River Monitoring Network Condition Report

# Isinglass River, Barrington, NH

NEW HAMPSHIRE DEPARTMENT OF ENVIRONMENTAL SERVICES

RM-035

Station: **07T-ISG** Current reporting period: **2012-2016** Start year: **2009**

| **Water Quality Summary** (Data from May - September) | | | |
|---|---|---|---|
| Parameter | Trend | Current Condition | Overall Rating |
| Specific Conductance | ⊗ | Intermediate | ⊗ |
| Total Phosphorus | ⊗ | High | ⊗ |
| Total Nitrogen | ⊗ | Intermediate | ⊗ |
| pH | ⊗ | Low | ⊗ |
| Invertebrates | ⊗ | Good | ⊗ |
| Temperature | ⊗ | ⊗ | ⊗ |

⊗ - no or limited data. For Current Condition: High>75th percentile, Intermediate=25th-75th percentile, Low <25th percentile of statewide conditions. Overall rating requires trend analysis and current condition. Shaded cells indicate that conditions are not as good as expected.

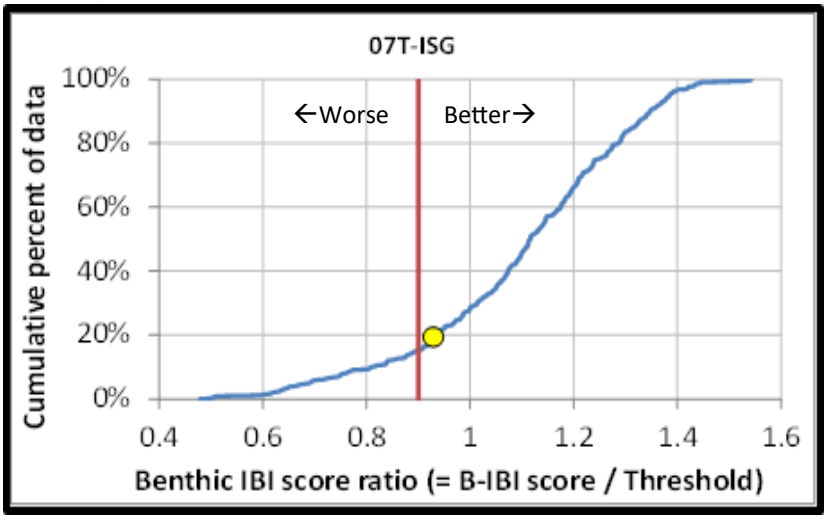
## Sample station characteristics

| | |
|---|---|
| Assessment unit | NHRIV600030607-01 |
| Latitude | 43.2388 |
| Longitude | -71.0766 |
| Drainage area (Sq. Mi.) | 58 |
| Elevation (FT) | 235 |
| Development category | Moderate |
| Drainage area size category | Medium |
| Coldwater fish probability | 0% |
| Fish community type | WARMWATER |
| 8 digit hydrologic unit code | 01060003 |

**Station Highlights:** The Isinglass River is a medium size stream in the Coastal drainage of New Hampshire with a moderate percentage of developed land in its watershed. It has an intermediate specific conductance level, low pH, and moderate to high nutrient concentrations.

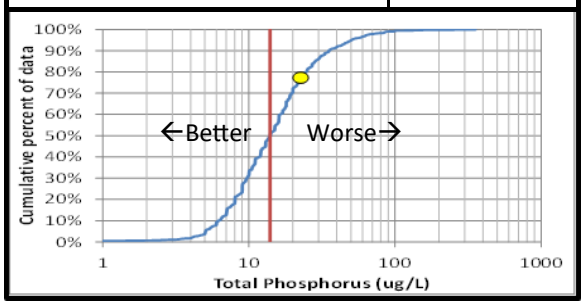
**Biological indicators** - For 07T-ISG benthic macroinvertebrates were used as the primary biological indicator. Samples were collected from 2012-2016. The results, based on B-IBI scores that exceeded the applicable threshold, indicate that the benthic invertebrate community is in good condition (plot at right). Relative the statewide data, the median B-IBI score ratio at 07T-ISG was greater than 19% of the B-IBI score ratios statewide (plot at right).

*For plot at the right:* Yellow dot=median score ratio; curved blue line=statewide score ratio distribution; red vertical line=water quality threshold.



