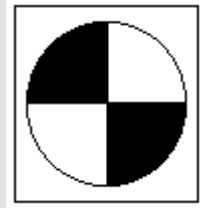


August 2004

Editor:
Roger Edwards

LAKE WISE

A Voice for Quiet Waters



The Oregon Lakes Association Newsletter

President's Perspective

by Lori Campbell

Plans are being finalized for the fall OLA conference. The program for this year's meeting is turning out to be an excellent one, with focus on lakes in the Cascades. Plan on attending this meeting in Bend on September 25th and learn about some of Oregon's high desert and mountain lakes. On Sunday take the opportunity to visit some of these lakes. Take a look at the meeting announcement in this issue for registration and reservation information.

One topic of interest included in this year's program is the US Forest Service monitoring program for *Anabaena*, an alga that can potentially produce toxic blooms. Monitoring for toxic algal blooms requires the development of a protocol to issue warnings, as toxic blooms become a health risk to lake users. Businesses that rely on lake users are negatively affected when lakes are "shut down" due to health risk. So, we have the classic case of the man who says, "I'm from the government and I'm here to help..." It's not an easy situation. Monitor for toxic algae, post warnings or close a lake when risk from toxins are present, and the local community suffers economically as lake use diminishes. Or, continue without monitoring, risk health issues for unaware lake users, and both users and then the community suffers. Which is the better situation?

There are benefits to developing and maintaining a monitoring program. The Oregon Lakes Association supports thoughtful monitoring of lakes for some important reasons. Baseline information provides a means to judge monitoring data by developing reference data for comparison, and offers insight on how problems develop. Also, implementing a monitoring plan sooner rather than later allows resource managers to better "catch" conditions before they get out of control, particularly important in the case of monitoring for potentially toxic algae. A good monitoring program will provide for better, informed management decisions. Often seen as the bearer of problems, the "man from the government" hopefully can be seen in a different perspective.

And finally, the Oregon Lakes Association has vacancies on its Board of Directors. Those interested in lakes and lake issues are invited to participate by becoming a Director. Contact one of the OLA directors during the meeting for more information.

Oregon Lakes Association Annual Meeting

by Joe Eilers

OLA is preparing for an exciting conference to be held this year in Bend. The conference will start on Saturday, September 25 at the Phoenix Inn in downtown Bend. The OLA Board of Directors will hold a business meeting open to all members on Friday evening, September 24 at the Phoenix Inn. The theme of this year's conference is "Crisis in the Cascades?" and will feature a number of talks on individual Cascades lakes and the growing concerns of *Anabaena* (a blue-green algae) blooms. Dr. David Stone from the Oregon Division of Health Services will provide a talk on the *Anabaena* and its capability for producing toxins. A number of lakes in the Cascades are currently under investigation and talks will be presented on research results for Crane Prairie Reservoir, Odell Lake, Lava Lake, Lake of the Woods, and Waldo Lake. Sherri Chambers from the Umpqua National Forest will provide an overview and update of Diamond Lake and the environmental impact process associated with the proposed action of removing the tui chub from the lake using rotenone. Space for posters of lake projects will be provided at the conference center.

Following the conference, participants will have the option of touring several of the study lakes in the Cascades on Sunday, September 26. Representatives from the research groups will be present at Lava (9 am – 11 am), Odell (10 am -12 pm), and Waldo (11 am – 2 pm) lakes with boats and equipment used in various research efforts. Participants will be able to look over the spectacular scenery, while at the same time learn more about these fascinating lakes.

A block of rooms are currently available at the Phoenix Inn (541-317-9292) at a special rate (mention OLA) and a list of great restaurants and pubs within walking distance of the conference site will be available with the registration packet. Attendees are urged to register early because of anticipated high demand associated with this year's topics and indications from the Forest Service of strong participation from their staff.

For further information regarding the conference contact Joe Eilers at 541-388-3500 or j_eilers@maxdepthaq.com.

