FOSR Office
1460 University Drive
Winchester, VA 22601
(540) 665-1286
www.fosr.org

Issue II 2011

FRIENDS OF THE SHENANDOAH RIVER
We All Live Downstream

FOSR Laboratory
1460 University Drive
Gregory Hall 152
Winchester, VA 22601

http://www.fosr.org/data/

Message from the President,

All of us, here at the Friends of the Shenandoah River, are committed to help the Chesapeake Bay program reach the goal of cleaning up the watershed and reducing nutrient loading. We have decided to upgrade our water quality analysis capability by adding instrumentation to measure Total Nitrogen and Total Phosphorous. Our historic nutrient parameters measured ortho-phosphate, nitrate plus nitrite, and ammonia. This new testing protocol is really important because Total Nitrogen and Total Phosphorous are the nutrient measurements being called for by the State and Federal Agencies to assess load reduction. These are costly upgrades. It is an expensive leap of faith for us; but we feel that it is a necessary one.

We are going to try and recoup the cost through both grant proposals and fundraising, and we are excited about the possibilities of not just monitoring these parameters in our own watershed, the Shenandoah, but in helping other organizations with their monitoring programs as well. At first, we are only going to add these analyses at a few sites while we work through the inevitable new "wrinkles." After we familiarize ourselves with the new protocols, we will be able to offer this service to other monitoring organizations in the watershed in the near future.

It's also become very apparent through our "visioning" sessions that we need to make our data more "relevant." The data are available on our website, www.fosr.org, but we need to put information in front of people, not wait for them to come find it. We should be putting together reports on a quarterly basis for all the counties in our watershed. These reports should discuss important trends, highlight serious changes, and keep area localities up to date with all important water quality information.

I will keep you updated on our progress in this new venture, but I'm really excited about the possibilities it will open up for partnering with new groups. I also think that it's going to be really helpful for our localities to be able to compare their actual measured progress with what government modeling results will say.

George L. Ohrstorm, II

Treasurer's Report, *Bernard C. Nagelvoort*

The first ten months of operations of FOSR from a financial perspective are much better than expected when the budget was prepared early in the year. Through October 31 we're looking at an actual deficit of $7,880 versus a budgeted deficit of $38,605. A very generous donation accounts for this substantial improvement.

Total income through October is $32,000 above budget with total expenditures about $1,000 over budget. The expenditure excess is accounted for by a unique water quality problem requiring the acquisition of special filtration equipment.

By year-end, total income should be about $96,000 with expenditures totaling around $110,000 for a deficit of about $14,000 versus a budgeted year-end deficit of $48,000.

Our current cash position is just under $110,000 with an anticipated year-end balance of about $100,000 which should leave us with a reasonable balance as we enter 2012.

We at the Friends of the Shenandoah River, extend a warm thank you to all of the volunteers that help to make the water quality monitoring program the success that it is.

Below is a list of active volunteer monitors that are carrying on the legacy of the retired volunteer water monitors that helped to build the Friends of the Shenandoah River's long-term water quality program into the premier program that it is today.

Bob Hearn, Ann Cross, Allison Ramey, Charles Vandervoort, Terry Lay, Bud Nagelvoort, Robert Friedensen, Tim Lawrence, Nolan Thomas, Jim Peters, Fran Tamas, Trudy Peterson, Scott Middleton, Jim Cotter, Ken Johnson, Chris Anderson, Richard Kilburne, Charlie Newton, Paul Otto, Alice Pence, John Sylvester, Harold Skinner, U.S. "Jack" Rinca, Jr., Herb & Susie Wilburn, Susan Kadel Fehr, Roger Bolland, Ross Clem, Lee Dieter, Ron Falyar, Jim Fitzsimmons, Kim & Tav Hafner, Frank Hovermale, Jody Jenkel, Katherine Layton, Steve Lowe, Remy Luerssen, Margaret Nelson, Ken Ownes, Darnice Pettigrew, Zoe Sollenberger, Ibby Stratton, David Timer, Beverly & Chuck Veatch, Leslie Mitchell-Watson, Skylar & Susan Wolf, Ric Aldhizer, Tom Benzing, Jim Benedict, Mike Bernier, Otis Bilkins, Jim Boland, Robbie Brown, Paul Bugas, Kemper Eagel, Emerson Fike, Rolf Gebel, Sandy Greene, Jim Harris, Lyle Hood, Dave Horn, Charlie Huppuch, Bob & Betty Kite, Tom Long, Jane Morriss, Sally Newkirk, Dennis Patzig, Ray Pine, Roger Robinson, Neil Tucker, Bruce Wiggins, Mike Wood

Wishing you and your family

Happy Holidays!

