

# SEBAGO LAKE

## WATERSHED NEWS

WINTER 2017

Photo by John Stetson

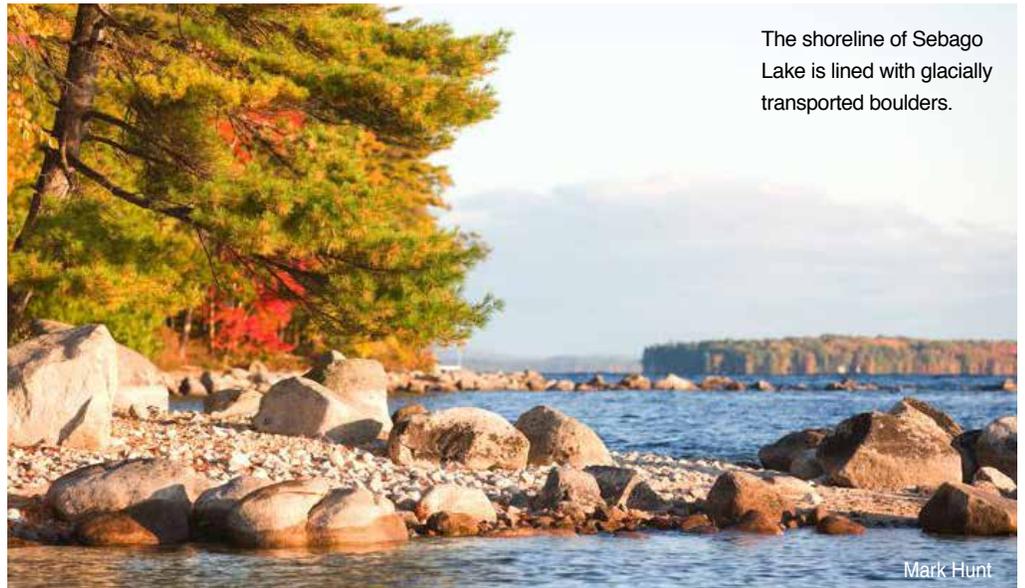
Portland Water District • 225 Douglass Street • Portland, Maine 04104-3553 • 207.761.8310 • [www.pwd.org](http://www.pwd.org)



All of us have been to Sebago Lake and swam in it, floated on it, photographed it, fished it, or just stood next to it and stared. Maine has thousands of clean, beautiful, and interesting lakes. Trying to choose “the best” is like trying to rank our children – all are special and none is the favorite. We love and care for them all equally. Better to just talk about each one and what makes him or her special.

Sebago Lake is certainly that – special. It also has a lot of “mosts” and “firsts” to its credit. If anyone asks you to tell them more about what makes Sebago Lake special, here are some things you can talk about.

## A Lake Like No Other



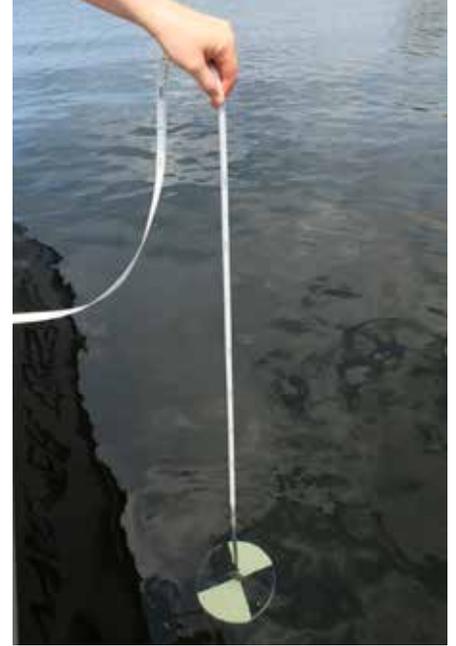
The shoreline of Sebago Lake is lined with glacially transported boulders.

