



WATERLINE

December 2005

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tions.

Membership brochures are available; contact Paula Lowe, 360-491-0109 or pmrlowe@comcast.net.



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Please save *Waterline* issues for future reference.

WALPA Board plans projects

By Sally Abella, WALPA president

The last WALPA Board meeting was held in September at the Washington Department of Ecology Northwest Regional Office in Bellevue.

We are planning a joint conference in 2006 co-sponsored by WALPA and the Oregon Lakes Association (OLA), along with the North American Lake Management Society (NALMS). The Portland conference is in September, so WALPA will not hold its annual spring conference in 2006. (See related article on page 3.) Because changes in the Board of Directors usually occur in conjunction with the conference, the Officers and Board members will hold office until September 2006 under the WALPA by-laws, which state that terms will end on March 31 or at the time of the annual conference, whichever is the later date.

Past President Barry Moore represented WALPA and regional NALMS representative Harry Gibbons represented the Pacific Northwest at the annual NALMS conference in Madison, Wisconsin in November. NALMS is exploring the possibility of restructuring as the parent organization of state chapters such as WALPA, and some changes in how the organization works can be anticipated in the near future.

The idea of pro-rated membership dues was discussed to make membership more attractive to people who discover the organization later in the year. The membership and by-laws committees will present a proposal at the December meeting for a more equitable fee structure.

Work continues on a plan to offer dues discounts to private citizens who belong to a lake association that belongs to WALPA and who join as a group. A reduction in conference fees may also be offered to Lake Association members who all belong to WALPA and register together for annual conferences.

WALPA's informal scholarship program is under review and may transition to more permanent status, possibly by setting up a dedicated fund, and canvassing members and businesses for contributions to support an ongoing scholarship program for students studying lakes and lake-related questions.

One of the Board members has nearly completed an update of active Washington State Lake Associations that WALPA may use to inform and alert interested parties about proposed legislation or news pertinent to lakeshore communities or lake users.

There is ongoing interest in remodeling the WALPA website to provide more timely and useful information to people wanting to know about lakes and lake issues. The Fact Sheets inserted in *Waterline* that were produced in response to the 2001 survey will be re-formatted to download and print easily from the website. Responses to frequently asked questions about lakes and a general PowerPoint presentation are also under consideration.



Lake Associations in Northern Idaho protect and preserve lakes

By Glen Rothrock, Idaho Department of Environmental Quality

The five-county panhandle of Northern Idaho has abundant lake resources. There are three large oligotrophic lakes: Priest, Pend Oreille (82,000 acres!), and Coeur d'Alene, along with numerous medium-sized lakes with established communities. Our lakes are not only enjoyed by Idaho residents, but also by our neighbors from eastern Washington and guests from across the country.

Many of our lake communities have established Lake Associations. In 2005, Idaho Department of Environmental Quality (DEQ) began to interest the associations in becoming involved with WALPA (Idaho does not have a state chapter of NALMS). Our lakes have water quality and lake management issues similar to those in Washington, and our associations could gain valuable information, insight, and ideas from the WALPA community. Members from three of our associations, Cocolalla, Hauser, and Twin Lakes, attended the 2005 conference in Spokane.

Idaho DEQ participates with the associations in searching for solutions to familiar water quality problems, often related to lakeshore development and surrounding land use activities (some lakes have nutrient TMDLs). DEQ also sponsors a Citizens Volunteer Monitoring Program on seven lakes. Volunteers do seasonal and monthly sampling using their boats and equipment purchased by the associations. DEQ supplies training and covers the cost for analysis of total phosphorus and chlorophyll a.

Featuring four Northern Idaho Lake Associations

These lake associations share their water quality problems and management solutions.

Cocolalla Lake, south of Sandpoint and 805 acres in size, has a very active lake association. I often use the Cocolalla Lake Association as the model for Northern Idaho in community activism, and in seeking



Priest Lake is one of the three largest lakes in Idaho. Twin Island in the foreground, is one of several islands in the lake. Lionhead Head (rock) is in the background, as seen from lower Priest Lake along the 13-mile Lakeshore Trail. Photo by Daniel Lowe.

support from their governmental agencies. Cocolalla Lake develops dense blue-green algae blooms, with a suspected occurrence of cyanotoxins. Watershed programs have centered on wastewater issues, cattle grazing along tributary corridors, homeowner education for lake-lot stewardship, and monitoring.

