Rangeley Lakes Heritage Trust

CONSERVE | RESTORE | STEWARD

2026 Water Quality Report

Loon Lake

Survey History:

Loon Lake, located in Dallas Plt, ME is a developed water body in the area. It has a mean depth of 6.4 (21ft) and a maximum depth of 15.2m (50ft). The maximum depth is represented by station 1 (*Figure 1).* Monitoring on Loon Lake began in 1975 and has continued since with multiple gaps in the data. This station provides important information about water clarity, water temperature, dissolved oxygen, and water chemistry parameters, including phosphorus. Collecting and studying this data helps with understanding not only the current state of Loon Lake, but also how it has been changing in recent years due to rising temperatures, shorter winters, and increased runoff from developments.

Figure 1. Map of Loon Lake and its sample station. Via Lakes Stewards of Maine

At each lake and pond monitored, annual readings of water transparency, dissolved oxygen, and water temperature are recorded, as well as one phosphorus sample that is collected in late summer. In recent years, these readings have been taken by volunteers and RLHT's Headwaters Coordinator twice a month between May and October. In the past, some years had a lack of volunteers or the resources to monitor the water body biweekly as suggested by the state and Lake Stewards of Maine. Therefore, the data has some gaps which could account for minor inconsistencies in the data. Due to warming air temperatures and increased lakefront development, most lakes in Maine have been warming and have a greater chance of change.

Current Trends:

Common trends occurring on lakes and ponds in Maine is the tendency to become warmer and more polluted due to climate change and lake front development. Warmer waters are not capable of holding as much oxygen compared to colder waters. When oxygen levels drop too low, lakes are unable to support fish, plants, and other aquatic organisms. When pollutants increase, such as runoff from fertilizers, herbicides, human and pet waste, and other man-made materials, it creates a viable environment for increased algae growth and decreased oxygen and water transparencies. Although these trends are common statewide, they are not necessarily the same trends that are being observed on Loon Lake.

Water Transparency:

Water transparency readings are taken with a Secchi disk and an Aquascope to determine the depth at which light can penetrate through the water. This reading tells us how clear or turbid the water is at any given time. Taking readings with the secchi disk also suggests how abundant pollutants are in the water. Turbid water typically indicates the lake has more runoff. It is important to note, however, that natural factors like rain, seasonal changes, and proximity to the shore can influence secchi readings to be lower due to increased sediments in the water. A higher secchi reading is preferred as it indicates that the water is clear, unpolluted, and contains little to no runoff. A lower secchi reading indicates increased pollution and runoff. Deeper secchi readings suggest clearer waters which expand the littoral zone allowing more plants to grow and improve the health of fish and loons by allowing more light penetration and visibility.

Loon Lake is experiencing positive water transparency trends. Since 1975, a strongly correlated trend shows that water transparency has increased by about 1.5m (*Figure 2*). Increasing water transparency is a sign that there is a limited amount of runoff and pollution entering the water. Overall, the trends observed suggest healthy and relatively unpolluted waters on Loon Lake.

