Ossipee Water Quality Report

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RIVERS Field Sampling Parameters

Total Phosphorus (TP)

- Valuable nutrient, alongside Nitrogen, for plant development
- High levels indicate elevated decomposition (ie. sewage inputs)

Turbidity

- Clarity of the fluid
- Determined by the amount of suspended particulates

Stream Characteristics

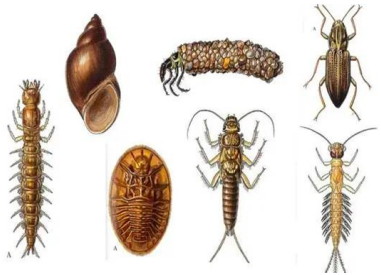
-site changes
-substrate
-general observations

Conductivity

- Ability of water to pass an electrical charge
- Based on the amount of positively (Mg+, Ca+) or negatively (Cl-, NO_3-) charged elements

Temperature

- Influences…
  - biological activity
  - plant growth
  - rate of chemical reactions
  - DO levels



Dissolved Oxygen (DO)

- Measure of how much oxygen is available for aquatic organisms
- Different species require different DO levels

pH

- Pure water is 7 (neutral)
- Most water in NH is slightly acidic (~6.5)
- Optimal levels to support aquatic organisms: 6.5 - 8.2

Water Quality Standards & Allowable Limits

- Turbidity
  - < 10 NTU
- Temperature
  - No standard, but monitored for changes
- pH
  - 6 - 8
  - Preferably closer to 6.5
- Dissolved Oxygen (DO)
  - 6 - 11 mg/L
  - 75% - 120%
- Conductivity
  - < 100 µS/cm
- Total Phosphorus (TP)
  - < 30 µg/L
  - Anything above is considered “nuisance levels”

Based on NHDES and EPA Criteria

Each site monitored will vary slightly due to differences in geology, plant life, site characteristics, etc.

GO-1 Beech River: 2018 - Oct. 2023

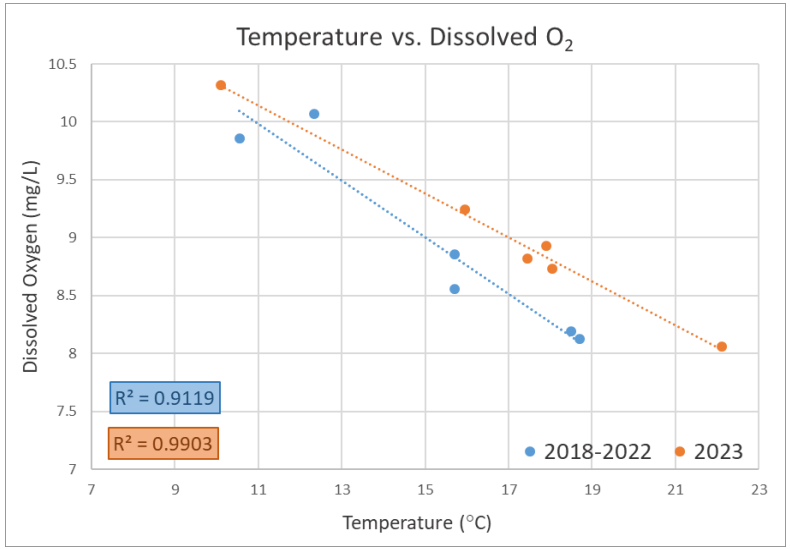
- Monitored since 2002
- Parameters collected: pH, turbidity, TP, temperature, conductivity, DO

Parameter	Status*
Turbidity	Stable
pH	Stable
Total Phosphorus	Stable

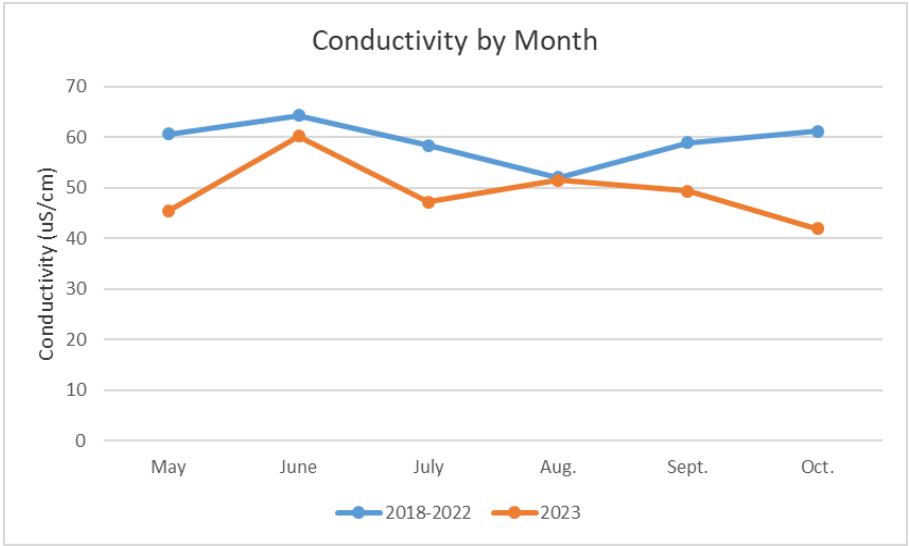
**Data from 2018 - Oct. 2023*

GO-1 Beech River: 2018 - 2023

Dissolved Oxygen (DO) has an inverse relationship with temperature: as temperature increases, DO decreases.

