

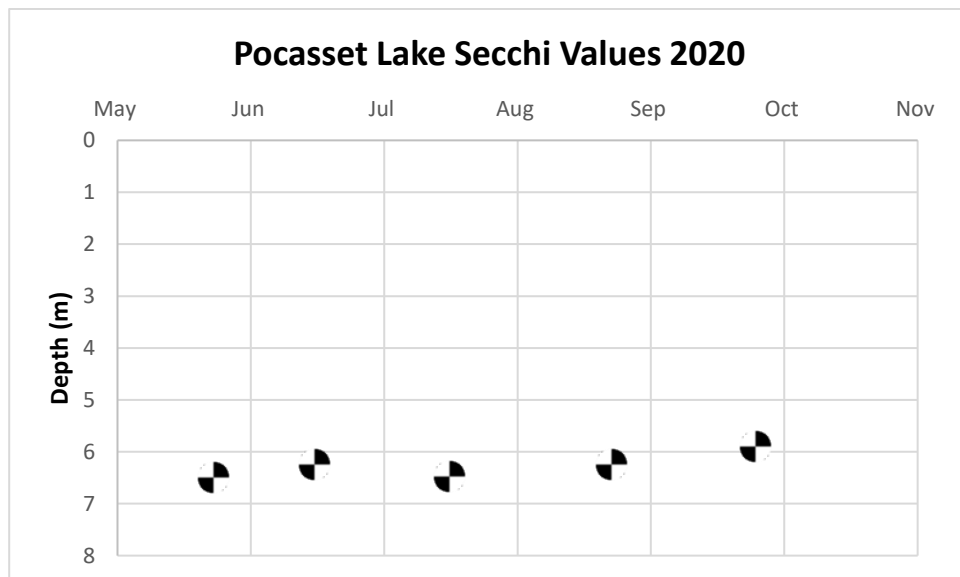


## Overview

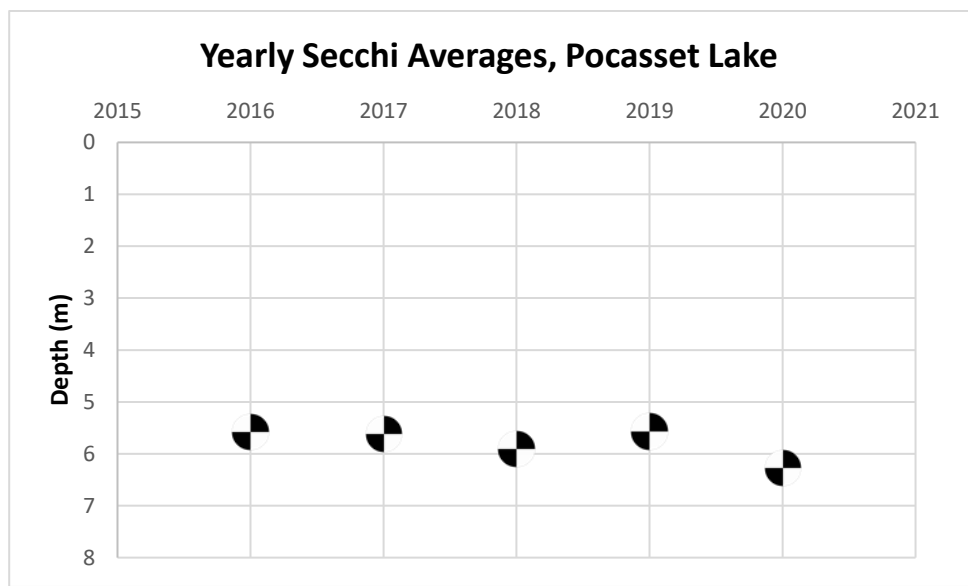
Pocasset Lake is a 566-acre lake in Wayne, Maine with a mean depth of 4 feet and a maximum depth of 20 feet. In 2020, 30 Mile monitored Pocasset Lake once a month from May through September, for a total of 5 visits throughout the summer. On each visit we collected **water clarity** readings and **dissolved oxygen / temperature** profiles. Twice during the late summer, water samples were collected and tested for **phosphorus** concentrations. Sampling visits this summer were performed less frequently than a typical season due to constraints of the COVID-19 pandemic, but the focus remained to keep eyes on the water, collecting the quality data necessary to monitor water quality trends.

