

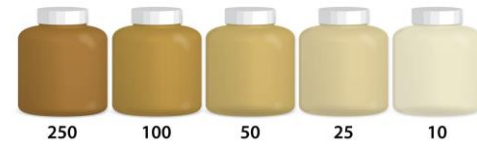
Tamworth Water Quality Report



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)

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

Stream Characteristics

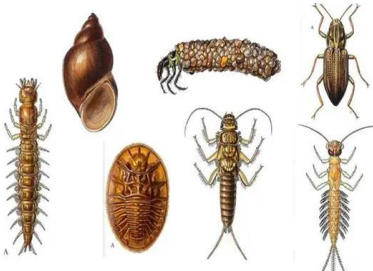
- site changes
- substrate
- general observations

Dissolved Oxygen (DO)

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

Conductivity

- Ability of water to pass an electrical charge
- Based on the amount of positively (Mg⁺, Ca⁺) or negatively (Cl⁻, NO₃⁻) charged elements



Water Quality Standards & Allowable Limits

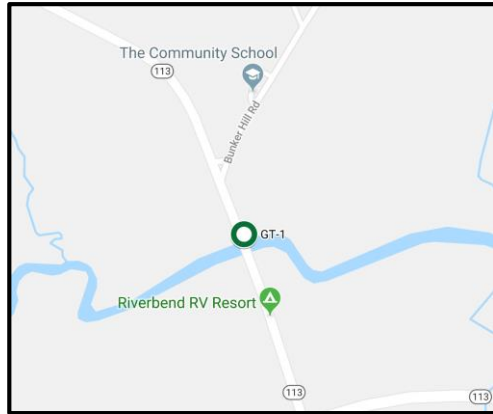
- Turbidity
 - < 10 NTU
- Temperature
 - No standard, but monitored for changes
- pH
 - 6 - 8
 - Preferably closer to 6.5
- Dissolved Oxygen (DO)
 - 6 - 11 mg/L
 - 75% - 120%
- Conductivity
 - < 100 $\mu\text{S}/\text{cm}$
- Total Phosphorus (TP)
 - < 30 $\mu\text{g}/\text{L}$
 - Anything above is considered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

Based on NHDES and EPA Criteria

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

GT-1 Bearcamp River: 2018 - Oct. 2023

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



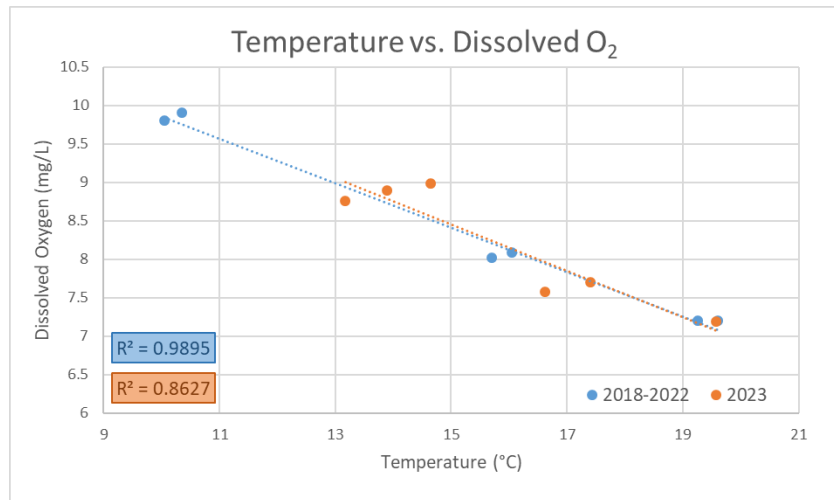
Parameter	Status*
Turbidity	Stable
pH	Usually near or below 6, well above 6 in 2023
Total Phosphorus	Stable

