Volunteer Lake Assessment Program Individual Lake Reports

CAPTAIN POND, SALEM, NH

MORPHOMETRIC DATA

Watershed Area (Ac.):	960	**Max. Depth (m):**	8.6	**Flushing Rate (yr^{-1}):**	2.3
Surface Area (Ac.):	90	**Mean Depth (m):**	2.2	**P Retention Coef:**	0.65
Shore Length (m):	2,600	**Volume (m^3):**	788,500	**Elevation (ft):**	156

TROPHIC CLASSIFICATION

Year	Trophic class
1987	MESOTROPHIC
2002	MESOTROPHIC

KNOWN EXOTIC SPECIES

Variable Milfoil

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

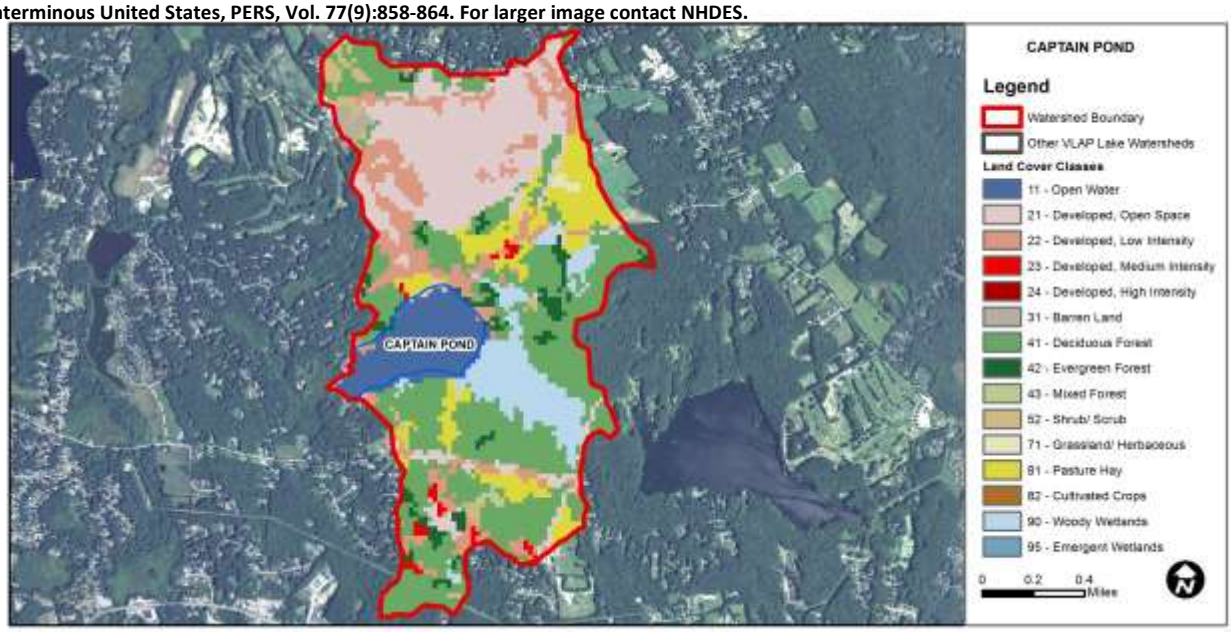
Designated Use	Parameter	Category	Comments
Aquatic Life	Phosphorus (Total)	Slightly Bad	Data exceed water quality standards or thresholds for this parameter by a small margin.
	pH	Slightly Bad	Data periodically exceed water quality standards or thresholds for a given parameter by a small margin.
	Oxygen, 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	Slightly Bad	Data periodically exceed water quality standards or thresholds for a given parameter by a small margin.
	Chlorophyll-a	Slightly Bad	Data exceed water quality standards or thresholds for this parameter by a small margin.
Primary Contact Recreation	Escherichia coli	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	Good	Sampling data commonly meet water quality standards or thresholds for this parameter.

BEACH PRIMARY CONTACT ASSESSMENT STATUS

CAPTAIN POND - GIRLS INC OF HAVERHILL BEACH	Escherichia coli	No Data	No data for this parameter.
CAPTAIN POND - CAMP Y WOOD BEACH	Escherichia coli	Cautionary	Limited data for this parameter predicts exceedance of water quality standards or thresholds; however more data are necessary to fully assess the parameter.
CAPTAIN POND - CAMP HADAR	Escherichia coli	Bad	Data periodically exceed water quality standards or thresholds for this parameter by a large margin.
CAPTAIN POND - CAMP OTTER SWIM AREA BEACH	Escherichia coli	Bad	Data periodically exceed water quality standards or thresholds for this parameter by a large margin.
CAPTAIN POND - CAPTAIN'S BEACH	Escherichia coli	Bad	Data periodically exceed water quality standards or thresholds for this parameter by a large margin.

