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 (yr¹) 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 (m³):	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.
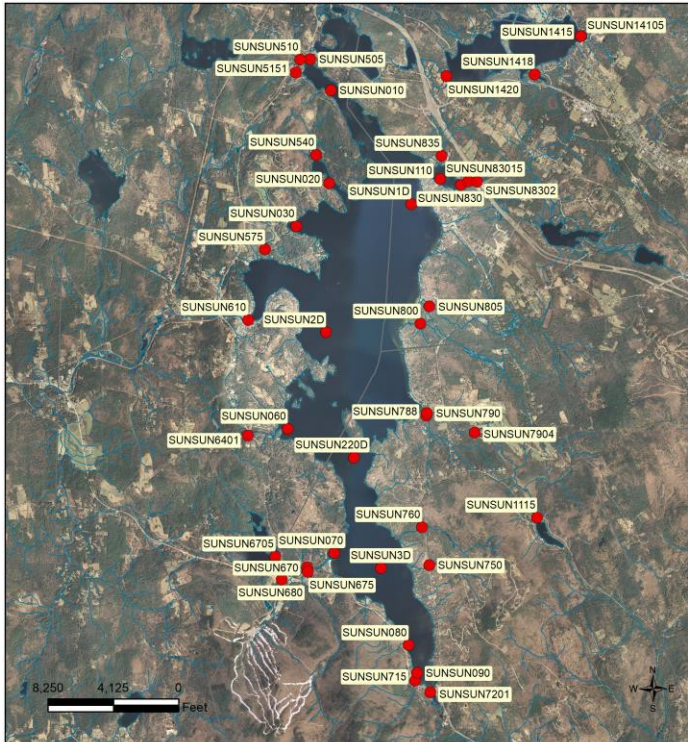
SUNAPEE LAKE
SUNAPEE
VOLUNTEER LAKE ASSESSMENT PROGRAM

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
SUNSUN5705	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
SUNSUN575	575
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
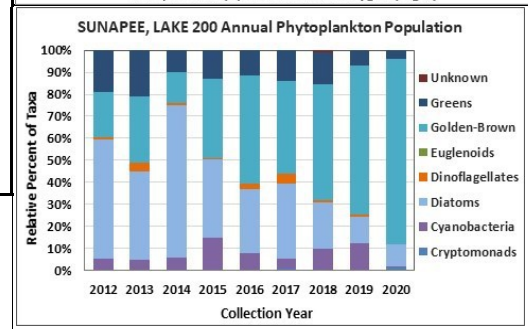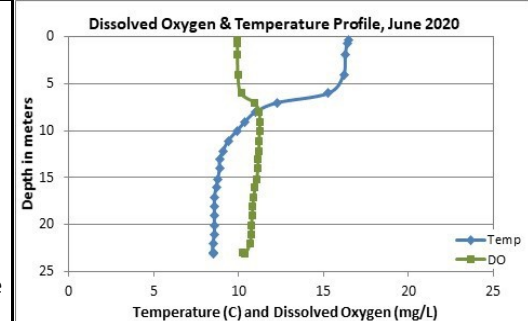
Volunteer Lake Assessment Program Individual Lake Reports
Lake Sunapee, Stn. 200, Sunapee
2020 Data Summary

Recommended Actions: Great job monitoring in 2020! Lake conductivity levels have significantly increased (worsened) indicating the use of de-icing materials in the winter is likely impacting lake quality. Continue to encourage local winter maintenance companies to obtain NH Voluntary Salt Applicator licenses through UNH Technology Transfer Center's Green SnowPro Certification. The improving epilimnetic pH levels are encouraging as NH surface waters recover from the historical impacts of acid precipitation. For more information on the recovery of NH's surface waters read the NHDES "Acid Rain Status and Trends" report available on the website. The improving phosphorus levels are also encouraging and we hope watershed management activities continue to result in improved conditions. Inventory and prioritize areas susceptible to stormwater runoff and implement best management practices in these areas. Keep up the great work!

