



CRYSTAL WHITECAPS

The Newsletter of the Crystal Lake & Watershed Association

Protecting Crystal Lake Now for Generations to Come.

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Fall 2016

IN SEARCH OF CRYSTAL LAKE'S INVASIVE PLANTS

Crystal Lake is famous for its clear water and sandy bottom. So when we see something fuzzy and green growing near our dock or shoreline, we begin to worry. What is causing these changes and how can we stop them?

In early August, under the leadership of Vice President Jim Hamp, the CLWA began a multi-year survey to identify native and invasive aquatic weeds. The goal is to provide baseline documentation of the lake's current status so that future changes – such as expanding weed beds or new species – can be recognized. Initial results, focused on the east end around Beulah, reconfirmed earlier studies that identified invasive Eurasian watermilfoil as the principal non-native plant.

Conducted under the auspices of the Michigan Cooperative Lakes Monitoring Program, the survey will continue in 2017 toward the west end of the lake. Hamp and other team members received training in April during the Michigan Lake and Stream Associations annual conference. The onsite launch of the project was overseen by Dr. Jo Latimore of the Michigan State University Department of Fisheries and Wildlife, who commented, "I've never had the pleasure of working with a more organized crew!"

The team created thirty-one transect lines beginning at the Crystal Lake Marina on the northeast shore, extending through the Beulah shoreline to the Mollineaux Road DNR boat launch site on the southeast shore. Each transect had 2-3 sampling points (totaling 81 sites sampled) at which GPS coordinates and depths were recorded. A special grappling rake was tossed at the four quadrants of each site to bring up samples of the weeds that were present. Samples were identified and recorded, with examples later dried and mounted for reference.

As found in previous studies, invasive Eurasian watermilfoil was well established around the Beulah beach, with dense beds noted directly west of the concrete boat launch. This weed, introduced by transient watercraft not



Eurasian Watermilfoil
(Myriophyllum spicatum)



Native Northern Watermilfoil
(Myriophyllum sibiricum)

cleaned before launching, has now extended its reach around the east end and along the south shore including the DNR boat launch area. While these new occurrences are mostly early small patches, the expansion of the watermilfoil into additional areas is a new finding. Next year's survey expects to find further extension into Onkeonwe Bay and beyond.

E. watermilfoil can outcompete and dominate native milfoil and other beneficial plantlife, leading to a change in breeding sites, shelter and food sources for fish and other smaller wildlife. If left alone, it becomes dense matted growth that can entirely clog a water body, impeding recreational activities. Fragments clinging to boat propellers or hulls, or lodged in sporting equipment, easily spread the weed from place to place. Thus its control is essential to the maintenance of a healthy lake environment.

Four methods are commonly used to treat this plant, none of which is ideal: (1) herbicides, which can indiscriminately destroy desirable aquatic biota as well; (2) repeat mechanical harvesting, which spreads the plant by fragmentation; (3) hand digging to remove the entire plant; or (4) covering it with black plastic or double thickness burlap for prolonged periods to deprive the plant of light. The first two methods tend to be used in smaller lakes overrun with dense growth, in order to allow even temporary recreational use before it regrows. They are not permanent solutions, and require recurrent treatment with ongoing expense. Hand digging removal and light deprivation are more appropriate for limited early growth. This can eliminate milfoil before the exponential growth phase is achieved, which leads to recurrence, continued expansion and ongoing expense.

To combat this threat on Crystal Lake, education of riparians is one of the most important tools for preventing milfoil's spread around the lake. Those who frequent the shoreline can identify early patches and facilitate their treatment for elimination, before it is too late as is now the case at Beulah.

The future is sure to bring more invasive plants to our shores from other parts of the world. Starry Stonewort (now in Houghton Lake), Hydrilla (known in Indiana lakes), and Curly-leaf Pondweed (detected in Michigan) are examples of current threats. We may not be able to stop them all, but being alert to early warnings and washing our watercraft will help keep Crystal Lake as pristine as possible.

