



# LAKE WISE

... a voice for quiet waters

NEWSLETTER FROM OREGON LAKES ASSOCIATION

DECEMBER 2018

Connie Bozarth, Newsletter Manager

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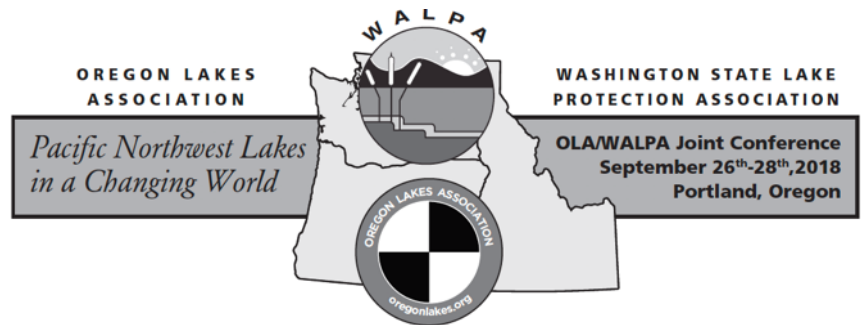
## Report from Northwest Lakes in a Changing World joint OLA/WALPA Conference,

26-28 September

Contributed by Theo Dreher, OLA President

Every five years or so, OLA combines with our sister organization in Washington, the Washington State Lake Protection Association (WALPA), to host a joint meeting in place of our independent annual meetings. OLA took the lead this time around in organizing the conference, which was held at the DoubleTree Hotel near the Lloyd Center in East Portland. We had a great turnout, with 190 people registered, including a sizable group of students, many of whom presented talks or posters describing their research. Among those were the OLA (Laura Costadone, PSU) and WALPA scholarship recipients.

We were very appreciative of the 16 sponsors who showed off their wares and provided valuable financial support; check out their ads in this issue of LakeWise. Altogether there was a lot of positive energy at the conference, so we're already looking forward to the next joint meeting with our WALPA colleagues!



The conference title, **Northwest Lakes in a Changing World**, reflected the overall theme, which was the direct topic of the Plenary Lecture presented by Dr. Daniel Schindler (Univ. of Washington) and of a Climate Change presentation session organized by Board Member Trish Carroll. Dr. Schindler described climate change influences on lakes and watersheds. Most lakes worldwide are experiencing warmer temperatures but the resultant water quality effects can be highly variable based on local factors and therefore hard to pre-

dict. Outcomes can include mistiming of predator and prey population peaks as warming occurs earlier in the spring. For example, the food chain keystone *Daphnia* zooplankton in Lake Washington have failed to thrive in some years. Schindler described the differences in sensitivity of water quality conditions to increasing tempera-

tures between two lakes over a 20 year period. The annual thermal stratification duration increased at both Lake Washington and Lake Sammamish over the period; Lake Sammamish water quality was sensitive to this change, but Lake Washington was not. Longer periods of stratification in Lake Sammamish increased the duration of hypolimnetic anoxia, releasing phosphorous and risking late summer cyanobacterial blooms. Lake Washington remained well oxygenated regardless of stratification duration and mostly escaped bloom.

Schindler has also studied salmon responses to climate change in the remote Bristol Bay region of Alaska. His group observed that salmon returns are more predictable watershed-wide than in individual tributaries, with wide stochastic variation evident in returns to particular locales within a watershed. Thus, as systematic changes due to climate change can be expected, year-to-year and place-to-place variability can be a large and confounding factor. As a practical matter, environmental assessments for planned development could be misleading if based on observations over too short a time scale. High variability in the adaptive response to climate change will make it all the more difficult to anticipate the ecological changes. Nevertheless, Schindler believes that we are able to adequately forecast the responses of ecosystem components, and that our biggest uncertainties going forward are in predicting unexpected interactions such as the mistiming of *Daphnia* growth mentioned above or adaptive human behaviors. Our policies responding to climate change should be designed to be robust to uncertainties that will remain inherent in our ecological predictions.



