OREGON LAKE WATCH

March 1991

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CITIZEN LAKE WATCH PROGRAM

Scientific Resources, Inc. (SRI) continues to coordinate the *Citizens Lake Watch* (CLW) program for selected Oregon lakes, as part of the Clean Lakes Challenge Grant sponsored by the Oregon Department of Environmental Quality (DEQ). The purpose of the program is to both continue and expand the collection of basic, base-line water quality data on the lakes so that any apparent long-term trends in lake quality can be identified.

Last summer, volunteers collected lake water quality data for 20 lakes. Eight were coastal lakes: Cullaby, Garrison, Mercer, Munsel, Sunset, Siltcoos, Triangle and Woahink. Ten were Cascade lakes: Blue, Cultus, Diamond, Hosmer, Lava, Odell, South Twin, Suttle and Timothy. Wallowa Lake in northeast Oregon and Lake Oswego in the Willamette Valley were also part of the program. Through the winter, volunteers continued to collect data in the lower elevation lakes that are not covered in ice.

The measurements for some of the lakes are presented in this issue of Oregon Lake Watch. SRI collated the volunteer's data and developed formal data tables for each lake. A complete summary report will be provided to DEQ in April and eventually to each volunteer who contributed time on their lake, showing past data and information they collected this year.

Please contact DEQ if you're interested in future efforts.

NEWS OF OREGON LAKES

Waldo Lake

Information and data collected last summer at Waldo Lake in the Cascades is being summarized this winter by Dr. Douglas Larson, Jim Sweet, John Salinas, and Randy Jones. As mentioned in the last issue of *Oregon Lake Watch*, a detailed look at the lakes bottom (or benthic environment) was obtained through the use of a Remote Operated Vehicle, a small unmanned submersible equipped with a video camera.

Aquatic plants were found on the lake bottom at varying depths, some at over 300 feet! How, where, and why these plants grow in such a sterile lake (sterile from a water quality and lake productivity standpoint) are some of the questions the researchers will explore in the final analysis.

EPA 1991 Clean Lakes Funding

The U.S. Environmental Protection Agency (EPA) has monies available for Clean Lakes Projects for 1991. The Oregon Department of Environmental Quality (DEQ) administers the program in Oregon, awarding funds for new projects or for supplementing existing Clean Lakes Projects. A maximum of $348,000 is available for Region 10, which includes Oregon, Washington, Idaho, and Alaska.

Oregon proposals were solicited by DEQ. Several proposals are being submitted, including Lake Water Quality Assessments, to continue Citizen Lake Watch in coastal and Cascade lakes, and supplemental grants for monitoring Devils, Sturgeon and Garrison lakes.

PRELIMINARY 1990 CITIZEN LAKE WATCH TRANSPARENCY DATA

The following are graphs of secchi disk data collected by volunteers at some of the lakes this past year. Secchi disk measurements reflect the transparency of the lake water. Transparency is, in turn, a general measure or function of a lake's productivity. Studies suggest that transparency is directly correlated with the amount of chlorophyll-a in lake water. Chlorophyll-a is produced by plants (including algae) growing in a lake. Transparency is also strongly correlated to a lake's trophic state index (see *Oregon Lake Watch*, vol. I, June 1990).

The graphs are for lakes where the most extensive and complete data was collected. All data collected at other lakes (including other types of data, i.e., pH, temperature, and observations) will be presented in the final report in April.

The vertical graph axis on the left represents water depths from 0-meters (the surface) down to whatever depth includes the deepest secchi disk reading. The maximum depths shown on the graphs do not necessarily represent the maximum depth of the lake. Transparency varies over the course of a season.

Some of the variation is attributable to lake turnover, as when ice on a lake melts. Cold, dense, surface water is sent downward and is replaced by the relatively warmer deeper water. Lake turnover also occurs in the fall when cold air cools the lake surface water, which again becomes more dense than the bottom water. The surface water descends and the lake "turns over." This mixing often increases the transparency of the water because surface algae and other debris are carried downward or are at least mixed with a greater volume of water.