Jim Hamp,
CLWA Water Quality Committee

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PRESIDENT'S MESSAGE: GREETINGS FROM THE SHORES OF CRYSTAL LAKE!

The fall colors are at their height and it is a good time to reflect on what your CLWA has accomplished since our last *Crystal Whitecaps* arrived in your letterbox. I want to call your attention to five very important undertakings that focus on protecting Crystal Lake now and for generations to come: swimmer's itch control, aquatic invasive flora, boat washing, lake level monitoring, and the means to make this all possible. You will read about all of these actions in the following articles, so I will touch on some key details.

Swimmer's itch control focused on establishing the necessary baseline metrics to define the state of our problem and to measure the effects of our current and future management efforts. We spent \$65,000 this summer to hire SICON LLC to determine our swimmer's itch (SI) infection rate, characterize all contributing vectors (snails and avian waterfowl) to make sure we continue to focus on the root of the problem, bird counts and snail identification of the contributing vectors, and DNA analysis of snail samples to verify laboratory analyses. A portion of these funds was used to promote work establishing a real time method of determining the presence of SI in swim areas. This work is fundamental to all future actions related to managing SI on Crystal Lake.

CLWA led by Dr. Jim Hamp began a multi-year survey of invasive flora in all areas of Crystal Lake. This effort has already pinpointed established beds of Eurasian milfoil on the south shore and

east end of our lake. This invasive will need to be managed as it presents a significant detriment to our water quality should it be left unchecked. This is important work that needs to continue.

Boat washing at your CLWA Mollineaux Boating Access Site station has taken hold and under the management of Gary Herbert has educated many regular boaters at Crystal Lake to use this state-of-the-art boat washing facility to combat invasive species transfer into our beautiful lake. Please continue to educate your friends and family that this service is available, free and funded by CLWA, 24 hours per day. It takes just minutes to wash your boat and trailer and make a big difference in the future water quality of Crystal Lake.

Lake level monitoring at the CLWA station at the Crystal Lake Outlet continues day in day out. You can now check its readings in real time on the new CLWA website (<http://crystallakewatershed.org/water-quality/lake-level-monitoring>)! This observation is important to verify that the seasonal lake levels meet the 1980 court settlement established to satisfy the shoreline protection requirements of all stakeholders. CLWA will continue to maintain this system and work toward establishing best practices with the Benzie County Drain Commissioner.



CLWA President Joel Buzzell demonstrating how to clean aquatic hitchhikers from a fishing boat at the Mollineaux Road boat washing station.

These key actions are set in place to protect the quality of Crystal Lake's beautiful waters. Until other sources of revenue are established, it is we – the CLWA and our individual contributions – who make them possible. We are operating at a budget deficit for 2016 and with your financial support now, we can continue, balance our budget and put forward the monies required to protect Crystal Lake now and for future generations! Please take a moment to consider your 2016 contribution to our essential work.

Your contribution is our future,

Joel A. Buzzell, President
Crystal Lake & Watershed Association

NEW CLWA WEBSITE LIVE

Have you checked out the CLWA website lately at its new address: CrystalLakeWatershed.org?

Over the past year Education and Communication committee members Rick Cosaro and Ellen Herscher have worked hard to update the site and provide more timely and accessible information to our members and the interested public. While parts of the site

still remain a work in progress, here are some of the new features you will find:

- ✔ Real-time readings from the electronic monitor at the Outlet, displaying current lake level, water temperature, and recent precipitation
- ✔ Latest Crystal Lake news on the Home page
- ✔ Calendar of CLWA events

- ✔ Identifying and reporting invasive species
- ✔ Latest report on water quality monitoring
- ✔ Opportunities to volunteer

What else would you like to see? Find errors? Contact Ed/Comm chair Ellen Herscher and let her know (herschere@yahoo.com).



