Photo: Linda Panzera

SEBAGO LAKE State of the Lake 2012 REPORT

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Introduction

1

Photo: Claire Crocker

What makes a lake popular?
What makes a lake valuable?
What makes a lake outstanding?

What makes a lake popular? What makes a lake valuable? What makes a lake outstanding?

There are many answers to these questions. But it seems fair to say that a popular lake is one that many people use. A valuable lake is one that generates revenue and other less tangible benefits like enjoyment. And, according to lake science, an outstanding lake is one that has superior water quality.

Sebago Lake would be important if it were popular, valuable, or outstanding. But what truly sets Sebago Lake apart is that it is all three.

Sebago Lake is the water supply for 200,000 people. It is one of Maine's most popular vacation destinations. It is surrounded by boys and girls camps that draw thousands of campers each year. Sebago Lake is popular.

Sebago is surrounded by some of the most impressive waterfront properties in the state – supporting the tax base of seven towns. Dotting the shoreline are several outstanding marinas that generate millions of dollars. The lake is home to a fishing derby that is so successful it offers a $100,000 grand prize. Sebago Lake is valuable.

Photo: Rich Antinarelli

Photo: Roberta Milward


Photo: Linda Panzera


Photo: Rich Antinarelli


Photo: Kendra Raymond

Finally, the lake water is clean and clear enough that it does not require filtration, an honor only a few dozen water supplies across the country can claim. Sebago Lake has outstanding water quality.

Maintaining the lake is a challenge we all share. It's important to assess the condition periodically – so we can all see how the lake is faring. If we see evidence of decline, then we can begin a conversation and set a course of action to correct the problem. We are all responsible for its care.

This is the fourth edition of the State of the Lake Report prepared by the Portland Water District. It provides a snapshot of the condition of the lake through 2011. You can view past reports on our website (www.pwd.org) and share your comments or ask questions at sebagolake@pwd.org.

Water Quality

3

Photo: Bob and Marian Wright

Overall, the water quality of Sebago Lake is high and based on the data, there is no cause for alarm. However, the lake is not invincible, and we all have a role to play in protecting Sebago Lake.

The quality of water in Sebago Lake is important to all who use the lake, own property near it, or drink from it. PWD has been monitoring the health of Sebago Lake and the land surrounding it (the watershed) for decades. The monitoring program includes sampling of tributaries, near-shore locations, deep basins, and many locations around the water intakes in Lower Bay. While PWD performs a number of chemical and physical tests on lake and stream waters, this article focuses on lake clarity and bacteria. Monitoring these parameters allows changes in water quality to be detected before they impact the quality of water consumed by the public.

LAKE PRODUCTIVITY

There are many ways to classify a lake. The most common is to determine how productive it is - or how much growth (plants, animals, algae, etc.) it supports. The productivity of a lake is dependent on many factors; rate of nutrient input, climate, lake geology, watershed topography, lake size and shape, and human influence. All lakes have different levels of productivity. Less productive lakes (such as Sebago) are clear, cold, and highly oxygenated; support environmentally sensitive organisms (ex. salmon, trout, and mayflies); and are suitable for a drinking water supply. More productive lakes are murky and warm; exhibit low oxygen levels; and only support environmentally tolerant organisms (pickerel, perch, and mosquitoes).

LAKE CLARITY

One of the ways to determine the health of a lake is to measure the clarity of the water. Clarity is measured by lowering a black and white disk, called a Secchi disk, down into the water and recording the depth at which the disk disappears. The deeper the disk is visible, the clearer and cleaner the lake. Secchi disk measurements are taken on lakes across the state of Maine and the numbers are compiled annually by the Maine Volunteer Lake Monitoring Program. Figure 1 shows the Sebago Lake overall Secchi numbers for 2010. The average clarity for all Maine lakes monitored in 2010 was 5.6 meters. In 2010, the average clarity of Sebago Lake was 9.7m in Lower Bay, and in 2011 it was 10.1m, making Sebago Lake one of the clearest lakes in Maine (Figure 2).


