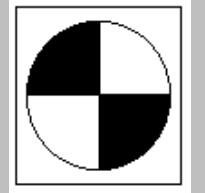


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Editor:
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LAKE WISE

A Voice for Quiet Waters



The newsletter of the Oregon Lakes Association

It was a Memorable Conference at Crater Lake

The opportunity to visit a lake that might not otherwise be a high priority is one of the several attractions for attending the annual OLA conference. The decision to meet at Crater Lake this year was well received because it is not a low priority lake. But it is a lake whose essential nature is difficult to appreciate. The lake's splendor is not in question. It has a surface area twice that of Waldo Lake, and has vantage points that permit views of the entire lake. Its distinctive, deep blue color is readily apparent and it is enjoyable too, to watch how the color modulates over the course of a day. Unlike most lake trips however, it is no easy thing to get down to the water's edge at Crater Lake.

It is possible to fish and swim in the lake, and with some advanced planning, it might still be possible to scuba dive. But all these activities require a 1.1 mile hike down and back over a 700 foot change in elevation (at an elevation of 7000 feet). It is listed as one of the strenuous hikes of the park's many trails. In comparison, the trail to the top of Multnomah Falls rises 600 feet in 1 mile. A group of OLA members did manage this hike and climbed to the top of Wizard Island besides during the Sunday boat trip. Wizard Island is fairly barren but is home to quite a number of fearless, golden mantled ground squirrels. A couple of pools on the west side of the island sparked some interest from limnologists gazing down from the rim of the cinder cone.

The boat trip does add another dimension to a Crater Lake visit, not only because boats and lakes go together so well, but also because the commentary during the cruise points out key features of the lake and provides a good introduction to volcanology. The trail to the Cleetwood Cove boat facility has some additional viewpoints and the wide dusty switchbacks are conducive to conversation. The OLA boat ride on September 16th was the last day of the boating season, and came just days after the National Park had been awarded a Clean Marina certification for the operation of their docks.

In Saturday's formal presentations, Mark Buktenica and Scott Girdner described some of their long term research at the lake, and John Salinas told tales of swimming with the fishes as captain and crew of the one-man submersible that probed the depths of the lake. During the day we learned that there are rotifers and cladocerans, but no copepods in Crater Lake; the *Daphnia* population oscillates, out of phase with that of the kokanee; and it is the moss *Fontinalis sp.* that grows as a bathtub ring around the lake and is responsible for the lake's peat deposits. Other observations reported that there is a greater capacity for transparent lakes to absorb atmospheric CO₂ because photosynthesis can occur throughout the greater volume of their photic zones and so processes more dissolved CO₂ per unit of surface area; genetic testing methods may soon provide reliable assessments of the toxigenic risk posed by harmful algae blooms; mercury emissions from the cement kiln at Durkee, Oregon have had little or no effect on the lakes of the Eagle Cap Wilderness; and milfoil weevils have been introduced into Multnomah County's Blue Lake and are reducing the Eurasian milfoil stand there. The Center for Lakes and Reservoirs will restart the Citizens Lake Watch with an emphasis on aquatic invasive species. There are now well over 200,000 Oregon drivers with Crater Lake license plates. In spite of their contribution, they do not get a discount at the Mazama Village gas station, which is among the few places in Oregon where there are no gas station attendants.

In OLA news, a \$750 scholarship was awarded to Kristin Richardson. She is a student from Montana who, after teaching elementary school for a few years, has returned to OSU for graduate studies focusing on lake sediments and what they can explain about the movement of soils and organic matter through watersheds. Readers should note that tax deductible donations for the OLA scholarship can now be made through the website, www.oregonlakes.org.

Steve Wille began his two year term as President by thanking out-going President Andy Schaedel for his work this past year. After a very civil campaign, Paul Robertson was elected as President-Elect, and Kit Rouhe was re-elected to a two year term as Treasurer. Directors Wayne Carmichael, Trish Carroll, and Michelle DeRosa agreed to new two year terms, and Theo Dreher, Rich Miller, and Vanessa Morgan were appointed as new Directors.

"Clean Marina" Kudos to Prineville Reservoir Resort, Cleetwood Cove, and Rocky Point Resort

The Oregon State Marine Board program to encourage best management practices at marinas has recognized the good work at three new lakes this summer. Odell Lake was the first lake to gain this distinction when Odell Lake Resort became the 24th marina to meet program requirements in July 2007. Since then, Cove Palisades Marina on Lake Billy Chinook, and both Kane's Marina and Detroit Lake Marina on Detroit Lake have also achieved this status. The Clean Marina program draws attention to the extra care that is needed to minimize the environmental impact at these key sites of land/water interface.

