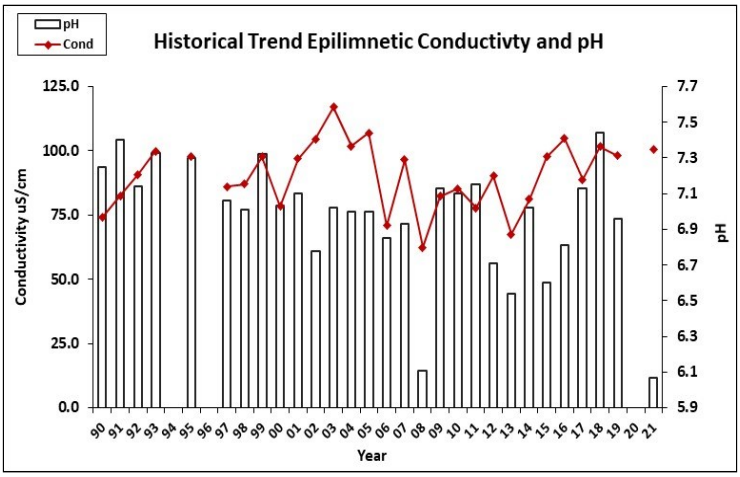
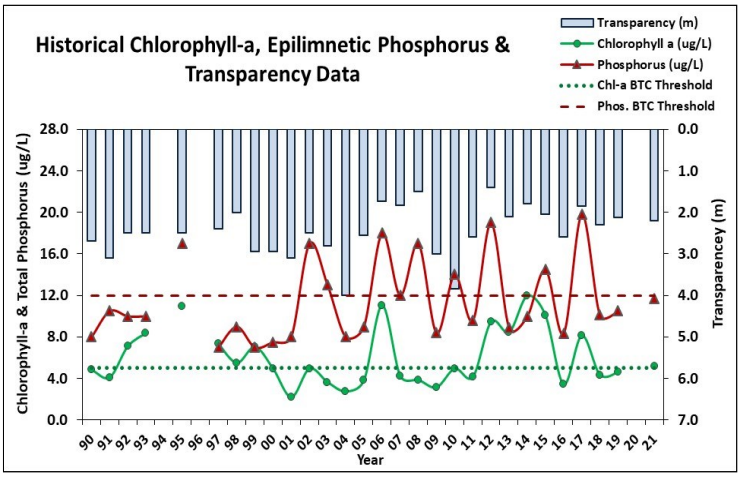
Volunteer Lake Assessment Program Individual Lake Reports
South (Upper) Mountain Lake, Haverhill
2021 Data Summary

Recommended Actions: Great job sampling in 2021! Lake water quality was generally representative of mesotrophic, or average, conditions. Epilimnetic (surface layer) nutrient (phosphorus) levels and algal growth (chlorophyll) remained within the thresholds for mesotrophic lakes, however have fluctuated above the thresholds historically. Increase monitoring frequency to once per month, typically June, July, and August, to better assess monthly and annual variations in water quality over time. Water clarity (transparency) remains below average and may be a result of water color becoming darker, or more tea colored, over time due to the increased frequency and intensity of storm events and flushing of systems rich in dissolved organic acids. Continue monitoring water color to better evaluate the relationship between with water clarity. Consider development of a watershed management plan to help identify and quantify pollutant sources and loading to the lakes, and make recommendations on ways to reduce nutrient loads. For more information contact the NHDES Watershed Assistance Section. Keep up the good work!

Historical Water Quality Trend Analysis

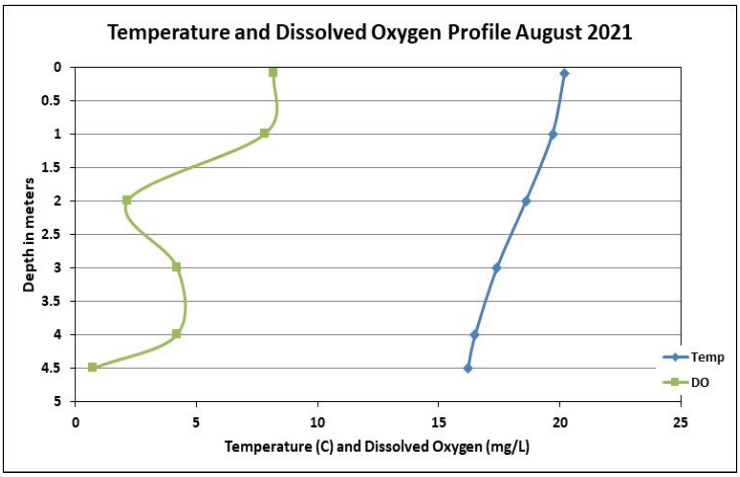
Parameter	Trend	Parameter	Trend
Conductivity	Stable	**Chlorophyll-a**	Stable
pH (epilimnion)	Stable	**Transparency**	Stable
		Phosphorus (epilimnion)	Stable

