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LAKE WISE

A Voice for Quiet Waters

The newsletter of the Oregon Lakes Association

A Couple of Lake Conferences Completed, Another Coming Up

The annual conference is easily the highlight of OLA's activity cycle. The OLA website can be consulted anytime, the quarterly newsletters draw state wide attention to the organization, the periodic business meetings allow an exchange of ideas in a teleconference format, and e-mail exchanges between Board members explore alternative approaches to matters of mutual interest. But the scope of possible interactions expands dramatically at the conference. Matching names and faces, renewing past acquaintances, passing on and receiving informal updates on all manner of things, and even eavesdropping on the conversation at your elbow can all provide a welcome change to workday routines. A pertinent agenda at any focused conference or convention can prove to be beneficial, but the offhand networking in play at these events can be equally valuable.

For those of us who were able to attend both the Portland OLA Conference and the Spokane NALMS Symposium, there were lots of lake lectures late in last October. Many of these presentations advocated adding materials to lakes for their betterment. On the Friday tour of the Bull Run watershed, we learned that the Water Bureau is adding multiple level outlet capability to the two outlet towers in their downstream reservoir. In Portland during the Saturday session, we were told how the addition of alum to Lake Oswego has noticeably tempered the harmful algal blooms that occur there. Furthermore, the method of alum application will selectively address problems of internal cycling or external loading of phosphorus. A project at Willow Creek Reservoir, immediately upstream of Heppner, demonstrated that the experimental addition of ammonium nitrate to *in-situ* enclosures suspended in the reservoir, produced greater Secchi depths, and lower concentrations of chlorophyll α, cyanobacteria, and microcystin than occurred naturally outside of the enclosures. These findings support the contention that cyanobacteria toxin production is constrained when TN:TP ratios are >75.

Dr. John Stockner, of the University of British Columbia was the keynote speaker at the Spokane meeting and he also spoke about the importance of nitrogen, phosphorus, and carbon ratios in lakes. His presentation continued to emphasize that the addition of phosphorus can often be beneficial, just as he did when he addressed the OLA/WALPA meeting in Portland in 2006 (see the November 2006 issue of *Lake Wise*). Because carbon and nitrogen can be obtained from the atmosphere, phosphorus is often the limiting factor in lakes. Dr. Stockner has a long track record of restoring optimal productivity by fertilizing lakes to put their nutrient levels back into balance. These restoration projects have shown that satisfactory results are most often obtained when lake managers have gained a good understanding about local lake processes. Picoplankton density and the relative biovolume of edible and inedible phytoplankton were among the conditions monitored at Idaho's Dworshak Reservoir in a project that improved the kokanee fishery there with additions of ammonium nitrate to correct declining N:P ratios.

Increased understanding about mercury cycling has spurred research into ways to control the movement of this element into lake food webs. Hypolimnetic oxygenation can be an effective tool for this purpose by dispelling the anoxic conditions that promote the methylation of mercury, which is necessary to make it available for bioaccumulation in the animals consuming it. Mercury methylation can also be suppressed by the addition of

liquid calcium nitrate, which increases the redox potential at the lake bottom to levels above those needed for methylation to occur. Reports from both Fort Worth TX and San Diego CA told of efforts to convince water users in these cities that advanced treatment of wastewater makes treated wasterwater a suitable supplement for drinking water supplies. The very real discussions on this topic have already concluded that implementing the addition of this novel supplement may still be insufficient to meet future demand for drinking water.

The highlights summarized above are a very small sampling of the presentations attracted to the recent two lake conferences now completed. There is sure to be an equally diverse selection of topics when NALMS and the National Water Quality Monitoring Council convene the 8th National Monitoring Conference in Portland on 30 April to 4 May 2012. Read on to find what OLA has discovered about this welcome event.

Portland Will Host National Lake Conference, 30 April-4 May 2012

OLA is not officially a part of this conference, although it will likely be well represented among the attendees. The conference is the collaborative product of NALMS and the National Water Quality Monitoring Council, and is an offshoot of the April Lake Conference formerly sponsored by NALMS, the EPA, and the Chicago Botanical Garden. The NWQMC is a committee formed in 1997 to address the common interest of the EPA and the USGS in water quality monitoring. The Portland conference will be the 8th national gathering of the NWQMC. Their meeting last year was held in Denver.

