



LAKE WISE

... a voice for quiet waters

NEWSLETTER FROM OREGON LAKES ASSOCIATION

MAY 2017

Laurie Carmichael, Newsletter Manager

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Contributed by Wayne Carmichael, OLA Board Secretary



**Oregon Lakes Association 2017 Annual Conference
Driftwood Shores Resort and Conference Center
Florence, Oregon, October 20-21**

Oregon's coastal lakes come in all shapes and sizes. They have unique climatic influences, fisheries, management issues, and more, which make them worthy of a conference focus. This is where we need your help. We are searching (aka surfing) for presentations and posters that highlight the understanding of these often overlooked freshwater shores. Join us in Florence, Oregon at the Driftwood Shores Resort and Conference Center (<https://driftwoodshores.com>) **October 20-21st** for a deeper dive into coastal lakes. Please consider submitting an abstract to describe studies on Oregon's coastal and other lakes.

Other Topics of Interest Include:

- Harmful algal blooms
- Invasive aquatic species
- Lake and watershed management
- As well as non-coastal Oregon lakes!

More Information and Abstract Submission Requirements:

Go online through: <http://www.oregonlakes.org/event-2498699>

2017 Oregon Lakes Association (OLA) Scholarship Announcement

Contributed by Wayne Carmichael, OLA Board Secretary

The Oregon Lakes Association as part of its scholarship and outreach commitment is pleased to announce the availability of a \$1000 academic scholarship.

- ✓ Application deadline is **May 8, 2017**.
- ✓ Award will be announced by **May 31, 2017**.
- ✓ The successful applicant will also be awarded a one-year membership in OLA, an invitation to attend our annual meeting with up to \$200 in travel expenses and a waiver of the conference fee, in order for OLA to present you with your award. In addition, OLA encourages the scholarship recipient to present results of their lakes project at an OLA future annual meeting.
- ✓ See our website with instructions and details at: <http://www.oregonlakes.org/Scholarship>



Ariana Chiapella, 2016 OLA Scholarship Winner.

AquaTechnex

Our Services

For over 40 years the biologists at Aquatechnex have been at the forefront of the fight to protect our water resources. Our team pioneered assessment technologies to detect and map threats to our nation's lakes and rivers. We have a recognized expertise in the restoration of aquatic habitats impacted by invasive aquatic species. As phosphorus pollution is increasingly driving toxic algae blooms, our team has the technology to sequester and remove phosphorus from lake and river systems. We support homeowner associations, pond owners and golf course superintendents protect the value of the water on their property. We have the capabilities to analyze, prescribe solutions and implement programs to protect and restore any size water body.

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- ◆ Development of Proactive Measures
- ◆ Implementation of Prescriptive Solutions

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Oregon Lakes in the News

Contributed by Paul Robertson, Former OLA President

42 Cuts to the EPA Proposed by the 45th

With sweeping changes proposed for the EPA by the Trump administration, the potential impact to Oregon and Oregon lakes may still be unclear. However, the 97% reduction in Great Lakes Restoration Funds that is proposed (300 million to 10 million), may be an indicator of the priorities the current administration has for freshwaters across the US. Similarly, funding sliced from drinking water and non-point grants to the states has local regulators and environmentalists on alert. Read more on **OregonLive.com** about the other cuts proposed for the nation's lead environmental agency. See <https://tinyurl.com/42-proposed-epa-cuts>

Peppered with Salt!



Photo Courtesy of ODOT.

With the ice and snow of last winter all but in the rear-view mirror of most drivers, the *Portland Tribune's Sustainable Life* section offers this look at the environmental impact of the practice of salting roadways. Salt-ing roads has also been a featured article in *Lake Wise* (spring 2014), and if last year is any indication, will undoubtedly become a more prevalent topic as Oregonians shift priorities as they shift gears on the highways. For historical reference, also featured in the *Tribune's* article



Smith and Bybee Lakes. Photo courtesy of Next Adventure.

is a glimpse of how the recent “snowmageddon” actually compared to past events. Read more....

