Volunteer Lake Assessment Program Individual Lake Reports

RUSSELL RESERVOIR, HARRISVILLE, NH

MORPHOMETRIC DATA

Watershed Area (Ac.):	7,031	**Max. Depth (m):**	4.7	**Flushing Rate (yr^{-1})**	93.5
Surface Area (Ac.):	26	**Mean Depth (m):**	1.6	**P Retention Coef:**	0.14
Shore Length (m):	1,900	**Volume (m^3):**	170,000	**Elevation (ft):**	1160

TROPHIC CLASSIFICATION

Year	Trophic class
1988	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

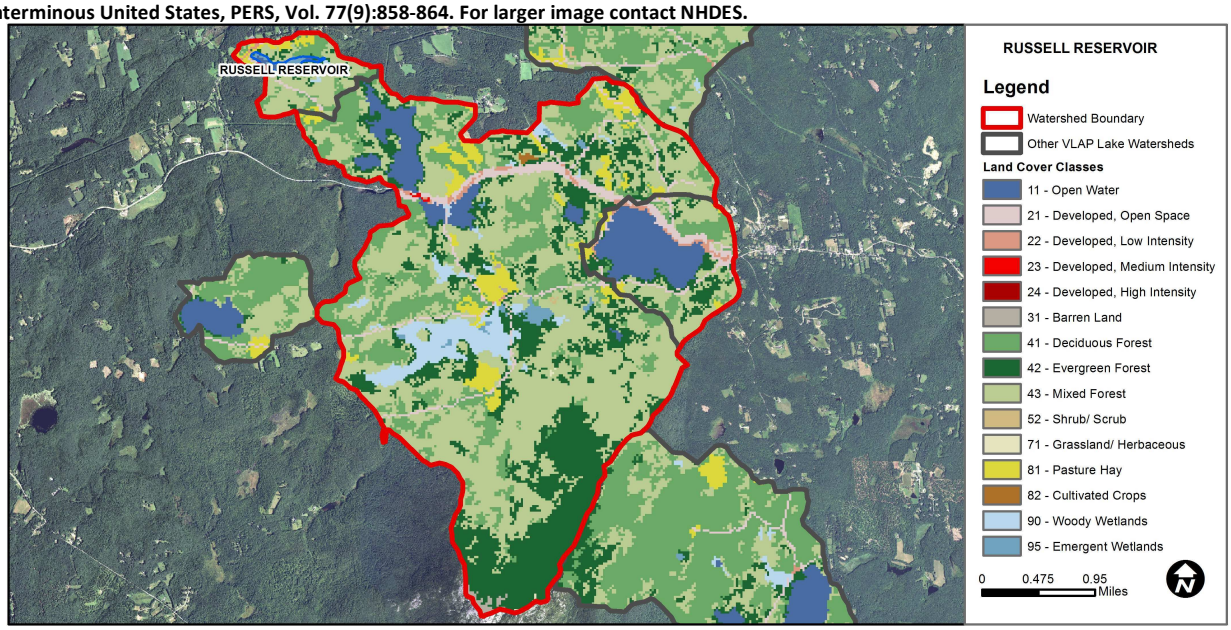
Designated Use	Parameter	Category	Comments
Aquatic Life	Phosphorus (Total)	Good	The calculated median is from 5 or more samples and is < indicator and > 1/2 indicator and the chlorophyll a indicator is okay.
	pH	Slightly Bad	>10% of samples exceed criteria by a small margin (minimum of 2 exceedances).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

RUSSEL RESERVOIR - CHESHAM BEACH	Escherichia coli	Bad	There are >=1 exceedance(s) of the geometric mean and/or >=2 single sample criterion exceedances. One or more exceedance is >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	6.9	Barren Land	0.31	Grassland/Herbaceous	0.04
Developed-Open Space	3.72	Deciduous Forest	16.16	Pasture Hay	4.48
Developed-Low Intensity	0.64	Evergreen Forest	22	Cultivated Crops	0.08
Developed-Medium Intensity	0.04	Mixed Forest	40.66	Woody Wetlands	3.77
Developed-High Intensity	0	Shrub-Scrub	0.05	Emergent Wetlands	0.78

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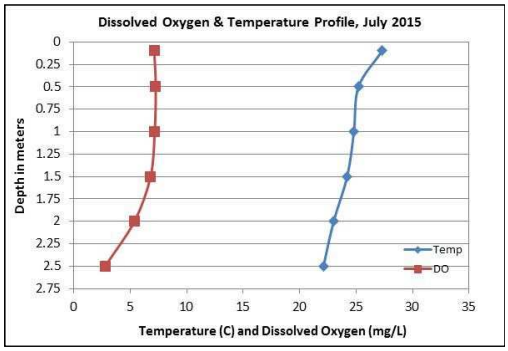
Russell Reservoir, Harrisville

2015 Data Summary

Recommended Actions: Increase monitoring frequency to once per month, typically June, July and August, to better assess seasonal and historical water quality trends and decrease data variability. Chlorophyll levels have remained stable since monitoring began, however have remained at a slightly higher level since 2010. Epilimnetic phosphorus levels have also remained slightly higher since then and is likely what contributes to the higher levels of algal growth. It is important to minimize phosphorus inputs to the pond from the surrounding watershed. Educate residents to properly maintain septic systems, eliminate fertilizer use or use phosphate free fertilizers, maintain vegetative buffers along the shoreline, and reduce stormwater runoff from dirt and gravel roads, steep slopes, agricultural operations, and residential properties. DES' "N.H. Homeowner's Guide to Stormwater Management" and UNH Cooperative Extension's "Landscaping at the Water's Edge" are great resources. Keep up the great work!

