

Tamworth 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

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

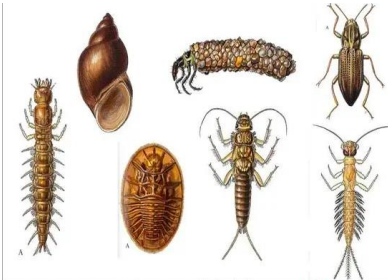
- site changes
- substrate
- general observations

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

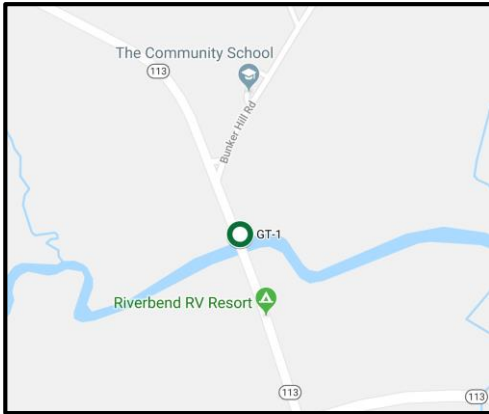
- Turbidity
 - < 10 NTU
- Temperature
 - No standard, but monitored for changes
- pH
 - 6 - 8
 - Preferably closer to 6.5
- Dissolved Oxygen (DO)
 - 6 - 11 mg/L
 - 75% - 120%
- Conductivity
 - < 100 $\mu\text{S}/\text{cm}$
- Total Phosphorus (TP)
 - < 30 $\mu\text{g}/\text{L}$
 - Anything above is considered “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: 2017 - Oct. 2022

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

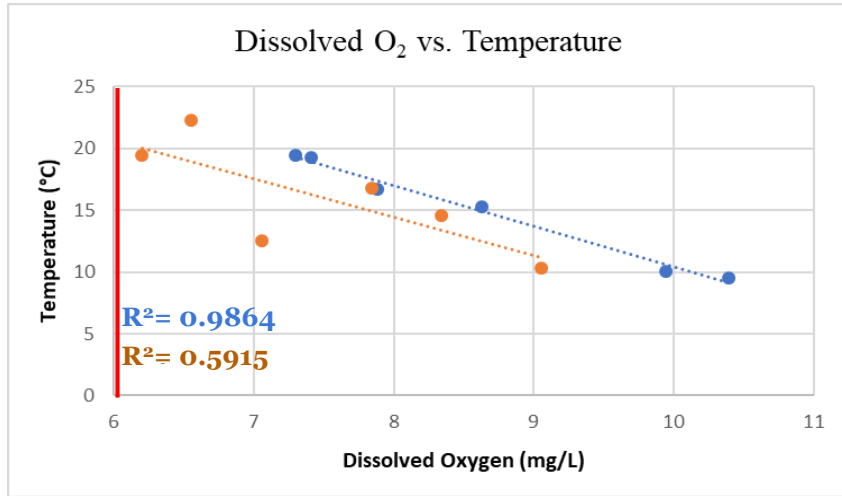


Parameter	Status
pH	Stable
Turbidity	Stable
Total P*	Moderate amounts = Average quality

