



LAKE WISE

... a voice for quiet waters

NEWSLETTER FROM OREGON LAKES ASSOCIATION

SEPTEMBER 2016

Laurie Carmichael, Newsletter Manager

IN THIS ISSUE

2016 Annual Conference

The Dalles, October 14-16th

2016 OLA Scholarship Winner

Congratulations to Ariana Chiapella!

Oregon Lakes in the News

Crater Lake site of naturalization ceremony! New mobile app to monitor lake quality.

Diamond Lake and a New Approach to Restoration

Tiger trout to replace rotenone.

Lead (Pb) Fishing Tackle Bans

A history and current trends.

OLA Co-sponsors Lower Willamette River HABs Workshop at Portland State University

Discussions of issues impacting Ross Island.

New Genetic Tools help to Identify Problem Cyanobacteria and Design Monitoring Tools

A discussion of DNA sequencing as a tool for monitoring water quality.

Harmful Algae Blooms (HABs) Corner

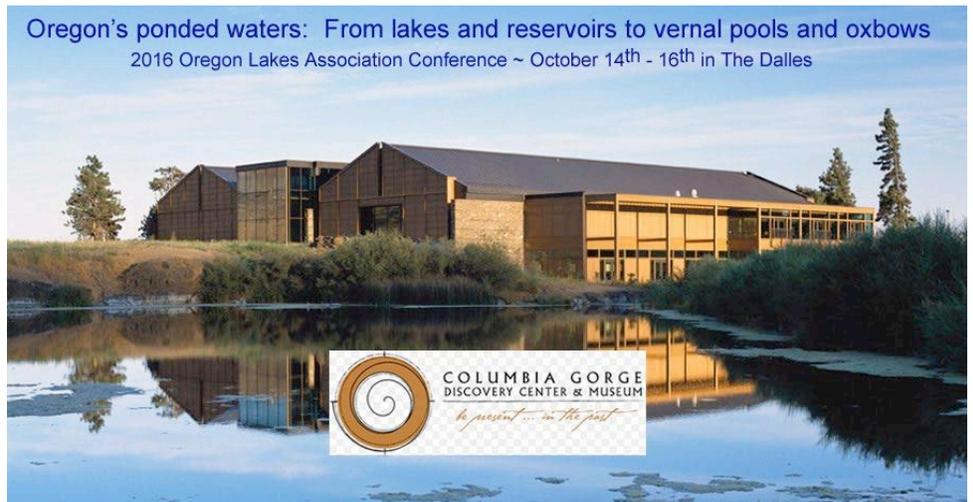
Gene-based assays reach the marketplace. Announcements of 2016 HABs meetings.

2016 OLA Annual Conference

Contributed by Rich Miller, OLA Board Member

Oregon's ponded waters: From lakes and reservoirs to vernal pools and oxbows

2016 Oregon Lakes Association Conference ~ October 14th - 16th in The Dalles



Join us for our annual Oregon Lakes Association conference from Friday October 14th through Sunday October 16th at the Columbia Gorge Discovery Center & Museum (www.gorgediscovery.org) in The Dalles, Oregon. The theme of this year's conference is "Oregon's ponded waters: from lakes and reservoirs to vernal pools and oxbows" and will touch on a wide range of topics from reservoir operations to toxic algal blooms.

Activities kick off Friday afternoon with guided tours of local petroglyphs. That evening at Spookys Pizza Restaurant, 3320 West 6th Street in The Dalles, Lloyd Dekay of the Ice Age Flood Institute will talk about the pre-historic floods that helped shape the Columbia Gorge that we see today. This event is free and open to the public.

Saturday features a full slate of oral and poster presentations at the Columbia Gorge Discovery Center & Museum as well as a raffle and auction to support our scholarship program. Presentations will be highlighted by a plenary talk by Bob Spateholts, senior aquatic biologist for Portland General Electric's Pelton Round Butte Hydro project. Bob will talk about project modifications implemented to address temperature and dissolved gas water quality issues and fish passage to the upper reaches of the Deschutes River. Other presentations will cover climate change and water temperature, management of aquatic invasive plants, reservoir nutrient loading, and volunteer lake monitoring. Presentation slots are still available, so please submit an abstract at the conference website by Friday September 2nd (www.oregonlakes.org/event-2281625). Include your presentation title, author(s) noting student authors,

preference of a talk or poster, and an abstract of less than 300 words/3,000 characters. Oral presentations will be 20 minutes (15 minutes plus 5 minutes for discussion).

Conference activities conclude on Sunday with guided tours of operations of The Dalles Dam.