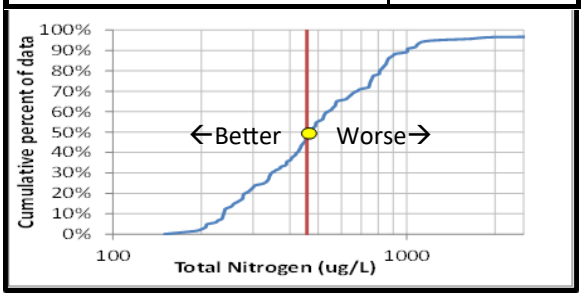
**Statewide Comparison** - The median value of the sampling station for the reporting period (yellow dot) was plotted with respect to water quality data collected from 1990-present as a percentile of the statewide distribution (curved blue line) and the statewide median (vertical red line). The position of the sampling station median on the plot provides an indication of the trend site's water quality compared to that collected around the state. For total phosphorus, total nitrogen, and specific conductance higher percentiles indicate lower water quality. Conversely, a lower percentile for pH indicates lower water quality. Over time, changes in the percentile can be used to track whether water quality is improving or declining at the sampling station with respect to data from around the state.

| Total Phosphorus (ug/L) | |
|---|---|
| Statewide median | 14.0 |
| Station median | 22.7 |
| Station percentile of statewide data | 77.2% |

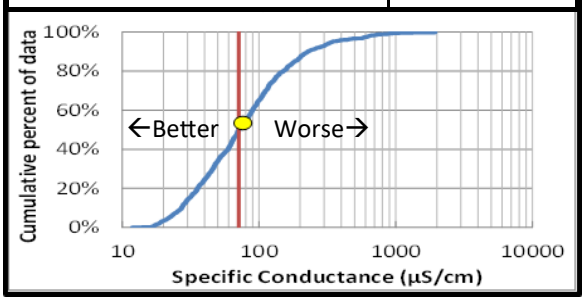



| pH (standard units) | |
|---|---|
| Statewide median | 6.53 |
| Station median | 5.83 |
| Station percentile of statewide data | 8.7% |

| Total Nitrogen (ug/L) | |
|---|---|
| Statewide median | 457.8 |
| Station median | 465.0 |
| Station percentile of statewide data | 49.4% |



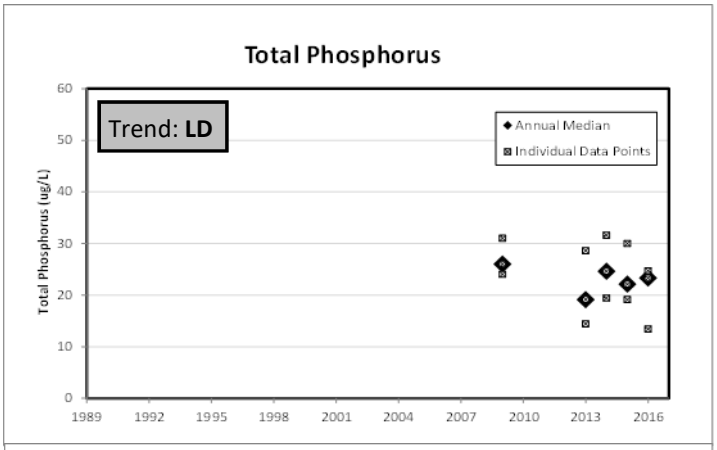

| Specific Conductance (us/cm) | |
|---|---|
| Statewide median | 71.1 |
| Station median | 76.5 |
| Station percentile of statewide data | 53.3% |

