Volunteer Lake Assessment Program Individual Lake Reports

FOREST LAKE, WINCHESTER, NH

MORPHOMETRIC DATA

Watershed Area (Ac.):	4,480	**Max. Depth (m):**	9.8	**Flushing Rate (yr^{-1})**	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 (m^3):**	1,653,000	**Elevation (ft):**	443	2009	MESOTROPHIC	

TROPHIC CLASSIFICATION **KNOWN EXOTIC SPECIES**

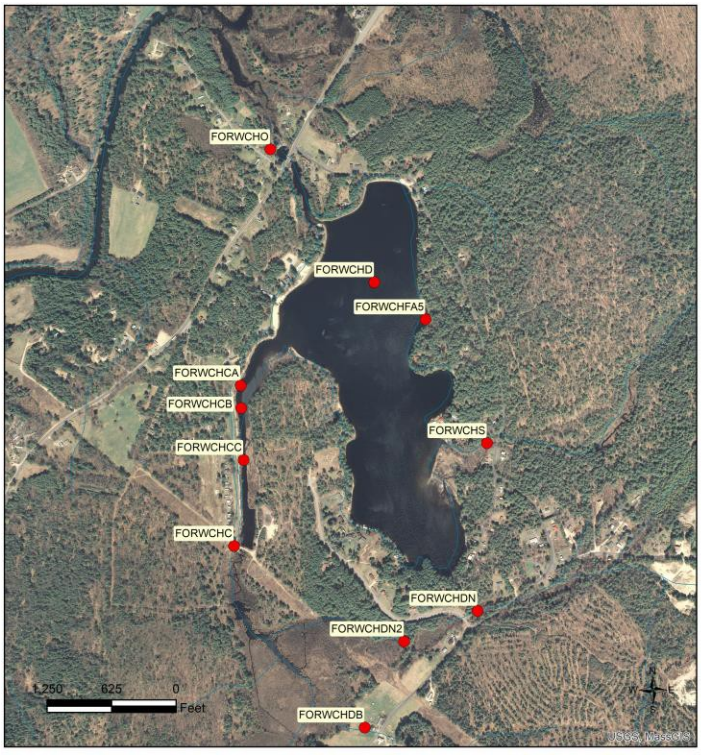
The Waterbody Report Card tables are generated from the DRAFT 2020 305(b) report on the status of N.H. waters, and are based on data collected from 2010-2019. Detailed waterbody assessment and report card information can be found at NHDES' Water Quality Assessment Website.

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	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	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).

VLAP SAMPLE STATION MAP: This map depicts the location of routine sampling stations discussed on page two of the report.



FOREST LAKE
WINCHESTER
VOLUNTEER LAKE ASSESSMENT PROGRAM

STATIONID	STATION NAME
FORWCHC	CAMPGROUND INLET
FORWCHD	DEEP SPOT
FORWCHDB	DUMP BRANCH
FORWCHDN	NE BRANCH DOWNSTREAM
FORWCHO	OUTLET
FORWCHS	SANDY POINT INLET
FORWCHCA	CAMPGROUND INLET A
FORWCHCB	CAMPGROUND INLET B
FORWCHCC	CAMPGROUND INLET C
FORWCHFA5	5 FOREST AVE
FORWCHDN2	NORTHEAST BRANCH 2

Source: The data layers are derived from NHDES data and are under constant revision. NHDES is not responsible for the use or interpretation of this information. Not intended for legal use.NHDES Watershed Management Bureau Date: 2/17/2021

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Forest Lake, Winchester
2020 Data Summary