Spirit Lake is a high quality, fairly unknown gem of 1,446 acres. The Property Owners Association has initiated some unique water quality projects. One program, undertaken each spring, is a "search-and-map" for Eurasian watermilfoil stands. They then hire a diving firm to hand pull plants from mapped areas.

Hayden Lake is a larger lake, 3,907 acres, with two-thirds of the lake deep and oligotrophic. The Hayden Lake Watershed Association was formed in 2005. This community effort stemmed from a concern of new lakeshore development with inadequate compliance of erosion control and stormwater runoff measures. The association supported the local water

and sewer district in contracting a lake manager to work on water quality issues.

The Hauser Lake Watershed Coalition was reformed in 2004, with a renewed vigor for watershed management. Hauser Lake is 625 acres, just east from Newman Lake, Wash. The lake exhibits extreme dissolved oxygen depletion, beginning in the upper thermocline, and has a nutrient TMDL. The coalition has developed a lake and tributary sampling program, initiated education programs, and is working with local ranchers and agencies to install agricultural BMPs.

The Twin Lakes Improvement Association has two medium-sized lakes under its care, Upper and Lower Twin. The association developed a unique program with its primary upland land owner, Inland Empire Paper. A permit fee program was initiated for entry onto Inland property, with a staffed entry gate, in part to control four-wheel damage to lake tributaries.

WALPA Board of Directors 2005-06

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WALPA holds regional conference

By BiJay Adams, president-elect and conference coordinator, WALPA

This year WALPA will co-host its annual conference with the North American Lake Management Society (NALMS) and another NALMS Chapter, Oregon Lakes Association (OLA). The 2006 regional conference will be held at Portland State University in Portland, Oregon on September 13 and 14, 2006, with Friday, Sept. 15 tentatively reserved for a field trip.

The benefit for holding a regional conference allows the opportunity to learn the concerns and challenges experienced by other chapters while providing an avenue to work closely with the neighboring states. In addition, co-hosting a regional conference will provide each of the associations the opportunity to expand while working closely with NALMS. For more information, contact BiJay Adams at 509-922-5443 or by e-mail at bijay@libertylake.org.

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Lake Focus on Soap Lake

By Heidi Wachter, Taylor Associates

Located within Grant County in the center of Washington state, Soap Lake, the waterbody and town, are approximately 20 miles north of Interstate-90. The town of Soap Lake is on the southern shoreline of the lake, which is approximately two miles long by one mile across. Soap Lake, the waterbody, reaches due north from the town of Soap Lake and is the most downstream waterbody in the Lower Grand Coulee lake chain, which extends southward from Dry Falls at the head of the chain. Banks Lake Reservoir, which is approximately 17 miles north of Soap Lake, lies approximately 900 feet in elevation above Soap Lake in the Upper Grand Coulee.

Flow between the lakes of the Lower Grand Coulee lake chain is primarily through underground streams. The result is an increase in the mineral content of each lake's waters travel downstream in the chain, with the highest mineral content found in Soap Lake. Soap Lake's shape and the high salt content of its lower layer has prevented the lake from turning over for more than 2,000 years, making it one of the more unique lakes in the United States.

Soap Lake, as a meromictic lake, and is "characterized by permanent meromixis - a permanent chemically stratified state." Thus, the upper and lower layers of the lake (mixolimnion and monimolimnion, respectively), are separated and according to the Soap Lake Microbial Observatory "have not mixed for 2,000 to 10,000 years." According to the Soap Lake Conservancy, there are only 11 meromictic lakes in the United States, with Soap Lake being one of "the most extreme of all."

