

Merrimack River, Manchester, NH

Station: **08-MER**

Current reporting period: **2012-2016**

Start year: **1990**

Water Quality Summary (Data from May - September)			
Parameter	Trend	Current Condition	Overall Rating
Specific Conductance	Worsening	Intermediate	Fair
Total Phosphorus	Stable	High	Bad
Total Nitrogen	Stable	Intermediate	Good
pH	Worsening	Intermediate	Fair
Dissolved Oxygen	⊗	⊗	⊗

⊗ - 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.



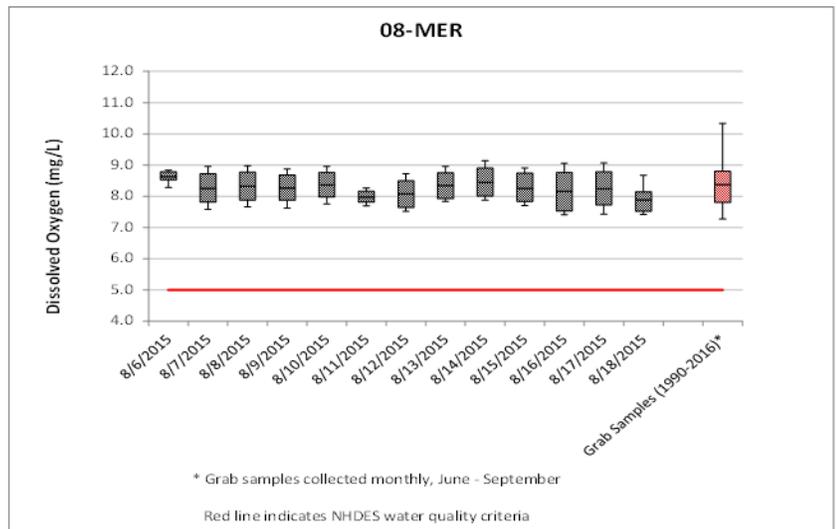
Sample station characteristics

Assessment unit	NHRIV700060803-14-0
Latitude	42.9360
Longitude	-71.4565
Drainage area (Sq. Mi.)	3086
Elevation (FT)	110
Development category	High
Drainage area size category	Large
Coldwater fish probability	0%
Fish community type	WARMWATER
8 digit hydrologic unit code	01070006

Station Highlights: The station 08-MER in the Merrimack River is a approximately 1/2 mile downstream of the City of Manchester’s WWTF outfall. It is experiencing worsening trends for specific conductance (increasing) and pH (decreasing). Nutrient levels (total phosphorus) higher than expected. Dissolved oxygen concentrations are within state water quality criteria. Water quality indicators were similar for the current reporting period compared to 2008 through 2011.

Biological indicators - For 08-MER dissolved oxygen was used as the primary biological indicator. One deployment of a continuous data logger was made in 2015. Of the 1,153 data points gathered, zero were below state water quality criteria (5.0 mg/L). The daily mean dissolved oxygen was 8.24 mg/L and ranged from 7.89-8.63 mg/L. A total of 93 grab samples have been collected at this site since 1990. The mean dissolved oxygen concentration of the grab samples was 8.38 mg/L with a range from 4.60-10.90 mg/L.