The first of the latest batch of honorees is Prineville Reservoir Resort. Visitors to the resort can select from a range of amenities beyond the marina and moorage facilities, located on the north shore of this Crooked River reservoir upstream of Prineville Reservoir State Park. The resort is described at the website, www.prinevillereservoirresort.com.

Cleetwood Cove is the principal boating facility for Crater Lake National Park. While it has few amenities available other than allowing park visitors a close up look at the lake, it is fitting to know that these operations are performed using best management practices. The OSMB award presentation was held on September 11th, just a few days before the Crater Lake boat ride that concluded the OLA Conference.

Rocky Point Resort is at Pelican Bay, on the northwest shore of Upper Klamath Lake. It is the 57th facility to be recognized as a Clean Marina, but must not be confused with Rocky Pointe Marina, which is on the Multnomah Channel across from Sauvie Island. Rocky Pointe Marina became Oregon's first Clean Marina in April 2006. Rocky Point Resort caters to the usual range of lake boaters but also to those interested in exploring the Upper Klamath Wildlife Refuge Canoe Trail. See www.rockypointoregon.com for further details.

Avian Botulism Returns to Smith and Bybee Lakes

As you might recall, Smith and Bybee Lakes are the shallow, serial lakes in the lowlands near the junction of the Columbia and the Willamette Rivers. Management strategies for the two lakes were summarized in the November 2007 issue of *Lake Wise*. The key point in that discussion was the progression of ideas of how to

best capture the full potential of this resource. The natural wet and dry cycles there do attract migratory waterfowl, but carry the risk of avian botulism outbreaks. There are documented accounts of past outbreaks at these lakes. Putting gated, water flow controls in place allow the area to be maintained in a flooded state and so minimizes the disease threat, but this practice reduced the attraction for the migrating flocks of birds. The flocks returned when the natural cycle of flooding was imitated, but the episode of botulism this summer shows the downside of this regimen.

Botulism can be devastating to bird populations. With the exception of Smith and Bybee Lakes, recognized outbreaks in Oregon have only occurred in the southeast corner of the state. A 1925 incidence at Malheur Lake is estimated to have killed 100,000 birds. Losses elsewhere have been estimated in the millions.

The disease is caused by *Clostridium botulinum*, an anaerobic bacteria that is common in wetland sediments. It is a spore forming species and so can lie dormant during adverse environmental conditions. Spores that germinate in a habitat that is warm, wet, and has a low oxygen level can thrive if there is a suitable energy source. *Clostridium* cannot synthesize certain essential amino acids and so requires matter high in protein content, such as decaying plants and animals. Fluctuating water levels, pesticides or pollutant contamination, or raw sewage inputs all stress local plants and animals and so serve as ways that a high protein substrate can be made available. But not all *Clostridium botulinum* bacteria produce avian botulism. There are seven different botulism toxins that the bacteria produce and not all of them affect birds. The toxins are labeled A to G, and it is Type C that is most harmful to waterfowl. Types A, B, and E present the greatest hazard to humans.

The production of a specific toxin is thought to be dependent on a bacterial virus or phage. The gene for the toxin formula is carried in the phage that infects the bacteria and stimulates the bacterial cell to produce the toxin. In the case of Type C botulism, the toxin accumulates in the protein food source and is then consumed by invertebrates and insect larvae. Fly maggots are tasty snacks for healthy birds, but two to four maggots with a concentrated level of toxin can kill a duck. The toxin acts on peripheral nerves and paralyzes voluntary muscles. Infected birds lose the use of their legs and become unable to fly. By flapping their wings, they can propel themselves through the water to the shore, but no further. Sick birds often congregate on the shoreline. As the poisoning progresses, the nictitating membrane in the eye will droop and the birds will be unable to hold their head erect. Death can come from drowning or from the inability to breathe when the respiratory system is paralyzed. Other afflictions can mimic these symptoms so specific testing is required to diagnose avian botulism.

This summer at Smith and Bybee Lakes, a Metro biologist first noticed dead birds in early September. The wetland was closed to water contact activities on September 7th. Metro and ODFW began systematically removing sick and dead birds to keep them from extending the disease cycle. Bybee Lake was drained and Smith Lake was lowered as much as possible, but beaver dams retained some pools in the area. Samples sent to the OSU Veterinary Diagnostic Laboratory and the National Wildlife Health Center Lab in Madison WI were positive for Type C avian botulism. After air horns, explosives, lasers, obnoxious workers, paintball markers, and sirens proved unable to keep birds away from the area, the troublesome beaver dams in Smith Lake were blown up. With no standing water and with cool rains beginning to wash out the exposed lakebed, normal conditions should soon return. The number of birds killed in the episode is estimated to be about 2000. Green-wing teal were the largest affected species, but mallards, wood ducks, northern shovelers, northern pintails, some shorebirds, and a pelican were also counted among the victims.

