LAKE WISE

... a voice for quiet waters

NEWSLETTER FROM OREGON LAKES ASSOCIATION

SEPTEMBER 2018

Connie Bozarth, Newsletter Manager

IN THIS ISSUE

Pacific NW Lakes in a Changing World

A joint conference of the Oregon Lakes Association (OLA) and the Washington Lake Protection Association (WALPA)

September 26-28, 2018

Double Tree Hotel by Hilton, Portland, OR

EARLY REGISTRATION ENDS SEPTEMBER 1

Join us for workshops, presentations, a field trip, and meeting with friends and colleagues at the 2018 Joint Oregon Lakes Association/Washington State Lakes Protection Association Conference at the DoubleTree by Hilton in Portland, Oregon. Conference proceedings will kick off at a series of Wednesday afternoon workshops on Aquatic Plants, Cyanobacteria Identification, and Water Resources Modeling. Thursday will start with a plenary presentation by Dr. Daniel Schindler from the School of Aquatic and Fishery Sciences at the University of Washington followed by presentations through mid-day Friday.

Conference registration rates range from $25 to $175 depending on membership status and whether you register before the early registration cut-off data of September 1. Each workshop, and the field trip to Ross Island, have an additional fee of $20.

Special accommodation rates at the DoubleTree by Hilton are available under the OLA/WALPA Conference group room block though August 28th or until the group block is sold out.

Please visit our **conference event website**

Draft Conference Schedule

Oral Sessions Highlighted in Yellow

Day	Date	Session A	Session B	start	end
Wednesday	9/26/2018	Modeling Workshop		1:00	4:00
		Aquatic Plant School		1:00	4:00
		CyanobacteriaWorkshop		2:30	5:30
Thursday	9/27/2018	Registration		7:00	5:00
		Continental breakfast		7:00	8:30
		Welcome		8:30	8:40
		Plenary, Dan Schindler		8:40	9:25
		Modeling	Aquatic Invertebrates	9:30	10:10
		Poster break		10:00	10:30
		OR HABS program proposal	Climate Change	10:30	12:00
		Lunch/business		12:00	1:30
		Invasive Species	Mountain Lakes	1:30	3:00
		Poster break		3:00	3:30
		Dryland Lakes	Aquatic Plants	3:30	5:00
		Happy hour and raffle		5:00	7:00
Friday	9/28/2018	*Continental breakfast*		7:00	8:00
		Toxics	Outreach and Education	8:30	10:00
		Poster break		10:00	10:30
		Urban Lakes	Miscellaneous	10:30	12:00
		Ross Island Field Trip		TBD	

Lake Abert Update, August 2018

Contributed by Ron Larson, OLA Board Member

Lake Abert (Fig. 1) is located in southcentral Oregon. It is the state's 6th largest natural lake and is its only hypersaline lake, meaning that its salt content is equal to or greater than that of the ocean. Lake Abert is so salty because it is a terminal lake, with no outlet, so all of the water flowing into the lake evaporates or seeps underground. Most of the water in the lake comes from the 75-mile long Chewaucan River that flows east from 8,000-foot high Gearhart Mountain near the Lake-Klamath County line.

Fig. 1. Lake Abert sits in a basin bordered on the east by Abert Rim, which rises over 1,000 feet from the lake surface. Because of the arid conditions the only trees growing near the lake are drought-tolerant western juniper.

Fig. 2. Lake Abert as it appeared from the air in October 2014. The red color of the lake is from single-celled microorganisms called Archaea that live in very salty lakes. A wide band of white alkali salt surrounds the lake where it has receded.

In 2014 the lake nearly went dry owing to drought and upstream water diversions for agriculture. As a result of low water levels salinities spiked, upsetting the ecosystem so most of the brine shrimp and alkali flies that the birds feed on died. The lake became dominated by microorganisms (Fig. 2). Consequently, the thousands of waterbirds, such as avocets, stilts, and sandpipers, that come to the lake to replenish fat reserves lost during migration and breeding, had to alter their migration pattern to find other feeding sites, or they died.

Lake Abert is a critical feeding area for migratory waterbirds. OLA, East Cascades Audubon Society, WaterWatch of Oregon, National Audubon Society, and volunteers are monitoring conditions at the lake and working together to find solutions to increase inflows to the lake. Water levels and salinities in the lake have improved since 2014, especially due to high inflows in 2017 that brought the lake up 6 feet from the low levels of 2014, but the lake is still in a danger zone whereby low inflows could shrink the lake in size and increase salinity in just 3 years to where it was in 2014.

