



Volunteer Lake Assessment Program Individual Lake Reports

BEAVER LAKE, DERRY, NH

MORPHOMETRIC DATA

TROPIC CLASSIFICATION

KNOWN EXOTIC SPECIES

Watershed Area (Ac.):	5,760	Max. Depth (m):	14	Flushing Rate (yr ⁻¹)	4.1	Year	Trophic class	
Surface Area (Ac.):	134	Mean Depth (m):	5	P Retention Coef:	0.47	1985	EUTROPHIC	
Shore Length (m):	5,800	Volume (m ³):	2,707,500	Elevation (ft):	287	1999	MESOTROPHIC	

The Waterbody Report Card tables are generated from the 2012 305(b) report on the status of N.H. waters, and are based on data collected from 2001-2011.

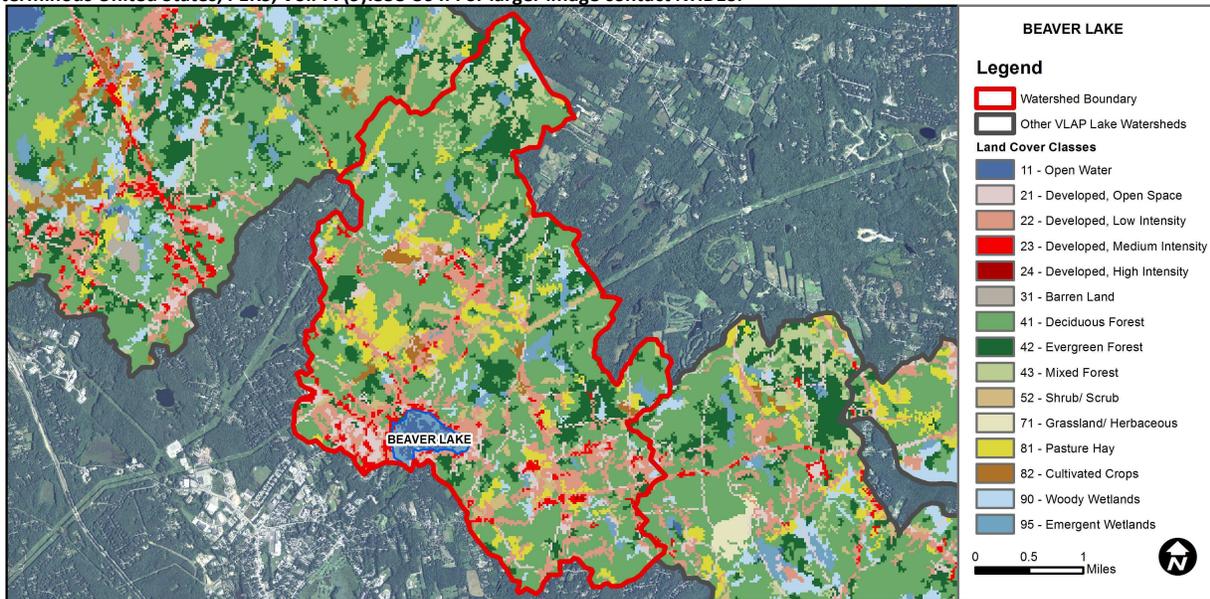
Designated Use	Parameter	Category	Comments
Aquatic Life	Phosphorus (Total)	Slightly Bad	>/=5 samples and median is >threshold.
	pH	Slightly Bad	>10% of samples exceed criteria by a small margin (minimum of 2 exceedances).
	D.O. (mg/L)	Encouraging	< 10 samples and no exceedance of criteria. More data needed.
	D.O. (% sat)	Slightly Bad	>10% of samples exceed criteria by a small margin (minimum of 2 exceedances).
	Chlorophyll-a	Slightly Bad	>5 samples and median is > threshold.
Primary Contact Recreation	E. coli	No Data	No Data for this parameter.
	Chlorophyll-a	Good	At least 10 samples with 1 sample but < 10% of samples exceeding criteria.

BEACH PRIMARY CONTACT ASSESSMENT STATUS

Beach Name	Parameter	Category	Comments
BEAVER LAKE - COMEAU'S BEACH	E. coli	No Data	No Data for this parameter.
BEAVER LAKE - PARK BEACH	E. coli	Very Good	All bacteria samples <75% of geometric mean criteria, but not enough to calculate geometric mean. Or, all bacteria samples are < single sample criteria and calculated Geometric means are less than geometric mean criteria.
BEAVER LAKE - GALLIEN'S BEACH	E. coli	Bad	>/=1 exceedance(s) of geometric mean criterion and/or >/=2 exceedances of single sample criterion, with 1 or more >2X criteria.

