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Editor:
Roger Edwards

LAKE WISE

A Voice for Quiet Waters

The Oregon Lakes Association Newsletter

Let Us Talk About the Weather

The weather this past Winter generated much concern throughout the State about whether there would be adequate water supplies later in the year. Generally, there was below average precipitation in October through December, and then near record low precipitation amounts in January and February. (Wasn't that pleasant!) The rains returned in March, and April and May saw above average rainfall.

Governor Kulongoski, acting on the advice of the Oregon Drought Council, declared the counties of Baker and Klamath to be in drought emergencies on March 8th and added Crook, Gilliam, Hood River, Morrow, Sherman, and Umatilla to this list in April. By early June, the list had been expanded to include Deschutes, Lake, Wallowa, Wasco, and Wheeler Counties. The drought declarations bring flexibility to rules addressing the management of water resources for irrigators, municipalities, and other water users.

The Spring rainstorms have brought water year rain totals back to comfortable levels, even if they remain below average. The water year totals are more descriptive than those for the calendar year because the former, which begin on October 1st and run to the following September 30th, includes all the precipitation that contributes to meeting the water demand of the dry summer months. While this accumulated total is a good descriptor of water conditions, the pattern of precipitation is also a factor that must be considered. In Oregon's northern Cascade Mountains, the months of December, January, November, and February produce the most precipitation in a typical year. The accumulation in these four months normally accounts for just over half of the rainfall total for the entire year. Because these months are also the coldest, much of this precipitation falls as snow to be stored at high elevations. As this snow pack melts during the Summer it provides a source of water when rainstorms do little to maintain water supplies. The snowmelt also helps to keep stream temperatures cooler. These observations suggest the regions of the State that rely on high elevation watersheds for their Summer water supply may indeed have shortages before rain resumes in the Fall. But even these areas have benefited from the recent rains because of a drop in normal demand for irrigation water during the rainy Spring. The rain has delayed the onset of drawdown in water reservoirs by increasing supply and reducing demand.

The water supplies now available are greater than predictions from February or early March dared hope for. Predictions for what will happen in the next few months are also based on educated guesses that rely on key indicators that have proven useful in the past. The inability to view the future with good resolution means that such things as droughts

are best described in hindsight. With some knowledge of the past however, it is not too great of an expectation to anticipate the likelihood of what the future holds. There have been ample warnings that, in all likelihood, water will not be plentiful this Summer.

These warnings come from rain gauge readings, snow surveys, streamflow data, and the like, which produce historical records for comparison to current conditions. An example of how these records can be used will demonstrate their value. Bull Run Lake is the source of the Bull Run River, which is the principal water supply for Portland. As such, the lake is closely monitored. It is located in a drainage area of only 3.5 square miles but receives between 110-130 inches of precipitation per year. The highest elevation in the drainage is just above 4000 feet so the snow that does accumulate does not persist long into the Summer. The USGS installed a stage recorder at Bull Run Lake in early October 1992, the beginning of water year 1993. The stage data that accumulated during the next nine years were used to calculate rudimentary means and standard deviations for each month of the year, based on the stage level recorded on the last day of the month. The reading there on May 31, 2005 was 3169.0 feet above sea level. The mean calculated for May in years past is 3173.9 feet so the lake level is about 4 feet lower than normal. However the standard deviation of the calculated May mean is 6.8 feet so while the level this May is lower, it is still within the normal range of past May measurements. This specific information is very useful for water supply managers throughout the Portland area for the specific planning they must do to assure there are adequate water supplies for their users.

This indicator of water availability only exists because the foresight was found to begin collecting the data back in 1992. It is hard to know what information will be useful in the future, but when that time comes and there is scant information on hand, an opportunity has been missed. Water is becoming increasingly important in all regions of the State so there is a good reason to quantify its movement from the clouds to the ocean.

McMinnville Increases Capacity of McGuire Reservoir

McGuire Reservoir was built on the upper reaches of the Nestucca River in the early 1970's to supply water for McMinnville, supplementing the supply drawn from the Haskins Creek Reservoir 11 miles to the east. McMinnville's population then was below 14,000 and now it is in the range of 27,500 and growing. The Haskins Creek Reservoir has a capacity of 733 acre feet that it gathers from a 6.9 square mile watershed in the Yamhill River drainage. McGuire Reservoir had a 3700 acre feet capacity and a watershed area of just 2.9 square miles, which reflects its location in the headwaters region of the Nestucca. Both water supply reservoirs have restricted public access to protect this highest use of water resources. To meet the demand of their growing service population, the McMinnville Water & Light utility decided in 1997 to increase the storage capacity of McGuire Reservoir. This project has now been completed and the reservoir should fill to its new capacity of 9800 acre feet this month. As might be expected however, the simple decision to enlarge the reservoir had a lot of details to be worked out.

