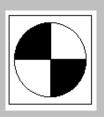
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LAKE WISE

A Voice for Quiet Waters



The newsletter of the Oregon Lakes Association

Crater Lake is the Crown Jewel of Oregon Lakes and the Site of our September 15th Conference

Oregonians are under the shadow of Crater Lake regardless of where they live. The lake is displayed on the license plates of our cars, it adorns the quarters in our pockets, and it regularly appears in the calendars on our walls. Wizard Island and the Phantom Ship are well known features of Oregon's only National Park, the sixth national destination to gain this distinction. With a depth of 1943 feet, it is the deepest lake in the US, and easily among the best studied lakes in the world. But while there is a substantial body of knowledge about Crater Lake, its public perception is largely limited to its intense blue color, its purity, and its beauty.

The geological origins of the lake began with volcanic eruptions 400,000 years ago, in the Middle Pleistocene epoch. The Phantom Ship is a remnant of this activity. Eruptions beginning 75,000 years ago built Mount Mazama to an elevation greater than 12,000 feet high. By the end of the Pleistocene, the mountain was an east/west ridge with overlapping, eroded peaks, and multiple vents. The cataclysmic eruption occurred about 7,700 years ago in the Holocene epoch, a time span short enough to have disrupted the lives of indigenous peoples in the region. The collapse of the caldera formed a 4,000 foot deep crater that was partially refilled with continuing volcanic activity, which includes the building of Wizard Island. Accumulating precipitation turned the empty caldera into a lake, which increased in depth until the surface area was large enough that evaporation from the surface matched the annual precipitation.

The first recorded sighting of "Deep Blue Lake" was made by John Hillman in 1853. It wasn't until 1869 and several discoveries later before the name Crater Lake appeared in Jim Sutton's Jacksonville newspaper and entered into common usage. An 1874 photograph taken by Peter Britt extended the lake's renown and undoubtedly increased the resolve of William Gladstone Steel to visit the lake. Steel was a 15 year old lad from Ohio when he first heard of Crater Lake. It was 15 years later in 1885 before his goal was achieved, and he remained an active advocate for the lake's protection until his death in 1934. He is credited with packing in the first fish to the lake in 1888. ODFW was stocking the lake with rainbow trout and kokanee until 1942 and there are still some of these populations in the lake.

Steel began publicizing the lake and petitioning for a national park to preserve its distinctive features from the time of his first visit. Within a year he had arranged for and participated in a USGS expedition to map the topological features of the lake and caldera. The report from this work won the support of John Wesley Powell, who was the head of the USGS at the time, for a national park designation. But even within the Oregon Congressional delegation, there was disagreement about the wisdom of tying up so much land. While the debate continued, Steel kept on writing letters to influential people, sending articles to newspapers around the country, and lecturing diverse audiences on the merits of the cause. After 17 years of lobbying, the perfect fit between his ideas and President Theodore Roosevelt's thoughts of Conservatism could no longer be ignored, and Crater Lake National Park was finally established in 1902.

The life of William Steel was multifaceted and includes many notable achievements. He was an avid outdoorsman and mountaineer. His enthusiasm for these activities succeeded in gathering a core of like-minded individuals to form the Oregon Alpine Club, and when that group dissolved he recast it into the Mazamas, an organization he founded on 19 July 1894 with other kindred spirits who had climbed to the summit of Mt Hood that morning for the occasion. The group persists to this day and has become a respected promoter of mountain climbing and mountain stewardship in the Pacific Northwest. The name they chose for their organization is a Mexican word for mountain goat. The name took on greater significance in August 1896 during a William Gladstone Steel hosted Mazama excursion to Crater Lake. The visit included a pyrotechnic illumination from Wizard Island, and bestowed the name of Mount Mazama to the volcano that begat Crater Lake.

It quickly became evident once Crater Lake had won National Park status, that Steel's work was still incomplete. He had an active role in planning access roads to the lake, lodge construction, and even considered an elevator to the lake surface. For a time, he was the concessionaire for the park. He served as the Park's second superintendent from 1913 to 1916. He resigned that office when park jurisdiction went from state to federal control, but was still a park commissioner at his death. He was buried in Medford wearing his National Park Service uniform.

