

# WATERLINE

September 2004

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## Time to pay WALPA dues

Remember to renew your WALPA membership if you didn't attend the April conference. For information, contact [debra.bouchard@metrokc.gov](mailto:debra.bouchard@metrokc.gov) or [moya.joubert@ci.seattle.wa.us](mailto:moya.joubert@ci.seattle.wa.us)



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## Blue-green algae can kill

By Moya Joubert, senior water quality analyst, Seattle Public Utilities

The first human death in the United States from blue-green algae cyanotoxins in recreational waters has occurred in Wisconsin. A teenager went swimming in a scum-covered pond, consuming some of the blue-green algae, leading to his death two days later.

Algae need a combination of nutrients such as nitrogen and phosphorus, plus light and temperature to grow. Cyanobacteria, more commonly called blue-green algae, may reproduce very rapidly or "bloom" when these conditions occur. Blue-greens have the ability to go up and down in the water column seeking light and nutrients and they will often form surface scums that look like green paint floating on the water. Usually the scums form on calm, sunny days but a slight breeze may concentrate the algae along a downwind shoreline.

Not all blue-greens produce toxins and it is not known what triggers toxin production. The most common toxin producers are *Microcystis* and *Anabaena*. These two algae groups also consistently form surface scums. The most widespread cyanotoxin is microcystin, a hepatotoxin or liver toxin. The acute effects from this toxin include nausea, vomiting, diarrhea and death in a couple of days from severe liver damage. The chronic effect from microcystin is liver tumor

formation. Detected less often, is anatoxin, a neurotoxin that causes death from suffocation. The toxins are contained within the algae cells and are not released unless the cell breaks open, which occurs either when the bloom starts to decompose or with ingestion. If a bloom is treated with an algicide, the toxin from all of the algae cells will be released all at once making the water, not just the scum, hazardous.

There are no established regulations for cyanotoxin concentrations in recreational waters. The World Health *continued on page 5.*

## WALPA 2005 heads east

WALPA's 2005 annual conference will be in Spokane at the newly-remodeled Mirabeau Park Hotel. Tentative conference dates are March 30 through April 1

WALPA President-elect and Conference Coordinator Sally Abella and the board are working on conference program ideas. Please send conference session topic suggestions to [sally.abella@metrokc.gov](mailto:sally.abella@metrokc.gov).

# Lake Focus on Spirit Lake

By Heidi Wachter, Taylor Associates

Spirit Lake became widely known when Mount St. Helens erupted on May 18, 1980, sending a 300 mph lateral blast northward across the lake. Spirit Lake lies just to the northeast of Mount St. Helens and was in the direct path of the 24 megaton (thermal energy) blast. Spirit Lake was devastated and permanently altered from the clear, mountain lake many local residents, recreational enthusiasts, and scientists had come to know.

Spirit Lake was formed between 3,300 and 4,000 years ago when pyroclastic flows and lahars formed fans around the base of the volcano, some of which dammed the upper drainage area of the North Fork Toutle River. Thus Spirit Lake became the upland source of the North Fork Toutle River.

Of the lakes within Mount St. Helens "blast zone," Spirit Lake was the most affected due to its proximity to the mountain. The eruption introduced pyroclastic material, mud, ice, ash, and downed timber into the lake altering the lakes physical characteristics. The lake's surface area increased from 1,300 acres to approximately 2,200 acres and the lake's bottom elevation was raised nearly 300 feet. The midpoint depth in the lake's east bay was decreased from 190 feet to less than 50 feet. In 1987 the lake was measured to have a water surface area of 2,717 acres and a maximum depth of 112 feet.

The eruption-triggered debris-avalanche, which traveled north from the mountain into Spirit Lake and west 15 miles into the North Fork Toutle River valley, increased the lake level nearly 200 feet as avalanche debris partially filled the lake. Displaced water rushed onto the lake's upland slopes bringing timber blown down by the lateral blast into the lake. Today, a layer of floating timber still remains along the northern regions of the lake. Deposits blocked the southwest outlet to the North Fork Toutle



River raising the lake's natural outlet to a higher elevation. If the waters from Spirit Lake were to naturally flow into the North Fork again, the lake's surface level would need to rise to approximately 3,600 feet, nearly 1,400 feet above its original elevation of 2,198 feet.

From May 1980 through November 1982, the crater of Mount St. Helens became the source of the North Fork Toutle River, and the water surface level of Spirit Lake continued to rise as the lake received rain and snow melt runoff from the upland mountains. The rising lake "threatened to breach the unstable debris-avalanche deposits damming the lake" and it was feared that a breach could result in "catastrophic mud flows." In November 1982 Spirit Lake was reconnected with the North Fork via a temporary pumping station and pipeline constructed by U.S. Army Corps of Engineers. The pump station maintained a constant outflow across the erodible volcanic deposits resulting in rapid degradation and aggradation downstream. Thus, in 1985, a permanent gravity-fed tunnel was constructed connecting Spirit Lake and South Coldwater Creek.

