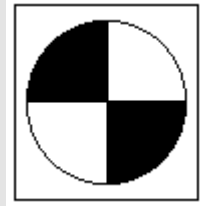


November  
2005

Editor:  
Roger Edwards

# LAKE WISE

**A Voice for Quiet Waters**



**The Oregon Lakes Association Newsletter**

## **OLA is Looking Ahead**

The Fall OLA Conference bears a similarity to harvest time, when the preparation and work of the previous months comes to fruition and the gathered bounty provides sustenance for the months ahead. It is a pleasant time to renew old acquaintances and to watch for new insights from the formal program. OLA has reaped a bountiful harvest from this year's Conference. The turnout and generous sponsorships of HACH and Electronic Data Solutions ensured the financial success of the meeting. There was enough interest in the list of Oregon Lakes, Reservoirs, Ponds, and Puddles to cover printing costs and a little more besides. The plan for a joint OLA/WALPA meeting next year has initiated a connection with the NALMS affiliate of our neighbor to the north. And three new Directors were selected to serve on the OLA Board.

For the coming year, OLA affairs will be conducted by President Mark Rosenkranz, Past President Lori Campbell, Treasurer Dave Gilbey, Secretary Roger Edwards, and Directors Jim Carpenter, Jesse Ford, Al Johnson, John Kelsey, and Toni Pennington. First term Directors Jesse Ford is with the Department of Fish and Wildlife at OSU; Al Johnson is a Limnologist with the USFS Middle Fork Ranger District; and Toni Pennington is a student at the Center for Lakes and Reservoirs. Joe Eilers and Mark Sytsma will continue to serve OLA by working with WALPA to set up the regional meeting.

As your favorite Oregon lake takes on its winter condition, there are still ways to serve your lacustrine interests at meetings where various aquatic topics will be discussed. The Oregon Marine Board has already begun describing its Clean Marina program and some other pertinent issues as well. The remaining dates for these meetings are:

- Nov 28, 0930-1230 at Port of St Helens, Invasive Species & Boating and Petrol at Marinas
- Nov 30, 0930-1230 at Portland Yacht Club, State Spill Response and Invasive Species & Boating
- Dec 2, 0930-1230 at Port of Astoria, Petrol at Marinas and Environmental Practices at Marinas

The US Army Corps of Engineers will celebrate the expedited completion of the Fern Ridge dam repair at a ribbon cutting on November 29<sup>th</sup> at 1300 at Orchard Point Park. The reservoir is now refilling.

The US EPA will host a discussion in Portland on January 25 about their "Salmon 2100 Project: The Future of Wild Pacific Salmon", where the steps required and the feasibility of those steps to perpetuate NW salmon runs will be considered.

OLA will have a display at the January 27<sup>th</sup> "Urban Ecology and Conservation Symposium", to be held in the Portland Convention Center. This is a meeting to foster communication and collaboration among interested agencies and parties in the Portland and Vancouver area.

And looking a little further ahead, the joint regional OLA/WAPLA meeting is now scheduled for September 13-15, 2006 at Portland State University.

## Highlights from OLA Conference

This year's OLA Conference in Eugene did not revolve around a central issue like the agenda in Bend did last year. Still, the day passed quickly with interesting presentations and the opportunity for the scattered members of OLA to get together and become better acquainted. The substantial rainstorm and resultant traffic problems south of Portland provided a ready topic for starting conversations.

Dave Stone, toxicologist with the Oregon Health Services was up early in the agenda to summarize the State experience with cyanobacteria this summer. Perhaps his most alarming news was the exposure and subsequent death of a dog at John Day. Licking algal cells from paws may have contributed to this death. Raising the threshold of cell counts for a recreational advisory did reduce the number of postings from the 13 issued last year. There was also better coordination between OHS and local agencies in regard to the advisories. This improved response was due to the discussions at the cyanobacteria meetings held last November and in May. The strategies developed at these sessions will be further reviewed at the coming meeting set for November 9<sup>th</sup>. Dr. Stone also reported on the proceedings of a North Carolina meeting he attended in September. He learned there that 41 states are monitoring for cyanobacteria blooms, and Oregon is one of 20 states that have issued advisories cautioning the public to avoid contact recreation in affected waters. Australia has published guidelines that justify advisories when cell counts exceed 50,000/mL or when microcystin levels are at 10 µg/L.