<http://portlandtribune.com/sl/345165-224278-the-environmental-case-against-using-salt-to-clear-frozen-roads>

Smith & Bybee—More Wet than Land this Year

With the wet winter, the status of “lake” returns to both Bybee and Smith. In drier times the area is often left to the painted turtles to explore. Also returning this year are the kayaks and canoes. In fact, thanks to a partnership between Columbia Slough Watershed Council, OLA Members are invited to an upcoming guided paddle event on May 20th. Space is limited, so RSVP at <http://www.oregonlakes.org/event-2510142> to reserve your spot today.

Read more at:

<http://www.canoeandkayak.com/travel/destination-smith-bybee-lakes-near-portland-oregon/#pfmvMye3UgXD46qy.99>

2017 National Lakes Assessment

Contributed by Shannon Hubler, Oregon Department of Environmental Quality
Solicited by Andy Schaedel, OLA Board Treasurer

In 2017, DEQ's Statewide Biomonitoring and Toxics Programs will be combining efforts to assess the condition of Oregon's lakes, reservoirs and ponds. This joint effort will provide a statewide assessment of the ecological, chemical, and physical conditions of these important waterbodies. Sampling will occur from June through September of 2017.

The EPA's National Lakes Assessment, a component of the National Aquatic Resources Survey (NARS), will fund the majority of the sampling effort (29 lakes). The project is described on the EPA website as follows:

<https://www.epa.gov/national-aquatic-resource-surveys/nla>

The National Lakes Assessment (NLA) is designed to provide statistically valid national and regional estimates of the condition of lakes. It uses a probability-based sampling design to represent the condition of all lakes across the coterminous United States. The survey is a collaborative effort between EPA, states, tribes, federal agencies, and other organizations.

The NLA is designed to answer the following questions about lakes across the United States.

- What is the current biological, chemical, physical and recreational condition of lakes?
- What is the extent of degradation among lakes?
- Is degradation widespread (e.g., national) or localized (e.g., regional)?
- Is the condition of lakes getting better, worse, or staying the same over time?
- Which environmental stressors are most associated with degraded biological condition in lakes?

Almost half of the lakes to be surveyed in 2017 are lakes that were monitored as part of the 2007 and 2012 NLA. These repeated site evaluations will provide information on trends in Oregon's lakes.

Joint DEQ Efforts

In addition to the 29 lakes funded by the EPA, Oregon is adding 21 more lakes to survey bringing the total to 50 lakes (**Table 1**). These additional samples will provide a more robust statistical representation of Oregon's lakes. In addition to the national suite of biological, chemical and physical indicators collected as part of the NLA, DEQ sampling crews will collect samples for over 400 different toxic pollutants to further the monitoring goals of the Statewide Toxics Monitoring Program.

Data Reporting

The EPA has published two previous NLA studies, one in 2007 and the other in 2012. See <https://www.epa.gov/national-aquatic-resource-surveys/nla>.

Key findings from the 2012 NLA study shows approximately one-third of all lakes in the U.S. were in poor biological condition, as measured by the littoral macroinvertebrate community. Additionally, 35-40% of lakes showed signs of eutrophication, or nutrient enrichment. Compared to 2007, biological conditions stayed about the same. However, substantial increases in poor conditions were observed for phosphorus, cyanobacteria, and microcystin.

For Oregon-specific assessments, we did not have sample sizes for NLA 2007 and NLA 2012 that would allow us to do an adequate population assessment of Oregon lakes. For 2007, we instead assessed the percent of sites surveyed in good, fair, or poor conditions for biological communities and stressors. See <http://www.oregon.gov/deq/wq/Pages/WQ-Monitoring-NARS.aspx>. Generally, we found fairly similar patterns as shown in the national report, especially for the western mountains and xeric regions. The 2012 data has yet to be analyzed for an Oregon-specific summary.

The Toxics Monitoring Program produces an annual report that provides the data from each year's sampling efforts. Toxics data from 2017 lakes sampling effort should be available some time in 2018 and will be integrated into a statewide lakes report when the complete data set is finalized.

Table 1. Lakes to be Sampled by Oregon Department of Environmental Quality in 2017 as part of the Environmental Protection Agency's National Lakes Assessment (NLA).