The design for the enlargement settled on a central raise of the existing dam to a height 30 feet above the original dam crest. To achieve this primary objective, plans were developed that also:

- ✓ Upgraded the dam to current seismic codes and design standards.
- ✓ Increased spillway capacity to meet "Probable Maximum Flood" flow calculations.
- ✓ Improved valve configuration and control systems, intake and drainage options, and other operational features of the dam

- ✓ Updated the Emergency Action Plan with downstream counties for scenarios suggested by hypothetical dam failure modeling.
- ✓ Enhanced fish passage at a downstream historical barrier to ensure the project produced a net benefit for anadromous fish runs.
- ✓ Created 24 acres of constructed wetlands to replace the wetlands to be flooded.
- ✓ Relocated the affected portion of the Nestucca River Highway.
- ✓ Addressed the concerns about an ancient landslide upstream from the dam.

The eight years between the project's conception and completion were full of planning sessions, public hearings, permit processing, and peer reviews that had to be coordinated between multiple private and public agencies on the local, state, and federal levels. The process required patience and perseverance but did finally produce the desired goal. This success should serve as a lesson and an inspiration to lake managers contemplating projects of a comparable scale.

Cyanobacteria Advisories Expected Again This Summer

After a longer than expected incubation period, interest in refining the response to elevated cyanobacteria cell counts is still strong. An invitation from the Oregon Department of Human Services to review committee recommendations drew about 40 people to Lane Community College for a short day's work on May 12. The meeting was a continuation of the session held last November, where it was agreed that toxins produced in blooms of cyanobacteria (blue-green algae) do pose a serious health hazard, and that the effort last summer to protect the public from this hazard could be improved. While the discussions have not yet turned to preventing the blooms that require advisories, the meetings to date have ensured a more uniform response to blooms that occur this summer.

As was the case last year, ODHS in conjunction with local agencies will issue public health advisories for lakes and reservoirs that exceed threshold levels of cyanobacteria. These are recreational advisories focusing on water contact. They will be triggered by a visible scum in recreation areas, by total cell counts of 100,000/mL, or by cell counts of 40,000/mL for the cyanobacter species *Microcystis* or *Planktothrix,* which are recognized toxin producers. The advisories will remain in effect until two weeks after the cell counts fall below threshold levels. This waiting period offers assurance the counts will not spike again, and gives time for the degradation of any toxin produced.

Agencies that will conduct systematic cyanobacteria monitoring this summer include the Forest Service, the Corps of Engineers, Josephine County, and some other specific lake managers. Lakes where no monitoring is performed are still susceptible to being placed under advisory because of the visible scum criteria. It is recognized that cyanobacteria can bloom in localized areas of a lake and remain generally contained there. The decision to post a lake in this situation will be based on the best judgment of the appropriate health officials. By summer's end, the characteristics of a visible scum will be better defined. However, the ability of cyanobacteria to quickly multiply at an exponential rate means that managers for any lake with an arguable scum would do well to become knowledgeable about the subject.

ODHS will alert the media and post lakes on their list when an advisory is issued. Color, 8 x 11½" posters and a standardized press release will be made available for dissemination by local authorities. Information brochures, in English and Spanish, are also available. A graduated advisory was considered but ruled out

because of the confusion they generate over time. The advisories warn against water contact, using water for drinking or cooking, and state children and pets are at greatest risk. Swallowing or inhaling water droplets are specifically mentioned as behavior to avoid. The inability to remove toxins by filtering, boiling, or other field treatment methods is also emphasized. Activities such as camping, hiking, biking, picnicking, fishing, and bird watching are given as good reasons to still visit a lake even if the water poses some risk. The reduced level of activity that results from a lake being listed for cyanobacteria may appeal to people who prefer these more passive activities.

