Volunteer Lake Assessment Program Individual Lake Reports

SWANZEY LAKE, SWANZEY, NH

MORPHOMETRIC DATA

Watershed Area (Ac.):	1,024	**Max. Depth (m):**	16.2	**Flushing Rate (yr^{1})**	0.6
Surface Area (Ac.):	117	**Mean Depth (m):**	6.9	**P Retention Coef:**	0.7
Shore Length (m):	3,400	**Volume (m^{3}):**	3,271,500	**Elevation (ft):**	524

TROPHIC CLASSIFICATION

Year	Trophic class
1986	MESOTROPHIC
2005	MESOTROPHIC

KNOWN EXOTIC SPECIES

The Waterbody Report Card tables are generated from the DRAFT 2018 305(b) report on the status of N.H. waters, and are based on data collected from 2008-2017. Detailed waterbody assessment and report card information can be found at www.des.nh.gov/organization/divisions/water/wmb/swqa/index.htm

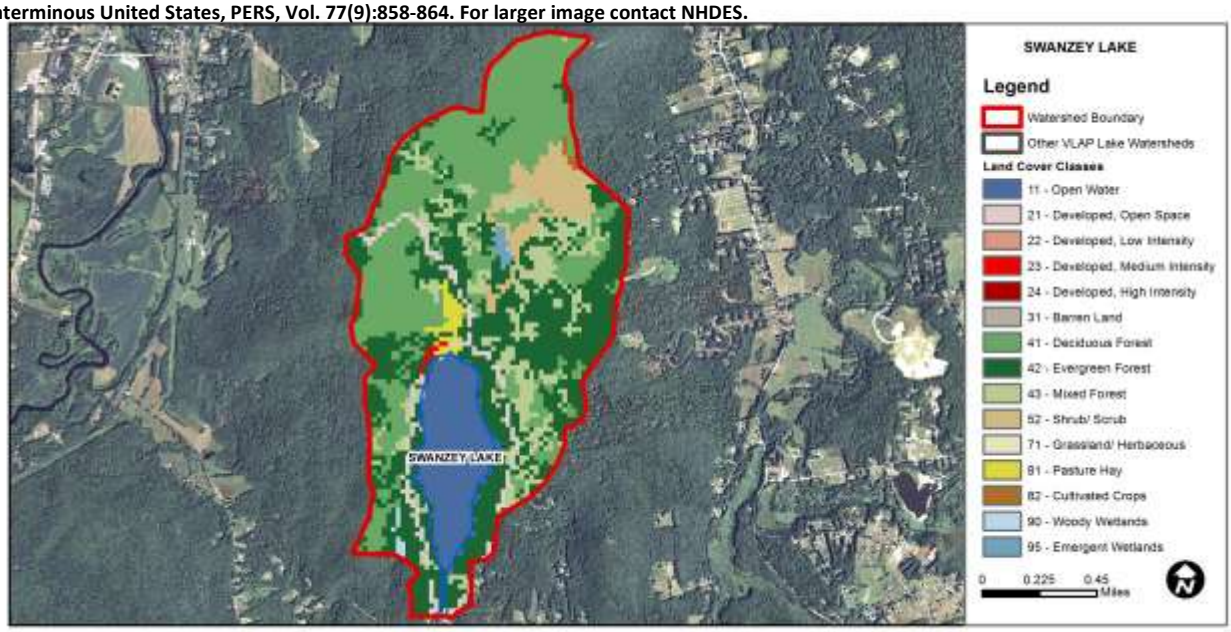
Designated Use	Parameter	Category	Comments
Aquatic Life	Phosphorus (Total)	Good	Sampling data is better than the water quality standards or thresholds for this parameter.
	pH	Slightly Bad	Data periodically exceed water quality standards or thresholds for this parameter by a small margin.
	Oxygen, Dissolved	Cautionary	Limited data for this parameter predicts exceedance of water quality standards or thresholds; however more data are necessary to fully assess the parameter.
	Dissolved oxygen satura	Cautionary	Limited data for this parameter predicts exceedance of water quality standards or thresholds; however more data are necessary to fully assess the parameter.
	Chlorophyll-a	Good	Sampling data is better than the water quality standards or thresholds for this parameter.
Primary Contact Recreation	Escherichia coli	Very Good	All sampling data meet water quality standards or thresholds for this parameter.
	Chlorophyll-a	Very Good	All sampling data meet water quality standards or thresholds for this parameter.