Registration for the meeting is now open at www.oregonlakes.org/event-2175723. Early registration costs (before September 30th) are \$35 for students, \$85 for OLA members, or \$100 for non-members. Conference sponsorship opportunities are available, which will entitle you to a booth at the conference plus registration fees for one attendee, and advertising in our *Lake Wise* newsletter (www.oregonlakes.org/Sponsorship). If you have any questions, please contact Rich Miller at richm@pdx.edu or (503) 725-9075. We hope to see you in The Dalles!



**Tsagaglatal (She Who Watches) petroglyph
near The Dalles Oregon**

Congratulations to our 2016 OLA Scholarship Winner Ariana Chiapella, Portland State University

Contributed by Wayne Carmichael, OLA Board Member



Ariana is a current PhD student at PSU in Dr. Angela Strecker's laboratory.

Her past experience included Massachusetts College of Liberal Arts and Williams College. She has also worked with the Massachusetts Audubon Society's Boston Nature Center. All this motivated her to pursue a cohesive research project that uses limnological, ecological, and toxicological knowledge to inform the social and political aspects of watershed management in the Pacific Northwest. Her

dissertation research focuses on the effects of anthropogenic stressors, specifically contaminants, on sensitive

mountain lake ecosystems in the Pacific Northwest. Fieldwork is being done in the Olympic, Mount Rainier, North Cascades National Park, the Mt. Baker-Snoqualmie and the Mt. Hood National Forests. The research investigates the relationships between food web dynamics and contaminant burdens in fish. She plans to use the research for public outreach to draw connections between human actions and ecological health.

Her time in Dr. Strecker's lab has consisted of two field seasons in Washington's National Parks, as well as lab analyses of samples and some preliminary data analysis. During her first year she worked as a teaching assistant, which includes an award for a Graduate Research Fellowship from the National Science Foundation, as well as an IGERT (Integrative Graduate Research Traineeship) from NSF. She has presented preliminary results at the Joint Aquatic Sciences Meeting (Portland, OR 2014), the Association for the Science of Limnology and Oceanography (ASLO) Annual Meeting (Granada, Spain, 2015), and the American Fisheries Society Annual Meeting (Portland, OR 2015). She plans to present at the 2016 ALSO meeting in Santa Fe, NM, and will present her results to our Oregon Lakes Society in 2017.

Congratulations to Ariana!

Oregon Lakes in the News

Contributed by Paul Robertson, OLA Board President

America's Crater Lake naturalization ceremony

America's newest citizens took the Oath of Citizenship on Independence Day at Crater Lake this summer. The National Parks Service, as part of its centennial celebration, is holding 100 naturalization ceremonies at national parks around the country this year. July 4th's ceremony saw 17 of America's newest citizens make it official on the rim of Oregon's most famous lake. OPB's Jes Burns filed this audio postcard from the edge of Crater Lake.

See these links for more information:

<http://www.opb.org/news/article/crater-lake-citizen-naturalization-ceremony/>

https://www.youtube.com/watch?time_continue=2&v=LCVxUjci7yA

Citizens merging science & technology at Emigrant, Applegate and Lost Creek Lakes

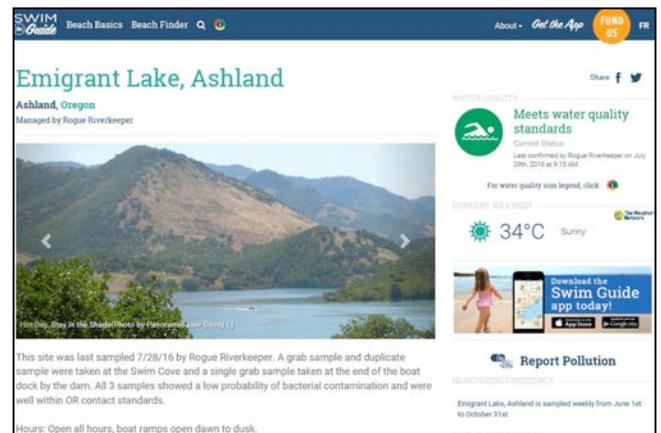
As recently reported by Mark Freeman of the *Mail Tribune*, citizen-scientists are making use of the latest mobile apps to bring water quality data to the rest of America. The Rogue River Keepers are publishing their bacterial data from local lakes on a new app called "The Water Keepers Swim Guide". See <https://www.theswimguide.org/>

The Rogue River Keepers (<http://roguekeeper.org/>) are not alone; some 7,000 beaches across North America, and at last count 155 in Oregon alone, can be found on the site. The mobile app is available for download for Android and iPhone providing data right in the hands of



beach-goers. The mobile tool also provides a pollution-reporting tool, so users can relay concerns back to the local waterkeepers, closing the communication loop on water quality.

