



2026 ANNUAL REPORT

State of Water Quality in Raymond Lakes



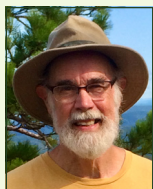


About This Report

In this second annual water quality report from Raymond Waterways, we are happy to introduce a new tool for understanding lake health and the challenges facing Maine lakes, including ours in Raymond. The Maine Department of Environmental Protection (DEP), in collaboration with Lake Stewards of Maine, has created "Lake Scorecards" for over 1,000 lakes in the state. Much of the data behind the Scorecards is collected by dedicated volunteers, supported by their lake associations, and under the direction of Lake Stewards of Maine. These volunteers are your neighbors, and you may have seen them out on the water identifying aquatic plants or lowering instruments to the bottom of your lake. As a team, they are committed to taking your lake's vital signs as many as 10 times each season and surveying all the shallower regions of the lake for invasive species annually.

We hope our annual water quality reports will make it easier for the people of Raymond to understand what is known about lake health and the human factors that influence it now and in the future. Becoming familiar with the Lake Scorecards and how to use them will provide an accessible and up-to-date answer to the question, "how is our lake doing?" We believe this will aid all residents and visitors to be good stewards of Raymond's waters. Everyone who uses these lakes and their adjacent lands can help protect this vital resource.

About the Author



This report was written by Steve Craine, the Environmental Officer for Raymond Waterways. He has a master's degree in conservation biology from Tufts University, where he did research on the effects of flooding on rare plants on Cape Cod pond shores. For ten years he has owned a camp on Raymond Pond, where he can be seen canoeing, paddleboarding, and sailing.

Acknowledgments

We'd like to recognize the many local volunteers who monitor the water quality of our lakes and inspect them for invasive species. Their dedication is invaluable to preserving the quality of life here in Raymond. The Crescent Lake Watershed Association, Panther Pond Association, and Thomas Pond Improvement Association are instrumental in keeping these volunteer efforts going through the years. We also thank Jeremy Deeds of the Maine Department of Environmental Protection and Tristan Taber of Lake Stewards of Maine, a nonprofit organization that trains volunteer monitors and compiles data from across the state. Working together over the past several years, they have developed the Lake Scorecards presented here as a new way to guide citizen and governmental action to protect lake health throughout the state.

About Raymond Waterways

For the past 50+ years, Raymond Waterways has worked tirelessly to preserve and protect lakes, streams, and ponds in the Town of Raymond. We are a volunteer organization that works closely with lake associations, residents, shoreline property owners, visitors, and state and local agencies to address watershed issues of concern.



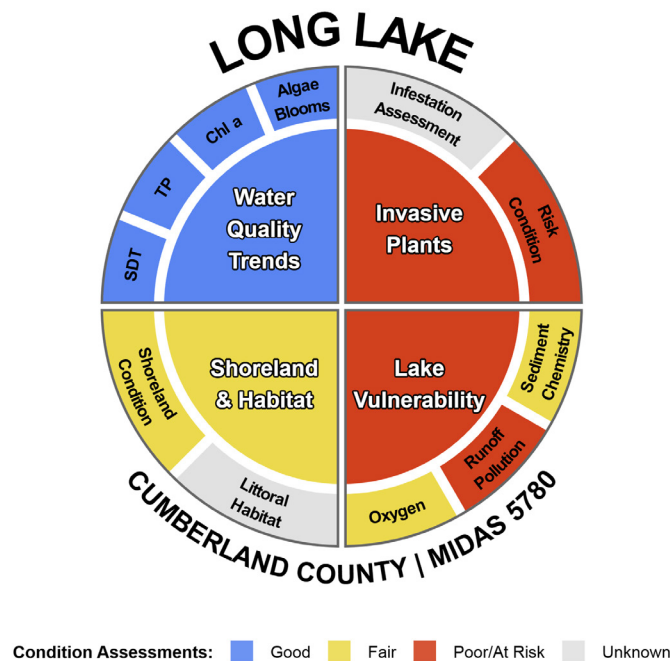
Over the years, Raymond Waterways has addressed lake contamination due to septic leakage, acid rain, non-point source pollution from erosion and runoff, and invasive plants. We remain vigilant in detecting and addressing threats to our waterways and educating the public and local officials about these issues. If you are interested in preserving our lakes, please join our cause! Contact us at info@raymondwaterways.org.

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Introduction to Lake Scorecards

The DEP's Lake Scorecards bring together many ways of looking at current water quality, as well as identifying factors that may threaten that quality in the future. The cards start with a visual summary that grades each lake on 11 factors in four general areas. Each lake's online Scorecard then links to more detailed data on the lake and in-depth information about the meaning of each factor and how it is determined. This report is designed for Raymond residents and visitors who want to understand the health of our lakes and ponds and learn what they can do to protect this most important natural resource.



As seen in the sample card above, the color-coded circle gives you a quick overview of lake status in four major categories—Water Quality Trends, Shoreline & Habitat, Lake Vulnerability, and Invasive Plants—each of which is divided into subcategories.

Clicking on the circle online, you reach data on the specific lake, as well as information on the meaning of each subcategory and how it is measured and analyzed. After each major section, you will find the lake's total score for the category—an average of subcategory scores. At first it may be confusing to navigate the interactive links between sections of the report (which would be many pages long if it all appeared on one page), but the table of contents on the left side of the page is always helpful to find what you need.

At the end of each major section, be sure to look for the heading **“✓ Take Action!”** This paragraph contains links to further information about how you can help out, either as a volunteer monitor of lake conditions or in mitigating threats such as pollution or invasive plants.

Later in this report, you will find links to the Scorecards of each of Raymond’s lakes and ponds, and our commentary on the results you will find there. In addition, Scorecards for some 1,200 lakes can always be accessed at the [Lakes of Maine website](#) (part of Lake Stewards of Maine). From that page, you can use the “Search for Your Lake” box to find your lake of interest. That takes you to a page with basic information about the selected lake. You will see a tab for “Scorecard” in the second row of menu items at the top. Or you can scroll down to the bottom of the page to see the Scorecard multi-colored circle and click on it to enter the active Scorecard. Or, once you know your lake’s MIDAS number, you can find its Scorecard at https://www.lakesofmaine.org/data/2025-scorecards/html/SC_MIDAS.html (inserting the 4-digit MIDAS number in place of “MIDAS”).



