

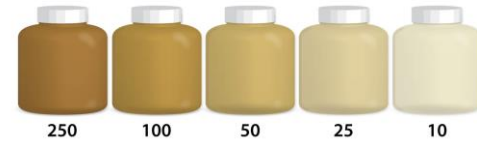
Madison Water Quality Report



Jill Emerson, *Water Quality Coordinator*
Grace Piselli, *AmeriCorps Water Quality Resource Assistant*

RIVERS Field Sampling Parameters

Water Samples:

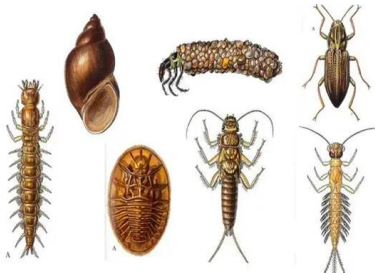


Total Phosphorus (TP)

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

Conductivity

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



Dissolved Oxygen (DO)

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

Stream Characteristics

- site changes
- substrate
- general observations

Turbidity

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

Temperature

- Influences...
 - biological activity
 - plant growth
 - rate of chemical reactions
 - 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 $\mu\text{S}/\text{cm}$
- Total Phosphorus (TP)
 - < 30 $\mu\text{g}/\text{L}$
 - 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.**