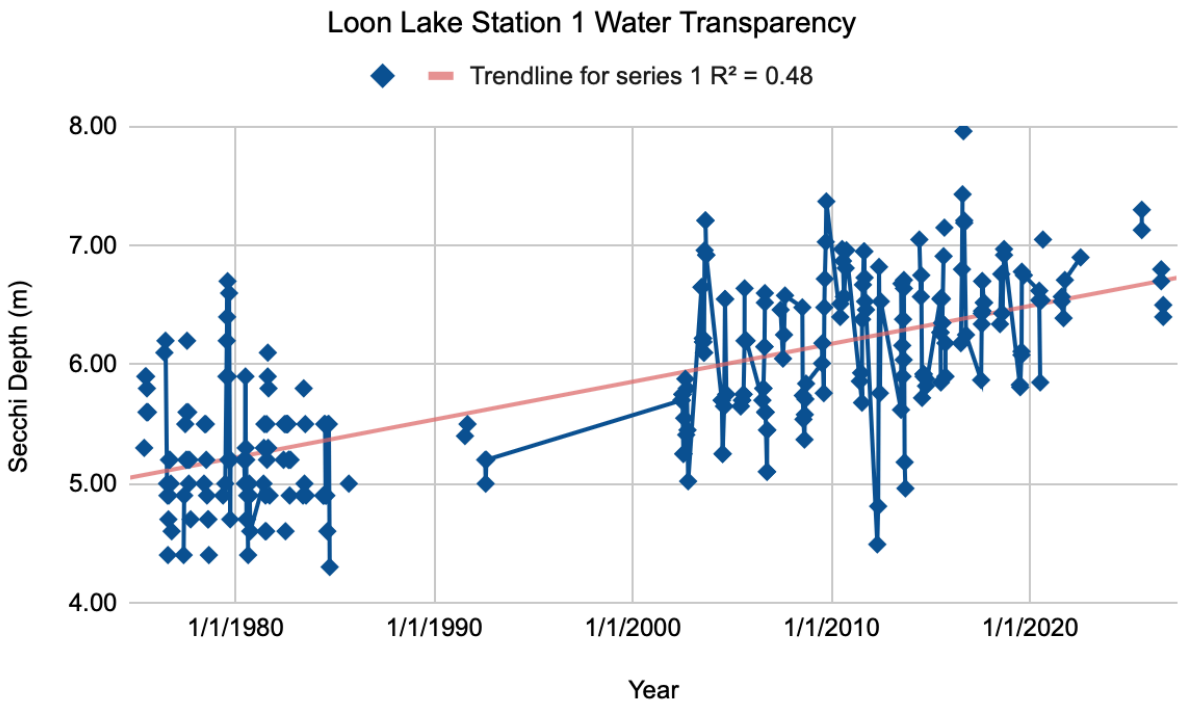

Figure 2: Water transparency readings on Loon Lake since 1975 showing a significant increase of about 1.5m.

Dissolved Oxygen:

Dissolved Oxygen (DO) readings are taken with a dissolved oxygen meter that is slowly lowered from the surface of the lake to the bottom in 1m increments. DO levels can fluctuate greatly from the surface to the bottom for a host of reasons, including water temperatures, decomposing matter, light penetration, and photosynthesis abilities. In the summer, it is expected that DO will be lower at the bottom of a water body. However, if DO levels are too low throughout the entire column for long periods of time, aquatic life will not be able to thrive. According to the US EPA, when dissolved oxygen levels drop below 5mg/L, the waters become stressful to fish and other aquatic life. When levels drop below 3mg/L, they can no longer support fish. Anything below 1mg/L is considered a hypoxic dead zone where nothing can survive. When temperatures rise, or excess nutrients such as phosphorus and nitrogen enter the water, DO levels will decrease.

Loon Lake is experiencing a slight decrease in DO. Since monitoring began in 1975, a weak correlation shows that DO has decreased slightly (*Figure 3*). This is a negative trend that suggests there is less oxygen in the water which is making it difficult for aquatic life to thrive. In the past, DO levels have dropped below the stressful threshold of 5mg/L on six different occasions. This trend is very concerning and can result in habitat changes for aquatic life. This trend of decreasing DO is common as the station is also experiencing increasing temperatures which usually results in lowered dissolved oxygen readings. It is important to continue monitoring Loon Lake.

