



**Devils Lake Water Improvement District**  
Post Office Box 974, 820 SE Hwy 101 Suite D, Lincoln City, Oregon 97367  
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[www.DLWID.org](http://www.DLWID.org)

**Quick Look:**

- **Vegetation Management Strategies**
- **Audit**
- **NALMS and OLA Summaries**
- **Communications Update**

**AGENDA 2012 January 5**

Regular Meeting: 6 pm, Lincoln City, Council Chambers  
801 SW Hwy 101, 3<sup>rd</sup> Floor

- I. Consent Agenda** 6pm
- a. Minutes of the Previous Meetings
  - b. Financial Report
- II. Public Comment** (Please limit comments to 5 minutes per person or as outlined by Chair)
- III. Unfinished Business** (Agenda Support Item A)
- a. The Devils Lake Plan
    - i. Septic Tank Revitalization Program (Seth Lenaerts)
    - ii. Save our Shoreline Campaign (Seth Lenaerts)
    - iii. Vegetation Management
    - iv. Sewer (Brian Green)
  - b. Erosion Study
  - c. Communications Report
  - d. Safety Report
  - e. Audit
  - f. Internship
- IV. New Business** (Agenda Support Item B)
- a. Cyano-Watch Program
  - b. NALMS 2011 Summary
  - c. OLA 2011 Summary
  - d. Digital Camera (Seth Lenaerts)
- V. Non-agenda Items**
- VI. Public Comment**
- VII. Board Comments & Announcements**
- VIII. Adjournment**

Meetings of DLWID are handicapped accessible under the ADA.  
If special accommodations are needed, please contact the District Office at (541) 994-5330 prior to the meeting.

**Unfinished Business**

**a. The Devils Lake Plan**

i. **Septic Tank Revitalization Program** (Seth Lenaerts) As requested by the City, a memo was prepared that compared the way that several states and counties manage septic systems. The analysis included the mandatory septic inspection programs of, Arizona (on time of sale), Washington, and Wisconsin. It also includes discussion on the local inspection ordinances of Queen Anne’s County, Maryland, and Trinidad, California. The driver of these regulations in every case was the same as we see here, a focus on protecting public water bodies.

A second task that the City has asked the District to help out with is coming up with inspection criteria. I looked at several different inspection forms around the country and have found a couple of very comprehensive forms, which will be a good starting point for any discussion on what should be included in an inspection.

**Septic database update:** A request was made to the county for an updated list of properties that have been issued a permit related to their onsite wastewater management system. They should be submitting that list to us soon. At that point, if necessary, I can make updates to the database for systems in the Devils Lake watershed.

ii. **Save our Shoreline Campaign** (Seth Lenaerts) It is still possible for the District to join the Northwest Oregon Restoration Partnership. As discussed in previous meetings, the partnership consists of watershed councils, soil and water conservation districts, state agencies, land conservancies and others. The basic goal of the group is to gather plant seed that is native to the Oregon coast and Northwest Oregon. The partnership then propagates and grows the plants until they can be distributed among the members of the group.

**Staff Recommendation: Join the Oregon Northwest Restoration Partnership.**

**East Devils Lake State Park Recreation Area:** Spiro Landscapes and Jon Thompson Construction recently submitted their invoices for the EDLSRA project. Below is a summary of costs related to that project.

**Summary of Costs: EDLSRA**

<b>Expenditure</b>	<b>Cost</b>
Plastic covering	\$100.00
Pavers	
Site preparation	\$4,500.00
Site/ design/ consultation/ labor/ plant delivery	\$1,971.00
Plant materials	\$2,991.00
Permits	\$200.00
<b>Total</b>	<b>\$9,762.00</b>

iii. **Vegetation Management:** We have developed a contract with Max Depth Aquatics, which they agreed to, and were to have sent a signed copy in the mail. Since then and prior to this we have been busily gathering data and information to share with them. A number of paper documents that we

received from ODFW in our records request have been digitized and additional information is being requested as I have further scrutinized their submission. It would seem that there are a few missing sets of minutes or staff reports relative to the Grass Carp rule changes and/or variances. In addition a database containing ODFW's full record of grass carp stocking is being completed by the Department based on our request. We should have a copy of this by the end of January. I have also been reviewing the Grass Carp Strategic Plan which would call for us to be working on obtaining an engineer's topographical survey of the watershed as part of our application. I am going to be working on this over the next months.

iv. **Sewer** (Brian Green)

b. **Erosion Study:** From staff's review the document was largely incomplete as received originally. I have developed a comprehensive checklist and summary of the products rendered and those withstanding, and have provided that to Tetra Tech. One aspect of the study I know they have been working on is the georectifying of the aerials. We have established our February 2<sup>nd</sup>, 2012 meeting as an end point for the project and thus I will continue to work with the contractors through January on the final products.

c. **Communications Report:** (Seth Lenaerts & Paul Robertson) Our December meeting has been airing on Channel 4 each day since it broadcasted live. The televised broadcasts have certainly caught the attention of the general public. The number of people randomly coming up to me and board members is certainly on the rise as people are recognized from the airing of the broadcasts. A link to the Channel 4 guide is available on our website or is available here: <http://www.lincolncity.org/resources/channel-4-program-schedule.html>



Audio from the meetings are also now available. People can visit our Meetings Page and click on the blue audio icon to stream the meeting directly to their computer or smart phone.