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

- **Chlorophyll-a:** Chlorophyll level was within a low range in June, increased slightly from 2019, and was less than the state median and 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) and Hypolimnetic (lower water layer) conductivity levels remained slightly elevated and greater than the state median. Epilimnetic, Metalimnetic and Hypolimnetic chloride levels were slightly greater than the state median, yet much less than a level of concern. However, historical trend analysis indicates significantly increasing (worsening) conductivity levels since monitoring began.
- **Total Phosphorus:** Epilimnetic phosphorus level was very low in June, remained stable with 2019, and was much less than the state median and the threshold for oligotrophic lakes. Historical trend analysis indicates significantly decreasing (improving) epilimnetic phosphorus levels since monitoring began. Metalimnetic and Hypolimnetic phosphorus levels were within a low range in June and remained stable with 2019.
- **Transparency:** Transparency was below average (worse) for the lake in June, decreased from 2019, and remained greater than the state median. Historical trend analysis indicates stable transparency since monitoring began.
- **Turbidity:** Epilimnetic, Metalimnetic and Hypolimnetic turbidity levels were within a very low range in June and decreased from 2019.
- **pH:** Epilimnetic, Metalimnetic and Hypolimnetic pH levels were within the desirable range 6.5-8.0 units. Historical trend analysis indicates significantly increasing (improving) epilimnetic pH levels since monitoring began.
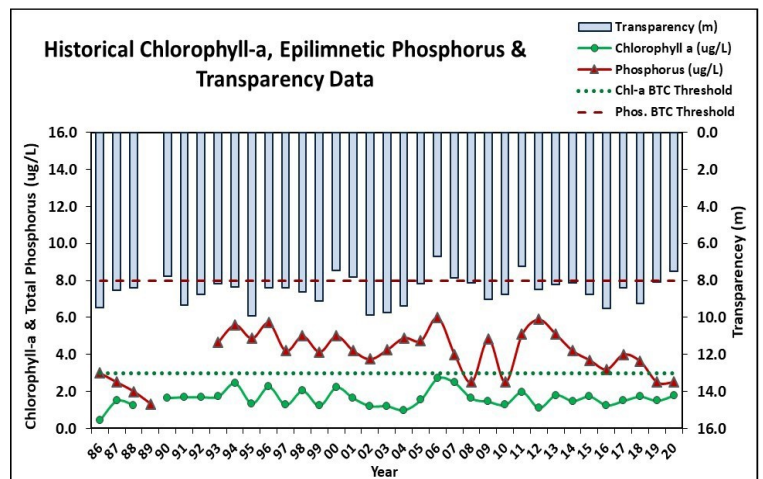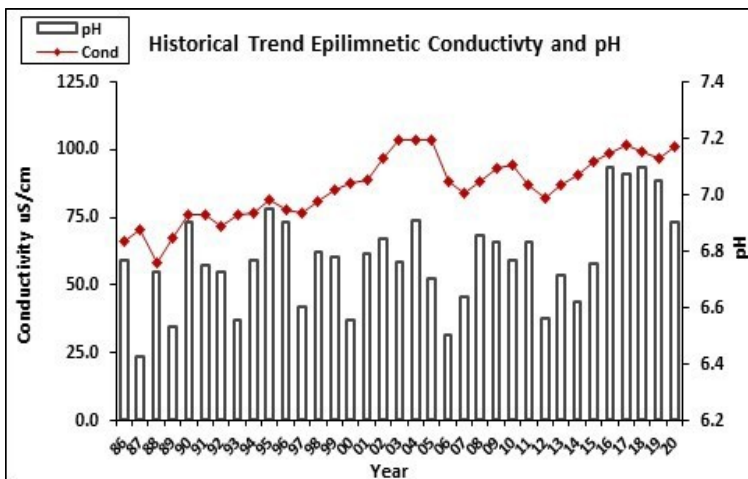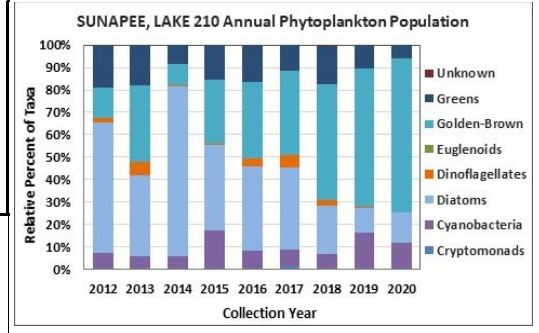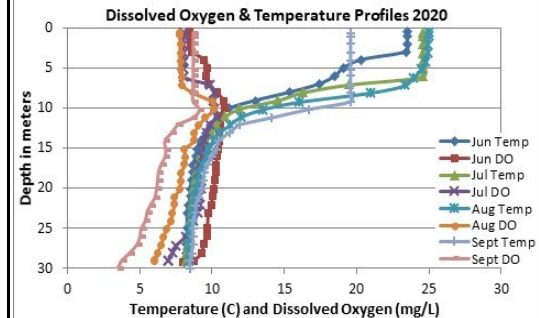

