

Adirondack LAP 2020 & 2021 Summaries

Canada Lake

Trophic State Oligotrophic	Acidity Circumneutral	Acid Neutralizing Capacity Moderate	Road Salt Influence Moderate
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Water quality values for Canada Lake during the 2020 sampling season. Historical trend analysis performed in 2018 (updated every five years). Trend analysis was not performed on calcium data. BDL=below detection limit.

Water Quality Indicator	6/25/2020	7/21/2020	8/15/2020	Average	Trend
Transparency (m)	4.3	4.2	5.7	4.7	No Trend
Total Phosphorus (µg/L)	4.8	7.1	4.1	5.3	No Trend
Chlorophyll- <i>a</i> (µg/L)	0.6	2.0	1.3	1.3	No Trend
Laboratory pH	6.8	6.8	6.8	6.8	No Trend
Sp. Conductance (µS/cm)	45.1	46.9	47.3	46.4	No Trend
Color (Pt-Co)	24.6	24.6	24.6	24.6	No Trend
Alkalinity (mg/L)			5.6	5.6	No Trend
Chloride (mg/L)			8.5	8.5	Increasing
Calcium (mg/L)			1.8	1.8	Not Analyzed
Sodium (mg/L)			5.0	5.0	No Trend

Canada Lake

Trophic State Oligotrophic	Acidity Circumneutral	Acid Neutralizing Capacity Moderate	Road Salt Influence Moderate
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Water quality values for Canada Lake during the 2021 sampling season. Historical trend analysis performed in 2018 (updated every five years). Trend analysis was not performed on calcium data. BDL=below detection limit.

Water Quality Indicator	6/13/2021	7/19/2021	8/16/2021	Average	Trend
Transparency (m)	4.3	3.3	2.8	3.5	No Trend
Total Phosphorus (µg/L)	2.8	3.3	6.3	4.1	No Trend
Chlorophyll- <i>a</i> (µg/L)	1.4	2.7	2.9	2.3	No Trend
Laboratory pH	7.1	7.4	6.9	7.1	No Trend
Sp. Conductance (µS/cm)	50.4	47.5	38.8	45.6	No Trend
Color (Pt-Co)	24.6	31.1	31.1	28.9	No Trend
Alkalinity (mg/L)	5.3	6.0	5.2	5.5	No Trend
Chloride (mg/L)	9.0	5.8	7.3	7.4	Increasing
Calcium (mg/L)	1.9	2.4	2.1	2.1	Not Analyzed
Sodium (mg/L)	5.2	5.2	4.4	4.9	No Trend

East Caroga Lake

Trophic State Oligotrophic	Acidity Circumneutral	Acid Neutralizing Capacity Well buffered – not sensitive	Road Salt Influence High
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Water quality values for East Caroga Lake during the 2020 sampling season. Trend analysis will be performed on the next full report. BDL=below detection limit.

Water Quality Indicator	6/22/2020	7/20/2020	8/17/2020	Average	Trend
Transparency (m)	4.1	4.0	2.9	3.7	Not Analyzed
Total Phosphorus (µg/L)	7.3	8.9	6.8	7.7	Not Analyzed
Chlorophyll- <i>a</i> (µg/L)	1.0	0.2	3.0	1.4	Not Analyzed
Laboratory pH	7.8	8.9	8.2	8.3	Not Analyzed
Sp. Conductance (µS/cm)	160.4	160.0	154.4	158.3	Not Analyzed
Color (Pt-Co)	18.2	15.0	27.9	20.3	Not Analyzed
Alkalinity (mg/L)			31.8	31.8	Not Analyzed
Chloride (mg/L)			25.1	25.1	Not Analyzed
Calcium (mg/L)			9.2	9.2	Not Analyzed
Sodium (mg/L)			15.0	15.0	Not Analyzed

East Caroga Lake

Trophic State Oligotrophic	Acidity Alkaline	Acid Neutralizing Capacity Well buffered – not sensitive	Road Salt Influence Moderate
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Water quality values for East Caroga Lake during the 2021 sampling season. Trend analysis will be performed on the next full report. BDL=below detection limit.