Photo: Neil Hiltunen

Clean, clear water is important to the Portland Water District because Sebago Lake is the drinking water supply for the greater Portland area. In addition, clean water is important to the people who own property around Sebago Lake. A study by the University of Maine showed that property values are related to water clarity. Property values are higher on lakes with clear water and lower on lakes with water that is less clear.

LAKE BACTERIA

An important way to determine the quality of water for drinking is to measure bacteria in the water. Bacteria are present throughout our environment and while many are not harmful, some can cause illness. Weekly during the summer months, PWD monitors *E.coli* (a type of fecal coliform bacteria found in the gut of warm blooded animals) levels at beaches around Sebago Lake. Samples are taken at beaches within the 2-mile no bodily contact zone and at swimming beaches outside the no bodily contact zone. *E. coli* levels are much lower at beaches where humans are not allowed to swim (Figure 3). Minimizing *E. coli* in the lower bay of Sebago Lake is important to ensure safe, clean drinking water is delivered to the public.

Overall, the water quality of Sebago Lake is high and based on the data, there is no cause for alarm. However, the lake is not invincible, and we all have a role to play in protecting Sebago Lake.

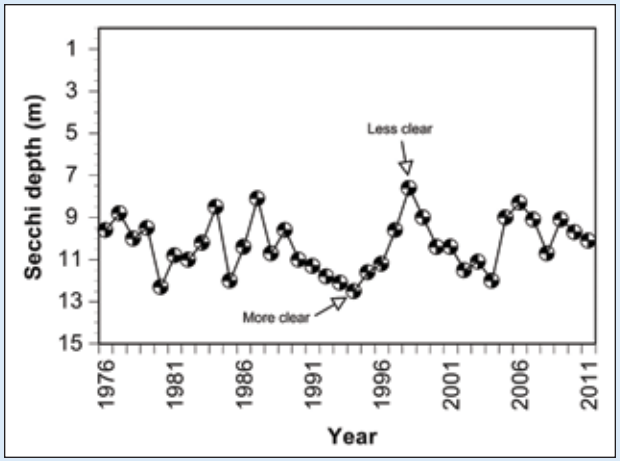

Figure 1: Sebago Lake secchi depth presented as annual averages. Please note that the vertical axis is reversed so that larger numbers appear at the bottom of the graph meaning greater lake clarity.

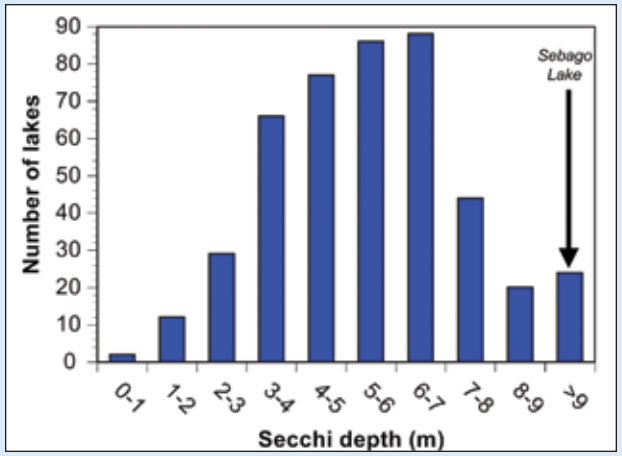

Figure 2: Water clarity of Maine lakes by Secchi depth in 2010. Sebago Lake is clearer than the majority of lakes in Maine. Data provided by the Maine Volunteer Lake Monitoring Program.

