



CRYSTAL WHITECAPS

The Newsletter of the Crystal Lake & Watershed Association

Protecting Crystal Lake Now for Generations to Come.

Vol. 13, No. 1

Spring 2017

HIGHS AND LOWS ON CRYSTAL LAKE

The quest for a Goldilocks water level (“not too high, not too low, but just right”) on Crystal Lake has been ongoing for more than a century. When there’s too much water, it can result in shoreline erosion or even flooded yards. Too little water, and some riparian owners find it tough to get boats in to their docks or off their boat lifts.

And Mother Nature regularly reminds us that “Goldilocks” was a fairy tale.

Lake level management is accomplished – to the extent possible – at the Crystal Lake Outlet dam, off Mollineaux Road in Crystal Lake Township. The dam consists of a 50-foot-wide concrete spillway with five 10-foot “stop-logs” that can be raised or removed to alter the amount of water flowing out of the lake.

in the vulnerable late fall and early spring months, as well as to provide storage capacity for spring meltwater. The higher summer level allows for better access to docks and lake-entry points.

The six-inch difference from winter to summer may seem very small, but on a nearly 10,000 acre lake it represents a tremendous volume of water. For some lakefront owners, boating would be extremely difficult if the lake were maintained at the lower level. In shallow shoreline areas, the summer increase results in 18 inches of water at the end of a homeowner’s dock, instead of 12 inches.

The Benzie County Drain Commissioner’s office takes weekly water level measurements, weather permitting, and can adjust the stop-logs to let more water or less flow out from the lake. (The county’s elected Drain Commissioner, Ed Hoogterp, is a past president of CLWA.)

Crystal Lake has a complex hydrology. Water comes into the lake through direct rainfall, stream flows, storm runoff and groundwater inflow. It exits through the process of evaporation and through groundwater outflows to Lake Michigan, in addition to the Outlet channel.

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In the matter of determination and fixing of a water level of the waters of Crystal Lake, Benzie County Michigan:

“... It is ordered that the County (Drain Commissioner) shall attempt to maintain the level of 600.25 feet above sea level for the period May 1st through October 31st of each year, and 599.75 feet above sea level for the period November 1st through Aril 30th of each year...”

Charles A. Wickens, Circuit Judge
Dec. 1, 1980 (as amended)



Location of Crystal Lake Outlet dam from air (Google Earth)



Outlet dam, March 2017: three center boards raised, west board removed, east board in place, to maximize outflow since the lake was well above winter target level. (photo: E. Hoogterp)

The dam was first built about 1911, and reconstructed in the late 1970s. Following that reconstruction, a committee of property owners worked with the Benzie County Road Commission to recommend the lake levels (599.75 feet above sea level in winter and 600.25 in summer) which were incorporated in Judge Charles Wickens’s 1980 court order.

The intent of the lower winter target is to reduce shoreline erosion and “ice push”



HIGHS AND LOWS ON CRYSTAL LAKE

Continued from Cover

Because of all those factors, plus the size of Crystal Lake, the water level responds quite slowly to changes in the flow over the dam. During periods of heavy rain, water can't drain through the outlet channel fast enough to keep the lake from rising. And, in dry years, the lake level has sometimes fallen below the elevation of the dam.

Over the past several years, the lake has seldom gone down to the designated

November-to-May level. That, in turn, has resulted in unusually high water in the spring and led to riparian complaints when they find their beach has been eroded away. Depending on conditions this fall, the Drain Commissioner will likely remove more stop-logs in November in an effort to reduce the lake level and make space for spring runoff.

An automated sensor, funded by CLWA, now provides real-time lake level readings. That is expected to improve

lake management in the future. The sensor data usually correspond closely to the manual readings. Both methods will continue being used for the time being. The Drain Commissioner's office will use the CLWA data along with weather station data and the manual readings in an effort to develop a model that will better predict lake levels and control them more proactively.

Ed Hoogterp,
Benzie County Drain Commissioner



Automatic sensor monitoring lake levels at the Outlet



Real-time lake level report from CLWA website
(April 27, 2017, 3:00 p.m.) (www.crystallakewatershed.org)

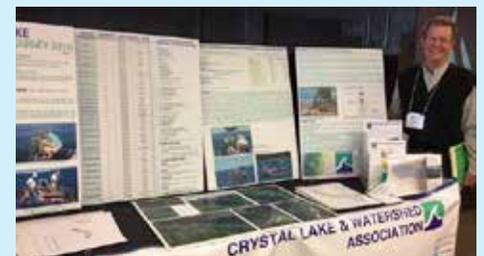
You can monitor the ups and downs of Crystal Lake as well as the water temperature from the comfort of your own home! The continuously updated lake level readings can be viewed on the CLWA website www.CrystalLakeWatershed.org (click on "Lake Level Monitoring" on the dropdown menu under "Water Quality").