Dr. Daniel Schindler presents plenary talk: "Climate change and water quality in western US lakes: how can we plan for an uncertain future?"

The conference program featured six presentation sessions during Thursday and Friday morning, with two concurrent sessions running. The session topics included Modelling, Aquatic Invertebrates, Invasive Species, Mountain Lakes, Urban Lakes, Aquatic Plants, Toxics, Outreach & Education, Dryland Lakes, and a session aimed at convincing the Oregon legislature to support a state-wide freshwater HABs monitoring and research program, which I chaired. This session grew out of a discussion at last January's CyanoHABs Stakeholder meeting, which is organized annually through OLA, OSU and Oregon Health Authority. Recent major and

publicly visible events, such as the death of 32 cattle near Lakeview in June 2017, the City of Salem water crisis, and the spillage of HABs from Ross Island Lagoon down the Willamette River through downtown Portland, make this a good time to advocate for a state-wide program addressing drinking water, recreational and rural exposure risks to cyanotoxins. We were fortunate to have Ken Helm, Representative for Oregon House District 34, talk about effective advocacy to the Oregon Legislature. OLA will build on this session and continue efforts to accomplish the implementation of a more



comprehensive CyanoHABs program than the seriously underfunded program we currently have. Conference abstracts are available at [Conference Abstracts](#).

Three well-attended workshops on Water Resources Modeling, Aquatic Plants and Cyanobacterial Identification were held at Portland State University on Wednesday. Friday afternoon featured a field trip to Ross Island. About 20 of us were accommodated in two 12-person canoes provided and piloted by [Lower Columbia](#)



[Estuary Partnership](#) folks. With the sun overhead and the river at a low point and flowing very slowly, it was an easy and pleasant paddle from Willamette Park on the west shore around Ross Island. Part of the island is City of Portland property, while a part is owned by [Ross Island Sand & Gravel Co.](#), which excavated the lagoon to a



Ending the conference with a pleasant paddle on the Willamette River around Ross Island.

size of some 130 acres and to a maximum depth of 125 feet. Rock brought by barge from elsewhere is still crushed here and some material is dumped into the lagoon as fill, but no extraction is occurring any longer. The static water in the lagoon has supported blooms of *Aphanizomenon*, *Anabaena/Dolichospermum* and *Microcystis* in recent years, spilling some toxic bloom material into the river. The field trip was informative in view of on-going discussions regarding options for preventing HABs in Ross Island Lagoon. Mike Houck from the [Urban Greenspaces Institute](#) kindly took time to accompany our two canoes and provide background information on Ross Island.

Conferences such as this require a lot of behind-the-scenes planning and logistics. Thanks to OLA board members who volunteered their time generously, with special thanks to Rich Miller and Toni Pennington, who worked tirelessly in crafting the program and setting up the venue, and to Steve Wille, who was outstanding in fundraising and in organizing the field trip.

Finally, an OLA general business meeting was held on 27 September. Business was largely limited to confirming the slate of officers by vote. Current officers and board members are listed at the end of this newsletter. We still have a vacancy for the Vice President position. If you are interested in serving on the board in any role, please contact any board member.

#### **Conference silent auction/raffle enriches scholarship fund**



Due mainly to a stellar effort by Steve Wille, the silent auction/raffle proceeds came to a grand total of \$6,685 with each organization netting \$3,164.42 after expenses. Many thanks to major donors In Situ and YSI/Xylem, as well as the many other individual and corporate donors.



A photograph of a YSI EXO water quality probe submerged in water. The probe is cylindrical with a blue and silver body. A bright light beam from above illuminates the probe, creating a dramatic effect with bubbles and light rays. The background is dark blue water.