IN SEARCH OF CRYSTAL LAKE'S INVASIVE PLANTS

Continued from Cover

John Ransom (Benzie Conservation District) tossing rake to recover aquatic weed samples.

Photo E. Hoogterp



J. Ransom (BCD) with aquatic weed sample from Crystal Lake.

Photo J. Latimore



Identifying and recording aquatic weeds: S. Brown, J. Hamp, J. Ransom, D. Wynne.

Photo J. Latimore

- ▣ **Thanks to team members Susan Brown, Stacy L. Daniels, John Ransom, and Ruthy Ransom.**
- ▣ **For more information and the report of the previous (2008) survey, see <http://crystallakewatershed.org/water-quality/invasive-species>.**

MICHIGAN LAKE AND STREAM CONFERENCE COMING TO BENZIE COUNTY

The Michigan Lake and Stream Associations (MLSA) will hold its 56th annual conference at Crystal Mountain Resort on April 21-22, 2017. This will be an opportunity for local lake lovers to meet with other individuals, organizations, and businesses who share the goal of preserving and protecting the state's vast heritage of freshwater resources. The conference will include educational presentations, in-depth workshops, exhibits, and opportunities to network with like-minded individuals from throughout Michigan.

A 501(c)3 organization, the MLSA is a collaborative partner with the MiCorps Cooperative Lakes Monitoring Program, in which the CLWA is an active participant. Each year the Cooperative Lakes Monitoring Program runs training sessions at the MLSA annual conference, to teach local volunteers the techniques for recording water quality data from their lakes and practicing sound lake management. At last year's conference, a CLWA team was trained to undertake the aquatic weed survey that they began in August (see Cover of this issue).

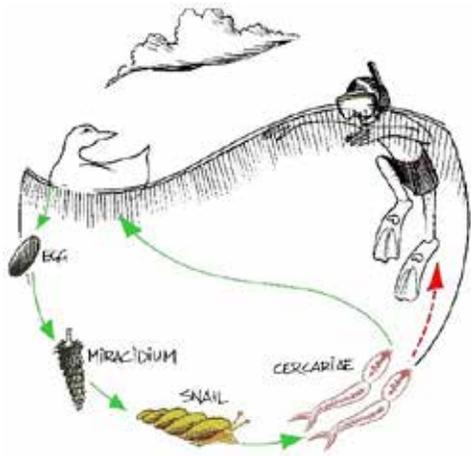
The CLWA looks forward to joining with other area lake associations to welcome the attendees and introduce them to beautiful Benzie County. All CLWA members are encouraged to come learn more about the environmental, legal and practical issues that affect our lake.

For more on the MLSA and the conference, see www.mymlsa.org. Conference registration will begin in January 2017. ▣



COMBATING SWIMMER'S ITCH: SUMMER 2016

Swimmer's itch continues to be a major concern for the Crystal Lake community, affecting those who reside, vacation, and do business in the area. All efforts to control the infestation depend on breaking the parasitic cycle that releases cercariae into the water, which then penetrate human skin (rather than their natural waterfowl host), and cause an allergic reaction.



Life cycle of the swimmer's itch parasite (avian schistosomiasis).

Intensifying its efforts to find answers, the CLWA sponsored several multi-faceted research programs during the summer of 2016, aiming to gather the data needed to measure the extent and causes of the parasite and resulting human rash. CLWA also strengthened its coalition with the Michigan Swimmer's Itch Partnership as the group pursued its strategy of state support for swimmer's itch control.

So it was a busy summer for the research teams and the many CLWA volunteers who assisted. Final analysis of all the data has not yet been completed, but the preliminary reports are summarized below.

OAKLAND UNIVERSITY DEPARTMENT OF BIOLOGICAL SCIENCES

Madelyn Messner returned to Crystal Lake for a second year of research for her Master's degree, under the supervision of

Dr. Thomas R. Raffel (see *Crystal Whitecaps* 11:2, Fall 2015, p. 4; 12:1, Spring 2016, pp. 4-5). She was joined by additional researchers and trained volunteers, who expanded the testing to 38 sites (four on Crystal) on a total of 16 lakes.

