

Virginia Water Central

Virginia Water Resources Research Center Blacksburg, Virginia September 2008 (No. 46)



A Green Darner dragonfly perched just long enough for this remarkable photo in August 2008, near Ashburn (Loudoun County). *Photo by Marc Sagan, used with permission.*

IN THIS ISSUE

Editor's Column _____	2	Drought Report _____	23
Teaching Water _____	2	Water Quality and You (también en español) _____	25
<i>Water Central</i> Turns 10 _____	3	Va. Govt. Water Issues Overview _____	27
Index to Previous <i>Water Centrals</i> _____	4	Notices _____	30
In and Out of the News: Expanded Edition _____	7	At the Water Center _____	33
Update on the <i>Water Central</i> News Grouper _____	18	Water-Energy Conference _____	33
Water Status Report _____	19	You Get the Last Word _____	34

Editor's Comments



If They Held a Water "Town Hall," What Would You Ask?

By Alan Raflo

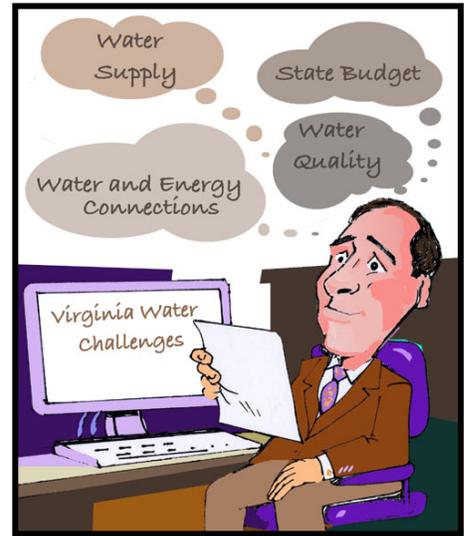
(While Water Center Director Stephen Schoenholtz is away on Center business, Water Central editor Alan Raflo pinch-hits for the regular "S² on H₂O" Director's Column.)

Last evening (October 7), presidential candidates John McCain and Barack Obama held their second of three scheduled debates. The format followed a so-called "town hall" style, where the candidates fielded questions from the debate audience, along with some e-mailed questions and some from the moderator. For me, the most remarkable aspect of the event was the insight, clarity, and directness of those citizens who got one brief moment to question the next "most powerful person in the world."

This leads me to wonder what questions Virginians might ask—and what insights and clarity they would offer—if Virginia were electing a "water president" this November, and the candidates held a water-resources debate, town-hall style. Here are a few that I think citizens might ask:

- Does Virginia have enough water—where it's needed—for its growing population?
- How will climate change affect our water resources, how are we responding, and how *should* we respond?
- What will state budget shortfalls and the national financial problems mean for water resources?
- What is needed to restore the Chesapeake Bay and the hundreds of other impaired waters in Virginia?

As the presidential town hall meeting showed, however, citizens know best what questions they want answered. If you are concerned, interested, confused, or curious about water, you don't have to wait for a televised town hall to ask a question. While there's obviously no Virginia water president, there are many state and local elected officials and staff—including us at the Water Center—who manage or monitor the Commonwealth's water resources. Find them and join in the debate; most likely, your questions will add some needed perspective and insight.



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 Water Status Report and Drought Report and by the new *Water Central* News Grouper initiative (an online collection of current news stories, categorized and annotated; please see page 18). The SOLs listed below are from Virginia's 2003 Science SOLs and 2001 Social Studies SOLs. Abbreviations: BIO = biology; CE = civics and economics; ES=earth science; GOV = Va. and U.S. government; LS=life science; WG = world geography.

Newsletter Section	Science SOLs	Social Studies SOLs
Water Status (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
Drought Report	4.5, 4.8, 6.5, 6.7, LS.7, LS.12, ES.7, ES.9, ES.13	WG.2
News Grouper (focused on current events in water, climate, and energy)	3.10, 4.8, 6.5, 6.6, 6.7, 6.9, LS.11, LS.12, ES.7, ES.9, ES.11, ES.13, BIO.9	CE.7, WG.2, WG.7, WG.12, GOV.1, GOV.9, GOV.16

VIRGINIA WATER CENTRAL TURNS 10



In June 1998, the Virginia Water Resources Research Center introduced *Virginia Water Central* as the successor to *Water News*, the Water Center's newsletter from 1970-94. Like its predecessor, *Water Central* has aimed to provide timely, readable, well-researched, and objective information on the water issues of the day. *Water Central* has also continued the *Water News* tradition of using cartoons to add some informative humor to the policy and science discussions.

In other ways, *Water Central* has changed significantly from *Water News*. Most obviously, last year the Water Center stopped routine printing of *Water Central* issues, opting instead to distribute the newsletter primarily by Internet posting with an e-mail notification of new issues. A second key change is inclusion of more photographs and other visual elements, including *color* cartoons beginning with this issue. A third difference is inclusion of new recurring sections, such as the Water Center Director's Column, the Water Status Information pages, "Water Quality and You" tips for pollution prevention, and most recently a Spanish translation of the "Water Quality and You" page.

A common goal has guided both the continuity with *Water News* and the changes implemented in *Water Central*: to provide information that helps Virginia's citizens and officials make informed decisions about the Commonwealth's water resources. *Water Central* hopes to continue and improve that role for many years to come.

The *Water Central* staff and all of us at the Virginia Water Resources Research Center thank the people and agencies who have contributed time, effort, knowledge, skills, and financial support to our newsletters.

Finally, we offer our sincere gratitude to you, our readers, for your support, compliments, and criticisms of *Water Central*, and for your commitment to Virginia's water resources.



For more newsletter history and a sample of events, issues, and quotes from 1970 to 2005, please see *A Look Back over 35 Years of Water News in Virginia*, Water Center Educational Report ER02-2005, available online at www.vwrrc.vt.edu/pdfs/specialreports/edureports/er02005.pdf.

All issues of *Water Central* are available online at the Water Center's Web site, www.vwrrc.vt.edu/water_central.html. Paper copies may be requested from the Water Center. For more information or to request copies, please contact Newsletter Editor, Virginia Water Resources Research Center (0444), Blacksburg, VA 24061; (540) 231-5463; water@vt.edu.

A guide to the topics in *Water Central's* main articles appears on the following two pages.

Guide to *Water Central* Article Topics, June 1998—June 2008

Listed below are topics covered in longer *Water Central* items (generally at least one page) in issues from June 1998 (the first issue) through September 2008 (issue #46). All issues of *Water Central* are available online at www.vwrrc.vt.edu/watercentral.html; page numbers below refer to the two-column versions of each issue (a one-column version is also available for issues since December 2001/Issue #19).

Feature Articles

- Bill Walker Tribute—May 2007, p. 3.
 Chesapeake Bay Blue Crabs—Jun. 2008, p. 18.
 Clean Water Act Jurisdiction—Jan. 2007, p. 1.
 Coastal Conditions—Aug. 2004, p. 8.
 Desalination—Jan. 2005, p. 1.
 Disaster Preparedness and Response—Aug.-Sep. 2001, p. 2; Jun. 2008, p. 2 (on hurricanes; see also Aug. 2005, p. 15).
 Drinking Water—Dec. 1998, p. 1; Feb. 1999, p. 1; Jan. 2001, p. 1; Jun. 2008, p. 15 (Virginia Household Water Quality Program).
 Drought in 2007—Dec. 2007, p. 1.
 Environmental Laboratory Certification Program—Aug. 2005, p. 1.
 Federal Farm Bill—Jun. 2008, p. 16.
 Flood Hazard Mitigation in Grundy, Va.—June 2006, p. 1.
 Groundwater—Oct. 2002, p. 1.
 James River Sojourn, Sep. 2007, p. 1.
 Marine Fisheries—Nov. 2003, p. 2.
 Market-based Water Quality Management—Aug. 2003, p. 2.
 Non-tidal Wetlands—Nov. 2000, p. 1.
 Nutrients—Jun. 2003, p. 2; Jan. 2004, p. 7.
 Oceans—Aug. 2004, p. 1 (report of Oceans Commission).
 Off-shore Gas and Oil Exploration Reports—Feb. 2006, p. 14; Sep. 2006, p. 1.
 Rappahannock River Water Resources Planning—Feb. 2002, p. 1.
 Regional Water Authority (Roanoke area)—Aug. 2005, p. 7.
 Shenandoah River Fish Kills—Jun. 2008, p. 11.
 Urban Stormwater—Feb. 2000, p. 1.
 Virginia General Assembly Water-related Legislation—Jun. 1998, p. 3; Aug. 1998, p. 1; Apr. 1999, p. 1; Jun. 1999, p. 1; Apr. 2000, p. 1; Jun.-Aug. 2000, p. 2; Jun. 2001, p. 1; Apr.-June. 2002, p. 1; Mar. 2003, p. 1; Apr. 2004, p. 1; Apr. 2005, p. 1; Feb. 2006, p. 1; May 2007, p. 8; Jun. 2008, p. 3.
 Virginia State Budget Related to Water—Apr. 2001, p. 1 (see also Oct. 2002, p. 22; Jan. 2004, p. 18).
 Water Quality Overview by Virginia Secretary of Natural Resources—Nov. 2005, p. 9.
 Water Quality, Impaired Waters, and TMDLs— Oct. 1998, p. 1; Oct. 1999, p. 1; Dec. 1999, p. 1; Dec. 2001, p. 1; Dec. 2002, p. 1; Jun. 2008, p. 6.
 Water Supply Policy and Planning—Jan. 2004, p. 2; Jan. 2004, p. 13 (Report of Water Supply Technical Advisory Committee); Nov. 2004, p. 1; Nov. 2005, pp. 1 and 4 (two articles).

Science Behind the News

- Algae—Jun. 1998, p. 9.
 Amphibians—Apr. 2001, p. 6.
 Aquatic Plants—Nov. 2000, p. 7.
 Bacteria—Aug. 1998, p. 5; Oct. 1999, p. 8; Aug. 2004, p. 10 (at beaches).
 Beavers—Apr. 2005, p. 14.
 Benthic Macroinvertebrates—Apr.-Jun. 2002, p. 11.
 Biosolids—Aug. 2005, p. 7.
 Blue Crabs—Sep. 2007, p. 9.
 Drinking Water Infrastructure Research—Jun. 2006, p. 8.
 Drought and Floods in Virginia—Sep. 2006, p. 5.
 Fish and Water Quality—Oct. 1998, p. 6.
 Genetics—Apr. 1999, p. 8.

Groundwater—Oct. 2002, p. 9.
 Hurricane Isabel—Nov. 2003, p. 8.
 Hydrology—Dec. 1998, p. 7.
 Lakes—Jun. 1999, p. 5.
 Mosquitoes—Mar. 2003, p. 13.
 Non-native/Invasive Aquatic Species—Aug.-Sept. 2001, p. 7.
 Nutrients—Jun. 2003, p. 9; Apr. 2008, p. 14.
 Pathogens in Water—Jan. 2007, p. 9 (symposium).
 Potomac River Basin Fisheries—May 2007, p. 16.
 Safe Yield of Water Supply—Feb. 2002, p. 5.
 Statistics—Jun.-Aug. 2000, p. 8; Jan. 2001, p. 6.
 TMDL Development—Nov. 2004, p. 9.
 Urban Stormwater Research—Apr. 2008, p. 16.
 Water Sciences Overview—Feb. 1999, p. 6.
 Watersheds—Feb. 2000, p. 8.

Sources of Information (“For the Record”)

Aquatic Life—Nov. 2000, p. 19; Nov. 2004, p. 27.
 Coastal and Marine Resources—Jun. 2001, p. 19; Feb. 2006, p. 28.
 Drinking Water—Aug. 1998, p. 14; Apr.-Jun. 2002, p. 27; Sep. 2006, p. 22.
 Federal Legislation and Regulations—Jun. 1998, p. 15; Jun.-Aug. 2000, p. 19; Aug. 2004, p. 27.
 Groundwater—Feb. 1999, p. 15; Apr. 2001, p. 19.
 Hydrology (Water Quantity)—Dec. 1998, p. 15; Feb. 2002, p. 17.
 Maps—Jan. 2001, p. 18; Aug. 2005, p. 27.
 Virginia Legislation—Feb. 2000, p. 15; Dec. 2001, p. 18; Jan. 2005, p. 21.
 Virginia Water Regulations—Apr. 2000, p. 15; Apr. 2004, p. 23.
 Water Law and Water Rights—Dec. 1999, p. 10; Aug. 2003, p. 22.
 Water Quality—Oct. 1998, p. 15; Dec. 2001, p. 19; May 2007, p. 34.
 Water Use—Jun. 1999, p. 15.
 Weather and Climate—Apr. 1999, p. 15; Aug. 2002, p. 17.
 Wetlands—Oct. 1999, p. 15; Jun. 2003, p. 22.

