

## **2017 Year End Report**

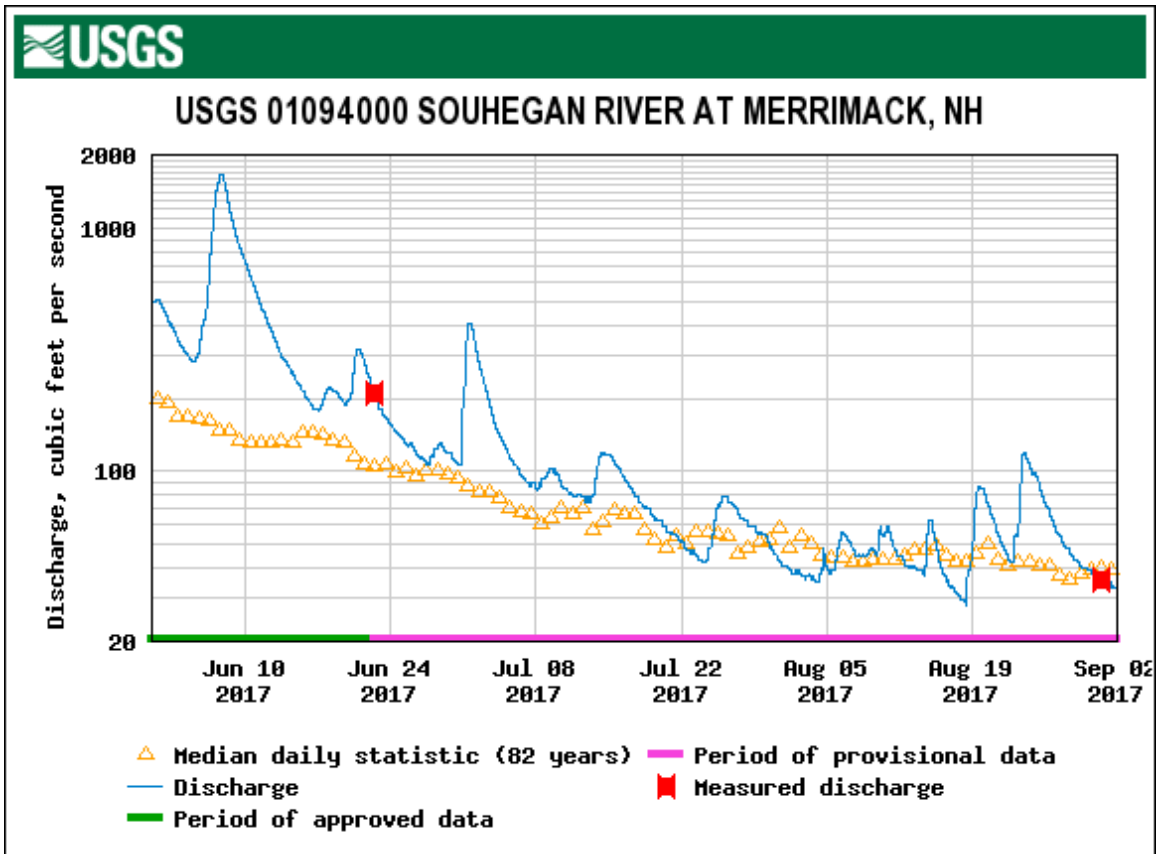
All in all this was a very good summer. The drought conditions of last year have disappeared, water temperatures were pleasant and fairly consistent throughout the summer, and rainfall was pretty normal.

There were six tests this summer. We monitored 20 sites on the Souhegan River, from the headwaters in Ashburnham to the mouth of the river in Merrimack, over 35 miles in length. We monitored 10 sites on the Merrimack River on the stretch from the Amoskeag Dam in Manchester to Tyngsborough. Volunteer monitors collected samples that were tested for E. coli bacteria, dissolved oxygen, turbidity, temperature, and in some cases pH. We considered adding phosphorus testing but the expense and information that would be obtained postponed that test for this year. A few extra tests were taken where pollution was suspected.

Here's what we found:

