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# HIGGINS LAKE WATER ANALYSIS

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## Report #19



AUGUST 27, 2020  
RAVEN ANALYTICAL  
104 First street

# Higgins Lake Report

The Higgins Lake Property Owners Association (HLPOA) approached Raven Analytical Laboratory in Roscommon, Michigan in 2018 to provide water testing on Higgins Lake.

This report covers testing at Big Creek and little Creek in August of 2020.

Based on the data provided for testing from USGS suggestions and the concern(s) about the water quality on Higgins Lake, the following testing protocols are performed.

## Water Tests:

1. Phosphorus
  - a. Total phosphorus is reported in milligrams/liter (mg/L)
2. Nitrate
  - a. Nitrate is reported in milligrams/liter (mg/L)
3. Nitrite
  - a. Nitrite is reported in milligrams/liter (mg/L)
4. pH
  - a. pH is measured on a 1 to 14 scale with pure water being a pH of 7.0
5. Dissolved Oxygen
  - a. Dissolved oxygen is reported in milligrams/liter (mg/L)
6. Total dissolved solids (TDS)
  - a. measured in parts per million
7. Conductivity
  - a. Conductivity is reported in microsiemens per centimeter (uS/cm)
8. Beach Plate Count; MPN
  - a. Most probable number (MPN) is measured in colonies per 100 milliliters of cultured water
9. Beach Plate count: E-coli
  - a. Most probable number (MPN) E-coli is measured in colonies per 100 milliliters of cultured water

All water analysis was performed at Raven Analytical Laboratory in Roscommon using EPA approved test methods. This lab is an EPA certified water analysis laboratory (#9954) and has two certified water sanitarians on staff at Roscommon.

1. Water quality tests were performed in April, 2020 at Big Creek and little Creek, Higgins Lake. Testing results are shown below:

<u>Site</u>	<u>Big Creek Military Road</u>	<u>Mouth of Big Creek</u>
<b>Phosphorus</b>	1.6	0.55
<b>Nitrogen (Nitrate)</b>	0.477	0.503
<b>Nitrogen (Nitrite)</b>	N.D.	N.D.
<b>Beach Plate Count; MPN</b>	158	238
<b>Beach Plate Count; e-coli MPN</b>	5.0	22
<b>pH</b>	7.64	7.62
<b>Dissolved Oxygen</b>		
<b>Total Dissolved Solids</b>	86.0	117
<b>Water Temperature; C</b>	6.7	6.7
<b>Air Temperature; C</b>		
<b>Conductivity; uS</b>	170.9	220

<u>Site</u>	<u>Little Creek Military Road</u>	<u>Mouth of Little Creek</u>
<b>Phosphorus</b>	0.75	0.45
<b>Nitrogen (Nitrate)</b>	0.738	0.470
<b>Nitrogen (Nitrite)</b>	N.D.	N.D.
<b>Beach Plate Count; MPN</b>	344	249
<b>Beach Plate Count; e-coli MPN</b>	0	26
<b>pH</b>	7.85	7.83
<b>Dissolved Oxygen</b>		
<b>Total Dissolved Solids</b>	80.5	137
<b>Water Temperature; C</b>	6.8	6.8
<b>Air Temperature; C</b>		
<b>Conductivity; uS</b>	164.7	280

2. Water quality tests were again performed in July, 2020 at Big Creek and little Creek, Higgins with test results shown below:

<u>Site</u>	<u>Big Creek Military Road</u>	<u>Mouth of Big Creek</u>
<b>Phosphorus</b>	0.25	0.25
<b>Nitrogen (Nitrate)</b>	0.687	1.33
<b>Nitrogen (Nitrite)</b>	N.D.	N.D.
<b>Beach Plate Count; MPN</b>	960	1011
<b>Beach Plate Count; e-coli MPN</b>	105	218
<b>pH</b>	8.29	8.59
<b>Dissolved Oxygen</b>	2.7	2.7
<b>Total Dissolved Solids</b>	114	155
<b>Water Temperature; C</b>	13.8	11.2
<b>Air Temperature; C</b>		
<b>Conductivity; uS</b>	230	308

<u>Site</u>	<u>Little Creek Military Road</u>	<u>Mouth of Little Creek</u>
<b>Phosphorus</b>	0.3	0.14
<b>Nitrogen (Nitrate)</b>	1.14	1.59
<b>Nitrogen (Nitrite)</b>	N.D.	N.D.
<b>Beach Plate Count; MPN</b>	1011	1011
<b>Beach Plate Count; e-coli MPN</b>	1011	179
<b>pH</b>	7.81	7.46
<b>Dissolved Oxygen</b>	2.6	2.5
<b>Total Dissolved Solids</b>	157	136
<b>Water Temperature; C</b>	11.4	10.9
<b>Air Temperature; C</b>		
<b>Conductivity; uS</b>	313	271

3. Water quality tests were again performed in August, 2020 at Big Creek and little Creek, Higgins with test results shown below:

<u>Site</u>	<u>Big Creek Military Road</u>	<u>Mouth of Big Creek</u>
<b>Phosphorus</b>	0.7	2.55
<b>Nitrogen (Nitrate)</b>	1.15	0.249
<b>Nitrogen (Nitrite)</b>	N.D.	N.D.
<b>Beach Plate Count; MPN</b>	1011	1011
<b>Beach Plate Count; e-coli MPN</b>	960	721
<b>pH</b>	8.32	8.47
<b>Dissolved Oxygen</b>	3.7	3.0
<b>Total Dissolved Solids</b>	127	148
<b>Conductivity; uS</b>	255	294

<u>Site</u>	<u>Little Creek Military Road</u>	<u>Mouth of Little Creek</u>
<b>Phosphorus</b>	1.15	0.55
<b>Nitrogen (Nitrate)</b>	0.72	0.889
<b>Nitrogen (Nitrite)</b>	N.D.	N.D.
<b>Beach Plate Count; MPN</b>	1011	1011
<b>Beach Plate Count; e-coli MPN</b>	1011	574
<b>pH</b>	8.25	8.29
<b>Dissolved Oxygen</b>	4.1	4.0
<b>Total Dissolved Solids</b>	130	169
<b>Conductivity; uS</b>	262	335
<b>Lead</b>	<b>0.007</b>	
<b>Arsenic</b>	<b>0</b>	

Two additional test were performed for informational purposes. These included lead and arsenic tests. The results are included in the information above.

Submitted by:

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CEO

QuadSil/Raven Analytical