



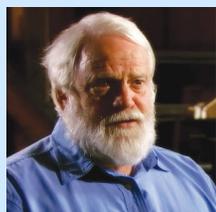
News

President's Message

The big news for the upcoming year is that The Friends will have a new president as of January 1, 2015, Mr. Terry Lay.

Terry has been a FOSR member since becoming a Clarke County river monitor in 1999. He joined the FOSR Board of Directors in 2011.

Recently retired, Terry has a diverse work history that includes the industrial chemical industry, manufacturing software development and installation, business consulting, and most recently with renewable energy. Terry's knowledge of the chemical industry, and his business consulting experience will benefit us well; especially in our efforts to make our data more relevant and our partnerships more fruitful for all concerned.



George Ohrstrom II
President

I intend to remain on the Board for some time. After extensive consultations with many funders including the Chesapeake Bay network; it's becoming apparent that small, single mission watershed groups like ours are no longer as attractive to large grant-making organizations. The big funders are now more interested in funding groups that combine many levels of expertise and impact. For example, they might be much more interested in receiving a larger grant request from a combined Friends of the Shenandoah,

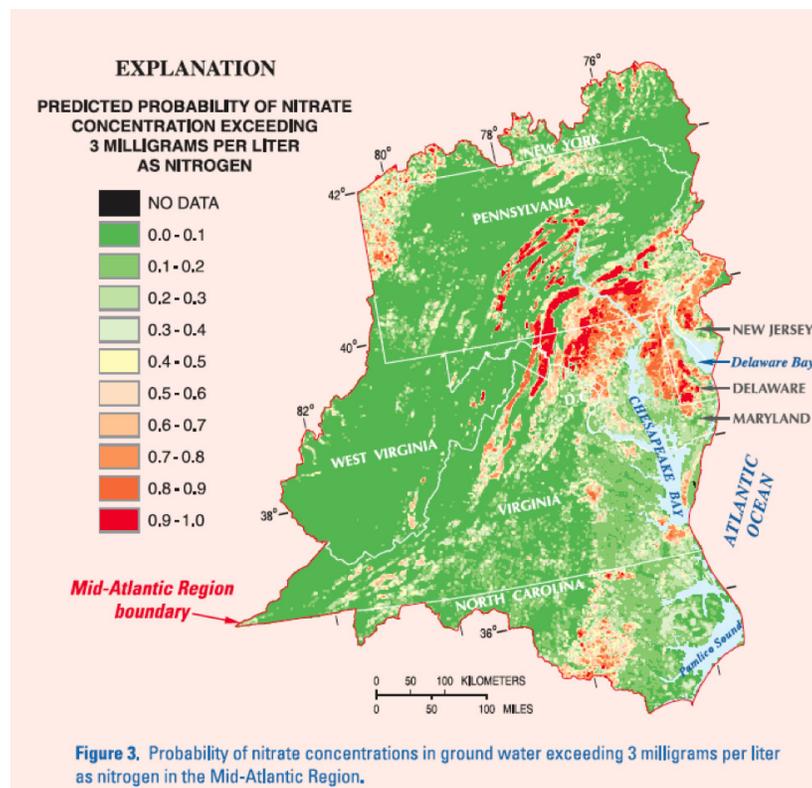
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Stories Your FOSR Data Can Tell You

Wayne Webb

We encourage you to visit the FOSR website page, <http://fosr.org/state-of-the-river/>, that will open with a map identifying all of the FOSR's monitoring sites throughout the Shenandoah River watershed. You will be able to click on the individual markers that will lead you to a link to obtain FOSR's water-quality data for that site. The FOSR's "Water Window" data portal provides unparalleled documentation of the evolving health of the Shenandoah River watershed.

The story from Clarke County is that if the trend in nitrate levels continues, the ground water in the karst areas of the county will contain nitrate concentrations that exceed the US EPA drinking water limit of 10 mg/l of nitrate as N in the latter (continued on Page 5)