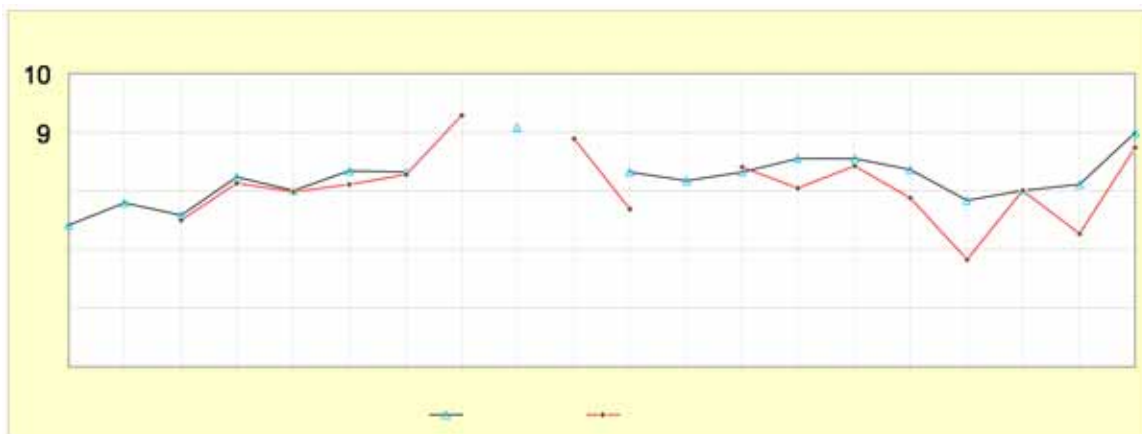
### **Souhegan River**

First, here is a graph of the flow on the Souhegan for the summer of 2017. It shows a higher than normal flow this season. The blue line is the actual flow and the yellow triangles are the historic flow average. The vertical scale is logarithmic, not linear, which visually exaggerates the low-flow changes. You can see that the river was higher than average in June and July and then mostly follows the average flow in August. Last year the river was continually well below its averages. This has been an excellent year for kayaking on the river.



### Dissolved oxygen

Dissolved oxygen tests give a generally good picture of the health of the river itself. The dissolved oxygen levels remained good all season. Here's a graph showing the first test in the spring and the last test in August. DO levels drop naturally during the summer as the water heats up and flow diminishes. We saw this, but generally DO levels remained up all season. The dark line shows the DO on the first test on June 13, the red line shows the DO on the last test on August 22.



There are a couple of caveats for this chart: many of the tests this season came after rainstorms which raises the DO levels. Also DO levels are higher where there is rapid flow splashing over rocks. The levels here are in the 8-9 range, which is a picture of the excellent general health of the river.

### E. coli

Here is a chart of the E. coli counts averaged for the entire summer. It gives a picture of the E. coli counts rising from almost nothing in the headwaters and New Ipswich to Milford... and then dropping again through Amherst and Merrimack to its mouth at the Merrimack River. It gives a pretty good picture of the river itself. The river is pretty clean until it gets to downtown Wilton. Pollution increases through Milford. The river tries to improve through Amherst but the slow flow over shallow sandy meanders keeps the E. coli higher than desired. The river cleans up more through rural Merrimack where there are a few more rapids to help out.



There is a blue line at 88 – everything below this line meets the standards for swimming at a public beach (*excellent*); above that is an aqua line at 126 – below this line means that the water quality is *questionable* and that swimmers *might* experience ear and eye infections or gastrointestinal problems; above that is a red line at 406 – below this is considered *poor* for swimming; finally, everything above this line does not meet the standards for Class B fishable and swimmable waters in NH and would be *dangerous* for swimming. SWA has been doing weekly tests at Watson Park in Merrimack and flagging the area with the above information.

There are a couple of caveats for this chart also: the high point on the chart at SoR 133 is the result of two very high unexplained readings. These two readings have skewed that average much higher than it should be and needs to be further surveilled to determine the cause of the pollution. This site is just downstream of Kaley Park and upstream of the wastewater treatment facility at the end of the small island. The same is true for SoR 309. There were a couple of higher than usual counts here also. This site is in the pond

upstream of the Greenville dams. Also, it should be pointed out that most of our tests this season came after rain events which bring the E. coli counts up. So the graph shows what appear to be higher than real E. coli counts for the entire summer if it were tested every day.

We will continue to do occasional pH tests along the river although we have never seen a problem. The river tests slightly acidic, the natural response to acid rain. Cleanups of coal fired plants in the mid-west should make things better for the river eventually.

Whenever we can add macroinvertebrate testing we can validate our chemical tests. This is really the 'gold' test for a river. If we can identify the various organisms living in the river that require clean or very clean water to live in, then we know that the river is clean. This would be a good Scout project or school project as the monitors would learn as much by doing this as the program would from the results.

So what can we predict? Here's a repetition of what we said last year; and it's still true. The Souhegan River could be considered two rivers – the Upper down to Wilton and the Lower down to the mouth. The Upper river will continue to have acceptable E. coli counts and DO will continue at acceptable levels. The Lower will continue to show high E. coli counts from pollution discharges whenever conditions are right – rainstorms after dry periods and low flow conditions. The Lower flows through the centers of Wilton and Milford, which is where the pollution increases. Cleaning up discharges into the river from runoff and storm drains in these town centers will make a big difference.

