Volunteer Lake Assessment Program Individual Lake Reports

EASTMAN POND, GRANTHAM, NH

MORPHOMETRIC DATA

Watershed Area (Ac.):	4,907	**Max. Depth (m):**	9.2	**Flushing Rate (yr^{-1}):**	2.1
Surface Area (Ac.):	335	**Mean Depth (m):**	3	**P Retention Coef:**	0.61
Shore Length (m):	4,000	**Volume (m^3):**	4,066,500	**Elevation (ft):**	1095

TROPHIC CLASSIFICATION

Year	Trophic class
1999	MESOTROPHIC
2009	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	Cautionary	Limited data for this parameter predicts exceedance of water quality standards or thresholds; 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	Good	Sampling data commonly 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	7.93	Barren Land	0.03	Grassland/Herbaceous	0.07
Developed-Open Space	5.02	Deciduous Forest	25.34	Pasture Hay	1.85
Developed-Low Intensity	4.45	Evergreen Forest	13.13	Cultivated Crops	0.01
Developed-Medium Intensity	0.22	Mixed Forest	37.64	Woody Wetlands	3
Developed-High Intensity	0	Shrub-Scrub	1.01	Emergent Wetlands	0.28

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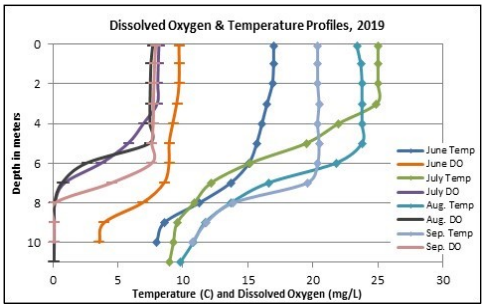
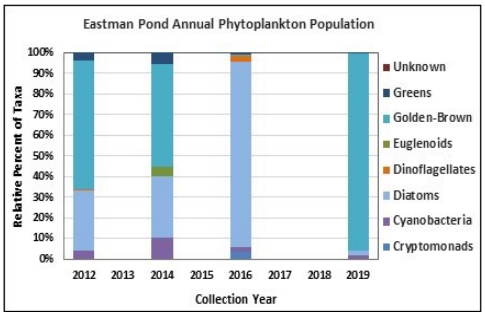
2019 Data Summary

Recommended Actions: Water quality is representative of mesotrophic, or average, conditions. The improving chlorophyll, epilimnetic and metalimnetic phosphorus levels are encouraging and likely contributing to the improved clarity that has been measured since 2015; we hope to see this continue! Elevated conductivity and chloride levels continue to be a concern and long-term management goals should be developed to make sure levels don't continue to rise. Continue efforts to update the watershed management plan to assist with assessing pollutant loads such as phosphorus, turbidity and chloride and developing long-term management solutions. Keep up the great work!

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

- **Chlorophyll-a:** Chlorophyll levels fluctuated within a low range and were highest in July and lowest in September. Average chlorophyll level decreased from 2018 and was less than the state median and the threshold for mesotrophic lakes. Historical trend analysis indicates significantly decreasing (improving) chlorophyll levels since monitoring began.
- **Conductivity/Chloride:** Deep spot and tributary conductivity and chloride levels remained elevated and much greater than the state medians, with the exception of Butternut and Anderson Pd. Brooks. Historical trend analysis indicates significantly increasing (worsening) epilimnetic (upper water layer) conductivity levels since monitoring began.
- **Color:** Apparent color measured in the epilimnion indicates the pond water was lightly tea colored, or light brown.
- **E. coli:** Beach and Cove bacteria levels were much less than the state standard for public beaches. Refer to 2019 monthly data reports for E. coli results.
- **Total Phosphorus:** Epilimnetic, Metalimnetic (middle water layer), Unnamed to Stoney Bk., Butternut Bk., Grass Pond, Eastman Bk. Outlet, Stoney Bk., and Stoney Bk. at Robin Ln. phosphorus levels fluctuated within a low range. Average epilimnetic phosphorus level decreased from 2018 and was much less than the state median and the threshold for mesotrophic lakes. Historical trend analysis indicates significantly decreasing (improving) epilimnetic and metalimnetic phosphorus levels since monitoring began. Hypolimnetic phosphorus levels were slightly elevated in July and September and the turbidity of the samples was also elevated. Mill Pond Dam, Northeast Bk. and Stroing Bk. phosphorus levels increased to slightly elevated ranges in July and August during low flows.
- **Transparency:** Transparency measured with (VS) and without (NVS) the viewscope was below average (worse) in June, increased (improved) in July, increased again in August and was over 5.0 meters, and then decreased in September. Average NVS transparency decreased slightly from 2018 and was higher (better) than the state median. Historical trend analysis indicates relatively stable transparency since monitoring began.
- **Turbidity:** Epilimnetic, Butternut Bk. and Eastman Bk. Outlet turbidity levels fluctuated within a low range. Metalimnetic turbidity level was slightly elevated in June, and Hypolimnetic turbidity levels were elevated on each sampling event due to the formation and accumulation of organic compounds under anoxic conditions. Unnamed to Stoney Bk., Northeast Bk., Grass Pond, and Mill Pond Dam turbidity levels were elevated in August and September during low flow conditions. Stroing Bk., Stoney Bk. and Stoney Bk. at Robin Ln. turbidity levels were slightly elevated in July and August following storm events.
- **pH:** Deep spot and tributary pH levels were generally within the desirable range of 6.5-8.0 units, with the exception of the Metalimnion, Northeast Bk. and Stroing Bk. However, historical trend analysis indicates significantly decreasing (worsening) epilimnetic pH levels since monitoring began.





Station Name	Table 1. 2019 Average Water Quality Data for EASTMAN POND									
	Alk. mg/l	Chlor-a ug/l	Chloride mg/l	Color pcu	Cond. us/cm	Total P mg/l	Trans. m		Turb. ntu	pH
							NVS	VS		
Epilimnion	8.0	3.10	56	32	218.4	5	3.82	4.72	0.84	6.88
Metalimnion			55		226.8	8			1.28	6.38
Hypolimnion			60		248.4	14			9.04	6.53
Butternut Brook			1		25.6	8			1.42	7.11
Eastman Bk. Outlet			58		222.8	5			0.86	7.08
Grass Pond			78		312.2	9			4.72	6.75
Mill Pond Dam			87		299.6	12			3.62	6.91
Northeast Brook			101		348.0	13			1.95	6.29
Stoney Bk. At Robin Ln.			109		395.5	9			1.73	7.10
Stoney Brook			130		480.6	6			2.34	7.40
Stroing Brook			42		156.3	16			0.93	6.14
Unnamed To Stoney Bk.			136		528.0	8			3.35	6.82

Station Name	Table 2. 2019 Conductivity & Chloride Study	
	Chloride mg/l	Cond. us/cm
Anderson Pd. Bk.	7	41.0
Lyons Bk.	203	634.0
Pipe 1	186	474.0
Pipe 11	208	577.0
Pipe 2	172	234.5
Pipe 5	196	509.5
Pipe 6	121	406.5
Pipe 7	72	907.0
Pipe 8	177	541.0
Stream 9	110	342.0

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)	Worsening	Data significantly decreasing.	Transparency	Stable	Trend not significant; data moderately variable.
			Phosphorus (epilimnion)	Improving	Data significantly decreasing.