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## Important News From the President

From a facilities point of view, things are looking particularly good for the Friends right now. On the one hand, we are very worried about current economic trends. But, on the other hand, our new laboratory at Shenandoah University is undergoing the final work needed before we are ready to move in. It is in the same building as the old lab, but now the Smith Endicott Water Quality Laboratory is a real lab, flanked by two other classrooms that were also renovated into other laboratories. Our lab is named after two champions of the environment, Former State Delegate Alston H. Smith and our own incomparable Francis Endicott.

Our new Lachat Water Quality analysis machine, thanks to the efforts of Senator Potts last year at the General Assembly, is on premises. Due to some unforeseen lab construction delays, it won't be hooked up until early November. We are also having to change the sink at the last minute to become American Disabilities Act compliant, but the new sink is on order and should be installed shortly.

The Board of FOSR is extremely excited about finally having a real lab for our monitoring analyses. I know the volunteers who monitor for us will be very pleased at having a space they can visit and be proud of. It is going to be a very different facility. Instead of a cramped small room that functioned as both a lab and an office, we will now have both a much larger lab and a separate office in which to work.

We encourage our monitors to stop in and see

the new space, and I'm sure they will feel real pride. (If they happen to be there at dusk they can also enjoy the view of beautiful sunsets!) It's an honor to their incredible hard work over the years that we have this new lab. If it weren't for their diligence and perseverance, it's doubtful that The Friends would ever have reached this point. We are, with our other water quality monitoring partner groups like the Friends of the North Fork and The Friends of Page County, the prime conduit of information about water quality in the Shenandoah River watershed to both local and state policy-makers. We are considered a Tier 3 certified laboratory. Not only State agencies like the VA Department of Environmental Quality (DEQ) use our data, but on occasion Federal Agencies like the Environmental Protection Agency utilize it as well.

So, the next time you are in the Winchester area, please stop by Shenandoah University and check out the new "digs," and if you happen to see the new President of Shenandoah University, Dr. Tracy Fitzsimmons, in your travels please thank her for her continuing support as well.

I also want to thank our professional staff, Karen Andersen and Molly Smith, for excellent work in 2008, our financial contributors who have helped keep us afloat this year, and our Board of Directors for their time and dedication in a challenging year. We look forward to successful operations in 2009 as we continue to provide the scientific basis for efforts to protect and improve water quality in the Shenandoah River for the benefit of citizens in the Valley as well as our neighbors downstream. After all, we all live downstream.

George Ohrstrom II, President

## DEQ-DGIF: FISH KILL TASK FORCE EVALUATES LATEST STUDIES

\*RICHMOND, VA.\*\*\* – The Shenandoah River Fish Kill Task Force met November 17, 2008, to review the latest research on the cause (s) of unexplained fish kills in several Virginia river systems since 2003. The meeting included presentations and discussions of findings during 2008. Though researchers have not identified a cause, they are evaluating several significant findings.

The work plan for 2009 will be developed with input from the task force's science subcommittee and should be finalized by early January. The general focus of work for 2009 will be on disease-causing organisms, fish health and water quality.

As researchers continue to gather valuable information, task force members are considering several theories. This includes the possibility of multiple stressors on fish populations that make the cause of the kills more complex than a single contaminant, virus or bacteria.

The Department of Environmental Quality and the Department of Game and Inland Fisheries, co-chairs of the task force, set priorities earlier in 2008 for available funds and coordinated a number of investigations this year. For example, studies in 2008 included sampling before, during and after fish kills in the rivers experiencing those problems. The investigation also emphasized rivers where fish kills have not occurred, expanded lists of chemical analyses with a focus on storm flows, and fish health studies.