Fishing in a posted lake did produce some discussion. A compromise statement in the press release will say that fish from posted waters should have their skin, fat, and organs removed before cooking because if toxins are present, they are more likely to collect in those tissues. This recommendation provides a partial answer to questions posed to resort staffs last year about eating fish from waters unsafe for wading. It is also true that water conditions in wading areas will not be duplicated throughout the water column. Using cell counts to protect against toxin exposure offers further leeway because these two concerns are not absolutely connected. Catch and release fishing or limiting fish consumption are additional approaches that consumers can adopt. Recent research has detected toxin in fish fillets however so the topic bears watching. ODHS has acquired the capability to analyze water and tissue samples for toxin concentrations and will stay abreast of the issue. If fish from a specific lake present a significant health risk, then a separate fish advisory will be issued for that lake.

There were other discussions of interest at the meeting. Sampling methodology encompasses so many variables that standardizing procedures is not yet feasible. Guidelines for a monitoring rationale that looks to the long term produced no disagreement. Efforts to combine monitoring results from the coming season into a common database can be expected, so the conformation process will likely begin with agreement on uniform protocols for sample collection and a format for results.

The cost of monitoring activities presents a formidable hurdle. Increasing awareness of cyanobacteria toxins will make them a higher priority, which should result in the future allocation of new funds for future studies. The advisories to be issued again this summer will provide another lesson about cyanobacteria. Vacationers will learn about the health risk, regulators will learn how well their new criteria protects the public, monitoring staff will gain insight on pertinent lake processes, resort managers can try new marketing approaches, and advocates for Oregon will learn that our State resources are becoming a bit sullied. These experiences are sure to generate a lot of interest for future discussions.

A Good Use For Your Secchi Disk

Once again it is time for the Great North American Secchi Dip-In. This annual event, which has gained the sponsorship of the US EPA and NALMS, seeks transparency data from lakes and reservoirs anywhere on earth for comparisons and to track long-term trends. Water transparency is affected by water color and the concentration of suspended particles it contains. Transparency measurements therefore describe an element of water quality. The program began in 1994 as an idea of Dr. Robert Carlson at Kent State University, who continues to champion the work. Transparency readings recorded between June 25 and July 17 are forwarded to the Dip-In to serve as a snapshot of lake conditions. The data are sorted by individual lake so a cumulative record will grow as readings are received in successive years. The Dip-In is now accepting readings from anytime in the year into their data repository as well, and for surface temperature and pH too. Their database

shows that lakes in the northern US and Canada tend to be clearer, and that lakes in the agricultural Midwest have some of the lowest transparencies. The Secchi readings they have logged-in range from 1 inch to 65 feet.

The enclosed data form shows that a level of commitment is required for Dip-In participants. The size of the program mandates that it must rely on volunteers, but this volunteered data must be well documented for the program to be creditable. The Dip-In has become a showcase for volunteer monitoring programs and an opportunity for volunteer monitoring programs to show off their work. Both of these perspectives benefit by insisting on methodical and detailed records. So look over the data form and Dip-In instructions, check out their website (http://dipin.kent.edu), and make plans to include a Secchi measurement in your celebration of Lake Appreciation Month.

Call For Papers

Has something happened recently at a nearby lake that would be of interest to other OLA members? A good way to get out the news is to make a presentation at the annual OLA Conference. There are slots available for both speakers and poster displays. The focus of the Conference is Oregon lakes, so if you can make this broad connection, we would be happy to consider your topic. Send abstracts to our PO Box 345 in Portland 97207 or e-mail the webmaster at www.oregonlakes.org. Time is getting short though as the Conference agenda needs to be essentially set by the end of August.

The Conference will convene at the Valley River Inn in Eugene on Friday evening of September 30th. All are welcome to attend the business meeting to be held at this time. The formal sessions will take place the next day, with time reserved for meeting and conversing with others in attendance. A Hydrolab representative will be there to discuss options for your monitoring needs. Plan now to attend this September 30-October 1 event.

Our Man in Chicago

Report from the 18th Annual National Conference on
Enhancing the States' Lake Management Programs
Attended by Rich Miller
Center for Lakes and Reservoirs, Portland State University

The Environmental Protection Agency in conjunction with the North American Lake Management Society and the Chicago Botanic Garden held their 18th annual *Enhancing the States' Lake Management Programs* meeting this past April in Chicago, Illinois. The theme of this year's conference was protecting lakes and reservoirs in urbanizing areas. Topics included watershed management strategies, lake restoration, and lake water quality assessments. A few highlight from the conference are discussed below.

Geoffrey Anderson, Acting Chief of Staff for the EPA Office of Policy, presented an overview of how smart growth development can affect water resources in urbanizing watersheds. Smart growth is characterized by dense development surrounded by open space and farmland rather than the low density development with a lack of open space typical of many suburbs. On a watershed scale, EPA has found that smart growth results in less impervious area per capita which in turn results in healthier watersheds.