Near the end of July 2018, a friend and I went to Lake Abert to count waterbirds. Along the shore and far out into the lake as far as we could see were countless birds; some were large like avocets, stilts, and gulls, and others were much smaller shorebirds like phalaropes and sandpipers (Fig. 3). Looking closely, we could see they were all searching for food, especially the phalaropes, which spin in circles creating a vortex that brings up small brine shrimp (Fig. 4). The vast numbers of birds attracted to the lake every summer after they nested as far away as the Arctic is remarkable, and sadly is a biological phenomenon that could easily disappear.

Fig. 3. A flock of Western Sandpipers flies swiftly along the Lake Abert shore. These birds come to the lake to feed at the lake after breeding in the Arctic. Later they will migrate south to spend the winter along the California and Mexico coast.

Fig. 4. Phalaropes dot the surface of Lake Abert in August 2013. They feed by creating a vortex that brings up small invertebrate prey such as brine shrimp. After actively feeding for several weeks they will head south to salt lakes in South America, as far away as southern Chile.

Like nearly all of the lakes in the drought-prone region of Oregon east of the Cascades, Lake Abert experiences wide swings in water levels and in size (Fig. 5). This is further exacerbated by its shallow depths, high evaporation rates, and upstream water removal. In general, since the 1920s the lake experienced increasing elevations to about the late 1950s and since then variable but declining elevations, especially since about 1985. Because of low inflows during water year 2018, as discussed below, the lake has declined one foot from elevations at the start of the water year.

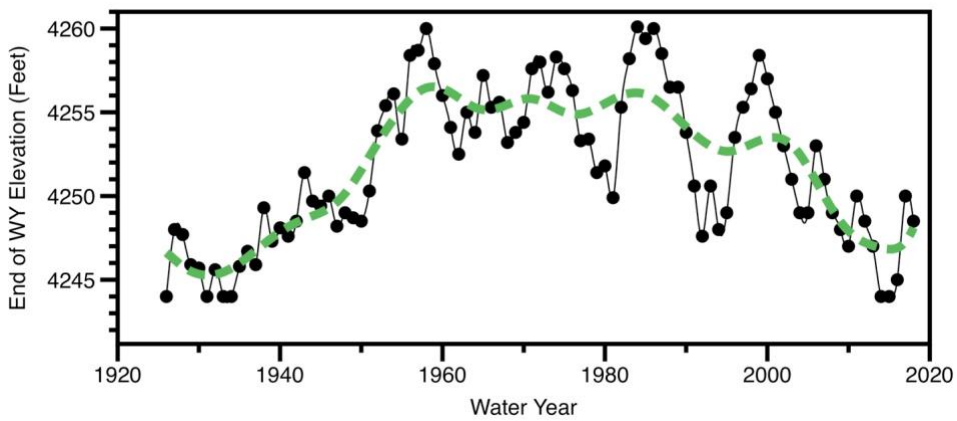

Fig. 5 1926 to 2017 end-of-water-year elevations and Loess smoothed, trend dashed line (green color). Data from Phillips and VanDenburgh (1971), Larson et al. (2016), and unpublished. The estimated end-of-water elevation for 2018 is shown.

Because the Chewaucan River provides most of the water to the lake, the volume of flow in the river each year has a major effect on lake levels, and ultimately on salinities, which then determines how the ecosystem functions. In Fig. 6, the cumulative flow of the river, measured above Paisley, Oregon, is shown on a water-year basis, 2015-2018, which starts October 1 each year. The graph shows how river flows increased from WY 2015 to 2017 and then declined in WY 2018. As noted above, the lake has declined one foot in WY 2018 because of low inflows. If future flows are similar to or less than those that occurred in WY 2015 and 2018, the lake will continue to decline and that could lead to conditions like 2014 when the ecosystem that had supported huge numbers of birds was replaced by

