Volunteer Lake Assessment Program Individual Lake Reports

SUNAPEE LAKE, SUNAPEE, NH

MORPHOMETRIC DATA | **TROPHIC CLASSIFICATION** | **KNOWN EXOTIC SPECIES**

Watershed Area (Ac.):	28,863	**Max. Depth (m):**	31.9	**Flushing Rate (yr^{-1})**	0.3	**Year**	**Trophic class**	Variable Milfoil
Surface Area (Ac.):	4090	**Mean Depth (m):**	11.4	**P Retention Coef:**	0.7	1995	OLIGOTROPHIC	
Shore Length (m):	47,600	**Volume (m^3):**	188,150,000	**Elevation (ft):**	1092	2006	OLIGOTROPHIC	

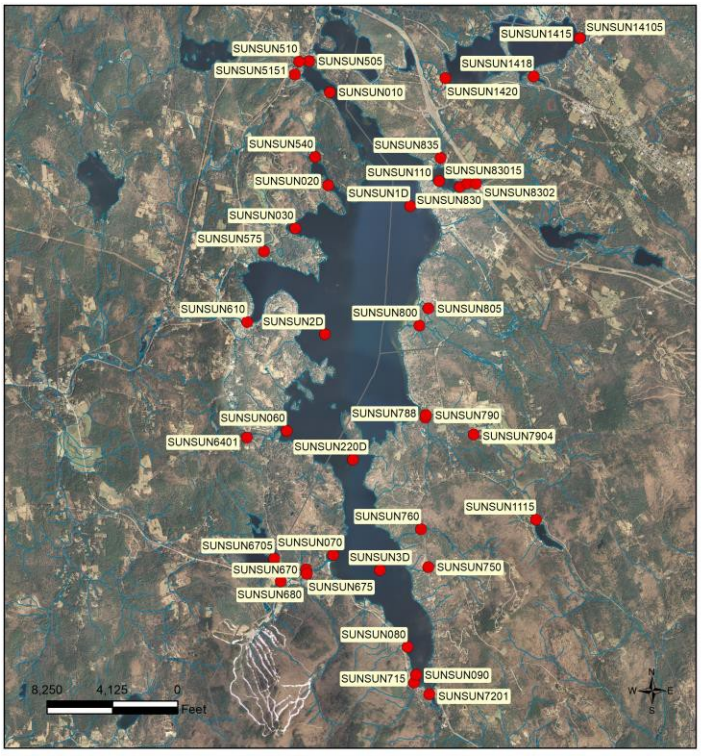
The Waterbody Report Card tables are generated from the DRAFT 2020 305(b) report on the status of N.H. waters, and are based on data collected from 2010-2019. Detailed waterbody assessment and report card information can be found at NHDES' Water Quality Assessment Website.

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	Bad	Data periodically exceed water quality standards or thresholds for this parameter by a large margin.
	Dissolved oxygen satura	Slightly Bad	Data periodically exceed water quality standards or thresholds for a given parameter by a small margin.
	Chlorophyll-a	Very Good	Sampling data is 50 percent better than the water quality standards or thresholds for this parameter.
Primary Contact Recreation	Escherichia coli	No Data	No data for this parameter.
	Chlorophyll-a	Very Good	All sampling data meet water quality standards or thresholds for this parameter.

BEACH PRIMARY CONTACT ASSESSMENT STATUS

SUNAPEE LAKE - SUNAPEE STATE PARK BEACH	Escherichia coli	Bad	Data periodically exceed water quality standards or thresholds for this parameter by a large margin.
SUNAPEE LAKE - BLODGETT'S LANDING BEACH	Escherichia coli	Bad	Data periodically exceed water quality standards or thresholds for this parameter by a large margin.
SUNAPEE LAKE - DEWEY (TOWN) BEACH	Escherichia coli	Bad	Data periodically exceed water quality standards or thresholds for this parameter by a large margin.
SUNAPEE LAKE - DEPOT BEACH	Escherichia coli	Very Good	All sampling data meet water quality standards or thresholds for this parameter.
SUNAPEE LAKE - GEORGES MILL TOWN BEACH	Escherichia coli	Very Good	All sampling data meet water quality standards or thresholds for this parameter.

VLAP SAMPLE STATION MAP: This map depicts the location of routine sampling stations discussed on page two of the report.