Lake Name	Latitude	Longitude	County	2007	2012	2017
Mann Lake	42.774309	-118.444215	Harney	X	X	X
Sparks Lake	44.011243	-121.742747	Deschutes	X	X	X
Beulah Reservoir	43.930942	-118.154366	Malheur	X	X	X
Emigrant Lake	42.157825	-122.607634	Jackson	X	X	X
Waldo Lake	43.730009	-122.043580	Lane	X	X	X
Phillips Reservoir	44.681270	-118.052087	Baker	X	X	X
Lake Edna	43.631937	-124.179189	Douglas	X	X	X
Clemens Log Pond	44.548937	-123.342737	Benton		X	X
Malheur Reservoir	44.362642	-117.693932	Malheur		X	X
Keene Creek Diversion Pond	42.130013	-122.478277	Jackson		X	X
Link Lake	44.399926	-121.801390	Jefferson		X	X
Carter Lake	43.854166	-124.146755	Douglas		X	X
Cougar Lake	45.036958	-122.265382	Clackamas		X	X
(no name - Waldo Wilderness)	43.764423	-122.008641	Lane		X	X
Tenas Lakes	44.229320	-121.9161000	Lane			X
Calamut Lake	43.365710	-122.108100	Douglas			X
Eagle Lake	45.128790	-117.340600	Union			X
Horse Heaven Reservoir	44.189450	-120.451100	Crook			X
Scout Lake	46.042880	-123.177500	Columbia			X
Smith Lake	45.580780	-123.946100	Tillamook			X
Lake Owyhee	43.604340	-117.304100	Malheur			X
Upper Lake	44.796530	-121.813900	Jefferson			X
Wildhorse Lake	42.629320	-118.588700	Harney			X
Hawks Lake	42.620570	-121.637300	Klamath			X
Cabot Lake	44.579410	-121.764200	Jefferson			X
(no name)	45.709790	-121.498000	Hood River			X
Torrey Lake	43.796230	-122.017400	Lane			X
Hwy 203 Pond at Hwy84	44.859880	-117.813400	Baker			X
Powers Pond	42.889810	-124.077900	Coos			X
Sunset Lake	43.989570	-121.857100	Lane			X
Alameda Lake	43.459500	-122.157500	Lane			X
Rest Lake	42.958530	-120.752800	Lake			X
Slide Lake	44.289440	-118.662800	Grant			X
Lake Merritt	43.374840	-124.245700	Coos			X
Cheadle Lake	44.512610	-122.887600	Linn			X
Betty Lake	43.676820	-122.026700	Lane			X
Chamberlain Lake	45.313060	-123.960800	Tillamook			X
Butterfield Lake	43.518960	-124.222600	Coos			X
Square Lake	44.435680	-121.820500	Jefferson			X
Haldeman Pond	45.708160	-122.815600	Multnomah			X
Lost Lake	45.489350	-121.821700	Hood River			X
Devils Lake	43.828540	-122.213700	Lane			X
Bigelow Lake	42.088590	-123.371300	Josephine			X
Cache Lake	44.393640	-121.781000	Jefferson			X
(no name)	44.56567	-123.2199	Linn			X
Lower Quinn Lake	43.81285	-122.083	Lane			X
Diamond Lake	45.14344	-117.4808	Union			X
Island Lake	42.51817	-122.2391	Klamath			X
Walnut Grove Park	44.08641	-123.1486	Lane			X
Croft Lake	42.98227	-124.4521	Coos			X

Making Sense of Climate Change

Contributed by Trish Carroll, OLA Board Member

Twenty years ago *Lake Wise* included an article entitled “Threats to Water Resources from Climate Change,” which discussed possible future impacts of climate on water supplies.¹ The article acknowledges that: “uncertainties as to how the region and its hydrology will change in response to a global greenhouse warming are enormous.” Today climate change appears almost daily in newspapers, scientific journals, and conservation magazines. The topic of climate change, global warming, carbon dioxide and carbon sequestration, and factors affecting these phenomena, both positively and negatively, is complex and the responses are indeed uncertain.

