

LAKE WISE

Newsletter of the Oregon Lakes Association

August 1995

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Annual Meeting Coming Up!

The annual meeting of the Oregon Lakes Association will be held on October 21, 1995 at Portland State University. Bill Wall, President-elect and Program Chair for this year's meeting, has assembled an exciting agenda that focuses on urban lakes. As last year, the Association with the greatest representation at the annual meeting will receive a special award. The tentative agenda is on page 2 and preregistration form is on page 15 of this issue of *Lake Wise*.

Hydrilla Found in Washington

Hydrilla has been found in Pipe/Lucerne Lake near Auburn, Washington. This is the first confirmed find of Hydrilla, a very invasive and pernicious aquatic weed, in the Northwest. Hydrilla has been found in 17 California counties, as far north as Redding, and is serious pest in waterbodies across the South and on the east coast as far north as Washington D.C. There have been no confirmed finds of Hydrilla in Oregon.

Pipe and Lucerne Lakes are connected by a narrow arm of water, with a combined area of 73 acres. Maximum depth of Pipe and Lucerne is 65 and 37 feet, respectively. Water quality in the lakes is good; Secchi disk transparency on July 15 in Pipe Lake was 5.25 m (16 ft). Hydrilla is widespread in the lakes and may have been present for several years. A survey by Mark Sytsma and Keith Perkins, from Portland State University, found maximum hydrilla density at approximately 3 m (approx. 10 ft). No hydrilla was found below the thermocline depth (approximately 20 ft.),

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Ballot for New Officers and Meeting Preregistration Inside Vote and Register Now!

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and more about Oregon lakes!

Oregon Lakes Association

ANNUAL MEETING

October 21, 1995
Portland State University
Room 236, Smith Memorial Center

URBAN LAKES AND RESERVOIRS: MORE THAN JUST FOR LOOKS!

TENTATIVE AGENDA

- 9:30 Registration/Coffee/Pastries
- 9:50 Welcome Mark Sytsma, OLA President
- 10:00 Columbia Slough: Mixing
and Productivity Scott Wells, PSU
- 10:20 Everything That I Know
About Fairview Lake is on My T-shirt Jane Greybill, Fairview Lake
- 10:40 Smith and Bybee:
Are They Really Lakes? Jim Morgan, METRO
- 11:00 Break
- 11:20 Diurnal Variation in Dissolved Oxygen
and pH in Lake Oswego Darin Ash, Lake Oswego
- 11:40 Scientific Approaches to Assess
Water Quality for Urban Lakes Paul Ash, Lake Oswego
- 12:00 Lunch
- 1:30 Bull Run Lake: Its Natural History Doug Bloem, Portland Water Bureau
- 1:50 Effective Watershed Management
for Surface Water Supplies Dick Robbins, Portland Water Bureau
- 2:10 Break
- 2:20 Business Meeting All Welcome
- 3:30 Adjourn

Parking is free in the PSU parking structure located on Broadway between Hall and Harrison. Smith Memorial Center is located at 1825 SW Broadway, across Broadway and one block down from the parking structure.

Preregister now!

Use the registration form provided on page 15.

Meet in PDX in March

OLA will join the Western Aquatic Plant Management Society (WAPMS) and other western chapters of the North American Lake Management Society (NALMS) in cosponsoring a symposium on nonnative aquatic pest species next spring in Portland. The symposium, set for 27 March at Portland State University, will feature invited speakers who will provide updates on the biology, impacts, and management of aquatic pest species currently present in, or threatening to invade, the Northwest.

Following the one-day symposium, WAPMS will hold its annual meeting, which will focus on aquatic weed biology and management. Concurrently with the WAPMS meeting, OLA will host a regional meeting of western state chapters of the NALMS. Chapter representatives from Washington and California will join Oregonians in a discussion of regional approaches to dealing with invasive, nonnative aquatic organisms and methods and programs for increasing citizen involvement in lake management in the West.

The meetings and symposium will provide an opportunity to meet and discuss lake management issues with a number of people with a variety of experience. Please try to attend the meeting. Better yet, volunteer to help in the organization of the meeting—there is much to do. You are guaranteed to meet a number of interesting people with a common interest—better management of our lakes. Contact Mark Sytsma (725-3833) for information and/or to see what you can do to help out.

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◆ Secchi Award winners – supplied services and meeting support in addition to membership.

Meeting Schedule

October 21, 1995 – Annual OLA Meeting. Portland State University. Urban Lakes. Contact Bill Wall for information (666-0418).

March 27 to 29, 1996 – Aquatic Pest Symposium and WAPMS/OLA/WALPA meeting. Contact Mark Sytsma for information (725-3833).

November 6 to 11, 1995 – 15th International Symposium on Lake, Reservoir, and Watershed Management. Toronto, Ontario. Contact NALMS for information ((608-233-2836).

Florence Meeting a Success

OLA held a Regional Meeting in Florence on June 3, 1995. Approximately 40 people attended including members from Clear, Garrison, Mercer, Muncel, Tenmile and North Tenmile, and Woahink Lakes.

The focus of the meeting was to: 1) identify issues and concerns that are affecting coastal lake quality; 2) learn about two new programs that will help address many of the lake issues - the Coastal Nonpoint Program being developed by the Department of Land Conservation and Development (DLCD) and Department of Environmental Quality, and a program to help encourage and support local watershed councils in addressing water quality issues that is being supported through the Water Resources Department (WRD); and 3) identify areas where OLA can play an important role to address coastal lake issues. A summary of the meeting and discussions will be featured in the next newsletter.

OLA would like to thank the speakers who took time on their Saturday mornings to meet with the Association - Jeff Weber (DLCD), Bob Rice (WRD), Dave Dickens (Northwest Resource Conservation and Development) and Jim Brown (City of Lakeside).

After the meeting, OLA held a picnic and litter clean up and Cleawox Lake. A special thanks goes to Bob

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Who Owns the Lakes?

2. The Water

Reed Benson, WaterWatch of Oregon

A fundamental principle of Oregon water law is that all the waters of the state, whatever their source, are owned by the public. Thus, the simplest answer to the question of who owns the water in Oregon lakes is, "We all do."

It isn't quite that simple, however. While the public owns the water in Oregon lakes, the state allows that water to be withdrawn and used for a variety of purposes—household uses, irrigation of crops and lawns, watering of livestock, etc. The state issues "water rights" for these purposes to individuals, businesses, cities, special districts, and other entities.

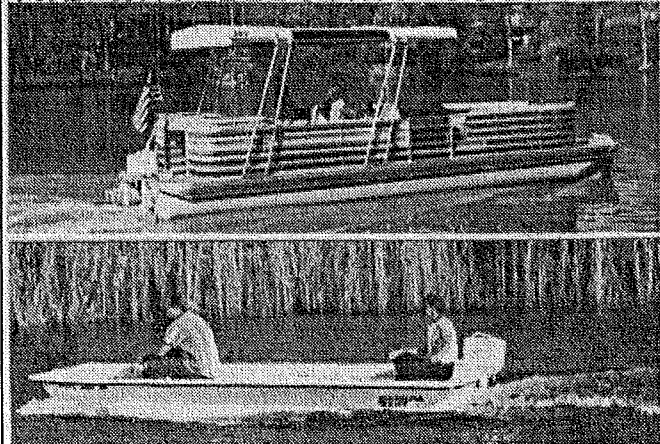
When the well's dry, we know the worth of water.