MICHIGAN LAKE AND STREAM ASSOCIATIONS HONORS CLWA

The Michigan Lake and Stream Associations presented the CLWA with their "Michigan Lake Association of the Year Award for 2017" during their 56th annual conference, held this year at Crystal Mountain Resort on April 21-22. It recognized CLWA for "outstanding leadership, teamwork and dedication to preserving and protecting Michigan's freshwater heritage for future generations." The CLWA is grateful for this honor, and for all those board members and volunteers who work so hard on behalf of Crystal Lake.

The CLWA was well represented at the conference, with 10 board members attending and several serving on panels and making presentations. Our booth in the exhibit hall featured the results of the aquatic weed survey conducted by Jim Hamp last summer, as well as information on other CLWA projects such as boat washing, lake level monitoring, and the Walkabout. Hamp received training to do the survey at the MLSA meeting in 2016, and his results attracted considerable interest from visitors to the booth. He hopes to complete the survey this summer.

Next year's conference will also be held at Crystal Mountain, April 20-21, 2018, and we encourage all lake lovers to consider attending. 📍



Jim Hamp at the CLWA booth during the Michigan Lake and Stream Associations conference



NEW INITIATIVES IN SWIMMER'S ITCH CONTROL 2017

This summer the CLWA will undertake a major new initiative for swimmer's itch control and expand its participation in research programs through its collaboration with the Michigan Swimmer's Itch Partnership (MISIP), a coalition of 24 lake associations. Intensified efforts are possible thanks to \$250,000 in appropriations from the State of Michigan for swimmer's itch remediation, which was authorized thanks to MISIP's efforts.

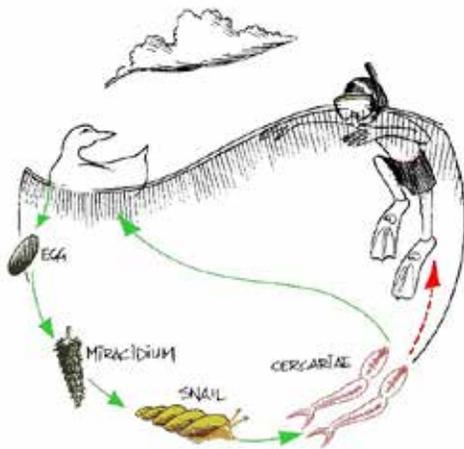
CLWA has contracted with Swimmer's Itch Solutions LLC, headed by Curt Blankespoor, to conduct a control program on Crystal Lake that focuses on trapping broods of common merganser ducks and relocating them to other bodies of water that do not harbor the swimmer's itch parasite. As has been demonstrated by earlier research, the swimmer's itch life cycle depends on the presence of two distinct hosts, one avian and one snail species: on Crystal, these are the common merganser and the stagnicola emarginata snail. By removing one link in this cycle – the merganser –

the occurrence rate of SI can be reduced, as has been demonstrated with past programs on Glen and Higgins lakes.

SIS LLC will also carry out a trial program to locate and seal off merganser nests, and may band some birds as part of an ongoing study of migration patterns. In order to facilitate merganser capture, CLWA has suspended its spring pyrotechnic program this summer. Instead the Crystal Lake community is being urged to report sightings of mergansers and cases of swimmer's itch to the form on the CLWA website (see box below). Nesting behavior will be seen in May, and broods should begin to appear by early June.

Data obtained from last summer's research will serve as a baseline for SI infection on Crystal Lake, so that the success of control efforts can be assessed in the future. (See the summary and full report from SICON LLC posted on the CLWA website www.CrystalLakeWatershed.org.)