Water Quality Indicator	6/16/2021	7/19/2021	8/16/2021	Average	Trend
Transparency (m)	3.5	3.2	3.5	3.4	Not Analyzed
Total Phosphorus (µg/L)	8.9	4.5	3.4	5.6	Not Analyzed
Chlorophyll- <i>a</i> (µg/L)	2.1	1.2	2.8	2.0	Not Analyzed
Laboratory pH	8.3	7.9	8.3	8.1	Not Analyzed
Sp. Conductance (µS/cm)	152.9	151.0	137.0	147.0	Not Analyzed
Color (Pt-Co)	27.9	24.6	43.9	32.1	Not Analyzed
Alkalinity (mg/L)	25.5	28.1	25.6	26.4	Not Analyzed
Chloride (mg/L)	29.5	25.8	23.5	26.3	Not Analyzed
Calcium (mg/L)	9.6	9.5	9.9	9.7	Not Analyzed
Sodium (mg/L)	17.0	15.7	13.9	15.5	Not Analyzed

West Caroga Lake

Trophic State Oligotrophic	Acidity Circumneutral	Acid Neutralizing Capacity Adequate – low sensitivity	Road Salt Influence Moderate
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Water quality values for West Caroga Lake during the 2020 sampling season. Trend analysis will be performed on the next full report and after five years of consecutive data collection. BDL=below detection limit.

Water Quality Indicator	6/22/2020	7/20/2020	8/17/2020	Average	Trend
Transparency (m)	3.9	4.7	3.7	4.1	Not Analyzed
Total Phosphorus (µg/L)	5.2	7.8	4.5	5.8	Not Analyzed
Chlorophyll- <i>a</i> (µg/L)	1.7	0.9	2.6	1.8	Not Analyzed
Laboratory pH	7.4	7.9	7.6	7.7	Not Analyzed
Sp. Conductance (µS/cm)	97.7	99.4	97.4	98.2	Not Analyzed
Color (Pt-Co)	21.4	18.2	27.9	22.5	Not Analyzed
Alkalinity (mg/L)			19.9	19.9	Not Analyzed
Chloride (mg/L)			16.8	16.8	Not Analyzed
Calcium (mg/L)			5.0	5.0	Not Analyzed
Sodium (mg/L)			9.7	9.7	Not Analyzed

West Caroga Lake

Trophic State Oligotrophic	Acidity Circumneutral	Acid Neutralizing Capacity Adequate – low sensitivity	Road Salt Influence Moderate
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Water quality values for West Caroga Lake during the 2021 sampling season. Trend analysis will be performed on the next full report and after five years of consecutive data collection. BDL=below detection limit.

Water Quality Indicator	6/16/2021	7/19/2021	8/16/2021	Average	Trend
Transparency (m)	4.0	3.3	3.5	3.6	Not Analyzed
Total Phosphorus (µg/L)	5.1	3.9	5.2	4.7	Not Analyzed
Chlorophyll- <i>a</i> (µg/L)	1.8	3.1	2.9	2.6	Not Analyzed
Laboratory pH	7.6	7.7	7.3	7.5	Not Analyzed
Sp. Conductance (µS/cm)	100.7	95.9	88.7	95.1	Not Analyzed
Color (Pt-Co)	31.1	27.9	43.9	34.3	Not Analyzed
Alkalinity (mg/L)	15.3	17.3	17.1	16.6	Not Analyzed
Chloride (mg/L)	18.0	15.9	15.5	16.5	Not Analyzed
Calcium (mg/L)	5.5	5.5	5.7	5.6	Not Analyzed
Sodium (mg/L)	10.7	10.2	9.4	10.1	Not Analyzed

Lake acidity	Assessment
pH < 5.0	Acidic: critically impaired
pH 5.0 – 6.0	Acidic: threatened
pH 6.0 – 6.5	Acidic: acceptable
pH 6.5 – 7.5	Circumneutral: non-impacted
pH >7.5	Alkaline: non-impacted

Table 4. Assessment of sensitivity to acid deposition based on alkalinity concentration (mg/L).

Alkalinity	Neutralizing ability	Acidification Status
0	None	Acidified
0 - 2	Low	Extremely sensitive
2 - 10	Moderate	Moderately sensitive
10 - 25	Adequate	Low sensitivity
> 25	High	Not sensitive

Chloride (mg/L)	Road Salt Influence
Less than 1.0	Not significant
1 - 5	Present – low
5 - 20	Moderate
20 – 50	High

Conductivity

Conductivity of least-impacted and undeveloped lakes in the Adirondacks is quite low, and typically in the range of 10 to 25 $\mu\text{S}/\text{cm}$. Elevated conductivity may be indicative of road salt pollution, faulty septic systems or the influence of bogs and wetlands in the watershed.

