BURT LAKE Profile

2008 Report

Tip of the Mitt Watershed Council

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.

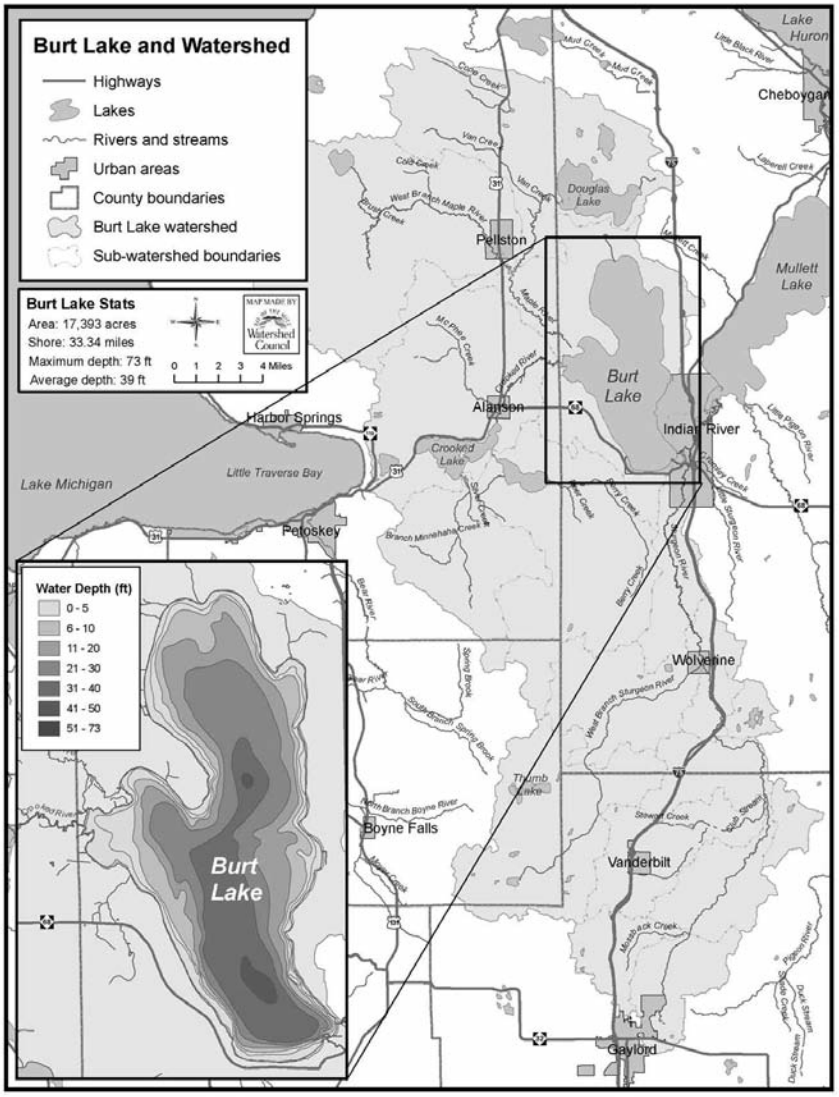
In the Watershed Council service area there are nearly 60 lakes greater than 100 acres in size, and 14 of these are among the State's largest with over 1000 acres of lake-surface area. The region also boasts some of the State's deepest lakes with five lakes having maximum depths of 100 feet or more. Burt Lake, on the west side of Cheboygan County, stands among these lake “giants” with over 17,000 acres of surface area and 72 feet of depth.

Over the last few decades, the Watershed Council has put forth great effort to preserve Burt Lake and ensure it remains a high quality resource 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 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 Burt Lake are included in our full version of the Burt Lake Profile.

We hope you will find this report both informative and helpful. If you would like a full version of our Burt Lake Profile, 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 Burt Lake. We have also included charts to provide a graphic display of trends occurring over time. For additional information about the Comprehensive Water Quality Monitoring Program please visit our web site at www.watershedcouncil.org.