Very Active OLA Membership

Readers, are you interested in expanding your horizons? Why not serve a term as an OLA Director? Doing so would surely make you more aware of Oregon lakes and you would work with other people who share this common interest. It is true that the OLA Board has to deal with other less interesting matters, but by helping out you would gain experience that is pertinent for any organization. It is a resume building experience. Terms are for two years and require you to call in, cost free, to a monthly teleconference. These meetings occur on the 3rd Tuesday of the month, beginning at noon and last an hour. Browse the meeting minutes posted on the website for a flavor of the discussions. Or join us at the open meeting Friday at the Conference. This session will begin at 7 PM at the Phoenix Inn. Hope to see you there.

Highest *Anabaena* Count in Oregon

The Oregon Department of Health and Safety reported counts of *Anabaena flos aquae* at 2 million algal cells per milliliter in samples from Lake Selmac, a 148 acre, multi-use impoundment build in 1961 on McMullin Creek, about 8 miles NE of Cave Junction. Park officials closed the popular lake on August 19th when test results were made known. The lake is owned and operated by Josephine County Parks and Recreation Department.

2004 Annual Meeting of the Oregon Lakes Association

Crisis in the Cascades?

Friday Sept. 24	Board of Directors Meeting (Open to all Members) Phoenix Inn 7:00 – 9:00 pm (<i>Agenda – L. Campbell</i>)
Saturday Sept. 25	Phoenix Inn
	8:00 – 8:45 am Registration -- coffee & rolls
	8:45 – 8:50 Welcome -- Lori Campbell, OLA President
	8:50–9:10 NALMS update --- Dr. Harry Gibbons, PNW NALMS
<i>Director</i>	
	9:10 -- 9:20 Introduction to Session 1 – Joseph Eilers, <i>MaxDepth Aquatics, Inc., Bend</i>
	9:20 – 9:50 Diamond Lake (Picking Your Poison) -- <i>Sherri Chambers, Umpqua National Forest, Diamond Lake EIS Coordinator</i>
	9:50 – 10:20 Crane Prairie Reservoir (A Fine Kettle of Fish) <i>Terry Shraeder, Fish Biologist, ODFW, Bend</i>
	10:20 – 10:40 Break -- refreshments (Posters)
	10:40 – 11:10 Anabaena in Lakes of the Deschutes National Forest; Results from 2004 – Paul Powers, Fish Biol., Deschutes National Forest, Crescent
	11:10 – 11:40 Cyanobacteria and Their Toxins – Dr. David Stone, <i>Toxicologist, Oregon Health Services</i>
	11:40 – 12:00 OLA Media Awards -- Lori Campbell
	12:00 – 1:30 Lunch (On Your Own)
	1:30 – 1:40 Introduction to Session 2 -- Dr. Mark Sytsma <i>Portland State University, Portland</i>
	1:40 – 2:20 Waldo Lake (Clearly the Best) -- Dr. Mark Sytsma
	2:20 – 2:50 Lake of the Woods -- Dr. Jesse Ford, Oregon State <i>University, Corvallis</i>
	2:50 – 3:00 Break -- refreshments (Posters)
	3:00 – 3:30 Odell & Lava Lakes (early study results) -- J. Eilers
	3:30 – 4:00 Lakes and Watershed Councils – to be named
	4:00 – 4:30 Lakes and the National Forests – Trish Carroll, <i>Watersheds Program, Region 6, USDA-Forest Service</i>
	4:30 – 4:40 Concluding Remarks -- Lori Campbell

Center for Lakes and Reservoirs

Waldo Lake Update

Waldo Lake is an ultraoligotrophic lake located in the Cascade Mountains of Oregon. The most striking feature of the lake is its' extraordinary clarity. Secchi disk transparency is often greater than 30 m! Low nutrients, short growing season, and relatively undisturbed shorelines keep productivity low, and make Waldo Lake a very unique and potentially fragile environment. Recent publications have indicated that water quality may be declining as a result of fish stocking, forest fire in the watershed, and increased recreational activities.

