Elk-Skegemog Lakes

2011 Report

What would Michigan be without water? One might as well ask what the Sahara would be without sand or the Himalayas without mountains. Michigan is defined by water and, in fact, the definition of Michigan in some Native American languages literally means water, “big lake” to be precise.

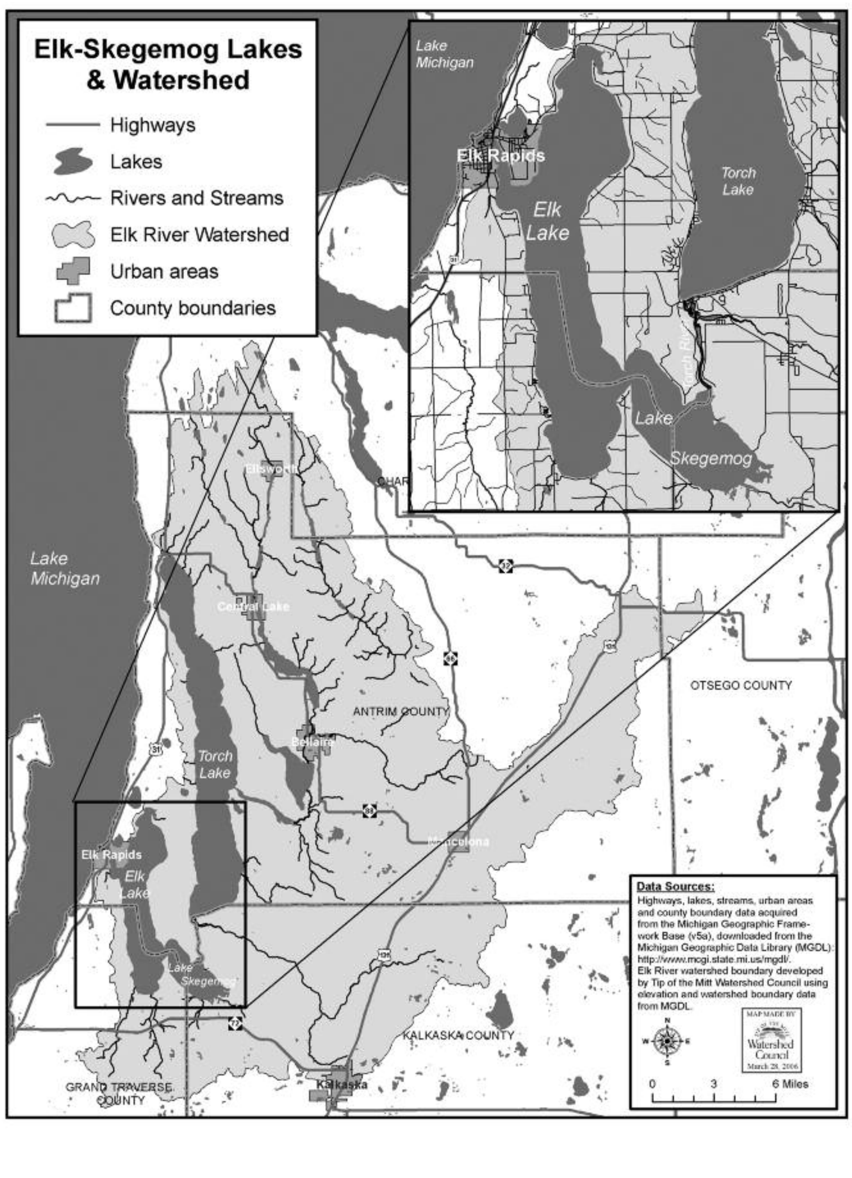
Water formed Michigan, frozen water that is, thousands of feet thick. A series of glaciers advanced and retreated across Michigan over the course of millions of years, creating the present-day landscape of rolling hills and broad plains; dotted with lakes, crisscrossed with rivers, and surrounded by freshwater seas. Glacial scouring and huge ice chunks that were left behind formed thousands of lakes across the landscape, lakes of all shapes and sizes, each unique: each beautiful and special in its own way.

Many people live in or travel through Northern Michigan because of these lakes and the character they lend to the region. Elk and Skegemog Lakes are among the most picturesque lakes in Michigan, true aquatic treasures that are experienced and enjoyed by thousands upon thousands of people every year; year after year and generation after generation. The Watershed Council has long recognized the value of Elk and Skegemog Lakes and worked diligently for decades to protect the water quality and preserve the ecosystems of these incredible lakes.

Lakes throughout Northern Michigan, whether large or small, are monitored by staff and volunteers alike who gather valuable data to keep tabs on the health of our waters. Over 50 lakes and streams in the region are monitored in early spring by Watershed Council staff on an every three year basis through our Comprehensive Water Quality Monitoring Program. Volunteers supplement the comprehensive program and fill in data gaps by collecting weekly water quality data throughout summer months as part of our Volunteer Lake Monitoring Program.