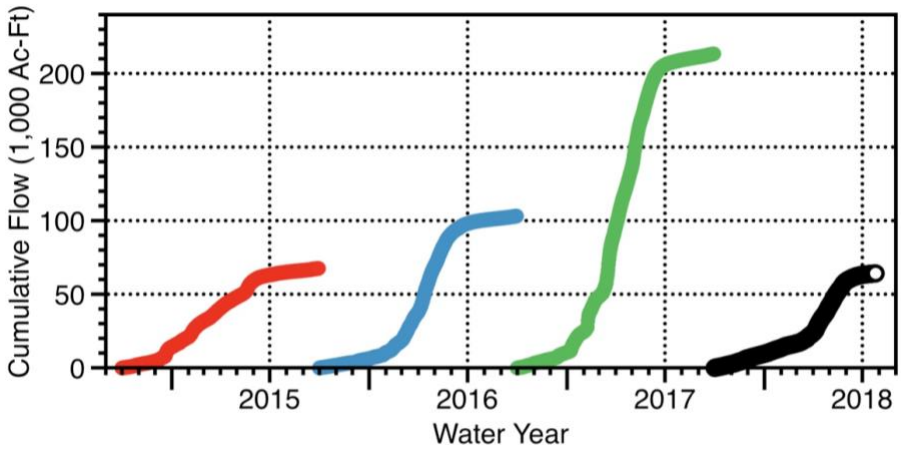

Fig. 6. Chewaucan River water-year cumulative flow measured above Paisley, Oregon.

one dominated by the red Archaea and nearly no birds.

Being an ancient lake, perhaps 1 million years old, Lake Abert has experienced wide swings in hydrologic and ecological conditions, and its biota has adapted to these changes. Previously these changes were likely slower and provided species time to adapt. Now, however, with water diversions removing half of the river flow and warmer and drier climate conditions dominating, the lake ecosystem could be in trouble if we don't act soon.

Fig. 7. Snowy plovers are small shorebirds that nest at Lake Abert. Because of habitat loss, they are listed as threatened in Oregon. Their distinctive coloration provides some camouflage in the alkali-encrusted lakeshore habitats where they live.

References Cited

Larson, R., J. Eilers, K. Kreuz, W.T. Becher, S. DasSarma, and S. Dougill. 2016. Recent Desiccation-related Ecosystem Changes at Lake Abert, Oregon. Western North American Naturalist 76(4):389-404.

Phillips, K.N. and A.S. Van Denburgh.1971. Hydrology and geochemistry of Abert, Summer, and Goose lakes, and other closed-basin lakes in south-central Oregon. Closed-Basin Investigations. U.S. Geological Survey Professional Paper 502-B. 86 pp.

Lake Abert Related Websites

Oregon Public Broadcasting, Oregon Field Guide
National Audubon Society, Birds in the Arid West

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2018 Oregon Lakes Association (OLA) Academic Scholarship Recipient

Contributed by Wayne Carmichael, OLA Board Secretary

Congratulations to our 2018 academic scholarship winner

Laura Costadone — Portland State University

Laura grew up in Turin, capital of the Piedmont region of northwestern Italy. She earned a degree in Environmental Science and Technology at the University of Turin (Italy). Thereafter, she was awarded an Erasmus Scholarship, a European High Academic Achievement Award, to support one year of study at the University of Castilla - La Mancha (UCLM) in central Spain working on preserving local plant varieties against biodiversity threats and influences such as invasive species and pollution.
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Laura Costadone, 2018 Scholarship recipient

After working for two years with Agroinnova (Centre of Competence for the Innovation in the Agro-Environmental Sector at the University of Turin) studying the impact of agricultural activities on the nutrients, pesticides and the use of water resources, Laura enrolled in graduate school at Washington State University. The focus of her M.S. thesis was to establish the protocol for the detection and quantification of airborne fungal pathogens using DNA in field-collected samples. The main goal was to potentially reduce fungicide usage through early and accurate identification of the pathogen.

Laura is currently pursuing her Ph.D. in Dr. Mark Sytsma's lab in the Center for Lakes and Reservoirs at Portland State University. The main goal of her Ph.D. research is to incorporate molecular tools into a routine harmful algal blooms (HAB) monitoring program. She will address the hypothesis that quantitative polymerase chain reaction (qPCR) can detect the onset of harmful algal blooms earlier than the traditional monitoring programs. Research will be conducted in Oswego Lake, but has applicability to all lakes with cyanobacteria blooms. Real-time qPCR will be added to the HABs monitoring program that has been maintained by the Lake Oswego Corporation since 2000. Phytoplankton samples will be collected weekly and identified using both morphological and molecular methods. The genotype of the Oswego Lake phytoplankton community composition will be characterized using PCR. *Aphanizomenon flos-aquae, Dolichospermum flos-aquae* and *Microcystis aeruginosa* are the dominant species of cyanobacteria in Oswego Lake. Toxigenic strains are likely present in the lake. qPCR will be used for monitoring toxic genotype dynamics and to predict toxin concentration in water to establish the minimum threshold cell number for toxic contamination events.