What Scores Mean and How They Are Determined

For most lakes, even with minimal or no human interference, natural processes lead to a progression over many decades or centuries from high clarity, low nutrients, and low productivity of plant and algae growth (a healthy stage known as “oligotrophic”) to an intermediate stage (“mesotrophic”), to a high-nutrient, high-productivity stage (“eutrophic”—a dying lake that is choked with plants and algae and low in oxygen). The factors described on the Lake Scorecards assess various aspects of the risk for acceleration of this “eutrophication” process.

- Each lake has a unique location and history, both natural history and human history.
- Every lake—even in wilderness areas—has a certain life span, which includes a tendency toward eutrophication. Most lakes eventually fill in, becoming bogs, then meadows, then forests, usually on a timescale of centuries or millennia.
- Many human activities near lakes—removing forests and other natural vegetation, increasing erosion on the land, adding harmful chemicals to the water, introducing invasive organisms—can speed up the eutrophication process.
- In the short term—the lifetimes of yourselves and your children and grandchildren—a lake that is becoming eutrophic is also becoming less suitable for human recreation and enjoyment.

Water Quality Trends

The water quality measures included here—clarity (Secchi disk transparency), total phosphorus, chlorophyll-a, and algae blooms—should be familiar to Raymond residents since they were the primary focus of Raymond Waterways’ 2025 Annual Report. However,

it is important to notice that the Scorecards are set up to explore water quality in terms of trends, that is, changes in trophic levels, or eutrophication. Where trends are significantly improving or too variable to be reasonably certain of any trend, the lake receives a score of GOOD. If there is a significant worsening trend, the score is POOR. If the trend is statistically significant, but of smaller magnitude, the lake receives a grade of FAIR.

Lake Scorecards analyze trends in clarity, phosphorus, and chlorophyll-a, only if reliable data are available for at least 10 years in the past 30 years. All Raymond lakes have enough data for clarity analysis, but for the other two, most appear in gray, indicating inadequate data. As of now, the Scorecards analyze phosphorus and chlorophyll-a samples only if they are taken from “epilimnetic cores,” not from specific depths. The epilimnion is the sun-lit top layer of the lake, where the water is well mixed with air. This layer extends from the surface down to the thermocline, where temperatures drop quickly with depth. An epilimnetic core sample is taken with a long tube that captures water throughout the epilimnion (usually down to around 10 meters). However, many lakes, including most of ours, have not done this type of sampling often enough to meet the 10/30 years standard. Future iterations of the Scorecards will include analysis of phosphorus or chlorophyll-a data from surface sampling, allowing more data to be included, even though the samples analyzed may be less representative.

An algae bloom is defined as conditions in which Secchi disk transparency decreases to less than 2 meters. If there are a minimum of 10 years of data and no recorded algae blooms in the last 30 years, the lake is scored as GOOD; if there are occasional blooms, but in less than half of documented years, it receives a FAIR rating; if more than half of measured years have algae blooms, the lake receives a score of POOR/AT RISK.

Shoreland and Habitat

Shoreland Condition

Natural shoreland vegetation—trees, understory vegetation, and ground cover—protects the lake by absorbing runoff and inhibiting erosion, while the built environment, including buildings, roads, and lawns increase stormwater runoff volume and energy by preventing water from soaking into the ground, increasing nonpoint-source pollution. The Scorecards evaluate shoreland condition by measuring the percentage of impervious surface within the 500-meter (0.3-mile) zone around the lake. Impervious surfaces covering less than 1% in this zone is associated with low nutrient, low productivity (oligotrophic) lakes (scored as GOOD); the range of impervious surface from 1% to 10% correlates with moderate (mesotrophic) nutrient levels (graded as FAIR); lakes with impervious surface area more than 10% of their shorelands generally have higher nutrient concentrations (POOR/AT RISK). Over a large sample of lakes, these categories correlated closely with other measures of water quality. Although all our lakes are in the FAIR category, it is good to know that 62% of all Maine lakes have less than 1% impervious surface in this zone earning a GOOD score.

Littoral Habitat

The littoral habitat refers to the structural habitat found in the zone of shallow water close to the shore of a lake. This area provides essential habitat for lake life, including feeding areas, breeding sites, and protective cover. A healthy littoral zone includes a variety of physical characteristics like rocks, sand, and submerged wood. Littoral habitat generally suffers when the shoreland loses its natural condition due to construction of homes, roads, etc. So littoral and near-shore land conditions are interrelated, and both are impacted by development.

Littoral habitat is evaluated directly with field surveys in 10 randomly placed locations around the lake. At each site, scores are determined for 10 indicators of habitat complexity and health, including variability of substrate size (ie boulders, rocks, sand), extent of plant coverage, and amount of woody habitat (dead trees and branches). Scores from the 10 sample areas are combined and compared with lakes with natural shorelines and no human development to determine three grades of habitat condition: natural (GOOD), intermediate (FAIR), and diminished (POOR).

Only one of our lakes (Panther Pond) has had a littoral zone survey, which are clearly quite complicated. However, Lake Stewards of Maine plans to develop a training program for volunteers so in the future more of these surveys can be performed.

Comparison of sub-category scores among all six Raymond lakes

	Sub-categories	Crescent Lake	Notched Pond	Panther Pond	Raymond Pond	Sebago Lake	Thomas Pond
Water Quality	SDT (clarity)	Blue	Blue	Blue	Blue	Blue	Blue
	Total Phosphorus	Grey	Grey	Grey	Grey	Blue	Grey
	Chlorophyll-a	Grey	Grey	Grey	Grey	Blue	Grey
	Algae Blooms	Blue	Blue	Blue	Blue	Blue	Blue
Shoreland	Shoreland Condition	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow
	Littoral Habitat	Grey	Grey	Red	Grey	Grey	Grey
Vulnerability	Oxygen	Yellow	Blue	Yellow	Yellow	Blue	Yellow
	Runoff Pollution	Red	Red	Red	Red	Red	Red
	Sediment Chemistry	Grey	Grey	Blue	Blue	Grey	Grey
Invasiveness	Infestation Assessment	Blue	Grey	Blue	Blue	Red	Blue
	Risk Condition	Red	Yellow	Red	Red	Red	Red

Lake Vulnerability

This category includes measures that are indicators of how sensitive the lake is to changes in water chemistry.