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## Harmful Algae Blooms (HABs) Corner

Contributed by Theo Dreher, President, OLA, Professor of Microbiology, Oregon State University

With committee members Wayne Carmichael and Gwen Bury

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### **OLA Advocates for an Oregon State-wide CyanoHABs Monitoring and Research Program**

Since 2010, OLA has had an interest and involvement in the status of cyanobacterial harmful algal blooms (CyanoHABs) in Oregon. Since 2014, I have sponsored an annual Oregon CyanoHABs Stakeholder Meeting on behalf of OLA, OSU and Oregon Health Authority. At these winter meetings, we have reviewed the past year's CyanoHABs occurrences and discussed any regulatory or other changes affecting the coming year. A discussion at this year's meeting planted the seed for an OLA advocacy program that is recommending the formation of an expanded state-wide CyanoHABs monitoring and research program to be funded by the Oregon legislature. Our proposed program would address the multiple problems associated with CyanoHABs: toxin exposure from drinking water, recreational exposure, or rural and agricultural exposure, as well as ecological damage to water bodies.

A session during our recent OLA/WALPA joint conference was dedicated to hearing input from various sides concerning the needs of such a program. We also discussed CyanoHABs programs from other states (Washington, Ohio, California) that can serve as models for an Oregon program. We were fortunate to have State Representative Ken Helm speak about ways in which OLA could most effectively advocate for such legislation.

OLA's explicit goal is see a comprehensive CyanoHABs program permanently funded by the Oregon legislature. At present, OHA and DEQ provide services and regulation focused on cyanotoxin exposure risks, but the program is limited and underfunded. To explain our rationale in recommending an expanded program, we have met with a number of legislators serving on relevant committees and whose districts have been especially af-



fectured by CyanoHABs. We have also met with the Governor's Natural Resources Policy Manager. We have found general support for a CyanoHABs program and, indeed, some elements of an enhanced program have begun to fall into place, though not with continuing funding.

The Salem water crisis this summer and the Ross Island Lagoon bloom flowing down the Willamette during the last few summers were visible enough events to result in emergency funding for DEQ and OHA. In particular, DEQ were able to begin providing cyanotoxin analyses based on a newly purchased ELISA analytical instrument. The recent CyanoHABs incidents in Oregon and nationwide (Lakes Erie and Okeechobee) have raised a level of awareness among the public and legislators that makes this an opportune time to attempt to find funding for a comprehensive program. Nevertheless, establishing expanded services in Oregon by committing new resources is always a challenge. We will continue to lobby legislators and attempt to recruit the support of other non-governmental groups.

The type of program we are recommending involves cyanotoxin analysis to be conducted on an extensive list of water bodies, with local agencies or groups responsible for sample collection. We recommend that analysis of samples for cyanobacterial genus and for toxins would be conducted by DEQ, individual drinking water utilities or commercial laboratories. OHA would continue to be the agency with authority to set toxin concentration standards and to enforce appropriate posting and actions when toxins have been detected. OHA should also re-establish a public education and outreach capability, as they had some years ago with support from a 5-year grant.

We also recommend the implementation of gene-based detection using polymerase chain reaction (PCR), in which Ohio has taken the lead. PCR can be used for high resolution identification of cyanobacterial strains and for early warning detection for toxic cyanobacteria (thanks to its high sensitivity). We also recommend implementing a satellite-based remote sensing capability using NOAA-derived data that is refreshed every one or two days. This will allow



A state-wide CyanoHABs Program would help to avoid cattle cyanotoxicosis events such as this one near Lakeview, OR, in June 2017.

lakes to be monitored for developing blooms (as long as cloud cover is not too persistent) and minimize personnel visits to the more remote lakes. DEQ seems a logical agency for taking on these analyses. In each case, excellent programs are running in other states, and those personnel would be happy to help establishing similar capabilities in Oregon.

Finally, we recommend a competitive grants program be established to support research on various aspects of Oregon CyanoHABs, such as improving identification and monitoring tools, investigating geographic and seasonal trends and relationships in CyanoHABs, identifying factors responsible for bloom development, and predicting bloom occurrences.