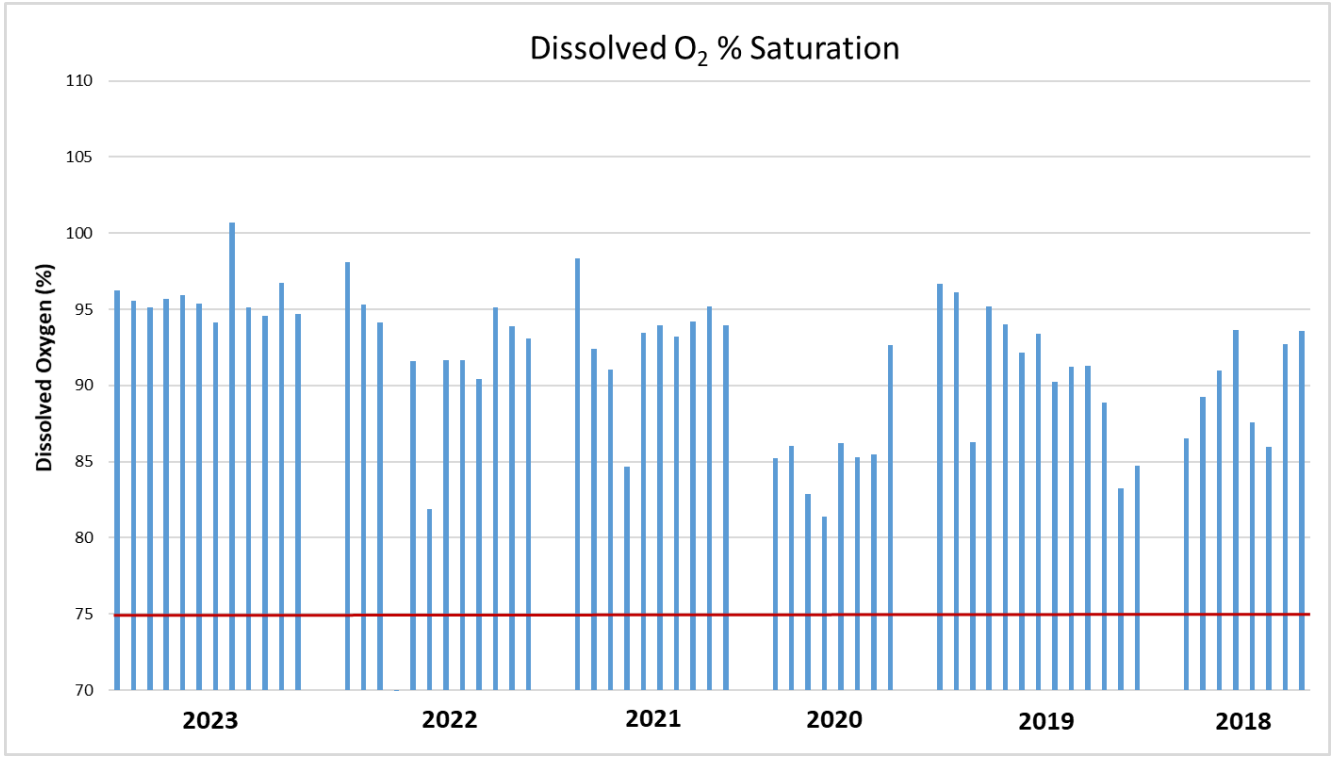


Conductivity shows a series of lower values at GO-1 in 2023 compared to 2018-2022. Values are below 100 uS/cm, indicating relatively good (normal) water quality in respect to salt concentrations.



The R^2 value from 2023 (orange) is slightly higher compared to 2018-2022 (blue). This indicates more stable DO levels. All values exceed the 6.0 mg/L requirement.

GO-1 Beech River: 2018 - 2023



New Hampshire State DO standard for Class A waters is above 75% during the months GMCG tests.

GO-2 Frenchman Brook: 2018 – Dec. 2023

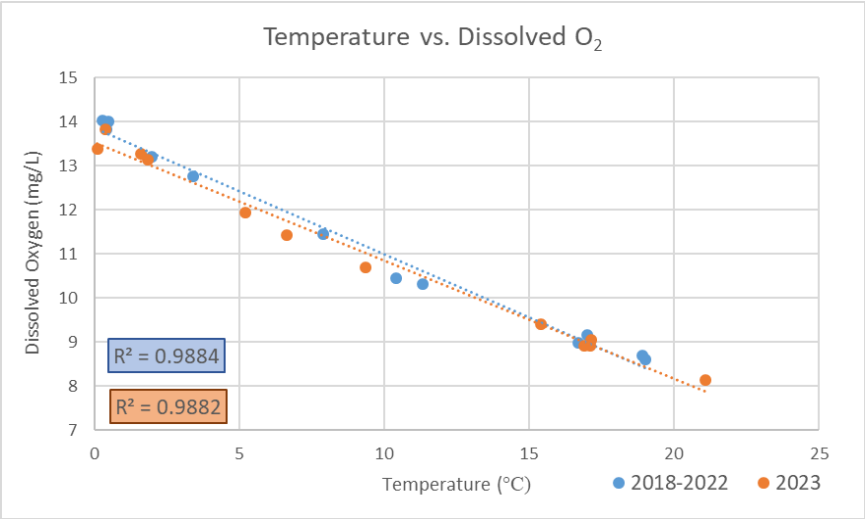
- Monitored since 2002
- Parameters collected: pH, turbidity, TP, temperature, conductivity, DO

Parameter	Status*
Turbidity	Stable
pH	Stable
Total Phosphorus	Stable

**Data from 2018 - Dec. 2023*

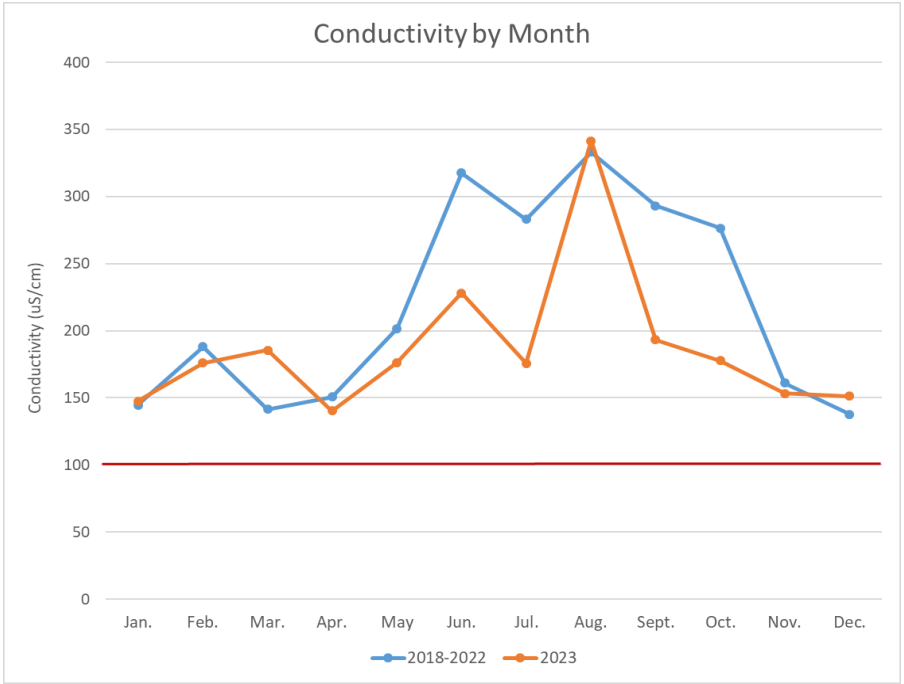
GO-2 Frenchman Brook: 2018 - 2023

Dissolved Oxygen (DO) has an inverse relationship with temperature: as temperature increases, DO decreases.