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



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2013 DATA SUMMARY

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

- ♣ **CHLOROPHYLL-A:** Chlorophyll levels were elevated and much greater than the state median in June, July and September. August chlorophyll levels were low and the 2013 average chlorophyll level increased from 2012. Historical trend analysis indicates stable chlorophyll with low variability between years.
- ♣ **CONDUCTIVITY/CHLORIDE:** Deep spot and tributary conductivity and chloride were elevated on each sampling event. Conductivity and chloride were particularly elevated at Cat-o-Brook, Cat-o-Brook at Beaver Rd, and Jenny Dickey Brook. Historical trend analysis indicates relatively stable epilimnetic conductivity with moderate variability between years.
- ♣ **TOTAL PHOSPHORUS:** Epilimnetic phosphorus increased slightly from 2012 and was greater than the state median. Metalimnetic phosphorus was elevated in August and September, and hypolimnetic phosphorus increased as the summer progressed likely due to the release of phosphorus from bottom sediments under anoxic conditions. Significant storm events occurred in July and September and tributary phosphorus levels were generally elevated following the storm events suggesting non-point sources of phosphorus pollution in the Cat-o-Brook at Beaver Rd. and Jenny Dickey Brook sub-watersheds.
- ♣ **TRANSPARENCY:** Transparency was relatively low and less than the state median in June, July and September due to the elevated algal growth and field data note wind and wave interference in July and September. August transparency was good and above 4.0 meter when chlorophyll levels were lowest. Historical trend analysis indicates highly variable transparency between years.
- ♣ **TURBIDITY:** Epilimnetic turbidity was elevated in June likely due to elevated algal growth. Hypolimnetic turbidity was elevated in July likely due to bottom sediment as field data note drifting due to wind conditions. Tributary turbidities were generally higher in June due to low flow conditions, but otherwise in a normal range for those stations, which is good news considering the significant storm events in July and September suggesting previous erosion problems have been addressed.
- ♣ **pH:** pH levels were sufficient to support aquatic life, however have historically been below the desirable range of 6.5 – 8.0 units. Historical trend analysis indicates relatively stable epilimnetic pH with moderate variability between years.
- ♣ **RECOMMENDED ACTIONS:** Phosphorus levels at Jenny Dickey Brook and Cat-o-Brook at Beaver Rd. were elevated following significant storm events and turbidity levels were not elevated. This suggests non-point phosphorus sources in the watershed such as fertilizer use and agricultural activities. Educate lake and watershed residents in these tributary sub-watersheds on ways to prevent stormwater runoff from their properties. DES' "Homeowner's Guide to Stormwater Management" is a great resource. Conductivity and chloride continue to be elevated. Work with the Town to establish low salt zones if possible in residential areas, and encourage staff to obtain a Voluntary Salt Applicator license by attending the UNH Technology Transfer Center's (T2) Green SnowPro Program.

Station Name	Table 1. 2013 Average Water Quality Data for BEAVER LAKE							
	Alk.	Chlor-a	Chloride	Cond.	Total P	Trans.	Turb.	pH
	mg/l	ug/l	mg/l	uS/cm	ug/l	m	ntu	
						NVS	VS	
Cat O Brook			66	289.7	31			1.33 7.11
Cat O Bk at Beaver Rd			109	606.3	38			1.31 7.52
Cat O Bk at Tsenetto Rd			34	204.7	43			1.89 7.13
Epilimnion	19.2	7.15	28	167.7	15	3.14	3.72	1.22 7.34
Metalimnion				178.1	18			1.40 6.74
Hypolimnion				186.8	23			2.55 6.61
Jenny Dickey Brook			59	272.5	28			0.89 7.16
Manter Brook			25	153.0	22			1.34 6.85

NH Median Values: Median values for specific parameters generated from historic lake monitoring data.

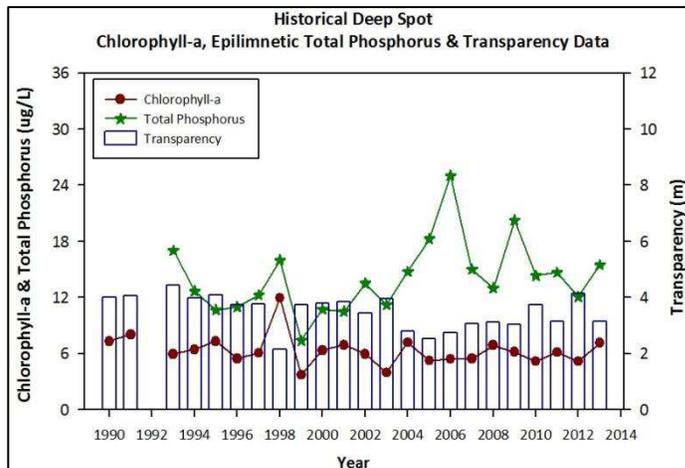
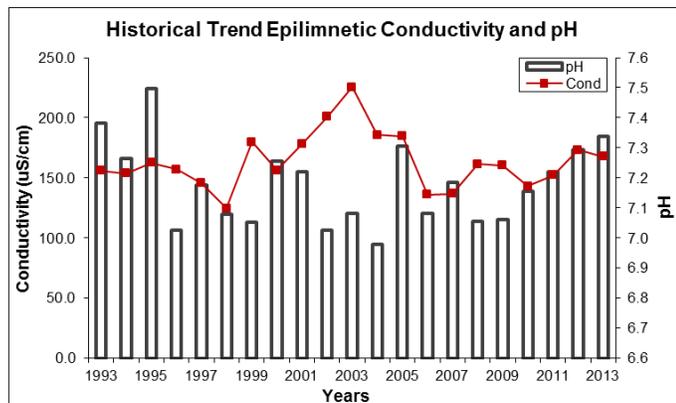
- Alkalinity:** 4.9 mg/L
- Chlorophyll-a:** 4.58 mg/m³
- Conductivity:** 40.0 uS/cm
- Chloride:** 4 mg/L
- Total Phosphorus:** 12 ug/L
- Transparency:** 3.2 m
- pH:** 6.6

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:** 6.5-8.0 (unless naturally occurring)

HISTORICAL WATER QUALITY TREND ANALYSIS

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





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