Lorie Rice, hydraulic engineer with USACE described the modification of the outlet tower at Cougar Reservoir that permits water to be released from a specified depth. The modification was required to overcome a disruption of salmon spawning due to the cold water coming from the reservoir, which delayed the fish moving upstream to preferred spawning beds. In its first year of use, the options now available with the modified tower seem to have restored more typical spawning runs. Patrick O'Brien, also with the USACE, described the effort to minimize erosion and sedimentation during construction of the tower modification. He concluded that it is possible to have some influence over outcomes with careful planning, balancing tradeoffs that can be conflicting, and adjusting to natural conditions of low probability. The decisions required in making plans of this sort benefit from understanding of the features and dynamics of the particular reservoir.

The value of understanding the watershed was also emphasized in the Eugene Water & Electric Board presentation about what changes might occur in the McKenzie Watershed under the effects of climate change. Mike McKann led this discussion when the scheduled speaker made the easy decision between going to the field on a first flush storm day or showing an old presentation to a new audience. By looking carefully at streamflows throughout the watershed, EWEB has come to understand that the McKenzie is spring fed and does not greatly fluctuate with local weather or even seasonally. Water will percolate into the headwaters region either as rain or melting snow, to reappear in the surface streams of the McKenzie in the range of 5-10 years. This dampening effect makes for a consistent flow that should see little change if warming temperatures reduce annual snow pack, so long as total precipitation stays constant.

Max Depth Aquatics consultant Joe Eilers reported his findings when he returned to Lincoln City after 10 years to repeat a paleolimnology study of Devils Lake. The better resolution now available produced an increased size estimate of the lake during the preliminary bathymetric phase of the work. Analyses of the new core samples showed an increase in sediment accumulation rate over that previously noted, a change in the diatom population to favor more planktonic species, and cyanobacteria concentrations that spiked in 1995 and remain

greater than those from older core sediments. The spike of cyanobacteria correlates with surface water monitoring results. These observations, as well as the increased concentrations of carbon and nitrogen found in the upper portions of the core samples, are attributed to the grass carp introduced in the lake in 1993 and the changes they have brought about.

In addition to their posters on curly leafed pondweed, *Elodea*, mitten crabs, and Waldo Lake, students from the Center for Lakes and Reservoirs made three presentations of on-going projects. Robyn Waldeck summarized the work of the Oregon Invasive Species Council to launch a statewide awareness campaign; Laura Johnson described her research on primary productivity in relation to light penetration in Waldo Lake; and Steve Wells outlined the reproductive cycle of curly leafed pondweed in Multnomah County's Blue Lake. Jim Graybill then gave a practical application of curly leafed pondweed research by recounting how volunteer efforts discovered, identified, and removed a new infestation of this invasive plant from Fairview Lake during a two-week period last Spring.

OLA President Mark Rosenkranz recounted the work this summer at Lake Oswego, where he serves as the Water Resource Manager, to reduce phosphorus cycling with alum applications. It was a major undertaking that roiled the waters almost as bad as the cyanobacteria blooms they were trying to prevent. Later measurements did show that phosphorus and chlorophyll concentrations did not reach levels seen last year and *Microcystis* counts also stayed below nuisance levels. This experience follows those reported in the Fall 2005 issue of *LakeLine*, which focuses on alum treatments.

Richard Lycan, PSU Professor and a co-author of the *Atlas of Oregon Lakes* addressed the interest in up-dating this text. The barriers that must be overcome for this project are deciding on a format, gathering the new data and photos, and finding the funding. OLA could be a great help in collecting ground level photos that show unique aspects of lakes. The Conference then adjourned with the pleasant thought about having a reason to visit a lake with a camera.