Laura's ultimate goal is to share knowledge and enthusiasm for science through teaching and research at the university level. She will use the OLA scholarship funds to complete the molecular methods she is using to characterize the phytoplankton community composition and monitoring toxic genotype dynamics in Oswego Lake (OR).

Laura will present results of her Ph.D. research at the joint OLA/WALPA conference, September 26-28.

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Oregon Lakes in the News

Contributed by Paul Robertson, Past OLA President

Keeping Tabs on Toxic Algae Blooms

Detroit Lake may top the news given the reservoir's impact on the drinking water supplies of Salem and other communities, but in the last decade or so, according to summary in the Statesman Journal, it only ranks tied for 10th in the number of reported toxic algae blooms. The number of samples taken from the aging reservoir this year, however, likely dwarfs the number taken from even the most prolifically sampled water bodies. Salem has been monitoring Detroit 24/7 according to Brandin Krempasky, Watershed Program Coordinator for the City of Salem.

For the latest on Salem's drinking water quality click here!

Water samples are being taken and tested every day from Detroit Lake. Click on photo to watch sampling video.
Photo credit: Anna Reed, Statesman Journal

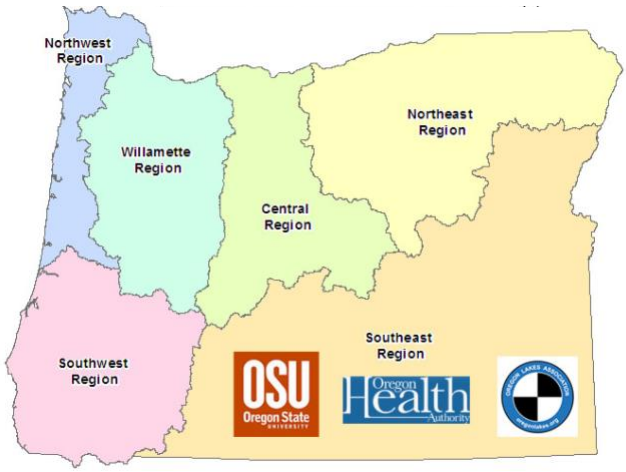
Oregon Toxic Algae Blooms 2007-2018

Water body	County	Number
Willow Creek Lake	Morrow	14
Lost Creek Lake	Jackson	13
Dorena Reservoir	Lane	7
Lemolo Lake	Douglas	6
Odell Lake	Klamath	6
Upper Klamath Lake	Klamath	6
Dexter Reservoir	Lane	6
Blue Lake	Multnomah	6
Wickiup Reservoir	Deschutes	5
Tenmile Lakes	Coos	4
South Umpqua River	Douglas	4
Hill Creek Lake	Lane	4
Devils Lake	Lincoln	4
Detroit Lake	Marion	4

Oregon Health Authority Steps up Monitoring Requirements for Cyanobacteria

With the significant toxic algae bloom on Detroit Lake, Oregon Health Authority has imposed a temporary rule requiring 150-200 drinking water providers to conduct bi-weekly water testing of raw water. The rule came into place on July 1st (see more in HABs Corner

Many providers are already ahead of the game, including Eugene Water and Electric Board (EWEB), which has been conducting routine surveillance since 2011 according to the Register Guard. With time of the essence in toxin detection, EWEB has also recently invested in detection equipment and is training staff to do the testing internally. Oregon Lakes Association in conjunction with and support from OHA and OSU leads an annual Harmful Algal Bloom Stakeholder Meeting and has provided trainings. Safe to say we can expect additional interest and need for such events with the new regulations in place. Watch OregonLakes.org for upcoming announcements and trainings.



HABS Stakeholder Meeting

Oregon Supreme Court Visits Oswego Lake

Oswego Lake was the subject of oral arguments in a case brought to Oregon's Supreme Court in May, 2018. The case involves restricted access to the waterbody. The plaintiffs seeking access to the lake appealed to the court to upend the City of Lake Oswego and Lake Oswego Corporation assertion that, due to safety concerns and to facilitate access to those funding improvements, the small park be for city residents only. The case may have far reaching implication for water bodies across the state. When asked about the water within Oswego Lake, the City's attorney Robert Koch stated that, despite signage indicating the lake is private, the City currently takes no position on the use of the lake by the public. Reportedly Koch said: "That sign reflects the fact that this was the city's understanding at the time they put the sign up, but with respect to the public/private nature of the lake, the city takes no position." The court is to rule on their findings later this year.