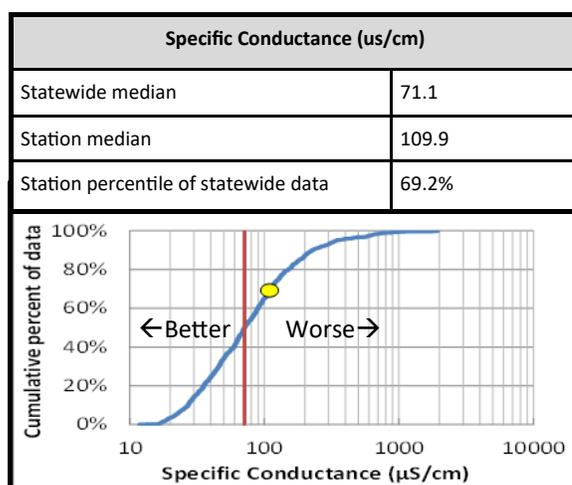
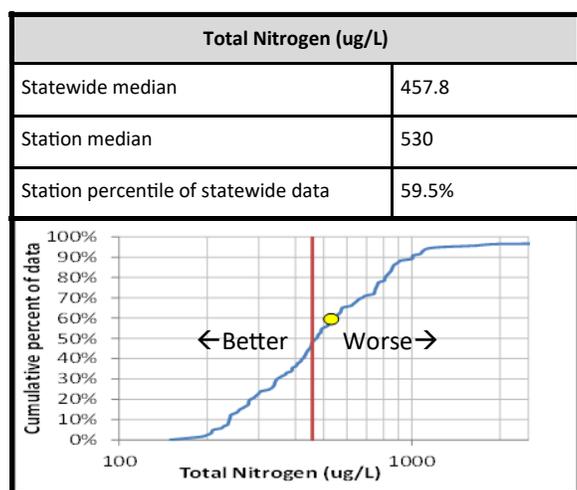
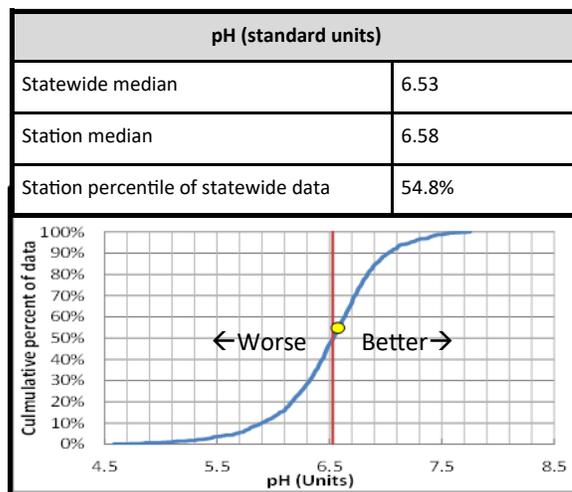
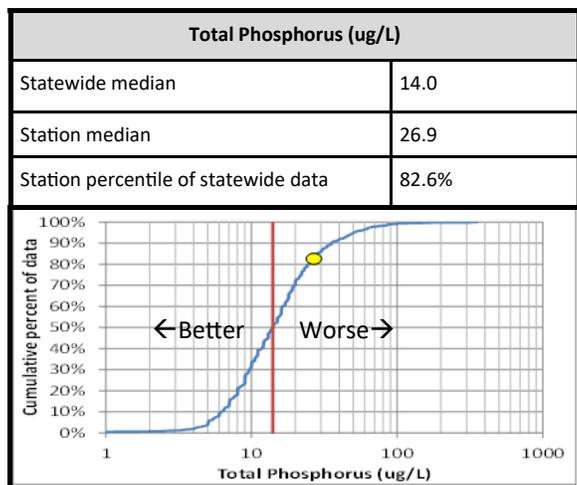
For the plot at the right: Upper whisker=95th percentile; lower whisker=5th percentile; upper and lower box boundary=75th and 25th percentile, respectively; line inside box=daily mean.