Mark Hunt

### IT WAS CREATED BY GLACIAL ICE

About 15,000 years ago, much of what we now call Maine was covered by glacial ice. The area that now includes Sebago Lake was under about a mile of ice. For centuries the movements of that ice scraped, carved, and scratched the surface of underlying bedrock. The ice carried along millions of tons of crushed up rock in

the form of silt, sand, and gravel – glacial sediment. As the Earth warmed the ice melted and retreated, leaving behind the smoothed and gouged bedrock covered in some places by hundreds of feet of that glacial sediment that the ice had been carrying. When piled in a deposit this sediment is called till. Sebago Lake sits in a very low spot in that bedrock surface where the rock – mostly granite - was more easily gouged out by the movement of ice. Beneath and around the lake are deposits of till. Till is all over Maine and is easily recognized by the presence of large rounded boulders mixed in with the finer-grained sediments. The stone walls that are found all over Maine were piled there by farmers frustrated by trying to plow in all that bouldery glacial till.



On a typical day on Sebago Lake, a Secchi disk can still be seen more than 30 feet below the lake surface.

Photos by Mark Hunt

Sebago Lake is the deepest lake in Maine – more than 300 feet deep in Big Bay – meaning the bottom of the lake is almost 50 feet lower than sea level. But the true depth of the ice-carved valley that holds the lake is much deeper. The Maine Geological Survey<sup>1</sup> used a method known as seismic reflection profiling to determine the depth of sediment on the floor of the lake. In Big Bay there is as much as 160 feet of sediment piled on top of the bedrock – meaning the true bottom of the bedrock valley that holds the lake is more than 450 feet below the lake’s surface.

### IT HOLDS A LOT OF WATER

Sebago Lake holds a lot of water – almost more than you can imagine. The lake covers an area of almost 30,000 acres. It has an average depth of about 100 feet. If you multiply the area of the lake by its depth you get a volume and that’s how much water the lake holds. When you convert that to gallons you get almost a trillion! That’s a hard number to grasp so think of it this way: the Portland Water District supplies the water needs of eleven Greater Portland communities – about 200,000 people – by drawing about eight billion gallons of water from the lake each year. Since the lake holds more than eight HUNDRED billion gallons, there is enough water in the lake today to meet the present day demand for more than 100 years. Surely there are cities in the western United States that would feel fortunate to have just 5 years of water in storage.

### IT’S VERY CLEAN

Sebago Lake is one of the cleanest lakes in Maine. In fact, it’s one of the cleanest lakes in the United States. How do we know this? There are many different tests that can be used to evaluate water quality. A few easy to understand measures show Sebago Lake is of exceptional quality. These include:

**Transparency:** Anyone would agree that water that is more transparent is more desirable. Who wants to drink murky water? A standard test done to compare lakes is to measure their transparency with a Secchi disk. The disk is lowered into the water and you record the depth at which it can no longer be seen – the deeper the better. Sebago Lake has an average transparency of about 34 feet. A typical Maine lake has a transparency of about half that and only a rare few have a greater transparency than Sebago Lake. And, as you might guess, the transparency of Maine lakes is generally much greater than that of lakes in other states,<sup>2</sup> so being one of the clearest lakes in a state full of very clear lakes makes Sebago Lake exceptional.

**Bacteria:** Many large water suppliers test their untreated water each day for a type of bacteria known as fecal coliform bacteria. Because a lake is natural, home to birds and animals, and usually includes swimming and other forms of human recreation, none is free of fecal coliform bacteria. But as lakes get overused and polluted, the amount of fecal coliform bacteria increases. Thus the federal Safe Drinking Water Act (SDWA) requires that 90% of the samples tested have fewer than 20 colonies of fecal coliform bacteria (this is in raw water – before treatment). We have run this test on Sebago Lake water more than 5,000 times in 20 years. Since 90% of samples

must be below 20 colonies we could have had as many as 500 samples higher than that and still meet the federal standard.

In 20 years we have had just two samples with more than 20 colonies.

