Volunteer Lake Assessment Program Individual Lake Reports

HARVEY LAKE, NORTHWOOD, NH

MORPHOMETRIC DATA

Watershed Area (Ac.):	1,553	**Max. Depth (m):**	6.5	**Flushing Rate (yr^{1})**	2.7
Surface Area (Ac.):	105	**Mean Depth (m):**	3.1	**P Retention Coef:**	0.58
Shore Length (m):	3,900	**Volume (m^3):**	1,320,500	**Elevation (ft):**	613

TROPHIC CLASSIFICATION

Year	Trophic class
1990	EUTROPHIC
2006	EUTROPHIC

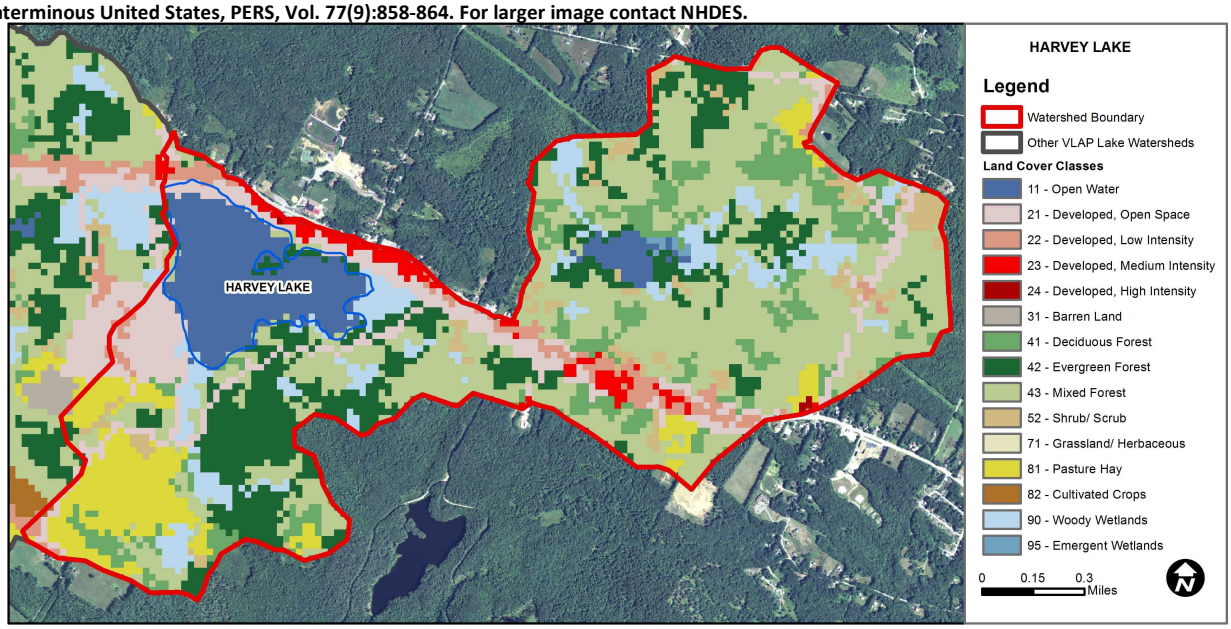
KNOWN EXOTIC SPECIES

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)	Slightly Bad	The calculated median is from 5 or more samples and is > indicator and the chlorophyll a indicator is exceeded.
	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	Slightly Bad	The calculated median is from 5 or more samples and is > indicator.
Primary Contact Recreation	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.
	Cyanobacteria hepatoto	Slightly Bad	Cyanobacteria bloom(s).
	Chlorophyll-a	Slightly Bad	There are >10% of samples (minimum of 2), exceeding indicator.

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.

