PORTLAND STATE UNIVERSITY

LAKE WISE

Spring 2001

NEWSLETTER OF THE CENTER FOR LAKES AND RESERVORIS AND THE OREGON LAKES ASSOCIATION

Governor Proclaims Lakes Appreciation Week

In recognition of the importance of lakes, reservoirs, and ponds to the lives of Oregonians, Governor Kitzhaber has proclaimed June 30 to July 8 Lakes Appreciation Week in Oregon. Several activities are planned to celebrate lakes in Oregon during Lakes Appreciation Week. Contact OLA (see page 7) or the Center for Lakes and Reservoirs for information about activities near you. If nothing is planned for your favorate lake organize something yourself: particpate in the Secchi dip-in, go fishing, or organize a barbeque for your lake-loving friends. See page 2 for more information and see page 3 for the Governor's proclamation.

Legislature Acts on Invasive Species

The Oregon legislature has enacts some important legislation that will benefit Oregon in its fight to keep our lakes and other aquatic systems free from the problems caused by invasive, nuisance plants and animals.

Senate Bill 895

Senate Bill 895, sponsored by Senator Messerle, Representative Kafoury; Senators Atkinson, Brown, Carter, Deckert, Gordly, Shields, and Representatives Beck, Brown, Jenson, Johnson, Lee, Merkley, Verger, establishes a ballast water management program in Oregon. The program established by the bill requires ships that enter Oregon ports to exchange ballast water taken on board in a foreign port with mid-ocean water. This requirement is more stringent than existing US Coast Guard rules, which make the exchange voluntary. Exchange is the best method currently available to reduce the possibility of transporting

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The 2001 Oregon Lake Watch (OLW) monitoring season has started strong. We have already added seven lakes and 12 new volunteers to the program! Thanks to the support from the current dedicated volunteers and the excited new volunteers, the program has grown and will allow us to evaluate the condition of more Oregon lakes this year.

The Center for Lakes and Reservoirs at Portland State University coordinates that Lake Watch Program under a grant from the Oregon Watershed Enhancement Board. Carrie Haag, the volunteer coordinator for the Lake Watch Program, will be visiting most of the lakes and volunteers to conduct quality control sampling and to promote continued monitoring. Southern Oregon University (SOU) will be assisting the Center for Lakes and Reservoirs on the Lake Watch Program this year by visiting and answering questions of volunteers in the southern parts of the state. You can contact Carrie at 503-725-3834 with any questions.

Volunteers will have the opportunity to participate in Lake Appreciation Week and the Secchi Dip-In this summer (see page — for additional information).

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Inside this issue

Oregon Lake Watch continued

Also, Lake Watch volunteers will be receiving information on a new aspect of the Program in the mail soon – Zebra Mussel Watch!. We are very concerned about the possible effects of zebra mussel invasion on Oregon Lakes. We are setting up a monitoring program as an early-warning system for these damaging critters. We hope that you will be able to help.

If you have any questions regarding the OLW Program, please contact Carrie at 503-725-3834 or at haagc@pdx.edu.◆

Lakes Appreciation Week and Dip-In 2001

Join the Oregon Lake Watch Program (OLW) in celebrating Lakes Appreciation Week (June 30-July 8) and *The Great American Secchi Dip-In.* The Dip-In is sponsored by the North American Lake Management Society (NALMS) and the US EPA and organizes citizen volunteers in existing monitoring programs to measure water transparency with a Secchi disk (see the January 2001 *LakeWise* issue for additional information on the Secchi disk). The Oregon Dip-In 2001 will require volunteers to take a Secchi disk measurement at the lake they monitor during Lakes Appreciation Week. OLW Coordinators will travel to several lakes throughout Oregon during this week to help participate in this event. We encourage volunteers to use the Dip-In as a springboard for spreading the word about the value and importance of lakes in Oregon. Collected transparency data will be compiled and analyzed at Kent State University. Regional lake transparency trends will be reported in a color map available at "http://dipin.kent.edu/whatis.htm" .