Sediment Chemistry

Phosphorus in the water is a fertilizer for algae and plants, so increases in phosphorus are a key factor in the eutrophication process. Some phosphorus normally binds to iron oxides and aluminum oxides in lake-bottom sediment, removing it from the water. However, when dissolved oxygen levels in lake water decline, iron oxides—but not aluminum oxides—change their form, releasing phosphorus. Therefore, ratios of aluminum-to-iron (Al:Fe) and aluminum-to-phosphorus (Al:P) in sediments can predict whether phosphorus sequestered in the sediments will be released into the water column under low-oxygen conditions.

More aluminum means less phosphorus will be released in low-oxygen conditions. DEP uses established values from published research to set cut-off ratios of 3-to-1 for Al-to-Fe and 25-to-1 for Al-to-P. If both ratios are higher than these cut-offs, the lake is considered GOOD for phosphorus retention; if both ratios are less than their cut-off points, the lake is scored POOR/AT RISK; if one ratio is above and the other below the cut-off, the lake is rated FAIR grade.

Runoff Pollution

Most significant pollution that comes from a single source, like a factory or a wastewater treatment plant (known as “point-source pollution”), was eradicated from Maine lakes long ago. However, nonpoint-source pollution (NPS), which comes from the watershed at large and is carried into the lake mostly by stormwater runoff, remains a significant threat to lake-water quality in the state. The DEP maintains an NPS priority list to encourage pollution abatement work in the most vulnerable watersheds. Lakes may be classified as threatened by NPS for various reasons including if they show negative water-clarity trends, are especially threatened by agricultural development, or are designated as impaired. This category also includes lakes that are considered particularly sensitive to increased pollution because they are used as public water supplies or fish hatcheries. The DEP uses a model to predict changes in lake phosphorus concentration using watershed growth projections to estimate future changes in phosphorus loading. The Scorecards assign grades of GOOD, FAIR, or POOR based on whether a lake has zero, one, or more than one of the factors that may put it on the DEP priority list.

Oxygen

This lake vulnerability factor indicates how likely the lake is to experience naturally low oxygen conditions (anoxia) that could affect fish survival and alter normal nutrient cycling, including the release of phosphorus from lake sediments. The likelihood of anoxic conditions decreases with increasing maximum depth. At the same time, the likelihood of anoxic conditions increases with larger proportions of the lake below the epilimnion, because this implies a smaller proportion of lake water in the zone where contact with air constantly mixes in more

oxygen. Oxygen scores in the Scorecards are based on a published model that accounts for both these effects. The Scorecards define a probability of anoxia less than 25% as GOOD, probability greater than 75% as POOR/AT RISK, and probability between 25% and 75% as FAIR.

Invasive Plants

Infestation Assessment

This assessment is generally performed by volunteer Invasive Plant Patrollers (or IPPers) organized on each lake. If a lake has been surveyed within the last 3 years and no infestations were observed, the lake is listed in GOOD condition. If the latest survey was 3 to 6 years ago and no infestations were observed, the lake is scored as FAIR, and the lake needs an updated survey. If the last negative survey was more than 6 years ago or there is a known current infestation, the lake receives a score of POOR.

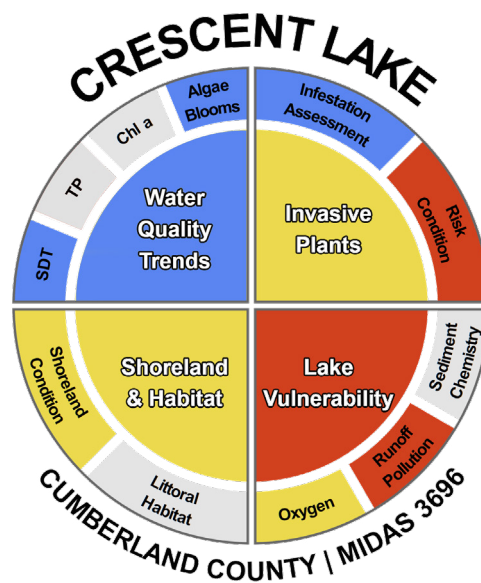
Risk Condition

This score reflects the likelihood of a new invasive plant infestation occurring in the lake. The score is based on a combination of weighted factors, with the most influential being connectivity to an infested waterbody (upstream or downstream), type of boat access, population within 30 kilometers (18.5 miles) of the lake, and proximity to an infested waterbody. The highest (worst) possible score is 90; scores above 50 are considered high risk. Since all lakes in Maine are at some risk of infestation, no lake in the state receives a score of GOOD.

It is important to note that the Scorecards are a work in progress: data will be updated periodically, and changes in analyses and presentation will be considered for future iterations.

Scorecards for Raymond's Lakes and Ponds

Now, let's walk through the Scorecards for the six lakes in Raymond.



Condition Assessments: ■ Good ■ Fair ■ Poor/At Risk ■ Unknown

Click on the image above to view the interactive Scorecard

Water Quality Trends

For measures of water quality, Crescent Lake received GOOD grades for Secchi disk transparency and algae blooms indicating stable or improving water quality, and UNKNOWN for total phosphorus and chlorophyll-a. (Note: If you look online, the Crescent Lake Scorecard currently will show the total phosphorus trend for Crescent Lake as POOR, but its true score is UNKNOWN. This was due to an error in translating information in the report to the circle image and will be corrected online soon.)

For **Secchi disk transparency (SDT)**, although there has been a slight decrease in average clarity from 1995 to 2024 ($\tau = -0.122$), the decline is not large and is not statistically significant ($P = 0.354$). Therefore, there is no certain change in transparency, and Crescent Lake is rated GOOD for water clarity. In 2025 volunteer water-quality monitors on Crescent Lake recorded an average SDT of 6.61 meters which was generally in line with the 30 years analyzed by the Scorecard, so it is unlikely to change the trend analysis when 2025 data are included.