GM-1 Banfield Brook: 2018 - Dec. 2023

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

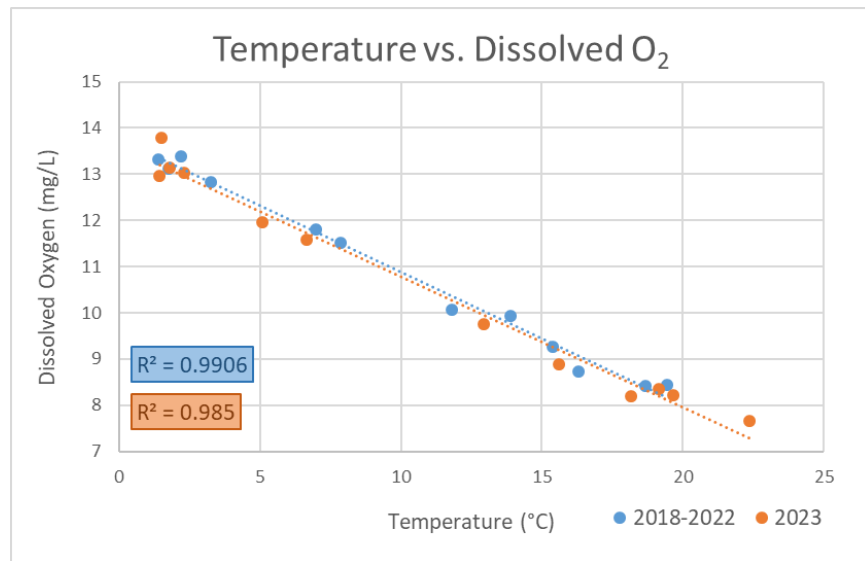


Parameter	Status*
Turbidity	Stable
pH	Stable
Total Phosphorus	Stable

**Data from 2018 - Oct. 2023*

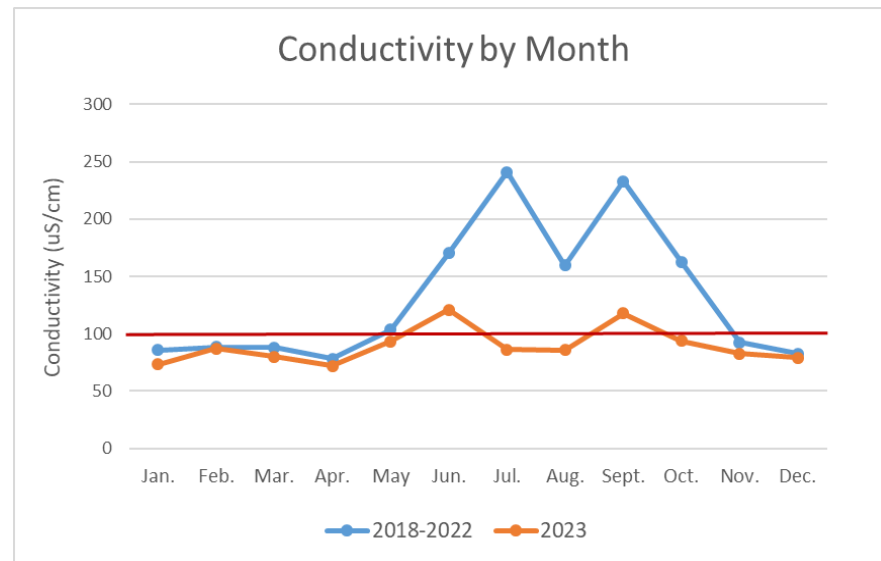
GM-1 Banfield Brook: 2018 - 2023

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

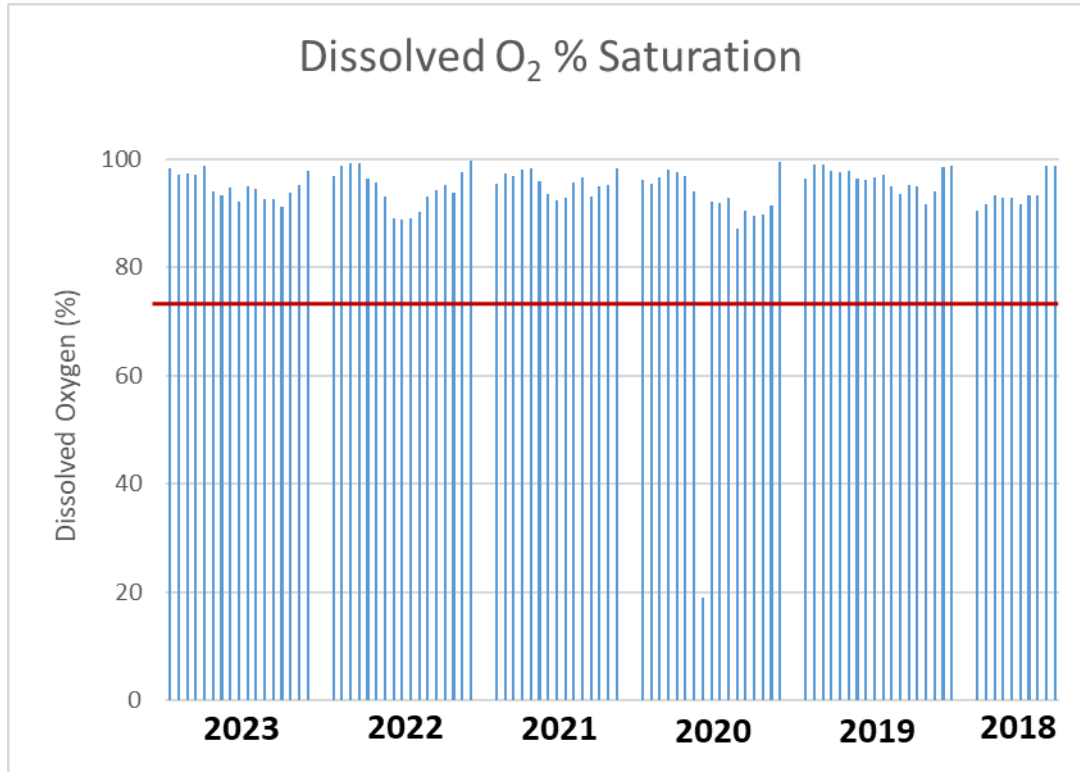


The R^2 values from 2023 (orange) show a similar set of values compared to the compiled 2018-2022 (blue). This indicates little change in DO levels. All values exceed the 6 mg/L minimum.

Conductivity shows a series of lower values at GM-1 in 2023 compared to 2018-2022. Multiple values exceed 100 uS/cm, indicating water quality in respect to salt concentrations is a low impact concern.



