Volunteer Lake Assessment Program Individual Lake Reports
WHITE OAK POND, HOLDERNESS, NH

MORPHOMETRIC DATA

Watershed Area (Ac.):	3,008	Max. Depth (m):	10.7	Flushing Rate (yr^1)	1.3	
Surface Area (Ac.):	291	Mean Depth (m):	4	P Retention Coef:	0.66	
Shore Length (m):	5,100	Volume (m³):	4,697,500	Elevation (ft):	583	

TROPHIC CLASSIFICATION

Year	Trophic class
1979	MESOTROPHIC
1990	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)	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 a given 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	Slightly Bad	Data periodically exceed water quality standards or thresholds for a given parameter by a small margin.
	Chlorophyll-a	Good	Sampling data is better than the water quality standards or thresholds for this parameter.
Primary Contact Recreation	Escherichia coli	No Data	No data 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.

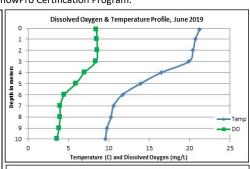| Land Cover Category	% Cover	Land Cover Category	% Cover	Land Cover Category	% Cover
Open Water	9.79	Barren Land	0	Grassland/Herbaceous	0
Developed-Open Space	1.52	Deciduous Forest	19.95	Pasture Hay	0.9
Developed-Low Intensity	0.14	Evergreen Forest	13.33	Cultivated Crops	1.7
Developed-Medium Intensity	0.04	Mixed Forest	42.43	Woody Wetlands	7.71
Developed-High Intensity	0	Shrub-Scrub	1.26	Emergent Wetlands	1.3

NEW HAMPSHIRE DEPARTMENT OF Environmental Services

RECOMMENDED ACTIONS: Pond quality was representative of mesotrophic conditions however chlorophyll levels tend to fluctuate above the threshold for mesotrophic lakes highlighting the delicate balance between nutrients and algal growth. A cyanobacteria bloom has occurred in the fall in the past two years. Consider development of a watershed management plant to help identify and quantify nutrient loads to the pond and make recommendations on implementing best practices to reduce stormwater runoff. Contact the NHDES Watershed Assistance Section for more information. Conductivity levels have increased in the lake and Dump Trib. and E. Holderness Rd. Trib. are contributing to the chloride load. Educate watershed residents on ways to reduce the application of de-icing products containing sodium chloride on their walkways and driveways. Encourage local companies to obtain NH Voluntary Salt Applicator Licenses through UNH T2 Center's Green SnowPro Certification Program.
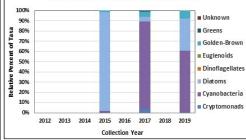
OBSERVATIONS (*Refer to Table 1 and Historical Deep Spot Data Graphics*)