BEACH PRIMARY CONTACT ASSESSMENT STATUS

SWANZEY LAKE - RICHARDSON PARK TOWN BEACH	Escherichia coli	Bad	Data periodically exceed water quality standards or thresholds for this parameter by a large margin.
SWANZEY LAKE - CAMP SQUANTO BEACH	Escherichia coli	Very Good	All sampling data meet water quality standards or thresholds for this parameter.

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	10.6	Barren Land	0	Grassland/Herbaceous	0
Developed-Open Space	3.52	Deciduous Forest	33.2	Pasture Hay	1.18
Developed-Low Intensity	0	Evergreen Forest	34.38	Cultivated Crops	0.22
Developed-Medium Intensity	0.24	Mixed Forest	10.86	Woody Wetlands	0.28
Developed-High Intensity	0	Shrub-Scrub	5.22	Emergent Wetlands	0.48

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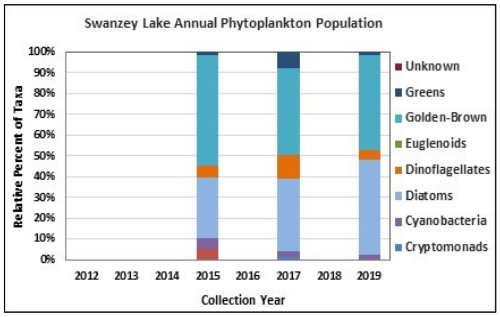
Swanzey Lake, Swanzey
2019 Data Summary

Recommended Actions: Lake quality is generally representative of borderline oligotrophic/mesotrophic conditions with phosphorus and chlorophyll levels that occasionally spike above the thresholds for oligotrophic lakes. Epilimnetic phosphorus levels have increased steadily since 2013. The increased frequency and intensity of storm events and resulting stormwater runoff likely contributes to excess nutrients. Efforts should be made to manage stormwater runoff from shoreline and watershed properties, beaches and dirt/gravel roads. DES' "NH Homeowner's Guide to Stormwater Management", Maine DEP's "Camp Road Maintenance Manual", and DES fact sheet WD-WB-18 "Perching Beaches to Lessen Impacts to Lake Quality" are great resources. Keep up the great work!

