Volunteer Lake Assessment Program Individual Lake Reports
EMERSON POND, RINDGE, NH

MORPHOMETRIC DATA

Watershed Area (Ac.):	528	Max. Depth (m):	5.2	Flushing Rate (yr⁻¹)	1.1
Surface Area (Ac.):	113	Mean Depth (m):	2.3	P Retention Coef:	
Shore Length (m):	3,900	Volume (m³):	1,047,000	Elevation (ft):	1167

TROPHIC CLASSIFICATION

| Year	Trophic class
1982	EUTROPHIC
2002	MESOTROPHIC

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 this 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	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	Slightly Bad	Data exceed water quality standards or thresholds for a given parameter by a small margin.
Primary Contact Recreation	Escherichia coli	Very Good	All sampling data meet water quality standards or thresholds for this 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.
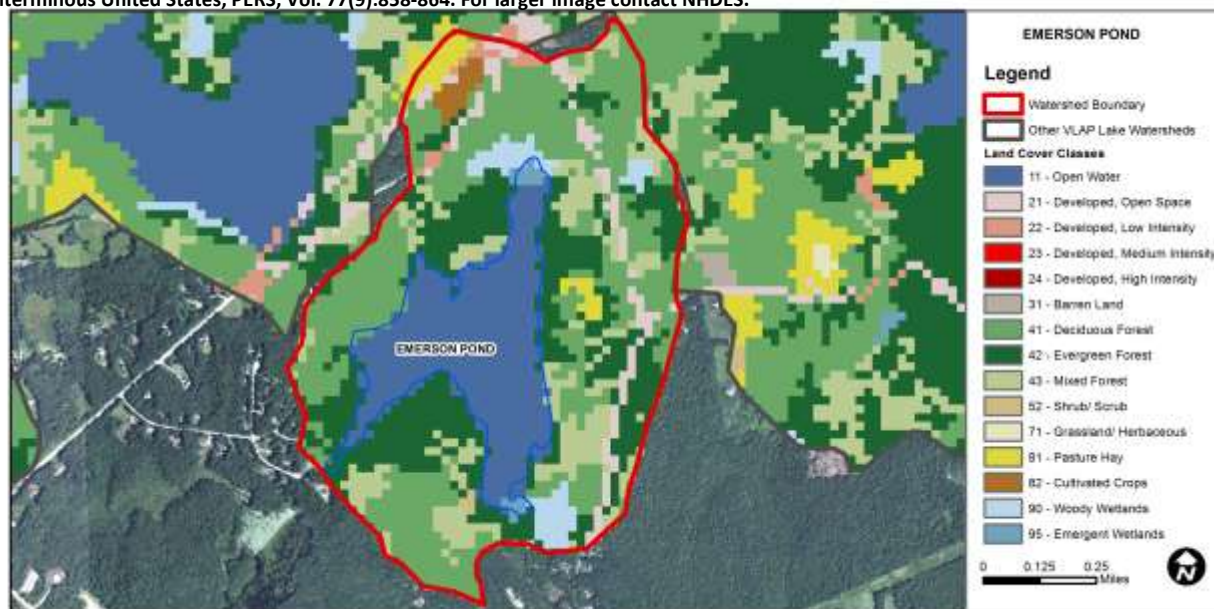
Land Cover Category	% Cover	Land Cover Category	% Cover	Land Cover Category	% Cover
Open Water	19.6	Barren Land	0	Grassland/Herbaceous	0
Developed-Open Space	4.45	Deciduous Forest	32.12	Pasture Hay	1.79
Developed-Low Intensity	0.92	Evergreen Forest	24.13	Cultivated Crops	1.06
Developed-Medium Intensity	0	Mixed Forest	11.61	Woody Wetlands	3.21
Developed-High Intensity	0	Shrub-Scrub	0.23	Emergent Wetlands	0.69

# VOLUNTEER LAKE ASSESSMENT PROGRAM INDIVIDUAL LAKE REPORTS
EMERSON POND, RINDGE
2019 DATA SUMMARY

RECOMMENDED ACTIONS: Increase monitoring frequency to once per month, typically June, July and August, to better assess seasonal and historical water quality. Pond conductivity levels have increased (worsened) since monitoring began and could indicate the impacts of road salting or the use of calcium chloride as a dust suppressant on dirt roads. Educate and encourage local road agents and winter maintenance companies to obtain a NH Voluntary Salt Applicator License through UNH T2's Green SnowPro Certification program. For more information visit www.t2.unh.edu/road-salt-reduction. The improving chlorophyll levels are approaching the threshold for mesotrophic lakes and we hope to see this continue. Epilimnetic pH levels have improved, although not significantly, likely as a result of the recovery of surface waters from historical acid rain inputs. For more information on how New Hampshire's waters are recovering see the "Acid Rain Status and Trends" report at www.des.nh.gov/organization/divisions/water/wmb/index.htm. Consider converting Cathedral Beach to a perched beach to reduce sediment and nutrient loading due to the steep slopes of the beach area. DES fact sheet WD-WB-18 "Perching Beaches to Lessen Impacts to Lake Quality" is a good resource.

