Elk & Skegemog Lakes

2008 Report

What attracts people to northern Michigan? In general, people come north to enjoy the natural beauty of the area's pristine ecosystems, but if asked for one specific landscape feature, most would undoubtedly say that "lakes" draw them in. Lakes define the landscape of Northern Michigan and sustain local economies, providing stunning views, abundant fisheries, and tremendous recreational opportunities.

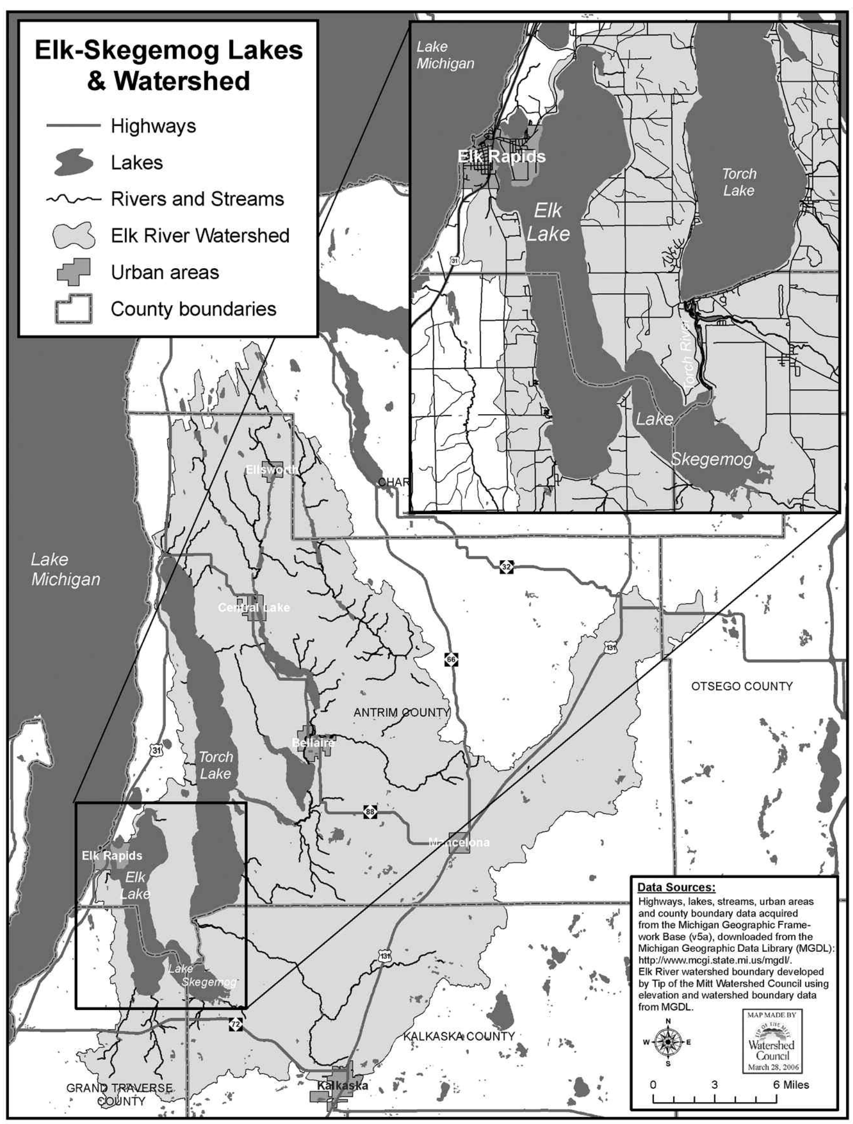
In the Watershed Council service area there are nearly 60 lakes greater than 100 acres in size, and 14 of these are among the State's largest with over 1,000 acres of lake-surface area. The region also boasts some of the State's deepest lakes with five lakes having maximum depths of 100 feet or more. Elk and Skegemog Lakes, at the nexus of Antrim, Grand Traverse, and Kalkaska Counties, stands among these lake “giants” with 10,960 acres of surface area between them and a maximum depth of nearly 200 feet!

Over the last few decades, the Watershed Council has put forth great effort to preserve Elk and Skegemog Lakes and ensure they remain high quality resources for the enjoyment of future generations. Water quality of the region’s lakes, both large and small, has been monitored by staff and volunteers alike, providing valuable data on the overall health of our waters. Our cornerstone water quality monitoring programs include Comprehensive Water Quality Monitoring and Volunteer Lake Monitoring.

The Comprehensive Water Quality Monitoring program is run by Watershed Council staff who have monitored water quality of Northern Michigan’s lakes and streams for the last 20 years. The Volunteer Lake Monitoring program was started in 1984 and has relied on hundreds of dedicated volunteers who monitor water clarity, algae abundance, phosphorus levels and more.