The mission assigned to the NWQMC is to provide a national forum to coordinate comparable and scientifically defensible programs to improve water quality monitoring, assessment, and reporting. Browsing their website gives the impression that they are a clearinghouse for monitoring methods and strategies. Good ideas are welcome from any source, whether government, tribal, private, or volunteer. They publish a newsletter that describes specific monitoring programs in detail, and work is underway to assemble a national network of reference watersheds. The opportunity for them to view the on-line *Atlas of Oregon Lakes*, and the decades of data from the Bull Run watershed will be a bonus for the Council's selection of Portland for their conference.

At five months out, planning for the conference appears to still be underway. The theme for the meeting is "Water: One Resource – Shared Effort – Common Future", which does not exclude many topics. A projected agenda is not yet available, and even the Portland venue of the meeting does not appear on conference announcements. *Lake Wise* will update forthcoming details in the next issue, but the March mailing date for that newsletter occurs after February 17th, when conference registration increases from $400 to $475. Potential attendees should watch the NALMS website, www.nalms.org, for additional information.

OLA Charts a Path and Fulfills a Pledge

A mundane but necessary part of the annual conference resolves the organizational matters that have surfaced during the year. A tally of the returned ballots showed that the OLA membership approved the proposed housekeeping changes to the By-Laws. The continuity of the organization was assured with the election of President Andy Schaedel, President-Elect Steve Wille, and Secretary Karen Williams. In the subsequent Board meeting, Jesse Ford ended her service as a Director, which began in 2005, and the Board appointed Roger Edwards, Stan Geiger, Al Johnson, Ben Johnson, and Paul Robertson to a new two year term as Directors.

The pledge to donate water monitoring equipment to a worthy program was approved at the Corvallis Conference last year. The worthy program selected is the Siuslaw Watershed Council and the equipment donated is a binocular, Leitz compound microscope. This microscope, which exceeded the agreed upon value of the donation, was made available by Director Wayne Carmichael. It is an old instrument relying on a reflected light source, which is focused onto the specimen with an adjustable, substage condenser. It has high quality optics and a mechanical stage, but no plastic parts. The optics include four objective lenses and three sets of ocular lenses that can be combined to produce a range of magnifications suitable for characterizing sediment particles and studying organisms ranging from insect larvae down to algae cells. The various components all fit in a carrying case that included a card stating the microscope was donated by OLA with the intention to bolster water quality monitoring programs in Oregon.

The donation was made during the tenth year of Siuslaw Watershed Council activities. During this time, they have developed a monitoring program that looks at Secchi depth, turbidity, dissolved oxygen, water temperature, salinity, and *E. coli* at multiple locations in the Siuslaw drainage. Triangle Lake is in the Siuslaw watershed, and the Watershed Council is sampling at sites upstream and downstream of the lake.

OLA thanks the aquatic biologists at Aqua Technex for their work to advance the science of lake management, and for their help in making our Portland Conference a success. Contact them at www.aquatechnex.com.

What Do We Know About Triangle Lake?

There are five Triangle Lakes in Oregon, although it is uncertain just where the one in Clackamas County is located. The only reference to it merely says it is in Township 7S, Range 6E. There are recognizable Triangle Lakes in Douglas, Marion, and Clatsop Counties, but the one of interest here is in Lane County, on Lake Creek in the Siuslaw River drainage.

The Lane County Triangle Lake was featured in the *Atlas of Oregon Lakes*, and this text is still the chief source of information about the lake. This account summarizes the nine mentions of Triangle Lake in the published literature from 1939 through 1976. A subsequent literature search through 2007 found no additional studies. The *Oregon Geographical Names* description said the lake was much more popular for recreation before the construction of Fern Ridge Lake. The Oregon State Marine Board rated Fern Ridge Lake at #9 in the state in their 2008 evaluation for boat use days. Triangle Lake did not make the top 50 and so must have less than the 9541 boat use days per year that were registered at Netarts Bay.

There are several points of interest in the *AOL* discussion of Triangle Lake. The observation that the lack of volcanoes and glaciers in the Coast Range was the reason these mountains have far fewer lakes than are found in the Cascades is a good explanation of why there are so few lakes in the Coast Range. The ancient landslide

that dammed Lake Creek to form Triangle Lake actually created a much bigger lake, which was long rather than triangular. Because only a triangular remnant of this former lake remains, sediment transport into the lake is certainly a candidate as a current management concern. Dissolved oxygen levels beneath the thermocline are another question worth looking into.

A prominent feature of Triangle Lake photos is the intense strip development along Hwy 36 as it hugs the southwest and north shores of the lake. *AOL* expresses concern about the sophistication of sanitation solutions that serve these structures. Perhaps this situation has improved since the 1985 publishing date of the AOL, but septic seepage is something to be watched at any developed lake. Where it is a problem, the nutrient enrichment often becomes apparent with a bloom of unusual algae. The algae reported in the AOL review gives no cause for alarm other than the characterization being based on a few grab samples from four decades ago.