— Benjamin Franklin,

Poor Richard's Almanac (1746)

A water right allows its holder to use water under certain terms and conditions. The source of water, place of withdrawal, purpose of use, and quantity of water are specified. In addition, each water right carries a "priority date," with the oldest rights having the highest priority. This means that if a lake has insufficient water to supply all water right holders at a given time, those with the most junior rights get nothing.

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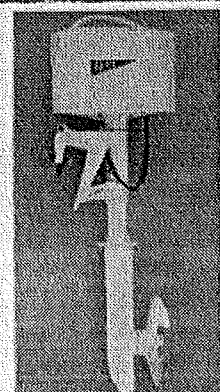
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Changes in Water Quality Standards Proposed

Under Section 303 of the Federal Clean Water Act, states must review their water quality standards every three years to incorporate the most recent scientific findings and to reflect evolving priorities within society. After a review, the Oregon Department of Environmental Quality (DEQ) has proposed amending Oregon's rules on groundwater nitrate, dissolved oxygen, temperature, pH and bacteria. The proposed rule changes are subject to public comment.

Public hearings on the proposed new rules will be held at the following dates and places:

La Grande September 5, 1995
Medford September 6, 1995
Newport September 7, 1995
Portland September 12, 1995

Written comments can be submitted before 5 pm on September 19, 1995.

Copies of the proposed changes can be obtained by contacting DEQ at 1-800-452-4011 or 229-5279.

DEQ will evaluate comments on the proposed rule changes and make a recommendation to the Environmental Quality Commission. Interested parties can request to be notified of the date the Commission will consider the changes by writing to DEQ at:

Department of Environmental Quality
Water Quality Division
811 SW 6th Ave.
Portland, OR 97204

Research Frontiers in Inland Water Ecology

Fresh water is a strategic resource in a rapidly changing world. It is a source of energy, an avenue of transportation, provides habitat for a myriad of organisms, and is essential for life. Fresh water shapes the physical landscape, is a central feature of climate, and exerts major influences on economic growth and demographic patterns.

Inevitably, as the human population increases, more and more demands are being placed on freshwater ecosystems. Already, sufficient clean

water and healthy aquatic habitats have become a rare natural resource. Understanding the abilities and limits of freshwater ecosystems to respond to human-generated pressures has become vital to long-term societal stability, say scientists who study these ecosystems. These are problems for basic science, according to the researchers; they reflect national and global needs, and they are happening now.

According to a newly released report funded in part by the National Science Foundation, *The Freshwater Imperative: A Research Agenda*, scientists and managers are increasingly called upon to provide a predictive understanding of freshwater ecological systems, but are unable to respond effectively at a scale commensurate with the issues involved.

There are two main reasons for this, say the report's authors: "The funding and infrastructure for freshwater sciences have dwindled while U.S. government agencies expend enormous resources on ineffective management activities that have a poor scientific foundation. And the current dependence on short-term studies does not allow for the separation of human-caused changes from natural environmental change."

Changes in the distribution, abundance, and quality of freshwater resources in this century represent a strategic threat to the quality of human life, the environmental sustainability of the biosphere, and the viability of human cultures, says the report.

"The United States is facing, in a real sense, a freshwater imperative. Will freshwater sciences and manage-

ment be ready to meet this challenge? As demands for freshwater resources increase, resource managers and policymakers must ensure that the benefits from water use and the protection of water resources are optimized."

Over the long haul of life on this planet, it is the ecologists, and not the bookkeepers of business, who are the ultimate accountants.

— Stewart L. Udall,
speech to Congress (1970)

The report identifies a number of deficiencies in the national infrastructure supporting freshwater sciences, including inability to predict the future vitality of altered environments, to combine environ-

mental and socioeconomic sciences into an integrated ecosystem perspective, and to provide a research and education framework that allows an effective response to emerging issues.

Two years ago, the National Science Foundation and other agencies awarded funding to a leading group of aquatic scientists to identify research opportunities and frontiers in the freshwater sciences for this decade and beyond. The new report summarizes the results of their effort. The *Freshwater Imperative* research agenda dis-

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Health Risks in Eutrophic Water Supplies

As recently as the early 1900's, waterborne diseases like typhoid fever, dysentery, and cholera were relatively common, especially in heavily populated areas of the U.S. For example, in some major cities the death rates due to typhoid fever were as high as 140 per 10,000 persons, and infant mortality rates due to diarrhea alone were 50 per 1,000 persons. Since the introduction of chlorine as a disinfectant in water treatment, however, these diseases have been practically eliminated.

Despite the eradication of these diseases, the American public is becoming more sensitized to drinking water quality and its association with other health risks. Ironically, some of these health risks are associated with substances produced when surface water is chlorinated. These substances are referred to as disinfectant by-products or DPBs. Trihalomethanes (THMs), a group of DPBs produced when chlorine reacts with naturally occurring organic matter (THM precursors) in surface water supplies, have received considerable attention from regulators, water supply managers, and the public because they have been shown to have carcinogenic and mutagenic properties.

Because of their potential health risk, the U.S. EPA has set a maximum contamination level (MCL) of 100 ug/L for THMs in treated drinking water. Many municipalities cannot meet these limits, however, and are faced with costly changes in their treatment plant operation. An alternative to changing treatment protocol would be to reduce the amount of THM precursors in surface water *before* it reaches the treatment facility. In order to do this, specific sources of THM precursors must be identified so that effective and cost efficient manage-

ment strategies to reduce them can be implemented.

What are the potential sources of THM precursors? Studies have identified terrestrial as well as in-lake sources. Terrestrially derived precursors tend to be humic in nature and are produced from decomposing plant material. These may enter a lake or reservoir via tributaries that receive particulate and dissolved organic material from the watershed, surrounding wetlands, and from direct deposition of particulate material from the shoreline (autumn leaves). Internal sources include algae and macrophytes (aquatic weeds), which produce THM precursors while alive and when they decompose. Lake and reservoir sediments have also been implicated as a source of THM precursors.

The relative importance precursor sources will vary between lakes and reservoirs. However, there are externally driven processes, collectively called eutrophication, which greatly enhance the production of THM precursors within surface water supplies. Therefore, an understanding of eutrophication is important in determining measures to reduce THM precursors and their sources.

Eutrophication is the excessive loading of particulate and dissolved inorganic and organic material to lakes and reservoirs, leading to increased biological production and decreased volume. Eutrophication increases the amount of THM precursors in a water supply by increasing the external load of THM precursors and by increasing the abundance of algae, macrophytes and organically enriched sediments. Eutrophication is also linked to THM production in other ways. Eutrophication is known to increase pH, blue-green algal abundance and hypolimnetic oxygen depletion, all of which directly or indirectly increase precursor concentrations.

