



VOLUNTEER LAKE ASSESSMENT PROGRAM INDIVIDUAL LAKE REPORTS

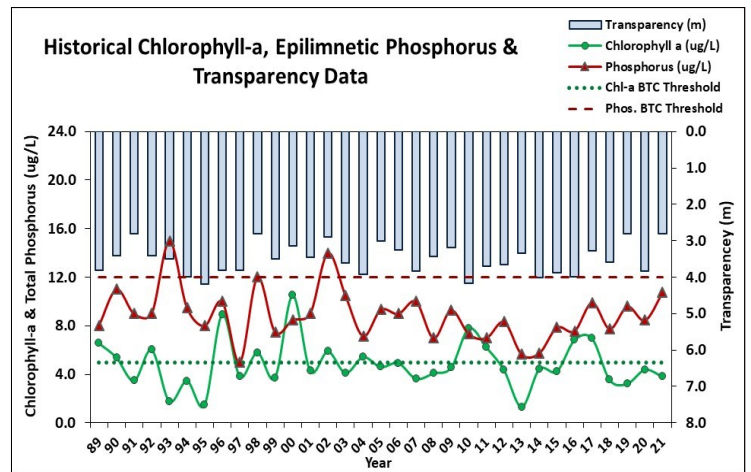
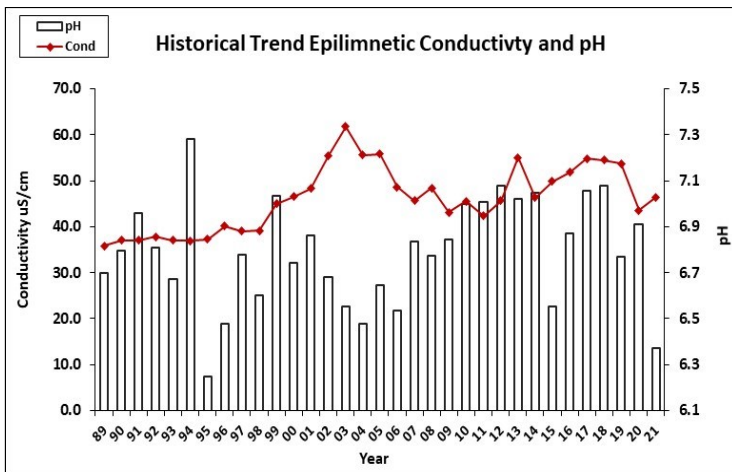
WHITE OAK POND, HOLDERNESS

2021 DATA SUMMARY

RECOMMENDED ACTIONS: Great job sampling in 2021! Pond quality is representative of mesotrophic, or average, conditions however chlorophyll levels tend to fluctuate above the threshold for mesotrophic lakes and cyanobacteria blooms have surfaced in the late summer/early fall. This suggests phosphorus release from bottom sediments as the summer progresses and dissolved oxygen levels are depleted in the hypolimnion, a process called internal loading. These nutrients are then readily available for cyanobacteria uptake during the summer and fall turnover. Record summer rainfall in July seemed to help flush nutrients out of the system resulting in lower in-lake phosphorus levels which is a positive sign. However several tributaries experienced higher phosphorus levels following storm events. Consider development of a watershed management plan to identify and quantify nutrient loading to the pond and make recommendations on implementing best practices to reduce stormwater runoff. Contact the NHDES Watershed Assistance Section for more information. Encourage shoreline property owners to become certified LakeSmart through NHLAKES lake-friendly living program. Contact the VLAP Coordinator in 2022 to schedule a biologist visit in August. Keep up the great work!

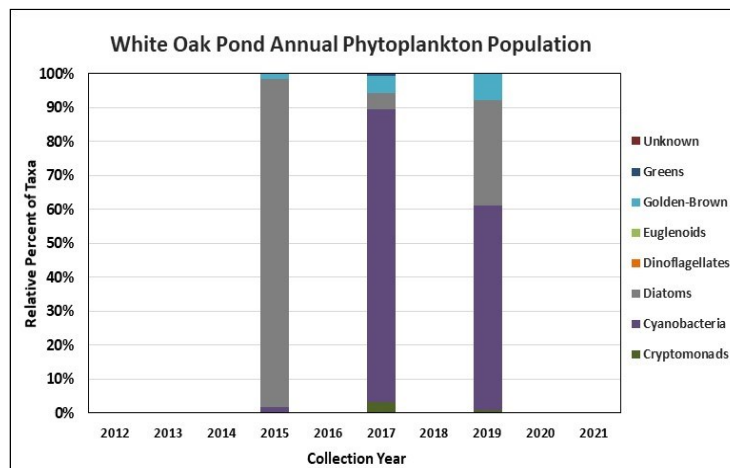
HISTORICAL WATER QUALITY TREND ANALYSIS

| Parameter | Trend | Parameter | Trend |
|-----------------|-----------|-------------------------|--------|
| Conductivity | Worsening | Chlorophyll-a | Stable |
| pH (epilimnion) | Stable | Transparency | Stable |
| | | Phosphorus (epilimnion) | Stable |



DISSOLVED OXYGEN AND PHYTOPLANKTON

(Note: Information may not be collected annually)





