



LAKE WISE

A Voice for Quiet Waters

Quarterly newsletter from Oregon Lakes Association

SUMMER 2014

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Past, Present, Future.
Mark your calendar for
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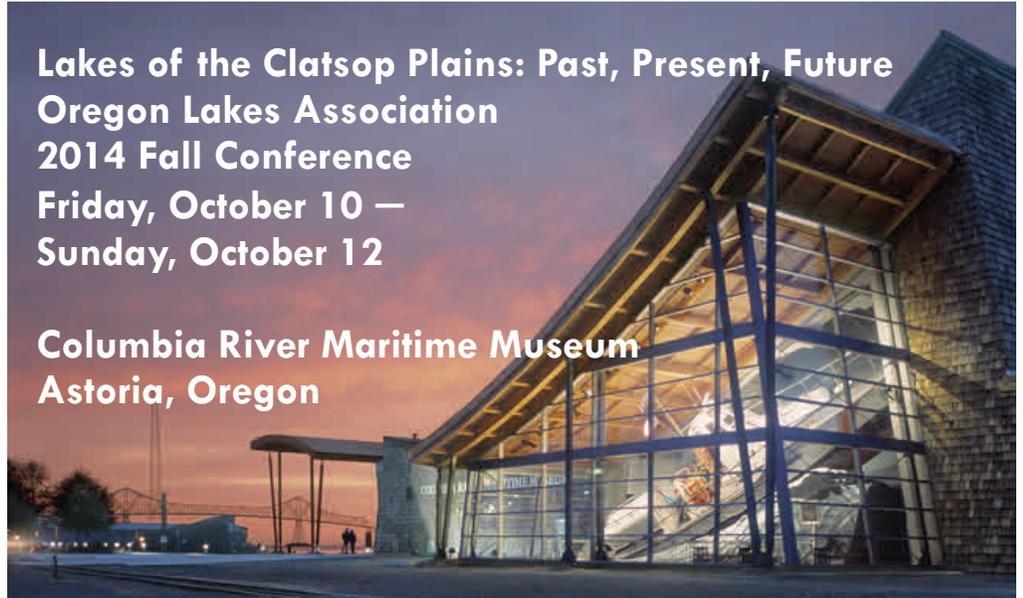
Signal crayfish have made a
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Calling all lake-lovers

Positions are open on the
Oregon Lakes Association
Board—consider joining the
OLA and using your expertise
to support the voice for quiet
waters.

Lakes of the Clatsop Plains: Past, Present, Future
Oregon Lakes Association
2014 Fall Conference
Friday, October 10 —
Sunday, October 12

Columbia River Maritime Museum
Astoria, Oregon



**Register now for the 2014 Oregon Lakes Association Fall
Conference at www.oregonlakes.org.**

The conference begins Friday, October 10 with an evening presentation at Rogue Ales in Astoria, and continues all day Saturday at the Columbia River Maritime Museum, with poster sessions and guest speakers focusing on issues of the lakes of the Clatsop Plains. Go to **www.oregonlakes.org** for the conference agenda, and list of speakers and topics. Poster abstracts on all topics lake-related are welcome through October 1 (submit via oregonlakes.org). The conference concludes on Sunday with a guided tour of nearby Cullaby Lake. Spaces for this Sunday event are limited, so register today to reserve your spot.

Register at **www.oregonlakes.org**

Questions or concerns can be answered by contacting
OregonLakesAssociation@gmail.com or, for specific questions:

Conference Chair: Paul Robertson | 541-994-5330 | Lake.Manager@dlwid.org

Program Chair: Rich Miller | 503-725-9075 | richm@pdx.edu

Venue Chair: Wayne Carmichael | wayne.carmichael@wright.edu

Fundraising: Steve Wille | sawille1@gmail.com and Richard Litts | tlbp@presys.com

Do you know about the Harmful Algal Bloom and Hypoxia Research and Control Act? You should!