Teaching Resources

Benthic Macroinvertebrates Poster Source—Dec. 1999, p. 11.
 Dragonflies Poster Source—Apr. 2000, p. 8.
 Federal Agency Educational Resources for Schools—Jan. 2001, p. 15.
 Geology in the Southern Appalachians—Apr.-Jun. 2002, p. 18.
 Internet Resources for Chesapeake Bay Education—Apr.-Jun. 2002, p. 18.
 National Park Service Earth Science Explorers—Nov. 2000, p. 6.
 Teach’n Fishing Workshops—Jun.-Aug. 2000, p. 13.
 Understanding Invasive Aquatic Weeds—Apr.-Jun. 2002, p. 18.
 U.S. Geological Survey Water Education Posters—Mar. 2003, p. 12.
 Virginia Standards of Learning for selected articles—Each issue, page varies.
 Virginia Water Resources: A Tool for Teachers (book notice)—Jun. 2003, p. 23.
 Virginia Watersheds Poster Source—Feb. 2000, p. 11.

Virginia Water Research

Forest Reference Stream Monitoring and Research—Mar. 2003, p. 22.
 Monitoring for Exotic Forest Pests at Virginia’s Ports—Aug. 2002, p. 6.
 National Research Council Report—Nov. 2004, p. 23.
 Research on Small Water Systems and Community Drinking Water—Aug. 1999, p. 2.
 VWRRRC Research Program Documentation for 1996-1999—Aug. 1999, p. 8.
 Water Science and Water Quality Management—Aug. 1999, p. 5.

Water Center Programs

Changing Leadership at the Water Center—Aug. 2002, p. 1.
 News Grouper Initiative: Sep. 2008, p. 17.
 Virginia Water Monitoring Council—Oct. 2002, p. 27.
 Virginia STEP Program: Summary of Summer Projects—Dec. 2001, p. 17; Dec. 2002, p. 21; Nov. 2003, p. 23; Jan. 2005, p. 20; Nov. 2005, p. 27; Jan. 2007, p. 26; Dec. 2007, p. 28.

Water Quality and You

Fats, Oils, and Grease: Jun. 2008, p. 20 (also in Spanish).
 Marine Debris (including poster): Apr. 2008, p. 24 (also in Spanish).
 Reporting Water Quality Problems: Sep. 2007, p. 13; in Spanish: Dec. 2007, p. 13.
 Urban/residential Nonpoint Source Pollution Prevention: Sep. 2007, p. 16; in Spanish: Dec. 2007, p. 13.
 Used Oil Management: Sep. 2008, p. 24.
 Virginia's Pollution Prevention Programs: Sep. 2007, p. 16; in Spanish: Dec. 2007, p. 13.

Water Status Reports

Groundwater Levels—Nov. 2003, p. 17; Aug. 2004, p. 15; Apr. 2005, p. 16; Feb. 2006, p. 18.
 Precipitation—Jun. 2003, p. 14; Jan. 2004, p. 19; Nov. 2004, p. 16; Aug. 2005, p. 14; Jun. 2006, p. 15
 Stream Flow—Aug. 2003, p. 10; Apr. 2004, p. 12; Jan. 2005, p. 7; Nov. 2005, p. 16; Sep. 2006, p. 10.
As of the January 2007 issue, all three topics are covered in each issue.

Miscellaneous Short Items

A Community Development Financial Institution and Water Resources—May 2007, p. 27.
 Drought—Oct. 2002, p. 24 (special commentary from North Carolina); Jun. 2006, p. 16; Sep. 2007, p. 14; Apr. 2008, p. 21; Jun. 2008, p. 25.
 Environmental Awards—Apr. 2008, p. 28.
 Forests—Jan. 2004, p. 28 (federal “Healthy Forests Act”).
 Governor’s Water Initiatives and Proposals—Dec. 2002, p. 11; Dec. 2002, p. 12.
 Groundwater and Water Supply Planning—Apr. 2004, p. 20 (reader comment).
 Groundwater Common Law and Rules—Dec. 2002, p. 20.
 Groundwater Rights Ruling in Virginia—Sep. 2007, p. 22.
 Hurricane Preparedness Information—Aug. 2005, p. 15 (see also Jun. 2008, p. 2).
 Lake Anna Nuclear Facility—Jun. 2006, p. 19.
 Meherrin Scenic River Status—Sep. 2006, p. 15.
 National Weather Service’s StormReady Program—Jan. 2005, p. 15.
 Nutrient Regulations—Jan. 2007, p. 16.
 Self-Help Virginia Program (for community water supplies)—Feb. 2002, p. 16.
 September 11, 2001, Water-related Responses—Dec. 2001, p. 8; Aug. 2003, p. 15.
 Stormwater—Sep. 2006, p. 11.
 State Budget Related to Water—Oct. 2002, p. 22; Jan. 2004, p. 18 (see also Apr. 2001, p. 1).
 Tropical Storm Reports—Nov. 2003, p. 8; Jan. 2004, p. 25 (response to Isabel); Nov. 2004, p. 17; Nov. 2005, p. 14.
 Water Conservation Survey from California—Dec. 2007, p. 7.

IN AND OUT OF THE NEWS

Newsworthy Items You May Have Missed

This is an expanded edition of this section, with news stories that were reported primarily between April and September 2008. Items in this section are based on information in the source(s) indicated in parentheses at the end of each item. Except as otherwise noted, the localities mentioned are in Virginia and the dates are in 2008. All Web sites listed were functional as of October 6, 2008. Frequently used abbreviations include the following: DEQ = Va. Dept. of Environmental Quality; DGIF = Va. Dept. of Game and Inland Fisheries; EPA = U.S. Environmental Protection Agency; VIMS = Virginia Institute of Marine Science.

In Virginia

Boating and Shipping

•Regulations took effect July 1 for the **phase-in of new requirements for boating-safety education**, passed by the 2007 Virginia General Assembly (Senate Bill 1241). The dates for meeting the requirements are as follows:

July 1, 2009: Personal watercraft operators 20 years of age or younger;

July 1, 2010: Personal watercraft operators 35 years of age or younger;

July 1, 2011: Personal watercraft operators 50 years of age or younger, and motorboat operators 20 years of age or younger;

July 1, 2012: All personal watercraft operators, regardless of age, and motorboat operators 30 years of age or younger;

July 1, 2013: Motorboat operators 40 years of age or younger;

July 1, 2014: Motorboat operators 45 years of age or younger;

July 1, 2015: Motorboat operators 50 years of age or younger; and

July 1, 2016: All motorboat operators, regardless of age.

More information is available online at www.dgif.virginia.gov/boating/education/.



Dams

•In April, the Virginia Department of Game and Inland Fisheries (DGIF) **rededicated the Powhatan Lakes**, two impoundments covering 66 acres in the Powhatan State Wildlife Management Area in Powhatan County. The lakes were constructed in the 1850s and acquired by DGIF in 1954. The two dams creating the lakes were breached by heavy rainfall in 2004. Besides repairing the dams, the \$2-million restoration project included new fishing piers, boat-launch sites, and trails.

Meanwhile, DGIF planned to drain Laurel Bed Lake in Russell County by July due to seepage through the dam. But as of May, DGIF had insufficient funds to repair the dam. (DGIF *Outdoor Report*, 5/14/08) (DGIF *Outdoor Report*, 5/14/08)

Education

•In September, **Washington and Lee University** in Lexington was awarded a \$600,000 grant from the Andrew W. Mellon Foundation to add a **Chesapeake Bay component to its Environmental Studies program**. The program will focus on the upper Bay watershed and how individual and community decisions in that area affect the overall watershed. (*Rockbridge Weekly*, 9/4/08)

•A higher-education bond package passed by the 2008 Virginia General Assembly included \$4.3 million for a **seawater research facility at the Virginia Institute of Marine Science's (VIMS) Wachapreague facility** (Accomack County). The facility will provide researchers with running seawater for study of ocean organisms. VIMS' Gloucester Point campus has a similar facility using York River brackish to study Chesapeake Bay organisms. (*Daily Press*, 5/9/08).

Energy and Climate

•University of Maryland scientists are investigating **plant-decomposing enzymes in a bacterial species** found in the Chesapeake Bay in the 1980s by George Mason University scientists. Researchers are investigating the organism's (*Saccarophagus degradans*) plant-breakdown capability as part of a search for a more efficient process to derive **ethanol from cellulose**. Cellulose is widely available—found, for example, in wood chips, straw, and corn wastes—but it is more difficult to break down chemically than is starch found in grains, the current standard raw material for ethanol production. (*Washington Post*, 3/10/08)

•In August the Va. DEQ approved the final permit (an air permit) that will allow Osage Bio Energy (based in Glen Allen) to build a **barley-based ethanol plant in Hopewell**. The plant, reportedly the first of its kind in Virginia, will cost \$150-160 million and have a production capacity of 68 million gallons per year. The proposal generated both support and opposition locally, including a 4-3 city council vote in December 2007 to sell part of the land for the site near the city's downtown. Meanwhile, Osage also has plans to seek property for an ethanol facility in **Mecklenburg County**. In February, Mecklenburg received a \$650,000 state grant to extend a water line to the area of the potential plant. (*Richmond Times-Dispatch*, 4/24, 5/25, and 8/28/08)

•In June, the U.S. Senate held a week of debate on the **climate-change legislation sponsored by Virginia Sen. John Warner and Connecticut Sen. Joseph Lieberman** (S.2191; information on this bill is available online at <http://thomas.loc.gov>). On June 6, a 48-36 vote to end debate fell shy of the 60 votes needed. California Sen. Barbara Boxer, the current chair of the Senate Environment and Public Works Committee, said at that time that no new climate-change proposal would emerge from her committee before a new president and new Congress take office in 2009. ("Greenwire" at www.eenews.net/, 6/6/08)

•Here are some recent developments in the **proposal by Virginia-based AES Corporation to build a liquefied natural gas (LNG) terminal** on the Sparrows Point peninsula in Baltimore County, Maryland, and an 88-mile pipeline to Pennsylvania.

••In May, a three-judge panel of the U.S. Court of Appeals for the 4th Circuit (in Richmond) ruled that Baltimore County exceeded its local zoning authority when it passed an ordinance banning LNG plants in certain coastal areas. A U.S. District Court upheld the county ordinance, passed as part of its local coastal zone management program, but the Appeals panel reversed that decision. Subsequently, the county sought federal agency approval of a revised coastal management plan with the LNG ban.

••In June, the U.S. Commerce Department ruled that the need for natural gas outweighs potential environmental damage by the project. The Commerce Department ruling does not settle the issue. FERC is

expected to decide about the proposal in November, and the U.S. Army Corps of Engineers must also review plans to dredge part of the Patapsco River for LNG ships.

Opponents have cited concerns over potential damage to the Chesapeake Bay and Patapsco River and the proximity to residences and schools. Proponents have cited the project's capacity to help meet regional energy needs and an estimated 50 permanent jobs and 375 construction jobs that the facility would generate. (*Baltimore Sun*, 5/20, 6/10, and 6/27/08)

•In May, the Blue Ridge Environmental Defense League (BREDL) filed a **federal lawsuit** against the Nuclear Regulatory Commission's (NRC) approval of an "early site permit" for a **third nuclear reactor at Dominion Virginia Power's North Anna Power Station** in Louisa County. Among the issues raised by the lawsuit are water consumption, location of the reactor along a geologic fault, water-quality impacts, and handling of radioactive waste. A draft environmental impact statement on the Dominion proposal is due to the U.S. EPA in December 2008, and a final impact statement is due by December 2009. An NRC decision is expected in 2010. (*Fredericksburg Free Lance-Star*, 4/18/08; *Richmond Times-Dispatch*, 5/16/08; and BREDL Press Release, 5/16/08, at www.bredl.org/press/2008/NorthAnna-lawsuit.htm)

Fishing and Fisheries

•In September, the Virginia Department of Health reported several updates to the state's **fish-consumption advisory list**. New advisories for **mercury** were issued for Lovills Creek Lake, the Emporia River, the Meherrin River, Big Cherry Reservoir, and Lake Witten. Modified mercury advisories were issued for the Dan River and the Nottoway River. A modified **PCB** advisory was issued for the Dan River. Details on these and other advisories are available online at www.vdh.virginia.gov/Epidemiology/dee/PublicHealthToxicology/Advisories/, or contact your local VDH office. (VDH Press Release, 9/16/08)

Land Use

•In April, **two reservoirs were the focus of large conservation easements**. Appalachian Power Company announced its intention to put an easement on about 5,000 acres adjacent to Smith Mountain Lake in Bedford and Pittsylvania counties. On the same day, the Roanoke City Council voted to put an easement on 6,185 acres (Virginia's largest to that date) around the city's Carvins Cove water-supply reservoir. (*Roanoke Times*, 4/22/08)

•In May, musician **James Taylor donated an estimated \$200,000 to help protect migratory bird habitat on Virginia's Eastern Shore**. Mr. Taylor donated part of the proceeds from his May 22 concert in Virginia Beach to the Southern Tip Partnership, a coalition of governmental agencies and non-profit groups that has been purchasing land at the southern tip of the Eastern Shore. This area is on the migratory routes of many bird species. (*Virginian-Pilot*, 5/20/08)

Solid Waste Management

•A series of lawsuits has resulted from **contamination in 2002 of a residential well adjacent to the Campbell County landfill**. In 2005, the residents sued the county for damages, claiming the landfill operation led to contamination of their land and groundwater. In 2007, Campbell County sued Joyce Engineering of Richmond, who designed the 1979 landfill, for damages and clean-up costs. In May 2008, Joyce Engineering sued Stearns, Conrad and Schmidt, an engineering company that the county hired to clean up the contamination. Joyce denies wrongdoing and alleges that Stearns made incorrect assumptions about groundwater flow and that contaminated water in the residential well does not match up with landfill leachate. Trials are expected to begin in December. (*Lynchburg News & Advance*, 5/23/08. For a previous *Water Central* item: Aug. 2005, p. 19.)

