LAKE WISE

... a voice for quiet waters

NEWSLETTER FROM OREGON LAKES ASSOCIATION

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Laurie Carmichael, Newsletter Manager

IN THIS ISSUE

2017 OLA Annual Conference

Contributed by Rich Miller, OLA Board

Meet your old friends and make some new ones at our annual Oregon Lakes Association conference at the Driftwood Shores Resort in Florence, Oregon from Friday October 20th through Saturday the 21st. This year, we're pleased to include the Siuslaw Watershed Council as co-hosts for the conference. Activities will include oral and poster presentations on Friday afternoon and Saturday morning, a free public presentation Friday night to introduce the Siuslaw Coho Partnership, and a tour of the Fivemile-Bell Watershed Restoration Project on Saturday afternoon. Make a full weekend out of it and walk the beach, enjoy Florence's shop and restaurants, or get out on one of the many lakes in the area.

Preliminary Agenda at a Glance

Friday, October 20

- **1-5 pm**. Oral and Poster Sessions and coffee breaks
- **Friday evening**, TBD. Free public presentation to introduce the Siuslaw Coho Partnership

Saturday, October 21

- **8 am-12 pm**. Oral and Poster Sessions and coffee breaks
- **12-1 pm**. Lunch
- **1-5 pm**. Tour of Fivemile-Bell Watershed Restoration Project

Dr. Allison Aldous, a freshwater scientist with The Nature Conservancy (TNC), will highlight Friday's presentations. Dr. Aldous will connect Oregon lakes to the groundwater flow systems that are often important for supporting them, including the dune aquifers that are connected to many coastal lakes. She will talk about how we use that groundwater for municipal, agricultural, and domestic purposes, and how important it is to protect the groundwater supply for lakes and wetlands in addition to using it for our societal needs. She'll also discuss TNC's work with a variety of stakeholders to include groundwater-dependent ecosystems in management and policy decisions that are made regarding our water resources. Dr. Aldous is based in Portland and works across Oregon as well as in Gabon, central Africa. She holds a Ph.D. (2001) from Cornell University in wetland ecology; a M.Sc. (1994) in plant sciences; and a B.Sc. (1989) in biochemistry, both from McGill University in Montréal, Canada.

On Friday evening, **Dan Carpenter**, Executive Director of the Siuslaw Watershed Council (SWC), will take center stage for a free public presentation to introduce a new collaborative group called the Siuslaw Coho Partnership. Coho are very important to the region as the Siuslaw River and nearby Coastal Lakes once supported one of the largest wild coho runs along the Oregon Coast. Returns of hundreds of thousands of adult salmon each year in the late 1800's were precipitously reduced to less than 1000 during the 1990's, triggering an

Endangered Species Act listing. Over the past 150 years habitat conditions have been severely modified and degraded, which is attributed to: clearing of riparian areas; splash dam logging; building of streamside roads; disconnection of floodplains; and ditching, diking and other stream modification for agricultural purposes. The Siuslaw Coho Partnership are local partners, working together to reverse this downward spiral with the goal of improving watershed health for fishes and promoting livable, and economically resilient communities. Dan Carpenter has worked for the SWC since January 2016 and is responsible for program development and direction. Previously, Dan worked as a professional hydrologist for the Forest Service and BLM in Washington, Oregon and Nevada with more than 35 years of experience. He holds a BSc. in Soil Conservation from Washington State University. Dan has managed many restoration projects involving streams and wetlands, including riparian and upland projects designed to protect water quality and beneficial uses and to restore the proper functioning of streams, riparian areas and watersheds.

Munsel Lake, August 1990: one of a series of historical aerial photographs taken by Saturday's plenary speaker Dr. Doug Larson.

Saturday Morning **Dr. Doug Larson** will kick things off with a presentation on historical changes to the lakes of the Oregon Coast. The central coast of Oregon features a chain of rare maritime lakes that wind among towering sand dunes for a distance of about 50 miles, extending from Heceta Head in the north to Coos Bay in the south. Beginning in 1968, Dr. Larson independently photographed these lakes and their immediate watersheds from an aircraft about once every three years. His purpose was to provide a photo-historic record of lake evolution attributable to both natural and human-related forces. Many of the photos were controversial, revealing the consequences of imprudent and exploitative land-use and recreational development. Doug Larson (Ph.D.) is a Portland limnologist and writer. He has studied lakes, reservoirs and rivers in the Pacific Northwest since 1967, doing much of this work independently. His earlier research focused on environmental factors possibly related to the occurrence of neotenic salamanders in highly saline Devils Lake, North Dakota.