Contributed by Wayne Carmichael, OLA Board Member

This article appeared originally in the Ohio Lake Management Society newsletter and has been edited and updated for inclusion in this OLA newsletter. Original authors are: Stephanie A. Smith, Co-founder and CSO/COO of Beagle Bioproducts, Inc. and Bradley Bensen, Heidelberg University and summer intern at Beagle Bioproducts, Inc. 959 Schrock Road, Columbus, OH 43229
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On Saturday August 2, 2014, Toledo, Ohio area residents were issued a do not drink order from the local water authority. The cause was a cyanobacteria (blue-green algae) water bloom that occurred over the cities water intake in Lake Erie. The type of cyanobacteria involved was the genus Microcystis, which produces a potent group of liver toxins called microcystins. Microcystins were not removed by the water treatment plant's normal process and this led to levels of microcystin in the finished water that exceeded the safe drinking water guideline level of 1 part per billion (ppb). The result was a water crisis that affected 500,000 water users in and around Toledo and caused Ohio's Gov. John Kasich to declare a state of emergency.

<http://www.toledoblade.com/local/2014/08/02/City-of-Toledo-issues-do-no-drink-water-advisery.html>

Freshwater blooms of cyanobacteria, referred to as Freshwater Harmful Algae Blooms or "FHABs" are not new to Lake Erie and in fact occur worldwide, especially as our water supplies become more nutrient rich with nitrogen and phosphorus. Many of us who do research and are tasked with monitoring and managing FHABs have long advocated for policies that would provide needed methods for monitoring, management and mitigation of FHABs that could minimize or avoid the ensuing problems and confusion that resulted from this latest Lake Erie waterbloom.

A legitimate question would then be: "Is there, and what would be, an appropriate role for the federal government in FHABs?" The good news is that there has been a recent and very important development in that regard. On July 1 President Obama signed Public Law 113-124 (113th Congress 124th Law), the Harmful Algal Bloom and Hypoxia Research and Control Act (HABHRCA), or "habarka" as we

call it. The board of directors at the Oregon Lakes Association have followed progress of this legislation very closely, and here we hope to make OLA members and even a wider audience more aware of the history and importance of this legislation, and we strongly encourage readers to let Congress know how important it is.

HABs have been responsible for at least 52 deaths and 10,000+ cases of human illness (Lopez et al., 2008), and human health impacts have been documented since the 1930s. In 1960 the entirety of the western basin of Lake Erie was covered in cyanobacterial blooms and massive growths of

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Cladophora, leading regional newspapers to declare that Lake Erie was dead. The resultant public outcry led to the signing of the 1972 Great Lakes Water Quality Agreement between the USA and Canada, the purpose of which was to lower the amount of nutrients that both the US and Canada were putting into the Great Lakes. At that time, poor control of human and animal waste was considered the primary source of the nutrient overload into the Great Lakes. NOAA led the organization of several workshops and research that ultimately would lead to a better understanding, at the federal level, of how widespread this issue was and that research would be needed to better understand the problem and address it. It took over 20 years for those efforts to culminate in the first HABHRCA legislation in 1998. Partly prompted by a 1997 outbreak of *Pfiesteria piscicida* in the Chesapeake Bay, sometimes called the “Pfiesteria hysteria,” the 1998 HABHRCA was actually Title VI of Public Law 105-383, the Coast Guard Authorization Act (CGAA) of 1998. Significantly, it established an Interagency Task Force that was required to deliver four reports: three about hypoxia and one about actual algal blooms. Led by NOAA but including the U.S. EPA and the National Science Foundation (NSF) as partners, it is not surprising that the focus was entirely on ocean

waters at that time. Importantly, HABHRCA 1998 provided \$52.25 million for R&D related to HABs and hypoxia, and raised awareness on this topic through the efforts of the researchers that were funded. Note that the U.S. was not alone in recognizing the need to address HABs and hypoxia at this time. In 1999 the EUROHAB cluster formed with a total funding of \$12 million dollars (in U.S. currency), and in 2001 973 Key Project (CEOHAB) formed in China with a funding of \$3.5 million (in U.S. currency).

