

# Virginia Water Central

Virginia Water Resources Research Center Blacksburg, Virginia May 2007 (No. 41)

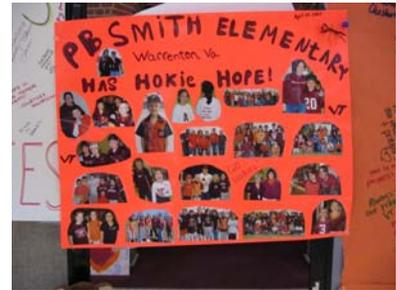
## After the Virginia Tech Tragedy



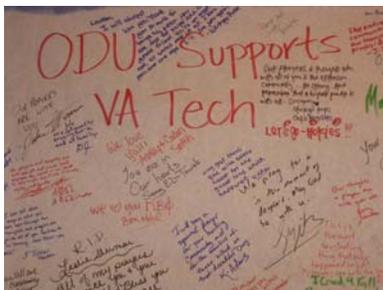
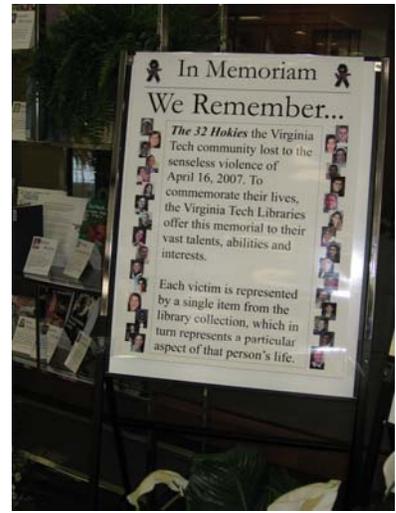
The Virginia Water Resources Research Center expresses our deep sympathy for the families of the people who died on April 16, 2007; our wish for a full recovery by those who were wounded; our willingness to do whatever we can to help Virginia Tech and Virginia recover; and our sincere gratitude for the tributes, support, and well-wishes extended by people worldwide.



Virginia Tech's Web site devoted to the events and aftermath of April 16 is at [www.vt.edu/remember/](http://www.vt.edu/remember/). Virginia Tech has set up the Hokie Spirit Memorial Fund ([www.vt.edu/fund/](http://www.vt.edu/fund/); phone 800-533-1144) for donations to support victims' and families' grief counseling, memorials, and other needs. Also, the United Way of New River Valley has established the United in Caring fund ([www.unitedwaynrv.org](http://www.unitedwaynrv.org)) to provide assistance to families, wounded victims, and community agencies responding to the event; for more information, phone (540) 381-2066. Several funds suggested by specific families are listed online at [www.vt.edu/remember/archive/memorial\\_services.php](http://www.vt.edu/remember/archive/memorial_services.php). The Water Center encourages you to consider these or other legitimate funds set up to honor or memorialize the people lost on April 16.



The Virginia Tech Office of University Relations asks that notes, tributes, and other messages intended for families of victims be directed to the Dean of Students Office, 201 West Roanoke Street, Blacksburg, VA 24060; (540) 231-3787.



The photos around this page are a sample of the hundreds of tributes that were on display on the Virginia Tech campus in late April and early May.



*Water Central's* regular content begins on page 2.

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North Fork Shenandoah River at Timberville in Rockingham County, February 26, 2007. For recent stream flow, groundwater, and precipitation information, please see the Water Status Report.

## SPECIAL ANNOUNCEMENT

### ***Water Central* Says Good-bye to Paper (Soon)**

After this issue and one more, the paper version of *Virginia Water Central* will be discontinued, except for special requests.

Starting with issue #43, the primary distribution will be an e-mail notification when a new issue is posted at the Center's Web site, [www.vwrcc.vt.edu](http://www.vwrcc.vt.edu). Readers who currently receive only the paper version of the newsletter and who wish to receive e-mail notifications *must* send an e-mail address to [araflo@vt.edu](mailto:araflo@vt.edu); when doing so, please indicate the mailing address on your print copy. Readers who do not have access to the Internet or a printer may ask to receive photocopies of future issues, and we will honor those requests as long as the number is manageable and affordable. Also, Virginia state depository libraries will continue to provide public access to *Water Central*.

Many readers (I suspect) appreciate the concrete, portable nature and convenience of a print newsletter. But this change will save paper, energy, and money (between \$2500 and \$3000 per issue that can then be used for other educational, research, or public service efforts), and it will allow more flexibility and creativity in the newsletter's content and layout.

The Water Center asks for and appreciates your cooperation during this transition.

*Alan Raflo, Water Central editor*



## S<sup>2</sup> on H<sub>2</sub>O



*By Stephen Schoenholtz, Director Virginia Water Resources Research Center*

In the months since the last *Water Central*, much has happened at the Water Center.

Most of it has been positive, but some—as you are all aware—has been tragic.

Of course, Virginia Tech will never be the same after the events of April 16, 2007. The campus water community, in particular, is mourning the loss of G.V. Loganathan and his class of advanced hydrology students. G.V. had worked with the Water Center for many years and was a key collaborator and highly respected colleague at Virginia Tech. The graduate students in his class were some of the brightest young hydrologists on campus. The outpouring of sympathy and concern from many of you following this loss has been comforting and very supportive. We at the Water Center are very appreciative of your thoughtful concerns. We are also newly aware of being a part of the resilient Virginia Tech community, which is clearly determined to prevail, while memorializing those we have lost.

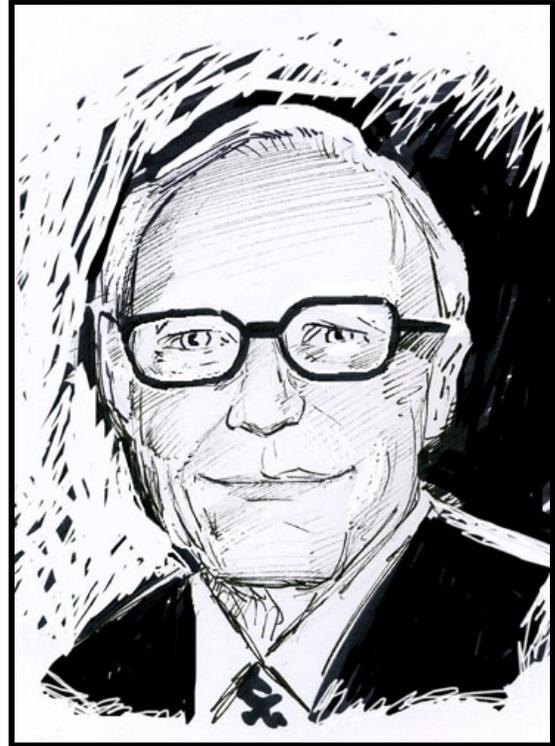
In March we lost our good friend and former director, William R. Walker, to whom we pay tribute in the following article. Bill and his wife Loreta were world travelers and had recently returned from a wonderful tour of New Zealand. It is heartening to know that Bill enjoyed life to the fullest right up to his passing. Bill leaves behind an amazing legacy of accomplishment as Water Center director. He liked to visit our offices to say hello and check on my progress as the new director, and I quickly came to appreciate his experience and insight into water issues and the role of the Water Center. I feel fortunate to have had the opportunity to get to know him.

Despite these setbacks, there has been much positive news at the Water Center during the past several months. We are ending the fiscal year on a very positive note. The Water Center recently received funding from the Virginia Department of Conservation and Recreation (DCR) and the U.S. EPA to support two projects in the critical area of stormwater management in Virginia. The DCR project involves developing a Web-based

*See Schoenholtz, page 33*

## SPECIAL FEATURE

### Bill Walker Built the Water Center



**William R. Walker, 1925-2007**

William R. Walker, the first, longest-serving, and most influential director of the Virginia Water Resources Research Center, died March 21, 2007, in Phoenix, Arizona.

Born in 1925 in Waverly, Nebraska, Bill studied civil engineering and then law at the University of Nebraska. He earned a master's degree in sanitary engineering from the University of North Carolina. He met his future wife, Loreta, while in school in Nebraska. Their three children—Jim, JoEllen, and Michael—were born while Bill was working in Chicago for U.S. Gypsum.

Bill came to Virginia Tech to teach in the Department of Civil Engineering (now the Via Department of Civil and Environmental Engineering). In 1965, he was appointed as the first director of the Virginia Water Center. For the next 27 years, he and his staff built a program that administered over 200 research projects, published over 170 research bulletins and many educational publications, held an annual conference, helped train water-resources students,

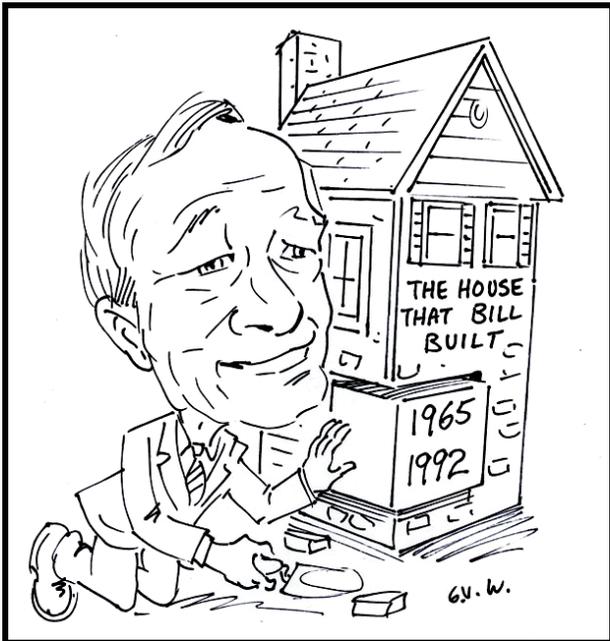
and provided technical assistance to citizens, General Assembly members, agency staff, and educators in Virginia and other states.

Bill built the Water Center on a foundation of service. A 1992 Water Center publication, *Putting the Pieces Together*, identified four principles guiding the Center's work: 1) an interdisciplinary approach among science, engineering, law, and public policy; 2) objective analysis of water issues; 3) quality control of research projects; and 4) making information accessible to all Virginia citizens and decision makers. That publication concluded with the following statement (author unidentified):

"Every citizen has a vital interest in water. It is one of the few resources that is finite in quantity, owned by all, and under constant threat from pollution. Water must be managed for the present and future good of all citizens, and the role of the Virginia Water Resources Research Center is to provide the information needed for good management."

Those principles and that statement describe Bill Walker's vision for the Virginia Water Center. Forty-two years after Bill began to build the Center, we at the Center still try to use that vision to see the way forward.

In this article, *Water Central* is pleased to present comments generously provided by people who knew and worked with Bill. The article also lists a sample of Bill's publications and concludes with some of Bill's own words.



This George Willis cartoon accompanied the April 1992 *Water News* article announcing Bill Walker's retirement from the Water Center.

## Colleagues Recall Remarkable Contributions

*Len Shabman, Water Center Director 1995-2002; currently a Resident Scholar, Resources for the Future, Washington, D.C.*

I was a new faculty member at Virginia Tech in July 1972 when Bill invited me to help him identify the most important water resources issues facing the Commonwealth. I learned quickly that Bill wanted to align the Center programs in research, extension, and teaching with the needs of the people of Virginia. In the end we prepared a plan to bring the expertise in the academic community to bear on solving the water-management problems of the state.

This was strategic planning, 1972 style. Bill did not develop his plan by reading journals or by sitting at his desk; rather, in 1972 he and I spent hours, indeed days, riding from Virginia Beach to Fairfax and from Fairfax to Grundy to hear from citizens, government officials, and faculty at all the colleges and universities across the state who were concerned about water resources. Bill repeated this activity at different times in the years that followed.

*Service* was the hallmark of Bill's tenure as Center director. For Bill, service meant that a decision was made with a better understanding of water science, or that a member of the General Assembly asked for advice before a vote was made. Bill established multiple publication series to build bridges from the academic world to the world of decision making. Service also meant undergraduate and graduate education through ever-expanding learning opportunities.

The Center gained support throughout the state and in the General Assembly. With a growing budget and reputation for academic excellence and service to the Commonwealth, the Center was recognized as one of the best of its kind across the nation. A series of unfortunate budget and political events, unrelated to the Virginia Center, transpired in the early 1990s just as Bill was about to retire, and budget support for the Center in the state and at the federal level fell dramatically. But even as the Center has had to change with the times, it continues to serve the needs of the Commonwealth and remains among the best of its kind across the nation. In no small part this continuing success is built on the foundation laid by Bill Walker.

## A Sample of Work by William R. Walker

During Bill Walker's tenure as Water Center director (1965-92), the Center maintained a busy program of supporting research, helping train students in water-related fields, holding an annual Virginia water-resources conference, helping individuals with specific questions or problems, and publishing information in various formats, including Research Bulletins, Special Reports, the monthly newsletter *Water News* (predecessor to *Virginia Water Central*), the "Point-Counterpoint" series, and the "Focus on Water" series.

According to the April 1992 issue of *Water News* (announcing Bill's retirement as Water Center director), Bill wrote over 100 articles and publications. As a sample, below are listed several Water Center Research Bulletins and Special Reports for which Bill was author or co-author.

### **Water Center Research Bulletins**

- No. 1, *Water Resources of Virginia: Inventory of Printed Information and Data*, by Frederick E. McJunkin and William R. Walker, 1966.
- No. 2, *Water Resources Programs in Virginia*, edited by William R. Walker, 1966.
- No. 9, *Water Resources Laws in Virginia*, by William R. Walker and William E. Cox, 1968.
- No. 10, *Flood Damage Abatement Study for Virginia*, by William R. Walker, 1971.
- No.17, *Water Resources Research Interests in the Colleges and Universities of Virginia*, William R. Walker, 1968.
- No. 18, *Water Resources Research in Virginia*, by William R. Walker, 1968.
- No. 26, *Economics of Air and Water Pollution*, edited by William R. Walker, 1969.
- No. 37, *Legal Aspects of Water Supply and Water Quality Storage*, by William R. Walker and William E. Cox, 1970.
- No. 39, *Flood Damage Abatement: Federal Assistance to Local Government*, edited by W.R. Walker and T.W. Johnson, 1970.
- No. 49, *Water Resources in Virginia: 1969-1971*, edited by William R. Walker and T.W. Johnson, 1972.
- No. 107, *Water Resources Administration in Virginia: Analysis and Evaluation*, by William R. Walker and William E. Cox, 1976.
- No. 112, *Wastewater User Charges and Industrial Cost Recovery: Guidelines and Examples*, by Peter M. Ashton and William R. Walker, 1978.
- No. 147, *A Water Code for Virginia*, William R. Walker and Phyllis G. Bridgeman, 1985.

### **Water Center Special Reports**

- SR-11, *Recommendations for Improving Water Resources Management in Virginia*, by William R. Walker and William E. Cox, 1976.
- SR-7, *Virginia Water Law: A Functional Analysis with Respect to Quantity Management*, by William E. Cox and William R. Walker, 1979.
- SR-18, *Anatomy of a Water Problem: Virginia Beach's Experience Suggests Time for a Change*, by William R. Walker and Phyllis G. Bridgeman, 1985.
- SR-20, *A Water Code to Meet Virginia's Needs*, by William R. Walker and Phyllis G. Bridgeman, 1985.
- SR-23, *Are Virginia's Wastewater Treatment Plants Financially Healthy?* by W.R. Walker and S.C. Richardson, 1991.
- SR-24, *The Federal Wetlands Manual: Swamped by Controversy*, by William R. Walker and S. C. Richardson, 1991.

### ***William E. Cox, Professor of Civil and Environmental Engineering, Virginia Tech***

My association with Bill Walker goes back to the early days of the Water Center. Back in the early 1960s, Bill was a member of the [Civil Engineering] Department's faculty who used his multidisciplinary background in engineering and law to teach such classes as "Professional and Legal Issues in Engineering and Water Law." The establishment of the Virginia Water Resources

Research Center as part of a federal/state partnership created an unplanned opportunity for him to head a new organization when he was asked to be its original director. The shape of the new organization and its relationship with the rest of the university had to be developed, and the continued existence of the centers [in Virginia and other states] was often in doubt and required considerable effort to build the necessary support. Bill was one of the national leaders in those

efforts and can be given much of the credit for the program's survival and ultimate success over the years since that time. Bill found his true calling as an administrator, and the Center will always be closely associated with Bill's name due to his long and dedicated service as its director. He is well known in the water-management field across Virginia and the nation due to his extensive involvement in efforts to improve water-management capabilities.

***Gerald P. McCarthy, Executive Director, Virginia Environmental Endowment***

Bill Walker was a consummate professional.... When he started the Water Center at Tech, it was a new idea, and he was among the most accomplished at getting the purpose of the Center recognized and accepted by our state government. I served Governor [Linwood] Holton and then Governor [Mills] Godwin during these earlier days, and Bill was always a source I could depend on for accurate policy and scientific information.