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

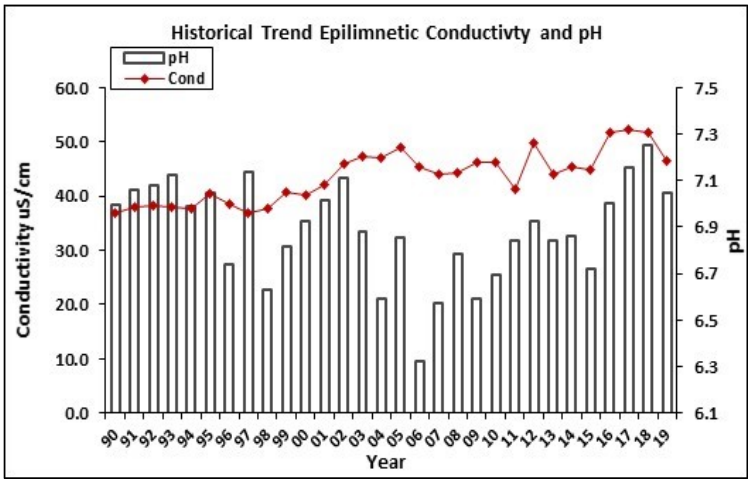
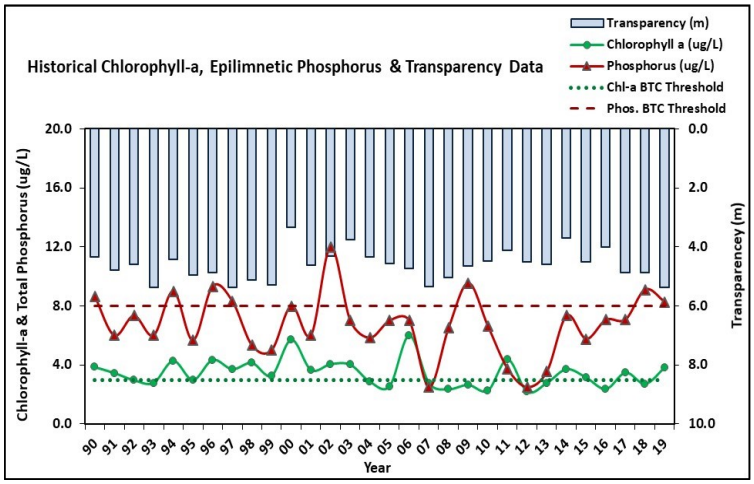
- **Chlorophyll-a:** Chlorophyll level was moderate in June and then decreased to a low level in August. Average chlorophyll level increased slightly from 2018, was less than the state median, and was slightly greater than the threshold for oligotrophic lakes. Historical trend analysis indicates stable chlorophyll levels since monitoring began.
- **Conductivity/Chloride:** Epilimnetic (upper water layer), Metalimnetic (middle water layer), Hypolimnetic (lower water layer), Outlet, and Pine Inlet B conductivity and/or chloride levels were approximately equal to the state medians and less than a level of concern. However, historical trend analysis indicates significantly increasing (worsening) epilimnetic conductivity levels since monitoring began. Pine Inlet A conductivity levels were slightly elevated in August during low flow conditions.
- **Color:** Apparent color measured in the epilimnion indicates the water was lightly tea colored, or light brown.
- **E. coli:** Outlet, Pine Inlet A and Pine Inlet B E. coli levels were much less than the state standard of 406 cts/100 mL for surface waters.
- **Total Phosphorus:** Epilimnetic phosphorus levels were moderate in June and decreased to a low level in August. Average epilimnetic phosphorus level decreased slightly from 2018 and was approximately equal to the state median and the threshold for oligotrophic lakes. Metalimnetic phosphorus levels were slightly elevated in June potentially due to a layer of algal growth. Hypolimnetic phosphorus levels were elevated on each sampling event potentially due to the release of phosphorus from bottom sediments under anoxic (no dissolved oxygen) conditions. Pine Inlet A and Outlet phosphorus levels were within a low range. Pine Inlet B phosphorus levels were within a moderate range and were below average for that station.
- **Transparency:** Transparency measured without the viewscope (NVS) was high (good) in June and increased (improved) in July. Average NVS transparency increased from 2018 and was higher (better) than the state median. Historical trend analysis indicates stable transparency since monitoring began.
- **Turbidity:** Epilimnetic, Pine Inlet A, Pine Inlet B, and Outlet turbidity levels were within a low range for those stations. Metalimnetic turbidity levels were slightly elevated in June potentially due to a layer of algal growth. Hypolimnetic turbidity levels were elevated in August likely due to the formation and accumulation of organic compounds under anoxic conditions.
- **pH:** Epilimnetic, Metalimnetic, Pine Inlet A, Pine Inlet B, and Outlet pH levels were within the desirable range 6.5-8.0 units, however epilimnetic pH levels have historically fluctuated below the desirable range. Historical trend analysis indicates relatively stable epilimnetic pH levels since monitoring began. Hypolimnetic pH levels were slightly less than desirable.



Station Name	Table 1. 2019 Average Water Quality Data for SWANZEY LAKE - SWANZEY										
	Alk. mg/l	Chlor-a ug/l	Chloride mg/l	Color pcu	Cond. us/cm	E. coli mpn/100ml	Total P mg/l	Trans. m		Turb. ntu	pH
								NVS	VS		
Epilimnion	8.4	3.84	6	25	46.5		8	5.38	4.75	0.64	7.05
Metalimnion					46.6		13			1.16	6.80
Hypolimnion					53.5		25			3.24	6.25
Outlet					49.8	24	9			0.89	6.84
Pine Inlet A			3		65.5	37	7			0.72	6.75
Pine Inlet B			5		39.1	9	17			1.33	6.50

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: 4.5 mg/L
Chlorophyll-a: 4.39 ug/L
Conductivity: 42.3 uS/cm
Chloride: 5 mg/L
Total Phosphorus: 11 ug/L
Transparency: 3.3 m
pH: 6.6

Historical Water Quality Trend Analysis

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