From all the information available then, Triangle Lake seems to be a pleasant lake in a region of the state where lakes are rare. More monitoring data may exist for Triangle Lake, but it is not obvious who would be doing it or where their data is archived. It is not just Triangle Lake where useful water quality data may be under wraps. It takes an effort to display data and the benefits of doing so may be minor for the agency doing the monitoring. There is interest in such data however. The report issued for the 2007 National Lakes Assessment commented that characterizing the condition of the nation's lakes was hampered by the difficulty of finding sufficient reference lakes to serve as comparison standards. These unsullied lakes surely exist, but remain hidden because their credentials are not publicized. It is of interest to note that the goals of the National Water Quality Monitoring Council include the establishment of a national network of reference watersheds. While this national program will be scrutinized at the coming April/May Portland Conference, the local development of the *on-line AOL* provides a place and a format to display monitoring data for Oregon lakes. Time will tell if this opportunity is utilized.

Modified Drawdown Strategy for Fall Creek Lake

The US Army Corps of Engineers has announced changes to their operation of Fall Creek Lake in an on-going effort to improve the endangered run of spring Chinook salmon. The reservoir is in the drainage basin of the Middle Fork Willamette River, and is 22 miles southeast of Eugene and just north of Lookout Point Lake. It is one of the 13 USACE flood control reservoirs in the Willamette River watershed and it first began filling in 1966. The published record of USGS stage monitoring of the reservoir pool covers the years from 1966 to 2003. These stage measurements show that the water level was maintained at near full pool from March through August each year, and would be at its lowest point in November and December. The mean pool level for November and December during these 37 years ranged from 721 to 725 feet elevation. The spillway crest of the dam is at 834 feet and there are spillway outlets down to 728 feet. The bottom of the reservoir is at 670.4 feet.

The target drawdown level was lowered to 714 feet for water years 2007-09 and to 690 feet in 2010. Historical records show a positive correlation between drawdown level and annual salmon returns, which is likely due to improved passage through the dam for juvenile salmon migrating downstream. Fall Creek Lake does not produce hydropower so the smolts moving downstream must go down the spillway or through the reservoir drain. Salmon returning to spawn are trapped at the dam, counted, and trucked upstream. The USACE announcement for this winter targets a drawdown level of 680 feet that will last through mid January 2012. The pool is expected to have returned to normal levels by February 1st. The announcement warns area residents of

higher turbidities during the drawdown from channel cutting through deposited sediments. The reservoir will be closed to all boating during the drawdown.

Allowing a reservoir to revert to a stream status is not unprecedented, but it may be an underutilized management strategy. It was the National Marine Fisheries Service's 2008 Biological Opinion that recommended this plan, and Fall Creek Lake, which is the largest contributor to the Middle Fork Willamette River salmon fishery, is a logical site for a test run.

U.S. Army Corps of Engineers Adds an Island to Malheur Lake

The USACE penchant for adding islands to Oregon lakes was previously discussed in the November 2008 issue of *Lake Wise*. Then as now, the motivation for this work is multifaceted; it attracts Caspian terns away from their nesting site on East Sand Island in the Columbia River estuary, it improves the survival of juvenile Columbia River salmon during their downstream migration to the sea, it disperses the range of Caspian tern nesting sites over a broader area, and at Malheur Lake, it may complement the effort to control nuisance carp populations.

Caspian terns, or *Sterna caspia* as they are known in birding circles, are colonial nesting, opportunistic piscivores that pluck great numbers of small fish from surface waters during their spring and summer nesting season. Any fish of a size between 2 and 10 inches is fine. Caspian terns gobbled up an estimated 6.7 million salmon smolt at the mouth of the Columbia River during 2008. The island that the USACE placed in Crump Lake has an ample number of tui chub for the terns there. The Corps has built three other islands in the area immediately upstream of Summer Lake, another in Fern Ridge Lake, and more in California. By creating new sites for nesting, the Corps has been able to reduce the nesting area on East Sand Island at the agreed upon rate of 1:2; 1 acre on East Sand Island is allowed to re-vegetate for every 2 acres of bare ground made available elsewhere. The goal of this program is to reduce the size of the highly successful tern colony on East Sand Island from 6 to about 1.5 acres, which is still sufficient space for 2500 to 3000 nesting pairs of terns.