Friends of the Shenandoah River:
2012 Shenandoah River Watershed Cooperative Volunteer Water Quality Monitoring Calendar

January	**7 & 21**	**May**	**12**	**September**	**8 & 22**
February	**11 & 25**	**June**	**9 & 23**	**October**	**6 & 20**
March	**10 & 24**	**July**	**14 & 28**	**November**	**3 & 17**
April	**14 & 28**	**August**	**11 & 25**	**December**	**8**

If you would like to join the team of volunteer water monitors, assist in the lab or in another way please contact Karen Andersen at friendsofshenandoahriver@gmail.com or (540) 665-1286.

To support the Friends of the Shenandoah River in their efforts including the long-term volunteer water quality monitoring program, please send donations to: Friends of the Shenandoah River
Attention: Karen Andersen
1460 University Drive
Winchester, VA 22601

WE ALL LIVE DOWNSTREAM

Status of the River - November 2011

by Charles Vandervoort

The concentration of nitrogen and phosphorus in the water of the Shenandoah River has not changed much since the previous newsletter. Turbidity still is high at many monitoring sites and the trend is up; nitrogen concentrations are also high and the concentrations are not declining. The ten monitoring sites reporting the highest concentrations of nitrogen and turbidity are mostly on the tributaries located in agricultural and cattle/poultry intensive counties of Rockingham, Page, and Augusta.

Muddy Creek (JR01) in Rockingham County has been among the ten worst sites since the FOSR started formal monitoring in 1997. Because of that creek's high concentrations of nitrogen, turbidity, and fecal coliform; it has attracted considerable attention from EPA, DEQ, USGS, and other government and private organizations. The creek was placed on the EPA "impaired" list and several Total Maximum Daily Load (TMDL) projects and "Best Management Projects" were implemented. Muddy Creek is examined in more detail at the end of this paper.

Condition of the Tributaries that are sampled by the FOSR.

In the tributaries, as shown in figures 1 and 2, the trend for the average concentration of nitrogen remains flat at around 1.2 PPM (a high value), and the trend for turbidity is up and increased from 5 NTU in 1997 to about 20 NTU (a high value) today.

Figure 1: Nitrogen Trend for Tributaries

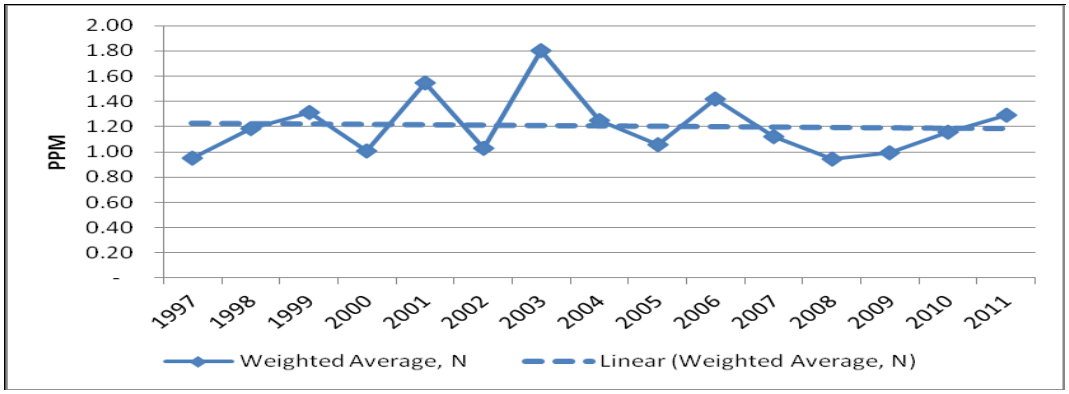
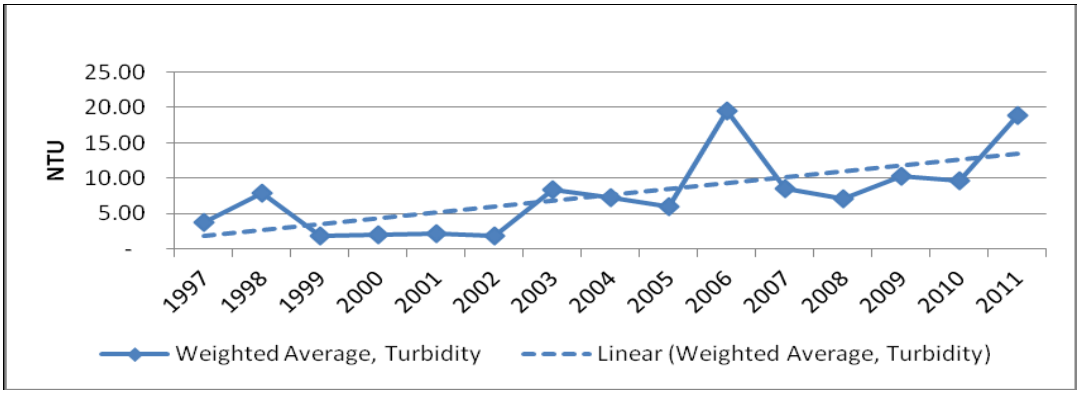