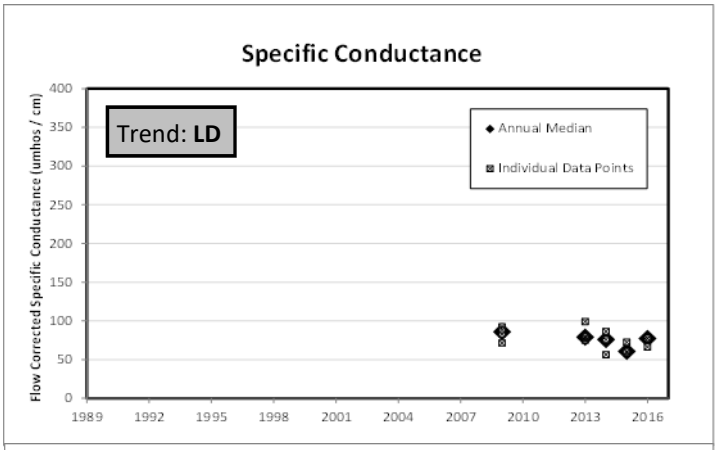


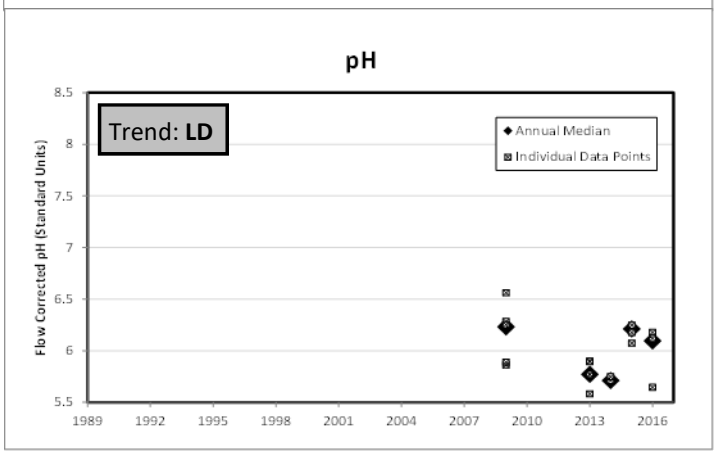

**Current vs. previous water quality conditions**– Data included in the current reporting period was compared to that from the previous reporting period. A Kruskal-Wallis test (p=0.05) was used to compare data collected in the respective reporting periods for each parameter. Differences between reporting periods provide a indication of whether short term water quality changes have occurred at the site. For table below, "Different (Y/N)" column indicates if significant change has occurred (Y=yes, N=no, Insufficient data=fewer than five samples contained in either of the reporting periods). "Change" column indicates the direction of change (Increase=water quality indicator higher in current period than previous period, Decrease= water quality indicator lower in current period than previous period, Blank=no change or insufficient data for comparison).

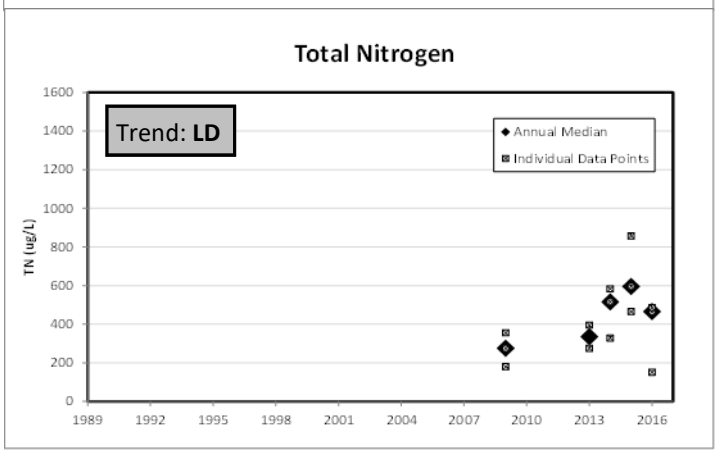
| Parameter | Period | Years | Mean C | Range C | Period | Years | Mean P | Range P | Different (Y/N) | Change |
|---|---|---|---|---|---|---|---|---|---|---|
| pH | Current | 2012-2016 | 5.9 | 0.9 | Previous | 2008-2011 | 6.2 | 0.4 | Insufficient data | |
| Specific Conductance | | | 74.4 | 42.8 | | | 83.7 | 20.8 | Insufficient data | |
| Total Nitrogen | | | 464.8 | 707.0 | | | 269.7 | 176.0 | Insufficient data | |
| Total Phosphorus | | | 22.5 | 18.2 | | | 27.0 | 7.0 | Insufficient data | |

**Trend analyses** - Sites with 10 or more years of data were analyzed for trends. Trends analyses were completed on annual medians using the Mann-Kendall test (p=0.05). For 07T-ISG, water quality data exists from 2009—2016. The limited amount of data did not allow for trend analyses for this site. Trend outcomes included in plots below (**NT**=no trend; **(+)**=increasing; **(-)**=decreasing; **LD**=limited data; trend analysis not completed). Significant increasing or decreasing trends include a LOESS trend line for the period of analysis.