Posted plaques on the steps at the edge of Oswego Lake in the public park read: "Private Lake – Please stay on the steps." Currently access to the lake is restricted to city residents only.
Photo credit: Conrad Wilson/OPB

Supreme Court Case Number: S065014 ~ Mark Kramer v. City of Lake Oswego. Conrad Wilson of Oregon Public Broadcasting filed this report including outtakes from the proceedings held in Aloha.

Harmful Algae Blooms (HABs) Corner

Contributed by Wayne Carmichael, OLA Board Secretary

Oregon Health Authority Updates HAB Action Levels for Drinking and Recreational Waters

In response to continuing cyanobacteria harmful algae blooms (cyanoHABs), and especially the recent breakthrough of cyanotoxins in Salem's finished water supply, the Oregon Health Authority has developed temporary rules. These will require drinking water systems in the state using certain surface water sources, such as those prone to harmful algae blooms, to routinely test for cyanotoxins that these blooms produce and to notify the public about the test results.

These rules are effective starting July 1, 2018 and will remain in effect until permanent rules can be established later this year following a thorough, public rulemaking process.

As part of this rulemaking, water systems subject to these rules can send their samples to the Department of Environmental Quality's laboratory in Hillsboro for analysis.

More information on this rulemaking and a pdf copy of the rulemaking presentation by OHA and DEQ can be found at: Drinking Water Cyanotoxin Monitoring

Breakthrough of Cyanotoxins in Salem's Drinking Water Supply

Despite Detroit Reservoir testing positive for cyanotoxins in 2007, 2015 and 2017, Salem was not prepared for the multiple positive tests of cyanotoxins in finished drinking water in 2018. The first health advisory was made on May 29, and subsequent advisories were made throughout June.

Local (Statesman Journal), state (OPB) and national (AP news) news outlets covered this situation.

Salem is now experimenting with the use of activated charcoal to remove cyanotoxins and other organics as part of their normal water treatment system. Carbon filtration has been used in many parts of the country and the world to remove organics, and it can be argued that Salem and other water treatment systems in Oregon should be more proactive in adopting this and other cyanobacteria/cyanotoxin technology, especially when there is a history of cyanoHABs in their source waters.

Oregon Lakes Association has had a program of education and outreach for 8 years on cyanoHABs. Outreach and research continues this September when OLA along with Washington's lake association (WALPA) holds a joint meeting in Portland on September 26-28. CyanoHABs will be on the program both as a major session topic and as a taxonomy training workshop. See the 2018 OLA/WALPA Joint Conference website or the draft conference schedule in this newsletter.

Recreational Waters HAB website

In addition to changes in Oregon's drinking water rule making, some upgrades to rules pertaining to recreational waters were also made in April of this year. These changes, which lower the action levels for the cyanotoxins, are detailed in OHA's April 2018 "Public Health Advisory Guidelines for Harmful Algae Blooms in Freshwater Bodies", available at the OHA HAB advisory website.

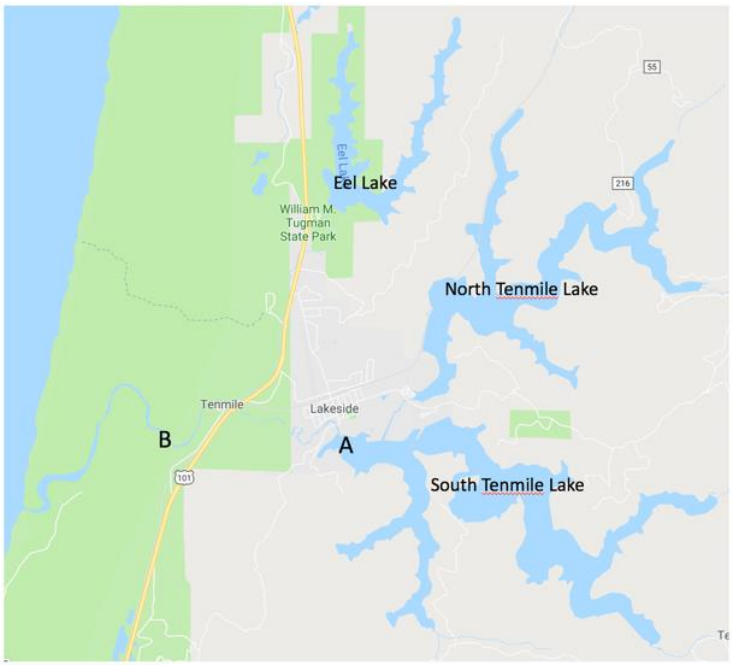
	New Guideline Value µg/L	Former Guideline Value µg/L
Microcystin	4	10
Cylindrospermopsin	8	20
Saxitoxin	4	10
Anatoxin-a	8	20