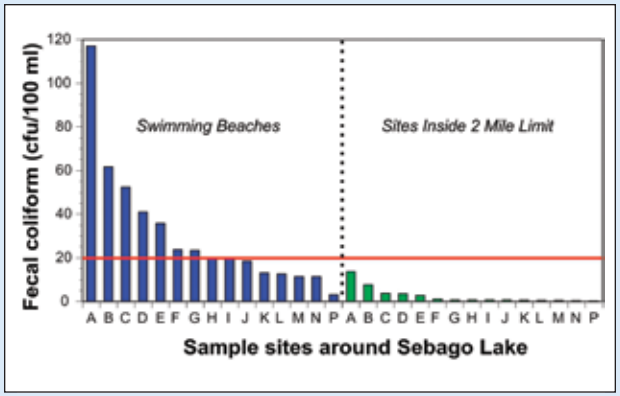

Figure 3: Fecal coliform bacteria around Sebago Lake from 1979-2011 for swimming beaches and sites within the 2 mile no bodily contact zone. The horizontal red line shows the legal limit for fecal coliform bacteria in raw water under the Safe Drinking Water Act.

Development

5

Photo: Tom Scannel

In 2010, with the exception of Sebago, all towns had the lowest number of building permits since we began collecting data in 2002.

Shorefront property in Maine is highly coveted. Since improper development of shorefront properties can impact lake water quality, comprehensive shoreland zoning regulations have been enacted in every town in the state. More recently, the state has adopted an erosion control law that recognizes that improperly managed development anywhere in a watershed can impact water quality. In general, state and local regulations are more restrictive for properties closer to bodies of water than those further away. Maine's Erosion and Sedimentation Control Law requires that erosion control measures be in place before an activity begins, and remain in place and functional until the site is permanently stabilized. The law further requires that all chronically eroding sites in watersheds most-at-risk (including the Sebago Lake watershed) must be stabilized. Examples of chronic erosion problems include camp roads that wash out each spring, culverts with erosion at the inlet or outlet, and ditches showing erosion gullies.

BUILDING PERMITS ISSUED IN SHOREFRONT TOWNS DURING 2010

The Sebago Lake watershed includes all or parts of 24 towns and covers approximately 300,000 acres (450 square miles). Water from this entire land area eventually reaches Sebago Lake, some directly and some indirectly (after flowing into and then out of other lakes such as Brandy Pond). There are seven towns that have Sebago Lake frontage: Standish, Sebago, Naples, Casco, Raymond, Windham, and Frye Island. Because of their proximity, development of watershed properties in these towns has the greatest potential to impact Sebago Lake. The total Sebago Lake watershed land area in these seven towns is 86,440 acres, ranging from 862 acres in Frye Island to 20,452 acres in Naples.

In an effort to evaluate the rate of watershed development in these towns in 2010, building permits on file at the town offices were reviewed and compared to previous years. Numbers of building permits in Figure 4 reflect those permits in the Sebago Lake watershed for new construction or


Photo: Kendra Raymond

improvements with an estimated value equal to or greater than $50,000. These totals give an indication of the numbers of previously undeveloped properties which were developed in each year. All towns have seen fewer building permits in 2010 as compared with 2007, the last time data were compiled. This is not surprising in light of economic trends. In addition, all towns except Sebago had the lowest number of building permits in 2010 since we began collecting data in 2002.

SEPTIC SYSTEM CONSTRUCTION PERMITS, 1997-2011

In 1913, the Maine Legislature granted the PWD authority to regulate the disposal of drainage and waste from structures located within 200 feet of the normal high water line of Sebago Lake. In practice this means that a new or replacement septic system, or the seasonal conversion or expansion of an existing septic system, may not be undertaken without a permit from PWD. The number of new septic systems installed each year is a measure of the rate of development in the most critical part of the lake watershed, the shoreland zone. A new system, as opposed to a replacement system, is installed on a previously undeveloped lot. Figure 5 shows new septic systems installed during the period 1997-2011. In the past two years, less than 5 new systems per year have been installed within 200 feet of Sebago Lake. This is in line with recent economic trends. Undeveloped lots are also increasingly rare after the development boom of the mid-2000s.

