



Volunteer Lake Assessment Program Individual Lake Reports

BERRY BAY, FREEDOM, NH

MORPHOMETRIC DATA

Watershed Area (Ac.):	230,326	Max. Depth (m):	11.6	Flushing Rate (yr ⁻¹)	254
Surface Area (Ac.):	145	Mean Depth (m):	3.7	P Retention Coef:	-0.01
Shore Length (m):	5,800	Volume (m ³):	2,147,000	Elevation (ft):	406

TROPHIC CLASSIFICATION

Year	Trophic class
1987	OLIGOTROPIC
2003	MESOTROPIC

KNOWN EXOTIC SPECIES

The Waterbody Report Card tables are generated from the DRAFT 2014 305(b) report on the status of N.H. waters, and are based on data collected from 2004-2013. Detailed waterbody assessment and report card information can be found at www.des.nh.gov/organizations/divisions/water/wmb/swqa/index.htm

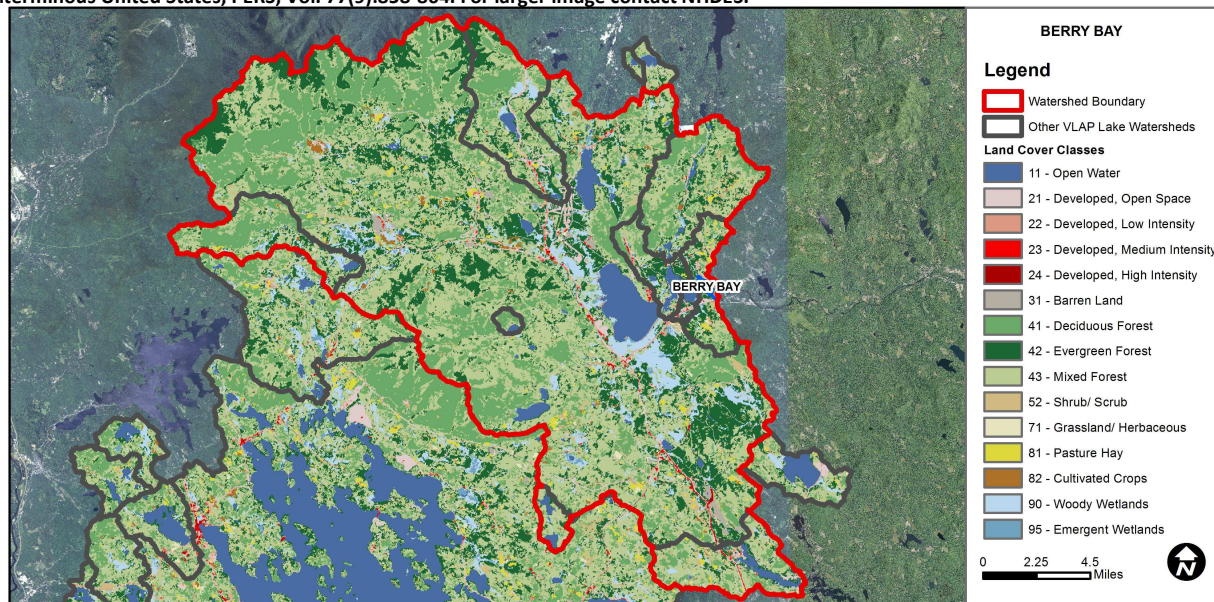
Designated Use	Parameter	Category	Comments
Aquatic Life	Phosphorus (Total)	Good	The calculated median is from 5 or more samples and is < indicator and > 1/2 indicator and the chlorophyll a indicator is okay.
	pH	Slightly Bad	>10% of samples exceed criteria by a small margin (minimum of 2 exceedances).
	Oxygen, Dissolved	Very Good	There are a total of at least 10 samples with 0 exceedances of criteria.
	Dissolved oxygen satura	Cautionary	There are < 10 samples with 1 exceedance of criteria. More data needed.
	Chlorophyll-a	Good	The calculated median is from 5 or more samples and is < indicator and > 1/2 indicator.
Primary Contact Recreation	Escherichia coli	No Data	No data for this parameter.
	Chlorophyll-a	Very Good	There are a total of at least 10 samples with 0 exceedances of indicator.

BEACH PRIMARY CONTACT ASSESSMENT STATUS

Beach Name	Parameter	Category	Comments
BROAD BAY - CAMP ROBIN HOOD BEACH	Escherichia coli	Very Good	Where there are no geometric means, all bacteria samples are < 75% of the geometric mean. Where there are geometric means all single bacteria samples are < the SSMC and all geometric means are < geometric mean criteria.
LEAVITT BAY - CAMP MARIST BEACH	Escherichia coli	Very Good	Where there are no geometric means, all bacteria samples are < 75% of the geometric mean. Where there are geometric means all single bacteria samples are < the SSMC and all geometric means are < geometric mean criteria.
BROAD BAY - CAMP HUCKINS BEACH	Escherichia coli	Cautionary	There are no geometric means and there is one single sample exceedance. More data needed.