Thanks to Seth, the winter E-Newsletter was developed and sent out. Included were articles on King Tides, our winter intern, the SOS program, Holiday Fun and more. An excerpt is posted here. A full copy can be downloaded here. <http://conta.cc/sLdZ00>

Lastly our social media presence continues to grow. Posts regarding news coverage we received, projects in the watershed and interesting lake matters can be found on our Facebook page:

<http://www.facebook.com/DevilsLake.Oregon> We also have enabled some simplified tweets via our listserv and mobile device entry.



44 followers



68 likes



Winter 2011

**Dear Lake Manager,**

[King Tides](#)

Happy Holidays!

[Winter Intern](#)

In the midst of this Holiday Season, one thing we are thankful for is another beautiful day here in Lincoln City. This winter has certainly been a mild one filled with plenty of sun and little rain. In fact, since September we have only had about 23 inches of rain, compared to 43 last year!

[Meeting Venue](#)

[Holiday Fun](#)

The seas have been much calmer too. This is the first year in awhile that the D River has not been backed up due to large surf events that push sand into Devils Lake and the river bed.

[Save our Shoreline](#)

[DLWID on Facebook](#)

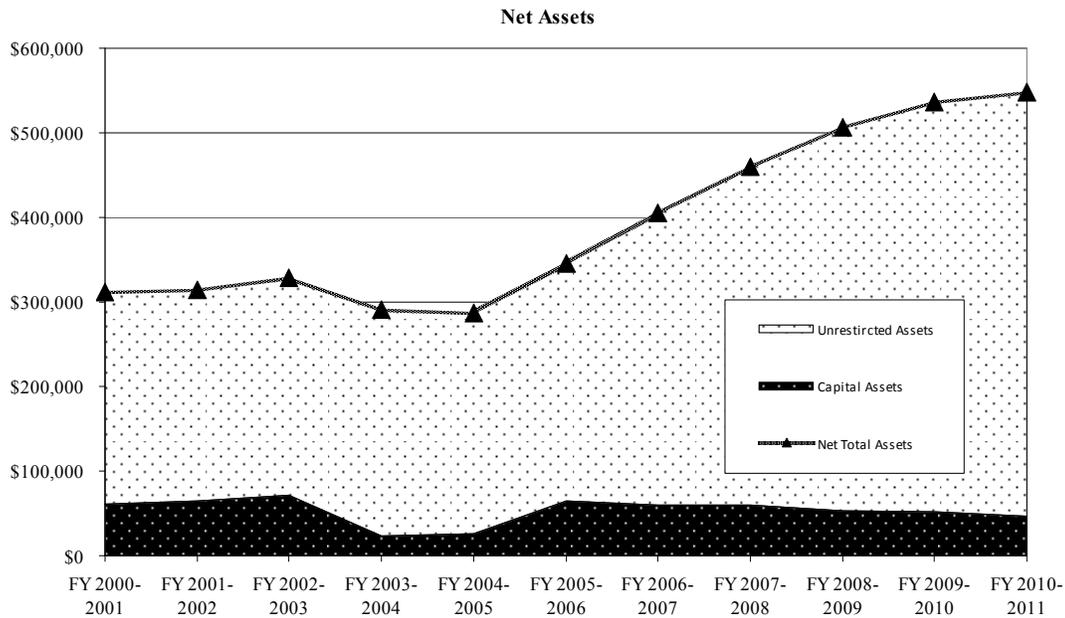


Tide is? No worries, we have included an article

Of course, winter has only just begun and indeed the 10 day forecast has several rainy days projected. Although, that could change, what will not change is the return of King Tides. Not sure what a King

d. **Safety Report:** Safety is no accident! No incidents.

e. **Audit:** The independent account has completed their review of the District's finances. A copy can be found on our website, and has been sent to the Secretary of State's Division of Audits. While as part of our new contract for a review, (verses an audit), the accountant will not be presenting the report during our meeting, however upon review it is clear that the District did again receive a good report, with no issues of material concern identified. The report includes the District's seven page Management Discussion and Analysis, which graphically shows the District's net assets growing for the sixth consecutive year. This has been done with the continuation of Project Manager Position and increased offerings from the District.



f. **Internship:** David Philips, a Bachelor Degree program candidate at Oregon State University has been interning with the District since December 12, 2011. His internship is for 90 hours which at this time he has fulfilled just over half of the hours at this point. His workload has surrounded around developing more detailed assessments of some vegetation management strategies. I have asked him to present his findings to you with a PowerPoint presentation.