**Data from 2018- Oct. 2023*



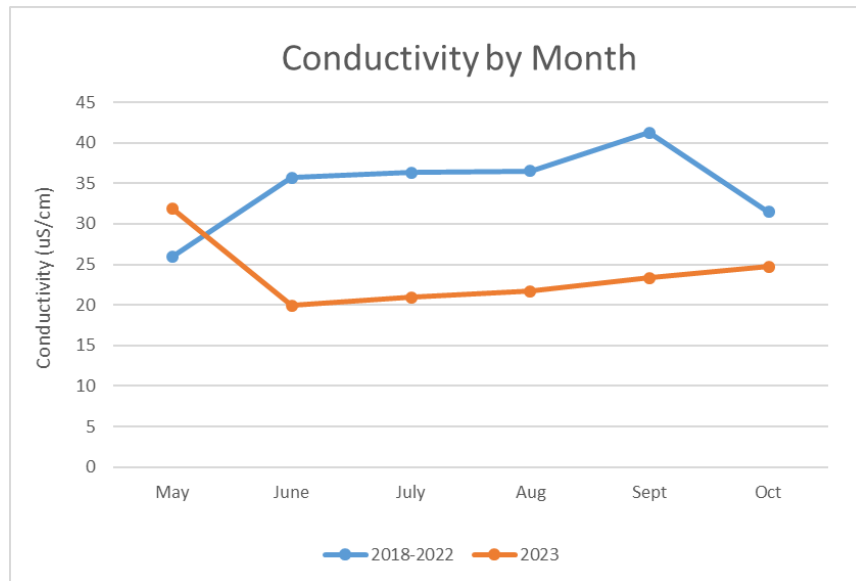
GT-1 Bearcamp River: 2018 - 2023

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

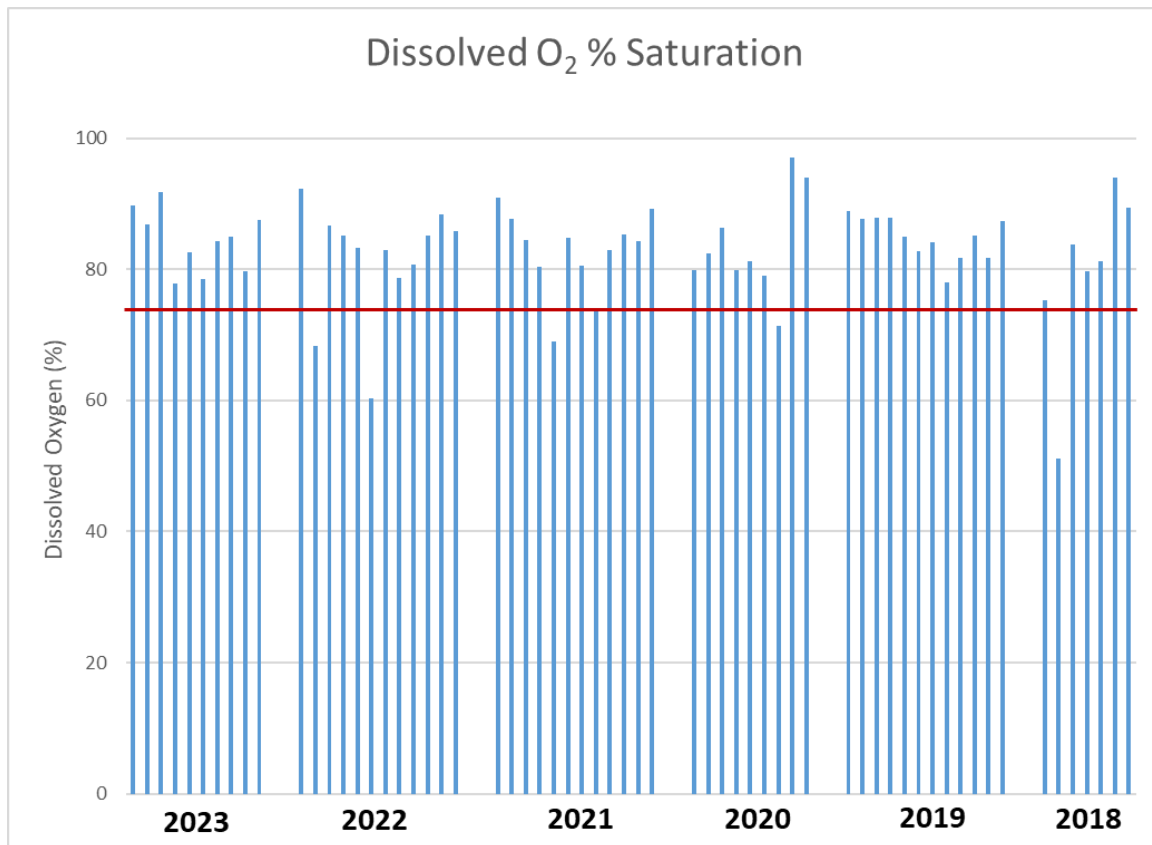


The R^2 value from 2023 (orange) is lower than the 2018-2022 value (blue). This indicates inconsistent fluctuations in DO. All values exceed the 6.0 mg/L requirement, yet a decreasing trend raises concern.