“Climate change is the most important issue of our time. The question is can we change our course in time.” This statement is from Leonardo DiCaprio’s documentary *Before the Flood*. Released in 2016, this effort takes a look at Earth’s future if we continue to ignore global warming signs. Ten years earlier Vice President Al Gore released *An Inconvenient Truth*, initiating his campaign to educate citizens about global warming. This documentary has been credited for raising international public awareness of global warming. A follow-up documentary, *An Inconvenient Sequel: Truth to Power*, will be in theaters July 28, 2017. It addresses the progress made in tackling the problem, investment in renewable energies, and the landmark signing of the Paris Agreement of 2016.

The concepts of **climate**, **global warming**, and **climate change**, are inter-related. **Climate**, defined as the typical or average weather conditions for a given region, is measured by assessing the patterns of variation in meteorological variables. **Global warming** is the term used to describe the current increase in the Earth’s atmospheric and oceanic temperature. **Climate change** refers not only to changes in temperature, but also to changes in wind, precipitation, the length of seasons, as well as the strength and frequency of extreme weather events like droughts and floods. Global warming is a worldwide phenomenon, while climate change can be seen at global, regional or even more local scales.²

There has been an awareness of changes in the Earth’s atmosphere for decades. The National Research Council’s Climate Research Board sponsored a report in 1979 entitled “Carbon Dioxide and Climate: A Scientific Assessment” by Jule G. Charney et al. The report states: “for more than a century we have been aware that changes in the composition of the atmosphere could affect its ability to trap the sun’s energy for our benefit. We now have incontrovertible evidence that the atmosphere is indeed changing and that we ourselves contribute to that change. Atmospheric concentrations of carbon dioxide are steadily increasing, and these changes are linked to man’s use of fossil fuels and exploitation of the land.”³

The Earth’s climate has always been changing. There have been seven cycles of glacial advance and retreat, with the abrupt end of the last ice age (about 7,000 years ago) marking the beginning of the modern climate era, and of human civilization. Scientists have pieced together a record of Earth’s climate by analyzing a number of indirect measures of climate such as: ice cores, tree rings, glacier lengths, pollen remains, and ocean sediments; and by studying changes in Earth’s orbit around the sun. This record shows that the climate system varies naturally over a wide range of time scales. In general, climate changes prior to the Industrial Revolution in the 1700s can be explained by natural causes, such as changes in solar energy, volcanic eruptions, and natural changes in greenhouse gas concentrations. Recent trends, however, cannot be explained by natural causes alone, especially since the mid-20th century. Rather, it is extremely likely that human activities have been the dominant cause of that warming.⁴ The current warming trend is of particular significance because most of it is likely human-induced and proceeding at a rate that is unprecedented in the past 1300 years.⁵

The DiCaprio documentary concludes that we have the means of stopping the changes caused by human activities. Not everyone agrees, nor does everyone agree that human activities are a causal factor in the Earth’s changing atmosphere. Some do not agree there is even an issue. Although there is a wide range of views on climate change, there seems to be a growing body of evidence that the planet’s climate is changing, and that humans are a causal factor.

What about effects to lake and wetland ecosystems? According to a 2015 study jointly funded by NASA and National Science Foundation, more than half of the world’s water supply held in lakes is being warmed by climate change, threatening freshwater supplies and ecosystems. Using more than 25 years of satellite temperature data and ground measurements of 235 lakes on six continents, this study—the largest of its kind—found lakes are warming an average of 0.61° Fahrenheit (0.34° Celsius) each decade. Scientists say this is greater than the warming rate of either the ocean or the atmosphere, and it can have profound effects. Water temperature influences a host of its other properties critical to the health and viability of ecosystems. When temperatures swing quickly and widely from the norm, life forms in a lake can change dramatically and even disappear.

“These results suggest that large changes in our lakes are not only unavoidable, but are probably already happening,” said lead author Catherine O’Reilly, Associate Professor of Geology at Illinois State University, Normal. Earlier research by O’Reilly revealed declining productivity in lakes with rising temperatures. Study co-author Simon Hook, Science Division Manager at NASA’s Jet Propulsion Laboratory in Pasadena, California, said satellite measurements provide a broad view of lake temperatures over the entire globe. But they

only measure surface temperature, while ground measurements can detect temperature changes throughout a lake. Also, while satellite measurements go back 30 years, some lake measurements go back more than a century. “Combining the ground and satellite measurements provides the most comprehensive view of how lake temperatures are changing around the world,” Hook stated.