Watersheds that are already highly developed provide other challenges. John Barton from Plymouth, Minnesota discussed the effects of a ban on phosphorus lawn fertilizer on lawn health and lake water quality. He suggested that their five year old ban has not affected lawn health, but has significantly improved the trophic status of their urban lakes. Their phosphorus ban was borne out of testing that revealed very high soil phosphorus fertility levels in most lawns. Harry Gibbons from Tetra Tech, Inc. in Seattle, Washington discussed returning urban watersheds closer to their former functions through engineered solutions such as pocket wetlands, permeable surfaces, biofiltration systems, greenways, and greenroofs.

Other topics covered included assessments of lake quality using biocriteria such as fish or benthic invertebrate assemblages and urban wildlife problems such as geese, gulls, and mosquitoes. Michael Adam from the Lake County Health Department in Illinois stressed that mosquito species that carry the West Nile virus are not common in lakes.

The conference also included a workshop on the EPA's National Lakes Assessment Planning Project (NLAPP). The goal of the workshop was to seek attendees' input on designing a national lakes survey. A lively discussion ensued about the goals of the national survey, how to choose lakes for the survey, and what parameters to measure. Consensus was not reached on all the issues; however, it was agreed that volunteer monitoring should be included as part of the national survey.

For more information about the conference, including copies of presentations, contact Rich Miller at richm@pdx.edu or (503) 725-9075. As a representative of the Oregon Lakes Association, registration and portions of travel costs were supported by the conference sponsors.

The U.S. Army Corps of Engineers

"Relevant, Ready, Responsible, Reliable"

Recent news reports detail the U.S. Army Corps of Engineers work to allocate limited water supplies in the upper reaches of the Willamette basin, processing bids for the dredging of the Columbia River channel, and repairing the dam at Fern Ridge. In the meantime, we read how Halliburton and Kellogg, Brown and Root are busy in Afghanistan and Iraq trying to rebuild those war torn nations. These work assignments seem somehow reversed. A little investigation at www.usace.army.mil quickly resolves this quandary by proving the Corps is on the job in both locations and around the world as well. The large private engineering firms with Middle East assignments are actually contractors reporting to the USACE at their Gulf Region Division Headquarters in Baghdad, which was established in January 2004. The presence of the Corps is readily apparent throughout the U.S. and can also be found wherever else there is an interest of national concern.

The organization chart for the USACE shows the top office is the Chief of Engineering and USACE Commander, with offices in the Pentagon. The USACE Headquarters is in nearby Washington, DC. There are eight divisions that oversee Corps activities in the Great Lakes and Ohio River, Mississippi Valley, North Atlantic, Northwestern, Pacific, South Atlantic, South Pacific, and Southwestern regions. These divisions have 41 subordinate districts within their separate jurisdictions. Oregon is included in the Northwestern Division, which has district offices in Kansas City, the Missouri River region, the North Pacific region, Omaha, Portland, Seattle, and Walla Walla. The Gulf Region Division is provisional and has four districts. The Corps also runs research and development laboratories on a variety of subjects, such as cold and ice engineering, environmental quality, and computing and information technology, among others. Mapping and topography analysis is

another principal activity. The Corps is the landlord for all government property at Army installations throughout the country and is responsible for the buildings, infrastructure, and utilities there. The private sector is considered a part of the Corps too because most of the design and all the construction work assigned to the Corps is contracted out. Their reliance on private contractors makes project management another important part of their responsibilities. There are approximately 34,000 civilian and 650 military employees currently with the Corps.

The origin of the Corps came out of the need for battlefield engineering solutions. There are examples of these requirements in the Revolutionary War, but the organization of the USACE really became established in the years before and after the War of 1812. After Congress passed an authorization act in 1802, the Corps was reorganized to perform "military construction and work of a civil nature". Building coastal fortifications to defend the young nation was high on their list of prioritized tasks. The multi-pointed ramparts that now support the Statue of Liberty was one of these projects. Because this work proved so useful during the War of 1812, Congress increased their reliance on the Corps for additional projects after the war. When the Supreme Court ruled in 1824 that interstate commerce fell under federal authority, Congress passed the General Survey Act, which assigned the Corps to survey routes for roads and canals "of national importance, in a military or commercial point of view, or necessary for the transport of public mail". A separate act authorized the Corps to improve navigation on the Ohio and Mississippi Rivers.