Here is a summary of the fish kill investigation findings to date:

\*Water quality and environmental conditions\* – DEQ monitored every two weeks from March through May at multiple sites in the Shenandoah, James and Cowpasture rivers, and several comparison streams, for metals. Dr. Dan Downey of James Madison University conducted a study on the South Fork Shenandoah River and a heavily farmed tributary, Cub Run, that

evaluated physical and environmental conditions, metals, nutrients, organic chemicals, and pesticides. This was done at frequent intervals before, during and after storm events between March and May 2008. The fish kills have occurred mostly during the spring months, starting when water temperatures reach about 59 degrees Fahrenheit in March and April, and ending when temperatures reach the mid to upper 70s in mid-June. Fish kills appear to be connected to spawning periods for many of the fish species that have been affected. Water quality data from these studies and from extensive sampling during previous fish kill seasons have not identified any contaminants at levels that exceed water quality criteria or known levels of concern for toxic chemicals. This monitoring does not cover every possible water quality parameter, though it does include the most likely potential contaminants.

\*Analyses of "passive samplers" (imitation fish tissue)\* – Passive samplers were placed at multiple sites in the Shenandoah and Cowpasture rivers in spring 2007 by the Friends of the North Fork and DEQ. Additional samplers were deployed in spring 2008. These samplers imitate fish tissue and "accumulate" chemicals during a four- to six-week period and allow measurements of chemicals that are normally not detected in conventional water samples. A wide range of chemicals were detected and quantified, but no chemicals were found at levels equal to or above known water quality criteria at any sites.

\*Bottom-dwelling stream life\* – Dr. Reese Voshell of Virginia Tech led a multi-year study that evaluated invertebrate communities in the North and South Forks of the Shenandoah and a number of tributaries. Data analyses included comparisons with other large river systems, historical comparisons in the Shenandoah River, and indications whether areas with severe fish kills had corresponding harm to small creatures living on stream bottoms. None of the large river sites in the Shenandoah basin showed significant reduction in biological conditions. The health

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of small stream creatures showed no patterns that corresponded with areas of heavy fish kills. The data provided no evidence that toxic substances were present in amounts that would cause biological harm. In general, the presence of these creatures in the large river sections appears to be consistent with streams that have high levels of nutrients.

\*Fish health\* - Studies of fish health continued in 2008 by Dr. Vicki Blazer of the U.S. Geological Survey, and Dr. Don Orth of Virginia Tech and associates. Studies focused on fish kill areas in the Shenandoah, James and Cowpasture rivers and included comparison sites in the Rappahannock, New, North Fork Holston and other rivers. Fish were collected before, during and after fish kills. Specimens were examined externally and internally for lesions, general health and abnormalities of skin, gills and internal organs. In addition, parasites were identified and quantified, microscopic analysis was conducted on gills and internal organs, and blood chemistry was evaluated. As seen in previous years, male fish from the Shenandoah and Cowpasture rivers had a high incidence of immature female eggs in the testes, known as intersex. The studies suggest that a wide variety of parasites, bacteria and viruses caused infections in fish that died. It is not known whether fish kills and reproductive issues are linked.

\*Bacteria and viruses\* - In 2008, Dr. Rocco Cipriano of USGS conducted bacterial analyses on numerous specimens from fish kill and comparison sites before, during and after kills in the Shenandoah, James, Cowpasture and other rivers. Cultures were obtained from skin, gills and internal organs. The findings show that pre-kill fish had diverse types of bacteria, but no symptoms. Once the fish kills and symptoms such as skin lesions began, the dominant bacteria shifted to *Aeromonas salmonicida*. When fish kills ended in mid to late June, the bac-

teria in fish from the rivers with fish kills returned to the diverse groups seen before the kills. Specimens examined from streams without fish kills did not appear to host *Aeromonas salmonicida* at any time, even when fish kills were occurring in other rivers. *Aeromonas salmonicida* causes furunculosis, a disease with symptoms consistent with those observed in dead and dying fish in the Shenandoah, Cowpasture and James rivers. However, the investigation has not determined whether the bacteria caused the fish kills or is related to them.

Fish kills mainly have affected smallmouth bass and redbreast sunfish, though the incidence of fish deaths was relatively low in 2008. DEQ and DGIF continue to coordinate the investigation and efforts to obtain additional funding for future work.

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## Friends' Board Establishes Science Advisory Committee

Taking advantage of the substantial technical talent present on the Board of Directors, this past summer the Friends established a new Science Committee to help direct the organization's efforts in the near and long term.