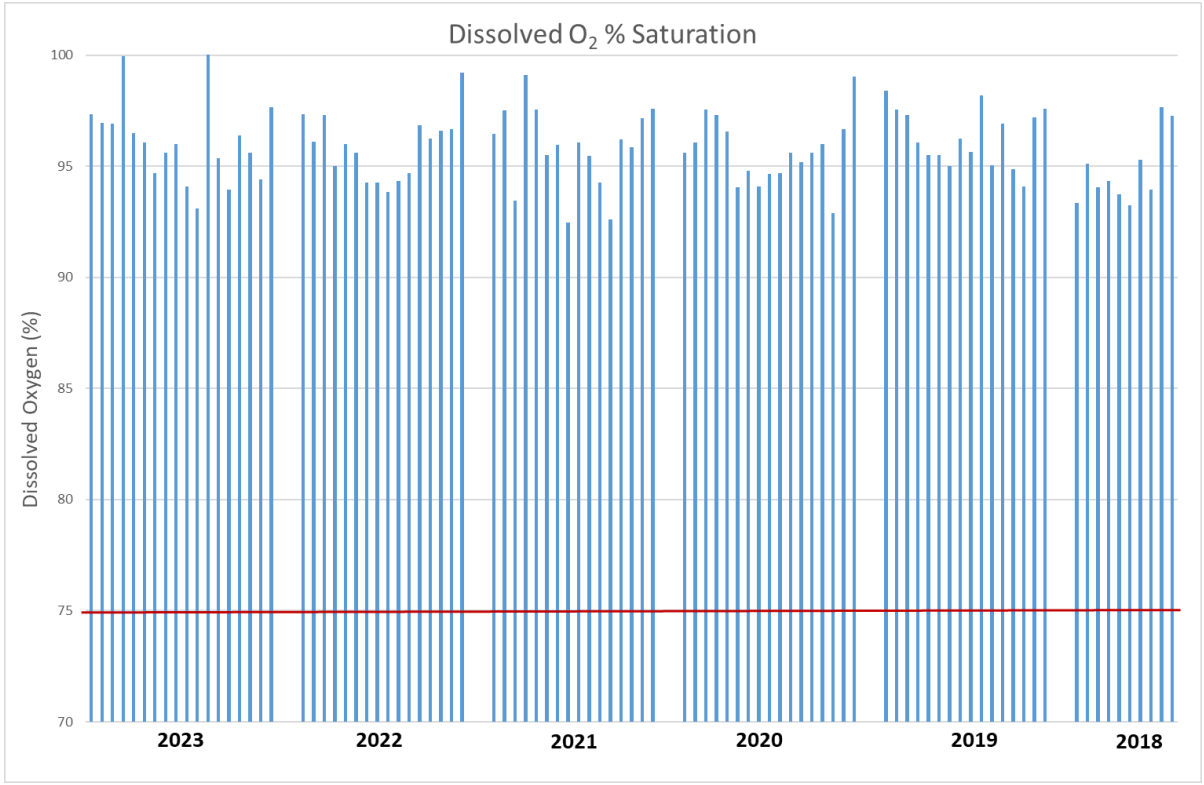


The R^2 values from 2023 (orange) show a similar set of values compared to the compiled 2018-2022 (blue). This indicates some change in DO levels. All values exceed the 6.0 mg/L requirement.

Conductivity shows a series of similar values at GO-2 in 2023 compared to 2018-2022. All values are above 100 uS/cm, indicating water quality which is considered low impact in respect to greater salt concentrations.



GO-2 Frenchman Brook: 2018 - 2023



New Hampshire State DO standard for Class A waters is above 75% during the months GMCG tests.

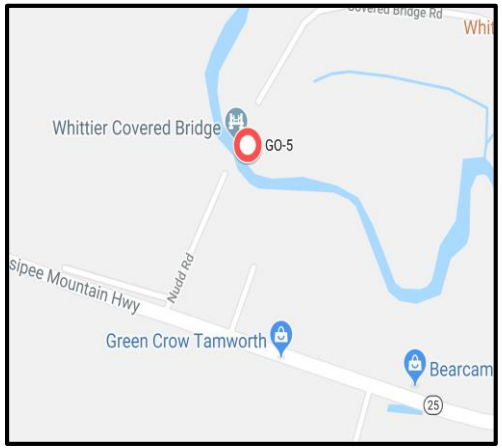
GO-2 Frenchman Brook: 2018 – Oct. 2023

Parameter	Status
Ammonium	Stable
Orthophosphate	Stable
Dissolved Organic Carbon	Stable
Total Dissolved Nitrogen	Stable
Chloride	Above pristine concentrations; showing some human impact
Nitrate	Above pristine concentrations; showing some human impact
Sulfate	Stable
Sodium	Stable
Potassium	Stable
Magnesium	Stable
Calcium	Stable
Dissolved Organic Nitrogen	Stable

Parameter	Typical Pristine Surface Water Concentrations
Ammonium	<0.2mg/L
Orthophosphate	<10ug/L
Dissolved Organic Carbon	N/A; between 1-10mg/L
Total Dissolved Nitrogen	<0.5mg/L
Chloride	<10mg/L
Nitrate	<50ug/L
Sulfate	<80mg/L
Sodium	<50mg/L
Potassium	<10mg/L
Magnesium	1-100mg/L
Calcium	<15mg/L
Dissolved Organic Nitrogen	N/A

GO-5 Bearcamp River: 2018 - Dec. 2023

- Monitored since 2004
- Parameters collected: pH, turbidity, TP, temperature, conductivity, DO

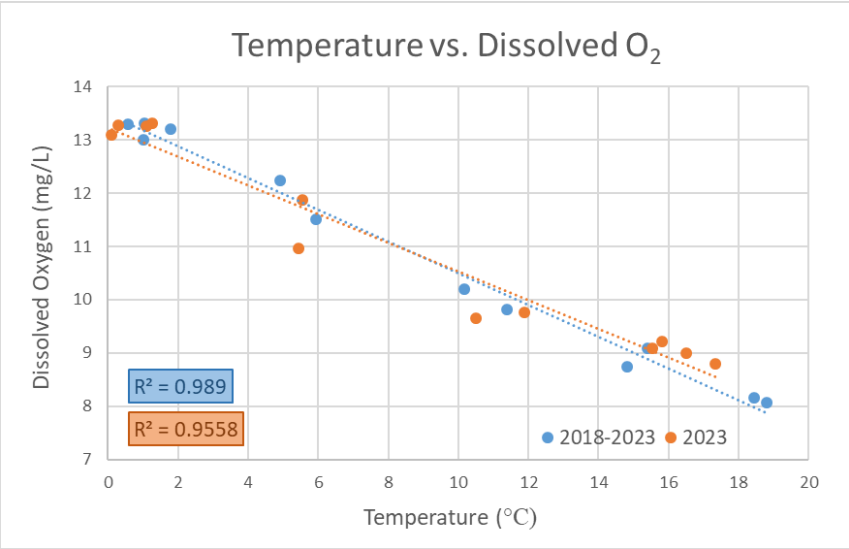


Parameter	Status*
Turbidity	Stable
pH	Stable
Total Phosphorus	Stable

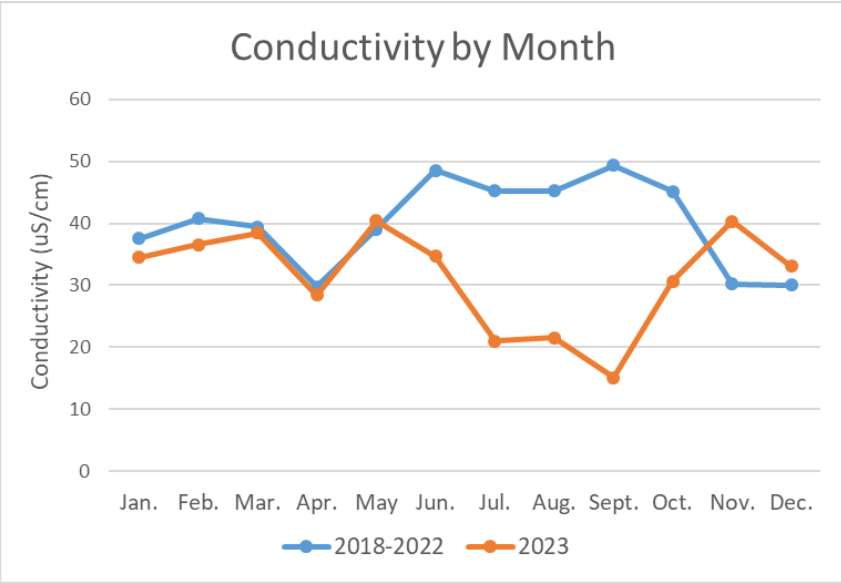
**Data from 2018 – Dec. 2023*

GO-5 Bearcamp River: 2018 - 2023

Dissolved Oxygen (DO) has an inverse relationship with temperature: as temperature increases, DO decreases.