Other lake-related topics covered during the oral and poster sessions on Friday afternoon and Saturday morning will include:

- Warm and cold water fisheries in western Oregon lakes,
- Lamprey populations and their passage through dams,
- Birds and water levels at southeast Oregon's Abert Lake,
- Carp population modeling in Malheur Lake,
- Invasive aquatic plant monitoring and research in Willamette River backwaters,
- Update on the Oregon Lake Watch program.

Past and present OLA scholarship winners will present results of their research, and Jesse Dolin from Stoney River Sinkers will lead a discussion about getting the lead out of fishing weights to protect fish and wildlife.

Conference activities will conclude with a field trip to observe restoration activities in the Fivemile-Bell watershed located upstream of Tahkenitch Lake, about 10 miles south of Florence. The Fivemile-Bell Restoration Project is a collaboration between the Siuslaw National Forest, Ecotrust, Siuslaw Soil and Water Conservation District, the Siuslaw Institute, and the Siuslaw Watershed Council. Two overarching goals guide the project: to enhance the health of streams and associated aquatic ecosystems focusing on threatened Coho salmon habitat, and to speed the development of late-successional and old-growth forest habitats to benefit species such as the northern spotted owl and marbled murrelet. Paul Burns, fisheries biologist with the Siuslaw National Forest's Reedsport office, will lead the tour.

Space is still available for poster presentations, so please submit your abstracts though through the conference website at **http://www.oregonlakes.org/event-2498699**. On the website you'll also find an updated conference agenda, presentation abstracts, and a link to register for the conference. Early registration (before October 2nd) rates range from $35 for students, $85 for OLA members, to $100 for non-OLA members. Reduced room rates are available at the Driftwood Shores (**https://driftwoodshores.com**) for conference registrants. Hope to see you in Florence!

2017 Oregon Lakes Association (OLA) Scholarship Winner

Contributed by Wayne Carmichael, OLA Board Secretary

OLA 2017 Scholarship Winner—Christina Murphy, Oregon State University

OLA's 2017 academic scholarship winner is Christina (Chrissy) A. Murphy, a PhD. Candidate in the Department of Fisheries & Wildlife at Oregon State University.

After a year-long Fulbright research project on the ecology of intertidal crabs, Chrissy refocused on the sweet study of '*agua dulce*' (freshwater) ecosystems for her Masters at the University of Girona (Spain) and her current PhD. studies at Oregon State University. In Chrissy's words:

> "I returned to Oregon after first meeting my present-day advisor while working on my Masters in Spain. The Pacific Northwest provides excellent models in which to study limnology and the effects of hydropower and reservoir management because we have reservoirs formed by large, high-head dams, relatively uniform in age, size and biotic composition and managed for multiple uses, including hydropower, recreation, and conservation. In addition, we have a range of land-use practices, cultural, ecological and economic icons such as salmonids and an amazing infrastructure for aquatic studies. This is a very exciting time to be working in reservoirs, especially with larger questions such as upstream-downstream linkages and stream-terrestrial connections. Modern tools are finally making quantification, analysis and interpretation of these complex linkages possible. I have been drawn to applied ecology both for my love of natural systems, but also through my enjoyment of mathematics, programming, and statistics. My thesis brings my knowledge and skills back to work in systems fundamental to the resource structure of the Pacific Northwest, and continues my academic path with a research plan that is ideally suited to my skills and interests."

More specifically, Chrissy's studies aim to understand the ecology of Willamette basin reservoirs and how the application of different water level regimes affect:

1) **Trophic relationships** within reservoir food webs (using natural abundance of carbon (δ13C) and nitrogen (δ15N) stable isotope ratios as well as a limited number of sulfur (δ34S) samples),
2) **Water quality** (nutrient and physical parameters),
3) **Phytoplankton and zooplankton communities,** which support listed juvenile salmonids.

Christina (Chrissy) Murphy, OLA's 2017 academic scholarship winner on Lookout Point Reservoir.

Her research focused on four reservoirs in the Willamette Basin: Blue River, Fall Creek, Lookout Point and Hills Creek. From 2013-2016, her group measured nutrient concentrations, dissolved oxygen, temperature, chlorophyll-a, and light transmission within each reservoir. This data was collected at multiple depths and fixed locations at the start, middle, and end of full pool. They also sampled fish, zooplankton, and aquatic macroinvertebrates. Outfall water samples and zooplankton were collected during drawdown periods to examine exports and annual nutrient budgets.