- a) **Cyano-Watch:** In November the District ask to have a staffing estimate available relative to potentially changing the Cyano-Watch program language to be inline with Oregon's Harmful Algal Bloom Surveillance Program. Like the Oregon HABS program the Cyano-Watch program has evolved significantly over the years. This latest potential iteration deals with the updating the signage and messaging the District uses to describe the program specifically focusing on words like Harmful Algal Bloom Surveillance and Blue-Green Algae over the title of Cyano-Watch and names like cyanobacteria.

While it is not likely that the Oregon HABS program will change significantly again this year from a language perspective, a Stakeholders meeting is being held by the Oregon Health Authority on March 7<sup>th</sup>. I plan on attending this meeting which should provide some clarifications as to what is next for the state. It may thus make sense to hold off on making any decision, other than to seek to align our program with the states, as it too may change somewhat for 2012.

Currently, we have a number of GREEN permanent signs (eight) in the watershed which would have to be redesigned and reprinted. These were new signs made last year at a printing cost of about \$35.00 per sign. Depending on the language research, redesign would be fairly simple figure a few hours. Add in another few hours to coordinate with the printers (there are two businesses involved in the production of these signs), getting them the corrected images, then picking up the decals, transferring them to the sign business, etc., will be another couple of hours. Lastly, having the Lake Contractor switch out the old for the new will be another couple of hours. The other postings (YELLOW and RED and a banner used to publish information with the News Guard) would also have to be changed, but that would only require a redesign which should also be few hours at most. For all these postings combined figure \$280 plus approximately 8 hours of the Lake Manager time and 2 hours of Lake Contractor time.

The website poses an additional requirement and upgrade. We have a number of images, PDF downloads, etc. that would all have to be modified. This includes a poster for Pet owners and veterinarians which will have to be redesigned and reposted, along with all the changes to the GREEN, YELLOW, and RED signs modified above which will need uploading and linking. Once modified, other images will also have to be generated and uploaded as well. Lastly there are a number of changes on other sites that are worth linking directly to. For instance a publication from the Oregon Health Authority is now available about fish consumption. Website work tends to be tedious and takes a lot longer than what it might seem it should. Overall we are looking probably at least 10 hours or so to complete this overhaul, probably more like 20 hours.

The District also has a couple of brochures that will need to be updated as well as information on its mobile displays. With the state agency changing its name and having new contact details and logos, so on these changes are required regardless. Other changes relative to the language are discretionary and would be done if so desired. Estimate 4 hours plus additional printing costs for brochures (.65cents - \$1.00 /copy), 4 hours to change the display.

The other item of consideration will be the Sampling and Analysis Plans (SAPs) and Quality Assurance Project Plan (QAPP) which reference the postings we have and the specific language in them. While the protocol within the plans need may not need to have significant language changes made to it per se, the sections with the actual public communications methodology will have to be audited and language adjusted accordingly. This will include the merging of the new GREEN, YELLOW and RED signs into the documents. All of these changes need to be incorporated into new copies of the SAPs and QAPP. These will have to be distributed to DEQ and Oregon Health Authority as well as republished to our website and reprinted internally. Overall, estimate 20 hours.

Total: 56 hours Lake Manager; 2 Lake Contractor; approximately \$350 - \$400

b) **NALMS 2011:** The North American Lake Management Society's 2011 conference was held in Spokane, Washington this year. Highlights from the event included:

**Dr. John Stockner, Eco-Logic Ltd & University of British Columbia Fisheries Centre: Holistic or 'ecological' lake management:** Demonstration of the importance of salmon in BC streams as a source of phosphorus for primary production. Evidence given about the scarcity of phosphorus globally being on par with the idea of Peak Oil. Case Study of phosphorus recycling in WWTP by precipitating Struvite. Confirmation of the requirement of providing a balance nutrient ration to decrease the explosion of nitrogen fixing cyanobacteria.

**Stanley Miller, LID as a Lake Management Tool:** Providing rationale for Low Impact Development providing evidence of stream/lake degradation at 10% development of the landscape. Provided suitable strategies to limit footprint including the use of French Drains, Rain Gardens and Bio Infiltration providing the limits of each from Phosphorus saturation perspective of 30 days, 2-3 year, and indefinitely provided the plants are harvested, respectively. Suggests 1200 ft<sup>2</sup> per acre of asphalt.

**Nancy Turyk, Integrating build-out scenarios with lake and river response models to guide management decisions:** Demonstration of the significant modeling evidence for disconnecting stormwater systems. Computer model (Nutrient Budget) demonstrates the percentage occurrence of Harmful Algal Blooms (HABS) based on simulations of disconnecting more and more of a stormwater system.