It was not until the 2004 reauthorization of HABHRCA that *freshwater* HABs started to gain much-deserved attention, in no small part due to the nations leading scientist on the topic, Dr. Wayne Carmichael of Wright State University (now retired living in Oregon and a member of OLA’s board of directors). Ominously, his 2003 testimony before Congress pointed out that great progress was made in curbing Lake Erie HABs in the late 1960s through 2000, but he saw food web changes (partly related to invasive zebra mussels) and occasional spikes in blooms that foretold of an increasing frequency and intensity of blooms to come. As we know today, that prediction was to play out, with massive blooms now being the “new normal” in Lake Erie.

The 2004 HABRCA Reauthorization called for five reports to be delivered by NOAA, one of which was the Scientific Assessment of Freshwater Harmful Algal Blooms (FHABs, http://www.cop.noaa.gov/stressors/extremeevents/hab/habhrca/Report_Plans.aspx). NOAA was also allocated funds for competitive grant programs that were instrumental in advancing our knowledge regarding the root causes of HABs. Another important result of the 2004 HABHRCA was for NOAA to develop a means to predict and respond to HABs. Some fruits of that legislation include the now-popular NOAA HAB Forecast. NOAA has great online resources that allow *everyone* to see satellite images of growing HABs in Lake Erie, and ongoing updates of their predictions regarding the intensity and scope of Lake Erie Blooms.

Money for HABHRCA ran out long before legislation was reauthorized in 2014. Senator Olympia Snowe (ME) attempted a reauthorization which would fund HABHRCA at a level of \$34 million per year for fiscal years 2011-2015. Very importantly (and sadly, since it failed), the bulk of this money was to fund R&D. The 2010 bill also had increased

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emphasis on freshwater HABs (FHABS), with the proposal that the EPA take an active role in overseeing freshwater HAB efforts while NOAA would maintain oversight of marine efforts. This made it through the House, but it stalled in the Senate. Another attempt in 2011, for which Dr. Stephanie Smith (an author of this article) testified before Congress, retained the idea of the EPA overseeing FHAB efforts. A unique aspect of this legislation was language that specifically called for the provision of affordable toxin reference materials, to aid in R&D efforts for both marine and freshwater HABs. The legislation would have authorized \$18 million per year from 2012-2015, with the money being used as directed by Congress. Some Democrats who had previously supported the program withdrew support because they believed that this funding level, coupled with tight congressional oversight, would not be the foundation for a successful program.

So at long last, the legislation authored by Bill Nelson (FL) and Rob Portman (OH) in 2013, and strongly supported by Oregon's U.S. House Representative Suzanne Bonamici, has survived the Congressional gauntlet. Some notable updates for the 2014 HABHRCA include the addition of the Centers for Disease Control to the Interagency Task Force, a recognition that serves to emphasize that the potential human health impacts of HABs need to be more carefully studied. In addition the EPA has finally been given oversight over freshwater HABs, while NOAA has retained oversight of marine HABs. NOAA is still responsible for the administration and management of funds appropriated, and will set up programs that disburse the funds. Of great interest to those in Ohio, and largely due to the involvement of Senator Portman, HABHRCA specifies that within two years the Task Force has to come up with a workable plan to fix HABs and hypoxia in the Great Lakes. Such a plan will likely lay the foundation for future legislation and appropriations.

While the 2014 authorization for \$20.5 million/year from 2014-2018 is a good place to start, note that *authorization* does not mean *appropriation*. Subcommittees within Congress will have to approve funding bit by bit, and there are no guarantees that the appropriations will reach the authorization level. An interesting perspective is that the total \$82 million authorization pales in comparison with the costs of a single F-22 Raptor, coming in at \$143 million (and we have 180+ of those).



Satellite image of the 2011 bloom in Lake Erie, courtesy of MERIS/ESA, processed by NOAA/NOS/NCCOS)

We close this overview with a call to action: organizations like OLA need to let Congress know how important this issue is and how it affects our members, our families, and our businesses. We hope to see an organized effort that both thanks congressional supporters for their role in this legislation, and which also calls all of the nation's leaders to offer ongoing support through the coming appropriations battles.