***Tamim Younos, Water Center Associate Director (Interim Director 2002-06)***

Bill Walker was a visionary leader who understood the long-term impacts of good science on policy and decision making. As the Water Center director, he championed...the role of the Center and the importance of water research and education to the Virginia General Assembly. His efforts led to establishing the Water Center as a state agency.

***Sandra S. Batie, Department of Agricultural and Applied Economics, Virginia Tech, 1973-92; currently Professor, Michigan State University***

Bill Walker was an important person to the evolution of water science and policy on [the Virginia Tech] campus. His willingness to use the Center funds for all types of science on campus was a catalyst for much of what we see today at Tech. Tech [and I] owe him thanks.

***Saied Mostaghimi, Professor and Head, Biological Systems Engineering Department, Virginia Tech***

As a new faculty member, I received my first grant from the Water Center. We proposed to build small plots and use a rainfall simulator to investigate the impacts of various management practices on runoff water quality. Bill Walker saw great potential in the approach and results, and over the years [the Center] funded another half a dozen projects to continue my work on evaluation of the effectiveness of best management practices

[BMPs]. This funding defined my career and interest in developing monitoring systems for [BMP] impact assessment.

I also had the great privilege of traveling with Bill and his wife to Israel in 1989 as a member of the Virginia governor's delegation to discuss water issues of mutual interest. I really enjoyed the time I spent with them and he always mentioned the fond memories of that trip.

I was so pleased when the Virginia Water Center's William R. Walker Graduate Fellow Award was established to honor him. Two of my graduate students have proudly received that award. I feel blessed that I had the opportunity to get to know Bill. He was a great mentor and friend and impacted the life and careers of many individuals. He will be greatly missed.

***Mary C. Terry, Executive Director, Southeast Rural Community Assistance Program, Roanoke***

Bill Walker was the sustainer of the Water Center's newsletter, which provided great information. Also while he was [Center director, the Center had] a computer game with questions on the use of water, and it would tell you if you were a "Water Hog" or not. It is items like this that Bill brought to people across the state.

***George M. Simmons, Professor in the Department of Biological Sciences and University Director for Pre-medical/dental Advising, Virginia Tech***

Bill was instrumental in helping [me] begin my career [first] while I was a graduate student at Virginia Tech and [then] as a new faculty researcher in aquatic ecology [at Virginia Commonwealth University]. Aside from funding, his confidence in my ideas and activities were very important. He was gracious and went to extra lengths to [introduce me] to one person or another...to discuss a topic of mutual interest.

Bill was a visionary person. He was always looking at the horizon and contemplating the next big issue or problem in water resources/water quality. In many instances, he already had funded projects going when the problem became recognized and people were asking for answers.

Whenever a meeting in Virginia involved water, Bill Walker was there and everyone was interested in knowing his position or opinion. I am very lucky that my career spanned his. Many of us old-timers at Virginia Tech (and many others from around the Commonwealth) owe our beginnings to his support and encouragement. He was a friend and mentor.

**John Carlock, Deputy Executive Director,  
Hampton Roads Planning District  
Commission, Chesapeake**

From this end of the state, Bill was seen as a strong supporter for improved water-supply planning and water-supply delivery. He was instrumental in a regional project in the mid-1990s to review state water law and recommend steps that could be taken to improve the state's consideration of water supply.

**Elizabeth Crumbley, Editor of Water News from 1985 to 1994; currently  
Communications Manager, Virginia Tech  
College of Engineering**

When Bill Walker returned from a trip—whether...to Richmond...or to exotic places like Peru or the Amazon—he always brought ideas back with him. Some were practical ideas that were easy to execute; others were far-reaching ideas that seemed, on the surface, impossible. He was...always seeking ways to take the Water Center farther than anyone else would have imagined it could go.

In trying to help carry out some of those ideas during the nine years I worked at the Center, I learned about water resources, our legal system, communications, the workings of government, and how to wrestle ideas into action—in ways that I would never have learned had I not worked with Bill. He was demanding and didn't hesitate to let us know when he was disappointed. But he could be surprisingly charming, as he was the first time I confessed a mistake I'd made in writing an article about a piece of General Assembly legislation. "Don't fret about it," he said, with his dry sense of humor. "If you were perfect, I couldn't afford you."

## Some Walker Straight Talk

This article closes with several observations on Virginia water resource issues that Bill made in 1990 for a special *Water News* insert commemorating the Virginia Water Center's 25<sup>th</sup> anniversary.

•“To date, water supply has been viewed as a local responsibility. ...[But] increases in demand coupled with a limited number of new sources will make regional management of water supply a necessity. The state can move aggressively to address the problem, or it can be brought kicking and screaming into a leadership role in the 21<sup>st</sup> Century when regionalization of water supplies is the only feasible and cost-effective solution.”

•“Virginia needs to move from a superficial reactive position to an active position of organized drought management that can reduce economic and social costs as well as address issues such as minimum instream flows...and conjunctive use of surface and ground waters.”

•“The hard reality is that affordable structural resources cannot prevent all flood losses. ...The option of keeping people away from floodwaters is rarely implemented. The state will need to assert real leadership in making non-structural options viable in the future.”

•“The state needs to determine whether it wants to assume primacy [primary regulatory control] in [wetlands] management or to leave the issue for the federal bureaucracy to decide.”

•“Water is a public resource and the state needs to develop a comprehensive water-use policy.... Virginia faces two choices during the 1990s and the 21<sup>st</sup> Century: develop a management strategy pursuant to a well-conceived water policy, or stumble from crisis to crisis with stop-gap decisions that will maximize social and economic costs.”

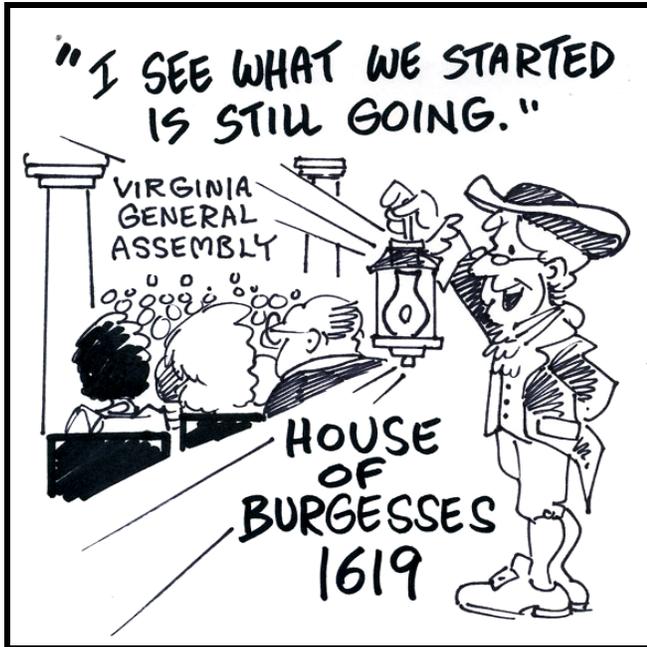


Bill Walker's red pick-up truck carried the VWRRC director through many years of faithful service. The license plate read "H2O-Bill."

A memorial service for Bill Walker will be held June 9, 2007, at Blacksburg United Methodist Church. Bill's family requests that memorial contributions be made to the William Walker Graduate Fellowship, Virginia Tech Development Office, 902 Prices Fork Road (0336), Blacksburg, VA 24061; or to a charity of the donor's choice.

## FEATURE ARTICLE

### Water in the 2007 Virginia General Assembly



The 2007 Virginia General Assembly convened January 10, adjourned February 24, and held a reconvened (“veto”) session on April 4. During the session, the Assembly considered 3427 measures (3069 introduced in this session and 358 continued from the 2006 session). This year’s “short session” Assembly also considered amendments to the 2006-08 biennial state budget.

In this article, *Virginia Water Central* lists 150 measures in the 2007 Assembly that dealt with water resources or with land activities with a relatively direct impact on water. The list also includes some bills that may affect water resources *indirectly*, such as certain bills about air pollution, electricity generation, or transportation. A table on page 10 lists several topics and bills from the 2007 Assembly that received attention in various news media

*Water Central’s* list comes from the Legislative Information Service (LIS) Web site, at <http://leg1.state.va.us>. Most measures were located by searching the following LIS subject categories: Budget; Conservation; Energy Conservation and Resources; Fisheries and Habitat of Tidal Waters; Game, Inland Fisheries and Boating; Water and Sewer Systems; and Waters of the State, Ports and Harbors. *Water Central’s* list is organized alphabetically by these LIS categories. A few bills found in other

categories are included under “Miscellaneous” at the end of the list (with the LIS category indicated). Bills are listed under only one category, even if LIS listed them more than once.

Within each category, bills are listed in order of their **bill number**, using the following abbreviations: **HB** = bill started in House of Delegates; **HJ** = joint resolution started in the House; **SB** = bill started in the Senate; and **SJ** = joint resolution started in the Senate.

*Water Central* does not claim that our list includes *all* bills that potentially could affect Virginia’s water resources.

**SPECIAL NOTE:** Normally *Water Central* includes a summary for each bill, based on information provided by the LIS. This year, however, the April 16 events at Virginia Tech and their aftermath reduced the time available for this article, so bill summaries are not provided. If you are reading this article online, you can get more information about each bill (summary, legislative history, etc.) by visiting the LIS Web site listed above and searching by bill number. If you do not have Internet access, you may enquire about bills by calling (804) 698-1500 (House bills) or (804) 698-7410 (Senate bills).

#### Following Next Year’s General Assembly

Various services are available for following legislation during a General Assembly session. Virginia’s **Legislative Tracking Service** allows tracking up to five bills in one “profile”; online registration is at [www.virginia.gov/liab/cgi-bin/liab\\_signup.cgi](http://www.virginia.gov/liab/cgi-bin/liab_signup.cgi). To track more than five bills, the **Lobbyist-In-A-Box** subscriber service is available for a fee; visit [www.virginia.gov/liab/infopage.htm](http://www.virginia.gov/liab/infopage.htm). The Legislative Automated Systems Help Desk at (804) 786-9631 also has information about either tracking service.

You may enquire about bills during sessions by phoning (toll free) (888) 892-6948 (Senate bills) or (877) 391-FACT (House of Delegates bills). To express your opinion on legislation during a session, phone the **Constituent Hotline** at (800) 889-0229; in Richmond, use (804) 698-1990.

## BUDGET

[HB1650](#) Budget Bill. Appropriation of public revenues for the two years ending, respectively, on June 30, 2007, and June 30, 2008. **Passed.**

## CONSERVATION

### Land Conservation Bills

[HB 1713](#) Resources Authority; expands projects that can be financed to include land conservation and preservation. **Incorporated** into HB 2694 (see below).

[HB 2191](#) Land preservation tax credit; maximum amount allowed annually. **Failed** in House Finance Committee.

[HB 2226](#) Land conservation income tax credits; removes annual inflation indexing. **Failed** in House Finance Committee.

[HB 2694](#) Resources Authority; expands projects that can be financed to include land conservation and preservation. **Passed.** Identical to SB 1211.

[HB 2825](#) Land Conservation Fund; disbursement of moneys. Identical to SB 942. **Passed.**

[HJ 576](#) Open space and farmlands; joint subcommittee studying funding sources for purchase of development rights. **Incorporated** into HJ 692 (see below).

[HJ 692](#) Open space and farmlands; joint subcommittee studying funding sources for purchase of development rights. **Passed.** Identical to SJ 401.

[SB 804](#) Easements; landlocked parcels. **Failed** in Senate Courts of Justice Committee.

[SB 942](#) Land Conservation Fund; disbursement of moneys. Identical to HB 2895. **Passed.**

[SB 1211](#) Resources Authority; expands projects that can be financed to include land conservation and preservation. **Passed.** Identical to HB 2694.

[SJ 358](#) Northern Virginia land preservation; Department of Conservation & Recreation & task force to study. **Failed** (stricken from Senate Rules Committee at request of patron).

[SJ 396](#) Northern Virginia parkland; Governor to establish task force to study. **Incorporated** into SJ 401 (see below).

[SJ 401](#) Open space and farmlands; joint subcommittee studying funding sources for purchase of development rights. **Passed.** Identical to HJ 692.

### Other Conservation Bills

[HB 1689](#) Municipal solid waste; regulation thereof. **Passed.**

[HB 2206](#) Highway construction projects; shortens time for state agencies to respond for permits requested. **Failed** in House.

[HB 2384](#) Uniform Environmental Covenants Act; created. **Failed** in House Agriculture, Chesapeake and Natural Resources Committee.

[HB 2396](#) Goose Creek; designating portion in Fauquier and Loudoun Counties as Scenic River. **Passed.**

[HB 2431](#) Reversion of federal lands; state to take title to lands containing environmental contamination. **Passed.**

[HB 2539](#) Water Resources and Wetlands Protection Program; created. **Passed.**

[HJ 698](#) Power plants; Department of Health to study public health effects of using trona to mitigate emissions. (Trona is a mineral with properties similar to baking soda that is used to reduce sulfur dioxide emissions.) **Failed** in House Rules Committee.

[HJ 709](#) State park along South Mayo and North Mayo Rivers; Department of Conservation and Recreation to study feasibility in Henry County. **Passed.**

[SB 1031](#) Power plant siting; requirement for applicant. **Passed.**

[SB 1115](#) Trees and timber; proceeds of sale of those from state parks and natural area preserves (plus threshold for competitive bids). **Passed.**

[SB 1418](#) First Landing State Park; Department of Conservation and Recreation to lease portion. **Passed.** Similar to HB 3151 (see below under Game, Inland Fisheries, and Boating).

*List continues after table on following page*

## Some Water Resource Issues Covered by News Media During the 2007 Virginia General Assembly.\*

Topic and Related Bill Numbers	MEDIA SOURCES**
<b>Biosolids/Sewage Sludge</b> HB 2079, HB 2801, HB 2802, HJR 694, SB 1241, SB 1300, SB 1313, SB 1339, and budget amendments to fund transfer of oversight from Dept. of Health to Dept. of Environmental Quality	AP, AVJ, BB, BUS, DP, FLS, LNA, RN, ROA, WDBJ-TV (Roanoke), V-P
<b>Boating Safety</b> HB 1627, HB 2373, SB 1130, SB 1241, SB 1314	BB, LNA, ROA, V-P, WDBJ-TV (Roanoke)
<b>Chesapeake Bay Clean-up</b> (\$250 million in bonds proposal; plus \$26 million in general fund, for sewage-treatment improvements) HB 1650, HB 1710, SB 771	AGP, DP, FLS, PW, RTD, SNL, V-P, WE, WP
<b>Climate Change Study</b> HJ 681	CDP: 1/12; RTD: 1/22
<b>Consolidation of Citizen Boards</b> (for air, water, and waste) HB 3113, SB 1403	AGP, DP, HDNR, ROA, RTD, SNL, V-P
<b>Combined Sewer Overflow</b> (CSO money for Lynchburg and Richmond) HB3102, SB 1301, SB 1322, and a budget amendment	LNA, RTD, WDBJ-TV (Roanoke)
<b>Eminent Domain</b> HB 2954, HJ 708, HJ 723, SB 781, SB 1296, SJ 404	BB, LNA, ROA, WDBJ-TV (Roanoke)
<b>Energy: Electricity-industry Re-regulation</b> HB 3068, SB 1416	ROA, RTD, V-P, WDBJ-TV (Roanoke), WP
<b>Energy: Renewable Energy Portfolio Standard</b> SB 1275	PW, RTD
<b>Energy: Tax Breaks for Conservation Purchases</b> HB 1678, SB 867 (Assembly considered several other bills as well, but these two were mentioned in the news sources cited)	V-P, WDBJ-TV (Roanoke)
<b>Open-space funding</b> Budget amendment	WVTF-FM, ROA

\*Each issue (but not necessarily each related bill) was mentioned at least once by each source noted.

\*\*Abbreviations for media sources: AGP = *Alexandria Gazette Packet*; AP = *Associated Press*; AVJ = *Altavista Journal*; BB = *Bedford Bulletin*; BC = *Burke Connection*; BUS = *Brookneal Union Star*; CNS = *Capital News Service*; CDP = *Charlottesville Daily Progress*; DP = *Daily Press* [Hampton Roads area]; FLS = *Fredericksburg Free Lance-Star*; GW = *Greenwire Internet Site*, [www.eenews.net/Greenwire.php](http://www.eenews.net/Greenwire.php); HDNR = *Harrisonburg Daily News-Record*; LNA = *Lynchburg News & Advance*; PW = *Portfolio Weekly* ([www.portfolioweekly.com](http://www.portfolioweekly.com)); RN = *Rappahannock [County] News*; ROA = *Roanoke Times*; RTD = *Richmond Times-Dispatch*; SNL = *Staunton News Leader*; V-P = *Virginian-Pilot*; WE = *Washington Examiner*; WP = *Washington Post*; WPCVA.com (Web site for Appomattox Times-Virginian, Alta Vista Journal, Brookneal Union Star, and Chatham Star-Tribune).