Activities are planned at Fairview, Devils, and Oswego Lakes. Additional activities are in the works.

OLW Volunteers – look for further information on this event in the mail. If others would like to participate in the event, please contact Carrie Haag at the Center for Lakes and Reservoirs (503-725-3834/ haagc@pdx.edu). ◆

Mitten Crab Monitoring Started

Erik Hanson
Center for Lakes and Reservoirs

The Center for Lakes and Reservoirs will continue a program started last year to monitor and conduct outreach for mitten crab in the lower Columbia River in 2001 with funding from the US Fish and Wildlife Service in conjunction with the Pacific States Marine Fisheries Commission. The mitten crab is an invasive catadromous species that spawns in estuarine areas and rears in freshwater. The recent infestation of mitten crabs in the San Francisco Bay has caused many problems with fish passage, water diversion, and taken a toll on native aquatic communities. These same impacts are expected here if mitten crabs become established.

The mitten crab may have been introduced to the San Francisco Bay by ships that discharged ballast water taken on in Asia. Ships from Asia may have been responsible for delivering the one mitten crab that has been confirmed in the Columbia river.

The Center for Lakes and Reservoirs is looking for volunteers to deploy and monitor mitten crab colonization traps in the lower Columbia and other Oregon estuaries. The traps are deployed in the lower portions of estuaries in water 5 to 15 feet deep and need to be checked once a week. If you have an interest in volunteering in the mitten crab monitoring effort please contact Erik Hanson (503-725-3834 or ehanson@pdx.edu).◆

Lakes Appreciation Week Activities

Oswego Lake (Contact Steve Lundt (503-636-1422 ext. 2)

June 30 Educational booth at L.O. farmer's market (8 am - 1 pm)
July 2 Powerhouse tours (noon and 6 pm)
July 3 Dip-In (noon) Gov. Kitzhaber is invited
July 4 Kid's Fishing Derby (9 am - 11 am)
July 6 Lake Aeration tour (noon and 6 pm)
July 7 Water Quality Tour (10 am)

Fairview Lake (Contact Jim Graybill 503-667-4547)

July 4 Evening "Boat-in" and Secchi dipping

LakeWise is published quarterly by the Center for Lakes and Reservoirs at Portland State University with funding provided by the Oregon Lakes Association, PSU, and the Oregon Watershed Enhancement Board.
LakeWise is available in alternate format (e.g., large type or braille) by contacting the Center for Lakes and Reservoirs, Portland State University, PO Box 751, Portland OR 97207-0751 or 503-725-3834

OFFICE OF THE GOVERNOR STATE OF OREGON — PROCLAMATION

WHEREAS: the State of Oregon is blessed with more than 6,000 lakes, reservoirs and ponds with a combined surface area of over 500,000 acres (more than 5 times the size of Oregon's State Park System); and

WHEREAS: lakes, reservoirs and ponds are important resources to the Oregon way of life and its environment, providing sources of drinking water, irrigation, recreation, scenic beauty and habitat for wildlife; and

WHEREAS: Oregon lakes are valuable economic resources for Oregon businesses, tourism and municipal governments; and

WHEREAS: over 25 citizen volunteers have demonstrated their intense interest in Oregon lakes by actively monitoring lake quality over the last 10 years through the Citizen Lake Watch Monitoring Program; and

WHEREAS: the State of Oregon recognizes the need to protect these lakes, reservoirs and ponds for future generations, and a step toward doing this has been through the formation of the Center for Lakes and Reservoirs at Portland State University.

NOW, THEREFORE, I, John A. Kitzhaber, Governor of the State of Oregon, hereby proclaim June 30-July 8, 2001 to be

LAKES APRRECIATION WEEK

in Oregon and encourage all citizens to join in this observance.

IN WITNESS WHEREOF, I hereunto set my hand and cause the Great Seal of the State of Oregon to be affixed. Done at the Capitol in the City of Salem in the State of Oregon on this day, May 21, 2001.