GM-1 Banfield Brook: 2018 - 2023



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

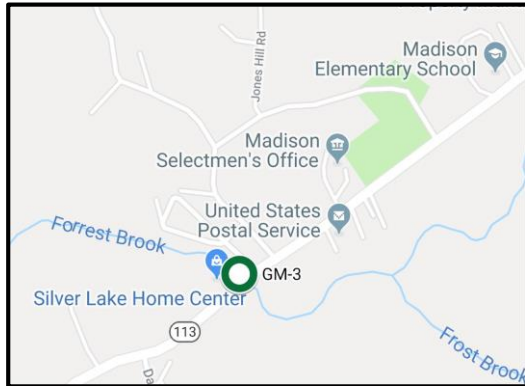
GM-1 Banfield Brook: 2018 – Oct. 2023

Parameter	Status
Ammonium	Stable
Orthophosphate	Stable
Dissolved Organic Carbon	Stable
Total Dissolved Nitrogen	Stable
Chloride	Slightly above 10mg/L
Nitrate	Slightly above 50ug/L
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

GM-3 Forrest Brook: 2018 - Oct. 2023

- Monitored since 2003
- Parameters collected: pH, turbidity, TP, temperature, conductivity, DO

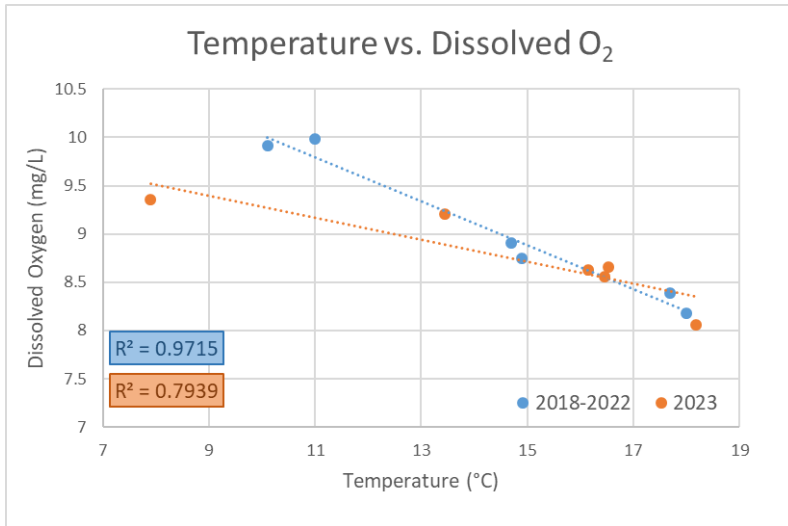


Parameter	Status*
Turbidity	Stable