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



GT-1 Bearcamp River: 2018 - 2023



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

GT-4 Chocorua River: 2018 - Dec. 2023

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



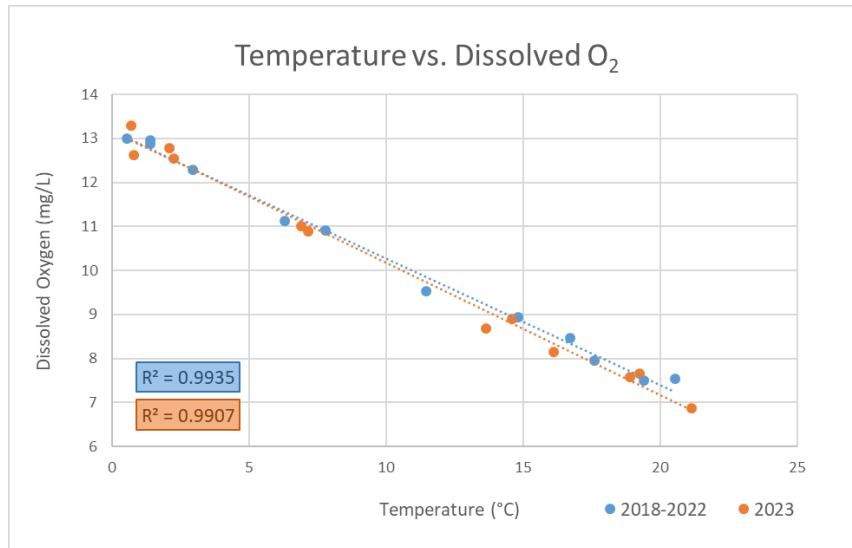
Parameter	Status*
Turbidity	Stable
pH	Stable
Total Phosphorus	Stable