In 2003 we initiated a limnological study of Waldo Lake to understand physical, biological and chemical characteristics which influence ecological processes in the lake, with two main aspects: the first to provide in-depth understanding of the physical characteristics of the lake. This includes studying the hydrology of the lake in detail, bathymetric mapping, and characterization of temperature mixing events and light attenuation in the lake. The second being to understand some of the variations in the data collected as part of the long-term monitoring activities of the U.S. Forest Service. This involves studying the pattern of phytoplankton productivity over multiple days, the vertical migration activities of phytoplankton and zooplankton and the horizontal and vertical distribution of chlorophyll, as well as an assessment of how large-scale meteorological functions affect primary productivity. This information will be incorporated into a sophisticated model which will be utilized as a management tool and to fully understand dynamics of the lake ecosystem.

As of yet, the benthos of Waldo has not been studied in detail. Consisting primarily of liverworts and stromatolites, the benthic layer is extremely productive, thus a very important aspect of the lake ecosystem. Two studies will be initiated this summer, including bottom-type mapping using sonar, and (conducted by the University of Oregon) detailed studies of the taxonomic and chemical composition of cyanobacteria mats and their role in lake productivity and nutrient storage. This project is funded by the Willamette National Forest Service. For additional information contact **Laura Johnson** (503-725-3833)

Aquatic Plant Surveys

I have surveyed another 20 plus lakes in the Siuslaw National Forest south of Florence, OR. This year's work included small inter-dunal lakes as well as large, high use lakes such as Siltcoos and Tahkenitch. This year we had funding to do some water chemistry analyses to supplement the plant survey data. No results are back yet on those. The inter-dunal lakes tended to contain few aquatic plant species while the large lakes contained numerous species, both native and introduced. I also surveyed two lakes in the Mt. Hood National Forest - Timothy Lake and Lake Harriet. Neither had introduced aquatic plant species, however, Timothy Lake is at high risk for invasion due to its popularity with recreational boaters and its proximity to the already infested Columbia River. For more information contact **Dr. Mary Pfauth**, 503-725-3834

An Overview of Mercury Contamination

by Roger Edwards

The first Oregon advisory for mercury contaminated fish was issued in April of 1979 when the average concentration of all the fish tested from Cottage Grove Reservoir was greater than the acceptable threshold level of 0.35 ppm. As testing was extended to locations throughout the State and data accumulated for specific sites, additional advisories or updates have been posted. The warnings explain that fishing remains a wholesome pastime and that fish with elevated levels of mercury are still a good source of nutrition, but too many meals of fish resident in the listed waters can overload the body's ability to metabolize ingested mercury.

The advisories go on to give guidelines of the amount of fish that can safely be eaten from the listed waters. Predaceous or larger fish generally have higher mercury levels because they accumulate this contaminant over time. Migratory fish passing through the listed waters are not included in the advisories. The guidelines are different for children under 6 years old, women of childbearing age, and the general population because the risks are different for these classes of people. Young children are still growing and so are susceptible to long term debilitation by inadvertent mercury exposure. Pregnant and nursing mothers can pass mercury on to their infants so this segment of the population is also singled out for special care.

Mercury Advisories for Oregon						
LOCATION	DATE	AVG CONC (in ppm)	DIETARY RESTRICTIONS			COMMENTS
			KIDS <6	"MOMS"	GEN POP	
Cottage Grove Res	Apr-79					
Antelope Res	Dec-88					
Jordan Ck	Dec-88					
Cottage Grove Res	May-93	0.53	none	none	8 oz/wk	No fish for kids and moms
Owyhee Res	Feb-94	0.65-1.77	none	none	8 oz/2 mo	No fish for kids and moms
East L	Jul-96	>1.0	4 oz/10 wk	8 oz/6 wk	8 oz/10 d	eat no brown trout >16"
Owyhee R & Res	Nov-96	0.54	4 oz/6 wk	8 oz/3 wk	8 oz/5 d	from Three Forks to Owyhee Res
Willamette R	Feb-97	0.63	4 oz/7 wk	8 oz/mo	8 oz/wk	from Col. R to Cottage Grove Res
Dorena Res	Feb-97	0.37	4 oz/ 4 wk	8 oz/ 2 wk	8 oz/4 d	
Snake R/Brownlee Res	Apr-97	0.41	4 oz/mo	8 oz/2.5 wk	8 oz/5 d	from WA border to below Adrian
Plat I Res	Feb-00	0.48	4 oz/mo	8 oz/3 wk	8 oz/5 d	
Galesville Res	Feb-01	0.69	4 oz/7 wk	8 oz/mo	8 oz/wk	
Copper Creek Res	Feb-01	0.63	4 oz/7 wk	8 oz/mo	8 oz/wk	no threat to Sutherlin water users
Willamette R	Nov-01		4 oz/7 wk	8 oz/mo	8 oz/wk	advisory for Hg & PCB
Dorena Res	Apr-04	0.45	4 oz/2 mo	8 oz/mo	8 oz/2 wk	
Cottage Grove Res	Apr-04	0.58	none	none	8 oz/mo	No fish for kids and moms