Chrissy credits her early interest in fishes, invertebrates and aquatic biology to an apprenticeship before college, working for the Oregon Department of Fish and Wildlife. Her current research started out as a study of the effects of dam management on the growth and survival of juvenile Chinook salmon. It has become a broad project on physical, chemical and biological conditions within upper Willamette Basin reservoirs and how all of those factors interact. She initially set out to improve our understanding of how hydrological alterations impact fishes, and ended up working across variables. Chrissy now considers herself a reservoir limnologist, in the mold of G.E. Hutchinson.

Please join us on October 20-21 for our annual meeting in Florence where Chrissy and our 2016 scholarship winner Ariana Chiapella will both present results on their Ph.D. research. See: **http://www.oregonlakes.org/Events**

Oregon Lakes in the News

Contributed by Paul Robertson, Former OLA President

Flying Fish Rain Down on Oregon's Alpine Lakes

Oregon Department of Fish & Wildlife Photo

With a drop of 100' from a helicopter, thousands of fingerlings are being planted in lakes across Oregon. Undoubtedly a rare sight, these fish drops seek to provide wilderness fishing for hikers and campers. The program is on a biennial cycle and utilizes smaller fish, which ODFW says fare better in what for the fish must be a harrowing experience. Oregon is not alone in their fish planting methods. Catch a bird's eye view of flying fish in this Ontario Ministry of Natural resources video of a similar stocking program in Canada. **https://www.youtube.com/watch?v=0ppg2DxCKqE&feature=youtu.be&app=desktop**

Read more from KGW.com at: **http://www.kgw.com/news/helicopters-to-drop-350000-trout-into-oregons-high-mountain-lakes/456425980**

1 Hour, 4 Minutes and 53 Seconds

For 23 years, long distance swimmers have been testing themselves in the open waters of the Cascade Lakes Swim Series. This year's 5K first place finisher swam it in under 65 minutes, averaging about 1.28 m/s, or about as fast as one might walk that distance on dry land. According to the Victoria Jacobsen of the Bend Bulletin, the event drew national competitors and a record crowd to Elk Lake this summer, which served as this year's Open Swim national championship for the crown event. Read and see the first-place finisher online at **http://www.bendbulletin.com/sports/5484215-151/23rd-annual-cascade-lakes-swim-series-draws-record?referrer=section**

NALMS in November

The 37th International Symposium of the North American Lake Management Society is scheduled for November 6–9, 2017 in Westminster, Colorado. From alpine lakes to urban reservoirs, Colorado like many western states, wrestles with what are often conflicting management interests. NALMS seeks to address the idea of *Finding Balance*, in the needs of water quality, water rights, population growth, and much more. For more information see **https://www.nalms.org/nalms2017/**

Restoration Alternatives for Malheur Lake from Degradation by Invasive Carp (*Cyprinus carpio*)

Contributed by James Pearson, Pathways Intern USFWS, and Tamara Wood, Hydrologist USGS

Malheur Lake is a large (average ≈14,000 ha), shallow (average depth ≈0.76 m; max depth ≈1.52 m), terminal lake (endorheic basin) located in southeastern Oregon within the Malheur National Wildlife Refuge (MNWR). President Theodore Roosevelt established the MNWR in 1908 to preserve habitat for migratory birds and the breeding grounds of other native bird species. Malheur Lake is one of the largest freshwater marshes in North America and serves as an important transitional area for migratory ducks and geese.

LandSat image of Malheur Lake by Devan Schwartz.

Shallow lake ecosystems such as Malheur Lake are among some of the most important habitats on Earth due to their numerous ecological functions, such as groundwater recharge, water purification, flood protection, and habitat for numerous aquatic and terrestrial species. Shallow lakes exist in two alternate states: clear or turbid, with the clear state characterized by an abundance of aquatic macrophytes, diverse aquatic biota, low water column nutrients and phytoplankton biomass, and the turbid state characterized by the opposite. The shift from a clear to a turbid water state is induced by several factors (*i.e.* climatic and biotic), which collectively reduce the resilience of the clear water state. Structural changes in submerged macrophytes or fish populations are the final factor leading to a turbid state. Once a shallow lake shifts from a clear to turbid state there is a resistance by the aquatic ecosystem to a shift back due to positive feedback mechanisms such as wind fetch, turbidity, nutrient loading, and biotic factors.