Aquatic Biogeochemistry of Nitrogen and Phosphorus: A Guide to the Wilderness

Richard Marzolf

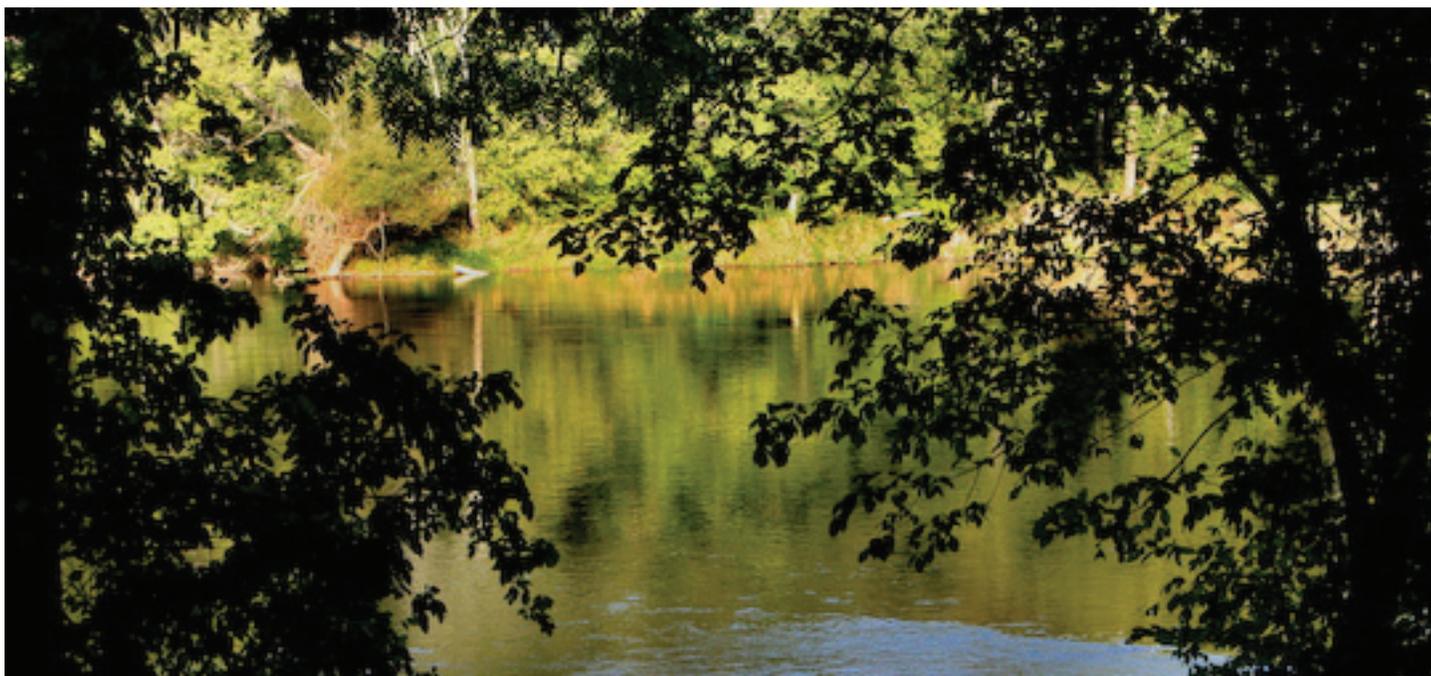
The Friends of the Shenandoah River (FOSR) have conducted a monitoring program that now is approaching 25 years in duration. Nitrogen (N) and phosphorus (P) are among the nutrients whose concentrations are measured: N as ammonia and as nitrate plus nitrite, P as reactive orthophosphate. The purpose of the monitoring is to detect changes in nutrient concentrations that interfere with our uses of the river and to guide management decisions to correct emerging pollution problems in the Shenandoah River and its tributaries and further downstream in Chesapeake Bay. References to FOSR data in the newsletter almost always center on these data.

Now, more than two decades later, we realize that the choice of N and P as chemical parameters to be measured were common sense choices. Other chemical measurements might have been chosen to be sure, but shortages of time and money imposed limits. Despite inevitable limits these were excellent beginnings and the value of the data has increased with time. The water qualities in the valley are controlled by natural processes involving these nutrients in a complex

“wilderness” of interacting processes in aquatic biology, aqueous chemistry, and hydraulic physics. All of these dynamic processes interact in a geological setting transported from upstream to downstream by flowing waters. Water is the geomorphic medium of erosion, transport, and deposition. The aqueous chemical reactions take place in water. Water is also a universal solvent of organic and inorganic compounds and the medium in which the aquatic biota live. Altogether water is a complicated and wonderful wilderness that is both the essential resource for life and the supporting resource for human existence.

The essay is offered to provide a primer about some of these features of N and P in aquatic ecosystems... sort of a guide to the wilderness. This may be useful background that will help interpret the monitoring results and design ways to correct pollution insult for the benefit of the Shenandoah Valley.

To read the complete white paper please visit www.fosr.org





Treasurer's Report

Summary through November 15, 2014
(FOSR operates on a cash basis)

Cash receipts for fiscal 2014 through November 15 are \$92,812 versus budgeted income of about \$129,500.

Cash expenditures for fiscal 2014 through November 15 are \$120,031 versus budgeted expenditures of about \$130,375.