How dangerous is mercury poisoning and what is it about this element that makes it such a concern? Mercury is a heavy, silver colored metal that is liquid at temperatures warmer than -39°C. It is listed as the 68th most abundant of all the chemical elements, but it can be detected in every living thing, even though it has no role in biological processes. The reason it is so widespread is its volatility. Anyone who has tried to move a puddle of mercury from one point to another can attest to the ease of breaking large globules into much smaller ones. Smaller spheres have a greater ratio of surface area to volume, so small bits of mercury have more available surface from which liquids can change into vapors. At 20°C, the pressure required to turn water from a liquid to a vapor is more than 10⁴ times than that needed to vaporize mercury. The volatility of mercury then is a combination of a very low vapor pressure, plus a capacity to maximize its surface area.

Elemental mercury in the air combines readily with other chemicals, especially chlorine compounds, and falls back to the earth in precipitation. Because of their relative weight, mercury compounds tend to find their way deep into soils or the sediments at the bottom of lakes and oceans. Deposition on land is less of a problem than in water because flowing water can move mercury downhill until it concentrates at a low point, like a lake bottom. Water supply sources, such as Copper Creek Reservoir, are not compromised by abnormal mercury levels because the problem manifests in the sediment and fish rather than the water. Anaerobic bacteria can transform inorganic mercury into an organic molecule, methyl mercury, which can enter into reactions with other organic compounds. Methyl mercury can thus be incorporated into growing plants and into the tissues of animals that eat these plants. In the food web it tends to accumulate in the tissues of high-level predators, such as bass, pike, swordfish, and tuna.

The seriousness of mercury exposure depends in part on the nature of the mercury compound. Mercury can exist in four states, the elemental metal, an inorganic mineral with either of two different valence states, and organomercury. The ingestion of liquid mercury or the compounds of univalent mercurous mercury cause few problems because these forms are poorly absorbed from the digestive tract. Inhaled mercury vapor however, readily enters the bloodstream in the lungs. Absorbed into the blood, it is distributed throughout the body and undergoes oxidation to the divalent, or mercuric state. When inhaled mercury vapors are transported to the brain they cause the classic symptoms of fatigue, memory loss, irritability, depression, and tremors. Mad hatters disease was caused by breathing mercury fumes generated in processing beaver and rabbit fur into hats. There are many other historical incidents where mercury vapors have caused serious health problems or death.

Most mercuric mercury compounds are water-soluble and so can react with body tissues. In high concentrations they cause corrosive ulceration, circulatory shutdown, and shock. At lower concentrations symptoms of headache, salivation, a metallic taste, vomiting, and diarrhea are commonly noted. About 15% of ingested mercuric compounds are absorbed from the gastrointestinal tract. The kidney is the organ of elimination for inorganic mercury compounds absorbed in the bloodstream, but has a limited capacity to deal with mercury wastes.

Fish advisories are issued to limit people's exposure to methyl mercury. This compound is readily absorbed during digestion. There are estimates that up to 95% of the methyl mercury consumed will bind with molecules involved in body functions. The most attractive sites are amino acids containing sulfur. Enzymes especially can be inactivated if too many of their component amino acids enter into these reactions. Symptoms of methyl mercury poisoning include apathy, difficulty walking, slurred speech, bizarre behavior, blindness, and coma. These symptoms can be irreversible and can lead to death. They are caused by disruption of the central nervous system. This focus may be due to the higher susceptibility of the enzymes in these tissues, or the inability of these tissues to quickly repair or regenerate. Repair mechanisms do exist and methyl mercury is excreted. It is also locked away in hair and nails. It is thought that the half-life for the elimination of organomercury from living tissues is two or three months. Chelation therapy can speed the removal process. Advisories try to limit exposure to avoid an overload of the contaminant and spread the duration of the exposure so the contaminant will not accumulate in the body.