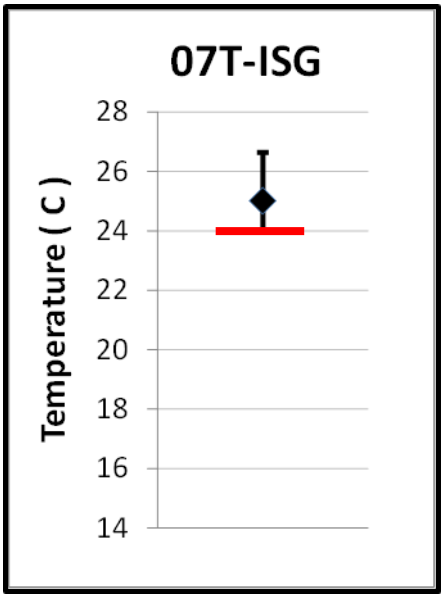



**Summary of 7-day maximum water temperature**




**Water temperature** – Water temperature is an important physical characteristic that influences water chemistry and biological community composition. For trend sites where continuous temperature data loggers are deployed, the maximum 7-day rolling mean was used as the primary metric for summarizing the thermal regime at individual sampling stations. The plot (left) summarizes the average (diamond), minimum (lower whisker), and maximum (upper whisker) 7-day maximum water temperature in the current reporting period. The table (below) provides the total number and percent of consecutive days that the 7-day running mean water temperature exceeded temperature benchmarks associated with the expected fish community type. For 01T-ISG, the expected fish

**Number and percent of consecutive days when the running 7-day mean water temperature exceeded the benchmark**

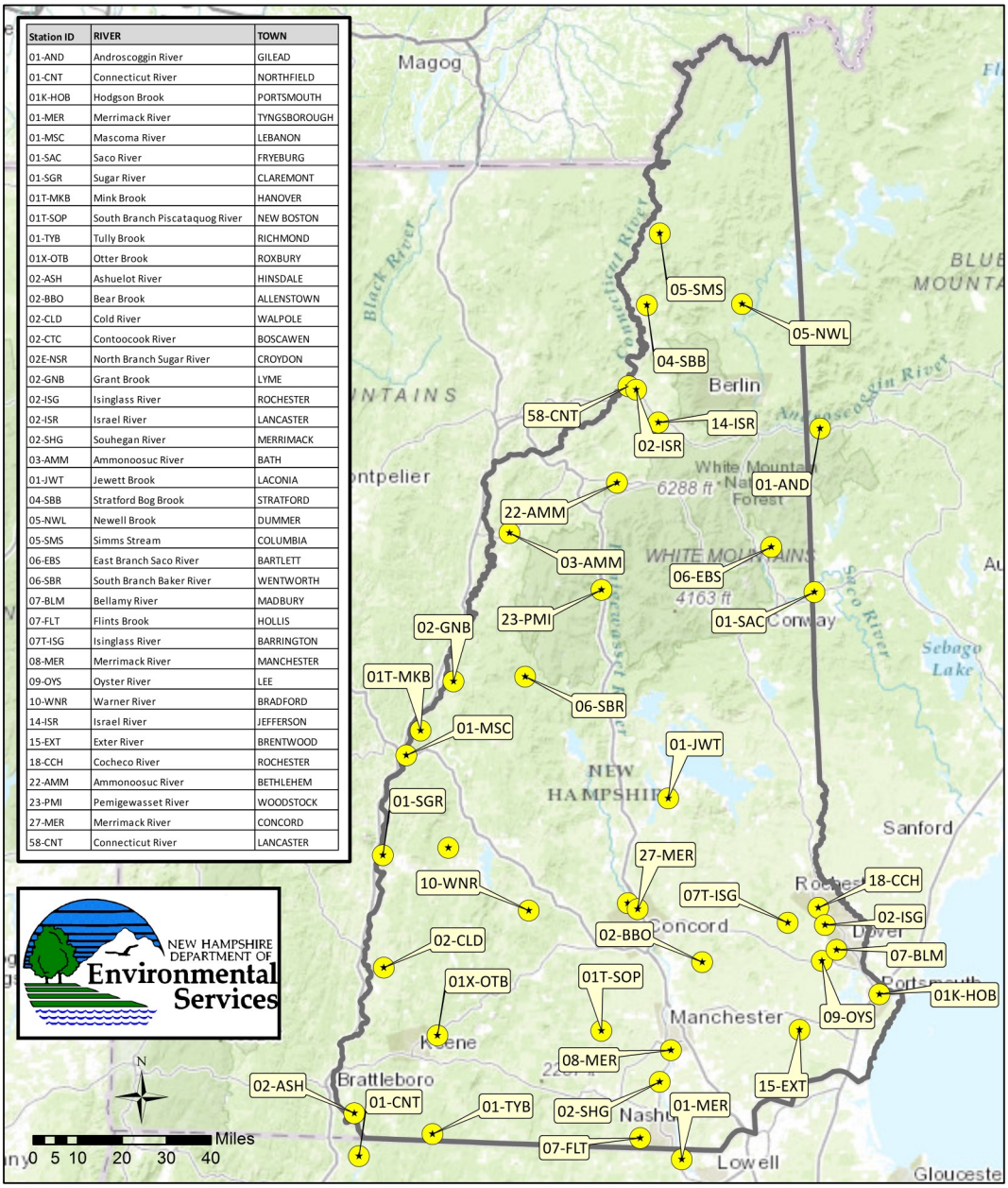
| Year | 2012 | 2013 | 2014 | 2015 | 2016 | Total |
|---|---|---|---|---|---|---|
| Number of days | | 10 | 0 | 9 | 11 | 30 |
| Percent of days | no data | 10.1% | 0.0% | 7.6% | 9.1% | 5.55% |