In addition to monitoring, the Watershed Council works with property owners, associations, local governments, and others on a variety of projects to protect lakes throughout Northern Michigan. Projects carried out on these lakes have ranged from lake-wide aquatic plant surveys to individual shoreline property restoration projects. Details about recent projects involving Elk and Skegemog Lakes are included in this report.

We hope you find the information presented in this report both interesting and insightful. If you have any questions, comments, or concerns, please contact Tip of the Mitt Watershed Council at (231) 347-1181 or visit our website at www.watershedcouncil.org.



Comprehensive Water Quality Monitoring

Water Quality Trends in Elk-Skegemog Lakes

Tip of the Mitt Watershed Council has consistently monitored the water quality of Northern Michigan lakes for decades as part of the Comprehensive Water Quality Monitoring Program. When the program was launched in 1987, Watershed Council staff monitored a total of 10 lakes. Since then, the program has burgeoned and now, remarkably, includes more than 50 lakes and rivers throughout the tip of the mitt. Over the course of 20+ years of monitoring, we have managed to build an impressively large water quality dataset. This unique, historical dataset is, simply put: invaluable. Data from the program are regularly used by the Watershed Council, lake and stream associations, local governments, regulatory agencies, and others in efforts to protect and improve the water resources that are so important to the region.

Every three years, Watershed Council staff head into the field in early spring, as soon as ice is out, to monitor lakes and rivers spread across the tip of the mitt. All lakes over 1000 acres and the majority of lakes greater than 100 acres in size, as well as all major rivers, are included in the program. In each of these water bodies, the Watershed Council collects a variety of physical and chemical data, including parameters such as dissolved oxygen, pH, chloride, phosphorus and nitrogen.

Water quality data collected in the field are compiled and used by Watershed Council staff to characterize water bodies, identify specific problems and examine trends over time. One obvious trend found by analyzing data from this program is that chloride (a component of salt) levels have increased significantly in many water bodies during the last 23 years. Why? We need not look any farther than ourselves to find the answer as we use salt in everything from de-icing to cooking.

The following pages contain descriptions of the types of data collected in the program as well as select data from Elk and Skegemog Lakes. We have also included charts to provide a graphic display of trends occurring in the lake. For additional information about the Comprehensive Water Quality Monitoring Program please visit our web site at www.watershedcouncil.org/protect.

Parameters and Results

pH

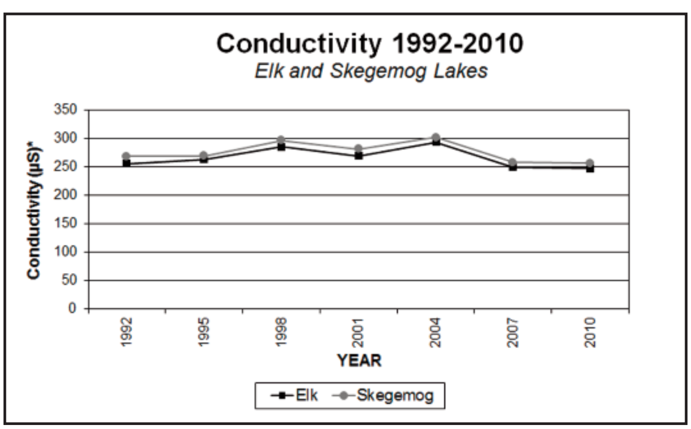
pH values provide a measurement of the acidity or alkalinity of water. Measurements above 7 are alkaline, 7 is considered neutral, and levels below 7 are acidic. When pH is outside the range of 5.5 to 8.5, most aquatic organisms become stressed and populations of some species can become depressed or disappear entirely. State law requires that pH be maintained within a range of 6.5 to 9.0 in all waters of the state. Data collected from Elk and Skegemog Lakes show that pH levels consistently fall within this range, with a minimum of 7.1 (Skegemog, 2000) and a maximum of 8.73 (Elk, 2009).

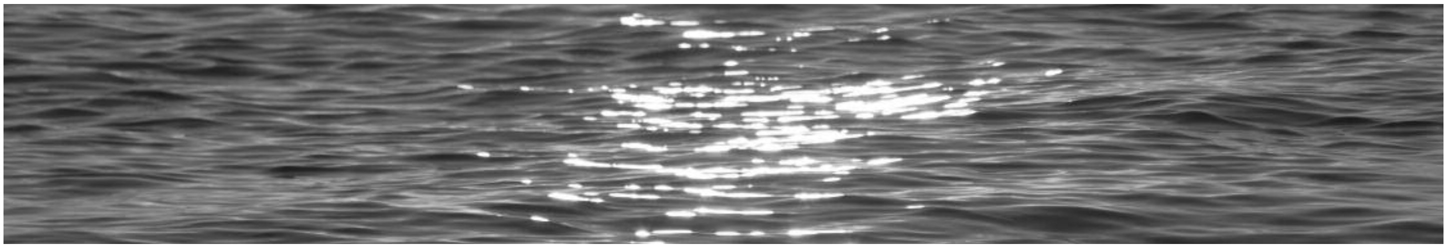
Dissolved Oxygen

Oxygen is required by almost all organisms, including those that live in the water. Oxygen dissolves into the water from the atmosphere (especially when there is turbulence) and through photosynthesis of aquatic plants and algae. State law requires that a minimum of 5 to 7 parts per million (PPM) be maintained depending on the lake type. Dissolved oxygen levels recorded in Elk and Skegemog Lakes, from lake surface to bottom, have always been above 5 parts per million and only dropped below 7 a handful of times. Measurements have ranged from 6.2 PPM (Skegemog, 2002) to 13.6 PPM (Elk, 2007).