Events and activities in the watershed or on the lake can also influence lake transparency. Activities such as logging, road building, residential development involving land clearing and/or excavation where insufficient erosion control practices are used can cause the addition of sediments to the lake, causing a murky color and an associated decrease in transparency. Algae blooms in spring and summer months can drastically affect transparency, causing the milky-green color so often mistaken for polluted water.

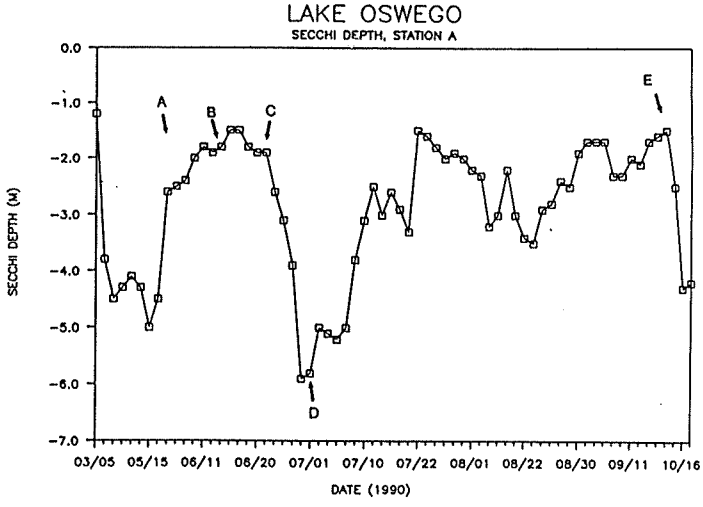
How lake transparency is influenced by natural and human agents is evident in the Lake Oswego secchi disk data collected by Chris Kern. Chris collected data from 5 March through 16 October 1990. The graph of the data shows several significant decreases and increases in transparency. Shortly after the first of March, there was an increase in transparency of slightly over 3 meters (about 9.5 feet), possibly from zooplankton cropping algae. Around the middle of May, the annual algae bloom occurred and the lake became murky green. Copper sulfate, an inert chemical applied to control aquatic weed growth, was applied the first of June. Shortly thereafter, as part of the Lake Oswego Corporation Comprehensive Water Management Program, the water flow through the Lake Oswego canal from the Tualatin River was restricted. The Tualatin River is the primary source of the lake's phosphorus (the key nutrient for biological growth in this lake system). When the nutrient source was reduced because of lower flows (and copper was applied) the transparency increased by almost 5 meters!

After the first of July, when phosphorus concentrations in the Tualatin decreased, inflow through the canal was resumed and transparency decreased once again. The very end of the graph shows another marked increase in transparency after fall lake turnover about the first of October.

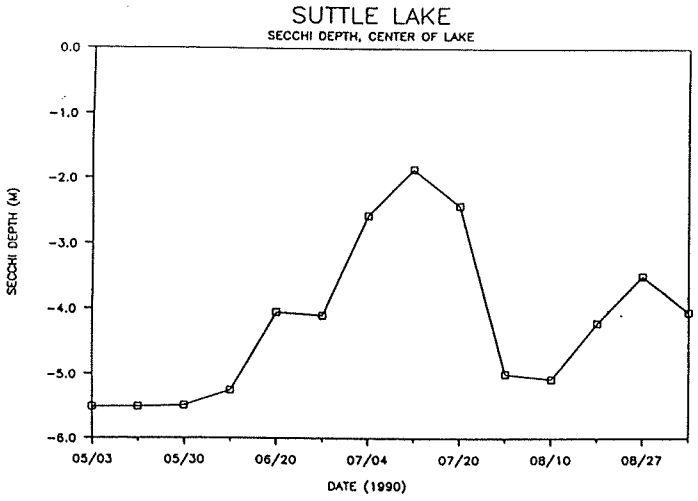
Other lakes where monitoring occurred also experience variations in transparency, but none are manipulated to the degree of the Lake Oswego system. Suttle Lake experienced a decrease in transparency about the first of July due to an algae bloom. Two of the coastal lakes on the other hand, Triangle and Woahink, experienced a general increase in transparency over the summer, possibly reflecting an early spring bloom.