**Jennifer Winter Blooms of cyanobacteria reported in Ontario, Canada from 1994 to 2010:** Concise representation of numerous lakes in Ontario experiencing algal blooms. Many blooms being seen later and later in the season with a growing tendency to being dominated by cyanobacteria. Key to Devils Lake was the report of Gloeotrichia (species which dominates early in the season) gets its phosphorus from the sediment, while other species (Anabaena) for instance are able to absorb nutrients from the water column. This is likely the reason blooms can switch in dominance or why the late fall/early winter blooms currently in the lake is dominated by Anabaena. Generally issues associated with increased blooms include climate warming & land development.

**Phillip Cerner, Historical Perspective of the Coeur d'Alene Tribes Management of Coeur d'Alene Lake.** Passionate presentation and outline of the politics involved in "restoring" the Spokane River and Lake Coeur d'Alene. EPA required that the polluters only clean up the limited footprint where the pollution started. The Tribe ended up suing the corporation responsible for the mercury pollution that covers the river and lake which lie downstream. BLM and Dept of Ag joined the suit which was eventually successful. Local developers objected to the lake being ruled a Superfund site as it would have decrease property values, even though the lead levels in the waterbody and those in the blood of those contaminated would have demanded it. Metal pollution lies in place with the goal of long-term improvements to water quality which will keep oxygen level high enough at the sediment to keep the metals in place as a precipitate.

**Kenneth Wagner, Stocking the tool box: Understanding lesser known options.** Study of sonication and bacterial additives as a means for cyanobacteria degradation. Dr. Wagner is a former NALMS President and widely respected (particularly for his hockey skills apparently). Take home message is that even though some of the vendors fail to produce peer reviewed science defending their products many can and do have applications in the real world that can work. Teasing out the mechanism is where the difficulty lies which is the challenge with dealing with proprietary materials.

**Joan Hardy, Efforts to Screen Microcystins in Fish from Western Washington Lakes with Toxic Cyanobacteria Blooms.** Comparison of ELISA Kits Abraxis vs. Envirologic. We use the Abraxis Kits which were shown to over estimate the toxins in Fish tissue likely due to some interferences that provide false positives. This is not known to be a concern on water samples however which is what we use the kits for.

**Joan Hardy, Evaluating Toxic Cyanobacteria in Washington State:** Summary of the water quality limits in Washington as well as the toxin producers. Gloeotrichia confirmed to be a producer of Microcystin. Listing of the state's three-tier approach to signage: Caution, Warning, and Danger. From Abstract: Microcystins were observed above the guidance value in 18 lakes in 2008, 19 lakes in 2009, and 14 lakes in 2010 (maximum = 18,700 µg/L). During the same period, anatoxin-a was observed above the guidance value in 8 lakes in 2008, 4 lakes in 2009, and 5 lakes in 2010 (maximum 172,640 µg/L). Cylindrospermopsin (maximum = 0.106 µg/L) and saxitoxin (maximum = 193 µg/L) have each been observed in two Washington lakes. As part of a cooperative agreement with Centers for Disease Control and Prevention entitled "Harmful Algae Bloom-related Illness and Surveillance System" (HABISS), a third season of monitoring 30 Puget Sound lowland lakes for the four cyanotoxins began in June 2011. Outreach efforts in 2011 regarding dangers of exposure to toxic blooms are focused on animal owners and veterinarians.

**Marisa Burghdoff Rapid Detection and Public Notification of Toxic Cyanobacterial Blooms at Three Lakes in Snohomish County, Washington.** Comparison of testing techniques and toxin levels. Even with sophisticated monitoring tools such as chlorophyll a, and phycocyanin detectors, no environmental factors were identified that could improve the ability to predict future bloom occurrences or toxin production. Cyanobacteria are awash with unpredictability.

**Thomas Woolf, Aquatics in Idaho: Survey, treatment and prevention:** Comprehensive presentation of the aquatic species program. 800,000 generated through the inspection program. 15 stations around the state which are mandatory. Must have passport stamped to pass. 2011 had 47,000 inspections with 24 cases of mussels found and 107 with milfoil. Treatment in lakes is largely chemical. Educational information shared through utility bills

**Allen Pleus New Zealand Mudsnails in Washington.** Treatment program for invader also in Devils Lake. Freeze, salt. Very difficult to remove/kill.

**Meg Modley, Asian clam (*Corbicula fluminea*) Rapid Response efforts in Lake George, NY**  
Treatment program for invader also in Devils Lake. 800 Benthic barriers. \$500,000 thus far in costs.  
[www.stoptheasianclam.info](http://www.stoptheasianclam.info)

**Lance Lumbard, A TMDL-Weighted Approach to Evaluating Project Efficacy.** Statistical approach to determine the cost benefit of improvements as required by TMDLs. Provides good evidence for doing nutrient budget.

