Volunteer Lake Assessment Program Individual Lake Reports
KNOWLES POND, NORTHFIELD, NH

MORPHOMETRIC DATA

Watershed Area (Ac.):	365	Max. Depth (m):	17	Flushing Rate (yr¹)	0.6	
Surface Area (Ac.):	60	Mean Depth (m):	5.8	P Retention Coef:	0.73	
Shore Length (m):	2,600	Volume (m³):	1,396,500	Elevation (ft):	746	

**TROPHIC CLASSIFICATION**

Year	Trophic class
2000	OLIGOTROPHIC

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)	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.
	pH	Slightly Bad	Data periodically exceed water quality standards or thresholds for this parameter by a small margin.
	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.

VLAP SAMPLE STATION MAP: This map depicts the location of routine sampling stations discussed on page two of the report.
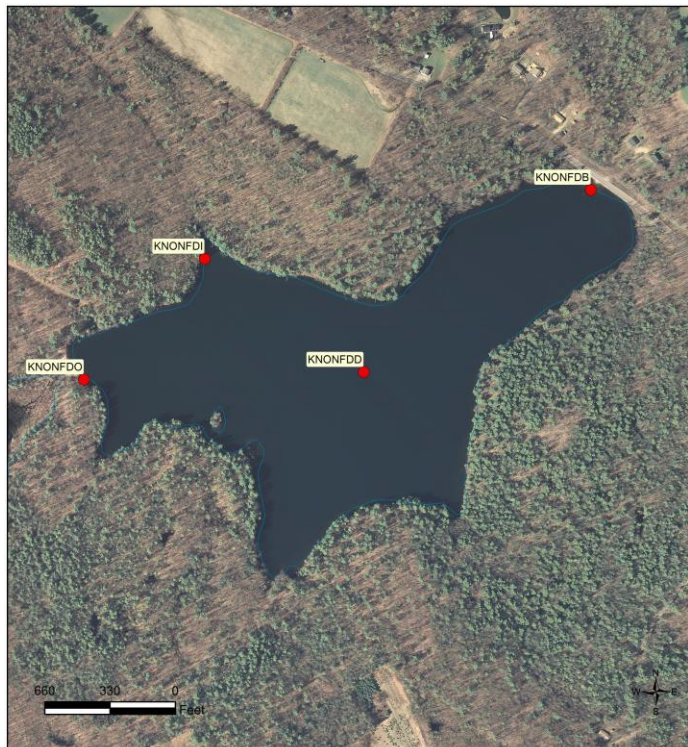
KNOWLES POND
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STATIONID	STATION NAME
KNONFDB	BEACH
KNONFDD	DEEP SPOT
KNONFDI	INLET
KNONFDO	OUTLET

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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Knowles Pond, Northfield
2020 Data Summary

Recommended Actions: Great job sampling in 2020! Pond quality is representative of oligotrophic, or high quality, conditions with nutrient (phosphorus) level and algal (chlorophyll) growth within acceptable thresholds. Drought conditions in 2020 resulted in low water levels with very little water flushing out of the pond. The lack of flushing of nutrients out of the pond resulted in slightly higher phosphorus levels in Metalimnetic waters in August which likely fueled increased algal growth. Conductivity levels, while within a low range, have significantly increased since monitoring began and likely reflects the impacts of road salt usage. Consider implementing a low salt zone near the pond to prevent further increases in conductivity and chloride levels. 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 June and increased to a slightly elevated level in August. Average chlorophyll level increased slightly from 2019 but remained less than the state median and the threshold for oligotrophic 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), Inlet, and Outlet conductivity levels were within a low range and less than the state median. Epilimnetic chloride level was also within a low range and slightly greater than the state median. However, historical trend analysis indicates significantly increasing (worsening) 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.

⬥ **E. coli:** Epilimnetic and Beach E. coli levels were very low and much less than the state standards for public beaches and surface waters.

⬥ **Total Phosphorus:** Epilimnetic phosphorus level was low in June and remained stable in August. Average epilimnetic phosphorus level increased slightly from 2019 and was less than the state median and the threshold for oligotrophic lakes. Historical trend analysis indicates stable, yet variable, epilimnetic phosphorus levels since monitoring began. Metalimnetic phosphorus level was low in June and decreased in August. Hypolimnetic phosphorus level was slightly elevated in August.

⬥ **Transparency:** Transparency measured with (VS) and without (NVS) the viewscope was high (good) in June and then decreased (worsened) to a below average range in August potentially due to wave conditions and algal growth. Average NVS transparency decreased slightly from 2019 and remained much higher (better) than the state median. Historical trend analysis indicates relatively stable NVS transparency since monitoring began.

⬥ **Turbidity:** Epilimnetic, Metalimnetic, Hypolimnetic, Inlet, and Outlet turbidity levels fluctuated within a low range and average turbidity levels were generally the lowest measured since monitoring began.

⬥ **pH:** Epilimnetic pH levels were within the desirable range 6.5-8.0 units and historical trend analysis indicates significantly increasing (improving) epilimnetic pH levels since monitoring began. Metalimnetic, Inlet and Outlet pH levels were slightly less than desirable. Hypolimnetic pH levels were slightly acidic and potentially critical to aquatic life.

Station Name	Table 1. 2020 Average Water Quality Data for KNOWLES POND - NORTHFIELD										
	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)		Turb. (ntu)	pH
								NVS	VS		
Epilimnion	3.0	2.78	9	15	36.2	5	5	6.55	7.56	0.25	6.92
Metalimnion					36.4		7			0.45	6.42
Hypolimnion					37.8		14			0.54	5.52
Beach						7					
Inlet					36.2					0.20	6.42
Outlet					36.2					0.22	6.26

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

Historical Trend Epilimnetic Conductivty and pH

Historical Chlorophyll-a, Epilimnetic Phosphorus & Transparency Data