

SEBAGO LAKE

WATERSHED NEWS
WINTER 2012

Photo Credit: Kerry Freeman

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

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Both Nature and Nurture By Brie A. Holme

Anyone who visits Sebago Lake for the first time is sure to notice the incredible clarity of its water.

In fact, Sebago Lake is clearer than 95% of the lakes in Maine. Untreated water from the District's intakes is also remarkably free of the type of bacteria that is commonly found in Maine lakes. Sebago's water is so clean that the Portland Water District doesn't have to filter the water (the District just treats the water, primarily with ozone). We are fortunate. But to what do we owe our good fortune for this clean water?

As with children, success is a combination of nature and nurture. Children who grow up to be successful adults usually were both born with some important traits such as intelligence, physical strength, and beauty AND also enjoyed a good upbringing by caring parents, were fed well, and received a good education and ethical instruction. Similarly, Sebago Lake has some inherent features that make for an excellent water supply (nature) and has also enjoyed excellent treatment by generations of people who have cared for it (nurture).

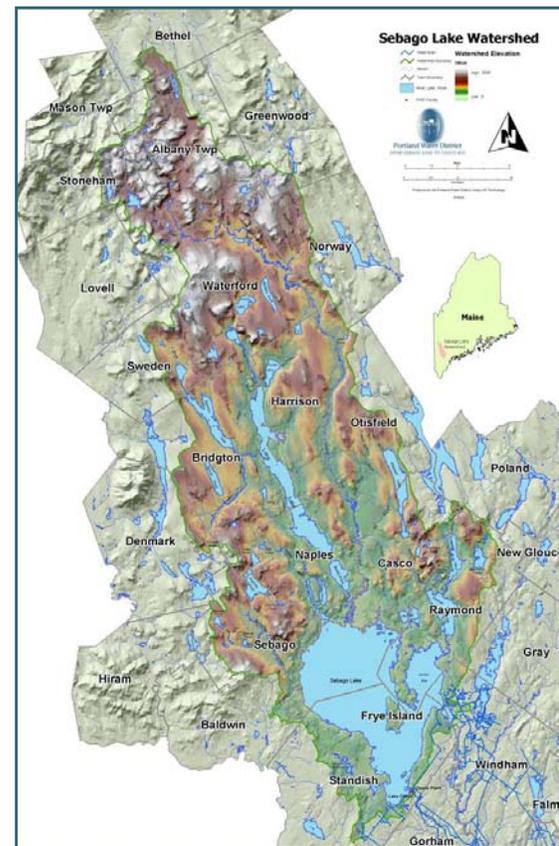
Nature

Some of Sebago Lake's inherent traits responsible for its water quality include that it is deep, cold, and has an enormous volume of about a trillion gallons of water. How much is a trillion gallons of water? Think of it this way; if you started filling those pool water trucks from Sebago Lake – each about 50 feet long and holding about 10,000 gallons – the

line of trucks would reach from the Earth to the moon and back. Twice! Lakes with larger volumes are harder to pollute than lakes with smaller volumes.

The location of Sebago Lake's watershed and the land uses within it are also important factors reflected in the water quality of the lake. The 300,000 acre watershed (all the land that drains to the lake) is oriented North-Northwest, with the vast majority of the watershed located to the north of the lake where there is less development (Figure 1). The watershed is currently about 81% forested. The Portland Water District doesn't have to filter Sebago Lake water before disinfecting it because the forest IS the filter. You can read about how forests filter and absorb water on page 8. We are fortunate Sebago's watershed doesn't extend much to the south of the lake, where the landscape is much more developed.

The geology of the lake also has a favorable effect on water quality. According to the Maine Geological Survey, 75% of Sebago Lake's perimeter is made up of shoreline types that are hard to erode (mostly glacial deposits known as till). On a lake shoreline glacial till forms a boulder armor which waves cannot easily move. You may have noticed this natural riprap along the shoreline that prevents erosion. The other