## ENERGY CONSERVATION AND RESOURCES

- [HB 1640](#) Retail Sales and Use Tax; exemptions include for alternative fuel burning stoves. **Passed.**
- [HB 1678](#) Retail Sales and Use Tax; exemptions include energy-efficient products. **Passed.**
- [HB 1878](#) Income tax, state; energy-efficient equipment deduction. **Failed** in House Finance Committee.
- [HB 2160](#) Income tax, state; energy-efficient equipment tax credit. **Failed** in House Finance Committee.
- [HB 2555](#) Green Buildings Act; created, report. **Failed** in House General Laws Committee. Companion to SB 1273.
- [HB 2618](#) Real estate tax; localities allowed to tax certain energy-efficient buildings at a lower rate. **Passed.** Companion to SB 1051.
- [HB 2739](#) Retail Sales and Use Tax; exemptions include Energy Star certified products. **Failed** in House Finance Committee.
- [HB 3125](#) Income tax, state; energy-efficient equipment tax credit. **Failed** in House Finance Committee.
- [SB 867](#) Retail Sales and Use Tax; exemptions include Energy Star qualified products. **Passed.**
- [SB 870](#) Income tax, corporate; extends sunset provision for machinery & equipment used in recycling process. **Passed.** Similar to SB 990.
- [SB 990](#) Income tax, corporate; extends sunset provision for machinery & equipment used in recycling process. **Failed** in Senate Finance Committee. Similar to SB 870.
- [SB 1051](#) Real estate tax; localities allowed to tax certain energy-efficient buildings at a lower rate. **Passed.** Companion to HB 2618.
- [SB 1152](#) Energy Policy Act of 2006; Renewable Electricity Production Grant Program and Solar and Wind Energy System Acquisition Fund. **Passed.**
- [SB 1273](#) Green Buildings Act; created, report. **Failed** in Senate Finance Committee. Companion to HB 2555.
- [SB 1275](#) Sustainable Energy, Energy Efficiency, and Energy Conservation Fund, plus renewable energy and energy efficiency program requirements. **Failed** in Senate Commerce and Labor Committee.
- [SJ 361](#) Waste minimization, reuse, and recycling; Joint Legislative Audit and Review Commission to study. **Passed.**

## FISHERIES AND HABITAT OF TIDAL WATERS

- [HB 1624](#) Menhaden; limits on amount harvested annually. **Incorporated** into HB 2082 (see below)
- [HB 1720](#) Gold mining, recreational; exempts miners from having to obtain [Marine Resources Commission] permit if meet certain conditions. **Passed.**
- [HB 1855](#) Aquaculture; sets guidelines for placement of temporary shellfish enclosures in state waters. **Passed.**
- [HB 1868](#) Saltwater fishing licenses; sets commission fee for license agents. **Passed.**
- [HB 1993](#) Oysters; shifts measurement to point of landing to enforce selling thereof. **Passed.**
- [HB 2020](#) National Forest Stamp [for hunting, fishing, or trapping]; changes term thereof to one year from date of purchase. **Passed.**
- [HB 2043](#) Crab meat; processors to include on label of container date was processed and packed. **Failed** in Senate Agriculture, Conservation and Natural Resources Committee after passing House.
- [HB 2082](#) Menhaden; establishes annual harvest quota for portion of Chesapeake Bay. **Passed.**
- [HB 2250](#) Exemption from licensing; exempts siblings of landowner from obtaining any hunting, etc., license. **Failed** in House Agriculture, Chesapeake and Natural Resources Committee.
- [HB 2642](#) Subaqueous land; Marine Resources Commission to convey certain lands to S&S Marine Supply in Hampton. **Passed.** Companion to SB 1367.
- [HB 2782](#) State-owned bottomlands; circumstances for conveyance. **Passed.**
- [HB 2990](#) Subaqueous lands; Marine Resources Commission to convey two adjoining parcels. **Passed.**
- [HJ 650](#) Crab traps; Center for Coastal Resources Management to study those abandoned/discarded. **Passed.**
- [SB 1333](#) Aquaculture; sets guidelines for placement of temporary shellfish enclosures in state waters. **Passed.**
- [SB 1367](#) Subaqueous land; Marine Resources Commission to convey certain lands to S&S Marine Supply in Hampton. **Passed.** Companion to HB 2642.

## GAME, INLAND FISHERIES, AND BOATING

- HB 1627** Boating safety education; must complete to operate a motorboat, civil penalty. **Passed.** Identical to SB 1241.
- HB 2019** Waterfowl blind licenses; allows for electronic transmission of license applications. **Passed.**
- HB 2313** Migratory Waterfowl Conservation Stamp; changes term to fiscal year. **Passed.**
- HB 2373** Motorboats; speed limits on Smith Mountain Lake. **Failed** in House Agriculture, Chesapeake and Natural Resources Committee.
- HB 2374** Boating safety education; increases penalty if not completed. **Failed** in House Agriculture, Chesapeake and Natural Resources Committee.
- HB 2978** Watercraft; maiming of another resulting from operation while intoxicated; penalty. **Passed.** Identical to SB 1130.
- HB 3118** Freedom of Information Act; exemption for certain records of Department of Game and Inland Fisheries. **Failed** in House General Laws Committee.
- HB 3151** First Landing State Park; Department of Conservation and Recreation to lease portion. **Passed.** Similar to SB 1418 (above under Conservation).
- HB 3169** Hunting and fishing license, lifetime; allows resident disabled veterans to purchase. **Failed** in House Agriculture, Chesapeake and Natural Resources Committee.
- SB 883** Freedom of Information Act; exemption for certain records of Department of Game and Inland Fisheries. **Failed** in Senate General Laws and Technology Committee.
- SB 1076** Disabled persons; authorizes Department of Forestry *et al.* to adopt hunting, etc. regulations. **Failed** in Senate Committee on Agriculture, Conservation and Natural Resources Committee (stricken at request of patron).
- SB 1130** Watercraft; maiming of another resulting from operating while intoxicated; penalty. **Passed.** Identical to HB 2978.
- SB 1241** Boating safety education; penalty if not completed. **Passed.** Identical to HB 1627.
- SB 1314** Boating under influence of alcohol; makes blood- and breath-testing protocol consistent with that used for driving under influence. **Passed.**
- SJ 444** General Assembly; confirming appointment of James Carlton Courter as director of Department of Game and Inland Fisheries. **Passed.**

## WATER AND SEWER SYSTEMS

- HB 1710** Virginia Public Building Authority; authorized to issue bonds for nutrient-removal technologies at specified water-treatment plants. **Passed.** Identical to SB 771.
- HB 1865** Water resources; locality to deny or delay subdivision approval of building permit if public water facilities are inadequate. **Failed** in House Counties, Cities and Towns Committee.
- HB 1949** Onsite Sewage Indemnification Fund; increases indemnification claim time. **Passed.**
- HB 1951** Traditional onsite sewage system; definition. **Failed** in House General Laws Committee.
- HB 2079** Sewage sludge; consolidates program that regulates application thereof. **Incorporated** into HB 2802 (see below).
- HB 2366** Water systems; Board of Health to implement program on chronically noncompliant systems. **Passed.** See similar SB 998.
- HB 2692** Onsite Sewage Indemnification Fund; limitations. **Passed.**
- HB 2791** Onsite sewage disposal system; securing permit for installation in Augusta County. **Passed.** Identical to SB 1215.
- HB 2801** Sewage sludge; requires local government certify that land-application site is in compliance with ordinances. **Failed** in House Agriculture, Chesapeake and Natural Resources Committee. See similar SB 1313.
- HB 2802** Land application of biosolids; management and regulation consolidated under Department of Environmental Quality. **Passed.** Identical to SB 1339.
- HB 3039** Water and sewer charges; adds Town of Blacksburg to localities that may provide lien on real estate. **Passed.** Identical to SB 1050.
- HB 3102** Cities of Lynchburg and Richmond Combined Sewer Overflow Fund; created. **Failed** in House Appropriations Committee. Identical to original version of SB 1301; also see related SB 1322.

- [HB 3134](#) Onsite sewage systems; Board of Health to establish program for operation and maintenance of alternative systems and to establish fund to cover program costs. **Passed.** See similar SB 1270.
- [HB 3136](#) Sewage sludge; prohibits land application unless generated locally. **Failed** in House Agriculture, Chesapeake and Natural Resources Committee.
- [HB 3170](#) Sewage sludge; person seeking permit to apply to land to identify specific sites it will be applied. **Incorporated** into HB 2802 (see above).
- [HB 3178](#) Wastewater treatment plants; funding for upgrades. **Failed** in House Appropriations Committee.
- [HJ 694](#) Biosolids; panel of experts to study impact of land application. **Passed.**
- [SB 771](#) Virginia Public Building Authority; water treatment. **Passed.** Identical to HB 1710.
- [SB 798](#) Sewage overflows; regarding Water Control Board authorization to issue administrative orders for corrective actions. **Passed.**
- [SB 852](#) Water and sewage systems, private; localities not required to take over. **Failed** in House Counties, Cities and Towns Committee after passing Senate.
- [SB 998](#) Water systems; Board of Health to implement program on chronically noncompliant systems. **Passed.** See similar HB 2366.
- [SB 1050](#) Water and sewer charges; adds Town of Blacksburg to localities that may place lien on real estate. **Passed.** Identical to HB 3039.
- [SB 1215](#) Onsite sewage disposal system; permit for installing in Augusta County. **Passed.** Identical to HB 2791.
- [SB 1270](#) Sewage disposal; Board of Health to promulgate regulations governing the maintenance, inspection and use of alternative onsite sewage systems. **Passed.** See similar HB 3134.
- [SB 1300](#) Sewage sludge; locality may adopt an ordinance that requires special use permit for routine storage. **Passed.**
- [SB 1301](#) Water Quality Improvement Fund; Combined Sewer Overflow funding for Cities of Lynchburg and Richmond. **Passed,** but governor offered substitute; governor's substitute passed by Senate but rejected by House on April 4; **governor veto** on April 10. Original version identical to HB 3102; also see related SB 1322.
- [SB 1313](#) Sewage sludge; requires local government certify that application site is in compliance with ordinances. **Passed.** See similar HB 2801.
- [SB 1322](#) City of Lynchburg Combined Sewer Overflow Fund; created. **Failed** in House Appropriations Committee after passing Senate. See related HB 3102 and SB 1301.
- [SB 1339](#) Land application of biosolids; management and regulation consolidated under Department of Environmental Quality. **Passed.** Identical to HB 2802.
- [SB 1377](#) Water & sewer rates; prohibits towns from charging unreasonably discriminatory rates for service to residents of adjacent county. **Failed** in Senate Local Government Committee.

## WATERS OF THE STATE, PORTS AND HARBORS

- [HB 1758](#) Obstructing or contaminating state waters; increases penalty. **Passed.**
- [HB 1847](#) Waste load allocations; Water Control Board to grant thereof for Chesapeake Bay nutrient-credit exchange program. **Passed.**
- [HB 1859](#) Citizen water-quality monitors; Department of Environmental Quality to set goal of having 3,000 stream miles monitored by citizen groups by 2010. **Passed.**
- [HB 2085](#) Petroleum Storage Tank Fund; requires reports by professionally certified engineer, geologist, etc. **Failed** in House Agriculture, Chesapeake and Natural Resources Committee.
- [HB 2180](#) Stormwater inspectors; removes certification required by Department of Environmental Quality. **Passed.**
- [HB 2203](#) Subaqueous lands; parties in City of Norfolk in 2006 to pay amount commensurate with property interest. **Passed.**
- [HB 2225](#) Publications tax; created, revenue to be deposited in Water Quality Improvement Fund. **Failed** in House Finance Committee.
- [HB 2229](#) Impaired Waters Clean-up Plan Report; consolidation of the Tributary Strategy Implementation Report, the Watershed Planning and Permitting Report, and the Water Quality Improvement Fund Annual Report. **Passed.**

- [HB 2483](#) Water quality monitoring; establishes April 30 of each year as the deadline for the public to submit its recommendations of which specific water segments should be included in the State Water Control Board's water quality monitoring plan. **Passed.**
- [HB 2487](#) Low-flow protections to be included in authorizing certain withdrawals of water from the Potomac River. **Passed.**
- [HB 2679](#) Localities with Chesapeake Bay Preservation areas; allows impact fees for public facilities related to development. **Failed** in House Counties, Cities and Towns Committee. Identical to HB 2680.
- [HB 2680](#) Localities with Chesapeake Bay Preservation areas. **Failed** in House Counties, Cities and Towns Committee. Identical to HB 2679.
- [HB 2695](#) Dams, low-head; regarding liability if owners use signs and buoys to warn public of hazards of swimming, fishing, etc. **Passed.**
- [HB 2710](#) Dams and related facilities; service districts authorized to construct and maintain. **Passed.**
- [HB 2779](#) Haley's Mill Pond Dam; Virginia Department of Transportation to repair dam in Middlesex County. **Failed** in House Transportation Committee.
- [HB 2785](#) Highway funds; additional allocation to certain port cities. **Passed.**
- [HB 2839](#) Soil Scientists and Wetland Professionals, Board for; extends waiver of requirements, etc. **Passed.**
- [HB 2938](#) Potomac River; restores jurisdictional provision of Maryland-Virginia Compact. **Failed** in House Agriculture, Chesapeake and Natural Resources Committee.
- [HB 2989](#) Portsmouth Port & Industrial Commission; authority to provide financing by leasing, etc. facilities. **Passed.** Identical to SB 957.
- [HB 3005](#) Natural gas pipeline; Marine Resources Commission to grant easements and rights-of-way across Hampton Roads harbor and Elizabeth River. **Passed.**
- [HB 3037](#) Potomac River Fisheries Commission; amends compensation, powers, and duties. **Passed.**
- [HB 3088](#) Discharges into Levisa Fork; prescribes size of mixing zone for discharge of salty mine water and prohibits PCB discharge. **Failed** in House Agriculture, Chesapeake and Natural Resources Committee. Identical to SB 1402.
- [HB 3113](#) Environmental Quality, Department of; consolidation of Air Pollution Control Board, State Water Control Board, and Waste Management Board; increase of authority; *requires re-enactment in 2008*. **Passed.** See also SB 1403.
- [HB 3129](#) Service districts; additional powers with regard to dredging of creeks and rivers. **Passed.**
- [HJ 658](#) James River; celebrating panoramic view thereof from Libby Hill Park. **Passed.**
- [SB 900](#) Virginia Beach Police Department Marine Patrol; enforcement of federal security and safety zones. **Passed.**
- [SB 957](#) Portsmouth Port and Industrial Commission; authority to provide financing by leasing, etc. facilities. **Passed.** Identical to HB 2989.
- [SB 1256](#) Hazardous materials; allows localities to prohibit storage in certain floodplains. **Failed** in House Counties, Cities and Towns Committee after passing Senate.
- [SB 1396](#) Offshore energy resources; exploratory, etc., activity of submerged lands off Atlantic shoreline. **Failed** in House after passing Senate.
- [SB 1402](#) Discharges into Levisa Fork; prescribes size of mixing zone for discharge of salty mine water and prohibits PCB discharge. **Failed** in Senate Agriculture, Conservation and Natural Resources Committee. Identical to HB 3088.
- [SB 1403](#) Environmental Quality, Department of; consolidation of various boards, increase of authority. Bill amended to include House's re-enactment clause (see HB 3113 above). **Passed.**

## MISCELLANEOUS

### Administration of Government

- [HJ 681](#) Changing Climate; joint subcommittee to study risks, etc., in state. **Failed** in House Rules Committee.

### Drainage, Soil Conservation, Sanitation, And Public Facilities Districts

- [HB 1931](#) Hampton Roads Sanitation District Commission; increases membership. **Failed** in House General Laws Committee.
- [HB 2568](#) Erosion/sediment control violations, penalties. **Passed.** Identical to SB 821.
- [SB 821](#) Erosion/sediment control violations, penalties. **Passed.** Identical to HB 2568.

**Eminent Domain**

- [HB 2954](#) Public uses; definition and limitations. **Passed.** Identical to SB 781.
- [HJ 708](#) Eminent domain; Joint Legislative Audit and Review Commission to study current state of law regarding exercise. **Failed** in House Rules Committee.
- [HJ 723](#) Constitutional amendment establishing limitations on taking of private property for public uses (first reference). **Failed** in Senate after passing House.
- [SB 781](#) Public uses; definition and limitations. **Passed.** Identical to HB 2954.
- [SJ 404](#) Eminent domain; Joint Legislative Audit and Review Commission to study use by governmental entities. **Failed** in House Rules Committee after passing Senate.