Conductivity

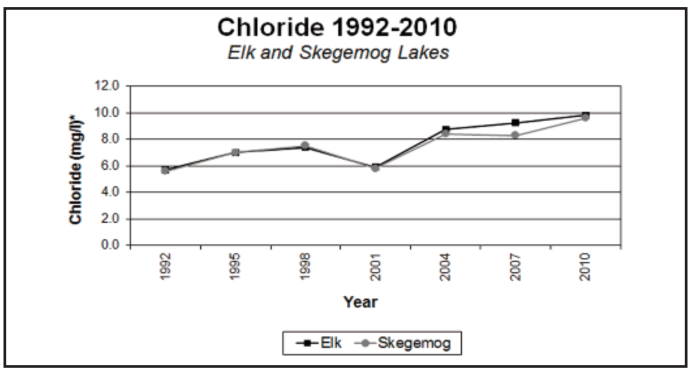
Conductivity is a measure of the ability of water to conduct an electric current, which is dependent upon the concentration of charged particles (ions) dissolved in the water. Research shows that conductivity is a good indicator of human impacts on aquatic ecosystems because levels usually increase as population and human activity in the watershed increase. Readings from lakes monitored by the Watershed Council have ranged from 175 to 656 microSiemens (µS). Conductivity levels in Elk and Skegemog Lakes have held steady in the 250-300 µS range during the last 20 years, with a low of 236 µS (Elk, 2008) and a high of 301 µS (Skegemog, 2004).





Chloride

Chloride, a component of salt, is present naturally at low levels in Northern Michigan surface waters due to the marine origin of the underlying bedrock (typically < 5 PPM). Chloride is a "mobile ion," meaning it is not removed by chemical or biological processes in soil or water. Many products associated with human activities contain chloride (e.g., de-icing salts, water softener salts, fertilizers, and bleach). Although most aquatic organisms are not affected until chloride concentrations exceed 1,000 PPM, increases are indicative of other pollutants associated with human activity (such as automotive fluids from roads or nutrients/bacteria from septic systems) reaching our waterways. Chloride concentrations in Elk and Skegemog Lakes have gradually increased from under 6 PPM in the early 1990s to around 10 PPM in 2010.

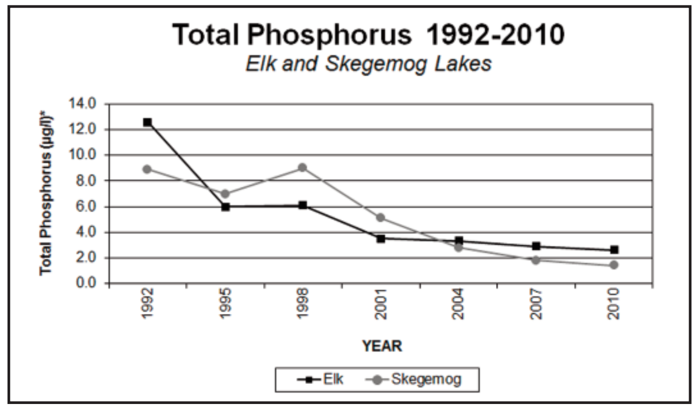


Nutrients

Nutrients are needed by organisms to live, grow, and reproduce; occurring naturally in soils, water, air, plants, and animals. Phosphorus and nitrogen are essential nutrients for plant growth and important for maintaining healthy, vibrant aquatic ecosystems. However, excess nutrients from sources such as fertilizers, faulty septic systems, and stormwater runoff lead to nutrient pollution, which can have negative impacts on our surface waters. In general, nutrient concentrations are highest in small, shallow lakes and lowest in large, deep lakes.

