LAKE WISE

... a voice for quiet waters

NEWSLETTER FROM OREGON LAKES ASSOCIATION

SEPTEMBER 2022

Lara Jansen, Newsletter Editor

IN THIS ISSUE

OLA celebrated Lake Appreciation Month at Suttle Lake!

OLA directors held a retreat at Cinder beach of Suttle Lake in July to celebrate sockeye salmon reintroduction to the upper Deschutes River Basin and Suttle Lake. OLA was joined by multiple agencies and the greater public for a lovely day of swimming, boating, and citizen science!

Fall 2022 OLA Conference at Wallowa Lake Co-hosted with the Nez Perce Tribe, October 14 &15

Please register for our joint conference with the Nez Perce Tribe on Friday 14 and Saturday 15 October! One day will be dedicated to celebrating sockeye salmon reintroduction and other issues focused on the Wallowa region. We will have the run of the lovely Wallowa Lake Lodge for the conference and accommodation. We'll also make remote attendance via Zoom available.

See program on the next page.

Check the email you should have already received for registration information or register here

Fall 2022 OLA Conference co-sponsored by Nez Perce Department of Fisheries Resources Management

Wallowa Lake Lodge, Joseph, October 14 & 15
Remote participation via Zoom also offered

Friday, Oct. 14, Sockeye salmon reintroduction program in the Wallowa valley

8:45 Welcome: Theo Dreher (OLA), Jim Harbeck (Nez Perce Fisheries)
9:00 Nakia Williamson, Nez Perce Tribe – Cultural Perspective & Blessing
9:30 Ellen Bishop, Terranes, LLC – Wallowa Lake Moraines
9:50 Shane Vatland, Nez Perce Tribe – Wallowa Lake Studies
10:10 Michael Meeuwig, ODFW – Wallowa Lake Studies

10:30-10:45 Coffee Break

10:45 Erik R. Moberly, ODFW – Deschutes Sockeye Program
11:05 Andrew Matala, Yakama Nation – Cle Elum Lake Sockeye Program
11:25 Eric L. Johnson, Idaho Department of Fish & Game – Redfish Lake Sockeye Program
11:45 Becky Johnson, Nez Perce Tribe – Wallowa Lake Sockeye Program
12:05 Jeff Hogle, Confederated Tribes of the Warm Springs – Deschutes Sockeye Program

12:30 – 1:30 Lunch

2:00 ***Afternoon Field Trips***: Wallowa Lake orientation by boat (Nez Perce, ODFW); tour of Wallowa Lake Dam (Wallowa Lake Irrigation District)

6:00 Evening banquet dinner and Plenary lecture

Courtney Crowell, Governor's Northeast Regional Solutions Center
Bringing Coho back to Wallowa Lake

Saturday, Oct. 15, Lake Ecology and Management

Session 1: Lake Ecology

9:00 Ron Larson – Satellite tracking of climate change effects at Oregon's playa lakes (via Zoom)
9:20 Joe Eilers, MaxDepth Aquatics, Inc. – Gas emissions (ebullition) from Oregon lakes
9:40 Theo Dreher, Oregon State University – CyanoHAB genomes: *Limnoraphis* and *Woronichinia*
10:00 Desiree Tullos, Oregon State University – Predicted effects of removal of Klamath River dams

10:20-10:40 Coffee Break

10:40: Wayne Carmichael – Nehalem River trib restoration for salmonids incl. cool permanent vernal ponds
11:00 Dan Brown, DEQ – 2017 National Aquatic Resource Survey of Oregon Lakes
11:20 Open discussion of state-wide lake studies, thoughts for future design, etc.