### **New Program for Marinas**

The activities occurring at marinas make them a crucial site within a watershed. They are gateways for the public to access recreational opportunities at key lakes and streams. The potential for pollution and environmental degradation is high at these facilities. The Oregon Marine Board is now introducing a program to recognize marina operators who minimize these threats by following best management practices in the conduct of their business. Starting this month and continuing into the coming year, the Clean Marina program will be described at meetings to be held throughout the State. A checklist of 80 items has been prepared covering the different aspects of marina operations. These items are partitioned into 19 legal requirements, 21 prescriptive practices, and 40 optional policies. All legal and prescriptive procedures must be followed, and enough of the optional policies must be employed so that marina operation conforms to 80% of all applicable items on the list for the Clean Marina certification to be awarded. Marinas meeting this standard can use the Clean Marina logo at their site and in their correspondence.

The program is described on the Marine Board web site, [www.boatoregon.com](http://www.boatoregon.com). OMB asks to be notified about intentions to attend their meetings so enough handouts will be available. While Clean Marina is a voluntary program, the emphasis it places on responsible conduct is a positive step in the management of Oregon's natural resources. By seeking a Clean Marina certification, marinas, boat basins, yacht clubs, and houseboat

communities can proclaim they have taken extra care to preserve the resource that attracts people to their location. Marinas that have made this effort are then credible sources of clean boating tips and aquatic nuisance species information. These are topics the Marine Board is also trying to make common knowledge among the boating public, and which are also discussed at the Clean Marina meetings. Enlisting the help of marinas to increase the awareness of these issues will certainly work to the benefit of all Oregonians.

### **Interest About Cyanobacteria Remains High**

An increasing audience gathered for the third meeting of the Cyanobacteria Task Force on November 9th. As in the previous meeting, the Oregon Division of Health Services hosted the session at Lane Community College. The meeting provided an opportunity to review the past summer's monitoring and advisories, and consider refinements for 2006. OLA and Klamath County were recognized for contributing to the travel costs of Dr. Ken Hudnell, neurotoxicologist with the EPA, who placed local efforts to deal with cyanobacteria blooms into perspective with a description of the federal approach to the problem.

There were 7 recreation and 1 drinking water advisories posted this year on 5 lakes. Daly Lake in Linn County was also posted based on a visible scum, but no press release was issued. The first closure occurred at Crane Prairie on June 24<sup>th</sup> and all advisories had been lifted by September 26<sup>th</sup>. The other lakes suffering this indignity were the east half of Odell Lake; Larrison Cove, Packard Arm, and Hills Creek Arm in Hills Creek Reservoir; and Goodman Creek Arm and the area upstream of Hampton boat ramp in Lookout Point Reservoir. High counts or a visible scum of either *Anabaena* or *Microcystis* species were the justification for the advisories. The drinking water advisory was for Tenmile Lake.

The DEQ Lab will continue to accept agency samples for both anatoxin-a and microcystin-LR again next year. Analyses will be conducted by either an ELISA or a mass spectrophotometry method. Because both of these procedures rely on specific standards that may not represent all the toxin variants present in a bloom, the results for either toxin does not measure the true toxicity of the sample. The values detected and reported are therefore at the lower range of the toxin concentrations that may have formed in affected lakes.

Discussions of sampling methodology still could not reach agreement on a standard procedure. Samples collected from the fouled beach provide the best estimate of risk for bathers but do not necessarily allow temporal comparisons, as is possible with scheduled samples from a fixed sample point. Discoloration would provide a good trigger to begin doing cell counts, but documenting these visual observations would allow later observers to better compare present and former conditions. The adoption of pre-printed sample forms would ensure uniformity in data collection. Samplers were cautioned not to freeze samples sent to contract labs, and to understand whether cell counts were reported as cells/mL or units/mL.

The standard advisory notice, informational bulletin, and press release all worked well. There was trouble actually placing the notice and bulletins on site due to the physical effort required, and the imagination needed to find a place for these materials. Placing and removing the advisory notices in quick response to the official decisions is especially burdensome. An official bulletin board is certainly better than stapling the advisory to a post or tree, but those bulletin boards are becoming crowded and each new addition reduces the attention paid to all the important messages there. It might be a signal of some success that scums of tree pollen did produce inquiries of water safety, but continued emphasis on increasing public awareness about cyanobacteria toxins may offer the best hope of avoiding poisonings. Monitoring all lakes is not possible so making information

available at accessible lakes and trailheads may be as good as can be done for now. It was agreed to meet again in the Spring and hear reports from committees assigned to investigate the edibility of fish from posted lakes, and to devise an education campaign beyond distribution of the informational bulletin.

