Volunteer Lake Assessment Program Individual Lake Reports
FOREST LAKE, WINCHESTER, NH

MORPHOMETRIC DATA

						TROPHIC CLASSIFICATION		KNOWN EXOTIC SPECIES
Watershed Area (Ac.):	4,480	Max. Depth (m):	9.8	Flushing Rate (yr¹)	5	Year	Trophic class	Variable Milfoil
Surface Area (Ac.):	87	Mean Depth (m):	4.7	P Retention Coef:	0.46	2005	EUTROPHIC	
Shore Length (m):	3,500	Volume (m³):	1,653,000	Elevation (ft):	443	2009	MESOTROPHIC	

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	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	Slightly Bad	Data exceed water quality standards or thresholds for this parameter by a small margin.
Primary Contact Recreation	Escherichia coli	Very Good	All sampling data meet water quality standards or thresholds for this parameter.
	Cyanobacteria hepatoto	Slightly Bad	Cyanobacteria bloom(s).
	Chlorophyll-a	Slightly Bad	Data periodically exceed water quality standards or thresholds for this parameter by a small margin.

BEACH PRIMARY CONTACT ASSESSMENT STATUS

FOREST LAKE - TOWN BEACH	Escherichia coli	Good	Sampling data commonly meet water quality standards or thresholds for this parameter.
FOREST LAKE - 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.
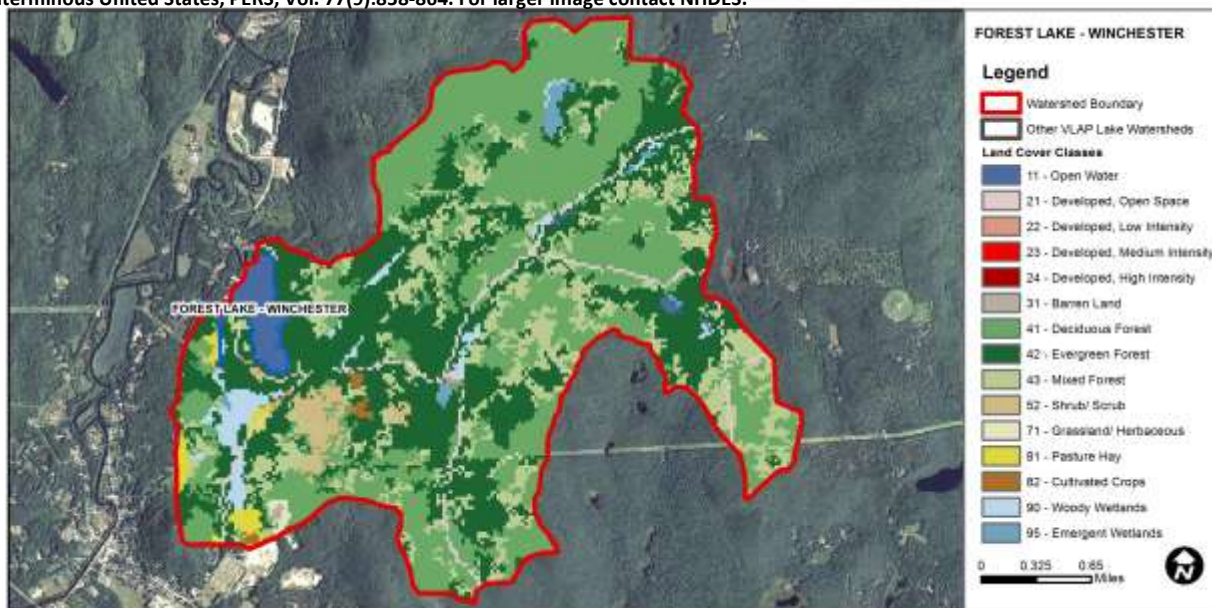
Land Cover Category	% Cover	Land Cover Category	% Cover	Land Cover Category	% Cover
Open Water	2.22	Barren Land	0.08	Grassland/Herbaceous	0.23
Developed-Open Space	2.21	Deciduous Forest	37.28	Pasture Hay	1
Developed-Low Intensity	0.14	Evergreen Forest	35.08	Cultivated Crops	0.34
Developed-Medium Intensity	0	Mixed Forest	16.47	Woody Wetlands	2.28
Developed-High Intensity	0	Shrub-Scrub	1.74	Emergent Wetlands	0.76

RECOMMENDED ACTIONS: The improving conductivity and transparency (clarity) trends are encouraging and we hope to see this continue! Lake phosphorus levels have generally remained below the threshold for mesotrophic lakes since 2011 which is a great sign. Algal growth continues to fluctuate slightly above the mesotrophic threshold however has remained at a lower level since 2011 and chlorophyll levels have responded by remaining within a lower range as well. Participate in NH LAKES' LakeSmart program to evaluate and certify lake front properties as lake-friendly. For more information visit www.nhlakes.org/lakesmart/. Increase monitoring frequency to once per month during the summer to better assess seasonal and historical water quality trends. Keep up the great work!