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

- **CHLOROPHYLL-A:** Chlorophyll level was moderate in August, decreased slightly from 2018, was slightly greater than the state median, and was approximately equal to the threshold for mesotrophic lakes. Historical trend analysis indicates significantly decreasing (improving) chlorophyll levels since monitoring began.
- **CONDUCTIVITY/CHLORIDE:** Epilimnetic (upper water layer) and Hypolimnetic (lower water layer) conductivity levels remained slightly elevated and greater than the state median. Epilimnetic chloride levels were also greater than the state median yet much less than the state chronic chloride standard. However, historical trend analysis indicates significantly increasing (worsening) epilimnetic conductivity levels since monitoring began.
- **COLOR:** Apparent color measured in the epilimnion indicates the water was moderately tea colored, or brown.
- **E. COLI:** Cathedral and Wozniak Beach E. coli levels were very low and much less than the state standard for public beaches.
- **TOTAL PHOSPHORUS:** Epilimnetic phosphorus level was within a moderate range, remained stable from 2018, and was approximately equal to the state median and the threshold for mesotrophic lakes. Historical trend analysis indicates stable epilimnetic phosphorus levels since monitoring began. Hypolimnetic phosphorus level was elevated potentially due to release of phosphorus from bottom sediments under anoxic (no dissolved oxygen) conditions, and/or bottom sediment in the sample.
- **TRANSPARENCY:** Transparency measured without the viewscope (NVS) was high (good) for the pond, increased (improved) from 2018, was slightly less (worse) than the state median, however was the best measured since 2016. Historical trend analysis indicates relatively stable NVS transparency since monitoring began. Viewscope transparency (VS) was slightly higher (better) than NVS transparency and likely a better measure of actual conditions.
- **TURBIDITY:** Epilimnetic turbidity level was within a low range. Hypolimnetic turbidity level was slightly elevated potentially due to bottom sediment contamination, and/or the formation and accumulation of organic matter under anoxic (no dissolved oxygen) conditions.
- **PH:** Epilimnetic pH level was within the desirable range 6.5-8.0 units, however epilimnetic pH levels have historically fluctuated below the desirable range. Hypolimnetic pH level was slightly acidic and less than desirable.

Dissolved Oxygen & Temperature Profile, August 2019

EMERSON POND Annual Phytoplankton Population
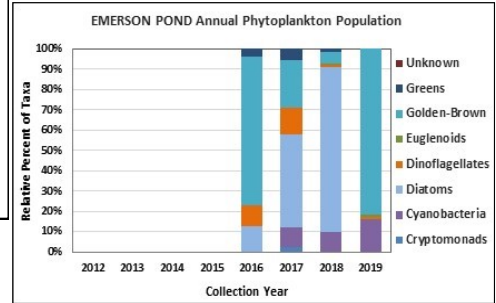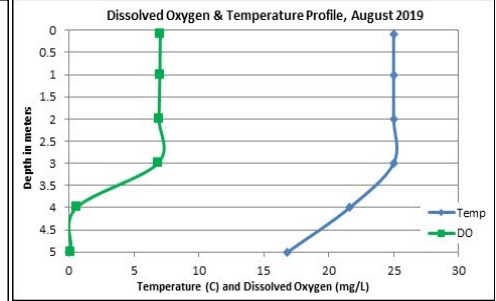
Station Name	Table 1. 2019 Average Water Quality Data for EMERSON POND - RINDGE										
	Alk. mg/l	Chlor-a ug/l	Chloride mg/l	Color pcu	Cond. us/cm	E. coli mpn/100ml	Total P mg/l	Trans. m		Turb. ntu	pH
								NVS	VS		
Epilimnion	5.8	5.15	21	50	97.3		12	2.75	3.50	0.83	6.66
Hypolimnion					96.9		28			2.13	6.16
Cathedral Beach						2					
Wozniak Beach						15					

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

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)

HISTORICAL WATER QUALITY TREND ANALYSIS

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

Historical Trend Epilimnetic Conductivity and pH

Historical Chlorophyll-a, Epilimnetic Phosphorus & Transparency Data