



## Volunteer Lake Assessment Program Individual Lake Reports

### BEAVER LAKE, DERRY, NH

#### MORPHOMETRIC DATA

Watershed Area (Ac.):	5,760	Max. Depth (m):	14	Flushing Rate (yr <sup>1</sup> )	4.1
Surface Area (Ac.):	134	Mean Depth (m):	5	P Retention Coef:	0.47
Shore Length (m):	5,800	Volume (m <sup>3</sup> ):	2,707,500	Elevation (ft):	287

#### TROPHIC CLASSIFICATION

Year	Trophic class
1985	EUTROPHIC
1999	MESOTROPHIC

#### 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](http://www.des.nh.gov/organization/divisions/water/wmb/swqa/index.htm)

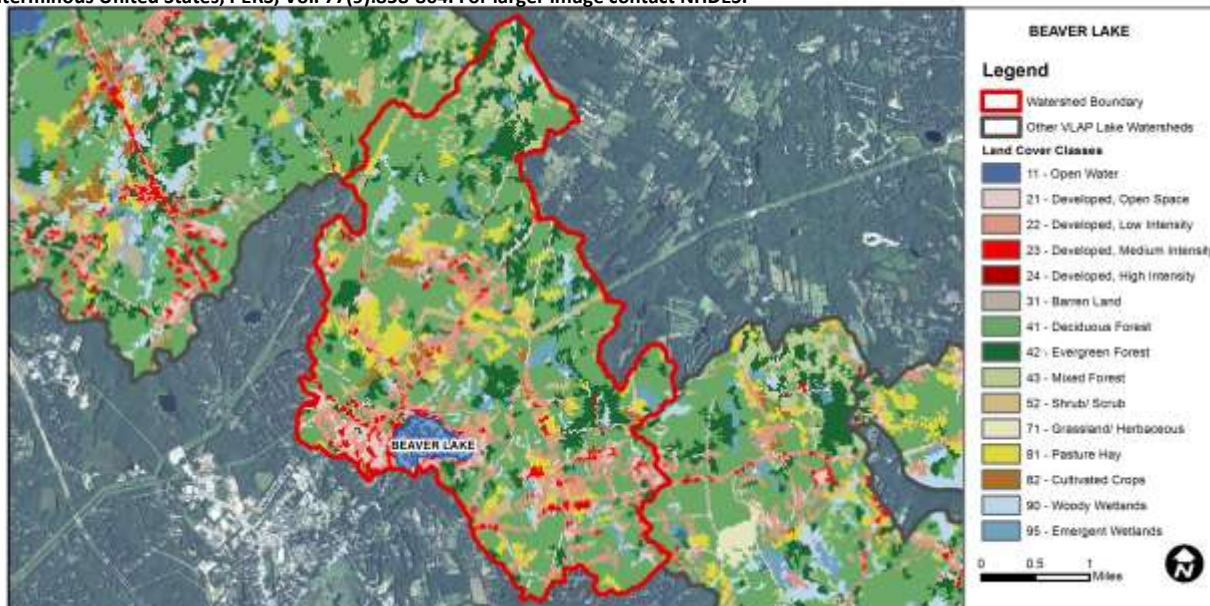
Designated Use	Parameter	Category	Comments
Aquatic Life	Phosphorus (Total)	Slightly Bad	Data exceed water quality standards or thresholds for a given parameter by a small margin.
	pH	Slightly Bad	Data periodically exceed water quality standards or thresholds for a given parameter by a small margin.
	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 a given parameter by a small margin.
Primary Contact Recreation	Escherichia coli	No Data	No data for this parameter.
	Chlorophyll-a	Very Good	All sampling data meet water quality standards or thresholds for this parameter.

#### BEACH PRIMARY CONTACT ASSESSMENT STATUS

BEAVER LAKE - COMEAU'S BEACH	Escherichia coli	No Data	No data for this parameter.
BEAVER LAKE - PARK BEACH	Escherichia coli	No Data	No data for this parameter.
BEAVER LAKE - GALLIEN'S BEACH	Escherichia coli	Bad	Data periodically exceed water quality standards or thresholds for this parameter by a large margin.

#### 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	1.13	Barren Land	0.05	Grassland/Herbaceous	0.01
Developed-Open Space	5.16	Deciduous Forest	44.15	Pasture Hay	7.07
Developed-Low Intensity	12.7	Evergreen Forest	12.38	Cultivated Crops	1.1
Developed-Medium Intensity	2.67	Mixed Forest	3.84	Woody Wetlands	2.83
Developed-High Intensity	0.03	Shrub-Scrub	3.77	Emergent Wetlands	3



