

# Crystal Lake Association

Since 1932, working for the preservation and improvement of Crystal Lake and its watershed for future generations.

Vol. No. 2/20/04

## Seasonal Metamorphosis at Crystal Lake

### CLA BOARD OF DIRECTORS 2003/2004

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Dear CLA Members,

It is the goal of the Crystal Lake Association to always strive for excellence, and this cannot be accomplished with out the help of the membership of this great Association. The board is always looking for improvement, and one way to do this is through the feedback we receive from the residents and property owners around Crystal Lake.

I am fortunate to work with such a hard working board, and we are always looking for new ways to improve the quality of Crystal Lake, for the enjoyment of all. Some of the projects the CLA Board Members are working on for the upcoming year is directional zoning signs (North Shore, South Shore & etc.) around the lake, increasing membership, the availability of environmental safe fertilizer, and improving on the 4<sup>th</sup> of July fireworks display. Water quality, water safety, and public safety will continue to be a priority for all of the board members.

If there is anything I can do to assist you, please don't hesitate to contact me. I want to make sure we continue with the great tradition the CLA Board has established and we can only do that with your help.

Sincerely,  
Jeff Warder  
C.L.A. President

### VILLAGE PROJECT

The Boundary Commission will hold a public meeting to determine the feasibility and benefit of forming a village. If they decide we should proceed we move to the next phase of the process which is to a public election of a Charter Commission

Their job will be to prepare a Village Charter for the public's consideration by the proposed Village residents. Upon completion of the proposed Charter their will be another public vote to approve the Charter. The final step will be another public election to elect the Village Board. As you can see this process gives the Village residents (4) four opportunities to insure that the final Village Charter meets their satisfaction!

We have completed a good bit of research and have a number of suggestions we will make to the Charter Commission. The Village can successfully operate with a full time Village Manager on a 2 mil tax base but the final Charter Provisions will be up to the Charter Commission and the Village Residents.

The required number of petition signatures for the process is 100. We have secured 170. We are now working with Christine A. Holmes of the State Boundary Commission, to place the project on the Commissions agenda for March.

We hope to have the timing established for the next phase so we can announce it before the summer season. If you have any question please feel free to phone either Phil Woodruff at 235-6741 or John Bird at 235-4352 or check the web site for further information,  
[\(http://www.villageofcrystallake.org/\)](http://www.villageofcrystallake.org/)

**ANNUAL SUMMER LAKE SURVEY**

On August 18, 2003 AAT Labs Inc, performed the summer sampling event for Crystal Lake. At the time of sampling the weather conditions were sunny, calm and had an air temperature of 70°F. This sampling event was conducted on a Monday morning after a heavy boating weekend on Crystal Lake. Sampling location was the Central Basin.

*The following are the tested profiles .*

- ◆ Temperature and Dissolved Oxygen
  - ◆ Nutrient data ( Nitrogen-Nitrate & Total Phosphorus)
  - ◆ Transparency & Chlorophyll-a
  - ◆ Conductivity & pH
  - ◆ Fecal Coliform
  - ◆ Common Plankton Identification
- The following is a minimized version of the resulting data.

**Temperature ( °C [ °F ] ) & Dissolved Oxygen (mg/L)**

Feet Depth	Temp	Dissolved Oxygen
Surface	20.0 [68.0]	8.6
5 feet	20.0 [68.0]	9.0
10 feet	20.0 [68.0]	8.6
15 feet	20.0 [68.0]	8.1
20 feet	19.0 [66.2]	6.2
25 feet	17.0 [62.6]	1.3
30 feet	15.0 [59.0]	0.0
35 feet	13.5 [56.3]	0.0
40 feet	13.0 [55.4]	0.0
45 feet	12.5 [54.5]	0.0
50 feet	11.0 [11.0]	0.04*

\* Vegetation located on the bottom produces Oxygen.

**Nutrient Data:**

Central Basin	Nitrogen-Nitrate (mg/L)	Total Phosphorus (ug/L)
Surface	0.21	20
10 Feet	0.26	<10
20 Feet	0.26	<10
30 Feet	0.23	<10
40 Feet	0.21	30
50 Feet	0.27	10

**Transparency & Chlorophyll-a**

Central Basin	Transparency	Chlorophyll-a
	10.5	3.92

**Conductivity & pH**

Central Basin	Conductivity	pH
Surface	310	8.0
10 Feet	310	8.0
20 Feet	310	7.9
30 Feet	335	7.1
40 Feet	340	7.5 *
50 Feet	348	7.5

\* Vegetation located on the bottom produces increased number of hydrogen & hydroxide pH ions.

**Fecal Coliform**

Central Basin	Fecal Coliform (#/100ml)
Surface	11

**Common Plankton Identification**

The following table identifies the common plankton found in Crystal lakes summer sampling 2003.