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

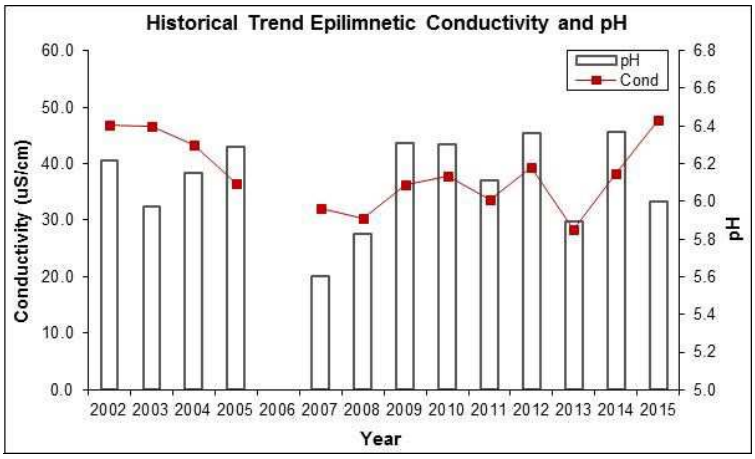
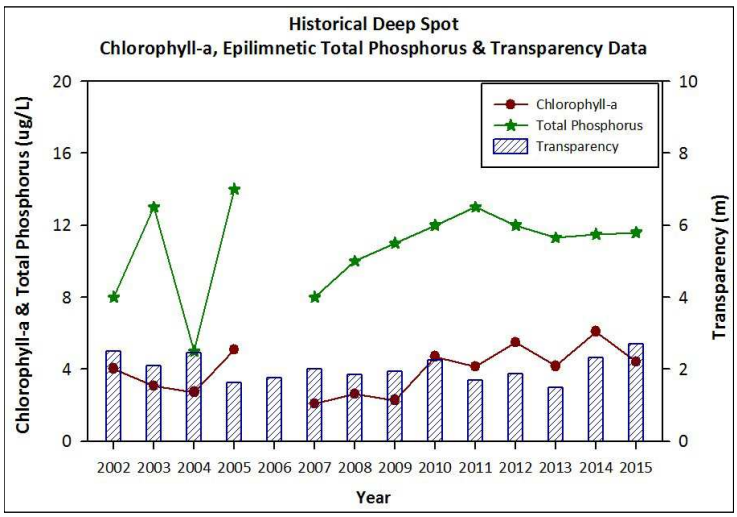
- **Chlorophyll-a:** Chlorophyll levels were within an average range, decreased slightly from 2014 and were approximately equal to the state median. Historical trend analysis indicates relatively stable chlorophyll levels with moderate variability between years.
- **Conductivity/Chloride:** Epilimnetic, Inlet and Outlet conductivity levels were within an average range and were approximately equal to the state median. Historical trend analysis indicates highly variable epilimnetic conductivity since monitoring began.
- **Total Phosphorus:** Epilimnetic phosphorus remained stable from 2014 and was approximately equal to the state median. Historical trend analysis indicates relatively stable epilimnetic phosphorus with moderate variability between years. Inlet and Outlet phosphorus levels were within an average range.
- **Transparency:** Transparency was very good and the Secchi disk was visible on the pond bottom in July. Historical trend analysis indicates highly variable transparency since monitoring began and this is likely due to fluctuating water levels.
- **Turbidity:** Epilimnetic turbidity was slightly above average for the pond and potentially due to dissolved organic matter that give color to the water. Inlet and Outlet turbidities were low.
- **pH:** Epilimnetic, Inlet and Outlet pH levels were less than the desirable range 6.5-8.0 units and slightly acidic. Historical trend analysis indicates highly variable epilimnetic pH since monitoring began.



Station Name	Table 1. 2015 Average Water Quality Data for RUSSELL RESERVOIR							
	Alk. mg/l	Chlor-a ug/l	Cond. uS/cm	Total P ug/l	Trans. m		Turb. ntu	pH
					NVS	VS		
Epilimnion	3.9	4.40	47.4	12	2.70	2.70	1.46	6.13
Inlet			47.8	10			0.79	6.19
Outlet			47.8	11			1.12	6.27

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	Stable	Trend not significant; data highly variable.	Chlorophyll-a	Stable	Trend not significant; data moderately variable.
pH (epilimnion)	Stable	Trend not significant; data highly variable.	Transparency	Stable	Trend not significant; data highly variable.
			Phosphorus (epilimnion)	Stable	Trend not significant; data moderately variable.