**Data from 2018- Oct. 2023*



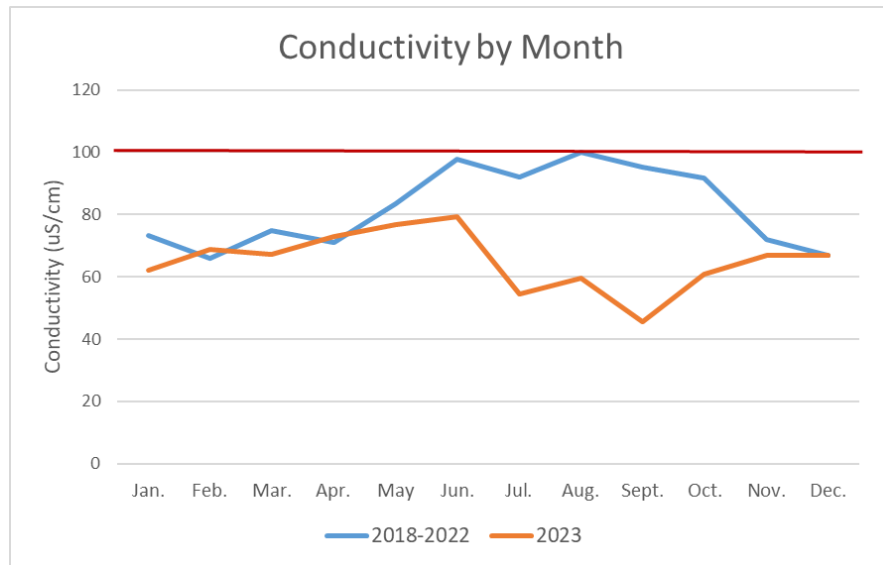
GT-4 Chocorua River: 2018 - 2023

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

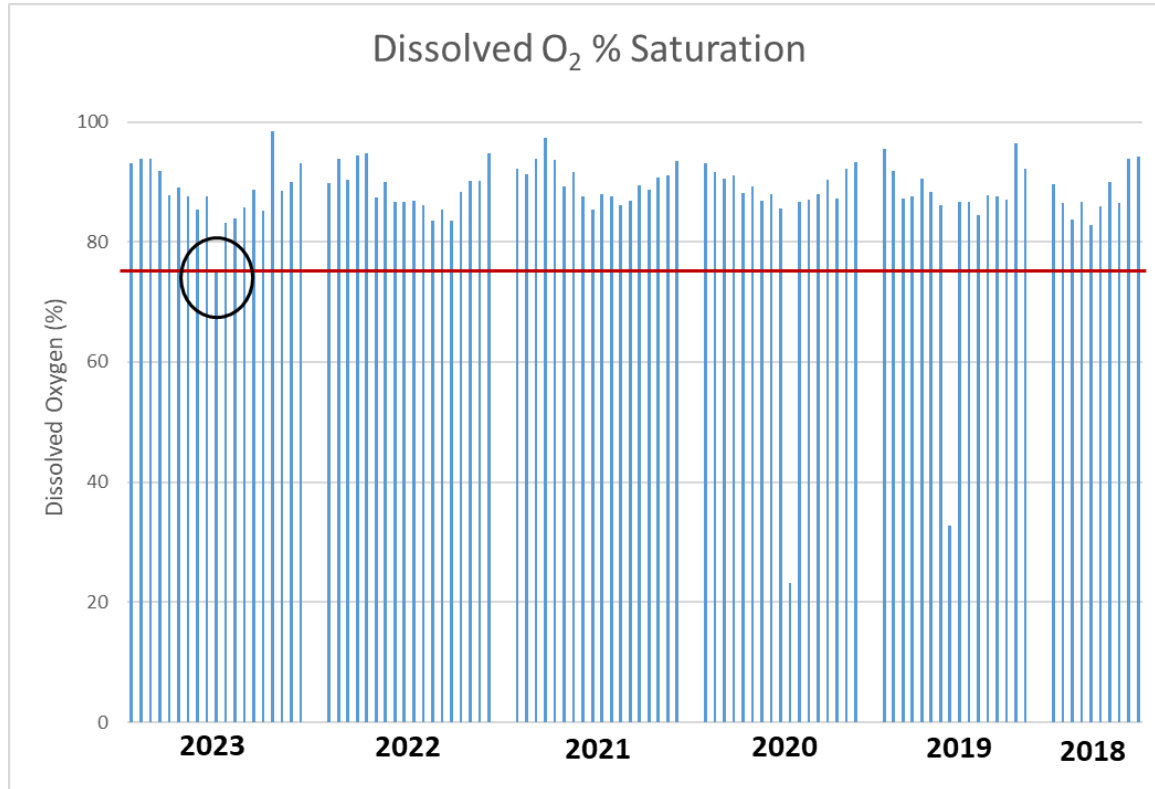


The R^2 values from 2023 (orange) show a similar set of values compared to the compiled 2018-2022 (blue). This indicates little change in DO levels. All values exceed the 6.0 mg/L requirement.