**Filtration:** Almost every surface water body (lake or river) in the country that is used for drinking water must be filtered before treatment and use. This is because surface water usually has enough sediment and algae suspended in the water that it would interfere with proper treatment. But the SDWA allows a utility to avoid filtration if the water is clean enough. Of the 13,000 surface water supplies in the United States, only about 50 have been allowed to avoid filtration. Sebago Lake is one of them.

Sebago Lake is deeper than any lake in Maine, cleaner than most in the country, and holds enough water to meet our needs for a century. The lake is precious and one of the state’s most important natural resources. Caring for the lake in the way proud parents care for a precious child is something we owe to future generations.

<sup>1</sup> *Why is Sebago Lake so Deep?* R. Johnson, 1999, Geological Site of the Month, Maine Geological Survey.

<sup>2</sup> *Regional Distribution of Secchi Disk Transparency in Waters of the United States.* Stephens et al., 2015, Lake and Reservoir Management 31.



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



# Sebago Lakescaping

Photos by Mark Hunt

By Nate Whalen



Nate Whalen is a water resources specialist at the Portland Water District. He can be reached at [nwhalen@pwd.org](mailto:nwhalen@pwd.org)

Have you thought about landscaping your waterfront property? Landscaping looks nice, improves property value, and can be done to protect the lake. Portland Water District's Lakescaping program offers free site visits and reports to waterfront landowners on Sebago Lake and some of its tributaries. Private landowners may be eligible for a matching grant of up to \$1,000 and associations, municipalities, businesses, or other groups may be eligible for a matching grant of up to \$2,000.

We meet landowners on their property to discuss ways to improve their property and protect the lake at the same time. The recommendations focus on how water flows across the property. Does rain water fall off your roof and splash up mud? Do gullies appear after heavy rain storms? These are some of the situations that we like to prevent. Controlling water flow is important. Planting vegetation to absorb the water is important too. Recommendations include which trees, shrubs, and flowers to plant.

Vegetation acts like a sponge to absorb and filter runoff. "Rain gardens" can be excellent ways to absorb water. They can add a lot of color to your property and be designed to attract butterflies and other wildlife.

Did you know there are ways to improve lake views that won't harm the lake or violate environmental laws? We can show you pruning techniques, how to do selective thinning, and how to create shrub and ground cover layers -- all strategies to create a window frame lake view.

If you would like some ideas on how to improve your lakefront property, contact us at [Sebagolake@pwd.org](mailto:Sebagolake@pwd.org) to be placed on a list for a spring site visit!



## Water Connections Events

### JOIN US IN 2017

In 2017 the Portland Water District will offer seasonal recreational events that connect Sebago Lake watershed residents and our customers to the resources that affect the lake's water quality. Past popular events that may be offered again include snowshoeing, cross country skiing, hiking, and kayaking. Each event will inform participants of one of PWD's programs, policies, or philosophies while visiting one of the many trails, forests, mountains, or rivers that influence Sebago Lake.



To learn more about these upcoming events, follow us on Facebook [facebook.com/MyPortlandWater](https://www.facebook.com/MyPortlandWater) and join our email list (email [sebagolake@pwd.org](mailto:sebagolake@pwd.org)).



# SEBAGO LAKE

# Believe It or Not!

ARTWORK BY JARED STEVENS



**1.** Sebago Lake holds a trillion gallons of water. If you filled pool water trucks from Sebago Lake - each about 50 feet long and holding about 10,000 gallons - a line of trucks would reach from the Earth to the moon and back . . . twice!



**3.** During the last Ice Age - about 15,000 years ago - much of Maine was under about a mile of ice. The movement of that ice scraped out the depression that is now Sebago Lake.