Dissolved Oxygen & Temperature Profile, June 2020

SUNAPEE, LAKE 200 Annual Phytoplankton Population

Table 1. 2020 Average Water Quality Data for SUNAPEE LAKE - STN. 200

Station Name	Alk. (mg/L)	Chlor-a (ug/L)	Chloride (mg/L)	Cond. (us/cm)	Total P (ug/L)	Trans. (m)	Turb. (ntu)	pH
Epilimnion	4.4	1.79	20	101.4	3	7.50	0.08	6.90
Metalimnion			20	103.0	5		0.08	6.90
Hypolimnion			20	102.1	5		0.08	6.66

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

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

Historical Trend Epilimnetic Conductivty and pH

Historical Chlorophyll-a, Epilimnetic Phosphorus & Transparency Data

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

Recommended Actions: Great job monitoring in 2020! Lake conductivity levels have significantly increased (worsened) indicating the use of de-icing materials in the winter is likely impacting lake quality. Continue to encourage local winter maintenance companies to obtain NH Voluntary Salt Applicator licenses through UNH Technology Transfer Center's Green SnowPro Certification. Inventory and prioritize areas susceptible to stormwater runoff and implement best management practices in these areas. The improving phosphorus levels are encouraging and we hope watershed management activities continue to result in improved conditions. Encourage lake residents to maintain vegetative buffers to infiltrate stormwater runoff and prevent shoreline erosion. Refer to DES' "New Hampshire Homeowner's Guide to Stormwater Management" for assistance. Keep up the great work!