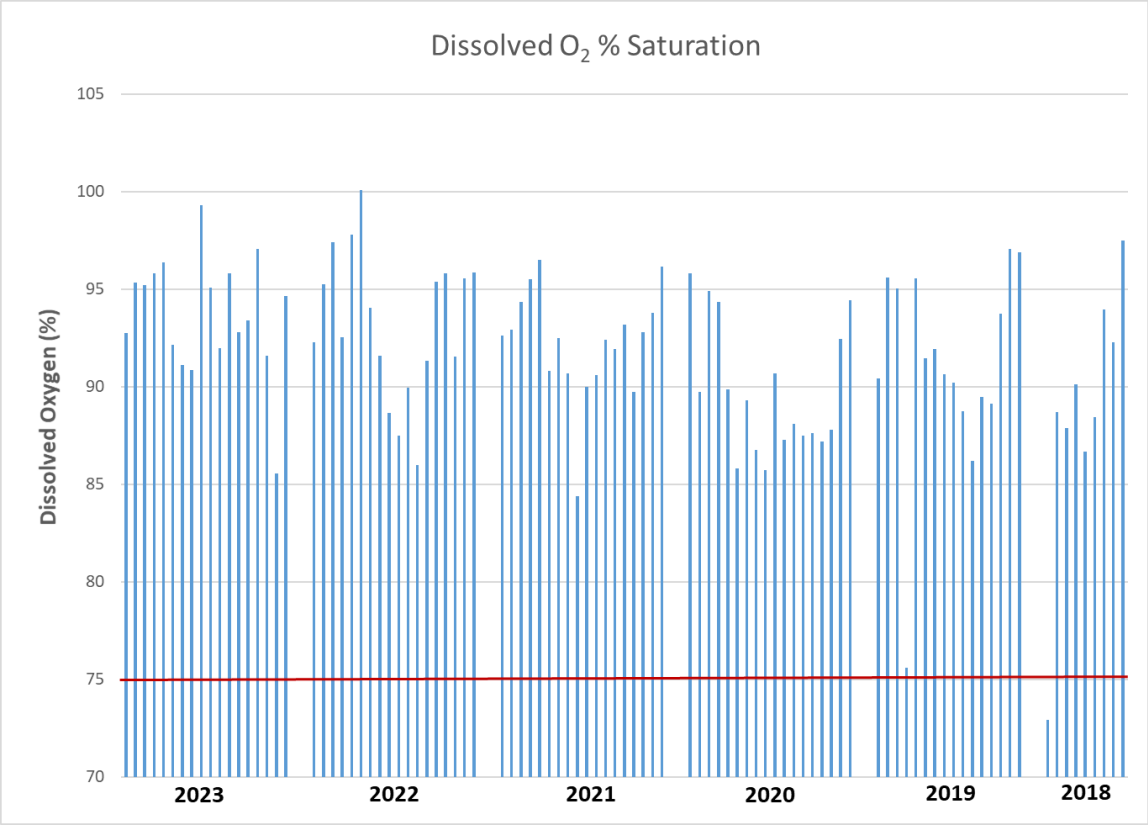


Conductivity shows a series of lower values at GO-5 in 2023 compared to 2018-2022. Values are below 100 uS/cm, indicating relatively good (normal) water quality in respect to salt concentrations.



The R^2 values from 2023 (orange) show a similar set of values compared to the compiled 2018-2022 (blue). This indicates little change in DO levels. All values exceed the 6.0 mg/L requirement.

GO-5 Bearcamp River: 2018 - 2023



New Hampshire State DO standard for Class A waters is above 75% during the months GMCG tests.

GO-7 Ossipee Lake Outflow: 2018 - Dec. 2023

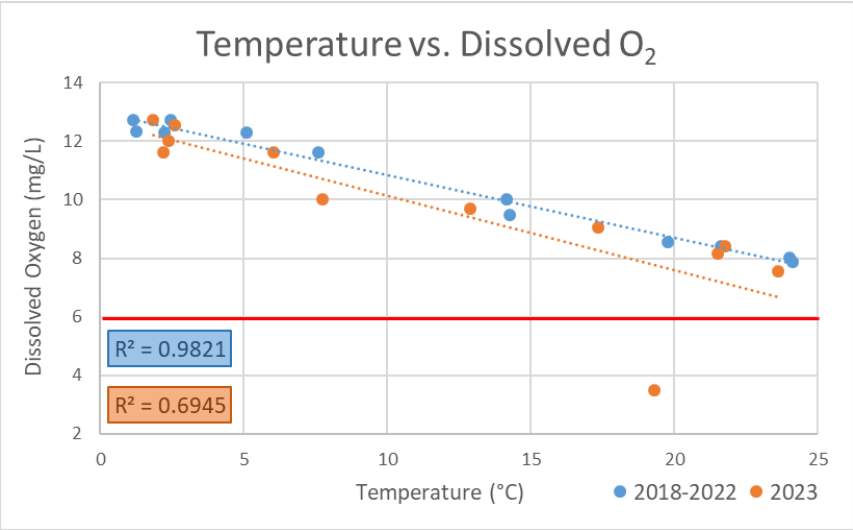
- Monitored since 2012
- Parameters collected: pH, turbidity, TP, temperature, conductivity, DO

Parameter	Status*
Turbidity	Stable
pH	Stable
Total Phosphorus	Stable

**Data from 2018 – Dec. 2023*

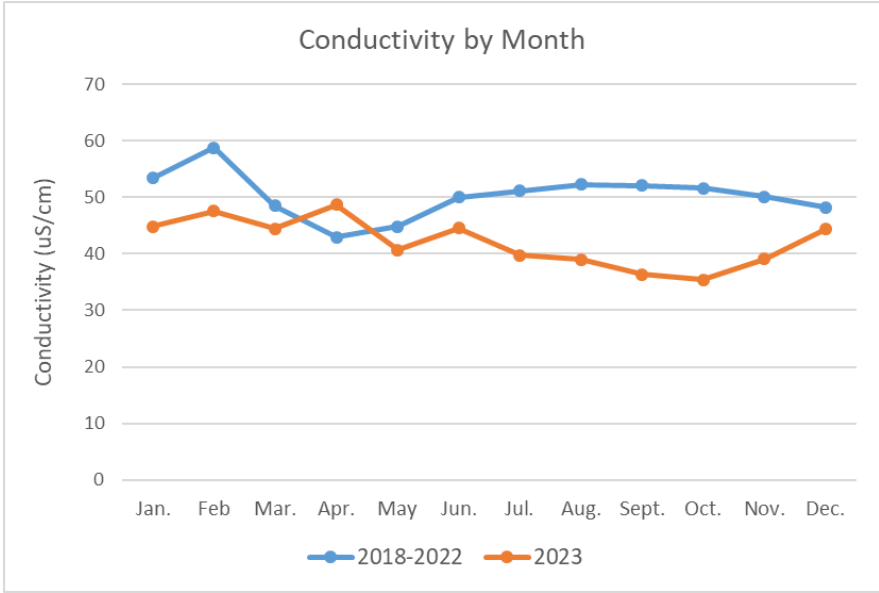
GO-7 Ossipee Lake Outflow: 2018 - 2023

Dissolved Oxygen (DO) has an inverse relationship with temperature: as temperature increases, DO decreases.