These birds are not the greatest impediment to restoring endangered salmon runs, but they were not a significant problem at all until the disposal of dredging spoils in the mouth of the Columbia River provided them a nesting surface in the late 1980's. Up until then, it was rare to discover a nesting colony of 1000 breeding pairs anywhere throughout their extensive range. The ideal conditions at East Sand Island attracted close to 10,000 breeding pairs of terns to nest there in 2007. So the tern predation is an added problem for salmon recovery that might be remedied by management action.

The management remedy now focused on Malheur Lake will have a new, 1 acre island in place there by March 1, 2012. The island will look much like its forerunner in Crump Lake, and will be placed 2000 feet offshore, and north northeast of the Malheur National Wildlife Refuge Headquarters. The crest of the island will be at 4099 feet elevation at a location in the lake that remains watered in all but the most extreme dry conditions of this playa lake. The *Atlas of Oregon Lakes* gives the maximum depth of the lake as 5 feet at a water surface elevation of 4093 feet, and notes the surface area of open water changes dramatically with climatic conditions. Bird nesting is best in high water due to the many near shore hillocks that become islands. Winter ice shear has largely eliminated these prominences from the lake's core areas.

The success of the USACE program of building tern islands varies with the criteria used for judgment. In the few years they have been available for tern nesting, their success has been uneven. The Fern Ridge Lake island has attracted a variety of birds, but not Caspian terns. The island at Crump Lake has seen some very good tern nesting seasons, but not every year. On the floating island at Duchy Lake, eight pairs of Caspian terns enjoyed the island all to themselves and fledged 13 youngsters during 2009. Normally there is a mixture of nesting bird species. The islands then have been very successful at attracting an assortment of birds to lakes with abundant stocks of small fish. This feature makes Malheur Lake a good candidate for an island because of the degradation of the marsh habitat that the carp there have caused. The USACE program can also be considered a success for dispersing the terns from a single large colony. The value of dispersed colonies was demonstrated on East Sand Island this year when the combined predation of bald eagles and gulls stopped the tern colony from fledging any chicks. Caspian terns normally nest in scattered groups of a few breeding pairs, and it may not be a bad thing should this practice become more common again.

This Year's Cyanobacteria Season Delayed and On-Going

Readers may recall last spring's cold and wet weather that delayed the growing season in much of the state. Whether or not the weather had a role in this year's late development of the poorly understood harmful algae blooms, it was not since 2005 that the first HAB advisory of the year was posted later than in 2011. Typically, the year's first posting comes in May.

2011 Advisories for Harmful Algae Blooms

water body	county	date posted	date lifted
Cougar Reservoir	Lane	14-Jun	19-Jul
Lost Creek Lake	Jackson	20-Jun	11-Jul
Lost Creek Lake	Jackson	23-Sep	
Cullaby Lake	Clatsop	1-Jul	1-Sep
Fish Lake	Jackson	1-Jul	25-Jul
Willow Creek Reservoir	Morrow	11-Jul	8-Aug
Willow Creek Reservoir	Morrow	7-Sep	9-Nov
Diamond Lake	Douglas	29-Jul	9-Aug
South Umpqua River	Douglas	29-Jul	
Dexter Reservoir	Lane	19-Aug	14-Oct
Gerber Reservoir	Klanath	23-Aug	
Sru Lake	Coos	24-Aug	
South Tenmile Lake	Coos	25-Aug	21-Nov
Lemolo Lake	Douglas	31-Aug	19-Sep
North Fork Reservoir	Clackamas	8-Sep	23-Sep
Timothy Lake	Clackamas	8-Sep	23-Sep
Dorena Lake	Lane	19-Sep	24-Oct
Fall Creek Lake	Lane	20-Sep	

An interesting observation about the 2011 advisories is that at both of the reservoirs with double postings, the first was for a bloom of *Anabaena* and the second was for *Aphanizomenon*. This year's advisory for the South Umpqua River is again in response to dog deaths there. A glance at the table shows that in early December, there are still five advisories in effect.

It is well understood that placing a lake under a no water contact advisory presents a real hardship on local resorts and communities. The advisories are issued to warm people of a known health risk and to increase awareness that a cyanobacteria bloom anywhere should be avoided. The success of this campaign in Oregon and worldwide continues to increase the priority of finding a means to prevent and mitigate these blooms. The number of presentations on this topic at the recent Portland and Spokane conferences is good evidence that

cyanobacteria blooms are attracting funding. And the cumulative impact of this research is making headway on the problem. It was instrumental in the 2010 policy change at ODEQ to identify waters with health advisories as impaired, triggering an assessment intended to reverse the impairment. HAB awareness led to the placement of "cyanobacteria, other fresh water algae, and their toxins" on the second listing of the Safe Drinking Water Act's Contaminant Candidates. Anatoxin α, microcystin-LR, and cylindrospermin appear on Contaminant Candidate List 3. The US Congress is now considering whether to renew the Harmful Algae Bloom and Hypoxia Research and Control Act of 1998. So there is a lot in play, which should someday bear fruit.