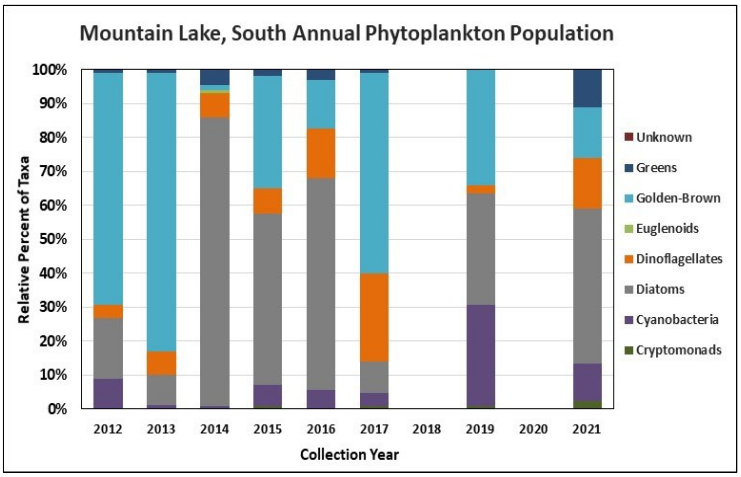




Dissolved Oxygen and Phytoplankton

(Note: Information may not be collected annually)





Volunteer Lake Assessment Program Individual Lake Reports
South (Upper) Mountain Lake, Haverhill
2021 Data Summary

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

- **Chlorophyll-a:** Chlorophyll level was within a low range in August, was slightly greater than the state median, and was approximately equal to the threshold for mesotrophic lakes. Historical trend analysis indicates stable, yet variable, chlorophyll levels since monitoring began.
- **Conductivity/Chloride:** Epilimnetic (upper water layer), Hypolimnetic (lower water layer), Cove, Monteau Inlet, and Outlet conductivity levels remained slightly elevated and greater than the state median. Epilimnetic, Cove and Outlet chloride levels were slightly greater than the state median, yet much less than the state chronic chloride standard. Historical trend analysis indicates relatively stable epilimnetic conductivity levels since monitoring began.
- **Color:** Epilimnetic color data indicate the water was highly tea colored, or dark brown, in August.
- **E. coli:** Beach E. coli level was low and much less than the state standard for public beaches.
- **Total Phosphorus:** Epilimnetic and Hypolimnetic phosphorus levels were within a moderate range in August, were slightly greater than the state median, and were approximately equal to the threshold for mesotrophic lakes. Historical trend analysis indicates stable, yet variable, epilimnetic phosphorus levels since monitoring began. Cove, Monteau Inlet and Outlet phosphorus levels were within a low range.
- **Transparency:** Transparency measured with (VS) and without (NVS) the viewscope was below average (worse) in August potentially due to the darker water color, and was slightly lower than the state median. Historical trend analysis indicates stable, yet variable NVS transparency since monitoring began.
- **Turbidity:** Epilimnetic, Cove, Monteau Inlet, and Outlet turbidity levels fluctuated within a low range for those stations. Hypolimnetic turbidity level was slightly elevated.
- **pH:** Epilimnetic and Hypolimnetic pH levels were slightly acidic and less than desirable range 6.5-8.0 units and were more acidic in 2021 due to above average rainfall. Historical trend analysis indicates stable, yet variable, epilimnetic pH levels since monitoring began. Cove, Monteau Inlet and Outlet pH levels were within the desirable range.

Station Name	Table 1. 2021 Average Water Quality Data for UPPER MOUNTAIN LAKE - HAVERHILL										
	Alk. (mg/L)	Chlor-a (ug/L)	Chloride (mg/L)	Color (pcu)	Cond. (us/cm)	E. coli (mpn/100mL)	Total P (ug/L)	Trans. (m)		Turb. (ntu)	pH
								NVS	VS		
Epilimnion	15.2	5.14	23	90	100.6		12	2.20	2.25	1.59	6.07
Hypolimnion					100.2		12			2.52	6.20
Beach						19					
Cove			22		102.3		10			1.50	6.66
Monteau Inlet					103.4		10			1.04	6.74
Outlet			23		101.7		11			1.54	6.72

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.