John A. Kitzhaber, Governor

Bill Bradbury, Secretary of State

Oregon Lake Condition Index

Carrie Haag
Center for Lakes and Reservoirs

How do you summarize a boatload of information on lake in a simple and concise way? That is the challenge of Center for Lakes and Reservoirs graduate student Carrie Haag, who is working on her Masters degree in the Environmental Sciences and Resources Program at Portland State University.

Carrie is developing the Oregon Lake Condition Index (Oregon LCI), a multiparameter lake classification scheme that can be used to quantify the overall condition of Oregon's lakes. Specifically, the Oregon LCI will be used to determine if water quality standards are being realized in Oregon's lakes, evaluate attainment of designated beneficial uses as required under the Clean Water Act, rank the relative condition of Oregon's lakes, and identify lakes potentially effected by nonpoint source pollutants.

The Oregon LCI is modeled on the Ohio Lake Condition Index developed by the Ohio EPA in 1988. The Oregon LCI is in its beginning stage of development - an advising committee is currently reviewing the framework. After revisions, the index will be applied to selected lakes in Oregon. The proposed completion of the Oregon LCI is fall 2001.

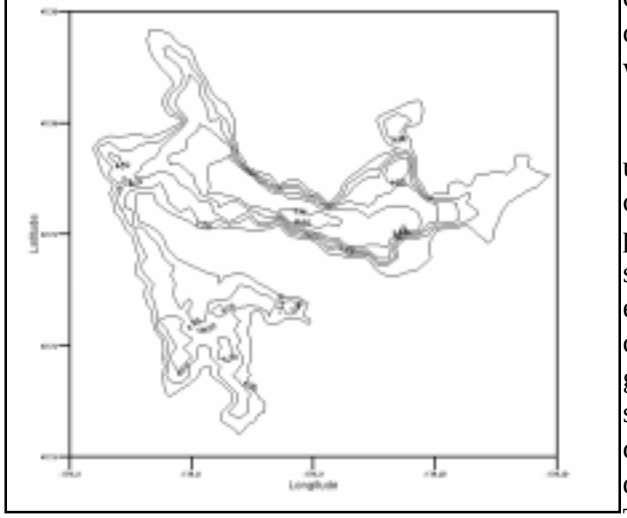
If you have any questions regarding the Oregon LCI, please contact Carrie Haag at 503-725-3834 or haagc@pdx.edu. ◆

Nutrient Criteria Development in EPA Region 10

Mark Rosenkranz
Center for Lakes and Reservoirs

The Center for Lakes and Reservoirs has been working on a nutrient criteria development project with Region 10 of the US Environmental Protection Agency (EPA) for the past two years. We have focused on lakes in the Coast Range ecoregion in EPA Region 10. The goal is to establish criteria for nutrient concentrations (nitrogen and phosphorus) for lakes in the ecoregion. A similar process is occurring in other regions of the EPA. Lakes have been sampled from Garrison Lake near Cape Blanco to Lake Ozette in the Olympic Peninsula.

Bathymetric map of Garrison Lake



Bathymetric data collection was added as a parameter during the last year of the program. Some of the lakes have bathymetry data over 30 years old while other lakes have never been mapped. Lake volume influences how lakes process nutrients. Lake volume determines water retention time – how long water remains in the lake. Phytoplankton in lakes with short retention times are "washed out" faster than they can reproduce; and as a consequence, relatively high nutrient concentrations can only support relatively low phytoplankton abundance. Conversely, at a given nutrient concentration, phytoplankton abundance is higher in lakes with long residence times. Since high phytoplankton abundance leads to degradation of water quality good information on lake volume and residence time is important in lake management.

Early lake maps were produced using a depth sounder that printed a strip chart that represented one transect of the lake. That strip was then matched up with a map of the lake the in same scale using shoreline references as the common matching points. Depths from the strip chart were transferred by hand to the map and the points of equal depth connected with lines.