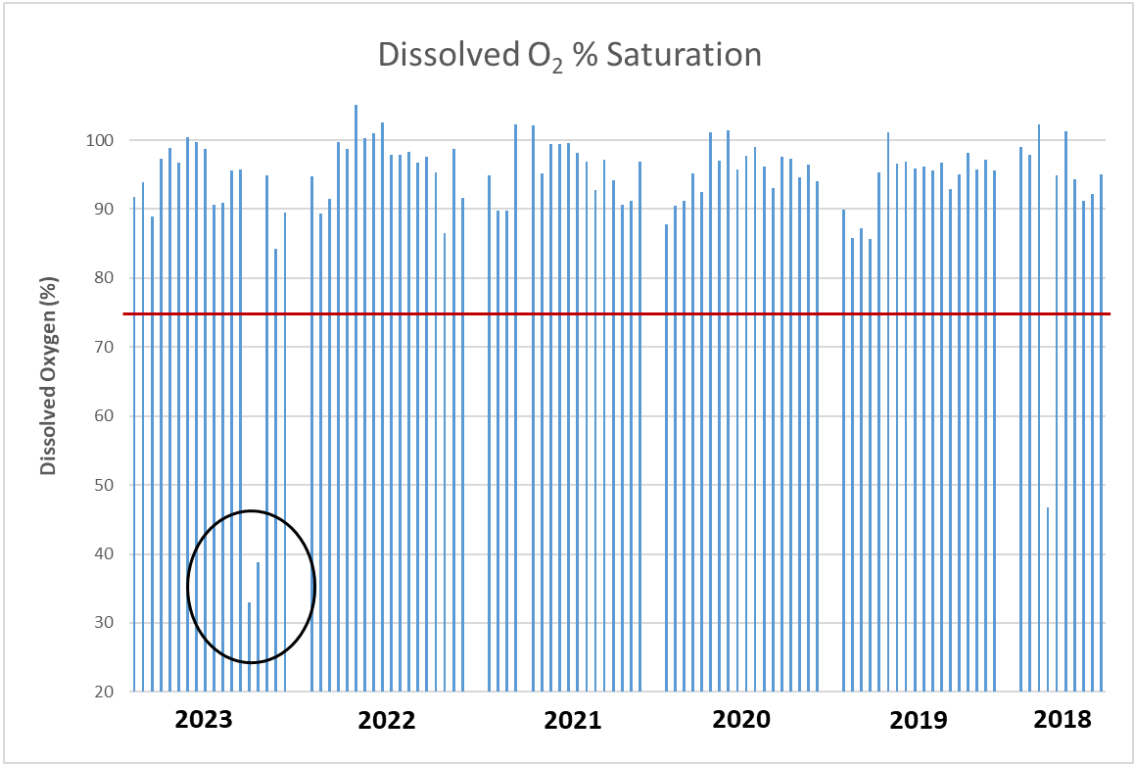


The R^2 values from 2023 (orange) show a slightly inconsistent set of values compared to the compiled 2018-2022 (blue). This indicates some change in DO levels and inconsistent data for 2023. One value falls below the 6.0 mg/L requirement.

Conductivity shows a series of higher values at GO-7 in 2023 compared to 2018-2022. Values are below 100 uS/cm, indicating relatively good (normal) water quality in respect to salt concentrations.



GO-7 Ossipee Lake Outflow: 2018 - 2023



New Hampshire State DO standard for Class A waters is above 75% during the months GMCG tests.

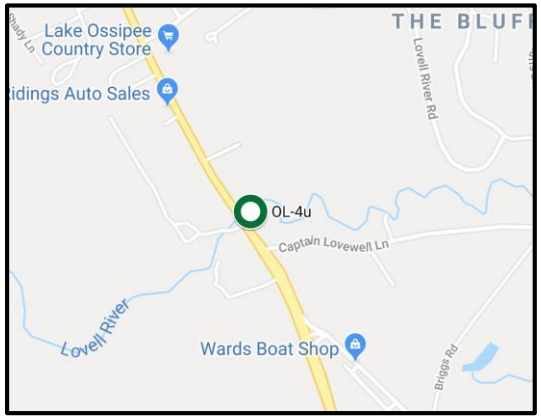
GO-7 Ossipee Lake Outflow: 2018 – Oct. 2023

Parameter	Status
Ammonium	Stable
Orthophosphate	Stable
Dissolved Organic Carbon	Stable
Total Dissolved Nitrogen	Stable
Chloride	Stable
Nitrate	Stable
Sulfate	Stable
Sodium	Stable
Potassium	Stable
Magnesium	Stable
Calcium	Stable
Dissolved Organic Nitrogen	Stable

Parameter	Typical Pristine Surface Water Concentrations
Ammonium	<0.2mg/L
Orthophosphate	<10ug/L
Dissolved Organic Carbon	N/A; between 1-10mg/L
Total Dissolved Nitrogen	<0.5mg/L
Chloride	<10mg/L
Nitrate	<50ug/L
Sulfate	<80mg/L
Sodium	<50mg/L
Potassium	<10mg/L
Magnesium	1-100mg/L
Calcium	<15mg/L
Dissolved Organic Nitrogen	N/A

OL-4u Lovell River: 2018 – Oct. 2023

- Monitored since 2005
- Parameters collected: pH, turbidity, TP, temperature, conductivity, DO

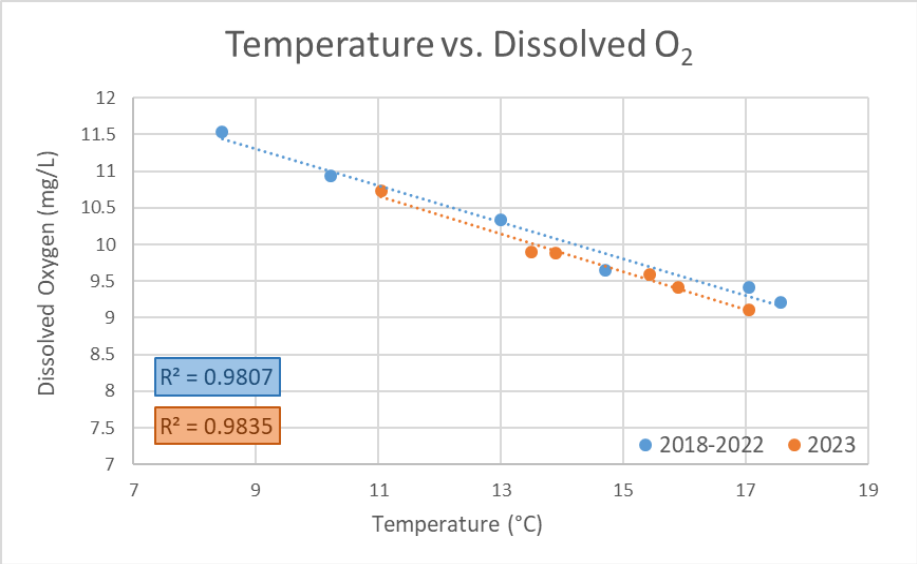


Parameter	Status*
Turbidity	Stable
pH	Stable
Total Phosphorus	Stable

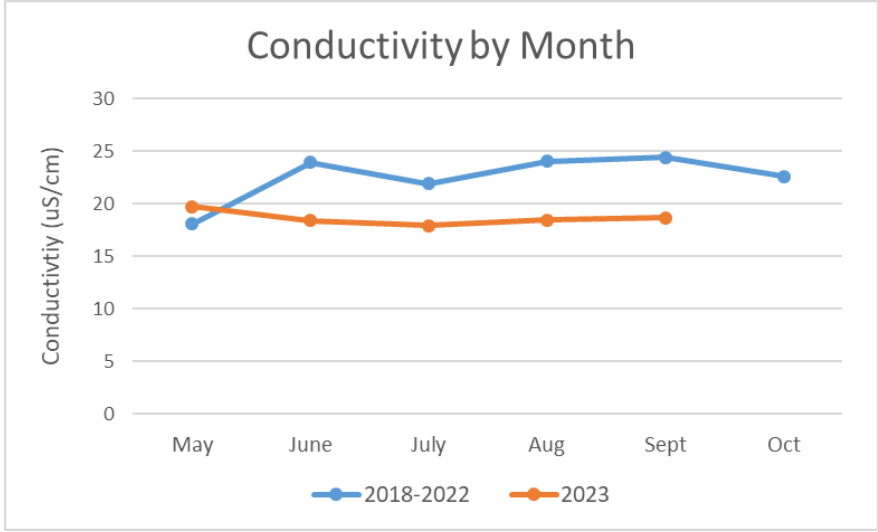
**Data from 2018 - Oct. 2023*

OL-4u Lovell River: 2018 - 2023

Dissolved Oxygen (DO) has an inverse relationship with temperature: as temperature increases, DO decreases.

