# Volunteer Lake Assessment Program Individual Lake Reports

## PERKINS POND, SUNAPEE, NH

**MORPHOMETRIC DATA**

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Watershed Area (Ac.): | 704 | Max. Depth (m): | 2.7 | Flushing Rate (yr$^{-1}$) | 1.3 | Year | Trophic class | |
| Surface Area (Ac.): | 157 | Mean Depth (m): | 1.4 | P Retention Coef: | 0.83 | 1986 | OLIGOTROPHIC | |
| Shore Length (m): | 3,900 | Volume (m$^3$): | 877,000 | Elevation (ft): | 1082 | 2003 | MESOTROPHIC | |

**TROPHIC CLASSIFICATION**

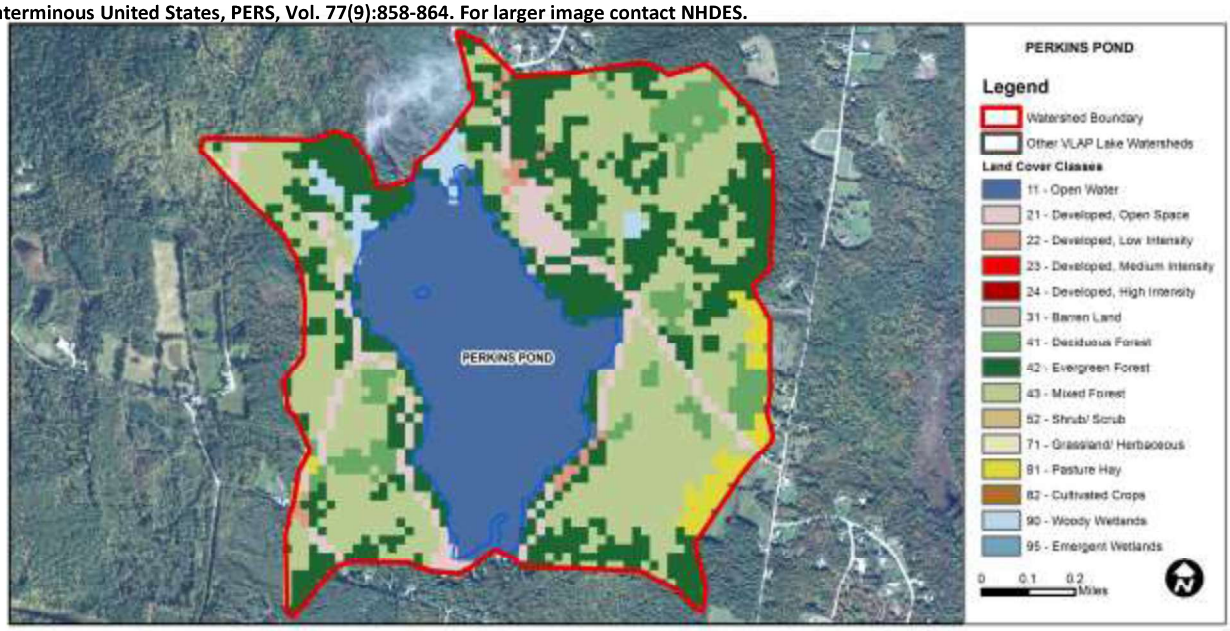
**KNOWN EXOTIC SPECIES**

**The Waterbody Report Card tables are generated from the DRAFT 2018 305(b) report on the status of N.H. waters, and are based on data collected from 2008-2017. Detailed waterbody assessment and report card information can be found at www.des.nh.gov/organization/divisions/water/wmb/swqa/index.htm**