The researchers said various climate factors are associated with the warming trend. In northern climates, lakes are losing their ice cover earlier in the spring and many areas of the world have less cloud cover, allowing more exposure of their waters to the sun’s warming rays.

Previous work by Hook, using satellite data, indicated many lake temperatures were warming faster than air temperature and that the greatest warming was observed at high latitudes, as seen in other climate-warming studies. This new research confirmed those observations, with average warming rates of 1.3° Fahrenheit (0.72° Celsius) per decade at high latitudes.

In general, the researchers write, “The pervasive and rapid warming observed here signals the urgent need to incorporate

climate impacts into vulnerability assessments and adaptation efforts for lakes.

Regardless of the causal factors for climate change, sharing knowledge of our lake and wetland systems is inherent in OLA’s mission: “To promote the understanding, protection and thoughtful management of lake and watershed ecosystems in Oregon.” OLA invites you to share your ideas, information and interests on our website, under “discuss and post” to help continue the discussion on climate change and lakes.

----to be continued

Citations:

1. Oregon Lake Association, August 1997 *Lake Wise* newsletter.
2. <http://whatsyourimpact.org/global-warming-climate-change>
3. Carbon Dioxide and Climate: A scientific assessment; Jule G Charney and others, July 27, 1979.
4. <https://www.epa.gov/climate-change-science/causes-climate-change>
5. <http://climate.nasa.gov>

Oregon Lake Watch Training Sessions Coming Soon

Contributed by Rich Miller, OLA Board Member

“Hey, what’s this plant growing in my favorite lake, is it an invader, and what’s happening with our water quality?” You may find answers to these questions by participating in one of our upcoming Oregon Lake Watch (OLW) program training sessions. OLW is a volunteer-based citizen-science program with two primary goals: 1) Detecting high-priority invasive aquatic plants and animals early, before they are widespread within a waterbody or spread to other waterbodies; 2) Collecting simple water quality data that can be used to track the status and trends of our lakes and reservoirs. OLW is funded by the Oregon Department of Agriculture and was developed using funds provided by the Oregon State Marine Board and Oregon Department of Environmental Quality.

This coming spring and early summer we’ll be holding several four-hour training sessions where we’ll cover identification of invasive species, field survey techniques, simple water quality measurements, and data management. This year we’ll also be training and encouraging volunteers to report blue-green algal blooms using the EPA’s bloomWatch smartphone application at <http://cyanos.org/bloomwatch/>. Volunteers who complete the training will be issued sampling equipment and species identification materials. Volunteers who collect samples twice per year will receive free membership in the Oregon Lakes Association.

Since the OLW program began in 2013, a total of 55 people have completed the training and 35 lakes have been monitored (**Figure 1**). Several invasive species have been documented by volunteers including the aquatic plants fanwort (*Cabomba caroliniana*), Brazilian elodea (*Egeria densa*), and Eurasian watermilfoil (*Myriophyllum spicatum*); and animals such as

red swamp crayfish (*Procambarus clarkii*) and Chinese mystery snails (*Cipangopaludina chinensis*). Fortunately, the worst-of-the-worst aquatic invaders, Hydrilla (*Hydrilla verticillata*) and zebra/quagga mussels (*Dreissena polymorpha/D. rostriformis bugensis*) have not been found in Oregon.

To find out more about the program and our upcoming training sessions, visit our website at <http://www.pdx.edu/oregon-lake-watch/> or send us an email at olw@pdx.edu. Hope to see you later this spring!