**Data from 2017- Oct. 2021*

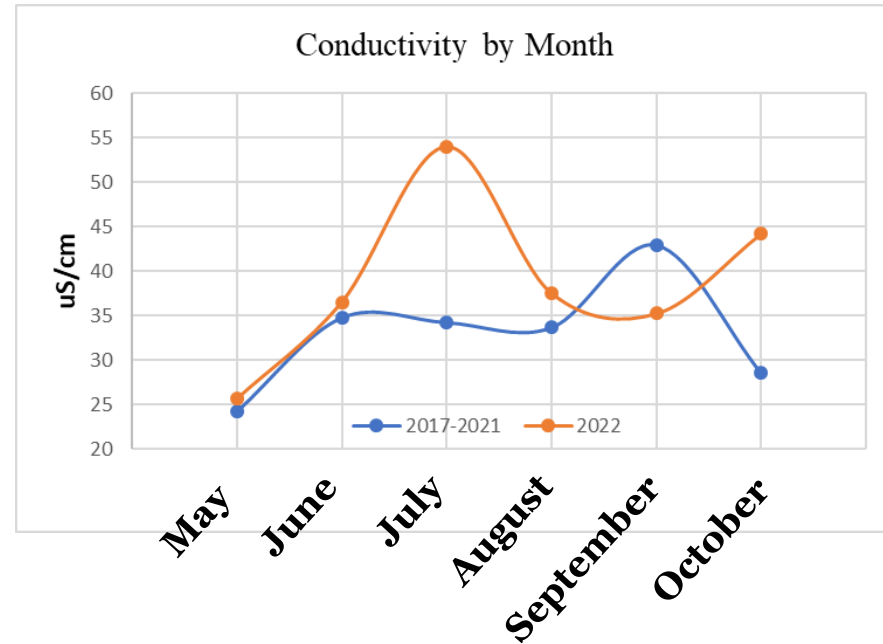
GT-1 Bearcamp River: 2017 - 2022

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

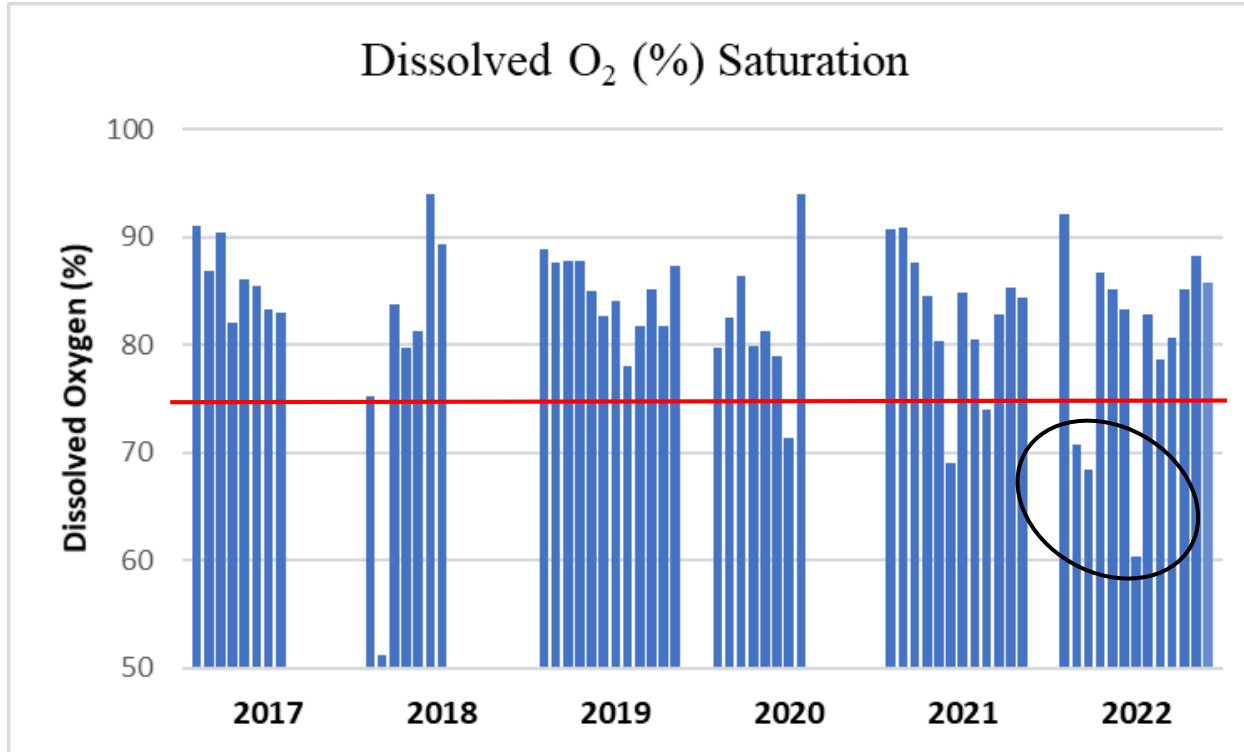


The R² value from 2022 (**orange**) is low, indicating a weaker relationship between the parameters at this site, compared to the 2017-2021 values (**blue**). All values exceeded the minimum requirement of 6 mg/L, yet a decreasing trend in 2022 raises concern.