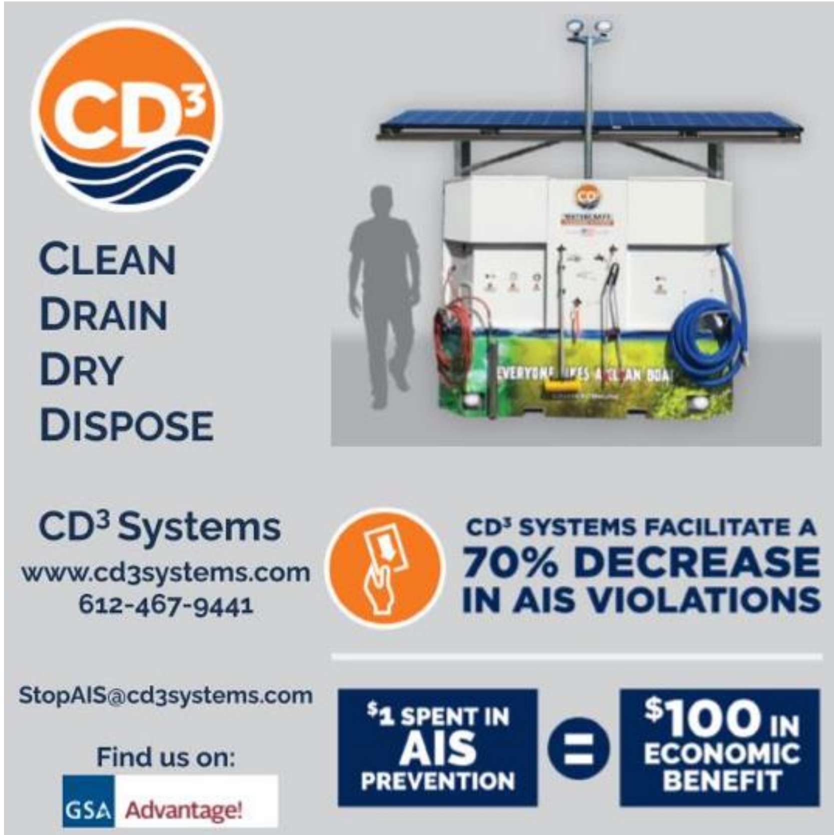
11:45 -1:15 Lunch

Session 2: Lake Management

1:30 Ivan Arismendi, OSU – AquaPV: modeling impacts of floating solar panel arrays on lakes (via Zoom)
1:50 Ed Rudberg, CD3, Inc. – A digital alternative to in-person boat inspections for controlling invasives
2:10 Ryan Van Goethem, EutroPHIX, Inc. – Improving Water Quality with Lanthanum Modified Bentonite
2:30 Dan Sobota, DEQ – Web-based app for detecting and monitoring cyanoHABs in Oregon lakes

2:50-3:15 Coffee Break

3:15-~5:00 OLA business meeting presenting slate of 2022-2024 officers; short report by president; budget report; what OLA has been emphasizing & what OLA could do in the future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OLA's Lake Appreciation Event at Suttle Lake

Randy Jones

Lakes and reservoirs are among Oregon's most valuable natural resources. This is the foundational expression from Governor Brown's 2022 proclamation establishing July as Lakes Appreciation Month. "Our lakes and reservoirs improve the quality of life for all Oregon residents."

Lara Jansen sets up a microscope to show others the types of plankton present.

Such was the case at the OLA Board of Director's retreat held at Suttle Lake on July 16. The combination of a popular mountain lake, summertime, and the OLA gathering to celebrate Oregon lakes all came together in highlight of OLA and its mission. The OLA mission is inclusive, evidenced in July when our lakes community welcomed members, students, event participants and community partners at historic Cinder Beach. The OLA mission was also on-stage with the broad spectrum of participants coming together to learn about the challenging science behind Sockeye salmon reintroduction and about the complex history and current management of fisheries in Oregon's high lakes.

If knowledge can lead to enhanced understanding, and understanding can lead to enhanced appreciation, then Oregon citizens showed they know about Suttle Lake and were congregating in large numbers as friends' groups, family groups, and as the traveling summer public to appreciate this lake and its cool breezes. OLA's programmatic focus on citizen science was on-stage too, welcoming passers-by to peer at various biota through microscopes – a view so much appreciated yet seldom seen by so many. It well may have been that OLA Director Lara Jansen illuminated a few of our youngest budding limnologists at a lakeside table full of instruments, maps and water samples (see photo).

OLA is so appreciative of the time and talents from our speakers, both fisheries biologists: Nate Dachtler and Mike Reilly with the Deschutes National Forest, Bend-Fort Rock and Sisters Ranger Districts, respectively. OLA partners attending also included Trout Unlimited, Oregon Parks Forever, Friends of the Metolius, Sisters District Ranger Ian Reid and District Recreation Team lead Sarah Boughman, and Portland General Electric's fisheries and water quality manager, Megan Hill.

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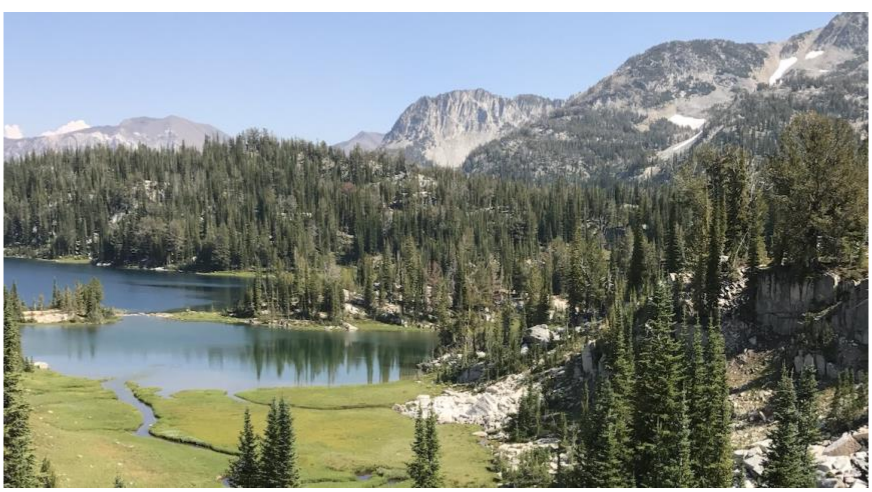