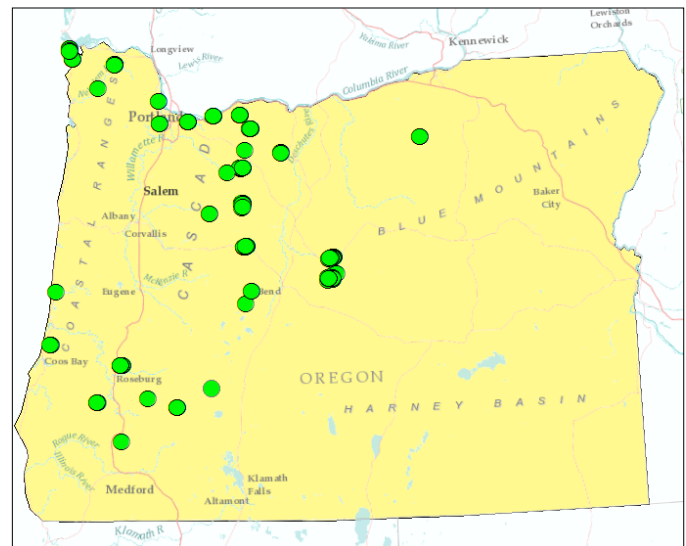


Figure 1. Lakes and reservoirs that have been surveyed by OLW volunteers.

Harmful Algae Blooms (HABs) Corner

Contributed by Wayne Carmichael, OLA Board Secretary

NATIONAL HAB NEWS:

The recent March 2017 USEPA Freshwater HABs Newsletter at <https://www.epa.gov/nutrient-policy-data/research-and-news#freshwater> demonstrates the continuing discussion, monitoring and research on freshwater harmful cyanobacteria waterblooms and their toxins. Some excerpts follow:

“NOAA GLERL begins analyzing Lake Erie algal toxins in near real-time. NOAA’s Great Lakes Environmental Research Laboratory (GLERL) deployed in 2016 the first Environmental Sample Processor (ESP), an autonomous robotic instrument that works as a ‘lab in a can’ in aquatic environments to collect water samples and analyze them for algal toxins in a freshwater system. This tool can provide drinking water managers with data on algal toxicity in near real-time before the water reaches municipal water intakes.

HAB Tracker Daily Forecast with 3-dimensional predictions of bloom extent. NOAA’s GLERL developed HAB Tracker, an experimental forecasting tool to aid local managers in decision-making on HABs, that incorporates real-time data with modeling to produce daily updated 5-day forecasts of potential bloom distribution and movement.”

US EPA U-Tube videos on nutrient pollution and HABs. The US EPA released a series of videos to increase awareness regarding the adverse effects of nutrient pollution and HABs.

Algal Blooms Can Harm Your Health Video

(<https://www.youtube.com/watch?v=00j0Yef9oJU>)

Algal blooms are not only unsightly; they can make you or your pet sick. Stay healthy by avoiding contact with water that might have an algal bloom. *When in doubt, stay out* and keep your pet out of the waterway.

You Can Prevent Nutrient Pollution Video

(<https://www.youtube.com/watch?v=2e60gGBsf0>)

Nutrient pollution occurs when too much nitrogen or phosphorus enters a waterway, and is often caused by human activities. This can harm the waterway and aquatic life, and produce unsightly and sometimes harmful algal blooms. Do your part to protect our waterways from nutrient pollution.

RECENT HAB DISCUSSIONS SPONSORED BY OLA

CONTRIBUTED BY THEO DREHER, OLA BOARD PRESIDENT

OLA has made a major commitment to discussion and actions to help inform, manage and mitigate the increasing water quality and human health issue of freshwater harmful algae blooms (FHABs). Highlighting this commitment, two recent Cyanobacterial HAB-related meetings were organized by Prof. Theo Dreher and held at Oregon State University: the **Annual CyanoHAB Stakeholder Meeting** (1 March, 47 participants), and the **CyanoHAB Technical Workshop** (22

March, 29 participants). Both meetings were co-sponsored by OLA and OSU, and held in close collaboration with Oregon Health Authority, the body with jurisdiction over issuing bloom advisories.

The Stakeholder Meeting emphasized the roles of US-EPA, OR-DEQ and OHA in providing information, regulatory guidance and monitoring support for CyanoHABs occurring in lakes and reservoirs. EPA is currently considering comments to their draft advisory values for recreational exposure to microcystins and cylindrospermopsin. The recommended value for microcystins is lower than the current Oregon standard, since it is based on potential exposure of children. It is expected that the final recommendations will be adopted by OHA for the 2018 bloom season.