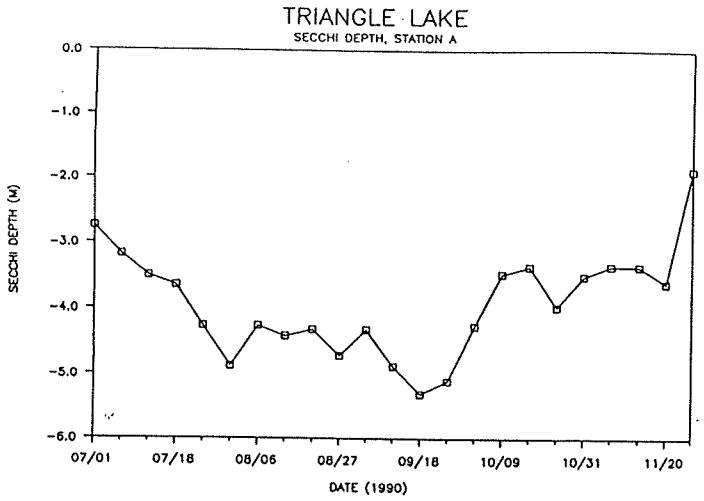
Shallow, well-mixed lakes, such as Hosmer in the Century Drive area southwest of Bend, do not turn over. Their variable surface water temperatures cause temporary fluctuations in biologic activity, which affects the water's transparency.

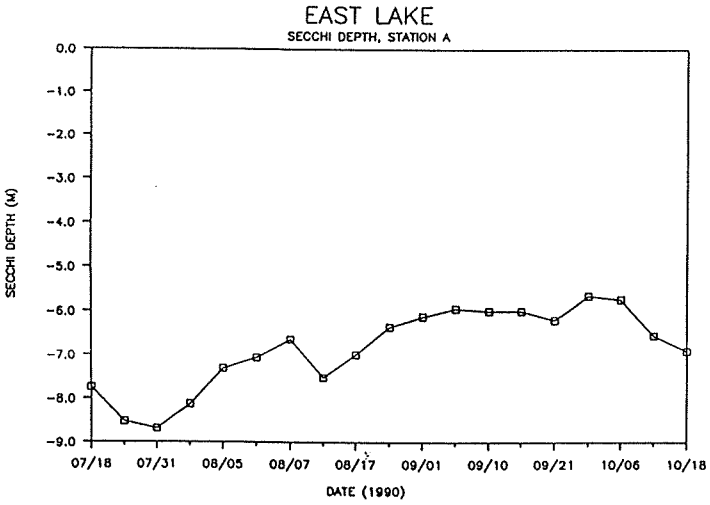
Our final report will compare the data collected from the various lakes over the last several years. It will document meaningful trends in transparency or pH.