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

- **Chlorophyll-a:** Chlorophyll levels fluctuated within a low range and were highest in June. Average chlorophyll level decreased slightly from 2019 and was less than the state median and the threshold for oligotrophic lakes. Historical trend analysis indicates relatively stable chlorophyll levels since monitoring began.
- **Conductivity/Chloride:** Epilimnetic (upper water layer), Metalimnetic (middle water layer) and Hypolimnetic (lower water layer) conductivity levels remained slightly elevated and greater than the state median. Epilimnetic, Metalimnetic and Hypolimnetic chloride levels were slightly greater than the state median, yet much less than the state chronic chloride standard. However, historical trend analysis indicates significantly increasing (worsening) conductivity levels since monitoring began.
- **Color:** Apparent color was measured in the epilimnion and indicated the lake water was lightly tea colored, or light brown in June, decreased to a clear range in July and August, and increased to a lightly tea colored range in September.
- **Total Phosphorus:** Epilimnetic phosphorus levels were stable and low from June through September. Average epilimnetic phosphorus level remained stable with 2019 and was much less than the state median and the threshold for oligotrophic lakes. Historical trend analysis indicates significantly decreasing (improving) epilimnetic phosphorus levels since monitoring began. Metalimnetic and Hypolimnetic phosphorus levels were also low and remained stable from June through September.
- **Transparency:** Transparency was below average (worse) in June when algal growth was slightly higher and water color was slightly darker, and then increased (improved) in July and remained stable through September. Average transparency increased (improved) slightly from 2019 and was much higher (better) than the state median. Historical trend analysis indicates stable transparency since monitoring began.
- **Turbidity:** Epilimnetic and Metalimnetic turbidity levels fluctuated within a low range and were highest in August. Hypolimnetic turbidity level was higher in September but remained within a low range.
- **pH:** Epilimnetic and Metalimnetic pH levels were within the desirable range 6.5 -8.0 units. Historical trend analysis indicates stable epilimnetic pH levels since monitoring began. Hypolimnetic pH levels were slightly less than desirable.
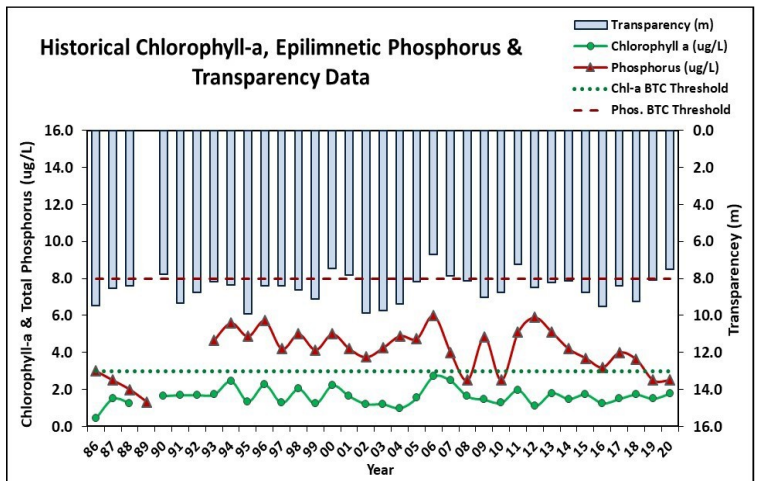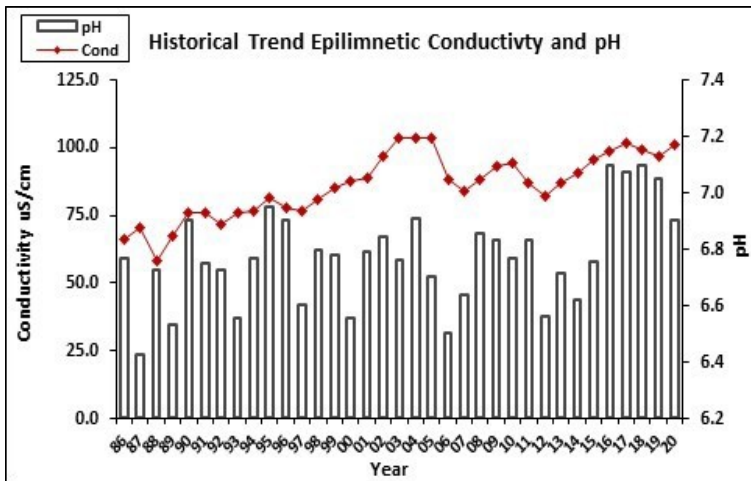

Dissolved Oxygen & Temperature Profiles 2020

SUNAPEE, LAKE 210 Annual Phytoplankton Population

Station Name	Table 1. 2020 Average Water Quality Data for SUNAPEE LAKE - STN. 210								
	Alk. (mg/L)	Chlor-a (ug/L)	Chloride (mg/L)	Color (pcu)	Cond. (us/cm)	Total P (ug/L)	Trans. (m)	Turb. (ntu)	pH
Epilimnion	7.15	1.29	24	22	100.5	3	9.06	0.24	6.80
Metalimnion			23		99.7	4		0.39	6.77
Hypolimnion			23		100.2	4		0.35	6.34

NH Median Values: Median values for specific parameters generated from historic lake monitoring data.

Alkalinity: 4.5 mg/L
Chlorophyll-a: 4.39 mg/m³
Conductivity: 42.3 uS/cm
Chloride: 5 mg/L
Total Phosphorus: 11 ug/L
Transparency: 3.3 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	Worsening	Data significantly increasing.	Chlorophyll-a	Stable	Trend not significant, data moderately variable.
pH (epilimnion)	Stable	Trend not significant; data show low variability.	Transparency	Stable	Trend not significant; data show low variability.
			Phosphorus (epilimnion)	Improving	Data significantly decreasing.