Conductivity shows a trend of slightly higher values at GT-1 in 2022 compared to 2017-2021. Values are **below 100 uS/cm**, indicating relatively good water quality in respect to salt concentrations.



GT-1 Bearcamp River: 2017 - 2022



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

GT- 4 Chocorua River: 2017 - Nov. 2022

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



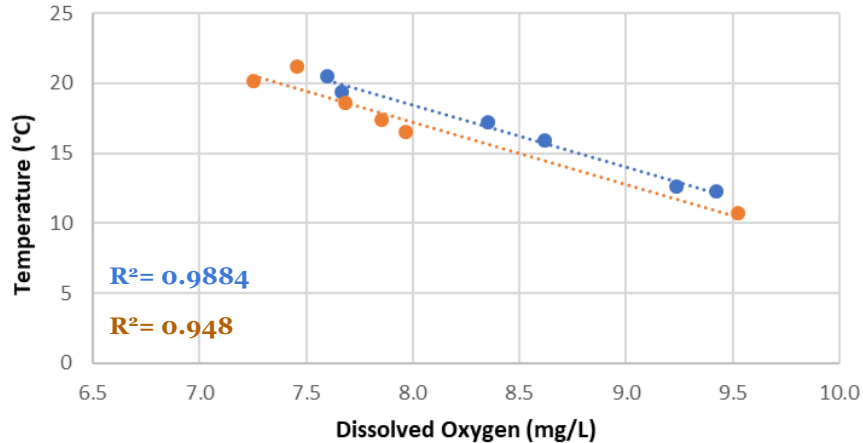
Parameter	Status
pH	Decreasing, with values falling below 6 in 2022
Turbidity	Stable
Total P*	Low amounts = Good quality