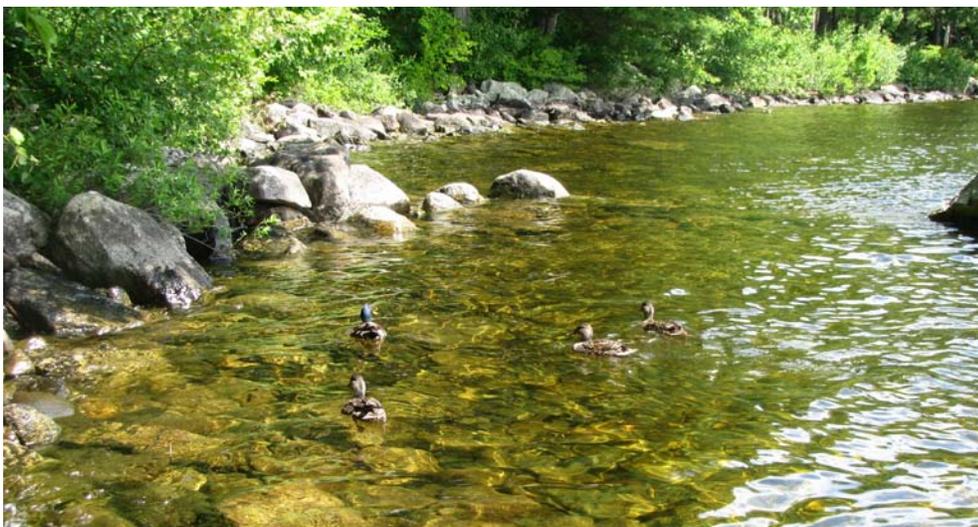
hard-to-erode shoreline types include artificial fill--such as concrete or installed riprap-- sea walls, marsh, and bedrock.

Nurture

In addition to its inherent traits, Sebago Lake has outstanding water quality because people have cared for the lake for generations. Landowners care for the lake by maintaining lake-friendly properties. In the past twelve years 182 lakefront property owners have taken part in the District's Lakescaping program. These "Lakescapers" invest their own money combined with a District grant to make their property both more attractive and more lake friendly. Together, Lakescapers and the District have spent over \$600,000 on Lakescaping projects in the past twelve years. The program will also be funded in 2013.

Landowners also care for the lake by limiting development and maintaining natural vegetation in the shoreland zone. To date just 2,600 of the 4,000 lots within 200 feet of Sebago Lake have been developed. And the seven towns that border Sebago Lake have played a huge role in lake protection by reviewing developments that do occur and ensuring that shoreland zoning rules are followed. The Portland Water District inspects all development projects in the shoreland zone of these towns to assist the towns in protecting the lake. We conduct about 600 inspections a year and the good news is that most reveal that landowners are following the rules. The towns further north in the upper watershed of the lake help, too, by enforcing their ordinances which protect the water quality of the lakes and rivers upstream. Eventually, all the water from those lakes and streams flows into Sebago.

Visitors care for the lake by not swimming within two miles of the Portland Water District intakes. The No Bodily Contact law, enacted in 1913 by



Glacial till forms a boulder armor that protects the shoreline from erosion.

Photo credit: Kendra Raymond

the Maine Legislature and still in effect today, effectively protects the drinking water for over 200,000 people. The District's swimming beach monitoring program demonstrates that where people swim, bacteria can be found, while it is extremely rare to find the same type of bacteria at the District's intakes.

The Lake is not Invincible

Those of us who live near, recreate on, or drink from Sebago Lake are fortunate. However, the lake is not invincible. Total phosphorus readings from Sebago Lake hint at this. Phosphorus is a nutrient found in high concentrations in soil and fertilizer, while lake water is naturally low in phosphorus. Phosphorus feeds algae and too much phosphorus in a lake can cause an algae bloom. Soil erosion is the largest contributor of phosphorus to lakes in Maine. Total phosphorus readings taken by the District in the past five years are statistically higher than in the previous 30 years. The highest phosphorus readings we've ever taken occurred in the past 5 years. While at this point the total phosphorus readings are still very low and no cause for alarm, they are definitely something to watch.

Another trait that bears watching is development of the watershed. While Sebago Lake's greatest asset may be

its largely forested watershed, it is important to note that according to a study commissioned by the District, the watershed lost 5% of its forest to development in 11 years. We must be mindful of our natural filter. As population grows some trees will be cut and homes built. This can be done in a way to limit the effect on lake water quality and towns can encourage this type of low-impact development through their ordinances. One example is what's known as a conservation subdivision, where the town allows a developer to build more houses closer together on a parcel in return for leaving large areas of the land wooded. This is good for the lake and also provides areas for residents to enjoy nature.

Nature has granted Sebago Lake numerous inherent qualities which produce clean water. The preservation of Sebago Lake now depends on the vigilance of those who nurture it.



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



A PWD Water Resources Specialist inspects a construction project in the shoreland zone.