As part of its collaboration with the Michigan Swimmer's Itch Partnership (www.misip.org), the CLWA will also participate in research led by Freshwater Solutions LLC that will be carried out mainly on Glen Lake. These projects will focus on studies of the qPCR method (quantitative polymerase chain reaction) as a way of measuring the density of cercariae DNA in water samples, to determine whether this technique can replace the labor intensive process of gathering snails and testing for infection. Research activities will also include banding birds (to assist in determining the extent to which mergansers removed from a lake return in subsequent years) and trying out drones as a way of locating merganser nests (to get the bird's point of view). The MISIP program will also feature an active training component to teach qPCR analysis and SI control methods to new practitioners, thus expanding SI expertise for future years. 📍



Life cycle of the swimmer's itch parasite



Curt Blankespoor releasing captured merganser brood

YOU CAN ASSIST THE CLWA'S SWIMMER'S ITCH RESEARCH AND CONTROL PROGRAM BY REPORTING YOUR SIGHTINGS OF MERGANSER BROODS OR NESTS, OR CASES OF SWIMMER'S ITCH OUTBREAKS. YOU WILL FIND THE LINK ON CLWA'S HOME PAGE, WWW.CRYSTALLAKEWATERSHED.ORG.



MIDDLE SCHOOL FALL WALKABOUT 2016

Having completed its 24th year, the CLWA Walkabout for 2016 is now in the history books. This year we welcomed many new volunteers and experts from the local community, and October 6 even brought great weather (until the last bus pulled out, at which time the “heavens” opened and we dashed for our transportation!) No amount of planning can control the Benzie weather, but with its cooperation the middle school students from Frankfort-Elberta and Benzie Central were treated to many improved, interactive experiences at each of our three locations.

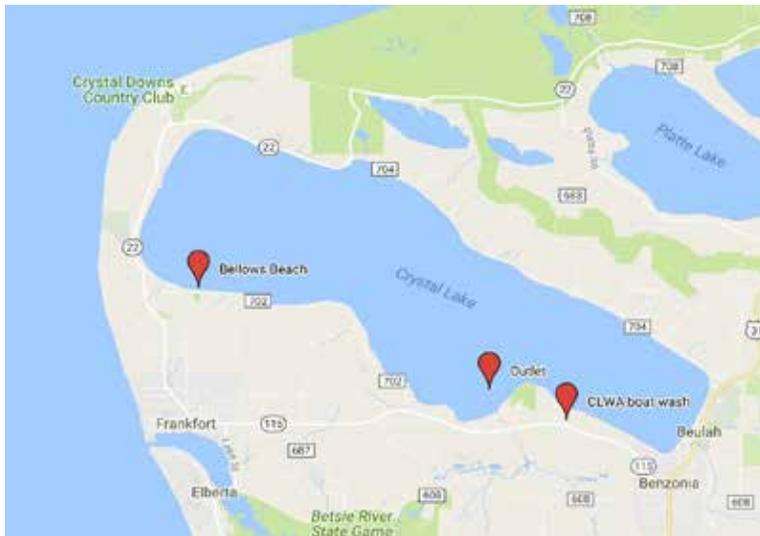
Walkabout activities require our students to use the skills that make for successful learning: listening, interacting, analyzing, reflecting and applying, providing lessons beyond the scientific subject matter. The presenters work hard to be sure that their sessions engage the students and the results are rewarding to watch. The units all highlight various watershed issues that the CLWA’s ongoing projects address, to preserve and protect the surrounding environment for future generations.

A revamped learning aid—now called the Field Notebook—and a fresh design for the popular Walkabout t-shirts got the students energized at each of the three sites.

📍 **CLWA boat wash/upper DNR boat launch on Mollineaux Road.** Ed Hoogterp, past CLWA president, and Gary Herbert, boat wash manager, engaged the students in practicing washing a boat to remove “aquatic hitchhikers,” which refers to any type of contaminant (organic or non-organic) that clings to a boat about to be launched. The students role-played the consequences of washing a boat in both the “right” and “wrong” places – learning that uphill

from the lake and in the “wrong” place, the contaminated water and any other contaminants (like oil and dirt) flow downhill and end up in the lake anyway, defeating the purpose of washing. Ed stressed the value of manmade wetland areas and home rain gardens, discussing the suitable types of plants (especially native grasses) that have deep roots to draw up and clean the polluted water.

From the dock at the lower boat launch, Ed gave students the chance to try pulling Eurasian watermilfoil up from the lake bottom with a two-sided rake. This is one of the aquatic invasive species present in Crystal Lake that can have an impact on fish habitat, swimming and boating, and which boat washing aims to keep from spreading.



Activity sites for Walkabout 2016

Ed’s message stressed that people in our community are working hard to protect our clean water and there are simple things (boat washing, rain gardens, etc.) that everyone can do to help.