Presentations from the Centers for Disease Control and the US Environmental Protection Agency described the national approach to cyanobacteria. As is set down in the Harmful Algal Bloom and Hypoxia Research and Control Act, both of these agencies are actively increasing their understanding about cyanobacteria and their toxins. The Conference in North Carolina last September was convened to assess the current knowledge about this emerging concern. Future work will produce a national research plan that ultimately will allow regulatory legislation to be fashioned. As specific research needs are identified, Congress can be expected to allocate funding for these projects and then look for where leverage will make this money go further. Perhaps the groundwork in place in Oregon will attract their attention.

### **OPTICAL DISSOLVED OXYGEN TECHNOLOGY**

*Submitted by Randy Glover, Electronic Data Solutions, [www.elecdata.com](http://www.elecdata.com)*

Dissolved Oxygen (DO) is one of the single most important parameters monitored when examining aquatic biology and related processes. Until recently the ability to accurately monitor dissolved oxygen levels over long periods of time was limited. Existing electrochemical sensors (Clark, Galvanic) require sample stirring and are functionally limited by the durability of their membrane and electrode, while galvanic diffusion types offer characteristically slow response. Recently, a breakthrough has been made with the use of luminescence and fluorescence for measuring DO. The new optical DO sensors provide superior performance to traditional DO sensing technology currently on the market.

The technology is not new. It was developed in the 1960's by the U.S. military for measuring the amount of oxygen in blood and other medical applications. The breakthrough that allowed the sensor to be practical for water quality applications was the advent of the LED (light emitting diodes), an inexpensive, blue light-emitting source that has very low power requirements.

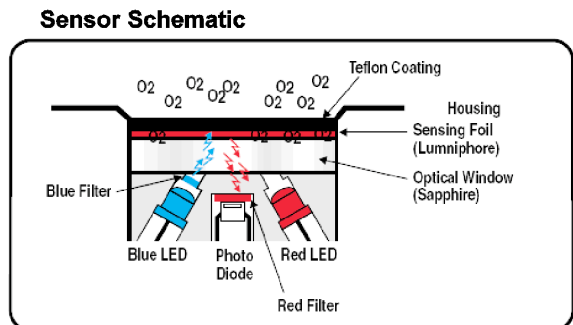
#### **Why Optical DO?**

- High Precision & Accuracy** – With an accuracy of +/- 0.1 mg/L or +/- 1% of the reading (whichever is greater), the optical DO sensor delivers twice the accuracy of conventional sensors
- No Membranes / No Electrolyte** – No electrochemical processes are involved
- No Stirring or Flow Necessary** – The sensor is solid-state with no moving parts
- Low Sensitivity to Fouling** – No residue from electrochemical processes
- Up to 1 Year between Calibrations** – Optical DO sensors are less costly, quicker and easier to calibrate than electrochemical when infrequent calibrations are required
- Fast Response & Stabilization Time** – less than 16 seconds
- Fewer Site Visits** – the length of deployment is not limited by maintenance or calibration needs
- Low Drift** – the result of the optical sensor's phase domain signal frequency

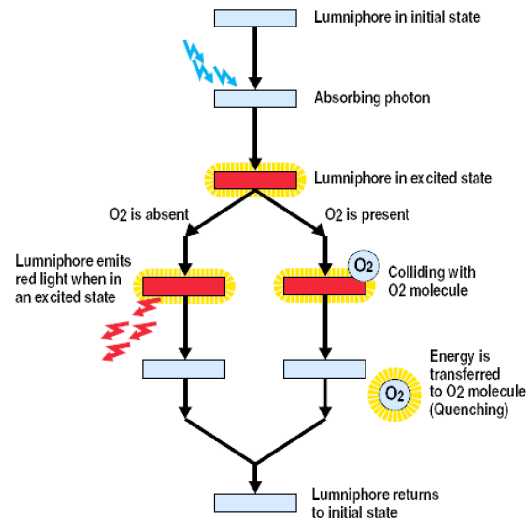
#### **Optical DO Theory**

The sensing element (lumiphore) is activated, or excited when illuminated with a blue light. When activated, the sensor emits red light in an intensity that is inversely proportional to the amount of oxygen present in the water.