<http://registerguard.com/rg/news/local/34332361-75/citizen-scientists-to-help-id-bacteria-filled-lakes.html.csp>



Diamond Lake: a New Approach to Restoration

Contributed by Trish Carroll and Rich Miller, OLA Board Members

Invasive species have been a problem in Diamond Lake for many years. The Oregon Lake Association (OLA) has been following the attempts to rid the lake of invasive fish for nearly two decades. The August 1997 *Lake Wise* contained an article by Joe Eilers entitled "Probing the Past in Diamond Lake". Eilers states that Diamond Lake was one of the most productive trout fisheries in the state but the population experienced a major decline as a consequence of the inadvertent introduction of tui chub. The tui chub were also abundant in the lake in the 1940s until they were finally poisoned with rotenone application into Diamond Lake in 1954.

In August 2003, *Lake Wise* published an article entitled "Consulting the Experts on Diamond Lake's Future". Serious environmental problems had developed due to another reintroduction of tui chub into the lake in the late 1980s or early 1990s. As a consequence, Diamond Lake was in violation of state water quality standards because of high pH and dense algae populations including potentially toxic cyanobacteria. Associated decreases in populations of large zooplankton and benthic invertebrates resulted in poor trout growth and condition. The June 2004 *Lake Wise* had an update by Sherri L. Chambers on the studies and alternatives developed for ad-



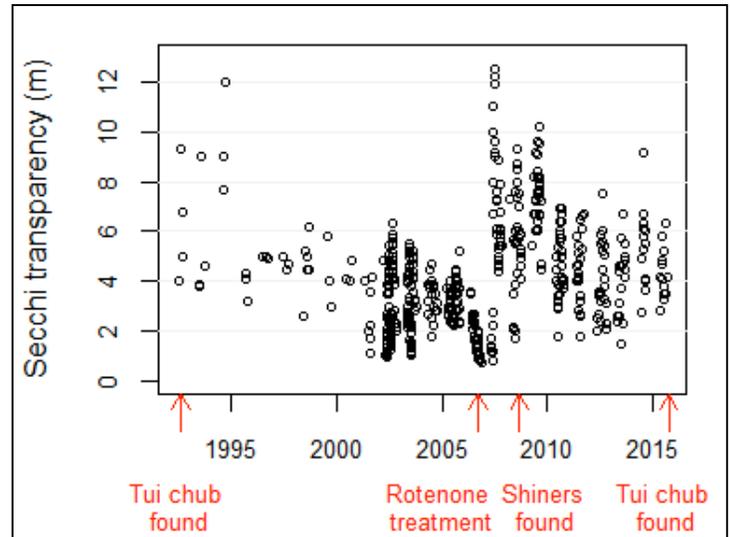
addressing the water quality and invasive fish issues. Another update in the January 2005 *Lake Wise* described the alternative selected to once again rotenone the lake, and the techniques that would be applied. The June 2006 *Lake Wise* included an article entitled “Diamond Lake Treatment Prescription is Underway”, and outlined the details of the treatment prescription.

Although this 2006 attempt to eradicate the troublesome tui chub by treating Diamond Lake with rotenone was effective, it was short-lived. After ridding the lake of an estimated 90 million tui chub, dramatic improvements were observed including lower pH levels and algal and cyanobacterial densities, greater water transparency, more large zooplankton and benthic macroinvertebrates, and better trout health (Eilers et al. 2011). Then in 2008, biologists discovered golden shiners, another illegally introduced baitfish. Declines in water quality, including water transparency (see **Figure** below), were observed soon thereafter (Miller and Sytsma 2015). Then during the fall of 2015, scientists discovered a single tui chub while conducting routine monitoring, which caused the Oregon Department of Fish and Wildlife (ODFW) to rethink their eradication efforts.

This time, ODFW is trying something new. A tiger (trout) is now swimming in the lake, says Jane Chorazy in the US Fish and Wildlife Service (USFWS) newsletter. The plan is to add a new fish to remove two unwanted ones. Tiger trout are sterile trout that are a hybrid between a female brown trout (*Salmo trutta*) and

a male brook trout (*Salvelinus fontinalis*). ODFW released tiger trout into the lake’s waters in hopes these sterile trout will prey on the unwanted tui chub and golden shiners, which could potentially take over the lake once again.

The Diamond Lake project is an excellent example of Federal and State Governments working together on a difficult problem to protect water quality and provide the best possible recreational fishing opportunities for the public.



Diamond Lake Secchi transparency measured by the USFS, ODFW, Diamond Lake Resort, and others in relation to the 2006 Rotenone treatment and invasive fish detections.