Historical Trend Epilimnetic Conductivty and pH

Historical Chlorophyll-a, Epilimnetic Phosphorus & Transparency Data

Recommended Actions: Great job monitoring 2020! Lake conductivity levels have significantly increased (worsened) indicating the use of de-icing materials in the winter is likely impacting lake quality. Continue to encourage local winter maintenance companies to obtain NH Voluntary Salt Applicator licenses through UNH Technology Transfer Center's Green SnowPro Certification. The improving algal growth (chlorophyll) is encouraging and we hope to see this continue. Inventory and prioritize areas susceptible to stormwater runoff and implement best management practices in these areas. Keep up the great work!

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

◊ **Chlorophyll-a:** Chlorophyll level was within a low range in June, decreased slightly from 2019, and was less than the state median and the threshold for oligotrophic lakes. Historical trend analysis indicates significantly decreasing (improving) chlorophyll levels since monitoring began.

◊ **Conductivity/Chloride:** Epilimnetic (upper water layer), Metalimnetic (middle water layer) and Hypolimnetic (lower water layer) conductivity levels remained slightly elevated and greater than the state median. Epilimnetic, Metalimnetic and Hypolimnetic chloride levels were slightly greater than the state median, yet much less than the state chronic chloride standard. However historical trend analysis indicates significantly increasing (worsening) conductivity levels since monitoring began.

◊ **Color:** Apparent color was measured in the epilimnion and indicated the lake water was clear in June with little to no tea or brown coloring.

◊ **Total Phosphorus:** Epilimnetic, Metalimnetic and Hypolimnetic phosphorus levels fluctuated within a low range in June. Epilimnetic phosphorus level increased slightly from 2019 but remained less than the state median and the threshold for oligotrophic lakes. Historical trend analysis indicates relatively stable epilimnetic phosphorus levels since monitoring began.

◊ **Transparency:** Transparency was high (good) in June, increased (improved) from 2019, and was much higher (better) than the state median. Historical trend analysis indicates stable transparency since monitoring began.

◊ **Turbidity:** Epilimnetic, Metalimnetic and Hypolimnetic turbidity levels fluctuated within a very low range for those stations.

◊ **pH:** Epilimnetic and Metalimnetic pH levels were within the desirable range 6.5-8.0 units. Historical trend analysis indicates stable epilimnetic pH levels since monitoring began. Hypolimnetic pH level was approximately equal to the low end of the desirable range.
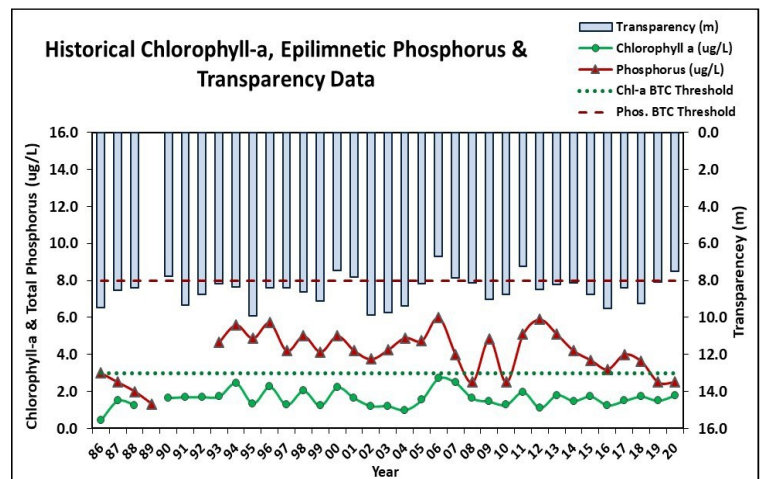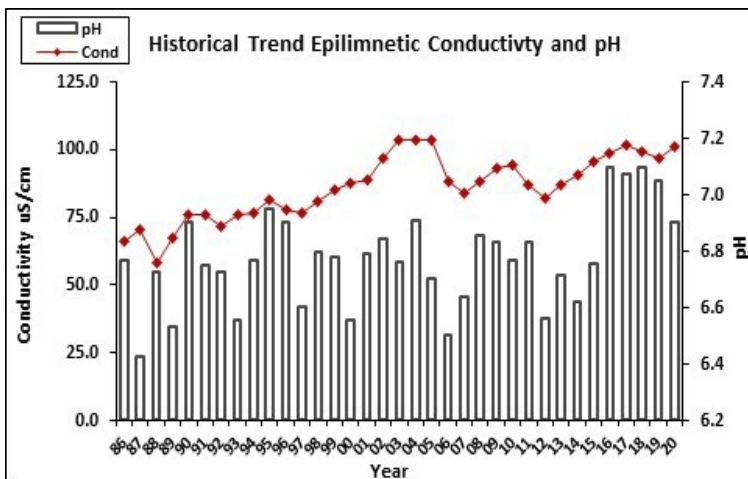