In addition to monitoring, the Watershed Council has worked with lake shoreline owners and lake organizations, such as Elk-Skegemog Lake Association, on a variety of projects to protect the lakes scattered throughout Northern Michigan. Projects carried out on these lakes have ranged from comprehensive aquatic plant surveys to shoreline restoration projects. Details about recent monitoring activities and lake projects on Elk and Skegemog Lakes are included in this report.

We hope you find this report both informative and helpful. 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: 20 years of data

In May of 2007, Tip of the Mitt Watershed Council completed its 20th year of comprehensive monitoring. Starting on just 10 lakes in 1987, the Watershed Council's Comprehensive Water Quality Monitoring Program has expanded to include over 50 lakes and rivers throughout northern Michigan. An incredible amount of data has been generated from this program and utilized by the Watershed Council, lake and stream associations, local governments and regulatory agencies in an effort to protect and improve the water resources that are so important to the region.

Every three years, Watershed Council staff head into the field as soon as ice is out to monitor lakes and rivers spread across the tip of the mitt. Over 60% of the region's lakes greater than 100 acres in size and all major rivers are included in the program. In each of these water bodies, the Watershed Council collects a variety of data, including parameters such as dissolved oxygen, pH, chloride, phosphorus and nitrogen.

Information gathered in the Comprehensive Water Quality Monitoring Program has proven to be very useful. The data are used by the Watershed Council and others 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 20 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 lakes. For additional information about the Comprehensive Water Quality Monitoring Program please visit our web site at www.watershedcouncil.org.

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 on Elk and Skegemog Lakes has shown that pH levels consistently fall within this range, with a minimum of 7.6 (Elk, 1995) and maximum of 8.4 (Skegemog, 2001).

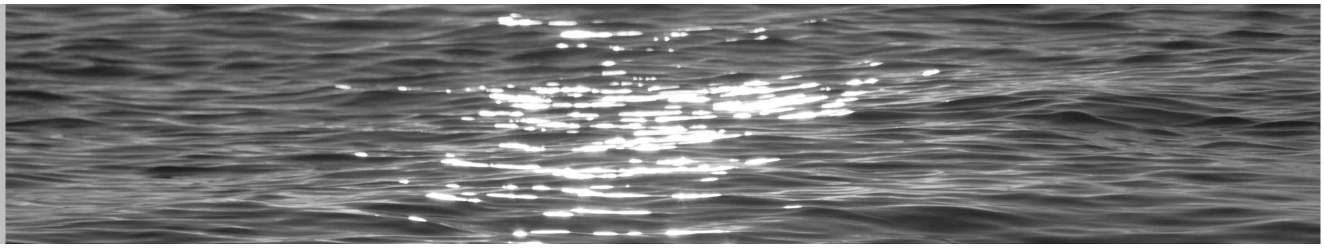
Kevin Cronk, our Monitoring and Research Coordinator, uses the Hydrolab™ to measure water quality.

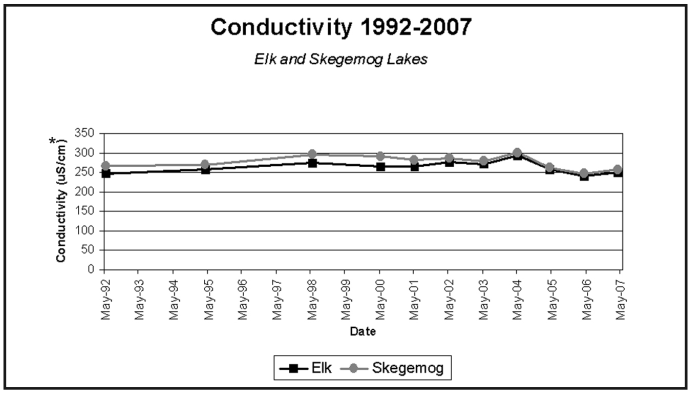
Dissolved Oxygen

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 have consistently exceeded State minimums, ranging from 9.1 PPM (Skegemog, 1998) to 13.6 PPM (Elk, 2007).