The initial focus of the Committee relates to the recent fish kills in the Shenandoah River system. A "white paper" is being developed on the subject of arsenic and its possible involvement in the fish kills. At the same time, the impact of arsenic as an endocrine disrupter with implications for the bi-sexual condition in smallmouth bass in the River will be considered.

Making up the Committee are Meryl Christiansen, PhD, Robert Luce, PhD, Richard Marzolf, PhD, Chair, and Charles Vandervoort, MS. We look forward to the results of their efforts.

**Shenandoah Riverkeeper Opposes  
Changes for Merck Discharge  
Permit**

On July 24, 2008, on behalf of the Shenandoah Riverkeeper, the Director of the University of Virginia School of Law— Environmental Law and Conservation Clinic – filed an objection to Merck’s petition to increase its Wastewater Load Allocation (WLA) for nitrogen threefold and phosphorus fourfold over its current WLA for its wastewater treatment facility on the South Fork of the Shenandoah River. The objection states that the “increases violate the relevant regulations for restoration of the Chesapeake Bay, but they also represent a significant lost opportunity to further restore water quality in the South Fork” of the Shenandoah River.

The petition notes that “Merck’s nitrogen and phosphorus allocation were set as part of a lengthy process designed to attain water quality standards in the Bay, including the Chesapeake 2000 agreement, the Chesapeake Bay Watershed Nutrient Credit Exchange Program Act passed in 2005, the Tributary Strategy, the setting of WLAs in 9 VAC 25–720 (ed. note: State Regulation), and the implementation of those WLAs through the nutrient trading general permit.”

The filing states “that the overall process to actually achieve these cuts is failing. The Bay has seen little improvements in water quality, and the various programs set out in the Tributary Strategy are behind schedule.” It goes on to state that DEQ’s own Agency Background document related to Merck’s petition says the total nitrogen delivered to the Bay from the Potomac– Shenandoah basin is

expected to exceed the target of the Tributary Strategy by 300,000 pounds and that “the increase in Merck’s WLA for nitrogen from 14,619 lbs/year to 43,835 lbs/year will exacerbate this excess by almost 10 percent.”

The filing goes on to cite Section 40 (D) of the Regulation stating: “Any adjustment to an individual waste load allocation must ensure water quality standards are maintained.” And it comments that “The regulation does not list technical difficulty or expense in achieving a WLA as a potential reason for modifying a WLA,” and that Merck’s request “runs directly contrary to the Regulation “which authorizes reducing WLAs if the basin’s allocation is not met.”

The filing devotes substantial attention to Merck’s claim that it cannot meet its current WLA and DEQ’s suggestion that it might be allowed to expand its treatment capacity and see what level of treatment it achieves on a larger scale. “This approach is again inconsistent with the Bay restoration and nutrient credit trading programs” and “if Merck has difficulties meeting its WLA, it must purchase nutrient credits in order to comply with the general permit.”

Finally, the filing says “The Board (ed. note: The State Water Control Board) should not consider this rulemaking in isolation. — The totality of amendments to WLAs will determine whether the goals of the Tributary Strategy are met, —.”

The Riverkeeper concludes that he is deeply concerned if Merck’s petition is approved that it would represent a “missed opportunity to reduce pollution even more to the South Fork” and by the potential precedent approval of the petition would set for other facilities having trouble meeting their Waste Load Allocation nutrient caps.

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## WHO WE ARE

This column introduces to our readers the backgrounds of FOSR Monitors, Staff and Officers/ Directors. This issue honors and thanks Officers and Directors. (Meryl Christiansen will appear next quarter)

### George L. Ohrstrom, II

Mr. Ohrstrom is currently President (4th year) of The Friends of the Shenandoah River. He graduated from the University of VA with BA in English in 1978. He ran his own cabinetmaking business (Opequon Woodworks) from 1980 through 1998 when he became involved in natural resource protection issues in this region of VA. Mr. Ohrstrom is a board member/executive committee member of both The Piedmont Environmental Council and The VA League of Conservation Voters. He is also Vice-Chair of The Clarke County Planning Commission, and a member of the Clarke County Conservation Easement Authority and the Berryville Area Development Authority.