This edition of the Sebago Lake Watershed News is the second in a three-part series focusing on Sebago Lake's past, present, and future. You can read about Sebago Lake's past here: www.pwd.org/news/publications.php We hope you will learn more about Sebago Lake's present in the pages that follow and look for predictions for Sebago Lake's future in the next edition of the Watershed News.

Native Plant Spotlight: BLACK-EYED SUSAN (*Rudbeckia hirta*)



Photo Credit: Colin Holme



Photo Credit: Bob and Marian Wright



Photo Credit: Colin Holme



Photo Credit: Colin Holme

Size: Low maintenance perennial that grows 2 to 3 ft high with a spread of 1 to 2 ft.

Foliage: Leaves are rough, hairy, and lance shaped. Flowers are yellow to orange-yellow with a dark brown center.

Soil conditions: Prefers dry to medium wet, well-drained soil but is tolerant of heat, drought and a wide range of soils.

Light: Full sun to part shade.

Zones: 3-9

Black-eyed Susans are lake-friendly, low-maintenance, and a great addition to a garden to attract butterflies!

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



WATER WATCH

The Streams that Feed Sebago Lake

By Nate Whalen

Mesh bags filled with rocks are deployed in the rivers in August.

Most of the water in Sebago Lake comes from rain pouring and snow melting over the land uphill. Water concentrates in valleys where the land is low and streams are formed. Many aquatic species depend on these streams to complete their natural cycle of life. Salmon swim up the Crooked River to spawn in the fall. Rainbow Smelt travel into the streams just after ice out to spawn. Aquatic insects spend most of their life cycle in the streams as larva. We know the streams feeding Sebago Lake are healthy because the District studies the aquatic insects that live there.

Every year we collect, count, and identify the insect larvae that live in the Crooked River, the Muddy River, and the Northwest River. The number and type of insects found in these streams tells us how healthy the streams are. Some insects require clean, cool water with lots of oxygen, while others can tolerate less clean water. We compare the insects we find in the streams that feed Sebago Lake with those found in natural, undisturbed watershed streams across the state. The good news is that each year, we find the types of insects that can only live in clean water. If there is any cause for concern,

it is that sometimes we find more insects in the southern portion of the Crooked River than any other place upstream. The presence of more bugs can mean more food, or nutrients such as phosphorus, is present upstream.

An increase in nutrients in the Crooked River is not good for the lake because it can lead to more algae and other water quality problems. While the Crooked River remains healthy, the fact that sometimes we find more insects in the southern portion is a reminder that we need to be vigilant in protecting Maine's most important natural resource. For more information on the bugs that live in the Sebago Lake watershed see http://www.pwd.org/pdf/Reports/Tributary_biological_monitoring_through_2009.pdf



The bags are collected after spending one month in the river.



The insects that colonized the bags are collected and identified.



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

Sebago Lake Conservation Project Update

By Heather True

The second phase of the Sebago Lake Conservation Project begins in 2013. The goal of the project is to install conservation practices that reduce erosion and polluted runoff at 11 high priority sites in the towns of Standish and Frye Island. Once the project is completed, it is estimated that over 40 tons of sediment (carrying 35 pounds of phosphorus) will be prevented from entering Sebago Lake each year. The first phase, completed in 2011, addressed 12 sites in the towns of Naples and Sebago and the intent is to apply for future grants to solve erosion problems in all of the towns that border Sebago Lake. To date, work has been completed on Frye Island where both the ferry landing and Beach #3 had direct flow of stormwater runoff to the lake. The ferry landing was graded to direct runoff into a newly stabilized ditch and plunge pool. At Beach #3 strategically placed stone berms and erosion control mulch were installed to re-direct and infiltrate runoff. On Frye Island, two other public beaches and Sunset Road will have conservation



Erosion site improved with native plants, erosion control mulch, and strategically placed large rocks

practices installed in 2013. Sites slated to be addressed in Standish in 2013 include: Sucker Brook Road, Perimeter Avenue, Lakeview Lane North, Chadbourne's Landing, Maine Avenue, and, possibly, Checkerberry Lane.

In addition to fixing these erosion sites, free technical assistance will be provided through PWD's Lakescaping Program and targeted workshops will be held offering information on water quality protection approaches.

This project is being managed by Cumberland County Soil and Water Conservation District. For more information, or to set up a free site visit, contact Heather True at (207) 892-4700 or htrue@cumberlandswcd.org



Heather True is a project manager at the Cumberland County Soil and Water Conservation District. She can be reached at htrue@cumberlandswcd.org

Nurturing Sebago through Shoreland Zoning

By Kirsten Ness

Confused about Shoreland Zoning Regulations? We can help. Contact us at sebagolake@pwd.org to ask questions or set up a free site visit. Our SLZ-certified water resources specialists can guide you through the process.