There are not enough data from epilimnetic core samples over the years to perform trend tests for total phosphorus or for chlorophyll-a for Crescent Lake. The Scorecard encourages readers concerned with the health of Crescent Lake to support the Crescent Lake Watershed Association, which organizes and assists volunteer water quality monitors on the lake, and to check out the **"Get Involved"** section at the end of the Scorecard for other ways to help.

Crescent Lake has not experienced an **algae bloom** in 30 years of frequent monitoring, earning it a score of GOOD in this subcategory.

Shoreland & Habitat

The **shoreland** condition score for Crescent Lake is FAIR based on the satellite finding of 5.04% impervious surfaces on the land within 500 meters of the lakeshore. This suggests more stormwater runoff is probably reaching the lake than for an undeveloped lake, bringing with it a moderate risk for pollutant inputs that will degrade water quality over time.

Littoral habitat (shallow water) requires an on-site (in-the-water) assessment. No such assessment has been made of Crescent Lake, so it is given a score of UNKNOWN.

Lake Vulnerability

No analysis has been made of the **sediment chemistry** of Crescent Lake, so it is unknown whether ratios of aluminum, iron, and phosphorus are likely to contribute to the release of phosphorus in the lake's waters if dissolved oxygen concentrations decline.

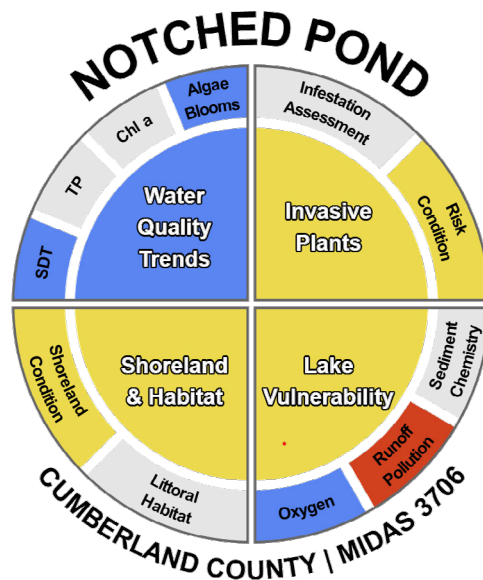
The **runoff pollution** subcategory relates to elements of the lake or its watershed that make the lake more susceptible to the effects of pollutants in stormwater runoff. The DEP priority list identifies Crescent Lake as vulnerable to runoff pollution for two reasons, which places it in the POOR/AT RISK category:

- DEP models predict it is vulnerable to additional phosphorus inputs due to lake hydrology (including its connections to other waterbodies) and threats within the watershed.
- It has had recent increased impacts or significant potential threats from agriculture or residential development.

Based on modeling, Crescent Lake is in the FAIR category for **oxygen**, but very close to the POOR/AT RISK range. This indicates a moderate probability of the lake experiencing low oxygen concentrations (anoxia), which may affect fish habitat and internal nutrient cycling. This probability is dependent on two factors, lake depth and percentage of lake area below the epilimnion, as explained above. Crescent Lake has a maximum depth of 16.5 meters (54 feet), and a little more than 40% of Crescent Lake’s area is below the epilimnion.

Invasive Plants

Crescent Lake has been assessed for invasive plant species within the last 3 years, and none have been found. This gives the lake a GOOD rating in the **assessment** sub-category. However, Crescent Lake receives a POOR/AT RISK rating, with a **risk condition** score of 76 due to factors such as connectivity to infested waterbodies (Sebago Lake), public boat access, and high human population within 30 kilometers.



Condition Assessments: Good Fair Poor/At Risk Unknown

Click on the image above to view the interactive Scorecard

Water Quality Trends

For measures of water quality, Notched Pond received GOOD grades for Secchi disk transparency and algae blooms indicating stable or improving water quality, and UNKNOWN for total phosphorus and chlorophyll-a.

Secchi disk transparency data for Notched Pond from 1995 to 2018 show a significant improving trend ($\tau = +0.543$; $P < 0.001$). Unfortunately, Lake Stewards and DEP have no data from Notched Pond after 2018, so new measurements will be needed soon. There are insufficient data from epilimnetic core samples on **total phosphorus** and **chlorophyll-a** to support a statistically valid test for trends in those factors. The Scorecard directs readers interested in Notched Pond to the **Get Involved** section at the end of the Scorecard for information on how to understand and help protect the pond in the future.

Notched Pond has had no **algae blooms** in any of the 25 years since 1995 for which Secchi disk results are on record. The graph of these results indicates that multiple Secchi disk readings were taken each year from 1995 to about 2018, but only once since then.

Shoreland & Habitat

Shoreline condition on Notched Pond is rated as FAIR, based on a finding of 5.86% impervious surfaces within 500 meters (0.3 miles) of the shore.

Littoral habitat (shallow water) requires an on-site (in-the-water) assessment. No such assessment has been made of Notched Pond, so it is given a score of UNKNOWN.

Lake Vulnerability

No analysis has been made of the **sediment chemistry** of Notched Pond, so it is unknown whether ratios of aluminum, iron, and phosphorus are likely to contribute to the release of phosphorus in the pond's waters if dissolved oxygen concentrations decline.

The DEP priority list identifies Notched Pond as vulnerable to **runoff pollution** for two reasons, which places it in the POOR/AT RISK category:

- DEP models predict it is vulnerable to additional phosphorus inputs due to lake hydrology and threats within the watershed.
- It has had recent increased impacts or significant potential threats from agriculture or residential development.

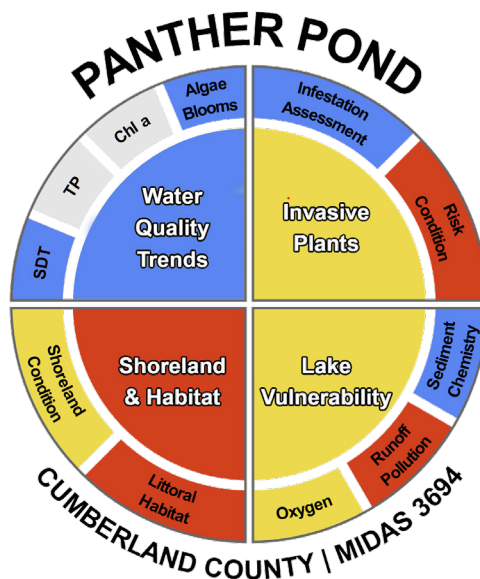
Due to the shallowness of the pond, it is relatively unlikely that Notched Pond will lose substantial dissolved **oxygen**, giving it a GOOD rating on the Scorecard. Shallow lakes often do not display strong thermal stratification, allowing most of the lake volume to remain oxygenated through wind action and photosynthesis. The model used to estimate oxygen

loss was developed by studying deeper lakes that are stratified through most of the warm season. Direct measurement of temperature and dissolved oxygen in Notched Pond should be considered to verify the lack of stratification.