Conductivity

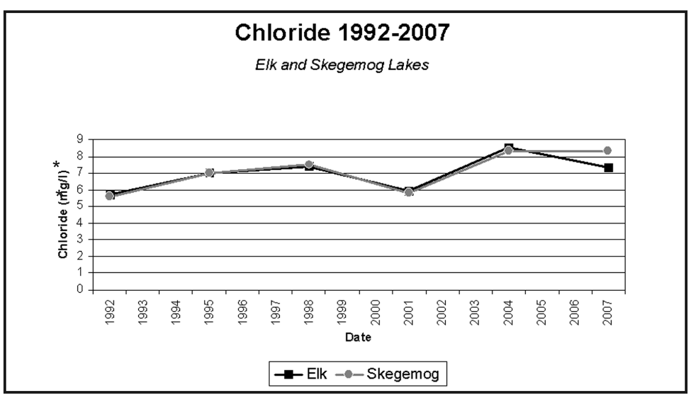
Conductivity is a measure of the ability of water to conduct an electric current, which is dependent upon the concentration of charged particles (ions) dissolved in the water. Readings on lakes monitored by the Watershed Council have ranged from 175 to 656 microSiemens (µS). Conductivity levels in Elk and Skegemog Lakes gradually increased from 249 µS in 1992 to 301 µS in 2004, but dropped to 250 µS by 2007. A steady increase in conductivity levels generally occurs due to greater human activity in the watershed and may indicate that water pollution is occurring.





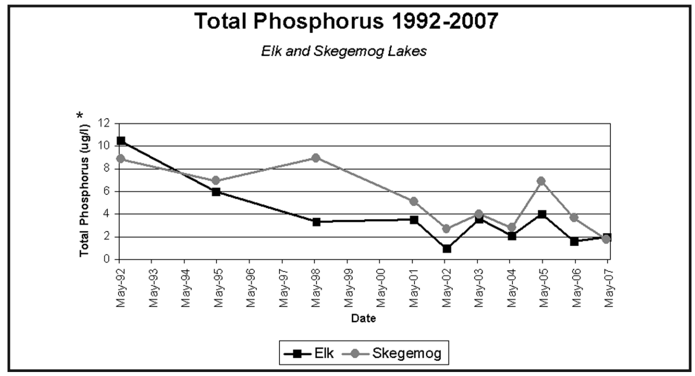
Chloride

Chloride, a component of salt, is present naturally at low levels in Michigan surface waters due to the marine origin of bedrock in Northern Michigan (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, and bleach). Chloride concentrations in Elk and Skegemog Lakes have steadily increased from 5.6 PPM in 1992 to 9.6 PPM in 2007. Although most aquatic organisms are not affected until chloride concentrations exceed 1,000 PPM, increasing chloride concentrations are indicative of other pollutants associated with human activity (such as automotive fluids from roads or nutrients/bacteria from septic systems) reaching our waterways.



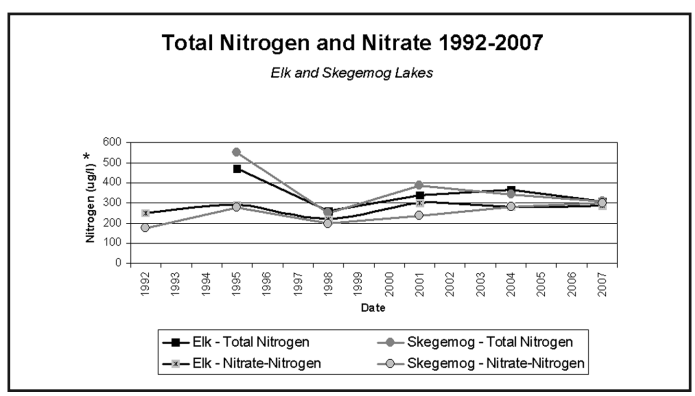
Total Phosphorus

Phosphorus is the most important nutrient for plant productivity in surface waters 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. Although water quality standards have not been set for lakes, the U.S. EPA recommends that total phosphorus concentrations in streams discharging into lakes not exceed 50 parts per billion (PPB). Phosphorus is normally found at concentrations less than 10 PPB in high quality surface waters. In Elk and Skegemog Lakes, total phosphorus levels have ranged from 1.0 PPB (Skegemog, 2007) to 12.6 PPB (Elk, 1992). In general, total phosphorous appears to be decreasing in Elk and Skegemog Lakes.



Total Nitrogen

Nitrogen is another essential nutrient for plant growth. It is a very abundant element throughout the earth's surface and is a major component of all plant and animal matter. Although nutrients occur naturally, nutrient pollution is usually the result of human activities (from things such as fertilizer, faulty septic systems, and stormwater runoff). In general, the lowest nutrient levels were found in Lake Michigan and large deep inland lakes, while the highest nutrient levels were found in small shallow lakes. Total nitrogen levels in water bodies monitored by the Watershed Council have ranged from 125 PPB to 1911 PPB, whereas values in Elk and Skegemog Lakes have ranged from 230 PPB (Elk, 1998) to 550 PPB (Skegemog, 1995). Although trends are mixed and not well-defined, total nitrogen levels have been dropping since first measured in Elk and Skegemog Lakes and, conversely, nitrate-nitrogen levels have been rising.