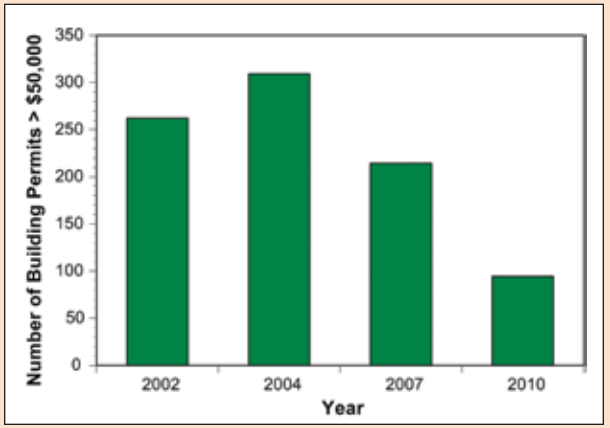

Figure 4: Number of building permits for new construction projects in the watershed for the towns of Casco, Naples, Windham, Raymond, Standish, Sebago, and Frye Island.

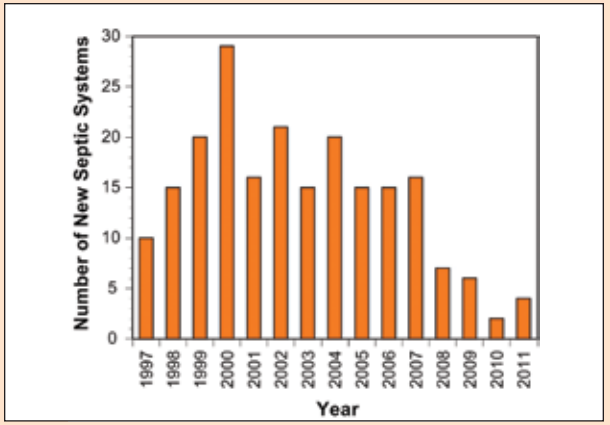

Figure 5: Number of new septic systems within 200 ft of Sebago Lake per year.

Lake Level

7

Photo: Linda Panzera

The Portland Water District supports the proposed LLMP because there is no evidence that it would negatively impact lake water quality.

Sebago Lake outlets through the Presumpscot River to Casco Bay. A dam was first built at the outlet of the lake around 1827. The existing Eel Weir Dam was built to its present height in 1884 by the Presumpscot Water Power Company and is managed today by the South Africa Pulp and Paper Company (SAPPI) which owns S.D. Warren Company. According to the Maine Department of Environmental Protection, the lake is nine feet higher now than it was before the dam. The level of the lake has historically been managed over about a 5-foot range from at or above the dam's spillway in the spring to lower levels in the fall and winter. Because the dam is used to generate hydroelectric power, the Federal Energy Regulatory Commission (FERC) licenses the operation of the dam.

The dam license expired in 2004. Since then, S.D. Warren has been operating under a provisional license. Under this license, S.D. Warren must follow a Lake Level Management Plan (LLMP) which requires them to increase or decrease outflow from the dam in order to keep the lake within specific lake level ranges throughout the year. It has been difficult for them to comply with the LLMP. Over the past four years they have been out of compliance 32 out of 108 weeks, or 38% of the time (Figure 6).

In June 2011, S. D. Warren submitted a new license application to FERC in which they proposed a different LLMP. Under their proposed LLMP, S.D. Warren will maintain a constant outflow from the dam and only increase or decrease outflow if the lake gets very high or very low. This would more closely mimic a natural, undammed lake. Lake levels would be higher when it rains a lot and lower when it doesn't. This will make compliance more easily achievable for SAPPI.

The Portland Water District supports the proposed LLMP because there is no evidence that it would negatively impact lake water quality and because it would release more oxygen-rich water to the Presumpscot River during the summer months when the river can experience low oxygen levels.