**Health**

- [HB 2102](#) Private well construction prohibited within 50 feet of agricultural property lines except under certain conditions. **Passed.**
- [HB 2691](#) Environmental Health Education and Training Fund; created. **Passed.**
- [HB 3167](#) Lead poisoning prevention; physicians to make available to parents information on dangers. **Passed.**

**Highways, Bridges, And Ferries**

- [HB 2663](#) Pesticides and fertilizers; prohibits providers of lawn care services from applying to streets or other impervious surfaces. **Failed** in House Agriculture, Chesapeake and Natural Resources Committee.

**Public Service Companies**

- [HB 3068](#) Electric utility regulation. **Passed.** Identical to SB 1416.
- [SB 1416](#) Electric utility regulation. **Passed.** Identical to HB 3068.

**Taxation**

- [SB 1167](#) Retail Sales and Use Tax; exemptions during “holiday” to include hurricane-preparedness equipment. **Passed.**

**Waste Disposal**

- [HB 1715](#) Garbage; increases fine for dumping into state waters. **Passed.**
- [HB 3133](#) Sanitary landfills; post-closure guidelines to be developed. **Passed.**

**TEACHING WATER**  
**Especially for Virginia’s K-12 teachers**

**This Issue and the Virginia Standards of Learning**

Below are suggestions for Virginia Standards of Learning (SOLs) that may be supported by this issue’s Feature article, Science article, Water Status Reports, and For the Record section. *Abbreviations:* BIO = biology; CE = civics and economics; ES=earth science; GOVT = Va. and U.S. government; LS=life science; WG = world geography.

<b>Newsletter Section</b>	<b>Science SOLs</b>	<b>Social Studies SOLs</b>
Feature (2007 Virginia General Assembly)	6.9, LS.12, ES.7, ES.11	CE.7, GOVT.8, GOVT.9, GOVT.16
Science (Potomac River Basin Fisheries Overview)	6.7, LS.11, LS.12, BIO.8, BIO.9	WG.2, WG.7
Water Status Report: Precipitation, Groundwater, and Stream Flow	4.6, 4.8, 6.5, 6.7, LS.7, LS.12, ES.7, ES.9, ES.13	WG.2
For the Record (Water Quality)	6.5, 6.7, 6.9, LS.12, ES.9, BIO.9	CE.7, WG.2, WG.7, GOVT.9

## SCIENCE BEHIND THE NEWS

### An Overview of Fisheries in the Potomac River Basin

Ed. note: This article was originally published in the November/December 2006 issue of *Potomac Basin Reporter*. That publication is available online at [www.potomacriver.org/info\\_center/reporter.htm](http://www.potomacriver.org/info_center/reporter.htm). (All Web sites listed in this article were functional as of 5/22/07). Some passages from the original have been removed due to space limitations. Photos and illustrations from the original are not included here; Water Central added the illustration below. Opinions in the article are not necessarily those of the Virginia Water Resources Research Center. *Water Central* thanks the Interstate Commission on the Potomac River Basin for permission to reprint this article.

Many of us use [the end of the year] to take stock of what has happened during the past twelve months in our lives and to help set a course for the future. Government agencies and organizations that work to preserve and restore natural resources do the same thing, although it can be very difficult to provide a true assessment of a watershed from year to year.

The environmental picture often changes in small increments, and organizations from the Chesapeake Bay Program to small citizen environmental groups struggle to develop meaningful, simple indicators that portray environmental status in a way that is easily understandable by the general public. Rather than create a scorecard to submit to argument, this article will take a brief look around the basin, highlighting the status of some natural resources that in the minds of many people make the Potomac an important resource and part of their life in the region.

This quick look should be viewed in the context of basin history. Although the basin's natural resources face challenges, it is important to realize the huge successes that have lifted the status of the Potomac's fisheries. While we struggle with issues, it must be remembered that many of the fisheries barely existed 40 years ago, when industrial and mining pollution devastated the North Branch Potomac, the metropolitan river was described as "an open sewer," aquatic plants were absent, and Largemouth Bass were nowhere to be found in the waters of the District of Columbia.

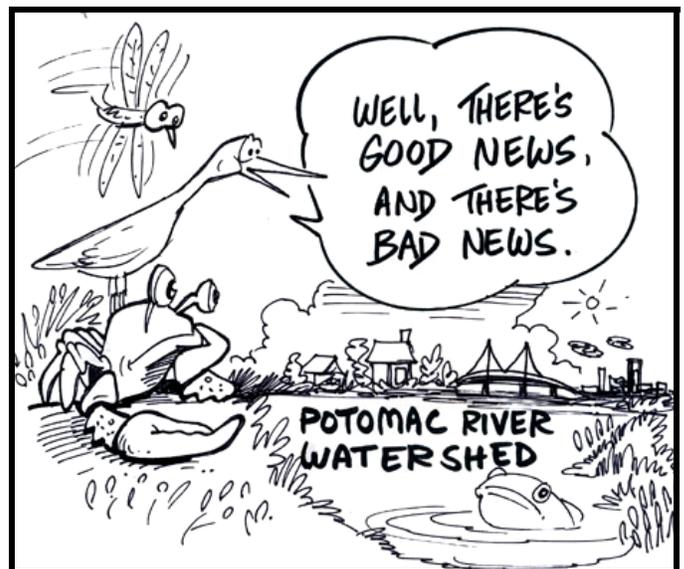
### Special Notice on Shenandoah River Fish Kill

"The Department of Environmental Quality [DEQ] began receiving reports on...April 23 [2007] of dead and dying fish on the North and South forks of the Shenandoah River [a tributary of the Potomac River]. Since then, DEQ, the Department of Game and Inland Fisheries, and other members of the Shenandoah River Fish Kill Task Force have been canvassing the river system to determine the condition of fish, primarily Smallmouth Bass and Redbreast Sunfish.

"The task force encourages the public to provide any information on the location, number and type of fish found dead or sick in the mainstem Shenandoah, the North and South forks, South River, Middle River, or North River. Distressed fish are found mainly in eddies, shallow areas, and slow-moving waters away from the main current.

"Anyone with information is asked to call the DEQ regional office in Harrisonburg at (540) 574-7800, or toll-free in Virginia at (800) 592-5482. Information also can be emailed to [fishreports@deq.virginia.gov](mailto:fishreports@deq.virginia.gov)."

(Text from DEQ News Release, 4/26/07, accessed at [www.deq.virginia.gov](http://www.deq.virginia.gov))



## North Branch Potomac

In the northwestern part of the basin, the legacy of coal mining remains a primary impact.... Much work has been done during the past few decades to improve water quality, and miles of the North Branch Potomac and tributary streams now hold trout and other fish. In turn, they are providing new recreational opportunities and economic growth. The Interstate Commission on the Potomac River Basin (ICPRB) has worked with citizen groups in the region and has helped to acquire and place lime dosers that mitigate acid mine drainage impacts.

A major setback occurred in 2005 in George's Creek, which runs through the Maryland towns of Lonaconing, Barton, and Westernport. Acidic seepage from the abandoned McDonald mine, which discharges to a small tributary, had been successfully treated by a lime doser since 2001. The discharge changed drastically in character, turning the small George's Creek tributary orange with highly acidic water and metals that [affected aquatic life for several miles].

The Maryland Bureau of Mines has been working on the problems with the help of local organizations such as the George's Creek Watershed Association.... The mysterious change in the mine drainage may be from subsidence deep in the mine, according to experts. The toxic nature of the mine seepage decreased late in 2006, but even if it returns to pre-subsidence state, it will be some time before the creek returns as a recreational magnet in the affected segment. The current status of the creek highlights the difficulties in maintaining the treatment facilities needed to overcome the legacy of coal mining in the northwestern watershed, and the need to continue to support those efforts.

## South Branch Potomac

Fish kills primarily of Smallmouth Bass along with a few other species occurred beginning in 2002. An intense research effort continues today. Fish collections revealed many Smallmouth with lesions and bacterial infections of the skin and organs. Researchers noted that the fish were environmentally stressed, but could not determine a cause of death. Examination led to the discovery of a condition known as "intersex" in male Smallmouth Bass, which were found to be carrying eggs. Collections of more fish from other areas showed more lesions and intersex condition. A fish kill of primarily Redhorse Suckers occurred in May 2006, but again, an exact cause of the kill could not be determined. Continued kills [in fall 2006] have prompted not only increased research

but also greater coordination among the area's river watchers. A Web site, Potomac Water Watch ([www.potomacwaterwatch.org](http://www.potomacwaterwatch.org)) was set up [in 2006] to allow for quicker reporting of fish kills [giving researchers a chance to arrive on the scene more quickly], provide more tools in determining the cause of the repeated fish kills, and to serve as a clearinghouse for information on emerging contaminants that may be stressing fish or causing the intersex condition, which may or may not be related to the kills. [The Web site is] sponsored by the Cacapon Institute, Friends of the Cacapon, the Appalachian Center for the Environment and the Economy, and the West Virginia Rivers Coalition. ...

Researchers convened to brainstorm about the kills at a meeting in September [2006]. "All agreed that one key to understanding the problem is to know when and where fish kills are occurring in real time," said Cacapon Institute Executive Director Neil Gillies. Finding afflicted, but still alive, fish is key to finding a cause. It is hoped that...rapid-response reporting, plus intensive water quality monitoring and other research, will provide answers as to what is killing fish in the South Branch. Despite the kills, biologists note that the watershed's fish populations were in generally good condition, and fish growth rates are considered good.

## Shenandoah Watershed

The same can't be said for the Shenandoah system, where unexplained fish kills similar to the South Branch events have been occurring during the past three years. In 2004, the North Fork Shenandoah experienced a large Smallmouth Bass fish kill, with many fish developing lesions and parasite problems before succumbing. From April through July 2005, an estimated 80 percent of the adult Smallmouth Bass and Redbreast Sunfish population in the South Fork Shenandoah River died.... Reports of fish kills on the South Fork continued in 2006, additionally affecting two species of suckers, a bottom-feeding fish. Again, despite ongoing research into the fish themselves and water quality, no direct cause of the kills has been found. Fish kills also have been noted in the mainstem Shenandoah.

In response, Virginia resource agencies formed the Shenandoah River Fish Kill Task Force to focus and coordinate the efforts of a growing number of state and federal agencies and other organizations. Possible contributing factors being pursued by the task force include point and non-point sources of pollution, disease, parasites,

spawning stress, temperature, sediment chemistry, and population dynamics. At the same time, researchers—particularly the U.S. Geological Survey’s Fish Health Center in Leetown, West Virginia—have been examining the fish and water of the area, as well as investigating the growing prevalence of intersex fish being found in a growing number of areas, including Largemouth Bass in the District of Columbia portion of the Potomac.

The Shenandoah’s reputation as one of the top river systems for Smallmouth bass angling has suffered greatly, along with segments of the economy that depend on angler tourism. There is some good news for the Shenandoah, as the kills have involved adult fish, and the area has had very good spawns during the same time period as the fish kills. If these fish survive to adulthood, the river will again be a popular venue for anglers, although the fish hatched in 2004-2005 will take 5 to 10 years to reach good size.

The Shenandoah Pure Water Forum maintains an informative site on the Shenandoah fish kills and the activities of the task force at [www.purewaterforum.org/fishkill](http://www.purewaterforum.org/fishkill). The ICPRB has worked on several pollution problems in the watershed, and has met with Pure Water Forum members and other groups to address water quality and water resources planning issues.

## Upper Potomac Mainstem

Monitoring by the Maryland Department of Natural Resources (DNR) shows the free-flowing Potomac to be in good shape with respect to fisheries. Reproduction was just above the long-term average, according to DNR Fisheries Biologist John Mullican. ...

Adult [Smallmouth Bass] were found to be generally healthy [in 2006], and anglers noted catches that in size and number were improved compared with the previous few years. ...Mullican keeps aware of the problems further upstream and on the Shenandoah, and looks out for lesions and other problems, but has found no evidence that those problems have moved downstream. The occurrence of intersex fish in this region has not been heavily researched....

## Tidal Potomac

Largemouth Bass dominate the attention of anglers in the Potomac from the District of Columbia to the Route 301 Bridge over the river. By most accounts, [2006] was a banner year for anglers. Bass guide Ken Penrod described his experience on the tidal Potomac as one of the best

seasons in memory. Other tidal Potomac bass guides...issued similar glowing reports.

Largemouth Bass fishing is popular throughout the upper tidal Potomac but is centered in a large area around Mattowoman Creek, perhaps the Potomac’s most productive tributary. The large creek, with its high diversity of fish and aquatic vegetation, is a growing focus of local environmental groups as well as the government of Charles County, Maryland. A state park adjacent to the creek hosts bass and catfish tournaments that are held on most weekends, generating significant economic activity for La Plata, the county seat, and other...communities.

The county is growing quickly, and county council members are on record as realizing that future planning will be critical for preserving the watershed’s many values. ... The decisions being made [in this county] serve as a microcosm for development issues occurring throughout the Potomac watershed.

Researchers also are keeping an eye on the river’s most recent immigrant, the Northern Snakehead (see July/August 2006 *Potomac Basin Reporter*). Snakeheads seem here to stay, and research showed the species increasing in numbers and range in the Potomac. While area fisheries biologists are collecting as much information as time and funding allows, knowledge about how the foreign species will...impact the tidal Potomac’s ecology and food web is in short supply. One aspect that resource managers are watching closely is the effects that the species may have on other important species, such as the Largemouth Bass, which may have to compete for habitat and available food.

Habitat is a critical need for healthy fish stocks, and the upper tidal Potomac generally provided [adequate habitat during 2006] with increased submerged aquatic vegetation. The mild winter and dry spring got aquatic plants growing early in the season, and the stands of plants were established and resistant to several major storm events later in the year. Eight different species of aquatic plants were observed in the upper tidal river and were still alive in December [2006], noted U.S. Geological Survey Scientist Nancy Rybicki. The healthy stands of plants bode well for 2007, she added. The picture was not so rosy in the District of Columbia, where plants are still recovering from a significant decrease in 2003. The lower Potomac also is recovering from an Eel Grass die-off last season that some attribute to high water temperatures and other factors. The middle portion of the tidal river also saw some blooms of blue-green algae,

which in high concentrations can poison fish or humans who come in contact with it. The blooms are indicative of high nutrient concentrations.

After a long absence, the migratory American Shad continues its resurgence in the Potomac, led by the ICPRB stocking program that began in 1995. With assistance from state and federal agencies, watermen, volunteers, and school students, the program captured adult spawning shad that were stripped of eggs and milt. The fertilized eggs were hatched in federal fisheries facilities and school classrooms, and fry were released at upstream sites that had previously been blocked to migration by the Little Falls Dam just upstream of Washington, D.C. The dam was modified in 2000 to allow the passage of fish, and fry placed upstream are now returning to the newly opened area of the Potomac.

The species, harvested by George Washington, was one of the most economically important [Potomac] fish. Pollution, overfishing, and habitat destruction decimated the species in the 1950s, and a harvest moratorium has been in place in Maryland for decades. While the species [population] is still only a remnant of its former [numbers] in the Chesapeake Bay as a whole, the fish has begun returning in significant numbers in this decade. Maryland researchers have been tracking the status of American Shad with seine net surveys since 1958, and [in 2006 they] reported a young-of-the-year index (a measure of the reproductive success for the year) down from the two previous years, but still above the long-term average. The successful index was, however, “based entirely on the strength of the Potomac River’s index,” said Maryland Department of Natural Resources’ (DNR) Eric Durell. ...

That success is helping other [bay tributaries]. Eggs taken from Potomac shad are being fertilized and sent to provide stock for the Susquehanna River in Pennsylvania and Maryland and the Rappahannock River in Virginia. Other jurisdictions also are using volunteers and school groups as an important public outreach portion of the projects that create public understanding and support for the projects. These groups learn about the shad life cycle and its importance as a part of the ecosystem—a role it is only beginning to again assume. A strong shad population in the river can help it in many ways.

When the project and its leader, ICPRB Director for Living Resources Jim Cummins, were honored by *Field & Stream Magazine*, Cummins noted that his dream was an end to the harvest moratorium, and a “Potomac so full of shad that Congress has to shut down for a day because

everybody on Capitol Hill has gone fishing.” Cummins’ dream may become reality soon, as a limited recreational season may only be a couple of years away. “We are well on our way toward seeing light at the end of the tunnel,” said Kirby Carpenter, executive secretary of the Potomac River Fisheries Commission (PRFC), a bi-state (Maryland and Virginia) agency that regulates fishing in the tidal Potomac downstream of Washington, D.C. The PRFC is participating in producing a stock assessment for the river that will eventually be used to set restoration targets and suggest harvest limits.