The goal of the team's study has been to answer, "What environmental factors determine patterns of schistosome abundance?" Messner's analysis of her research in 2015 suggests that snail density and percentage of forest in the watershed have an impact, as well as light and algae growth in the water. The numbers of cercariae vary considerably on a daily basis, affected by wind and temperature. The number of snails also varies widely, even in a single lake. Dr. Raffel has identified a newer protective skin cream that may become available and may prove to be more effective than previously available products.

The Oakland group began their 2016 season with a presentation at the Congregational Summer Assembly beach for an audience of about 30 lake lovers. They demonstrated their methods for collecting and straining water samples, testing for cercaria DNA, recording temperatures, and trapping snails and other shellfish. Analyses of the treasure trove of data collected this summer will continue over the winter.



Ted Fisher (CLWA), Madelyn Messner and Jenna McBride (Oakland University) demonstrate their data collection methods at the Congregational Assembly beach on June 23, 2016. Photo D. Wynne

SICON LLC

As reported in the last newsletter (*Crystal Whitecaps* 12:1, Spring 2016, p. 4), the CLWA hired SICON LLC ("swimmer's itch control") to launch a new research and assessment project on Crystal Lake in summer 2016. The objective of this preliminary program was to definitively identify the species of snail and waterfowl that contribute to swimmer's itch on this particular lake, and to measure the severity of the avian schistosome presence. (The final report on this work is available on the CLWA website www.crystallakewatershed.org.)

The only snail species known to harbor itch-causing parasites found in sufficient quantities on Crystal is *Stagnicola emarginata*, of which SICON collected more than 10,000 samples.

Two surveys of waterfowl present on the lake were conducted, comprising counts of mergansers, Canada geese, and mallards. Fecal samples of all three species were collected and analyzed for the presence of miracidia (larva) of avian schistosomes. Only the mergansers harbored schistosomes, some in very abundant quantities.

In order to measure the SI "severity rate," SICON collected snails from ten different

sites around the lake on five different days from late June to early August. The density of snails (number per square meter) at each site was recorded, a figure that varied widely, from 0.02 to 26.9. Analysis revealed what percentage of the collected snails was infected, a rate



Kelsey Froelich (SICON) collecting waterfowl droppings for analysis.

that varied from 0.10% to 1.67%, with a lake-wide average of 0.79%. A “severity rate” for each site was then calculated by multiplying the infection rate by the density. These data demonstrated considerable differences among the sites, ranging from 0.08 at the Crystal Lake Yacht Club on the west end to 19.99 off Onkeonwe Road on the southeast shore.

All the samples are currently being analyzed for DNA identification, which can be expected to produce further results. One observation made by SICON is that Crystal Lake has fewer summer waterfowl and a generally lower snail infection rate than other lakes of similar size where they have worked.

With these baseline metrics in hand, CLWA now has a clear picture of the swimmer’s itch infestation in Crystal Lake. While we have practiced various kinds of control methods over recent years – most prominently lake-wide pyrotechnics to discourage local merganser nesting – SICON has a successful record of trapping mergansers on other lakes and releasing them to other locations. On Higgins Lake, the snail infection rate decreased from 3.0% in 2015 to 0.28% in 2016 following trap-and-release. A similarly effective

program was carried out on Glen Lake a few years ago. The CLWA is considering whether this approach should be adopted on Crystal for summer 2017.

CONGREGATIONAL SUMMER ASSEMBLY BEACH

As in previous years, the waterfront staff at the CSA beach continued to record detailed data on swimmer’s itch occurrences affecting their swimmers (see *Crystal Whitecaps* 11:2, Fall 2015, p. 3). This data continues to be the gold standard for swimmer’s itch incident reports, since the reporting is more systematic and complete than that acquired randomly.