There are many more details about the lake to be learned at OLA's Crater Lake Conference. First however, attention is required to some tedious but necessary details about attending the Conference. Lodging options are described on the OLA website, <u>www.oregonlakes.org</u>. A remote conference site has limited lodging, especially for participants who prefer a roof. Mentioning the OLA Conference may be helpful in making room reservations. Spending a night at nearby Diamond Lake is not an unrealistic alternative.

The Conference registration fee does not include annual membership as it has in the past. The fee is \$40 for current OLA members and \$50 for non-members. To encourage early registration, these fees will increase by \$10 on September 1^{st.} At the conclusion of the Saturday presentations, there will be an optional bar-be-cue for \$10 per person. OLA has reserved 30 spaces on a Sunday morning boat ride that are available for \$33 each. These are quickly filling to take advantage of the Park Ranger tour of the lake and visit to Wizard Island. Boat access involves a steep 700' descent and return at Clewood Cove. The tour embarks at 0930 and returns after 2:30 pm. Conference costs then is the total of registration fee, plus the optional fees for member and guests at the bar-be-cue and/or the boat tour. Lodging and park entry fee must be paid separately. On-line registration is encouraged this year to take advantage of the website upgrade that records the information submitted on the OLA membership and mailing lists. (But hand written applications mailed to OLA, POB 345, Portland OR 97207, giving name, mailing address, e-mail address, and phone number will be honored if a check is included for the proper sum. You cannot reserve a boat tour space with this method.)

There will be an opportunity to address the OLA Board on Friday evening at 6:30 to 8:00 pm at Annie Creek Restaurant in the Mazama Village. The Board is especially interested in hearing feedback about the new OLA website, but other topics are welcome as well. The Saturday sessions will take place in the upstairs meeting room at the Rim Village Café. Registration will get under way at 8:00 am on Saturday and the presentations begin at 9:00.

Tentative Agenda for the OLA Conference at Crater Lake, September 14-16, 2012

• Friday Evening –

6:30-8:00PM Business meeting at Annie Creek Restaurant (at Mazama Village)

- Saturday (Rim Village Cafe upstairs meeting room)
 - 8:00 Registration w/ Continental Breakfast
 - 8:45 Welcome Remarks, Andy Schaedel, OLA

9:00 - 10:30 Session I - Crater Lake:

- Past Studies & On-going Limnological Programs, Scott Girder & Mark Buktenica, NPS
- Crater Lake Science and Learning Center & Crater Lake, Crater Lake National Park Trust, Linda Hilligoss, NPS/SOU

10:30-10:50 Break – Poster Viewing and Vendors, Refreshments

10:50 – 12:00 Session II – Pristine Lakes

- Waldo Lake, Rich Miller, PSU-CLR
- Mercury in the Eagle Caps, Collins Eagle-Smith, Al Johnson, USGS
- 12:00-1:00 light Lunch of fruit and vegetable platters
 - OLA elections, announcement of scholarship winner, demonstration of new website

1:00-2:30 Session III – Harmful Algae Blooms and Lakes

- Umpqua Lake HAB Issues Diamond Lake Macroinvertebrate Recovery and Lemolo Reservoir Update, Joe Eilers, MaxDepth
- Update on Klamath Lake and Rogue Valley Lake HAB Issues Willow Lake, Reeder Reservoir, J Herbert Stone Nursery, Jake Kann
- Willamette Valley Reservior Study, Theo Dreher, OSU
- 2:30 -2:50 Break Poster Viewing and Vendors, light Refreshments

2:50-4:30 Session IV – Updates

- Lake Management Activities in Oregon 5-10 minute updates from invited lake association speakers
- Lake Programs Activities 5-10 minute updates from invite state agency speakers
- Lake Reflections 10 minute reflections from several retired speakers who have worked on lakes in the area

4:30-5:00 Concluding Remarks, Steve Wille

5:00 Potluck BBQ

• Sunday

9:30-3:00 Crater Lake and Wizard Island Tour–Limited Seating! Register Separately

Crater Lake Science & Learning Center Offers Research Opportunities

The Crater Lake Science and Learning Center is a relative recent addition to the resources available at the National Park. Part of the financing for the Center comes from the sale of Crater Lake license plates, which have proven to be among the most popular of the special plates offered by the Oregon Department of Motor Vehicles. Well over 110,000 sets have now been sold since they became available in August 2002, and \$17 of each sale goes to the Crater Lake National Park Trust, a non-profit organization which directs much of funds to the operating budget of the Science Center. The Center became operational in 2006 when the 1930 era Park Superintendent residence was reconfigured to house the administrative offices of the Center. The first floor of this building is the only part of the Center open to the public, but researchers, educators, and artists with approved proposals have access to a repository of Crater Lake research reports, archived collections, housing in the former residence of the Chief Naturalist, and a water laboratory complete with field equipment. The Center is affiliated with the Oregon Institute of Technology and Southern Oregon University, and the facilities of these schools are also available for approved projects. Research proposals must follow National Park Service protocols and are submitted to the Science Coordinator at the Crater Lake Science and Learning Center.