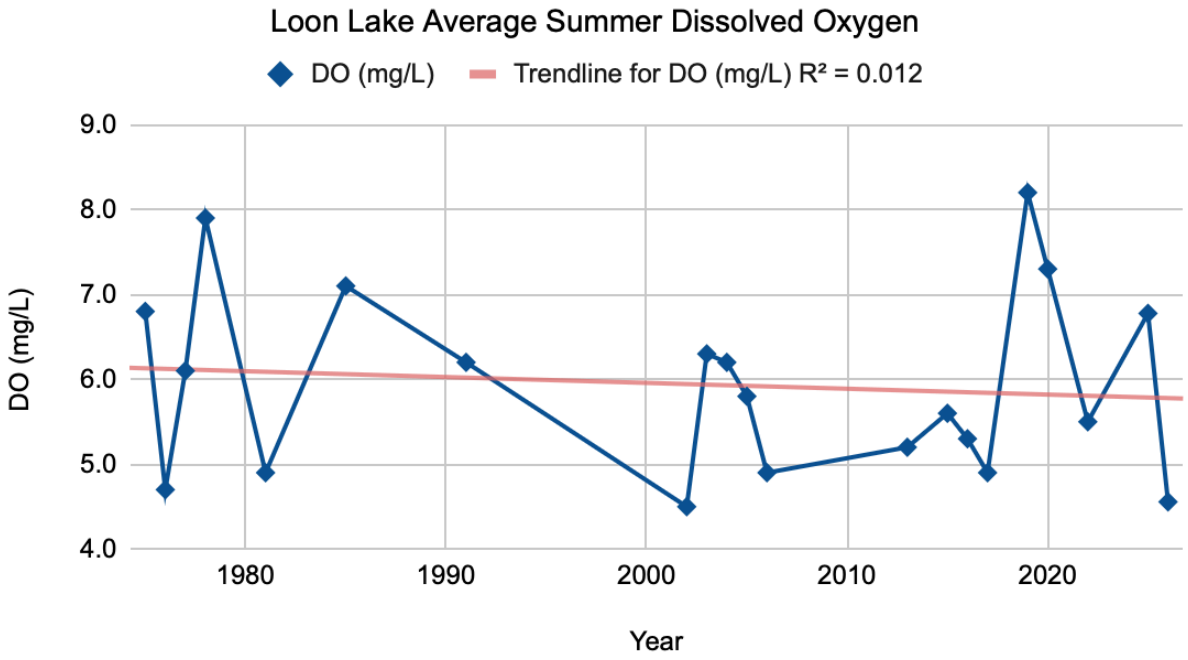

Figure 3. Average summer DO readings on Loon Lake taken between May and October since 1975 showing a slight decrease.

Water Temperature:

Water temperature readings are taken with the same meter as DO and are measured in 1m increments from the surface to the bottom of the lake. In the summer, temperatures are typically higher closer to the surface while they are much cooler closer to the bottom. Rising temperatures in a lake can directly affect fish and other aquatic life, as well as increasing algal blooms, decreasing DO levels, and in extreme cases, lead to hypoxic dead zones. Lake temperatures have been increasing across New England for decades, and Loon Lake is experiencing similar trends.

Loon Lake is experiencing a significant increase in water temperatures. Since monitoring began in 1975, trends show temperatures have increased by almost 4°F (*Figure 4*). While this trend is common in the region, it is not necessarily good for the lake's health. These rising temperatures are most likely causing the decrease seen in DO levels which could affect aquatic life. While water temperatures are difficult to control, there are a few actions that can be taken to help retain colder temperatures that are discussed at the end of this report.

