Volunteer Lake Assessment Program Individual Lake Reports
MILLEN POND, WASHINGTON, NH

MORPHOMETRIC DATA

							TROPHIC CLASSIFICATION		KNOWN EXOTIC SPECIES

|							Year	Trophic class
Watershed Area (Ac.):	832	**Max. Depth (m):**	12.6	**Flushing Rate (yr¹)**	0.7			
Surface Area (Ac.):	156	**Mean Depth (m):**	5	**P Retention Coef:**	0.71		1984	OLIGOTROPHIC
Shore Length (m):	5,000	**Volume (m³):**	3,185,500	**Elevation (ft):**	1582		1997	OLIGOTROPHIC

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)	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	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	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.

BEACH PRIMARY CONTACT ASSESSMENT STATUS

MILLEN POND - TOWN BEACH	Escherichia coli	Good	Sampling data commonly meet water quality standards or thresholds for this parameter.

VLAP SAMPLE STATION MAP: This map depicts the location of routine sampling stations discussed on page two of the report.
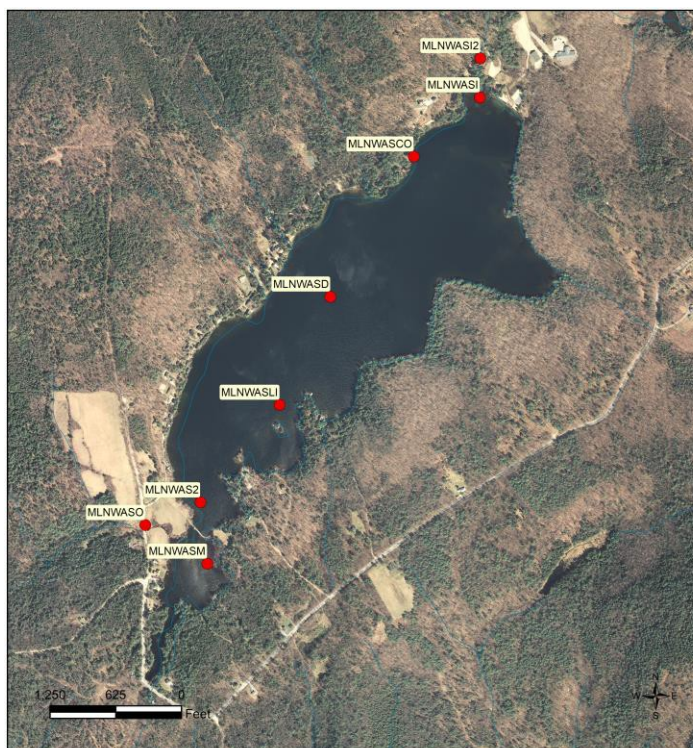
MILLEN POND
WASHINGTON
VOLUNTEER LAKE ASSESSMENT PROGRAM

STATIONID	STATION NAME
MLNWAS2	2 W SHORE
MLNWASD	DEEP SPOT
MLNWASI	INLET
MLNWASO	OUTLET IN STREAM
MLNWASI2	INLET 2
MLNWASCO	COPPS
MLNWASLI	LOON ISLAND
MLNWASM	MOLONEY

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

Recommended Actions: Great job sampling in 2020! Pond quality is representative of oligotrophic, or high quality, conditions. Drought conditions likely resulted in higher nutrient (phosphorus) levels in lake however algal growth remained within a low range. The worsening transparency is likely a result of a slight increase in algal/cyanobacteria growth and turbidity in Metalimnetic waters and an alert was issued in 2020 due to a short-lived cyanobacteria surface scum. Outlet phosphorus levels have significantly increased, particularly since 2010, and indicate a potential pollution source within that area of the pond. Investigate potential changes to the sub-watershed that may be influencing phosphorus levels. Epilimnetic turbidity and phosphorus levels increased following a significant storm event in September highlighting the importance of managing stormwater runoff within the watershed. There are several resources for homeowners on NHDES' website www.des.nh.gov. Encourage shorefront 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 low in July and then increased slightly in August but remained within a low range. Average chlorophyll level increased slightly from 2019, was less than the state median, and was approximately equal to the threshold for oligotrophic 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), and Outlet conductivity levels were within a low range for NH lakes and less than the state median. Epilimnetic chloride levels were also within a low range but slightly greater than the state median. Historical trend analysis indicates significantly decreasing (improving) epilimnetic conductivity levels since monitoring began.
- **Color:** Apparent color measured in the epilimnion indicates the water was clear with little to no tea, or brown, coloring.
- **Total Phosphorus:** Epilimnetic phosphorus level was low in July and increased to a slightly elevated level in September following a significantly storm even during drought conditions. Average epilimnetic phosphorus level increased from 2019, was less than the state median, and was approximately equal to the threshold for oligotrophic lakes. Historical trend analysis indicates stable, yet variable, epilimnetic phosphorus levels since monitoring began. Metalimnetic and Hypolimnetic phosphorus levels were slightly elevated potentially due to drought conditions and lack of flushing. Outlet phosphorus level was slightly elevated in July and elevated in September following the storm event. Historical trend analysis indicates significantly increasing (worsening) Outlet phosphorus levels since monitoring began.
- **Transparency:** Transparency measured without the viewscope (NVS) was slightly below average (worse) in July and remained stable in September. Average NVS transparency decreased slightly from 2019 but was higher (better) than the state median. Historical trend analysis indicates significantly decreasing (worsening) transparency since monitoring began. Viewscope transparency (VS) was much higher (better) than NVS transparency and likely a better measure of actual conditions.
- **Turbidity:** Epilimnetic turbidity increased following the significant storm event in September, however remained within a low range for NH lakes. Metalimnetic, Hypolimnetic and Outlet turbidity levels were stable and low from July to September.
- **pH:** Epilimnetic and Metalimnetic pH levels were within the desirable range 6.5-8.0 units. Historical trend analysis indicates significantly increasing (improving) epilimnetic pH levels since monitoring began. Hypolimnetic and Outlet pH levels were slightly acidic and less than desirable.

Station Name	Table 1. 2020 Average Water Quality Data for MILLEN POND - WASHINGTON									
	Alk. (mg/L)	Chlor-a (ug/L)	Chloride (mg/L)	Color (pcu)	Cond. (us/cm)	Total P (ug/L)	Trans. (m)		Turb. (ntu)	pH
							NVS	VS		
Epilimnion	2.4	2.84	8	15	30.4	8	5.12	6.08	0.43	6.80
Metalimnion					31.0	9			0.38	6.60
Hypolimnion					30.8	13			0.42	6.12
Outlet In Stream					33.0	26			0.40	6.20

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

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)

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)	Improving	Data significantly increasing.	Transparency	Worsening	Data significantly decreasing.
			Phosphorus (epilimnion)	Stable	Trend not significant; data highly variable.

Historical Trend Epilimnetic Conductivty and pH

Historical Chlorophyll-a, Epilimnetic Phosphorus & Transparency Data