SUNAPEE LAKE
SUNAPEE
VOLUNTEER LAKE ASSESSMENT PROGRAM

STATIONID	STATION NAME
SUNSUN3D	230 STN 3 DEEP SPOT
SUNSUN1D	200 STN 1 DEEP SPOT
SUNSUN1115	1115
SUNSUN2D	210 STN 2 DEEP SPOT
SUNSUN505	505
SUNSUN6705	670.5
SUNSUN5151	515.1
SUNSUN060	60
SUNSUN030	30
SUNSUN020	20
SUNSUN010	10
SUNSUN110	110
SUNSUN610	610
SUNSUN788	788
SUNSUN790	790
SUNSUN800	800
SUNSUN805	805
SUNSUN830	830
SUNSUN835	835
SUNSUN1415	1415
SUNSUN510	510
SUNSUN540	540
SUNSUN715	715
SUNSUN760	760
SUNSUN670	670
SUNSUN675	675
SUNSUN680	680
SUNSUN090	90
SUNSUN080	80
SUNSUN070	70
SUNSUN220D	220
SUNSUN14105	1410.5
SUNSUN1418	1418
SUNSUN1420	1420
SUNSUN7201	720.1
SUNSUN750	750
SUNSUN7904	790.4
SUNSUN83015	830.15
SUNSUN8302	830.2
SUNSUN675	675
SUNSUN6401	640.1

Source: The data layers are derived from NHDES data and are under constant revision. NHDES is not responsible for the use or interpretation of this information. Not intended for legal use.NHDES Watershed Management Bureau Date: 2/23/2021

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Lake Sunapee, Stns. 010, 020, 030, 040, 050, 060, 070, 080, 090, 100.1, & 110
2020 Data Summary

Recommended Actions: Great job monitoring in 2020! Chloride levels are greater than the state median but are much less than the state chronic chloride standard. However, the increasing conductivity trends at nearshore stations and chloride levels in tributaries suggest impacts from winter de-icing materials. Phosphorus levels have generally increased at all stations, and were particularly high at Stns. 030, 040 and 050. Continue monitoring stations 040 and 050 to better understand water quality at these locations. Drought conditions and the lack of stormwater runoff generally led to decreased algal growth and increased (improved) water clarity (transparency). This highlights the importance of managing stormwater runoff within the watershed. Identify areas prone to stormwater erosion and runoff and implement stormwater management best practices to help capture and infiltrate stormwater prior to entering the lake. Keep up the great work!

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

- **Chlorophyll-a:** Chlorophyll levels fluctuated within a low range at all stations and were generally highest in June and August. Average chlorophyll levels remained less than the state median and the threshold for oligotrophic lakes. Average chlorophyll levels decreased from 2019 at Stns. 010, 020, 030, 060, 070, and 110, and remained relatively stable at Stns. 080, 090 and 100.1. Historical trend analysis indicates relatively stable chlorophyll levels at all stations except for Stns. 020 and 080 where chlorophyll levels have significantly decreasing (improved) since monitoring began.
- **Conductivity/Chloride:** Conductivity levels increased slightly from 2019 at all stations. Average conductivity levels ranged between 101.6 to 112.0 u S/cm in 2020 and remained slightly greater than the state median. Chloride levels were approximately equal to 20 mg/L at all stations in June. Chloride levels were slightly greater than the state median, yet much less than the state chronic chloride standard. Historical trend analysis indicates significantly increasing (worsening) conductivity levels at all stations, except Stn. 100.1 where conductivity levels have remained stable since monitoring began.
- **Total Phosphorus:** Phosphorus levels fluctuated within a low range from June through September at Stns. 010, 070, 080, 090, 100.1, and 110. Phosphorus levels at Stns. 020 and 050 were slightly elevated in August. Phosphorus levels at Stn. 030 were elevated in July and September. Phosphorus levels at Stn. 040 were elevated in June and August following storm events during drought conditions. Average phosphorus levels remained relatively stable from 2019 at Stns. 010, 090 and 110. Average phosphorus levels decreased from 2019 at Stns. 020, 030, 060, 070, and 080. Average phosphorus level increased slightly at Stn. 100.1. Historical trend analysis indicates relatively stable phosphorus levels at Stn. 010, 090 and 100.1 since monitoring began. However, historical trend analysis indicates significantly increasing (worsening) phosphorus levels at Stns. 020, 030, 070, 080, and 110.
- **Transparency:** Transparency increased (improved) in 2020 at all Stns. and remained stable at Stns. 020 and 080 where the Secchi disk is generally visible on the bottom. Historical trend analysis indicates relatively stable transparency at Stns. 020, 030, 080, 090, and 100.1 with low to moderate variability between years. Historical trend analysis indicates significantly increasing (improving) transparency at Stn. 010 and 070, and significantly decreasing (worsening) transparency at Stn. 110 since monitoring began.
- **Turbidity:** Turbidity levels at Stns. 020, 030, 050, 060, 070, 080, 090, and 100.1 were generally within a low to average range on each sampling event. Turbidity level at Stn. 010 was elevated in September and field data noted light Gloeotrichia growth. Turbidity levels at Stn. 040 were elevated in June and August. Turbidity levels at Stn. 110 fluctuated within a slightly elevated range from July through September potentially due to Gloeotrichia growth. Average turbidity levels decreased from 2019 at Stns. 010, 030, 070, 080, and 100.1, and increased slightly at Stns. 020, 060 and 110.
- **pH:** All stations experienced pH levels within the desirable range 6.5-8.0 units on each sampling event. Average pH levels generally increased slightly from that measured in 2019. Historical trend analysis indicates stable pH levels with moderate variability at Stns. 010 ,020, 030, 070, and 080, and significantly increasing (improving) pH levels at Stns. 090, 100.1 and 110 since monitoring began.

