2014 Three Lakes Internship Report

Presented by Meike Stoldt and Caitlin Scroggins from Elk Rapids High School, Haley Dole From Traverse City West High School, and Kyle Russell from Central Lake High School

Watermilfoil

- Freshwater aquatic plant located in Northern Michigan (among other areas)
- Native species is beneficial to the environment while…
- Eurasian watermilfoil is an invasive species. EWM's ability to adapt to cold and deep water gives it an evolutionary advantage over native milfoil.
- EWM grows taller and can hinder recreational boating. It blocks the sun from reaching other native plants and thus wipes out plant populations essential to the survival of the aquatic ecosystem.
- The two types of milfoil have also started interbreeding, forming a hybrid. Is this good or bad?
- Differences between Native and Eurasian Watermilfoil

Pictured Left:
Native Watermilfoil

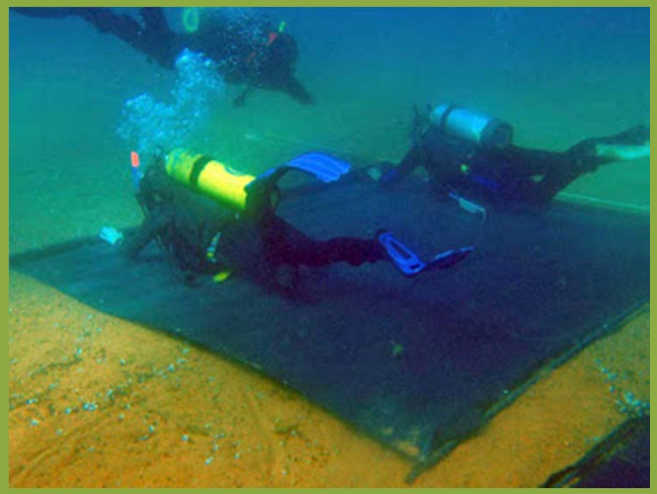
Pictured Right:
Eurasian Watermilfoil

Table 1: 2014 Watermilfoil Sample Results

Site Location	Sample #	Species
Alden Harbor at Torch Lake	1	Eurasian watermilfoil (Myriophyllum spicatum)
Alden Harbor at Torch Lake	2	Eurasian watermilfoil (Myriophyllum spicatum)
Alden Harbor at Torch Lake	3	Eurasian watermilfoil (Myriophyllum spicatum)
Butch's Marina, Torch Lake	4	Eurasian watermilfoil (Myriophyllum spicatum)
Butch's Marina, Torch Lake	5	Eurasian watermilfoil (Myriophyllum spicatum)
Embayment on Torch Lake	6	Eurasian watermilfoil (Myriophyllum spicatum)
Embayment on Torch Lake	7	Eurasian watermilfoil (Myriophyllum spicatum)

Torch Lake Eurasian Watermilfoil History

- 1997: EWM first discovered at Butch's Marina
- 1998: Benthic barriers placed at Butch's in hopes to eliminate the EWM. Results showed limited success
- 2005: Butch's Marina is treated with the chemical Navigate which eliminated most of the EWM.
- 2011: Suction Harvesting done a Alden Harbor and the Embayment between Stony and Lone Tree Point. Weather conditions limited success.
- 2012: Butch's Marina and Alden Harbor are found to be severely infested with EWM. GPS coordinates are taken of all the sightings. EWM sighted in the Embayment.
- 2013: Alden Harbor and Butch's chemically treated with Renovate in June and July. Treatment appeared successful upon inspection. EWM continued to be present in small amounts.
- 2014: EWM found in abundant amounts at Alden Harbor, Butch's Marine, and the Embayment. Chemical treatment of the Alden Harbor and Butch's was considered but not further discussed. The interns agreed that benthic barriers could work in the Embayment. The Three Lakes association is still waiting on DEQ approval to place the benthic barriers.