**Phytoplankton:**

**Cyanophyta** (Blue - Green Algae)

- Ananbaena*
- Merismopedia*
- Microcystis*
- Oscillatoria*
- Pandorina*

**Chlorophyta** (Green Algae)

- Coelastrum*

**Chrysophyta**

- Bacillariophyceae ( Diatoms)
- Frafilaria*

**Euglenaphyta**

- Euglena spp.*

**Zooplankton:**

**Cladaceron**

- Daphnia*

**Copepod**

- Calanoid*
- Cyclpoid*

**Rotifer spp.**

**Summation:**

Crystal Lake exhibits thermal stratification during summer months. When stratification has set in, the hypolimnion, (typically below 25 ft.) becomes devoid of oxygen as decomposition of organic matter occurs. In this anaerobic condition sediments are able to release phosphorus back into the water column. The central basin sample has a transparency reading pf 10.5 ft. which is in the mesotrophic range. The Chlorophyll-a concentration of 3.93 ug/L, also falls in the mesotrophic range. The total phosphorus concentration at the surface of the Central Basin was 20 ug/L, right at the mesotrophic/eutrophic transition. This indicates there is sufficient phosphorus available in Crystal Lake to support abundant aquatic plant and algae growth. The combination of the phosphorus level with the transparency and chlorophyll-a is in a mesotrophic state.

As stated before, the classification of lake's trophic state is not absolute, but rather relative instead. A review of summer reports conducted in the past shows some fluctuations in these classification parameters. Transparency has also remained in the mesotrophic range. Chlorophyll-a has also remained in the mesotrophic range, except for last summer where Chlorophyll-a concentration dropped just into the oligotrophic range. With this years sample total phosphorus has been in each classification. Considering all this data, it justifies Crystal Lake as a mesotrophic state.

Remember, all lakes are undergoing eutrophication, or natural aging process of lakes. Categorizing Crystal Lake as being in the mesotrophic state is just a guide to where the lake is in its aging process. This natural aging process can be sped up by any human activities such as sewage and industrial contamination, fertilizer input's, and sediment runoff. All these activities increase the rate of the lake filling in by either introducing sediment itself, or by nutrients that support plant growth which leads to lake filling in.

Submitted By:  
*Brian Weiden*  
Aquatic Biologist  
AAT Labs Inc.

All analysis are in accordance with "Standard Methods for the Analysis of Water & Wastewater," 19<sup>th</sup> Edition, 1995 and EPA Approved Methodologies

To receive a complete copy of the report please review the results at the following net address,  
(<http://www.crystalonline.org/>), entitled Summer Survey of Crystal Lake, Montcalm County 2003.

◆ *Because the question has been asked we present this next article.*

## WHAT CAUSES FOAM ON THE LAKE

*By Doug Fuller  
The Michigan Riparian*

Have you noticed foam on the surface of the lake once or twice this year? It is especially prevalent in lakes on windy days, either as streaks on the surface or in

windrows along the shoreline. It is most commonly the result of the natural characteristics of the water.

### What is surface Tension?

The physical properties of water result in an exceptionally strong bonding of water molecules to each other (cohesion) at the water surface. This is referred to as surface tension. The surface tension of water is higher than any other liquid, except mercury. Keen observers may have noticed surface tension as a "tough surface film." This is why some objects with greater density than that of water, such as individual sand grains, do not sink when dropped onto the water surface. Some insects, such as water spiders, take advantage of surface tension to walk on the water in search of prey. The surface tension also presents a threat to some organisms, such as microscopic zooplankton which may become trapped in the surface film and cannot escape.

### What Causes Foam?

A reduction on surface tension is conducive to the formation of bubbles or foam. The surface tension of water can be greatly reduced by the addition of certain substances, mostly organic compounds. These substances are called surface active agents (or surfactants). Natural populations of algae and submerged aquatic plants secrete large quantities of organic compounds during photosynthesis, as well as during decomposition. Locally depressed surface tension near beds of aquatic plants has been observed. Strongly stained bog lakes and lakes having massive algae blooms have the most greatly depressed surface tension. Slow flowing streams generally have greater surface tension depression than more rapidly flowing waters. Although unstained lakes with low plankton productivity generally have little surface tension depression, foam forms even on unproductive waters as the Great lakes. Seawater, which is very productive, has long been noted for its excessive foaming properties.

### The Effects of Water Action

Wind and wave action can create parallel cells of clockwise and counterclockwise vertical currents that result in linear alternations of divergences in the upper layers of lakes. These types of currents, called Langmuir circulation, are most noticeable when the wind is strong. Where current cells coverage, drifting debris and surfactants concentrate. This, coupled with the turbulence of the lakes surface, generates streaks of foam which are oriented approximately parallel to the wind. Between the streaks are clearer zones of upwelling. The greater the wind speed and wave size, the wider the distance between streaks. The persistent foam blows downwind and forms windrows along the windward shores. The compounds responsible for surface tension depression can also be concentrated in downwind areas, resulting in additional foaming as waves, break on the shoreline.