* Grab samples collected monthly, June - September

Red line indicates NHDES water quality criteria

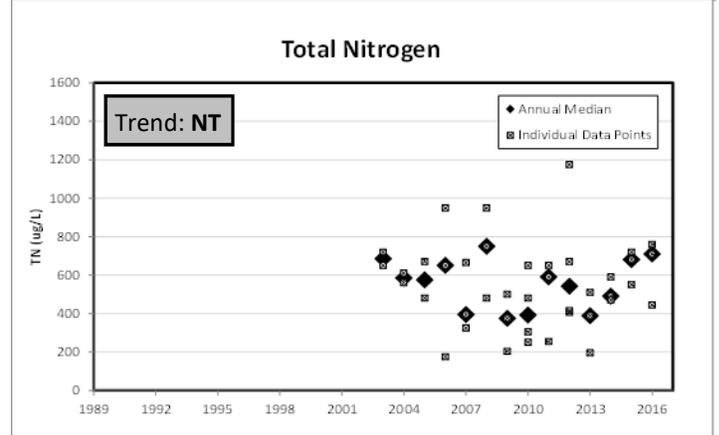
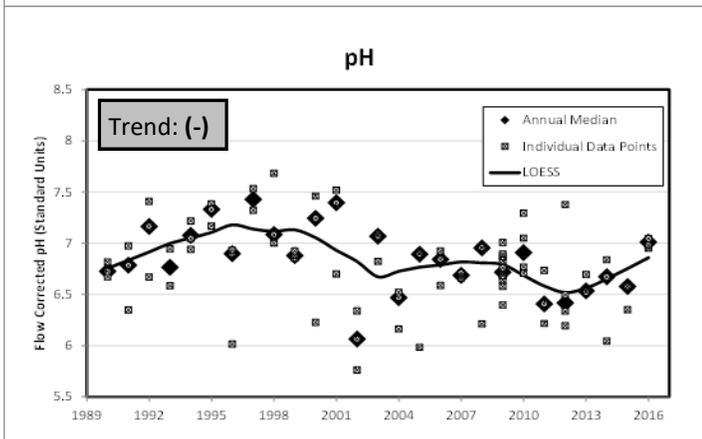
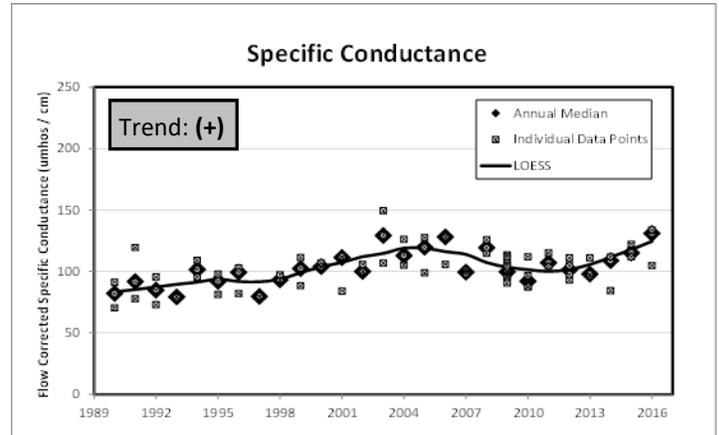
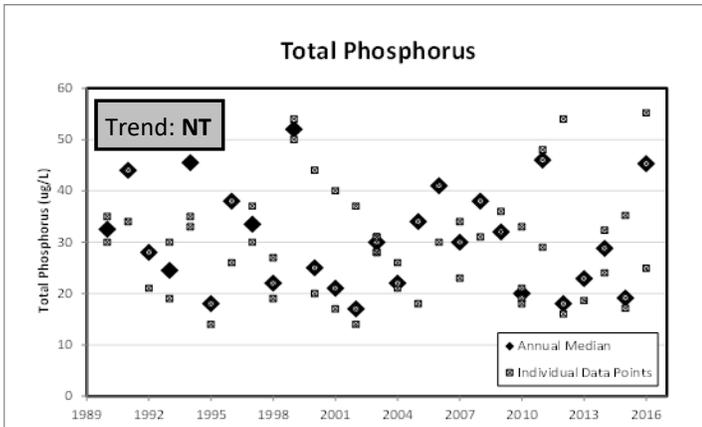
Statewide Comparison - The median value of the sampling station for the reporting period (yellow dot) was plotted with respect to water quality data collected from 1990-present as a percentile of the statewide distribution (curved blue line) and the statewide median (vertical red line). The position 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.