Especially of note this year is the final cleanup of the Fletcher Paint site in Milford by the EPA. A section of the river bottom was removed and replaced with clean sand. A new kayak access was added to the site that will make for an easy takeout for boaters coming down the river. We look forward to being able to access the river again and plan to improve the opposite riverbank with plantings and cleanup.

Many of the volunteers will return again next season and are already holding on to supplies that were returned for updating in the past. We plan another get-together to thank volunteers and get needed supplies to them prior to next season's testing. As always, there is room for more volunteers, especially those young and agile. If you know anyone, pass it along.

This was the 21<sup>st</sup> year of continuous water testing on the Souhegan and Merrimack Rivers so we have data going back quite a while. It is all available on our website at [www.souheganriver.org](http://www.souheganriver.org) – it may require some digging. We have been testing the same sites all along – and some of the volunteers have been with us and testing their site for all those years. The great volunteers and the great cooperation from the Nashua, Merrimack, Milford, Manchester, and Greenville wastewater treatment facilities have made this all possible.

Support from newspapers and Facebook is important to getting the word out to people who ordinarily wouldn't pay much attention to our important rivers and streams. The E.

coli information really is only important to citizens who might be swimming in the river but others read the information enough times and it enhances the importance of protection for the rivers. Our interest sparks others' interest. Thanks also to support from most of the conservation commissions along the Souhegan. The writeup for each testing date is also posted on the SWA website at [www.souheganriver.com](http://www.souheganriver.com) with all of the data listed.

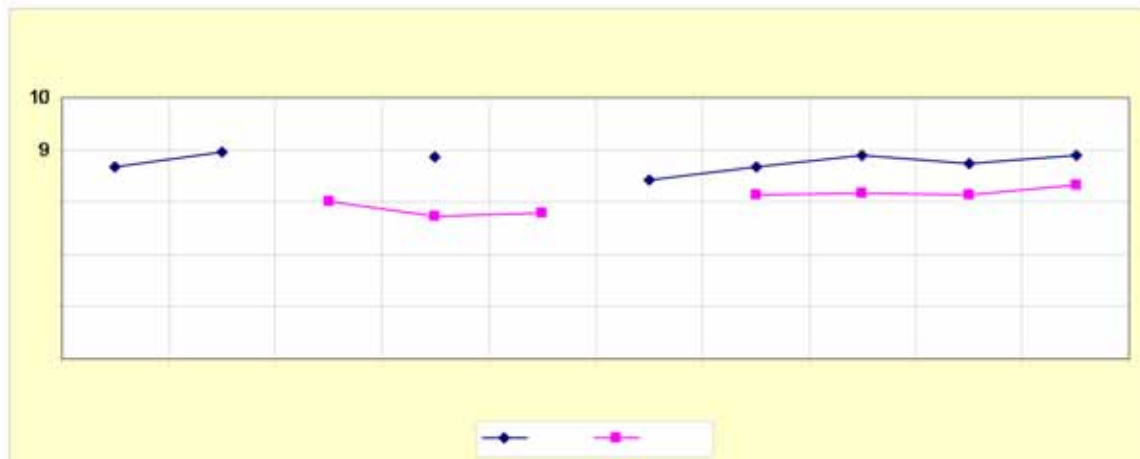
## Merrimack River

### E. coli

This year's E. coli tests were unusual; results this season do not reflect the results expected from years past. Work on both the Amoskeag Dam in Manchester and the Pawtucket Dam in Lowell caused aberrations in the E. coli counts. This was a short term problem that will go away when the work is completed. The Merrimack River continues as it has in the past to have excellent E. coli levels most of the time. There are CSO releases of raw sewage into the river during heavy rainstorms that do raise the E. coli levels to very high levels for a short period of time – again, in my opinion, these few events are short term problems that do not justify contaminating tributary brooks with runoff 100% of the time to prevent river pollution 1% of the time. Nashua recently built a giant holding tank that prevents some CSO releases and directs all of the flow to the treatment plant. This is a great solution to prevent pollution going into the river.

### Dissolved Oxygen

The DO levels are also in the excellent range. Much of the river between Manchester and Reeds Ferry flows over rocks and small rapids that keep the DO levels up. Here are the first and last DO tests for the season – the June test is almost 9 and the August test almost 8.



There are pollution problems on this stretch of the Merrimack that we have observed. Manchester airport continues to have a runoff problem during deicing conditions

especially during winter and spring. The PFOA contamination in Merrimack is being monitored by DES. The Beazer property in Nashua is being cleaned up once again – we hope this time it works better than before. The river was used as a dumping ground for a long time in the past and may still have contamination yet to be discovered. What we test for, the river looks great.

We're always glad to hear any comments on how to improve the program.

Thanks to Jeff Ostman, who helped with the graphs.