For more information see:

<http://usfwspacific.tumblr.com/post/145310910400/diamond-lake-invasives-to-be-fed-to-the-tiger>

Citations:

- Eilers, J. M., H. A. Truemper, L. S. Jackson, B. J. Eilers, and D. W. Loomis. 2011. Eradication of an invasive cyprinid (*Gila bicolor*) to achieve water quality goals in Diamond Lake, Oregon (USA). *Lake and Reservoir Management* 27(3): 194–204.
- Miller, R. and M. Sytsma. 2015. Diamond Lake water quality assessment: 2013-2014. *Report to the USDA, Umpqua National Forest*. 24pp. Portland State University, Portland, OR.

Lead (Pb) Fishing Tackle Bans

Contributed by Stephen Wille, OLA Board Member

With all the recent national and local interest in lead in public water supply systems, the issue of lead in fishing tackle was brought up for discussion before the OLA Board at our last meeting. An internet search found several recent sources where this has also been the topic of

discussion. National groups such as the American Sportfishing Association, the Congressional Sportsmen’s Foundation, and the American Fisheries Society have reported on proposed rules to nationally ban the use of lead in fishing tackle. In addition, some (primarily



northern) states have recently enacted local fishing tackle restrictions, with a few popular outdoor magazines (*Field & Stream*) reporting on the issue. NALMS (North American Lake Management Society), however, does not yet have a policy

regarding lead and fishing tackle. A short history lesson is worthwhile...

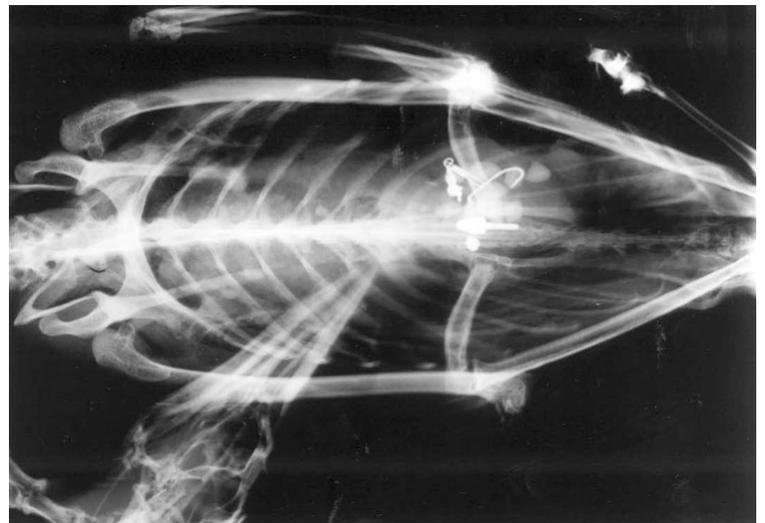
- Lead poisoning (toxicosis) affecting entire waterfowl populations prompted the enactment of federal regulations in 1986 for phased implementation by 1991. These regulations prohibited the use of lead shot for waterfowl hunting in all 50 states. The primary concern stemmed from waterfowl that were ingesting spent lead shot in small, confined wetlands.
- In 1988, some common loon advocacy groups expressed concerns about the death of waterfowl from the ingestion of lead fishing sinkers.
- A 1992 study by Tufts University School of Veterinary Medicine indicated that 50 percent of the loons they examined likely died from the ingestion of lead sinkers.
- It took until 1994 for the EPA to propose a federal rule prohibiting lead or zinc fishing sinkers "one inch or under in any dimension," which elicited the largest number of public comments the EPA had received on a draft rule to that point. The EPA subsequently abandoned the rule because there was insufficient supportive data.
- A comprehensive 1999 study conducted by the National Wildlife Health Research Center in Madison, Wisconsin further found that "the data are insufficient to evaluate the role of lead poisoning as a proportional cause of mortality in this species (loons), or its role in population dynamics."
- Since then, the EPA has received multiple petitions by conservation organizations to ban all lead in fishing tackle and ammunition under the Toxic Substances Control Act. All subsequent petitions have been rejected, and the EPA has determined that a national ban is scientifically unjustified and outside the agency's jurisdiction.
- Finally, in 2015, the Hunting, Fishing and Recreational Shooting Protection Act (S. 225) was introduced in the House, with companion legislation, the Sportsmen's Heritage and Recreational En-

hancement (SHARE) Act (H.R. 2406). These bills include a provision that blocks the EPA from regulating lead in ammunition and fishing tackle, and were eventually approved and included in the FY 2016 Interior and Environment Appropriations Bill signed by the President in December 2015. Specifically, the exemption means lead-based fishing tackle cannot be banned locally. State and local regulation of lead-based fishing tackle can still be enacted and enforced without the use of federal funds.

