



WATERLINE

December 2004

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Germ's in the sand?

By Shawn Ultican, environmental health specialist, Kitsap County Health District, Water Quality Program

When beaches are monitored for health risk, water samples are usually collected near the shore and analyzed for bacteria. If high bacteria concentrations are detected, this indicates an increased risk of people getting sick from swimming in the water. Bacterial pollution is often blamed on wildlife, failing septic systems, or stormwater run-off from the surrounding land. However, there is increasing evidence that some of these bacteria may also be coming from the beach itself.

Dr. Elizabeth Alm is a researcher at Central Michigan University. She has been conducting research on microorganisms in beach sand on the shore of Lake Huron. Her investigations have demonstrated that bacteria not only exist in the sand of freshwater beaches, but they can survive and reproduce in sand as well.

The bacteria *Escherichia coli*, or "E. coli", has been used as a primary indicator for monitoring pollution at freshwater beaches. Dr. Alm's research found that high levels of *E. coli* bacteria could be explained, at least in part, by the ability of *E. coli* to live and grow in beach sand.

In laboratory studies she found that *E. coli* bacteria can grow rapidly in beach sand, increasing from a concentration of 190 to more than 20,000,000 per 100 grams of sand in just two days. The bacteria continued

to exist at these levels for more than a month. She duplicated these results in the sand along the shore of Lake Huron, where bacteria stayed at these high concentrations for at least 48 days.

She also used genetic techniques to show that bacteria from pollution sources, such as stormwater, can pass along traits to the natural population of bacteria. This has some serious implications for the spread of antibiotic resistance and other traits that could affect public health.

In addition to finding *E. coli* bacteria in beach sand, she also found the pathogens *E. coli* O157:H7 and *shigella*. *E. coli* O157:H7 is a rare variety of *E. coli* that produces potent toxins that cause severe damage to the lining of the intestine. *Shigella* is a type of bacteria that can cause food borne illnesses such as dysentery.

This research supports the idea that some of the *E. coli* found in swimming areas may be coming from beach sand rather than pollution sources. The potential for bacteria to re-enter the water in swimming areas would then confuse *E. coli* based monitoring methods.

This research was presented at the National Beach Conference held in San Diego, California in October 2004. This conference was a gathering of people from around the U.S. involved *continued on page 3.*

Lake Focus on Little Pend Oreille Lakes

By Heidi M. Wachter, Taylor Associates

In the scenic northeastern corner of Washington state lies the Little Pend Oreille Lakes. A lake chain made up of five named lakes and several smaller unnamed lakes. Waters captured and released by this lake chain enter the Little Pend Oreille River and flow south-southwest approximately 22 miles to the confluence with the Colville River, which flows northwest into the Columbia River.



The Little Pend Oreille Lakes ecosystem exists within two counties, Pend Oreille and Stevens counties. Lake Leo, the 43 acre headwater lake, lies just within the Pend Oreille County border. Waters from Lake Leo flow across the county line via a small creek into Stevens County. After traveling through two small unnamed lakes, waters enter 73 acre Heritage Lake, which via a navigable wetland channel is connected to Thomas Lake, the largest lake in the chain (170 acres). Waters from Thomas Lake flow through a short navigable channel into 47 acre Gillette Lake and then via a similar channel to the most downstream lake, 25 acre Sherry Lake.

The lake chain's watershed covers approximately 17 square miles across Pend Oreille and Stevens counties. The main tributaries to the Little Pend Oreille Lakes include Patchen and Deer creeks (tributaries of Heritage Lake), Spring Creek (tributary of Thomas Lake), and Gillette Creek (tributary of Gillette Lake). In addition to these larger systems, there are numerous unnamed tributaries that flow into the lake chain. The watershed contains several principal wetland areas. Wetlands exist primarily along the shoreline of Lake Leo; the inlet or outlets of Heritage, Thomas, and Gillette lakes; and downstream of Sherry Lake, where the Department of Natural Resources operates a Natural Area Preserve supporting two rare and endangered wetland plant species.

The land cover in the watershed is primarily forest with upland anthropogenic activities including timber harvest and range grazing. Residential land use is primarily along the shorelines of Heritage, Thomas, Gillette, and Sherry lakes. Recreational sites in the Little Pend Oreille Lakes chain include one resort (Beaver Lodge) on Gillette Lake; National Forest campgrounds on Leo, Thomas, and Gillette lakes; and two public boat launches on Leo and Gillette lakes.