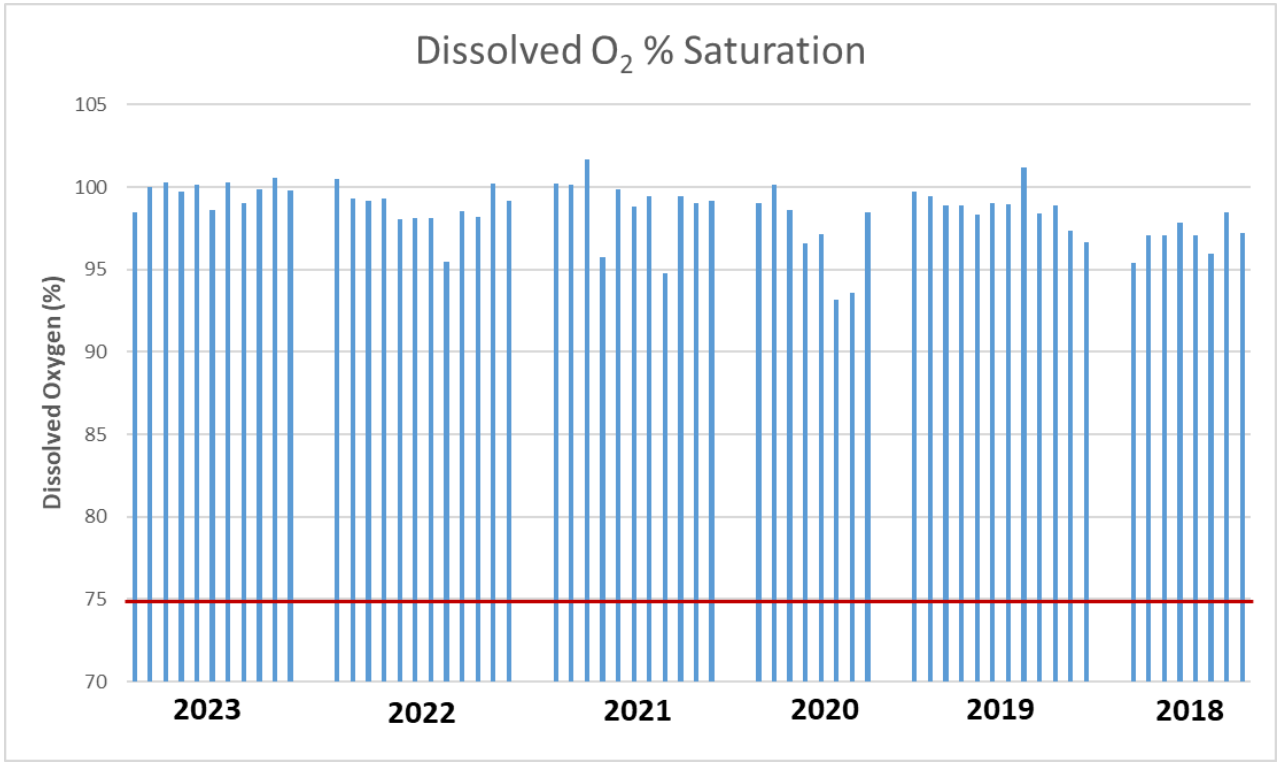


Conductivity shows a series of lower values at OL-4u in 2023 compared to 2018-2022. Values are below 100 uS/cm, indicating relatively good (normal) water quality in respect to salt concentrations.



The R^2 values from 2023 (orange) show a similar set of values compared to the compiled 2018-2022 (blue). This indicates little change in DO levels. All values exceed the 6.0 mg/L requirement.

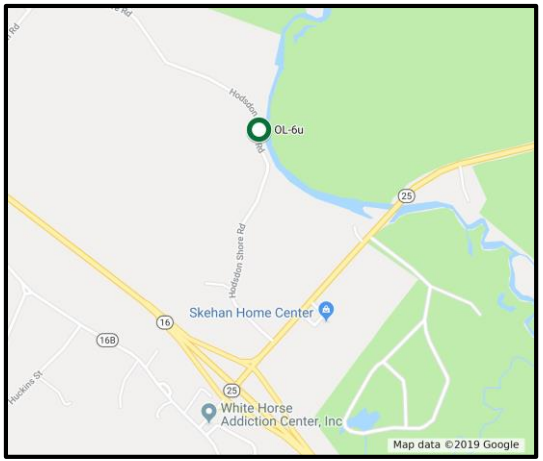
OL-4u Lovell River: 2018 – 2023



New Hampshire State DO standard for Class A waters is above 75% during the months GMCG tests.

OL-6u Pine River: 2018 - Oct. 2023

- Monitored since 2013
- Parameters collected: pH, turbidity, TP, temperature, conductivity, DO