**Mark Doneux, Como Lake: An Urban Lake TMDL Implementation Success Story.** Minnesota urban area revitalized using under the street infiltration trenches and Rain Gardens for stormwater. Cost was significantly less than other solutions and was able to meet TMDL targets set by EPA. Capitolregionwd.org 651-644-8888

**Josh Wozniak, Milfoil Eradication by Hand Pulling in Walsh Lake, Washington.** 7 year study seeking to full eradicate milfoil. Year 1 – 580# (pounds of milfoil in two days) , Year 2- 91#, Year 3 -55#, Year 4 – 0.2 #, Year 5 – 1.1 #, Year 6 – 28# (bottom barrier added to part of the area), Year 7 0.5#. Cost is about \$2500/day. In Year 7 was \$10,000.

**James Gawel, Developing a data-intensive nutrient budget for Wapato Lake, Tacoma, Washington, with an eye towards future management.** Exactly what the title says. A lot of data collected and processed into a high level nutrient budget dealing with a lake that has had numerous attempts of a multitude of treatment technologies. including two alum treatments, 1984 and 2008. Model was successful in predicting the bloom conditions that occurred in the subsequent year, providing good evidence or cause for conducting a nutrient budget on the scale that they were able to in order to determine the best and most cost effective means of restoration.

c) **OLA 2011:** The Oregon Lakes Management Association held its annual meeting at Portland State University this year. DLWID and its manager at the time Dell Isham are founding members of this organization. Other DLWID managers have also served including past president Lori Campbell. I currently serve on the board of directors, and am the webmaster for the association. Highlights Included:

**Mark Sytsma, Center for Lakes and Reservoirs, PSU, Offerings and Current Projects at CLR:** A vital component to the Oregon Lakes Association, CLR at PSU has conducted a myriad of reports many of which bear reviewing. Particular to Devils Lake would be their Quagg Mussels study based on Calcium concentrations, the Aquatic Weed program in its 16<sup>th</sup> year, and the courses taught on CE QUAL –W2 by Scott Wells. This is the modeling software which we have discussed potentially doing a nutrient budget with, but in conjunction with SWAT, which enable land use load allocations. Dr. Sytsma and the Center for Lakes and Reservoirs has expressed a strong interest in exploring a research station on Devils Lake in the past in conjunction with The CAFE.

**Mark Rosenkranz, Lake Oswego Corporation, Six Years of Alum Use on Oswego Lake: Lessons learned during our phosphorus reduction efforts:** Combination of sediment caps and ongoing injections used to reduce the occurrence of cyanobacteria on the lake. Current usage is between 60,000 and 80,000 gallons at approximately \$1.00 per gallon for the product. Other costs include labor and machinery.

**Elaine Stewart, Metro Regional Government, Blue Lake (East Multnomah County) Management Partnerships:** Eutrophic lake with long history of copper sulphate use to reduce cyanobacteria (40 years). Currently using 4 SolarBees to combat the water quality issues. Pre SolarBees, Blue Lake violated the pH criteria of 8.5 100% of the time, in 2011 they had no exceedences. Cyanobacteria counts reduced with a change in primary species. 2009 –Microcystis = 9,000,000 cells/ml; 2010 Anabaena = 1,500,000 cells/ml; 2011 Anaphanizomeom = 280,000 cell/ml. Metro has said they are committed to continuing the study and lake management strategy, although they are no the only partners.

