WALPA The Washington State Lake Protection Association Newsletter

WATERLINE

SEPTEMBER 2007

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For information about the organization, call **1-800-607-5498** or visit the WALPA website

www.walpa.org

Please save *WATERLINE* issues for future reference.

Join Us For Our 20th Annual Conference!

WALPA brings community and science together at Lake Chelan

It's that time of year again – time to plan your trip to the WALPA conference! To help celebrate this year's 20th annual conference, we will convene at Campbell's Resort on Lake Chelan. WALPA will host its members on October 18th and 19th for two days of lake-relevant presentations and networking. Come hear the fantastic talks we've got lined up! Session topics will range from nutrient legislation to volunteer programs and community efforts to blue-green algae and climate change.

The biggest news about this year's conference is that it is now a sanctioned continuing education event for holders of a Washington Pesticide and Herbicide Applicator license. The Washington State Department of Agriculture has qualified WALPA to grant two recertification credits to members who attend sessions 1B (Noxious Weeds and Animals) and 3B (Volunteer Programs) on Thursday. Be sure to attend those sessions to get two recertification credits!

The plenary session conferences will focus on why nutrients cause issues on lakes and what kind of legislation can help us figure it out. Senator Ken Jacobsen, plenary speaker, will guide us through the process of creating legislation. Another highlight will be

Continued in box on page 3

REGISTER NOW!

WALPA Conference Quick Facts:

- Register at **www.walpa.org** or contact Beth Cullen at **beth.cullen@kingcounty.gov**. Register before September 14th and get a discount!
- **NEW!** Attendees can receive two continuing education credits through the Washington State Department of Agriculture. To get the credits, attend Session 1-B (Noxious Weeds and Animals) on Thursday morning AND Session 3-B (Volunteer Programs) on Thursday afternoon.
- If you can't make the conference, share your research or project with a poster. Contact Bijay Adams at **bijay@libertylake.org** for more information.
- Check out the conference program online at **www.walpa.org/conference**.

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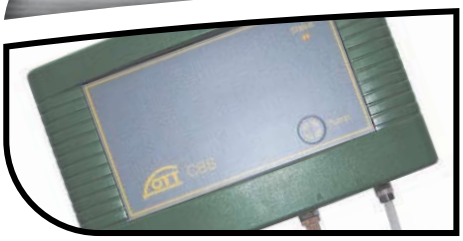

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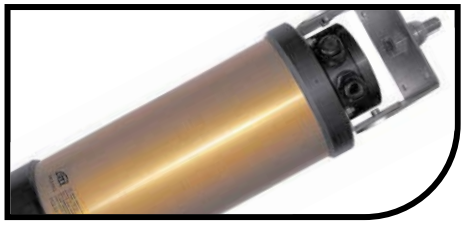

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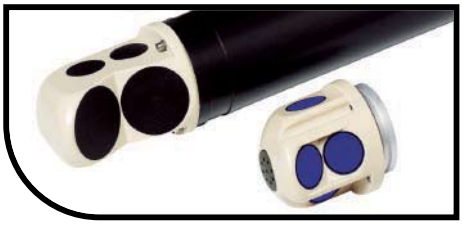

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What WALPA Can Do For You

The Washington Lakes Protection Association (WALPA) is a strong advocate for local lakes. Formed in 1986, WALPA continues to build relationships between government agencies, citizens, the scientific community, and lakeside residents. WALPA serves as an excellent resource on lake topics and can help you reach professionals or organizations knowledgeable about most lake issues.

WALPA is the local chapter of the North American Lake Management Society (NALMS), which supports the management and protection of lakes and watersheds internationally. WALPA supports and carries out the mission of NALMS in Washington, and actively participates in legislation related to lake issues. WALPA can keep you informed about upcoming legislation on lake and water quality topics. As an organization, WALPA promotes legislation that will further protect and enhance lake systems.

WALPA's annual conference is designed for anyone who wants to learn more about lakes and their ever-changing systems. The conference brings lakeside residents, enthusiasts, policymakers, and scientists together to discuss lake issues face to face.

Since forming in 1986, WALPA and its dedicated members have provided education and outreach, forged partnerships among stakeholders, and helped guide state policy on lake issues. We encourage anyone who would like to get involved in lake and watershed protection to join WALPA. As our organization grows, we strengthen our ability to protect and manage our lakes and watersheds.