Station Name	Table 1. 2020 Average Water Quality Data for SUNAPEE LAKE - NEARSHORE						
	Chlor-a (ug/L)	Chloride (mg/L)	Cond. (us/cm)	Total P (ug/L)	Trans. (m) VS	Turb. (ntu)	pH
010	1.33	22	112.0	5	9.25	1.69	6.98
020	1.12	20	105.3	9	4.30	0.95	7.03
030	1.09	21	101.6	18	10.15	0.89	7.02
040	1.71		108.8	20	9.34	2.04	6.96
050	0.38		104.2	14	5.20	0.67	6.93
060	1.16	21	101.8	8	5.72	0.88	7.06
070	0.59	24	105.7	5	7.90	0.79	6.93
080	1.07	21	105.5	6	2.00	0.76	6.99
090	0.96	21	103.6	5	7.10	0.86	6.98
100.1	1.00	20	103.0	8	7.80	0.96	7.15
110	1.28	21	105.1	6	6.97	1.40	7.06

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

Station	Parameter	Trend	Explanation
010	Chlorophyll-a	Stable	Data show moderate variability.
	Transparency	***Improving***	***Data significantly increasing.***
	Phosphorus	Stable	Data show high variability.
	Conductivity	***Worsening***	***Data significantly increasing.***
	pH	Stable	Data show moderate variability.
020	**Chlorophyll-a**	***Improving***	***Data significantly decreasing.***
	Transparency	Stable	Data show low variability.
	Phosphorus	***Worsening***	***Data significantly increasing.***
	Conductivity	***Worsening***	***Data significantly increasing.***
	pH	Stable	Data show moderate variability.
030	Chlorophyll-a	Stable	Data show moderate variability.
	Transparency	Stable	Data show low variability.
	Phosphorus	***Worsening***	***Data significantly increasing.***
	Conductivity	***Worsening***	***Data significantly increasing.***
	pH	Stable	Data show moderate variability.
070	Chlorophyll-a	Stable	Data show moderate variability.
	Transparency	***Improving***	***Data significantly increasing.***
	Phosphorus	***Worsening***	***Data significantly increasing.***
	Conductivity	***Worsening***	***Data significantly increasing.***
	pH	Stable	Data show moderate variability.

Station	Parameter	Trend	Explanation
080	**Chlorophyll-a**	***Improving***	***Data significantly decreasing.***
	Transparency	Stable	Data show moderate variability.
	Phosphorus	***Worsening***	***Data significantly increasing.***
	Conductivity	***Worsening***	***Data significantly increasing.***
	pH	Stable	Data show moderate variability.
090	Chlorophyll-a	Stable	Data show moderate variability.
	Transparency	Stable	Data show low variability.
	Phosphorus	Stable	Data show high variability.
	Conductivity	***Worsening***	***Data significantly increasing.***
	pH	***Improving***	***Data significantly increasing.***
100.1	Chlorophyll-a	Stable	Data show high variability.
	Transparency	Stable	Data show low variability.
	Phosphorus	Stable	Data show high variability.
	Conductivity	Stable	Data show low variability.
	pH	***Improving***	***Data significantly increasing.***
110	Chlorophyll-a	Stable	Data show moderate variability.
	Transparency	***Worsening***	***Data significantly decreasing.***
	Phosphorus	***Worsening***	***Data significantly increasing.***
	Conductivity	***Worsening***	***Data significantly increasing.***
	pH	***Improving***	***Data significantly increasing.***