Invasive Plants

The **infestation status** of aquatic invasive plants in Notched Pond is unknown because of a lack of data. Surveys for aquatic invasive plants have not been completed recently at Notched Pond. The Scorecard notes that the best way to keep lakes free of invasive plants is to conduct frequent surveys. Many Raymond residents are trained Invasive Plant Patrollers.

With a **risk condition** score of 37, Notched Pond is considered at MODERATE risk for a new infestation of aquatic plants, unlike all other lakes in Raymond, which are at HIGH risk. This difference is probably due to Notched Pond having no public access and not being connected to Sebago Lake, as our other lakes are. Our entire town scores high for the risk factors of proximity to large human population and roads.



Condition Assessments: Good Fair Poor/At Risk Unknown

Click on the image above to view the interactive Scorecard

Water Quality Trends

For measures of water quality, Panther Pond received GOOD grades for Secchi disk transparency and algae blooms indicating stable or improving water quality, and UNKNOWN for total phosphorus and chlorophyll-a. (Note: If you look online, the Panther Pond Scorecard

currently will show the transparency trend for Panther Pond as POOR, but its true score is GOOD. This was due to an error in translating information in the report to the circle image and will be corrected online soon.)

For **Secchi disk transparency (SDT)**—or water clarity—there has been a slight decrease in annual average clarity in Panther Pond from 1995 to 2024. However, the difference is on the edge of statistical significance at $P = 0.05$. A P-value of 0.05 means the likelihood of getting this test result by chance alone would be 5%, even if no trend were actually present. For most purposes, results are considered significant if the probability of a false positive like this is less than 5%. In addition, the magnitude of the trend ($\tau = -0.255$) is less than the limit set by DEP to define a meaningful change, which is plus or minus 0.5. This decline in transparency is small. Therefore, Panther Pond gets a GOOD rating for water clarity. In 2025 volunteer water-quality monitors on Panther Pond recorded an average SDT of 6.77 meters, which was generally in line with the 30 years analyzed by the Scorecard, so it is unlikely to change the trend analysis when 2025 data are included.

There are not enough data from epilimnetic core samples over the years to perform trend tests for **total phosphorus** or **chlorophyll-a** for Panther Pond. The Scorecard encourages readers concerned with the health of Panther Pond to support the Panther Pond Association, which organizes and assists volunteer water-quality monitors on the pond, and to check out the [Get Involved](#) section at the end of the Scorecard for other ways to help.

Panther Pond has not experienced an **algae bloom** in 30 years of frequent monitoring, earning it a score of GOOD in this subcategory.

Shoreland & Habitat

The **shoreland** condition score for Panther Pond is FAIR based on the satellite finding of 4.91% impervious surfaces on all the land within 500 meters of the lakeshore. This suggests more stormwater runoff is probably reaching the lake than for an undeveloped lake, bringing with it a moderate risk for pollutant inputs that will degrade water quality over time.

Panther Pond is the only lake in Raymond that has had an on-site evaluation of its **littoral habitat**. This survey was conducted in 2022 and found average conditions in 10 random sites around the lake to be less natural, with 95% confidence that the true average is below the average defined as “intermediate condition,” which mandates a score of POOR/AT RISK. Figure 4 in this section of the Panther Pond Scorecard shows the distribution of scores for the 10 littoral habitat assessments both in Panther Pond (in red) and in all evaluated deep lakes in the state (in gray).

Lake Vulnerability

A **sediment chemistry** study of Panther Pond was conducted in 2017. It found the ratios of Al:Fe and Al:P were 3.99 and 56.69, respectively. Both results are better than the established thresholds, giving Panther Pond a rating of GOOD for sediment chemistry. These ratios

suggest that anoxic (low oxygen) conditions in the lake are unlikely to result in the release of phosphorus from the sediments.

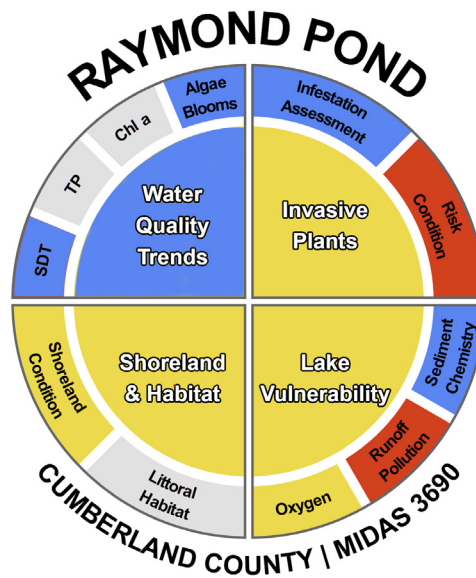
The DEP priority list identifies Panther Pond as vulnerable to **runoff pollution** for two reasons, which places it in the POOR/AT RISK category:

- DEP models predict it is vulnerable to additional phosphorus inputs due to lake hydrology and threats within the watershed.
- It has had recent increased impacts or significant potential threats from agriculture or residential/urban development.

Based on modeling, Panther Pond is in the FAIR category for **oxygen**. This indicates a moderate probability of the lake experiencing low oxygen concentrations (anoxia), which may affect fish habitat and internal nutrient cycling. This probability is dependent on two factors: lake depth and percentage of lake area below the epilimnion, as explained above. Panther Pond has a maximum depth of 21 meters (68 feet), and a little more than 40% of Panther Pond's area is below the epilimnion.