Today we used sophisticated global positioning system (GPS) equipment coupled to graphical sonar units to collect data digitally. Thousands of location-linked depth readings can be taken in a few hours. In the lab, the data is processed using geographic information system software to produce extremely accurate maps. Lake volumes mapped with the new system are typically greater than those done with the older technology, sometimes as much as two times greater!

Preliminary data suggests that lakes in the coast range ecoregion are quite diverse and that it is not appro-

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Lake Lytle Milfoil Control Project

Rupa Shrethra
Center for Lakes and Reservoirs

Eurasian water milfoil (*Myriophyllum spicatum* L.), or milfoil, is a noxious weed that has invaded lakes throughout the United States. In Oregon, milfoil is most abundant in the Willamette Valley. There is evidence that milfoil was displaced from some coastal lakes by Brazilian elodea (*Egeria densa*), another noxious aquatic plant. Replacing one noxious weed with another is not a preferred method of managing aquatic plants!

Milfoil has degraded water quality, fish habitat, and recreational use of Lake Lytle for many years. Lake Lytle is located near Rockaway Beach, north of Tillamook on the Oregon coast. In 1999 the Center for Lakes and Reservoirs developed the *Integrated Aquatic Vegetation Management Plan for Lake Lytle.* The Plan served two purposes: it demonstrated how to do integrated aquatic vegetation planning using the *Guide for Developing Integrated Aquatic Vegetation Management Plans*, which was written by the Center for Lakes and Reservoirs with Oregon Watershed Enhancement Board funding, and it provided a roadmap to control of milfoil and restoration of native plants in Lake Lytle. The Plan formed the basis of an application to the Oregon State Weed Board (OSWB) for funding to implement the Lake Lytle Milfoil Control Program

The OSWB funded the first year of the milfoil control program in 2000. The first year included an application of the aquatic herbicide Sonar to the lake along with pre and posttreatment vegetation sampling, intensive water quality sampling, and an information/ education component. The lake was treated with 6-7 ppb of aqueous Sonar (active component: fluridone) during the summer of 2000. Milfoil is more sensitive to Sonar than most native plants. It kills milfoil by interfering with carotenoid synthesis, which causes sunlight to degrade the chlorophyll in the leaves. Loss of chlorophyll causes the plant to starve to death. Sonar has no use restrictions at the low rate used in Lake Lytle.

At the end of the summer, milfoil cover was reduced by 95 percent. The milfoil plants that were still present at the end of the summer were quite unhealthy and didn't survive when transplanted into the greenhouse. Native vegetation, except *N. flexilis* (naiad), was not adversely effected by the Sonar treatment. *N. flexilis* is sensitive to fluridone and its decline was expected. It is anticipated that *N. flexilis*, an annual plant, will reestablish this summer from the seed bank present in the lake sediments. One native species, *Potamogeton richardsonii*, which has not been reported previously in the lake, was collected following Sonar treatment in the late summer of 2000. Monitoring of the lake in 2001 has found that *P. richardsonii* is very abundant in those areas that had the most dense milfoil before the treatment. Lake transparency in 2000 was remarkably high after the Sonar treatment. There were no algae blooms, and physical and chemical conditions of the lake were similar to, or better than, pretreatment conditions. Furthermore, there were no complaints or challenges to the herbicide application, perhaps because the public education program that was implemented as part of the integrated management plan was highly effective.

