Volunteer Lake Assessment Program Individual Lake Reports

LAUREL LAKE, FITZWILLIAM, NH

MORPHOMETRIC DATA

Watershed Area (Ac.):	768	**Max. Depth (m):**	14.1	**Flushing Rate (yr^1)**	0.4
Surface Area (Ac.):	155	**Mean Depth (m):**	6.1	**P Retention Coef:**	0.78
Shore Length (m):	3,500	**Volume (m^3):**	3,826,000	**Elevation (ft):**	1099

TROPHIC CLASSIFICATION

Year	Trophic class
1992	MESOTROPHIC
2006	OLIGOTROPHIC

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

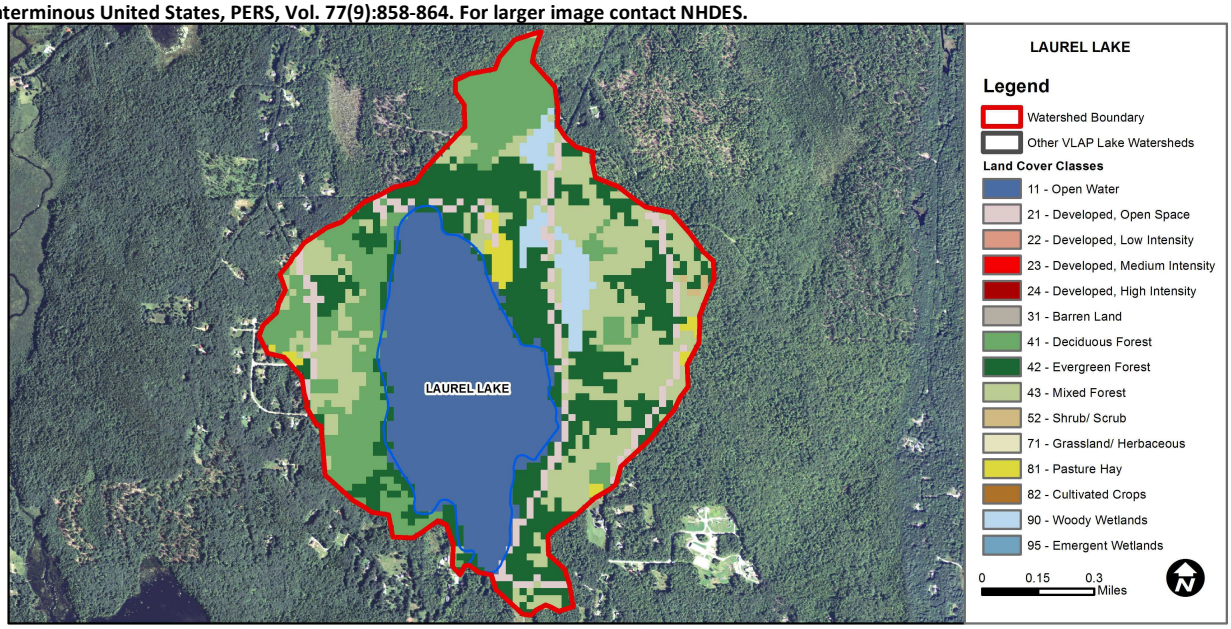
Designated Use	Parameter	Category	Comments
Aquatic Life	Phosphorus (Total)	Good	The calculated median is from 5 or more samples and is < indicator and > 1/2 indicator and the chlorophyll a indicator is okay.
	pH	Bad	>10%, with a minimum of 2, samples exceed criteria, with 1 or more by a large margin.
	Oxygen, Dissolved	Encouraging	There are < 10 samples with 0 exceedances of criteria. More data needed.
	Dissolved oxygen satura	Encouraging	There are < 10 samples with 0 exceedances 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	Good	There are geometric means and all geometric means are < geometric mean criteria; and there has been a single sample exceedance.
	Chlorophyll-a	Very Good	There are a total of at least 10 samples with 0 exceedances of indicator.

BEACH PRIMARY CONTACT ASSESSMENT STATUS

LAUREL LAKE - CAMP FLEUR DE LIS 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.
LAUREL LAKE - TOWN 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.

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	28.0	Barren Land	0	Grassland/Herbaceous	0
Developed-Open Space	5.42	Deciduous Forest	17	Pasture Hay	1.46
Developed-Low Intensity	0	Evergreen Forest	23.68	Cultivated Crops	0
Developed-Medium Intensity	0	Mixed Forest	20.99	Woody Wetlands	3.44
Developed-High Intensity	0	Shrub-Scrub	0.17	Emergent Wetlands	0

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2015 Data Summary

Recommended Actions: Water quality in the lake is generally representative of Oligotrophic, or high quality water, conditions. Keene Ave Trib. Has a history of elevated and fluctuating phosphorus and turbidity levels likely due to waters rich in organic content. Volunteers noted nesting Canada Geese on the lake for the first time. The DES fact sheet WD-BB-53 "Canada Geese Facts and Management Options" is a good resource. Discourage residents from feeding the geese and encourage residents to maintain vegetative buffers along the shoreline. UNH Cooperative Extension's "Landscaping at the Water's Edge" is a great resource. Keep up the great work!