Figure 2: Turbidity Trend for Tributaries



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The Main Stem of the Shenandoah River

Figures 3 and 4 show the trend for nitrogen and turbidity at station FC08, the monitoring site located on the Main Stem of the river at the Route 7 Bridge in Clarke County. This monitoring site is the last monitoring site before the main stem joins the Potomac river As such, it could possibly provide a useful index of average water quality in the waters of the Shenandoah river basin because it captures much of the flow of the upstream smaller rivers, such as the North Fork, and all the tributaries.

For turbidity both the mean (arithmetic average) and the median (50 percentile) are shown. For statistical reasons based on the fact that the distribution of turbidity is highly skewed, the median provides a more accurate indicator of the level of turbidity. The mean is also useful because it is an important factor (in addition to stream flow) for calculating the "loading" in tons per year of sediment as water from the Shenandoah River Basin enters the Potomac and eventually flows into the Chesapeake Bay.

Figure 3: Trends for Turbidity at the Route 7 Bridge, FC08

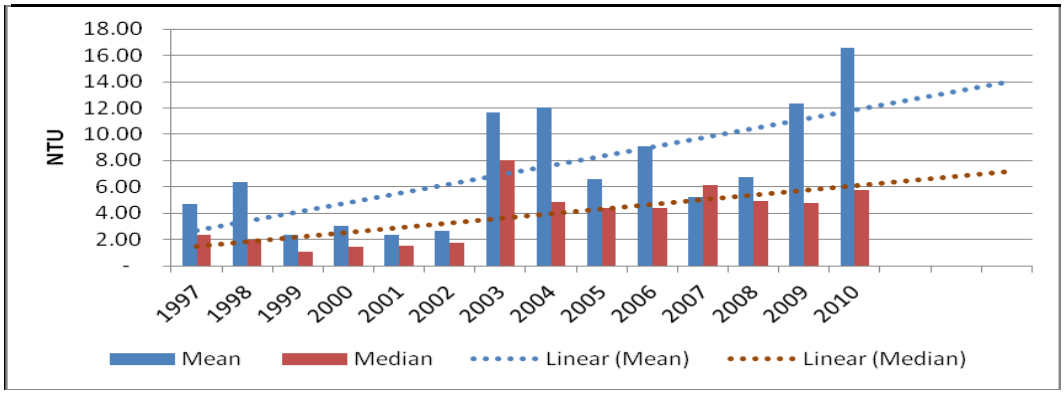
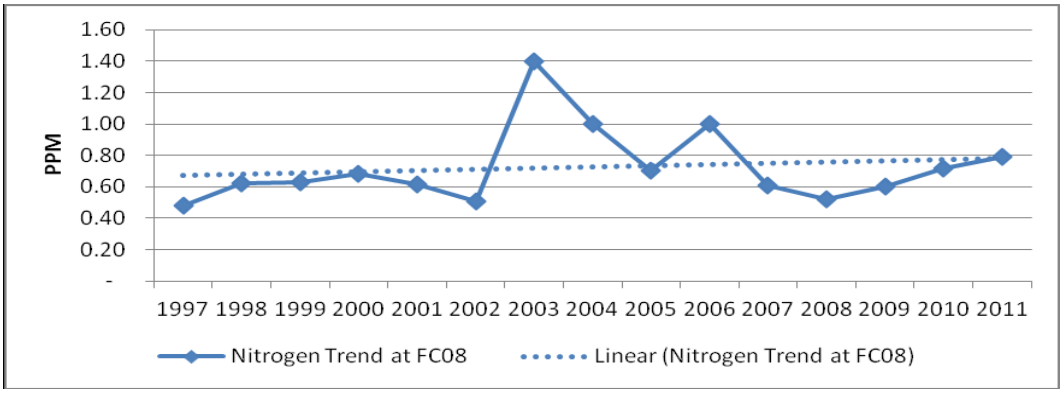


Figure 4 shows that the trend for average nitrogen at FC08 is up, but not as sharply as for turbidity. We observed the same for the nitrogen trend in the tributaries. Because the statistical distribution for nitrogen is "normal" (also known as the "bell" or "Gaussian" curve) the use of an arithmetic average for nitrogen is appropriate as one of the elements in calculating both average the concentration and the loading of nitrogen.