National HAB Updates

CyanoHABS continue to form part of the national debate on water quality, nutrient excess and global warming. For information, visit the EPA's CYANOHABs Website. Freshwater HABS Newsletters are also available.

OLA Kayak Outing, Tenmile Lake
July 14 2018

Contributed by Theo Dreher, OLA President



Board member, Richard Litts, recently hosted a kayak trip down Tenmile Creek from Tenmile Lake, in Lakeside on the Oregon coast. Seven OLA members participated. Richard lives on North Tenmile Lake, which is connected to South Tenmile Lake by a narrow channel, just east of Lakeside. The two lakes are natural, highly dendritic lakes lying in rather steep, hilly forested terrain east of the Oregon sand dunes. Eel Lake is a deeper lake a little to the north. In the early 1900's, a seasonal salmon fishery operated in Tenmile Lakes to harvest the highly abundant salmon, with annual returns of over 200,000 Coho. That abundance is obviously a thing of the past. Fishing activity on the lakes currently focusses on stocked rainbow trout, and warmwater, non-native species such as Bass and Yellow Perch.

The Tenmile Lake shoreline is are predominantly privately owned, and there are about 200 dwellings fronting on North Tenmile Lake, many of which are vacation homes. A rare treat of living on Tenmile Lake is that the US Mail is delivered by boat! That's Richard checking the mail on his floating dock, which will rise some 10-13 feet in response to the winter's abundant rains.

The kayak trip went from point A to B on the map, starting at the Lakeside boat ramp and ending at Spinreel Park boat ramp on the edge of the sand dunes. A driving north wind discouraged further paddling towards the coast.

The lake was pretty turbid and is a frequent host for cyanobacterial blooms. There is an attractive pad of water lilies next to the Lakeside docks and park, but many invasives are among the natives here. Some of the dune-side ponds visible from the highway north of Lakeside have very abundant native water lilies. A nice sight around the docks and marina were multiple nesting boxes on poles above the water for Purple Martins, and several

species of Swallows which were visible above us on the wing.

The first half of the Tenmile Creek section we traversed was in many places an interesting obstacle course among willows, submerged logs, etc. There were even a couple of jettisoned boats,and a non-submerged log that had to be negotiated by portaging. A diversion channel allows this winding and congested part of the creek to be bypassed when lake levels are at their winter highs.

Just west of the highway, we passed the Eel Creek tributary, which provides access to Eel Lake. Richard and the Tenmile Lakes Basin Partnership, a watershed council, are working at reestablishing habitat for Pacific Lamprey, for whom Eel Lake was presumably named. These fish were historically very abundant and highly prized by the local native tribes for their high fat (high energy) content, and for ceremonial and medicinal purposes. Pacific Lamprey numbers dramatically declined during the twentieth century and surprisingly little is known about their ecology, especially in the Oregon coastal regions. It is known that their upstream migration can be blocked by sharp-stepped (90°) edges of culverts and fish ladders that are perfectly functional for salmon. TLBP has been working with ODOT, the Confederated Tribes of the Coos, Lower Umpqua and Siuslaw Indians, and ODFW to make appropriate modifications to local culverts and the Eel Lake fish ladder, where a lamprey ramp will be installed this summer. Richard's group is surgically implanting radio telemetry tags into adult Pacific Lamprey to allow tracking of their movements, holdover habitats, and spawning behavior in a dunal stream.

Look for notice of an OLA lake outing next year in spring or early summer. Or if there's a lake you'd like to show off by hosting an outing, please contact me at theo.dreher@oregonstate.edu.

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Trish Carroll, Director

Lake Wise
Oregon Lakes Association
P.O. Box 345
Portland, OR 97207-0345

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