Stormwater Management

•In May, the Virginia Soil and Water Conservation Board approved a **new general permit for small municipal separate storm sewer systems** serving fewer than 100,000 people. These regulations affect approximately 100 cities, universities, and military bases in Virginia. Regulations governing these permits (known as **MS4 permits**) were last revised in 2003; the federal Clean Water Act and Virginia law require that Virginia Stormwater Management Program permits be updated every five years. The regulations are in the *Virginia Administrative Code* at 4VAC50-60-400; the *Administrative Code* is searchable online at

<http://leg1.state.va.us/cgi-bin/legp504.exe?000+men+SRR>. (*Virginian-Pilot*, 5/14 and 5/16/08. Please see the Feb. 2000 *Water Central*, p. 1, for an introduction to urban stormwater.)

•In June, the U.S. EPA and the Justice Department announced that **four large, national home-building companies agreed to pay \$4.3 million in fines for inadequate stormwater controls** at construction sites. Seven states—Virginia, Colorado, Maryland, Missouri, Nevada, Tennessee, and Utah—were involved in the settlement and will receive a portion of the money. The companies involved were Centex of Dallas, KB Home of Los Angeles, Pulte Homes of Michigan, and M.D.C. Holdings of Denver. (Associated Press, as reported in *Washington Post*, 6/11/08)

Water Quality and Aquatic Habitat

Statewide

•**Didymo is an invasive algae species** receiving attention in Virginia, Maryland, and other locations. Didymo (scientific name *Didymosphenia geminata*) is a type of algae known as a diatom. First documented in Virginia in 2006, it has been detected in the Jackson River below the Gathright Dam in Alleghany County, in the Pound River below Flannagan Dam in Dickenson County, and in the Smith River below Philpott Dam on the border between Franklin and Henry counties. Similarly, it has been found below several Maryland dams. Didymo is non-toxic but is capable of forming dense mats that can cover plants, rocks, and other materials. The species can spread by attaching to boats, paddles, boots, or other water equipment. The following steps will help prevent spreading Didymo (and other non-native, invasive aquatic species): **check** boats and aquatic gear and remove attached materials; **clean** gear by soaking for at least one minute in a five-percent saltwater solution or a two-percent bleach solution; **dry** gear in the sun for 48 hours; and **do not move** fish, plants, rocks, or other materials between water bodies. More information and a poster about Didymo are available from the Virginia Department of Game and Inland Fisheries Web site at www.dgif.virginia.gov/fishing/didymo.asp. Information is also available online at www.epa.gov/region8/water/didymosphenia/. (*Baltimore Sun*, 5/23/08; and Web sites listed, 9/24/08. For a general introduction to algae, please see the June 1998 *Water Central*.)



Chesapeake Bay Watershed

•In April, the U.S. EPA's Chesapeake Bay Program's annual report on Bay conditions in 2007 asserted that slight progress is occurring toward some restoration goals but population growth and development continue to prevent more substantial progress. Among the report's findings were the following:

only 12 percent of Bay and tributary waters met desired **dissolved oxygen levels**; **Blue Crab populations** were at about 78 percent of a target of 200 million individuals; and the Bay and its tidal tributaries had about 65,000 acres of **submerged aquatic vegetation (SAVs)**, an increase of 10 percent over 2006 but well below the Bay-restoration SAV goal of 185,000 acres. (SAVs comprise several species of aquatic plants collectively referred to as “bay grasses.”) Moderately good news about increases of SAVs in the upper portions of the Bay was tempered by continued reduced levels in the lower Bay of Eelgrass, a particularly important plant for Blue Crab habitat and reproduction. The Bay Program report is available online at www.chesapeakebay.net (click on “How is the Bay Doing?”). (*Daily Press*, 4/4/08; and *Richmond Times-Dispatch*, 4/29/08)

- On June 7, the Chesapeake Bay Foundation’s 20th Annual **Clean the Bay Day** brought out an estimated 5,000 volunteers who collected 114,400 pounds of litter at 195 sites, including 70 sites in Virginia Beach. (*Virginian-Pilot*, 6/8/07)

- In September, the **Elizabeth River Project** formally announced a new action plan for **restoring the river by 2020**. The goal of the plan is to make the river—polluted for decades by industrial activities—suitable again for fishing, swimming, and shellfishing. More information about the plan is available at the Project’s Web site, www.elizabethriver.org. (*Virginian-Pilot*, 5/1 and 9/16/08)

- On September 23, the U.S. Commerce Department declared the **Chesapeake Bay Blue Crab Fishery a “commercial fishery failure”**—the fishery equivalent of a federal disaster area declaration. Virginia Gov. Tim Kaine and Maryland Gov. Martin O’Malley had filed a request for the declaration in May. The declaration does not automatically provide any federal financial assistance to crabbers or crab processing businesses; funding still requires Congressional approval. (*Daily Press*, 9/24/08. For recent developments leading up to the request for a Blue Crab fishery disaster declaration, please see the June 2008 *Water Central*, p. 18.)

Coastal Watersheds

- SAV restoration in bays on the Atlantic side of Virginia’s Eastern Shore** has been remarkably successful over the past 10 years. In the late 1990s, VIMS researcher Robert Orth seeded about 190 acres of Eelgrass in these bays, where vegetation destroyed in a 1993 hurricane had never returned. By this year, over 1,000 acres of Eelgrass were growing successfully. Dr. Orth attributed this success rate, compared to difficulties in restoring SAVs in Chesapeake Bay waters, to better water quality on the sea side of the Eastern Shore. (*Daily Press*, 6/29/08)

Wastewater

- In April, the **Clarke County Sanitary Authority** received approval from the Va. DEQ to expand the Authority’s wastewater treatment plant in Boyce. The project will increase the plant’s capacity from 50,000 to 99,000 gallons/day and will add treatment processes to meet Virginia’s Chesapeake Bay-related nutrient-removal requirements. Funding for the \$4.3 million project is to be a DEQ grant (\$1.57 million) and a loan from the Virginia Resources Authority. (*Winchester Star*, 4/10 and 6/11/08)

Elsewhere in Clarke County, in June the **Town of Berryville** raised water and sewer connection fees about 25 percent, primarily to fund a new treatment plant for an estimated \$20 million. An earlier estimate for the plant of \$7.5 million did not include the technology necessary to meet the Bay-related nutrient requirements. (*Winchester Star*, 6/12/08)

- The Frederick County town of **Middletown’s new \$5.5-million wastewater treatment plant** began operating in April. The new plant increases capacity by 150,000 gallons/day and is supposed to correct an ammonia problem identified by the Va. DEQ in 2002. (*Winchester Star*, 4/15/08)

- In April, approximately **75 residents of a mobile-home park in Zion Crossroads** (Louisa County) learned they would have to move by October 31, after the park owner decided not to upgrade the park’s private wastewater-treatment system. To renew the system’s permit, the Va. DEQ required greater removal of copper and zinc. A restaurant and laundry serving the park were able to connect to Louisa County’s public sewer, but the residential area is located in Fluvanna County and therefore was not allowed to use the Louisa system. The owner of the park, who estimated that the wastewater system improvements would cost between \$500,000 and \$750,000, decided to close the residential area. (*Charlottesville Daily Progress*, 4/30/08)

•Also in April, the Town of Orange approved a **\$21.9-million contract for wastewater-treatment improvements**. The work at the Town's plant along the Rapidan River will correct problems with copper in the discharge; increase the plant's capacity from 2 to 3 million gallons per day, helping to address a problem of stormwater infiltration and inflow to the sewer system; improve the plant's nutrient-removal process, in line with Chesapeake Bay-related regulations; and change the disinfection process from chlorine to ultra-violet light. (*Orange County Review*, 5/15/08)

•In May, Gov. Kaine and the Va. Department of Housing and Community Development announced grants totaling **\$7 million for construction of wastewater-collection and treatment infrastructure**. The grants are part of the Southern Rivers Watershed Enhancement Program, serving the state's non-Chesapeake Bay watersheds (Albemarle Sound, Big Sandy, Chowan, New, Roanoke, Upper Tennessee, and Yadkin watersheds). This year's grants will help fund 11 projects and result in 789 households being connected to public sewer. (Governor's Press Release, 5/13/08, available at www.governor.virginia.gov/MediaRelations/NewsReleases/archives.cfm)

•Also in May, the **Isle of Wight** Board of Supervisors approved local implementation of the **five-year septic-tank pump-out** requirement mandated by regulations under Virginia's Chesapeake Bay Preservation Act (the regulation in the *Virginia Administrative Code* is 9VAC 10-20-120 available online at <http://leg1.state.va.us/cgi-bin/legp504.exe?000+reg+9VAC10-20-120>). The county will notify affected households on a five-year rotation among the county's election districts. Once notified, homeowners will have two years to complete the pump-out. (*Daily Press*, 5/16/08; and *Tidewater News*, 7/3/08)

•In July, **Culpeper County and the Town of Culpeper** signed a memorandum of agreement that may eventually lead to a regional water and wastewater authority and a county-town boundary adjustment. (*Fredericksburg Free Lance-Star*, 7/30/08. For a previous *Water Central* item: Jan. 2007, p. 18.)

In a related development, in September **Culpeper County rejected a public-private partnership** for a new wastewater and water supply infrastructure.¹ The county was considering collaborating with Angler Development of Warrenton. (*Culpeper Star-Exponent*, 6/3 and 9/2/08)

•The **Accomack County** Board of Supervisors voted in June to create a **public service authority** that eventually would provide water and wastewater service. The action was recommended by a citizen's committee that had been studying the county's water and wastewater issues since fall 2007, after a consultant reported problems of groundwater pollution from failing septic systems and possible health hazards from septage-storage lagoons. (*Eastern Shore News*, 6/4/08. For a previous *Water Central* item on Accomack County wastewater issues: Sep. 2007, p. 18.)

•Bedford County is developing an **online database of land-application sites for biosolids** (treated sewage sludge). Citizens will be able to access the site via the county's Web site. (*Lynchburg News & Advance*, 7/31/08. For a background article on biosolids, please see the Aug. 2005 *Water Central*.)

Water Supply

•Groundwater-withdrawal limitations have delayed the Town of Smithfield's (Isle of Wight County) **plans for a new water-treatment plant that would reduce the fluoride levels**. Starting in 2003, fluoride levels in some of the town's wells had exceeded the federal drinking water standard of 4 milligrams per liter. In 2004, the Town signed a consent order with the Va. DEQ to reduce the levels. With local groundwater containing naturally high fluoride levels, the Town decided to build a plant to treat water from its wells. Early in 2008, however, the DEQ notified the Town that its groundwater-withdrawal plan would exceed allowable limits from a particular groundwater aquifer. As of May, the Town was consulting with its water-plant contractor and was to file a revised groundwater-withdrawal permit request with the DEQ. (*Daily Press*, 5/1/08)

•In May, the **Cumberland County** Board of Supervisors voted to borrow up to \$10 million to help fund a **proposed reservoir on Cobbs Creek**. The money would be borrowed from the county's industrial development authority. The proposed reservoir would cover 1100 acres, cost \$185 million, store water pumped from the James River, and serve Cumberland, Goochland, Henrico, and Powhatan counties.

¹ Such partnerships are allowed under Virginia's Public-Private Education and Infrastructure Act of 2002; information on this law is available at www.dgs.state.va.us/PPEA/tabid/62/default.aspx.