The Stakeholder Meeting is intended as a forum for sharing experiences of CyanoHABs across Oregon. Among these experiences, Al Johnson described blooms on US Forest Service lands (including Lake Billy Chinook, which has been monitored only recently despite long-standing blooms), and Brandin Krempasky described monitoring of blooms in Detroit Lake, the source of City of Salem drinking water. A 7-epi-cylindrospermopsin-producing *Anabaena*, discovered in Detroit Lake a few years ago, blooms annually for a short period.

The Technical Workshop featured conventional information about CyanoHABs as well as discussion of some lesser-recognized aspects, such as exposure to toxins through irrigation of food crops, exposure to toxins from benthic sources or in rivers transporting bloom material from upstream lakes. Future monitoring possibilities—using genetic and other technologies and including remote sensing from satellites, aircraft or drones—were also mentioned.

The Workshop included hands-on experience with a dip-stick microcystin assay kit designed to provide qualitative information on microcystin concentrations in recreational waters (kits kindly provided by Abraxis, Inc. and DEQ). These kits are being used to obtain a rough idea of microcystin levels over time or in different locations, usually providing guidance for taking samples for quantitative analysis. Participants also had the opportunity to inspect several bloom samples by microscopy.

The programs and slides used to illustrate the talks presented at the meetings are posted at the OLA Events website at: <http://www.oregonlakes.org/event-2470802>.

For these events and more, why not join OLA and receive this information in a timely fashion—and as a bonus—be able to participate with discounts. Join at: http://www.oregonlakes.org/Join_OLA



Welcoming New and Returning Board Members

Contributed by Paul Robertson, Former OLA Board President



Oregon Lakes Association welcomes back [Dr. Toni Pennington](#) to the Board of Directors. Toni is an aquatic biologist for Tetra Tech, Inc., a provider of consulting services that supports a wide range of sectors, including water and the environment. Toni

works on developing and implementing integrated aquatic plant control and research projects with expertise in sampling and analysis plans for freshwater systems, aquatic invasive species (AIS) prevention and management programs, water quality data planning, collection, analysis, and data QA/QC. She enjoys working closely with a variety of shareholders in a multidisciplinary team to implement science-driven solutions for a range of clients from local to federal. She is actively involved in numerous regional and international organizations related to the research and management of aquatic plants, lakes and reservoirs, and invasive species. Toni received her PhD from Portland State University where she evaluated the phenological response of *Egeria densa* (an invasive aquatic macrophyte) from two populations in Oregon and California. Under the guidance of Dr. Mark Sytsma, she also supported other faculty, staff, and students at PSU in a variety of field projects across Oregon. Toni has been an OLA member since moving from Texas to Oregon in 2000 and has previously served on the OLA board as Director and Treasurer. Toni now lives in Bend, OR with her husband, young son, and dog where

she enjoys kayaking, paddle boarding, skiing, hiking, and mountain views.



[Kathryn Tackley](#) is a newcomer to the OLA Board, having recently joined OLA. Kathryn is a physical scientist with the U.S. Army Corps of Engineers, Portland District. She is responsible for managing and executing research activities associated with the implementation of the Columbia and Willamette Basin Biological Opinions, Clean Water Act (TMDLs),

Endangered Species Act, and other federal laws and regulations that support the recovery of salmon and steelhead throughout the Pacific Northwest. She encourages water resource protection strategies that strike a logical balance between the environment and human needs—hydropower, flood damage reduction and recreation. As Technical Lead, she manages technical teams that carry out water quality and fish passage improvement measures in the Columbia & Willamette Basins through structural or operational solutions. Other accomplishments include strengthening relationships with outside stakeholders by working through conflicting Resource and Action Agency priorities and by providing technical information and expertise to the region. Strong relationships between the Corps and regional stakeholders will encourage successful and collaborative solutions to the water resource challenges we face in the Pacific Northwest.

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Oregon Lakes Association

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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 Bloom trainings, and works as an advocate for lakes in the legislative arena. For additional information on OLA, write to the address above, or visit our website at <http://www.oregonlakes.org>.

OLA and *Lake Wise* welcome 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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