One such biotic factor is the invasive common carp (*Cyprinus carpio*; hereafter "carp"), which influences the aquatic ecosystem of shallow lakes via multiple mechanisms and are referred to as an ecosystem engineer. In the 1920's invasive carp were introduced into the Silvies River, and by the early 1950's large numbers of carp were observed in Malheur Lake. An immediate decline in water quality, waterfowl productivity, and aquatic vegetation was detected. Most notably, by 1955 the once abundant sago pondweed (*Potamogeton pectinatus*) had completely disappeared, followed by a subsequent decline in waterfowl such as the canvasback duck (*Aythya valisineria*) that thrive on the sago pondweed.

Carp degrade the ecosystem through their activity and mode of feeding, which physically uproots aquatic vegetation while simultaneously suspending sediment in the water column. This leads to increased turbidity and diminished light availability, further inhibiting the growth of aquatic macrophytes. Carp biomass must be substantially decreased to reduce these impacts and potentially return the aquatic ecosystem to previous conditions. Control of carp can be extremely difficult, however, due to their high capacity for population growth and expansion.

Over the past 65 years, biologists at the MNWR have been attempting to control the population of carp in Malheur Lake to restore the aquatic ecosystem back to pre-invasion conditions. Several large-scale carp removal efforts have been conducted, including eight rotenone (piscicide) treatments. Studies conducted in the years following the rotenone treatments determined that both aquatic vegetation and waterfowl production rebounded significantly. However, the carp populations eventually reestablished, returning the ecosystem to conditions dominated by poor water quality, drastically reduced aquatic vegetation, and lowered waterfowl productivity.

Carp control. Photo by Devan Schwartz.

Modeling has played an essential role in the advancement of carp control due to the ability to quickly and effectively investigate alternative control measures (*e.g.*, commercial harvest, separation cages, pheromone lures, cyprinid herpesvirus, daughterless carp, and spawning sabotage). These modeling efforts suggest that removal measures will ul-

timately be unsuccessful without repeated and intensive intervention focused at multiple life stages. These results have led researchers to suggest that future projects should take a wider ecosystem perspective on carp control, which focuses on restoration via a multitude of direct and indirect carp control measures focus outside of carp's demographics.

Our project aims to develop a novel systems model constructed of several sub-models (hydrodynamics, wind resuspension, and carp population dynamics), which will enable us to simulate the major drivers of the aquatic ecosystem. One of the major aspects of the systems model will be the empirical wind resuspension model constructed by the USGS, which describes light in the water column as a function of location, depth (lake stage), incident solar radiation, wind speed and direction, and aquatic vegetation coverage. Combining these models into a novel systems model will enable us to investigate the potential for habitat manipulation projects to be used as a tool to restore the natural wetland functions in Malheur Lake. These major habitat manipulations will give managers the ability to:

1) Isolate carp populations,
2) Manage water levels,
3) Decrease wind fetch,
4) Increase recreational opportunities,
5) Increase carp control capabilities (commercial harvest, juvenile trapping, spawning habitat manipulation, water level manipulations).

Ultimately, this project will further our understanding of the relationships between the invasive carp population, habitat manipulation projects, and the surrounding abiotic and biotic components of the aquatic ecosystem.

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OLA Board Activities Supporting Healthy Lakes: Lake Abert and Lead Sinkers

Contributed by Theo Dreher, OLA President

The OLA board is currently working on two initiatives aimed at keeping Oregon's lakes healthy.

Lake Abert Desiccation

Lake Abert is Oregon's sixth largest lake when full and the state's only hypersaline lake. Because of its high salinity, only a few other lakes in the West, such as the Great Salt Lake, Mono Lake, and the Salton Sea, share its ecology. Lake Abert is noted for being a major waterbird habitat supporting 80 species with summer abundances reaching several hundred thousand birds (Larson *et al*., 2016). The lake is a major habitat for the state-listed, threatened Snowy Plover, a small shorebird, and for large numbers of migrating Wilson's phalarope. The lake is also of great aesthetic value, being situated in Oregon's high desert. Concerns over the future of the lake have recently attracted public attention though newspaper and magazine articles and an Oregon Public Broadcasting Oregon Field Guide segment in 2015 (**http://watch.opb.org/video/2365444802/**).

Map of ancient Lake Chewaucan showing modern-day Summer Lake and Lake Abert. Photo by Wayne Carmichael.

Panorama of Lake Abert. Photo by Laurie Carmichael.