The mixolimnion and monimolimnion are both saline and alkaline (pH: 9.8 - 10.2) with the lake's alkalinity resulting from high concen-



Scientists and researchers have been studying Soap Lake's unusual characteristics for the past three years courtesy of a National Science Foundation grant. Last August the Soap Lake Conservancy held a conference featuring these scientists and researchers who presented their findings. Photo by John Glassco.

trations of carbonate. The lake's carbonate levels, which on windy days promote the development of suds near the lake's shoreline, are in part responsible for the lake's name. The mixolimnion currently has a total dissolved solids (TDS) concentration of 14 g/L. However, at a lake depth of approximately 70 feet the mineral composition of the lake becomes much stronger, with the monimolimnion having a TDS of 85 grams/L. In addition, "there is essentially no dissolved oxygen in the monimolimnion," making it an ideal lake for the study of anaerobic organisms.

Soap Lake's history since the mid 1900s and the changes this waterbody and community have undergone are closely tied to the United States Bureau of Reclamation's (BOR) Columbia Basin Project (CBP). Construction for the CBP occurred during 1946 through 1966 and included the development the Bank Lakes Reservoir in the 1950s. The CBP is considered "one of the largest irrigation projects in the world," and consists of "a system of pumps, canals, dams, reservoirs, laterals, waste-ways, and

ditches," that provide irrigation water to farmlands in central Washington. The source for the irrigation waters is the Grand Coulee Dam, which is located 47 miles north of Soap Lake.

Through the Banks Lake irrigation canal, irrigation of the land within the Soap Lake drainage basin "radically" increased groundwater (freshwater) inputs into the highly saline lake. Originally, the TDS concentration in Soap Lake was 32 g/L. As farmers continued to irrigate fields in the basin, the lake's TDS level began to decline. In addition to diluting the lake's highly mineral waters, the lake water level rose. One of the impacts to local residents was the flooding of basements, which resulted in the BOR installing pumps to lower the lake level. The result was a rapid decrease in salinity as saline waters were pumped out of Soap Lake and freshwater inputs through the groundwater continued.

This decline in salinity altered the community's economy, in addition to the lake's water quality and ecology. During the 1940s and '50s, the production of Soap Lake medicinal salts

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Lake Focus on Soap Lake continued from page 4

and health spas were strong industries for the local community. The town was built around the development of spas and drew numerous visitors looking for a "healthful escape." The decline in the lake's mineral levels impacted these industries. Thus, in response to the lake's changing conditions, the BOR installed interceptor pumps, which pump out groundwater before groundwater enters the lake. After the interception of groundwater flows was initiated, the TDS concentrations and lake level re-stabilized by the 1960s, however, TDS concentrations only returned to nearly half of the lake's original TDS levels.

Regardless of Soap Lake's high pH and mineral content, a highly productive biological community exists in the lake. Even though no fish are present, there are rotifers, copepods and five different species of algae. In 2004 on-going research by biologists identified a new genus of bacteria in the lake, *Nitrumicola lacisaponis*. These University of Missouri researchers "found and isolated four colonies of bacteria" in a sample collected from "pink-tinted driftwood" found on the lake's shore. In addition, anaerobic bacteria thrive near the zone between the mixolimnion and monimolimnion, where oxygen levels drop to near zero.

To the south of Soap Lake is the Columbia Wildlife Refuge, which is home to "dozens of migrating species of birds." Today, migratory flocks visit Soap Lake, landing on the lake surface after feeding in the nearby farmlands. However, this was not always the case. Prior to the decline of the lake's high TDS concentrations, the high mineral levels would deter migrating flocks from visiting the lake.

As one of the most "extreme" meromictic lakes in the United States, Soap Lake is definitely worth a visit and further investigation. In addition to the area's beautiful landscapes, the region and lake has an interesting and

unique history, which warrants exploration. If you seek further information refer to the references below or plan a trip to Soap Lake and the Lower Grand Coulee.

Note: WALPA makes no guarantee to the accuracy of this information.

Sources for this article:

Sally Bartley Abella, Lake Stewardship Program, King County Dept. of

Natural Resources and Parks

Soap Lake Conservancy –
www.thelake.org

National Science Foundation's Soap Lake Microbial Observatory – Holly C. Pinkart, Associate Professor, Central Washington University,
www.cwu.edu/~pinkarth

www.sciencedaily.com/releases/2004/05/040525063445.htm
Biologists Uncover New Genus Of Bacteria In Washington Lake. May 2004.