Sediments and Sentiments at Mirror Pond

Mirror Pond is a 1 mile stretch of the Deschutes River in Bend, Oregon. It was created in 1910 by the construction of a small hydropower dam, which effectively electrified the city. The pond that formed behind the dam has become a city icon, so when accumulating sediments became noticeable after 1970, there was sufficient public concern to organize and carry out a dredging operation. This project was performed in 1984, at a cost of \$312,000, and removed an estimated 60,000 cubic yards of sediment.

Mudflats began appearing in the pond again in 2006. The discussions and studies that have followed this observation have concluded that dredging the pond again would be helpful, but would be very costly, and would merely move the problem into the future. In spite of the boating that occurs on the pond, this stretch of the Deschutes is not considered to be navigable, so the property rights of the landowners along the pond's shoreline extend out to the middle of the river. These property owners cannot afford the estimated \$2-5 million cost of dredging, either individually or collectively. It is not only the shoreline property owners who appreciate Mirror Pond, but even so, there is no consensus of who should take the lead in working toward an acceptable solution.

The other logical solution would be to take out the dam to let the river return to a free flowing condition. This plan too would be costly but would end the recurrent problem of sedimentation, although at the expense of the sentiments attached to the pond. This remedy is also flawed as the hydropower dam is only one of four dams that span the river within the city limits. Removing the hydropower dam at Newberry Street would just move the sediments downstream to the slack waters behind the Tumalo Irrigation District Diversion Dam at Pioneer Park.

Another suggestion that offers a problematic solution is to periodically flush the pond by altering the river flow through the Colorado Avenue Bridge dam upstream of the hydropower dam. Increasing the range of flows through a reservoir pool causes erosion or even channel cutting in the sediments that accumulate during normal

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flow rates. For the best effect, the independent operators of the four dams should coordinate their releases to gain some control over where the sediments end up. Re-suspending sediment does produce a significant turbidity plume, but the affected downstream reaches have previously benefitted by the reduction in turbidity when those suspended solids have settled out in the ponds upstream. An evaluation of this approach might find it instructive to review the observations of the drawdown at Fall Creek Lake last winter. This 180' high, USACE flood control dam was completed in 1966 and was drawn down to the original stream channel before refilling was begun in January.

There is agreement that the do nothing alternative will result in rooted plant growth and stabilization in the sediment banks. This scenario is likely to convert Mirror Pond into a low gradient, meandering river channel, which might have sufficient current to minimize continued sediment deposition. A positive aspect of this plan is that it has no funding problem, in the short term. Lack of funding is a real problem for the other alternatives and both bond measures and tax levies have been mentioned as possible funding sources. Raising the issue with the taxpayers would be a way to measure the depth of the Mirror Pond sentiments.

Private Powerhouse Under Construction at USACE's Dorena Lake Dam

There is an innovative idea now unfolding at the base of the dam at Dorena Lake. On the north shore of the Row River, which flows through the US Army Corps of Engineers flood control reservoir, a private company is building a power plant to generate electricity from falling water siphoned from the lake. Novel aspects of the project are the federal/private relationship, and the placement of a new hole in an existing dam. However, it has long been the policy of the USACE to promote multiple uses at their facilities, and under the operating protocols of the proposed power plant, the Corps will retain control of water releases.

The Dorena Dam is an earth fill structure with gravel embankments and a concrete spillway. The proposed penstock will utilize an existing borehole in the concrete section. While the penstock will not require a new hole in an existing dam, the excavation of the existing borehole and placement of the penstock are still critical points in the project. The length of the borehole through the dam is 85'.