Invasive Plants

Panther Pond has been assessed for invasive plant species within the last 3 years, and none have been found. This gives the lake a GOOD rating in the **assessment** subcategory. However, with a risk score of 76, Panther Pond receives a POOR/AT RISK score for **risk conditions** due to factors such as connectivity to infested waterbodies (Sebago Lake), public boat access, and high human population within 30 kilometers.



Condition Assessments: ■ Good ■ Fair ■ Poor/At Risk ■ Unknown

Click on the image above to view
the interactive Scorecard

Water Quality Trends

For measures of water quality, Raymond Pond received GOOD grades for Secchi disk transparency and algae blooms indicating stable or improving water quality, and UNKNOWN for total phosphorus and chlorophyll-a. (Note: If you look online, the Raymond Pond Scorecard currently will show the transparency trend for Raymond Pond as POOR, but its true score is GOOD. This was due to an error in translating information in the report to the circle image and will be corrected online soon.)

For **Secchi disk transparency (SDT)**—or water clarity—there has been a slight decrease in annual average clarity in Raymond Pond from 1995 to 2024. However, the magnitude of the declining trend ($\tau = -0.273$) is less than the limit set by DEP to define a meaningful change, which is plus or minus 0.5. Moreover, the trend is not statistically significant at $P = 0.059$. This means the likelihood of getting this result would be near 6% even if no real trend were present (ie a false positive). For most purposes, results are considered significant if the probability of a false positive like this is less than 5%. This decline in transparency is small, with only marginal certainty that it is not a false positive (the result of chance variations in the data). Therefore, Raymond Pond gets a GOOD rating for water clarity. In 2025 volunteer water-quality monitors on Raymond Pond recorded an average SDT of 5.94 meters which is generally in line with the 30 years analyzed by the Scorecard, so it is unlikely to change the trend analysis when 2025 data are included.

There are not enough data from epilimnetic core samples over the years to perform trend tests for **total phosphorus** or for **chlorophyll-a** for Raymond Pond. The Scorecard encourages

readers concerned with the health of Raymond Pond to check out the Get Involved section at the end of the scorecard to find ways to help protect lake health.

Raymond Pond has not experienced an algae bloom in 30 years of frequent monitoring, earning it a score of GOOD in this subcategory.

Shoreland & Habitat

The shoreland condition score for Raymond Pond is FAIR based on the satellite finding of 3.08% impervious surfaces on all the land within 500 meters of the lakeshore. This suggests more stormwater runoff is probably reaching the lake than for an undeveloped lake, bringing with it a moderate risk for pollutant inputs that will degrade water quality over time.

Littoral habitat (shallow water) requires an on-site (in-the-water) assessment. No such assessment has been made of Raymond Pond, so it is given a score of UNKNOWN.

Lake Vulnerability

A sediment chemistry study of Raymond Pond was conducted in 2010. It found the ratios of Al:Fe and Al:P were 4.37 and 33.78, respectively. Both findings are better than the established thresholds, giving Raymond Pond a rating of GOOD for sediment chemistry. These ratios suggest that anoxic (low oxygen) conditions in the lake are unlikely to result in the release of phosphorus from the sediments.

The DEP priority list identifies Raymond Pond as vulnerable to **runoff pollution** for two reasons, which places it in the POOR/AT RISK category:

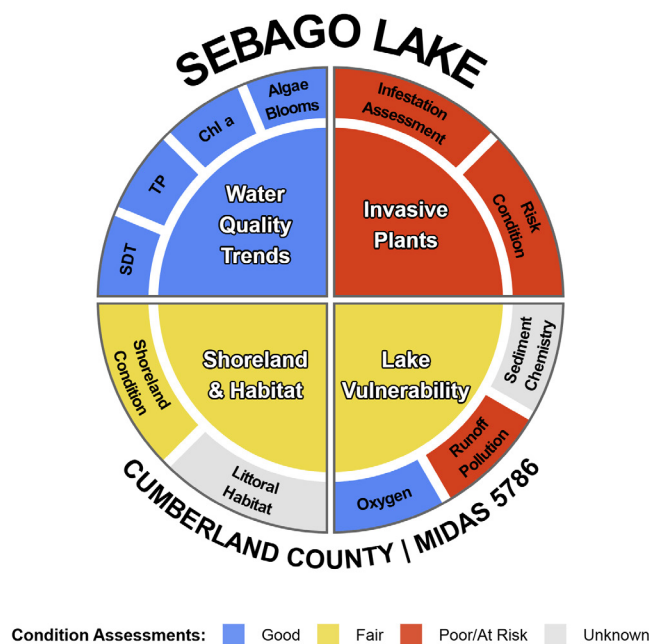
- DEP models predict it is vulnerable to additional phosphorus inputs due to lake hydrology and threats within the watershed.
- It has had recent increased impacts or significant potential threats from agriculture or residential/urban development.

Based on modeling, Raymond Pond is in the FAIR category for **oxygen**. This indicates a moderate probability of the lake experiencing low oxygen concentrations (anoxia), which may affect fish habitat and internal nutrient cycling. This probability is dependent on two factors: lake depth and percentage of lake area below the epilimnion, as explained above. Raymond Pond has a maximum depth of 13 meters (42 feet), and a little more than 40% of Raymond Pond's area is below the epilimnion.

Invasive Plants

Raymond Pond has been assessed for invasive plant species within the last 3 years, and none have been found. This gives the lake a GOOD rating in the **assessment** subcategory. However, with a risk score of 54, Raymond Pond receives a POOR/AT RISK score for **risk conditions**

due to factors such as connectivity to infested waterbodies (Sebago Lake) and high human population within 30 kilometers.



Click on the image above to view the interactive Scorecard

Water Quality Trends

For measures of water quality trends—Secchi disk transparency, total phosphorus, and chlorophyll-a—Sebago Lake received a grade of GOOD indicating stable or improving water quality for each of these three subcategories. It also scores GOOD for algae blooms, with no recorded blooms or greatly reduced water clarity for the past 30 years.

For **Secchi disk transparency (SDT)**—or water clarity—there has been no change in annual average clarity in Sebago Lake from 1995 to 2024. The magnitude of the trend is positive but very small ($\tau = +0.007$), suggesting water clarity in the lake is stable or too variable to detect any trend. Therefore, Sebago Lake is rated GOOD for water clarity. We have no 2025 data on clarity in Sebago Lake yet.