Public comments on the condition of the lake have been universally positive. Waterfowl and human use of the lake is reported have increased following milfoil removal. This summer, we will monitor the vegetation in the lake and apply a nonchemical control method if the nefarious weed sprouts again.◆

Nutrient Criteria continued

priate to use the ecoregion scale for nutrient criteria. Rather, nutrient criteria should be developed for specific lake types within the ecoregion. Upland lakes, for example, tend to be deeper and surface water fed while the coastal lakes tend to be shallow with more wetland and groundwater influence. Planned work this summer will focus on assessing the importance of landscape position in lake ecology.◆

Diamond Lake and the Tui Chub

Rogers Edwards
OLA Secretary

A lot has happened at Diamond Lake since OLA last met there in October of 1998. In a flurry of e-mail with Dave Loomis, Oregon Department of Fish and Wildlife (ODFW) Fisheries Biologist for the Umpqua Watershed, we learn that in spite of this activity however, the tui chub that have overgrown the lake's sport fishery continue their domination. At the time of our Conference at the lake, the ODFW was to issue the final impact statement in the Fall of 1999, and select the best alternative for dealing with the chub early in 2000. This schedule has not been met. Concerns that came up during the writing of the Environmental Impact Statement (EIS) led to attempts to gain a better understanding of the introduced tui chub population and how best to deal with it. There are no current projections of when the EIS will be available for comments.

Prior to 1913, Diamond Lake was naturally fishless but had a well-developed ecosystem containing amphibians and many other species. Fish introduced into the lake grew well enough that annual stocking of 400,000 rainbow trout fingerling became a June ritual. These fish grow to nearly a foot long by the following April, making the lake a popular destination for people throughout Oregon and northern California. The introduction of the tui chub interrupted this pattern in the late 1940s, and lead to the lake being drawn down and poisoned with rotenone in 1954. After this treatment, the lake enjoyed another 40 years as a productive rainbow fishery before the tui chub was again illegally introduced.

Calls for a repeat treatment with rotenone are one management option for the lake, but times are different now. OLA previously met at Diamond Lake in 1992 and then watched a documentary of the 1954 rotenone treatment. In her summary of the Conference, Avis Newell wrote, "The film was extremely interesting, both in the subject matter covered, and in providing a good historical perspective of lake management. No one could imagine going through the environmental impact statement and permitting process that would be required today to manipulate the lake so drastically". And indeed, some concerns about the projected reenactment have been raised. While most can be readily addressed, some other issues present significant problems. It will cost over two million dollars for another rotenone treatment, and with the realization that the chub will surely return in the future. Dealing with the downstream nutrient loading from the decomposed carcasses remains an issue. ODFW estimates the biomass of chub in the lake at about 100,000 pounds. They hope to remove about half of this volume before and immediately after the treatment to minimize the impact, but have reached no conclusion about nutrient concentrations, their duration, and the extent of their impact to Lake Creek and other downstream habitats.

Another alternative explored in the EIS is to control the chub population by the introduction of a variety of trout and salmon species. This program would depart from current policy of stocking rainbow trout only, and so would require a public review process leading to a recommendation from the ODFW Commission. Different varieties of rainbow fingerlings have been planted in the lake in recent years, but survival seems to be based on size rather than origin. Diet studies suggest that very few rainbow trout under 10 inches feed on tui chub. Phytoplankton populations in the lake are at very high levels while zooplankters are severely depressed in both abundance and diversity, and benthic organisms are almost nonexistent. Based on this information, stocking fingerlings in 2000 gave way to planting an equal weight of 8" and larger trout, including some two pounders purchased from a private trout farm. This strategy gave rise to a short-term improvement in the fishery, but its long-term effects have yet to be determined.

The population of chub in the lake is estimated at between 25 and 30 million. To discover if these numbers might be a commercial resource, a herring purse seiner was hired this summer to test the feasibility of this removal method. After three and a half, long and intensive, days of setting seine nets, the catch was about 40.000 fish at a cost of $1.83 per fish. While these returns were disappointing, the experiment did provide good information on age-classes and their spatial distribution in the lake. Almost all of the chub are less than two inches in length. Females longer than three inches appear to be mature enough to produce eggs, and there are about 300,000 females of this size. Reproducing females can lay between 2100 to 48,000 eggs in a year, depending on their age. A population model of tui chub developed from observations in East Lake shows that a few fish can multiply into millions in just a 10-15 year span.