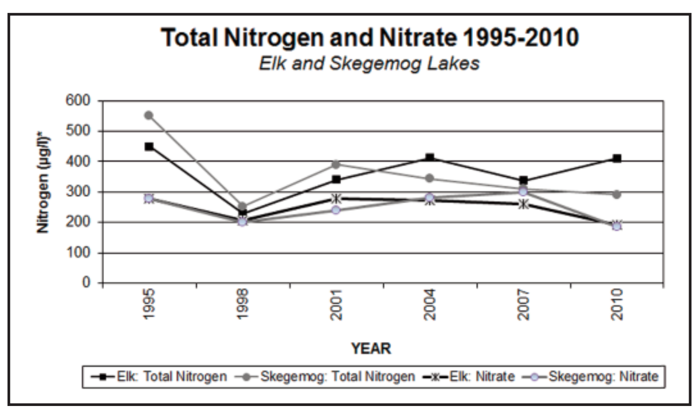
Total Phosphorus

Phosphorus is the most important nutrient for plant productivity in our lakes because it is usually in shortest supply relative to nitrogen and carbon. A water body is considered phosphorus limited if the ratio of nitrogen to phosphorus is greater than 15:1. In fact, most lakes monitored by the Watershed Council are found to be phosphorus limited. Because of the negative impacts that phosphorus can have on surface waters, legislation has been passed in Michigan to ban phosphorus in soaps, detergents, and fertilizers. Water quality standards for nutrients in surface waters have not been established, but total phosphorus concentrations are usually less than 10 parts per billion (PPB) in the high quality lakes of Northern Michigan. Total phosphorus concentrations in Elk and Skegemog Lakes have ranged from a high of 12.1 PPB (Skegemog, 1992) to a low of less than 1.0 PPB (Elk, 2010). There has generally been a trend of decreasing phosphorus levels in Elk and Skegemog Lakes over time. This decrease is probably, at least in part, due to the introduction of zebra mussels, which have filtered much of the algae out of the water column and disrupted the natural nutrient cycle in the lake.



Total Nitrogen

Nitrogen is a very abundant element throughout the earth's surface and is a major component of all plant and animal matter. Nitrogen is also generally abundant in our lakes and streams and needed for plant and algae growth. Interestingly, algae have adapted to a wide variety of nitrogen situations in the aquatic environment, some fixating nitrogen directly from the atmosphere to compete in low-nitrogen environments (blue-green algae), while others tend to thrive in nitrogen-rich environments (diatoms). Total nitrogen levels in Elk and Skegemog Lakes have ranged from 230 PPB (Elk, 1998) to 550 PPB (Skegemog, 1995). Nitrogen concentrations have gone up and down over time with no clear trend.



*Unit descriptions: mg/l = parts per million, µg/l = parts per billion, µS = microSiemens per centimeter

Comprehensive Water Quality Monitoring Program
How Does Elk - Skegemog Lakes Compare?