On the states level, in 2000, the state of New Hampshire (citing the Tufts study) became the first state to ban the use of lead sinkers, followed by Maine, New York, Vermont and Massachusetts; all states within the summer breeding range of common loons. A common thread was banning the sale of lead sinkers ½ ounce or less. Located on the fringe of the breeding range, and with a recognized decreasing loon population, the Washington Fish and Wildlife Commission implemented a regulation in May 2011 that prohibited the use of lead fishing weights and jigs at 12 northerly lakes. In 2014, the California Department of Toxic Substance Control released a draft plan that identified lead, zinc and copper fishing weights and gear as products of concern.

Meanwhile, since the initial work associated with loons and other birds, additional research has provided evidence of lead poisonings from incidental or accidental ingestion of fishing weights extending to marine mammals and even humans. Research into methylation of lead by microorganisms and processes of biogeochemical cycling may provide additional pause.

The NE states, and our west coast neighbors, have already and continue to take steps to remove this anthropogenic source of lead redistribution through the



Xray of Loon showing lead sinker and fish hook.

environment. Internationally, Canada and many countries in Europe have also already proceeded with regulations for lead weights. The question of whether Oregon and/or the Oregon Lakes Association should join this push is a worthy consideration.

If OLA would like to consider a policy regarding the use of lead in fishing tackle, and provide *a voice for quiet waters*, my suggestion would be to start a discussion after reviewing the policy adopted by the American Fisheries Society in 2012, http://soarraptors.org/wp-content/uploads/AmericanFisheriesSociety_LeadPolicy.pdf. The State of Washington's report on lead weights (<http://dfw.wa.gov/publications/00037/wdfw00037.pdf>) provides additional information. Collectively, we can uncover many additional resources, and develop a better understanding of this issue for Oregon lakes and waterbodies across the globe.

While fishing undoubtedly contributes to lead entering waterbodies, shotgun pellets introduce vast quantities of lead and have already been banned from use for hunting waterfowl. Dabbling birds are documented to unknowingly ingest lead instead of the small rocks that they use to aid in digestion, leading to their poisoning. Given that one shotgun shell contains between 225-430 small lead pellets, how many pellets are being spread over waterbodies during just one hunting season, putting entire populations at risk? Despite these facts, lead continues to be used in hunting terrestrial animals, which contributes to lead entering the environment, and of course lead is also dominant in fishing tackle today.

OLA Co-sponsors Lower Willamette River HABs Workshop at Portland State University

Contributed by Stephen Wille, OLA Board Member

Last fall, Steve Wille and John Runyon, of the Oregon Lakes Association and the River Restoration NW, respectively, approached Mike Houck of the Urban Greenspaces Institute, to suggest convening a technical workshop that focused on management issues involving Ross Island and the lower Willamette River. After numerous background and organizational meetings, a series of workshops were proposed—the first to address the recent spate of harmful algal blooms (HABs). Entitled “Algal Blooms on the Lower Willamette River” the first workshop was conducted at Portland State University on Wednesday, July 20, 2016.

The discussion revolved around Ross Island, which is a significant regional greenspace, because it has numerous restoration and management issues that include the state of restoration by Ross Island Sand and Gravel; public access; current restoration of publicly-owned land; erosion; camping and other encroachments; and—most recently—algal blooms. We are hoping this first workshop can be the start of a series of meetings that will address the myriad issues related to the ecological health of the Ross Island archipelago and natural resources of the lower Willamette River.

After some introductory background comments about the similarity of issues surrounding Ross Island, Clackamette Cove, and Cedar Island (all historically dredged sites in the lower Willamette River), Dr. Stan Gregory, Oregon State University, spoke about many years of monitoring work he has been coordinating with students in the Upper Willamette River and its reservoirs. He addressed how different measurement tech-

niques can give different results, how cyanobacteria can be an important aquatic food source, benthic versus planktonic assemblages, and how the accumulation of resting cells (akinetes) may be implicit in the development of recent blooms.



OLA was well represented at the Lower Willamette River/Ross Island HAB's Workshop; from the left, the first four attendees are all members (Andy Schaedel, Stan Geiger, Theo Dreher & Rich Miller). Photo by OLA member Stephen Wille.

Dr. Theo Dreher, Oregon State University, presented a short list of environmental conditions that favor the development of cyanobacteria blooms, explained why

some blooms are harmful and others are not, described how cyanobacteria blooms end up in large rivers, and proposed some general solutions for how to disrupt the cyanobacteria cycle in Ross Island lagoon.

