

SEBAGO LAKE

WATERSHED NEWS

FALL 2009

Photo by George Case

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The Forest Is The Future

BY PAUL HUNT

Ask any Mainer why he or she lives here and “I love the woods” is likely to be near the top of the list. We value the Maine woods to hike, hunt, ski, and ride. We look forward to the color explosion of fall foliage. And we also know that those same woods provide many jobs. These are clean jobs utilizing a renewable resource iconic of our Pine Tree State. The Maine woods are part of our legacy and our identity.

Here Is Another Good Reason To Love The Maine Woods: CLEAN WATER

Every year more than 40 inches of water rains down on our state. Of that water, about half runs off to streams or rivers, lakes and ponds, and eventually to the ocean. Another 30 percent or so evaporates during that journey. The remaining 20 percent soaks into the ground, replenishing our groundwater aquifers. Eventually, even that groundwater flows out of the ground into rivers and lakes.

The Connection: FOREST TO FAUCET

Forests act like great sponges, slowing and soaking up water as it travels over the land, ensuring that water reaches the groundwater. Even the water that doesn't soak into the ground is cleaned as it travels the forest floor to the nearest stream or lake. Forests are instrumental in nature's water treatment process, and when we convert forests to other uses, like residential housing, we diminish the land's ability to soak up and clean the water. To learn more about this process, read the article titled, *Why Forests Provide The Best Protection* on page 2.



The Way Life Should Be

The good news is that Maine is the most forested state in the country. In fact, according to the US Forest Service, we have more forest in Maine now than we did in 1900, when Maine hosted many, many more small farms than it does today. So even as our population doubled in the past century, the number of acres of forest per Maine resident stayed about the same (35 acres per person). **CONTINUED ON PAGE 3**

How Much Forest Is Enough?

BY BRIE A. HOLME

How much forested watershed does a lake need? More than 75 – 80 percent forested, according to a study of 23 lakes in Connecticut by Peter A. Siver and others. The study looked at how water chemistry changed over the past 100 years and how those changes correlated with land use changes in the lake watersheds. The authors took sediment cores from the lake bottoms and analyzed the remains of algae and plankton. They used their findings to infer changes in water chemistry such as pH, conductivity, trophic state, and nitrogen. When sediment cores were compared to land use changes observed through aerial photos, the study found changes in water quality occurred when forested land declined to 75 to 80 percent. **CONTINUED ON PAGE 3**

Why Forests Provide The Best Protection Of Water Resources And Public Health

BY PAUL K. BARTEN, PH.D.

Adapted from a 2006 article in New England Forests, New England Forestry Foundation



Forests are remarkably efficient, solar-powered living filters. Comparing the hydrologic characteristics of forests and developed areas highlights the subtle differences in vegetation, soil properties, and pathways of water flow that lead to substantial differences in streamflow and water quality. In forests, rain tumbles through the canopy of trees and shrubs, then herbaceous plants such as ferns, before reaching the litter layer. Renewed by annual additions of leaves, twigs, and branches, the litter layer is a natural mulch that limits evaporation, a shock absorber that protects soil pores, an insulator that inhibits soil freezing, and a source of nutrients to foster more plant growth and site protection. The underlying organic, mixed, and mineral layers in forest soils can store and transmit large quantities of water. This water storage capacity and permeability occasionally exceeded by hurricanes or rain-on-snow events is developed over centuries by microbes, insects, earthworms, burrowing animals, and the deep root systems of trees and shrubs. As a result of these ecological characteristics, overland flow and soil erosion are rarely, if ever, observed in forest ecosystems.

In contrast, roofs and paved (impervious) surfaces in developed areas convert rain or snowmelt immediately and directly to stormwater.