Dissolved Oxygen & Temperature Profile, June 2020

SUNAPEE, LAKE 220 Annual Phytoplankton Population
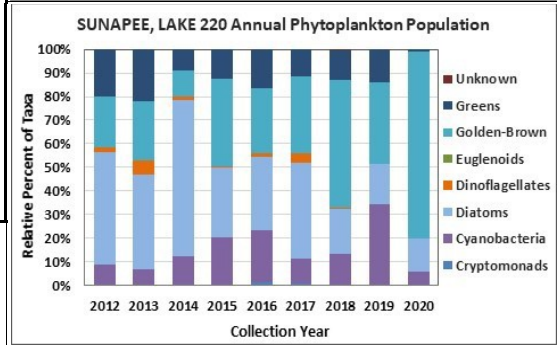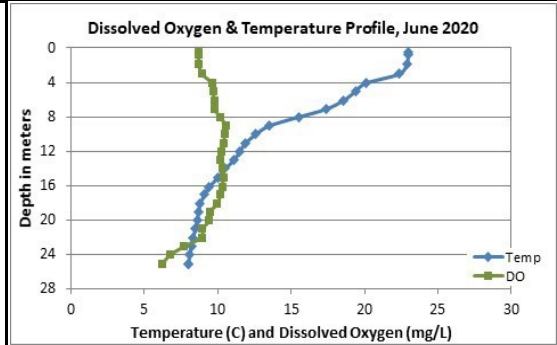
Station Name	Table 1. 2020 Average Water Quality Data for SUNAPEE LAKE - STN. 220								
	Alk. (mg/L)	Chlor-a (ug/L)	Chloride (mg/L)	Color (pcu)	Cond. (us/cm)	Total P (ug/L)	Trans. (m)	Turb. (ntu)	pH
Epilimnion	6.1	0.90	25	10	102.5	6	9.00	0.08	6.79
Metalimnion			25		101.1	5		0.08	6.93
Hypolimnion			25		99.7	7		0.08	6.49

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

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

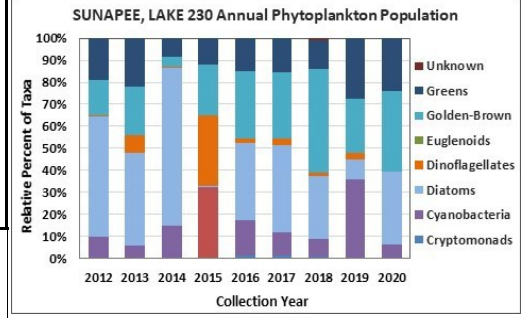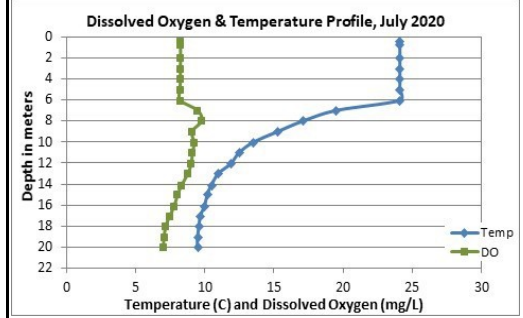| Parameter	Trend	Explanation	Parameter	Trend	Explanation
Conductivity	Worsening	Data significantly increasing.	Chlorophyll-a	Improving	Data significantly decreasing.
pH (epilimnion)	Stable	Trend not significant; data show low variability.	Transparency	Stable	Trend not significant; data show low variability.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