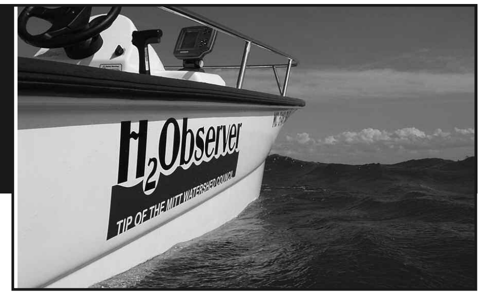
*Unit descriptions: mg/l = parts per million, µg/l = parts per billion, µS = microSiemens per centimeter

How do Elk and Skegemog Lakes compare with other lakes in the area?

Water Body	County where tested	Date	Dissolved Oxygen (mg/l)*	pH (units)*	Specific Conductivity (µS)*	Chloride (mg/l)*	Nitrate-Nitrogen (µg/l)*	Total Nitrogen (µg/l)*	Total Phosphorus (µg/l)*
Bass Lake	Antrim	4/19/2007	12.33	8.41	309.6	38.1	17.0	504.0	7.9
Bear River	Emmet	5/24/2007	8.78	8.26	338.0	12.3	103.5	305.0	8.6
Bellaire Lake	Antrim	4/19/2007	12.43	8.36	294.9	8.5	428.1	469.0	4.6
Ben-way Lake	Antrim	4/16/2007	11.37	8.08	311.7	8.5	419.4	556.0	1.6
Birch Lake	Antrim	4/19/2007	12.48	8.30	257.0	15.6	42.5	279.0	3.7
Black Lake	Cheboygan	5/4/2007	11.74	8.16	262.5	6.0	54.5	269.0	3.5
Black River	Cheboygan	4/9/2007	13.14	8.17	260.7	2.9	62.4	250.0	3.1
Boyne River	Charlevoix	4/2/2007	10.29	8.32	366.4	6.1	368.2	475.0	3.2
Burt Lake	Cheboygan	5/8/2007	11.19	8.29	273.6	10.4	120.3	254.0	3.0
Charlevoix, Main Basin	Charlevoix	5/2/2007	13.00	8.19	271.9	10.2	300.0	498.0	2.2
Charlevoix, South Arm	Charlevoix	5/2/2007	12.28	8.30	285.3	9.1	570.6	508.0	2.4
Cheboygan River	Cheboygan	4/9/2007	14.18	8.34	282.9	6.1	68.4	338.0	4.8
Clam Lake	Antrim	4/17/2007	12.10	8.24	300.5	8.8	421.4	471.0	2.6
Crooked Lake	Emmet	4/25/2007	11.62	8.31	275.1	7.8	267.9	404.0	2.8
Crooked River	Cheboygan	3/28/2007	11.97	8.36	290.3	8.9	224.8	373.0	4.9
Deer Lake	Charlevoix	4/24/2007	11.41	8.32	239.9	6.7	49.1	308.0	2.6
Douglas Lake	Cheboygan	4/20/2007	12.24	8.22	194.9	6.8	46.9	455.0	9.4
Elk Lake	**Antrim**	**4/17/2007**	**13.24**	**8.31**	**249.4**	**9.3**	**262.3**	**338.0**	**2.9**
Elk River	Antrim	4/2/2007	11.64	8.47	267.1	8.0	245.0	305.0	1.0
Ellsworth Lake	Antrim	4/16/2007	11.90	8.12	310.3	9.6	349.3	409.0	3.5
Hanley Lake	Antrim	4/19/2007	11.79	8.26	316.5	9.4	443.7	547.0	3.3
Huffman Lake	Charlevoix	4/30/2007	10.43	8.41	277.2	4.7	38.0	179.0	6.9
Huron, Duncan Bay	Cheboygan	5/8/2007	12.11	8.27	215.5	8.2	170.5	311.0	3.9
Indian River	Cheboygan	5/22/2007	10.13	8.25	284.7	10.4	105.2	316.5	3.9
Intermediate Lake	Antrim	4/19/2007	12.11	8.33	315.9	11.3	442.6	608.0	3.4
Jordan River	Charlevoix	4/2/2007	10.04	8.30	322.0	6.0	981.5	1021.0	5.6
Lancaster Lake	Cheboygan	4/20/2007	10.08	8.25	201.1	7.9	53.8	444.0	13.5
Larks Lake	Emmet	5/3/2007	10.88	8.50	189.6	4.2	66.0	453.0	7.6
