Volunteer Lake Assessment Program Individual Lake Reports
CANOBIE LAKE, WINDHAM, NH

MORPHOMETRIC DATA

Watershed Area (Ac.):	1,408	Max. Depth (m):	15.2	Flushing Rate (yr^{-1})	0.3
Surface Area (Ac.):	373	Mean Depth (m):	5.5	P Retention Coef:	0.83
Shore Length (m):	8,400	Volume (m³):	8,379,000	Elevation (ft):	219

TROPHIC CLASSIFICATION

Year	Trophic class
1987	MESOTROPHIC
2000	OLIGOTROPHIC

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	Cautionary	Limited data for this parameter predicts exceedance of water quality standards or thresholds; however more data are necessary to fully assess the parameter.
	Oxygen, Dissolved	Bad	Data periodically exceed water quality standards or thresholds for this parameter by a large margin.
	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	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.

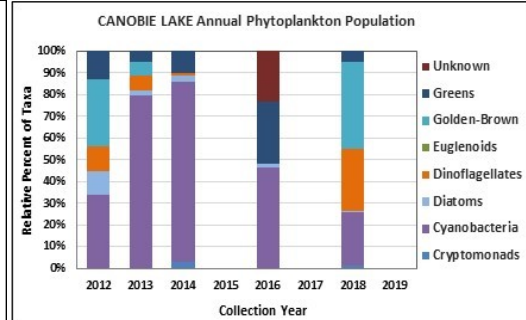| Land Cover Category	% Cover	Land Cover Category	% Cover	Land Cover Category	% Cover
Open Water	25.4	Barren Land	0.25	Grassland/Herbaceous	0.19
Developed-Open Space	18.1	Deciduous Forest	17.28	Pasture Hay	1.47
Developed-Low Intensity	19.3	Evergreen Forest	3.26	Cultivated Crops	0
Developed-Medium Intensity	8.36	Mixed Forest	0.11	Woody Wetlands	1.36
Developed-High Intensity	0.83	Shrub-Scrub	0.9	Emergent Wetlands	2.21

RECOMMENDED ACTIONS: Lake chlorophyll and phosphorus levels remained representative of oligotrophic, or high quality, conditions. Volunteers have continued to conduct a special study to better understand lake conductivity and chloride levels. We hope this will better inform decision makers on lake conditions. Continue to educate local government and private winter maintenance companies on obtaining NH Voluntary Salt Applicator Licenses through UNH Technology Transfer Center's Green SnowPro Certification program. Great job with the enhanced deep spot monitoring and we recommend continued monthly monitoring in the future. Educate shorefront property owner's on becoming certified LakeSmart through NH LAKES' LakeSmart lake-friendly living program www.nhlakes.org/lakesmart/. Keep up the great work!

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

- **CHLOROPHYLL-A:** Chlorophyll level was low in July and decreased in August. Average chlorophyll level increased slightly from 2018 and was less than the state median and the threshold for oligotrophic lakes. Historical trend analysis indicates significantly decreasing (improving) chlorophyll levels since monitoring began.
- **CONDUCTIVITY/CHLORIDE:** Deep spot, Stations 02, 04, 05, Frog Rock, Inlet, and Intake conductivity and chloride levels remained elevated and much greater than the state medians. Conductivity levels were lowest in May and increased later in the summer but remained fairly uniform across the lake. 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 water was clear with little to no tea (brown) coloring.
- **E. COLI:** Inlet E. coli levels were very low and much less than the state standard for public beaches and surface waters.
- **TOTAL PHOSPHORUS:** Epilimnetic phosphorus levels were low and stable from July to August. Average epilimnetic phosphorus level increased slightly from 2018, was less than the state median, and was approximately equal to the threshold for oligotrophic lakes. Historical trend analysis indicates stable epilimnetic phosphorus levels since monitoring began. Metalimnetic (middle water layer) and Hypolimnetic (lower water layer) phosphorus levels fluctuated within a moderate range. Inlet and South Shore Drainage phosphorus levels were low.
- **TRANSPARENCY:** Transparency measured without the viewscope (NVS) was high (good) in July and increased (improved) in August. Average NVS transparency decreased slightly from 2018 but remained higher (better) than the state median. Historical trend analysis indicates significantly increasing (improving) transparency since monitoring began. Viewscope transparency (VS) was much higher (better) than NVS transparency and likely a better measured of actual conditions.
- **TURBIDITY:** Epilimnetic, Metalimnetic, Inlet, and South Shore Drainage turbidity levels were within a low range. Hypolimnetic turbidity level was slightly elevated in August.
- **PH:** Epilimnetic, Metalimnetic, Hypolimnetic, Inlet, and South Shore Drainage pH levels were within the desirable range 6.5-8.0 units. Historical trend analysis indicates stable epilimnetic pH levels since monitoring began.

CANOBIE LAKE Annual Phytoplankton Population

Station Name	Table 1. 2019 Average Water Quality Data for CANOBIE LAKE - WINDHAM										
	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	24.0	2.1	91	20	365.2		8	5.62	7.62	0.32	7.20
Metalimnion					359.0		11			0.40	6.82
Hypolimnion					369.0		13			1.05	6.71
Inlet			86		366.0	4	9			0.34	7.40
South Shore Drainage			85		365.5		8			0.32	7.42
Station 04			92		373.7						
Station 05			91		373.3						
2 Cove			95		376.3						
Frog Rock			91		371.7						
Intake			92		374.7						

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	Improving	Data significantly decreasing.
pH (epilimnion)	Stable	Trend not significant; data show low variability.	Transparency	Improving	Data significantly increasing.
			Phosphorus (epilimnion)	Stable	Trend not significant; data show low variability.

Historical Trend Epilimnetic Conductivty and pH

Historical Chlorophyll-a, Epilimnetic Phosphorus & Transparency Data