Funding levels among the four counties are yet to be determined, and some regulatory permits are yet to be acquired. (*Richmond Times-Dispatch*, 5/14/08)

•Here's an update on the long-running and complicated effort to develop and implement a **50-year water-supply plan for the Charlottesville/Albemarle County area** (for a previous *Water Central* item: Jun. 2006, p. 22):

- In April 2006, after years of study and debate over a plan to supply the area with water for the next 50 years, the Rivanna Water and Sewer Authority recommended the option of expanding the Ragged Mountain Reservoir and filling it via a new pipeline from the South Fork Rivanna Reservoir. The Albemarle County Board of Supervisors and the Charlottesville City Council subsequently endorsed the recommended option.
- Over the next two years, as the Authority began to pursue permits for the work, some area citizens and groups continued to question the chosen option, particularly its cost estimates compared to an alternative of dredging the South Fork Reservoir to increase its capacity. Other citizens and groups, however, continued to back the Ragged Mountain option.
- In June 2008, the Albemarle supervisors and Charlottesville councilors reaffirmed their support of the Ragged Mountain option. They also formed a task force to consider the possibility of dredging the South Fork Reservoir, but this task force was *not* charged with re-evaluating the Ragged Mountain plan.
- Also in June, the U.S. Army Corps of Engineers approved a 10-year permit to the Authority for the Ragged Mountain expansion project (this was the final permit needed prior to construction). Due to the current dam's condition, however, Virginia regulators have set a deadline of 2011 for its replacement.
- In September, the firm hired to design and construct the new Ragged Mountain dam raised the cost estimate from \$37 million to \$70 million, due to the type of rock found at the site. Another firm estimated the cost at \$56.5 million. In response to the increased cost estimates, the Authority halted the project and requested an independent panel to review the estimates and make recommendations for how to proceed. (*Charlottesville Daily Progress*, 5/20, 8/4, and 9/22/08; *C'ville: Charlottesville News & Arts*, 6/3/08)

•**Long-term water-supply planning also continues in six localities just south of Richmond.**

Amelia, Chesterfield, Dinwiddie, and Price George counties and the cities of Colonial Heights and Petersburg would all be served by the planned Dawson's Creek Reservoir in Amelia County (a small part of the reservoir may be in Prince Edward County). As proposed, the reservoir would cover 622 acres, hold six billion gallons of water, provide 30 million gallons per day, and cost \$120 million. It would store water pumped from high flows on the Appomattox River (a James River tributary). Currently the Appomattox River Water Authority is negotiating a host agreement with Amelia County. The Chesterfield County administrator said that as long as 12 years might be needed for planning, permit requests, and construction (if the project were approved). (*Richmond Times-Dispatch*, 9/26/08)

Wetlands

•On September 15, Great Dismal Swamp National Wildlife Refuge officials said that the **refuge wildfire that began June 9 was under control**, although not extinguished. Throughout the summer, smoke from this fire and another one in North Carolina affected Hampton Roads localities and at times reached Richmond. Ignited by logging equipment (the exact cause was still under investigation as of September 25), the fire persisted so long partly because of drought in the southeastern corner of Virginia. A flare up could occur if fall weather remains dry, but refuge officials hoped that the significant rainfall from a coastal storm on September



25 might finally extinguish the fire. (*Richmond Times-Dispatch*, 7/8/08; *Daily Press*, 9/16/08; and personal communication with Refuge Manager Chris Lowie, 9/25/08)

In Other Chesapeake Bay States

•In April, **conditions in Maryland's Patuxent River** were rated very low—a “D-minus”—in an annual report from the Patuxent Riverkeeper and the University of Maryland's Center for Environmental Science. Differences within the watershed are expected to give the Riverkeeper and the Center guidance for focusing monitoring and restoration efforts. At 110 miles long, the Patuxent is Maryland's longest intrastate river. (*Washington Post*, 4/27/08)

•Here are some results of **Baltimore-area residents' knowledge and opinions about stormwater and water pollution**, from a Summer 2007 phone survey of 800 people:

- 82 percent were aware that stormwater runs off of urban areas and reaches waterways.
- 17 percent thought (falsely) that Baltimore's stormwater is treated before reaching Baltimore Harbor, 16 percent thought that it is not treated, 28 percent were not sure but thought that it is treated, and 38 percent did not know what happens to stormwater.
- 83 percent said that picking up litter and removing material from storm drains would make “a big difference” in local water quality; 75 percent said cleaning up pet waste would do so; and 67 percent said using less lawn fertilizer would do so.
- 83 percent were “very bothered” to have trash in Baltimore Harbor.
- 63 percent were “very bothered” or “somewhat bothered” by the idea of paying more taxes to reduce water pollution.

The survey was conducted by the Annapolis polling firm Opinion Works and was funded by the Herring Run Watershed Association and Jones Falls Watershed Association. (*Baltimore Sun*, 5/12/08)

•A **stormwater-management pond** at Urbana Middle School in Frederick, Md., became part of an **outdoor botany classroom** after students at the school planted native wetland plants around the pond in June. Once established, the wetland should also help remove pollutants from stormwater runoff. (www.gazette.net, 6/5/08)

•In another item linking stormwater and education, Back Creek Park in Annapolis, Md., broke ground in June on the **Stormwater Education Experience**, an exhibit that will include 19 stations for learning about how the Chesapeake Bay is affected by stormwater and nonpoint source pollution. (*Baltimore Sun*, 6/11/08)

•After rising dramatically in the late 1990s, the number of **American Shad migrating up Atlantic Coast rivers**—including the Susquehanna River, the largest Chesapeake Bay tributary—has been decreasing just as dramatically in recent years. Fishery officials have stated that factors causing the decline probably include more predation by increasing populations of Striped Bass and other predators, water pollution, dams, and fishing pressure. Fishing for American Shad is prohibited in Maryland and Pennsylvania but allowed in several other Atlantic Coast states. As of May, the Atlantic States Marine Fisheries Commission was planning public hearings on whether additional fishing restrictions are warranted. (*Baltimore Sun*, 5/27/08. For a previous *Water Central* item on American Shad: Dec. 2001, p. 13.)

•In June, **Maryland and Delaware signed an agreement to cooperate** on water-quality, land-conservation, history-education, and recreation efforts along the **Nanticoke River**, a 61-mile-long Bay tributary that the two states share. (*Baltimore Sun*, 6/3/08; and *Delmarva Farmer*, 6/10/08)

Meanwhile, in August the Nanticoke Watershed Alliance issued its “**State of the Nanticoke River Watershed**” report for conditions in 2007. The report found that the Nanticoke is one of the cleanest Chesapeake tributaries, but impacts from a growing population in the watershed will require efforts to maintain the river's quality. The report is available online at www.nanticokeriver.org, or you may request a copy by phoning (410) 873-3045. (*Sussex [Del.] Countian*, 8/22/08)

Elsewhere

•**New Mexico State University** researchers are investigating **water desalination using solar energy or “low-grade heat”**—such as waste heat from an air-conditioning unit or refrigerator. The research, funded by the New Mexico Water Resources Research Institute, has demonstrated a prototype system that can use these energy sources to produce potable water from brackish and impaired waters. The system uses a desalination method developed by Florida researchers that reduces the temperature (and therefore the energy) needed to distill water. For more information on this research, contact the principal investigator, Nirmala Khandan, at nkhandan@nmsu.edu. (*Divining Rod*, June 2007)

(A 2004 Virginia Water Center report, *The Feasibility of Using Desalination To Supplement Drinking Water Supplies In Eastern Virginia*, is available at www.vwrrc.vt.edu/pdfs/specialreports/sr252004.pdf; a summary of the report is in the Jan. 2005 *Water Central*, p. 1.)

•In December 2007, the **Maui (Hawaii)** County Council passed a bill dubbed the **“Show Me the Water” ordinance**. The law requires that in order to receive a zoning or subdivision approval (with some exceptions), a developer must show that a reliable, long-term water supply is available. (*Mauitime Weekly*, 12/13/08; as reported in *Hawaii Water News*, Mar. 2008)

•**Economic losses due to hurricanes** in the United States have been doubling every 10-15 years since 1900, due to increases in population and infrastructure along coastlines, according to “Normalized Hurricane Damage in the United States: 1900-2005.” The paper was published in the February 2008 issue of *Natural Hazards Review* and is available online at the publication’s Web site, <http://scitation.aip.org/nho>. (*Natural Hazards Observer*, May 2008)

•An uneasy cease-fire seems to have taken hold in what Alabama Gov. Bob Riley described as an **“18-year...water war” among Alabama, Georgia, and Florida** over the three states’ shared water in the Apalachicola-Chattahoochee-Flint basin. As of June, a revised allocation plan proposed by the U.S. Army Corps of Engineers had gained U.S. Fish and Wildlife Service (FWS) approval and seemed likely to take effect for a five-year period (until 2013). The Corps developed the “Revised Interim Operations Plan” after the U.S. Court of Appeals for the District of Columbia Circuit ruled in February that the Corps’ 2003 agreement with Georgia was invalid because it required (but had not been granted) approval by Congress. The 2003 agreement had increased allowable water storage in Georgia’s Lake Lanier (which serves Atlanta) and reduced downstream allocations (that is, water that would flow into Alabama and Florida). The new plan this year also increases water storage allowed in reservoirs in Alabama and Georgia, pleasing Georgia but generating strong criticism in Florida over the potential impacts on the fisheries in the Apalachicola River and its bay. In addition, Georgia continues to receive—and reject—criticism of its water-planning and conservation efforts. Both Corps and FWS officials have said more negotiation is need to devise a better long-term plan among these states (and perhaps other southeastern states). (*Land Letter* at <http://www.eenews.net/>, 2/7 and 6/5/08; and *Orlando Sentinel*, 6/6/08)

•Following **disastrous flooding of about 45,000 square miles in Iowa** in July, the governor appointed the 15-member “Rebuild Iowa Commission” to assess (by September 2) the state’s disaster damages, identify unmet needs, and make recommendations to the Iowa legislature. Another Commission report on a long-term plan to prepare for and avoid disasters is due in November. As of mid-July, estimates for agricultural damage were around \$4 billion, and for the city of Cedar Rapids, \$1 billion. (*Des Moines Register*, 7/17/08)

•North Dakota, the Canadian province of Manitoba, and the governments of the United States and Canada are involved in a dispute over an **estimated \$660-million project to divert Missouri River water to the Red River** on the North Dakota/Minnesota border. The Red River flows into Manitoba and its waters eventually reach Hudson Bay in Canada. The aim of the project is to supplement water supplies in Fargo, N.D., and other Red River Valley cities. Approval by the U.S. Department of the Interior is necessary for the project to proceed. The governments of Canada and Manitoba have objected to the interbasin transfer water because of the risk of introducing non-native species to Canadian waters. (*Fargo Forum*, 6/18/08, as reported in the *North Dakota Water Resources Research Institute Newsletter*, Jul. 2008)

Additional Headlines

The following headlines with brief annotations give a sense of some other newsworthy water-related events that took place in Virginia and elsewhere from July to September 2008. The sources are provided, and (if you are reading online) the titles are hyperlinked (all were functional as of 10/1/08). The items are in chronological order.

Headlines in Virginia

[Virginia Port Authority gets EPA grant for new locomotives](#) (EPA grant for low-emission locomotives; plus recognition for VPA's environmental management system), *Norfolk Virginian-Pilot*, 7/16/08.

[Virginia crab pots seized, tickets issued](#) (large one-day enforcement of new crabbing regulations by Virginia Marine Resources Commission police), Associated Press, 7/18/08.

[Dial for information: "Smart Buoy" talks to boaters](#) (Chesapeake Bay Interpretative Buoy System for providing current weather and water-quality information; the buoy phone number is 877-286-9229 and the Web site is www.buoybay.org), *Fredericksburg Free Lance-Star*, 7/20/08.

[Hampton Roads' seafood haul is 5th most valuable in U.S.](#) (nationwide report on fishing harvest in 2007 ranked Hampton Roads fifth by economic value and Reedville second by volume), *Virginian-Pilot*, 7/23/08.

[Organizations Awarded More Than \\$2.1 Million to Help Protect and Restore Chesapeake Bay Wetlands, Forests and Waterways](#) (Chesapeake Bay Program and National Fish and Wildlife Foundation grants for 34 Bay projects), Chesapeake Bay Program press release, 7/24/08.

[Rivanna River watershed fails watchdog's standards](#) (StreamWatch citizens' group reports that 75 percent of streams in the Rivanna watershed did not meet state water-quality standards in 2005-2007 period), *Charlottesville Daily Progress*, 7/24/08.

[Massive algae bloom surfaces in James](#) [and] [James River algae a threat to animals, not people](#) (two articles on a 15-mile algal bloom near Hopewell on the James River; attributed to nutrients from sewage), *Richmond Times-Dispatch*, 7/24 and 8/1/08.

[Report rates beach waters along Va., N.C. among cleanest](#) (annual beach water-quality report by the Natural Resources Defense Council; two percent of samples from Va. and N.C. in 2007 violated standards, compared to seven percent nationally), *Norfolk Virginian-Pilot*, 7/30/08.

[Water quality protection plan introduced for clam farmers](#) (State Water Control Board approval of new regulations for wastewater discharge in shellfish-growing areas), *Norfolk Virginian-Pilot*, 7/30/08.

[Navy work eyed in sinking SPSA plant](#) (Navy's groundwater withdrawal might be cause of sinking of regional solid waste authority's power plant in Portsmouth), *Norfolk Virginian-Pilot*, 7/31/08.

[City starts planning to replace old water system pipes](#) (Lynchburg's aging water infrastructure issues illustrate what many cities are facing), *Lynchburg News & Advance*, 8/3/08.

[Clarke alters, extends water study](#) (study of groundwater in Clarke County extended and expanded to include water quality as well as quantity), *Winchester Star*, 8/8/08.

[Watermen launch advocacy group](#) (Virginia State Watermen's Association plans to advocate for Chesapeake Bay restoration and protection and to increase watermen's input on harvest regulations), *Richmond Times-Dispatch*, 8/15/08.

[Governor issues a big challenge: O'Malley wants Maryland's aquaculture to rival Virginia's](#) (currently Virginia's aquaculture industry generates \$50 million annually, and Maryland's, \$3 million), *Salisbury (Md.) Daily Times*, 8/15/08.

