

SEBAGO LAKE

WATERSHED NEWS

WINTER 2011

Photo Credit: Beth Kurtz

Portland Water District • 225 Douglass Street • Portland, Maine 04104-3553 • 207.761.8310 • www.pwd.org

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It's All One Drop BY PAUL HUNT

Someone once commented to Neil Young that all his songs sounded the same. He replied, "It's all one song."

Something similar can be said of water. The water that rains on the land flows down streams and rivers, fills lakes, and in the case of a public water supply, is treated and consumed by water customers. To continue the story further, the same water then goes down a drain, is treated, then discharged back into a river or the ocean. Eventually it evaporates and starts the cycle over. It's all one drop.

With Sebago Lake, the first drop of water hits the ground many miles north and west of the lake, in towns like Norway, Bridgton, Waterford, and Harrison. About 70 percent of the surface water flowing into the lake comes down the Crooked and Songo Rivers and enters the lake in Naples. The lake has a 5-year residence time - meaning about one fifth of its total volume flows into and out of the lake each year. So a typical drop of water will reside in the lake for 5 years.

The vast majority of the water leaves the lake by evaporation. A lesser but significant percentage flows over the dam in Windham and down the Presumpscot River. About 8 billion gallons of water (4 percent of the annual inflow to the lake) is pumped, treated, and delivered to our customers.

Like any public water supplier, we constantly monitor the water that enters and leaves our treatment plant. Our customers expect, and the law requires, that the water leaving the plant meets all drinking water standards. The cleaner the water coming in, the easier this is to do. We monitor locations as far as twelve miles away from the treatment plant. This allows us to measure the quality of the water that will reach our intake pipes in the coming years. We carry this concept one step further by monitoring the water in the tributaries that flow into Sebago Lake. This gives us an indication of the quality of water which will reach the plant in even later years. This issue of Watershed News highlights a few of our many monitoring programs. For more detail on our water quality monitoring, visit our website at <http://www.pwd.org/environment/sebago/sebago.php>.

The District's interest in maintaining lake water quality is obvious. But if you are not one of our customers, why should this matter to you? Well, if you're reading this you obviously care about the lake. Maybe you own property close by or fish and swim in the lake or rivers that feed the lake. If so, the cleaner the better. **Clean water benefits everyone. Remember, it's all one drop.**



Paul Hunt is the environmental services manager at the Portland Water District. He can be reached at phunt@pwd.org.

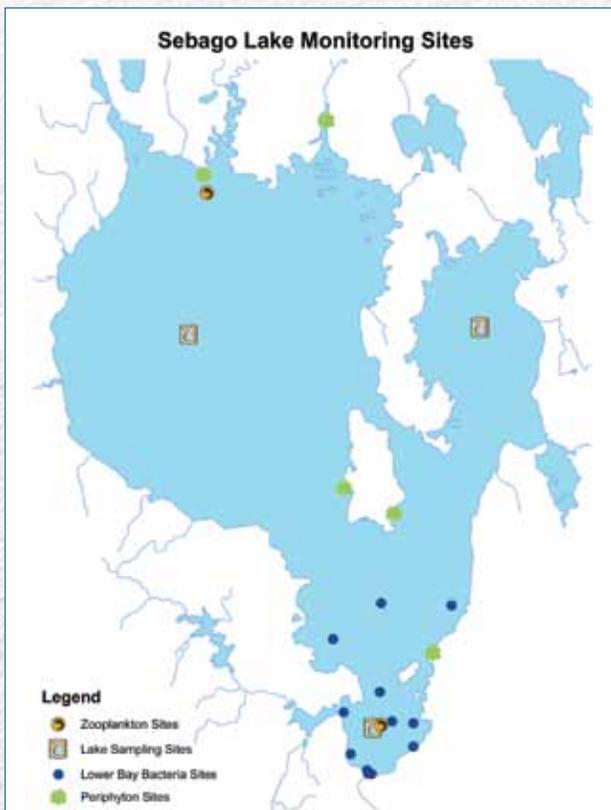
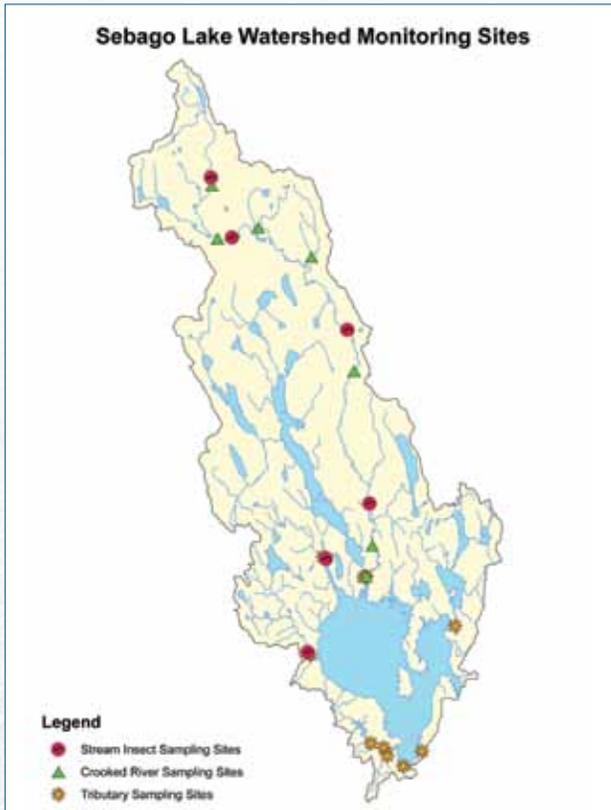