### Surfactants and More

Soaps, detergents, and other cleaning products contain surfactants mixed with conditioning and water softening agents. Surfactants increase the wetting and cleaning power of water. In the past, synthetic surfactants were highly resistant to microbial degradation. Foaming was excessive and persistent, and often mountains of foam could be found downstream from urban area and waste treatment plants. In addition to being unsightly, excessive foam causes water quality problems. Light transmission and atmospheric air exchange are reduced, causing low oxygen levels. The foam may also become wind-borne, causing public health problems in areas where water contains high levels of bacteria or other pollutants. Surfactants are now made of more degradable compounds that bacteria can utilize as a source of food.

**Conclusions**

Without laboratory analysis, it is impossible to determine whether foam observed on lakes and streams is the result of natural conditions or human activities. Detergent-caused foam could possibly find its way into our waterways from faulty septic systems, commercial or industrial areas, waste treatment facilities or human activities such as car and/or boat washing as well as im-lake bathing. However, it is unlikely that the foam would be long lived or that it would be found far from its source. Undoubtedly most foam is the result of natural circumstances.

*Doug Fuller is a biologist with Tip of the Mitt Watershed Council, Conway, MI 49722*

**COTTAGE & CABIN SECURITY**

How nice it is to get away for a long weekend or a vacation in your hideaway on the lake. However, this same seclusion that is so relaxing also increases the possibility of a burglary.

**ENVIRONMENTAL SECURITY**

Make it difficult to steal your belongings.

Trim trees that allow access to your doors and windows. Also, trim any shrubbery that could conceal intruders around doors and windows.

If you leave your power on, consider timed lights, a motion sensor or a security system.

**ESSENTIAL SECURITY**

Be sure your doors are all of solid wood or are steel-clad, with reinforced jambs and frames.

Secure all doors with deadbolt locks

Cover all windows with shutter, blinds or drapes. If a burglar can't see what you have inside, they are less likely to try to get in to get it. The more time and effort the burglar expends in attempting to break into your residence, the greater the chance

that they will move on to an easier opportunity.

Leave extra keys (Home, Gate and Garage) with trusted neighbors. DON'T hide spare keys near the home, a burglar knows where to look!

Keep all boats, recreational vehicles and other items securely locked and *disabled*, even if you lock them in an outbuilding or a garage.

**YOUR BELONGINGS**

Take anything with you that you can. Any item easily carried by you can also be carried out by a burglar.

If it is necessary to leave smaller items, hide them out of sight. Unlit closets and drawers can conceal small, valuable items from view.

**FIREARMS**

Never leave firearms in your hunting cabin if you are going to be heading home. They are easily sold and difficult to trace.

**OPERATION IDENTIFICATION**

It can be helpful to engrave your Michigan ( or official state drivers licence) number on items (TV, VCR, DVD, tools ). This lets the burglar know that your belongings can be traced back to you and they may be harder to sell. Also, record the make, model and serial number of your belongings for your records and keep, (2) two copies in separate locations.

If you arrive and suspect that your dwelling may have been broken into, DON'T GO INSIDE, Call the police from nearby and wait until they arrive. Also, don't disturb anything in the area (footprints, tire tracks) that could be useful in solving the crime.

Have a neighbor or friend check the property often. Their frequent presence helps. If your vacation home is broken into, timely reporting to law enforcement is important.

Ask your neighbors if there is a Neighborhood Watch Program in the area. If there is seek information from them relative to what it takes to join. You do not

have to be a full time resident to belong to a NWP. Nor does it cost a penny to join an already Watch Program.

Check windows in your area for the familiar signs for a Neighborhood Watch Program. The local Police department can probably lead you to them if they are existent in your area.

**MICHIGAN CLEAN WATER CORPS**

This article was excerpted from the Michigan Lake Steam and Watershed Association Newsletter February 2004, Volume 7, Issue 1.

On September 30, 2003, Governor Jennifer Granholm signed Executive Order No. 2003-15, creating the Michigan Clean Water Corps (MCWC). In the Executive Order, the Governor recognized that Michigan is blessed with an abundance of lakes and streams, many of which are exceptional quality. She also made the important point that Michigan's Citizens must play an active role in protecting the state's water resources. MCWC was created as an advisory body to assist the DEQ in carrying out its mission and assist in establishing a statewide volunteer water monitoring network.

MCWC will generate data on our lakes and streams, and more importantly it will provide citizen involvement in protection of Michigan's water resources. Lake and stream leaders should continue to follow development of the development of the MCWC.

This article was excerpted from the "leading Wave," the official publication, of the Lake and Stream Leader's Institute.

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**SPRING IS AROUND THE CORNER WE HOPE.**

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**CHECK YOUR MAIL FOR THE SOON TO ARRIVE 2004/2005 MEMBERSHIP AND 2004 LAKE ACTIVITIES NEWS LETTER**

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<http://www.crystalonline.org>