The search for a feasible alternative to rotenone continues. Work planned for 2001 include creel surveys to monitor how the larger trout introduced to the lake in 2000 fared, experimenting to find better collection methods for chub sampling, and performing some paleolimnological analyses on core samples to see how the lakes present status compares with years past. Stay tuned.◆

Sun and Your Lake in Summer

John Salinas
OLA Board Member

Our sun shines with a nuclear flame. This energy streams through space as both electromagnetic energy and high-energy particles. You may be familiar with the electromagnetic energy side of our sun's energy output since warming your body in the warm summer sun is often a pleasurable experience. The high-energy particles are usually thought of when speaking of the Northern Lights or Corona Borealis. These high-energy charged particles interact with the Earth's magnetic field (thankfully) and stream into the atmosphere in two distinct regions, where the magnetic field enters the atmosphere at the North and South Pole.

Warm summer days are simply a result of the more direct angle the sun is making with our location on the Earth. The most energy the Earth can absorb from the sun occurs when the sun is directly overhead. Here in Oregon, about 44 ° north latitude, this angle can get to be around 70° above the horizon. The energy the Earth can receive from the sun on each square meter of surface is about 1000 Joules per second or 1000 watts/m^2. In English, the Earth receives 5.3 BTU's per minute per square foot. This is called the solar constant and is different for each planet. Of course, what happens to this energy streaming constantly to the Earth depends on many factors. If it is cloudy, the incoming energy is reflected back into space and the Earth cools. If it is absorbed by land, the land warms and weather patterns are changed. If clouds cover the warm land, temperatures may stay high overnight. Those clear winter nights release great amounts of energy from the Earth back into space and the surface cools, maybe even freezing water vapor to frost or freezing lakes.

But what organisms most depend on the sun? The chlorophyll in plants is able to absorb the sun's electromagnetic energy to reduce carbon dioxide and oxidize water to sugars and free oxygen respectively. This is an awesome biochemical reaction. The basic nutrients and carbon dioxide used by plants to produce stored foods like sugar and starch for their future use depends on their availability in the environment. However, these starting materials are low on the 'stored energy' scale. The energy plants absorb from the sun is incorporated into these basic building blocks to produce organic chemicals high on the 'stored energy' scale. Other organisms can use these molecules as a food source. Who runs on solar energy? We all do!

Now let's look at a summertime lake or waterway. The water is a different color from winter. It may be green if the nutrients, temperature, and flora of the lake are optimal for life. This type of lake may be classified as eutrophic or mesotrophic, right for life. If the lake is brown, there may be more dissolved organic material in the water hindering the sunlight from penetrating far beneath the surface. In this case, the algae may be stalled in their efforts to absorb sunlight and flourish in the lake. But if the lake is blue, sunlight may be a problem for another reason....too much. Algae must protect the chlorophyll in their cells and perhaps live deeper in the lake whre light intensity is lower. At these lower depths, the temperature will be cooler and life will be slower. So, because of low temperatures and perhaps nutrient deficiencies, algae will not be as abundant, the short-wavelenth, blue light will not be absorbed and will be reflected back out of the water and, consequently, the the lake will appear blue. This type of lake is termed oligotrophic.

For the larger plants in your lake, the macrophytes, summer is prime time for growth – and grow they do. Plants grow along the lake shore, along the lake bottom, and in all visible places. Plants will not grow below the photic zone. The photic zone is the region of a lake where light is available for plants and usually ends at the one-percent surface sunlight intensity. It is surprising that at Crater Lake a moss grows no shallower than 200 feet and no deeper than 450 feet. This is its "life zone" in this naturally clear, nutritionally deficient, and cold water. Many lakes in Oregon support plant growth throughout their bottom. Native aquatic plant communities provide fish and other vertebrate and invertebrate habitat, and play a role in nutrient cycling. Diamond Lake has one deep spot where plants cannot grow, but throughout the rest of the lake, it is a jungle of native plants. When nonnative, noxious weeds are introduced, however, habitat and water quality are degraded. Many shallow, coastal lakes are considered water quality limited because of noxious macrophyte growth. Maybe your lake is too.