Historical Trend Epilimnetic Conductivty and pH

Historical Chlorophyll-a, Epilimnetic Phosphorus & Transparency Data

Volunteer Lake Assessment Program Individual Lake Reports
Lake Sunapee, Stn. 230, Sunapee
2020 Data Summary

New Hampshire Department of Environmental Services

Recommended Actions: Great job monitoring in 2020! Lake conductivity levels have significantly increased (worsened) indicating the use of de-icing materials in the winter is likely impacting lake quality. Continue to encourage local winter maintenance companies to obtain NH Voluntary Salt Applicator licenses through UNH Technology Transfer Center's Green SnowPro Certification. The improving epilimnetic pH levels are encouraging as NH surface waters recover from the historical impacts of acid precipitation. For more information on the recovery of NH's surface waters read the NHDES "Acid Rain Status and Trends" report available on the website. Inventory and prioritize areas susceptible to stormwater runoff and implement best management practices in these areas. Keep up the great work!

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

- **Chlorophyll-a:** Chlorophyll level was within a low range in July, remained stable with 2019, and was less than the state median and 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) and Hypolimnetic (lower water layer) conductivity levels remained slightly elevated and greater than the state median. Epilimnetic, Metalimnetic and Hypolimnetic chloride levels were slightly greater than the state median, yet much less than the state chronic chloride standard. However historical trend analysis indicates significantly increasing (worsening) conductivity levels since monitoring began.
- **Color:** Apparent color measured in the epilimnion indicated the lake water was clear in July with little to no tea, or brown, coloring.
- **Total Phosphorus:** Epilimnetic, Metalimnetic and Hypolimnion phosphorus levels fluctuated within a low range in July. Epilimnetic phosphorus level remained stable with 2019 and was much less than the state median and the threshold for oligotrophic lakes. Historical trend analysis indicates relatively stable epilimnetic phosphorus levels since monitoring began.
- **Transparency:** Transparency was below average (worse) in June, increased (improved) in July, and then decreased slightly through September. Average transparency decreased slightly from 2018 but was much higher (better) than the state median. Historical trend analysis indicates stable transparency since monitoring began.
- **Turbidity:** Epilimnetic, Metalimnetic and Hypolimnetic turbidity levels fluctuated within a very low range in July.
- **pH:** Epilimnetic and Metalimnetic pH levels were within the desirable range 6.5-8.0 units. Historical trend analysis indicates significantly increasing (improving) epilimnetic pH levels since monitoring began. Hypolimnetic pH level was slightly less than desirable.

Dissolved Oxygen & Temperature Profile, July 2020

SUNAPEE, LAKE 230 Annual Phytoplankton Population

Station Name	Table 1. 2020 Average Water Quality Data for SUNAPEE LAKE - STN. 230								
	Alk. (mg/L)	Chlor-a (ug/L)	Chloride (mg/L)	Color (pcu)	Cond. (us/cm)	Total P (ug/L)	Trans. (m)	Turb. (ntu)	pH
Epilimnion	6.1	1.25	27	20	100.4	3	9.35	0.08	6.84
Metalimnion			29		98.9	5		0.18	6.73
Hypolimnion			28		97.1	6		0.21	6.13

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
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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)	Improving	Data significantly increasing.	Transparency	Stable	Trend not significant; data show low variability.
			Phosphorus (epilimnion)	Stable	Trend not significant; data moderately variable.

Historical Trend Epilimnetic Conductivity and pH

Historical Chlorophyll-a, Epilimnetic Phosphorus & Transparency Data