pH	Stable
Total Phosphorus	Stable

**Data from 2018 - Oct. 2023*

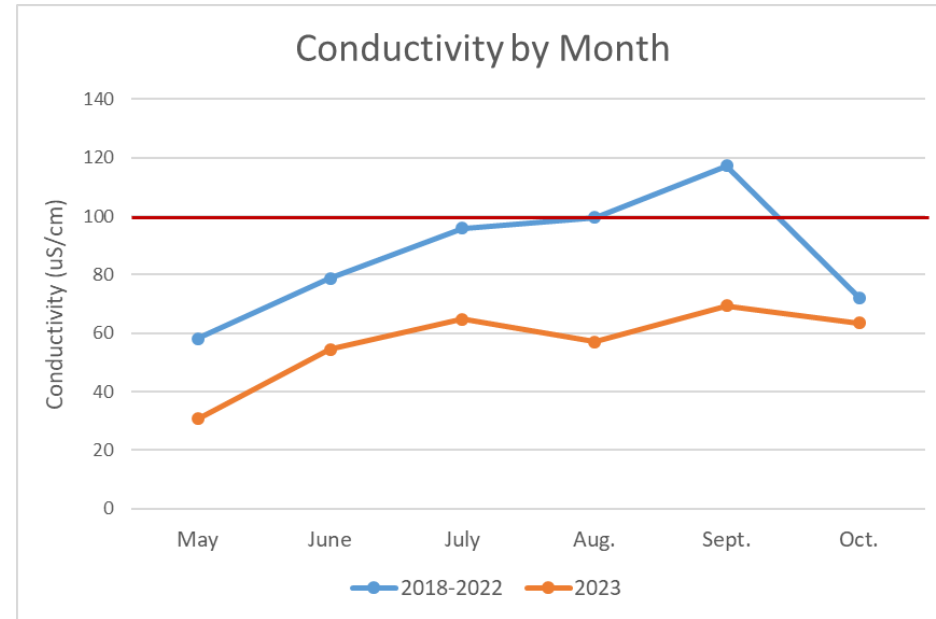
GM-3 Forrest Brook: 2018 - 2023

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

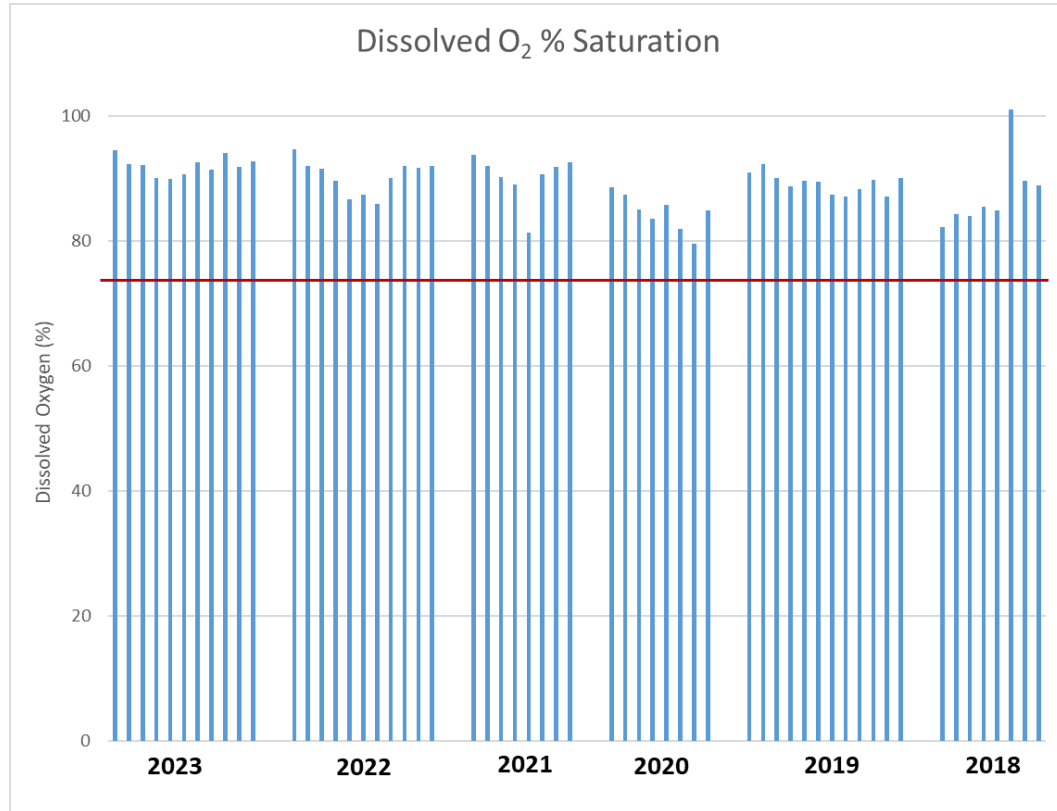


The R^2 value from 2023 (orange) is lower than the compiled 2018-2022 value (blue). This indicates inconsistent DO levels in 2023, with irregular values. All values exceed the 6 mg/L minimum.

Conductivity shows a series of lower values at GM-3 in 2023 compared to 2018-2022. Values are below 100 uS/cm, indicating good (normal) water quality in respect to salt concentrations.