## Water Clarity

Secchi disk transparency (SDT) is an indicator of water clarity. A black and white disk is lowered in the water and the reading is taken at the depth at which it is no longer visible. Factors that affect transparency include algal growth, zooplankton, natural water color, and suspended silt or sediment particles.



In 2019 the average reading was 6.27 m (20.6 ft), the maximum: 6.47 m (21.2 ft) and the minimum: 5.79 m (19 ft). The maximum depth of the lake is around 6 m. This is a good indicator of water quality for Pocasset Lake as most readings are near the full depth of the lake, and in some cases the Secchi disc can still be seen while resting on the bottom of the lake.



For comparison, Pocasset’s average Secchi reading in 2019 was 5.57 m. The historical average is 5.6 meters, which includes limited (sporadic) data dating back to 1976.

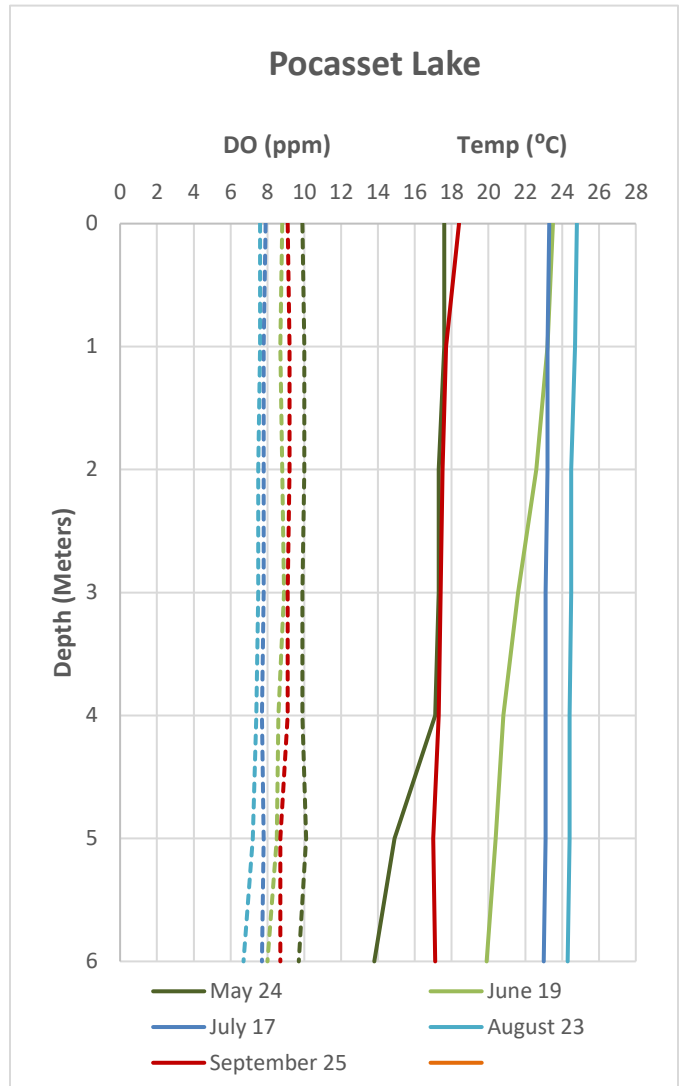
### **Dissolved Oxygen and Temperature**

As lake water is warmed during the summer months, many of Maine’s lakes form three distinct temperature layers. There is a warm layer at the surface (epilimnion), a thin transitional layer (thermocline), and a deep cold layer (hypolimnion).