Ornamental trees, shrubs, and gardens cast some shade, intercept and use some water, and recycle nutrients in imitation of forests. Lawns also use water and nutrients but typically require irrigation, fertilizers, and pesticides to maintain the characteristics that most people desire. Mowers leave clippings to form a thatch layer that, while helpful, is a poor substitute for the litter layer in forests. Last but not least, the earthwork for most construction projects decreases the ability of the soil to store and transmit water. Topsoil (a jumbled mixture of the original forest soil layers) is bulldozed into piles before the subsoil is used for “cut and fill.” The topsoil is spread back over the site and seeded to grass as the last step. The weight and vibration of the heavy machinery causes soil compaction that often inhibits drainage and root growth. Water-logged soils in developed areas are subject to freezing, which can temporarily reduce their permeability to zero. The combined effect of these changes can make overland flow and soil erosion commonplace events.

In sum, when forests are converted to residential, commercial, or industrial land uses, high flows increase, low flows decrease (...or go to zero), and the response time to rain or snowmelt is much more rapid. These changes in streamflow and water quality

largely occur because water that once flowed through the leaf litter and forest soils now flows over compacted soils and impervious surfaces. Overland flow lifts and carries soil particles, nutrients, and other pollutants (e.g., pet waste, motor oil, metals, etc.) downstream – to public water supply intakes, recreation areas, and estuaries. Subsurface flow that once took days or weeks (even months) in forests is replaced by overland flow that occurs in minutes or hours. This reduces the contact time with plants, soil microbes, and organic matter and the opportunity for what’s left of the forest filter to work on our behalf. Converting of forest land to developed areas replaces a stormwater and pollutant sink with a stormwater and pollutant source. This is the two-edged sword of sprawl. Keep it in the scabbard with common sense planning and forest conservation.



Dr. Barten is an Associate Professor of Forest Resources, University of Massachusetts Amherst, www.forest-to-faucet.org.



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The Portland Water District commissioned a study of land uses in the Sebago Lake watershed. Aerial photos revealed that the Sebago Lake watershed was 81.5 percent forested in 2001 and that 4 percent of the forest was lost to development between 1991 and 2001. At 81.5 percent forested, the Sebago Lake watershed is just above the level at which the authors of the Connecticut study saw changes in water quality. If the rate of development that occurred from 1991 to 2001 continues, we can expect the forested portion of the watershed to drop to 75 percent in 10 or 15 years – the point where the study found noticeable declines in water quality.

Siver, P.A., A.M. Lott, E. Cash, J. Moss, and L.J. Marsicano. 1999. Century changes in Connecticut, U.S.A., lakes as inferred from siliceous algal remains and their relationships to land-use change. Limnology and Oceanography 44: 1928-1935

An Easement Is Forever

Consider placing your Sebago Lake watershed land in a conservation easement to ensure that it will remain undeveloped, protecting the water quality of local water resources and Sebago Lake for generations to come. To learn more about the benefits of conservation easements and PWD funds available to help Sebago Lake watershed landowners acquire conservation easements, contact us at sebagolake@pwd.org.



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

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The Forest IS the Future

According to a recent report entitled “Forests, Water and People,” there is concern for the future of Sebago Lake. This study is the work of the US Forest Service and the University of Massachusetts at Amherst. The watershed that provides water to Sebago Lake and the Presumpscot River exists in a precarious state. It is able to produce very clean water today because it is mostly forested. This is important because many of us (one in six Maine residents) rely on Sebago Lake for drinking water. However, almost all of that forest, which cleans our water, is privately owned and could be developed into houses, stores, roads, etc. If this happens to a great extent, it will show up in the quality of water in Sebago Lake as well as the rivers and streams that feed the lake. You can find a link to the full report on our web site, www.pwd.org.

The US Forest Service report points out that Maine woods are not just enjoyable and beautiful, they are a critical resource that provide an ecological benefit or “service” to all of us. We all win if our woods stay wooded, and we all will pay an enormous price if they don’t. Should Maine adopt laws, regulations, and policies that make it more likely that the land stays wooded? That would seem to be in all our best interest. But just how to do so is a complicated question that should be answered by concerned citizens and local and state policy makers.