There are land management practices and in-lake/reservoir procedures that can be implemented that may reduce THM precursors in surface waters. These include sedimentation basins, nutrient diversion and inactivation, weed harvesting, and algicides. The effectiveness of any one or combination of these techniques in reduc-

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Contact Joseph Eilers

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ing THM precursors in a water supply will depend on the problems and characteristics of the particular lake or reservoir. Therefore, a detailed diagnostic description of the trophic state of a water supply (how eutrophic it is) and the forces driving it to that state must be performed.

It should be noted that there may be areas (ecoregions) in the U.S. which, because of their soil type, vegetation, slope, precipitation, etc., have naturally high loads of nutrients and organic material to streams and tributaries which contribute and/or stimulate THM precursor production in water supplies. In these ecoregions it might be very difficult, if not impossible, to reduce THM precursor levels to current standards without implementing land and in-lake/reservoir management programs.

Surprisingly, there is little documentation of the actual effectiveness of specific management techniques in reducing THM precursors. This stems from the lack of monitoring data for water supplies, before and after management practices have been implemented. A survey conducted by Cooke and Carlson (1989), found that "only a small number of utilities know enough about

their water supply to know whether their use of a particular management practice was effective or how long an effect had persisted." They concluded that most utilities do not know enough to be certain of the causes of their problems and appropriate steps to be taken to improve them.

A water supply/watershed monitoring program is necessary to develop an effective THM precursor management strategy. A monitoring program is also important a way of detecting changes in water quality over time, either to assess the effectiveness of management techniques or to detect declining water quality due to eutrophication.

Proper land and in-lake/reservoir management programs may provide a cost-efficient and effective means of improving drinking water supplies by reducing THM production. It must be stressed, however, that there are many questions to be answered about the effectiveness of management techniques, both specifically and on an ecoregional basis. Further research in this area is needed if we are to answer these questions.

From Martin, A. and G.D. Cooke. Health Risks in Eutrophic Water Supplies. LakeLine 14: 24-26.

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Two points are worth making about this system of "prior appropriation" of water. First, a person who owns property along a lake *is not* automatically entitled to withdraw water from the lake for use on that property. Such a withdrawal would violate state law unless authorized by a water right.

Second, state water law allows lakes to be drained totally dry by the exercise of water rights. The State of Oregon, however, may establish a water right to protect a certain water level in a lake. These in-lake rights are intended to keep lakes from being drawn down below specified levels, but they do not provide absolute protection. Water users with rights predating the in-lake right can still drain the lake below the state's minimum level. Moreover, the only lake with such a water right as of 1994 was Borax Lake in southeastern Oregon. For more information, call WaterWatch at (503) 295-4039 or the Oregon Water Resources Department at (800) 624-3199.

OLA Comments on Lake Abert Management

OLA has responded to the Bureau of Land Management's (BLM) Environmental Impact Statement for the proposed Lake Abert Area of Critical Environmental Concern in Lake County. Joe Eilers, a Past-president of OLA, authored the response. Joe pointed out that the future of Lake Abert appears to hinge, not on execution of one of the management alternatives proposed by BLM, but rather on the interpretation of its navigability and ownership of the minerals in the water. OLA's concern is that a ruling that Lake Abert is non-navigable and that the minerals in the water are not state-owned could leave the lake highly vulnerable to mining interests. OLA urged the BLM to use its influence as the federal land manager to argue for policies that protect these resources for the public rather than facilitate mineral extraction.

OLA offered to assist BLM in efforts to maintain the quality of Lake Abert and other lakes on BLM lands.

Urban Fishing Opportunities

Al Smith, Oregon Department of Fish and Wildlife

Oregon is changing. For those of us who grew up in rural Oregon, it is hard to accept that this state is becoming urbanized, but it is. Most Oregonians now live in cities and towns.

What is upsetting to those of us paid to think about such issues is that the percentage of anglers in our population is declining, especially in the cities. This all leads me and others to think we need to try and reverse this trend.

Why? Well, because fishing is really good recreation; one that a person can pursue all of his/her life. But we are most concerned about kids fishing. Studies have shown that most adults learned to fish as kids, and that's where we are losing anglers.

Fishing can instill in kids an appreciation for the out-of-doors; it teaches them the value of the natural environment compared to concrete and asphalt. Urban kids who learn about habitat as a place for fish and wildlife will grow up with these values and as adults apply them beyond just the place they learned to fish.

Warmwater fish are well fitted for the less than pristine conditions usually present in the type of water suited to kids' fishing: bank fishing in ponds. Panfish reproduce on their own and are easy to catch. Increasing opportunities for urban warmwater fishing is a high priority with my program. It also ties in nicely with Angler Education, which teaches kids to fish and instills the outdoor values I mentioned above. In cities there are lots of kids, and in cities is where the greatest need is for helping convert kids into kids that fish.

I've laid verbal groundwork for the next step; increase urban angling opportunities and teach kids to use them. We are doing the latter very well; the former is difficult. For example, I've seen aerial photos of greater Portland. There are a lot of ponds. One would think it would be easy to get access to them. It isn't. Ponds on commercial property are often prohibitively expensive. Easements for public angling on private property are difficult to obtain. Property owners are worried about liability, trash, vandalism, and parking. Some ponds are just not safe because of pollution, steep sides, etc. One

pond we considered a while back had an important population of painted turtles, a special animal that is declining rapidly and which has specific habitat needs. We couldn't disturb the turtles.

The solution appears to me to be patience combined with persistence. The Department of Fish and Wildlife is not a land management agency like local parks departments. The key is for agencies with different capabilities to work together on urban fishing projects. It often takes private funding and lots of citizen volunteer effort to keep a project moving. It takes time to find sites, to find ways to overcome obstacles and finally to fund and implement projects. For me, progress is frustratingly slow.

But we are moving ahead. The Oregon Bass and Panfish Club, Oregon Heritage Foundation, Metro, and Department of Fish and Wildlife are working on such Portland-area projects as fishing piers on the Willamette, trying to get access to ponds at Whittaker School, working on Project Lake on Sauvie Island, and cooperating on Cedar Island access with West Linn. Further out of town, work is being done at Recreation Lake near Trojan and at Government Cove near Cascade Locks. Urban angler access doesn't have to be in big cities. The Department of Fish and Wildlife is also working with local agencies on angler access projects in Bend, Grants Pass, Independence, and Ontario.

There are dead ends in this business of urban fishing access. Progress is incremental, not flashy. But if we in the warmwater fishing community work together with patience, we will make a difference.

The Cascade Research Group

John Salinas
Environmental Scientist

We document lake conditions and recommend water quality improvement activities.