References:

Lopez, C.B., Jewett, E.B., Dortch, Q., Walton, B.T., Hudnell, H.K. 2008. Scientific Assessment of Freshwater Harmful Algal Blooms. Interagency Working Group on Harmful Algal Blooms, Hypoxia, and Human Health of the Joint Subcommittee on Ocean Science and Technology. Washington, DC. http://www.cop.noaa.gov/stressors/extremeevents/hab/habhrca/FreshwaterReport_final_2008.pdf

Other related news articles on the Toledo, Ohio water bloom:

An AP article
http://m.apnews.com/ap/db_289563/contentdetail.htm?contentguid=YMxIhdDm

Christian Science Monitor
<http://www.csmonitor.com/USA/2014/0804/Toledo-water-crisis-may-be-over-but-toxic-algae-blooms-are-in-our-future>

NPR interview Jeff Reuter-head of Ohio Sea Grant program
<http://www.npr.org/2014/08/04/337842937/what-has-lake-erie-so-sick>

NY Times article
<http://mobile.nytimes.com/2014/08/05/us/lifting-ban-toledo-says-its-water-is-safe-to-drink-again.html>

Malevolent mussels may have met their match

Contributed by Meredith Jordan

Adapted from a blog post by Meredith Jordan on Dr. Angela Strecker's Aquatic Ecology Lab blog, <http://aquaticcecolologylab.wordpress.com/>

Aquatic ecologists the world over are no strangers to zebra and quagga mussels. The economic costs of the spread of these invasive mussels are staggering, and have long since surpassed billions of dollars for removal of these pests from the inner workings of dams, power plants and other facilities. Preventing the spread of zebra and quagga mussels is the best medicine, but convincing recreational



A native mussel is no match for a mob of zebra mussels. Photo courtesy of D.P. Malloy, University at Albany, reprinted courtesy of the New York Times.

boaters to adequately wash, drain and dry their boats is no small feat. Why should the average Joe care about these malicious mussels? There are many reasons, ranging from heavy losses to native biodiversity of a water body to the billions of dollars that it takes to remove these mussels from the pipes of say, your local hydroelectric dam. These management costs get passed onto the rate payer. That would be you.

There may be some good news on the horizon, however. As reported in a recent New York Times article, Drs. Daniel Malloy, Denise A. Mayer, and their colleagues discovered that a strain of soil bacteria successfully kills both zebra and quagga mussels while not killing other organisms. (The mechanisms for how this could possibly work are still not understood.) Clearly, *Pseudomonas fluorescens* strain CL145A doesn't exactly roll off the tongue; a group (not affiliated with Dr. Malloy) has been awarded a license to develop a commercial application of this bacteria, cleverly renamed Zequanox. The EPA approved Zequanox for lake use in July of 2014 based on laboratory trials, and the product is already being used in-lake treatments at various locations across the U.S.

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Why should the average Joe care about these malicious mussels?

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The difficulty of course is that what might work in a controlled laboratory setting will not necessarily work in open water. Daniel Malloy, one of the original scientists to discover this biocontrol, was recently brought out by the Christmas Lake Homeowners Association in Minnesota to oversee a Zequanox application based on recent findings of an early infestation of the mussels. Very preliminary results show that the Christmas Lake treatment appears to have worked (although that could also be due in part to the total removal of the pier and dock where the mussels were first located). In nearby Lake Minnetonka, Minnesota, USGS has been setting up in lake trials to see the efficacy of different application styles of Zequanox, with experiments beginning in September.

Given the potential for economic and environmental devastation from zebra and quagga mussel invasions, this treatment could be very promising. And in the meantime, it can only help to wash, drain and dry your boat, every time.