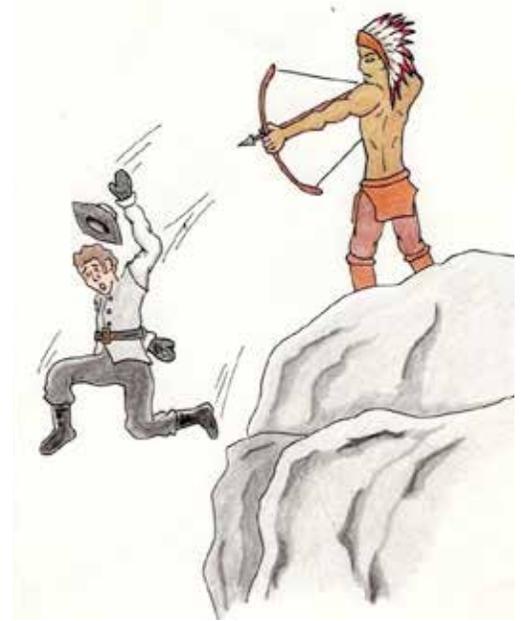
**2.** The Crooked River got its name because of its many bends and oxbows- although it travels across land only 35 miles, the river bed is over 60 miles long!



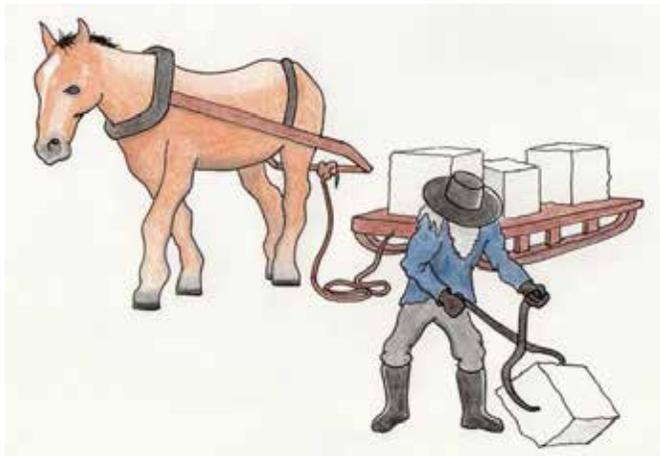
**4.** Although Sebago Lake is the water supply for 200,000 Mainers, most of the lake is open to swimming and recreation. Just 10% (Lower Bay) is designated "No Bodily Contact" by state law.



**5.** During World War II, two Corsair fighter planes collided in midair over Sebago Lake during a training exercise on May 16, 1944. The planes and pilots were never recovered and remain on the bottom of the lake in 200 feet of water.



**7.** English military Captain Joseph Frye explored the Sebago Lake region in the late 1740s. Apparently he was alone one day when he ran into a party of natives who gave chase. Frye soon found himself on a ragged outcrop over the frozen lake and had no choice but to jump. The natives, who were reportedly amazed by this feat, abandoned the chase, and Frye made his escape across the ice to an island. Today the cliff is called Frye's Leap and the island is now the Town of Frye Island. (1)



**6.** Before the invention of the household refrigerator, the Portland Sebago Ice Company cut 500 pound blocks of ice from Lower Bay. The ice was stored in large ice houses and shipped by rail to Portland where it was placed on ships bound for Boston and New York.



**8.** Legends speak of 30+ pound salmon living in Sebago Lake until the 1850s. Modern records of rod and reel catch document a 22 pound salmon being caught off Songo Beach by Edward Blakely of New York City in 1907. (2)

(1) Pat Higgins, "The Maine Story" 2001

(2) Robert G. Jones, "Sebago Lake Land" 1949

# WATER WATCH

## *NEWS from the depths of Sebago Lake*

Photo by Neily Raymond

In a previous edition of the Watershed News, we explained that the District was collecting samples of the sediment at the bottom of Sebago Lake in order to determine how the lake's water quality may be affected by climate change.

A warming climate can lead to a process called phosphorus recycling in lakes. As a lake gets warmer, it provides an even more favorable habitat for algae in the sunlight-filled water at the top of the lake. Algae eventually die and sink to the bottom of the lake where their decomposition uses up oxygen. If the bottom waters in a lake lose all their oxygen, this can release phosphorus from the sediments into the water where algae feed on it. This would be truly a lake catastrophe since that release of phosphorus would occur year after year and the lake would bloom bright green with an explosion of algae. While Sebago Lake water quality remains excellent and the bottom waters consistently have plenty of oxygen, even in late summer, District scientists wanted to find out how likely the bottom sediments will be to release phosphorus as the lake's temperature rises.