In 2014, the lake was nearly desiccated during a period of drought and upstream water diversions, destroying brine shrimp and alkali fly stocks that feed migratory bird populations. Importantly, hydrologic modeling suggests that drought alone was not responsible for the extreme loss of water and increase in salt levels (Larson *et al*. 2016, Moore 2016). As is common in the rural US west, there is intense competition for water resources between human uses (especially farming) and maintaining healthy ecosystems. OLA is engaging in discussions with various stakeholders knowledgeable and involved in Lake Abert and its primary water source, the Chewaucan River, with the intention of identifying the best way that OLA can help to avoid more of the desiccation events as occurred in 2014.

In order to incorporate an orientation trip to Lake Abert, the June board meeting (6/17-6/18) was held at the Summer Lake Hot Springs Resort near Paisley in the Chewaucan River valley. OLA member Ron Larson—who has studied Lake Abert extensively (Larson *et al*., 2016)—presented an overview of the lake and its ecosystem, including a drive through the Chewaucan Marsh irrigation pasturing ranch district near Paisley and a visit to Lake Abert. Fortunately, the lake was at a very high level after the abundantly wet winter, and brine shrimp and alkali fly populations were rebounding ahead of the typical migratory bird influx later in the summer.

Lead Sinker Poisoning

Past OLA president Paul Robertson instigated the Board's interest in accomplishing the eventual removal of lead weight usage for fishing. Lead is a well-recognized toxin, recently causing enormous problems in the Flint, MI water supply system. Why would we tolerate the knowing addition of this toxin to our lakes? Recreational fishing is a huge activity involving 50 million fisherpersons in the U.S., 10 million of whom are children. Some $500 million is spent annually on fishing efforts in the U.S. Small sinkers 0.5 ounces or less are very widely used, and almost all are currently made of lead, although alternatives made of stainless steel or stone do exist. These small sinkers are especially harmful to water birds after accidental ingestion. OLA is exploring ways to encourage a move to lead alternatives, such as through a lead sinker trade-in program that is being proposed by OLA member Jesse Dolin of Stoney River Sinkers.

If you are interested in participating in either of these efforts to keep Oregon lakes healthy, please contact OLA president Theo Dreher at **theo.dreher@oregonstate.edu**

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Ross Island Reclamation Plan Workshop

Contributed by: Steve Wille, Oregon Lakes Association, and Mike Houck, Urban Greenspaces Institute

One year ago the Urban Greenspaces Institute, Oregon Lakes Association, and River Restoration NW convened a "Cyanobacterial Bloom Workshop" at Portland State University to discuss the Ross Island Lagoon. Multiple agencies and stakeholders attended and decided that another meeting, to focus on current and future reclamation efforts by Ross Island Sand and Gravel (**RISG**), would be beneficial. On 18 May 2017, an invited group of interested state and federal employees, stakeholders, Ross Island Sand and Gravel legal counsel, and City of Portland bureau personnel met again at Portland State to discuss the current status of the Ross Island Reclamation Plan.

Quick Background: The original 1979 Reclamation Plan called for filling most of the lagoon up to -20 feet and building Ross Island out approximately 400 feet. In 2001 an advisory committee was formed to review the permit, resulting in an updated permit being issued in 2002. This updated permit stipulated a deadline of 2013 to comply with a new reclamation plan that estimated approximately 5 million cubic yards of fill would be required to meet revised habitat objectives. Most of the subsequent clean fill RISG used came from the Portland "Big Pipe" Combined Sewer Outflow project, but it has still not been enough to accomplish the reclamation as outlined in the new permit. Some contaminated fill has been used in the lagoon in the past, which is why a flushing line to reduce water retention time is not considered a viable option (as it might resuspend the contaminated fill). RISG does not want to

handle contaminated fill. The severe lack of availability of uncontaminated (Class A) fill material may delay the reclamation.

Ross Island. Photo by Mike Houck.

In 2015 RISG's permit was updated with new information, but no new conditions were added. The current DSL permit expires in 2023, and the USCOE permit expires in 2025. In the meantime, portions of the Ross Island complex are now in City of Portland and several organizations are working to restore habitat.

The availability of adequate clean fill material is only one of the resource issues identified and discussed during the Question & Answer and Agency Update portion of the meeting. Other topics that were part of this conversation were: using a lesser class of fill material and capping; invasive, non-native plants; ongoing shoreline erosion; climate change (with a 2-8' river rise expected around Portland); the aging out of the cottonwood tree canopy; deer browsing and a burgeoning deer population. Also discussed were unregulated access on public lands and camping in the urban area, squatter boats, and defining 'Ordinary High Water'.