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

Parameters and Results

pH

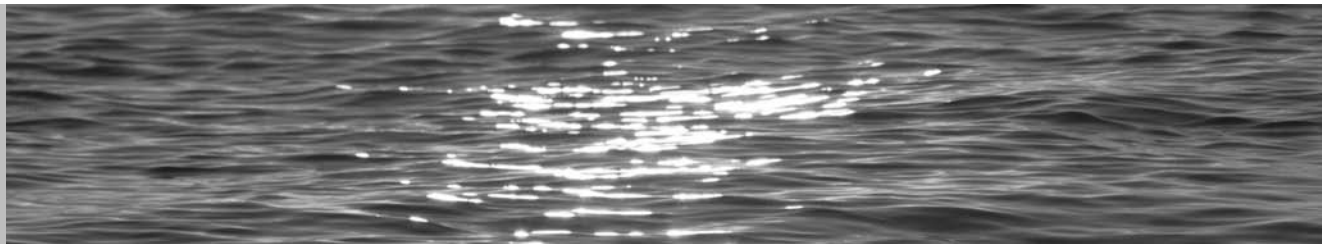
pH values provide a measurement of the acidity or alkalinity of water. Measurements above 7 are alkaline, 7 is considered neutral, and levels below 7 are acidic. When pH is outside the range of 5.5 to 8.5, most aquatic organisms become stressed and populations of some species can become depressed or 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 Burt Lake has shown that pH levels consistently fall within this range, with a minimum of 7.5 (bottom, 1992) and maximum of 8.4 (surface, 2001).

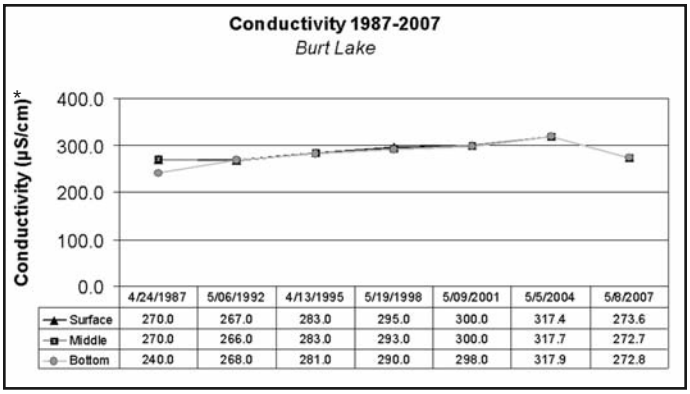
Dissolved Oxygen

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 Burt Lake have consistently exceeded State minimums, ranging from 8.2 PPM (Bottom, 1998) to 13.1 PPM (Surface, 1995).

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). In Burt Lake, levels gradually increased from 240 µS in 1987 to 318 µS in 2004, but decreased to 273 µS in 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.

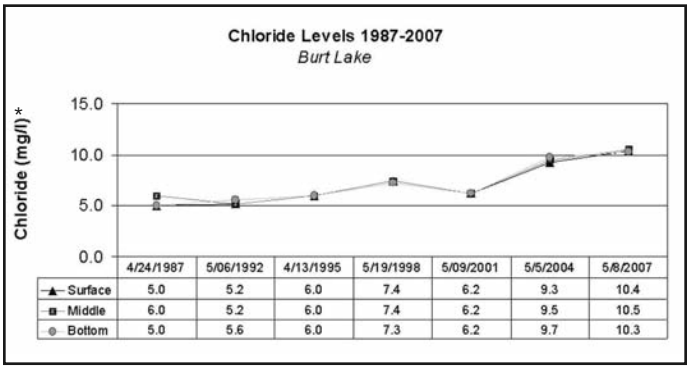




	4/24/1987	5/06/1992	4/13/1995	5/19/1998	5/09/2001	5/5/2004	5/8/2007
Surface	270.0	267.0	283.0	295.0	300.0	317.4	273.6
Middle	270.0	266.0	283.0	293.0	300.0	317.7	272.7
Bottom	240.0	268.0	281.0	290.0	298.0	317.9	272.8