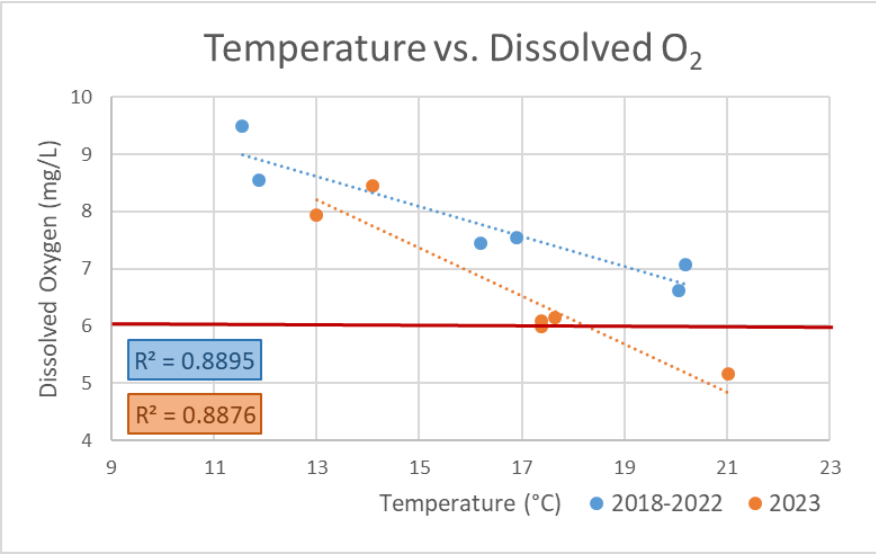


Parameter	Status*
Turbidity	Stable
pH	Stable
Total Phosphorus	Stable

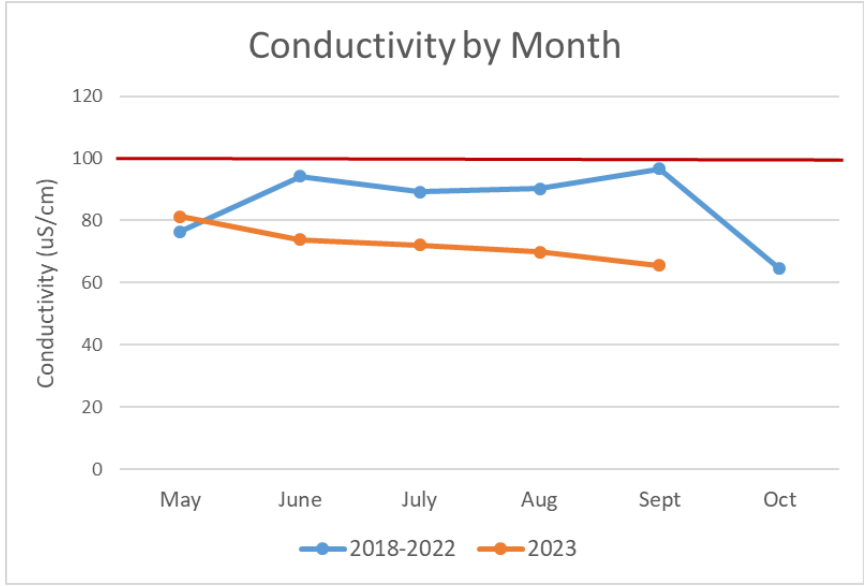
**Data from 2018 - Oct. 2023*

OL-6u Pine River: 2018 - 2023

Dissolved Oxygen (DO) has an inverse relationship with temperature: as temperature increases, DO decreases.

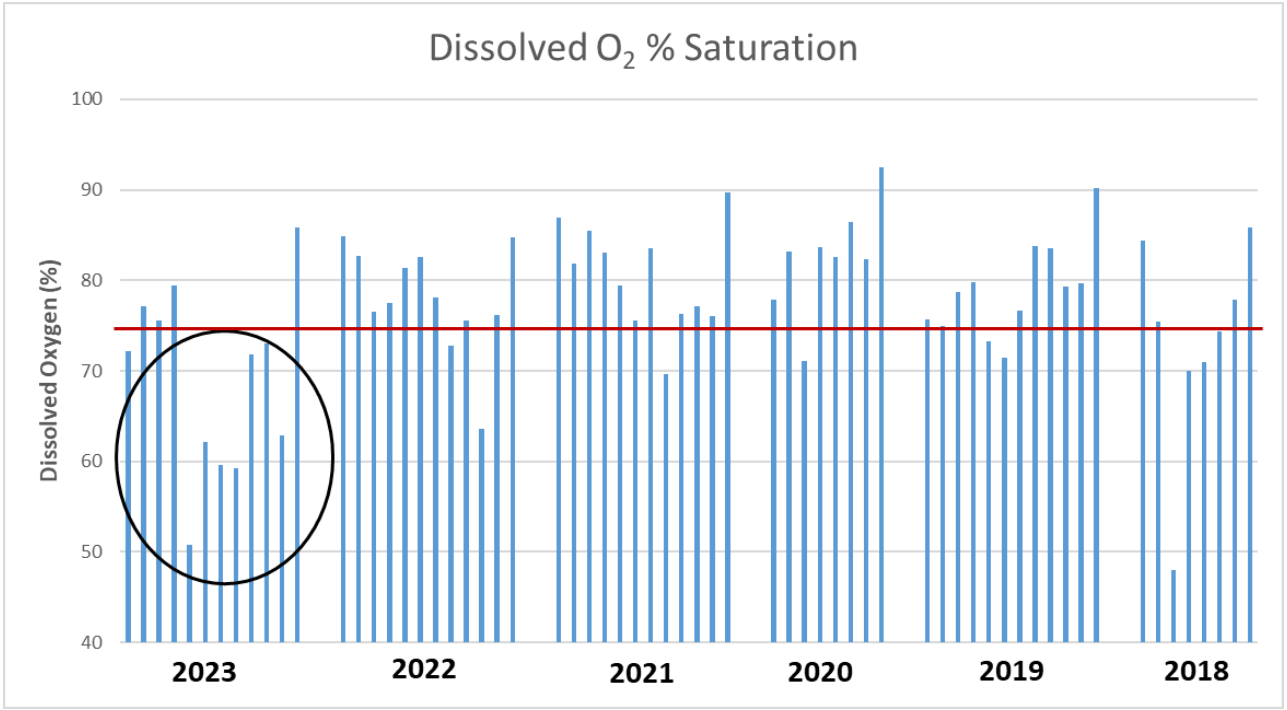


Conductivity shows a series of slightly higher values at OL-6u in 2022 compared to 2017-2021. Values are just below 100 uS/cm, indicating water quality which is becoming a low impact concern in respect to salt concentrations.



The R^2 values from 2022 (orange) show a similar set of values compared to the compiled 2017-2021 (blue). This indicates little change in DO levels. Multiple values fall at or below the 6.0 mg/L requirement.

OL-6u Pine River: 2018 - 2023



New Hampshire State DO standard for Class A waters is above 75% during the months GMCG tests.

OL-12u Philips Brook: 2018 - Dec. 2023

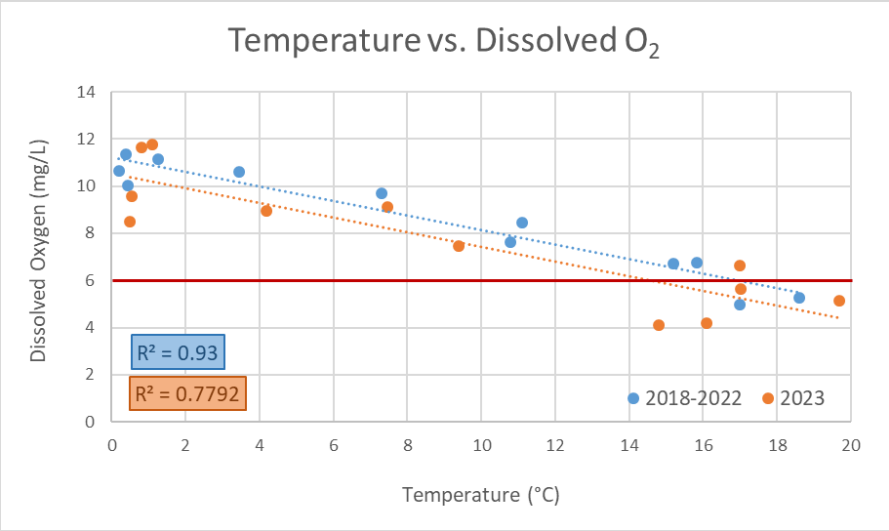
- Monitored since 2005
- Parameters collected: pH, turbidity, TP, temperature, conductivity, DO

Parameter	Status*
Turbidity	Stable
pH	Below 6 - due to wetland drainage
Total Phosphorus	Stable

**Data from 2018 - Dec. 2023*

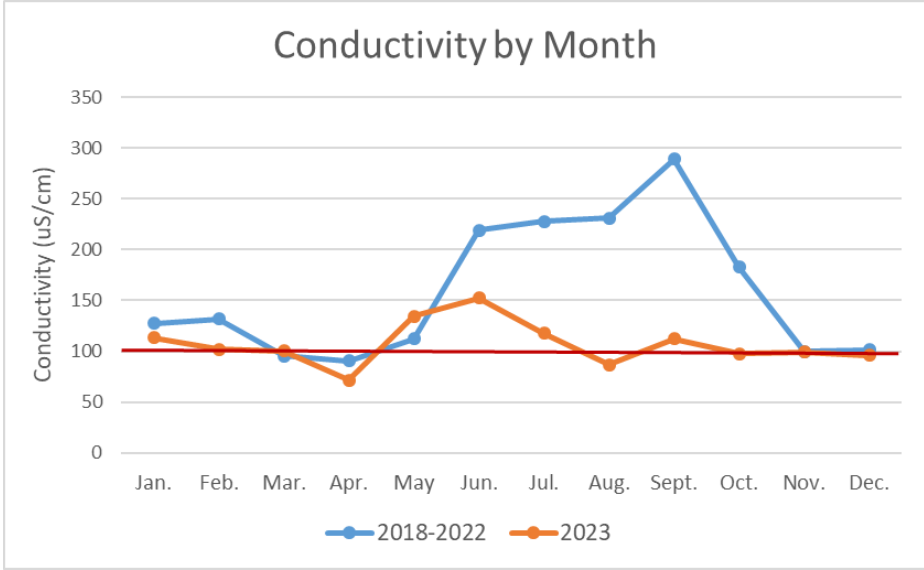
OL-12u Phillips Brook: 2018 - 2023

Dissolved Oxygen (DO) has an inverse relationship with temperature: as temperature increases, DO decreases.

