Volunteer Lake Assessment Program Individual Lake Reports

WEBSTER LAKE, FRANKLIN, NH

MORPHOMETRIC DATA

Watershed Area (Ac.):	11,136	**Max. Depth (m):**	11.8	**Flushing Rate (yr^{-1}):**	1.5
Surface Area (Ac.):	612	**Mean Depth (m):**	5.5	**P Retention Coef:**	0.58
Shore Length (m):	6,900	**Volume (m^3):**	13,586,500	**Elevation (ft):**	401

TROPHIC CLASSIFICATION

Year	Trophic class
1979	MESOTROPHIC
1993	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

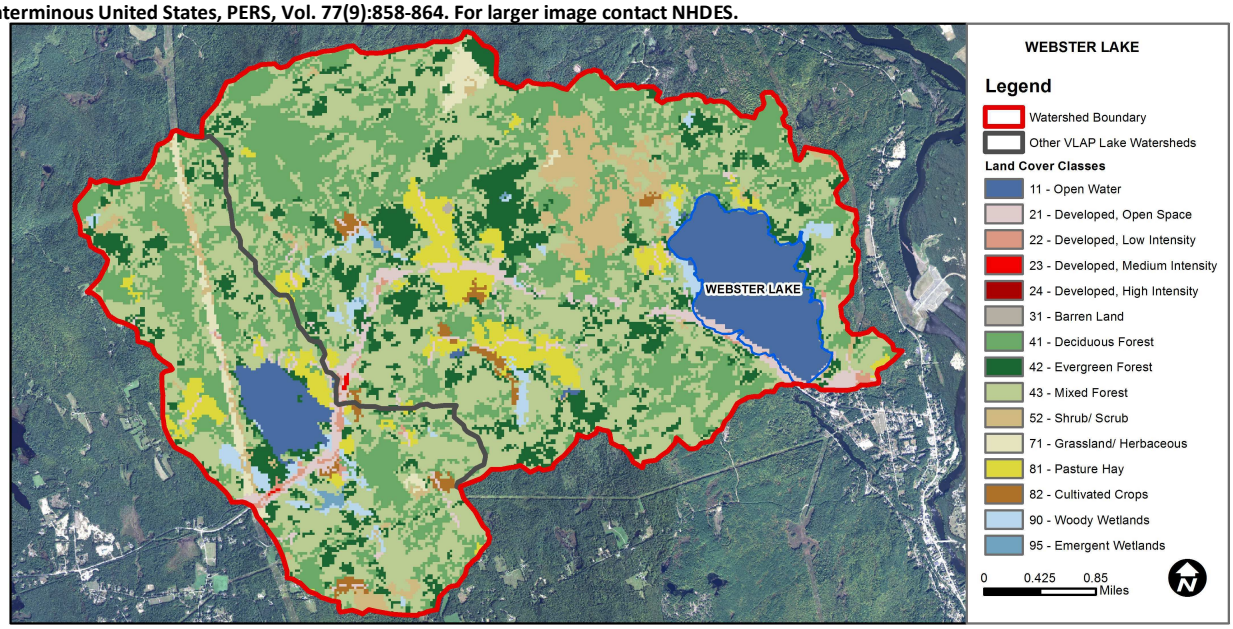
Designated Use	Parameter	Category	Comments
Aquatic Life	Phosphorus (Total)	Good	Sampling data is better than the water quality standards or thresholds for this parameter.
	pH	Slightly Bad	Data periodically exceed water quality standards or thresholds for this parameter by a small margin.
	Oxygen, Dissolved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

BEACH PRIMARY CONTACT ASSESSMENT STATUS

WEBSTER LAKE - LAGACE TOWN BEACH	Escherichia coli	Bad	Data periodically exceed water quality standards or thresholds for this parameter by a large margin.
WEBSTER LAKE - GRIFFIN TOWN BEACH	Escherichia coli	Bad	Data periodically exceed water quality standards or thresholds for this parameter by a large margin.
WEBSTER LAKE - LAGACE TOWN BEACH	Cyanobacteria	Slightly Bad	Cyanobacteria bloom(s).
WEBSTER LAKE - GRIFFIN TOWN BEACH	Cyanobacteria	Slightly Bad	Cyanobacteria bloom(s).

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	7.45	Barren Land	0.03	Grassland/Herbaceous	1.31
Developed-Open Space	3.01	Deciduous Forest	26.81	Pasture Hay	4.8
Developed-Low Intensity	0.42	Evergreen Forest	11.42	Cultivated Crops	0.86
Developed-Medium Intensity	0.04	Mixed Forest	37.07	Woody Wetlands	1.8
Developed-High Intensity	0	Shrub-Scrub	4.61	Emergent Wetlands	0.18

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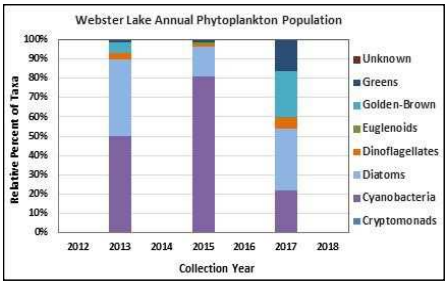
2018 Data Summary

Recommended Actions: Lake phosphorus and algal growth remained within a good range for mesotrophic lakes. Low tributary flows resulted in several samples having elevated turbidity, phosphorus and bacteria levels. Only collect a sample if there is enough flow in the tributary to get a sample free of organic material. This decaying organic matter and iron bacteria precipitate are rich in phosphorus and provide an ideal environment for bacterial growth. A significant storm event in August prior to sampling resulted in improved conditions in tributaries that normally exhibit low flows, which is a good sign. Continue to maintain flow in the Outlet channel to flush the pond and reduce nutrient retention that could fuel algal and cyanobacteria blooms. Continue implementation of recommendations outlined in the Watershed Management Plan. Contact the VLAP Coordinator for a sampling refresher in the spring of 2019.