Chloride

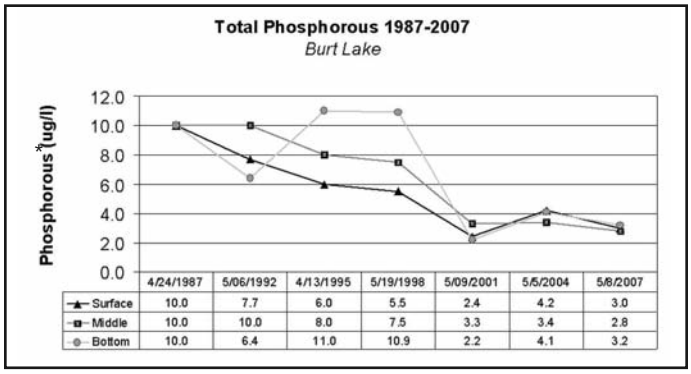
Chloride, a component of salt, is present naturally at low levels in Michigan surface waters due to the marine origin of bedrock in Northern Michigan (typically < 5 PPM). Chloride is a "mobile ion," meaning it is not removed by chemical or biological processes in soil or water. Many products associated with human activities contain chloride (e.g., de-icing salts, water softener salts, and bleach). Chloride concentrations in Burt Lake have steadily increased from 5.3 PPM in 1987 to 10.4 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.



	4/24/1987	5/06/1992	4/13/1995	5/19/1998	5/09/2001	5/5/2004	5/8/2007
Surface	5.0	5.2	6.0	7.4	6.2	9.3	10.4
Middle	6.0	5.2	6.0	7.4	6.2	9.5	10.5
Bottom	5.0	5.6	6.0	7.3	6.2	9.7	10.3

Total Phosphorus

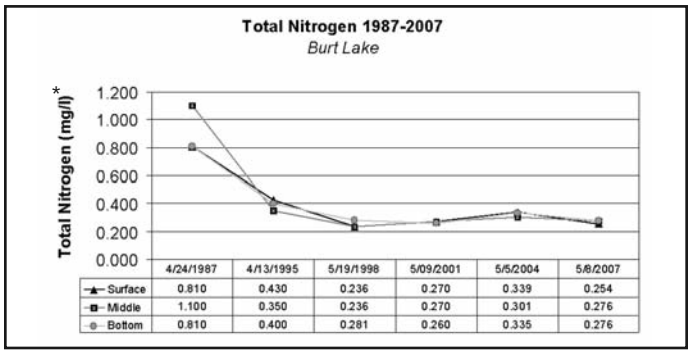
Phosphorus is the most important nutrient for plant productivity in surface waters because it is usually in shortest supply relative to nitrogen and carbon. A water body is considered phosphorus limited if the ratio of nitrogen to phosphorus is greater than 15:1. In fact, most lakes monitored by the 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 Burt Lake, total phosphorus levels have ranged from 2.2 PPB (Bottom, 2001) to 11 PPB (Bottom,1995). In general, the total phosphorous appears to be decreasing in Burt Lake.



	4/24/1987	5/06/1992	4/13/1995	5/19/1998	5/09/2001	5/5/2004	5/8/2007
Surface	10.0	7.7	6.0	5.5	2.4	4.2	3.0
Middle	10.0	10.0	8.0	7.5	3.3	3.4	2.8
Bottom	10.0	6.4	11.0	10.9	2.2	4.1	3.2

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 Burt Lake have ranged from 236 PPB (surface,1998) to 1100 PPB (middle, 1987). Total nitrogen has dropped substantially since first measured in Burt Lake in 1987, whereas nitrate-nitrogen shows no clear pattern.



	4/24/1987	4/13/1995	5/19/1998	5/09/2001	5/5/2004	5/8/2007
Surface	0.810	0.430	0.236	0.270	0.339	0.254
Middle	1.100	0.350	0.236	0.270	0.301	0.276
Bottom	0.810	0.400	0.281	0.260	0.335	0.276

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

Comprehensive Water Quality Monitoring Program
How Does Burt Lake Compare?