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

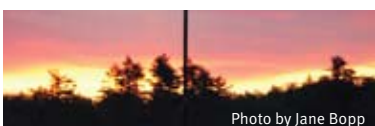


Photo by Jane Bopp

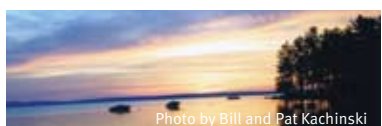


Photo by Bill and Pat Kachinski

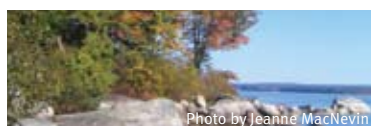


Photo by Jeanne MacNevin

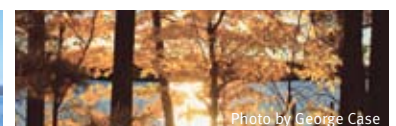


Photo by George Case

NATIVE PLANT SPOTLIGHT

Sheep Laurel or Lambkill

Kalmia angustifolia

Size: Grows 1 to 3 feet high with a greater spread.

Foliage: Evergreen shrub with blue-green, elliptical shaped leaves. Bright pink flowers bloom in early summer.

Soil Conditions: Grows best in moist, organic, cool, acidic soils but can tolerate a variety of soil types.

Light: Prefers full sun to partial shade.

Notes: As the name suggests, it is poisonous to livestock.

Zones: 1 - 6

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



Photo by Beth Kus

IMAGES OF SEBAGO LAKE 2010 CALENDAR WILL BE AVAILABLE SOON

The 2010 Images of Sebago Lake Calendar will be available after Thanksgiving. The calendar features dramatic images of Sebago Lake from amateur photographers who have captured the many moods of Maine's second largest lake.

A copy of Images of Sebago Lake 2010 can be obtained by visiting the Sebago Lake Ecology Center in Standish or PWD's Portland offices at 225 Douglass Street. Because supplies are very limited, visitors will be allowed only one calendar. For more information, contact sebagolake@pwd.org.

It's not too early to think about the 2011 calendar. Keep your camera ready; Sebago Lake offers many opportunities for that perfect shot!

Sappi Announces Intentions To Lower Lake This Fall

On October 2, Sappi Fine Paper North America announced that this fall the level of Sebago Lake will be lowered in accordance with the Sebago Lake Level Management Plan. Sappi operates the Eel Weir Dam which controls the outlet of Sebago Lake.

The Sebago Lake Level Management Plan requires that the lake occasionally reach a level of at least one and one half feet below the normal fall levels to promote restoration of beaches. Sappi will begin lowering the lake level in October and plans to reach this target by the end of November.

Sappi asks boaters who utilize Sebago Lake marinas to contact their marina to ensure their boats will be removed prior to the low level being reached. If boat owners do not take action, it is possible that some larger boats will be stranded on the lake.

For more information, contact Tom Howard with Sappi at 856-4286 or tom.howard@sappi.com

How's Your Duff? BY CHAD THOMPSON

Worried about erosion? Learn five easy steps to help your property stay put.

As described in Dr. Barten's article on page 2, the layer of leaves, sticks, and other forest debris, known as the "litter layer" or "duff layer," is a critical element of your property's ability to absorb and treat water and pollution. The duff layer acts as a sponge, absorbing large amounts of water. Slow percolation and microbial activity in the duff layer removes lake-polluting sediments and allows water to slowly infiltrate into the groundwater, preventing erosion.

Though the duff layer next to the lake cannot legally be removed under current shoreland zoning law, many shorefront property owners removed this layer years ago to "clean up" their yard, leaving bare soil or planting grass. When the duff layer is removed, the exposed soil often becomes compacted due to the pounding of precipitation and foot traffic. Compacted soil can not absorb and treat runoff.

Although you may not notice streams of runoff, *sheet flow* could be causing your property to erode. Sheet flow is a thin, continuous film of water that flows down relatively smooth soil and is difficult to see.

The best way to see if your property is experiencing sheet flow erosion is to evaluate areas where the duff layer has been removed. Here are five easy steps to identify and correct problem areas.