| Designated Use | Parameter | Category | Comments |
|---|---|---|---|
| Aquatic Life | Phosphorus (Total) | Slightly Bad | Data exceed water quality standards or thresholds for a given parameter by a small margin. |
| | pH | Slightly Bad | Data periodically exceed water quality standards or thresholds for a given parameter by a small margin. |
| | Oxygen, Dissolved | Encouraging | Limited data for this parameter predicts water quality standards or thresholds are being met; however more data are necessary to fully assess the parameter. |
| | Dissolved oxygen satura | Encouraging | Limited data for this parameter predicts water quality standards or thresholds are being met; however more data are necessary to fully assess the parameter. |
| | Chlorophyll-a | Bad | Data exceed water quality standards or thresholds for a given parameter by a large margin. |
| Primary Contact Recreation | Escherichia coli | Cautionary | Limited data for this parameter predicts exceedance of water quality standards or thresholds; however more data are necessary to fully assess the parameter. |
| | Chlorophyll-a | Very Good | All sampling data meet water quality standards or thresholds for this parameter. |

**WATERSHED LAND USE SUMMARY**

**Fry, J., Xian, G., Jin, S., Dewitz, J., Homer, C., Yang, L., Barnes, C., Herold, N., and Wickham, J., 2011. Completion of the 2006 National Land Cover Database for the Conterminous United States, PERS, Vol. 77(9):858-864. For larger image contact NHDES.**




| Land Cover Category | % Cover | Land Cover Category | % Cover | Land Cover Category | % Cover |
|---|---|---|---|---|---|
| Open Water | 24.8 | Barren Land | 0 | Grassland/Herbaceous | 0.1 |
| Developed-Open Space | 6.47 | Deciduous Forest | 5.65 | Pasture Hay | 2.53 |
| Developed-Low Intensity | 0.92 | Evergreen Forest | 24.64 | Cultivated Crops | 0 |
| Developed-Medium Intensity | 0 | Mixed Forest | 33.43 | Woody Wetlands | 1.71 |
| Developed-High Intensity | 0 | Shrub-Scrub | 0 | Emergent Wetlands | 0 |

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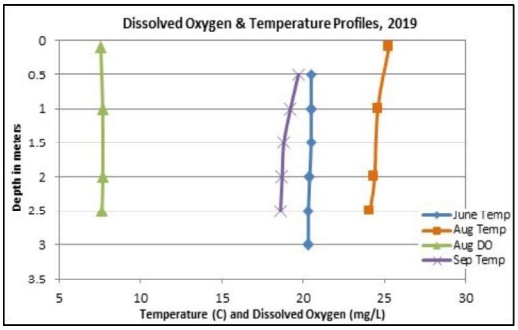
# Perkins Pond, Sunapee
# 2019 Data Summary

**Recommended Actions:** Pond chlorophyll and turbidity levels have remained within a higher range since 2010 which has likely caused the decline in water clarity or transparency. The shallow depth of the pond lends itself to potential negative impacts from boating activities. Boating activities could disturb bottom sediments in shallow areas which can in turn promote algal growth. DES' fact sheet WD-WMB-25 "Impacts of Motorized Watercraft on New Hampshire's Waterbodies" is a good resource to educate boaters on best practices. Mary's Rd. Trib. chloride levels were elevated in May, and although the level did not exceed the state chronic chloride standard, it is much greater than measured in undisturbed surface waters. Focus best management practices on application of winter de-icing materials in this area and encourage local winter maintenance companies to obtain Voluntary NH Salt Applicator license through UNH T2's Green SnowPro certification program. Ledge Pond Brook phosphorus and turbidity levels were generally elevated on each sampling event indicating potential pollution sources upstream and/or that flow conditions were too low to collect a clean sample. If pollution sources are suspected, stream bracket sampling is recommended to try and pinpoint sources. Keep up the great work!