Carpenter also pointed to improved crabbing as a bright spot for the lower Potomac, although harvests remain below the long-term average. ... [But] oyster populations in the Potomac remain a shadow of earlier years [with 3,000 bushels in 2006, compared to the half-million bushels taken from the river 30 years ago], and there is not much hope of reviving native stocks that are stricken by two oyster parasites. The PRFC is part of an effort to assess the viability of introducing non-native oyster species to the river, with a draft environmental impact statement scheduled for completion [in 2007].

## Overall Outlook

Although many fisheries within the Potomac are in generally good shape, the region’s fisheries in general are under increased stress through pollution largely associated with human population growth and land-use change. Nutrients that help feed algae blooms and chemical pollutants that cause lesions and may be creating intersex conditions in fish enter the water from discharges, stormwater, and even the atmosphere create a cumulative stress for fish and other aquatic populations.

Many species of fish are the subject of state...advisories that recommend limiting [consumption] or avoiding eating some fish altogether. The two most common pollutants are mercury and polychlorinated biphenyls (PCBs). A suspected carcinogen, PCB production has been banned for decades, but were used commonly in many industrial applications, and are long-lived in the environment. The ICPRB is working with Virginia, Maryland, the District of Columbia, and the U.S. Environmental Protection Agency to devise a cleanup plan aimed at reducing the level of PCBs found in Potomac fish. While these cleanup plans are important, they can be of greatest effect when coupled with regulations and other efforts designed to keep these substances from entering the fragile aquatic environment.

## VIRGINIA WATER STATUS REPORT

This section of *Water Central* presents recent and historical data on Virginia's precipitation, groundwater levels, and stream flow.

### Precipitation in Virginia, May 2006-April 2007

The chart below shows precipitation (in inches) at seven National Weather Service observation sites in Virginia. The upper number for each entry is the **total precipitation** for the respective site and month (with yearly total at the bottom of the chart), including the equivalent amount of water contained in any snowfall or other frozen precipitation. These values were found (on 5/14/07) at the "Climate" sections of National Weather Service Web sites, as follows: [www.weather.gov/climate/index.php?wfo=rnk](http://www.weather.gov/climate/index.php?wfo=rnk), for Blacksburg, Lynchburg, and Roanoke; [www.weather.gov/climate/index.php?wfo=lxw](http://www.weather.gov/climate/index.php?wfo=lxw), for Charlottesville and Washington-Dulles; and <http://mi.nws.noaa.gov/climate/index.php?wfo=akq>, for Norfolk and Richmond. The lower number in each entry (in parenthesis) is the **average precipitation** for the respective site month (again, with yearly total at the bottom of the chart), over the period 1971—2000, according to the National Climatic Data Center, *Climatology of the United States No. 81* (accessed at <http://www5.ncdc.noaa.gov/climate/normal/clim81/VAnorm.pdf> on 5/14/07). In the table, "RH" means record high for that month. The recent monthly amounts (but not the long-term averages) are classified by the Weather Service as *preliminary* data and are subject to revision; the National Climatic Data Center maintains any edited and *certified* data that are available.

More Virginia climate data and the *Virginia Climate Advisory* are available from the Virginia State Climatology Office, online at <http://climate.virginia.edu>. To reach the State Climatologist's office, phone (434) 924-0548 or send e-mail to [climate@virginia.edu](mailto:climate@virginia.edu).

	<b>Blacksburg (Station #012)</b>	<b>Charlottesville (Station #023)</b>	<b>Lynchburg (Municipal Airport)</b>	<b>Norfolk (Internat. Airport)</b>	<b>Richmond (Byrd Intern. Airport)</b>	<b>Roanoke (Woodrum Airport)</b>	<b>Wash.-Dulles Airport</b>
May 2006	3.00 (4.39)	1.67 (4.86)	1.65 (4.11)	2.96 (3.74)	3.24 (3.96)	1.46 (4.24)	1.80 (4.22)
Jun. 2006	10.96 RH (3.93)	8.48 (4.46)	6.75 (3.79)	10.53 RH (3.77)	7.85 (3.54)	8.51 (3.68)	11.79 (4.07)
Jul. 2006	3.61 (4.17)	2.77 (4.94)	2.37 (4.39)	1.34 (5.17)	4.59 (4.67)	1.92 (4.00)	2.45 (3.57)
Aug. 2006	3.66 (3.68)	2.68 (4.14)	4.19 (3.41)	3.13 (4.79)	5.99 (4.18)	2.35 (3.74)	1.24 (3.78)
Sep. 2006	3.16 (3.39)	5.76 (4.85)	7.73 (3.88)	11.64 (4.06)	9.52 (3.98)	3.21 (3.85)	7.12 (3.82)
Oct. 2006	4.91 (3.19)	7.35 (4.22)	6.76 (3.39)	3.54 (3.47)	6.12 (3.60)	5.33 (3.15)	4.82 (3.37)
Nov. 2006	3.71 (2.96)	5.37 (3.74)	4.77 (3.18)	6.46 (2.98)	6.67 (3.06)	4.22 (3.21)	5.31 (3.31)
Dec. 2006	1.83 (2.87)	1.71 (3.26)	1.66 (3.23)	2.06 (3.03)	1.42 (3.12)	1.98 (2.86)	1.74 (3.07)
Jan. 2007	2.83 (3.37)	1.90 (3.71)	3.33 (3.54)	2.71 (3.93)	3.46 (3.55)	2.40 (3.23)	2.11 (3.05)
Feb. 2007	1.85 (3.02)	1.91 (3.30)	2.00 (3.10)	2.09 (3.34)	2.06 (2.98)	2.23 (3.08)	2.54 (2.77)
Mar. 2007	6.64 (3.83)	1.57 (4.05)	3.95 (3.83)	1.84 (4.08)	2.66 (4.09)	3.32 (3.84)	2.93 (3.55)
Apr. 2007	3.63 (3.83)	2.22 (3.34)	3.10 (3.46)	3.19 (3.38)	3.62 (3.18)	2.60 (3.61)	3.38 (3.22)
<b>Total for period</b>	49.79 (42.63)	43.39 (48.87)	48.26 (43.31)	51.49 (45.74)	57.20 (43.91)	39.53 (42.49)	47.23 (41.80)

## Groundwater Levels at Selected Virginia Wells, May 2007

The U.S. Geological Survey (USGS) and the Virginia Department of Environmental Quality monitor groundwater levels in about 350 observation wells in Virginia. The USGS publishes these measurements annually; the latest update is *Water Resources Data-Virginia-Water Year 2005, Volume 2* (available online at <http://pubs.usgs.gov/wdr/2005/wdr-va-05-2/>). As of May 14, 2007, *real-time data* (updated every 15 minutes) were being recorded from 61 observation wells in 27 Virginia localities and were available online at <http://waterdata.usgs.gov/va/nwis/current/?type=gw>. The table below shows one May 14 measurement (between 12 noon and 2 p.m.) from each of 19 real-time observation wells. All measurements are in **feet below the land surface**, rounded to the nearest 0.1 foot; **a smaller value means wetter conditions, while a larger value means drier conditions**. The table also shows the level reported in the last issue of *Water Central* (from 1/4/07) and the deepest value (driest) and shallowest value (wettest) recorded for each well during the well's period of record (through the Water Year 2005 report mentioned above). All May 2007 readings are *provisional* (i.e., subject to revision).

Well (Local #)	5/14/07 Level	1/4/07 Level	Record Deepest (Driest)	Record Shallowest (Wettest)	Period of Record
Accomack (66M 19 SOW 110S)	8.6	8.1	11.3 (Nov. 1981)	7.4 (Apr. and Aug. 2004)	Since Sep. 1978
Buckingham (41H 3)	18.7	22.8	36.4 (Oct. 2002)	7.3 (Apr. 1973)	Since Mar. 1970
Clarke (46W 175)	35.8	38.2	45.7 (Sep. 2002)	22.9 (Sep. 2003)	Since Jul. 1987
Fairfax (52V 2)	12.5	13.5	24.9 (Dec. 1998)	6.5 (Mar. 1984)	Since Oct. 1976
Frederick (46X 110)	37.4	39.9	44.4 (Nov. 2002)	18.0 (June 2003)	Since Nov. 2002
Hanover (53K 19 SOW 080)	16.4	14.5	22.9 (Aug. 1984)	3.8 (Aug. 2004)	Since Jan. 1978
Loudoun (49Y 1 SOW 022)	58.1	58.4	62.0 (Jan. 2002)	48.0 (June 1972)	Since Aug. 1969
Montgomery (27F 2 SOW 019)	4.0	2.9	7.3 (Dec. 1969)	0.0 (Mar. 1993)	Jul. 1953, then since Apr. 1969
Northampton (63H 6 SOW 103A)	5.5	2.9	10.0 (Oct. 2002)	0.6 (Aug. 2004)	Since Oct. 1977
Orange (45P 1 SOW 030)	22.5	23.7	39.0 (Aug. 2002)	11.8 (Apr. 1973)	Since Feb. 1965
Prince William (49V 1)	9.4	7.4	13.1 (Sep. 1991)	6.6 (Dec. 2003)	Since Nov. 1968
Roanoke City (31G 1 SOW 008)	18.8	18.5	19.3 (Jun. 1987)	12.4 (Feb. 1986)	Since Aug. 1966
Rockbridge (35K 1 SOW 063)	22.5	21.4	30.4 (Sep. 2002)	14.3 (Apr. 1987)	Since Jun. 1972
Rockingham (41Q 1)	66.0	66.8	99.0 (Oct. 2002)	57.7 (Feb. 1998)	Since Aug. 1970
Suffolk (58B 13)	8.8	6.9	13.4 (Jan. 1981)	0.6 (Sep. 1999)	Since Mar. 1975
Surry (57E 13 SOW 094C)	7.5	6.4	11.2 (Dec. 1981)	3.9 (May 1980)	Since Jul. 1978
Virginia Beach (62B 1 SOW 098A)	3.6	1.9	12.0 (Sep. 1980)	0.8 (Aug. 2004)	Since Jun. 1979
Westmoreland (55P 9)	1.0	-0.1	12.8 (Dec. 1998)	0.8 (Aug. 2004)	Since Jul. 1977
York (59F 74 SOW 184C)	2.4	1.7	13.4 (Jan. 2002)	2.0 (Feb. 1994)	Since Jun. 1990

## Stream Flow in Virginia, April-May 2007

The graphs on this page, taken from the U.S. Geological Survey's Internet site, "WaterWatch—Current Water Resources Conditions" (<http://water.usgs.gov/waterwatch/?m=real&r=va&w=real%2Cplot>, 5/14/07) compare recent Virginia stream flow to historical records.

The data in the graphs come from 96 sites that have at least 30 years of records. The left graph covers March 31—May 13, 2007; the right graph covers July 1999 through mid-May 2007. Each graph uses a "stream flow index," which measures how a site's average stream flow *over 24 hours* (the **average daily stream flow**) compares to the historical average stream flow *for that same site and date*. The graphs show a further average: the stream flow index averaged *over all 94 monitoring stations*.

**Index values** (1-7 on the vertical axis in the graphs) mean the following:

Values indicating dry conditions:

1 = average daily flow is record low for that date;

2 = average daily flow is in the lowest 10 percent of historical values for that date;

3 = average daily flow is in the lowest 25 percent of historical values for that date, but exceeds the lowest 10 percent.

Value indicating "normal" flow:

4 = average daily flow exceeds the lowest 25 percent of historical values for that date, but is less than the highest 25 percent of values.

Values indicating wet conditions:

5 = average daily flow exceeds 75 of historical values for the date, but is lower than the highest 10 percent of values.

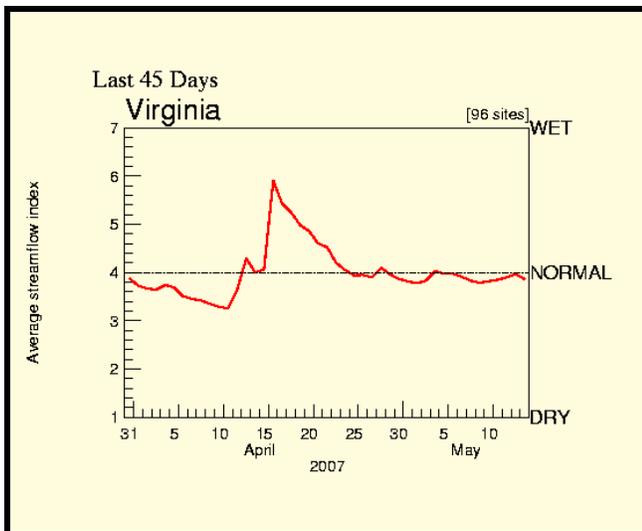
6 = average daily flow exceeds 90 percent of historical values for that date;

7 = average daily flow for the graphed date is record high for that date.

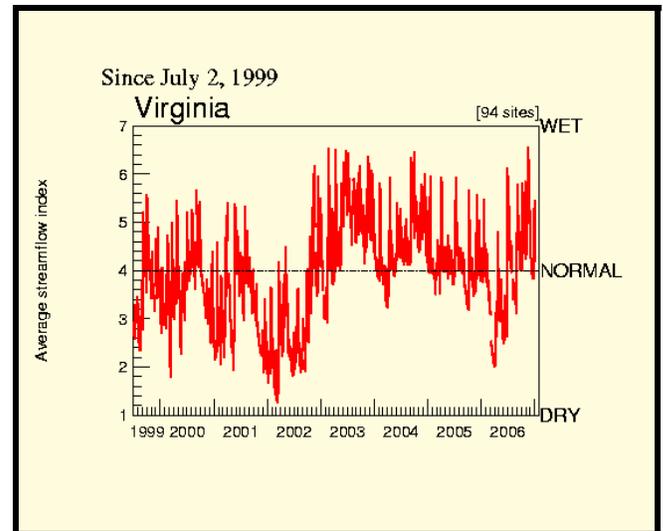
**Gaps in the data:** Data are not plotted for days when fewer than two-thirds of the sites report data (due to equipment or weather problems), because a statewide average on those days may misrepresent actual conditions.

### Average Daily Stream Flow Index, Compared to the Historical Average for the Date

For March 31—May 31, 2007



For July 1999—Mid-May 2007



## IN AND OUT OF THE NEWS

### Newsworthy Items You May Have Missed

The items in this section are based on information in the source(s) indicated in parentheses at the end of each item. Most of this issue's items were originally reported from January to May 2007. Except as otherwise noted, the localities mentioned are in Virginia and the dates are in 2007.

This issue begins a new feature called "**Water, Energy, and Climate**," providing a focus for the increasing number of news stories on connections among energy production and use, climate change, and water resources.

Because it's the season for exams and Standards of Learning tests, *Water Central* has made this section a **water-news quiz!** Numbered questions about recent water news events or trends are answered in corresponding footnotes. The Water, Energy, and Climate part uses multiple choice questions (be sure to see the answer hint!). For more detail on the items, please see the source(s) indicated or any Web sites mentioned. All Web sites listed were functional as of 5/17/07.

### In Virginia

1. What **state commission** approved \$2 million for oyster restoration in 2007, issued new restrictions on flounder fishing, reviewed projects on growing non-native oysters, and voted to review completely its Blue Crab-management activities?<sup>1</sup> (*Virginian-Pilot*, 1/23, 2/28, and 4/24/07; *Richmond Times-Dispatch*, 2/28)

2. What **state board** approved (for public comment) draft regulations on using **treated wastewater** for irrigation, industrial cooling, fire-fighting, livestock watering, and other uses?<sup>2</sup> (*Virginian-Pilot*, 3/10/07).

3. What **water-quality condition** is Fairfax County monitoring with "iButtons" in streams where the streamside zones have been replanted with native vegetation?<sup>3</sup> (*Conservation Currents*, Winter 2007)

4. What kind of plan must the **Rivanna Water and Sewer Authority** submit to the U.S. Army Corps of Engineers and Virginia Department of Environmental Quality (DEQ) as part of the permitting process for increasing the water-level in the Ragged Mountain Reservoir?<sup>4</sup> (*Charlottesville Daily Progress*, 12/19/06)

5. What structure might **Franklin County** remove to help increase tourism?<sup>5</sup> (*Roanoke Times*, 12/20/06)

6. What **toxic metal** have recent studies documented as contaminating fish worldwide—including in remote Virginia waters—and is the subject of a Virginia state study?<sup>6</sup> (*Washington Post*, 1/6/07; Associated Press, 1/23/07; *Daily Press*, 2/20/07; and *Greenwire*, [www.eenews.net/gw/](http://www.eenews.net/gw/), 3/8/07)

7. What **fish** accounted for the highest-number of citations in the 2006 Virginia Saltwater Fishing Tournament but is under recreational fishing restrictions in Maryland spawning areas?<sup>7</sup> (*Roanoke Times*, 1/12/07; *Baltimore Sun*, 1/30/07)

8. According to researchers, what kills hundreds of **ospreys** each year in the Chesapeake Bay area of Virginia and Maryland?<sup>8</sup> (*Richmond Times-Dispatch*, 1/25/07)

9. What river is the focus of a dispute between Buchanan County and Consolidation Coal Company over the company's **discharge of high-chloride water** generated by mining?<sup>9</sup> (*Richmond Times-Dispatch*, 1/30/07)

10. What contaminant has been found in at least 25 wells near the now-closed **Hidden Lane Landfill** in Loudoun County?<sup>10</sup> (*Washington Post*, 1/14/07)

<sup>1</sup> The Marine Resources Commission. Minutes of monthly VMRC meetings are available online at [www.mrc.virginia.gov/calendar.shtm](http://www.mrc.virginia.gov/calendar.shtm).