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

- **Chlorophyll-a:** Chlorophyll levels were low in June, decreased slightly in July, and then increased in August. Average chlorophyll level decreased slightly from 2017 and was slightly less than the state median and the threshold for mesotrophic lakes. Historical trend analysis indicates relatively stable chlorophyll levels since monitoring began.
- **Conductivity/Chloride:** Epilimnetic (upper water layer), Metalimnetic (middle water layer) Hypolimnetic (lower water layer), Gagnes Brook, Lake Ave Trib., and Sucker Brook conductivity levels were slightly greater than state median, yet less than a level of concern. Chloride levels at all stations were either less than or slightly greater than the state median and were much less than the state chronic chloride standard. Rte. 11 Inlet conductivity levels were very low. Historical trend analysis indicates stable epilimnetic conductivity levels since monitoring began.
- **Color:** Apparent color was measured in the epilimnion and indicates the lake water is lightly tea colored, or light brown.
- **E. coli:** Rte. 11 Inlet and Sucker Brook E. coli levels were less than the state standard for surface waters on each sampling event. Gagnes Brook E. coli levels were low in July and increased in August following a significant storm event. Lake Ave Trib. E. coli levels were low in June, elevated above the state standard in July when the turbidity of the sample was also extremely elevated, and decreased in August but remained slightly greater than the state standard.
- **Total Phosphorus:** Epilimnetic phosphorus level fluctuated within a low range. Average epilimnetic phosphorus decreased slightly from 2017 and was slightly less than the state median and the threshold for mesotrophic lakes. Historical trend analysis indicates stable epilimnetic phosphorus levels with high variability between years. Metalimnetic phosphorus levels were slightly elevated in June and August and the turbidity of the samples was also slightly elevated suggesting layers of algae. Hypolimnetic phosphorus levels were moderate in June, low in July, and elevated in August due to the release of phosphorus from bottom sediments under anoxic (low dissolved oxygen) conditions. Rte. 11 Inlet and Sucker Brook phosphorus levels fluctuated within low to moderate ranges for these stations. Gagnes Brook phosphorus levels were extremely elevated in July and the turbidity of the sample was also elevated during very low flow conditions. Lake Ave Trib. phosphorus levels fluctuated within an elevated range, particularly in June and July when the turbidity of the samples was also greatly elevated. Sucker Brook turbidity levels were slightly elevated in August following a significant storm event.
- **Transparency:** Transparency measured with (VS) and without (NVS) the viewscope was average in June, increased (improved) slightly in July, and then decreased to an average range in August. Average NVS transparency increased (improved) from 2017 and was slightly higher (better) than the state median. However, historical trend analysis indicates significantly decreasing (worsening) transparency since monitoring began. Transparency measured with the viewscope was generally higher (better) than NVS transparency and likely a better measure of actual conditions.
- **Turbidity:** Epilimnetic and Rte. 11 Inlet turbidity levels were low on each sampling event. Metalimnetic turbidity levels were slightly elevated in July and August likely due to algal growth. Hypolimnetic turbidity levels were slightly elevated in August. Gagnes Brook turbidity levels were extremely elevated in July during very low flow conditions following significant storm events. Lake Ave Trib. turbidity levels were elevated in June during low flows, extremely elevated in July, and then low in August following a significant storm event.
- **pH:** Epilimnetic, Metalimnetic, Hypolimnetic and Sucker Brook pH levels were within the desirable range 6.5-8.0 units. Historical trend analysis indicates stable epilimnetic pH level since monitoring began. Gagnes Brook, Lake Ave Trib., and Rte. 11 Inlet pH levels were slightly acidic and less than desirable.



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 mg/m^3
Conductivity: 42.3 uS/cm
Chloride: 5 mg/L
Total Phosphorus: 11 ug/L
Transparency: 3.3 m
pH: 6.6

Table 1. 2018 Average Water Quality Data for WEBSTER LAKE - FRANKLIN

Station Name	Alk. mg/l	Chlor-a ug/l	Chloride mg/l	Color pcu	Cond. us/cm	E. coli mpn/100ml	Total P ug/l	Trans. m NVS	Trans. m VS	Turb. ntu	pH
Epilimnion	7.2	3.78	7	37	59.1		10	3.85	4.68	0.73	7.13
Metalimnion					59.7		15			2.42	6.69
Hypolimnion					64.2		37			1.87	6.72
Gagnes Brook			3		55.3	131	72			22.48	6.18
Lake Ave Trib.			7		64.7	514	50			14.71	6.30
Rte. 11 Inlet			3		29.8	56	6			0.34	6.38
Sucker Brook			9		74.0	93	15			1.14	7.05

Historical Water Quality Trend Analysis

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