Volunteer Lake Assessment Program Individual Lake Reports
BROAD BAY, OSSIPEE, NH

MORPHOMETRIC DATA

						TROPHIC CLASSIFICATION		KNOWN EXOTIC SPECIES
Watershed Area (Ac.):	224,432	Max. Depth (m):	22.3	Flushing Rate (yr¹)	34.1	Year	Trophic class	Variable Milfoil
Surface Area (Ac.):	464	Mean Depth (m):	8.3	P Retention Coef:	0.04	1987	OLIGOTROPHIC	
Shore Length (m):	10,600	Volume (m³):	15,573,500	Elevation (ft):	406	2003	OLIGOTROPHIC	

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	Bad	>10%, with a minimum of 2, samples exceed criteria, with 1 or more by a large margin.
	Oxygen, Dissolved	Good	There are at least 10 samples with one, but < 10% of samples, exceeding criteria.
	Dissolved oxygen satura	Very Good	There are a total of at least 10 samples with 0 exceedances of criteria.
	Chlorophyll-a	Good	The calculated median is from 5 or more samples and is < indicator and > 1/2 indicator.
Primary Contact Recreation	Escherichia coli	Encouraging	There are no geometric means or there are > 2 single samples but those samples are within 75% of the geometric means criteria. More data needed.
	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.
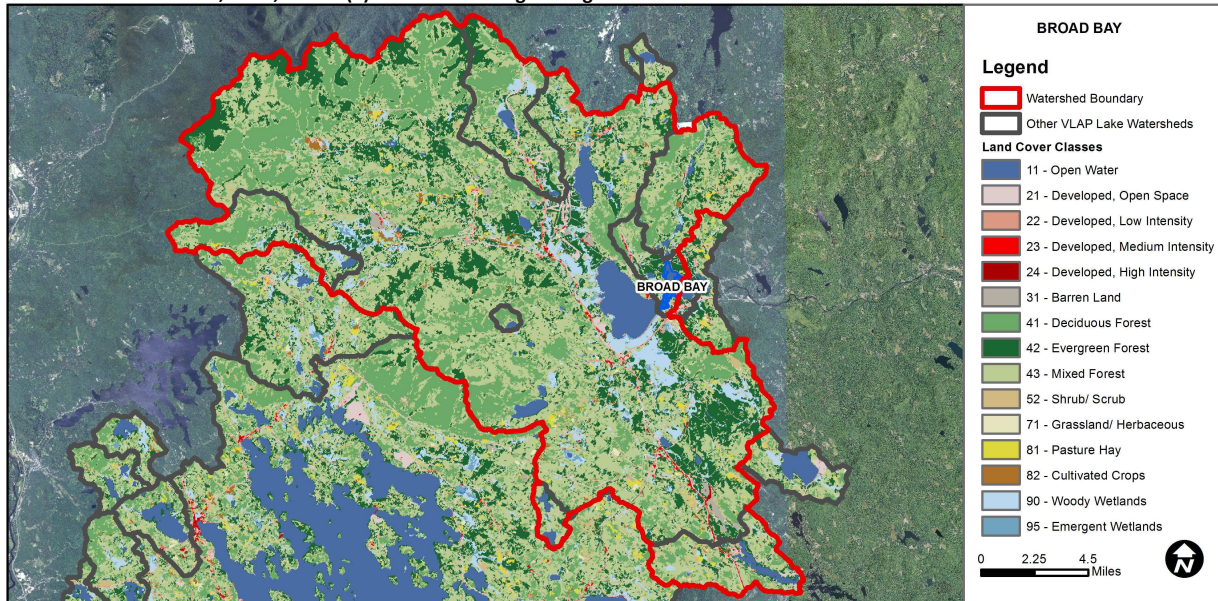
| Land Cover Category	% Cover	Land Cover Category	% Cover	Land Cover Category	% Cover
Open Water	3.56	Barren Land	0.64	Grassland/Herbaceous	0.36
Developed-Open Space	2.91	Deciduous Forest	23.33	Pasture Hay	0.85
Developed-Low Intensity	0.74	Evergreen Forest	20.37	Cultivated Crops	0.5
Developed-Medium Intensity	0.24	Mixed Forest	38.49	Woody Wetlands	4.63
Developed-High Intensity	0.04	Shrub-Scrub	2.67	Emergent Wetlands	0.6