In May 1985 the controlled release of lake waters into South Coldwater Creek was initiated through the

11-foot diameter, 1.5-mile tunnel dug beneath Harry's Ridge, which lies between Spirit Lake and South Coldwater Creek. The constructed outlet "portal" can be seen midway along the western shoreline of the lake. This ridge was named in honor of Harry Truman, the long-time Spirit Lake resident who refused to leave his home and was killed by the May 18 eruption.

Water quality was also greatly impacted by the massive introduction of organic and inorganic matter. Prior to the eruption, the lake was classified as ultra-oligotrophic and had water quality characteristics typical of sub-alpine lakes. In 1974 the lake's specific conductivity was measured at 27  $\mu\text{S}/\text{cm}$ . This level rose to 860  $\mu\text{S}/\text{cm}$  immediately after the eruption and by July 2000 had declined to 243  $\mu\text{S}/\text{cm}$ . During 1974 and 2000, pH was measured at 6.9 and 7.9, respectively. Surface water temperatures changed from 10°C in 1974 to 20.6°C just after the eruption and dropped to 17.9°C in July 2000. In June 1980, shallow water bacteria levels were unprecedented for a fresh water lake (1.5 billion cells/ml). During the following summer, the lake remained anoxic due to bacterial decomposition of organic matter. In October 1980, *continued on page 3*

# Lake Focus on Spirit Lake

continued from page 2

dissolved oxygen (DO) levels in the epilimnion were measured at 0.8 mg/l. By July 2000 surface water DO

levels had risen to 8.4 mg/l, comparable to the DO level in June 1974 (10.4 mg/l).

Prior to the 1980 eruption, fish presence in the Spirit Lake tributaries included anadromous coho, steelhead, sea-run cutthroat and hatchery rainbow trout. The tributaries and the lake have been surveyed for fish presence during the past 24 years with the first fish caught in Spirit Lake in 1983. Researchers "affectionately" named this rainbow Harry. Tributary surveys from 1993 through 2001 have found no fry or redds. In the 2000 lake survey, the first cast into the lake produced a "huge rainbow" and the mean length from gill net and angling surveys for 32 rainbow was 32 mm. This survey result was taken as an indication that Spirit Lake "had finally turned the corner" on recovery.

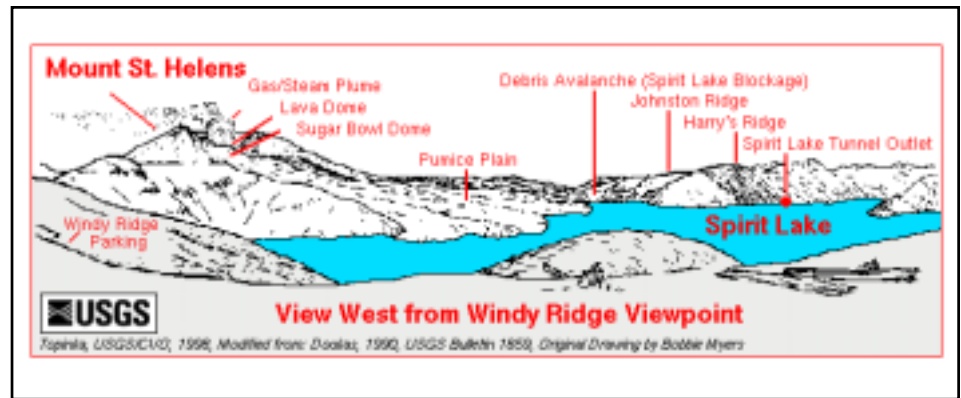
For information about touring or camping at Mount St. Helens, visit the U.S. Forest Service Gifford Pinchot National Forest Web site, [www.fs.fed.us/gpnf/mshnm/](http://www.fs.fed.us/gpnf/mshnm/).

*Sources for this article:*

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**Note:** WALPA makes no guarantee to 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](mailto:heidi@taylorassoc.net).

## Learn more about ...

### Boating and fishing

Check out this Web site: [www.WaterWorksWonders.org](http://www.WaterWorksWonders.org). It's sponsored by Water Works Wonders Recreational Boating and Fishing Foundation.

### River otter

People for Puget Sound presents Dr. Joe Gaydos, a wildlife (marine) veterinarian, who will talk about river otters on Thurs., Sept. 23, from 7 to 9 pm, at REI, downtown Seattle. Tickets are \$8 in advance; \$10 at the door. Students and retired folks are free. For information call 206-382-7007.

### Lake monsters

Buck DeFore is studying lake monsters around the world. Visit his Web site to learn about his research and how it's funded. [www.lakemonsterculture.com](http://www.lakemonsterculture.com).

### Stream Team

Stream Team is dedicated to protect and enhance the water resources, associated habitats, and wildlife of North Thurston County through citizen education and action. For information about the programs offered, call the city or county staffer. Lacey: Lisa Dennis-Perez, 360-438-2687. Olympia: Patricia Pyle, 360-570-5841. Tumwater: Debbie Smith, 360-754-4148. Thurston County: Susie Vanderburg, 360-357-2491.