[Dominion offers to pay \\$4m to \\$6m to extend city water](#) (Dominion Virginia Power will pay to extend water lines to a Chesapeake residential area near a golf course that was built on coal-combustion by-products [fly ash]; groundwater testing has shown various substances of concern), *Norfolk Virginian-Pilot*, 8/21/08.

[Hanover Water System Operator Receives EPA Regional Award](#) (EPA Mid-Atlantic region award for excellence to Michael Whitely, of the Hanover County Department of Public Utilities), PR-Canada.net, 9/1/08.

[DEQ offers changes to lake water-release proposal](#) (Smith Mountain Lake Hydroelectric Project reservoir levels and downstream releases at issue in Appalachian Power Company relicensing), *Roanoke Times*, 10/2/08.

Headlines Elsewhere

[More corn seen increasing 'dead zones'](#) (concerns that record acreage of corn planting in the United States in 2007, and 10-percent increase in the Chesapeake Bay watershed, will increase nutrient-related low-oxygen zones in Gulf of Mexico and the Bay in 2008), *Baltimore Sun*, 7/16/08.

[Scientists face bay invaders](#) (new Maritime Environmental Resource Center research center in Maryland to test methods for preventing arrival of invasive species in ships' ballast water), *Baltimore Sun*, 7/22/08.

And in another item on ballast water: [Court Ruling Ends Unpermitted Ballast Water Discharge](#) (Ninth Circuit Court of Appeals' July 23 decision, upholding lower court ruling requiring oceangoing vessels to get an EPA permit for ballast-water discharge), NBC4.com (Washington, D.C.), 7/30/08.

[Dealing with the dirty water](#) (hydraulic fracturing method of extracting natural gas from shale in Pennsylvania, and issues of managing the wastewater), *Towanda (Penn.) Daily Review*, 8/25/08.

[Md. gets tough on chicken farmers](#) (new regulation proposed for poultry waste on Maryland's Eastern Shore; covers storage, inspections, and enforcement of nutrient-management plans; public hearings in November), *Washington Post*, 9/12/08.

Final Words

•“The sooner we put a price on carbon, the sooner the emitting sectors of the U.S. economy will begin to develop low-emitting technologies...and American innovation leading to the creation of those technologies will create one of the largest export economies this country has ever had.”

—U.S. Rep. Rick Boucher (Va.-9th), chair of the House Energy and Air Quality Subcommittee, referring to efforts to pass a **carbon-regulation legislation** in Congress. (*Energy & Environment Daily* at www.eenews.net, 1/18/08)

•“What will it do to the view? How will wildlife be affected? What about noise? What will construction involve? What income can be realized, and how can it be used to support the nation's forests and wilderness areas? What subsidies will be asked, or required? What will wind power add to the grid? What effect will it have on energy prices? What polluting plants might be unnecessary if nonpolluting, renewable plants succeed??—*Daily Press* (Newport News), 4/3/08, in an editorial about a **proposed wind-energy project** in Virginia's George Washington National Forest, asking questions that could also apply to many other current energy proposals.

•“Load by load, the refuse came back up the slope in spurts as though the mountain were vomiting tons of refuse after three decades of ecological indigestion.”—Dan Kegley, writing about an **illegal-dumpsite cleanup in Smyth County**. (*Smyth County News & Messenger*, 4/23/08)

•“The goal is simple. You have a guy who lost a leg, he's in physical therapy, we get him out there wading a stream, he gets a boost. Or a guy who lost an arm, we start him casting, he has a chance to use his new arm and actually do something that's enjoyable.”—U.S. Navy Captain Ed Nicholson, referring to Project Healing Waters (www.projecthealingwaters.org), a non-profit organization that provides **fly-fishing opportunities for injured veterans**. (*Washington Post*, “Outdoors” column, 5/11/08)

•“It really is a misnomer. It is not dead. ... It's teeming with life, it's just not the life we like.”
—William Dennison, University of Maryland Center for Environmental Science, referring to so-called “**dead zones**” in the **Chesapeake Bay**, which are actually **low-oxygen zones** where certain life forms (like certain bacteria) can flourish but other forms (like Blue Crabs) cannot. (*Annapolis Capital*, 8/2/08)

•“We're looking at thousands of farm visits. We must have the bodies.”—Ricky Rash, president of the Virginia Association of Soil and Water Conservation Districts, urging federal agriculture officials in July to use **Chesapeake Bay restoration funds in the 2008 Farm Bill** to support staff work with farmers on soil and water conservation practices. (*Roanoke Times*, 7/20/08)

•“The way the crab business is going nowadays we kind of have to work together. Even though he's competition, he would have done it for me.”—Don Storm, owner of Shoreline Seafood in Gambrills, Md., referring to **loaning a crab boiler to a rival businessman** whose boiler broke over the busy July 4th weekend. (*Business Gazette*, 7/24/08)

A NEW *WATER CENTRAL* INITIATIVE: THE NEWS GROUPEr



As noted in the June 2008 issue, *Water Central* is experimenting with a new service for managing the daily flow of water-related news. The **Virginia Water Central News Grouper** categorizes and annotates water-related articles from various sources and posts the annotated list online. The Grouper's regular sources are the daily article collections provided by the Virginia Department of Environmental Quality and by the Chesapeake Bay Program; Webcasts and other water-related newsletters provide other occasional Grouper material.

The Grouper's introductory page is at the Water Center's Web site, at www.vwrrc.vt.edu/va_water_grouper.html. From there, you can access the article collection at the social bookmarking Web site, delicious.com. Each entry includes the article title, Internet link (functional as long as the publisher maintains the link), notes on the article's contents, key words, and the date of the article. The key words and the month of publication are **tags** in delicious.com terminology. Users can click on a tag to see the articles in a specific category or for a specific month.

The Virginia Water Center hopes that this service will help readers keep up with water-related news, and we would like to know what you think about this approach. Please provide any comments you have to Alan Raflo, (540) 231-5463; araflo@vt.edu; or 210 Cheatham Hall (0444), Blacksburg, VA 24061. Thank you!

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, October 2007-September 2008

The chart below shows precipitation (in inches) over the last 12 months at nine National Weather Service (NWS) observation sites in or near 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 10/6/08) at the "Climate" sections of NWS Web sites, as follows:

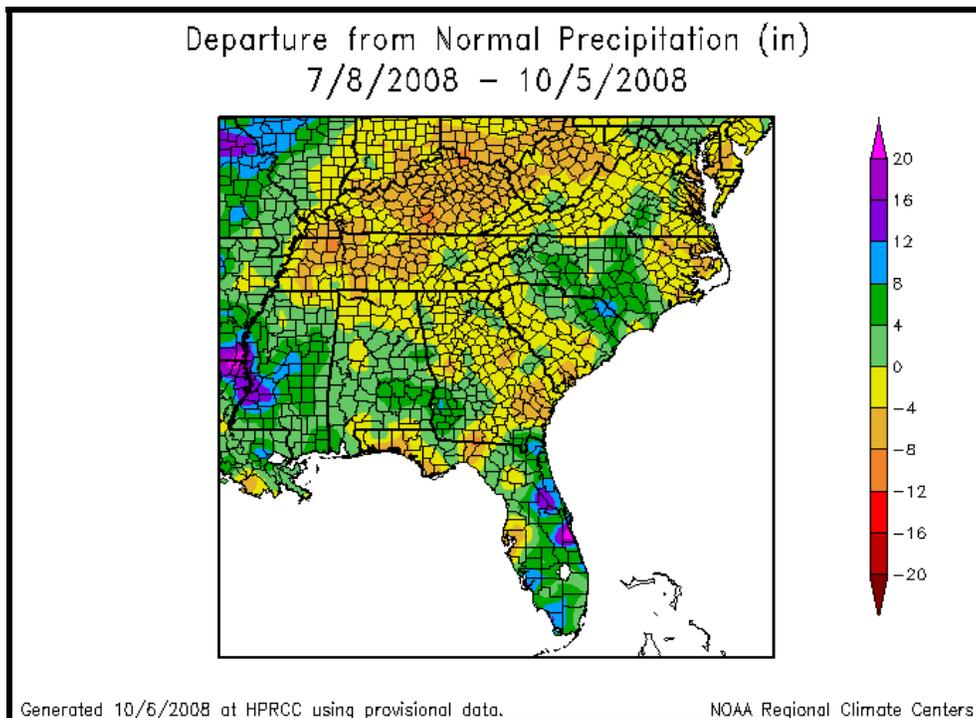
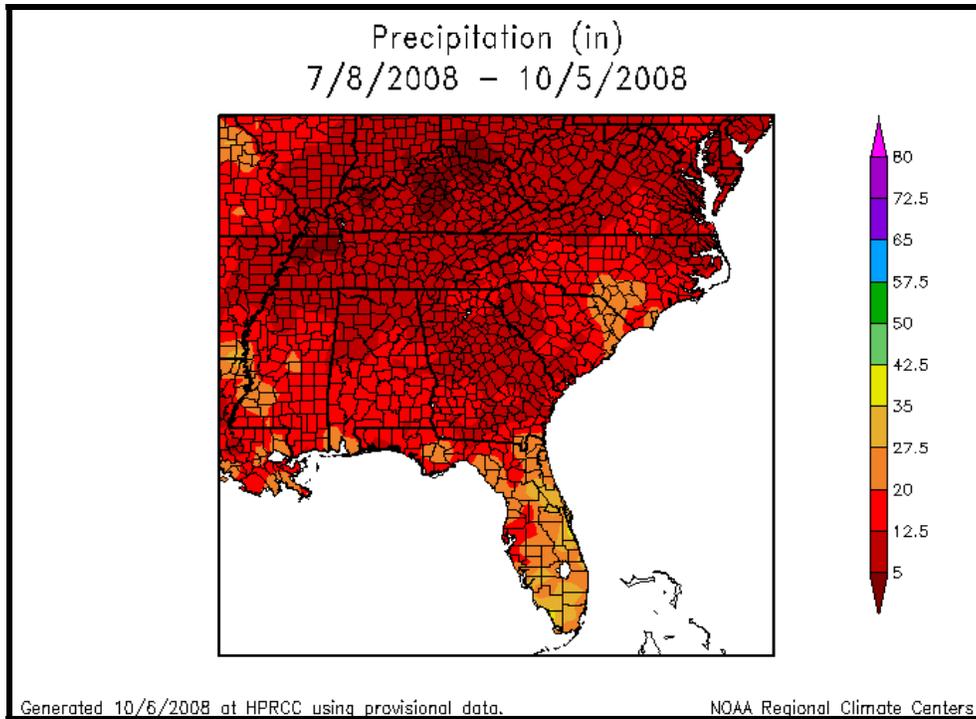
www.weather.gov/climate/index.php?wfo=mrx for the Tri-cities Airport in Tennessee, about 20 miles from Bristol, Va.; www.weather.gov/climate/index.php?wfo=rnk, for Blacksburg, Danville, Lynchburg, and Roanoke; www.weather.gov/climate/index.php?wfo=low, for Charlottesville* and Washington-Dulles; and <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 the average 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* (available online at www5.ncdc.noaa.gov/climate_normals/clim81/VAnorm.pdf, as of 10/7/08). RL and RH mean record low or high, respectively, for that month. The recent monthly amounts are classified by the Weather Service as **provisional data and are subject to revision**; the National Climatic Data Center maintains any edited and *certified* data that are available.

	Bristol (Tri- Cities, Tenn., Airport)	Blacks- burg (Station #012)	Charlottes- ville (Station #023/2W)	Danville (Station #037)	Lynchburg (Municipal Airport)	Norfolk (Internat. Airport)	Richmond (Byrd Intern. Airport)	Roanoke (Woodrum Airport)	Wash.- Dulles Airport
Oct. 2007	1.58 (2.30)	4.93 (3.19)	5.22 (4.22)	6.35 (3.71)	4.97 (3.39)	5.39 (3.47)	3.54 (3.60)	5.33 (3.15)	3.52 (3.37)
Nov. 2007	1.41 (3.08)	0.78 (2.96)	0.71 (3.74)	1.02 (3.07)	0.46 (3.18)	0.31 (2.98)	0.80 (3.06)	0.18 RL (3.21)	1.49 (3.31)
Dec. 2007	3.07 (3.39)	2.67 (2.87)	2.68 (3.26)	3.18 (3.16)	2.65 (3.23)	3.50 (3.03)	3.24 (3.12)	2.76 (2.86)	2.97 (3.07)
Jan. 2008	3.45 (3.52)	1.40 (3.37)	1.04 (3.71)	0.79 (4.03)	1.27 (3.54)	1.36 (3.93)	0.96 (3.55)	0.96 (3.23)	1.26 (3.05)
Feb. 2008	3.63 (3.40)	1.86 (3.02)	2.86 (3.30)	2.24 (3.41)	1.95 (3.10)	3.41 (3.34)	3.41 (2.98)	1.86 (3.08)	2.68 (2.77)
Mar. 2008	3.84 (3.91)	2.57 (3.83)	3.58 (4.05)	3.11 (4.25)	3.61 (3.83)	2.96 (4.08)	3.50 (4.09)	2.27 (3.84)	2.47 (3.55)
Apr. 2008	2.84 (3.23)	5.69 (3.83)	5.09* (3.34)	5.38 (3.83)	4.39 (3.46)	6.37 (3.38)	8.32 (3.18)	4.94 (3.61)	6.22 (3.22)
May 2008	1.50 (4.32)	3.19 (4.39)	4.93* (4.86)	3.67 (3.96)	2.86 (4.11)	2.88 (3.74)	5.10 (3.96)	2.08 (4.24)	9.38 (4.22)
Jun. 2008	2.26 (3.89)	2.27 (3.93)	2.11* (4.46)	0.88 RL (3.50)	1.94 (3.79)	1.93 (3.77)	3.64 (3.54)	4.64 (3.68)	4.21 (4.07)
Jul. 2008	4.69 (4.21)	4.88 (4.17)	2.94 (4.94)	4.00 (4.44)	1.07 (4.39)	5.19 (5.17)	4.05 (4.67)	3.67 (4.00)	2.18 (3.57)
Aug. 2008	2.99 (3.00)	3.28 (3.68)	4.48 (4.14)	6.92 (3.54)	2.73 (3.41)	0.67 (4.79)	5.73 (4.18)	4.65 (3.74)	2.48 (3.78)
Sep. 2008	2.53 (3.08)	1.99 (3.39)	3.91 (4.85)	6.67 (4.08)	2.28 (3.88)	9.41 (4.06)	5.94 (3.98)	2.20 (3.85)	7.18 (3.82)
Period Total	33.79 (41.33)	35.51 (42.63)	39.55 (48.87)	44.21 (44.98)	30.18 (43.31)	43.38 (45.74)	48.23 (43.91)	35.54 (42.49)	46.04 (41.80)

*Starred values for Charlottesville provided by University of Virginia Climatology Office, 7/11/08.