You can read a more detailed description of the proposed program online at

[https://www.oregonlakes.org/resources/Documents/Projects/CyanoHAB/CyanoHAB\\_Proposal\\_2018-10-19.pdf](https://www.oregonlakes.org/resources/Documents/Projects/CyanoHAB/CyanoHAB_Proposal_2018-10-19.pdf)



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## Oregon Lakes in the News

Contributed by Paul Robertson, Past OLA President

### Mickey (Mouse, that is) would be proud!

Not every technological advance in society has staying power. Assuredly, fewer yet can say they have steam power. Steamboat enthusiasts might be heard arguing that some things are just too grand to allow to be replaced by Mother Necessity. That is if you could hear them over the whistles and clicks and clacks of these most magnificent time traveling vessels. Watch and revel about a time when the Steamboat might well have been the most important invention of all time, or better yet join in with fellow



hobbyists as they set out each June on Upper Klamath Lake for literally a trip down memory lane. Erin Ross of Oregon Public Broadcasting explains all. <https://www.opb.org/news/article/oregon-steamboats-klamath-lake/>



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### Fires clear view and way for bumper crop

Eighty years is a long time to wait, but after the hot ash has settled and the smoke cleared, the rewards in this case are incredible views of Mount Washington and buckets of “huckles”. Fire is a natural and needed force on the landscape and for the lodge pole pine forests just part of the cycle ([William Sullivan, Stateman Journal. 2018-10-25](#)).

Fortunately for the hikers and lake enthusiasts there is a break in this endless loop. Head off from Big Lake along the Old Santiam Wagon Road and make your way to Patjens Lakes. Don't wait too long though as the views and berries won't last forever. Franziska Weinheimer shares more in [HikeOregon.Net](http://HikeOregon.Net)



Photo Courtesy of [Hike Oregon](http://HikeOregon.Net)

(On a clear day you can see a view of  
Mt. Washington from the trail)



# AquaTechnex

## PSU Grad Student Joins OLA Board of Directors

Contributed by Crysta Gantz, OLA Student Director

I am a 3<sup>rd</sup> year PhD student at Portland State University, advised by Dr. Angela Strecker. I am originally from Renton, Washington, which is at the south end of Lake Washington. I spent a lot of time on this lake growing up, which instilled in me an early love of lakes.



Through my exposure to the Oregon Lakes Association and researchers studying lakes in Oregon, as well as Oregon Lake Watch volunteers, I realize how much people in Oregon love their lakes and are dedicated to their preservation.

I study lakes in the Columbia Basin Project (CBP) in eastern Washington. My main focus is on landscape genetics of the zooplankton *Daphnia* (also known as the “water flea”). Landscape genetics is the study of how the landscape affects the population dynamics of animals and plants. The lakes in the CBP are impacted by many modern day stressors; my research focus is how large water projects (such as dams and irrigation canals) affect animal and plant populations in lakes.

I wanted to join the board of directors of the Oregon Lakes Association to work with others to protect, preserve, and learn more about lakes in Oregon. My goals as student director are to strengthen our community of student members and increase student participation in this great organization.









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## Climate Change and the National Wildlife Refuge System in the Pacific Northwest (Part 1)

Contributed by Tim Mayer, Supervisory Hydrologist, Water Resources Branch, US Fish and Wildlife Service

This article is basically a summary of the information I presented during the Climate Change session of the 2018 OLA/WALPA Joint Conference in Portland in September. In that talk, I discussed the way that my group, the Water Resources Branch of the US Fish and Wildlife Service, views the issue of climate change and its impacts on water resources on National Wildlife Refuges in our region.

I started the talk by briefly reviewing some of the most recent climate change data. As many of you are aware, concentrations of CO<sub>2</sub> are higher than they have been in the previous 400,000 years (at least). This has led to an unprecedented increase in air temperatures around the world (Fig. 1) and the impacts of this temperature increase are being observed globally. No longer is this just an issue about polar bears and rainforests; we are starting to be affected locally as well. In this country, we've experienced longer and more