Water quality data from the surface of all water bodies monitored in 2007

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

Cheboygan River Watershed Restoration Initiative Receives Funding and Benefits Lakes throughout the Watershed

The National Fish and Wildlife Foundation has chosen to fund Tip of the Mitt Watershed Council's Cheboygan River Watershed Restoration Initiative project for 2008 and 2009, through the ArcelorMittal Great Lakes Restoration Program. The Watershed Council's project was one of 16 projects selected from the Great Lakes Region to receive $1 million in funding awarded among all 16 projects. Match contributions obtained by grantees will enable and support a $9 million on-the-ground impact throughout the Great Lakes watershed.

The Cheboygan River Watershed Restoration Initiative is a project of the Watershed Council to identify, develop, and implement a number of restoration projects in the Cheboygan River Watershed in partnership with lake associations. Goals of the initiative are to protect the diversity of aquatic habitats and maintain excellent recreational opportunities within the Cheboygan River Watershed by controlling and managing contributions of sediments, nutrients, and aquatic invasive species.

To facilitate a restoration and management initiative in the watershed, specific preliminary surveys are being conducted to supplement our current information on restoration needs. Restoration initiatives in the Cheboygan River Watershed include control and management of aquatic invasive species and lakeshore and streambank restoration projects. In addition to surveys and on-the-ground restoration and management, the Cheboygan River Watershed Restoration Initiative includes an information and education campaign to showcase the implemented projects, create awareness of water quality issues in the Cheboygan River Watershed, and facilitate behavior change.

Lake associations that are partnering with the Watershed Council on this initiative include Burt Lake Preservation Association, Mullett Area Preservation Society, and Pickerel-Crooked Lakes Association. Other partners providing technical assistance include the University of Michigan Biological Station and the NOAA Great Lakes Environmental Research Laboratory.

For more information on the Cheboygan River Watershed Restoration Initiative please contact Valerie Olinik-Damstra, Watershed Coordinator, at (231)347-1181, or by e-mail at valerie@watershedcouncil.org.

Burt Lake Preservation Association (BLPA) furthers Purple Loosestrife Control and Management

For several years, BLPA has been interested in taking steps to control and manage purple loosestrife *(Lythrum salicaria)* within the Burt Lake Watershed. Recently, they increased their efforts by contracting with the Tip of the Mitt Watershed Council to implement a biological control program using *Galerucella* beetles.

The purpose of biological control is to reunite a plant with its natural enemies.The *Galerucella* beetle, purple loosestrife's natural enemy, is a voracious eater and consumes the leaves and stems of the plant. In turn, the viability of the plants is reduced as they cannot spread or flower at such a prolific rate. It is important to note, the release of *Galerucella* beetles has been tested and proven safe by the United States Department of Agriculture (USDA); the beetles will not consume plants other than loosestrife.

To implement the biological control program, the Watershed Council followed the management recommendations developed in the Volunteer Purple Corps Management Plan (Tip of the Mitt Watershed Council, June 2007). Recommendations include introducing the beetles to purple loosestrife stands in designated management areas including the Crooked River corridor, Straits Highway roadside corridor, and the Indian River corridor. The goal of the introductions is to suppress and contain existing populations and prevent its spread to areas free of purple loosestrife.

On June 4 and 5, 2008, the Watershed Council distributed nearly 2,500 *Galerucella* beetles at twelve release locations within the recommended management areas. Each release location was recorded with GPS. BLPA and the Watershed Council will monitor the locations over time to assess the effectiveness of the beetles, with the understanding that while we may never completely eradicate the 'purple plague', efforts to manage and control the plant are worthwhile for the benefit of our water resources and the plants and animals that depend on them. For more information on the BLPA purple loosestrife control project, please contact Jennifer Gelb, Restoration Ecologist, at (231) 347-1181, or by email at at jen@watershedcouncil.org.