Recommended Actions: Great job sampling in 2020! Lake quality has improved in recent years with lake nutrient (phosphorus) levels and algal (chlorophyll) growth remaining within a low range and less than the thresholds for mesotrophic lakes resulting in improved lake clarity (transparency). Conductivity levels have improved and pH levels are slowly starting to recover following a period of decline. These trends are encouraging and we hope to see them continue. Stream bracketing during a storm event in September revealed elevated phosphorus and turbidity levels at several downstream sites of a horse farm indicating potential nutrient runoff. Work with the NH Department of Agriculture and property owners to address stormwater and nutrient runoff issues at this site. Continue watershed education and outreach efforts and encourage shoreline property owners to be certified LakeSmart through NHLAKES 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 within a low range in August, decreased from 2019 and was less than the state median and the threshold for mesotrophic lakes. Historical trend analysis indicates stable, yet variable, chlorophyll levels since monitoring began.
- **Conductivity/Chloride:** Epilimnetic (upper water layer), Metalimnetic (middle water layer), Hypolimnetic (lower water layer), Campground Inlet, NE Branch, NE Branch 2, Outlet, and Test 3 and 5 conductivity 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 and Test 4 and 6 conductivity levels were low and less than the state median. Dump Branch conductivity levels were slightly elevated but historical trend analysis indicates decreasing conductivity levels at this station.
- **Color:** Apparent color measured in the epilimnion indicates the water was lightly tea colored, or light brown.
- **Total Phosphorus:** Epilimnetic, Metalimnetic and Outlet phosphorus levels were within a low range. Epilimnetic phosphorus level decreased slightly from 2019 and was less than the state median and the threshold for mesotrophic lakes. Historical trend analysis indicates stable, yet variable, epilimnetic phosphorus levels since monitoring began. Hypolimnetic phosphorus level was within a moderate range and the turbidity of the sample was slightly elevated. Campground Inlet phosphorus levels were slightly elevated on each sampling event during stagnant flow conditions and during a storm event. Dump Branch and Sandy Point Inlet phosphorus levels were low in August and slightly elevated in September during a significant storm event following drought conditions. NE Branch phosphorus levels were elevated in August during low flows and the turbidity of the sample was also slightly elevated. Storm event sampling and stream bracketing in September revealed greatly elevated phosphorus levels at NE Branch, NE Branch 2 and Test 3. Test 4 and 6 phosphorus levels were also elevated but within a much lower range, and Test 5 phosphorus level was moderate.
- **Transparency:** Transparency was high (good) in August, increased (improved) from 2019, was higher (better) than the state median, and was the best measured since monitoring began. Historical trend analysis indicates significantly increasing (improving) transparency since monitoring began. We hope to see this continue!
- **Turbidity:** Epilimnetic, Metalimnetic, Outlet, and Test 5 turbidity levels were within a low range. Hypolimnetic turbidity level was slightly elevated for that station likely due to the formation and accumulation of organic compounds under anoxic (low dissolved oxygen) conditions. Campground Inlet and Test 6 turbidity levels were slightly elevated in September during the storm event. Dump Branch and NE Branch turbidity levels were slightly elevated in August. NE Branch, NE Branch 2, Test 3, and Test 4 turbidity levels were elevated during the storm event and lab data indicate colored water with various amounts of organic matter in the samples.
- **pH:** Epilimnetic, Metalimnetic, Campground Inlet, NE Branch, NE Branch 2, Outlet, Sandy Point Inlet, Test 3, Test 4, and Test 5 pH levels were within the desirable range 6.5-8.0 units. Historical trend analysis indicates relatively stable epilimnetic pH levels since monitoring began. Hypolimnetic, Dump Branch and Test 6 pH levels were slightly less than desirable.

Table 1. 2020 Average Water Quality Data for FOREST LAKE - WINCHESTER

Station Name	Alk. mg/l	Chlor-a ug/l	Chloride mg/l	Color pcu	Cond. us/cm	Total P ug/l	Trans. m NVS	Turb. ntu	pH
Epilimnion	8.8	2.80	12	30	59.4	7	4.72	0.23	7.08
Metalimnion					57.1	8		0.28	6.76
Hypolimnion					55.4	22		4.98	6.37
Campground Inlet			14		79.6	32		1.61	6.60
Dump Branch					115.2	24		4.00	6.48
NE Branch			10		65.9	92		5.71	6.98
NE Branch 2					57.5	121		7.92	6.83
Outlet					57.1	12		0.41	6.91
Sandy Point Inlet					36.2	25		1.06	6.79
Test 3					57.6	181		4.81	6.58
Test 4					39.0	54		5.90	6.64
Test 5					44.6	26		1.02	6.89
Test 6					30.3	47		2.37	6.15

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