All aquatic organisms have a comfort zone where they can live easily with the right amount of light, nutrient, and temperature (on land we would include amount of water). Today, in Oregon, professional lake scientists, limnologists, are concerned with the spread of invasive aquatic plants. Everyone needs to be aware that transporting nonnative, invasive plants from lake-to-lake and state-to-state is like playing ecological russian roulette with our lakes. Once a plant like hydrilla or milfoil gets its roots into your lake, it will likely be impossible to remove it. Sunlight, heat, and nutrients will be available for its rapid growth and spread.

Animals have been known to respond similarly to the environment. Animals in lakes will be the topic for our next issue. Contact the author with your lake questions at jsalinas@rogue.cc.or.us. Meanwhile, watch the aquatic vegetation change, and enjoy your summer lake! ◆

Invasive Species Legislation continued

plants, animals, and pathogens that may have been taken on board ships in foreign ports.

The bill also goes beyond federal requirements in addressing ships that enter Oregon ports after visiting other ports on the West Coast. The bill requires that these ships exchange any ballast water taken on board with ocean water prior to passing 40 degrees North latitude (roughly Point Mendocino in California) or 50 degrees North latitude (roughly the northern end of Vancouver Island). Thus, the legislation will also protect Oregon estuaries and rivers from introduction of invasive species that are already established in other West Coast estuaries (San Francisco Bay is known as the most invaded estuary in the world). The bill passed unanimously through the House and Senate.

House Bill 2181

House Bill 2181 establishes an Invasive Species Council in Oregon to better coordinate activities of state and federal agencies, university researchers, and nongovernmental organizations that deal with invasive species in Oregon. Coordinating bodies, such as the Oregon Invasive Species Council, are considered a critical element of effective management of invasive species because management responsibilities are split among several different agencies. In Oregon, for example, the Oregon Department of Agriculture is responsible for noxious weeds, the Department of Fish and Wildlife is responsible for aquatic animals, the State Police are responsible for enforcement of laws to prevent the spread of invasive species, and the Division of State Lands manages many of the submersed lands that have been invaded by nuisance plants and animals. the Invasive Species Council will provide a forum for communication and coordination as the first step toward getting diverse agencies and people to work together to prevent and management invasive species problems.

Both bills are on their way to the Governor's desk.◆

Egeria densa (Brazilian elodea) and Water Quality

Toni Pennington
Center for Lakes and Reservoirs

Egeria densa (Brazilian elodea) is native to South America and has become naturalized around the world due to its widespread use in the aquarium industry and classroom experiments. *Egeria* is typically marketed as an oxygenating plant and is often planted for fish habitat. Interestingly, these efforts often produce contrary results, as the plant tends to dominate the aquatic landscape after its introduction - growing from bank to bank and top to bottom of a water body. Solid stands of vegetation limit wind mixing of the water column, thereby reducing dissolved oxygen. Additionally, while plants produce oxygen during the day, they actually use it during the evening – reducing the resource for fish and invertebrates.

Egeria may negatively impact the quality of drinking water. Aquatic plants naturally release carbon as part of their life cycle, however excessive amounts of carbon released by a monoculture of *Egeria* could be increasing the potential to produce carcinogenic compounds in drinking water disinfected with chlorine. When carbon encounters chlorine during the treatment of drinking water, by-products called trihalomethanes (THMs) are produced. The U.S. EPA has set standards on the levels of THMs in drinking water due to its carcinogenic nature.

In Oregon, *Egeria* has infested several coastal lakes and reservoirs, some of which serve as the drinking water supply for small communities. Research at the Center for Lakes and Reservoirs at Portland State University is being conducted to investigate the influence *Egeria* has on drinking water quality in coastal Oregon Lakes. This research is coupled with a thorough examination of the life history of *Egeria* in Oregon. Information on nutrient allocation and storage will be collected for two years and compared against similar research in the Southeastern U.S., California, and Japan. The objective will be to identify critical points in the plant's life cycle where management will be most effective.