Maury Creek

Before the other interns and I took GPS Points on Maury Creek everybody when Off of arials or guesses.
The interns did the following activity's

- E.coli Sampling
- Fish Shocking (found a 6in. Fish)
- Macroinvertebrate Sampling
- Culvert Evaluation
- Erosion Evaluation
- Core Sampling
- Recorded GPS points
- Used the Hydrolab

Erosion on the banks

Inspecting a culvert

Becky and I taking Core samples

Maury Creek

Woody Debris

Undercut Bank

Map to Maury Creek

- GPS Points
- Maury Creek

0 170 340 680 Feet

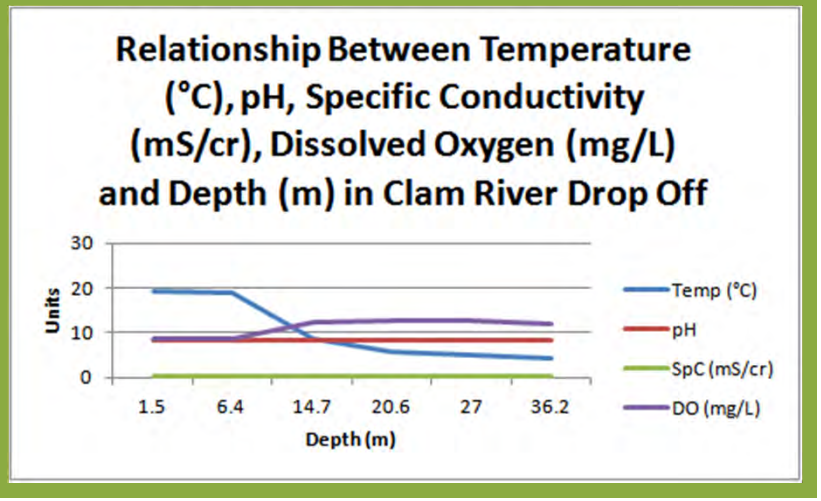
1 inch = 225 feet

N W E S

August 21, 2014

Hydrolab

- The Quanta Hydrolab is a system used to monitor water quality.
- Commonly used to measure Temperature, pH, Dissolved Oxygen (DO), Specific Conductivity (SpC), and depth.
- Measurements were taken at various depths off of the Clam River drop off, the trend noticed in the data is as depth increases temperature decreases, pH decreases, specific conductivity seems to remain steady with some small variation, and dissolved oxygen increases.



Hydrolab

- Nothing was out of the ordinary for the data collected in sites surveyed in previous years.
- Several of the sites were new to this year, all data collect from those sites seem to be of normal levels.

Site Name		Time	Temp °C	pH	SpC mS/cr	DO % sat	DO mg/L	Depth m
Coded	Common							
L001AE	Torch lake offshore of Clam River	9:46	19.35	8.36	0.302		8.76	0.8
R004AA	Clam River @ Butch's	10:16	21.16	8.24	0.351		8.34	1.0
L002AH	Clam Lake @ CLMP 050101	[illegible]	20.37	7.75	[illegible].355		[illegible] 5.20	6.4
R005AB	Grass River outlet @ Clam Lake	10:46	[illegible].41	8.40	0.351		8.92	1.1
C007AC	Finch Creek @ Grass River	10:55	15.42	8.40	0.350		8.50	0.4
C006AD	Cold Creek @ Grass River	11:21	10.03	8.19	0.375		9.45	0.6
C005AB	Shanty Creek @ Grass River	11:32	20.76	8.51	[illegible].346		11.33	0.5
L003AC	Lake Bellaire @ Grass River inlet	11:52	22.07	8.53	0.343		9.03	0.4
C023AB	Maury Creek @ Lake Bellaire	13:08	15.49	8.39	0.584		10.61	.1
C023AA	Maury Creek @ Fisherman's Paradise Rd	13:14	15.68	8.29	0.580		9.81	.1
C023AC	Maury Creek @ old RR grade	13:19	15.57	8.46	0.586		9.42	.1
C023AD	Maury Creek @ M-88 inflow	13:30	16.05	8.49	0.574		[illegible] 10.50	.1
C023AE	Maury Creek @ Pond outflow	13:41	17.19	8.11			12.93	.1
C023AF	Maury Creek @ Pond inflow	13:45	16.32	8.45	0.616		9.18	.1

Macroinvertebrate Sampling

- Bugs are shuffled out by someone in waders and captured in a D-net. This procedure is repeated every few feet in various habitats such as undercut banks, pools, and woody debris up to about 100 feet upstream, taking approximately 30 minutes to execute.
- After tallying all the macroinvertebrates we collected we came to the conclusion that Maury Creek is of good health with a score of 36.7.