Water quality data from the surface of all water bodies monitored in 2010

Water Body	Date	Dissolved Oxygen (mg/l) *	Specific Conductivity (µS)*	pH (units) *	Nitrate-Nitrogen (µg/l) *	Total Nitrogen (µg/l)*	Total Phosphorus (µg/l)*	Chloride (mg/l)*
Bass Lake	4/14/10	11.21	335.3	8.53	11	584	8.8	42.9
Bear River	3/24/10	13.05	283.1	8.30	192	433	16.2	14.3
Bellaire Lake	4/23/10	11.19	315.9	8.29	347	452	3.7	10.7
Ben-way Lake	4/6/10	11.06	358.0	11.32	406	567	6.4	10.8
Birch Lake	4/14/10	11.36	271.6	8.43	3	273	5.7	20.5
Black Lake	4/28/10	10.87	289.3	8.34	27	265	6.8	6.0
Black River	4/15/10	10.54	254.1	8.16	20	308	4.0	4.3
Boyne River	3/26/10	12.71	359.0	8.45	390	626	7.0	11.4
Burt Lake	4/28/10	10.68	297.2	8.32	94	240	3.7	11.5
Charlevoix, Main Basin	4/19/10	12.52	272.7	8.38	343	474	1.4	11.1
Charlevoix, South Arm	4/19/10	11.80	280.8	8.34	427	547	1.3	9.9
Cheboygan River	4/15/10	9.41	285.0	8.35	34	269	2.9	8.5
Clam Lake	4/23/10	10.76	317.6	8.25	322	423	2.7	10.0
Crooked Lake	3/24/10	11.72	252.8	8.51	269	443	8.7	8.7
Crooked River	4/21/10	10.76	293.9	8.50	137	296	4.5	9.4
Deer Lake	3/26/10	11.63	265.4	8.45	53	411	4.6	15.2
Douglas Lake	3/30/10	11.27	214.8	8.25	55	544	7.8	7.3
Elk Lake	**4/19/10**	**12.80**	**246.7**	**8.35**	**193**	**411**	**9.6**	**9.8**
Elk River	4/14/10	12.49	261.3	8.51	205	313	2.0	10.0
Ellsworth Lake	3/29/10	10.39	374.8	8.09	404	696	7.0	11.6
Hanley Lake	4/5/10	10.53	367.3	8.27	451	725	3.0	10.9
Huffman Lake	3/26/10	10.66	287.2	8.36	84	248	2.3	4.5
Huron, Duncan Bay	4/22/10	10.85	278.6	8.36	77	322	3.6	9.7
Indian River	4/21/10	11.32	301.4	8.48	75	226	1.6	12.4
Intermediate Lake	4/23/10	10.63	344.8	8.25	363	458	3.2	11.8
Jordan River	3/29/10	10.22	340.5	8.22	1122	1567	8.3	7.1
Lancaster Lake	4/1/10	8.49	276.0	7.72	75	596	6.9	9.1
Larks Lake	3/30/10	11.62	213.0	8.51	76	706	4.8	4.3
Little Sturgeon River	4/21/10	11.36	320.1	8.35	54	228	2.9	14.5
Long Lake	4/15/10	11.17	206.2	8.19	57	355	6.3	9.0
Maple River	4/22/10	10.30	275.9	8.16	308	544	4.5	6.4
Marion Lake	5/10/10	no data	no data	no data	<1	482	9.0	22.2
Michigan, Bay Harbor	5/3/10	11.31	277.0	8.16	284	493	2.2	14.8
Michigan, Grand Traverse Bay	4/28/10	12.40	241.1	8.26	251	360	1.4	11.8
Michigan, Little Traverse Bay	5/10/10	12.03	244.5	8.29	268	373	2.2	12.8
Mullett Lake	4/22/10	11.63	298.0	8.37	56	287	2.7	11.7
Munro Lake	4/1/10	11.55	215.4	8.41	36	1022	13.3	4.9
Nowland Lake	4/14/10	11.09	190.1	8.47	7	583	5.4	6.2
Paradise Lake	4/22/10	10.52	207.2	8.30	8	325	5.0	11.2
Pickerel Lake	3/24/10	11.26	261.6	8.26	183	453	3.1	7.3
Pigeon River	4/21/10	10.09	341.5	8.37	35	233	3.8	6.5
Pine River, Charlevoix	4/14/10	12.42	268.2	8.36	273	349	0.5	11.2
Round Lake (Emmet Cty)	3/30/10	11.95	306.3	8.52	49	739	2.9	25.9
Silver Lake (Wolverine)	4/20/10	10.65	194.4	8.35	26	247	3.3	4.9
Six-mile Lake	3/29/10	10.52	333.5	8.14	279	541	4.4	7.2
Skegemog Lake	**4/19/10**	**10.87**	**255.8**	**8.45**	**186**	**292**	**1.4**	**9.6**
Spring Lake	3/24/10	12.46	529.9	8.21	1397	1457	5.3	90.0
St. Clair Lake	3/29/10	10.49	351.0	8.14	260	560	5.4	8.8
Sturgeon River	4/22/10	11.03	374.0	8.33	194	273	1.0	13.9
Susan Lake	3/26/10	12.04	282.7	8.36	111	685	8.0	10.5
Thumb Lake	4/1/10	10.99	200.7	8.22	38	301	10.0	5.1
Torch Lake	4/23/10	12.39	260.3	8.31	270	371	0.7	8.0
Twin Lakes	4/23/10	11.49	259.6	8.32	27	393	9.7	2.2
Walloon, Foot	4/28/10	10.31	265.5	8.29	75	316	3.2	12.8
Walloon, Mud Basin	4/28/10	9.14	296.8	8.30	25	371	9.3	16.4
Walloon, North Arm	4/28/10	9.53	298.0	8.32	194	539	5.3	14.5
Walloon, West Arm	4/28/10	10.66	259.8	8.29	134	377	3.0	11.1
Walloon, Wildwood Basin	4/28/10	10.29	260.6	8.32	68	274	3.4	12.3
Wildwood Lake	4/20/10	10.35	295.0	8.38	<1	332	11.9	16.0
Wilson Lake	4/7/10	10.50	358.7	8.28	433	800	5.3	10.7

*Unit descriptions: mg/l = milligrams/liter (parts per million), µg/l = micrograms/liter (parts per billion), µS = microSiemens per centimeter

The Dirt on the Rapid and Grass Rivers

How much dirt (sediment) could and should a stream transport?

This is the question that the Elk River Chain of Lakes Stream Study Group is attempting to answer in regards to the Rapid River in Kalkaska County, the Grass River in Antrim County, and connecting tributaries. Throughout the summer of 2011, volunteers from Three Lakes Association, Elk-Skegemog Association, Friends of Rapid River, and the Friends of Clam Lake worked hard to collect a variety of data from the study streams. The Tip of the Mitt Watershed Council, Watershed Center of Grand Traverse Bay, Michigan Department of Natural Resources, Grand Traverse Bay Band of Ottawa and Chippewa Indians, and the County Conservation Districts have been involved with coordinating volunteer activities and assisting with field work.

To arrive at an answer to the question, discharge (i.e, the volume of water flowing down the stream) and suspended solids have been repeatedly measured at multiple locations in each river system. Taking it a step further, the volunteers have hiked the lengths of the tributaries of the Grass River: Shanty, Cold, and Finch Creeks; as well as much of the Rapid River, to document sources of sediments, such as eroding stream banks. In addition, volunteers have surveyed all the road-stream crossings in each river systems to assess sediment inputs from these sources.

The next question is: how to reduce sediment inputs in these river systems?

Thanks to volunteer efforts, we now have much of the information necessary to answer this question. Road-stream crossings and eroded areas will be evaluated using volunteer data and repairs prioritized based on the evaluation. Concurrently, a professional hydrologist from the College of Brockport in New York will incorporate the data collected by volunteers into models that that will help analyze and solve problems.