Mirror Lake, Eagle Cap Wilderness.
Photo: Theo Dreher, August, 2017
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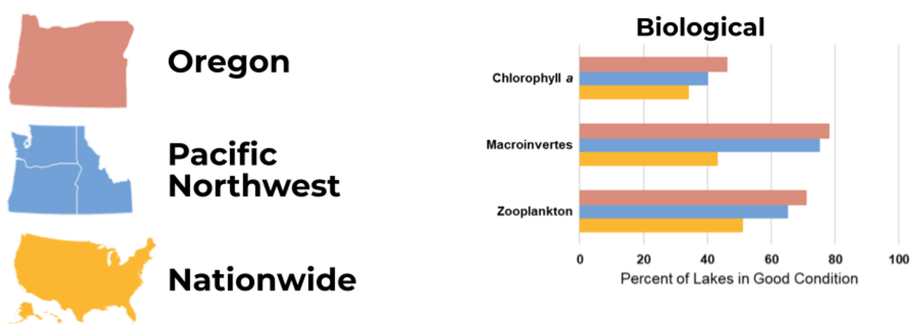
Thoughts on DEQ's "The 2017 Survey of Oregon Lakes"

Lara Jansen, Portland State University & Theo Dreher, Oregon State University

During August, the Oregon Department of Environmental Quality (DEQ) released a report on the conditions of Oregon lakes based on 49 lakes across the state in part for the 2017 National Lake Assessment (NLA). The NLA is part of the recurring National Aquatic Resources Surveys led by the Environmental Protection Agency (EPA) and carried out in partnership with state agencies. The Biomonitoring and Toxin Monitoring Programs of DEQ collected data on 29 lakes and reservoirs for the 2017 NLA survey and then for additional 20 lakes and reservoirs to better determine statewide conditions. The lakes and reservoirs were selected to be representative for major Ecoregions -Western Mountains and Xeric- and met the following criteria: greater than 1 ha in surface area, greater than 1 m deep, greater than 0.1 ha of open water and greater than 1 week of residence time. This survey is the first statewide assessment of important compounds, such as nutrients and toxins, in lakes and reservoirs in Oregon. Most lake and reservoirs were found to have 'good' biological conditions in terms of zooplankton (71% of water bodies) and macroinvertebrates (78%). The most widespread indicators of 'poor' conditions were chlorophyll-a, nitrogen and phosphorus concentrations. All waterbodies were found to have *E. coli* and microcystin concentrations below the recreational contact guidelines at the time of sampling. In addition, most other compounds in the toxin assessment rarely exceeded human health or aquatic life criteria. On the other hand many lake sediment samples contained persistent compounds that can bioaccumulate in fish and other aquatic life. See DEQ's Infographic Summary. Overall, Oregon lakes appear to be among the healthiest in the country.



Lake health summary: DEQ 2017-NLA Infographic

While the DEQ report on the 2017 NLA survey for Oregon lakes and reservoirs provides an update on conditions throughout the state, there are some limitations to the study structure, which was largely set by EPA and the goal of providing a high-level overview. The use of major Ecoregions may make sense at a broad national level for the NLA, but at a state level this system may not be as useful. Based on maps and texts from the report, Oregon waterbodies from the coast, some lowland areas and high Cascades are grouped together; this groups lakes that are fairly unique from one another in terms of climate, land cover and geology. In future surveys, the use of finer scale geographic divisions would be useful in examining regional trends and identifying potential landscape factors within each region. Additional evidence about how the sample of 49 waterbodies (~1% of the targeted population) is representative of the total population of lakes would be useful.

Since the lakes survey is limited to a single time point, due to logistical and fiscal limitations, an assessment of many seasonal ecological processes such as algal blooms is not possible. Therefore, one must be careful in not overstating the implications of the study results. In terms of trophic status and other water quality measures, the values of the 2017 survey differ from those defined by Oregon DEQ standards. An examination of the 2017 survey based on the state-based rules would allow for easy and useful comparisons to the latest Integrated Report for Oregon. The authors should consider following up on such comparisons to check the validity of the study conclusions that Oregon's lake and reservoirs are generally in good condition. As climate change and land use continue to impact Oregon's landscape, representative surveys that capture spatial and temporal variation and identify water quality issues are crucial. We applaud DEQ's role conducting this recent assessment and hope that more in-depth studies of the ecological status of Oregon's lakes will follow.

Lake Abert – Oregon's Only Hypersaline Lake: Importance of Evapotranspirational Water Losses and Irrigation Diversions in Recent Desiccation Events

Ron Larson

Figure 1. Post-breeding American Avocets and other shorebirds come to Lake Abert in large numbers during the summer to feed on brine shrimp and alkali flies in preparation for their southward migration (8-28-2009).

Introduction

Lake Abert is the only large saline lake in the Pacific Northwest and is its only hypersaline lake, reaching salinities >7x those of the ocean. It is Oregon's 6th largest lake and has reached an area of 64 square miles. 15,000 years ago, the lake was part of 500,000-square-mile Lake Chewaucan. Two invertebrates, the brine shrimp (*Artemia franciscana*) and alkali fly (*Ephydra hians*), dominate the lake (Conte and Conte 1988, Herbst 1988), and provide a ready and easily obtained food for waterbirds, especially shorebirds like avocets, sandpipers, stilts, and phalaropes. These birds have reached abundances exceeding 200,000 during July and August. Birds from as far away as the Arctic stop at the lake to gorge on the shrimp and flies (Figure 1) before migrating to distant areas, including southern South America. Only a few other North American saline lakes, e.g., Great Salt Lake, Salton Sea, and Mono Lake, provide the rich invertebrate food that enables these birds to nearly double their weight in just a few weeks' time, providing the energy needed to make a multi-thousand-mile migration. Water at the appropriate level of salinity is needed to support Lake Abert's productivity, and this is mostly affected by the levels of (a) river inflows, (b) evaporative losses and (c) upstream water diversions for human use.