P.O. Box 404
Murphy, OR 97533

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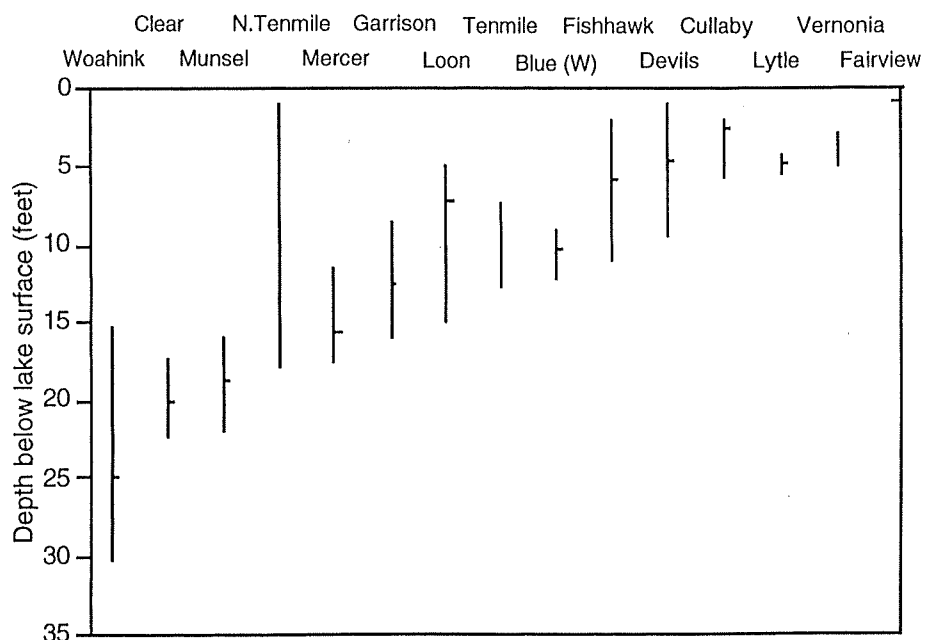
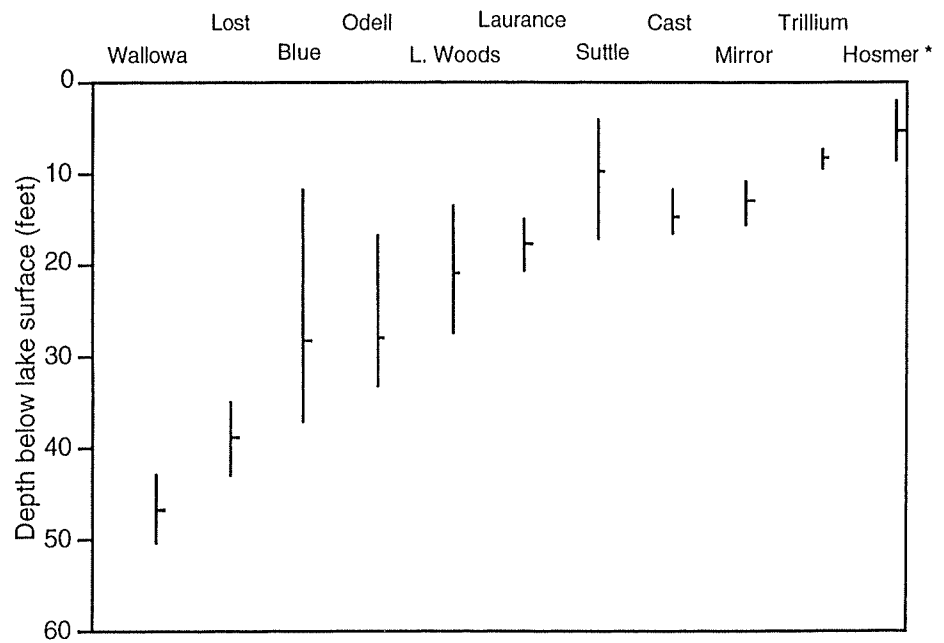
Citizen Lake Watch News

Summer 1995

Program notes

Citizen Lake Watch is a volunteer lake monitoring program coordinated by Portland State University under a grant from the U.S. Environmental Protection Agency and the Oregon Department of Environmental Quality. Citizen Lake Watch was funded under the Clean Lakes Program (Section 314) of the Clean Water Act. Unfortunately, funds for the program in 1995 were eliminated by the President and Congress. Partial funding for PSU coordination of the Program in 1995 were obtained by DEQ under the Nonpoint Pollution Program (Section 319) of the Clean Water Act. Additional support from the Oregon Department of Agriculture for the Hydrilla Watch Program will enable the Citizen Lake Watch Program to continue through 1995. DEQ has requested full funding of the Program under the Nonpoint Pollution Program for 1996, however, funding is reviewed annually and without vocal support all programs are subject to the budget-cutting axe.

The figures at the right summarize the Secchi disk transparency data collected by volunteers in the Citizen lake Watch Program in 1994. The vertical line represents the range in Secchi disk depth recorded. The short horizontal line indicates the average summer (June through August) Secchi depth. (* the Secchi disk was on the bottom of Hosmer Lake.)





Lake Watch Volunteer Roster

Jack Jenkins	Fishhawk	Richard Hiersche	Lytle
Bob Anderson	Woahink	Richard Kaufmann	Loon
Janette Goolsby	Cullaby	Steve Kaufmann	Loon
Koren Marthaller	Blue (Willamette)	John Richter	Vernonia
Elmer Waite	Clear	Stephanie Harte	Lawrence, Lost
Gary Lovegren	Blue (Cascade)	Kristi Hickox	Rock Creek Reservoir
Barbara Hagerman	Devils	Ryan Nieman	Trillium, Cast, Mirror
Warren Phillips	Devils	Paula Curry	Trillium, Cast, Mirror
Bill Vaughan	Devils	Sally Thomas	Tenmile Lakes
Al Rice	Devils	Edward Lopez	Tenmile Lakes
Robert Johnson	Fairview	John Kelsey	Tenmile Lakes
Don Martin	Garrison	Hazel Freeland	Tenmile Lakes
Max Peel	Hosmer	Ken Freeland	Tenmile Lakes
Catherine Hayes	Lake of the Woods	Dan Jordan	Tenmile Lakes
John and Janet Milandin	Odell	Dean Anderson	Tenmile Lakes
Ron Boehi	Mercer	Franklin Gray	Tenmile Lakes
Al Burhans	Munsel	Lake Oswego Corp.	Lake Oswego
Roy Fisher	Munsel	Wally Otto	Hagg Lake
Fred Barstad	Wallowa	Kathy Arndt	Neacoxie Lake

Late-breaking News!

The U.S. Army Corps of Engineers will begin participating in the Citizen Lake Watch Program under a pilot project at Fern Ridge Reservoir in 1996. The pilot program will expand to include Cougar Reservoir in 1997.

All volunteers should have received a copy of the Citizen Lake Watch annual report from DEQ. If you haven't received your copy call Mark Sytsma at 503.725.3833.

Control of Runoff and Sedimentation

Sediments are always washing into lakes, ponds, and reservoirs. When the rate becomes excessive because of human activities in the watershed, this hardly noticeable process becomes more and more destructive. Serious damage can be done even before an obvious buildup of sediment announces the problem to the casual observer.

Among the more subtle effects are:

Light limitation. Sunlight penetration is reduced and primary production falls. Fish and other aquatic forms that feed on algae and minute plant life will have less food available. In addition, the efficiency of oxygen production by green plants may be seriously impaired.

Fish diseases. Suspended sediments irritate fish gills. Abrasions on the gill linings invite parasites and disease organisms to prosper. Desirable gamefish that rely on sight to locate prey become less competitive.