Photo Credit: Jeff Kalinich

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Sebago's Health Check-ups

BY CHAD THOMPSON & KIRSTEN NESS



During an exam, your doctor performs a number of tests to check your health, and like you, lakes need check ups too. The Portland Water District conducts 17 programs to check the health of Sebago Lake and the streams and rivers that feed it. These programs allow us to track water quality changes over the short and long terms.

Stream Check Up

The Crooked and Songo Rivers contribute about 70 percent of all the surface water that flows into Sebago Lake, with the remaining 30 percent coming from smaller streams and brooks or overland runoff. The District monitors these streams and rivers regularly because the water in them will soon flow into Sebago Lake. Water clarity, phosphorus (a nutrient that feeds plants and algae), and *E. coli* bacteria are measured every month. And each summer insects are collected from the Crooked, Muddy, and Northwest Rivers because they are indicators of long term water quality.

Lake Check Up

From May to October, the District travels to the deepest spots in each bay of the lake to measure the temperature, dissolved oxygen, and water clarity. We collect samples to test for phosphorus and chlorophyll *a* (a measure of the algae floating in the lake). During these warm months, we also monitor the lower bay for *E. coli* bacteria. The District has a special interest in the lower bay of the lake because that is where the drinking water is withdrawn.



We also monitor zooplankton (small organisms that drift in the water column and eat algae) and periphyton algae (see page 5). Changes in the types and numbers of zooplankton can indicate water quality shifts over time.



Each test allows us to evaluate a different part of the lake system — from physical measures like temperature to biological measures like numbers and types of algae. Together, they paint an overall picture of water quality much like the tests a doctor conducts paint an overall picture of your general health.



Chad is the source protection coordinator with the Portland Water District. He can be reached at cthompson@pwd.org.



Kirsten is a water resources specialist with the Portland Water District. She can be reached at kness@pwd.org.

What do Streams in Bethel Have to do with Drinking Water Quality in Portland?

BY KIRSTEN NESS

When you think about the quality of Sebago Lake and the drinking water it produces, you might not realize the importance of the streams and rivers that feed the lake. How could activities, such as construction or development in Bethel, affect the water that flows from the tap of a customer in Portland? The answer is that activities on land that drains to the lake or to the streams that feed the lake can affect the quality of the water.

The best way to determine the health of a stream is to look at the insects that live in it. Insects are good indicators of water quality because they live in streams for extended periods of time and are influenced by the long term conditions within it. By contrast, physical and chemical water quality measurements only assess stream health at the time of sampling and therefore may not represent the overall condition of the stream. Also, physical and chemical measurements can differ greatly depending on many variables including the weather (rain vs. sun).

Streams flowing with clean water have different types of insects than polluted streams. Some insects, like mayflies and caddisflies, are highly sensitive and cannot tolerate pollution. If these sensitive insects are found in a stream, it is likely that water quality is high. Clean streams generally have fewer insects but many different types. Polluted streams have more insects but not as many different types.