Rebecca Hillwig, Oregon Health Authority, and Aaron Borisenko, Oregon Department of Environmental Quality, addressed their respective agency's roles in monitoring, data compilation, and communicating with the public. Both state agencies continue their efforts at reducing the cyanotoxin response time. Together they are developing a multiagency MOU for statewide sampling. DEQ is now engaged in an intensive monitoring effort within the Ross Island lagoon to help characterize the environmental parameters that are driving the blooms.

Kurt Carpenter, USGS, described HABs in Oregon as "a widespread and growing issue, with over 50 water bodies already significantly affected." Kurt discussed sampling considerations, data gaps, opportunities, and the next steps needed to address algal blooms. Kurt also

talked about benthic cyanobacteria associated with rivers, which can sometimes be toxic and can sometimes slough off the bottom as small rafts.

After noshing on light snacks prepared by Mick Jagger's chef (yes, it's true!), an open discussion ensued. Topics ranged from: what we currently know about management plans and ownership of the islands and lagoon, the Big Dig, oxygen diffusers, nutrient loading, altering critical physical and chemical conditions, floating islands, current and future data needs, monitoring requirements, and how to address the future drinking water needs of Portland.

This first workshop successfully brought together researchers, land managers and nonprofit organizations to develop a common understanding of the origin, severity, research needs, and potential responses to help prevent and mitigate the increased occurrence of algal blooms at Ross Island and elsewhere on the lower Willamette River.

New Genetic Tools that can help to Identify Problem Cyanobacteria and Design Monitoring Tools for Lake Managers and Drinking Water Utilities

Contributed by Theo Dreher, Professor, Department of Microbiology, Oregon State University, OLA Vice President

Among the new and powerful genetic tools that have become available in recent years, the one that has had the greatest impact is DNA sequencing. This has become impressively cheap, powerful and versatile, often entirely changing the approach taken to solve a problem. In past years, in order to determine the producer of a toxin such as microcystin or anatoxin, or of a taste-and-odor compound such as geosmin, we would culture cyanobacteria from the bloom and assay the production of those compounds in the cultures. That is still a good approach, but an approach based on DNA sequencing can be faster, while also providing information to design specific monitoring tools. We recently published a study illustrating the new approach, which is based on metagenomics: Tim Otten, Jennifer Graham, Theodore Harris & Theo Dreher, "Elucidation of Taste- and Odor-Producing Bacteria and Toxigenic Cyanobacteria in a Midwestern Drinking Water Supply Reservoir by Shotgun Metagenomic Analysis". *Applied & Environmental Microbiology*, 82(17), Sept 2016.

Metagenomics refers to the attempt to sequence the entire DNA in a sample. In practice, only the DNA from the more abundant organisms will be obtained, in rough proportion to the relative abundance of those organisms in the sample. The genomes of the separate organisms present in the sample are revealed in small fragments (each about one-tenth of a gene in size) that have to be

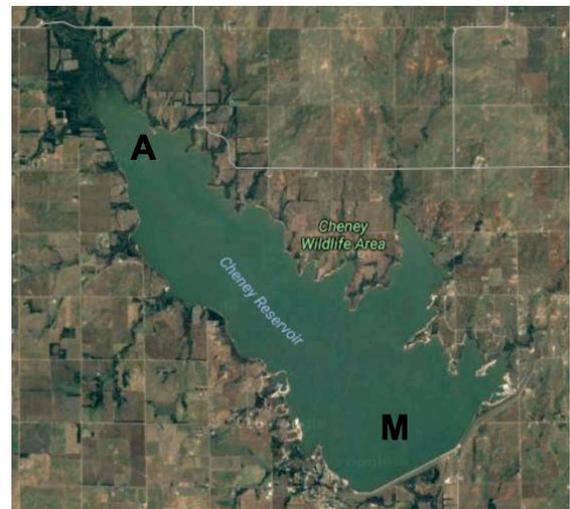


Fig. 1. Cheney Reservoir, KS, showing location of *Anabaena* bloom (A) and *Microcystis* bloom (M) near dam wall.

clustered together into a full genome. For the cyanobacteria (blue-green algae) that produce troublesome blooms, these genomes have about 5,000 genes, so the clustering to assemble full genomes is still very tricky. However, it is easy to look for specific genes and to assign them to provisional genomes that allow recognition of the toxin or taste-and-odor producer.