Recent Changes in Hydrology

Climate change is impacting the planet in profound ways, and Lake Abert has experienced rapid drying in the past 2 decades (Figures 2, 3). Only during the Dust-Bowl era of the 1920 and 30s was the lake recorded being so low (Figure 2).

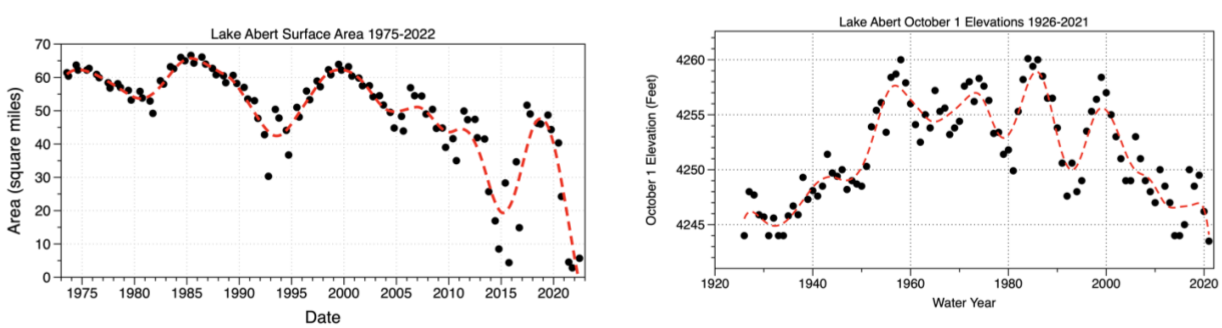


Figure 2. Left: Lake Abert surface area 1975-2022. Right: Lake Abert elevation, water years 1926-2022.

Figure 3. Lake Abert. Left: July 2018, when water levels were 4249 feet. Right: July 2022 when the lake was at an elevation of 4244 feet, and almost totally dry except for a very shallow pool along the eastern side that is spring fed.

<u>Changes in Precipitation & River-flow vs. Evapotranspiration (ET)</u>

The main natural influences on the water levels in Lake Abert are precipitation, inflow (with the Chewaucan River being the chief contributor) and ET losses. Figures 4-6 show recent changes in these factors. There has been a slight decline in precipitation, as indicated by SNOTEL data from nearby Summer Rim and Strawberry sites (Figure 4). With regard to Chewaucan River flows (measured above Paisley and above most of the diversions), averages seem stable, but flows measured in 2020 and 2021, were low (Figure 5). In contrast, ET shows the largest long-term change, increasing by ~20% since 1990 (Figure 6).

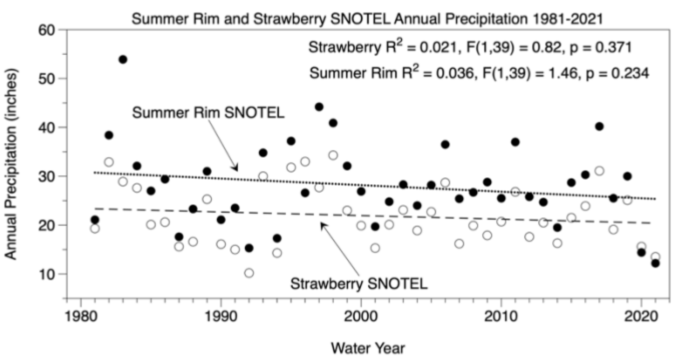


Figure 4. Scatterplot of annual precipitation at two SNOTEL sites, where snow depth is measured, near the Chewaucan watershed. Although there is a slight downward trend in annual precipitation 1981 to 2021, at each site, the slope is not different from zero at a *p* 0.05 level. Summer Rim SNOTEL, filled circles; Strawberry SNOTEL, open circles. Data from: wcc.sc.egov.usda.gov/reports.

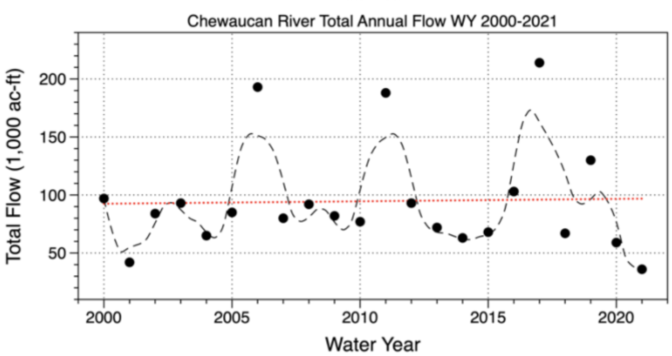


Figure 5. Scatterplot of Chewaucan River total annual flow water-years 2000-2021 (Paisley OWRD gage). An acre-foot of water is enough to cover an acre in area 1 foot-deep. The dashed black line shows short-term trends, whereas the dotted red line shows the long-term trend, which is also similar to the average. Data from: wrd.state.or.us.