<sup>2</sup> State Water Control Board. Minutes of SWCB meetings are available at the Virginia Regulatory Town Hall Web site, [www.townhall.state.va.us/Meeting/ListMeeting\\_Past.cfm](http://www.townhall.state.va.us/Meeting/ListMeeting_Past.cfm).

<sup>3</sup> Temperature.

<sup>4</sup> A stream- and wetland-impact mitigation plan.

<sup>5</sup> A Pigg River dam not used for power generation since the 1950s.

<sup>6</sup> Mercury.

<sup>7</sup> Striped Bass, with 1,098 out of 5,296 citations.

<sup>8</sup> Fishing line that has not been properly discarded.

<sup>9</sup> Levisa Fork, a tributary of the Big Sandy River.

<sup>10</sup> Trichloroethylene, or TCE, a metal-degreasing chemical.

11. How was a **50-year-old battery dump** discovered in Tazewell County?<sup>11</sup> (*Richlands News Press*, 1/30/07)

12. Why was **George Mason University professor Abul Hussam** awarded the National Academy of Engineering's Grainger Challenge Prize for Sustainability?<sup>12</sup> (*Washington Post*, 2/2/07)

13. What **water-supply project** was the focus of one lawsuit filed by the Chesapeake Bay Foundation in February and another one settled by the Mattaponi Tribe and Newport News in April?<sup>13</sup> (*Richmond Times-Dispatch*, 2/17/07; *Daily Press*, 4/11/07)

14. What is the **Puddingland Drum Dump Site**?<sup>14</sup> (*Rappahannock Record*, 2/21/07)

15. Who spent two weeks in a heated Westmoreland County greenhouse after being **rescued from icy waters**?<sup>15</sup> (*Fredericksburg Free Lance-Star*, 2/22/07)

16. What happened to Alice Welford of Richmond after she spent **six years working to control Phragmites** (Common Reed), an invasive wetlands plant?<sup>16</sup> (*Fredericksburg Free Lance-Star*, 3/14/07)

17. What happened to Jay Gilliam of Rockbridge County after he spent **15 years helping citizen water-quality monitoring efforts** in Virginia?<sup>17</sup> (Virginia Save Our Streams, [www.vasos.org](http://www.vasos.org), 3/19/07)

18. What work is **Giant Industries** preparing to do in York County that will cost \$30-40 million and take as long as 35 years?<sup>18</sup> (*Daily Press*, 3/23/07)

19. What resource that supplies 70 million gallons of water per day is the **subject of a new federal/state study**?<sup>19</sup> (*Fredericksburg Free Lance-Star*, 4/10/07)

20. According to an April 20 ruling by the Virginia Supreme Court, who has the right to **challenge state-issued pollutant discharge permits**?<sup>20</sup> (*Richmond Times-Dispatch*, 4/21/07)

21. What **disposal practice of a sewage product** has recently been the focus of packed public meetings in several counties, new Virginia Department of Health (VDH) regulations, and several bills in the 2007 General Assembly?<sup>21</sup> (*Lynchburg News & Advance*, 4/22 and 4/24/07)

22. What **non-native insect** is "right on [Virginia's] doorstep," threatening ash trees (which, among other values, often provide streamside buffers)?<sup>22</sup> (*Forest Health Review*, May 2007)

23. As of May 8, how much of Virginia and of the United States was experiencing some level of **drought**?<sup>23</sup> (U.S. Drought Monitor, [www.drought.unl.edu/dm/monitor.html](http://www.drought.unl.edu/dm/monitor.html), 5/10/07)

### **Other Chesapeake Bay Items**

24. Whose expedition in 1607-09 to explore the Chesapeake Bay is the basis of a new **National Historic Trail**?<sup>24</sup> (Southern Maryland Online, <http://somid.com>, 12/19/07)

25. What new coalition plans to seek grants and contributions to buy used construction materials and have them placed in the Bay and Atlantic Ocean as **fish and oyster habitat**?<sup>25</sup> (*Baltimore Sun*, 1/10/07)

<sup>11</sup> A controlled brush fire continued to smoke and emit heat days after the brush had burned.

<sup>12</sup> He developed a simple, inexpensive method for filtering arsenic from well water.

<sup>13</sup> The proposed King William Reservoir.

<sup>14</sup> An illegal dump site in Lancaster County containing over 1,000 barrels leaking toxic substances. The U.S. EPA is leading a \$2-million clean-up effort.

<sup>15</sup> About two dozen Brown Pelicans.

<sup>16</sup> She received a National Wetlands Award from the Environmental Law Institute.

<sup>17</sup> He received the President's Volunteer Service Award.

<sup>18</sup> Clean up decades-old petroleum contamination at the Yorktown Refinery.

<sup>19</sup> Groundwater aquifers on Virginia's Northern Neck peninsula.

<sup>20</sup> Groups (not just individuals), such as the Chesapeake Bay Foundation, which has sued the Va. DEQ over a discharge permit for the Philip Morris USA plant in Chesterfield County.

<sup>21</sup> Land application of biosolids, or treated sewage sludge.

<sup>22</sup> The Emerald Ash Borer. Forest health experts warn citizens *not to move ash trees or products or any hardwood firewood*.

<sup>23</sup> Virginia: 16%, in 17 southwestern counties; U.S.: 46%, in 32 states (drought was "severe" or worse in parts of 20 states).

<sup>24</sup> Captain John Smith.

<sup>25</sup> The Maryland Artificial Reef Initiative.

26. What **fish**, with a complicated life cycle involving the Sargasso Sea, is the focus of federal efforts to restore their Potomac River population?<sup>26</sup> (*Frederick News-Post*, 1/16/07)

27. What **water-quality problem** is found in various Bay “hot spots”?<sup>27</sup> (National Oceanic and Atmospheric Administration, [www.noaanews.noaa.gov](http://www.noaanews.noaa.gov), 1/23/07)

28. What **sewage-treatment plant** serving over 2.1 million customers is the subject of strict new nutrient limits proposed by the EPA in December 2006?<sup>28</sup> (*Bay Journal*, Feb. 2007)

29. What key **Bay water-quality indicator** decreased in 2006 by 25 percent to its lowest level since 1989?<sup>29</sup> (*Richmond Times-Dispatch*, 3/29/07)

30. What **famous Bay crustacean** has increased in numbers from a record low in 1999 but appears to have reached a population plateau well below its historic levels?<sup>30</sup> (*Bay Journal*, Feb. 2007)

31. What substance, probably in your kitchen cabinet, is being used as a non-toxic method for **removing peeling paint from boat hulls**?<sup>31</sup> (*Annapolis Capital*, 3/13/07)

32. What **distinction** does the Chesapeake share with over 1,600 other sites worldwide?<sup>32</sup> (*National Wetlands Newsletter*, Mar.-Apr. 2007)

### **Out of Virginia**

33. **Who passed** a tax credit for use of low-impact development techniques to reduce runoff from new buildings, a requirement that dishwashing detergent sold in the state contain less than 0.5 percent phosphorus, and a ban on trapping the Diamondback Terrapin, but **rejected** an impervious-surface construction fee (to generate funds for pollution-reduction projects)?<sup>33</sup> (*Baltimore Examiner*, 2/28/07; *Washington Post*, 3/3 and 4/25/07; *Baltimore Sun*, 4/11/07)

<sup>26</sup> The American Eel.

<sup>27</sup> Contaminated sediments, according to a January 2007 report, *Magnitude and Extent of Contaminated Sediment and Toxicity in Chesapeake Bay*.

<sup>28</sup> The Blue Plains Treatment Plant, serving Washington, D.C. and parts of Virginia and Maryland.

<sup>29</sup> Underwater grasses (also known as submerged aquatic vegetation, or SAVs).

<sup>30</sup> The Blue Crab.

<sup>31</sup> Baking soda.

<sup>32</sup> The Chesapeake estuary has been designated as a “wetland of international importance.”

<sup>33</sup> The 2007 Maryland General Assembly. For more information on the session, visit <http://mlis.state.md.us/>.

34. How has Minnesota **monitored over 10,000 lakes**?<sup>34</sup> (Univ. of Minn. *Minnegram*, Dec. 2006)

35. What **fuel additive** is the focus of a \$250-million lawsuit settlement between Santa Monica, Calif., and three oil companies over contamination of municipal water wells?<sup>35</sup> (*Water Policy Report*, 12/25/07)

36. For what purpose is the **Australian state of Queensland** considering using recycled wastewater?<sup>36</sup> (*Greenwire*, [www.eenews.net/gw/](http://www.eenews.net/gw/), 1/30/07)

37. What structure is the Luzerne County (Penn.) Flood Protection Authority proposing for the **Susquehanna River**?<sup>37</sup> (*Wilkes-Barre Times Leader*, 1/20/07)

38. According to a February report from the Government Accounting Office (GAO), how many leaks from **underground storage tanks** were known as of September 2005?<sup>38</sup> (GAO Web site, [www.gao.gov](http://www.gao.gov), 2/23/07)

39. What two governments released in March a proposed plan for cleaning up **four heavily polluted Great Lakes sites** by 2010 and making progress on 11 other sites?<sup>39</sup> (*Toronto Globe and Mail*, 3/19/07)

40. On what basis did a federal district court judge in March block U.S. Army Corps of Engineers permits for **mountaintop-removal mines** in West Virginia?<sup>40</sup> (*OVEC v. United States Army Corps of Engineers*, 3/23/07, available at [www.wvsc.uscourts.gov](http://www.wvsc.uscourts.gov))

<sup>34</sup> With Landsat satellite images to compare lakes at five times over the past 20 years.

<sup>35</sup> MTBE (methyl tertiary butyl ether).

<sup>36</sup> For drinking water, as a response to the country’s long drought.

<sup>37</sup> An inflatable dam that supporters claim will encourage recreation and economic activity.

<sup>38</sup> 117,000 known leaks. The report is *Leaking Underground Storage Tanks: EPA Should Take Steps to Better Ensure Effective Use of Public Funding for Cleanups* (GAO-07-152).

<sup>39</sup> The provincial government of Ontario and the Canadian federal government.

<sup>40</sup> Judge Robert Chambers ruled that the Corps had not adequately evaluated the potential impact of associated “valley fills,” i.e., depositing the material removed from mountain tops into headwater streams.

## **Water, Energy, and Climate:** **Multiple Choice**<sup>41</sup>

1. Which of the following agreements or actions to **reduce energy use or limit emissions** of carbon dioxide or other “greenhouse” gases occurred within the past year?
    - a. Virginia started the Green Lodging Program to encourage motels to save water and energy. ([www.deq.virginia.gov/p2/lodging/](http://www.deq.virginia.gov/p2/lodging/), 4/13/07)
    - b. Arlington County considered an energy tax to fund a greenhouse-gas-reduction initiative. (*Washington Post*, 2/27/07)
    - c. The Metropolitan Washington Council of Governments approved a plan to coordinate greenhouse-gas-reduction efforts among local governments. (Southern Maryland Online, <http://somid.com>, 4/12/07)
    - d. Maryland passed the “Clean Car Act,” requiring automakers to reduce by 30 percent the Maryland fleetwide average of carbon dioxide emissions. (*Baltimore Sun*, 2/27/07)
    - e. The North Carolina Legislative Commission on Global Climate Change issued 20 recommendations for how the state can reduce its greenhouse gas emissions. (*Greenwire*, [www.eenews.net/gw/](http://www.eenews.net/gw/), 3/7/07)
    - f. About 100 companies comprising Columbia University’s Global Roundtable on Climate Change called for governments to set targets for greenhouse gas reductions. (*Greenwire*, [www.eenews.net/gw/](http://www.eenews.net/gw/), 3/7/07)
    - g. All of the above.
  
  2. Which of the following are potential **alternative energy sources** or potential **new ways to use traditional sources**?
    - a. Using methane generated in the Fauquier County landfill to produce electricity. (*Fauquier Times-Democrat*, 2/29/07)
    - b. Using methane generated by poultry in Pennsylvania to produce electricity or heat. (*Lancaster Intelligencer Journal*, 3/9/07)
    - c. Using methane from Nebraska feedlot manure to power an ethanol-production plant. (Associated Press, 1/23/07)
    - d. Using prairie plants grown on “marginal lands” as a source of raw materials to produce ethanol or biodiesel fuel. (U. of Minn. *Minnegram*, Dec. 2006)
    - e. Developing technology to produce liquid fuel from coal and to capture the carbon dioxide produced (a process known as “carbon sequestration”). (*Greenwire*, [www.eenews.net/gw/](http://www.eenews.net/gw/), 3/2/07)
  
  - f. Wave-energy techniques being tested in the East River in New York, Oregon, and England. (“On Point,” [www.eande.tv](http://www.eande.tv), 3/22/07; (*Greenwire*, [www.eenews.net/gw/](http://www.eenews.net/gw/), 4/30/07; *International Herald Tribune*, 4/5/07)
  - g. All of the above.
3. Which of the following were actual news items about the **connections between water and energy**?
    - a. Richmond-based Dominion Resources agreed to sell its oil and natural gas operations in the Gulf of Mexico to Eni Petroleum Company. (*Greenwire*, [www.eenews.net/gw/](http://www.eenews.net/gw/), 4/30/07)
    - b. The Bush administration will seek to open areas 50 miles or more off the Virginia coast to oil and natural gas exploration. (*Virginian-Pilot*, 4/30/07)
    - c. Facing opposition from Maryland’s governor and local officials, Virginia-based AES Corporation is seeking to build a liquefied natural gas (LNG) terminal on the Sparrows Point peninsula of Baltimore County; this is one of 35 new liquefied natural gas (LNG) terminals proposed by various companies around the country as a way to increase imports of natural gas from overseas (liquefying the gas allows it to be shipped). (*Baltimore Sun*, 1/24/07; *Baltimore Examiner*, 3/6/07; Associated Press, 5/9/07)
    - d. In 2004-05, the Santa Clara Valley (Calif.) Water District’s water-conservation programs led to an estimated energy savings of 196 million kilowatt-hours, enough electricity for about 30,000 households for a year. (Calif. Office of Water Use Efficiency, *Water Conservation News*, Spring/Summer 2006)
    - e. All of the above.

## **Final Words**

Here are two perspectives on **efforts to restore the Chesapeake Bay**.

“We have done a truly tremendous job of defining the problem, and...of defining the solution. But we have not yet succeeded in actually implementing the solution.”—J. Charles Fox, associate administrator of the U.S. EPA. (*Richmond Times-Dispatch*, 1/30/07)

“When you are presented with an opportunity to save the Bay, it’s good to just grab it by the horns. ...We probably have 100 pigs filled.”—Jack Siglin, sixth-grader at Lime Kiln Middle School in Howard County, Md., referring to filling piggy banks with change to donate to Bay restoration efforts. (*Baltimore Examiner*, 3/19/07)

<sup>41</sup> Answer hint: choose “all of the above”!

## SPECIAL NEWS ITEM

### A Community Development Financial Institution and Water Resources

*Ed. note:* This following is an excerpt from an article that first appeared in the Summer 2006 issue of the *Leopold Letter*, a quarterly publication of the Leopold Center for Sustainable Agriculture at Iowa State University. That publication is available online at [www.leopold.iastate.edu/pubs/nwl/leoletter.htm](http://www.leopold.iastate.edu/pubs/nwl/leoletter.htm). Opinions in the article are not necessarily those of the Virginia Water Resources Research Center. *Water Central* thanks the Leopold Center for permission to reprint this excerpt.

*Water Central* would be pleased to receive and publish information from readers about how CDFIs are involved with water in Virginia. If you have such information, please contact the editor at (540) 231-5463 or [araflo@vt.edu](mailto:araflo@vt.edu).

### Finding the Right Fit, Support for Ag Entrepreneurs

By Brandon Scott

Sustainable agricultural enterprises are just like other business ventures. Whether it's opening an organic creamery or setting up a grass-based beef operation, business and agricultural entrepreneurs have at least one thing in common: the need for capital. That's where companies like the ShoreBank Corporation come in.