For more about WALPA's current projects, log on to **www.walpa.org**.

20th Annual Conference

Continued from front

our discussion of the plight of native freshwater mussels in Washington, for which we have teamed up with the Pacific Northwest Native Freshwater Mussel Workgroup. In the closing session, we'll discuss climate change and its effects on lakes – guaranteed to be a lively and informative finale.

For more information and registration forms, please go to our website at **www.walpa.org** You may also contact Beth Cullen at **(206) 263-6242** for information or questions. See you in Chelan this October!

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Washington's Freshwater Mussels

Important and little-known species face critical challenges

While mussels are usually thought of as marine animals, Washington is home to at least six freshwater mussel species. Just like their marine counterparts, these little known mollusks are critical to their ecosystems. Unfortunately, habitat loss and other changes associated with human encroachment may be endangering our state's mussel species, which could have widespread repercussions.

Four of the six freshwater species in Washington belong to the genus *Anodonta* including the California floater (*A. californiensis*), Winged floater (*A. nuttalliana*), Oregon floater (*A. oregonensis*) and Western floater (*A. kennerlyi*). These thin-shelled mussels prefer still or slow moving water and are commonly found in lakes and slow moving rivers. The western ridged mussel (*Gonidea angulata*) and the western pearlshell (*Margaritifera falcata*) prefer moving water and usually inhabit streams and rivers.

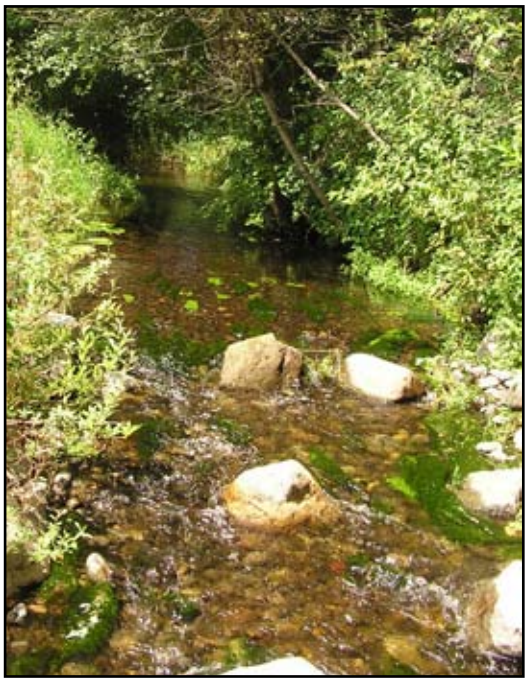
Like all mussels, Washington freshwater species are primarily sessile organisms that filter water through their gills continuously to take in oxygen and collect food. As filter feeders, freshwater mussels can decrease water turbidity by removing phytoplankton, organic matter and bacteria from the water column; they recycle the nutrients through excretion. Freshwater mussels also bring oxygen and water to sediments because they are burrowing bivalves. And, of course, freshwater mussels are food for many birds, fish and mammals.

Fertilized freshwater mussel embryos develop into larvae called *glochidia* that attach themselves to the gills or fins of host fish. As they develop, the juvenile mussels break free from their host and descend to the bottom. This strategy allows the mussels to be transported great distances and dispersed throughout the watershed, but means that they depend on healthy fish populations.

As adults, freshwater mussels move very little and can live from ten to more than 100 years. Mussel ligaments contain bands called *annuli* that show annual resting periods, as well as times of stress. Like the rings on a tree, the annuli indicate an animal's age as well as periods of change that may have caused varied growth rates. In addition, the age and size of a population can reflect impacts to their environment over time. Individually and collectively, these mussels are important indicators of ecosystem health and changes.

Freshwater mussels are highly endangered; many populations face an uncertain future. Logging and development, which bring dams and sedimentation, have degraded their habitat and depleted their numbers. Dwindling populations of salmonids and other fish probably also contribute to the decline of species like *M. falcata* who depend on them as hosts. In addition, the greater filtration rates and simpler reproduction strategies of invasive species like zebra mussels (*Dreissena polymorpha*) and Asian clams (*Corbicula fluminea*) mean they can out-compete our native freshwater mussels. Development, dwindling fish populations and invasive species all threaten the mussels' survival; as we know, conserving a species often means protecting its ecosystem.