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



1. Look for areas of exposed, compacted soil and rocks or tree roots that were once covered with soil but now protrude from the surface of the ground. These are the areas of greatest concern.



2. Identify areas of traditional use such as sitting areas and footpaths. Consider consolidating these areas to only what is needed for the use. Attractive and functional options include laying down mulch to define a sitting area and bordering it with logs or timbers. Define paths with mulch and plantings.



3. Identify areas where the duff layer can be restored by simply ending the practice of raking leaves and removing small forest debris. Allow the duff layer and natural vegetation to re-accumulate over time.

4. Consider planting the area with native groundcover plants such as lowbush blueberry, a low growth juniper, bearberry, or wintergreen. To see some attractive options, view the Conservation Practices for Homeowners Fact Sheets at www.pwd.org/news/publications.php



5. If a forest duff layer in the bare area is too unpleasant for you to bear, rent a chipper/mulcher from your local rental center each fall. Simply mulch the leaves and chip the sticks and branches to create your own natural mulch, or spread at least 6 inches of Superhumus or other commercially available erosion control mulch over the area.



For a free consultation and recommendations on how to make your property more lake friendly, contact us at sebagolake@pwd.org or 774-5961 x3375.

WHAT'S MAKING WAVES AROUND SEBAGO LAKE?

BY ROGER PARADIS



Photo by James Drake

THINK SPRING



PWD will once again be selling rain barrels in the spring of 2010. Rain barrels are a great way to make use of roof runoff to water your gardens, indoor plants, and lawns. If you would like to be added to the list to be contacted when details become available, please email sebagolake@pwd.org.

PERMEABLE PAVERS: A NEW ADDITION AT THE SEBAGO LAKE ECOLOGY CENTER

Looking for an attractive, lake-friendly alternative to pavement or gravel? Visit the Sebago Lake Ecology Center to see what permeable pavers look like installed and learn how they work. Stormwater Brick, generously donated by Genest Landscape and Masonry in Windham, is the newest addition to the Ecology Center's Pervious Pathway. The pavers keep polluted stormwater runoff from entering our streams and lakes by allowing 100% infiltration. Visit www.genestconcrete.com to learn more about permeable pavers.



MORE PIKE SURFACING IN SEBAGO LAKES REGION

Northern Pike have been caught in the Sebago Lake Region for the past several years. A 25 lb. pike was caught by a local angler on Panther Run this summer and many more were reported in the region. Pike were introduced within the last ten years and now appear to be thriving. This invasive species poses a threat to existing fisheries. Anglers are encouraged by the Department of Inland Fisheries and Wildlife to catch as many pike as they can as long as they don't release any.



ARE YOU AN ICE SEASON ENTHUSIAST?

Before we know it, ice fishing season will be here. Sebago Lake is a source of drinking water for nearly 200,000 residents and anything left on the ice in the winter will melt into the drinking water supply in the spring. Please help keep the lake clean by carrying out all trash and equipment, and use designated restroom facilities.

LOOK WHAT'S IN STORE FOR THE CROOKED RIVER!

The American Forest Foundation (AFF), the Western Foothills Land Trust in Norway, and their partners were recently awarded a \$500,000 grant by the US Department of Agriculture to preserve forests that make up the Crooked River watershed, including parts of Naples, Waterford, Greenwood, Norway, Casco, Otisfield, Harrison, Albany, Stoneham, and Bethel.

NEW BLOG REFLECTS ON SEBAGO LAKE

Sebago Reflections is a newly developed blog written by PWD environmental education coordinator, Lynne Richard. She recently posted her first entry and invites you to join in on the conversation about Sebago. Subscribe online at www.pwd.org.



Roger Paradis is a water resources specialist at the Portland Water District. He can be reached at rparadis@pwd.org.