- **CHLOROPHYLL-A:** Chlorophyll levels fluctuated within a low range from June through August. Average chlorophyll level remained stable with 2018 and was less than the state median and the threshold for mesotrophic lakes. Historical trend analysis indicates relatively stable chlorophyll levels since monitoring began.
- **CONDUCTIVITY/CHLORIDE:** Deep spot, #2 Lamb Swamp Inlet, #3 Dump Inlet, #4 Outlet, and #6 Stone Bridge Inlet conductivity and/or chloride levels were slightly greater than the state medians, yet much less than a level of concern. However, historical trend analysis indicates significantly increasing (worsening) epilimnetic conductivity levels since monitoring began. #3T Dump Trib. and #3T2 Dump Trib. 2 conductivity and chloride levels were elevated and greater than the state medians, however chloride levels were less than the state chronic chloride standard. #9 E. Holderness Rd. Trib. conductivity and chloride levels were greater than the state medians.
- **COLOR:** Apparent color measured in the epilimnion indicates the water was moderately tea colored or brown.
- **TOTAL PHOSPHORUS:** Epilimnetic phosphorus level was slightly elevated in June and then decreased to a low level as the summer progressed. Average epilimnetic phosphorus level increased slightly from 2018 and was slightly less than the state median and the threshold for mesotrophic lakes. Historical trend analysis indicates relatively stable epilimnetic phosphorus levels since monitoring began. Metalimnetic and Hypolimnetic phosphorus levels fluctuated within a low to moderate range. #2 Lamb Swamp Inlet, #3 Dump Inlet, #3T Dump Trib., #3T2 Dump Trib. 2, #4 Outlet, and #9 E. Holderness Rd. Trib. phosphorus levels fluctuated within average ranges for those stations. #6 Stone Bridge Inlet phosphorus levels were slightly elevated following a storm event in August.
- **TRANSPARENCY:** Transparency measured without the viewscope (NVS) was below average (worse) in June, decreased (worsened) in July due to wave conditions, and then increased slightly but remained below average in August. Average NVS transparency decreased from 2018 and was less (worse) than the state median. Historical trend analysis indicates stable transparency since monitoring began. Viewscope transparency was higher (better) than NVS transparency and likely a better measure of actual conditions.
- **TURBIDITY:** Epilimnetic and Hypolimnetic turbidity levels were slightly elevated in August following a storm event. #2 Lamb Swamp Inlet turbidity levels were within a low range however were the highest measured since monitoring began. #3 Dump Inlet turbidity levels were slightly elevated on each sampling event. #3T Dump Trib. turbidity levels were slightly elevated in July and August. #6 Stone Bridge Inlet turbidity levels were slightly elevated in June. #9 E. Holderness Rd. Trib. turbidity levels were within an average for that station. #3T2 Dump Trib. 2, Metalimnetic and Outlet turbidity levels were low.
- **pH:** Epilimnetic, #3 Dump Inlet, #3T Dump Trib., #3T2 Dump Trib. 2, #4 Outlet, #6 Stone Bridge Inlet, and #9 E. Holderness Rd. Trib. pH levels were within the desirable range 6.5-8.0 units. Historical trend analysis indicates relatively stable epilimnetic pH levels since monitoring began. Metalimnetic and #2 Lamb Swamp Inlet pH levels were slightly less than desirable. Hypolimnetic pH levels were slightly acidic and less than desirable.

Dissolved Oxygen & Temperature Profile, June 2019

White Oak Pond Annual Phytoplankton Population

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)

Station Name	Table 1. 2019 Average Water Quality Data for WHITE OAK POND - HOLDERNESS									
	Alk. mg/l	Chlor-a ug/l	Chloride mg/l	Color pcu	Cond. us/cm	Total P mg/l	Trans. m NVS	Trans. m VS	Turb. ntu	pH
Epilimnion	6.9	3.23	9	60	53.7	10	2.80	3.36	0.88	6.77
Metalimnion					54.7	10			0.92	6.41
Hypolimnion					55.8	12			3.25	6.06
#2 Lamb Swamp Inlet			9		56.1	11			1.02	6.32
#3 Dump Inlet			10		55.7	13			2.11	6.73
#3T Dump Trib.			61		259.3	19			1.25	6.61
#3T2 Dump Trib. 2			57		204.0	10			0.62	6.95
#4 Outlet (Dam)					53.3	8			0.67	6.87
#6 Stone Bridge Inlet			9		52.5	14			1.16	6.78
#9 E. Holderness Rd. Trib.			26		129.5	18			1.14	6.55

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
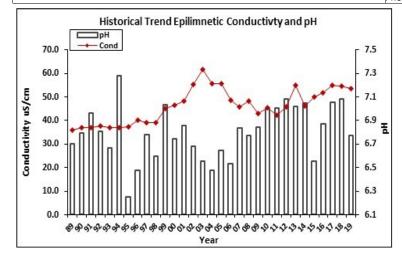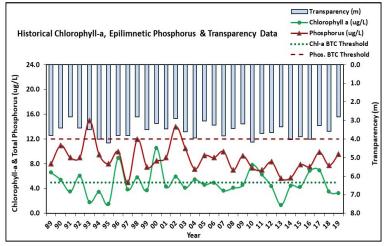**Conductivity:** 42.3 uS/cm
Chloride: 5 mg/L
Total Phosphorus: 11 ug/L
Transparency: 3.3 m
pH: 6.6

HISTORICAL WATER QUALITY TREND ANALYSIS

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

Historical Trend Epilimnetic Conductivty and pH

Historical Chlorophyll-a, Epilimnetic Phosphorus & Transparency Data