📍 **Lower DNR boat launch.** Emily Cook from the NW Michigan Invasive Species Network/Grand Traverse Conservation District, continued this theme with activities aimed at identifying invasive species that we are currently battling at Crystal Lake. With “From Here, From Away,” she showed students images

of species (plant and animal) and they had to decide if they thought they were from North America or introduced from another part of the world. They then had to decide if those same species were considered invasive or not - after learning the definition of “invasive species.” This encouraged critical thinking and questioning certain things the students thought they already knew about commonly seen species such as earthworms and invasive cattail. The lesson concluded with a short hike down the bike trail to identify some of the previously discussed invasive plant species, serving as a review of the overall discussion topic.

📍 **Crystal Lake Outlet.** John Ransom, Benzie County Conservation District, focused on the food chain in our lake.

At the base of the food chain are plankton, which students were asked to draw from samples that John had collected from Crystal Lake. With the help of a digital microscope, they also viewed the organisms present in a water sample. This activity emphasized observation as the foundation of the scientific method.

After this, John led the students through the food web of Crystal Lake from sunlight to humans, naming organisms at each level of

the food chain and talking about some of the major native and non-native species at each level. The students illustrated this with an energy pyramid, listing species at each level.

Also at the Outlet, Jane Limmer Perrino, NW Michigan Invasive Species Network, discussed understanding and measuring water quality. Students collected water samples and learned the factors affecting water quality: temperature, dissolved oxygen rate, pH balance (important for fish), turbidity, and the presence of



Students at the Outlet study the low end of the Crystal Lake food chain with the aid of a digital microscope (photo: D. Wynne)



Jane Perrino describes various water quality factors and why they are important, while teacher Daryl Bluhm (Benzie Central Middle School) looks on (photo D. Wynne)

ammonia (due to the decomposition of organic matter) and nitrates and phosphates (a common by-product of fertilizers). Jane had the students measure several of these components and record their findings in their Field Notebooks, an important lesson in the protocol of field research. As they stood by the lake level monitoring station, they also discussed how rising and falling lake levels during the year impact water quality in Crystal Lake.

█ **Bellows Beach.** Ted Fisher and Al Flory, members of the CLWA Swimmer's Itch committee, led a discussion of the problem of swimmer's itch and the part we all can play in the efforts to reduce its impact on everyone's enjoyment of Crystal Lake. They demonstrated some of the equipment being used for SI research and control (for example, pyrotechnics to discourage merganser nesting). Students viewed a short video on Al's laptop showing microscopic cercariae, the parasite that causes human skin to erupt in redness and itching. The presenters emphasized how important scientific research is in our efforts to fight swimmer's itch, to provide the knowledge in order to develop the best methods of control. All had a chance to share their own experiences with this summertime affliction, a topic that led to many questions and considerable discussion.

Josh Mills, the Frankfort City Superintendent, shared with students both the current progress and future hopes for the renovation of Bellows Park (see article this issue, p. 6). This area has long been subject to severe erosion, which is detrimental to the water quality (*E. coli* is frequently detected at this beach after heavy rain). Josh described this ongoing project as a great example of private and community effort coming together to accomplish this much-needed improvement of the beach which many area students use for summer recreation.

The CLWA Walkabout Committee expresses our appreciation and thanks to all the dedicated presenters and volunteers, both veterans and "newbies," for their time, effort, and, most of all, their passion for Crystal Lake and its future. We look forward to seeing them all, and anyone else who wants to pitch in next year for another chapter in the CLWA Walkabout.

Sue Brown
CLWA Education and Communication committee

SECOND ANNUAL BOAT WASHING "BLITZ" AGAINST AQUATIC INVASIVE SPECIES

Once again the CLWA joins forces with the Northwest Michigan Invasive Species Network and the Benzie Conservation District to host a community outreach event raising awareness of aquatic invasive species. Intruders such as quagga mussels, Eurasian watermilfoil, and fish diseases threaten the health of our lake, degrade water quality, and impair the enjoyment of recreational activities. The best defense is thorough boat cleaning, which prevents new invasives from being transferred from

infested lakes as hitchhikers on boats and equipment.

Join us to learn the best methods, pick up information and giveaway items, and help the CLWA preserve Crystal Lake for future generations. █

**SATURDAY, JULY 1,
NOON TO 3:00 P.M.**
**CRYSTAL LAKE PUBLIC ACCESS SITE
(BOAT LAUNCH) AT MOLLINEAUX RD.**



NEW BELLOWS PARK TAKES SHAPE

Returning snowbirds and summer residents will notice big changes at the Frankfort public beach on Crystal Lake, known as Bellows beach (or “7th Street Beach”). The park is being transformed by a city plan that aims to remediate the serious erosion issues that have plagued the location, and make it safer and more welcoming for its clientele. As one of only two public beaches on Crystal Lake, Bellows Park constitutes a vital link between the lake and the surrounding community of Frankfort and Benzie County.

