Volunteer Lake Assessment Program Individual Lake Reports
PEA PORRIDGE POND, BIG, MADISON, NH

MORPHOMETRIC DATA

							TROPHIC CLASSIFICATION		KNOWN EXOTIC SPECIES

| Watershed Area (Ac.):	1,431	Max. Depth (m):	13.7	Flushing Rate (yr¹)	1.5	Year	Trophic class	
Surface Area (Ac.):	142	Mean Depth (m):	4	P Retention Coef:	0.63	1979	MESOTROPHIC	
Shore Length (m):	3,900	Volume (m³):	2,295,500	Elevation (ft):	648	2001	OLIGOTROPHIC	

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)	Good	Sampling data is better than the water quality standards or thresholds for this parameter.
	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	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	Good	Sampling data is better than the water quality standards or thresholds for this parameter.
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.
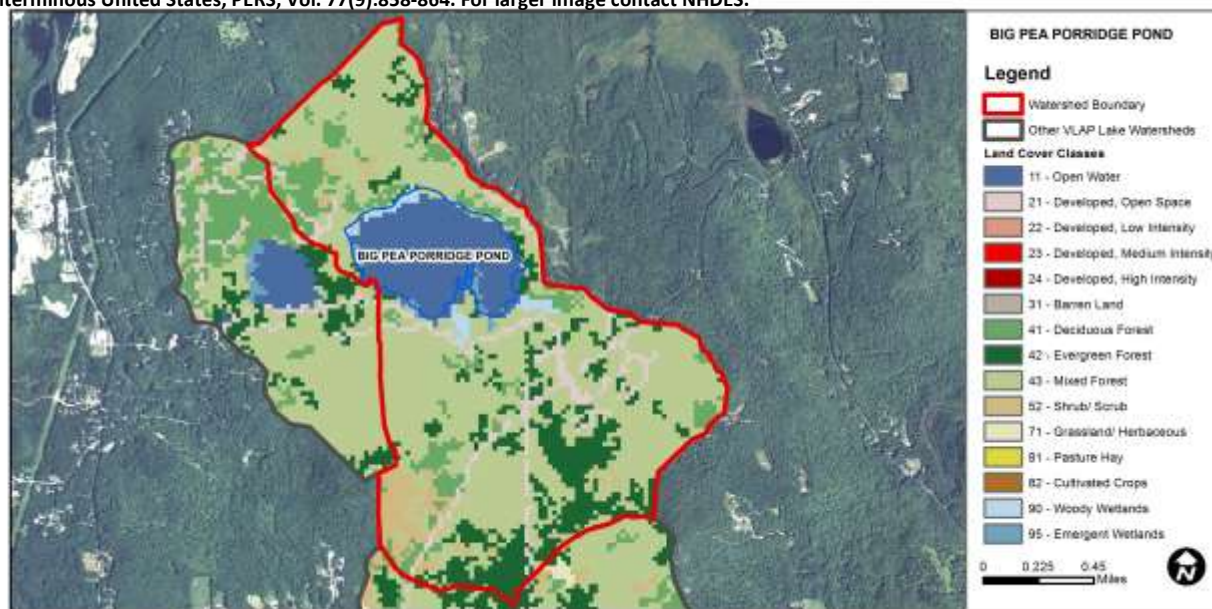
Land Cover Category	% Cover	Land Cover Category	% Cover	Land Cover Category	% Cover
Open Water	11.6	Barren Land	0	Grassland/Herbaceous	0
Developed-Open Space	5.48	Deciduous Forest	8.39	Pasture Hay	0
Developed-Low Intensity	0.05	Evergreen Forest	14.52	Cultivated Crops	0
Developed-Medium Intensity	0	Mixed Forest	53.29	Woody Wetlands	1.33
Developed-High Intensity	0	Shrub-Scrub	4.71	Emergent Wetlands	0.66

RECOMMENDED ACTIONS: Pond quality remains indicative of oligotrophic, or high quality, conditions. However, conductivity levels have worsened, and enhanced sampling efforts in the spring are on-going to identify problematic areas. The improving pH levels are encouraging and indicate slow recovery from the historical impacts of acid precipitation. For more information read NHDES' "Acid Rain Status and Trends Report". Continue efforts to educate the watershed community and develop a watershed management plan. Keep up the great work!