The source of mercury contamination in the lakes affected is certainly diverse. Volcanic eruptions and geothermal venting are a significant source of mercury. The East Lake advisory is thought to be from such a source. Mining activity is another major source of mercury contamination. Weathering processes on the tailings of the Black Butte mercury mine led to the advisory on the Willamette River from its confluence with the Columbia back to the Coast Fork of the Willamette and Cottage Grove Reservoir. The advisories for the

Owyhee River and Antelope Reservoir may be due in part to the use of mercury to amalgamate gold and silver ores in placer mining there. Soil disruption and the weathering of natural deposits are also sources of mercury. Oregon's volcanic heritage has created many natural mercury deposits. Between 1882 and 1966, the Black Butte mine produced 18,156 flasks of mercury, each weighing 76 pounds, from the cinnabar deposits there. Cinnabar is sulfide of mercury, HgS. Roasting this mineral burns off the sulfur, allowing metallic mercury to be collected as a distillate. Mercury has been mined at 46 sites in Oregon although just five of these mines produced 90% of the mercury extracted. The Bonanza mine in Douglas County was the largest, producing 39,500 flasks between 1865 and 1960.

Mercury is used in paints, pesticides, plastics, perfumes, rubber, antiseptics, mirrors, batteries, electrical switches, dental fillings, fluorescent lights, thermometers, gauges, and industrial processes. The widespread use of mercury has made point sources of pollution out of wastewater treatment facilities and the smokestacks from boilers, crematoria, factories, incinerators, and power plants. The recognition of the problems mercury can cause has produced efforts to reduce exposures. State and Federal agencies have joined with manufacturers and other interested parties to minimize the use of the element. Your local pharmacy no longer sells mercury thermometers. Useful products that have not been able to devise substitutes for mercury components are now required to carry labels warning of its presence. Fuels have been analyzed for their mercury content. Sources of mercury emissions have been inventoried and strategies for reduction or elimination are under development. Recovery and recycling programs now in place collected over 300 pounds of mercury wastes from Oregon dental offices this past April. Contaminated sites have been prioritized for clean up. At the Bonanza mine 240 cubic yards of contaminated soils have been excavated and placed in the Arlington landfill this year.

Nationally, coal fired power plants are a major source of mercury that is then deposited over a wide area of surrounding land. Analyses of American coal shows that their mercury content varies from 70 to 33,000 ppb. The facility at Boardman is the only power plant in Oregon using coal, but there are 12 such plants that use natural gas. The DEQ estimates that they produce about 434 pounds of mercury a year. The EPA is in the middle of a 5 year study to analyze the tissues of predaceous and bottom feeding fish for 268 "persistent, bioaccumulative, and toxic chemicals", including mercury. The study has sampled about 10 lakes in Oregon, ranging from Columbia River reservoirs to unnamed gravel pits in the Willamette Valley. These sites are among 500 randomly selected locations nationwide and will provide a good picture of overall exposure risks and geographical variability. The existence of studies like these and the data they produce is reassuring because it shows that environmental problems are recognized and remedies are being formulated. It doesn't seem that long ago that sulphur emissions were a threat to our well-being.

OLA Testimony on Grass Carp

The Oregon Bass & Panfish Club has petitioned Oregon Department of Fish & Wildlife to allow fishing for grass carp in Devils Lake. They reasoned that reducing grass carp population there would allow some regrowth of aquatic vegetation and so improve bass habitat in the lake. OLA presented oral and written testimony opposing this proposal at an ODFW meeting in Gresham on August 6th. The OLA opinion focused on the need for integrated management planning rather than the merit of the proposal. Grass carp were placed in Devils Lake by the Devils Lake Water Improvement District to control excessive vegetation in the lake. The program has not been a complete success, but it would be counterproductive for ODFW to undermine the management policy of DLWID in this matter. OLA members Lori Campbell and Katherine McKenzie presented similar testimony as representatives of DLWID. The issue will be put to a vote of the ODFW Commission at a meeting in Salem on September 10th. The Commission has indicated their intention to reject the measure, but will hear additional testimony and an ODFW overview of the issue before their vote.