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	3.63	Barren Land	0.63	Grassland/Herbaceous	0.36
Developed-Open Space	3.02	Deciduous Forest	23.03	Pasture Hay	0.93
Developed-Low Intensity	0.78	Evergreen Forest	20.56	Cultivated Crops	0.49
Developed-Medium Intensity	0.25	Mixed Forest	38.3	Woody Wetlands	4.62
Developed-High Intensity	0.04	Shrub-Scrub	2.7	Emergent Wetlands	0.6

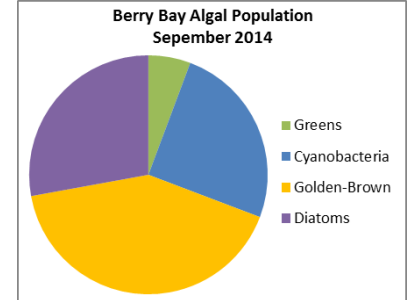
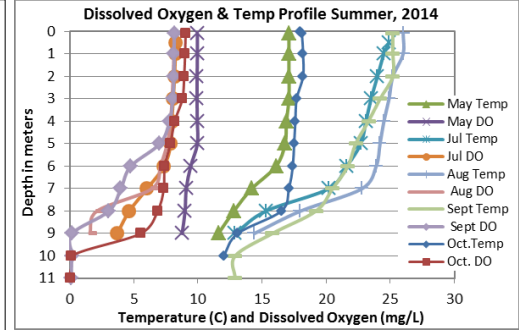


VOLUNTEER LAKE ASSESSMENT PROGRAM INDIVIDUAL LAKE REPORTS

BERRY BAY, FREEDOM 2014 DATA SUMMARY

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

- CHLOROPHYLL-A:** Chlorophyll levels were stable and low from June through August, and then decreased in September and October. Average chlorophyll levels were stable with 2013 and much less than the state median. Historical trend analysis indicates relatively stable chlorophyll with moderate variability between years.
- CONDUCTIVITY/CHLORIDE:** Deep spot conductivity and chloride levels were average and approximately equal to the state medians. Historical trend analysis indicates stable epilimnetic (upper water layer) conductivity since monitoring began.
- TOTAL PHOSPHORUS:** Epilimnetic phosphorus levels remained between 5 and 6 ug/L from May through September and then decreased to < 5 ug/L in October. Average epilimnetic phosphorus levels decreased from 2013 and were much less than the state median. Historical trend analysis indicates relatively stable epilimnetic phosphorus with moderate variability between years. Metalimnetic phosphorus levels remained between 5 and 6 ug/L on each sampling event. Hypolimnetic phosphorus levels increased from 6 ug/L in May to 9 ug/L in July, and then decreased to 6-7 ug/L in August and September. October hypolimnetic phosphorus levels peaked at 11 ug/L during fall turnover.
- TRANSPARENCY:** Transparency measured without the viewscope (NVS) was average in May, decreased to below average levels in July and August, and then improved to above average levels in September and October. The 2014 average NVS transparency was approximately equal to 2013 and the state median. Historical trend analysis indicates highly variable transparency since monitoring began. Transparency measured with the viewscope (VS) was generally much better than that without and is likely a better representation of actual conditions.
- TURBIDITY:** Epilimnetic turbidity remained low and was slightly higher from May through August potentially due to the slightly higher algal growth, decreased in September and then increased slightly in October. Metalimnetic turbidity remained stable and low from May through August and then increased to slightly elevated levels in October during fall turnover. Hypolimnetic turbidity increased gradually as the summer progressed from approximately 1.0 NTU to 3.0 NTUs during fall turnover.
- PH:** Epilimnetic and Metalimnetic pH levels were within the desirable range 6.5-8.0 units, however hypolimnetic pH was slightly less than desirable on each sampling event. Historical trend analysis indicates stable epilimnetic pH since monitoring began.
- RECOMMENDED ACTIONS:** Average phosphorus and chlorophyll levels have remained stable and generally have remained at a lower level since 2010, which is a good sign. The increased frequency and intensity of storm events highlights the importance of managing stormwater runoff from lake and watershed properties. DES' "NH Homeowner's Guide to Stormwater Management" is a great resource for watershed residents. Keep up the great work!



Station Name	Table 1. 2014 Average Water Quality Data for BERRY BAY								
	Alk. mg/l	Chlor-a ug/l	Chloride mg/l	Cond. uS/cm	Total P ug/l	Trans. m		Turb. ntu	pH
						NVS	VS		
Epilimnion	5.56	2.00	6	44.5	5	3.23	4.27	0.73	6.71
Metalimnion				45.3	6			1.08	6.59
Hypolimnion				52.2	8			1.42	6.32

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:** between 6.5-8.0 (unless naturally occurring)

HISTORICAL WATER QUALITY TREND ANALYSIS

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