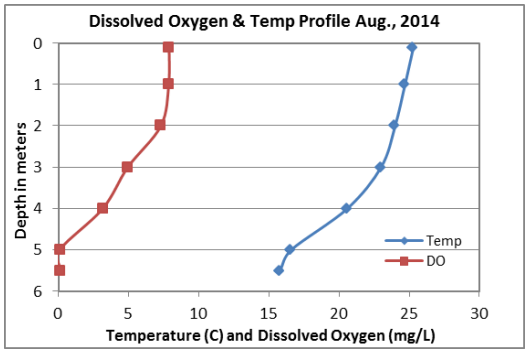


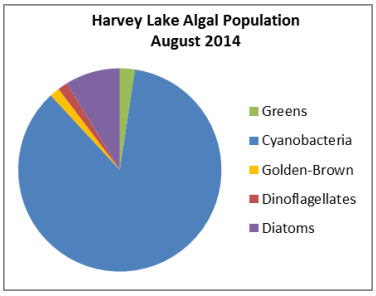
Land Cover Category	% Cover	Land Cover Category	% Cover	Land Cover Category	% Cover
Open Water	9.57	Barren Land	0.02	Grassland/Herbaceous	0
Developed-Open Space	9.11	Deciduous Forest	9.23	Pasture Hay	7.54
Developed-Low Intensity	3.06	Evergreen Forest	15.3	Cultivated Crops	0.03
Developed-Medium Intensity	1.78	Mixed Forest	34.03	Woody Wetlands	6.8
Developed-High Intensity	0.1	Shrub-Scrub	3.33	Emergent Wetlands	0.17

Volunteer Lake Assessment Program Individual Lake reports
Harvey Lake, Northwood
2014 Data Summary

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

- **Chlorophyll-a:** Chlorophyll levels were elevated on each sampling event and were greater than the state median. Historical trend analysis indicates relatively stable chlorophyll levels with moderate variability between years. The phytoplankton (algae) sample indicated that cyanobacteria, formerly called blue-green algae, were dominant in the lake. Cyanobacteria could be potentially toxic to pets, livestock and humans if ingested in large amounts.
- **Conductivity/Chloride:** Deep spot, Inlet and Outlet conductivity and chloride levels were slightly greater than the state medians. Historical trend analysis indicates relatively stable epilimnetic (upper water layer) conductivity with moderate variability between years.
- **Total Phosphorus:** Epilimnetic phosphorus increased slightly from June to early August and the decreased slightly in mid-August. Average epilimnetic phosphorus levels were greater than the state median however have remained stable since 2010. Historical trend analysis indicates relatively stable epilimnetic phosphorus with moderate variability between years. Hypolimnetic (lower water layer) phosphorus was slightly elevated in June and mid-August potentially due to the release of phosphorus from bottom sediments in the hypolimnion as the summer progresses and dissolved oxygen levels decrease below 1.0 mg/L, a process called internal loading. Inlet phosphorus levels remained stable from June to mid-August and were within an average range for that station. Outlet phosphorus levels were slightly elevated and increased from June to August. Historical trend analysis indicates Outlet phosphorus levels have significantly increased (worsened) since monitoring began.
- **Transparency:** Transparency was lower than the state median and remained fairly stable from June to August. Historical trend analysis indicates significantly decreasing (worsening) transparency since monitoring began.
- **Turbidity:** Epilimnetic turbidity was slightly elevated on each sampling event potentially due to the elevated algal growth. Hypolimnetic turbidity was slightly elevated on each sampling event potentially due to the formation and accumulation of organic compounds as the summer progresses and dissolved oxygen levels decrease. Inlet and Outlet turbidity levels were within average ranges for those stations.
- **pH:** Epilimnetic pH was within the desirable range 6.5-8.0 units, however hypolimnetic pH was less than desirable. Historical trend analysis indicates highly variable epilimnetic pH since monitoring began.
- **Recommended Actions:** Notify DES of any cyanobacteria blooms or surface scums during the summer months as they could be potentially toxic. Outlet phosphorus levels have significantly increased potentially due to localized wetland flushing from the increased frequency and intensity of storm events in recent years. This could also be contributing to the decreased lake transparency from flushing of Inlet wetland systems and waters rich in organic acids and color. Conduct apparent color analysis of deep spot samples to identify if lake water color has become darker. Keep up the great work!