Conductivity shows a series of lower values at GT-4 in 2023 compared to 2018-2022. All values in 2023 are below 100 uS/cm, indicating adequate water quality in respect to salt concentrations.



GT-4 Chocorua River: 2018 - 2023



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

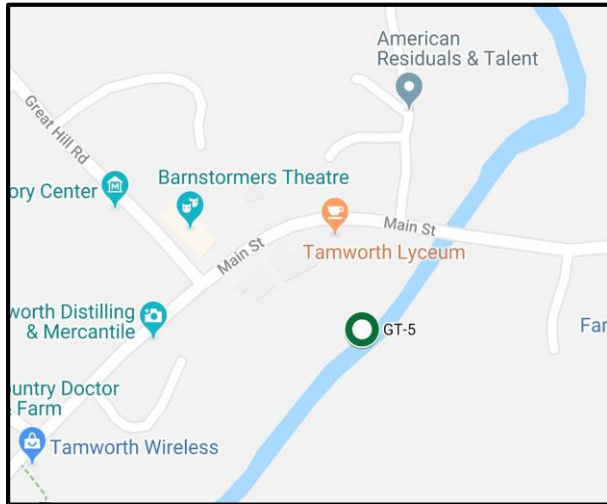
GT-4 Chocorua River: 2018 – Oct. 2023

Parameter	Status
Ammonium	Stable
Orthophosphate	Exceeds pristine limit of less than 10ug/L
Dissolved Organic Carbon	Stable
Total Dissolved Nitrogen	Stable
Chloride	Exceeds pristine limit of less than 10mg/L
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

GT-5 Swift River: 2018 – Oct. 2023

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



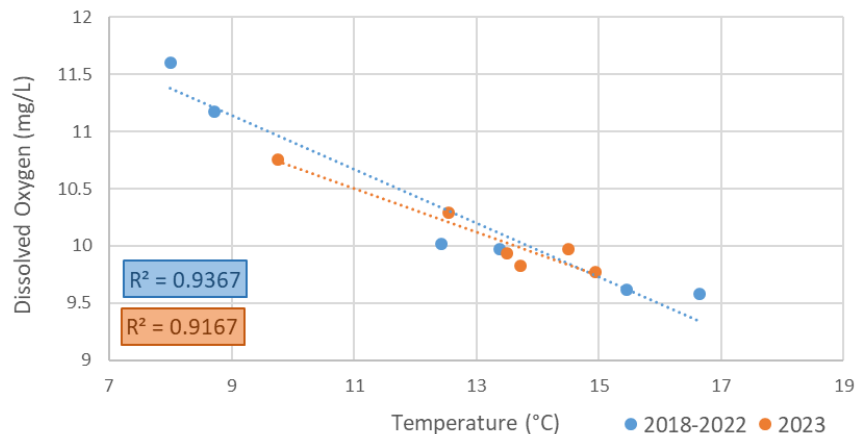
Parameter	Status*
Turbidity	Stable
pH	Stable
Total Phosphorus	Stable