Photo Credit: Brie Holme

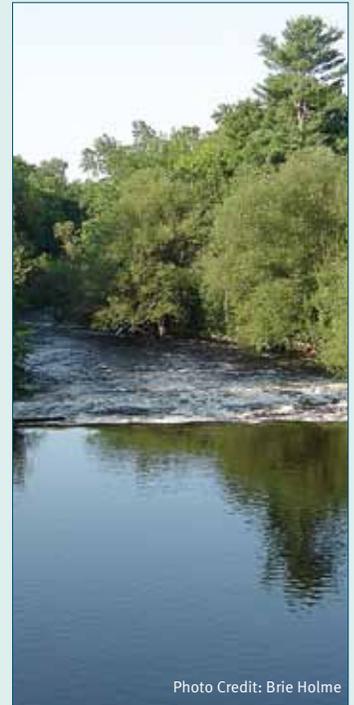


Photo Credit: Brie Holme



LESS CLEAN STREAM



CLEAN STREAM

The Portland Water District evaluates the insects in three rivers: the Crooked, Northwest, and Muddy Rivers. Based on Maine standards, the insect profiles indicate all three rivers are clean. Interestingly, however, the types of insects in the Crooked River change as you move from north to south. The insects at the northern sites indicate better water quality while those in the south are more numerous and some are pollution tolerant species. Though the overall quality of the river remains high, these findings suggest that some water quality degradation is taking place along the river.

The District will continue to monitor the quality of the Crooked River and work with communities and landowners along the river in an effort to keep it clean. A clean river and lake benefit both local residents and those in Greater Portland who drink the water.



NATIVE PLANT SPOTLIGHT

Witch Hazel: *Hamamelis virginiana*

Size: Deciduous tree that grows 10 to 15 feet high with an equal spread.

Foliage: Leaves are obovate, meaning they are egg shaped with the narrower end at the base. Small clumps of yellow flowers with narrow petals bloom in early fall.

Soil Conditions: Prefers moist, acidic soils.

Light: Full sun to partial shade.

Zones: 3-8

Uses: Popular ornamental tree with leaves, twigs, and bark that can be used to make an extract for treating bruises on the skin.

Unique Characteristic:

As other trees wind down and prepare for cold months, the witch hazel tree finally blooms. Although the golden blossoms curl up and turn brown, many remain on the tree throughout the winter.

Visit the Sebago Lake Ecology Center to see examples of native plants!

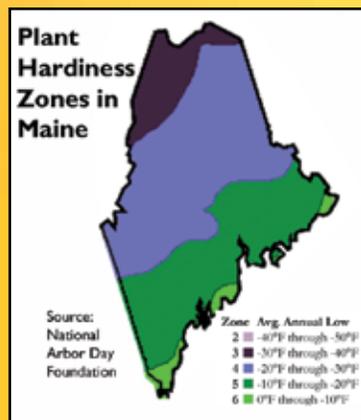


Photo Credit: Charlotte Hewson

Don't Risk It — Protect Your Oil Tank

Be sure your home heating oil tank is protected from snow and ice falling off your roof. Oil tank filters can easily break off and spill hundreds of gallons of oil on the ground and in our waters. **Clean-up can cost thousands.**

The Portland Water District will give away one **FREE** oil tank filter protector to the first person who contacts us at Sebagolake@pwd.org. The recipient's oil tank must be located within the shoreland zone (250 feet) of Sebago Lake.

**Win this free
filter protector**



Photo Credit: Brie Holme

Periphyton: Tiny Life Forms Yield Big Clues About Sebago's Water Quality

BY NATE WHALEN

The tiniest inhabitants of lakes and streams are often the most telling sign of water quality. Collecting a water sample and testing for pollutants is a less effective way to detect pollution because water quality may vary over time. So grabbing a sample at different times can give different results. This is why it is helpful to study the small organisms that live in the water, such as algae or insects. These tiny inhabitants live in the water all the time and will react to changing water quality. If they look right, the water is probably all right, too.

Periphyton Study

To study periphyton, we anchor styrofoam blocks at different locations throughout the lake, allow algae to grow for a month, then collect and measure the amount of algae. The District's studies of periphyton in Sebago Lake show that more algae grow near dense human development than next to undeveloped, forested land.