If you are interested in learning more about trihalomethanes or curious what the levels are in your community, visit the Oregon Department of Health's Drinking Water Program webpage at : www.ohd.hr.state.or.us/dwp/welcome.htm, and select data online.◆

OREGON LAKES ASSOCIATION NEWS

Workshop on Woahink

On April 21, 2001 thirty-one people met at Honeyman State Park on the shores of Woahink Lake to discuss issues related to Woahink Lake water quality and to begin to develop a workplan to address those issues. The workshop was sponsored by the Portland State University Center for Lakes and Reservoirs and the Oregon Lakes Association.

Woahink Lake, which is located South Florence in Lane County, Oregon, is a relatively deep (68 ft maximum) Oregon coastal lake. The morphology of the basin and condition of the watershed contribute to its low productivity and clear water. High rainfall in the area results in a 1.2-year water retention time in the 26,700 acre-foot basin. The lake is generally considered one of the highest quality lakes on the Oregon coast. Because of the high water clarity, the lake was recently designated as the first fresh-water dive park in Oregon.

Although still a high quality lake, activities in the watershed threaten Woahink. In recognition of the value and unique characteristics of the lake, Woahink was identified by the US Congress as a priority for action in the Estuaries and Clean Water Act of 2000 (ECWA) (Public Law 106-457). The listing of Woahink Lake in the ECWA authorizes expenditure of federal funds for management of water quality in the lake. The first step in applying for federal assistance to enhance and protect water quality in Woahink Lake is development of a workplan.

The meeting began with description of recent limnological studies on the lake by the Center for Lakes and Reservoirs at Portland State University. Water quality data on the lake is spotty and haphazard; systematic assessment and study of the limnology of Woahink has not been done. Although details are limited, existing data suggest that, as a whole, Woahink water quality has not been significantly degraded over the past 62 years, which encompasses the historical water quality record on the lake. Some activities in the watershed and some potential "early indicators" of future water quality problems, however, suggest that current water quality may be jeopardized in the future. This is in marked contrast to the condition of the Tenmile Lakes, the other coastal Oregon lakes identified in the ECWA as national priorities, which exhibit toxic algae blooms and serious water quality degradation. Together, the Oregon lakes identified in the ECWA cover a spectrum of lake water quality that ranges from severely degraded at Tenmile to not degraded, but threatened, at Woahink.

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The Oregon Lakes Association is a nonprofit organization dedicated to lake protection and management in Oregon.

For additional information on OLA, to get involved, or to obtain a membership application write to:

OLA, PO Box 345, Portland, OR 97207

or contact an OLA officer

Woahink Workshop continued

Following the description of the current understanding of the limnology of the lake, a discussion was held to identify important issues, concerns, and opportunities to address maintenance and protection of water quality of Woahink Lake. This discussion was informed by the description of a similar process that is well underway at the Tenmile Lakes.

Identification of the issues, concerns, and opportunities at the workshop is the first step toward a comprehensive management plan to protect and maintain water quality in Woahink Lake. The issues, concerns, and opportunities must be refined and focused through continued discussion with watershed residents, technical experts, and government representatives. A follow-up meeting was tentatively scheduled for mid-June to continue to develop the workplan. A number of organizations and agencies were identified as important participants in further development of the workplan. For a copy of a summary report on the workshop contact the Center for Lakes and Reservoirs (503-725-3834).◆

Plan to Attend the 2001 Oregon Lakes Symposium and OLA Annual Meeting

Plan now to attend the first annual Oregon Lakes Symposium and the Annual Meeting of the Oregon Lakes Association. the meeting will be held at Portland State University on **September 21 and 22, 2001**. The agenda is not completed, but we are planning on a series of technical presentations on Oregon limnology on the 21st, followed by a more "hands-on" experience and annual summary for Lake Watch volunteers on the 22nd. Save the dates now. You will be receiving more information this summer.◆

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