### Don Orr

Don Orr is currently the Executive Vice-President of FOSR. He has served on the Board since its inception in 1989. Mr. Orr is a master plumber who manages the potable water supply system in his residential development adjacent to the Shenandoah River just north of Front Royal. He has chaired the Monitor Committee for many years and has spent many hours transporting water samples and assisting in the lab. In his 20 years on the Board he has devoted his time and effort to the environment and the watershed.

### Charles Vandervoort

Charles Vandervoort is First Vice-President of FOSR. He lives on the River at Calmes Neck. He has MS degrees in physics from Stanford University and operations research from Case Institute. His work in many underdeveloped countries led

him face-to-face with the consequences of gross neglect of the environment, especially the massive pollution, sedimentation, and poisoning of the rivers. This experience was one of his main motivations to join the FOSR. After serving a stint as treasurer, he now applies much of his spare time working with the FOSR and partners monitoring rivers and analyzing monitoring data, and writing reports on the status of water quality in the Shenandoah River Watershed.

### John Simpers

Mr. Simpers has been Secretary of the Friends of the Shenandoah River since 2001. He also volunteers time at our laboratory facility helping with the bi-monthly analysis of water samples. While John does not live on the River, nor do many recreational activities on the water, he says he recognizes the vital importance of a healthy ecosystem and healthy watershed to our region. Employed full time and with many additional activities, John says his secretarial duties continue to be the main way he finds he can assist with the beneficial work that FOSR performs for the Shenandoah Valley.

### Bud Nagelvoort

Bud Nagelvoort has been on the Board since 1992 and has been Treasurer since 2004. He has been a monitor for 10 years and his background was described in an earlier issue of the newsletter. Mr. Nagelvoort says he has been very pleased to have been able to make use of FOSR monitoring data in his work with the Lord Fairfax Soil and Water Conservation District and with the Winchester Chapter of Trout Unlimited in dealing with water quality problems in the Shenandoah River watershed.

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**Charles Newton**

Charles is an engineer with a Masters in Business, who works for Shenandoah National Park.

Charles began volunteering for the Page Water Quality Advisory Committee in 1998 and is currently serving as Chairman of the Committee. Charles represents the Friends of the Shenandoah River on the Technical Advisory Committee to the multi-state Shenandoah Valley Regional Water Resources Policy Committee and the Shenandoah River Pure Water Forum. He is a Director of the Shenandoah Valley Soil & Water Conservation District, a member of the Page County Planning Commission, President of the non-profit Page County Tree Board and coordinates monitoring activities in the Page Valley for the Friends of the Shenandoah River.

**Glenn Boireau**

Mr. Boireau attended the University of Massachusetts for Mechanical Engineering. He has 30 years of experience in various types of water and wastewater treatment in the electroplating, electronics, and pharmaceutical industries, as well as for municipal entities. He is the chief operator for one of Frederick County's drinking water treatment plants. His involvement in the local agriculture business, and his concern for local water quality issues, led to his service with the FOSR.

**Gary Lauben**

Mr. Lauben earned a Bachelor of Science in Geophysics from Virginia Tech in 1993. He has worked as a field geologist for North American Exploration in Charlottesville, VA, and currently is employed by the USGS. He has worked with the FOSR since January 2007 as both a volunteer water monitor and webmaster.

**Robert W. Luce**

Mr. Luce received a PhD (Stanford University) in geology. His first job was with the U.S. Geological Survey. In 14 years with USGS he mapped geology, sampled geochemistry, and conducted experiments on mineral/water reactions. He directed chemical and mineralogical laboratories. For another 14 years he worked for private environmental engineering firms concerned with chemical pollution abatement. He directed several CERCLA and RCRA investigations and remediation. Two years were spent with the U.S. Nuclear Waste Technical Review Board, followed by five years consulting in geochemistry and hydrogeology. He has published in refereed journals and is a Certified Professional Geologist in Virginia. He retired In 2002 and joined FOSR, revised the lab QA manual, became its representative on the South River Science Team (for mercury contamination), and helped start the FOSR Science Advisory Committee.