The Portland Water District has tested for **total phosphorus** in epilimnetic cores every year since at least 1995. Through 2024, there has been a small upward (worsening) trend ($\tau = +0.103$), which is not significant ($P = 0.442$). Thus, the trend is stable or too variable to detect, putting Sebago Lake in the GOOD category.

Epilimnetic core samples for **chlorophyll-a** have also been taken every year at Sebago Lake for at least 30 years through 2024. Statistical analysis shows that the readings are stable or too variable to determine a trend, again giving Sebago Lake a score of GOOD.

Sebago Lake has not experienced an **algae bloom** in 30 years of frequent monitoring, earning it a score of GOOD in this subcategory.

Shoreland & Habitat

The **shoreland** condition score for Sebago Lake is FAIR based on the satellite finding of 5.43% impervious surfaces on all the land within 500 meters of the lakeshore. This suggests more stormwater runoff is probably reaching the lake than for an undeveloped lake, bringing with it a moderate risk for pollutant inputs that will degrade water quality over time.

Littoral habitat (shallow water) requires an on-site (in-the-water) assessment. No such assessment has been made of Sebago Lake, so it is given a score of UNKNOWN.

Lake Vulnerability

No analysis has been made of the **sediment chemistry** of Sebago Lake, so it is unknown whether ratios of aluminum, iron, and phosphorus are likely to contribute to the release of phosphorus in the lake's waters if dissolved oxygen concentrations decline.

The DEP priority list identifies Sebago Lake as vulnerable to **runoff pollution** for three reasons, which places it in the POOR/AT RISK category:

- Sebago Lake is a "Lake with Outstanding Water Quality" requiring a high level of protection from threats in the watershed.
- It is licensed as a public water source.
- It has had recent increased impacts or significant potential threats from agriculture or residential/urban development.

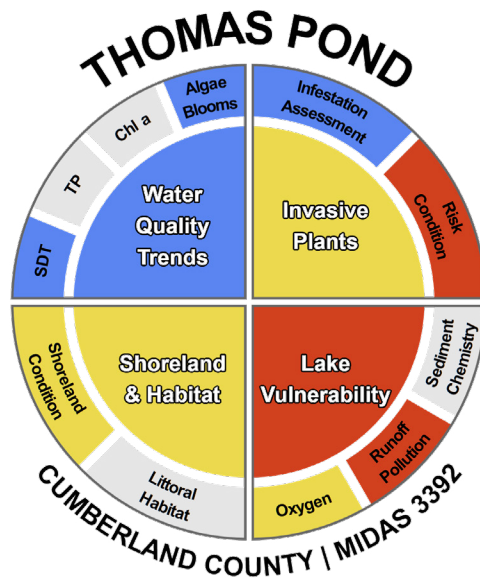
Based on modeling, Sebago Lake is in the GOOD category for **oxygen**. This indicates the likelihood of extensive low oxygen concentrations (anoxia) is low. Sebago Lake has a maximum depth of 96 meters (316 feet). At this depth, the other factor—lake area below the epilimnion—has no effect on anoxia risk.

Invasive Plants

There is a known **infestation** of variable leaf milfoil in Sebago Lake, giving the lake a POOR/AT RISK score automatically. Raymond Waterways, the Town of Raymond, and other organizations and municipalities around the lake work to remove milfoil and limit its spread, but it will probably never be eradicated from the entire lake. Inspection of boats and trailers entering and leaving Sebago Lake is essential to avoid an additional

infestation of new invasive species and to prevent the transfer of variable leaf milfoil to other lakes.

With a risk score of 84, Sebago Lake receives a POOR/AT RISK score for **risk conditions** due to factors such as connectivity to infested waterbodies (Long Lake, Brandy Pond, Songo River), a public boat ramp, and high human population within 30 kilometers.



Condition Assessments: ■ Good ■ Fair ■ Poor/At Risk ■ Unknown

Click on the image above to view the interactive Scorecard

Water Quality Trends

For measures of water quality, Thomas Pond received GOOD grades for Secchi disk transparency and algae blooms, indicating stable or improving water quality, and UNKNOWN for total phosphorus and chlorophyll-a.

For **Secchi disk transparency (SDT)**—or water clarity—there has been a small decrease in annual average clarity in Thomas Pond from 1995 to 2024. However, the difference is not statistically significant at $P = 0.239$. This means the likelihood of getting this result or a more extreme one would be near 25% even if no real trend was present. For most purposes, results are considered significant if the probability of a false positive like this is less than 5%. In addition, the magnitude of the declining trend ($\tau = -0.154$) is less than the limit set by DEP to define a meaningful change, which would be -0.5 . We could say this decline in transparency is small, with no

confidence that it is not the result of chance variations in the data. Therefore, Thomas Pond is rated GOOD for water clarity. In 2025 volunteer water-quality monitors on Thomas Pond recorded an average SDT of 6.03 meters which is generally in line with the 30 years analyzed by the Scorecard, so it is unlikely to change the trend analysis when 2025 data are included.

There are not enough data from epilimnetic core samples over the years to perform trend tests for **total phosphorus** or **chlorophyll-a** for Thomas Pond. However, volunteers on Thomas Pond have taken enough surface-grab samples of phosphorus to support a statistical analysis of trend, which will appear in the next version of the Scorecards. The Scorecard encourages readers concerned with the health of Thomas Pond to support the Thomas Pond Improvement Association, which organizes and assists volunteer water quality monitors on the pond and to check out the [Get Involved](#) section at the end of the Scorecard for other ways to help.

Thomas Pond has not experienced an **algae bloom** in 30 years of frequent monitoring, earning it a score of GOOD in this subcategory.

Shoreland & Habitat

The **shoreland** condition score for Thomas Pond is FAIR based on the satellite finding of 5.87% impervious surfaces on all the land within 500 meters of the lakeshore. This suggests more stormwater runoff is probably reaching the lake than for an undeveloped lake, bringing with it a moderate risk for pollutant inputs that will degrade water quality over time.

Littoral habitat (shallow water) requires an on-site (in-the-water) assessment. No such assessment has been made of Thomas Pond, so it is given a score of UNKNOWN.