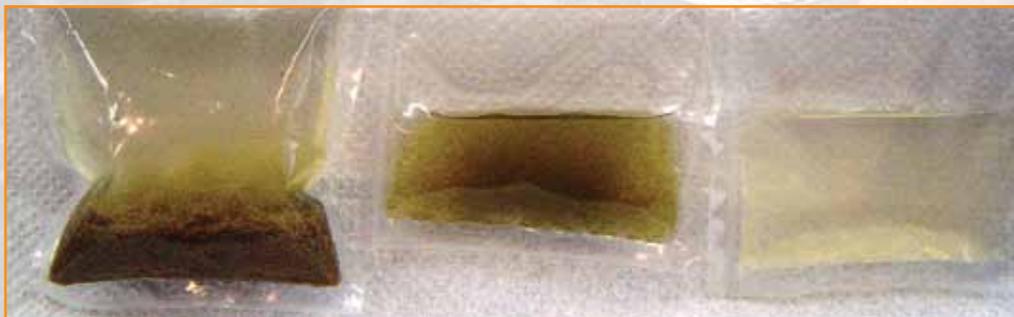
Long term trends in lake water quality are hard to determine from periphyton algae because they may grow and reproduce exponentially in a given year if conditions are just right or they may wither and die if conditions are not. These complex interactions take a large data set to establish trends. Nevertheless, the data to date underscore the need to design development to minimize runoff. The Portland Water District works closely with planning boards and code enforcement officers around the lake to ensure this happens.



Periphyton Collection

This principle is used by the District in our study of periphyton (**pe-riph-y-ton**) — the algae that grow on rocks and sticks under water in lakes. These algae grow thicker in response to pollution. The most common form of pollution in lakes is nutrients washed in from the surrounding land. Human activities that disturb soil and pave land can wash nutrients into the lake when it rains or when snow melts. These nutrients can over-feed algae to unnatural levels.

Periphyton Collected from Sebago Lake



Densely-developed Shoreline

Moderately-developed Shoreline

Forested-undeveloped Shoreline



Nate Whalen is a water resources specialist at the Portland Water District. He can be reached at nwhalen@pwd.org.

What's Making Waves Around Sebago Lake?

BY BRIE HOLME



Photo Credit: Brie Holme

Volunteers Needed For Crooked River Study

Spend the day canoeing the Crooked River or enjoying the watershed's scenery on foot. This spring volunteers are needed for both walking and canoeing surveys to help document erosion problems. Canoes needed as well. FMI or to volunteer for the Crooked River Watershed Survey, call Betty Williams at the Cumberland County Soil and Water Conservation District at 892-4700.

Survey of Crooked River Crossing Barriers Complete

A survey of all the stream crossings on the Crooked River and its tributaries is complete. That's 222 culverts, 72 bridges, 27 dams, and 4 natural barriers. The District partnered with Casco Bay Estuary Partnership, U.S. Fish and Wildlife Service, and Trout Unlimited on the project with the ultimate goals of improving passage for diadromous fish species and improving water quality by fixing soil erosion at the crossings. The purpose of the survey is to help towns and state agencies prioritize structures for replacement and to direct private, state, or federal funding for their replacement.



Brie Holme is a water resources specialist at the Portland Water District. She can be reached at bholme@pwd.org.

Manage your Woodlot for Wildlife and Water Quality with WoodsWISE

Do you own at least 10 acres of woods in the Crooked River/Sebago Lake Watershed? Would you like to know how to manage your woods for wildlife habitat, timber, or the protection of water resources? If so, the Maine Forest Service WoodsWISE Program is offering a 50 percent cost-share incentive for the development of a forest resource management plan. Contact Andy Shultz, Maine Forest Service, Landowner Outreach Forester, at 287-8430 or email: Andrew.h.shultz@maine.gov to find out how you can take advantage of this opportunity.

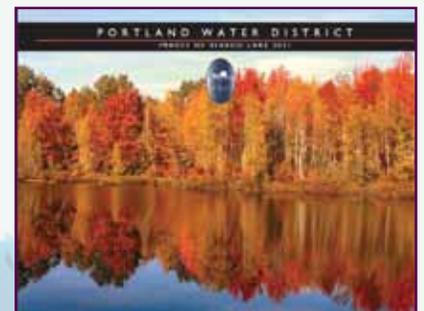
Sebago to the Sea Trail



The first eight miles of the Sebago to the Sea trail are open for use from Sebago Lake to South Windham. Once complete, the trail will be approximately 28 miles beginning at Sebago Lake and ending at Casco Bay, following the Presumpscot River most of the way. The first four miles of the Sebago to the Sea trail that traverses District land were dedicated on October 2. The proposed trail route will eventually go through the six towns of Standish, Windham, Gorham, Westbrook, Falmouth, and Portland, including Portland Trails' 32-mile network. A trail map and more information are available at www.sebagotothesea.org.