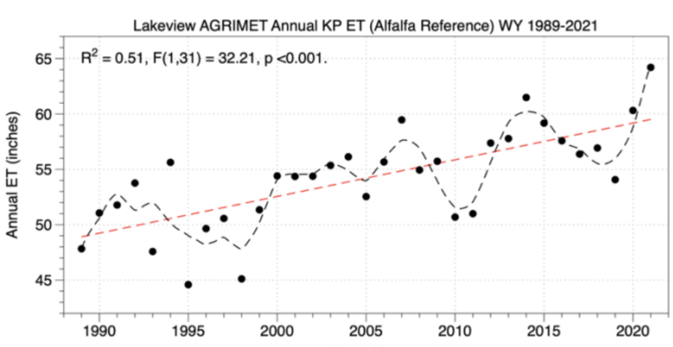


Figure 6. Scatterplot of annual ET measured at the Lakeview AgriMet station located south of Lake Abert. The dashed black line shows short-term trends, whereas the dashed red line shows the long-term trend. Data from: usbr.gov/pn/agrimet.

Changes in Chewaucan River Diversions for Human Use

Studies of the 2014-2016 Lake Abert desiccation event indicated a significant role for diversions as a causative factor (Larson et al. 2016, Moore 2016). So, have diversion levels changed recently? There are no data showing the amount of water being diverted for irrigation from the Chewaucan River. However, starting in 2017, estimates of ET from agricultural fields became available on the web-based app called OpenET (https://openetdata.org). OpenET uses a variety of satellite and climate data and algorithms to estimate ET at a local level of individual fields down to a few acres in size. Here, OpenET was used to estimate the cumulative, annual ET from irrigated fields in the Chewaucan Basin as well as the volume of river water that would be needed to produce the estimated ET (Table 1). The data from OpenET included over 100 fields totaling ~22,000 acres in the upper and lower marshes that primarily use flood irrigation. For those areas, the estimated annual ET for 2017- 2021, equaled ~30 to >50 thousand-acre-feet of water once the ET resulting from precipitation was subtracted. To meet that demand would have required between ~30% and 90% of the annual river flow, with the greatest percentage of the river flow being required in 2020 and 2021 (Table 1).

Year	Annual Ag. ET (1,000 Ac-Ft)	Annual River Flow (1,000 Ac-Ft)	Annual Ag. ET as Percent of Annual River Flow
2017	56	214	27
2018	53	67	79
2019	50	130	39
2020	47	59	80
2021	32	36	88

Table 1. Shows the estimated annual ET for ~22,000 acres irrigated fields in the Upper and Lower Chewaucan Marshes and the annual river flow for 2017-2021, and what percentage of the river flow would need to be diverted to meet the estimated ET. The annual agricultural ET estimate was based on the total annual ET for >100 fields totaling 22,000 acres minus the estimated ET for that same area resulting from precipitation, which was assumed to be the lowest measured field ET for each year. Annual ET data was obtained from OpenET (https://openetdata.org). Annual river discharge measured above Paisley was from the OWRD Near Real Time Hydrographics Data website.

Given these results, ET has not increased since 2017, perhaps because dry conditions in 2020-2021 forced limits on irrigation; however, a greater percentage of the river flow was required in 2020-2021 to meet the ET demands. Estimating irrigation diversions using ET is not the preferred method. To provide the most accurate information for informing water conservation efforts and to more accurately understand the current hydrology and ongoing trends, what is needed are actual measurements of water diversions or continuous flow measurements made at various points in the Chewaucan system.

Recent Changes in Waterbird Populations

Lake Abert is critical for migratory waterbirds using the Great Basin, and it is one of a few lakes that can provide a sufficiently-high biomass of invertebrate food to support several hundred thousand birds for several weeks during the summer, prior to their southward migration (Jehl 1988, Larson et al. 2016, Moore 2016, Senner et al. 2018). Being able to support all of these birds is likely due to its high productivity, lack of other predators, and its shallow depths making food more available. When Lake Abert was recognized as being a major habitat for waterbirds, the Bureau of Land Management began monitoring waterbird populations there between 1992 and 1994, documenting peak abundances from 65,000 to 120,000 (BLM unpublished). More recently, 2011-2022, birds have been surveyed by volunteers from the East Cascades Audubon Society (ECAS). Over that period, maximum numbers of waterbirds have ranged from ~10,000 to 250,000, but populations have not recovered since the lake desiccation event of 2014-16 (Figure 7).

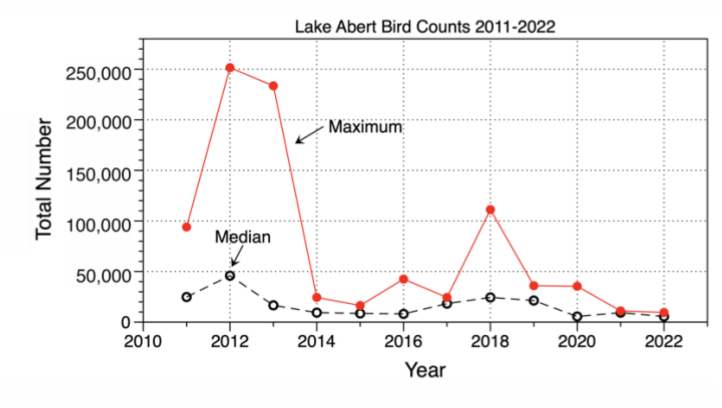


Figure 7. Scatterplot of total waterbird counts at Lake Abert, 2011-2022. The red line shows maximum numbers, the dashed black line shows median numbers. The substantial difference in median and maximum numbers is in part due to seasonal changes in abundance that peaks in July and August just prior to the birds' southward migrations. East Cascades Audubon Society, unpublished data.

