

Algae Identification/Cyanotoxin Report

Company: Painted Hills Lakes

Water body Name: **Holiday and Nebo**

Address: **4364 Rembrandt Dr.**

Surface Area: **107 (Holiday), 39 (Nebo)**

Martinsville, IN 46151

Contact Person: **Ms. Tina Thrasher**

Average Depth: **18 feet**

Phone: **812-650-2979**

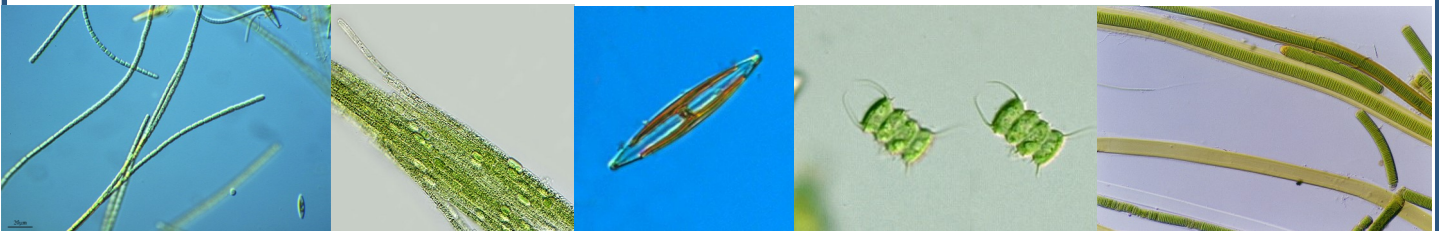
Date Sample Collected: **8/6/2018**

Email: **tthrasher6264@gmail.com**

Analysis Performed: **Algae ID, Enumeration and Colorimetric Cyanotoxin detection (Microcystin)**

Algae Identification Results (5 most prevalent Species)

Identification	Classification	Growth Form Description	Density (Cells/mL)
<i>Psuedanabaena</i>	Cyanophyta (blue-green algae)	Planktonic /mat-former	106,317
<i>Aphanizomenon</i>	Cyanophyta (blue-green algae)	Planktonic	21,621
<i>Navicula</i>	Bacillariophyta	Planktonic	8,421
<i>Desmodesmus</i>	Chlorophyta (green algae)	Planktonic	5,961
<i>Lyngbya Wollei</i>	Cyanophyta (blue-green algae)	filamentous	5,202



From Left to Right: *Psuedanabaena*, *Aphanizomenon*, *Navicula*, *Desmodesmus*, *Lyngbya wollei*

Toxin Analysis Results

Analysis	Site	Concentration (ppb)	IDEM Risk Level
Colorimetric test for Microcystin	Holiday 1 (boat launch)	0.0	1: low/no risk
Colorimetric test for Microcystin	Holiday 2 (club house)	0.0	1: low/no risk
Colorimetric test for Microcystin	Nebo 1 (boat launch)	0.0	1: low/no risk

Summary of Results

Algae ID and Density

In addition to water being tested for microcystin, water samples were also screened through an IFCB (Imaging Flow CytoBot) for algae identification and enumeration. In January of 2018, Planktothrix reached nuisance and toxic levels with a density of almost 2 millions cells per milliliter (mL) of water. As part of the consultation service being provided, algae are being identified to monitor presence and densities of known toxin or odor producing algae. The 5 most prevalent species are reported in the beginning on this document. IFCB analysis identified 27 species of algae present with a total density of 175,946 cells/mL. There were 5 dominant species that accounted for 84% of the total algal density. Those algae are listed on page 1.

Of the 5 dominant species, 2 (Aphanizomenon and Pseudanabaena) make up 73% of the density and are known to be capable of producing microcystin. Other species present at low densities may also produce certain contact dermal toxins (swimmers itch), or off-odors to the water. Lyngbya for example was heavily present near the boat launch and a pungent musty odor was present (geosmin).

Algal Toxin Test

At the time of initial identification (January 24, 2018) microcystin was detected at 80-100ppb in Holiday Lake. These levels significantly exceeded recreational exposure guidelines from both the US Environmental Protection Agency (USEPA) and Indiana Department of Environmental Management (IDEM). On February 19, 2018, two samples were collected from both Holiday and Nebo Lakes by Aquatic Control. Holiday samples were collected at the boat launch where some remnant algae was observed and from a site downwind near the clubhouse. These sites were selected on the likelihood of being able to detect presence of the toxin. Samples at Nebo were collected at the boat ramp and a protected cove in the North end of the lake. Samples were sent to Phycotech for analysis. All 4 samples tested negative (0.0ppb) for Microcystin. This new testing places the water in both lakes under IDEM/USEPA recreational use risk category 1 (<4ppb, low or no risk of exposure). This is good news as there were a high concentration of cyanobacteria that are capable of producing Microcystin present in the water, however, they are not producing.

Recommendations

Precautions

At this time the results of toxin monitoring indicate that no water use restrictions need to be observed. Residents should remain observant if a bloom occurs. Monitoring will continue through December 2018 and changes to water use precautions will be reported after each sampling event. At the present time, since the relative density of cyanobacterial harmful algal bloom species (CHABs) are high, residents are encouraged to be vigilant and watchful for signs of toxin production such as dead fish (large quantities of dead fish would signal a cause other than natural mortality) or wildlife near the lake. Also avoid swimming in areas where floating algae mats are present.

Algae Management

With algae densities in excess of 100,000 cells/mL, an immediate treatment is recommended. Applying algaecide to control cyanobacteria does not release toxins within the cell, but does prevent any further production and reduces the likeliness of toxin production. Cell densities of 15,000 are considered hypereutrophic and should be treated, however treating prior to this density (around 10,000 cells/mL) is recommended to prevent issues from occurring.