Precipitation, continued

For a more visual presentation over a wider area, the two graphs below—from the National Oceanic and Atmospheric Administration's (NOAA) Southeast Regional Climate Center, located at the University of North Carolina in Chapel Hill—show the total precipitation (in inches; top) over the past three months and the departure from normal (in inches above or below normal; bottom) over that period. *These data are provisional.* These graphs were taken from http://www.sercc.com/climateinfo/precip_maps on 10/7/08.



More Virginia climate information and data are available from the University of Virginia Climatology Office, online at <http://climate.virginia.edu>. To contact the office in Charlottesville, phone (434) 924-0548 or send e-mail to climate@virginia.edu.

Groundwater Levels at Selected Virginia Wells, October 2008

As of October 6, 2008, the Virginia Active Water Level Network—maintained by the U.S. Geological Survey (USGS) and available online at <http://groundwaterwatch.usgs.gov/StateMaps/VA.html>—provided access to groundwater levels at 467 wells in 62 Virginia counties and cities. At 67 of these observation wells in 31 localities, *real-time data* (updated every 5 to 60 minutes) were being recorded. The table below shows the October 6 daily average level from real-time wells in 19 localities. These readings are *provisional* (i.e., subject to revision). 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 levels reported in previous issues of *Water Central*, plus the median October level, the deepest (driest) level, and shallowest (wettest) level for each well's period of record. Historical information on groundwater is also available from the USGS' annual reports of groundwater. Annual reports back to 2002 are available online at <http://wdr.water.usgs.gov/>; for previous years, check your local library.

Well (Local #)	10/6/08 Level	7/7/08 Level	4/8/08 Level	October Median	Record Deepest (Driest)	Record Shallowest (Wettest)	Period of Record
Accomack (66M 19 SOW 110S)	10.1	9.3	9.2	9.9	11.3 (Nov. 1981)	7.4 (Nov. 2006)	Since Sep. 1978
Buckingham (41H 3)	26.7	24.6	24.3	24.0	36.7 (Jan. 2002)	7.4 (Apr. 1973)	Since Mar. 1970
Clarke (46W 175)	38.8	37.5	42.2	39.0	45.7 (Sep. 2002)	23.5 (Sep. 2003)	Since Mar. 1987
Fairfax (52V 2D)	15.8	14.0	14.0	15.7	24.9 (Dec. 1998)	6.5 (Mar. 1984)	Since Oct. 1976
Frederick (46X 110)	39.2	37.1	44.3	40.4	47.0 (Jun. 2006)	18.2 (Sep. 2004)	Since Nov. 2002
Hanover (53K 19 SOW 080)	20.8	19.0	19.0	20.6	22.9 (Aug. 1984)	5.1 (Aug. 2004)	Since Jan. 1978
Loudoun (49Y 1 SOW 022)	60.4	59.8	59.7	60.3	62.0 (Feb. 2008)	48.0 (June 1972)	Since Nov. 1963
Montgomery (27F 2 SOW 019)	6.8	6.3	4.5	5.5	7.3 (Dec. 1969)	0.0 (Mar. 1993)	Jul. 1953, then since Apr. 1969
Northampton (63H 6 SOW 103A)	8.2	6.9	6.9	6.4	10.0 (Oct. 2002)	0.8 (Aug. 2004)	Since Sep. 1977
Orange (45P 1 SOW 030)	31.2	26.7	29.6	29.8	39.0 (Aug. 2002)	11.8 (Apr. 1973)	Since Feb. 1965
Prince William (49V 1)	10.0	10.3	8.1	10.4	13.1 (Sep. 1991)	6.6 (May 2008)	Since Nov. 1968
Roanoke City (31G 1 SOW 008)	18.8	18.7	18.6	18.5	19.3 (Jun. 1987)	12.4 (Feb. 1986)	Since Aug. 1966
Rockbridge (35K 1 SOW 063)	28.6	27.7	26.9	26.1	30.4 (Sep. 2002)	14.3 (Apr. 1987)	Feb. 1964, then since Jun. 1972
Rockingham (41Q 1)	81.1	70.8	79.5	74.2	99.0 (Oct. 2002)	57.7 (Feb. 1998)	Since Aug. 1970
Suffolk (58B 13)	11.6	11.0	10.4	11.2	13.4 (Jan. 1981)	2.0 (Sep. 1999)	Since Mar. 1975
Surry (57E 13 SOW 094C)	10.1	9.7	7.9	9.3	11.2 (Dec. 1981)	3.9 (May 1980)	Since Jul. 1978
Virginia Beach (62B 1 SOW 098A)	3.4	4.7	3.4	4.7	12.0 (Sep. 1980)	0.9 (Aug. 2004)	Since Jun. 1979
Westmoreland (55P 9)	9.5	4.7	1.6	8.6	12.8 (Dec. 1988)	0.0 (Dec. 2003)	Since Jul. 1977
York (59F 74 SOW 184C)	11.1	11.2	6.7	11.3	14.1 (Jan. 2002)	0.9 (Nov. 2006)	Since Jun. 1990

Stream Flow in Virginia, August-October 2008

The graphs on this page, from the U.S. Geological Survey's (USGS) "WaterWatch—Current Water Resources Conditions" Web site (<http://water.usgs.gov/waterwatch/?m=real&r=va&w=real%2Cplot>, 10/7/08), compare recent Virginia stream flow to historical records.

The data in the graphs come from 102 sites that have at least 30 years of records. 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 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;

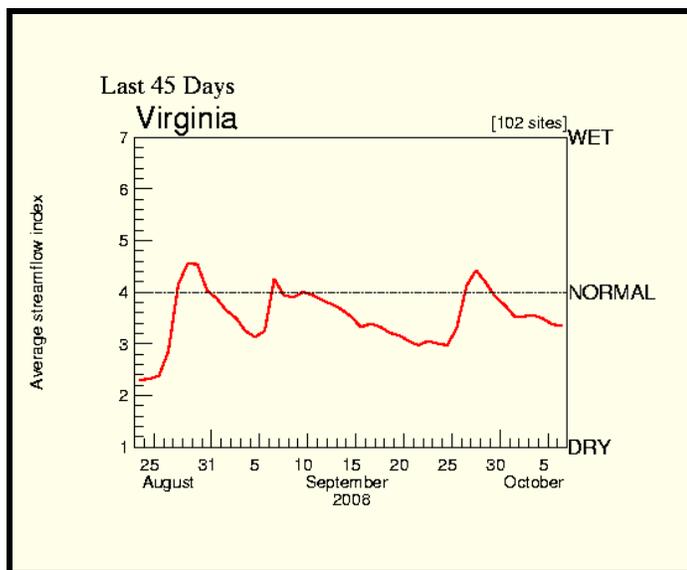
7 = average daily flow for the graphed date is record high for that date.

Gaps in the data: Data are not plotted for days when less 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.

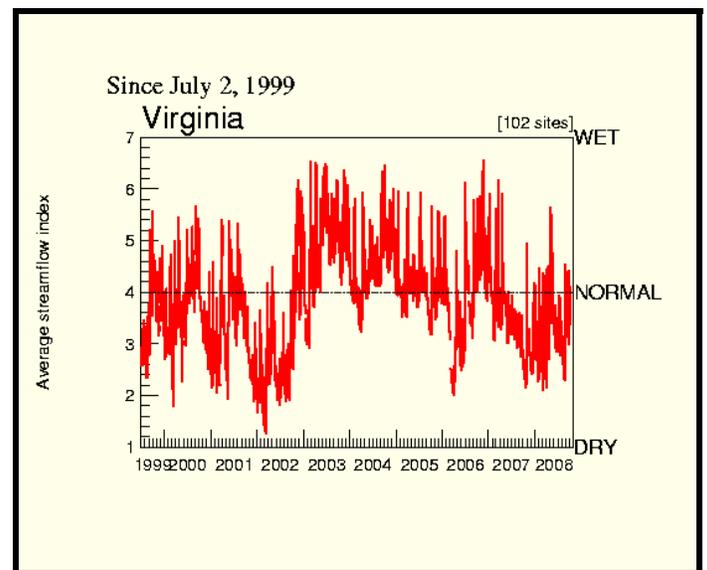
A USGS **map of current stream flow conditions** (with links providing access to details for each measuring station) compared to historical flows is available online at <http://water.usgs.gov/waterwatch/?m=real&r=va>. This Web site also has maps that show average flows over the previous 7-, 14-, and 28-day periods.

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

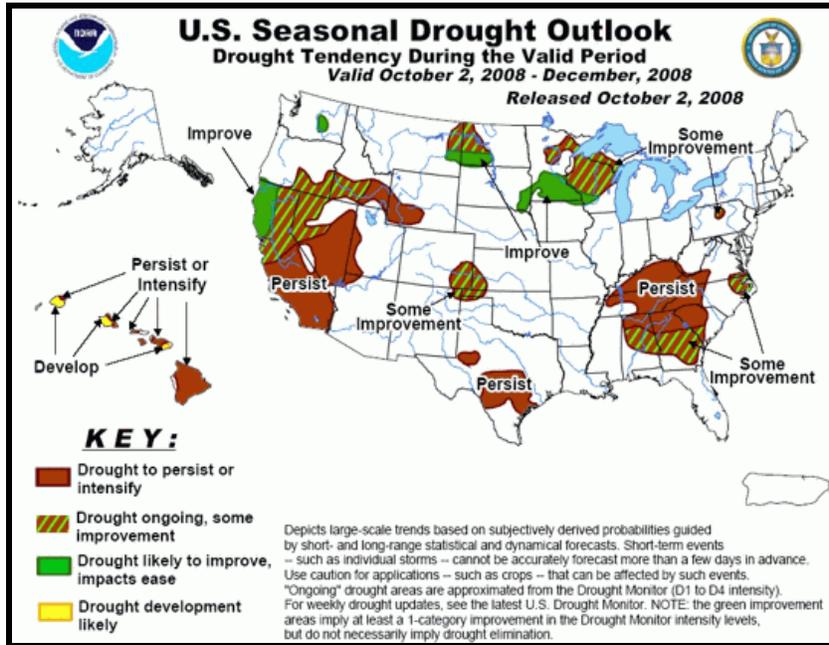
For August 24—October 6, 2008



For July 1999—October 2008



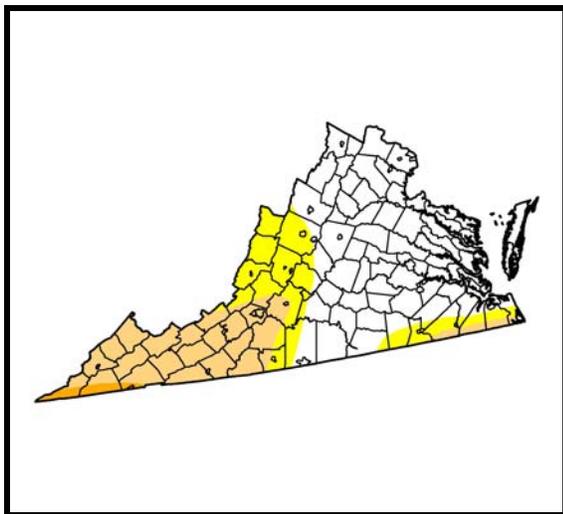
DROUGHT REPORT



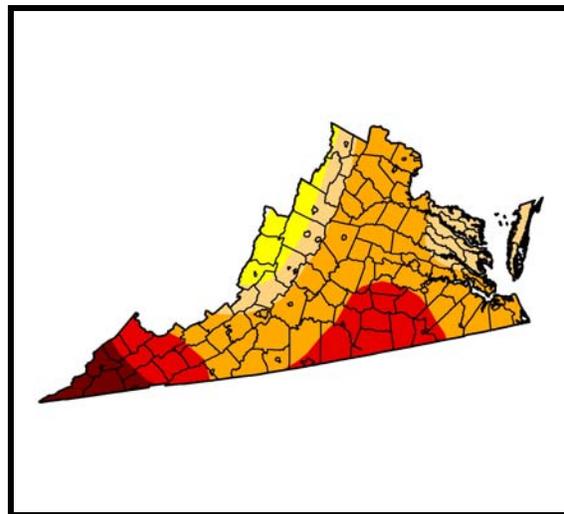
The national drought outlook for October-December 2008, according to the National Oceanic and Atmospheric Administration (NOAA) Climate Prediction Center Web site, www.cpc.ncep.noaa.gov/products/expert_assessment/seasonal_drought.html, accessed 10/7/08.