It was indicated in discussion that the existing RISG City of Portland's conditional use permit might be invalid, since it is predicated on BOTH continued excavation AND processing. Since excavation ceased in 2000 the permit may now be void. This is a major issue that should be addressed in the near future, and perhaps can be the basis for future negotiations regarding how much longer reclamation will take.

The meeting finished with a discussion regarding transient boats in the Willamette River and other state owned waterways. It was noted that portions of Ross Island lagoon and an area adjacent to Ross Island in the main channel are both privately owned under a 1926 agreement with the state, whereas all docks are under jurisdiction of the city.

Other Willamette River News

Kurt Carpenter (USGS) provided notice that the USGS station in the Willamette River at the Morrison Bridge was selected for inclusion into the USGS's National Water Quality Assessment (**NAWQA**) Program's new pilot study of harmful algal blooms (HABs) in 11 large rivers across the country. Other rivers include the Connecticut, Delaware, Susquehanna, Chattahoochee, Ohio, Mississippi, Kansas, Missouri, Trinity, and Sacramento. Kurt indicated that means they will be adding:

1) Phytoplankton species identification and enumeration,
2) Cyanotoxin testing (LC-MS/MS) for microcystins, cylindrospermopsin, anatoxin-a, and saxitoxin,
3) Genetic samples for cyanotoxin genes,
4) Chlorophyll-a.

If they encounter an algal bloom "off schedule", they have permission to collect extra samples for these parameters. If anyone hears about a bloom this year, send a note to Kurt or Jennifer Morace at USGS Portland office. As for the Ross Island lagoon, they will also do sampling in the lagoon, time permitting. Kurt can be contacted at: **kdcar@usgs.gov** 503-251-3215.

Harmful Algae Blooms (HABs) Corner

Contributed by Wayne Carmichael, OLA Board Secretary

"With a Special CyanoHAB Poisoning Report by Theo Dreher, OLA President"

NATIONAL AND LOCAL FRESHWATER HAB NEWS HAPPENINGS

National HAB News:

The most recent USEPA Freshwater HABs Newsletter with updates on all things cyanoHAB-related can be found at:
https://www.epa.gov/nutrient-policy-data/cyanohabs-newsletters-2017

To sign up for the newsletter (and for HABs-related questions) please send an e-mail to **epacyanohabs@epa.gov**

Local HAB News:

CyanoHAB events in Oregon are in full swing with summer's heat and expanded recreational use of our waters. See up to date HAB advisories at:

http://www.oregon.gov/oha/PH/HEALTHYENVIRONMENTS/RECREATION/HARMFULALGAEBLOOMS/Pages/Blue-GreenAlgaeAdvisories.aspx

Of special note was an extraordinary incident of a toxic farm reservoir bloom causing deaths of 31 cattle in southeast Oregon (as reported by Theo Dreher, OSU, Department of Microbiology).

Over the 3-day period 19-21 June, 2017, thirty-one 14-15-month-old steers died after contact with a HAB on a 175-acre ranch reservoir near Lakeview, OR. Persistent northerly winds had accumulated dense scum at the southern end of the reservoir where the cattle were drinking. Some of the steers had blue-green material staining their legs like long socks, indicating close contact with the HAB. Samples of the reservoir water and rumen contents of a rapidly deceased steer were submitted to the California Animal Health and Food Safety Laboratory for testing. Very high levels of microcystin were detected in the reservoir water/scum sample (3000 ppb) and in the rumen contents (7100 ppb). Liver and other organs from two mortalities analyzed at the Oregon Veterinary Diagnostic Laboratory revealed findings consistent with microcystin exposure. Unfortunately, HAB samples available for microscopic analysis were all in poor condition, limiting morphological identification of the cyanobacteria present. However, high levels of an irregularly coiled *Anabaena* were present, with small amounts of presumptive *Aphanizomenon flos-aquae* and no evident *Microcystis*. Genetic analysis is being conducted in Dr. Theo Dreher's lab at Oregon State University to identify the source of microcystin biosynthetic genes. Although microcystin is most commonly associated with *Microcystis*, microcystin-producing strains of *Anabaena/Dolichospermum* are known. In Oregon, such strains appear to exist in Odell Lake and in the Metolius Arm of Lake Billy Chinook, where toxic bloom occurrences have been posted this year and in recent years. Farm animal deaths from HAB-related toxicosis occur sporadically, but this number of deaths is fortunately very rare. The bloom may have occurred in response to nutrients washed into the reservoir during the recent very wet winter on the heels of several dry years.

For these informative news items 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

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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**.

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.