Discussion

The above information showed that Lake Abert has recently desiccated, something that had not happened since the Dust Bowl era of the 1920 and 30s. More detailed studies are needed to uncover the exact causes of the recent drying of the lake. However, a likely scenario describing the recent desiccation of the lake is that it was initiated by a short-term cycle of decreased precipitation and lower river flows (as seen in Figures 4 and 5), exacerbated by high rates of ET and irrigation diversions that would have used most of the river flow (Table 1). Once water levels were low, the relatively small inflows reaching the lake from the river were insufficient to compensate for the high ET, and consequently, the near complete desiccation of the lake resulted. In fact, in 2021, no river water reached the lake, and in 2022 inflows were small and the pool that was created was gone by early July. Thus, during the past several years, a large percentage of the river flow was likely diverted onto fields (Table 1), and consequently little reached the lake.

During the 1920s and 30s, a decline in precipitation and river flows over a series of years was undoubtedly the primary factor causing lake desiccation (Larson et al 2016, Moore 2016). In contrast, the results presented here suggest that ET has been a major factor in the current desiccation event. Thus, we now need to pay greater attention to ET as a major, and growing, contributor to water loss in the Chewaucan Basin, affecting both agriculture and Lake Abert. The increasing periods of very low humidity and high temperatures that drive ET water losses have other devastating effects, as evidenced by the huge 2021 Bootleg wildfire that destroyed tens of thousands of acres of forests in the Chewaucan watershed.

Flood irrigation is the primary way that fields in the Chewaucan Basin are supplied with water. It is an inefficient way to irrigate because much of the water is evaporated from pools formed in low areas, rather than being used by crops. These pools are so large that they are visible in satellite images (Figure 8).

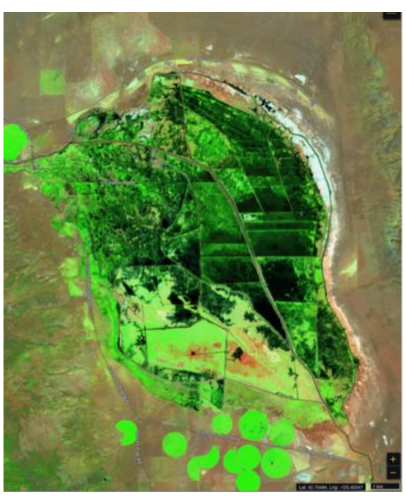


Figure 8. Left: Satellite image of the Upper Chewaucan Marsh, 5-4-2020. The dark areas are where water has accumulated as a result of flood irrigation forming lakes and wetlands. These flooded fields do provide habitat for some waterbirds, such as Sand Hill Cranes, right, but that comes at a substantial cost to those birds that rely on Lake Abert for the high abundance of invertebrates it provides.

Flood irrigation in the Chewaucan has been justified as providing temporary wetland habitat for freshwater marsh birds, such as Sandhill Cranes, which is certainly true (Figure 8). However, similar sizeable habitats are present at the nearby Summer Lake Wildlife Area and at several federally-managed wildlife refuges and wetlands in the adjacent Harney, Klamath, and Warner Basins. Importantly, the water that is used to create wetlands in the Chewaucan Marshes comes with a cost that is forced on the avocets, stilts, sandpipers, and other waterbirds that depend on Lake Abert for its high productivity to provide the fuel they need for long-distance migration. Without that fuel, the birds could succumb to predators, starvation, or experience reduced reproduction.

The continued presence of waterbirds at the lake, even in the face of severe habitat loss, shows the ecosystem has resilience, but clearly there has been a great loss of productivity that could put those waterbird populations at risk, as seen by low recent bird counts (Figure 7). It is probable the Lake Abert ecosystem will recover and birds would return when more water eventually reaches the lake, because saline lakes are variable, and the birds and other species that depend on them have evolved to cope with those changes. However, there likely is a tipping point, where bird populations become so small that recovery is impossible. The future of interior populations of migratory waterbirds dependent on salt lakes requires that there is suitable habitat and adequate water (Haig et al. 2019, Donnelly et al. 2020, Wurtsbaugh et al. 2020). Thus, urgent action is required if saline lakes like Lake Abert, the Great Salt Lake, and Mono Lake will support waterbirds in the future.

References

Conte, F.P, and P.A. Conte. 1988. Abundance and spatial distribution of *Artemia salina* in Lake Abert, Oregon. Hydrobiologia 158:167-172.

Donnelly, J.P. S.L. King, N.L. Silverman, D.P. Collins, E.M. Carrera-Gonzalez, A. Lafon-Terrazas, and J.N. Moore. 2020. Climate and human water use diminish wetland networks supporting continental waterbird migration. Global Climate Change Biology 26(4):2041-2059.

Haig, S.M., S.P. Murphy, J.H. Matthews, I. Arismendi, and M. Safeeq. 2019. Climate-Altered Wetlands Challenge Waterbird Use and Migratory Connectivity in Arid Landscapes. Scientific Reports 9, article 4666. 10 pp.