According to lake scientists at the Maine Department of Environmental Protection and the University of Maine, bottom sediments with more aluminum than iron are less likely to release phosphorus into the water, even if there is little or no oxygen

in the water. The analysis of the chemical makeup of Sebago's bottom sediments revealed that while they contain slightly more iron than aluminum, there is not a lot of phosphorus present in the sediments. This means that in the case of prolonged anoxia (the absence of oxygen) the sediments would likely release only low levels of phosphorus into the water column. It is important that we keep it that way.

Property owners around Sebago Lake and anywhere in its watershed have an important role to play in preventing phosphorus recycling in Sebago. Phosphorus is found in soil and fertilizer and it can wash into the lake when it rains. You can prevent this by minimizing lawn area, avoiding the use of fertilizer, and by maintaining or planting trees, shrubs, and ground covers along your waterfront to stop soil erosion and to slow and absorb runoff. Maintaining forested land throughout the watershed is key to the protection of the lake, as the forest acts as a natural filter.

Contact PWD at [Sebagolake@pwd.org](mailto:Sebagolake@pwd.org) for a free Lakescaping site visit to learn how to make your lakefront property less likely to erode and more beautiful as well. You may even be eligible for a matching grant for installing measures to prevent soil erosion and to slow down and absorb runoff.

Brie Holme is a water resources specialist at the Portland Water District. She can be reached at [bholme@pwd.org](mailto:bholme@pwd.org)



Water resources specialists Nate Whalen and Brie Holme collect bottom sediments from Lower Bay.



Brie Holme is a water resources specialist at the Portland Water District. She can be reached at [bholme@pwd.org](mailto:bholme@pwd.org)

# What's Making Waves



A 2017 calendar featured photo by Frank Fowles



View from Pismire Mountain, Raymond Community Forest  
Photo by Laurel Jackson

## 2017 CALENDARS AVAILABLE

Watershed residents, customers, and partners are invited to stop by the Sebago Lake Ecology Center to pick up a copy of our popular *Images of Sebago Lake* Calendar. The Calendar features pictures taken by amateur and hobbyist photographers. For the first time, photos of Sebago Lake's tributaries – the streams and rivers that flow into Sebago Lake – were considered, and several stunning shots are included in the twelfth edition.

Over 160 photographs from 47 amateur photographers were submitted for consideration for the 2017 Calendar. Copies are available from 8:00-4:30, Monday through Friday. Supplies are limited – one copy per person please.



## PWD INTRODUCES A NEW EDUCATION PROGRAM: WATERWAYS

The District has implemented in-school education programs for over twenty years. A recent shift in philosophy, staffing, and national science standards has changed our consistent programming dramatically. The overarching goal of our new program, *WaterWays*, is the same – using hands-on science lessons



to teach middle school students about the ways we use, share, pollute, and protect water.

The delivery method is very different, however. In the past, two temporary educators delivered the same lesson for an entire month to approximately 1,000 students in seven Sebago Lake watershed and PWD service area schools. Beginning this fall, a permanent educator will deliver different lessons for four consecutive weeks to one school. While the same amount of schools and students will be reached over the year, this method allows for our content to dovetail with the school's curriculum so the topic is also taught by the classroom teacher when our educator is not in the classroom. The changes have been endorsed by teachers and we are thrilled at the deeper learning that will result!

## TRAIL DAY A SUCCESS!

The District hosted its 4th annual Trail Day on the Sebago Lake Land Reserve on September 17th. District staff led a *Woods Walk and Talk* for adults and *Nature Painting* for kids. Two *Learn to Kayak Clinics* were led by Sebago Trails Paddling Company. Maine Inland Fisheries and Wildlife's

Hooked on Fishing program and Standish Fish and Game led two sessions of *Learn to Fish*. New events this year included a *Forest Fitness Boot Camp* led by Personalized Nutrition and Fitness and a *Radical Ropes Course & Climbing Wall Adventure* led by the YMCA of Southern Maine. The events were well attended and participants enjoyed the day.