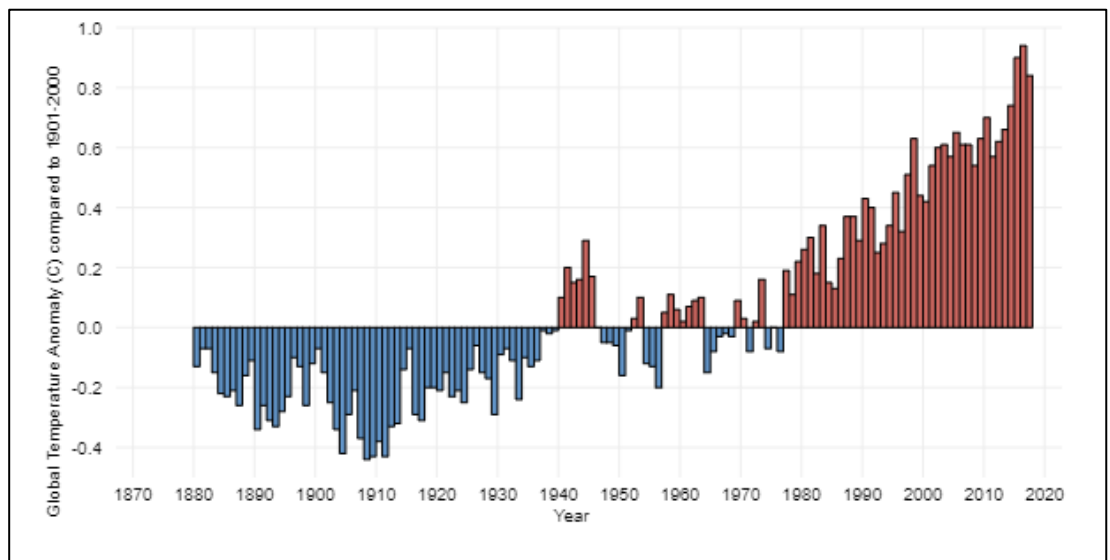


Fig.1. Average annual global air temperature deviations from 1901-2000 long-term average.

severe wildfire seasons, more frequent droughts, heat waves, and toxic algal blooms, and more intense hurricanes and storms, with devastating impacts on communities and ecosystems.

For the Pacific Northwest, the most significant impact of this warming has been the decline in snowpack and the change in streamflow that has been observed. Mote et al. (2018) reported that 90% of snow monitoring sites in the west show long-term declines in April 1<sup>st</sup> snowpack over the period 1955-2016. The decline in snowpack since mid-century is about 15-30%, which is comparable in volume to Lake Mead in Nevada, the West's largest reservoir. This loss of snowpack has serious hydrologic implications.

The main point is that the climate is changing and the past is no longer a guide to the future. With respect to water resources, the changes are going to impact both water supply and water demand. We are going to have less water at the same time that we will need more of it. Before discussing the impacts to water resources on national wildlife refuges specifically, let me first introduce you to the national wildlife refuge system.

The national wildlife refuge system is owned and managed by the US Fish and Wildlife Service. The mission of the national wildlife refuge system is:

*...to administer a national network of lands and waters for the conservation, management, and where appropriate, restoration of the fish, wildlife, and plant resources and their habitats within the United States for the benefit of present and future generations of Americans.*

The important point is that the priority on wildlife refuges is wildlife, not people or public use. There are approximately 566 national wildlife refuges across the nation (Fig. 2). Oregon has 18 and Washington has 24. The system includes almost 100 million acres, with much of that acreage in Alaska. This is more acreage than in national parks, although visitation is probably 10-15% of the national parks.

Contrary to many peoples' expectations, refuges are not national parks. That's not to say that they aren't pretty or pristine – there are some beautiful refuges – but the FWS doesn't protect areas just because they are scenic. Our mission is to conserve and manage wildlife and habitat and we actively manage the habitat on many wildlife refuges. Visit any of the refuges and you may see farming, grazing, burning, planting, restoration, and lots of infrastructure to control and manage water. We do this to maximize habitat for wildlife.

One of the most common ways of managing habitat is to manage water. Our water management activities include draining and flooding, diversion and control of water with dikes and levees, pumps, water control structures, and monitoring and research to determine water requirements and assess water quality. By managing the water, we can provide better wildlife habitat.

