoxin (liver toxin) and can cause "nausea, vomiting, and in severe cases liver and kidney failure," said Hilovsky.

Hilovsky said that a few years ago, a sign was posted at Silver Lake notifying lake users that high levels of algal toxins had been detected in the water. While the signs encouraged swimmers and sailors to be cautious in their contact with the water, no one was banned from using the water, according to Hilovsky. Water users were told not to ingest the water and to stay away from areas that were discolored, said Hilovsky.

Hilovsky noted his firm recommended that the Estates Board of Trustees post signage at the lake warning water users about the high amounts of algal toxins in the water. Lubinski said the Board "thought it best to err on the side of caution with full disclosure including the temporary display of a warning sign for swimmers." Lubinski added that the "warning sign was temporarily posted a couple times, for a few days, between Silver Lake's voluntary [water quality] tests ... to be very transparent and conservative before [the] replacement aeration system was installed."

Lubinski said the sign was posted "for a short time in 2013," and information was also posted on the Silver Lake Estates Board of Trustees' website.

The sign and website posting was released "between Silver Lake's voluntary [water quality] tests ... to be very transparent and conservative before [the] replacement aeration system was installed," said Lubinski.

Hilovsky said there were no reports of anyone experiencing health problems after using the lake during that time frame.

EnviroScience's report also noted that the old aeration system "was largely non-functioning."

After studying options for two years, the Board of Trustees solicited bids for new aeration systems and picked the "best one with the lowest life cycle costs," said Lubinski.

The Board hired Aqua Doc of Chardon in 2014 to purchase and install a lake-wide aeration system. The system is an "artificial circulation system designed and built by Vertex Water Features, of Pompano Beach, Fla.," EnviroScience's report stated.

The Estates Board of Trustees hired EnviroScience to assess lake conditions both before and after the installation of a new aeration system.

The system cost about $125,000. After factoring in an environmental and fish study, the overall cost totaled $160,000. Lubinski said the system was paid for through a one-time increase in the assessments paid by Silver Lake Estates lot owners. He noted the Estates' budget increased by 40 percent only in 2015 to "recover the cost" of installing the system and performing studies of water quality.

"Most people were happy to do it because [improving the lake quality] increases their property values," said Cliff Morrison, the lake manager.

HOW THE SYSTEM WORKS

The aeration system is set up to keep phosphorus away from the blue-green algae.

Lubinski explained: "By having oxygen in the water column, it keeps the phosphorus in the sediment ... the oxygen is basically the solution."

"When the blue-green algae dies and falls to the bottom, that feeds the good algae," added Morrison.

The aeration system consists of modules that each look like "an inverted shower head" which sit on the bottom of the lake and pump out oxygen, said Lubinski.

There are modules "scattered around the lake," said Lubinski.

Compressors are set up in three locations around the lake: on top of the boathouse; at the south end of the lake; and on the northeast shoreline.

There is about 3,700 or 3,800 linear feet of weighted rubber hose that extend from the compressor locations to "feed these heads" at the module sites in the lake, added Lubinski.

RESEARCH DOCUMENTS LAKE'S IMPROVEMENT

The improvement in lake quality happened quicker than the aeration contractor predicted.

"They were saying it would take two or three years to really impact the biology of the lake," said Lubinski. "...in like nine months of operating 24 hours, seven days a week, it was like a light switch was turned on."

"It's remarkable," added Lubinski. "It's like looking at a swimming pool."

Last summer, Morrison said he could stand on the back of the boathouse and "look down 7, 8 feet" into the water.

Studies performed by EnviroScience show that water clarity has improved and that the amount of blue-green algae and algal toxins have decreased since the installation of the aeration system in September 2014.

EnviroScience took

See Page A19 | Lake

Cuyahoga Falls News-Press/Phil Keren photo

Cliff Morrison shows the compressors that are situated on top of the Silver Lake Boathouse. These compressors are part of an aeration system that has cleaned Silver Lake since its installation in September 2014.

Submitted Photo

The clarity of Silver Lake has improved substantially since the installation of an aeration system in September 2014.

A look at the cleanup of Silver Lake

THE PROBLEM:

• A few years ago, a build-up of blue-green algae blooms caused Silver Lake (the body of water) to become discolored. The proliferation of algae blooms came from an increase in phosphorus in the water due to fertilizers used on lawns and from stormwater runoff. The blue-green algae produces microcystin, an algal toxin. From 2012 to 2014, levels of the toxin in the lake "were routinely exceeding state and federal recreational standards," according to a study performed by Enviroscience. The Silver Lake Estates Board of Trustees posted signage at the lake for a short time in 2013 warning people to exercise caution in using the lake and to not ingest the water.

THE SOLUTION:

• The Board of Trustees hired Aqua Doc of Chardon in 2014 to purchase and install a new lake-wide aeration system.

• The aeration system pumps oxygen into the water constantly. The process decreased the phosphorus concentration in the lake.

• Silver Lake Estates lot owners formed a committee to educate on the public what they could do to help. The main action was to refrain from using fertilizer that contained phosphorus.

• The fertilizer industry also stopped using phosphorus in its mix.

THE RESULTS:

• After the installation of the aeration system, the lake's transparency greatly improved and the levels of blue-green algae and algal toxins in the lake decreased.

• From August 2014 to August 2016, the amount of algal toxins in the water declined from about 60 parts per billion to essentially zero parts per billion, according to an Enviroscience study.

• From August 2014 to August 2016, the level of Chlorophyll a (a pigment produced by cyanobacteria and algae) decreased from almost 180 parts per billion (just before installing the aeration system) to a little more than 20 parts per billion, according to the same study.

Sources: Silver Lake Estates Board of Trustees, Enviroscience

Lake

From Page A3

water samples monthly from May to August in both 2015 and 2016.

From August 2014 to June 2016, water transparency improved from about 1 foot to greater than 9 feet, according to an EnviroScience study. There was a drop in water transparency to 4 feet in August 2016 "following seasonal trends," according to the study. From August 2014 to August 2016, the amount of algal toxins in the water declined from about 60 parts per billion to essentially zero parts per billion, according to the study.

The concentrations of algal toxins (or microcystin) fell and remained "well below Ohio EPA's Recreational No Contact advisory threshold," stated the study. That threshold is 20 parts per billion, according to the study.

From August 2014 to August 2016, the level of Chlorophyll a (a pigment produced by cyanobacteria and algae) decreased from almost 180 parts per billion (just before installing the aeration system) to a little more than 20 parts per billion.

Lot owner education has also played a role in keeping the lake cleaner. In 2013 Silver Lake Village Council and Mayor Bernie Hovey discussed proposed legislation to ban lawn fertilizers that contain phosphorus, which supports algae growth in lakes, according to the Silver Lake Estates website.

Village Council decided to support lot owner education to discourage the use of lawn fertilizers that contained phosphorus. Lubinski also noted that the fertilizer industry stopped using phosphorus in their mix, a development that has also helped the issue.

"Everyone in Silver Lake is now aware of their part in improving water quality for Silver Lake, Crystal Lake, the Cuyahoga River and eventually Lake Erie," added Lubinski.

"Every lake has this problem," noted Morrison. "We've had [representatives with] a couple different lakes come down here and see what we're doing." Often, the organizations do not have the funds to embark on an improvement project like this, said Morrison.