The CLWA has long been concerned about the severe erosion that takes place at the Bellows road end whenever there is a significant rain storm. The damage to

the beach and flooding of surrounding property is evident at these times. Unseen, however, are the *E. coli* readings which always elevate after these events, a sign of the many contaminants that are washing into the lake.

At last, thanks to a generous donation from Betsy and Emerson Pugh, the necessary improvements to the park are under way, following a comprehensive engineering study. Central to the plan are new rain gardens, road and parking improvements, and additional landscaping to control the erosion, deflect stormwater runoff, and enhance the park’s amenities. The finished park will include a new picnic pavilion, tables, grills, and restrooms.

Finally, planned improvements to the beach area include a new dock, designated swimming area with raft and buoys, and an upgraded boat launch ramp. A marked crosswalk will also increase the beach’s safety.

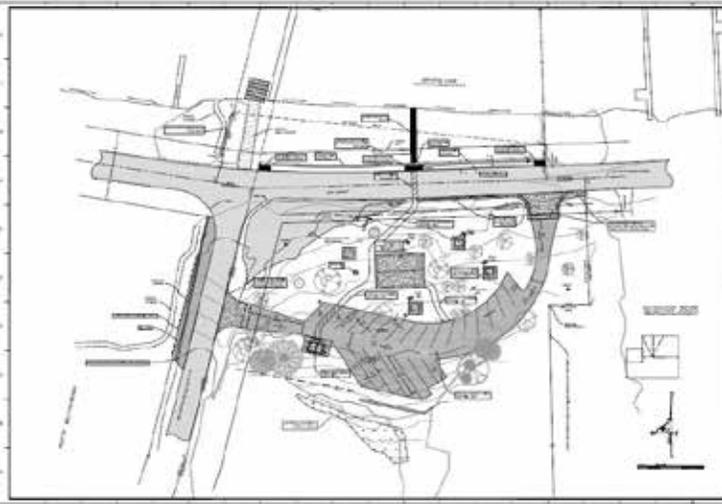
Josh Mills, Superintendent of the City of Frankfort, has been an avid champion of renovating the park, as part of Frankfort’s parks and recreation master plan. He stresses that the goal of the new facility is to be a model of shoreline stewardship that addresses water quality concerns and surface water runoff, while enhancing the recreational experience of residents and visitors. 🌱



Bellows Park, June 2016: old pavilion removed, sand erosion and runoff in foreground (photo: E. Herscher)



Flooding and erosion at Bellows Beach, August 2016. (photos: E. Herscher)



Plan of Bellows Park renovations (Grand Traverse Engineering LLC)



Constructing park road and parking area, November 2016 (photo: E. Hill)



Planting rain garden at corner of Bellows and South Shore roads, October 2016 (photos: E. Hill)



New parking area with permeable pavers, rain garden in the wetland in background, old restrooms in temporary location to right, November 2016 (photo: J. Buzzell)

Protecting Crystal Lake Now for Generations to Come.



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CRYSTAL WHITECAPS is published twice a year and is a benefit of membership in the Crystal Lake & Watershed Association. Back issues and membership information are available on the CLWA website: crystallakewatershed.org/education/newsletter

CLWA ANNUAL MEMBERS MEETING 2017

SATURDAY

JULY 22 AT 9:30 A.M.

**CONGREGATIONAL SUMMER ASSEMBLY
COMMUNITY BUILDING**

All are welcome to come and hear reports on CLWA's current activities.



Fourth of July 2016

MEET THE CLWA!

The CLWA will be participating in these local events during the summer of 2017. Please visit our booth and say hello! Let us know what's on your mind. Information on protecting our watershed will be available. CLWA T-shirts, hats, and watershed maps will be for sale.

**JULY 1....."LANDING BLITZ"
Noon – 3 P.M. at the Mollineaux Road
DNR boat launch**

**JULY 26..... CONGREGATIONAL SUMMER ASSEMBLY
10 A.M. – 4 P.M. ARTS AND CRAFTS FAIR**

**AUGUST 5BEULAH SIDEWALK SALE
10 A.M. – 2 P.M. AND COMMUNITY SHOWCASE**

**AUGUST 18-19FRANKFORT ART FAIR
Market Square Park**