Sebago Lake has many natural characteristics that make it a high quality lake, but it must be continually cared for and nurtured to help maintain that high quality for future generations. One way that Sebago Lake is nurtured is through the creation of Shoreland Zoning Regulations (SLZ). In part, these regulations help prevent pollution, protect buildings and lands from flooding and accelerated erosion, and conserve natural beauty and open space.

Administered by surrounding towns, SLZ ordinances govern activities within 250 feet of lakes in Maine. SLZ sets limits for the size of structures, protects the number of trees, and limits the size of impervious (hard) surfaces that are close to the lake. From the lake's perspective, these are all positive things because they help to limit



All projects that disturb soil within the shoreland zone must use temporary erosion control measures such as the silt fence and hay mulch shown here. All disturbed soil must be permanently stabilized upon project completion.

unwanted pollutants that enter the lake due to development. Trees and shrubs filter and treat runoff and stabilize soil along the shorefront, which helps to keep the water quality of Sebago Lake high. Excellent water quality keeps property values high and promotes recreation, which supports local economies.

Because District staff is certified in SLZ and works closely with Code Enforcement Officers, they can help shorefront property owners understand the regulations as they relate to activities on their property. For example, if a construction project requires a re-vegetation plan, District staff can help the homeowner put together a plan that will not only visually enhance the shorefront but will also stabilize the soils and prevent pollution of the lake. Please help nurture one of Maine's most important natural resources by observing your town's shoreland zoning ordinance.



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

What's Making Waves Around Sebago Lake?

By Chad Thompson

PWD Contributes to a Second Conservation Easement by Bart and Mary Ann Hague

The District awarded Bart and Mary Ann Hague of Waterford a contribution toward the cost of placing a conservation easement on their 88 acre farmstead. The Hague easement links two parcels previously conserved by the Hagues to create a conservation corridor of 460 acres with 1.5 miles of frontage on the Crooked River and 1,900 feet of frontage on McWain Pond. Contact sebagolake@pwd.org for information on a possible PWD contribution to your conservation easement in the Sebago Lake watershed.



The Hague Farmstead

Battling Milfoil on the Songo with Sights set on Sebago Lake

During the 2012 season, the Lakes Environmental Association (LEA) continued their work to control milfoil on the Songo River. Using a combination of hand removal, benthic barriers, and suction harvesting, the infestation on the north side of the Songo Lock has nearly been eliminated. After six seasons of plant removal, only a few spots still see seasonal regrowth. The lower river and the Sebago Lake State Park boat launch were the focus of the 2012 season. The LEA crew laid sixty 20'x30' benthic barriers on dense patches in the navigation channel to augment the suction harvesting effort.

LEA's plans for battling milfoil on Sebago Lake are in the early development stage. They are currently working to create an invasive plant managers'



LEA's Daniel Bishop and Christian Oren remove milfoil from the Songo River at the State Park Boat Launch

coalition consisting of local work groups to manage infestations on a cove-by-cove basis. LEA's role in the project will be to train the managers in plant control methods and assist with capacity building. LEA plans to host a Sebago Lake Summit on January 25th at 6:00 PM with St. Joseph's College as a tentative location.

Town of Casco Welcomes New CEO and New Shoreland Zone Permit

The Town of Casco welcomed its new Code Enforcement Officer (CEO), Donald Murphy, after the retirement last March of longtime CEO Elwin Thorpe. Murphy has previously held positions as a CEO in Bethel and Newry as well as a variety of other positions such as mason contractor, wetland scientist, and Maine Intern Forester. Recently, Murphy implemented new Shoreland Zone permits for activities in the shoreland zone such as tree cutting, dock installation, shed construction, and shoreline stabilization. The goal of the new permitting process is to educate homeowners about SLZ rules so that the environment is protected and violations do not occur. Permits are designed to be user-friendly and the application will be added to the Town's website www.cascomaine.org for easy use. Murphy sees educating homeowners as one of his main responsibilities and encourages anyone with questions to contact him at the Town Office at (207) 627-4298.