Al Flory of the CLWA Swimmer’s Itch Partnership has now summarized the data from the last four years (2013-2016) in a report that is available on the CLWA website (www.crystallakewatershed.org). It shows that the incident rate has been approximately the same (4.6 cases for every 100 swimmers) over that time, although the cases are clearly concentrated on particular days (85% occurred on just six days).

Two conclusions are clear, which should provide guidance for swimmers wishing

to minimize their risk of contracting SI: the risk appears to be higher on days with onshore winds and during the morning hours.

MICHIGAN SWIMMER’S ITCH PARTNERSHIP

The Michigan Swimmer’s Itch Partnership (MSIP) has grown and strengthened in its two years of existence (see *Crystal Whitecaps* 11:2, Fall 2015, p. 5). The CLWA continues as one of the lead organizations in this northern Michigan coalition that now numbers 24 lake associations. The group has outstandingly proven that “there is strength in numbers”!

A major accomplishment this year was to help bring about the successful passage of \$250,000 in state appropriations for swimmer’s itch research and control. These funds will be administered by the Leelanau Center for Education, available as grants to eligible 501(c)3 organizations. Now that the state of Michigan has recognized the critical importance of controlling SI, MSIP hopes that this support will become a multi-year commitment.

MSIP also hosted the first ever academic conference on swimmer’s itch, which

took place in June. Bringing together an international group of scientists researching various aspects of the swimmer’s itch cycle created a network of new contacts. By fostering such innovative collaboration, the MSIP hopes to speed the day when swimmer’s itch will no longer be a deterrent to enjoying Michigan’s pure waters. 🌿



Kelsey Froelich (SICON) processing water samples.



BOAT WASHING SPREADS – INVASIVE SPECIES DON'T

Crystal Lake's experience with zebra mussels has been a powerful lesson: it is better to keep invasive species out of a body of water rather than to try to remove them after they have become established. Now we are confronted with new threats – especially the quagga mussel and the New Zealand mudsnail – as well as the potential for invasive Eurasian milfoil to become more broadly entrenched (see this issue, Cover).

Concerned that the new DNR boating access site at Mollineaux Road would increase transient boat traffic, CLWA constructed a boat washing facility that opened in 2013 (see *Crystal Whitecaps* 11:1, Summer 2015). Studies have consistently verified that recreational boaters are the primary carriers of aquatic invasive species, and that the most effective deterrent is to power wash contaminated watercraft before launching them into an unaffected water body. It only takes one boat to introduce a new non-native plant or animal.

There remain, however, numerous secondary launch sites and road ends around the shores of Crystal Lake where no facilities are available, despite the township ordinances in place that require boat washing. The CLWA is directing more attention to these locations, both through public education and through efforts to make washing equipment more accessible. We report on two new initiatives here.

CRYSTAL LAKE YACHT CLUB WASHES SCORES OF VISITING BOATS

Over three days in late August, the Crystal Lake Yacht Club hosted the 2016 MC Scow National Championship Regatta, which brought 101 racing boats from across the United States to the CLYC's west shore beach.

This was the third national regatta that the CLYC has hosted in four years, a compliment to its active membership and the superb sailing environment of Crystal Lake (described on the MC Scow's website as "one of the world's nicest lakes"). To help insure that the lake will remain welcoming for future sailors, the CLWA has been working with the Yacht Club

to make sure that visiting boats are not bringing aquatic invasive species with them. Happily the Club was able to rent a portable washing station from Manistee County that was used for the event.

The CLYC will continue to be a busy club and a popular destination for organized sailing. In 2017 they will host the Western Michigan Yachting Association Regatta, and 2018 will bring the Butterfly Nationals. The CLWA congratulates them on their commitment to insuring that only clean boats participate.