The attention devoted to the outbreak at Smith and Bybee Lakes reflects the seriousness afforded to avian botulism. These episodes tend to recur at specific locations and so it is important to minimize the size of the area where birds can come in contact with the toxin. Perhaps it is the presence of Type C phage that determines the susceptibility of a location to harbor the disease. Whatever the mechanism, Smith and Bybee Lakes are quite close to the bird refuges on Sauvie Island, where an outbreak of avian botulism would be much more severe because of the greater number of birds that are attracted there. The potential of expanding the contagion to Sauvie Island weighed heavy in the minds of the ODFW and Metro staff responding to this incident.

Phillips Lake and Brownlee Reservoir Get New Mercury Advisories

The advisories were actually issued last May but remain noteworthy. Brownlee Reservoir had been listed previously. Additional sampling has shown mercury concentrations to be greater than the level that justified the April 1997 advisory. The latest Oregon Health Authority advisory lowers the recommended consumption from one meal per five days, down to three meals per month. The Brownlee Reservoir advisory includes warm water fish, such as smallmouth bass, white and black crappie, and yellow perch that are caught in the reservoir or its Powder River arm.

This is the first mercury advisory for Phillips Lake. It recommends that the general public consume no more than two meals per month of the yellow perch there. Children and women of child bearing age are at greater risk from mercury exposure and so should be especially cautious. Mercury advisories warn about eating resident fish in a listed water body. The Phillips Lake advisory then reinforces the catch and release policy in regard to the tiger trout that were introduced there in October 2011.

Avoid Confusion, Adopt Lake Naming Conventions

The proposal in the title above actually pertains to any geographical landmark. OLA however, is chiefly concerned with water bodies of fresh water and so this distinction is justified. There are easily 6000 named water bodies in Oregon and most of them have been recognized in the Geographical Names Information System. That is the GNIS for short. This entity is nestled within the USGS hierarchy and is the gateway for geographical names to appear on the *National Map*. There are well over 2.5 million names recognized on this official government map of the United States. These names have been verified by local jurisdictions before they are entered into the GNIS database, where they are assigned a unique numeric identifier, and cataloged by state, county, USGS quad map, latitude, and longitude. GNIS names then are closely documented at a precise location.

The use of names that are not recognized by the GNIS can be confusing. It is unclear whether unofficial names are synonyms for recognized water bodies, or legitimate names for unrecognized lakes. There is no way to verify the location of a presumed name, and when the reference is made for smaller water bodies, there is often multiple pools of standing water near the pond in question. Some confusing examples will be illustrative.

The Oregon Health Authority advisory to limit fish consumption from Phillips Lake states "The advisory for Phillips Reservoir, on the upper Powder River about five miles east of Sumpter, includes yellow perch." Phillips Lake is the GNIS name for this water body, which is a reservoir, and the OHA qualifier does generally indicate the correct one. But there is no Phillips Reservoir labeled at this location on (most) maps of the area.

Continuing to pick on the OHA, their notice lifting the HAB advisory for Walterville Pond said, "A health advisory for Walterville Pond, located five miles east of Springfield off Hwy 126, was lifted ..." There is a substantial water body at that location, but it is labeled "Walterville Reservoir" on maps, and it is listed by the GNIS with that name. Its outflow is to a canal called "Walterville Power Intake" in the Oregon Water Resources Department's Dam Inventory. The canal is not in GNIS but there are two water bodies that could be confused as Walterville Pond at the specified location. (Walterville Pond is the common name used locally for Walterville Reservoir.)

An HAB advisory issued on September 18th reads in part, "...high levels of blue-green algae in Big Creek Reservoir #1, located approximately one mile east of Newport in Lincoln County." Big Creek Reservoir #1 is the downstream impoundment of the two, serial reservoirs on Big Creek just east of Newport. There is a generation of maps that show this configuration. However, for better or worse, the GNIS recognizes this impoundment as Newport Reservoir, with the notation that Big Creek Reservoir is a variant name.