**Observations** (*Refer to Table 1 and Historical Deep Spot Data Graphics)*

- **Chlorophyll-a:** Chlorophyll levels were within a moderate range in July and September and elevated in June and August. Average chlorophyll level decreased slightly from 2018 and was greater than the state median and the threshold for oligotrophic lakes. Historical trend analysis indicates relatively stable chlorophyll levels since monitoring began.
- **Conductivity/Chloride:** Epilimnetic, Culvert and Outlet conductivity and chloride levels remained slightly greater than the state medians, yet less than a level of concern. However, historical trend analysis indicates significantly increasing (worsening) epilimnetic conductivity levels since monitoring began. Ledge Pond Brook and Boat Launch Trib. conductivity and chloride levels were low and approximately equal to the state medians. Mary's Rd. Trib. chloride levels were slightly elevated and much greater than the other stations.
- **Color:** Apparent color measured in the epilimnion indicates the pond water is lightly tea colored, or light brown.
- **E. coli:** Burma Rd. E. coli levels were very low and much less than the state standards for public beaches and surface waters.
- **Total Phosphorus:** Epilimnetic phosphorus levels fluctuated within a moderate range and were highest in July. Average epilimnetic phosphorus level decreased slightly from 2018, was approximately equal to the state median, and was greater than the threshold for oligotrophic lakes. Historical trend analysis indicates stable epilimnetic phosphorus levels since monitoring began. Culvert and Outlet phosphorus levels were low. Ledge Pond Brook phosphorus levels were elevated from July through September during low flow conditions.
- **Transparency:** Transparency measured without the viewscope (NVS) was high (good) in June, decreased (worsened) through August, and then increased (improved) in September. Average NVS transparency improved from 2018, however historical trend analysis indicates significantly decreasing (worsening) transparency since monitoring began.
- **Turbidity:** Epilimnetic turbidity levels were slightly elevated in June when algal growth was high and in July and lab data noted organic matter in the sample. Outlet and Culvert turbidity levels were within an average range for those stations. Ledge Pond Brook turbidity levels were elevated on each sampling event and lab data noted colored water and organic matter in the sample.
- **pH:** Epilimnetic, Culvert, Ledge Pond Brook, and Outlet pH levels were within the desirable range 6.5-8.0 units, Historical trend analysis indicates stable epilimnetic pH levels since monitoring began.




**NH Water Quality Standards:** Numeric criteria for specific parameters. Results exceeding criteria are considered a water quality violation.
**Chloride:** > 230 mg/L (chronic)
**E. coli:** > 88 cts/100 mL – public beach
**E. coli:** > 406 cts/100 mL – surface waters
**Turbidity:** > 10 NTU above natural level
**pH:** between 6.5-8.0 (unless naturally occurring)

**NH Median Values:** Median values for specific parameters generated from historic lake monitoring data.
**Alkalinity:** 4.5 mg/L
**Chlorophyll-a:** 4.39 ug/L
**Conductivity:** 42.3 uS/cm
**Chloride:** 5 mg/L
**Total Phosphorus:** 11 ug/L
**Transparency:** 3.3 m
**pH:** 6.6

| Station Name | Table 1. 2019 Average Water Quality Data for PERKINS POND - SUNAPEE | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | Alk. mg/l | Chlor-a ug/l | Chloride mg/l | Color pcu | Cond. us/cm | E. coli #/100ml | Total P mg/l | Trans. m | | Turb. ntu | pH |
| | | | | | | | | NVS | VS | | |
| Epilimnion | 7.5 | 6.66 | 16 | 34 | 79.8 | | 11 | 2.12 | 1.89 | 1.72 | 6.90 |
| Boat Launch Trib. | | | 8 | | | | | | | | |
| Burma Rd. | | | | | | 4 | | | | | |
| Culvert | | | 17 | | 78.7 | | 10 | | | 1.72 | 6.79 |
| Ledge Pond Brook | | | 7 | | 49.0 | | 30 | | | 2.29 | 6.56 |
| Marys Rd. Trib. | | | 46 | | | | | | | | |
| Outlet | | | 16 | | 83.3 | | 9 | | | 1.71 | 6.83 |

## Historical Water Quality Trend Analysis

| Parameter | Trend | Explanation | Parameter | Trend | Explanation |
|---|---|---|---|---|---|
| Conductivity | Worsening | Data significantly increasing. | Chlorophyll-a | Stable | Trend not significant; data moderately variable. |
| pH (epilimnion) | Stable | Trend not significant; data show low variability. | Transparency | Worsening | Data significantly decreasing. |
| | | | Phosphorus (epilimnion) | Stable | Trend not significant; data show low variability. |