# NH DES River and Stream Trend Monitoring Network

40 stations, sampled 3x from June through August and 1x during fall, winter, or spring

Last Updated: April 2016

| Station ID | RIVER | TOWN |
|---|---|---|
| 01-AND | Androscoggin River | GILEAD |
| 01-CNT | Connecticut River | NORTHFIELD |
| 01K-HOB | Hodgson Brook | PORTSMOUTH |
| 01-MER | Merrimack River | TYNGSBOROUGH |
| 01-MSC | Mascoma River | LEBANON |
| 01-SAC | Saco River | FRYEBURG |
| 01-SGR | Sugar River | CLAREMONT |
| 01T-MKB | Mink Brook | HANOVER |
| 01T-SOP | South Branch Piscataquog River | NEW BOSTON |
| 01-TYB | Tully Brook | RICHMOND |
| 01X-OTB | Otter Brook | ROXBURY |
| 02-ASH | Ashuelot River | HINSDALE |
| 02-BBO | Bear Brook | ALLENSTOWN |
| 02-CLD | Cold River | WALPOLE |
| 02-CTC | Contoocook River | BOSCAWEN |
| 02E-NSR | North Branch Sugar River | CROYDON |
| 02-GNB | Grant Brook | LYME |
| 02-ISG | Isinglass River | ROCHESTER |
| 02-ISR | Israel River | LANCASTER |
| 02-SHG | Souhegan River | MERRIMACK |
| 03-AMM | Ammonoosuc River | BATH |
| 01-JWT | Jewett Brook | LACONIA |
| 04-SBB | Stratford Bog Brook | STRATFORD |
| 05-NWL | Newell Brook | DUMMER |
| 05-SMS | Simms Stream | COLUMBIA |
| 06-EBS | East Branch Saco River | BARTLETT |
| 06-SBR | South Branch Baker River | WENTWORTH |
| 07-BLM | Bellamy River | MADBURY |
| 07-FLT | Flints Brook | HOLLIS |
| 07T-ISG | Isinglass River | BARRINGTON |
| 08-MER | Merrimack River | MANCHESTER |
| 09-OYS | Oyster River | LEE |
| 10-WNR | Warner River | BRADFORD |
| 14-ISR | Israel River | JEFFERSON |
| 15-EXT | Exter River | BRENTWOOD |
| 18-CCH | Cocheco River | ROCHESTER |
| 22-AMM | Ammonoosuc River | BETHLEHEM |
| 23-PMI | Pemigewasset River | WOODSTOCK |
| 27-MER | Merrimack River | CONCORD |
| 58-CNT | Connecticut River | LANCASTER |




**NHDES River Monitoring Network–** NHDES' river monitoring network includes 40 sampling stations located on rivers across New Hampshire. Stations are sited on small, medium, and large rivers in low to highly developed watersheds. The purpose of the network is to track changes in river water quality over time and document current conditions within a distinct five-year timeframe. Individual station reports provide a summary of water quality conditions at that site and are based on data analysis of monthly samples collected from May-September. Additional samples are collected seasonally every third year for fall, winter, and spring. For some stations, data exists back to 1990. Other stations were new in 2012 or 2013. The analyses completed on the river monitoring network sites are detailed in NHDES' Water Monitoring Strategy. The river monitoring network is one of several monitoring efforts detailed in the Water Monitoring Strategy and undertaken by NHDES Watershed Management Bureau to track surface water quality conditions across the state. For more information visit: https://www.des.nh.gov/organization/divisions/water/wmb/index.htm or call (603) 271-3503.