From the U.S. Drought Monitor: Conditions Now and One Year Ago

The U.S. Drought Monitor, available online at www.drought.unl.edu/dm/monitor.html, is a weekly nationwide drought assessment by federal agencies and state climatological centers. The following graphs show Drought Monitor assessments of Virginia conditions on September 30, 2008, compared to October 2, 2007. Note the much better conditions overall in Virginia in 2008, but also note the persisting drought in the southwest.



September 30, 2008



October 2, 2007

= D0 Abnormally Dry
 = D1 Moderate Drought
 = D2 Severe Drought
 = D3 Extreme Drought
 = D4 Exceptional Drought

Source: Images taken from archive of U.S. Drought Monitor, www.drought.unl.edu/dm/archive.html, 10/7/08. Authors: R. Helm and L. Love-Brotak, NOAA, for 9/30/08 image; J. Lawrimore and L. Love-Brotak, NOAA, for 10/2/07 image.

The Drought Monitor also gives *percentages* of the country, of regions, and of individual states classified in the drought categories. The following table shows how much of the country and of Virginia received different Drought Monitor ratings at various times between October 2007 and September 2008. As shown by the percentages on August 26, drought conditions were widespread in Virginia by late August 2008. But rain from the remnants of Tropical Storm Fay (August 27-28) and from Tropical Hanna (September 5-7) eliminated those conditions from much of the state (see the 9/30 percentages).

Drought Monitor Report Date	Percentage of area rated “abnormally dry” (D0) or worse	Percentage of area rated “severe drought” (D2) or worse
9/30/08	U.S. = 43% Va. = 42%	U.S. = 7% Va. = 2%
8/26/08	U.S. = 45% Va. = 94%	U.S. = 8% Va. = 32%
7/29/08	U.S. = 43% Va. = 46%	U.S. = 11% Va. = 4%
10/2/07	U.S. = 53% Va. = 99%	U.S. = 25% Va. = 76%

From the Virginia Drought Monitoring Task Force

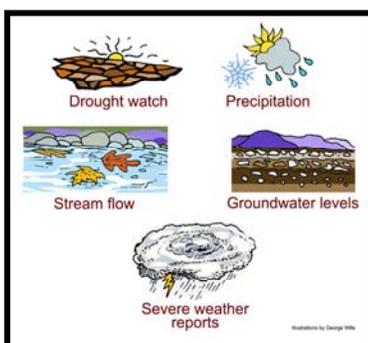
Following is a brief excerpt from the September 23, 2008, monthly report from the Virginia Drought Monitoring Task Force (the latest report available as of 10/7/08). The complete September report and previous reports are available online at www.deq.virginia.gov/waterresources/drought.php.

“...Welcomed precipitation was received during the last month due to the passing of tropical systems Fay and Hanna; unfortunately, the most drought-stricken areas of western Virginia received very minor rainfall from these systems. ...Seven day average **streamflows** for September 21 are generally below normal in the western half of the Commonwealth with conditions indicative of severe hydrologic drought...in the upper Roanoke River basin. ...**Levels of large reservoirs** in the eastern half of the Commonwealth have rebounded significantly during the last month but large reservoirs in the western portion of the Commonwealth continue to decline. ...While the Virginia Department of Health has not reported any impacts to **public water supplies** that have compromised their ability to provide the needs of their customers, 46 systems have initiated voluntary water-conservation requirements and 5 systems have initiated mandatory water-conservation requirements [a slight decrease from the August report, which listed 46 systems on voluntary conservation and 9 systems on mandatory conservation]. ...The Department of Game and Inland Fisheries reports limited **access at boat ramps** on several rivers across the Commonwealth [including the] Nottoway, James, South Anna, Pamunkey, and Staunton rivers.... [I]t is not likely, though possible, that significant water-supply drought impacts will occur before environmental and human demands seasonally decrease. Significant drought impacts are beginning to become measurable in the **agriculture sector**, with 19 localities requesting drought disaster designations. The longer-range concern is that lower-than-normal precipitation during the fall and winter of 2008-2009 will deepen the existing accumulated precipitation deficits and set the stage for significant drought impacts...in the spring of 2009.”

Other Useful Sources of Information Online

- U.S. Geological Survey “Drought Watch” for Virginia: <http://va.water.usgs.gov/drought/>.
- Virginia Forestry Department list of burn bans: <http://www.dof.virginia.gov/fire/burn-bans.shtml>.
- Virginia Department of Environmental Quality water-conservation tips: www.deq.virginia.gov/waterresources/waterconservation.html.

DON'T FORGET THE ONLINE WATER STATUS PAGE



The Water Center’s online “Water Status Information” area has links to current and historical information on drought, groundwater, precipitation, stream flow, and severe weather. Look for the image at the left, at www.vwrrc.vt.edu/water_status.html. Please let us know how you like this resource (via e-mail to araflo@vt.edu or phone to 540-231-5463).

WATER QUALITY and YOU/ LA CALIDAD de AGUA y USTED

In this section, *Water Central* offers suggestions for how individuals can help maintain and improve the condition of Virginia's waters and aquatic habitats. Unless otherwise noted, you are welcome to reproduce and distribute items in this section, but please retain the credits to the original source(s). All Web sites mentioned were functional as of 10/3/08. A Spanish translation is on the following page. *Para información en español, por favor vea la página proxima.*



If you are one of the many people who change their own motor oil, you need to know how to dispose of the used oil properly. Did you know that the used oil from one oil change can contaminate 1 million gallons of fresh water—a years' supply for 50 people!

If you change your own motor oil, protect our environment by recycling this valuable resource. Take your used motor oil to your nearest collection center, such as a service station, lube center, or automotive store. Oil dumped down storm drains contaminates our water. To find your nearest oil-collection center, call (800) CLEANUP (800) 253-2687 or visit www.cleanup.org/.

Source: The graphic and text above come from the U.S. EPA's "Used Oil Management Program" Web site (www.epa.gov/epawaste/consERVE/materials/usedoil/index.htm) and the agency's "You Dump It, You Drink It" campaign.

The "You Dump It, You Drink It" campaign focuses on the proper management of used motor oil and includes a variety of free, printed materials that are available in both English and Spanish. Materials are available online at www.epa.gov/epawaste/consERVE/materials/usedoil/ydiydi.htm, or you can order materials by phoning (800) 490-9198 (operator available M-F, 7:30 a.m.-5:30 p.m., Eastern Time; leave an order 24 hours a day).

En Español

En esta sección, *Water Central* le ofrece sugerencias de como individuales pueden mantener y mejorar la condición de las aguas y los habitats acuáticos de Virginia. Aprovechese de reproducir y distribuir esta pagina, pero por favor retenga los créditos a los originales. Todos los sitios Web mencionados funcionaban el 3 octubre 2008.



Si usted es una de las de las muchas personas que cambia el aceite de motor de su propio vehículo, usted necesita saber cómo desechar adecuadamente del aceite usado. ¿Sabía usted que el aceite de motor usado de un cambio de aceite podría contaminar hasta un millón de galones de agua dulce--el suministro anual para 50 personas?!

Si le cambia el aceite a su motor, puede proteger el medio ambiente al reciclar este valioso recurso. Lleve su aceite usado de motor al centro de recolección más cercano; ya sea una estación de gasoline, un taller que cambia aceite, o una tienda automotriz. El aceite que se tira por la acantarilla de aguas pluviales contamina nuestra agua. Para obtener más información sobre el centro de recolección de aceite usado más cercano a usted, llame gratis al (800) 253-2687 o visítenos en Internet en www.cleanup.org.

Fuente: La información susodicha viene de “Programa para el manejo de aceite usado” sitio de Web de la Agencia de Protección Ambiental de EE.UU (por su siglas en inglés EPA) a www.epa.gov/epawaste/conserva/materials/usedoil/index.htm, y de la campaña “Si lo tira, se lo toma” de la EPA.

La campaña “Si lo tira, se lo toma” se centra en el manejo adecuado del aceite usado de motor e incluye una variedad de materiales informativos impresos gratuitos que están disponibles en español y en inglés. Los materiales están en el Internet a www.epa.gov/epawaste/inforesources/pubs/espanol/index.htm, o puedes ordenarlos por teléfono a (800) 490-9198 (operador disponible los lunes-los viernes, 0730-1930 ET; o puedes dejar un mensaje 24 horas al día).

Muchas gracias a John Flores y Barbara Kraft para su ayuda con esta página.

VIRGINIA GOVERNMENT WATER ISSUES OVERVIEW

This section lists water issues under current consideration (study or regulation) by state boards, commissions, or agencies in Virginia. The first part identifies areas undergoing Total Maximum Daily Load (TMDL) processes. The second part identifies areas where solid waste facilities are undergoing a groundwater monitoring or corrective-action process. The third part covers other water-related topics of statewide concern that are currently being considered. The final part gives schedule and contact information for key water-related boards and commissions. Information in this issue is based on public meetings listed **July 21-September 30, 2008**, on the **Virginia Regulatory Town Hall** Web site, at www.townhall.state.va.us. The Town Hall site posts agendas of upcoming meetings and minutes of past meetings held by Virginia's boards, commissions, and departments. Unless otherwise noted, all contact people listed in this section are Virginia state employees. To find the e-mail address any state employee, go online to www.employees.state.va.us/directory-search.cfm. You can also request state employee phone numbers by calling (800) 422-2319. All Web sites listed in this section were functional as of 10/1/08.

Total Maximum Daily Load (TMDL) Processes

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. The table below lists those where public meetings were held during the period noted above. Information on the status of all TMDLs in Virginia is available online at www.deq.state.va.us/tmdl/.

Location	Water(s) & Impairment	Larger Watershed(s)	Most Recent Meeting Date as of 9/30/08	For More Information
Accomack County	Pocomoke River and Pocomoke Sound for bacteria impairment of shellfishing	Chesapeake Bay	Jul. 23	Jennifer Howell
Buchanan County	Bull Creek and all tributaries for aquatic life impairment	Levisa Fork/Big Sandy River	Sep. 23	Shelley D. Williams
Campbell, Charlotte, Halifax, and Pittsylvania counties	Staunton River for PCBs (polychlorinated biphenyls)	Roanoke River	Jul. 29	Amanda Gray
Culpeper and Rappahannock counties	Hazel River, Hughes River, and Rush River for bacteria	Rappahannock River	Sep. 16	May Sligh
Lancaster and Northumberland counties	Shellfish waters of tidal Antipoison, Dymer, Indian, and Tabbs creeks and their tributaries, all for bacteria	Chesapeake Bay	Sep. 29	Margaret Smigo
Rockingham and Shenandoah counties	Smith Creek for bacteria and sediment	Shenandoah River	Aug. 6	Robert Brent
Washington County	Middle Fork Holston River for aquatic life impairment and bacteria	South Holston Lake/Upper Tennessee River	Aug. 7	Shelley D. Williams
Washington County	Wolf Creek for aquatic life impairment and bacteria	South Holston Lake/Upper Tennessee River	Aug. 7	Shelley D. Williams
Wise County	North and South Fork Pound River for aquatic life impairment	Levisa Fork/Big Sandy River	Sep. 25	Shelley D. Williams
Wythe County	Cripple Creek for bacteria	New River	Jul. 29	Shelley D. Williams

Other Topics Under Current Consideration

The following lists topics considered in public meetings held during the period noted at the beginning of this section. Items are listed alphabetically by topic, followed by the agency or group coordinating state study or action and then a contact name. Minutes of most meetings listed are available at the Virginia Regulatory Town Hall Web site, www.townhall.state.va.us. Agency Abbreviations: DCR = Dept. Conservation and Recreation; DEQ = Dept. Environmental Quality; DGIF = Dept. Game and Inland Fisheries; DMME = Dept. Mines, Minerals and Energy; SWCB = State Water Control Board; VDH = Department of Health. “VAC” numbers indicate the *Virginia Administrative Code* section for a particular regulation; you can access and search the VAC at <http://legis.state.va.us/Laws/AdminCode.htm>. “NOIRA” stands for Notice of Intended Regulatory Action (the first public notification in the regulatory process).