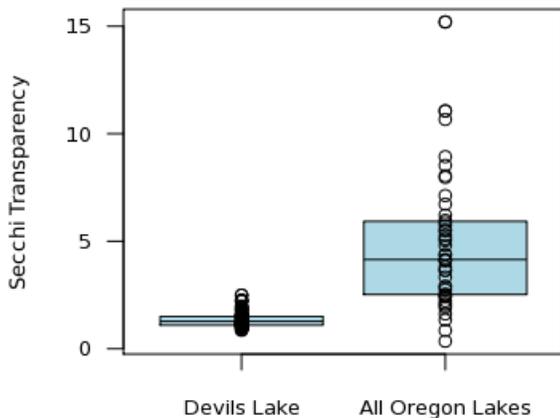
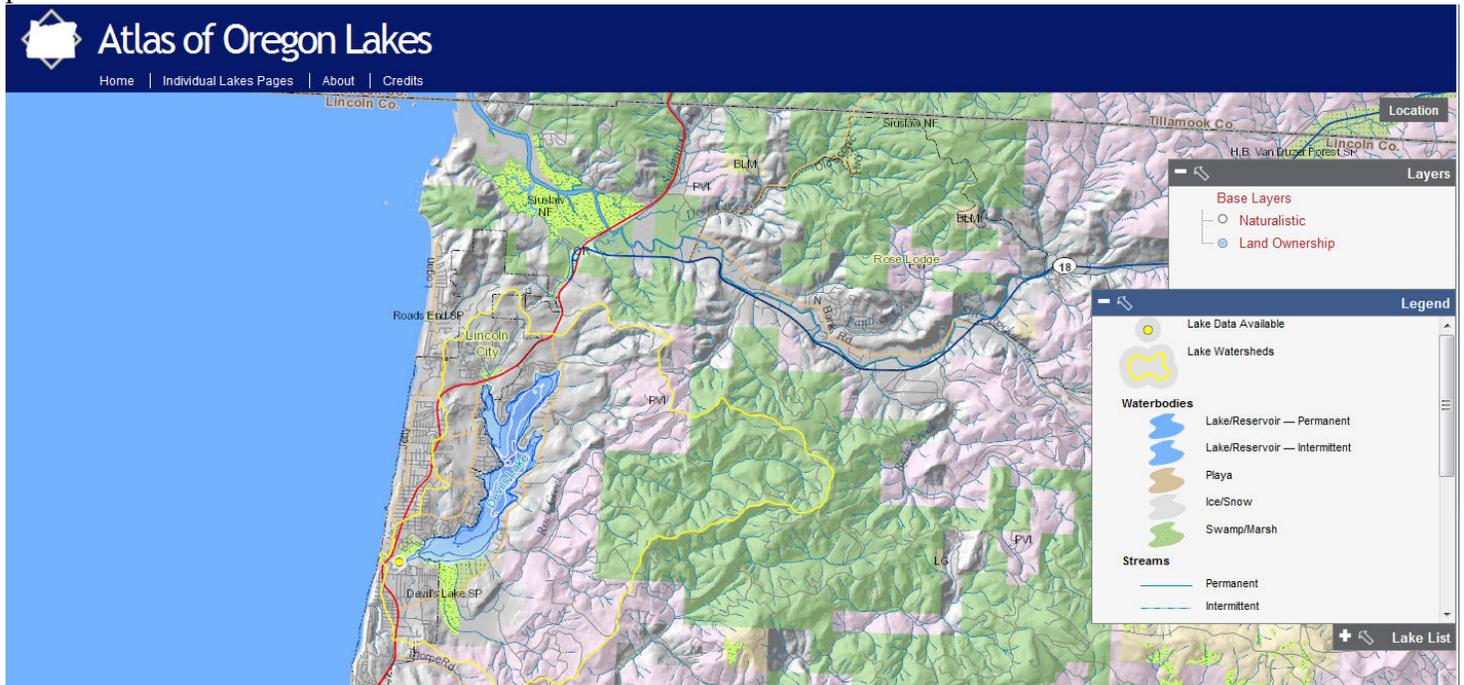
**Wayne Carmichael, Prof. Emeritus, Wright State University, Management and risk guidelines for cyanobacteria harmful algae blooms and their toxins: Historical perspective and future recommendations.** World authority on Cyanobacteria now again living in Oregon and serving on the OLA board. Concise thumb sketch of the development of the science around cyanobacteria ahead of the panel discussion. Just lucky to be in the same room as Dr. Carmichael!

### **Panel Discussion – Harmful Algal Bloom Surveillance and Response in Oregon: What's New and What's Next?**

- **Dan Turner, Oregon Dept. Environmental Quality** --- Laid out the HABS Strategy from DEQ prespective. Surveillance, Standards and Water Quality monitoring. Issues worthy of study mentioned directly in connection with Devils Lake were nutrient loading and fish interactions. DEQ plays a role in TMDLS and WQ planning. Mentioned the Septic Inspections for the Coastal Zone coming forth at Time of sale.
- **Curtis Cude, Oregon Health Authority HABS Program** --- Permanent signs developed similar to Beach Monitoring Program. Can be set as No Advisory or Health Advisory. Currently state is in year 4 of 5 years of funding. No money anticipated after that, so they are bolstering the efforts to get local authorities able to conduct water quality monitoring.
- **Trish Carroll, U.S. Forest Service** --- Spending about \$45,000 annula monitoring 6 lakes. Use signage based on Washington State. CAUTION, toxic algae may be present. Currently partnering with DEQ. Like to explore remote sensing opportunities.
- **Caroline Gross-Regan, Douglas County** ---- Third dog death this year. Anatoxin confirmed in one or more cases. Post Health Advisory.

- **Ismael Caballero, U.S. Army Corps of Engineers** --- Federal perspective presented as USACE is department of the military. They have standard methods for posting and lifting advisories. Signages are bilingual – Spanish and English. No Swimming Icon used as well as triangular to diamond shaped permanent signs developed by or similar to OHA. Cyanobacteria impacts are monitoring expense and losses of tourism revenues.

**Dr. Dick Lycan and Rich Miller:** Unscheduled demonstration of the Atlas of Oregon Lakes. Very impressive. Can use an interactive map similar to the District’s own GIS system. Rivers, urban areas, watershed, etc are provided.



Atlas also has the beginning of water quality data and may become a repository of DEQ’s data on lakes. Currently a Secchi Depth comparison is available to compare lakes.