While we can list several likely causes of freshwater mussel decline, the loss of local species sometimes remains a bit of a mystery. The Bear Creek population of *M. falcata*, for example, has recently experienced an abrupt decline, with as much as 90% mortality. Deb Lester, Bob Brenner and Dean Wilson of King County's Department of Natural Resources and Parks found that Bear Creek's *M. falcata* showed gill lesions, damaged digestive tubules, loss of gill tissue and disease. Along with these strange symptoms, the mussels had a high degree of shell erosion and a population heavily dominated by males. Populations of *M. falcata* in nearby streams did not suffer from the same symptoms.



Logging and development, which bring dams and sedimentation, have degraded mussel habitat and depleted their numbers.

Washington's freshwater mussels are key indicators of watershed health, play an important role in the ecosystem and are a part of our region's identity. Without increased efforts to preserve these populations, we will surely see the extinction of a unique and important group of animals.

For more information about the Pacific Northwest's freshwater mussel species, go to **www.fws.gov/columbiariver/mwg/pdfdocs/Pacific_Northwest_Mussel_Guide.pdf**

Special Section:
Meet WALPA's 2008 Board Candidates

Candidates for the 2008 WALPA Board offer a variety of experience and perspectives. Read about them, think about what you would like to see WALPA achieve this year, and come to the annual meeting at the October conference to cast your votes!

Ms. Kelly McLain – President-elect

Kelly McLain received a B.S. in marine biology/invasive species ecology from Evergreen State College, Olympia. She earned her Master of Environmental Studies degree in 2004. Today, Kelly manages the Washington State Department of Ecology's Aquatic Pesticide Program. She reviews new aquatic pesticides and adjuvants, and prepares risk assessments and environmental impact statements on those products. She also provides technical support during the development of aquatic pesticide permits. Kelly writes and manages permits for controlling plants and algae in lakes and ponds, mosquito larvae, and invasive moth species. She is a member of the Western Aquatic Plant Management Society, a past member of NALMS, and is currently a member of the WALPA Board of Directors.

Mr. Jacob McCann – Board of Directors

Jacob McCann is a graduate of Eastern Washington University and also studied Classics at Cambridge University in the UK. Jacob works in the Environmental Programs section of Spokane County's Division of Engineering and Roads, which also administers the Newman Lake Flood Control Zone District. His responsibilities at the Division include providing guidance and monitoring for county road and bridge projects with regard to sediment input into surface water, helping upgrade crossing structures to meet fish passage criteria, and coordinating these efforts with other agencies. Jacob also serves as SEPA coordinator for private land use issues in Spokane County that involve floodplains, which is virtually all lakes and most streams. For the Newman Lake Flood Control Zone District, he operates and maintains the hypolimnetic aeration system, organizes milfoil eradication efforts, and coordinates volunteer monitoring activities and community education. Furthermore, Jacob writes and edits the biannual newsletter, and helps lakeside and watershed residents on development activities consistent with improving Newman Lake's water quality. Jacob's current position allows him to be directly involved in protecting of the abundant natural treasures of the Inland Northwest; he feels it is vital that we protect lakes and their watersheds as wild spaces are urbanized.

Dr. Joe Ravet – Board of Directors

Joe Ravet received a B.S. in molecular biology from the University of Wisconsin and his M.S. and Ph.D. in civil engineering from the University of Washington. Joe is currently a Postdoctoral Research Associate in the Civil & Environmental Engineering Department at the University of Washington. His interests in lake research and stewardship are closely related to his love of fishing and being near the water. He is currently studying the molecular basis of food quality in aquatic food webs and how the presence of compounds like polyunsaturated fatty acids may help strengthen food web interactions leading to fewer nuisance algae blooms and increased fisheries production. He hopes to develop these interests into a teaching and research career and would consider it an honor to serve WALPA.

Ms. Shannon Brattebo – Secretary

Shannon Brattebo received her B.S. from Seattle University and her M.S. from the University of Washington, both in environmental engineering. For the past several years, Shannon has worked for Tetra Tech, Inc. as an environmental engineer and limnologist. She has participated in numerous water quality, limnological, water resource, environmental restoration, and watershed planning studies for both state and federal agencies. She is currently involved with relicensing studies for the Boundary Dam located in Metaline Falls, Washington. Shannon is registered as a professional engineer in South Dakota and served on the WALPA Board of Directors from 2003 to 2005.