The private company conducting this work is Riverbank Power, an engineering firm based in Toronto, Canada, which has been successful at developing utility scale, pumped water storage projects for hydropower production. Their focus expanded to become a run-of river hydropower producer when they merged with Symbiotics, a NW consulting firm that formerly provided services to utilities seeking hydropower licensing. Working together, the combined company has secured USACE approval, Federal Energy Regulatory Commission licensing, adequate financing, and a 20 year contract with PacifiCorp to buy the power the project produces.

The project intends to install a redundantly gated, 10' diameter penstock in the reservoir, route it through the dam borehole to a siphon house capable of filling the penstock when the reservoir surface is below the borehole, and then down to the powerhouse. The borehole is within the normal range of drawdown for Dorena Lake. The spillway of this 145' high dam is at 835' elevation, and the reservoir is typically at its lowest point in October, when the mean water level is at 774' elevation. The top of the borehole is set at 789' and the existing outlet valves are at 739' elevation. It is the borehole's location that makes it necessary to include a siphoning capability in the project design. The reservoir usually begins refilling in February so there is a limited

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construction window to complete the upstream portion of the project. Borehole excavation and penstock placement are estimated to require 30 days. The project is expected to be completed by June 2013. The powerhouse will have two generators rated at 3.8 and 4.5 megawatts. Only the generator that best matches the available flow will be run at one time. The flow range for power production must be greater than 260 cfs up to the capacity level of 812 cfs. Under these restrictions, it is not anticipated that generation will occur during July and August, but annual production is expected to be about 17,500 megawatt hours. Peak production should occur in February. The historical, mean water level at the end of February is 797' so much of the February production will be under siphoning conditions.

The Row River downstream of Dorena Lake was added to the ODEQ 303(d) list for temperature in 2006. To be in compliance for this listing, the 7 day average of maximum water temperature must not exceed 13°C. during the period of 15 Oct to 15 May. The placement of the penstock intake has a bearing on this concern and is under scrutiny. It is early October, when drawdown reaches its maximum, that the problem is most pronounced. Past temperature profiles for the reservoir show water cooler than 13°C. to be in short supply at this time. Temperature restrictions on power production may be imposed if the coolest water is limited to the depth of the existing reservoir outlets.

Hard Times are Getting Better at Force Lake

Force Lake is a natural lake in the low lands at the confluence of the Columbia and Willamette Rivers. It is identifiable in maps at least as early as 1852. An 1866 deed shows that 633.25 acres around the lake was acquired by George and Susan Force, and the lake appears labeled as "Force Lake" in a 1905 Portland city map. In 1917, the area was diked to lessen the likelihood of seasonal flooding, and soon afterward, the lake was drained for a time to cultivate row crops. The nearby Pacific International Livestock Exposition facilities were built in the early 1920's and they have since metamorphosed into the present day Portland Exposition Center. The heyday of Force Lake occurred in the mid 1940's when it was a focal point of the ill-fated Vanport community. Prior to the 1948 flood, it provided a landscaped area for recreation, picnicking, and swimming for 40,000 area residents.

After the flood receded, the land was used as a construction landfill. Infrastructure improvements made in conjunction with the Exposition buildings attracted other enterprises. An oil reprocessing business located just north of the lake experienced a major spill in 1974 and then burnt completely in 1979 with the total loss of the contents of five, 20,000 gallon storage tanks. The USGS surveyed Force Lake in September 1974 as part of their *Lakes of Oregon* series for Multnomah County. Their remarks include the comment that the ODEQ had investigated the cause of a fish kill in the lake that had occurred earlier in March.

The USGS characterization of Force Lake reported it to be an artificial, 10 acre water hazard on the West Delta Park golf course. It had a 4 foot depth and no discernible inlet or outlet, although buried drains to the Columbia Slough were said to exist on the lakes northwest shore, which is where the panhandle extension of the lake is shown in some documentation. The panhandle extension is sometimes labeled North Lake when it is separated from the main body of Force Lake. The 25 acre-foot lake was still described as a warm water fishery in spite of the earlier fish kill. It had a pH of 9.5, conductivity of 560 µmhos, dissolved solids of 507 mg/L, and a Secchi depth of 0.1 m. These water quality measurements are more extreme than those found in nearby Vanport Lake, which was also included in the USGS survey.

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Testing done in 2000 found a sufficient combination and concentrations of contaminants to place the lake on the US EPA National Superfund Priority List in 2003. There are outstanding Environmental Public Health advisories for the lake and surrounding wetlands warning about recreation and fish consumption.