Net Income to date - a deficit - \$27,219

Cash balance on January 1, 2014 - \$98,662

Cash balance on November 15, 2014 - \$70,046

The Friends of the Shenandoah River has performed its water quality monitoring program very effectively in calendar 2014 through the outstanding efforts of its volunteer monitors and professional laboratory operations. It has been a reasonable year from a financial perspective.

A major contribution of \$30,000 has been delayed, but has been promised for delivery before the end of the year. Its receipt is expected to result in a year-end deficit of about \$5,000 versus a budgeted deficit of \$1,000.

Because of a good cash position at the beginning of 2014 and no financial obligations other than for current operations we expect to enter 2015 in a sound financial position.

Bernard C. Nagelvoort, Treasurer



2015 Water Quality Monitoring Calendar

Thank you to all our volunteers for your dedication to FOSR and to the Shenandoah River.

Water samples are to be collected on either the highlighted Friday between 7:30 AM and the scheduled dropped off time for your location or on the highlighted Saturday with samples being delivered to the FOSR's lab no later than 10 AM. For information or assistance please contact the FOSR Lab Director, Karen Andersen, at 540.665.1286 or kandersen@fosr.org.

January

Su	Mo	Tu	W	Th	Fr	Sa
				1	2	3
4	5	6	7	8	9	10
11	12	13	14	15	16	17
18	19	20	21	22	23	24
25	26	27	28	29	30	31

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March

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June

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November

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December

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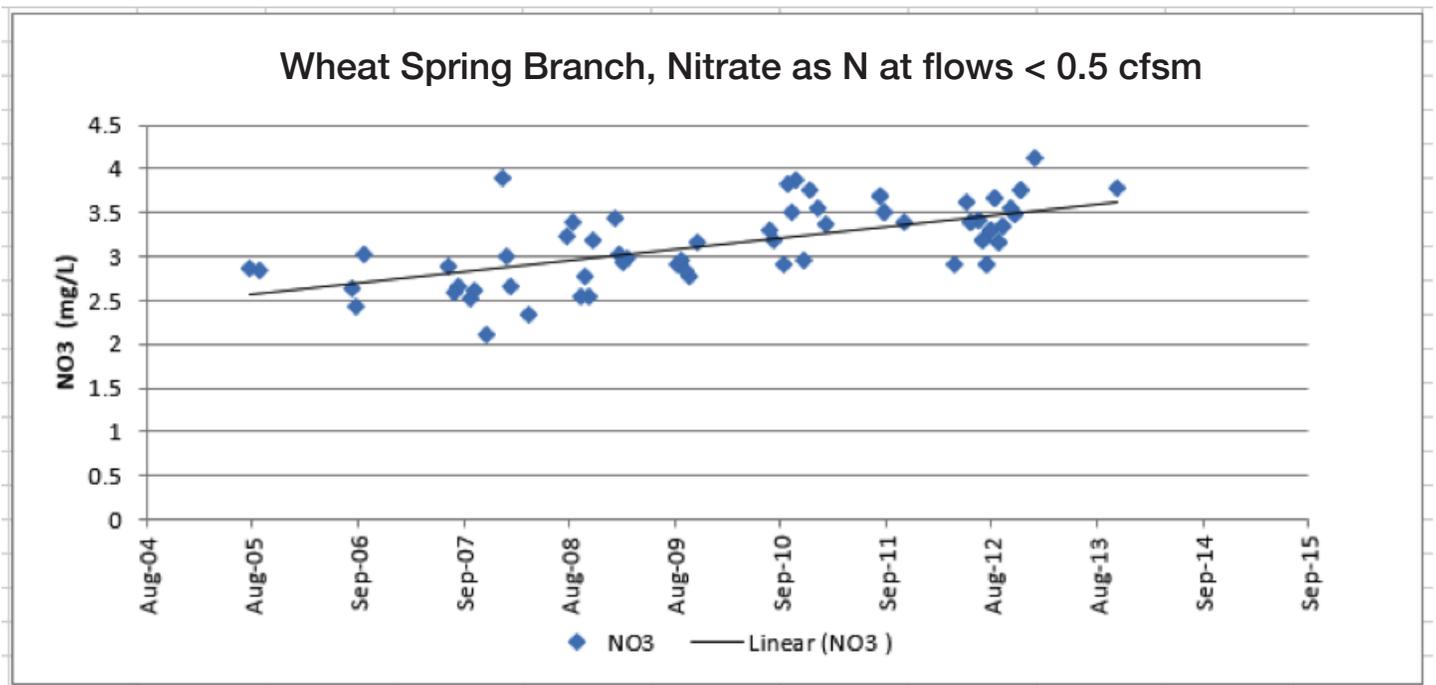
part of this century or possibly in the next. Most of us in the Shenandoah Valley live in the karst areas and thus, in the future, many of our rural wells could yield water containing high nitrate concentrations. The five streams FOSR has been monitoring for the past 18 years in Clarke County all show increasing low-flow nitrate concentrations of between 0.6 to 1.5 mg/l. (The Wheat Spring Branch record includes only the last 10 years.) a straight line projection of this increase suggests that, if this trend continues, two streams could reach EPA's drinking water limit of 10 mg/L before 2100: Wheat Spring Branch FC32 and Dog Run FC06. Chapel Run CF18 and Lewis Run FC03 are projected to reach 10 mg/L during 2100 to 2200. Spout Run FC02 and Page Brook FC09, a Spout Run tributary, are increasing more slowly and will not exceed 10mg/l till after 2300.