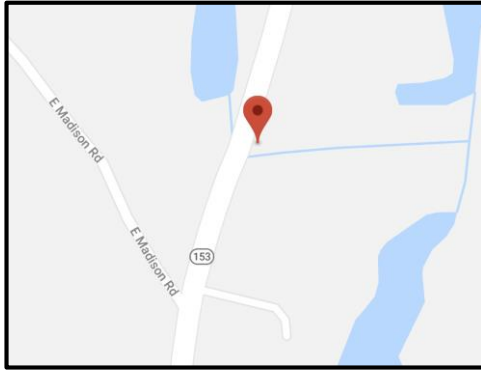
GM-3 Forrest Brook: 2018 - 2023



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

GM-4 Ferrin Brook: 2018 - Oct. 2023

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

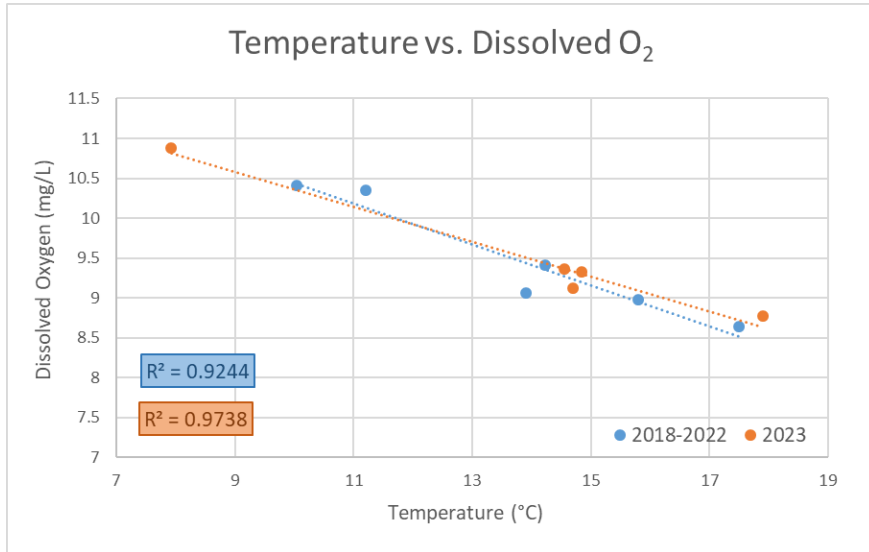


Parameter	Status*
Turbidity	Stable
pH	Stable
Total Phosphorus	Stable