Herbst, D.B. 1988. Comparative population ecology of *Ephydra hians* Say (Diptera: Ephydridae) at Mono Lake (California) and Lake Abert (Oregon). Hydrobiologia 158:145-166.

Jehl, J.R., Jr. 1988. Biology of the Eared Grebe and Wilson’s Phalarope in the non-breeding season: a study of adaptions of saline lakes. Studies in Avian Biology 12.

Larson, R., J. Eilers, K. Kreuz, W.T. Pecher, S. DasSarma, and S. Dougill. 2016. Recent Desiccation-related Ecosystem Changes at Lake Abert, Oregon. Western North American Naturalist 76(4):389-404.

Moore J. 2016. Recent desiccation of Western Great Basin Saline Lakes: Lessons from Lake Abert, Oregon. U.S.A. Science of the Total Environment 554-555:142-154.

Phillips, K.N. and A.S. Van Denburgh. 1971. Hydrology and geochemistry of Abert, Summer, and Goose lakes, and other closed-basin lakes in south-central Oregon. Closed-Basin Investigations. U.S. Geological Survey Professional Paper 502-B. 86 pp.

Senner, N.R., J.N. Moore, S.T. Seager, S. Dougill, and S.E. Senner. 2018. A salt lake under stress: Relationships among birds, water levels, and invertebrates at a Great Basin saline lake. Biological Conservation 220: 320-329.

Wurtsbaugh, W.A., Miller, C., Null, S.E., DeRose, R.J., Wilcock, P., Hahnenberger, M., Howe, F. and Moore, J., 2017. Decline of the world's saline lakes. Nature Geoscience, 10(11), pp.816-821.

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Harmful Algae Blooms (HABs) Corner

Theo Dreher, President, OLA, Professor Emeritus, Oregon State University

We are well into the summer/fall CyanoHABs season. Oregon Health Authority issues advisories based either on toxin analyses or presence of cyanobacterial scums that are considered to be potentially toxigenic. 8 µg/L microcystin, 15 µg/L anatoxin-a and 15 µg/L cylindrospermopsin are the thresholds for issuing advisories. A handful of advisories have been issued this year (see below). High levels of microcystin have been observed in Upper Klamath Lake, an annual occurrence as *Microcystis* populates the late after high summer, adding to the non-toxigenic *Aphanizomenon flos-aquae* that is persistently present at high levels.

Waterbody	Status	Link	County	Toxin	Data (ppb)
Willamette River between Willamette Cove and Cathedral Park	= Advisory in effect	August 26, 2022	Multnomah	Microcystin	9 ppb
Hells Canyon Reservoir	= Advisory in effect	August 8, 2022	Wallowa and Baker	Cyanobacteria	n/a
Brownlee Reservoir	= Advisory in effect	August 5, 2022	Baker	Cyanobacteria	n/a
Cronemiller Lake in Benton County	= Advisory has been lifted	August 3, 2022	Benton	Cyanobacteria	n/a
Upper Klamath Lake	= Advisory in effect	July 28, 2022	Klamath	Microcystin	61 ppb
South Umpqua River and mainstem Umpqua River	Permanent Recreational Use Advisory	Posted Sign	Douglas		

Advisories shown on OHA website, 1 September 2022.

A toxic cyanobacterial bloom visible in the Willamette River in the summer of 2021. Source: KGW8 News, Portland

There is also a current advisory for the Willamette River downstream of central Portland. OSU Prof. Desiree Tullos (also a member of the OLA Board of Directors) is utilizing genetic analysis to evaluate if this bloom is derived from the toxic cyanobacterial blooms that annually grow in Ross Island Lagoon, with results coming later this fall. Blooms in the Lagoon in past summers have affected the Willamette River to various extents.

In Washington State, more lakes are currently under advisories due to CyanoHABs. There are two methodological reasons that might explain the larger number of advisories in Washington compared to Oregon. First, Washington uses more stringent criteria for recreational advisories (1 µg/L anatoxin-a, 8 µg/L microcystin). Second, Washington has a long-standing program that encourages reporting and submission of bloom samples for toxin testing. This results in more comprehensive testing than we have in Oregon.

However, microcystin or anatoxin-a have been detected during August in 13 Washington lakes at levels that would have triggered advisories in Oregon (see table). It is uncertain whether Washington has more lakes prone to toxic CyanoHABs or whether we are missing the identification of toxic blooms in Oregon lakes and should increase our surveillance.

