

Lake Water Quality Update

By Barbara Dove and Murray Rowe

Earlier this spring, several lake residents observed an algae bloom on the lake and wondered if it presented any danger. LSMCA followed up with experts from the State's Regional Water Quality Control Board (the same folks that are overseeing the lake cleanup activities), the environmental consulting company engaged by CDC (Great Ecology) to conduct lake cleanup efforts, and with CDC officials.

Algae blooms can sometimes have cyanobacteria in them. According to Betty Fetscher, a staff biologist from the Water Board, "Cyanobacteria are nearly ubiquitous [found everywhere] in aquatic environments. They are naturally occurring and have been around for billions of years. The presence of cyanobacteria in a given water body is not, in and of itself, alarming, and does not automatically mean that conditions are dangerous. It's when they grow out of control (i.e., form a bloom), and produce toxins, that problems can arise." After recent testing by the Water Board, the lab observed cyanobacteria when the samples were examined under microscope.

Cyanobacteria are a unique and diverse class of bacteria that encompass approximately 4000 different species. Most of these species are not harmful to humans and animals with some believed to be beneficial like *Spirulina* which can be found in health food stores. However, about 46 species are known to produce harmful toxins known as cyanotoxins. These are the cyanobacteria that create headlines because their cyanotoxins can be harmful to animals or humans. Scientists have now been able to characterize four major cyanotoxins biochemically and genetically to help identify the harmful offenders. These particular species tend to reside in eutrophic lakes or oxygen impaired lakes.

So, what action has been taken to deal with the cyanobacteria and the algae bloom?

First, according to Nick Buhbe, Senior Managing Ecologist at Great Ecology, CDC obtained a permit to apply an algaecide known as Pak 27 to address the algal bloom. The application was conducted twice, May 2 and May 22. Pak 27 is a certified organic, non-copper based algaecide that is also effective with cyanobacteria.

Then, during the last week of May, the Water Board collected three water samples from different locations at the lake. These samples were analyzed to determine if toxin genes for four major cyanotoxin types were present. Good news!! Per Sarah Mearon, Engineering Geologist for the Water Board, "The genes were not detected." [Our emphasis.] As such there was no evidence at the time that we sampled the lake of the potential for toxin production."

As many of you are aware, our lake has been declared "impaired" for a number of years. Our lake has too much phosphorus which creates a nutrient rich environment that encourages algal growth. This causes diminished oxygen levels which is detrimental to other organisms. This process is called eutrophication. Lake clean-up over the past two springs/summers has involved using alum to inactivate the nutrient, phosphorus with some degree of success. This year a different treatment called Phoslock® will be used. Phoslock® is a bentonite clay product modified with the active ingredient Lanthanum. It was developed by the Land and Water Division of Australia's CSIRO (Commonwealth Scientific and

Industrial Research Organisation) to significantly reduce the amount of free reactive phosphorus (FRP) present in the water column. The effectiveness of Phoslock® is not driven by pH as it is with alum and is able to permanently bind FRP. According to Nick Buhbe, this treatment will be started as soon as the over-topping of the dam stops. He added that this will be a more long-term solution.

Aeration will also mitigate the eutrophic conditions of the lake by circulating the water. The plans for an aeration pilot test are anticipated to be submitted in June 2019. The installation of the device and its associated accessories is scheduled for October 2019 and the pilot testing to occur in January 2020, pending issuance of required permits.

It's certainly good news that no cyanotoxins were detected in the laboratory's genetic analyses and that the algae bloom was addressed, but it is important that we be vigilant in our efforts to clean up the lake. It's imperative that we reduce the eutrophic conditions that would allow any of those species of toxin producers to flourish. Removing phosphorous and installing an aeration system is a solid path forward to creating a clean and healthy lake.

LSMCA is committed to providing its members and other lake residents with accurate, timely information concerning the cleanup of Lake San Marcos.