Mr. Norm Dion – Board of Directors

Norm Dion's education includes a B.A. in geology from the University of New Hampshire, an M.A. in hydrogeology from Indiana University, and a year of ecological and limnological studies at the University of Wisconsin. Norm retired from the Water Resources Division of the U.S. Geological Survey (USGS) as a supervisory hydrologist in 1995 after 30 years of service. At the time of his retirement he had authored more than 40 technical reports and supervised up to 35 professional and technical employees in Florida, Idaho, and Washington. During his 22 years in the Tacoma USGS office, his assignments included studies of the groundwater resources of various regions, the effects of the Mount St Helens eruption on various lakes, a lay primer on lakes in Washington, a statewide reconnaissance of lakes' trophic status, the suitability of Ozette Lake for sockeye salmon, and water/nutrient budgets for Wilderness and Pine Lakes in King County. When not enjoying the luxury of total retirement, he volunteers with the lake monitoring arm of Pierce County Stream Team, runs a small home-based business buying and selling firearms, and enjoys the company of his grandchildren.

Dr. David R. Christensen – Board of Directors

Dave Christensen received a B.S. in fishery resources from the University of Idaho and his Masters in Environmental Science and Regional Planning from Washington State University (WSU). Recently, Dave completed his Ph.D. in Natural Resources at WSU where he focused on food web and habitat influences affecting salmonid survival in a meso-eutrophic lake. Dave currently works as a post-doctoral researcher at the WSU Limnology Lab where he is studying food web interactions and habitat constraints in a portion of the upper Columbia River. In the past, Dave worked with the Colville Confederated Tribes and the Idaho Department of Fish and Game on management and research projects, including both warm and cold water fish species and their habitats. During this time, he developed a profound appreciation for the interconnectivity of fisheries and limnology with an understanding that productivity drives the system. Dave hopes to continue his research as it pertains to both fish and the environment in which they live. He has published his research as a primary author and has other papers currently in review.

Blue-Green Blues: Toxic Cyanobacteria in Washington

by Jean Jacoby

Toxins produced by blue-green algae (cyanobacteria) are a growing concern to lake managers, health officials, and others who rely on freshwater systems for drinking water, recreation and other uses. Recently, there have been increases in the documented cases of human exposure to these toxins through drinking water or recreation.

Approximately 50 species of cyanobacteria may produce cyanotoxins harmful to vertebrates, including humans. Cyanotoxins include neurotoxins (e.g., anatoxins, saxitoxins) that can cause a variety of neurological problems, including paralysis and respiratory failure. Hepatotoxins are cyanotoxins that act primarily on the liver and kidneys (e.g., microcystins), while dermatoxins cause skin irritation, rashes and gastrointestinal upset. Some cyanotoxins are also suspected carcinogens.

Diverse environmental factors cause cyanobacterial blooms and toxicity, and bloom dynamics are complicated. Cyanobacterial blooms often occur in nutrient-rich waters; as Washington's waters become increasingly eutrophic, toxic cyanobacterial blooms increase in frequency, duration and magnitude.

Toxic blooms in Washington

Cyanotoxins have been found in about 20 Washington lakes (Jacoby and Kann 2007). Microcystins are the cyanotoxins most commonly detected here and have been found at concentrations ranging from <1 to almost 1,000 μg/L. The first documented toxic episodes occurred in eastern Washington in the 70's and 80's: several dogs died after drinking water during blooms in Long Lake (Spokane) and Moses Lake. More recent animal deaths have been associated with the detection of anatoxin-a in American Lake in Pierce County (December 1989); Kitsap Lake in Kitsap County (October 2001); and Anderson Lake in Jefferson County (June 2006, 2007). In October 2006, saxitoxin was measured at 4 μg/L in Ketchum Lake (Snohomish County), where anatoxin-a and microcystins had been measured earlier. Most recent toxic episodes have been documented in western Washington.