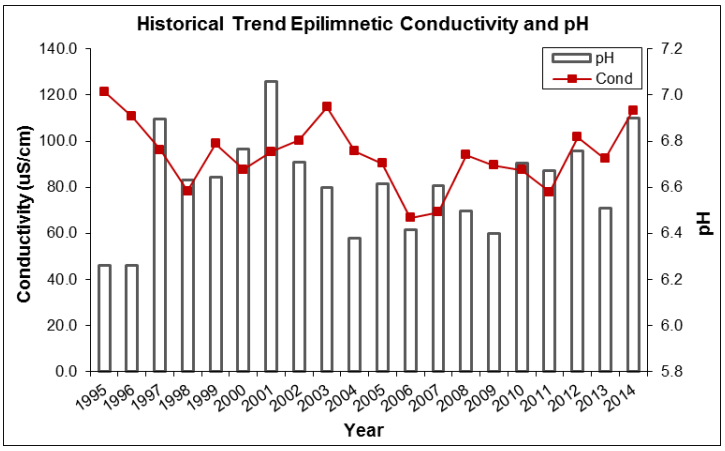
NH Water Quality Standards: Numeric criteria for specific parameters. Results exceeding criteria are considered a water quality violation.
Chloride: > 230 mg/L (chronic)
E. coli: > 88 cts/100 mL – public beach
E. coli: > 406 cts/100 mL – surface waters
Turbidity: > 10 NTU above natural level
pH: between 6.5-8.0 (unless naturally occurring)

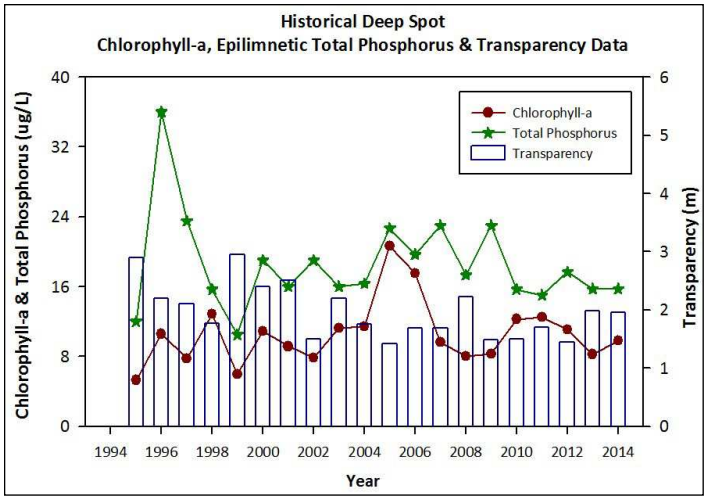
NH Median Values: Median values for specific parameters generated from historic lake monitoring data.
Alkalinity: 4.9 mg/L
Chlorophyll-a: 4.58 mg/m^3
Conductivity: 40.0 uS/cm
Chloride: 4 mg/L
Total Phosphorus: 12 ug/L
Transparency: 3.2 m
pH: 6.6

Station Name	Table 1. 2014 Average Water Quality Data for HARVEY LAKE								
	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	6.9	9.81	23	113.3	16	1.96	2.38	1.89	6.90
Hypolimnion				113.4	21			2.86	6.34
Inlet 1			21	104.6	33			2.31	6.45
Outlet				119.7	27			1.06	6.26

Historical Water Quality Trend Analysis

Parameter	Trend	Explanation	Parameter	Trend	Explanation
Conductivity	Stable	Trend not significant; data moderately variable.	Chlorophyll-a	Stable	Trend not significant; data moderately variable.
pH (epilimnion)	Stable	Trend not significant; data highly variable.	Transparency	Worsening	Data significantly decreasing.
			Phosphorus (epilimnion)	Stable	Trend not significant; data moderately variable.





This report was generated by the NH DES Volunteer Lake Assessment Program (VLAP). For more information contact VLAP at (603) 271-2658 or sara.steiner@des.nh.gov