Dragonfly Nymph

Caddisfly Larvae

Scud

Macroinvertebrate Sampling

- By doing an macroinvertebrate inventory on a stream, the general healthiness of the stream can be determined. This is because more macroinvertebrates equals more food for the fish.
- The weight of specimens found is based on the sensitivity of that organism. Then the score is tallied up and placed within a range to gauge health. Any score higher than 48 is excellent, 34-48 is good, 19-33 is fair, and anything under 18 is poor.

		StreamQuality Score and Grade Determination										
Location	Date	Group 1 R	Group 1 C	Group 2 R	Group 2 C	Group 3 R	Group 3 C	Group 1 Score	Group 2 Score	Group 3 Score	Total Stream Quality Score	Final Grade
Maury Creek @Fishermans	6/22/2010	1	1	4	2	3	0	10.3	18.4	3.3	32	Fair
N 44.95151 W 85.20174	10/13/2010	2	0	4	2	1	0	10	18.4	1.1	29.5	Fair
	6/29/2011	1	0	3	1	0	0	5	12.2	0	17.2	Poor
	6/18/2012	1	0	3	2	0	0	5	15.4	0	20.4	Fair
	6/20/2013	1	1	6	2	2	2	10.3	24.4	4.2	38.9	Good
	10/15/2013	2	0	5	2	0	1	10	21.4	1	32.4	Fair
	6/26/2014	2	1	5	1	2	1	15.3	18.2	3.2	36.7	Good

Fish Shocking

During late July, Three Lakes Association Interns and Heather Hettinger, fisheries management biologist in the DNR's Central Lake Michigan Management Unit, shocked portions Maury Creek and Grass Creek to assess the fish populations.

Shocking the streams allowed the Three Lakes Interns to view the fish populations and diversity within the populations at each creek.

Fish Shocking

Three Lakes interns shocked approximately 100ft of Maury Creek and 80ft of Grass Creek, starting downstream and traveling upstream.

In Maury creek Three Lakes Interns were surprised to find a six inch Brook Trout.

In Grass Creek the fish population was much higher.
Three lakes interns collected around twelve mud minnows ranging from 1-4 inches, crayfish, suckers, sculpins and several wood frogs and green frogs.

Torch Lake E. coli Samples

- Escherichia coli, more commonly referred to as E. coli, is a bacterium found in the intestines of warm blooded animals.
- Virulent strains of E. coli can cause intestinal illnesses as well as other infections in humans.
- This is why it is vital to test E. coli levels at beaches and in the swim areas of lakes.
- E. coli is present at higher concentration in sand than in water… one can see this on the table on the next slide.