Nevertheless, there is still hope for Force Lake. Common interest brought together the Friends of Force Lake (<u>www.friendsofforcelake.org</u>) in January 2011 and they achieved the coveted 501(c)1, non-profit status last May. They have also pulled over two tons of debris from and around the lake as they partner with other local jurisdictions to improve conditions there. Work crews have replaced invasive plant species with native trees and shrubs, and have been rewarded with the sightings of an increasingly diverse selection of wetland creatures.

NLA Sampling is Underway and You Can Still Help

Sampling for the second round of the National Lakes Assessment began in Oregon in mid June, and by the end of July, surveys at 13 of the 30 scheduled lakes had been completed. The sampling will continue through mid September. There have been changes in the sites to be visited since the lake list appeared in the last issue of *Lake Wise*. Three of the Wilderness lakes, Top Lake, Maxwell Lake, and Mowich Lake, were just too hard to get to, and Beyers Lake and Ten Cent Lake were cut for other reasons. Replacements have been selected. The two lakes to be sampled twice are Sparks Lake and Link Lake.

Shannon Hubler, from the ODEQ Water Quality Monitoring Section is overseeing the sampling. He has extended an invitation to OLA members interested in helping with the sampling or observing how the sampling protocols are carried out. Help with the carrying in and carrying out of the sampling gear would be especially appreciated during the week of August 13th at a small replacement lake near Waldo Lake, and at Jay Lake during the following week. Jay Lake is a replacement lake that is just inside the Three Sisters Wilderness, a bit southwest of Cultus Lake. Volunteering a boat for the sampling would allow the sampling team to be split and so could also be a benefit to the program. Contact Shannon at <u>Hubler.Shannon@deq.state.or.us</u> if this opportunity is of interest.

The remaining sampling schedule visits Odell Lake, Waldo Lake, and the small replacement lake during the week of August 13th. It is Jay Lake, Link Lake, and Sparks Lake that are scheduled for the week of August 20th. During the week of September 10th, sampling will occur at Sparks Lake, Link Lake, Fish Lake, and another of the replacements. Sampling will conclude during the week of September 17th at Beulah Reservoir, Malheur Reservoir, Phillips Lake, and Moon Reservoir.

Can Mechanical Removal Effectively Suppress a Brook Trout Population?

The question is being addressed this summer at High Lake, in Grant County. The name of the lake is not particularly inspired, but it is descriptive as at 7470' elevation, High Lake is indeed the highest of the several named lakes of the Strawberry Mountain Wilderness. The spring-fed, 6 acre, cirque lake is the headwaters of Lake Creek, a tributary of the Malheur River. Lake Creek is a stream with the clean, cold water that bull trout need to thrive and it is known to host native bull trout, but not upstream of Lake Creek Falls, an impassable barrier that kept High Lake fishless until brook trout were planted there during the 1930's. Bull trout and brook trout are both chars of the genus *Salvelinus*, and cross-breeding is documented. Past surveys in Lake Creek have demonstrated that hybridization is occurring between the two species. Because bull trout are federally

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OLA Mission: The Oregon Lakes Association, a non-profit organization founded in 1990, 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 OLA policy statements.

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High Lake Brook Trout ... (cont.)

protected, it is not unreasonable to consider a program to suppress the introduced population of brook trout in High Lake, which have migrated into Lake Creek, in order to reduce competition and enhance the genetic purity of Lake Creek bull trout.

The brook trout in High Lake are now a naturally reproducing population that has become over abundant and stunted. As a marginal fishery, it provides a good opportunity to test the effectiveness of removing the population by mechanical means. The barrier presented by Lake Creek Falls ensures the test will not be confounded by brook trout from the lower drainage. Furthermore, there is a benefit to the downstream bull trout regardless of how the experiment turns out. Culling the numbers of brook trout in High Lake will reduce the chances of their continued movement into Lake Creek, and improve conditions for the remaining trout in the lake if complete removal is not achieved. It is the willingness of the Burns Piute Tribe to take on this project that makes it a reality. Members of their laudable fisheries program will try gill-netting, electroshocking, minnow trapping, and seining to eliminate the lake's population of brook trout. They also will construct a weir just beyond the Wilderness boundary to stop brook trout moving upstream in Lake Creek. Fishing access will remain open during this experiment and is encouraged. If the effort is successful, ODFW is considering how triploid rainbow trout would do in High Lake.