Volunteer Lake Monitoring

Local Volunteers Monitor & Protect Our Lakes

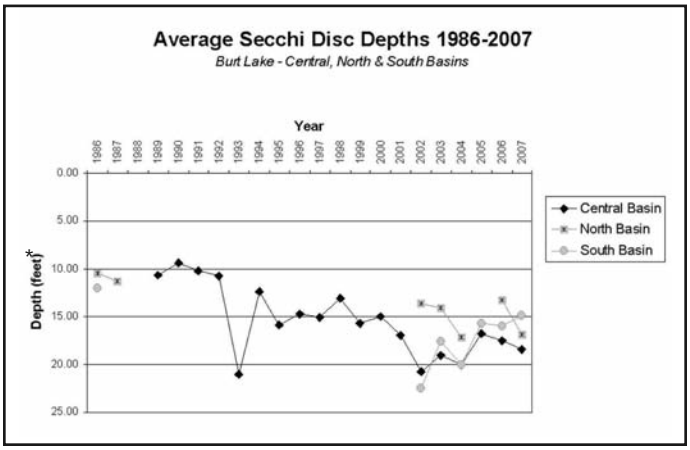
Since 1984, Tip of the Mitt Watershed Council has coordinated the Volunteer Lake Monitoring program (VLM), relying upon hundreds of volunteers to monitor the water quality of 35 lakes in the northern Lower Peninsula of Michigan. During the summer of 2007, 40 volunteers monitored water quality at 32 stations 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. 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.

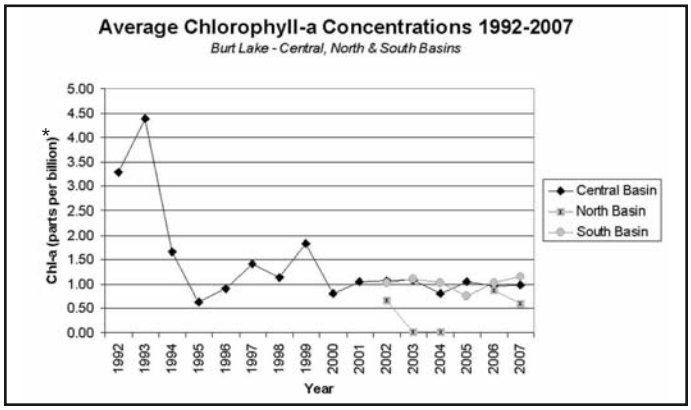
Secchi Disc

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

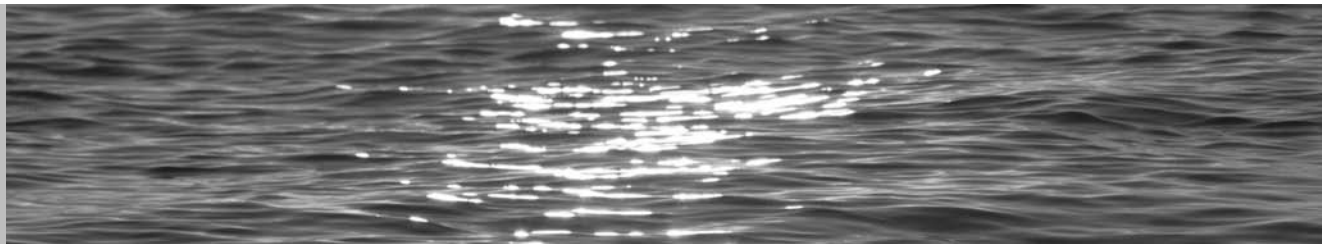
Chlorophyll-a is a pigment found in all green plants, including algae. Water samples collected by volunteers are analyzed for chlorophyll-a to determine the amount of phytoplankton (minute free-floating algae) in the water column. There is a strong relationship between chlorophyll-a concentrations and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