**Data from 2017 - Jan. 2022*

GT- 4 Chocorua River: 2017 - 2022

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

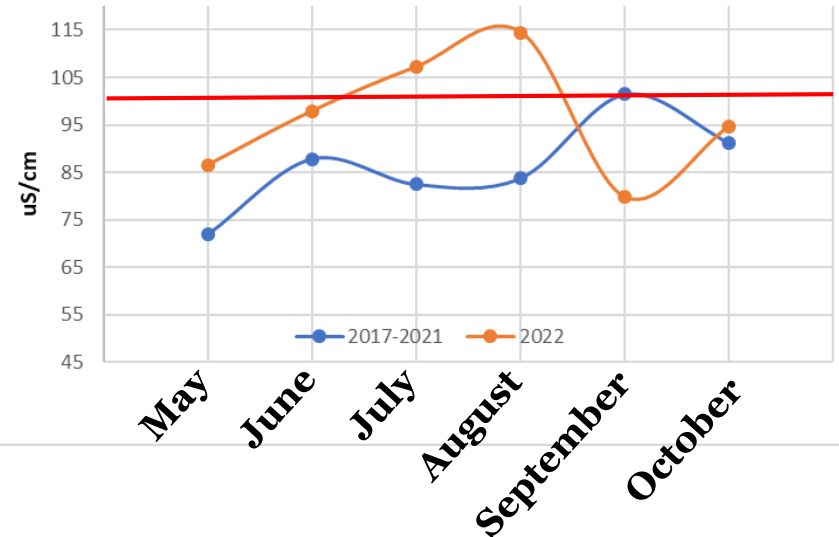
Dissolved O₂ vs. Temperature



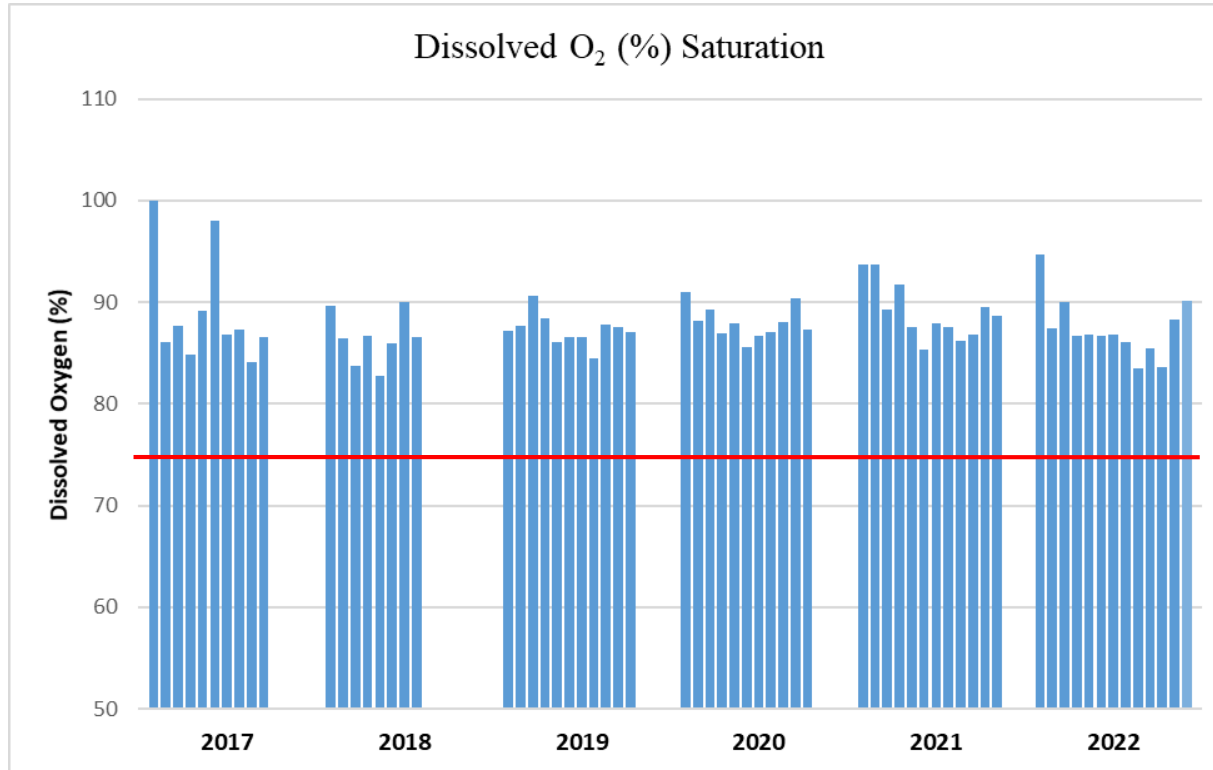
The R^2 values from 2022 ([orange](#)) show a similar trend compared to the compiled 2017-2021 values ([blue](#)). This indicates little change in DO levels. All values meet the 6.0 mg/L requirement.

Conductivity shows a trend of slightly higher values at GT-4 in 2022 compared to 2017-2021. Several values in 2022 are [above 100 uS/cm](#), indicating poor water quality in respect to greater salt concentrations.

Conductivity by Month



GT- 4 Chocorua River: 2017 - 2022



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

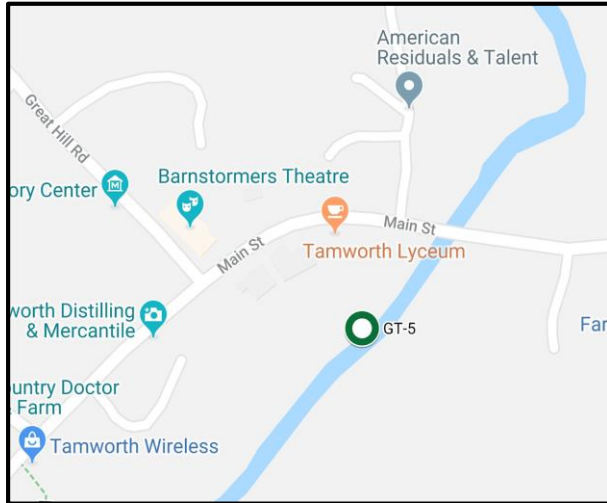
GT- 4 Chocorua River: 2017 - June 2022

Parameter	Status
Ammonium	Exceeds the standard
Nitrate	Exceeds the standard
Total Dissolved Nitrogen	Increasing
Sodium	Stable
Chloride	Stable, but over the standard 10 mg/L limit for freshwater
Dissolved Organic Carbon	Stable
Calcium	Stable
Magnesium	Stable