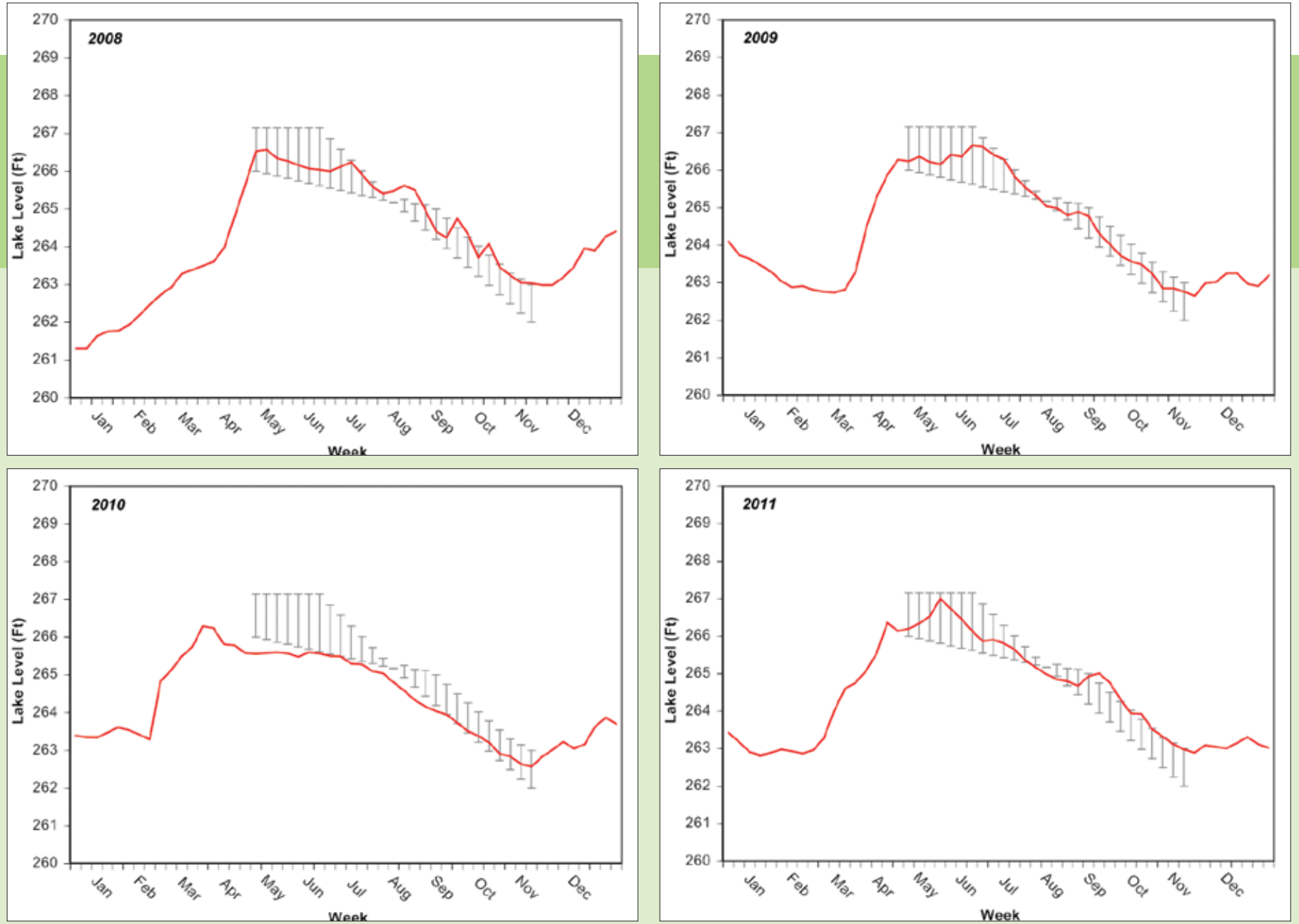

Figure 6: Sebago Lake levels recorded in 2008-2011. Please note: The red line represents the lake elevation in feet above mean sea level. The Gray bars represent the acceptable water levels for each week of the year between May and November, according to the LLMP. When the red line is above or below the gray bars, SAPPI was not in compliance with the LLMP.

Boating

9

Photo: Claire Crocker

There are many points of access around Sebago Lake for boaters. There are four public boat launches, at least four private boat launches, and four marinas with launches. Boats can also reach the lake by passing through the Songo Locks that connect Long Lake and Brandy Pond with Sebago Lake. Boat owners with shore frontage can also access the lake directly across their own property. The majority of lake activity occurs between Memorial Day and Labor Day.