Studies of environmental factors and toxic blooms in several western Washington lakes (American Lake,

Steilacoom Lake, Lake Sammamish) (Jacoby et al. 1994, Jacoby et al. 2000, Johnston and Jacoby 2003) showed that toxic blooms occurred when phosphorus levels, water temperatures, and water column stability were high. Migration of cyanobacteria from the sediments contributed to toxic blooms in Lake Sammamish (Johnston and Jacoby 2003). Most recent studies have focused on western Washington lakes, usually prompted by heavy blooms, public concern, or animal poisonings, although King County recently implemented a long-term monitoring program for cyanotoxins. Since 2003, microcystins have been routinely analyzed throughout the summer in Lakes Sammamish, Washington, and Union in King County.

The Washington State Legislature recently allocated funds ($250,000 annually) to the State Department of Ecology (Ecology) to develop a state Algae Control Program. Based on public comments and input from local health districts and lake managers, Ecology and the Washington Department of Health (DOH) will develop statewide guidelines for cyanobacterial blooms/toxins and work with a laboratory to test for toxins. Ecology now offers a mail-in service to identify cyanobacterial blooms; if they contain toxin-producing species, cyanotoxin concentrations will be analyzed. Local health districts and lake managers will be notified when blooms are reported and algae and toxins analyzed.

Addressing public health risks in recreational waters

Human exposure to cyanobacteria can result in skin rashes and lesions, nausea, vomiting, headaches, gastroenteritis, conjunctivitis, eye and ear irritations, fevers, and sore throats. While we know these conditions may follow recreational exposures to cyanobacteria, we have little information on the species, cell densities, and toxins to which individuals are exposed.

Consequently, efforts to manage toxic blooms and regulate recreational lake use during cyanobacterial blooms have been undertaken without standard guidelines. Some local jurisdictions use the World Health Organization (WHO) proposed drinking water guideline of 1 μg/L microcystin-LR to close lakes to recreational use, but this may be overly protective for lakes not used for drinking water. Other cities or counties post advisories based on scums or high levels of toxin-producing cyanobacteria.

Oregon has developed guidelines for issuing and lifting public health advisories based on the cell density of potentially toxic species in recreational waters (Stone and Bress 2007), an approach Washington may want to consider. In Oregon lakes, advisories are lifted when microcystin concentrations fall below 8 μg/L (**www.oregon.gov/DHS/ph/envtox/maadvisories.shtml**).

Human exposure to cyanobacteria can result in skin rashes and lesions, nausea, vomiting, headaches, gastroenteritis, conjunctivitis, eye and ear irritations, fevers, and sore throats.

Washington's DOH and Ecology are currently developing guidelines to reduce human exposures to cyanotoxins, which will provide more consistency in issuing lake advisories and closures. Increased monitoring in Washington is crucial to developing guidelines that will decrease human exposures to these potent toxins.

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Are You a WALPA Member?

Annual dues rates:

$15 - students

$20 - individuals

$30 - professionals

$40 - organizations & lake associations

$10 - individuals who belong to lake associations that are WALPA members

The membership year runs between annual conferences or from April 1 through March 31 if the conference schedule changes.

Send your membership dues to: WALPA, P.O. Box 4245 Seattle, WA 98194-4245

Focus on Redfish Lake

Continued from cover

the farthest-migrating sockeye salmon," have declined drastically over the past 60 years. In an effort to prevent their extinction -- and further declines in Snake River sockeye -- in November 1991 the National Marine Fisheries Service (NMFS) listed Snake River sockeye salmon as endangered under the Endangered Species Act (ESA).

Numerous partners have collaborated to avert the extinction of the Redfish Lake sockeye salmon. Data was collected to assess lake productivity in Redfish Lake from 1992 -2004. In 1991, NMFS worked with the Idaho Department of Fish and Game and the Bonneville Power Administration to help the Snake River sockeye recover from its "critically low numbers." For these programs, wild salmon are captured and kept in captivity throughout their lifecycle to produce a large number

The cold waters of Redfish Lake are fed by the surrounding glaciers

of juveniles to supplement the natural population. By 1999, the first "hatchery-produced" sockeye swam into the Stanley Basin with seven adults returning to spawn. By 2003, more than 300 anadromous sockeye returned to Idaho under this program.

In addition to sockeye and Chinook salmon, rainbow and steelhead trout and suckerfish also use the lake (and Stanley Basin). Divers say they have spotted the rare bull trout at Dead Fall dive (an underwater tangle of branches, roots and trunks from hundreds of trees torn up and deposited 80 feet into the lake by an avalanche).