Current lakes with values above guidelines

Location	Last Sample Date
Anderson Lake	08/15/2022
Lacamas Lake	08/29/2022
Lake Campbell	08/22/2022
Long Lake	08/16/2022
McNary Slough	08/26/2022
Pass Lake	08/22/2022
Round Lake	08/29/2022
Rufus Woods Lake	08/10/2022
Sagemoor Pond	08/29/2022
Vancouver Lake	08/29/2022
Wiser Lake	08/22/2022

Advisories shown on WA HABs website, 1 September 2022

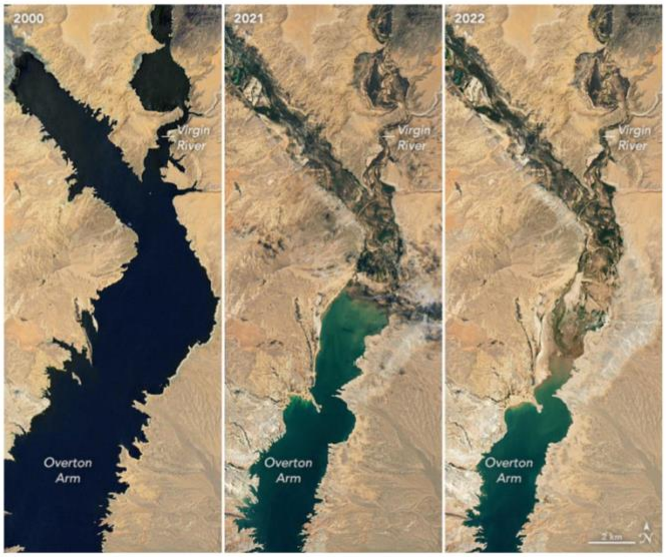
OLA at the 2022 International Conference on Toxic Cyanobacteria

In late May, the University of Toledo hosted the 12th International Conference on Toxic Cyanobacteria. The keynote address to launch the conference was delivered by Wayne Carmichael, Professor Emeritus, Wright State University and past member of the OLA Board of Directors. Dr. Carmichael was one of the originators of the cyanotoxin field, conducting research in this field since his Ph.D. studies at the University of Alberta in 1972-4. His talk emphasized the need to focus on abatement of CyanoHABs. Prof. Theo Dreher, OLA President, was also present at the conference, reporting on his research on the genomics of Pacific NW HAB cyanobacteria conducted at Oregon State University.

Dr. Wayne Carmichael

Lakes in the News: 2022 Drought impacts across the world
Theo Dreher

Prominent news about lakes and reservoirs recently has been about lakes disappearing. Persistent drought and uncontrolled water use has pressured the Colorado River to the point of causing Lake Mead to reach its lowest level since its construction. Low water levels have revealed trash and even human remains that were long deep under water. The capacity for hydroelectric generation is also under threat.

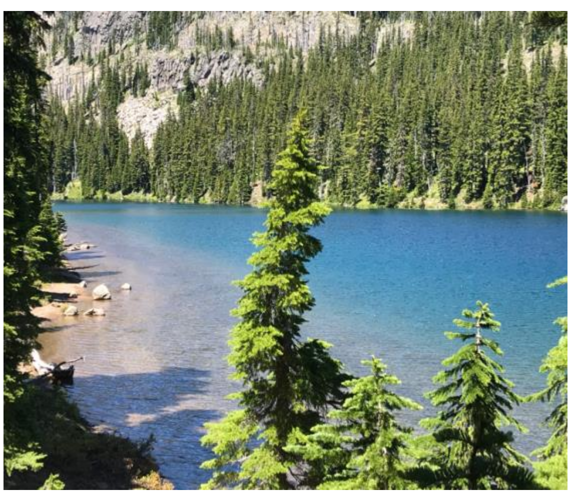


Satellite observations of Lake Mead between July 2000 and July 2022. Source: NASA Earth Observatory

In Europe, suffering an unprecedented heat wave, rivers are turning into lakes and supporting blooms that do not grow in running water, such as in Scotland and on the German/Polish border.

Parts of Oregon have also been in the grip of persistent drought. For the first time since the 1930's Dust Bowl era, Lake Abert, Oregon's hypersaline gem that is a key refueling resource for migratory shorebirds, is almost completely dry. See the article in this issue by Ron Larson. The drought has also caused unprecedented desiccation of Tule Lake, a key wildlife refuge for waterfowl just south of Klamath Falls in California.

Fortunately, not all news about local lakes is bad. Late spring snow and rains in SW Oregon have filled Applegate and Lost Creek Reservoirs in the Rogue River basin. This precipitation was also cherished by mountain lakes, such as the lovely Carl Lake in the Mount Jefferson Wilderness, SSE of the peak.



Carl Lake in the Mount Jefferson Wilderness in July. Photo: Theo Dreher

And based on the recent assessment of Oregon lakes, reporting results on samples taken in 2017, Oregon lakes are generally in good condition (see article in this issue). The assessment of 49 lakes, conducted by the Department of Environmental Quality, included lakes nominated by OLA: Lake Abert and Woahink Lake.

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The Oregon Lakes Association Mission

OLA, a non-profit organization founded in 1990, promote the understanding, protection, and thoughtful management of lakes and watersheds in Oregon. To fulfill this mission, OLA holds lakes conferences and workshops, publishes the Lake Wise newsletter, advocates for lakes in the legislative arena, and offers graduate student scholarships. OLA strives to be a diverse, inclusive, and welcoming community for all members, students, event participants and community partners. We encourage participation by all regardless of age, culture, disability, ethnicity, gender, national origin, color, race, religion, sexual orientation and socio-economic status. OLA recognizes a diversity of perspectives is important to tackle the complex issues facing Oregon's lakes and watersheds. Serving entirely through volunteer efforts, the Oregon Lakes Association puts on an annual conference, publishes a tri-annual newsletter, sponsors Harmful Algal Bloom trainings, and works as an advocate for lakes in the legislative arena. For additional information on OLA, write to the address above, or visit our website

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

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