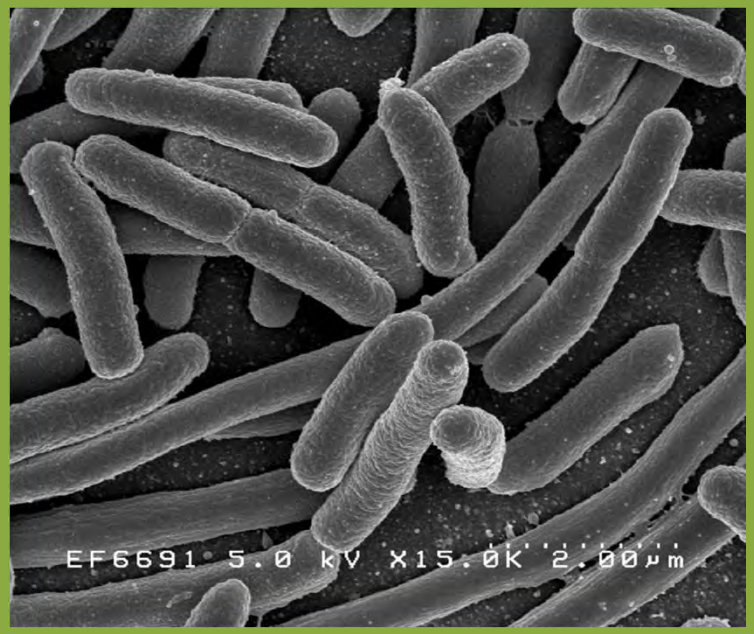
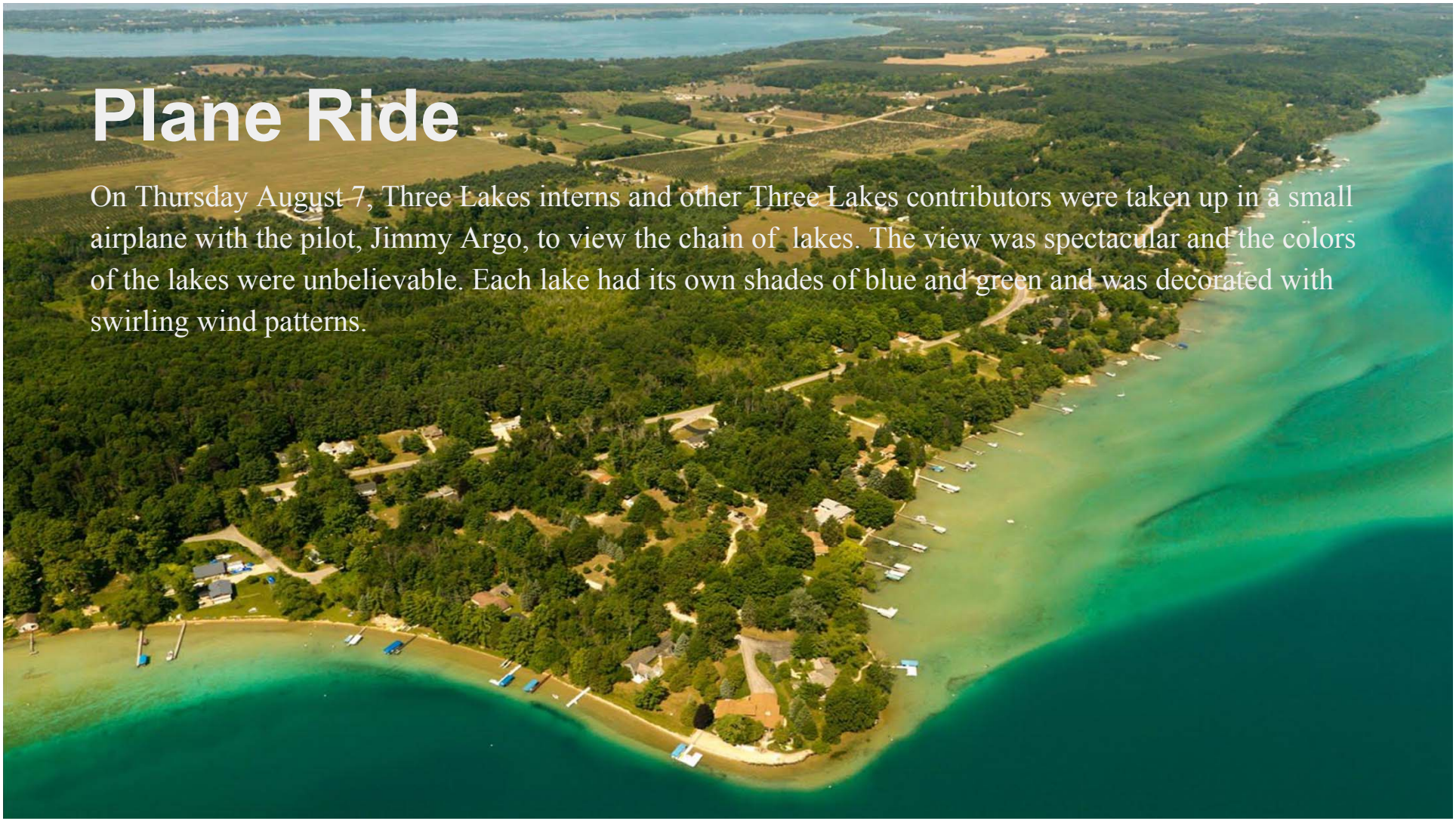