Lake visitors and summer residents have reported black bear, deer, elk, moose, pine martin, lynx, wolverine, fox and even the endangered gray wolf in and around the lake. Peregrine falcons, bald eagles, osprey and goshawk also live in the area.

This alpine lake is not the place for summer solitude, however. Boating, sailboarding, hiking, camping, horseback riding, and fishing attract outdoor enthusiasts from nearby Ketchum and Boise. The clear waters of the lake (summer visibility can range from 40 to 80 feet) attract recreational divers and diving students from around the region. When snow falls, back- and cross-country skiing, snowshoeing, snowmobiling and steelhead fishing draw visitors.

Redfish Lake is definitely worth a visit, if only for the scenic journey. The lake lies within the 756,000 acre Sawtooth National Recreation Area (SNRA), "one of the largest and most magnificent National Recreation Areas in the United States." The Sawtooth, Boulder, White Cloud and Smokie mountains "provide scenic landscapes in every direction." Within the SNRA there are more than 50 peaks over 10,000 feet; 1,000 alpine lakes, and 250 miles of trails. The area is the headwaters for four major Idaho rivers; the Salmon, South Fork of the Payette, Boise and Big Wood.

The Redfish Lake Lodge, built on the lake's north shore in 1929, is open from Memorial Day through September and offers cabins and lodge rooms, a marina, grocery store and public shower. Nearby Stanley also provides lodging and restaurants; there are five shoreline campgrounds. No matter how you get there or where you stay, this area is not to be missed.

Note: WALPA does not guarantee the accuracy of this information.

Want to recommend a lake for the next Lake Focus? Send suggestions and questions to Heidi Wachter at **heidi@taylorassoc.net**

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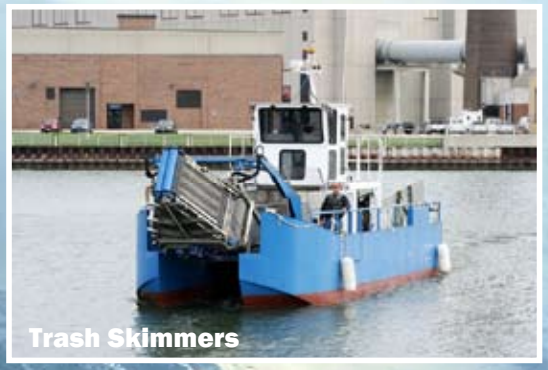
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Focus on Redfish Lake, Idaho

by Heidi Wachter

In central Idaho, scenic Redfish Lake lies in the Sawtooth Valley between the Sawtooth and White Mountain ranges. Redfish Lake offers vistas of some of Idaho's highest, most jagged peaks, supports diverse wildlife, and presents numerous recreational opportunities. The 1,500-acre lake lies at an elevation of 6,547 feet. Stanley, a mountain town with a year-round population of fewer than 500, is six miles north of the lake.

Redfish Lake is narrow and deep: five miles long, a mile across and 387 feet at its deepest point. Lodgepole and ponderosa pine ring the lake's 11-mile shoreline; the southwestern shore borders the 217,000-acre Sawtooth Wilderness. The lake's outlet, on the north shore, flows to Little Redfish Lake and then into the Salmon River. Redfish Creek feeds the lake with cold mountain water, which can plunge 40 feet deep into the lake.

Fed primarily by snowmelt and glacial runoff, the waters of Redfish Lake are cold year-round. Influenced by the frigid winters of the Sawtooth Mountains, the lake freezes two to three feet deep and may not thaw completely until late May. In late July to early August, surface temperatures may rise to 62ºF. At a depth of about 30 feet (the first thermocline) the water temperature drops 10 degrees from the surface. Deeper in the lake (at about 75 feet), the water temperature stabilizes at 37 to 40ºF regardless of the season.

Redfish Lake framed by the Sawtooth Mountains

Redfish Lake and nearby Little Redfish Lake lie in the Stanley Basin, the headwaters of the Salmon River. Waters from both lakes flow 900 miles to the Pacific Ocean via the Salmon, Snake and Columbia Rivers. The lakes were named for the red sockeye salmon that once abounded in their late summer waters. This stock, "noted for being

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