Little Sturgeon River	Cheboygan	5/21/2007	9.82	8.30	293.3	13.2	57.5	202.0	8.1
Long Lake	Cheboygan	5/4/2007	11.40	8.21	191.3	8.9	45.3	346.0	4.4
Maple River	Emmet	4/9/2007	14.41	8.17	222.3	3.3	270.3	472.0	3.0
Michigan, Bay Harbor	Emmet	5/30/2007	10.87	8.13	262.2	13.4	279.0	391.0	2.5
Michigan, Grand Traverse Bay	Antrim	4/17/2007	13.34	8.29	232.6	6.3	257.3	331.0	2.0
Michigan, Little Traverse Bay	Emmet	5/17/2007	13.40	8.29	228.0	11.6	259.0	397.0	2.5
Mullett Lake	Cheboygan	5/8/2007	11.54	8.28	276.2	12.9	73.0	211.0	3.1
Munro Lake	Cheboygan	5/8/2007	11.88	8.35	187.8	4.0	79.6	948.0	9.5
Nowland Lake	Charlevoix	5/10/2007	10.40	8.49	184.2	6.5	10.2	567.0	8.1
Paradise Lake	Emmet	4/20/2007	12.58	8.29	180.7	10.9	35.5	569.0	8.3
Pickerel Lake	Emmet	4/25/2007	11.07	8.31	267.5	6.3	209.1	361.0	2.7
Pigeon River	Cheboygan	5/21/2007	9.75	8.37	316.0	6.8	28.0	247.0	7.8
Pine River	Charlevoix	4/2/2007	13.54	8.47	277.7	7.7	322.2	418.0	4.6
Rainy River	Presque Isle	4/9/2007	13.14	8.09	248.8	4.5	32.7	411.0	8.3
Round Lake (Emmet Cty)	Emmet	5/1/2007	10.44	8.54	262.9	26.9	16.7	350.0	6.3
Silver Lake (Wolverine)	Cheboygan	4/30/2007	11.15	8.30	190.0	4.2	35.2	1203.0	2.8
Six-mile Lake	Antrim	4/24/2007	11.38	8.21	260.6	6.9	224.9	433.0	4.2
Skegemog Lake	**Antrim**	**4/17/2007**	**12.75**	**8.36**	**257.7**	**8.3**	**300.0**	**311.0**	**1.8**
Spring Lake	Emmet	5/1/2007	11.07	8.25	571.5	88.2	857.7	1292.0	7.3
St. Clair Lake	Antrim	4/16/2007	11.97	8.13	293.6	6.1	283.8	385.0	3.2
Sturgeon River	Cheboygan	4/9/2007	14.41	8.26	340.5	12.2	280.5	280.0	2.3
Susan Lake	Charlevoix	4/24/2007	10.83	8.28	251.4	9.5	29.1	333.0	3.6
Tannery Creek	Emmet	3/28/2007	12.22	8.22	428.1	37.1	705.2	902.0	5.7
Thumb Lake	Charlevoix	4/30/2007	11.66	8.33	177.8	4.4	37.0	293.0	2.8
Torch Lake	Antrim	4/17/2007	13.07	8.34	245.9	6.2	364.6	377.0	2.2
Twin Lakes	Cheboygan	5/1/2007	11.27	8.40	239.5	2.3	10.3	275.0	7.7
Walloon, Foot	Charlevoix	5/7/2007	11.77	8.18	243.6	12.4	91.2	279.0	1.9
Walloon, Mud Basin	Emmet	5/9/2007	10.92	8.32	277.7	15.2	9.6	424.0	10.2
Walloon, North Arm	Emmet	5/7/2007	10.91	8.24	267.1	14.2	268.5	458.0	4.1
Walloon, West Arm	Emmet	5/9/2007	12.27	8.27	238.4	9.3	157.7	385.0	3.0
Walloon, Wildwood Basin	Emmet	5/7/2007	11.79	8.24	238.8	12.5	82.9	255.0	2.7
Wildwood Lake	Cheboygan	4/30/2007	10.13	8.42	247.0	13.2	>1	379.0	6.2
Wilson Lake	Antrim	4/16/2007	11.75	8.11	317.6	9.7	405.2	595.0	1.9