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

- **CHLOROPHYLL-A:** Chlorophyll level was very low in June, increased to a slightly elevated level in July, and then decreased to a low level in August. Average chlorophyll level increased from 2018 and was less than the state median and the threshold for oligotrophic lakes. Historical trend analysis indicates stable chlorophyll levels since monitoring began.
- **CONDUCTIVITY/CHLORIDE:** Deep spot, Big Rock Inlet, Muddy Beach Inlet, Outlet, #8A Brenner Dr., #9 Lizum Pl., and Arlberg & Brenner conductivity and/or chloride levels were slightly greater than the state medians yet less than a level of concern. However, historical trend analysis indicates significantly increasing (worsening) epilimnetic (upper water layer) conductivity levels since monitoring began. #8 Brenner Dr. and Modock at Log Cabin chloride levels were greater than that measured at other stations, yet were also much less than the state chronic chloride standard. Allard & Gotzens conductivity and chloride levels were average for NH lakes and approximately equal to the state medians.
- **COLOR:** Apparent color measured in the epilimnion indicates the lake water was lightly tea colored, or light brown.
- **E. COLI:** Shore Beach E. coli levels were low and much less than the state standard for public beaches. Thusis Beach E. coli levels were slightly elevated and greater than the state standard in July.
- **TOTAL PHOSPHORUS:** Epilimnetic phosphorus levels were low in June and decreased as the summer progressed. Average epilimnetic phosphorus level decreased from 2018 and was much less than the state median and threshold for oligotrophic lakes. Historical trend analysis indicates relatively stable epilimnetic phosphorus levels since monitoring began. Metalimnetic (middle water layer) and Hypolimnetic (lower water layer) phosphorus level fluctuated within a low range.
- **TRANSPARENCY:** Transparency measured with (VS) and without (NVS) the viewscope was high (good) in June, decreased (worsened) in July likely due to algal growth, and then increased in August. Average NVS transparency remained stable with 2018 and was higher (better) than the state median.
- **TURBIDITY:** Epilimnetic, Metalimnetic and Big Rock Inlet turbidity levels were low. Hypolimnetic turbidity levels were slightly elevated in August. Muddy Beach Inlet and Outlet turbidity levels were elevated in June potentially due to low flows.
- **PH:** Epilimnetic, Big Rock Inlet, Muddy Beach Inlet, and Outlet pH levels were within the desirable range 6.5-8.0 units. Historical trend analysis indicates significantly increasing (improving) epilimnetic pH levels since monitoring began. Metalimnetic pH levels were slightly less than desirable, and Hypolimnetic pH levels were slightly acidic.

Dissolved Oxygen & Temperature Profile, July 2019

Pea Porridge, Big Annual Phytoplankton Population
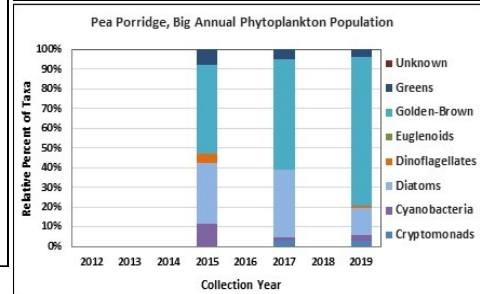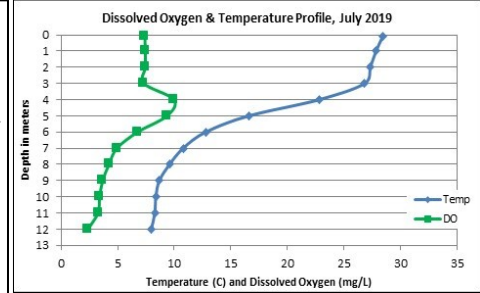
Table 1. 2019 Average Water Quality Data for BIG PEA PORRIDGE POND - MADISON

Station Name	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 NVS	Trans. m VS	Turb. ntu	pH
Epilimnion	4.8	2.70	13	33	59.8		5	4.85	5.25	0.48	6.71
Metalimnion					60.6		8			0.61	6.42
Hypolimnion					62.2		8			1.05	5.98
Big Rock Inlet			14		61.4		6			0.46	6.76
Muddy Beach Inlet			13		57.2		6			0.90	6.78
Outlet					60.3		10			1.88	6.76
Shore Beach						7					
Thusis Beach						50					

Table 2. 2019 Conductivity & Chloride Study

Station Name	Chloride mg/l	Cond. us/cm
#8 Brenner Dr.	23	99.8
#8A Brenner Dr.	8	52.4
#9 Lizum Place	17	78.8
Arlberg & Brenner	16	71.9
Allard & Gotzens	5	33.2
Modock at Log Cabin	28	118.5

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

HISTORICAL WATER QUALITY TREND ANALYSIS

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

Historical Trend Epilimnetic Conductivty and pH

Historical Chlorophyll-a, Epilimnetic Phosphorus & Transparency Data