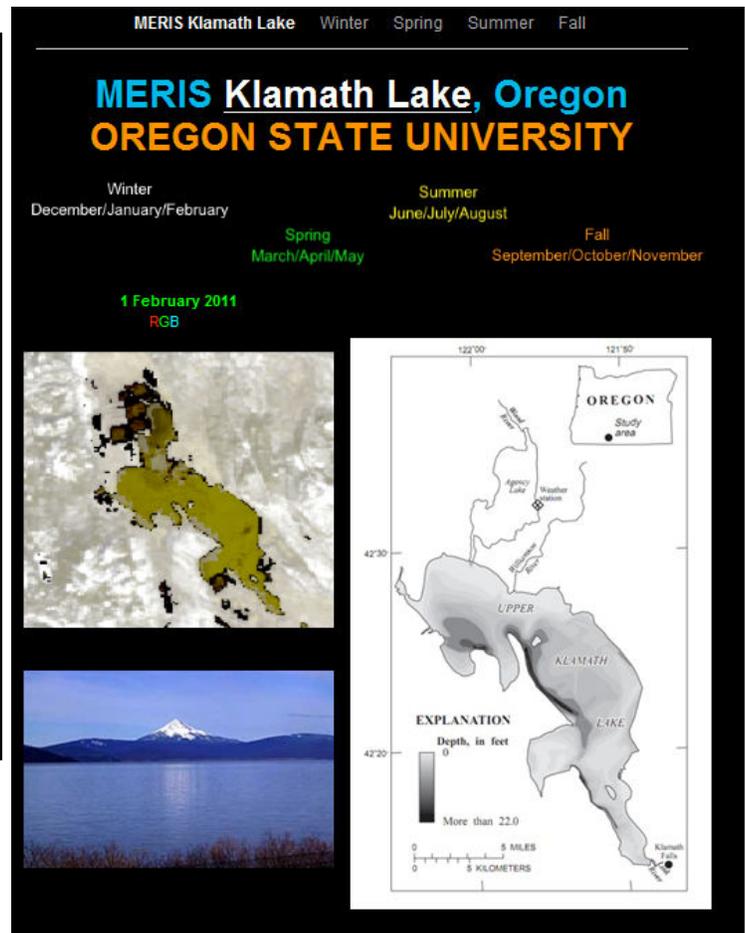
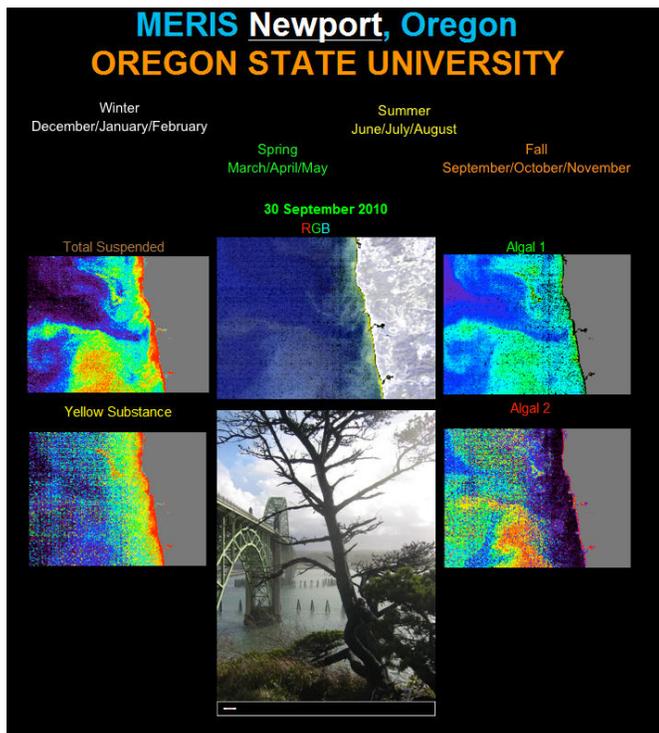
AOL Home: <http://aol.research.pdx.edu/>  
 Devils Lake: <http://aol.research.pdx.edu/?q=lake/353>

**Jeff Leighton, City of Portland Water Bureau,** How best to save and use 2 billion gallons of really cold water for fish: the story of Bull Run temperature management. Watershed management strategies used in Portland’s Drinking Water supply.

**Ted D. Harris and Frank Wilhelm, Dept. of Fish and Wildlife, University of Idaho** Willow Creek Reservoir - cyanobacteria and toxin production related to nutrient ratios. Excellent study of the way nutrient balance drives the production of toxic cyanobacteria verse non toxin producing cyanobacteria or other algal.

**Nick Tuffillaro and Curt Davis, OSU, Looking at Oregon Lakes from Space.** Remote sensing technology demonstrated. Tools for cyanobacteria monitoring discussed along with the ability to access or data mine existing imagery (infrared or otherwise) to extrapolate longterm data sets.