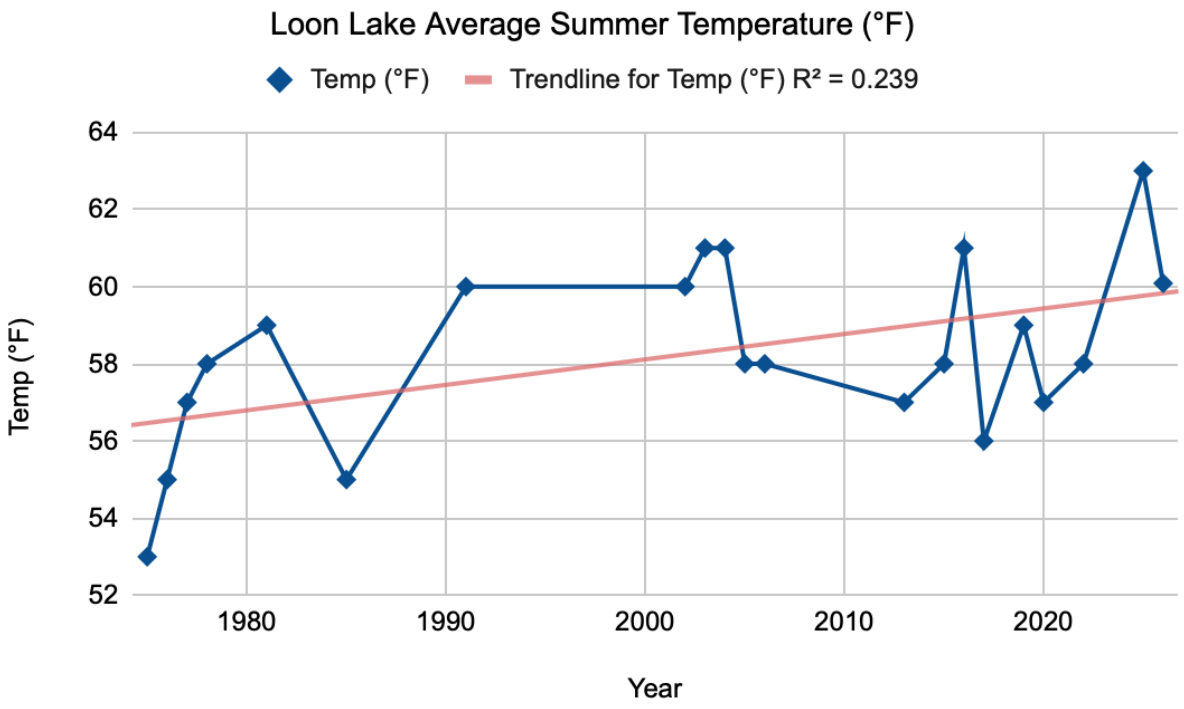

Figure 4. Average summer water temperature readings on Loon Lake taken between May and October since 1975 showing a significant increase of about 4°F.

Phosphorus:

Phosphorus tests are taken during the summer at the surface of the lake. A small sample of water is collected and sent to the Maine Health and Environmental Testing Laboratory. Phosphorus is a naturally occurring nutrient found in soils and sediments which is vital for plant growth. However, if too much phosphorus accumulates in a water body, it increases the chances of excessive bacterial and algae growth, also known as an algal bloom. These blooms can decrease water clarity and even produce harmful toxins for humans and animals. Phosphorus is commonly found in fertilizers and sewage which can easily find its way into a water body from lakefront gardens, yards, or faulty septic systems. The USEPA suggests that levels of phosphorus in a water body should stay below 0.05mg/L to maintain a healthy lake, however, other sources suggest maintaining levels below 0.03mg/L is best. We test for this nutrient in the water to understand how much runoff is entering the lake and if there is any potential for harmful algal blooms and decreased lake health.

Total phosphorus levels of Loon Lake are showing positive trends. Since monitoring began in 1976, phosphorus levels have decreased by about 0.007mg/L (*Figure 5*). Natural processes like sedimentation and biological uptake cause phosphorus levels to decrease naturally over time. Therefore, it is a good trend to observe. These trends tell us that phosphorus is not increasing and that Loon Lake is not experiencing any excess runoff or pollution. This trend, as well as the water transparency trend, further prove that runoff is being well contained along the shores of Loon Lake. It could be due to long-term land conservation that has prevented excess pollution, as well as mindful lakefront property owners.