**Date from 2018 – Oct. 2023*

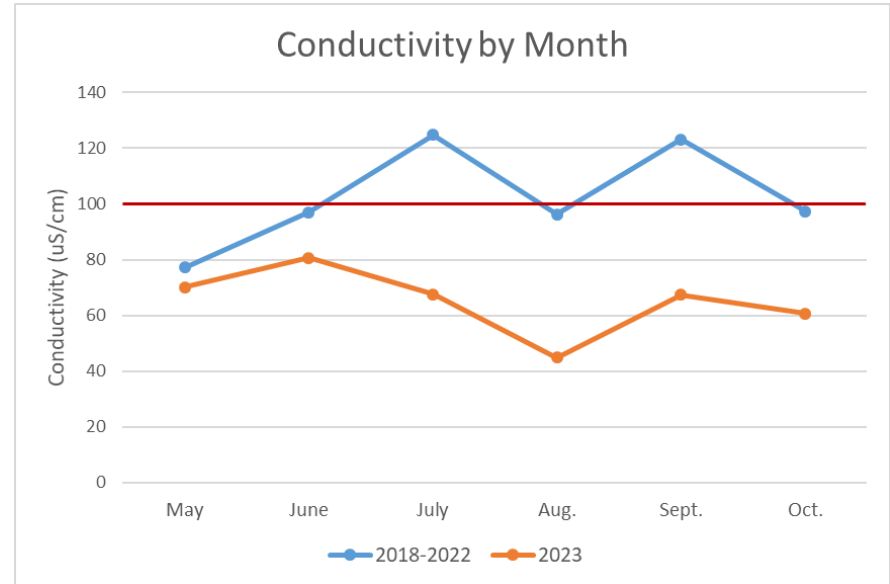
GM-4 Ferrin Brook: 2018 - 2023

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

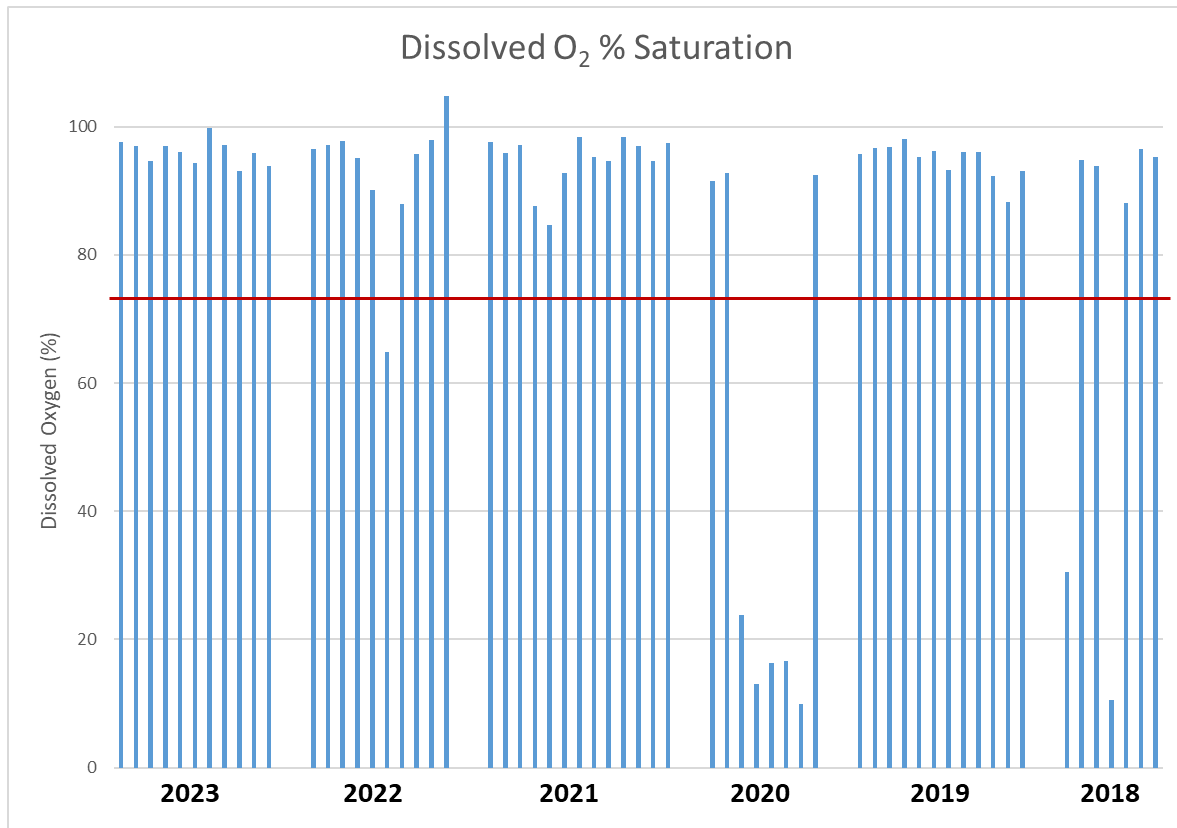


The R² value from 2023 (orange) is similar compared to the compiled 2018-2022 value (blue). This indicates little change in DO levels. All values exceed the 6 mg/L minimum.