Parameter	Typical Surface Water Concentrations
Ammonium	< 0.2 mg/L
Nitrate	< 0.5 mg/L
Total Dissolved Nitrogen	N/A
Sodium	< 50 mg/L
Chloride	< 10 mg/L
Dissolved Organic Carbon	N/A
Calcium	< 15 mg/L
Magnesium	1 -100 mg/L

GT- 5 Swift River: 2017 - Oct. 2022

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



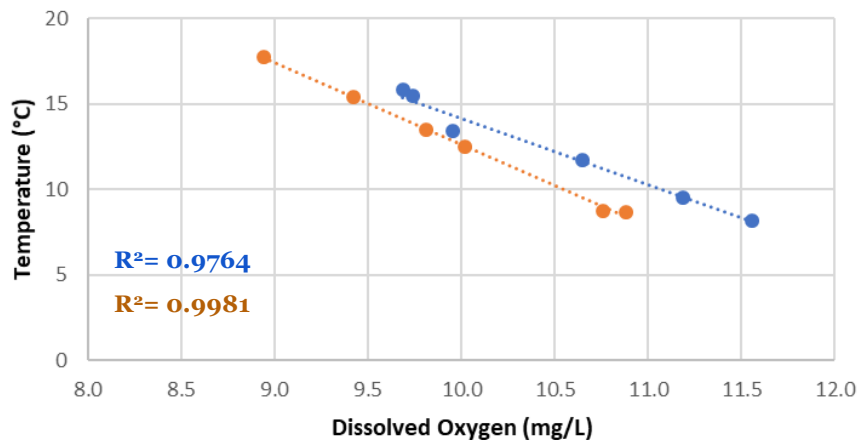
Parameter	Status
pH	Stable
Turbidity	Stable
Total P*	Low amounts = Good quality