Images of Sebago Lake 2011 Calendars Available

Visit the Sebago Lake Ecology Center in Standish or PWD's Portland offices at 225 Douglass Street to receive your free copy of the Images of Sebago Lake 2011 calendar. The calendar features dramatic images of Sebago Lake from amateur photographers who have captured the many moods of Maine's second largest lake. Because supplies are very limited, visitors will be allowed only one calendar. FMI, contact sebagolake@pwd.org. It's not too early to think about the 2012 calendar. Keep your camera ready; Sebago Lake offers many opportunities for that perfect shot!



Monitoring Water Quality Before and After Treatment

BY LAUREL JACKSON



Every day, millions of gallons of water are pumped from the lower bay of Sebago Lake, treated, and sent down a network of pipes to 11 communities. Treatment is accomplished with ozone, followed by a dose of chloramines to disinfect the water. The water is not filtered like most because of Sebago Lake's exceptional water quality. Sebago's water is so clean that the Environmental Protection Agency granted the Portland Water District a "waiver to filtration." This means that the District is not required to filter the water, but both the untreated (raw) and treated (finished) water must meet higher standards. We must continually demonstrate that our raw water has fewer bacteria and lower turbidity (water cloudiness) than a filtered system and that we have an effective program to keep it that way.

Turbidity

The most frequently conducted water tests measure turbidity and bacteria in the raw water. Turbidity refers to the amount of suspended microscopic particles in water that deflect light, i.e. the cloudiness of water. Things like sand, silt, algae, and air bubbles will increase turbidity. High turbidity can be a characteristic of a polluted water body. Turbidity is measured in the laboratory once a day, but the raw water is monitored continuously with an automated meter. The units of measurement of drinking water start at zero turbidity

units for very clear water and go up, the lower the number the better. Water with a turbidity of 4 turbidity units would be visibly cloudy. Common ranges for treated water at any water treatment plant are between 0.2 and 0.5 turbidity units. Sebago Lake water is commonly around 0.2 units and that's before treatment!

Bacteria

Fecal coliform bacteria belong to a class of microorganisms found widely in nature but are a subgroup commonly associated with the small intestine of warm-blooded animals. Fecal coliform bacteria are used as a water quality indicator because their presence signifies possible contamination from humans or animals. Sebago Lake is analyzed for fecal coliform bacteria five days a week and is commonly found to have none. The treatment process eliminates fecal coliform bacteria as well as any other harmful microbes present, and the finished water is monitored as it leaves the treatment plant. The finished water is tested at different points throughout the system to ensure that it remains safe as it travels through the pipes.



Monitoring Results Point To Sebago As Exceptional Source

Because of the exceptional water quality of Sebago Lake, it makes for an ideal drinking water source. Besides the exceptional quality, other benefits of a system that does not require filtration include lower costs and less environmental impact. Filtration plants consume more energy and use more chemicals during the treatment process.

The Portland Water District strives for energy efficiency and cost effectiveness while providing high quality water to its customers. Monitoring and protecting Sebago Lake helps ensure that water quality does not decline.



Laurel Jackson is a water resources specialist at the Portland Water District. She can be reached at ljackson@pwd.org.

2011 PWD Rain Barrel Promotion

Here's a way to conserve water and reduce polluted storm water runoff.

Portland Water District will once again offer discounted rain barrels in the spring of 2011.

Rain barrels provide an innovative way to capture rainwater from your roof and store it for later use. Water collected by rain barrels can be used to water lawns, gardens, and indoor plants. This water would otherwise run off your roof or through downspouts and become storm water, picking up pollutants on its way to a storm drain, stream, or lake.

To be the first to know the details, follow us on Facebook at MyPortlandWater. You can also visit www.pwd.org after March 1, 2011, for pricing, ordering, and pick up information. Ordering deadline is May 13, 2011.

For more information about rain barrels, contact Kirsten Ness at kness@pwd.org.



Little Stewards Story Time!

Preschoolers are invited to join us for stories, snacks, & activities.

Friday, February 18

Incredible Insects

Friday, March 18

Plants and Their Parts

Friday, April 15

Fun with Frogs

Where:

Sebago Lake Ecology Center

1 White Rock Rd.

Standish

(At the corner of Rtes. 35 & 237)

Reservation required!

774-5961 x 3319 or 3320

sebagolake@pwd.org



First lesson is free! A \$2 donation will be collected for each additional lesson to promote local loon preservation. Scholarships available.



The Sebago Lake Watershed News is published by the Portland Water District.

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