



# 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 <sup>-1</sup> )	254
Surface Area (Ac.):	145	Mean Depth (m):	3.7	P Retention Coef:	-0.01
Shore Length (m):	5,800	Volume (m <sup>3</sup> ):	2,147,000	Elevation (ft):	406

### TROPHIC CLASSIFICATION

Year	Trophic class
1987	OLIGOTROPHIC
2003	MESOTROPHIC

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

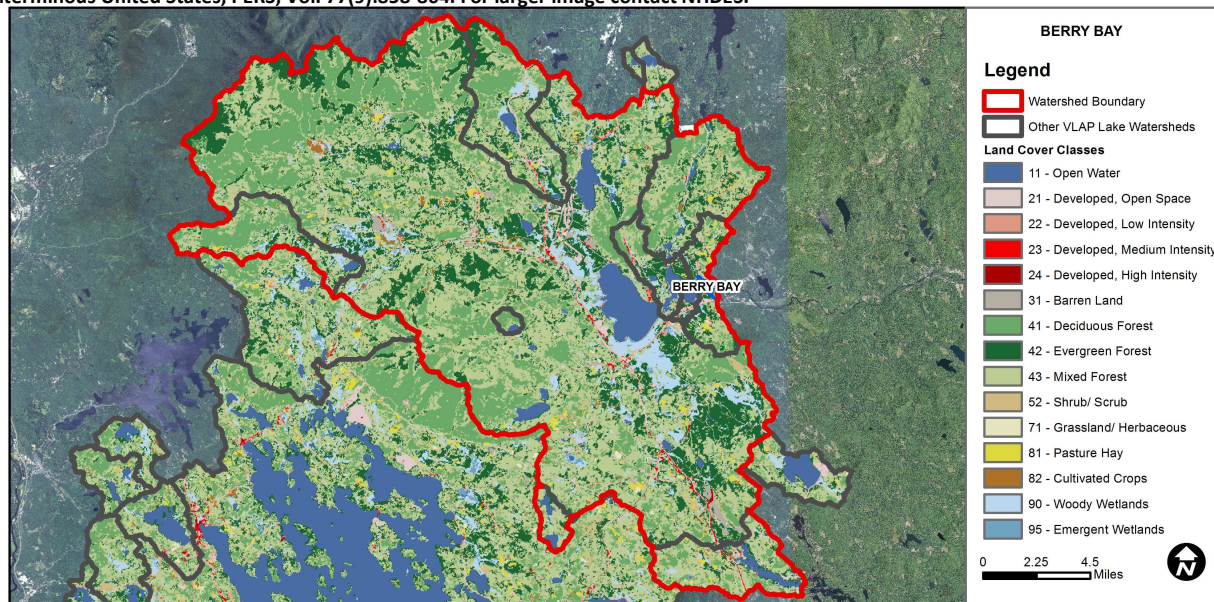
Designated Use	Parameter	Category	Comments
Aquatic Life	Phosphorus (Total)	Good	The calculated median is from 5 or more samples and is < indicator and > 1/2 indicator and the chlorophyll a indicator is okay.
	pH	Slightly Bad	>10% of samples exceed criteria by a small margin (minimum of 2 exceedances).
	Oxygen, Dissolved	Very Good	There are a total of at least 10 samples with 0 exceedances of criteria.
	Dissolved oxygen saturation	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

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

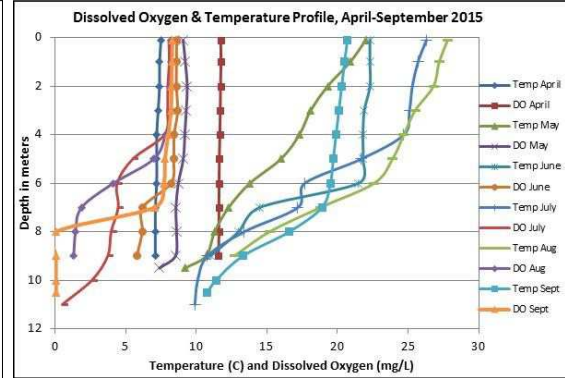
### BERRY BAY, FREEDOM

### 2015 DATA SUMMARY

**RECOMMENDED ACTIONS:** Berry Bay water quality is generally representative of oligotrophic, or high quality water, conditions and we hope to see this continue. Epilimnetic phosphorus and chlorophyll levels have decreased since 2010 which is a great sign. Spring sampling revealed elevated turbidity and decreased water clarity following spring snow melt after a winter of heavy snow accumulation. The above average snowfall and sand/salt application to local roadways and driveways likely contributed to the elevated turbidity and low water clarity. Road agents should be encouraged to remove any sand accumulated along roadsides, and to clean culverts and catch basins after the winter months to prevent any sediment and debris from entering nearby streams and the lake. Keep up the great work!

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

- ◆ **CHLOROPHYLL-A:** Chlorophyll levels fluctuated within a low range from April to September. Average chlorophyll levels decreased slightly from 2014 and were much less than the state median. Historical trend analysis indicates relatively stable chlorophyll with moderate variability between years.
- ◆ **CONDUCTIVITY/CHLORIDE:** Epilimnetic (upper water layer), metalimnetic (middle water layer) and hypolimnetic (lower water layer) conductivity and chloride levels remained stable and low and were approximately equal to the state median. Historical trend analysis indicates stable epilimnetic conductivity since monitoring began.
- ◆ **TOTAL PHOSPHORUS:** Epilimnetic, metalimnetic and hypolimnetic phosphorus levels also remained stable and low from April to September. Average epilimnetic phosphorus increased slightly from 2014 but was much less than the state median. Historical trend analysis indicates relatively stable epilimnetic phosphorus with moderate variability between years.
- ◆ **TRANSPARENCY:** Transparency was low (worse) in April after spring snowmelt and high water levels. Transparency increased (improved) through July and then decreased slightly in August and September. Average transparency improved from 2014 and was better than the state median. Historical trend analysis indicates highly variable transparency since monitoring began.
- ◆ **TURBIDITY:** Epilimnetic turbidity was elevated in April after spring snowmelt and during high water levels. Epilimnetic turbidity decreased to a low range from May to September. Metalimnetic turbidity remained within a low to average range on each sampling event. Hypolimnetic turbidity was low to average from April to August, but elevated in September potentially due to the accumulation of organic compounds in hypolimnetic waters.
- ◆ **pH:** Epilimnetic pH was within the desirable range 6.5-8.0 units and historical trend analysis indicates stable epilimnetic pH since monitoring began. Metalimnetic and hypolimnetic pH levels were less than desirable.



Station Name	Table 1. 2015 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	6.7	1.28	7	48.2	6	4.12	4.59	0.90	6.71
Metalimnion				50.8	7			0.96	6.46
Hypolimnion				48.1	8			3.21	6.14

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

**Alkalinity:** 4.9 mg/L

**Chlorophyll-a:** 4.58 mg/m<sup>3</sup>

**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.