Seattle, WA | Portland, OR
Missoula, MT | Olympia, WA

Rough times for a rough-skinned newt

Contributed by Meredith Jordan

Adapted from a blog post by Jeffrey Brittain on Dr. Angela Strecker's Aquatic Ecology Lab blog, <http://aquaticcecolgylab.wordpress.com/>

The Crater Lake Newt (*Taricha granulosa mazamae*), also known as the Mazama Newt, is a subspecies of the rough-skinned newt and is only found within [Crater Lake National Park](#). This amphibian has developed its own distinct population in the refuge of the blown-out caldera of Mount Mazama, which served as a hospitable home until the early 1900's. While the Mazama newt does generate some of the tetrodotoxin found in other newts to protect itself, the levels of this toxin are found in amounts orders of magnitude smaller than in its cousin, the rough-skinned newt. The thinking is that because this subspecies is endemic to Crater Lake, and because for thousands of years the Mazama newt enjoyed top-predator status in this unique aquatic habitat, the need for generating such high levels of toxins was lessened;



A rough-skinned newt. Photo © 2004 Tim Johnson.
Reprinted courtesy of CaudataCulture.org

this trade-off resulted in greater energy availability for the Mazama newt, but possibly at the cost of its own defense.

Enter the Signal Crayfish (*pacifastacus leniusculus*). This non-native species of crayfish was introduced in the 20th century to provide a food source for recreational fish populations (which were also introduced). Over the years the crayfish have slowly encroached their way around the lake to occupy more and more habitat, forcing the native newts to areas where competition is lower. Park researchers are studying the interactions between these organisms to better understand the mechanisms that drive their inability to co-exist. It appears that the impacts of direct predation, competition for food, and greater energy use to avoid the crayfish will continue to threaten the newts. As the crayfish continue to displace the newts, questions about the future survival of the endemic species arise. Will the Crater Lake Newt be able to hold its water and defend its strongholds from the siege of the Signal? More information on [research at Crater Lake can be found here](http://www.nps.gov/crla/naturescience/crayfish.htm): <http://www.nps.gov/crla/naturescience/crayfish.htm>

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CALLING LAKE-LOVERS! OLA SECRETARY AND TREASURER NEEDED

If you have ever balanced a checkbook, or taken notes at a meeting you attended, you have the basic skills necessary to become an OLA Officer and member of the Executive Committee! With the annual election of officers scheduled for the Astoria Conference on October 11, one of two positions remain available – Treasurer or Secretary. We have a candidate with the skill set to handle either position (a past President), but we need another individual willing to contribute time to the internal functioning of the group.

For the past few years the Treasurer position has been adroitly managed and maintained by Kit Rouhe, but Kit is ready to hand the position off to focus more time on his graduate studies. Summarizing our Bylaws, the Treasurer shall: be responsible for the financial affairs of the Association, make a report at the Annual Meeting (and monthly meetings), be bonded if required by the Board, and perform such other duties as may be assigned by the Board. There is also the yearly form filing with the state to maintain our tax-exempt status. Since Kit often needs to be in downtown Portland, he also periodically checks the post office box.

Past-President Andy Schaedel has been acting as our interim Secretary, and has expressed a willingness to accept either open position – but not both. Again, summarizing our Bylaws, the Secretary shall: prepare minutes of all Meetings, maintain all permanent records of the Association, maintain an accurate listing of members of the Association, perform such other duties as may be assigned by the Board, and shall develop an annual chapter report to NALMS.

The terms of all Board members are for two (2) years or until their successors are elected, and Board members may succeed themselves. However, Officer positions can be held for no more than two (2) consecutive terms. Nominations will be accepted any time prior to the election in Astoria. If you are interested in either of these positions, contact any OLA Board Member.

For a complete description of both positions responsibilities, go to: http://www.oregonlakes.org/Contact_Us/Board and look under OLA's Bylaws. If interested in joining the voice for quiet waters, please contact President Steve Wille at sawille1@gmail.com.

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The Oregon Lakes Association Mission

OLA, a non-profit organization founded in 1990, promotes understanding, protection and thoughtful management of lake and watershed ecosystems in Oregon. For additional information on OLA, write to the address above, or visit our website. www.oregonlakes.org

OLA and Lake Wise welcomes submissions of materials that further our goals of education and thoughtful lake management in Oregon. OLA is grateful for corporate support that helps sustain the organization. Corporate members are offered the opportunity to describe their products and services to Lake Wise readers. These descriptions are not OLA endorsements and opinions appearing in Lake Wise are not OLA policy statements.

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