Hatching areas. Many aquatic animals lay eggs on the lake bottom. Of particular interest in many lakes, salmonid (trout) eggs and young fry depend on an oxygen-rich environment in the bottom gravel. When sediment fills the voids between the gravel, eggs and fry die.

Safe territories. Rough bottoms provide some young fish an ideal nursery. Salmon establish territories based

Continued on page 3



Continued from page 2

on how far they can see. As the bottom smooths over, the fish can see farther. This reduces the number of territories and the number of fish that the area can support.

Food. Aquatic insects and other small organisms living on the bottom that are prey for fish may be eliminated. Sediment deposition may reduce food availability.

Nutrients. Soil particles carry adsorbed nutrient into lakes that can fuel algal growth. Erosion may also carry manure, fertilizers, and other organic material into lakes.

Loss of surface area. Deposition of sediment at the shoreline and near inlet streams reduces the lake circumference as the lake fills in.

Best Management Practices

Techniques designed to reduce soil loss or prevent surface runoff from increasing sediment and nutrient loading to waterbodies are known as best management practices, or BMPs. BMPs for sediment control include agricultural practices such as conservation tillage and terracing, forestry practices such as replanting cut areas, mining that restores the land as work progresses, and numerous methods of diverting and trapping sediments before it can enter a waterbody.

Controlling the flow of surface water has long been recognized as a principal means of preventing excessive sediment and nutrient loading.

Flow Control

Running water carries sediments, excess nutrients, and debris into lakes. One approach to reducing damage from runoff is to reduce the speed and direction of this running water. The devices used to control water flow range from simply a good, healthy crop of grass to structural controls such as dikes, holding ponds and ditches.

Rain falling on a roof has nowhere to go but down—and rapidly. The streaming water from rooflines hits the ground with greater force and concentration than the rainfall itself.

Over the years, home owners have become highly aware of the need for roofline gutters to protect their homes. Nearly all home owners recognize the need for a splash block or gravelled area at the end of a downspout to protect the soil beneath the spout opening.

These devices may not be enough, however. Where does the water go next? If the house is on flat or gently sloped land the flow of water will slow and most will gradually soak into the ground. If the home site is on a slope over 10 percent, however, rainfall and snowmelt run down slope too rapidly to soak in on nearly all soil types.

Runoff increases with

- the intensity of the storm,
- the impermeability of the soil type,
- compaction of the soil,
- extreme dryness (until the soil is wetted enough to allow infiltration),
- saturation from previous rainfall or snowmelt,
- slope, and
- absence of growing vegetation, mulch, or leaf layer.

A good stormwater design for home site grading would include a five-degree slope on a three-foot perimeter around the home, and a two percent slope over the remainder of the site to control runoff. The five-degree perimeter slope can be easily achieved by proper backfilling during home construction. On hilly, or rolling land, however, a two-degree slope for the remaining site may be impossible. Instead, runoff must be collected and guided to a safe area such as a grassed waterway or infiltration area. These areas may need further additional protection from infilling sediment carried in the runoff.

Continued on page 4



Continued from page 3

Several drainage methods are simple to construct and within the means of lake associations and home owners.

Terracing. Steeply sloped yards are as serious threat to nearby lakes, ponds, and streams. Soil loss may be quite high, which will degrade the topsoil and the closest waterbody. In addition, yards and parks that receive routine fertilization may contribute excess nutrients to the runoff.

Ambitious home owners can terrace small areas by hand. Rocky soils, steep slopes, and large areas may require hiring a contractor to grade and backfill.

Steep terrain will also require retaining walls. If the property is fronts on a lake, the final terrace should incorporate a berm and swale for additional protection against runoff entering the lake directly. Maintaining native shoreline vegetation can also reduce pollution from lakes and ponds by surface runoff. Vegetation alone may secure a 45-degree slope of six feet or less in vertical height.

Swales and berms. Swales and berms create an undulating surface that slows the rate of flow and redirects some of the flow perpendicular to the slope. It is rarely necessary to regrade an entire site; existing contours may be rebuilt or only a portion of the land may be swaled. In practice, the berms stop the water and the swales hold it for a short time. It is best to place berms and swales where traffic will be light during a storm.

Holding Stormwater

Controlling stormwater flow may solve the greatest portion of runoff problems in your watershed. Sometimes the stormwater requires a holding system as well. Holding may be necessary when:

- volume of flow is too great to be controlled by small trenches and sloping,
- water treatment is required before discharge into a stream or lake, and/or
- sediment load is high and settling is required before discharge.

Holding systems range from large-scale projects, not generally undertaken by individual home owners, to small systems that could easily fit on a home owners lot.

Percolation basins allow collected water to seep slowly into the ground. They could be a natural depression at the foot of a slope or a shallow excavated area. These basins can be lined with large rock or gravel to present an attractive appearance when dry. On most sites, however, the berm and swale system is cheaper to construct because few lots naturally drain via one or two major routes. Percolation basins are more typically constructed as part of large-scale developments as part of an overall drainage plan.

Stephanie Weise Joins Lake Watch Staff

Many of you have already know Stephanie Wiese's voice from her tireless phone contacts. Stephanie is an Senior at PSU where she is pursuing a degree in Environmental Sciences. She has lived all of her adult life and raised two sons in Oregon. She is interested in a career in natural resource management that will combine her academic

and life experience as a small businessperson in the nursery and landscape tree industry. Stephanie is a welcome addition to the Citizen Lake Watch Program. Her enthusiasm is contagious and her experience has added a new dimension to the program.

The Citizen Lake Watch Program is coordinated by Portland State University under a grant from the Oregon Department of Environmental Quality and the U.S. Environmental Protection Agency. The goal of the program is to involve citizens in the collection of reliable water quality data in an effort to identify long-term trends in the water quality of Oregon's lakes. For more information about the Citizen Lake Watch Program or Lake Watch News, contact Citizen Lake Watch, ODEQ, Water Quality Division, 811 SW 6th Avenue, Portland, OR 97204 (1-800-452-4011), or the Citizens Lake Watch Coordinator at Portland State University at 725-3833.

Lake Watch News is available in alternate format (e.g., braille or large type) by contacting DEQ Public Affairs at 229-5766 or toll-free in Oregon 1-800-452-4011. People with hearing impairments can also contact DEQ's TDD at 503-229-6993.

Continued from page 1

Hydrilla growth in the lakes is rapid. The PSU scientists sampled the hydrilla on July 15 and 31; during that two week period the biomass of hydrilla doubled. The lakes also contain Eurasian watermilfoil (*Myriophyllum spicatum*), although no milfoil was found growing in dense hydrilla beds.

The plant was discovered during a King County lakes survey in September 1994, but the Department of Ecology (DOE), which coordinates the Aquatic Weed Management Program in Washington, was not notified. The plant was "rediscovered" in May when DOE staff were reviewing a report on the lakes.