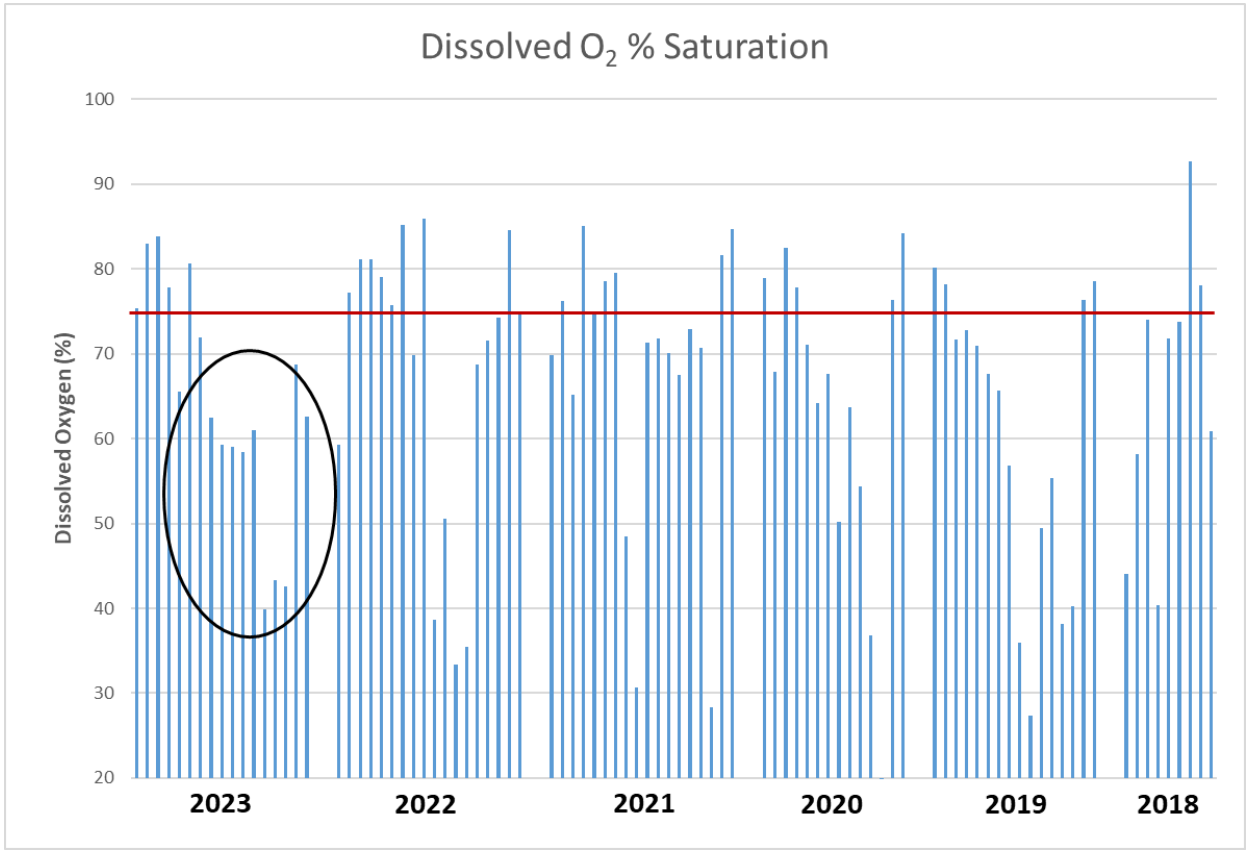


The R^2 value from 2023 (orange) is lower than the 2018-2022 (blue) value. This indicates frequent change in DO levels, making the data fairly inconsistent. Several values fall below the 6.0 mg/L requirement, though this is likely due to wetland drainage.

Conductivity shows a series of lower values at OL-12u in 2023 compared to 2018-2022. Most values fall at or above 100 uS/cm, indicating water quality is a low impact concern in respect to excessive salt concentrations.



OL-12u Phillips Brook: 2018 - 2023



New Hampshire State DO standard for Class A waters is above 75% during the months GMCG tests.

These low DO results are most likely due to wetland drainage, and historically are consistent.

OL-12u Phillips Brook: 2018 – Oct. 2023

Parameter	Status
Ammonium	Stable
Orthophosphate	Slightly elevated above pristine limits; showing human impact
Dissolved Organic Carbon	Slightly above expected values; historically stable
Total Dissolved Nitrogen	Stable
Chloride	Elevated above pristine limits; showing human impact
Nitrate	Slightly elevated above pristine limits; showing human impact
Sulfate	Stable
Sodium	Stable
Potassium	Stable
Magnesium	Stable
Calcium	Stable
Dissolved Organic Nitrogen	Stable

Parameter	Typical Pristine Surface Water Concentrations
Ammonium	<0.2mg/L
Orthophosphate	<10ug/L
Dissolved Organic Carbon	N/A; between 1-10mg/L
Total Dissolved Nitrogen	<0.5mg/L
Chloride	<10mg/L
Nitrate	<50ug/L
Sulfate	<80mg/L
Sodium	<50mg/L
Potassium	<10mg/L
Magnesium	1-100mg/L
Calcium	<15mg/L
Dissolved Organic Nitrogen	N/A

Ossipee Water Quality Summary

- GO-2
  - Conductivity: All values (‘18-’23) above 100 uS/cm (low impact)
  - Nitrate & Chloride: Exceed pristine limit (worsening)
- GO-7
  - DO: One point below 6 mg/L and September values are below 75% saturation
- OL-6u
  - Conductivity: At/just below 100 uS/cm (low impact)
  - DO: All months fall below 75% saturation at least once
- OL-12u
  - Conductivity: most values fall at or above 100 uS/cm (high impact)
  - DO: Multiple values below 6 mg/L and most values (May-December 2023) fall below 75% saturation
  - Orthophosphate, Nitrate & Chloride: Exceed pristine limit (worsening).

The majority of parameters tested fell within the acceptable limits for surface waters set by the New Hampshire Department of Environmental Services (NHDES) and/or the Environmental Protection Agency, however…

What can Ossipee do to protect its waters?

1. Encourage residents to get their septic system checked
2. Minimize salt application on roadways, especially around bodies of water and other sensitive habitats
    a. Brine is a equally effective and more environmentally friendly alternative
3. Maintain riparian habitats (aka Streamside Management Zones) around bodies of water
4. Use Best Management Practices (BMPs)
    a. Proper disposal of chemicals and other anthropogenic waste
5. Monitor the effectiveness of culverts in your town, and replace those posing as safety and environmental hazards

Thank You For Your Time

Report respectfully submitted by:
J. Emerson, *Water Quality Coordinator*
G. Piselli, *AmeriCorps Water Quality Resources Assistant*