At the time, the USACE was the only formally trained body of engineers in the world. When the military academy at West Point was established in 1802, its superintendent was an Army engineering officer and engineering coursework was prominent in the curriculum. Graduates were soldiers in the service of their country and even today there is a level of interdependence between military objectives and civil works. Established transportation routes support commercial activity, but also expedite troop movements should the need arise. Disaster relief puts communities back on their feet and also ensures the strength of a nation remains vigilant to threats. The Army Corps of Engineers played a major role in the building of America. They maintained river channels by keeping snags and sandbars out of traffic lanes. They explored the West while surveying prospective routes for the transcontinental railway. They placed lighthouses and other navigational aids on our coasts. The experience they gained making improvements on navigable waters made them a logical choice for an engineering solution to floods. After determining the limits of flood prevention that could be achieved with levees, they began building dams and reservoirs. Reservoirs can be used for irrigation, power generation, recreation, and water supply as well as flood control so the Corps added these assignments to their mission. Water quality and environmental protection issues were added as well. The role of the Corps has grown in parallel with the needs of the nation, and will surely continue to do so.

The familiar castle symbol of the Corps can be found all around Oregon. Once their Portland office first opened in 1871, the Corps turned their attention to navigational hazards in local rivers. Immediate needs and long term planning were both of interest as they made themselves familiar with the territory. In 1916, they took over the operation of the Willamette Falls navigation locks. In 1918 their 30' deep, 300' wide Columbia River channel between Portland and the Pacific was opened. Jetties were built for the harbors of Coos Bay and Yaquina Bay, and at the mouths of the Columbia, Siuslaw, Coquille, and Nehalem Rivers. The construction of Bonneville Dam was authorized in 1933. Construction of the network of 13 flood control reservoirs in the upper Willamette River basin began with Fern Ridge coming online in 1941 and Blue River in 1968. The Dalles Dam was completed in 1957 and the John Day Dam in 1968. In the Rogue River region the Lost Creek Reservoir first filled in 1977 and the Applegate Reservoir in 1980. Work on the Elk Creek Reservoir was halted by legal challenges in 1988, although the dam is operating in its unfinished state. The Corps operate the navigation

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PO Box 345
Portland OR 97207-0345

OLA Mission: The Oregon Lakes Association, a non-profit organization founded in 1988, promotes understanding, protection, and thoughtful management of lake and watershed ecosystems in Oregon. For additional information on OLA, write to the address above, or visit our website.

OLA welcomes submissions of material that furthers our goals of education and thoughtful lake management in Oregon, and is grateful for the corporate support that helps sustain the organization. Corporate members are offered a one-time opportunity to describe their product or service to Lake Wise readers. These descriptions are not endorsements, and opinions appearing in Lake Wise are not OLApolicy statements.

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locks on the 465 mile long Columbia-Snake River Inland Waterway. The second powerhouse at Bonneville Dam was finished in 1981 and the locks there were enlarged in 1993. The flood control dam on Willow Creek, south of Heppner, was completed in 1983.

There are many secondary effects that become evident during the operation of multi-purpose reservoirs. Local examples of these include; 1) The heralded cleaning of the Willamette River was due in part to the summer flow augmentation made possible by the network of dams the Corps built in the Willamette basin. Water stored in the winter and spring flood season was available to increase summer flows above their historic levels and so reduce water temperature, dilute municipal and industrial discharges, and increase dissolved oxygen levels; 2) Cold water releases from the Blue River and Cougar reservoirs into the McKenzie River however was found to impede the upstream migration of spring Chinook salmon. The fish would congregate at river reaches where warmer temperatures were more attractive and thereby not utilize the higher quality spawning beds farther upstream. Once this problem was recognized, the Corps has developed plans for multiple level intake towers and mixing chambers to match the temperatures of reservoir releases and the receiving waters; 3) To compensate for the loss of habitat that occurred when many of the Corps dams were built without fish passage capabilities and reservoirs flooded former spawning grounds, a series of fish hatcheries have been built and are funded by the Corps; 4) The mere existence of the USACE reservoirs around the State has been a major enhancement of recreation opportunities in Oregon. The Corps has included parks and other recreation facilities at these projects and continues to run some of them.

The Corps does not always do it right the first time; restoring salmon runs continues to be a challenge, but they do they live up to their dictum “To proudly serve the armed forces and the nation, now and in the future”.