The primary reason we measure dissolved oxygen is to observe when anoxic conditions (depleted of oxygen levels <2 ppm) are present in the lake. Oxygen levels below 2 ppm (parts per million) indicate anoxic conditions, and mostly occur in the bottom meter of a lake or pond. When anoxic conditions occur at the bottom of a lake, it triggers chemical reactions that release phosphorus that was formally bound to the lake sediment back into the water column. Typically, shallow lakes such as Pocasset see far less variation in oxygen than deeper lakes with greater temperature stratification. In 2020, oxygen levels below 2ppm were not detected in our sampling. This is a positive indicator for lake health.

Based on the bi-weekly temperature profiles collected by 30 Mile, there is little change in temperature throughout the water column in Pocasset Lake, and the lake does not experience a temperature stratification like many deeper lakes in our watershed. When stratification occurs, distinctive layers of warmer and cooler water form with a transitional layer in between. During this process high levels of oxygen are observed in the upper layer, but decomposition of organic materials consumes any oxygen present in the bottom meter of the water column.

The graph here demonstrates the strong association between dissolved oxygen and temperature in Pocasset Lake. The temperature and oxygen both remained very consistent throughout the water column. In shallow lakes, wind events can facilitate water mixing in the lake and disrupt the stratification that prevents oxygen from reaching the bottom of the lake.



## Phosphorus

Phosphorus is the nutrient that most influences the growth of algae in lakes, so it is important to measure. The lower the phosphorus the better. Even small increases in phosphorus in a lake can cause substantial increases in algal growth. Algal blooms are harmful to fish and other organisms because they use up the available oxygen in a lake. Algal blooms are also a risk to human health and can decrease the economic, recreational, and aesthetic value of a lake and the properties around it.

It is important to note that extreme weather events associated with climate change typically produce higher volumes and velocity of stormwater runoff. These combined factors increase the likelihood that sediment and nutrients (primarily phosphorus) will be transported to lakes and cause substantial increases in the concentration of algae in lake water over a relatively short period of time.

The phosphorus concentration in Pocasset Lake in 2020 was 8.0 ppb (parts per billion) at both of the two sampling visits. This is a good sign for water quality in Pocasset Lake. The average phosphorus concentration in 2019 was 9.0 ppb, and the historical average is 9.5 ppb.

## **Monitoring Pocasset Lake in 2020**

2020 was our fifth year of monitoring Pocasset's water quality. We began monitoring in late May and continued through the end of September, once per month. This was an abbreviated monitoring schedule, but still produced a thorough sample of this summer's conditions to be included in the growing dataset of water quality parameters that we are monitoring. The last five years has seen the most frequent water monitoring in Pocasset Lake's history in order to provide a greater understanding of the lake's dynamic processes. This effort will continue to develop a robust dataset that can help our community identify and address water quality concerns in Pocasset Lake.

Near real-time data for Pocasset's clarity (Secchi depth), dissolved oxygen and temperature can be found online at <http://30mileriver.org/programs/water-quality-monitoring/pocasset-lake/> along with a link to historical data that includes the many other parameters including phosphorus, chlorophyll, pH, alkalinity, color, and conductivity.

## **Need for Sustained, Longer-Term Monitoring**

Based on the growing historical dataset, the Maine DEP rates the overall water quality of Pocasset Lake as above average. It is important to note that although there are no red flags yet, we have only five years of complete, consistent data on clarity, dissolved oxygen, temperature, phosphorous and chlorophyll. According to Maine DEP water quality staff, we will need **ten years** of data at our current monitoring schedule before we will have enough information to identify any trends. Therefore, our **continual and consistent monitoring of Pocasset Lake is critically important** in order for us to identify negative trends in water quality.

The **annual cost of water quality monitoring of Pocasset Lake is \$3,500**. This includes staff time, lab fees, travel, and supplies over the six-month monitoring season. While some of the start-up cost of water quality monitoring of Pocasset as well as other lakes in the 30 Mile River Watershed were funded in part with foundation grants, the **ongoing cost of water quality monitoring of Pocasset must be supported by donors to 30 Mile, including the Pocasset Lake Association**.