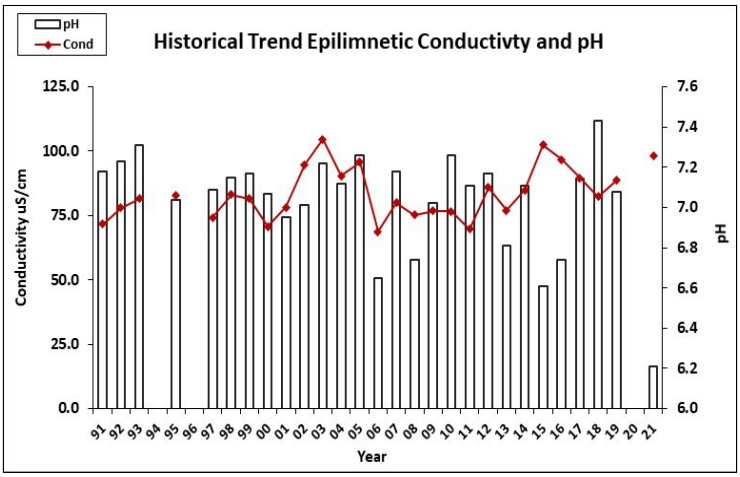
Chloride: > 230 mg/L (chronic) **Turbidity:** > 10 NTU above natural
E. coli: > 88 cts/100 mL (beach)
E. coli: > 406 cts/100 mL (surface waters)
pH: between 6.5-8.0 (unless naturally occurring)

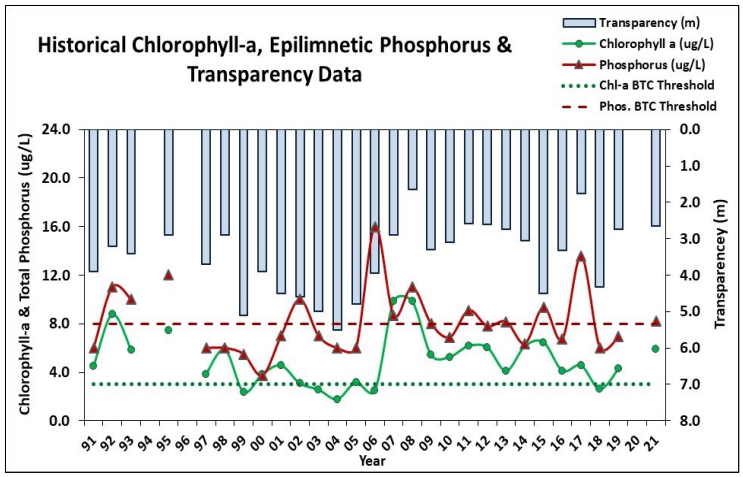
Volunteer Lake Assessment Program Individual Lake Reports
North (Lower) Mountain Lake, Haverhill
2021 Data Summary

Recommended Actions: Great job sampling in 2021! Lake nutrient (phosphorus) levels in surface waters (epilimnion) remained low, however lower water layer (hypolimnetic) nutrient levels are indicative of an internal load of phosphorus from bottom sediments when dissolved oxygen levels are depleted later in the summer. This internal load can fuel algal, particularly cyanobacteria growth, and cyanobacteria were dominant in the 2021 phytoplankton sample. Keep an eye on the pond for any cyanobacteria surface blooms or scums in late summer/early fall and notify NHDES' Harmful Algal Bloom Program if observed. Water clarity (transparency) remains below average potentially due to algal growth and/or stormwater runoff from the increased frequency and intensity of significant storm events. Consider development of a watershed management plan to help identify and quantify pollutant sources and loading to the lakes, and help make recommendations on ways to reduce nutrient loads. For more information contact the NHDES Watershed Assistance Section. Increase monitoring frequency to once per month, typically June, July and August, to better assess monthly and annual variations in water quality over time. Keep up the good work!

Historical Water Quality Trend Analysis

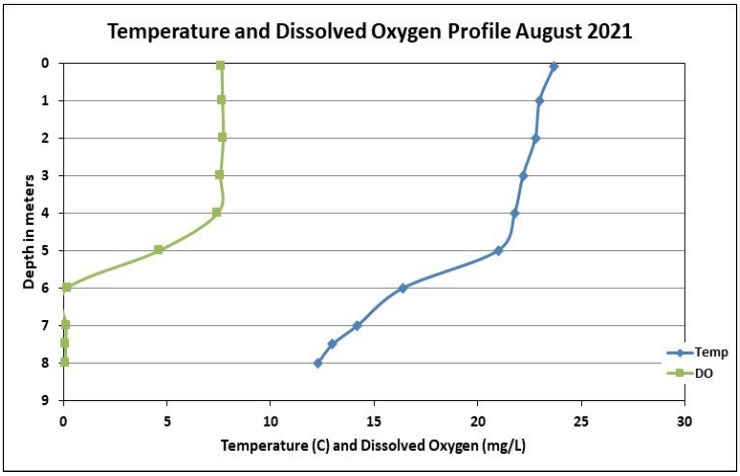
Parameter	Trend	Parameter	Trend
Conductivity	Stable	**Chlorophyll-a**	Stable
pH (epilimnion)	Stable	**Transparency**	Worsening
		Phosphorus (epilimnion)	Stable