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

Partnering to Protect Elk and Skegemog Lakes



ESLA Goes the Extra Mile: Elk Lake Oxygen Rich!

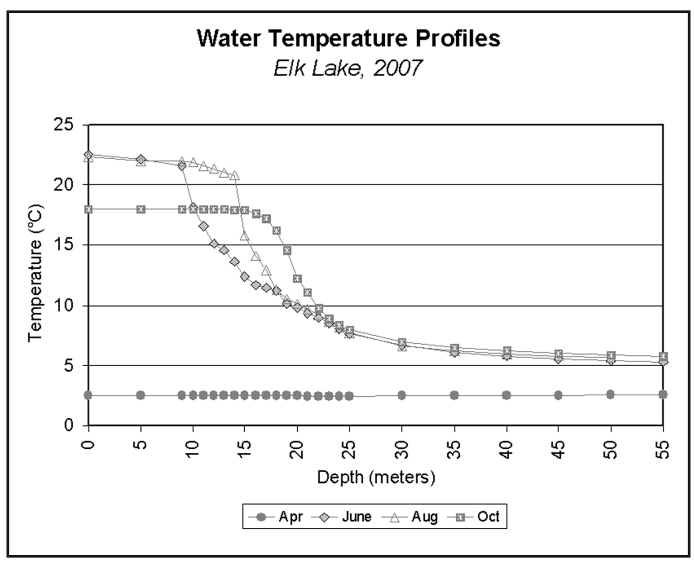
When it comes to water quality monitoring, the Elk-Skegemog Lake Association (ESLA) goes the extra mile. Beginning in 2000, ESLA has contracted with the Watershed Council every year to monitor water quality of both Elk and Skegemog Lakes. Both lakes are monitored as part of the Watershed Council's Comprehensive Water Quality Program, but monitoring in this program is limited to one monitoring event every three years. The additional monitoring sponsored by ESLA is more intense, carried out four times per season, and helps fill data gaps in the Watershed Council's program.

With the additional data, we are able to view seasonal trends in the water quality of Elk and Skegemog Lakes. Of the various parameters measured, dissolved oxygen and water temperature produce some of the most interesting results. In early spring, water quality conditions are homogenous throughout the water column, with little variation from the surface to the bottom of even the deepest part of Elk Lake. As the season progresses and the lakes' surface waters warm, changes begin to occur throughout the water column.

Just after ice-out in early spring, the surface water temperature is barely above freezing, but by late June water temperature at the surface often exceeds 70˚ Fahrenheit (see graph). As water temperatures warm, thermal stratification occurs wherein distinct layers of different-temperature waters form in the water column. These layers include the epilimnion or warmer surface waters, the thermocline or mixing zone, and the hypolimnion or deeper, cooler waters. The thermocline is an area of rapid change and thus, defined as the zone where water temperature changes by one degree Celsius for every meter of depth. Look at the water temperature graph on this page and see if you can locate the thermocline based on this definition. How did the thermocline change throughout the season?*

Thermal stratification causes great resistance to mixing between layers in the lake, which essentially isolates the deeper hypolimnetic waters. This is important from a water quality standpoint because, after stratification occurs in late spring or early summer, the deeper waters are cut off and not replenished with dissolved oxygen. Dissolved oxygen in a lake is brought in primarily through atmospheric diffusion at the surface, though a portion is generated by photosynthetic activity of plants, the majority of which also occurs near the surface. Thus, water at the lake surface is continually recharged with oxygen while little to no replenishing occurs in deeper waters. Once dissolved oxygen stores in hypolimnion are depleted, they will not be replenished until mixing occurs when temperatures drop in the autumn. What would happen if Elk Lake were to lose all of its dissolved oxygen below the thermocline? Considering that vast areas of the lake exceed 100' in depth and that the bottom of the thermocline ranges from 40 to 70 feet of depth, a large portion of the lake would no longer be inhabitable by fish, insects, and other aquatic life.

So, how are dissolved oxygen levels in Elk Lake? Fortunately, results from monitoring intensively for the last eight years show that high dissolved oxygen concentrations persist in the deepest waters throughout the summer. In fact, dissolved oxygen levels in Elk Lake are usually higher in the hypolimnion than at the surface! Toward the end of summer, oxygen supplies dip slightly in the deepest waters. During the course of this monitoring project, dissolved oxygen levels in Elk Lake have rarely been recorded below eight parts per million (the State standard for a cold-water fishery lake like Elk is seven parts per million), and have only been recorded below seven on one occasion in late summer at the very bottom of the lake. The fact that oxygen concentrations are so high in the hypolimnion attests to the excellent water quality of Elk Lake; a fact that ESLA has helped uncover and that gives ESLA members and all lake users peace of mind when enjoying this amazing lake!



* Thermocline formed by June with top at 10 meters deep, then the top moves down to 17 meters by early October as surface waters warm throughout season.

Volunteer Lake Monitoring

Local Volunteers Monitor & Protect Our Lakes

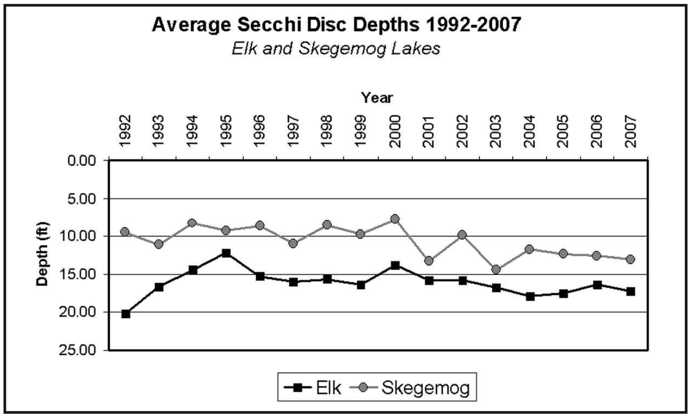
Since 1984, Tip of the Mitt Watershed Council has coordinated the Volunteer Lake Monitoring program (VLM), relying upon hundreds of volunteers to monitor the water quality of dozens of lakes in the northern Lower Peninsula of Michigan. During the summer of 2007, 40 volunteers monitored water quality at 32 stations on 25 lakes.