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

- **CHLOROPHYLL-A:** Chlorophyll level was within a moderate range in June, increased slightly from 2018, was slightly greater than the state median, and was approximately equal to the threshold for mesotrophic lakes. Historical trend analysis indicates relatively stable chlorophyll levels since monitoring began.
- **CONDUCTIVITY/CHLORIDE:** Epilimnnetic (upper water layer), Metalimnetic (middle water layer), Hypolimnetic (lower water layer), Campground Inlet, NE Branch, and Outlet conductivity and/or chloride levels were slightly greater than the state medians yet much less than a level of concern. Historical trend analysis indicates significantly decreasing (improving) epilimnetic conductivity levels since monitoring began. Sandy Point Inlet conductivity levels were low and less than the state median. Dump Branch conductivity levels were slightly elevated, however historical trend analysis indicates significantly decreasing conductivity levels at this station.
- **COLOR:** Apparent color measured in the epilimnion indicates the water was borderline light to moderately tea colored, or brown.
- **E. COLI:** Campground Inlet A E. coli levels were slightly less than the state standard of 406 cts/100 mL for surface waters. Campground Inlet B E. coli levels were low and much less than the state standards for surface water and public beaches.
- **TOTAL PHOSPHORUS:** Epilimnetic and Metalimnetic phosphorus levels were within a low range. Average epilimnetic phosphorus level decreased slightly from 2018 and was less than the state median and the threshold for mesotrophic lakes. Historical trend analysis indicates highly variable epilimnetic phosphorus levels since monitoring began. Hypolimnetic phosphorus level was slightly elevated and the turbidity of the sample was also elevated. Dump Branch, Outlet and Sandy Point Inlet phosphorus levels were within a low to moderate range. Campground Inlet and NE Branch phosphorus levels were slightly elevated yet within an average range for those stations.
- **TRANSPARENCY:** Transparency measured without the viewscope (NVS) was slightly above average (good) for the lake, increased (improved) slightly from 2018, and was slightly higher (better) than the state median. Historical trend analysis indicates significantly increasing (improving) NVS transparency since monitoring began. We hope to see this continue! Viewscope transparency (VS) was much higher (better) than NVS transparency and likely a better measure of actual conditions.
- **TURBIDITY:** Epilimnetic, Outlet and Sandy Point turbidity levels were within a low range. Metalimnetic turbidity levels were slightly higher likely due to algal growth. Campground Inlet, Dump Branch and NE Branch turbidity levels were also slightly higher yet within an average range for those stations. Hypolimnetic turbidity levels were elevated potentially due to bottom sediment, and/or the formation and accumulation of organic matter under anoxic (no dissolved oxygen) conditions.
- **PH:** Epilimnetic, Dump Branch, NE Branch, Outlet, and Sandy Point Inlet pH levels were within the desirable range 6.5-8.0 units. Historical trend analysis indicates significantly decreasing (worsening) epilimnetic pH levels since monitoring began. Metalimnetic, Hypolimnetic and Campground Inlet pH levels were slightly acidic and less than desirable.

Dissolved Oxygen & Temperature Profile, June 2019

FOREST LAKE Annual Phytoplankton Population
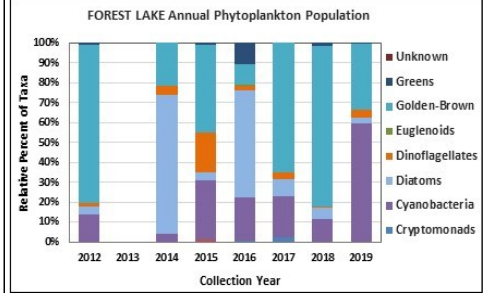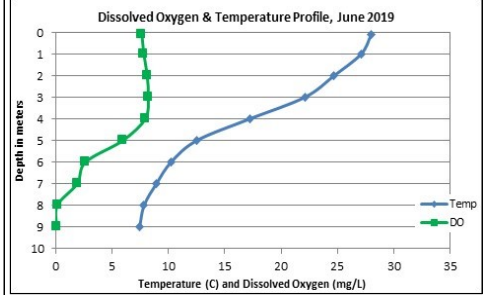
NH Water Quality Standards: Numeric criteria for specific parameters. Results exceeding criteria are considered a water quality violation.

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)

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

Station Name	Table 1. 2019 Average Water Quality Data for FOREST LAKE - WINCHESTER										
	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		Turb. ntu	pH
								NVS	VS		
Epilimnion	7.3	5.25	8	40	54.0		8	3.50	4.50	0.68	6.92
Metalimnion					55.0		10			1.83	6.34
Hypolimnion					72.5		27			10.90	6.10
Campground Inlet			10		71.5		30			1.92	6.38
Campground Inlet A						345					
Campground Inlet B						23					
Dump Branch					106.3		12			2.26	6.58
NE Branch			7		53.9		25			1.82	6.92
Outlet					53.0		8			0.80	6.87
Sandy Point Inlet					22.8		14			1.39	6.69

HISTORICAL WATER QUALITY TREND ANALYSIS

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

Historical Trend Epilimnetic Conductivty and pH

Historical Chlorophyll-a, Epilimnetic Phosphorus & Transparency Data