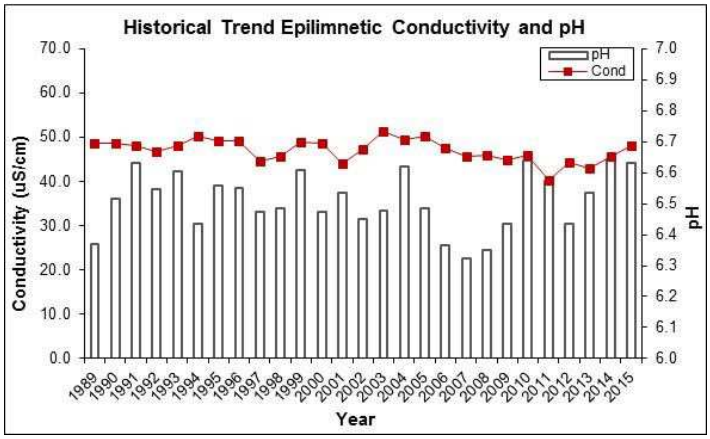
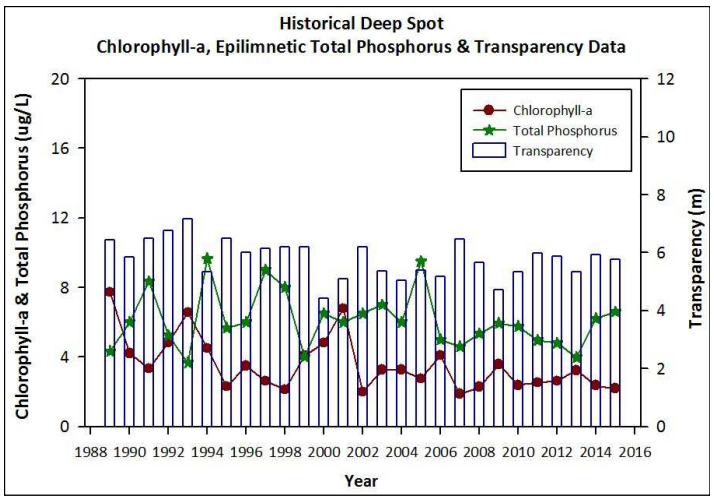
Observations (*Refer to Table 1 and Historical Deep Spot Data Graphics)*

- **Chlorophyll-a:** Chlorophyll levels were average in June and then decreased to low levels in July and September. The 2015 average chlorophyll level was stable with 2014 and much less than the state median. Historical trend analysis indicates significantly decreasing (improving) chlorophyll levels since monitoring began. We hope to see this continue!
- **Conductivity/Chloride:** Deep spot and Keene Ave Trib. conductivity levels remained slightly greater than the state median however were not above a level of concern. Historical trend analysis indicates significantly decreasing (improving) epilimnetic (upper water layer) conductivity since monitoring began. We hope to see this continue!
- **E. coli:** North Beach and Swim Club E. coli levels were very low on each sampling event and much less than the state standard of 88 cts/100 mL for public beaches.
- **Total Phosphorus:** Epilimnetic phosphorus levels were low in June and July and increased to average levels in September. Average epilimnetic phosphorus was stable with 2014 and much less than the state median. Historical trend analysis indicates relatively stable epilimnetic phosphorus with moderate variability between years. Metalimnetic (middle water layer) phosphorus was low and decreased as the summer progressed. Hypolimnetic (lower water layer) phosphorus was slightly elevated in June, decreased to average levels in July, and increased to slightly elevated levels in September. Keene Ave Trib. Phosphorus levels were elevated yet within an average range for that station. Keene Ave Trib. Before Lake phosphorus levels were also elevated and stagnant conditions and pine needles were noted in the sample.
- **Transparency:** Transparency measured without the viewscope (NVS) was low in June likely due to surface conditions and a significant storm event prior to sampling, and then increased (improved) as the summer progressed. Average NVS transparency was stable with 2014 and higher (better) than the state median. Historical trend analysis indicates significantly decreasing (worsening) transparency since monitoring began. Transparency measured with the viewscope (VS) was generally much better than NVS and likely a better representation of actual conditions.
- **Turbidity:** Epilimnetic turbidity remained stable and low throughout the summer. Metalimnetic turbidity was slightly higher in June and September potentially indicating a layer of algae at that depth. Hypolimnetic turbidity was low in June and July and increased slightly in September. Keene Ave Trib. and Before Lake turbidity samples were low.
- **pH:** Epilimnetic pH remained within the desirable range 6.5-8.0 units however has historically fluctuated below the desirable range. Historical trend analysis indicates stable epilimnetic pH since monitoring began. Metalimnetic pH fluctuated below the desirable range in June and July. Hypolimnetic pH was less than desirable and slightly acidic. Keene Ave Trib. and Before Lake pH levels were slightly more acidic and potentially critical to aquatic life.

Station Name	Table 1. 2015 Average Water Quality Data for LAUREL LAKE								
	Alk. mg/l	Chlor-a ug/l	Cond. uS/cm	E. Coli #/100ml	Total P ug/l	Trans. m		Turb. ntu	pH
						NVS	VS		
Epilimnion	4.5	2.19	48.2		7	5.77	6.67	0.58	6.63
Metalimnion			49.0		6			0.95	6.49
Hypolimnion			49.7		18			1.08	5.80
Keene Ave Trib.			57.1		43			0.54	5.21
Keene Ave Trib. Before Lake			65.3		60			0.95	5.39
North Beach				6					
Swim Club				5					

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^3
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	Improving	Data significantly decreasing.	Chlorophyll-a	Improving	Data significantly decreasing.
pH (epilimnion)	Stable	Trend not significant; data show low variability.	Transparency	Worsening	Data significantly decreasing.
			Phosphorus (epilimnion)	Stable	Trend not significant; data moderately variable.