A tremendous amount of data has been generated by the VLM program and is available to the public via our web site (www.watershedcouncil.org). 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. The following section summarizes the results.

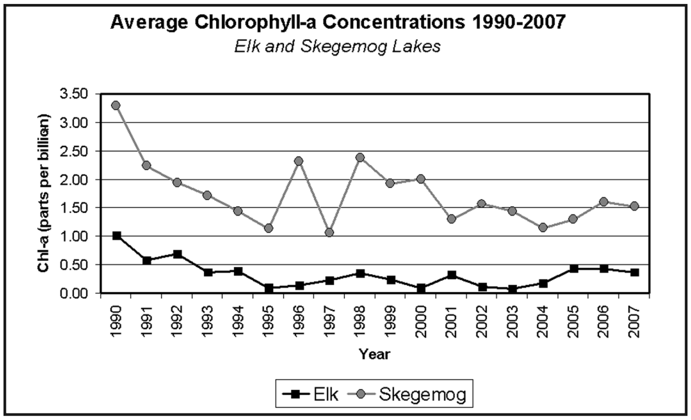
Secchi Disc

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 bloom at different times, causing clarity to vary greatly. Secchi disc depths have ranged from just a few feet in small inland lakes to 40-50+ feet in large inland lakes and Great Lakes' bays.



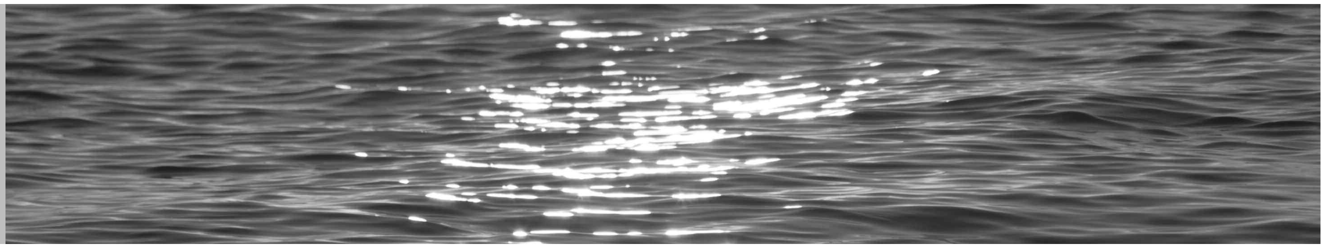
Chlorophyll-a

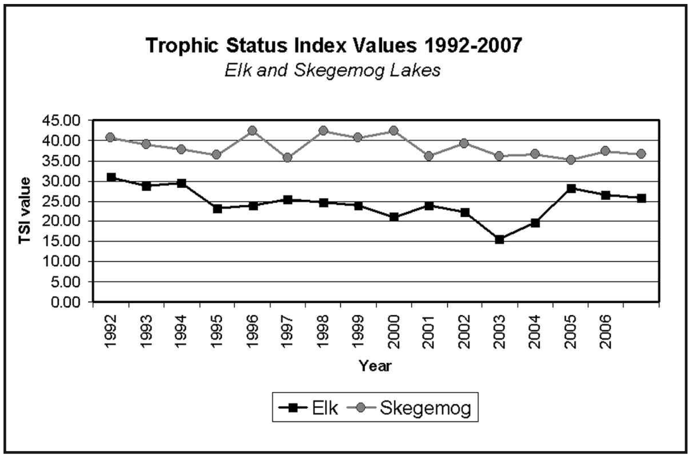
Chlorophyll-a is a pigment found in all green plants, including algae. Water samples collected by volunteers are analyzed for chlorophyll-a to determine the amount of phytoplankton (minute free-floating algae) in the water column. There is a strong relationship between chlorophyll-a concentrations and 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 marl.