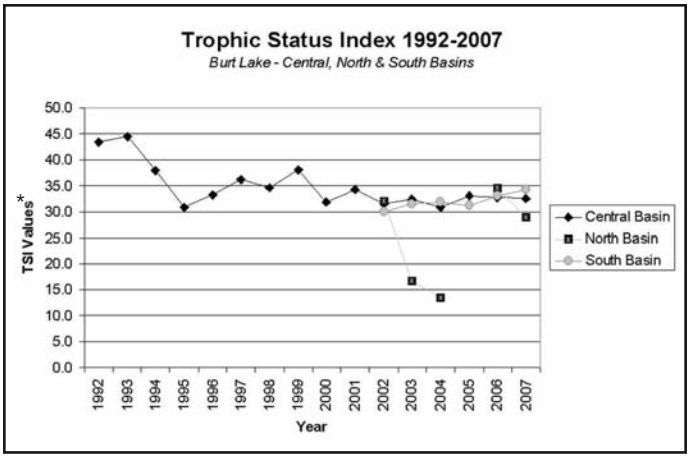


Trophic Status Index

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 values (50+) indicate a eutrophic or highly productive system.

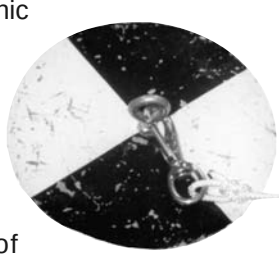
*Unit descriptions: mg/l = parts per million, µg/l = parts per billion, µS = microSiemens per centimeter





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 lack luster fishery when compared to highly productive eutrophic lakes.



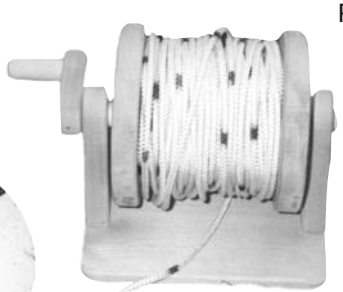
(2007 TSI Values for all lakes on back page.)

Results from Burt Lake

Volunteers have monitored water quality on Burt Lake in three different locations for the last 20 years. The central basin, located at the deepest hole in the center of the lake, has been monitored consistently since 1989. The north and south basins were monitored for a few years in the 1980s and have now been consistently monitored since 2002. 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.

During the last 20 years, average Secchi disc depths in Burt Lake have increased while average chlorophyll-a concentrations have decreased. These changes occurred in a time period that coincides with the introduction of the invasive zebra mussel. Zebra mussels are voracious filter-feeders that feed upon algae and essentially clear the water column. Unfotunately, zebra mussels are not cleaning the water, but rather removing the algae that are the base of the foodchain and thus, causing ecosystem disruptions. Their feeding habits make them a very likely culprit for the changes we are seeing in Burt Lake. If quagga mussels (another invasive in the Great Lakes) gets into Burt Lake, the lake ecosystem would be more heavily impacted as quaggas cluster more densely and live at greater depths than zebra mussels.

Before the introduction of zebra mussels, data collected by volunteers showed Burt Lake to be a mesotrophic or moderately productive lake. In 1994, the trophic status of Burt Lake changed to oligotrophic and TSI values have been in that range ever since. What was once a moderately productive lake appears to have changed for the long-term to a low productive lake: clear, nutrient poor, but oxygen-rich.



Fortunately, we have enough volunteer help to monitor three locations along the 10 miles that Burt Lake stretches from north to south. Interestingly, there have been different readings between sites, particularly at the site in the northern end of the lake. In contrast to the central and southern parts where large rivers flow into and out of Burt Lake, the northern end is supplied by a large quantity of springs that flow from the hills to the north. These water input and flow path dynamics might be responsible for the distinction we have seen in the data. With a couple more years of volunteer work and the invaluable data they provide, we will have a better idea of whether the waters of the northern basin are distinct from the rest of the lake.

Overall, data show that Burt Lake has exceptionally high quality waters. Without dedicated volunteers, we would have much 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 to help us monitor and protect the treasured lakes of Northern Michigan.

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

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

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.

Tip of the Mitt Watershed Council
426 Bay Street
Petoskey, MI 49770

Nonprofit
Organization
U.S. Postage
PAID
Petoskey, MI
PERMIT NO. 108