Science Daily Center for Columbia River History, The Columbia Basin Project –www.ccrh.org/comm/moses/project1.html

Soap Lake Chamber of Commerce –
www.soaplakecoc.org

Next Lake Focus on Lake Pend Orielle

Due to our increased membership in Idaho state, the next Lake Focus will be on Lake Pend Orielle, located in the Idaho Panhandle. Have some information to share on Lake Pend Orielle? Please contact Carla Milesi by Jan. 15, 2006 at carla@taylorassoc.net.

Jameson and Grimes lakes are high in saline

By Peter Burgoon, WALPA board, Water Quality Engineering, Inc.

Jameson and Grimes lakes are located on the Waterville Plateau of Central Washington, approximately six miles south of Mansfield. These lakes are little known outside of trout fishing circles and locals. Grimes Lake is a renowned catch and release fly fishing lake, and Jameson Lake is one of the most productive trout fishing lakes in the Columbia Basin. Both lakes offer a unique outdoor experience in the remote, unpopulated arid shrub steppe scab lands of the Columbia basin.

Both are historically saline lakes that are hydrologically closed basins contained behind a series of small glacial moraines in Moses Coulee. Surrounded by steep, dramatic lichen-encrusted basalt cliffs, the lakes are sustained by numerous springs throughout Moses Coulee. Despite the high evaporation rates in the hot desert climate, inflows from springs are sufficient to maintain these deep year-round lakes with cool waters.

Early 20th century settlers established farms on land between Grimes and Jameson Lakes and on the Waterville plateau surrounding the lakes. The small lakes were too saline to support fish or use for irrigation. It appears that water from freshwater springs, land tillage practices, and irrigation in the surrounding region, all contributed to changes in the lake ecology due to soil erosion and increased flows into the lakes.

Changes in Jameson Lake were dramatic, water levels rose almost 40 feet by 1959. Several hundreds acres of farmland were lost and barns were continually flooded and lost as the lake level rose. Increased water level rise in Jameson Lake has stopped now as natural land features prevent greater accumulation of water.

As the Jameson Lake level rose, saline waters were diluted and in 1960
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Grimes and Jameson lakes continued from page 5

Washington State Department of Fish and Wildlife began to stock rainbow trout. A natural outlet in Grimes Lake prevented significant changes in elevation, so there was less dilution. Grimes Lake was considered too saline to support fish until the mid-1970s when the state Fish and Wildlife Department began stocking salt-tolerant Lahontan cutthroat trout.

A natural process in the transition from saline to freshwater lake is elevated phosphorus and eutrophic conditions. In 1975 Jameson Lake had an average total phosphorus (TP) concentration of 211 ug/L and salinity of 1.4 g/L but by 2004, the lake had an average TP of 32 ppb and 0.6 g/L salinity. In 1985 the average concentrations in Grimes Lake was 2505 ug/L TP and 8.2 g/L salinity; by 2004 increased flows have diluted concentrations to 400 ppb TP and 2.3 g/L salinity.

Jameson Lake water quality relative to freshwater lakes improved due to dilution and changes in farming practices. Large fish kills in

the 1960s inspired water pollution control efforts in the 1970s that resulted in changes to livestock production close to the lake. In the 1980s and '90s large tracts of land surrounding the lakes were placed in conservation easements.

A new stewardship program was initiated by the Foster Creek Conservation District as part of the WRIA 44/50 Watershed Planning effort. A water quality assessment was completed in 2004. The lakes face limited development pressure, but natural conditions and agriculture continue to offer unique challenges to manage these isolated lakes.

For more information on the lakes, contact the Foster Creek Conservation District in Waterville, Wash. (www.fostercreek.net or fostercreek@wa.nacdnet.org). For information about unique boating and fishing opportunities, contact Jameson Lake Resort, at the north end of the lake (509-683-1929) or Jack's Fishing Resort at the south end of the lake (509-683-1095) for accommodations.

Waterline is the newsletter of the Washington State Lake Protection Association (WALPA). Articles may be reproduced; credit the *Waterline*. WALPA is a chapter of the North American Lake Management Society (NALMS).

The next deadline is Feb. 1 for the March issue. Send articles to Editor Paula R. Lowe, pmlowe@comcast.net.

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