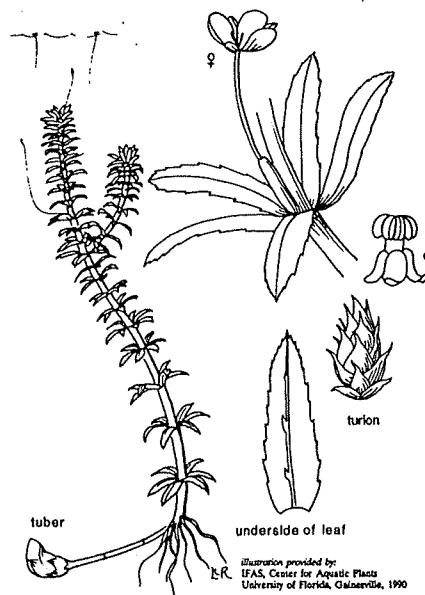
During the annual meeting of the Aquatic Plant Management Society, which coincidentally met in Bellevue in July, a Technical Advisory Committee was convened. The committee was comprised of aquatic plant management experts from Florida, North Carolina, Mississippi, South Carolina, California, and Oregon. The committee recommended, immediate treatment of the infestation with herbicide. Immediate treatment was deemed critical to remove the plant from the lake prior to the formation of tubers and turions, and to prevent spread of the plant by fragments. The committee also recommended listing of hydrilla as an "A" weed in Washington and expediting the permitting process to facilitate control. Intensive monitoring of the infestation after treatment and survey of nearby lakes was also recommended. Retreatment with herbicide or grass carp was recommended when regrowth occurs.

DOE has implemented most of the Task Force recommendations. The lakes were treated with Sonar (fluridone) on August 4 and 18. Public meetings are planned this winter to discuss long-term management options. According to Kathy Hamel, with DOE, there seems to be more opposition to stocking triploid grass carp than to repeated herbicide treatments.

The source of the infestation is unknown, however, ornamental water lilies are present in the lakes and the hydrilla may have been introduced as a contaminant of the lily tubers. Under a grant from the Oregon Department of Agriculture, Portland State University will be conducting surveillance of Oregon waterbodies this summer. A contingency plan will also be developed, which

will outline management options for hydrilla in Oregon. All Oregonians interested in lakes should be on the lookout for this pest. Please refer to the line drawing; if you find a plant that you suspect is hydrilla please call Mark Sytsma, at Portland State (725-3833).

Hydrilla verticillata



Response to Lake Complaints Unsatisfactory

Volunteers in Oregon's Citizen Lake Watch Program are encouraged to be good stewards of the resource and to watch for activities in the watershed of the lake they monitor that may degrade water quality. A recent survey found that of the four volunteers who reported watershed activities that could degrade lake water quality to government agencies (city and state), none reported a completely satisfactory response and correction of the problem.

Continued from page 3

Anderson for making local arrangements (meeting room, coffee, donuts and food for the picnic) and to Jeff Farm with Oregon State Parks for working with OLA on the picnic and cleanup.

Devils Lake Revegetation

For many years recreation on Devils Lake, which is located on Oregon's central coast near Lincoln City, was degraded by nuisance aquatic plants, most recently the exotic Brazilian elodea (*Egeria densa*). Introduction of triploid grass carp in the mid 1980s, with supplemental stocking in 1994, eliminated all vegetation from the lake. Lack of sediment-stabilizing vegetative cover has led to changes in fish populations, resuspension of sediments and algae blooms.

In an effort to restore balance to the ecosystem, the Devils Lake Water Improvement District and Portland State University have implemented a revegetation program. Exclosures were erected in the lake to prevent grass carp grazing. Sago pond weed and water celery were planted in some exclosures and others were left unplanted.

Preliminary results indicate that the plants have become established in the exclosures. The exclosures that were left unplanted have become colonized by native species, including waterwort (*Elantine*) species, a low growing species that has that is also present outside the exclosures. Grass carp apparently find waterwort unpalatable. This low growing species has established a carpet on the lake bottom, which may stabilize sediments and reduce internal nutrient loading and algae blooms.

An interesting possible side-effect of the elimination of the nonnative Brazilian elodea from Devils Lake has been a resurgence in coho salmon returns to Rock Creek, a tributary to Devils Lake. Changes in the fish populations in the lake may have reduced predation on smolts that rear in freshwater before returning to the sea. The Oregon Department of Fish and Wildlife is currently evaluating priorities for fish management in Devils Lake.

Continued from page 11

Langdon's visit to a lake is a first for a DEQ Director, and hopefully points out that lakes deserve attention in the overall water quality plans. The one-on-one discussion was very educational. I want to personally thank the Director for taking the time to visit Lake Woahink. We were left with positive thoughts and feel that Oregon has a winner in Langdon.

Milfoil Herbivore Survey

Researchers recently surveyed 19 lakes in Minnesota and 6 lakes in Wisconsin for Eurasian watermilfoil herbivores. They found the weevil *Euhrychiopsis lecontei* at 13 sites in 10 lakes. A midge, *Cricotopus myriophylli*, was found at eight sites in six lakes. A moth, *Acentria ephemerella*, was found at five sites. All three herbivores were found in both states. The weevil and moth had been reported previously in Wisconsin but not in Minnesota. This is the first report of midge outside eastern Ontario and British Columbia. The moth, which consumes Eurasian watermilfoil, is a species that has become naturalized in North America. The midge and weevil, which consume both Eurasian watermilfoil and the native Northern watermilfoil, are believed to be native to North America.

From R.M. Newman and L.M. Maher. New records and distribution of aquatic insect herbivores of watermilfoils (Haloragaceae, Myriophyllum spp.) in Minnesota. Entomological News, 1995, V106: 6-12.

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Aquatic Weed Meeting in Washington

The Aquatic Plant Management Society, an international organization of scientists, educators, students, commercial pesticide applicators, administrators and concerned individuals interested in the management and study of aquatic plants, held its annual meeting in Bellevue, Washington on July 9-12, 1995. Terry McNabb, President of Resource Management, Inc. (a Corporate member of OLA) was the Program Chair for the meeting.

The program included timely papers on hydrilla impacts and management in Florida, California, and South Carolina. Other presentations included reports on the efficacy and impacts of various aquatic plant management techniques such as herbicides, biological control, diver dredging, and grass carp. PSU graduate student Keith Perkins made a presentation on aquatic vegetation management in Oregon, and won a copy *Aquatic Weeds. The Ecology and Management of Nuisance Aquatic Vegetation* by A.H. Pieterse and K.J. Murphy.

A major topic of conversation throughout the meeting was the recent elimination of the U.S. Army Corps of Engineers Aquatic Plant Control Program by the President and Congress.

Other OLA members who attended the meeting included Dave Wagner, Mark Sytsma, Harry Gibbons, Jean Jacoby, SePRO, and Aquarius Systems. Next year, APMS will meet in Burlington, Vermont.

\$\$\$\$\$

Fund-raising Opportunity Proposed

OLA's parent organization, the North American Lake Management Society, has proposed a fund-raising activity for its chapters – collectable plates. According to the NALMS Executive Director, Charles Gardner, sales of the plates could generate funds that OLA could use to do good things for our lakes and members. Plate-collectors, or anyone else, interested in learning more about this funding-raising opportunity are encouraged to contact an OLA Board member (phone numbers on cover).