LAKE WISE
The Oregon Lakes Association
Newsletter 2004 #2

PO Box 345
Portland OR 97207-0345

E-mail: membership@oregonlakes.org
E-mail: events@oregonlakes.org

OLA Mission: The Oregon Lakes Association, a non-profit organization founded in 1988, promotes understanding, protection, and thoughtful management of lake and watershed ecosystems in Oregon. For additional information on OLA, to get involved, or to obtain a membership application write to: OLA, PO Box 345, Portland OR 97207-0345

We are also on the web! www.oregonlakes.org

NALMS NEWS

OLA is a state chapter of the North American Lake Management Society. NALMS is a valuable resource for anyone with an interest in lakes. They are holding their annual conference this year at the Empress Hotel in Victoria, British Columbia during the first week of November. This event is a good opportunity for Northwest residents to get acquainted with NALMS, visit Victoria, and even stay at the Empress. The theme of the conference is “Lakes: Habitat for Fish, Habitat for People”, a topic that certainly is pertinent for Oregon lakes and lake dwellers. The similarity of climate, natural history, and geomorphology between British Columbia and western Oregon makes this conference even more relevant. There are sessions and workshops from Tuesday, Nov 2 to Saturday Nov 6, including a reception at the Royal B.C. Museum, which houses splendid exhibits and publishes a series of field guides for Pacific NW flora and fauna. The exchange rate is about \$1.30 Canadian for each US dollar, making a room at the Empress cost \$110 US per night, plus tax. The passenger ferry from Port Angeles WA will virtually deliver you to the front door of the Empress, but beware the ferry will be running on winter schedule, and it is never a good idea to be late for the ferry. Be sure to take identification to document your US citizenship. For more details visit the NALMS website at www.nalms.org.

The theme of the summer 2004 issue of LakeLine, NALMS’ quarterly magazine, is lake recreation, part 1. Feature articles include a discussion of watercraft safety policies, an assessment methodology for conserving a variety of high quality and diverse water recreation opportunities, a description of a boater etiquette program, an approach to measure optimal boating densities on a lake, an explanation why diesel trucks are quieter than boats, and some thoughts on the relationship between phosphorus and chlorophyll measurements to lake trophic status.

Lake Appreciation Month

“I celebrated LAM at Little Crater L. Like its namesake, it is a bowl shaped lake but much smaller. It was also formed by an eruption, but from a ruptured artesian aquifer rather than a volcano. Its water is very clear and has a distinct blue color. More typical lake appreciation activities were enjoyed at nearby Timothy L.” R. Edwards

Oregon Lakes Association

ANNUAL CONFERENCE REGISTRATION FORM

September 24-26, 2004
Phoenix Inn (541) 317-9292
Bend, Oregon

Name: _____ Affiliation: _____

Address: _____ Phone: _____

_____ E-mail: _____

FEE & PAYMENT SCHEDULE

Friday business meeting open to all members no charge

Convenes at 7 PM at the Phoenix Inn

Saturday technical session, includes refreshments and OLA membership for 2005.

- Student: \$25
- Individual: \$35
- Family: \$45
- Public or Nonprofit: \$45
- Corporate or Business: \$75
- Sustaining \$100

Sunday activities

- Lava Lake visit (9-11 AM) no charge
- Odell Lake visit (10-12 AM) no charge
- Waldo Lake visit (11 AM- 2 PM) no charge

For planning purposes, early registration is encouraged. While you are always welcome, registrations made at the door will incur an added \$15 fee.

If you can't attend the Conference but wish to renew your OLA membership for 2005, select your membership category:

Student \$15 Individual \$25 Family, Public, or Non-Profit \$35 Corporate \$65
Sustaining \$100

Please make checks payable to: Oregon Lakes Association. Send payment and registration form to:

OLA, POB 345, Portland OR 97207-0345