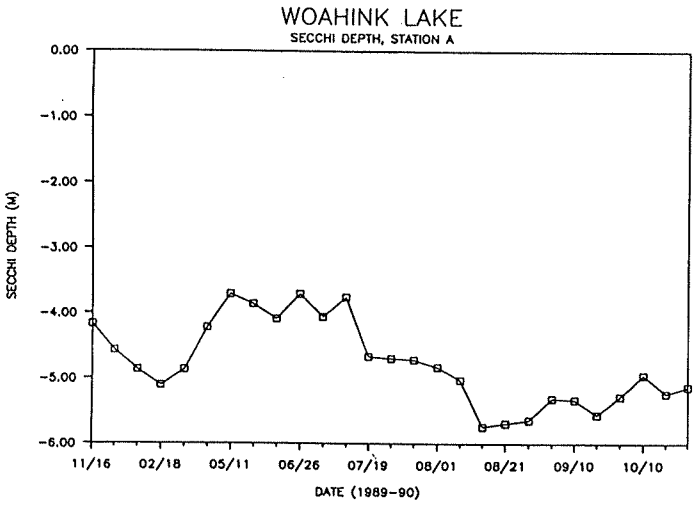


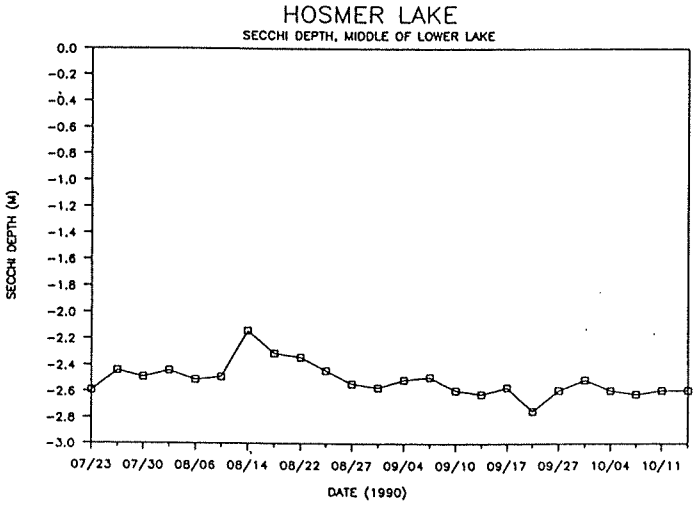
A. Algae bloom
B. Copper added
C. L.O. canal flow shut off
D. L.O. canal flow resumed
E. Fall turnover











OREGON LAKES ASSOCIATION

The *Oregon Lakes Association* (OLA) once again offers anyone the opportunity to join this first statewide organization that is working to promote the understanding, protection, and thoughtful management of Oregon's lakes and watersheds.

OLA has its roots, so to speak, in "Grass Carp Days" of Devils Lake in Lincoln City. The first organizing meeting was well attended and reflected the interest in taking action to protect our state's great lakes, both large and small, an interest also expressed at Portland State University's Lake's Forum, in April, 1990. Starting in late fall of 1990, meetings have been held in Salem on a monthly basis.

Andy Schaedel was elected President of OLA. Andy has long been an advocate of lake quality, working through his role in the Department of Environmental

Quality's ambient water quality monitoring program, and now in the Water Quality/Surface Water Section. **Joe Eilers** is President Elect. Joe has an incredible record of lake studies, and through his company in Corvallis, E & S Consultants, is putting science to work for better lake quality. **Ela Whelan** is Treasurer and has carefully conserved the dollars of the initial 55 members of the Association. Ela works for KCM in Tigard, a company with a long history in the Portland and Seattle area of work on lake restoration. **Stan Geiger** was elected Secretary. His company, Scientific Resources, Inc., has performed lake diagnostic studies in Washington and Oregon.

OLA membership encompasses a wide cross-section of people, including recreationists, property owners, public agencies, non-profit organizations, local lake associations, academicians, environmental consultants and just plain folks.

Various members volunteered to take on specific tasks of the organization. One prominent task is the effort to ban phosphorus-containing detergents in the state. The **OLA is sponsoring a bill** Dell Isham drafted for this session of the legislature. It would extend statewide a recent ban enacted for the Portland metropolitan area. Dell is an OLA Director and the manager of the Devils Lake Water Improvement District. He heads up the Legislative Issues interest group of OLA. Rep. Jim Jossi intends to introduce the bill.

If you want to express your interest in <u>improving Oregon lakes</u>, we encourage you to join OLA. Call or write the secretary, Stan Geiger, for membership information. The price is right. The number in Lake Oswego is (503) 245-4068, and the address is Scientific Resources Inc., 11830 SW. Kerr Parkway, Suite 375, Lake Oswego, OR 97035.

EDITOR'S NOTES

Upon initiating this past year's lake watch efforts, SRI asked volunteers to send in their data once a month, and many did. However, some of you have yet to send in any data. Please send us what you have even if you are still collecting measurements and making observations. We need this information by April, 1, 1991, in order to analyze the data and make comparisons with past years. Your cooperation is appreciated.

In the last issue of *Oregon Lake Watch* (October 1990), we also asked you to provide a short write-up about your lake. For example, what changes have you seen in the watershed? What has changed in the lake? Are there more weeds, less weeds, more boaters, more logging, more road building? If you can spare a few hours of your time, please tell us what you know. It will be greatly appreciated and very valuable.

An OLA meeting is being planned to take place in Florence towards the end of September/early October. There will be more specific information about the meeting in our next newsletter. *Stay tuned!*

If you have questions about the Oregon Lake Watch program contact:

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or

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