Low-flow stream nitrate concentrations are linked to groundwater concentrations. FOSR's recent analysis of springs showed that in general springs yield water with higher nitrate concentrations than the streams to which they are tributary. For example Carter Hall Spring water contained 3.5 mg/L during a period when Spout Run contained a little less than 2.5 mg/L of nitrate. See www.fosr.org and "FOSR Report: Risks of biosolid fertilizer application on water quality."

Ground water is the entire water supply of the streams during periods of low flow. (See <http://pubs.usgs.gov/sir/2010/5112/>) The definition of low flow for this report is when the flow of Spout Run at the gage is less than 0.5 cubic feet per second per square mile (cfsm) or 10.6 cubic feet per second (cfs). The gage flow records for USGS 01636316 SPOUT RUN AT RT 621 NEAR MILLWOOD, VA show that the discharge (flow) averaged no more than 0.5 cfsm 23% of the days during the 12-year period of record.

USGS Fact Sheet FS 2004-3067 published in 2005 shows that Clarke County karst areas have a very good chance of having 3 mg/L of nitrate in the ground water and about a 50% chance of having the EPA drinking water limit of 10mg/L in the ground water. Low-flow nitrate concentrations indicate the minimum concentration in the ground water. After water enters the stream, algae use nitrate to grow, thus reducing the nitrate concentrations in the water. It's possible that animal waste washing into streams could increase nitrate concentration as flow increases. Dog Run, Lewis Run and Wheat Spring Branch increase in nitrate concentration as the flow increases. The other streams decrease in nitrate concentration as flow increases. However, there is no wash off when the flow is 0.5 cfsm or less.

Figures from USGS Fact Sheet FS 2004-3067



Check Out the Website

www.fosr.org

The FOSR Mission:
"To protect and restore the aquatic environment of the Shenandoah River."

State of the River

Welcome Urbie Nash to the FOSR Board of Directors
Urbie retired in 2007 after 34 years as a professional environmental engineer. He has a bachelor's degree in civil engineering and a master's degree in environmental engineering from Virginia Polytechnic Institute and State University. During his professional career he worked [Read More](#)

Good News for Friends of the Shenandoah Valley River System
In July, The South River Science Team sent out for review to its more than 100 members a draft proposal with the title "Remediation of Mercury in the South River and a Segment of the South Fork of the Shenandoah" [Read More](#)

Support the 2013 FOSR Initiative
Lab Upgrades: To continue meeting the challenge of providing accurate water quality analysis, the FOSR lab and field equipment need to be upgraded. We recently added testing modules that measure total nitrogen and total phosphorus in response to new state [Read More](#)

Water Quality: A Report from Charles Vandervoort
Charles Vandervoort is a retired systems analyst and volunteer for the Friends of the Shenandoah River. His comprehensive report on water quality in the watershed pulls together data from the past decade to reveal a more accurate picture of the [Read More](#)

Water Monitor Training for Blue Ridge Watershed Coalition
Starting in 2008, several community meetings were held on the Blue Ridge of Jefferson County to help create a vision of these mountain communities in years to come. The meetings were well attended by approximately 350 mountain residents. With the [Read More](#)

[more ...](#)

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President's Message (continued from Page 1)

Friends of the North Fork of the Shenandoah, and Friends of the Middle River with a strong partnership component that would play to the strengths of each organization.

We have been actively seeking areas of cooperation with other groups that compliment our own water quality monitoring program, and we are making progress. I really believe Terry's expertise in the field of business development work will help us get to these levels and I'm very excited he's agreed to lead us forward.

George Ohrstrom II
President

Join the Team

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 kandersen@fosr.org 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
www.fosr.org

Get Your Commemorative 25th Anniversary Coin Today!



actual size

For a donation of \$100, you will receive this limited-edition commemorative coin celebrating FOSR's 25 years of monitoring our river's health. Only 250 will be minted. Visit our website at FOSR.ORG or use the enclosed donation form to make your contribution. Get yours today!