Verifying a name in the GNIS is a simple, but added step. Search the internet for "GNIS", and then select "Domestic Names" and "Search Domestic Names" to reach the query screen. You can limit the search by designating Oregon and a county. Enter the proper name of the feature in question and start the search. For example, entering "Big Creek" as the Feature Name produces the result that displays both Big Creek Reservoir #2 and Newport Reservoir, but not Big Creek Reservoir #1. When a search does not display the expected name, there is an opportunity to avoid some confusion by determining whether it is the water body or the expected name that the GNIS does not recognize.

HAB Advisories are Less, Later, and Longer This Year

2012 Harmful Algae Bloom Advisories			
Water Body	County	Date Posted	Date Lifted
Jackson Creek	Jackson	12-Jul-12	17-Jul-12
Walterville Reservoir	Lane	27-Jul-12	23-Aug-12
Dorena Lake	Lane	31-Jul-12	23-Oct-12
Dexter Reservoir	Lane	13-Aug-12	
Blue Lake	Multnomah	28-Aug-12	14-Sep-12
Willow Creek Reservoir	Umatilla	14-Sep-12	
Lost Creek Lake	Jackson	14-Sep-12	
Newport Reservoir	Coos	18-Sep-12	
Fern Ridge Lake	Lane	21-Sep-12	

There were just nine advisories issued this year warning people to avoid contact with water where an active harmful algae bloom was underway. These advisories are not uncommon in June or even May, but it was mid July this year before the first advisory was issued, after a telltale scum on Jackson Creek was noticed in Central Point. In early November, there are still five advisories in place. The small number, late onset, and delayed lifting of HAB advisories have all been seen previously, but not together in one year. Giving notice of harmful

algal blooms has been effective in educating the public of the hazard posed by the blooms, but the growing list of issued and lifted advisories offers little insight into their nature.

The work of Theo Dreher and Connie Bozarth at the OSU Department of Microbiology offers a promise that better sense might soon be made of the presence and the inherent hazard of cyanobacteria blooms. In the Fall 2012 issue of *LakeLine*, they write that the medical interest in genetic testing has produced research methodologies that are applicable to studies of cyanobacteria. Their use of these techniques has contributed to the growing body of evidence that microscopic analyses of cell morphology are not a good predictor of the toxin producing capacity of a cyanobacteria bloom. With a series of tests, they are able to characterize the genotypes present at a population level of a bloom, assess the presence or absence of toxin producing genes within these genotypes, and link the morphology of an individual colony to its genetic makeup and toxin production. This work may be able to establish criteria that would allow a specific bloom to be judged non-toxicogenic, and so unworthy of an HAB advisory. Before such threshold levels are set, there is still much to be learned about factors involved in HAB development and decline. The use of this approach to compare HAB populations between lakes, between sites within a lake, and over the course of a bloom should prove to be a great aid in advancing this understanding.

Single copies of *LakeLine* are available at the NALMS website, www.nalms.org.

Trap and Truck Fish Passage Facility Nears Completion Below Big Cliff Reservoir

The Willamette Project Biological Opinion of 2008 mandated better fish passage at several of the 13 US Army Corps of Engineer flood control dams in the Willamette River drainage. It is winter steelhead and Upper Willamette River spring Chinook salmon that are the main focus of this requirement as they are specifically listed under the Endangered Species Act. However, there is enough concern now for all anadromous fish runs to justify needed provisions in the design of any new facilities.

The trap and truck facility that the USACE built at Cougar Reservoir (see April 2009 *Lake Wise*) has been operating successfully since 2010 and so serves as a model for other dams in need of improved fish passage. The simple design just pumps water to the top of a short fish ladder, which routes fish migrating upstream from the river to a sorting pool, where they can be observed and separated into defined groups. Wild fish can be trucked above the dams to continue their spawning run. Hatchery fish can be trucked downstream to repeat their passage upstream past potential harvesters.

Big Cliff Reservoir is the re-regulating impoundment immediately downstream of Detroit Lake on the North Santiam River. Four miles downstream of the Big Cliff dam, there is a barrier dam that was built in 1951 as part of the Marion Forks Hatchery, which produced fish to compensate for the loss of habitat upstream of Big Cliff and Detroit dams. Fish trapped at the barrier dam provided brood stock for the hatchery. The Minto collection and sorting facility adjacent to the barrier dam is now undergoing a reconfiguration into a trap and truck facility similar to that at Cougar Reservoir.