Piece by piece, particle by particle, this collaborative effort among myriad organizations and agencies is uncovering the dirt on the Rapid and Grass Rivers. The Watershed Council will continue working with partners to monitor these river systems in the coming year and begin the process of fixing problems.

Volunteer Lake Monitoring

Local Volunteers Monitor & Protect Our Lakes

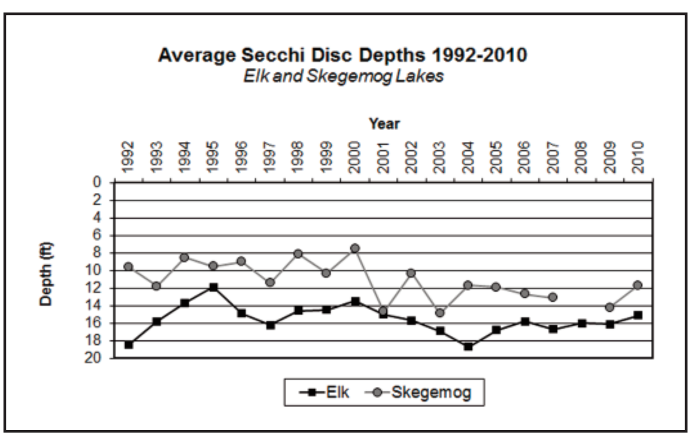
Since 1984, Tip of the Mitt Watershed Council has coordinated the Volunteer Lake Monitoring program (VLM), relying upon hundreds of volunteers to monitor the water quality of dozens of lakes in the northern Lower Peninsula of Michigan. During the most recent summer for which data are available (2010), 51 volunteers monitored water quality at 32 stations on 25 lakes.

A remarkable amount of data has been generated by the VLM program and is available to the public via our web site (www.watershedcouncil.org/protect). This data is essential for discerning short-term changes and long-term trends in the lakes of Northern Michigan. Ultimately, the dedicated effort of volunteers and staff will help improve lake management and protect and enhance the quality of Northern Michigan's waters.

Volunteers measure water clarity on a weekly basis using a Secchi disc. Every other week volunteers collect water samples to be analyzed for chlorophyll-a. Staff at the Watershed Council process the data and determine Trophic Status Index (TSI) scores to classify the lakes and make comparisons. Volunteers have monitored water quality in Burt Lake over the past few decades. The following section summarizes the parameters monitored and results.

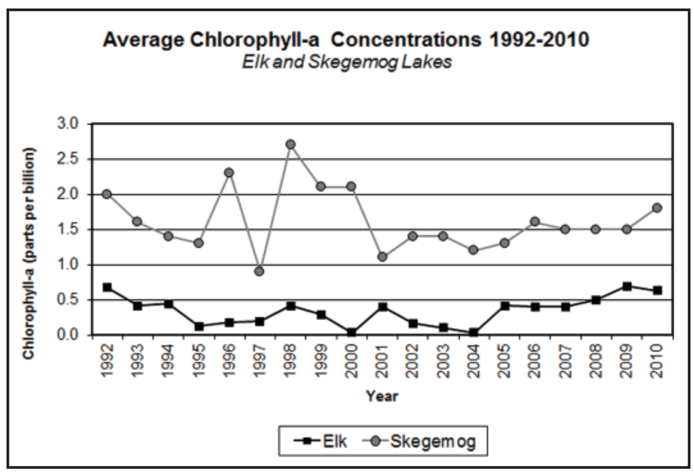
Secchi Disc

The Secchi disc is a weighted disc (eight inches in diameter, painted black and white in alternating quarters) that is used to measure water clarity. The disc is dropped down through the water column and the depth at which it disappears is noted. Using Secchi disc measurements, we are able to determine the relative clarity of water, which is principally determined by the concentration of algae and/or sediment in the water. The clarity of water is a simple and valuable way to assess water quality. Lakes and rivers that are very clear usually contain lower levels of nutrients and sediments and, in most cases, boast high quality waters. Throughout the summer, different algae types bloom at different times, causing clarity to vary greatly. Secchi disc depths have ranged from just a few feet in small inland lakes to over 80 feet in large inland lakes and Great Lakes' bays!