WATER WATCH



BY NATE WHALEN

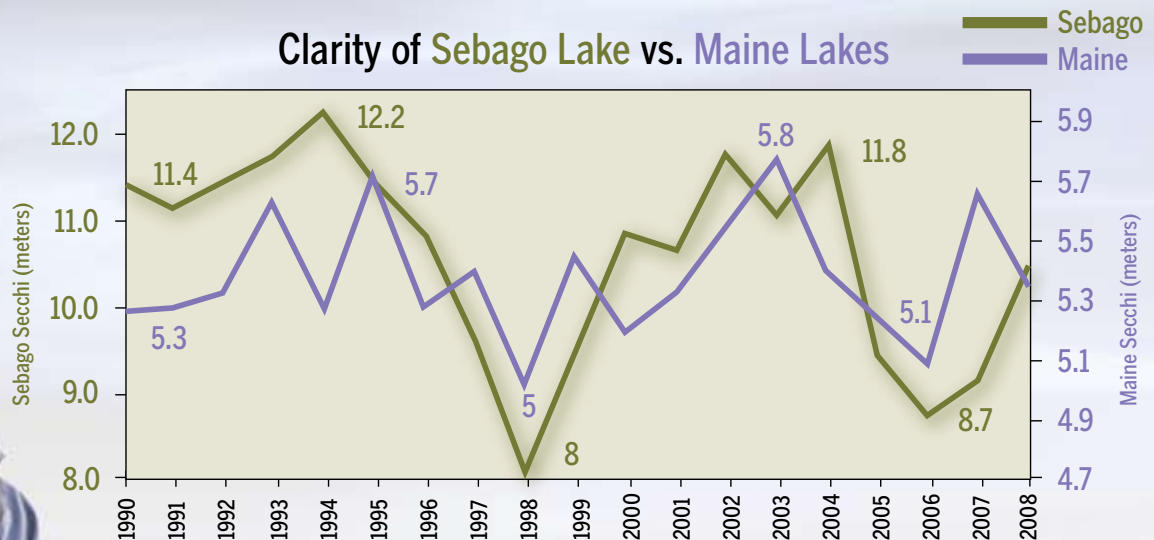
The Portland Water District has seen water clarity decline in Sebago Lake since 1990. While this trend is discouraging, Sebago Lake is not alone. Clarity patterns throughout Maine suggest there is a larger scale phenomenon. Data collected across the state by certified Volunteer Lake Monitors show statewide trends similar to those of Sebago Lake. Unfortunately, we do not have scientifically valid data prior to 1990, so a longer term evaluation is difficult.

Sebago Lake has an average clarity of 10 meters, while the average of all Maine lakes is 5 meters.

Lakes naturally have different levels of clarity. A shallow, weedy lake is generally less clear than a deep, sandy bottom lake, like Sebago. Water clarity ebbs and flows, like most things naturally do. Human development, climate conditions, ecological interactions and numerous other factors can affect clarity. Data from across Maine suggest the same general factors that occur in Sebago are occurring throughout the state.



Clarity of Sebago Lake vs. Maine Lakes



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



TAKE A HIKE SERIES



Wander and Wonder

Join PWD environmental educators for interpretive hikes on trails surrounding the Sebago Lake Ecology Center in Standish.

November 23

January 25

March 22

Hikes will run 10:00 a.m. to noon. Hot chocolate will follow!

Registration is **REQUIRED** and is open to those age 16 or older.

There is a \$5.00 registration fee that will contribute to an effort to Adopt-A-Loon from the BioDiversity Research Institute in Gorham, Maine. Scholarships are available.

Nature Kids

Join PWD environmental educators at the Sebago Lake Ecology Center for a themed hike and craft activity!

Frozen Forest

December 29

December 30

Winter Woods

February 16

February 18

Signs of Spring

April 20

April 22



Sessions will run from 9:00 a.m. to noon.

Sessions are open to 4th-6th graders. Each of the three hikes will occur twice. Registration is **REQUIRED** and group size is limited to 10 kids. A \$5.00 registration fee includes a snack and all craft materials and will contribute to an effort to Adopt-A-Loon from the BioDiversity Research Institute in Gorham, Maine. Scholarships are available.

To register, or for more information, please contact:

sebagolake@pwd.org | 207.774.5961 x 3319