Table 2: E. coli Concentrations, Torch Lake

Site ID	Concentration	Units
Bennett @3487 NETLD	290	Colonies/100 mL
Meggison S of 3028 NETLD	74	Colonies/100 mL
Krause @253 NETLD	86	Colonies/100 mL
Torch Lake offshore from Clam River	3	Colonies/100 mL
Torch Lake at Dockside Beach	150	Colonies/100 mL
Clam River @ Butch's Marine	11	Colonies/100 mL
Clam Lake @ Clam Lake Rd Launch	6	Colonies/100 mL
W Butler @ Bellaire Hwy	37	Colonies/100 mL
Intermediate River @ Bellaire Hwy	42	Colonies/100 mL
Cedar @ Schuss Mt. Rd	15	Colonies/100 mL
Maury Creek @ Fisherman's Paradise*	461	Colonies/100 mL
Grass River @ Grass River Rd	18	Colonies/100 mL
Shanty @ M-88	16	Colonies/100 mL
Cold @ Tyler Rd	3	Colonies/100 mL
Finch @ Alden Hwy	7	Colonies/100 mL
Torch Lake @ Eastport DNR Launch	27	Colonies/100 mL
Torch Lake @ Eastport DNR Launch - S	2360	Colonies/100 mL
Eastport @ M-88	93	Colonies/100 mL
Wilkinson N of 4358 NETLD*	147	Colonies/100 mL
Do-Di-Ah-Ta @ 4054 NETLD	46	Colonies/100 mL
Spencer @ Alden Harbor	50	Colonies/100 mL
Torch Lake @ TRB DNR Launch	0	Colonies/100 mL
Under House @ 6543 NWTLD	50	Colonies/100 mL
Creek @ 6187 NWTLD	88	Colonies/100 mL
The Creek 6049 NWTLD*	387	Colonies/100 mL
NN004 @ 5843 NWTLD	39	Colonies/100 mL
Campbell @ NWTLD	35	Colonies/100 mL
McLachlan @ 1165 NWTLD	35	Colonies/100 mL
Torch Lake @ TLT Day Park	1	Colonies/100 mL
Torch Lake @ TLT Day Park - S	90	Colonies/100 mL
6132 Crystal Beach Rd. NW	10	Colonies/100 mL

* These values were retested. The numbers listed are the new values.



Plane Ride

On Thursday August 7, Three Lakes interns and other Three Lakes contributors were taken up in a small airplane with the pilot, Jimmy Argo, to view the chain of lakes. The view was spectacular and the colors of the lakes were unbelievable. Each lake had its own shades of blue and green and was decorated with swirling wind patterns.

Plane Ride

The plane ride presented a new perspective of the landscape around Torch Lake, Lake Bellaire, and Clam Lake and allowed the passengers to see how the landscape, water bodies, and human development connected.

- It was an opportunity to look for anomalies or potential problems within the lakes to be further investigated.
- The view let the passengers observe changes in sediment and changes in the depth.
- It gave us the ability to locate possible Eurasian Millfoil Sites and survey previously identified Eurasian Milfoil Sites.
- View the Clam River Plume its color, size, and shape with the current, all of which couldn't be visualized from the ground.

Public Education

To reach the public Three lakes association Interns participated in events such as Water Awareness Day at the Alden Depot and the Antrim County Fair.

Education Focuses

- Invasive Species/Eurasian Milfoil
- Runoff Pollution
- Fish Shelters
- Macroinvertebrates
- Septic system and Groundwater pollution

Recommendations

- Continue to survey Eurasian watermilfoil sites and search for other Eurasian millfoil beds.
- Educate people on benthic barriers, how to identify the different types of milfoil, and other methods of treating invasive Eurasianwatermilfoil.
- Participate in more public education and continue to gear exhibits toward children/youth to influence them on what needs to be done and what is happening now with the environment.
- Consider updating the hydrolab and/or formally training others on how to use it.
- Present/handover information regarding Maury Creek such as the new map, culvert data, and erosion data to the Maury Creek steering committee.