The PWD employs a boat launch attendant to monitor daily activity at the Sebago Lake Station Boat Launch, located at the southern end of the lake, during the summer season. The boat launch attendant educates the public about preserving and protecting the drinking water supply, ensures compliance with the no bodily contact law, and inspects boats and trailers for invasive aquatic plants. The attendant records the number of boats launched and landed. In the past five years, over 90 % of the boats launched at the Sebago Lake Station Launch during the months of June, July, and August have been registered in Maine. In 2009 the Town of Standish began charging non-Standish residents for launching boats at the Sebago Lake Station Launch. Prior to 2009, 10-15 % were from Standish and in 2009-2011 about 36% were from Standish.

Sebago Lake State Park has two public boat launches: one at the day use area for the general public and one for overnight campers. During the period of June, July, and August, park employees counted 1,956 boats launched at the day use area in 2008, 1,249 in 2009, 1,789 in 2010, and 1,598 in 2011. They do not track launches or landings from the overnight area.

The hand-operated lock on the Songo River makes it possible to travel a 42-mile waterway from Long Lake, Brandy Pond, and Songo River through the Songo Lock and into Sebago Lake. Built in 1830, Songo Lock is the only navigation lock still in service in Maine. The lock is operated by the Department of Conservation, which records the number of boats that pass through the lock each day.

Figure 7 shows 2003-2011 summer boat counts for the Sebago Lake Station Boat Launch, the


Photo: Kendra Raymond

Songo Lock, and the Sebago Lake State Park Day Launch. Fewer boats were counted in 2011 than in the previous eight years.

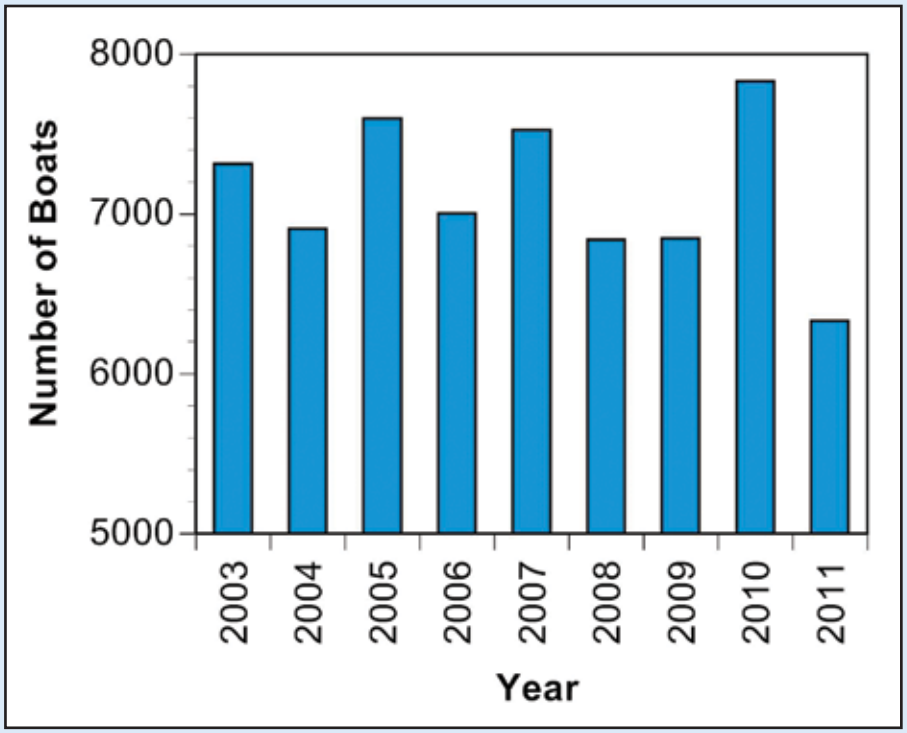

Figure 7: Summer boat traffic at Sebago Lake Station Launch, Songo Lock, and Sebago Lake State Park Day Launch. Please note: the State Park Day Launch data for 2005 includes the months of May-Oct.

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