The new Minto trap and truck facility will attract large and small fish into a 440 foot fish ladder with 52 pools. Water will flow through submerged portals in the pools so fish need not leap from pool to pool. A gravity supply line from above the barrier dam will provide some water to the fish ladder, which conveys fish from the river to a pre-sort pool. From there the fish are moved to one of eight post sort pools, directly to a truck loading

hopper, returned to the river upstream of the barrier dam, or otherwise harvested. Four pumps, plus one backup, will supply water from the river for the sorting pools. The post sorting pools can serve a variety of uses, such as collecting brood stock, building a load for transport, acclimating hatchery fish from Marion Forks before they are released to the river, or whatever other purpose that needs extra time to complete. The facility can provide fish for research, meat for food banks, or carcasses for streamside deposition as well. The design of this sorting station provides a safe and efficient workplace, and facilitates the handling of the fish, which should reduce their stress and decrease pre-spawning mortality. Construction is expected to be completed by year's end and operation is set to begin next spring.

The drainage basin above Detroit Lake is greater than 400 square miles. This area will once again be spawning habitat when the trap and truck crews begin their work. The addition of these spawning grounds should, in time, significantly augment the targeted runs. As this renovation gets underway on the North Santiam, construction has begun on a renovation of the Foster dam trap and truck facility on the South Santiam River. When completed, the new Foster facility will continue to collect fish for hatchery programs, but will also restore fish to the spawning streams above Foster and Green Peter Lakes.

Invasive Species Boat Inspections are Proving Their Worth

Oregon now has four, mandatory boat inspection stations set up on the key entry point highways coming into the state. These stations supplement similar inspections in Washington, California, Montana, and Idaho. Nevada will begin a program next year. The cost of these inspections is paid for by added boat registration fees. Paying these fees and being subject to roadside inspections both raise awareness among boaters that aquatic invasive species can be moved between water bodies on a boat or trailer. Private inspection stations are becoming more common at popular boat ramps.

The Oregon inspection stations are mobile, but spent most of this past year at locations near Ashland, La Grande, Klamath Falls, and Hines. It was the Ashland station on I-5 that was the busiest. Together however, the stations conducted 4526 inspections and discovered 54 boats carrying aquatic invasive species. There were 17 boats with zebra or quagga mussels. Contaminated boats were cleaned by a hot water pressure washing. Inspected boats are secured to their trailer with plastic lock tight ties and given a copy of the inspection record.

The mandatory boat inspection applies for all watercraft from yachts to paddleboards, regardless of state of origin. There were six citations issued in the past year to boaters who failed to heed the requirement to stop. The \$110 fine for these citations help to make this rule clear. The stations are routinely manned during days from February to September. They can be set up at other times and other locations as needed. The goal of the program is as much to educate the public about invasive species as to offer some protection to Oregon waterways.

Oregon Lake Watch Program Kicking Off in 2013

Portland State University and its Center for Lakes and Reservoirs are proud to re-launch the Oregon Lake Watch program starting in 2013. Originally, the Citizen Lake Watch Program was started in 1991 as a mechanism for citizens to get involved with monitoring the health of their lakes. The program ended in the 2000's, but we are excited to re-start the program with funding from the Oregon State Marine Board.

LAKE WISE
The Oregon Lakes Association
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OLA Mission: The Oregon Lakes Association, a non-profit organization founded in 1990, promotes understanding, protection, and thoughtful management of lake and watershed ecosystems in Oregon. For additional information on OLA, write to the address above, or visit our website.

OLA welcomes submissions of material that furthers our goals of education and thoughtful lake management in Oregon, and is grateful for the corporate support that helps sustain the organization. Corporate members are offered a one-time opportunity to describe their product or service to Lake Wise readers. These descriptions are not endorsements, and opinions appearing in Lake Wise are not OLA policy statements.

Visit our website: www.oregonlakes.org

Join Oregon Lake Watch ... (cont.)

The goal of Oregon Lake Watch is for citizens to have an important role in helping monitor the status and health of their lakes. A significant emerging problem in Oregon lakes is the spread of non-native or invasive species. Our program will train volunteers to identify key invasive plant and animal species, as well as collect baseline water quality data with equipment provided by the Center for Lakes and Reservoirs.

The success of Oregon Lake Watch is contingent on having dedicated volunteers from across the state. If you or someone you know would be interested in becoming a volunteer, please email OLW@pdx.edu with: 1) your name, 2) the lake or lakes you would be interested in monitoring (as well as county name), and 3) phone number that is best to reach you at.

Please visit our website for updates and more information about Oregon Lake Watch:

<https://sites.google.com/a/pdx.edu/oregon-lake-watch/>

We look forward to hearing from you!

Sincerely,

Angela Strecker, Ph.D.

Rich Miller

Vanessa Morgan

Center for Lakes and Reservoirs



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