Trophic State

Parameter	Oligotrophic	Mesotrophic	Eutrophic
Transparency (m)	>5	2 - 5	<2
Total phosphorus ($\mu\text{g/L}$)	<10	10 - 20	>20
Chlorophyll-a ($\mu\text{g/L}$)	<2	2 - 8	>8

Color

Alkaline lakes with high concentrations of calcium carbonate scatter light in the green and blue wavelength and thus appear turquoise in color. Lakes rich in dissolved organic matter and humic compounds absorb shorter wavelengths of light such as green and blue and scatter the longer wavelengths of red and yellow, thus these lakes appear to be brown in color (Image 7; Wetzel 2001). Analysis of color can provide us with information about the quantity of dissolved organic matter (DOM) in the water.

Chlorophyll

Lakes of low productivity (oligotrophic) tend to have chlorophyll-a concentrations less than 2 $\mu\text{g/L}$, while highly productive lakes (eutrophic) often have chlorophyll concentrations greater than 8 $\mu\text{g/L}$ (NYS DEC assessment criteria). Typically, major changes in algal biomass (e.g. an algae bloom) are related to changes in the availability of nutrients, primarily phosphorus or nitrogen, or at times, silica or inorganic carbon (Wetzel 2001).

Phosphorous

Generally speaking, lakes of low productivity (oligotrophic) have total phosphorus concentrations less than 10 $\mu\text{g/L}$, while highly productive lakes (eutrophic) have total phosphorus concentrations greater than 20 $\mu\text{g/L}$ (NYS DEC assessment criteria).

Calcium

Many lakes in the Adirondacks have low concentrations of calcium, typically between 2 and 5 mg/L . The reason for the relatively low concentration is that the granite bedrock underlying most of the Adirondack region weathers slowly, resulting in a low rate of calcium generation.

Canada Lake

Trophic State Oligotrophic	Acidity Circumneutral	Acid Neutralizing Capacity Moderate	Road Salt Influence Low
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Water quality values for Canada Lake during the 2022 sampling season. BDL=below detection limit.

Water Quality Indicator	5/24/2022	6/20/2022	7/20/2022	8/15/2022	9/2/2022	Average
Laboratory pH	7.0	6.9	6.9	6.8	7.1	6.9
Sp. Conductance ($\mu\text{S}/\text{cm}@25\text{ C}$)	42.9	43.9	45.8	47.7	48.4	45.7
Apparent Color (mg/L Pt-Co)	37.5	21.4	27.9	24.6	15.0	25.3
CDOM ($\mu\text{g}/\text{L QSE}$)	113.9	127.4	105.7	97.3	96.5	108.2
Chlorophyll-a ($\mu\text{g}/\text{L}$)	1.1	1.9	4.0	2.1	0.9	2.0
Transparency (m)	4.0	3.7	3.9	5.5	7.6	4.9
Alkalinity (mg/L as CaCO_3)	4.1	5.0	4.3	6.6	7.3	5.5
Chloride (mg/L)	7.6	7.6	8.1	8.5	8.7	8.1
Sulfate as SO_4 (mg/L)	2.2	2.1	2.0	2.2	2.1	2.1
Total Phosphorus ($\mu\text{g}/\text{L}$ as P)	4.2	4.3	4.3	3.9	10.2	5.4
Nitrate-Nitrite ($\mu\text{g}/\text{L}$ as N)	166.0	106.0	31.3	10.0	18.6	66.4
Ammonia ($\mu\text{g}/\text{L}$ as $\text{NH}_3\text{-N}$)	BDL	BDL	BDL	BDL	24.6	16.2
Total Nitrogen ($\mu\text{g}/\text{L}$)	261.7	291.8	199.9	177.1	172.3	220.6
Dissolved Organic Carbon (NPOC mg/L)	3.4	3.6	4.1	3.9	3.9	3.8
Calcium (mg/L)	2.2	2.3	2.2	2.7	2.5	2.4
Sodium (mg/L)	5.2	5.3	5.5	5.5	5.6	5.4

Pine Lake

Trophic State Oligotrophic	Acidity Circumneutral	Acid Neutralizing Capacity Moderate	Road Salt Influence Not Significant
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Water quality values for Pine Lake during the 2022 sampling season. BDL=below detection limit.