The example of our study will bring this to life. Although we are conducting similar studies in Oregon, this example is from Cheney Reservoir (Fig. 1), the major drinking water supply for Wichita, Kansas. On 30 August, 2013, soon after the inflow from a large rain-storm triggered a major bloom, we sampled sites in a transect from inflow (north) to outflow near the dam. *Anabaena* was abundant in the inflow region, while *Microcystis* dominated near the dam. Microcystin toxin was present, as were very high levels of geosmin, especially near the inflow. Our analyses showed that the only genes for geosmin biosynthesis we could detect were associated with other DNA sequences indicative of *Anabaena*, while the only genes for microcystin biosynthesis were associated with *Microcystis* genes (Fig. 2). The main producers of these compounds are thus identified. There was no evidence for multiple distinct genetic strains of either *Anabaena* or *Microcystis*.

This result is useful to lake managers, indicating that the *Anabaena* is not producing microcystin (or any other cyanotoxin) but is a geosmin producer. Since the colored dots in Fig. 2 represent the gene sequences, we can use that information to design genetic monitoring tools based on the polymerase chain reaction (PCR) that would allow testing for the levels of the specific problem genes over time. In coming years, we will undoubtedly be seeing more monitoring using genetic tools such as these to help research and management of cyanobacterial HABs.

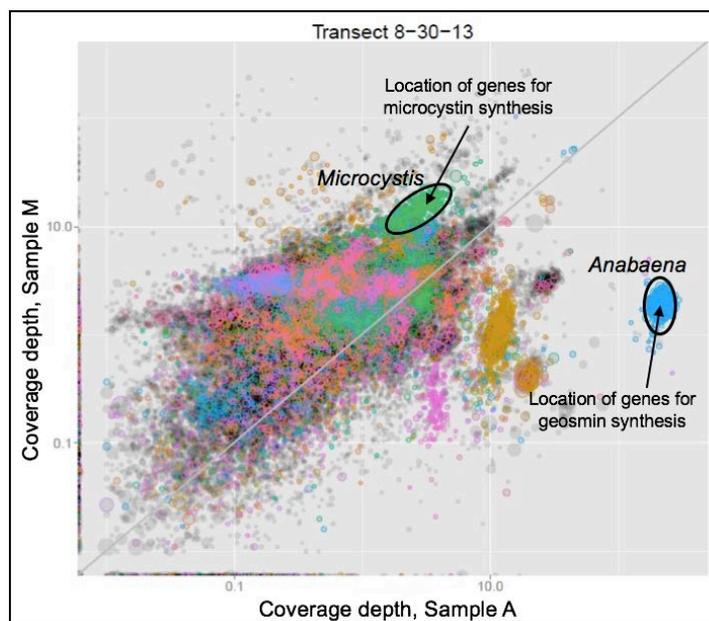


Fig. 2. The results of metagenomic analysis of samples from the two sites (A, M) in Cheney Reservoir shown in Fig. 1. The axes represent Coverage Depth, the number of times each gene fragment is identified in the dataset. The data are represented by dots colored by taxonomic identity. Massive amounts of data can be analyzed in this way, and in this case we could show that the genes for microcystin and geosmin biosynthesis cluster with other genes that represent the genomes of *Microcystis* and *Anabaena*, respectively (indicated by the ellipses).

Harmful Algae Blooms (HABs) Corner

Contributed by Wayne Carmichael, OLA Board Member

GENE-BASED ASSAYS FOR CYANOBACTERIA CYANOTOXINS REACH THE MARKET PLACE

Animal and human poisonings from cyanobacteria waterblooms (cyanoHABs) have been part of the published record since the late 1800's. Methods development for detection and analysis of cyanotoxins began with observations of animal poisonings in the field followed by collection of waterbloom material and dosing of animals under controlled conditions. The earliest studies to use these methods were done in South Africa and the United States. Use of small animal bioassays, especially mice, for studying cyanotoxins, began in the 1970's. In the late 1980's more toxin specific assays such as enzyme and immunological based assays were developed and began to replace the animal bioassay. The 1980's saw the use of chromatography, first thin layer and then columns, for separations of cyanotoxins to be used for their purification and identification. Eventually use of high

precision based chromatography (HPLC) was used to separate and identify cyanotoxins, first the microcystins and later the neurotoxins. The 1990's saw the adaptation of mass spectrometry linked chromatography (LC/MS) equipment for identification of cyanotoxins.

Chronology of cyanotoxin testing methods.

- ◆ Biological: Bioassay
 - Small animal – mouse, invertebrate LD and LC₅₀
 - Microbial
- ◆ Analytical: HPLC, MS, NMR
- ◆ Biochemical: i.e. Immunological (ELISA); Enzyme (PPIA); Cell Receptor
- ◆ Genetic: PCR

For the past 20 years, indirect and direct ELISAs (enzyme-linked immunosorbent assays) have been the most frequently used techniques for routine cyanotoxin monitoring programs due to their ease of use, lower cost per sample, and rapid analysis relative to other techniques.