## RAYMOND COMMUNITY FOREST COMES INTO BEING

On June 21<sup>st</sup>, ownership of 350 acres of land in Raymond was transferred from Hancock Land Company to Loon Echo Land Trust creating the Raymond Community Forest. This significant event was the culmination of many years of planning and fundraising by Loon Echo Land Trust and the Raymond Community Forest Stewardship Committee. The stewardship committee will oversee selective harvesting on the property and will also work with Loon Echo to create recreational trails, signage, and parking. The Portland Water District contributed \$50,000 to this project because of the importance of conserving forested watershed land. Forests act as a natural filter and are important to protecting long term water quality.

## STANDISH TOWN BEACH AND ICE FISHING ACCESS FACILITY

During the summer of 2016, the Town of Standish made significant progress on the development of the John Rich Memorial Beach. Improvements include the installation of a gated access road, parking lot, and a boardwalk to the beach. The new beach facility is for Standish residents only and is designed to accommodate up to 400 people and up to 50 boats. It includes a small building for attendants, a gravel parking lot, two permanent holding tank style bathrooms, an array of portable toilets, and a raised boardwalk to allow for pedestrian access to the beach.

Further development of the beach is planned for the spring of 2017 with paving of the access road and parking lot, and construction of a separate seasonal access road to provide lake access for ice fishing in the winter. The ice fishing access is designed to enable ATVs and snowmobiles to tow ice shacks to and from the lake once the ground is frozen and the ice is safe.

The District is partnering with the town on the establishment of the beach because the property is outside the two-mile no bodily contact zone around the water intakes. The Town and the District agree that the lake can be both a drinking water source AND a recreational resource as long as the two activities are properly separated.

### SEBAGO LAKE LAND RESERVE MOBILE MAP

A new GPS-enabled mobile map for the Sebago Lake Land Reserve recently launched. There are many miles of interconnected trails on the land reserve and the mobile map will be a great navigational tool for land reserve visitors. It is GPS-enabled so users can track their movement using their mobile device and find their way to the nearest kiosk. The map runs through a free app called "CarryMap Observer."

For instructions and to download the map, scan the QR code below or use the internet browser on your mobile device to open the page: <https://www.pwd.org/mobile-map>



Contact us with feedback about your experience using the trail map or the land reserve in

general: [sebagolake@pwd.org](mailto:sebagolake@pwd.org)

## PWD RECEIVES FEDERAL GRANT TO FIX EROSION SITES

By Heather True

Portland Water District is partnering with Cumberland County Soil and Water Conservation District (CCSWCD) to continue our efforts to keep soil and phosphorus out of Sebago Lake. When too much soil gets into our waterways, the water can become murky, algal growth increases, and less oxygen is available in the water for fish. To keep Sebago Lake clean, PWD and CCSWCD are fixing erosion issues to keep soil on the land and out of the Lake.

This effort is the third phase of work to address polluted runoff washing into Sebago Lake. Over the next two years, PWD and CCSWCD will provide over \$24,000 for construction projects to improve eight sites that are impacting Sebago Lake. We will also reach out to some of the golf courses and agriculture operations in the area to offer assistance with runoff control and treatment.

For more information about this project, please contact Heather True, CCSWCD Project Coordinator, at 207.892.4700 or [htrue@cumberlandswcd.org](mailto:htrue@cumberlandswcd.org). If you need help with an erosion issue on your lakefront property that may



This unstable ditch on Sebago State Park Road in Naples is washing soil directly into the Songo River, which provides a significant amount of water to Sebago Lake. PWD will partner with CCSWCD to stabilize the ditch to prevent soil from washing into the River

be addressed through PWD's Lakescaping Program, please contact PWD at [sebagolake@pwd.org](mailto:sebagolake@pwd.org).

This Sebago Lake Watershed Protection Project grant was awarded to PWD by the Maine Department of Environmental Protection with funding provided by the U.S. Environmental Protection Agency under Section 319 of the Clean Water Act.



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

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