### Car washing

When washing cars on the street, the soapy water heads for the stormwater drains, which reaches our waterways without treatment. Learn prevention tips: visit [www.forester.net/sw\\_0205\\_take.html](http://www.forester.net/sw_0205_take.html).



# Leeches lurk in Lake Wilderness

By Bill Kristan, Ph.D. and Kathy French, Ph.D., Neurobiology section, division of Biological Sciences, University of California, San Diego, La Jolla, Calif.

Katharine Hepburn is aboard the *African Queen*; Bogey is in the river pushing the boat through the weeds. As he climbs back on board, he notices black, squirming creatures all over his body. He shudders and starts pulling them off, pausing just long enough to mutter, "If there's one thing I hate, it's leeches!"

In similar fashion, a few swimmers have emerged from Lake Wilderness in the past with leeches adhering to their exposed skin. One major difference: Bogey's critters fed on human blood whereas the Lake Wilderness leeches are a danger only to worms, insects and snails.

What are leeches? They are annelid worms, cousins of the earthworms we use for composting and fishing. Unlike earthworms, all leeches have front and back adhesive pads. The larger one at the back is used only to attach as a leech hangs around or crawls. The smaller sucker at the front is also used for crawling. The two suckers attach and release, causing the animal to "inchworm" along smooth surfaces. In addition, the front sucker is specialized for feeding by suction, but it frequently attaches to other animals without biting.

What does a leech suck? It depends on what kind of leech it is. Some leeches are carnivores, consuming their prey whole. Others are parasites, attaching to a host and staying there. However, most are somewhere in between, taking a quick meal from a larger animal as it passes by. Many leeches are very specialized, recognizing only a single type of host. There are "duck" leeches, "fish" leeches, "snail" leeches and "turtle" leeches. A few species are specialized to suck the blood of warm-blooded vertebrates like raccoons, moose or cows — or in some cases, even people. These species have been used in many human societies for blood-letting, to remove "bad blood" with the intent of curing diseases or injuries. In fact,



**This leech is not the blood-sucking kind.**

such "medicinal leeches" are used today by western medicine to keep blood flowing in human tissue — like ears or fingers — that have been lopped off accidentally and surgically reattached.

More than 65 species of leeches are found in the U.S. Three of those species were found in a recent leech hunt in Lake Wilderness. What do these leeches eat? Are there any blood-sucking "worm vampires" in this local lake? Fortunately not. Two of the species found (*Helobdella stagnalis* and *Helobdella triserialis*) are snail leeches, feeding on many kinds of snails. These are small leeches, less than a half-inch long, that hide under rocks and on the stems of reeds, waiting for snails to come along. The third species (*Erpobdella punctata*) is up to two inches long, colored and shaped like an earthworm. This species feeds on aquatic insect larvae, such as dragonflies and mosquitos.

If the local leeches feed on insect larvae and snails, what were they doing attached to people? Chances are good that these were "erps" swimming around looking for a mate or for

a place to make their cocoons to deposit their fertilized eggs. Erps make leathery, dark brown egg cases that they attach to a smooth surface such as a rock, a dead branch, or even a discarded can or bottle. Once they lay their eggs, they die, so the largest adults are gone by the end of the summer.

Who feeds on leeches? Mostly, turtles, birds, and fish. In fact, in the northern midwest, Erps are sold as fish bait. They are reported to be particularly good for attracting bass to fishing lines.

Bogey was right — it is not pleasant to have sucking worms crawling all over you. But, at least in Lake Wilderness, the leeches are completely harmless to us. They may attach, but do not bite humans; they do not carry any diseases or parasites harmful to people; and they prefer rocks over people for a good cocoon attachment site. If you happen to find one crawling on you, scrape it off with a fingernail and put it on a rock. They are part of the natural food chain: they keep the insect and snail populations in check and provide another food source for fish. Stay away from the rocks and older wood pilings and you are likely never to see one. Have a nice swim!

## Blue-green algae can kill continued from page 1

Organization has researched this subject extensively and recommends that if a surface scum is present in recreational waters, then water contact activities should be prevented.

What should you do if you suspect that blue-green algae are blooming in your local lake? Stay away from the scum. Without a microscope you cannot tell what algae are forming the bloom and you need sophisticated lab equipment to tell if it is toxic. Keep animals away from the water – dogs are particularly susceptible, as they will get coated with scum and then lick their fur. Report the suspicious bloom to your local health department.



**Blue-green algae can be toxic. Humans and animals should stay out of scum-covered lakes. Photo by Michael Murphy, King County DNRP, Lake Stewardship Program**

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**WASHINGTON STATE LAKE  
PROTECTION ASSOCIATION  
P.O. BOX 4245  
SEATTLE, WA 98104**

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<u>Deadline</u>	<u>Issue date</u>
Nov. 1	Dec. 1
Feb. 1	March 1
May 1	June 1
Aug. 1	Sept. 1

Send your ideas for articles to *Waterline* Editor Paula Lowe, pmrlowe@comcast.net or call 360-491-0109.

Please include a description of the topic, suggest a writer, a contact person with phone number and e-mail address. Each recommendation is reviewed carefully.