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

- **CHLOROPHYLL-A:** Chlorophyll levels increased from May through August, decreased in September and then increased slightly in October. Monthly chlorophyll levels remained low and were less than the state median. Historical trend analysis indicates stable chlorophyll levels since monitoring began.
- **CONDUCTIVITY/CHLORIDE:** Deep spot conductivity and chloride levels remained average and approximately equal to the state medians. Historical trend analysis indicates stable epilimnetic (upper water layer) conductivity levels since monitoring began.
- **TOTAL PHOSPHORUS:** Epilimnetic and Metalimnetic phosphorus levels remained between 5 and 6 ug/L between May and October. Epilimnetic phosphorus decreased sharply from that measured in 2012 and 2013, and were much less than the state median. Historical trend analysis indicates significantly increasing (worsening) epilimnetic phosphorus since monitoring began. Hypolimnetic phosphorus levels remained between 5 and 6 ug/L between May and September and then increased slightly in October.
- **TRANSPARENCY:** Transparency measured without the viewscope (NVS) was low in June, improved (increased) slightly in July, decreased in August, and then improved in September and October. Transparency remained less than (worse) the state median from June through September. Average transparency remained stable with 2013 and historical trend analysis indicates significantly decreasing (worsening) transparency since monitoring began. Transparency measured with the viewscope (VS) was good in June, decreased (worsened) in July, and then increased (improved) from August through October. Average VS transparency was generally much better than that measured without and likely a better representation of actual conditions.
- **TURBIDITY:** Epilimnetic turbidity remained relatively stable and low from May through October. Metalimnetic turbidity was low, but increased slightly in July and August likely due to algal growth, and then decreased in September and October. Hypolimnetic turbidity was low in May and July and then increased from August through October likely due to the decrease in dissolved oxygen levels and the accumulation of organic compounds in hypolimnetic waters as the summer progressed.
- **PH:** Epilimnetic pH levels were within the desirable range 6.5-8.0 units, however metalimnetic and hypolimnetic pH levels were less than desirable. Historical trend analysis indicates relatively stable epilimnetic pH with moderate variability between years.
- **RECOMMENDED ACTIONS:** The worsening epilimnetic phosphorus trend is likely the result of stormwater runoff from the increased frequency and intensity of storm events. This may also be contributing to the worsening transparency as well as natural interferences such as wave action. Transparency was better measured with the viewscope however was still below average for the station. Continue collecting viewscope data to better assess transparency. The development of a watershed management plan is underway; keep up the great work!

Dissolved Oxygen & Temp Profile Summer, 2014

Broad Bay Algal Population Sepember 2014
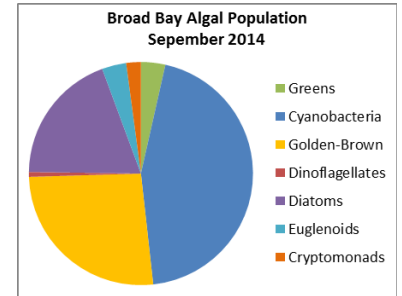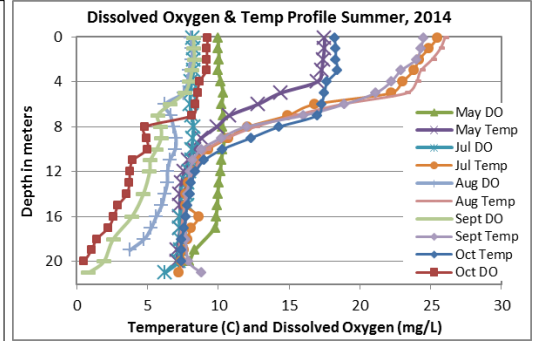
	Table 1. 2014 Average Water Quality Data for BROAD BAY							
Station Name	Alk. mg/l	Chlor-a ug/l	Chloride mg/l	Cond. uS/cm	Total P ug/l	Trans. m		Turb. ntu	pH
						NVS	VS		
Epilimnion	5.90	2.38	6	41.8	6	2.97	3.72	0.80	6.70
Metalimnion				40.1	5			0.88	6.36
Hypolimnion				38.2	6			0.99	6.17

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 show low variability.
pH (epilimnion)	Stable	Trend not significant; data moderately variable.	Transparency	Worsening	Data significantly decreasing.
			Phosphorus (epilimnion)	Worsening	Data significantly increasing.

Historical Trend Epilimnetic Conductivity and pH

Historical Deep Spot
Chlorophyll-a, Epilimnetic Total Phosphorus & Transparency Data