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



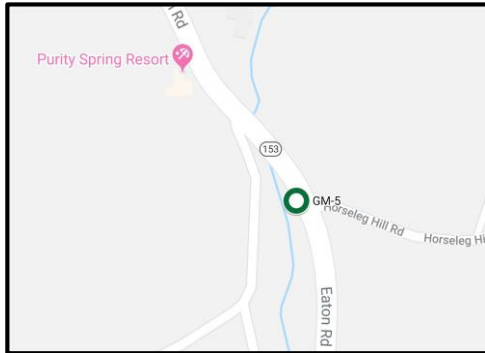
GM-4 Ferrin Brook: 2018 - 2023



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

GM-5 Mill Brook: 2018 - Oct. 2023

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

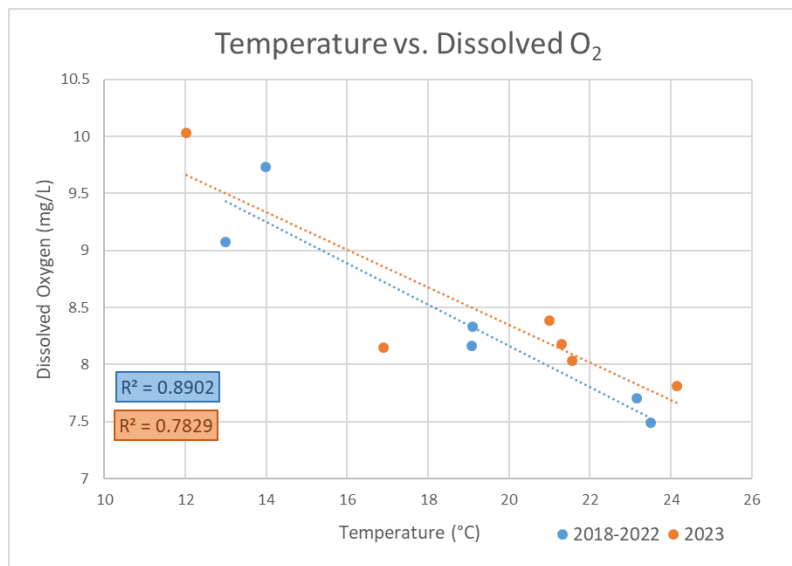


Parameter	Status*
Turbidity	Stable
pH	Stable
Total Phosphorus	Stable

**Data from 2018 - Oct. 2023*

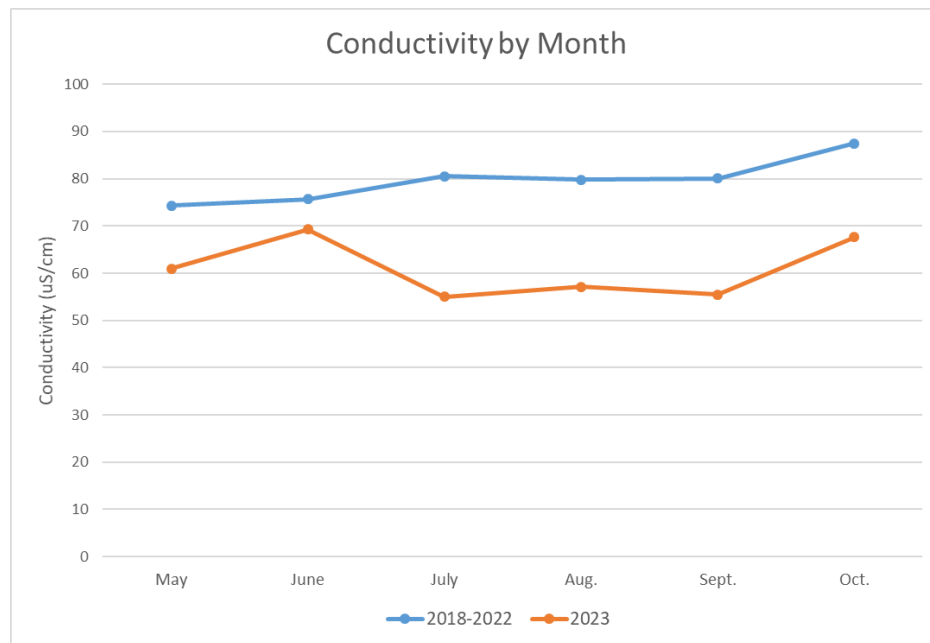
GM-5 Mill Brook: 2018 - 2023

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

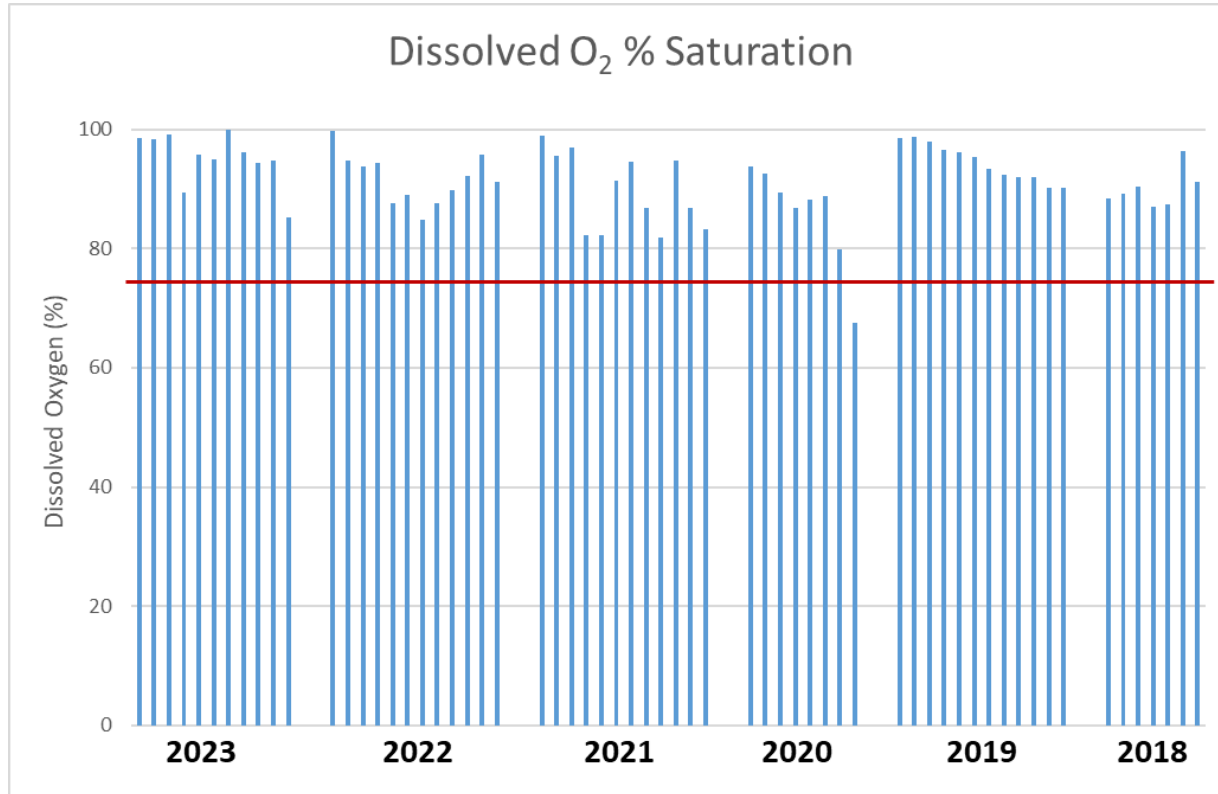


The R^2 value from 2023 (orange) is lower than the compiled 2018-2022 value (blue). This indicates higher, more irregular DO levels in 2023. All values exceed the 6 mg/L minimum.

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



GM-5 Mill Brook: 2018 - 2023



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

Madison Water Quality Summary

- 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 ...
 - GM-1
 - Conductivity: Two values exceed 100 uS/cm limit = low impact concern
 - Nitrate: Values higher than 50ug/L, but stable (values seen hovering around 50ug/L for the past 5 years)
 - Chloride: Consistently above 10mg/L, but lowest values observed in the last 5 year
 - GM-3 and GM-4
 - DO: Inconsistent levels throughout year, though all are above 6.0 mg/L minimum

What can Madison 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:
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G. Piselli, *AmeriCorps Water Quality
Resources Assistant*