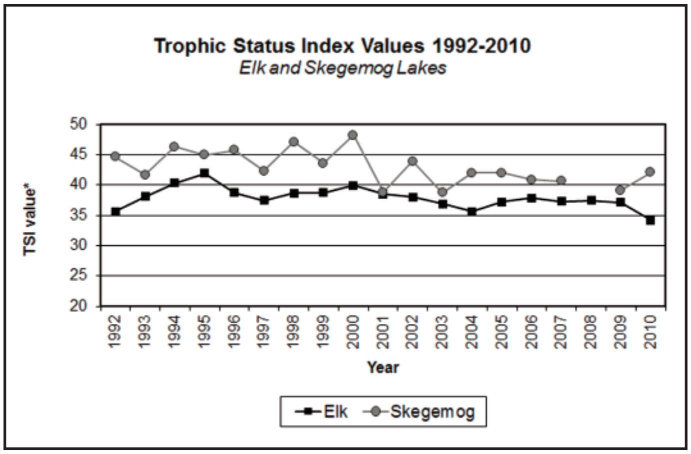
Chlorophyll-a

Chlorophyll-a is a pigment found in all green plants, including algae. Water samples collected by volunteers are analyzed for chlorophyll-a to estimate the amount of phytoplankton (minute free-floating algae) in the water column. There is a strong relationship between chlorophyll-a concentrations and Secchi disc depth. Greater amounts of chlorophyll-a indicate greater phytoplankton densities, which reduce water clarity and, thus, the Secchi disc depth as well. So why collect chlorophyll-a data? The chlorophyll-a data provides support for Secchi disc depth data used to determine the productivity of the lake, but it can also help differentiate between turbidity caused by algal blooms versus turbidity caused by other factors such as sedimentation or calcite.



Trophic Status Index

Trophic Status Index (TSI) is a tool developed by Bob Carlson, Ph.D. from Kent State University, to determine the biological productivity of a lake. Formulas developed to calculate the TSI value utilize Secchi disc depth and chlorophyll-a measurements collected by our volunteers. TSI values range from 0 to 100. Lower values (0-38) indicate an oligotrophic or low productive system, medium values (39-49) indicate a mesotrophic or moderately productive system, and higher values (50+) indicate a eutrophic or highly productive system. Lakes with greater water clarity and smaller phytoplankton



populations would score on the low end of the scale, while lakes with greater turbidity and more phytoplankton would be on the high end.

TSI values are an indication of a lake's biological productivity. Oligotrophic lakes are characteristically deep, clear, nutrient poor, and with abundant oxygen. On the other end of the spectrum, eutrophic lakes are generally shallow and nutrient rich. A highly productive eutrophic lake could have problems with oxygen depletion whereas the low-productivity oligotrophic lake may have a lackluster fishery. Mesotrophic lakes lie somewhere in between and are moderately productive.

Depending upon variables such as age, depth, and soils, lakes are sometimes naturally eutrophic. However, nutrient and sediment pollution caused by humans can lead to the premature eutrophication of a lake, referred to as "cultural eutrophication". Cultural eutrophication can affect the fisheries, lead to excessive plant growth, and result in algal blooms that can be both a nuisance and a public health concern.

(2010 TSI Values for all lakes on back page.)

Results from Elk and Skegemog Lakes

Elk and Skegemog Lakes are connected via a wide channel and are, in a sense, one lake. However, the lakes are distinct and merit individualized attention. Therefore, volunteers monitor sites in both lakes, which they have done consistently for decades. Efforts by these dedicated volunteers produce results: long-term Secchi disc and chlorophyll-a data that allow Watershed Council staff to assess water quality and examine changes over time.

Although not pronounced, average Secchi disc depths in Elk and Skegemog Lakes appear to be increasing over time. This trend towards greater water quality is most evident in Lake Skegemog, which increased from approximately 8-10 feet in the 1990s to around 12-14 feet in recent years. Average chlorophyll-a concentrations in both lakes have gone through changes over time, but without any discernable long-term trends.

The increase in average Secchi disc depths may be a repercussion of the introduction of invasive zebra mussels *(Dreissena polymorpha)*, which have been present in Elk and Skegemog Lakes for a number of years. Zebra mussels are filter-feeders that prey upon algae and essentially clear the water column. Unfortunately, zebra mussels are not cleaning the water, but rather removing the algae that are the base of the food chain. This loss of primary productivity (i.e., algae) alters the entire food web, ultimately leading to a reduction in top predator fish populations, such as trout or walleye. On a positive note, zebra mussels are reportedly no longer as common as they once were on many large lakes in the area, which indicates that they may have passed their peak and that many of these lake ecosystems appear to be approaching a new equilibrium.

Not surprisingly, data show that the trophic state of Elk and Skegemog Lakes has changed. Trophic status index scores from the first 9 years of monitoring showed that Elk Lake bordered between the oligotrophic and mesotrophic categories and that Lake Skegemog was clearly in the mesotrophic range. Since the year 2000, both lakes have gradually become less biologically productive; Elk moving deeper into the oligotrophic category and Skegemog now bordering on oligotrophic. Data from the Comprehensive Water Quality Monitoring program also attest to this decrease in biological productivity as total phosphorous concentrations have dropped considerably since the early 1990s. Zebra mussels appear to have altered the Elk and Skegemog Lakes food web and reduced its biological productivity, perhaps for the long term. However, data show that water quality remains high, with abundant stores of dissolved oxygen throughout the water column.

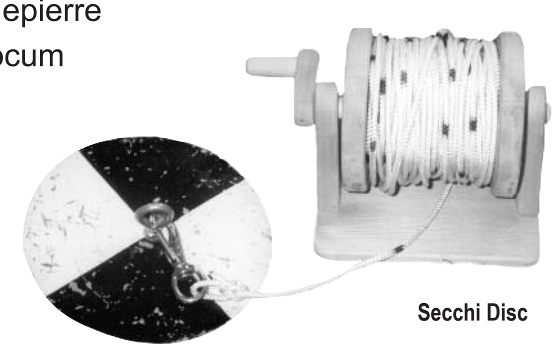
Clearly, volunteers are doing an excellent job of monitoring Elk and Skegemog Lakes. Without their dedication and enthusiasm, we would have much less data to assess lake health and fewer eyes on our precious waters. Thus, we can not thank our volunteers enough for the critical roles they play in helping protect the lakes of Northern Michigan. We and the waters of Northern Michigan are eternally grateful! Of course, alternates are always needed, so please consider joining the program to help protect and preserve Elk and Skegemog Lakes.