Established in 1994, ShoreBank was the nation's first commercial bank formed to support environmentally sustainable development. ShoreBank Pacific, based in Ilwaco, Washington, started as a joint non-profit project of the ShoreBank Corporation of Chicago and the environmental nonprofit organization, Ecotrust of Portland. Since that time, ShoreBank Pacific has invested more than \$30 million in economic opportunities and environmental restoration and preservation in the Pacific Northwest.

[John] Berdes [president of ShoreBank] elaborated on his institution's mission and dedication to the "triple bottom-line."

"Most businesses have a single bottom-line—maximizing shareholder return," Berdes said. "'Triple bottom-line' companies typically manage to achieve three returns: profitability, social return, and an environmental return."

ShoreBank measures its bottom line by looking at three things: traditional financial performance, the dollars they invest in "priority communities" (communities whose median income and housing values are below the state or regional standards), and the dollars they loan to finance activities that contribute to a healthier environment, such as building renovations that reduce energy consumption.

One of the enterprises supported by ShoreBank Pacific through loans is an organic dairy/cranberry farm in southwest Washington. The farm is preserving farming traditions and lands and developing new

products and markets. The farm emphasizes a "value proposition" for family farms.

ShoreBank has made loans to a shellfish farm that raises oysters. The Nisbet Oyster Farm in the Willapa Bay of southwest Washington employs numerous immigrants and pushes for high local water quality standards. The local water quality has a direct impact on the Nisbet bottom line; if water quality drops, oysters may become unfit for consumption.

Nisbet also promoted an effort to replace nearby septic systems, which were outdated, and Shorebank helped with funding. By replacing the septic systems, Shorebank was able to meet their "triple bottom-line" by helping to protect water quality. Local properties increased in value because of updated septic systems, oyster farms were able to increase profits due to a cleaner water source, and the environment was improved by removal of leaky septic systems.

Berdes described Shorebank's partnerships with its clients as "a portfolio of relationships, not a portfolio of loans," that serve as a guideline of how lending institutions should treat their customers.

Berdes summarized the key ingredients needed for rural entrepreneurs to succeed:

- Local capital, a customized and unregulated capital resource in addition to banks;
- Collaborations, growing partnerships into new kinds of institutions; and
- Markets, "consumers who care about quality, consistency, convenience and only then values or environment," he explained.

### More about CDFIs

What sets ShoreBank Corporation apart from other lending institutions? ShoreBank is the nation's first (and still its largest) community development financial institution, or CDFI.

A CDFI is a specialized financial institution that works in market niches that have not been adequately served by traditional lending institutions. A CDFI can be a community development bank, credit union, loan fund, venture capital fund or microenterprise loan fund. CDFIs provide a range of services including mortgage financing for first-time homebuyers, financing for needed community facilities and commercial loans to start or expand small businesses.

The U.S. Treasury Department operates the CDFI Fund program that awards money and tax credits to community-based organizations that work in low-income urban and rural communities. Treasury Department information about CDFI's is available at [www.cdfifund.gov](http://www.cdfifund.gov). As of 5/22/07, a list of CDFI's by state was available online at [www.cdfifund.gov/docs/certification/cdfi/CDFIbystate\(11-1-06\).pdf](http://www.cdfifund.gov/docs/certification/cdfi/CDFIbystate(11-1-06).pdf).

# N O T I C E S

If you would like to receive a weekly e-mail notification about *upcoming meetings, conferences, and other events related to water quality*, you may do so by joining the Virginia Water Monitoring Council; contact Jane Walker at the Water Center at (540) 231-4159 or [janewalk@vt.edu](mailto:janewalk@vt.edu).

Also, please see the Water Center's regularly updated "Quick Guide to Water-related Meetings and Conferences in Virginia," on our Web site at [www.vwrrc.vt.edu](http://www.vwrrc.vt.edu).

All Web sites listed in this section were functional as of 5/17/07.

## State Meeting Review

This section presents a list of most water-related public meetings and hearings that occurred December 26, 2006—April 30, 2007, as listed on the **Virginia Regulatory Town Hall** Web site, at [www.townhall.state.va.us/Intro.cfm](http://www.townhall.state.va.us/Intro.cfm). The Town Hall site posts minutes of these and all public meetings by Virginia's boards, commissions, and departments. Water Cental's list gives includes the name of a contact person for further information. To find the e-mail address or phone number of the contact people, go to the Regulatory Town Hall Web site, click on Meetings (Future or Past), and then click on the particular event. You can also request state employee phone numbers by calling (800) 422-2319, and you can find the e-mail address of any state employee online at [www.employees.state.va.us/directory-search.cfm](http://www.employees.state.va.us/directory-search.cfm).

## Total Maximum Daily Load (TMDL) Meetings

Under the federal Clean Water, when a water body fails (with a certain frequency) to meet state water-quality standards, the water is to be designated as "impaired," requiring development of a total maximum daily load (TMDL). A TMDL *study* identifies the pollutant source(s) causing the impairment and determines how much of the pollutant(s) the water can receive (the "load") and still meet standards. A TMDL *implementation plan* (required by Virginia law) maps a process for reducing the pollutant load to the TMDL level. Many Virginia TMDLs are underway, each involving many public meetings.

During the period noted above, TMDL-related public meetings were held regarding the waters listed in the table below (listed alphabetically by localities). The contact people listed for TMDL meetings are Virginia Department of Environmental Quality staffers unless otherwise noted. Information on the status of all TMDLs in Virginia is available online at [www.deq.state.va.us/tmdl/](http://www.deq.state.va.us/tmdl/).

Location	Water(s) & Impairment	Larger Watershed(s)	For More Information
Accomack County	Assawoman, Little Mosquito, and Parker creeks for bacteria	Coastal bays	Jennifer Howell
Albemarle, Culpeper, Fauquier, Greene, Madison, Orange, Rappahannock, and Spotsylvania counties.	Rappahannock River and tributaries (Blue Run, Browns Run, Cedar Run, Craig Run, Hazel River, Hughes River, Marsh Run, Rapidan River, and Rush River) for bacteria	Rappahannock River	Katie Conaway
Albemarle, Greene, and Orange counties	Rivanna River and tributaries (Beaver Creek, Mechums River, Meadow Creek, North Fork Rivanna River, Preddy Creek) for bacteria	James River	Robert Brent
Buchanan County	Garden Creek for aquatic-life impairment and bacteria	Levisa Fork/Big Sandy River	Shelley D. Williams
Chesterfield, Henrico, and Powhatan counties and City of Richmond	James River and tributaries (Almond Creek, Bernards Creek, Falling Creek, Gillies Creek, Goode Creek, No Name Creek, Powwhite Creek, and Reedy Creek) for bacteria	James River	Chris French
Frederick County	Hogue Creek for bacteria	Potomac River	Robert Brent
Gloucester County	Shellfish waters for bacteria	York River	Chester Bigelow
Halifax and Pittsylvania counties	Banister River watershed for bacteria	Dan River/Roanoke River	Lauren Theodore

Lancaster County	Shellfish waters for bacteria	Rappahannock River	Chester Bigelow
Lunenburg County	Flat Rock Creek watershed for bacteria	Meherrin River/Chowan River/Albemarle Sound, N.C.	Lauren Theodore
Mecklenburg County	Great Creek watershed for bacteria	Roanoke (Staunton) River	Lauren Theodore
Northampton County	Shellfish waters for bacteria	Chesapeake Bay	Chester Bigelow
Tazewell County	Indian Creek for aquatic-life impairment and bacteria	Clinch/Powell rivers	Shelley Williams
Westmoreland County	Lower Machodoc Creek for bacteria	Potomac River	Chris French
Westmoreland County	Nomini Bay watershed (shellfish growing area 4) for bacteria	Potomac River	Chester Bigelow
Wise County	Pound River (North and South Forks) for aquatic life impairment	Big Sandy River	Shelley Williams
York County	Felgates, King, and Queen creeks for bacteria and dissolved-oxygen impairment	York River	Jennifer Howell

### Other Meetings of Statewide Interest

Items are listed alphabetically by agency or group, then by topic (shown in bold). Date listed is that of the *most recent* meeting on the topic.

Air Pollution Control Board, State Water Control Board (SWCB), and Waste Management Board: **annual joint meeting** (Apr. 10). More information: Cindy Berndt.

**Chesapeake Bay Local Assistance Board's Policy Committee** (Mar. 26). More information: David Dowling (Dept. of Conservation and Recreation).

Department of Environmental Quality (DEQ) public hearing on a proposed plan for **mercury emissions** from coal-fired electric steam generating units (Apr. 26). More information: Beth Major.

Department of Health (VDH) advisory committee on **on-site soil evaluator regulations** (Feb. 13). More information: Dwayne Roadcap.

VDH advisory committee on **sewage handling and disposal regulations** (Feb. 23); more information: Donald Alexander; and **Sewage Handling and Disposal Appeals Review Board** (Apr. 4); more information: Donna Tiller.

Department of Mines, Minerals and Energy (DMME) information meeting on FY2007 **Abandoned Mine Land Consolidated Grant** Application to be submitted to the Federal Office of Surface Mining (Feb. 16). More information: Roger Williams.

**Game and Inland Fisheries Board's Finance, Audit, and Compliance Committee** (Feb. 13). More information: Beth Drewery (Dept. of Game and Inland Fisheries).

State Water Control Board (SWCB) advisory committee on amendment to the general permit

for **concrete product facilities** (Apr. 19).

More information: Michael Gregory.

SWCB advisory committee on amendments to the general permit for **cooling-water discharges** (Mar. 21). More information: Burt Tuxford.

SWCB public meeting on proposed "**Exceptional Waters**" designation for portions of the Hazel River (Mar. 27). More information: David C. Whitehurst.

SWCB workgroup meeting on *implementation* of the general watershed permit regulation (9 VAC 25-820) for **nitrogen and phosphorus discharges and nutrient trading in the Chesapeake Bay Watershed** (Feb. 16). This regulation became effective Nov. 1, 2006. More information: Kyle Winter (DEQ).

SWCB advisory committee on **triennial review of water quality standards** (9 VAC 25-260) (Apr. 18). More information: Elleanore Daub (DEQ).

SWCB advisory committee on a proposed general permit for **wastewater discharges from water-treatment plants** (Mar. 10). More information: George Cosby (DEQ).

### Regular Meetings of Statewide Boards and Commissions

**Chesapeake Bay Local Assistance Board**—meets March, June, September, and December. More information: (800) CHESBAY; [www.cblad.state.va.us](http://www.cblad.state.va.us).

**Game and Inland Fisheries Board**—meets bimonthly. More information: [www.dgif.virginia.gov](http://www.dgif.virginia.gov).

**Groundwater Protection Steering Committee**—meets third Tuesday of odd-

numbered months. More information:

[www.deq.virginia.gov/gwpsc/](http://www.deq.virginia.gov/gwpsc/).

**Land Conservation Foundation**—meets about three times per year. More information: (804) 786-3218;

[www.dcr.virginia.gov/virginia\\_land\\_conservation\\_foundation/index.shtml](http://www.dcr.virginia.gov/virginia_land_conservation_foundation/index.shtml).

**Licensing and Regulation Boards** for engineers, soil scientists, waterworks and wastewater works operators, and wetland delineators, under the Dept. of Professional and Occupational Regulation, (804) 367-8500, TDD (804) 367-9753;

[www.dpor.virginia.gov/dporweb/boards.cfm](http://www.dpor.virginia.gov/dporweb/boards.cfm)

**Marine Resources Commission**—meets monthly. More information: (757) 247-2200, TDD (757) 247-2292; [www.mrc.state.va.us](http://www.mrc.state.va.us).

**Soil and Water Conservation Board**—meets bimonthly. More information: (804) 786-1712; [www.dcr.virginia.gov/soil\\_water/vs&wcb.shtml](http://www.dcr.virginia.gov/soil_water/vs&wcb.shtml).

**State Water Control Board**—meets March, June, September, and December. More information: (800) 592-5482;

[www.deq.virginia.gov/cboards/homepage.html#water](http://www.deq.virginia.gov/cboards/homepage.html#water)

**Waste Management Board**—meets about three times per year. More information: (800) 592-5482;

[www.deq.virginia.gov/cboards/homepage.html#waste](http://www.deq.virginia.gov/cboards/homepage.html#waste).

## Other Notices

### Public Swimming Beach Information

**Virginia Department of Health (VDH) Waterborne Hazards Control Program**—This program investigates reports of illnesses related to water exposure, conducts epidemiological studies to determine risk factors for waterborne illnesses, and maintains databases on water related illnesses. The main Web site is

[www.vdh.virginia.gov/epi/dzee/waterborne/](http://www.vdh.virginia.gov/epi/dzee/waterborne/).

The VDH beach monitoring Web site is

[www.vdh.virginia.gov/epi/dzee/beachmonitoring/](http://www.vdh.virginia.gov/epi/dzee/beachmonitoring/).

The U.S. Environmental Protection Agency (EPA) Beach Standards, Monitoring, and Notification Web site is

[www.epa.gov/waterscience/beaches/](http://www.epa.gov/waterscience/beaches/).

The U.S. Centers for Disease Control and Prevention's Healthy Swimming Web site is [www.cdc.gov/healthyswimming/](http://www.cdc.gov/healthyswimming/). This site provides information about recreational water illnesses and ways to prevent these illnesses.

### Got "Straight-pipes" in Your Locality?

The Virginia Department of Housing and Community Development has funds to help homeowners eliminate straight-pipe sewage-disposal systems. More information, Brad Belo, [brad.belo@dhcd.virginia.gov](mailto:brad.belo@dhcd.virginia.gov) or (804) 786-1161.

### Chowan River Basin Atlas

The Virginia Canals and Navigation Society (VCNS) recently published the *Blackwater, Nottoway, Meherrin, and Chowan River Atlas*. VCNS atlases provide detailed river-navigation maps and historical information. Atlases on several other Virginia rivers are also available; for a list and prices, visit <http://organizations.rockbridge.net/canal/>, or contact Richard Davis at [dunoon@intelos.com](mailto:dunoon@intelos.com) or (540) 463-6777.

### New Coastal Map and Data Tool

Released in February 2007, "Coastal GEMS" is a Web-based source of coastal-resource maps and data, planning information, laws and policies, and links to relevant agencies. The Web site is [www.deq.virginia.gov/coastal/coastalgems.html](http://www.deq.virginia.gov/coastal/coastalgems.html). More information: Kelly Price, Virginia Coastal Zone Management Program, [kelly.price@deq.virginia.gov](mailto:kelly.price@deq.virginia.gov).

### Earth Portal

This new online resource from the National Council for Science and the Environment aims to provide a "comprehensive resource for timely, objective, science-based information about the environment," according to the Web site at [www.earthportal.org](http://www.earthportal.org). Features include "Encyclopedia of Earth," "Earth News," "Earth Forum," and "Environment in Focus." The "Hot Topic" link for "water" leads to summaries of water conditions in dozens of countries, along with other topics. Other links lead to information on biodiversity, climate change, energy, marine ecology, and other topics.

### Streamflow and Nutrient Delivery to the Gulf of Mexico

An April 2007 report from the U.S. Geological Survey (USGS) analyzes streamflow and the delivery of nitrogen, phosphorus, and silica from the Mississippi River Basin (including 30 sub-basins) to the Gulf of Mexico. The report is available online (only) at <http://toxics.usgs.gov/pubs/of-2007-1080/>.

## Two Flood Management Resources

The Associated Programme of Flood Management (APFM) Web site, [www.apfm.info](http://www.apfm.info), offers papers and reports on the concept of **integrated flood management**.

The Association of State Floodplain Managers Web site, [www.floods.org](http://www.floods.org), offers many resources related to floodplain management, hazard mitigation, the National Flood Insurance Program, preparedness, and recovery.

## Rooftops to Rivers

This 2006 report from the Natural Resources Defense Council discusses urban stormwater and includes nine case studies of cities using stormwater-reducing techniques. Available at [www.nrdc.org/water/pollution/rooftops/contents.asp](http://www.nrdc.org/water/pollution/rooftops/contents.asp). More information: [nrdcinfo@nrdc.org](mailto:nrdcinfo@nrdc.org) or (212) 727-2700.

## Water Conservation Brochure

*55 Facts, Figures, and Follies of Water Conservation* is available for sale (minimum order 30) from the American Water Works Association. More information: (800) 926-7337; [www.awwa.org/bookstore/product.cfm?id=70077](http://www.awwa.org/bookstore/product.cfm?id=70077)

## Upcoming Conferences and Workshops

### Conferences In Virginia

**The Chesapeake Bay, Economics, & the Environment.** Jul. 9-13, Farmville. Organized by the Longwood Center for Economic Education. More information: (434) 977-4837; [www.longwood.edu/lcee/Chesapeake%20Bay.htm](http://www.longwood.edu/lcee/Chesapeake%20Bay.htm)

**Wetlands 2007: Watershed Strategies to Protect and Restore Wetlands' Ecological and Social Services.** Aug. 27-29, Williamsburg: Organized by the Association of State Wetland Managers. More information: Laura Burchill, [laura@aswm.org](mailto:laura@aswm.org) or (207) 892-3399; [www.aswm.org/calendar/wetlands2007/wetlands2007.htm](http://www.aswm.org/calendar/wetlands2007/wetlands2007.htm).