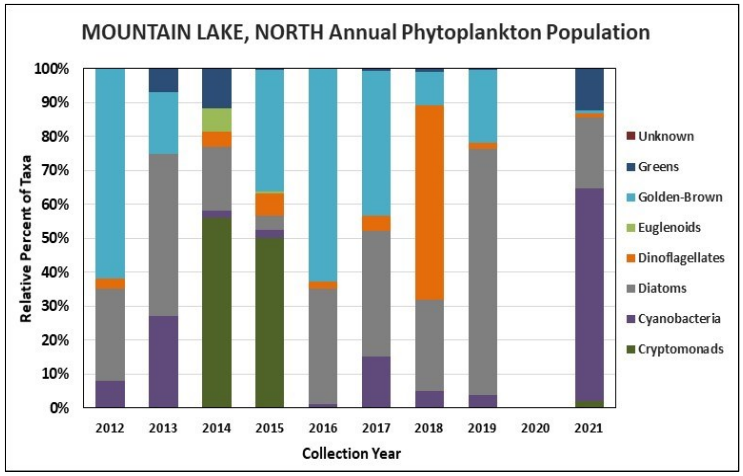




Dissolved Oxygen and Phytoplankton

(Note: Information may not be collected annually)





Volunteer Lake Assessment Program Individual Lake Reports
North (Lower) Mountain Lake, Haverhill
2021 Data Summary

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

- **Chlorophyll-a:** Chlorophyll level was slightly elevated in August, was greater than the state median and the threshold for oligotrophic lakes, and was the highest measured since 2016. 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), and Outlet conductivity levels remained slightly elevated and greater than the state median. Epilimnetic chloride level was also greater than the state median, yet much less than the state chronic chloride standard. Historical trend analysis indicates relatively stable epilimnetic conductivity levels since monitoring began.
- **Color:** Epilimnetic color data indicates the water was moderately tea colored, or brown, in August.
- **E. coli:** Beach E. coli level was very low and much less than the state standard for public beaches.
- **Total Phosphorus:** Epilimnetic phosphorus level was within a low range, was less than the state median, and was approximately equal to the threshold for oligotrophic lakes. Historical trend analysis indicates relatively stable epilimnetic phosphorus levels since monitoring began. Metalimnetic and Hypolimnetic phosphorus levels were elevated and the turbidity of the samples was also elevated indicating the release of phosphorus from bottom sediments under anoxic (no dissolved oxygen) conditions. Outlet phosphorus level was within a low range.
- **Transparency:** Transparency measured with (VS) and without (NVS) the viewscope was below average (worse) in August potentially due to slightly elevated algal growth. VS and NVS transparency was slightly lower (worse) than the state median and historical trend analysis indicates significantly decreasing (worsening) NVS transparency since monitoring began.
- **Turbidity:** Epilimnetic and Outlet turbidity levels were within an average range for those stations. Metalimnetic and Hypolimnetic turbidity levels were elevated indicating the formation and accumulation of organic compounds under anoxic conditions.
- **pH:** Epilimnetic, Metalimnetic and Hypolimnetic pH levels were slightly less than desirable range 6.5-8.0 units and were more acidic in 2021 due to above average summer rainfall. Historical trend analysis indicates relatively stable epilimnetic pH levels since monitoring began. Outlet pH level was within the desirable range.

Station Name	Table 1. 2021 Average Water Quality Data for NORTH (LOWER) MOUNTAIN LAKE - HAVERHILL										
	Alk. (mg/L)	Chlor-a (ug/L)	Chloride (mg/L)	Color (pcu)	Cond. (us/cm)	E. coli (mpn/100mL)	Total P (ug/L)	Trans. (m)		Turb. (ntu)	pH
								NVS	VS		
Epilimnion	13.7	5.92	22	50	98.1		8	2.65	3.05	1.04	6.21
Metalimnion					114.8		16			6.74	6.21
Hypolimnion					112.6		18			7.43	6.25
Beach						1					
Outlet					100.4		7			1.03	6.74

NH Median Values

Median values generated from historic lake monitoring data.

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