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	7.86	Barren Land	0.72	Grassland/Herbaceous	0.35
Developed-Open Space	20.9	Deciduous Forest	34.62	Pasture Hay	9.1
Developed-Low Intensity	11.8	Evergreen Forest	3.53	Cultivated Crops	0
Developed-Medium Intensity	1.09	Mixed Forest	0.25	Woody Wetlands	8.07
Developed-High Intensity	0	Shrub-Scrub	1.75	Emergent Wetlands	0.08

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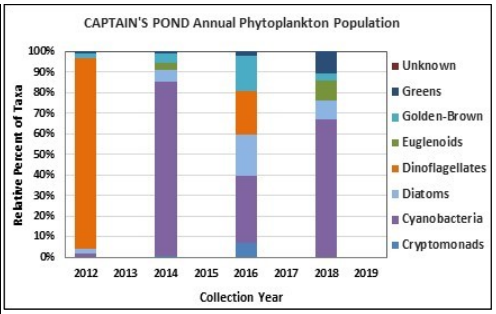
Captains Pond, Salem
2019 Data Summary

Recommended Actions: Pond phosphorus levels were elevated throughout the summer and remain at a higher level from that measured between 2010-2016. Above average rainfall, stormwater runoff, high water levels, waterfowl, plant management, and boating activities can all impact phosphorus levels. A cyanobacteria bloom occurred in late June and algal growth was elevated in June and July. Report any future blooms to DES immediately. Watershed management activities should focus on reducing stormwater runoff, stabilizing steep slopes, perching beach areas, planting vegetative buffers, and properly maintaining septic systems. Identify and inventory areas in need of stormwater management and prioritize implementation of stormwater best practices. Work with DES and the town to develop a watershed management plan to help identify and quantify pollutant loading to the pond and make recommendations on remediation activities. Discourage the feeding of waterfowl and consider managing waterfowl populations to reduce bacteria and nutrient loading to the pond. Keep up the great work!

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

- **Chlorophyll-a:** Chlorophyll level was slightly elevated in July and then decreased to a low level in August. Average chlorophyll level decreased slightly from 2018 and was greater than the state median and the threshold for mesotrophic lakes. Historical trend analysis indicates stable, yet variable, chlorophyll levels since monitoring began.
- **Conductivity/Chloride:** Deep Spot, Inlet, Outlet, and nearshore station conductivity and/or chloride levels remained elevated and much greater than the state medians. Historical trend analysis indicates stable, yet variable, epilimnetic (upper water layer) conductivity levels since monitoring began, and levels have remained within a higher range since 2015.
- **Color:** Apparent color measured in the epilimnion indicates the water was highly tea colored, or dark brown.
- **E. coli:** 7 Captains Dr., 21 Plaisted Ext. and Camp Y Wood E. coli levels were less than state standards for public beaches and surface waters. Buzzell Cove and Boat Launch E. coli levels were elevated and much greater than the state standard for surface waters in August during a rain event.
- **Total Phosphorus:** Epilimnetic phosphorus levels fluctuated within an elevated range and were highest in June and July. Average epilimnetic phosphorus level increased from 2018, was much greater than the state median and the threshold for mesotrophic lakes, and was the highest measured since monitoring began. Historical trend analysis indicates stable epilimnetic phosphorus levels since monitoring began. Metalimnetic (middle water layer) phosphorus levels were elevated in July and the turbidity was also elevated indicating a layer of algae/cyanobacteria at that depth. Hypolimnetic (lower water layer) phosphorus levels were elevated and increased as the summer progressed. Inlet, Outlet, 21 Plaisted Ext., and Camp Y Wood phosphorus levels fluctuated within a moderate range. 7 Captains Dr., Boat Launch and Buzzell Cove phosphorus levels fluctuated between moderate and slightly elevated range.
- **Transparency:** Transparency measured with (VS) and without the viewscope (NVS) was below average (worse) in June during a cyanobacteria bloom, decreased slightly in July, and then increased (improved) in August when algal growth was low. Average NVS transparency remained stable with 2018 and was less than the state median. Historical trend analysis indicates relatively stable transparency since monitoring began.
- **Turbidity:** Epilimnetic, Metalimnetic, Camp Y Wood, Inlet, Outlet, and nearshore stations' turbidity levels were slightly elevated to elevated in July when algal growth was elevated and water levels were high. Hypolimnetic and Inlet turbidity levels were elevated in August. Buzzell Cove and 21 Plaisted Ext. turbidity levels fluctuated within an average range.
- **pH:** Deep spot, Inlet, Outlet, and nearshore station pH levels were within the desirable range 6.5-8.0 units. Historical trend analysis indicates relatively stable epilimnetic pH levels since monitoring began.



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

Table 1. 2019 Average Water Quality Data for CAPTAIN POND - SALEM

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	20.5	6.12	48	100	205.0		25	1.90	2.54	1.53	7.05
Metalimnion					210.0		26			2.73	6.84
Hypolimnion					215.3		28			3.23	6.62
21 Plaisted Ext.					213.0	46	15			0.84	7.11
7 Captains Dr.			50		219.7	42	20			2.12	7.14
Boat Launch			56		252.3	997	23			1.34	7.42
Buzzell Cove			48		208.0	778	21			1.14	7.21
Camp Y Wood			49		209.0	14	17			1.14	7.27
Inlet			49		209.3		17			5.60	7.32
Outlet					211.0		18			1.26	7.28

Historical Water Quality Trend Analysis

Parameter	Trend	Explanation	Parameter	Trend	Explanation
Conductivity	Stable	Trend not significant; data highly variable.	Chlorophyll-a	Stable	Trend not significant; data highly variable.
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.