**Richard Marzolf**

Dick Marzolf received a PhD from the University of Michigan in 1961. He was on the faculty at Kansas State University from 1962-1988 and developed the study of river impoundments and problems presented by high suspended sediment loads in reservoirs that created conditions of light limitation. He served on the Water Science and Technology Board of the National Research Council/ National Academy of Science 1986-1991. He joined the National Research Program of the USGS in 1991. He is currently a USGS Scientist Emeritus after serving for several years as the Chief of the Eastern Region of the National Research Program. He volunteers time in retirement to the Lord Fairfax Soil and Water Conservation District and to FOSR to help apply principles of fundamental science to public policy issues relevant to water resources.

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## Cleanup Moves Forward at Avtex Site

By John Torrence, Site Representative and  
Manager FMC Corporation

FMC, the Virginia Department of Environmental Quality (VDEQ) and the Environmental Protection Agency (EPA) continue to work together finalizing the plans for the remaining remediation tasks at the Avtex site. Cleanup continued to the east of the railroad tracks in the former Plant Area in preparation for the Royal Phoenix business park redevelopment effort.

FMC began excavating sewers from the southern half of the former Plant Area in February 2007 and will continue sewer removal work during 2008. In addition, impacted soils were identified, stockpiled, and then disposed in accordance with design plans.

In the Fall of 2007 the United States Army Corps of Engineers (Corps) completed the demolition of the last Plant Area buildings, the management of their portion of the demolition debris and other activities prior to leaving the Site in November 2007. During the Fall the Corps and FMC had been characterizing the brick, concrete and debris generated from this effort so that it could be properly disposed.

FMC also continued clean-up work on the parcel of land intended for future use as an Open Space and Conservation Park (Conservancy Area.) Native Virginia grasses, bushes and trees were planted on the closed Fly Ash Basins where the Smithsonian CRC continued their ecological monitoring work. The engineering design to close eight more waste basins and a landfill has been completed and the Waste Water Treatment Plant continues to treat storm water on a regular basis.

Working together, FMC, VDEQ and EPA remain committed to achieving a shared goal of finishing the remediation so that the land can be redeveloped and reused safely.

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ed. note: The Friends of the Shenandoah River is pleased to continue to receive financial support for its work from FMC, the latest being \$2500 this summer.

## Chesapeake Bay Cleanup Means a Healthier Environment in the Shenandoah Valley But Will Miss 2010 Goals

The September 2008 issue of the Bay Journal describes the status of key 2010 goals established by the Chesapeake Bay Program to correct the long term damage to the Bay caused by water pollution entering the Bay from its watershed including the Potomac River with its Shenandoah River tributary. While the following numbers don't spell out benefits to residents of the Valley, they do provide evidence of progress since the goals were first established in 1985.

### Basinwide Nitrogen Reduction

Goal - 162.5 million pound reduction  
2007 - 47 % achieved, 2010 - 54 % anticipated

### Basinwide Phosphorus Reduction

Goal - 14.36 million pound reduction  
2007 - 62 % achieved, 2010 - 68 % anticipated

### Basinwide Sediment Reduction

Goal - 1.69 million ton reduction  
2007 - 64 % achieved, 2010 - 74 % anticipated

### Municipal and Industrial Wastewater Nitrogen

Goal - 49.9 million pound reduction  
2007 - 74 % achieved, 2010 - 80 % anticipated

### Municipal and Ind. Wastewater Phosphorus

Goal - 6.16 million pound reduction  
2007 - 87 % achieved, 2010 - 93 % achieved

### Agriculture Nitrogen

Goal - 97 million pound reduction  
2007 - 48 % achieved, 2010 - 54 % anticipated

### Agriculture Phosphorus

Goal - 6.5 million pound reduction  
2007 - 51 % reduction, 2010 - 54 % anticipated

### Agriculture Sediment

Goal - 2.55 million ton reduction  
2007 - 48 % achieved, 2010 - 54 % achieved