Trophic Status Index

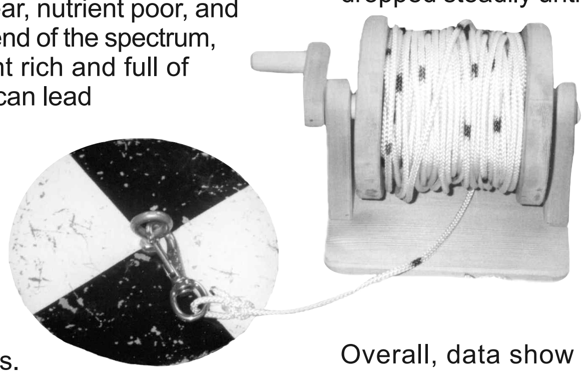
Trophic Status Index (TSI) is a tool developed by Bob Carlson, Ph.D. from Kent State University to determine the biological productivity of a lake. Formulas developed to calculate the TSI value utilize Secchi disc depth and chlorophyll-a measurements collected by our volunteers. TSI values range from 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 population 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 do not measure water quality, but simply place the lake on a scale of biological productivity. Oligotrophic lakes are characteristically deep, clear, nutrient poor, and with abundant oxygen. On the other end of the spectrum, eutrophic lakes are shallow, nutrient rich and full of productivity, which when excessive can lead to oxygen depletion.



Mesotrophic lakes lie somewhere in between and are moderately productive. Lakes may be placed in the eutrophic category as a result of algal blooms, which are often a public concern and can be indicative of water pollution problems. On the other hand, low productivity of oligotrophic lakes may result in a lackluster fishery when compared to highly productive eutrophic lakes.

(2007 TSI Values for all lakes on back page.)

Results from Elk and Skegemog Lakes

Volunteers have monitored water quality on Elk and Skegemog for nearly 20 years. Both Elk and Skegemog Lakes have consistent Secchi disc depth data going back to 1992 and the chlorophyll-a data goes back even further to 1990. These long-term Secchi disc and chlorophyll-a data allow Watershed Council staff to characterize water bodies, assess water quality, and examine changes over time.

With the exception of a decrease in Elk Lake early on, averaged yearly Secchi disc depths in Elk and Skegemog Lakes have increased since the early 1990s. At the same time, averaged yearly chlorophyll-a concentrations have decreased in both lakes. These changes occurred in a time period that coincides with the zebra mussel's arrival to the region. The non-native zebra mussel is a voracious filter-feeder that feeds upon algae and essentially clears the water column. Unfortunately, zebra mussels are not cleaning the water, but rather removing the algae that are the base of the food chain, causing ecosystem disruptions. Their feeding habits make them a very likely culprit for the changes we are seeing in the lakes. If quagga mussels (another invasive in the Great Lakes) get into Elk and Skegemog Lakes, the ecosystem would be more heavily impacted as quaggas cluster more densely and live at greater depths than zebra mussels.

Until the year 2000, Trophic Status Index (TSI) scores for Lake Skegemog bounced between the mesotrophic classification (moderately productive lake) and oligotrophic (low productivity). Since 2000, the TSI values have placed Skegemog consistently in the oligotrophic category. TSI scores for Elk Lake place it in the oligotrophic category and dropped steadily until 2005 when scores began to rise. The decreasing TSI scores are likely related to zebra mussel impacts, though it is uncertain as to why Elk Lake has become a more productive lake in the last few years. It does appear that Lake Skegemog, a once moderately productive lake may have changed for the long-term to a low productive lake: clear, nutrient poor, but oxygen-rich.

Overall, data show that Elk and Skegemog Lakes have exceptionally high quality waters. Without dedicated volunteers, we would have less data, so we would like to send out a big "thank you" to all those that have helped with the program. We would also like to encourage others to become involved with our volunteer program and help us monitor and protect the hidden treasures of northern Michigan. We are fortunate to have volunteers monitoring both Elk and Skegemog Lakes, though considering the immense size of Elk Lake, it would be ideal to have another volunteer on the water to monitor both ends of the lake.

If you would like to get involved, please contact the program coordinator, Kevin Cronk, 231-347-1181 or by e-mail at kevin@watershedcouncil.org.

Trophic Status Index (TSI) Values for Lakes Monitored in 2007					
Lake	TSI*	Lake	TSI*	Lake	TSI*
Bass Lake	39	Huffman Lake	34	Six Mile Lake	46
Black Lake	30	Lake Marion	29	Thumb Lake	34
Burt Lake, Central Basin	33	Lake Michigan, Bay Harbor	22	Twin Lake	36
Burt Lake, North	29	**Lake Skegemog**	**37**	Walloon Lake, Foot Basin	29
Burt Lake, South	34	Long Lake, Cheboygan County	30	Walloon Lake, North	37
Douglas Lake - Cheboygan	38	Mullett Lake, Center	29	Walloon Lake, West Arm	31
Douglas Lake - Otsego	40	Mullet Lake, Pigeon Bay	33	Walloon Lake, Wildwood	29
Elk Lake	**26**	Munro Lake	44		
Lake Charlevoix, Main	25	Paradise Lake	40		
Lake Charlevoix, South Arm	30	Pickerel Lake	34		

* 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.