Lake Vulnerability

No analysis has been made of the **sediment chemistry** of Thomas Pond, so it is unknown whether ratios of aluminum, iron, and phosphorus may be likely to contribute to the release of phosphorus in the lake's waters if dissolved oxygen concentrations decline.

The DEP priority list identifies Thomas Pond as vulnerable to **runoff pollution** for two reasons, which places it in the POOR/AT RISK category:

- DEP models predict it is vulnerable to additional phosphorus inputs due to lake hydrology and threats within the watershed.
- It has had recent increased impacts or significant potential threats from agriculture or residential development.

Based on modeling, Thomas Pond is in the FAIR category for **oxygen**. This indicates a moderate probability of the lake experiencing low oxygen concentrations (anoxia), which may affect fish habitat and internal nutrient cycling. This probability is dependent on two factors:

lake depth and percentage of lake area below the epilimnion, as explained above. Thomas Pond has a maximum depth of 19.5 meters (64 feet), and about 50% of Thomas Pond's area is below the epilimnion.

Invasive Plants

Thomas Pond has been assessed for invasive plant species within the last 3 years, and none have been found. This gives the lake a GOOD rating in the **assessment** subcategory. However, with a risk score of 75, Thomas Pond receives a POOR/AT RISK score for **risk conditions** due to factors such as connectivity to infested waterbodies (Sebago Lake), a public boat ramp, and high human population within 30 kilometers.



What You Can Do About Water Quality

There are many ways for you to take an active role in maintaining the health of Raymond lakes. See the links below for specific ways to get involved.

Water Quality—The regular collection of good data is essential to understanding the condition of lakes. Volunteer lake monitors collect these data. If you are interested in becoming a volunteer lake monitor, contact Raymond Waterways or your lake association. See the [Lake Stewards of Maine](#) website for more about state-wide monitoring efforts and how monitors are trained. Volunteers are especially needed for Raymond Pond and Notched Pond.

Shoreland & Habitat—Good stewardship of your lake begins with a healthy shoreland area. Discontinuing the use of fertilizers and pesticides, reducing stormwater runoff, properly maintaining septic systems, and planting more native species can make a big difference. LakeSmart is a state-wide program helping landowners make these sorts of changes to protect water quality and habitat. Contact [Raymond Waterways](#) to schedule a free, voluntary, non-regulatory, evaluation of your lakeshore property. Learn more about this program, including how to become a volunteer evaluator, at [LakeSmart.org](#).

Invasive Plants—Prevention of infestation and early detection are keys to managing the spread of aquatic invasive species. This is intensive work and is best conducted with many

hands. See the links below from Raymond Waterways, Maine DEP, Lakes Environmental Association, and Lake Stewards of Maine for information about getting involved with invasive aquatic plant management on your lake:

- Assist with [the Raymond Waterways](#) courtesy boat inspection program (CBI)
- [Learn about invasive aquatic plant identification and becoming a certified invasive plant patroller \(IPPer\)](#)
- Contact [Raymond Waterways](#) or your lake association to be put in touch with other IPPers

Financial and Volunteer Support—Raymond Waterways and your local lake associations need volunteers and funds to do the good work of protecting our lakes and educating the public about waterway issues. If you are interested in volunteering in any capacity or donating money, please visit one or more of the following websites for more information and links to donate:

- [Raymond Waterways](#)
- [Crescent Lake Improvement Association](#)
- [Panther Pond Association](#)
- [Thomas Pond Improvement Association](#)



Conclusion: Vigilance Required to Preserve Our Lakes!

Raymond residents are lucky that water quality in our lakes and ponds has historically been very good. We are also fortunate to have a strong culture of defending our waterways. This is reflected by the very active role that volunteers have taken in monitoring water quality factors, searching out invasive plants before they become difficult to eradicate, and educating neighbors and visitors to prevent the spread of invasives from other lakes.

Starting last year, Raymond Waterways initiated a new tradition of reporting to the public annually on the health status of our lakes. This year we are familiarizing you with the DEP's "Lake Scorecards," a system of reporting that we all hope will deepen everyone's understanding of the state of our lakes. Future Raymond Waterways reports will build on the information in these first two issues, with up-to-date data and new features. This report was produced mainly with publicly available data, but in future years, and with wider participation of Raymond volunteers, we hope to tailor these reports to issues of most concern to town residents and visitors.



How You Can Get Involved with Raymond Waterways

For the past 50+ years, Raymond Waterways has worked tirelessly to preserve and protect lakes, streams, and ponds in the Town of Raymond. We are a volunteer organization that works closely with lake associations, residents, shoreline property owners, visitors, and state and local agencies to address watershed issues of concern.

Today, our core programs are all looking for additional volunteers:

1. Courtesy Boat Inspections (CBI): We run the Courtesy Boat Inspection program, which educates boaters about how to inspect their boats at all four public boat ramps in Raymond to prevent the spread of invasive species.

2. LakeSmart: We provide free onsite assessments to shoreline residents who are interested in improving their properties to minimize erosion and runoff into the lakes—the best way to combat some of the threats described in this report. Let us know if you would like an evaluation of your property or if you are interested in becoming a LakeSmart evaluator.

3. Water-Quality Monitoring: We assist volunteers who monitor water quality on lakes, ponds, rivers, and streams; we provide funds to lake associations to purchase water-quality monitoring equipment; and we publish these annual water quality reports.

4. Watershed Stewardship: We assist lake associations and individuals in conducting watershed surveys and implementing lake protection projects to document and control erosion and polluted runoff. Last year we took on the task of pulling up invasive milfoil in the shallows of Turtle Cove.

5. Education & Outreach: We develop outreach and education programs to promote public awareness of water quality and watershed issues; we also foster working partnerships with state and local officials and other watershed protection groups.

Raymond Waterways couldn't do its work—including this report—without generous donations of time and money by countless residents and visitors to Raymond. To all of you who have contributed, we give you our heartfelt thanks!



Volunteer with Raymond Waterways: email info@raymondwaterways.org
or visit our website at <http://www.raymondwaterways.org>.



Donate to Raymond Waterways: email treasurer@raymondwaterways.org
or visit our website at <http://www.raymondwaterways.org>.