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 an 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	6.6	1.3	Previous	2008-2011	6.7	1.3	N	
Specific Conductance			108.4	49.3			106.4	40.7	N	
Total Nitrogen			573.5	979.0			511.8	775.0	N	
Total Phosphorus			34.9	96.0			37.0	61.0	N	

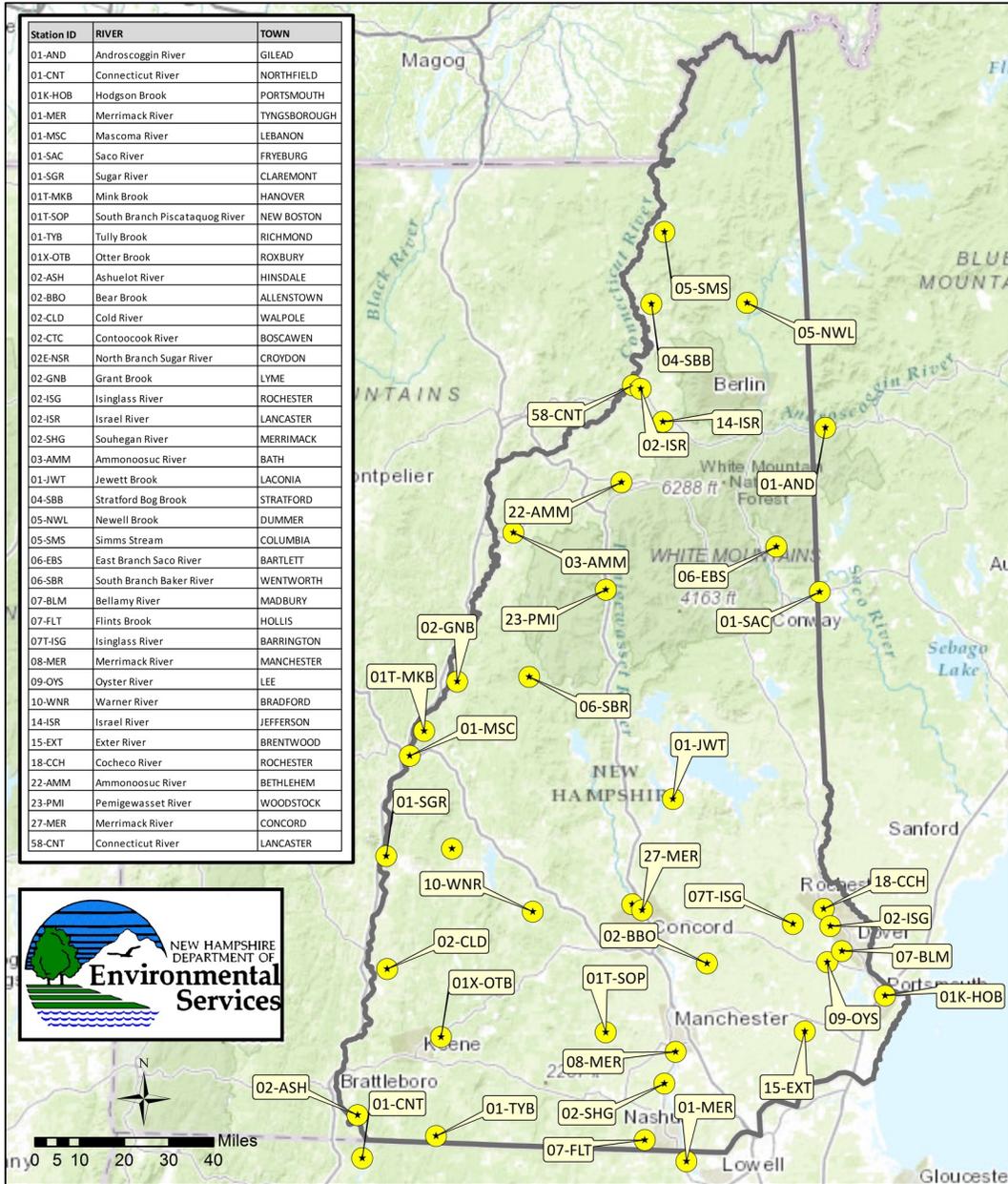
Trend analyses - Sites with 10 or more years of data were analyzed for trends. Trends analyses were completed on annual medians using the Mann-Kendall test ($p=0.05$). Data from 1990-2016 were used to analyze trends at station 08-MER for most water quality indicators. Trend outcomes included in plots 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.



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



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.