New Code Enforcement Officer in Naples

With the departure of Code Enforcement Officer Boni Rickett, the Town of Naples is welcoming seasoned code enforcement officer Renee Carter to the position. Renee has decades of experience in the field, mostly recently with the Town of Windham. She also serves as one of the directors of the Maine Building Officials and Inspectors Association (MBOIA). Among other initiatives, Renee plans to hold several ordinance workshops for builders, contractors, and homeowners, and she looks forward to helping people understand the ordinances and the reasons why the ordinances are important.

New Full-time Game Warden Position for Sebago Lake in 2013

The Maine Inland Fisheries and Wildlife Department has approved a 12-month game warden position on Sebago Lake. Game Warden Mike Pierre will be assigned to Sebago Lake for next year's fishing and boating season. Typical game warden duties include monitoring fishing and hunting activities as well as ensuring adherence to Maine boating laws and helping to prevent the spread of invasive aquatic plants.

Shoreland Zoning Training Opportunities

Two training opportunities for contractors and interested homeowners will be offered at the Naples Town Office. A **Contractor Certification in Erosion Control Practices Training** will be held on January 24th. As of January 1, 2013 all contractors who disturb soil in the shoreland zone must be state certified. A **Basics of Shoreland Zoning Workshop** will be held on April 30th. To register, contact Renee Carter or Barbara Beckwith at 207-693-6364.



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

Winter at the Sebago Lake Ecology Center



Photo Credit: Heather Neary

KidsVille News!

New to Cumberland County, Kidsville News is a monthly family newspaper and educational resource to promote literacy, health, anti-bullying, success in school, and environmental awareness. Portland Water District is sponsoring monthly water and watershed information; look for it in schools, libraries, and online at www.kidsvillenews.com.



Drinking Water Week

Watch for announcements of events planned for the Sebago Lake Ecology Center during National Drinking Water Week, May 5-11, 2013. Typically, we schedule presentations on Vernal Pools, loons, guided nature hikes, and others.

PWD Blog

Visit our blog at <http://sebagoreflexions.wordpress.com> for recent posts by guest blogger and PWD educator Megh Rounds.

Images of Sebago Lake 2013 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 2013 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 or to submit your photos contact sebagolake@pwd.org.



Little Lake Stewards

Little Lake Stewards Story Time

2013 Schedule

Please join us at the Sebago Lake Ecology Center for Little Lake Stewards Story Time for stories, games, snacks, and crafts!

January 18	Winter Water Fun
February 22	Move Like an Animal
March 22	No Place Like Home
April 19	Here Comes the Sun
10 a.m. - noon	

**Please preregister for story time. A donation of \$2 per session is requested, to support local loon preservation. Scholarships are available!*

sebagolake@pwd.org

A Forested Watershed Keeps Sebago Clean

By Laurel Jackson

In order to serve unfiltered water, PWD must test the water in Sebago Lake for bacteria to make sure that 90% of samples are below a level of 20 units of bacteria. Over 250 samples are analyzed per year, and not only do they consistently meet the legal level, but almost 100% of samples are less than 2 units! That is over ten times lower than required!

One of the main reasons why the water quality is excellent is that the watershed is predominantly forest. According to analysis conducted on aerial photos, 81% of the Sebago Lake watershed is forested. Forests produce great water quality because they have multiple ways of stopping pollutants from getting into water bodies. First, the forest canopy slows rainfall which prevents large surges of rainwater from eroding soil and carrying it to the lake or to tributaries that feed the lake. Water that lands on the forest floor is absorbed by the leaf litter layer and infiltrated into the ground where it is taken up by the roots of trees and other plants in the forest. By contrast, developed landscapes with hard, smooth surfaces like roads, parking lots, roof tops, and driveways, add toxins and bacteria to water, speed up runoff, and cause soil erosion. As you can see, forests naturally provide clean water.

In addition to being highly forested, the Sebago Lake watershed is also mostly privately owned. It is because these landowners choose to maintain healthy forests instead of building shopping centers that we all enjoy a clean Sebago Lake. Studies have shown that lake water quality begins to show signs of decline when watersheds drop below 75-80% forest. You can see that with 81% forest, the Sebago Lake watershed is near that tipping point where any further loss of forest could affect water quality. This is why it is so important that forested land in the watershed be maintained. If landowners are interested in conserving forested land for future generations, a conservation easement is an excellent tool for doing so. Your local land trust can provide you with more information on how conservation easements work. Preserving forested land in the Sebago Lake watershed is vital to maintaining good water quality in its rivers and streams and ultimately, the lake. Contact the Portland Water District at sebagolake@pwd.org to see if your land qualifies for a District contribution to your conservation easement.



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

Photo Credit: Terry E. Augustyn



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