If you would like to get involved or would like additional information, please contact the program coordinator, Kevin Cronk, at (231) 347-1181 ext. 109 or by e-mailing kevin@watershedcouncil.org.

Thank you

Volunteer Lake Monitors on
Elk and Skegemog Lakes

Dale Claudepierre
Thomas Yocum



Secchi Disc

*Unit descriptions: mg/l = parts per million, µg/l = parts per billion, µS = microSiemens per centimeter

Elk and Skegemog Lake Fish Populations

By Dave Clapp
Watershed Council Board Member

Compared with trees, or even other animals, fish are difficult to count. They move constantly, don't leave much behind in the way of tracks or droppings, and live in large, murky underwater realms that make the job of a fisheries biologist difficult. To evaluate fish populations, biologists use both "fishery-dependent" (counts of anglers' catch) and "fishery-independent" (netting or electrofishing) surveys. Elk and Skegemog Lakes have been sampled using both strategies in recent years, so we have a pretty good understanding of the current status of fish populations in these waters. The most recent surveys were conducted in 2008-09, as part of the Michigan Department of Natural Resources (MDNR) "Large Lakes Program". The netting and electrofishing portions of these surveys collected 25 species of fish in total. More than 100 individuals were collected for 14 of these species, including common game fish (e.g., rock bass, yellow perch, smallmouth bass) as well as large and small non-game species (e.g., longnose gar and mimic shiner).

Anglers took about 15,000 fishing trips on the Elk / Skegemog system during 2008-09, fishing for a total of 54,000 hours. Fishing effort appeared similar to that observed in the most recent previous creel survey (1996). The majority of angler harvest in these lakes was composed of eight species: northern pike, smallmouth bass, yellow perch, bluegill, rock bass, pumpkinseed sunfish, lake trout, and lake herring. More than 27,000 yellow perch and more than 16,000 smallmouth bass were caught during the 2008-09 fishing season!

In addition to the standard fisheries surveys conducted on Elk and Skegemog Lakes in recent years, research is ongoing to answer questions related to muskellunge and lake trout populations in this system. Specifically, biologists are determining movement patterns and habitat selection by a population of Great Lakes muskellunge, and evaluating how lake trout in Elk Lake relate to historic Great Lakes populations.

Based on recent surveys, the status of fish populations in the Elk/Skegemog system is good. Together with the other lakes and tributary streams that make up the Elk River Chain of Lakes, they're a real Northern Michigan treasure.

For more information:

Fuller, D.R. 2001. ***Fish of the Elk River Chain of Lakes: a Watershed Perspective***. Tip of the Mitt Watershed Council.

Elk – Skegemog Lake Association, P.O. Box 8, Elk Rapids, Michigan 49629.

Michigan Department of Natural Resources
Large Lakes Program: http://www.michigan.gov/dnr/0,4570,7-153-10364_52259-160193--,00.html

Master Angler Database:
http://www.michigan.gov/dnr/0,4570,7-153-10364_52261_10948---,00.html

Fish Stocking Database:
http://www.michigandnr.com/fishstock

Inland Lake Maps:
http://www.michigan.gov/dnr/0,1607,7-153-30301_31431_32340---,00.html

Trophic Status Index (TSI) Values for Lakes Monitored in 2010

Lake	TSI*	Lake	TSI*	Lake	TSI*
Bass Lake	44	Lake Charlevoix, South Arm	37	Pickerel Lake	47
Black Lake	41	Huffman Lake	53	Six Mile Lake	45
Burt Lake, Central Basin	37	Lake Marion	39	Skegemog Lake	42
Burt Lake, North	37	Lake Michigan, Bay Harbor	26	Thayer Lake	42
Burt Lake, South	37	Lake Michigan, Little Traverse Bay	31	Thumb Lake	31
Crooked Lake	46	Long Lake, Cheboygan County	34	Twin Lake	42
Douglas Lake - Cheboygan	40	Mullett Lake, Center	38	Walloon Lake, Foot Basin	37
Douglas Lake - Otsego	43	Mullet Lake, Pigeon Bay	37	Walloon Lake, North	44
Elk Lake	34	Munro Lake	42	Walloon Lake, West Arm	41
Lake Charlevoix, Main	34	Paradise Lake	46	Walloon Lake, Wildwood	40

* TSI values range from 0 to 100. Lower values (0-38) indicate an oligotrophic or low productive system, medium values (39-49) indicate a mesotrophic or moderately productive system, and higher values (50+) indicate a eutrophic or highly productive system.