CLWA JOINS FORCES FOR BOAT WASHING EDUCATION

As the busy 2016 summer boating season began, CLWA hosted an event on Saturday, July 2, to promote boat washing at the DNR public access site off Mollineaux Road. We were joined by Emily Cook of the Northwest Michigan Invasive Species Network and John Ransom of the Benzie Conservation District, whose organizations served as cosponsors. The morning was one of a series of statewide



Mobile boat wash in action at Crystal Lake Yacht Club. Photo H. Dow

The MC Scow is a 16-foot flat-bottomed craft with one sail, crewed by one or two persons. It has become extremely popular, partly because it is easy to launch and trailer. These features, of course, encourage its movement among bodies of water and increase its vulnerability to aquatic hitchhikers.



“Landing Blitzes” being supported by the Michigan Department of Environmental Quality (MDEQ).

Boaters coming to the launch were greeted by volunteers who directed them to the wash facility and handed out information on invasive species. The volunteer team and CLWA boat wash staff demonstrated the proper way to rinse and inspect a watercraft and its equipment (including fishing gear)

to rid it of any unwanted aquatic hitchhikers from other lakes. Mounted samples of invasive plants known in Crystal Lake were on display, and useful items such as drying towels were given out.

Fishermen especially were alerted to the threat of the New Zealand mudsnail, which has been identified in popular sport fishing waters such as the Pere Marquette River near Baldwin. The tiny size and strong attachment

ability of these snails mean that they can easily hide and survive in damp environments, ready to be transported to new waters if the boat is not thoroughly cleaned.

Another “Landing Blitz” has been scheduled for next summer, July 1 from noon to 3:00 p.m. Plan now to bring your watercraft and get it off to a good start in 2017. 📍



Launching MC Scows at Crystal Lake Yacht Club. Photo K. Zalar



Emily Cook, NW Michigan Invasive Species Network, discusses aquatic hitchhikers before launch. Photo J. Ransom



Conner Smith (CLWA) washing boats at Landing Blitz 2016. Photo R. Cosaro



Future invasive threats to Crystal Lake (l to r): Starry Stonewort (*Nitellopsis obtusa*), Hydrilla (*Hydrilla verticillata*), Curly-leaf Pondweed (*Potamogeton crispus*).



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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

CALL FOR NOMINATIONS TO THE CLWA BOARD OF DIRECTORS

The CLWA is an all-volunteer organization and welcomes new members to its board and committees. It looks for individuals from throughout the watershed area – special skills are helpful, but most important are enthusiasm and willingness to pitch in for the many tasks that help the CLWA preserve and protect Crystal Lake.

If you would like to recommend yourself or someone you know, please contact the chair of this year's nominating committee, Tassie Boshier at tassboshier@gmail.com. For information on terms and duties, see the Bylaws posted on the CLWA website crystallakewatershed.org



MC Scow National Championship Regatta on Crystal Lake August 2016. Photo K. Zalar

CLWA ANNUAL MEETING 2016

The Annual Members Meeting of the CLWA was held Saturday, July 23, 9:30-11:30 a.m. at the Congregational Summer Assembly Community Building, with about 75 members and other interested persons attending. President Joel Buzzell surveyed the accomplishments of the past year and Treasurer David Appleford reported that the organization's financial situation is sound. Committee chairs presented brief reports on their current work to preserve and protect Crystal Lake. The featured program was reports from the two CLWA-sponsored projects conducting swimmer's itch research on Crystal Lake this summer: SICON LLC and Oakland University Department of Biological Sciences. Both projects also had set up informational exhibits.

The following officers and board members were elected:

Re-elected President: Joel Buzzell (2016-2018)

Re-elected Secretary: Ellen Herscher (2016-2018)

New Board Member: Bruce Gerhart (2016-2019)

Re-elected Board Members: Ted Fisher, Wanda Shreiner, Hugh Walton (2016-2019); Stacy L. Daniels (2016-2017)

Full minutes of the meeting are available on the CLWA website CrystalLakeWatershed.org.

CLWA thanks the Assembly for the use of its facility!