Lake Associations Take Note – LOIS is Complete and Functioning!

LOIS is the Lake Oswego interceptor sewer. It is a novel, submerged but buoyant, gravity flow sewer that runs the length of Lake Oswego. It was built with $110 million of revenue bonds, and the project was completed on schedule and under budget. The cost was estimated to be $20 million less than a perimeter sewer due to its shorter length, reduced requirement for pumping stations, and minimal disruption of existing infrastructure. It replaces an undersized, corroding, and seismically unsafe concrete and cast iron system that was installed in 1963. The estimated life of the new system is 100 years.

The novel aspect of the project was the specific combination of its proven, component parts. The wastewater pipe selected is made of high density polyethylene, and 10,800 feet of 42 inch diameter pipe was required. Its buoyancy is enhanced with sealed sections of 30 inch HDPE, placed in pairs along the length of the sewer pipe. There are 2000 feet of 24 or 22 inch HDPE laterals connected to the main line. The sewer is precisely tethered, 8 to 17 feet beneath the lake surface with stainless steel cables, attached to 428 bedrock anchors, placed at 25 foot intervals. The gravity flow is maintained at a slope of just 7 feet over a distance slightly more than 2 miles. Lake Oswego typically experiences a temperature range of 42 to 77 °F, which can produce 14 feet of expansion/contraction in 9000 feet of HDPE pipe. To ensure this change does not disrupt the slope of the line, it was anchored in place in a sinusoidal curve with a 400 foot wavelength, and amplitude of 18.5 feet. Buoyancy of the line is impaired where there is less than 10 feet of water beneath the pipe. In these shallow sections, the pipe is supported with pilings. The pipe is flexible enough to accommodate drawdowns. Submerged access points are spaced along the line for inspection and cleaning. Construction required over 1200 commercial dives. All phases of the project were tightly controlled to produce minimum bother for the residents on this private lake.

There is an abundance of quality engineering in this project and the construction contractors have been recognized with several industry awards. The innovative solutions that were devised for this sewer system present new options for other lake communities seeking better ways to manage their wastewater. The project is described in greater detail in an article published in the July 2011 issue of the Journal of the American Water Works Association. A related article is also in the November 2010 issue of *Lake Wise*.

Clever Funding Pays for Detroit Lake Improvements

Detroit Lake is one of 32 lakes recognized nationally as a Federal Lakes Recreation Demonstration Project. As the lake with the most boating use in all of Oregon, this distinction is deserved and draws attention to the management activities on this US Army Corps of Engineers reservoir. The US Forest Service has management responsibility for the lake and they are a member of the Federal Lakes Recreation Committee for Detroit Lake

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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

Detroit Lake Improvements … (cont.)

along with Oregon State Parks, the City of Detroit, and the lake's two private marinas, Kane's Marina and Detroit Lake Marina (which are both certified Clean Marinas).

The lake community thrives on recreation dollars so businesses suffered during a low water period lasting from October 2000 to March 2002, when the water level stayed below the lowest of the lake's six boat ramps. The reservoir operates between the full pool level of 1569 down to 1425 feet of elevation. The existing boat ramps allow safe launches down to 1548 feet. The Detroit Lake Committee petitioned for a low water boat ramp and secured a $720,000 grant made of contributions from the Oregon State Marine Board, the Oregon Department of Fish and Wildlife, the USFS, and Oregon State Parks. The facility was built at the Mongold Day Use Area on the north side of the lake. It permits launches at water levels down to 1450 feet, and was in use by March 2010.

Low water boating in Detroit Lake quickly noted some new navigational problems. The most onerous was the limited passage along the channel of the North Santiam River, between Piety Island and the drawn down reservoir's south shore. It was a longer route to follow the Breitenbush River channel in a detour around the north side of the island. The remedy to this bottleneck became a training exercise for the 224th Engineer Company of the US Army National Guard. The soldiers used their heavy equipment to expand the passage, and mounded the excavated soils into a new small island northeast of Piety Island. It was the National Guard's Innovative Readiness Training Request Program that funded this work in response to an application from the USFS. The program selects projects that have no other funding, meet the goals of the Army National Guard, and give back to the community.