Below, I list some of the most common threats to water resources that we face on refuges in the PNW. These threats exist outside of climate change but climate change is making all of them worse. To borrow a term from the military vernacular, it is a "threat multiplier." It has the potential to transform any

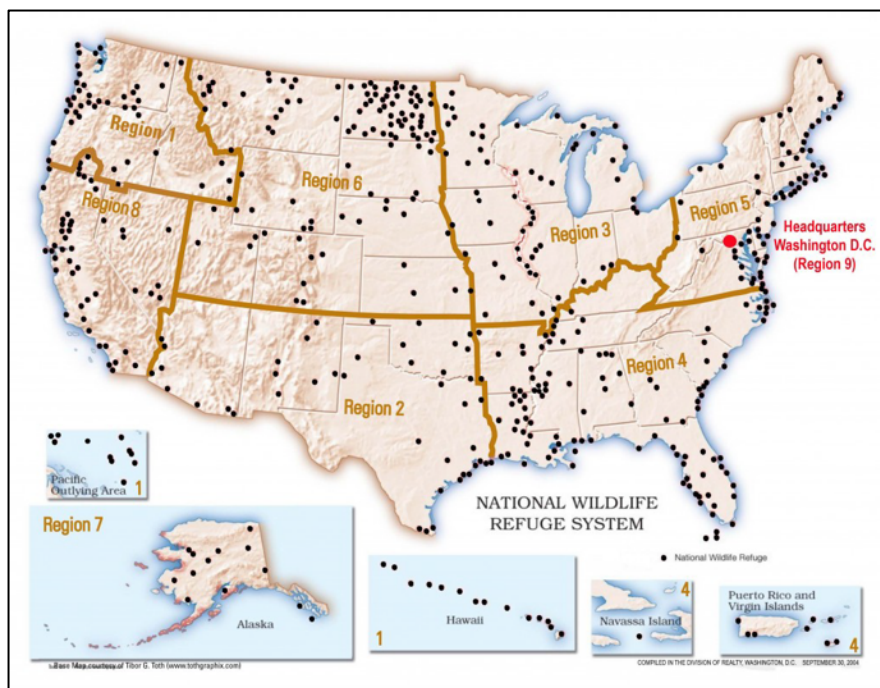


Fig. 2. Map of US National Wildlife Refuges.

of the water issues and challenges we face into crises.

1) Limited water supply. The precipitation in the PNW tends to occur in the winter but the highest demand and greatest competition for water among all users and needs (agriculture, municipalities, wetlands, fisheries,



etc.) is in the summer. We need the most water when there is the least amount of it. That has been made worse by the reduced snowpacks, enhanced evaporation, longer and more intense droughts associated with climate change.

2) Over-allocation of water and water rights. This has become more of an issue as society starts to consider environmental needs more seriously. When much of the water supply in the West was appropriated years ago, there was little thought given to the needs of fish and wildlife. All available water was totally allocated or even over-allocated in many areas. This really becomes a problem in drier years, with limited water supply and more competition for that supply. Climate change is amplifying that problem.

3) Increased groundwater pumping. The impacts of climate change, more frequent droughts and declining surface waters, are leading many users to increase groundwater pumping as an alternative water supply. Of course, surface water and groundwater are all connected and increased groundwater pumping can threaten springs, wetlands, ponds, streams and rivers on our refuges.

4) Warmer water temperatures and poor water quality. Again, these are issues that exist because of many different factors but they are exacerbated by climate change.

In summary, we view climate change as a threat multiplier. It is not just climate change alone that we are struggling to address, it is climate change on top of all the other stresses that water resources face on refuges. Climate change exacerbates all these other problems. In the next article (May 2019 issue of LakeWise), I will illustrate this with a couple of examples from refuges in the PNW, Nisqually NWR in Washington and the Klamath Basin NWRs in southern Oregon and northern California.

Reference: Mote, Philip W., et al., "Dramatic declines in snowpack in the western US." *Climate and Atmospheric Science* 1.1 (2018): 2.



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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. Serving entirely through volunteer efforts, the Oregon Lakes Association puts on an annual conference, publishes a tri-annual newsletter, sponsors Harmful Algal

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