**Data from 2017 - Oct. 2021*

GT- 5 Swift River: 2017 - 2021

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

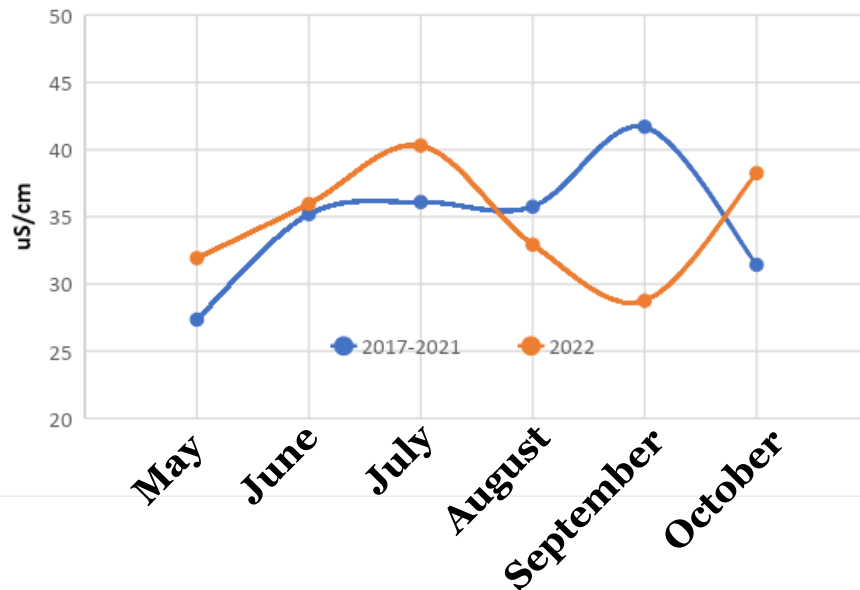
Dissolved O₂ vs. Temperature



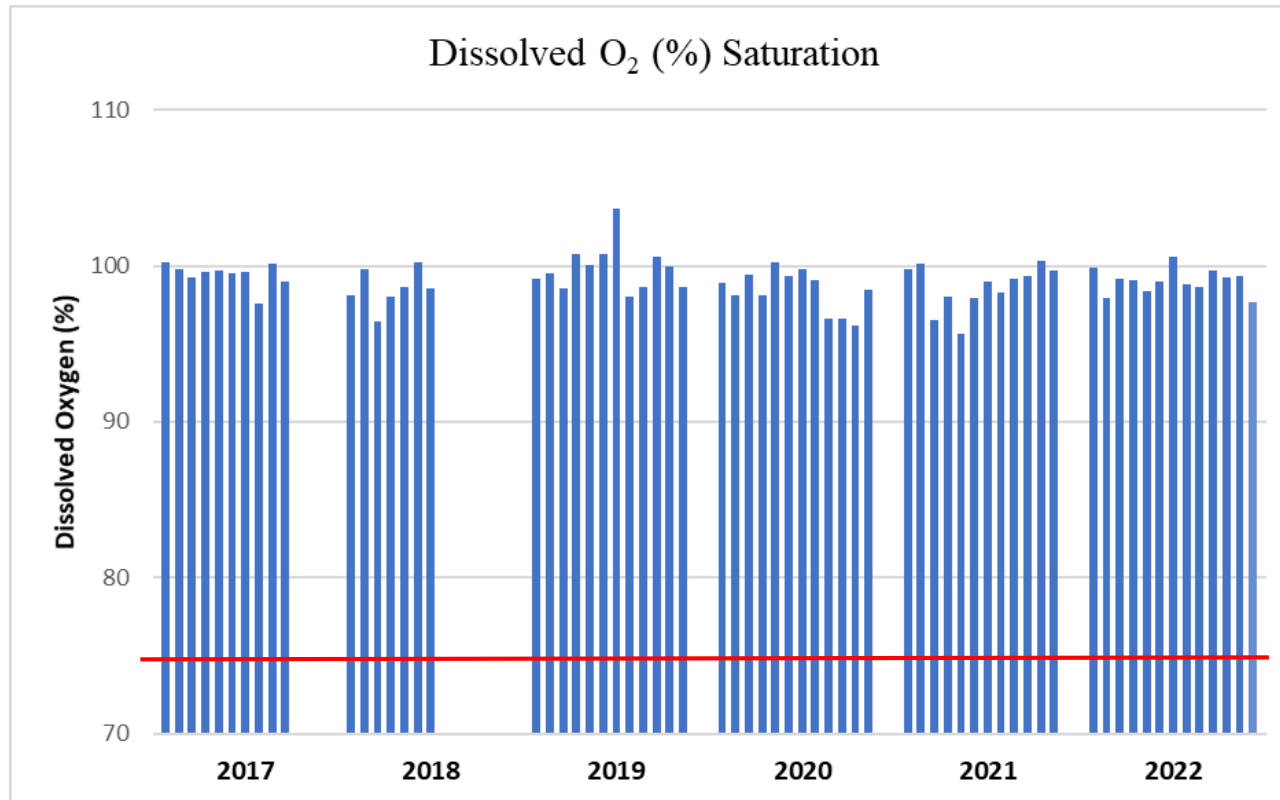
The R^2 values from 2022 (orange) show a similar trend compared to the compiled 2017-2021 values (blue). This indicates little change in DO levels. All values meet the 6.0 mg/L requirement.

Conductivity shows a trend of slightly higher values at GT-5 in 2022 compared to 2017-2021. Values are below 100 uS/cm, indicating good water quality in respect to salt concentrations.

Conductivity by Month



GT- 5 Swift River: 2017 - 2021



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
 - DO: Slightly unstable, with several data points below 75%
 - Conductivity: Increasing but still below 100 uS/cm
 - pH: Slightly unstable, but improving and starting to stabilize around 6.5
 - GT-4
 - Conductivity: Increasing, and above 100 uS/cm in July and August of 2022
 - pH: Lowest within the past 5 years, becoming increasingly more acidic
 - Ammonium and Nitrate: Exceed the standard limit, and highest within the past 5 years
 - Chloride: Over the standard 10 mg/L limit for freshwater, but fairly consistent
 - GT-5
 - pH: Lowest within the past 5 years, becoming increasingly more acidic

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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