Water Quality Indicator	6/20/2022	7/19/2022	8/15/2022	Average
Laboratory pH	6.6	6.2	6.7	6.5
Sp. Conductance ($\mu\text{S}/\text{cm}@25\text{ C}$)	14.8	10.5	13.5	12.9
Apparent Color (mg/L Pt-Co)	15.0	15.0	18.2	16.1
CDOM ($\mu\text{g}/\text{L QSE}$)	84.2	77.4	77.2	79.6
Chlorophyll-a ($\mu\text{g}/\text{L}$)	1.5	1.5	1.3	1.4
Transparency (m)	4.8	5.1	6.0	5.3
Alkalinity (mg/L as CaCO_3)	3.3	2.6	4.3	3.4
Chloride (mg/L)	0.7	0.6	0.8	0.7
Sulfate as SO_4 (mg/L)	2.0	1.8	2.0	1.9
Total Phosphorus ($\mu\text{g}/\text{L}$ as P)	5.9	4.4	6.5	5.6
Nitrate-Nitrite ($\mu\text{g}/\text{L}$ as N)	34.7	BDL	BDL	12.7
Ammonia ($\mu\text{g}/\text{L}$ as $\text{NH}_3\text{-N}$)	20.9	23.1	BDL	20.2
Total Nitrogen ($\mu\text{g}/\text{L}$)	261.2	220.1	251.3	244.2
Dissolved Organic Carbon (NPOC mg/L)	3.5	3.4	3.9	3.6
Calcium (mg/L)	1.3	1.1	1.3	1.2
Sodium (mg/L)	0.8	0.7	0.8	0.8

East Caroga Lake

Trophic State Oligotrophic	Acidity Alkaline	Acid Neutralizing Capacity High	Road Salt Influence Moderate
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Water quality values for East Caroga Lake during the 2022 sampling season. BDL=below detection limit.

Water Quality Indicator	6/25/2022	7/17/2022	8/14/2022	Average
Laboratory pH	7.8	8.5	7.9	8.0
Sp. Conductance ($\mu\text{S}/\text{cm}@25\text{ C}$)	158.2	151.4	159.5	156.4
Apparent Color (mg/L Pt-Co)	31.1	21.4	31.1	27.9
CDOM ($\mu\text{g}/\text{L QSE}$)	111.4	102.1	85.6	99.7
Chlorophyll-a ($\mu\text{g}/\text{L}$)	2.2	1.8	7.1	3.7
Transparency (m)	4.4	5.3	3.2	4.3
Alkalinity (mg/L as CaCO_3)	28.2	24.5	31.7	28.1
Chloride (mg/L)	28.6	27.7	30.0	28.8
Sulfate as SO_4 (mg/L)	2.6	2.3	2.1	2.3
Total Phosphorus ($\mu\text{g}/\text{L as P}$)	5.0	6.3	9.2	6.8
Nitrate-Nitrite ($\mu\text{g}/\text{L as N}$)	BDL	BDL	BDL	0.6
Ammonia ($\mu\text{g}/\text{L as NH}_3\text{-N}$)	BDL	BDL	BDL	15.6
Total Nitrogen ($\mu\text{g}/\text{L}$)	240.8	244.1	211.0	232.0
Dissolved Organic Carbon (NPOC mg/L)	4.2	4.5	4.5	4.4
Calcium (mg/L)	11.1	10.9	11.5	11.2
Sodium (mg/L)	18.5	17.8	18.1	18.2

West Caroga Lake

Trophic State Oligotrophic	Acidity Circumneutral	Acid Neutralizing Capacity Adequate	Road Salt Influence Moderate
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Water quality values for West Caroga Lake during the 2022 sampling season. BDL=below detection limit.

Water Quality Indicator	6/17/2022	7/17/2022	8/12/2022	Average
Laboratory pH	7.5	7.5	7.3	7.4
Sp. Conductance ($\mu\text{S}/\text{cm}@25\text{ C}$)	93.5	98.2	100.6	97.4
Apparent Color (mg/L Pt-Co)	31.1	21.4	24.6	25.7
CDOM ($\mu\text{g}/\text{L QSE}$)	127.8	106.7	118.8	117.8
Chlorophyll-a ($\mu\text{g}/\text{L}$)	3.9	0.8	2.1	2.3
Transparency (m)	3.2	6.1	4.8	4.7
Alkalinity (mg/L as CaCO_3)	14.9	14.5	18.0	15.8
Chloride (mg/L)	17.0	17.2	18.2	17.5
Sulfate as SO_4 (mg/L)	2.6	2.4	2.7	2.6
Total Phosphorus ($\mu\text{g}/\text{L as P}$)	5.2	3.3	4.3	4.3
Nitrate-Nitrite ($\mu\text{g}/\text{L as N}$)	BDL	BDL	BDL	BDL
Ammonia ($\mu\text{g}/\text{L as NH}_3\text{-N}$)	BDL	BDL	BDL	BDL
Total Nitrogen ($\mu\text{g}/\text{L}$)	197.5	203.5	228.5	209.8
Dissolved Organic Carbon (NPOC mg/L)	4.5	4.6	4.7	4.6
Calcium (mg/L)	5.7	6.0	6.3	6.0
Sodium (mg/L)	10.5	11.2	11.6	11.1