A DEQ First:

Director Visits a Lake!

Bob Anderson, Lake Watch Volunteer, Woahink Lake

Langdon Marsh, the new Director of the Oregon Department of Environmental Quality (DEQ), stopped en route from Bend to Newport to tour Lake Woahink on August 20. Langdon was shown some of the problems that threaten Woahink's oligotrophic status and its ability to provide drinking water to over 200 households and Honeyman State Park.

We viewed the newly introduced weed, parrotfeather, and talked about how nonnative weeds get introduced into lakes and their problems. The watershed of the arm that has the parrotfeather also has a serious erosion problem. Photos and documentation were shown and it was explained that it took three years of frustration before DEQ's stormwater specialist came out. Violations were identified but corrective measures are not in place.

Woahink has four main feeder streams, all Class 1, which flow through forest land (F2). A proposed RV park surrounds two of the streams, and another has a tentative approval for a subdivision now under appeal at LUBA. Aerial photos were shown which helped point out the potential pollution problems. Residents are vigorously opposing these proposals in the Woahink watershed. Langdon asked many questions and shared his thoughts on the importance of watersheds.

Woahink lived up to Langdon's comment, "this is really a beautiful lake". We sited several ospreys and a small flock of murrelets.

Anchoring at one of my test sites, I explained what the Lake Watch volunteers do. Testing for dissolved oxygen was demonstrated and we took a Secchi reading. I urged him not to dismiss the value of Lake Watch volunteers.

After the tour, we tied up at a resident's home and Langdon met several of the members of the Woahink Lake Association. A relaxed question and answer session followed. Langdon said that correcting problems is like turning a battleship. It takes time to move even three degrees (be patient).

Continued on page 10

Computer Assisted Phytoplankton ID

This new multimedia software called Computer Assisted Algal Recognition: Rapid Identification of Common Freshwater Algae Genera (CAAR) was created by Dr. Keith Knutson and Jeremy Sterk. The CAAR package is written for Macintosh (4 meg RAM, System 7 or >) and Windows (386SX20Mhz, mouse, and 4 meg RAM). CAAR is an interactive program featuring 250 genera and 750 example species. Nine graphics screens and one ecology screen allow the user selections for keying specific genera. When done keying, you are provided with five probable genera and with the click of your mouse you can bring up graphic screens of example species to instantly identify the genus under inspection. Many other features are included. Contact the publisher for their brochure and review copy. Wm. Brown Publ., 2460 Kerper Blvd., Dubuque, IA 52001, 1-800-338-5578.

From WAPMS News.

Purple loosestrife Biocontrol Agent Assessment

The Fish and Wildlife Service proposes to release three insect species on Service and other lands in the United States to contribute to the biocontrol of Purple loosestrife (*Lythrum salicaria*), an introduced weed. USFS has prepared an environmental assessment on the release of three insects: *Galerucella californiensis*, *Galerucella pusilla*, and *Hylobius transversovittatus*. These insects are not native to North America. You may obtain a copy of the report by sending an e-mail message to Meridith_Caballo@mail.fws.gov. Include your name and mailing address in the message. The document is also available on the world wide web server at <http://bluegoose.arw.r9.fws.gov/nwrsfiles/habitatmgmt/loosestrifemgmt.html/>.

The Oregon Department of Agriculture has released these insects on Purple loosestrife at several sites in Oregon with good results. Contact Noxious Weed Control at 503.986.4621 for more information.

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Toxic Algae Kills Birds

According to an article in the March 29, 1995 issue of the Los Angeles Times, the deaths of 15,000 eared grebes in 1992 and 20,000 more in 1994 at the Salton Sea national Wildlife Refuge have been linked to high levels of a toxin produced by cyanobacteria (blue-green algae). Tests on dead birds revealed high levels of microcystin in their livers. The grebes probably ingested the toxin by drinking contaminated water. Additional studies are under way to determine if grebes are more sensitive to the toxin than other birds, which overwinter at the refuge, but appeared to be unaffected.

Increased nutrient inputs into the Salton Sea may have contributed to conditions favoring cyanobacteria blooms. Microcystin is produced by *Microcystis aeruginosa*, which has previously been associated with many reports of algal toxicity. *M. aeruginosa* is present in Oregon lakes and reservoirs. For more information on hazards associated with cyanobacteria see chapter 16 of *Algae and Human Affairs* by C.A. Lembi and J.R. Waaland.

Probing the Depths of Tenmile Lake

Joe Eilers, E&S Environmental Chemistry

Work began this May on Tenmile and North Tenmile Lake to develop new bathymetric maps for the lakes and to reconstruct the recent lake history through analysis of the lake sediments. There has been considerable concern in recent years regarding perceived deterioration of water quality associated with lakeshore development, logging, agriculture, and fisheries management. The City of Lakeside is using funds from the Watershed Health program and the Department of Environmental Quality is supporting research by E&S Environmental Chemistry to unravel some of these issues. The first step involved constructing a detailed bathymetric map of the lake using SONAR/GPS methodology. The revised lake map, due out next month, was developed using thousands of electronic soundings and is expected to be a substantial improvement over the earlier map which was constructed with comparatively few manual soundings. However, the major effort of the study is devoted to analyzing the four sediment cores collected from the lakes. The rate of sediment accumulation will be assessed using measurements of a natural isotope in the sediment (lead-210). the long-term sedimentation rate

in both lakes was measured at the base of two long (6.5-ft) cores using another isotope (carbon-14). The age of these deeper sediments was about 2000 years in both lakes.

An experimental technique also will be tested in an attempt to relate the lipids preserved in the sediments to changes in the magnitude of the salmon runs in the watersheds. The lipids are a natural fat produced by the salmon and released into the water as the spawning fish die and decompose. It is believed that historical salmon runs used to number in the hundreds of thousands compared to only several thousand in recent years. The salmon spawn, die, and decompose allowing some of the natural lipids to remain in the sediments. If the technique is successful, it will make it possible to reconstruct changes in salmon runs in other watersheds with lakes.

For additional information, contact Jim Brown with the City of Lakeside (503-759-3011), Avis Newell with DEQ (503-229-6018), or Joseph Eilers with E&S (503-758-1330).

Mercury in Oregon Lakes

Avis Newell, DEQ

The topic of mercury in Oregon lakes, or more precisely, in Oregon's freshwater fish, has been in the news recently. While this may not be a new problem in Oregon, it has been receiving increasing attention in recent years.

In general, there are only a few sources of mercury in Oregon's lakes. Mercury occurs naturally in the mineral cinnabar, sometimes in deposits high enough to make mining of mercury economically feasible. In regions where the cinnabar deposits are close to the ground surface, or where mining has occurred in the past, the mercury can make its way to the lake through the watershed. The other common mercury source is from mercury waste left behind by miners during placer mining activities. Mercury, also known as quicksilver is used to amalgamate gold and silver, separating it from the ore. The mercury is later evaporated off, leaving refined silver or gold behind. Elemental mercury depos-

its can still be seen in water where gold prospecting was high, such as in the Owyhee drainage in eastern Oregon.