Figure 4: Trend for Nitrogen at FC08



The hot spots:

As reported in earlier newsletters, the membership of the ten monitoring sites reporting the highest concentrations of nitrogen and turbidity (the hot spots) stayed remarkably constant from year to year.

Muddy Creek (JR01) in Rockingham County and close to Mount Clinton has been in the hot spot family since FOSR monitoring started. As shown in Figure 5 the level of nitrogen concentration started off at the high level of 5 PPM and maintained that level throughout the 1997 – 2010 time periods. High levels of

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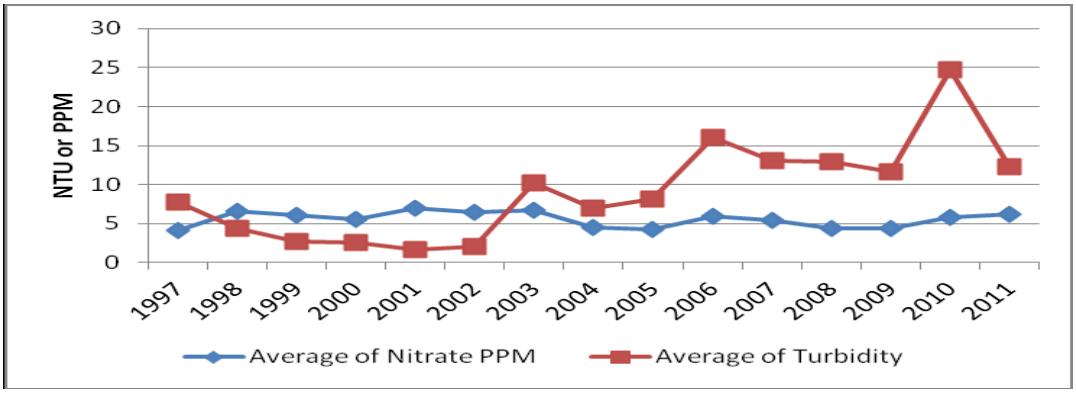
nitrogen encourage algae growth and eutrophication, and because much of this nitrogen flows downstream it is one of the adverse contributing factors to the "dead" zones in the Chesapeake Bay.

The problems with Muddy Creek are well known within the environmental community and the EPA, DEQ, and USGS have devoted considerable attention to trying to understand and remedy the problems. According to the USGS National Water-Quality Assessment (NAWQA) Program, their monitoring of nutrients in Muddy Creek started in 1999 at a level of three samples per year, and for some of the nutrients (total nitrogen) reached a level of about 23 samples per year.

Figure 5: Trends for Nitrogen and Turbidity in Muddy Creek, JR01



Addressing the water pollution problem

Muddy Creek provides an instructive example of the impact measures used to improve water quality. Thanks to data collected on Muddy Creek by the EPA, USGS, State Agencies and private organizations a sufficient amount of evidence was provided for Muddy Creek to be placed on Virginia's list of impaired waters.[i] At least two TMDL programs were implemented and BMPs were installed to help address the problems.

What was done at Muddy Creek

In addition to measures to reduce the concentration of fecal coliform, the agricultural BMPs included measures such as: strengthening dairy loafing lot management systems, protect streams from agricultural runoff, protect grazing land, and encourage small grain cover crops.

The fecal coliform reduction was successful, but the impact of the attempts to reduce nitrogen and turbidity concentrations in Muddy Creek did not seem to have had much impact. According to the FOSR data the trend for nitrogen remained flat at around 5 PPM, and the trend for turbidity, after going down and reaching a low level in the year 2002, continued its rise after that date. Of course, this simple statistical analysis is not sufficient to prove there was no impact – for all we know the trends could have been even worse without the TMDL programs.

Showing the true impact will require sophisticated models and formal ex-post impact evaluation studies that take into account the large number of factors relevant to water quality improvement projects, such as population and urbanization growth, and deforestation. Such studies develop the understanding and possible identification of currently unknown factors needed to formulate cost-effective programs to improve water quality.

[i] EPA "Section 319 Nonpoint Source Program Success Story. Conservation Stewardship Puts Muddy Creek and Lower Dry River Watersheds on Path to Recovery", no date but believed to be around 2008.

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Winchester, VA 22601

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"To protect and restore the aquatic environment of the Shenandoah River and its tributaries"

Yes, I would like to be a member of The Friends of the Shenandoah River (FOSR)

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___ $100 Steward

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*If you do not wish for the FOSR to exchange your info with other environmental groups, please check box ☐