During those 20 years, a number of molecular gene markers and probes were developed. They targeted not only processes unique to cyanobacteria such as phycocyanin and heterocysts (nitrogen fixing cells), but evolutionary relationships among toxigenic and non-toxigenic strains and species. This was often done using 16S and 23S rRNA sequences. A major breakthrough in the understanding of cyanotoxin production came in 1996 with the discovery that microcystin is a thio-template product. This led to an understanding that microcystins and other cyanotoxins are synthesized non-ribosomally by the thio-template function of large multifunctional enzyme complexes containing both non-ribosomal peptide synthetase (NRPS) and polyketide synthase (PKS) domains. Sequencing of these gene clusters has now led to the use of certain genes within the cluster, combined with the powerful method of quantitative polymerase chain reaction (QPCR), to detect toxigenic (ability to produce cyanotoxins) strains and species.

Commercial availability of rapid high throughput genetic based kits and equipment for cyanotoxins is now available using products marketed by a group out of Australia. “**Phytoxigene**” advertises that they provide “Molecular detection and quantification of biotoxin producing genes”. See their website:

<http://www.phytoxigene.com/>

More recently Dr. Tim Otten, a former postdoctoral student of Prof. Theo Dreher with Oregon State University and Vice President of OLA, has set up QPCR services for detecting cyanotoxins and toxigenic cyanobacteria in Sacramento, California. He can be contacted through his website at: www.bendgenetics.com or through his email at: ottentim@bendgenetics.com. Tim reports he targets the following cyanotoxin genes:

microcystin, mcyE; anatoxin-a, anaC or anaG; cylindrospermopsin, cyrC or cyrJ; and for saxitoxin, sxtA.

At present, gene-based assays for cyanotoxins and toxic cyanobacteria should be considered complimentary to ELISA and analytical methods. Further developments and methods may lead to them being a stand-alone rapid detection method, but not at present.

SUMMER 2016 HAB SEASON REPORTS

According to the USEPA’s July “Freshwater HABs News”, this summer has seen several states with large-scale waterblooms. In Florida, officials declared a state of emergency in four counties. Other states with significant HABs included Ohio, California Utah, New York, and North Dakota.

HAB MEETINGS FOR 2016:

17th ICHA

October 9-14, 2016, Florianapolis, Brazil

16th GLBAC

October 4-7, 2016, Marquette, Michigan

10th ICTC

October 23-28, 2016 Wuhan, China

SETAC 2016

November 6-10, 2016, Orlando, FL

For further information on these meetings and other HAB news, see the USEPA newsletter link at: <https://www.epa.gov/nutrient-policy-data/cyanohabs-newsletters-2016>

For the latest on Oregon’s HAB season see: <https://public.health.oregon.gov/HealthyEnvironments/Recreation/HarmfulAlgaeBlooms/Pages/Blue-GreenAlgaeAdvisories.aspx>

Jim Carpenter, OLA President 2001. July 23, 1942 – February 25, 2016.



Sadly, former OLA President Jim Carpenter recently passed away in Klamath Falls. Jim grew up in the Great Lakes region and moved to Klamath Falls in 1991 with Stephanie, his wife of nearly 50 years. There he worked with Cell Tech Inc. and was an advocate basin-wide for wetlands restoration, with the dream of seeing salmon return to the upper Klamath. Jim served as commodore of the Klamath Yacht Club, President of OLA, President of Klamath Wingwatchers, and Chair of Senator Hatfield's Upper Klamath Basin Working Group. He was awarded the U.S. Fish & Wildlife Service Upper Klamath Basin Wetlands Conservation Award. Just last year, Jim and Stephanie were instrumental in making the Klamath Yacht Club a perfect setting for the 2015 OLA conference. His energy for lake conservation will be missed.

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Lake Wise

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The Oregon Lakes Association Mission

OLA, a non-profit organization founded in 1990, promotes understanding, protection and thoughtful management of lake and watershed ecosystems in Oregon. Serving entirely through volunteer efforts, the Oregon Lakes Association puts on an annual conference, publishes a tri-annual newsletter, sponsors Harmful Algal Bloom trainings, and works as an advocate for lakes in the legislative arena. For additional information on OLA, write to the address above, or [visit our website](#).

OLA and Lake Wise welcomes submissions of materials that further our goals of education and thoughtful lake management in Oregon. OLA is grateful for corporate support that helps sustain the organization. Corporate members are offered the opportunity to describe their products and services to Lake Wise readers. These descriptions are not OLA endorsements and opinions appearing in Lake Wise are not OLA policy statements.

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