If an oxygen molecule is present, that oxygen molecule will absorb the energy from the lumiphore and prevent the luminescent signal from emitting. There is also a time delay between the peak emission of blue light and peak response of fluoresced red light. The amount of delay is also inversely proportional to the amount of oxygen present. This time delay can be expressed as a phase shift between the wave patterns of incident blue light and the fluoresced red light. The red LED, when activated, is a reference used to gauge sensor foil response.



Optical DO Measurements are based on selected substances that can act as dynamic fluorescence quenchers. For example for oxygen, if a ruthenium-complex is illuminated with a blue LED it is excited and emits back a red luminescent light with an intensity, or lifetime, which directly depends on the oxygen concentration. Lifetime based measurements are superior for both long-term (no drift) and fast response applications.



The benefits of the OPTICAL DO sensor can be summarized as follows:

**Optical DO does not consume oxygen** – and therefore is not flow dependent, eliminating the need for a stirrer or a circulator.

**Optical DO has no membranes or electrolytes to replace; no electrodes to clean** – costs associated with supplies and time spent performing maintenance are eliminated.

**Optical DO will read accurately in anoxic waters** – the technology is ideally suited to measuring in oxygen-depleted waters, below 2 ppm, and in other harsh environments.

**Optical DO does not lose calibration with rapid changes in temperature** – phase domain technology minimizes drift.

**Optical DO allows for longer, unattended deployments** – Infrequent calibrations and resistance to fouling results in extended deployments of months for optical DO sensors instead of weeks or days with electrochemical sensors.

## Welcome to Cygnet Enterprises, Inc.

Cygnet Enterprises, Inc. has been an OLA corporate member since 2004. After some coaxing, they agreed to accept the offer to highlight their products and services for Lake Wise readers. Jill Winfield is their consultant for the Northwest, and she is knowledgeable about the status of the *Headwaters vs Talent Irrigation District* lawsuit, in which the US 9<sup>th</sup> Circuit Court of Appeals ruled an NPDES permit is required for the application of aquatic herbicides.

**LAKE WISE**  
**The Oregon Lakes Association**  
**Newsletter 2005 #4**

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**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, 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](http://www.oregonlakes.org)**

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### **Attention Riparian Land Managers:**

The Oregon State University Extension Service has produced a surprisingly interesting DVD on rural land management. It is titled, *Landmarks in Conservation* and essentially deals with how farmers, ranchers, and woodland managers throughout Oregon have benefited by taking better care of their lands. While the observations made in the video do not pertain to typical lake issues, many of the recommended practices do address water quality enhancements for upland watersheds. OLA members involved in watershed councils might then be the most appreciative of this resource.

The format of the DVD focuses on six geographical regions of the State. There are visits with three or four family farmers within each region and each farm describes three improvements they have made to their land use practices. Typically, these are simple projects that produced observable results. For example, installing fencing to keep cattle out of a creek, but providing drinking water with a diversion to a series of troughs. The fence allows a defined riparian zone to be re-established, and the flow of water through the troughs keeps it fresh and unfrozen before it is returned to the creek. When viewed in its entirety, the DVD shows 57 ideas to improve a variety of rural property concerns, such as rangeland, irrigation, stream crossings, woodlands, pest management, grazing, manure, crop selection, and wetlands. Admittedly, this would not appeal to everyone but it can be compelling for those who can identify with some of these situations. The DVD also provides a direct internet link to resources that can help customize a solution to a specific problem. These resources can also be accessed independently of the DVD at <http://extension.oregonstate.edu/landmarksdvd/>. The DVD is available from the Extension Service for \$19.95 + shipping. It could be a useful tool for watershed councils or lake associations seeking upstream remedial actions.