The lake chain supports a variety of recreational uses including fishing, swimming, boating, and wildlife observation. Thus, public use of the lakes is high, by local residents and visitors to the region. To support recreational fishing, in 1999 the Washington Department of Fish and Wildlife (WDFW) stocked in the lake system with "catchable size trout (7 inches or larger)." During 2000-2003 WDFW's Hatchery Trout Stocking Plan for Washington Lakes and Streams did not include the Little Pend Oreille Lakes.

During the 1990s, growth of exotic aquatic plants in the lower four lakes was affecting recreational uses, fish and wildlife habitat, and water quality. The lake chain was "determined to be under attack" by Eurasian watermilfoil (*Myriophyllum spicatum*), and to a lesser extent, by Yellow Pond Lily (*Nuphar variegatum*). Watermilfoil (milfoil) was first spotted in the lake chain in 1989 and in 1993 a long-time lake resident involved the Stevens County Noxious Weed Control Board. Since then, agencies, land owners, public citizens, local organizations, and consultants worked collaboratively and provided funding to address the milfoil infestation.

With the support of lake residents and the Little Pend Oreille Lakes



Sherry Lake is the most downstream lake of the Little Pend Oreille Lakes. Photo courtesy of Stevens County Noxious Weed Control Board.

Association, an Integrated Aquatic Plant Management Plan (IAPMP) was developed and implemented with a goal to maintain recreational, fish, and wildlife use through aquatic plant control measures. The plan proposed aquatic plant control measures that had high public support, a high cost to benefit ratio, and would promote maintenance of natural and diverse aquatic plant populations. Preventive measures included a public awareness program and plant surveillance. Plant eradication techniques included hand removal and herbicide treatments. The IAPMP, which included monitoring before, during, and after the project, was implemented from 1994 through 2000. The overall efficacy of the milfoil eradication component was estimated at 67 percent removal of the biomass present in 1997 (when the first herbicide treatment occurred).

Future management plans include continued monitoring for the presence of milfoil, prompt response to remove small milfoil beds, water quality monitoring, and a regular newsletter to local residents. To help fund future lake management activities, annual donations to the Little Pend Oreille Lakes Association are anticipated from local property owners. The voluntary donations will support maintenance of a healthy lake ecosystem. *continued on page 3.*

Map on this page courtesy of Stevens County Noxious Weed Control Board.

Lake Focus

continued from page 2

Sources for this article:

- Little Pend Oreille Lakes Association, Integrated Aquatic Plant Management Plan.
- Tom O'Brien, Little Pend Oreille Lakes Association, vice chairman.
- Sue Winterowd, Stevens County Noxious Weed Control Board, coordinator.
- Little Pend Oreille Lakes Eurasian watermilfoil "Eradication" Project Final Report, AWMF Grant #G9800032. December 2000.
- Washington Dept. of Fish and Wildlife, Hatchery Trout Stocking Plan for Wash. Lakes and Streams; spring 1999-2004 plans. www.wa.gov.



Photo courtesy of Stevens County Noxious Weed Control Board.

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.

Germes in the sand?

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in monitoring our coastal beaches, both along the marine coast and Great Lakes region. It included representatives from federal, state and local organizations, as well as academic researchers such as Dr. Alm.

For more information, check www.epa.gov/waterscience/beaches/2004conference.html, or contact Beth LeMond, 202-566-0444 or lemond.beth@epa.gov, or Bryan "Ibrahim" Goodwin, 202-566-0762, goodwin.bryan@epamail.epa.gov, at the U.S. Environmental Protection Agency, 1200 Pennsylvania Ave. NW, Mail Code 4305, Washington, DC 20460.

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WALPA 2005 conference is in Spokane

WALPA's 2005 annual conference will be in Spokane at the newly-remodeled Mirabeau Park Hotel. The conference will run from March 30 through April 1, 2005.

WALPA President-elect and Conference Coordinator Sally Abella and the board are working on conference program ideas. Send conference session topic suggestions to sally.abella@metrokc.gov.

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. For information about the newsletter or advertising, call 360-491-0109.

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