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

- ◆ **CHLOROPHYLL-A:** Chlorophyll level was within a low range in June, remained stable in July, and decreased in August. Average chlorophyll level decreased slightly from 2020 and was less than the state median and the threshold for mesotrophic lakes. Historical trend analysis indicates relatively stable chlorophyll levels since monitoring began.
- ◆ **CONDUCTIVITY/CHLORIDE:** Epilimnetic (upper water layer), Metalimnetic (middle water layer), Hypolimnetic (lower water layer), #2 Lamb Swamp Inlet, #3 Dump Inlet, #4 Outlet, and #6 Stone Bridge Inlet conductivity and/or chloride levels were within a low range and approximately equal to or slightly greater than the state medians. Historical trend analysis indicates significantly increasing (worsening) epilimnetic conductivity levels since monitoring began. #3 Dump Trib. and #9 E. Holderness Rd. Trib. conductivity and chloride levels were elevated however chloride levels remained less than the state chronic chloride standard.
- ◆ **COLOR:** Epilimnetic color data indicates the water fluctuated within a moderately tea colored, or brown, range and was darkest in August following record summer rainfall amounts.
- ◆ **TOTAL PHOSPHORUS:** Epilimnetic phosphorus level was moderate in June, decreased to a low range in July, and then increased slightly in August. Average epilimnetic phosphorus level increased from 2020, was approximately equal to the state median, and was slightly less than the threshold for mesotrophic lakes. Historical trend analysis indicates relatively stable epilimnetic phosphorus levels since monitoring began. Metalimnetic phosphorus levels were slightly elevated in June and August following storm events and during stronger wind and wave conditions suggesting potential mixing or de-stratification of thermal layers. Hypolimnetic phosphorus level fluctuated within a slightly elevated range and was highest in August when turbidity levels were also elevated suggesting potential internal load of phosphorus from bottom sediments as the summer progresses and dissolved oxygen levels are depleted. #2 Lamb Swamp Inlet phosphorus level was within a moderate range for that station. #3 Dump Inlet phosphorus levels fluctuated within a moderate range. #3 Dump Trib. phosphorus level was slightly elevated in July following a significant storm event. #4 Outlet phosphorus levels fluctuated within a low range. #6 Stone Bridge Inlet phosphorus levels were slightly elevated in July and August following significant storm events. #9 E Holderness Rd. Trib. phosphorus levels were slightly elevated in June during low flows and in August following a storm event and lab data noted colored water.
- ◆ **TRANSPARENCY:** Transparency measured without the viewscope (NVS) was below average (worse) in June likely due to wave conditions, increased (improved) in July, and then decreased in August again likely due to wave conditions. Average NVS transparency decreased (worsened) from 2020 and was lower than the state median. Historical trend analysis indicates stable NVS transparency since monitoring began. Viewscope transparency (VS) was higher (better) than NVS transparency and a better measure of actual conditions.
- ◆ **TURBIDITY:** Epilimnetic, #2 Lamb Swamp Inlet, #4 Outlet, and #6 Stone Bridge Inlet turbidity levels fluctuated within a low range. Metalimnetic turbidity level was slightly elevated in August potentially due to algal growth. Hypolimnetic turbidity levels were elevated in July and August indicating potential formation and accumulation of organic compounds under anoxic conditions. #3 Dump Inlet turbidity level was slightly elevated in June during low flows. #3 Dump Trib. turbidity level was elevated in July following significant storm event. #9 E Holderness Rd. Trib. turbidity levels were slightly elevated in June and August.
- ◆ **pH:** Epilimnetic and #6 Stone Bridge Inlet pH level fluctuated above and below the desirable range 6.5-8.0 units and was more acidic in July following significant rainfall. Historical trend analysis indicates relatively stable epilimnetic pH levels since monitoring began. Metalimnetic, Hypolimnetic, #2 Lamb Swamp Inlet, #3 Dump Inlet and Trib., and #9 E. Holderness Rd. Trib. pH levels were slightly acidic. #4 Outlet pH level was within the desirable range.

| Station Name | Table 1. 2021 Average Water Quality Data for WHITE OAK POND - HOLDERNESS | | | | | | | | | |
|---------------------------|--|-------------------|--------------------|----------------|------------------|-------------------|------------|------|----------------|------|
| | Alk. (mg/L) | Chlor-a (ug/L) | Chloride (mg/L) | Color (pcu) | Cond. (us/cm) | Total P (ug/L) | Trans. (m) | | Turb. (ntu) | pH |
| | | | | | | | NVS | VS | | |
| Epilimnion | 6.8 | 3.82 | 8 | 60 | 46.4 | 11 | 2.82 | 3.66 | 0.66 | 6.37 |
| Metalimnion | | | | | 48.8 | 15 | | | 1.24 | 5.95 |
| Hypolimnion | | | | | 50.5 | 17 | | | 3.14 | 5.97 |
| #2 Lamb Swamp Inlet | | | 10 | | 51.8 | 21 | | | 0.86 | 5.76 |
| #3 Dump Inlet | | | 8 | | 50.1 | 17 | | | 1.30 | 6.31 |
| #3 Dump Trib. | | | 42 | | 182.4 | 31 | | | 2.56 | 6.25 |
| #4 Outlet (Dam) | | | | | 47.1 | 11 | | | 0.76 | 6.55 |
| #6 Stone Bridge Inlet | | | 7 | | 41.6 | 23 | | | 1.21 | 6.41 |
| #9 E Holderness Rd. Trib. | | | 21 | | 106.8 | 25 | | | 1.73 | 6.27 |

NH Median Values

Median values 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

NH Water Quality Standards

Numeric criteria for specific parameters. Water quality violation if thresholds exceeded.

Chloride: > 230 mg/L (chronic) **Turbidity:** > 10 NTU above natural

E. coli: > 88 cts/100 mL (beach)

E. coli: > 406 cts/100 mL (surface waters)

pH: between 6.5-8.0 (unless naturally occurring)