In lake sediments, mercury is easily transformed to methyl mercury, a form easily taken up by fish, and a highly toxic form. This form created the mercury poisoning epidemic in Japan, and became known as Minimata disease. While the concentrations of mercury in Oregon fish are not known to kill fish, because mercury is not quickly excreted from the body, it tends to bioaccumulate in predatory fish and in older, larger fish. The concentrations of fish from some Oregon lakes have been high enough for the Health Division to post an advisory. These warn adults to limit their fish consumption from these lakes, and warns that pregnant women and children limit their consumption to even lower levels, be-

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cause these populations are more sensitive to mercury. For the most part, consumption of a single meal of fish from any of Oregon's lakes will not result in immediate illness. However prolonged consumption of fish may result in subtle symptoms. Also, women of child-bearing age who may later have children should limit their exposure to mercury-laden fish, as the fetus is susceptible to much lower mercury concentrations than are children and adults. Mercury causes neurological damage, which can lead to paralysis and death.

What is the State of Oregon doing about this problem? The Department of Environmental Quality is responsible for protecting the environment of Oregon, and is the agency that analyses samples for mercury content. In some cases, environmental cleanup may also be encouraged by the DEQ. The Health Division evaluates the human health risk associated with consumption of mercury-laden fish, and posts the fish advisories. Folks from these agencies and several others have formed a Mercury Working Group where representatives from each member agency shares their knowledge, data and concerns for mercury. The group also acts as a forum for the coordination of mercury studies and related activities. For example, to conduct a health risk assessment, the Health Division may indicate how many samples are required, while the Fish & Wildlife Department will indicate what species of fish should be present, and how heavily the lake is fished. They then collect fish, with the help of DEQ, who analyze the samples, and give the data to the Health Division to complete the risk assessment. Other agencies such as the Army Corps or the Forest Service keep abreast of this work as they are often landowners and lake managers of the bodies in question.

Where is mercury a problem? Oregon has posted mercury advisories on five waters; Owyhee Reservoir, Jordan Creek, and Antelope Reservoir in the far eastern side of Oregon, East Lake in the Newberry Crater, and in Cottage Grove Reservoir in the Willamette Valley. The specifics of each advisory differ in the number and size of meals that are considered safe for consumption in a given time period, due to the varying levels of mercury in the fish tissue. These advisories appear in the fishing and hunting guide that accompany your fishing license.

Does an advisory mean you really shouldn't eat any fish? No. The advisory is written using the assumption that you will eat some fish from that body of water everyday for a time period as long as 30 years. Therefore, if you consume the recommended amount you should not accumulate sufficient mercury to cause health problems. Many folks in our population consume fish irregularly, when on vacation or out for an occasional weekend. If, however, you subsist on fish from freshwaters, the best advice is to fish at many water bodies across the state, avoiding those that have advisories posted. Fish is a healthy food, high in protein, and low in fat. Avoiding all fish because of some known problems may lead you to eat other foods which may also cause health problems.

If you have more questions, you are welcome to contact me, Avis Newell the Mercury Working Group Coordinator, at the Portland DEQ office, (503) 229-6018. I may not have all the answers, but hopefully I can point you in the right direction.

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Oregon Lakes Association:

<http://clas.www.pdx.edu/~perkins/oregonlakes/map.html>

The Wildlife Society - Oregon Chapter:

http://www.orst.edu/Dept/fish_wild/twsindex.html

Ecological Society of America:

http://www.sdsc.edu/l/SDSC/Research/Comp_Bio/ESA/ESA.html

1995 OLA BALLOT

OLA must elect a President-elect and two new Directors. The terms of Richard Raymond and Andy Schaedel as Directors are expiring, and Bill Wall will move from President-elect to President at the Annual Meeting. The new President-elect will serve as Program Chair for the 1996 Annual Meeting and as President in 1996/1997. The new Directors will serve two-year terms. The Secretary (Avis Newell), Treasurer (Dave Wagner), and two other Directors (Margaret Kilansky and Anjala Ehelebe) were elected to two-year terms last year and will continue in those positions next year.

President-elect (vote for one)

- ☐ **Andy Schaedel**, Water Quality Specialist, Oregon Department of Environmental Quality. Founding OLA member, Past-president, and current Director.
- ☐ Write-in _____

Director (vote for two)

- ☐ **Stan Geiger**, Consultant, SRI/Shapiro, Inc. Founding OLA member.
- ☐ **Jack Jenkins**, Accountant, Sager and Associates. Fishhawk Lake resident, Citizen Lake Watch Volunteer.
- ☐ Write-in _____
- ☐ Write-in _____

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Annual Meeting Registration

Registration includes: conference, lunch (for preregistrants), 1996 membership in the Oregon Lake Association, and one-year subscription to *Lake Wise*. Corporate members receive acknowledgement in *Lake Wise*. Association members receive OLA's Lake Resource Library (annual update for renewing Association members).

Please help us keep the cost of the conference low by preregistering.

Individual Preregistration of \$25 must be received by October 11, 1995.

(\$65 for Corporate members)

On-site registration will be \$5 more (Lunch cannot be guaranteed).

___ Check if you do not want to be a OLA member (registration cost is the same).

Name: _____ Organization: _____

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For 1996	Student	\$5
membership only:	Individual	\$10
(no meeting registration)	Association/	
	Public/Nonprofit	\$25
	Corporate	\$50
	Sustaining	\$100+

Amount enclosed _____

**Mail ballot and meeting registration
form to:**

OLA, PO Box 586, Portland, OR 97207
Questions? Call Bill Wall (503) 666-0418

Association News

Woahink Lake

People concerned about Woahink Lake have organized into the Woahink Lake Association and joined OLA as an Association member. WLA used the *Organizing Lake Users Guide* provided by OLA to get started. Officers of WLA include: Darrell Helmuth, President; Bob Anderson, Secretary; and Bill Barnum, Treasurer. Joyce Keener, Susie Navetta, Bob Williams, and Matt Hipkiss are WLA Directors. As are many coastal lakes, Woahink quality is threatened with development and nonnative aquatic plant invasion. Getting organized, like WLA, is the first step in effective lake management and protection.

Fairview Lake

Fairview Lake residents are forming a lake association. Fairview Lake is a shallow, highly turbid lake in eastern Multnomah County with an abundance of active and concerned residents. Fairview Lake has the distinction of holding the record for lowest measured Secchi disk transparency of all the lakes in the Citizen Lake Watch Program for several years running. The lake is located near the Columbia River and most turbidity in the lake is due to wind resuspension of sediments. There are many management issues in and around Fairview Lake and formation of an Association is a valuable step in the development of a consensus on how to best manage the resource.

Continued from page 5

cussed in the report addresses science issues with immediate policy relevance, and discusses fundamental research "to help ensure that today's uncertainties do not become tomorrow's problems."

The Oregon Lakes Association is a nonprofit organization dedicated to the protection and enhancement of Oregon's lake resources and is a chapter of the North American Lake Management Society. Lake Wise is published quarterly by the Oregon Lakes Association, PO Box 586, Portland, OR 97207

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