# VOLUNTEER LAKE ASSESSMENT PROGRAM INDIVIDUAL LAKE REPORTS

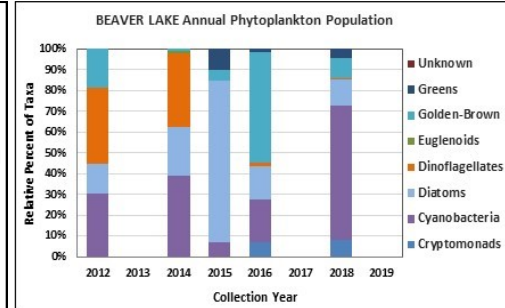
## BEAVER LAKE, DERRY

### 2019 DATA SUMMARY

**RECOMMENDED ACTIONS:** Lake nutrient levels and algal growth are generally higher than desirable for a mesotrophic lake. Jenny Dickey and Manter Brook experienced elevated phosphorus and turbidity levels following storm events in 2019. Efforts should be made in these sub-watersheds to educate residents to implement best practices to control stormwater runoff. Consider joining Soak Up the Rain NH to implement stormwater improvement projects throughout the watershed. Elevated conductivity and chloride levels in tributaries and the lake also indicates that winter de-icing materials are negatively impacting water quality. This could negatively affect aquatic life. Encourage all companies responsible for salting roads, parking lots, driveways, and walkways to obtain NH Voluntary Salt Applicator Licenses through UNH Technology Transfer Center's Green SnowPro Certification program. Encourage the Town Highway Dept. to clean roadside ditches, culverts and catch basins each spring to remove accumulated sand/salt before it enters waterways. Keep up the great work!

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

- CHLOROPHYLL-A:** Chlorophyll level was low in June, increased slightly in August, and remained stable in September. Average chlorophyll level decreased from 2018 and was slightly less than the state median and the threshold for mesotrophic lakes. Historical trend analysis indicates stable chlorophyll levels since monitoring began.
- CONDUCTIVITY/CHLORIDE:** Epilimnetic (upper water layer), Metalimnetic (middle water layer), Hypolimnetic (lower water layer), Cat-o-Bk. at Beaver, Jenny Dickey Bk., and Manter Bk. conductivity and chloride levels remained elevated and greater than the state medians. Historical trend analysis indicates significantly increasing (worsening) epilimnetic conductivity levels since monitoring began. Cat-o-Bk. conductivity and chloride levels were greatly elevated in June and chloride levels approached the state chronic chloride standard.
- COLOR:** Apparent color measured in the epilimnion indicates the water was moderate tea colored, or brown, and was darkest in June.
- TOTAL PHOSPHORUS:** Epilimnetic and Metalimnetic phosphorus levels were slightly elevated in June and August and decreased to low levels in September. Average epilimnetic phosphorus level remained stable with 2018 and was slightly greater than the state median and the threshold for mesotrophic lakes. Historical trend analysis indicates relatively stable epilimnetic phosphorus levels since monitoring began. Hypolimnetic phosphorus level was slightly elevated in June and August and greatly elevated in September when the turbidity of the sample was also elevated. Cat-o-Bk. and Cat-o-Bk. at Beaver Rd. phosphorus levels were elevated in June but within an average range for those stations. Jenny Dickey phosphorus levels were elevated in June following a storm event and during high flows and the turbidity of the sample was also elevated. Manter Brook phosphorus levels were elevated on each sampling event.
- TRANSPARENCY:** Transparency measured without the viewscope (NVS) was below average (worse) in June due to wave conditions, decreased in August, and then increased (improved) to within an average range in September. Average NVS transparency increased slightly from 2018 and was slightly less than the state median. Historical trend analysis indicates relatively stable transparency since monitoring began. Viewscope transparency (VS) was generally higher (better) than NVS transparency and likely a better measure of actual conditions.
- TURBIDITY:** Epilimnetic, Metalimnetic, Cat-o-Bk., and Cat-o-Bk. at Beaver Rd. turbidity levels were within a low to moderate range for those stations. Hypolimnetic turbidity level was elevated in September. Jenny Dickey turbidity level was elevated in June following a storm event. Manter Brook turbidity levels were elevated in June and August following storm events.
- pH:** Epilimnetic, Metalimnetic, Hypolimnetic, Cat-o-Bk., Cat-o-Bk. at Beaver Rd., Jenny Dickey, and Manter Brook pH levels were within the desirable range 6.5-8.0 units. Historical trend analysis indicates stable epilimnetic pH levels since monitoring began.



**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 BEAVER LAKE - DERRY									
	Alk.	Chlor-a	Chloride	Color	Cond.	Total P	Trans.		Turb.	pH
	mg/l	ug/l	mg/l	pcu	us/cm	mg/l	NVS	VS	ntu	
Epilimnion	24.9	2.72	37	60	185.4	14	3.00	3.50	1.01	7.24
Metalimnion					184.8	13			1.25	6.87
Hypolimnion					194.2	36			3.55	6.62
Cat O Brook			121		594.0	46			1.24	7.44
Cat O Bk. Beaver Rd.			42		267.0	59			1.38	6.99
Jenny Dickey Brook			60		278.0	28			2.03	7.24
Manter Brook			37		191.3	49			3.09	7.10

### HISTORICAL WATER QUALITY TREND ANALYSIS

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