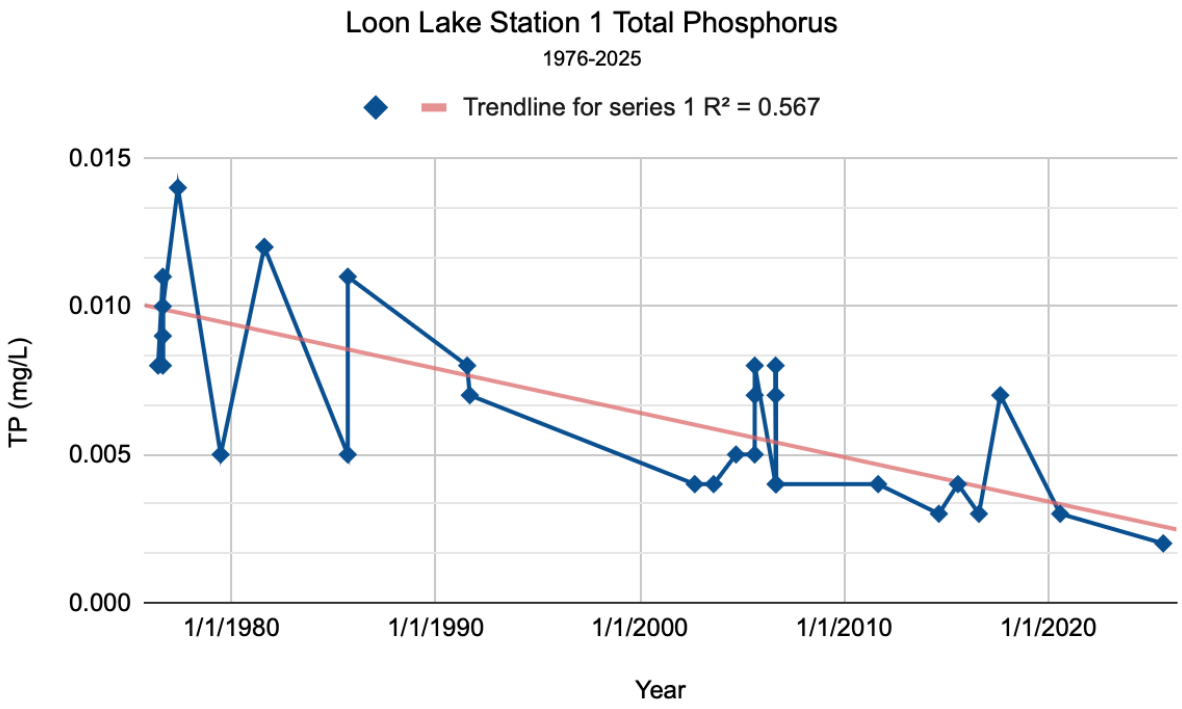

Figure 5. Phosphorus readings on Loon Lake since 1976 showing a significant decrease of about 0.007mg/L.

Suggestions:

Possible actions to decrease lake temperatures:

Actions	Benefit	Location
Implement rain gardens and infiltration steps	-Allows stormwater to enter underground aquifers to cool instead of entering directly into the lake -Reduces the risk of erosion	Lakefront homes and properties
Maintain a native vegetative buffer at the shoreline	-Reduces the flow of stormwater directly into the lake -Reduces the risk of erosion	-Lakefront homes and properties -Shoreline around the entire lake
Plant mature trees along lake edge	-Directly shades and cools shallow waters along the lake -Helps reduce the flow of stormwater into the lake	-Lakefront homes and properties -Shoreline around the entire lake
Maintain narrow, shaded roadways	-Shades and cools the land around lake	Large and small roads surrounding the lake
Continuous monitoring of potential invasive plants	-Reduces the possibility of invasive plants entering the water body, disrupting the ecosystem, and contributing to warming temperatures.	-Boat Launches -Littoral zone surrounding the lake
Maintain healthy and shaded tributaries	-Deposits cold water directly into lake	-Haley Brook -Geneva Bog Brook

	-Improves fish habitat and movement	-Rock Pond Stream

Possible actions to limit decreasing DO:

Actions	Benefits	Locations
Maintain a vegetative buffer and native forests surrounding the lake	-Intercepts stormwater and prevents large amounts of runoff from entering the lake -Reduces soil erosion	Lakefront homes and properties
Implement highly permeable soils	-Sandy and permeable soils increase filtration of stormwater before entering the lake	-Lakefront gardens -Lakefront lawns
Care for septic systems	-Reduces the risk of chemicals, bacteria, and viruses from entering the water	Lakefront homes and properties
Limit use of herbicides, pesticides, and fertilizers	-Prevents toxic chemicals from getting the chance to enter the water	-Lakefront homes and properties -Nearby farms
Maintain driveways and roads with less impervious surfaces	-Minimizes road chemicals entering the lake directly	-Lakefront homes and properties -Roads surrounding the lake
Consider becoming LakeSmart certified	-Allows waterfront properties to be individually analyzed -Provides feedback on how to improve your home lake impact	Lakefront homes

While any of these actions could be beneficial to the health of Rangeley's water bodies, there is no way for us to understand our impact without continued monitoring. The volunteer water quality monitoring program needs volunteers to continue taking annual readings at the sampling stations on the lakes. Individuals can become certified to take Secchi and DO readings through Lake Stewards of Maine. With the information gathered, we can observe current trends and take immediate action if concerning trends are observed. For more information on joining the volunteer effort, or with any other questions, please reach out to headwaters@rlht.org.

Sources:

Lakes Environmental Association

United States Environmental Protection Agency-Climate Change Workbook

United States Environmental Protection Agency-Dissolved Oxygen

USGS-EPA Phosphorus levels

Maine Lakes

Lake Stewards of Maine