**Data from 2018 - Oct. 2023*

GT-5 Swift River: 2018 - 2023

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

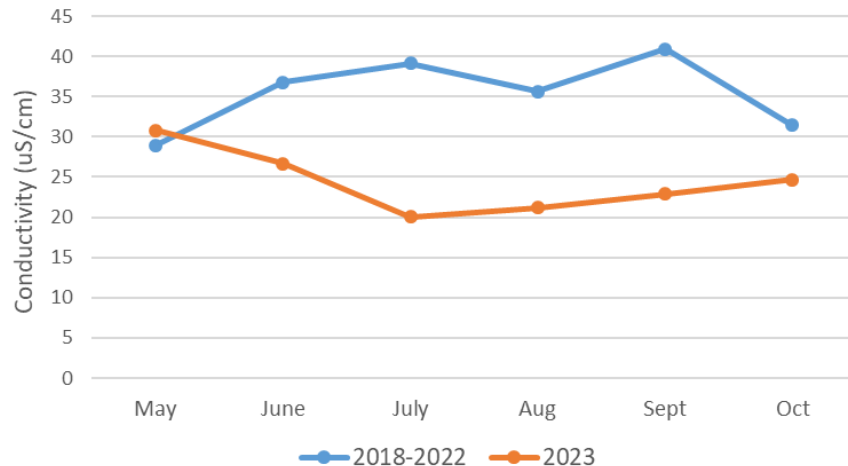
Temperature vs. Dissolved O₂



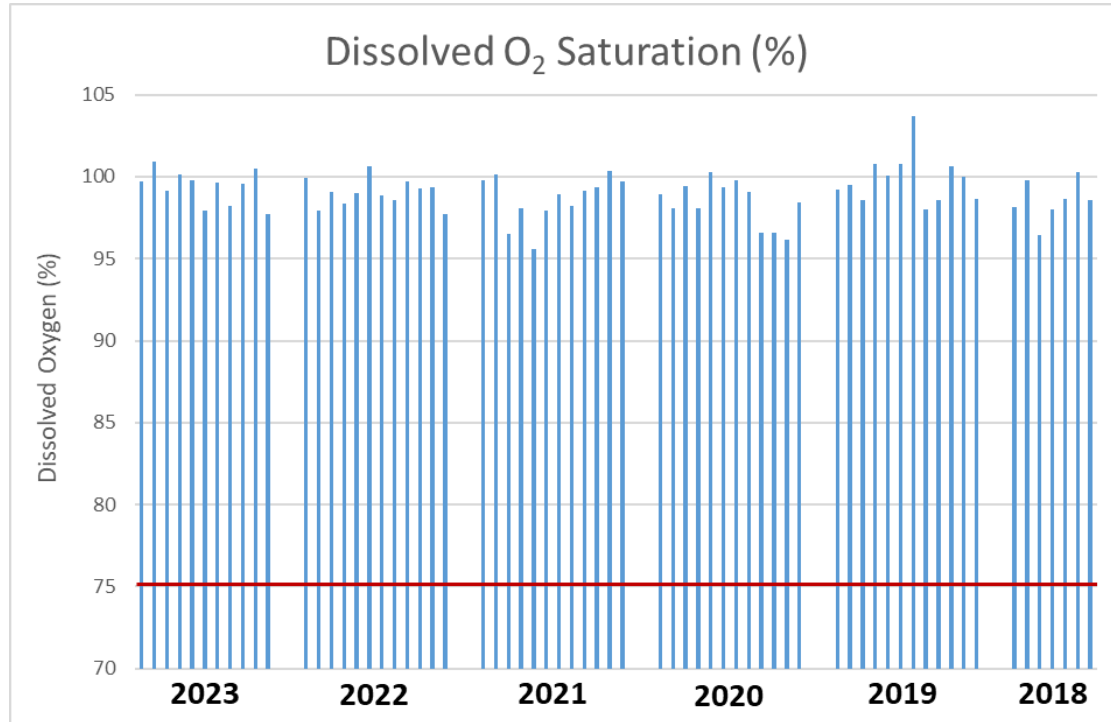
The R² value from 2023 (orange) is similar to the compiled 2018-2022 value (blue). This indicates little change in DO levels. All values exceed the 6.0 mg/L requirement.

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

Conductivity by Month



GT-5 Swift River: 2018 - 2023



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

Tamworth 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...
 - GT-1
 - pH: Within limits, but highest it has been in the past 5 years
 - DO: All values are within limits, but few approach the 75% minimum
 - GT-4
 - DO: One value below the 100 uS/cm limit
 - Orthophosphate: Over the pristine standard of 10ug/L, and the highest its been in 5 years.
 - Chloride: Over the pristine standard 10 mg/L, but fairly consistent year to year
 - GT-5
 - Parameters within normal and expected ranges in 2023

What can Tamworth 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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Resources Assistant*