### Conferences Elsewhere

**Annual Conference of the Soil and Water Conservation Society.** Jul. 21-25, Tampa, Florida. More information: [swcs@swcs.org](mailto:swcs@swcs.org); (515) 289-2331; [www.swcs.org/en/conferences/](http://www.swcs.org/en/conferences/).

**Sustainable Water, Unlimited Growth, Quality of Life—Can We Have it All?** Aug. 29-Sep. 1, Tucson, Arizona. Organized by Arizona Hydrological Society. More information: [azhydro@comcast.net](mailto:azhydro@comcast.net); (520)299-6787; [www.watersymposium.org](http://www.watersymposium.org).

**The Practice of Restoring Native Ecosystems.** Oct. 8-9, Nebraska City, Nebraska. Organized by National Arbor Day Foundation. More information: [spearson@arborday.org](mailto:spearson@arborday.org); (888) 448-7337; <http://arborday.org>.

## Also Out There...

(Brief descriptions of some interesting items *Water Central* has recently discovered)

**“Rising Tide—Will Climate Change Drown Coastal Wetlands?”**—Discusses changes in coastal marshes and the potential impacts on coastal communities. *Coastal Heritage*, Winter 2007. South Carolina Sea Grant Consortium, Charleston, S.C.; (843) 727-2078 or [annette.dunmeyer@scseagrant.org](mailto:annette.dunmeyer@scseagrant.org); available at [www.scseagrant.org/oldsite/library/library\\_coaher.htm](http://www.scseagrant.org/oldsite/library/library_coaher.htm).

**World Water Day in Photos**—World Water Day on March 22 was sponsored by the United Nations to highlight water-scarcity issues around the world. A series of photos published by *The Guardian* (London) to mark the day is available at [www.guardian.co.uk/gallery/2007/mar/20/1?picture=329754632](http://www.guardian.co.uk/gallery/2007/mar/20/1?picture=329754632).

**“(Re)Cycle of Life: We Want to Believe”**—Discusses the economics and public acceptance of solid waste recycling in the Charlottesville and Albemarle County area, with lessons for other localities. *The Hook*, February 8, 2007 (cover article). Charlottesville, 434-295-8700. Available (via the magazine archive) at [www.readthehook.com/stories/archive.asp](http://www.readthehook.com/stories/archive.asp).

## CLARIFICATION FROM PREVIOUS ISSUE

The Feature Article in the January 2007 issue of *Virginia Water Central*, “The Supreme Court Again Stirs the ‘Waters of the United States,’” by Jesse Richardson, was intended to provide factual information (as is typical in our Feature Articles) but also to present the *viewpoints* of the author on recent Supreme Court cases concerning the Clean Water Act and on related issues of law. As with all opinions expressed by guest authors, the opinions expressed in Mr. Richardson’s article are not necessarily those of *Water Central*, the Virginia Water Resources Research Center, or of Virginia Tech. *Water Central* invites readers to submit opposing viewpoints for possible publication.

## AT THE WATER CENTER

To reach the Virginia Water Resources Research Center: phone (540) 231-5624; FAX (540) 231-6673; e-mail [water@vt.edu](mailto:water@vt.edu); Web site [www.vwrrc.vt.edu](http://www.vwrrc.vt.edu).

### New Water Center Report

*Analysis of Sinkhole Susceptibility and Karst Distribution in the Northern Shenandoah Valley, Virginia: Implications for Low Impact Development (LID) Site Suitability Models* (VWRRRC Special Report SR31-2006), by Sara E. Hyland, Lisa M. Kennedy, Tamim Younos, and Shane Parson (2006). Available on the Water Center Web site at [www.vwrrc.vt.edu/publications/SR31-2006-SinkholeAnalysis.pdf](http://www.vwrrc.vt.edu/publications/SR31-2006-SinkholeAnalysis.pdf).

### Research by Water Center Staff

“Developing a Standardized Water Quality Index for Evaluating Surface Water Quality,” by Frederick W. Kaurish and Tamim Younos. *J. of the American Water Resources Association*, Vol. 43, No. 2 (April 2007), pp. 533-545.

“Pathogens in Natural and Engineered Water Systems: Emerging Issues,” by Tamim Younos, Valerie Harwood, Joseph Falkinham, and Hua Shen. *Water Resources Impact*, Vol. 9, No. 3 (May 2007), pp. 11-14.

### Grants Received

The Water Center received approval in March 2007 for the following research grants:

**“Research Opportunities in Interdisciplinary Watershed Sciences and Engineering.”** National Science Foundation; three-year project, \$300,000. Research team: Tamim Younos and Vinod Lohani (principal investigators), Andrea Dietrich, Charles Hagedorn, Pushkin Kachroo, John Little, Vinod Lohani, Madeline Schreiber, and Maurice Valett (from several Virginia Tech departments). (*Ed. note:* We note sadly that G.V. Loganathan, a Virginia Tech professor who died April 16, 2007, would also have been one of the researchers on this project.)

**“Virginia’s Stormwater Impact Evaluation Project: Developing an Optimization Tool for Improved Site Development, Selection, and Placement of Stormwater Runoff BMPs”** [best management practices]. U.S. EPA; one-year project, \$111,768. Researchers: Tamim Younos, David Kibler, and Randy Dymond (all at Virginia Tech).

**“Virginia Stormwater Best Management Practices Information Clearinghouse–Business Plan.”** Va. Dept. of Conservation and Recreation. Three-year project, \$289,782. Researchers: Stephen Schoenholtz and Tamim Younos.

For more information about any of these projects, please contact Tamim Younos at [tyounos@vt.edu](mailto:tyounos@vt.edu) or (540) 231-8039.

### Water Center Participates in Public School Initiative



A high school science teacher shares a water-quality project with teachers from Montgomery County, Virginia, during a March 2007 training workshop at Virginia Tech. The workshop was part of a new initiative to help high school science teachers conduct water-quality lessons. Along with the county school division, initiative partners include the Water Center, Virginia Tech Service-Learning Center, Virginia Tech Science Outreach Program, Montgomery County Planning and GIS Services Department, Blacksburg Planning and Engineering Department, and the Virginia Department of Environmental Quality. The initiative continues through Summer 2007.

*Text and photo by Ana Constantinescu*

## 2007 Virginia / West Virginia Water Research Symposium

“Connecting Management to Aquatic Communities”

November 28-29, 2007

The Inn at Virginia Tech and Skelton Conference Center  
Blacksburg, Virginia



For online symposium information and registration, please visit [www.vwrrc.vt.edu/2007Symposium.htm](http://www.vwrrc.vt.edu/2007Symposium.htm). More information is also available from Jane Walker, Virginia Water Resources Research Center, at [janewalk@vt.edu](mailto:janewalk@vt.edu) or (540) 231-4159; or Tamara Vandivort, West Virginia Water Research Institute, at [tamara.vandivort@mail.wvu.edu](mailto:tamara.vandivort@mail.wvu.edu) or (304) 293-2867, x5448.

*Schoenholtz, cont. from page 3*

clearinghouse for stormwater best management practices (BMPs). The EPA-funded project is aimed at developing improved methods for development and placement of stormwater BMPs. We also recently received two EPA grants to help support our coordination of the multi-institute Academic Advisory Committee, which is advising the Virginia Department of Environmental Quality on establishing nutrient-standard criteria for Virginia's fresh waters.

In collaboration with eight faculty members from Virginia Tech's colleges of Engineering, Science, and Agriculture and Life Sciences, the Water Center recently received a three-year grant under the National Science Foundation Research Experiences for Undergraduates (REU) program. Eight undergraduate students from around the country arrived on campus in May to begin an 11-week program of participating in field and laboratory research, attending weekly seminars, and exploring multi-disciplinary approaches to

watershed science and engineering. Ongoing research projects where REU students will be involved include studies of (1) dynamics of sediment and bacteria movement in a watershed, (2) microbial source tracking, (3) metal cycling in aquatic environments, (4) water-quality effects in active and abandoned mine lands, (5) reservoir management for water pollution control, (6) watershed-based water supply and drought management, and (7) advanced watershed instrumentation and control.

Our STEP summer internship program began May 29 with three new interns who will be working with Catawba Valley LandCare, the New River Valley Watershed Roundtable, and the Dan River Basin Association.

Finally, I am pleased to inform you that Ana Constantinescu has joined the Water Center as a part-time communications manager. You will quickly see the effects of Ana's presence in the coming months on our Web site and in future issues of *Water Central*.

All the best for a pleasant summer!

## FOR THE RECORD

### Sources for Selected Water Resources Topics

## Water Quality Information Sources

This topic was last covered in the Dec. 2001 *Water Central* (Issue #19), p. 19. This issue updates and adds to the previous list of sources. All Web sites listed in this section were functional as of 5/8/07.

## Nationwide Information Sources

### EPA

The U. S. Environmental Protection Agency (EPA) submits the **National Water Quality Inventory Report** to Congress, as required under section 305(b) of the Clean Water Act. As of May 2007, the 2002 report was the most recent available. For the 2002 Report, states combined information for this report with lists of “impaired waters” required under section 303(d) of the Clean Water Act. The **2002 National Assessment Database**—the electronic summary of state-reported data and information—reflects these changes. *Web site:* [www.epa.gov/305b/](http://www.epa.gov/305b/) (all reports); [www.epa.gov/owow/tmdl/](http://www.epa.gov/owow/tmdl/) (for Section 303[d] reports, lists and maps); *phone:* (800) 490-9198 (EPA’s National Service Center for Environmental Publications); for Section 303(d) copies, request EPA-840-B00-002.

For information about local watersheds, visit the EPA’s “**Surf Your Watershed**” Web site, ([www.epa.gov/surf/](http://www.epa.gov/surf/)). This site allows users to locate their watersheds and then find specific information, such as monitoring sites, lists of impaired waters, and watershed groups.

### U.S. Geological Survey

The U. S. Geological Survey (USGS) has been conducting the **National Water Quality Assessment (NAWQA) Program** since 1991. The program has collected surface and groundwater quality data from thousands of stream sites and wells in 51 study areas throughout the nation and has published reports for each watershed, along with national summary reports on various water-quality problems (such as nutrients and pesticides). Four reports covered watersheds located partially or wholly in Virginia. By 2012, USGS intends to reassess 42 study areas; three will include portions of Virginia.

*Web site:* <http://water.usgs.gov/nawqa>; *e-mail:* [nawqa\\_info@usgs.gov](mailto:nawqa_info@usgs.gov); *phone:* (703) 648- 5716.

### U.S. Department of Agriculture

The **Water Quality Information Center** ([www.nal.usda.gov/wqic](http://www.nal.usda.gov/wqic)) at the National Agricultural Library, located in Beltsville, Maryland, is a primarily online source for scientific findings, educational methods, and public policy information on water quality and agriculture. *Mailing address:* National Agricultural Library, Abraham Lincoln Building, 10301 Baltimore Avenue, Beltsville, MD 20705-2351; *phone:* (301) 504-5755.

### Virginia Information Sources

#### Virginia Water Center Report

**Long-term Water Quality Trends in Virginia’s Waterways**, a 1998 Water Center Special Report (SR11-1998), is a good starting point for learning about water-quality monitoring in Virginia. The report is available at the Water Center’s Web site, [www.vwrrc.vt.edu](http://www.vwrrc.vt.edu) (first, click on “Publications, Reports, & Research Bulletins”; then, click on “Special Reports” and scroll down). *E-mail:* [water@vt.edu](mailto:water@vt.edu); *phone:* (540) 231-5624;

#### Department of Environmental Quality

Virginia’s Department of Environmental Quality (DEQ) monitors water quality in surface water and groundwater. The home page for DEQ water-quality programs is [www.deq.state.va.us/water/](http://www.deq.state.va.us/water/). The Virginia DEQ’s central office number is (804) 698-4000 or, toll-free in Virginia, (800) 592-5482. The Public Affairs Office phone number is (804) 698-4447.

Important DEQ water-quality documents include them **305(b)/303(d) Water Quality Assessment Integrated Report**. The 2006 report, a summary of the water-quality conditions in Virginia from January 1, 2000 to December 31, 2004, is the most recent available as of May 2007. This report is part of the National Water Quality Inventory Report, mentioned above under EPA. The 2006 report can be found online at [www.deq.virginia.gov/wqa/ir2006.html](http://www.deq.virginia.gov/wqa/ir2006.html). Other state water-quality reports are available online at [www.deq.state.va.us/water/reports.html](http://www.deq.state.va.us/water/reports.html). DEQ’s statewide contact for water-quality monitoring and assessment is Daryl Glover: *e-mail:* [dmglover@deq.virginia.gov](mailto:dmglover@deq.virginia.gov); *phone:* (804)

698-4321. The DEQ also has many **water quality technical studies and databases** (for example, the Virginia Pollution Discharge Elimination System Permit database, or the Elizabeth River water and sediment quality database). A fee may be charged in some cases for these sources. A list is available on-line at [www.deq.virginia.gov/info/reportstudies.html](http://www.deq.virginia.gov/info/reportstudies.html) - [water](#) along with the name and e-mail of the appropriate DEQ contact person.

For more information about DEQ water-quality programs, contact the Public Affairs Office, *e-mail*: [wphayden@deq.virginia.gov](mailto:wphayden@deq.virginia.gov) (Bill Hayden); *phone*: (804) 698-4447.

### Citizen Monitoring Groups

Many citizen groups monitor water quality in Virginia. Most of these groups focus on a particular area or watershed and may be able to provide data or information about such areas. Here are three ways to find out about citizen water-quality monitoring groups in Virginia.

- **Va. DEQ Citizen Monitoring Coordinator—**

*Web*: [www.deq.state.va.us/cmonitor/homepage.html](http://www.deq.state.va.us/cmonitor/homepage.html); *e-mail*: [jebeckley@deq.virginia.gov](mailto:jebeckley@deq.virginia.gov) (James Beckley); *phone*: (804) 698-4025.

- **Virginia Citizens for Water Quality**

According to their Web site, this group strives “to coordinate volunteer water quality monitoring efforts and monitoring methodologies, provide a funding mechanism for volunteer water quality monitoring, and promote watershed water quality and stream health needs and issues.”

*Web site*: [www.virginiacwq.org/index.htm](http://www.virginiacwq.org/index.htm); *e-mail*: [monitor@virginiacwq.org](mailto:monitor@virginiacwq.org); *phone*: (804) 615-5036.

- **Virginia Save Our Streams Program**

The Virginia Save Our Streams program focuses on training volunteers in water-quality monitoring and data collection. Data collected by certified monitors is used by state agencies when preparing reports or assessments. *Web site*: [www.sosva.com](http://www.sosva.com); *e-mail*: [vasosoffice@vasos.org](mailto:vasosoffice@vasos.org); *phone*: (888) 656-6664 (toll-free).

### Virginia Water Monitoring Council

According to the its Web site, the Council’s goals are to “enhance coordination, collaboration, and communication among government agencies, organizations, and individuals involved in monitoring; encourage effective and efficient use of monitoring resources (e.g., labor, finances, and equipment); and facilitate the transfer of water monitoring information.” *Web site*:

[www.vwrrc.vt.edu/vwmc/Default.asp](http://www.vwrrc.vt.edu/vwmc/Default.asp); *e-mail*:

[janewalk@vt.edu](mailto:janewalk@vt.edu) (Jane Walker); *phone*: (540) 231-4159 or (540) 231-5624.

## You May be a Information Source

To **report** a pollution incident or suspected violation of state environmental law, contact the DEQ Pollution Response Program (PREP). During normal work hours, phone your local DEQ Regional Office; regional contact information is in the state government pages of local phone books and online at [www.deq.virginia.gov/prep/contacts.html](http://www.deq.virginia.gov/prep/contacts.html). At other times, phone (800) 468-8892 (in-state) or (804) 674-2400 (out-of-state).

## A Key Source—The Library!

Finally, don’t forget to enquire at your local library for printed or electronic reports or databases on water quality, either those mentioned here or others we have missed.

*By Amanda Mullins and Ana Constantinescu*



Thornton River near Sperryville (Rappahannock County), June 2006. Downstream stretches are on Virginia’s impaired-waters list.

### Next “For the Record”: Hydrologic (Quantity and Flow) Information Sources.

Please see page 30 (in the two-column version) of the February 2006 *Water Central* (issue #37) for a list of previous “For the Record” topics.

## Virginia Water Central

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Please notify *Water Central* at (540) 231-5463 or [araflo@vt.edu](mailto:araflo@vt.edu) if your address has changed or if you no longer wish to receive the newsletter.

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