Sample from Newport, Oregon where algal presence has been detected remotely and another from Klamath Lake



See links to see and learn more.

[http://meris.coas.oregonstate.edu/osu\\_meris/osu\\_meris\\_portal.html](http://meris.coas.oregonstate.edu/osu_meris/osu_meris_portal.html)

Hyperspectral Imager for the Coastal Ocean (HICO™)

<http://hico.coas.oregonstate.edu/>

**Douglas W. Larson, Retired, USACE and Ron Larson, USFWS Saving Lake Abert: Salt Lake in the high desert.** Report on the efforts to remove a dam that has been negatively impacting the lake and region.

d) Digital Camera: (Seth Lenaerts) The District's Sealife DC 500 camera has been slowly become less and less dependable. The camera has multiple problems right now that make it unreliable and inconvenient for use. For example, the camera does not read the charge correctly on the batteries. After only a few pictures the camera will say that fresh batteries are out of power and turn off. A minute later you can turn the camera back on; it will display full power, and then again after a few pictures turn off. This occurs on both the old batteries and the new ones we purchased more recently. Another problem is that the camera is no longer being recognized by the computer when you try to download your photos. Photos can still be downloaded, it just requires inserting the memory card into the computer. This is not totally inconvenient, but it is inconvenient when you are out in the field ready to take a picture and you realize, the memory card is still in your computer. Even despite these problems it is an old camera that has served the district well for the past five years and is ready for retirement. Knowing that the camera was in decline the District budgeted \$500 for a replacement in the current fiscal year.

In a new camera we were looking for several features, high mega pixel, good video quality, GPS feature and of course durability including waterproof.

Several cameras meet these criteria, with some sacrificing photo and video image for durability. These two cameras have the durability to meet the District's needs and offer superior photo and video quality.

**Nikon Coolpix AW100 16 MP Digital Camera (12/27/2011, \$279),  
Shutterbug = \$299**

Specs:

- Waterproof to 33 feet
- Shockproof,
- freezeproof
- GPS
- 16 megapixel
- HD video
- 5x zoom



Nikon COOLPIX AW100 16 MP CMOS Waterproof Digital Camera with GPS and Full HD 1080p Video (Orange)  
by Nikon  
★★★★☆ (43 customer reviews) | Like (44)  
List Price: ~~\$379.00~~  
Price: [See price in cart](#) (Why don't we show the price?)  
This item ships for FREE with Super Saver Shipping. [Details](#)  
[Special Offers Available](#)  
17 new 1 refurbished from \$361.45  
Color: Orange

\*\*\*\*\*

**Olympus TG-810**

Specs:

- Waterproof to
- Shockproof, freeze proof
- GPS
- 14 Megapixel
- HD Video
- 5x zoom



Olympus TG-810 Tough 14 MP, 5x Wide Optical Zoom (28mm), 3" 920K LCD (Black)  
by Olympus  
★★★★☆ (16 customer reviews) | Like (12)  
List Price: ~~\$399.00~~  
Price: **\$285.17** & this item ships for FREE with Super Saver Shipping. [Details](#)  
You Save: **\$113.83 (29%)**  
**In Stock.**  
Sold by [safetstucco](#) and [Fulfilled by Amazon](#). Gift-wrap available.  
Only 4 left in stock--order soon.  
**Want it delivered Friday, December 30?** Order it in the next 21 hours and 50 minutes, and choose **One-Day Shipping** at checkout. [Details](#)  
31 new 2 refurbished from \$237.00

\*\*\*\*\*

**Panasonic Lumix DMC-T53 (12/27/2011, \$255) Shutterbug \$389**

Specs:

- Waterproof to 40 feet
- Shockproof,
- freeze proof
- GPS
- 12.1 megapixel
- HD video
- 4.6 zoom



Panasonic Lumix DMC-TS3 12.1 MP Rugged/Waterproof Digital Camera with 4.6x Wide Angle Optical Image Stabilized Zoom and 2.7-Inch LCD (Blue)  
by Panasonic  
★★★★☆ (223 customer reviews) | Like (94)  
List Price: ~~\$379.00~~  
Price: ~~\$369.00~~  
Sale: **\$255.00**  
You Save: **\$124.99 (33%)**  
25 new 10 used from \$203.12  
Color: Blue

Additional expenditures: Expect additional costs of up to \$30 for a memory card and camera case. Reusable batteries are also something to consider both for long term price and creating less waste. The Nikon includes a rechargeable battery. A back up battery will cost about \$40. The Panasonic Lumix rechargeable battery is \$31 on Amazon. A replacement battery for the Olympus is \$28 on Amazon.

**Staff Recommendation:** All three cameras receive generally good reviews and would be suitable for the District's needs. Based on price, I suggest purchasing the Panasonic Lumix, with a camera case, memory card, and replacement battery for an estimated total of, \$316 + shipping.