Air Pollution Control Board, State Water Control Board, and Waste Management Board—Joint meeting of representatives of the three boards: 9/25/08. More information: Cindy Berndt.

Biosolids Regulations (9 VAC 25-20, 25-31, and 25-32)—Expert study panel/joint work-group meeting: Jul. 21; State Water Control Board public meeting on regulations’ revisions: 7/24/08; field trip to Henrico Wastewater Reclamation Facility and a land-application site: 9/24/08. A state panel, established by the Secretary of Natural Resources and the Secretary of Health and Human Resources, is studying biosolids (sewage sludge) in Virginia. The SWCB published a Notice of Intended Regulatory Action (NOIRA) in the June 23, 2008, *Virginia Register* about several possible amendments to the biosolids regulations; the NOIRA public-comment period ended July 31. More information: Jeff Corbin.

Coal Combustion By-products—Technical Review Committee meeting: 8/13/08. The Coal Combustion By-Product (CCB) Technical Review Committee is studying information on CCB re-use, impacts, and regulatory requirements, and the committee is to provide recommendations on any regulatory changes to the Technical Advisory Committee for Amendment 7 of the Virginia Solid Waste Management Regulations (9 VAC 20-80). More information: Leslie Beckwith. (Please see below for more information on Solid Waste Management Regulation Amendment 7.)

Coal Surface Mining Reclamation Regulation (4 VAC 25-130, sections 816, 817, and 842)—Public hearing: 9/9/08. The DMME is considering amendments to this regulation, regarding topsoil standards, revegetation standards, and water diversion design. The amendments “would maintain consistency with corresponding federal regulations, allow more natural designs of stream restoration channels, and clarify requirements for requesting formal hearing to review the agency’s decisions not to inspect or enforce sections of the regulations on particular sites” (quoting the Regulatory Town Hall notice). The public comment period ended Oct. 3. More information: Gavin M. Bledsoe.

Energy Plan and Policy—Governor’s Energy Policy Advisory Council meeting: 8/27/08 (in conjunction with the “Built Environment” work group of the Virginia Commission on Climate Change). The Governor’s Energy Policy Advisory Council is tasked with reviewing and evaluating strategies for implementing the recommendations of the Virginia Energy Plan. More information: Eileen Leonard.

Industrial Activity Stormwater Discharge General Permit Regulation (9 VAC 25-151)—SWCB advisory committee meeting: 8/20/08. The SWCB is considering the reissuance, including possible amendments, of this regulation. More information: Burt Tuxford.

Marine Resources Commission regular monthly meetings: 7/22/08, 8/26/08 and 9/23/08. Minutes of VMRC meetings are available online at www.mrc.virginia.gov/calendar.shtm. More information: Jane McCroskey.

Mined Land Reclamation—DMME’s Coal Surface Mining Reclamation Fund Advisory Board meeting: 9/3/08. More information: Ernest Barker. The Abandoned Mined Land Advisory Committee also met Sep. 3; more information on this meeting: Roger L. Williams.

Non-metallic Mineral Mining Discharge General Permit Regulation (9 VAC 25-190)—SWCB technical advisory committee meeting: 9/4/08. The SWCB is considering reissuance, including possible amendments, to this regulation. More information: George Cosby.

Poultry Waste Management Regulation (9 VAC 25-630)—SWCB advisory committee meeting: 8/13/08. The SWCB is considering amendments to the Virginia Pollution Abatement (VPA) General Permit Regulation on managing poultry waste. More information: Betsy K. Bowles.

Recycling—DEQ’s Litter Control and Recycling Fund Advisory Board meeting: 8/28/08; more information: Steve Coe. DEQ’s Recycling Markets Development Council meeting: 9/4/08; more information: Thomas Smith, Prince William County Public Works, tsmith@pwcgov.org or (703) 792-6252.

Smith Mountain Lake Project Virginia Water Protection (VWP) Permit Renewal—Public hearing: 8/7/08. Appalachian Power Company is seeking a renewal of its VWP permit for the Smith Mountain Lake

hydroelectric project. The project also involves Leesville Lake and the Staunton River. The public comment period on the draft permit ended August 22. More information: Joseph P. Hassell.

Solid Waste Management Regulation (9 VAC 20-80), Amendment 7—DEQ advisory committee meetings: 8/25/08, 9/22/08, and 9/29/08. According to the Waste Management Board's Notice of Intended Regulatory Action, the purpose of this amendment is to "review each section of the regulation [covering siting, design, construction, operation, closure, and post-closure care of solid waste facilities] for clarity and complexity in order to transform the regulation into a standard that is easier for the public and regulated community to read and to follow" (January 21, 2008, issue of the *Virginia Register of Regulations*). More information: Leslie Beckwith.

Sewage Handling and Disposal Regulations—VDH's advisory committee meetings: 8/8/08 and 9/12/08. More information: Donald Alexander.

State Water Control Board held regular quarterly meetings: Jul. 29-30. Minutes of SWCB meetings are available at the Virginia Regulatory Town Hall Web site, www.townhall.state.va.us/Meeting/ListMeeting_Past.cfm. More information: Cindy Berndt.

Stormwater Best Management Practices (BMPs)—Virginia Stormwater BMP Clearinghouse Committee meeting: 9/11/08. The BMP Clearinghouse Committee, coordinated by the Va. DCR and the Virginia Water Resources Research Center, is working to develop a publicly accessible Web site that will serve as Virginia's reference site for stormwater BMPs. More information: David Dowling.

Stormwater from Construction Activities General Permit (4 VAC 50-60)—DCR's technical advisory committee meetings: 7/22/08, 8/19/08, and 9/9/08. More information: David Dowling.

Stormwater Management Regulations (4 VAC 50-60)—DCR technical advisory committee meetings: 8/14/08, 8/26/08, and 9/10/08. More information: David Dowling.

Regular Meetings of Statewide Boards and Commissions

Cave Board—meets three times per year. More information: DCR (804) 786-7951; www.dcr.virginia.gov/natural_heritage/cavehome.shtml.

Chesapeake Bay Local Assistance Board—meets March, June, September, and December. More information: (800) CHESBAY; www.dcr.virginia.gov/chesapeake_bay_local_assistance/board.shtml.

Game and Inland Fisheries Board—meets bimonthly. More information: www.dgif.virginia.gov/about/.

Gas and Oil Board—meets the third Tuesday of each month. More information: Bob Wilson, DMME, (276) 5423, bob.Wilson@dmme.virginia.gov; <http://www.dmme.virginia.gov/divisiongasoil.shtml>.

Groundwater Protection Steering Committee—meets third Tuesday of odd-numbered months. More information: www.deq.virginia.gov/gwpsc/.

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

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

Outdoors Foundation—meets quarterly. More information: (540) 327-7727; www.virginiaoutdoorsfoundation.org.

Scenic River Advisory Board—meets at least two times a year. More information: Lynn Crump, DCR, (804) 786-5054 or lynn.Crump@dcr.virginia.gov; www.dcr.virginia.gov/recreational_planning/srmain.shtml.

Soil and Water Conservation Board—meets bimonthly. More information: DCR (804) 786-1712; www.dcr.virginia.gov/soil_&_water/vs&wcb.shtml.

State Water Control Board—meets March, June, September, and December. More information: Dept. of Environmental Quality, (800) 592-5482; www.deq.virginia.gov/cboards/homepage.html#water.

Waste Management Board—meets about three times per year. More information: Dept. of Environmental Quality, (800) 592-5482; www.deq.virginia.gov/cboards/homepage.html#waste.

N O T I C E S

If you would like to receive e-mail notifications about meetings, reports, and other items related to water quality and water monitoring, you may do so by joining the Virginia Water Monitoring Council; contact Jane Walker at (540) 231-4159 or janewalk@vt.edu.

All Web sites listed in this section were functional as of October 7, 2008.

Water Alternatives Journal

Water Alternatives is a new (June 2008) peer-reviewed, electronic journal covering water-related issues in politics, economics, development, and governance. The journal is available at www.water-alternatives.org.

Take a Tour of a Bat Roost

The state-endangered Rafinesque's Big-eared Bat—also known as the “Swamp Bat,” because its native habitat is old-growth trees in wetlands—is the star of this short (3 minutes 39 seconds) video from the Virginia Dept. of Game and Inland Fisheries, available online at www.dgif.virginia.gov/video/?video=12. For more information, phone DGIF in Richmond at (804) 367-1000 or contact a DGIF office listed in the government pages of your local phone book.

Flood Hazard Mapping Revisions

Revisions are underway in several Virginia localities to Flood Insurance Rate Maps produced by the Federal Emergency Management Agency (FEMA) under the National Flood Insurance Program. Information is available online at www.fema.gov/plan/prevent/fhm/index.shtm or from FEMA's Map Assistance Center at (877) 336-2627. For questions specifically about flood *insurance*, phone (800) 427-4661 or visit www.floodsmart.gov.

From Big Sky Country: Technical Assistance for Small Water Systems

The Montana Water Center has a series of CDs for small water-supply systems and utility boards. Copies (while supplies last) of the following CDs may be requested from the National Environmental Services Center at (800) 624-8301 or info@mail.nesc.wvu.edu: “Water Quality Expedition” (product #DWCDTR25); “Contamination Explorer” (product #DWCDTR24); and “Small Utility Board Training” (product #DWCDTR23). Other titles are also available. For more information, visit <http://watercenter.montana.edu/training>.

100 Ways to Conserve Water

This is one of the features at the “Water—Use It Wisely” Web site, at www.wateruseitwisely.com. Other items include links to state agencies and local water authorities, a home water-audit tool, and a section on new technologies.

Recruiting Plumbers for Water and Energy Conservation

GreenPlumbers® of Sacramento, California, offers a national training and accreditation program for plumbers that covers issues and technologies related to water conservation, energy efficiency, and climate change. For more information: (888) 929-6207; Web site: www.greenplumbersusa.com.

Come and Listen (online) to the USGS

The U.S. Geological Survey is developing audio podcasts on water topics. Some items are for a general audience, while others are intended for water scientists. Sample titles include “Two 500-year Floods within 100 Years” and “Pharmaceuticals in the Nation's Water.” The podcasts are available at <http://water.usgs.gov>.

Recent Reports: Bacteria, Groundwater, and Drinking Water

A Multiple-Tracer Approach for Identifying Sewage Sources to an Urban Stream System (U.S. Geological Survey [USGS] SIR 2006-5317; 89 pp.), documents work to find sources of sewage reaching **Fairfax County's Accotink Creek**. Available at <http://pubs.usgs.gov/sir/2006/5317/>; more information: Ken Hyer, (804) 261-2636 or kenhyer?@usgs.gov.

Escherichia coli Concentrations in Recreational Streams and Backcountry Drinking-Water Supplies in Shenandoah National Park, Virginia, 2005-2006, USGS SIR 2007-5160 (18 pp.) documents ***E. coli* bacteria in Shenandoah National Park** (20 streams and 19 drinking-water sources (streams and springs). Available at <http://pubs.usgs.gov/sir/2007/5160/>; more information: Ken Hyer, (804) 261-2636 or kenhyer@usgs.gov.

Ground-Water Availability in the United States (USGS Circular 1323, 70 pp.) examines current knowledge of **U.S. groundwater resources** and outlines a USGS groundwater-research program. Available online at <http://pubs.usgs.gov/circ/1323/>; to request a print copy: phone: 888 ASK-USGS or e-mail infoservices@usgs.gov.

Drinking Water: Understanding the Science and Policy Behind a Critical Resource (28 pp.), from the National Academies, gives an introduction to drinking-water issues. Available online at <http://water.nationalacademies.org/>; print copies may be requested there.

Energy/Climate Resources and Reports

The **Virginia Wind Energy Collaborative** at James Madison University provides information (including wind-resource maps) and services to promote wind energy in Virginia. Its Web site is <http://vwec.cisat.jmu.edu>.

The U.S. EPA is accepting comments until November 28 on a notice of proposed rulemaking regarding **regulation of greenhouse gas emissions** under the Clean Air Act. The notice, published in the July 30 *Federal Register*, is available online at www.epa.gov/EPA-AIR/2008/July/Day-30/a16432a.htm.

Water Implications of Biofuels Production in the United States (National Research Council, 2008; 88 pp.), examines potential **water-quality impacts of ethanol production** from different sources; order or read online at www.nap.edu/catalog/12039.html, or phone the National Academies Press at (888) 624-8373.

Next-Generation Biofuels: Taking the Policy Lead for the Nation (Chesapeake Bay Commission and State of Pennsylvania, 2008; 40 pp.). This report—the latest in a series of Commission reports on biofuels in the Bay watershed—examines the **potential for cellulosic ethanol production** in Bay states. Available online at www.chesbay.state.va.us/biofuels.html.

Upcoming Conferences and Workshops

(Please see also the Water Center's "Quick Guide to Water-related Meetings and Conferences in Virginia," online at www.vwrrc.vt.edu/VAConfQuickGuide.html.)

Events In Virginia

Oct. 21, Richmond: **Annual Meeting of the Virginia Chapter of the Soil and Water Conservation Society**. More information: Clifton Bell at (757) 873-8700.

Oct. 22, Falls Church: **Rainwater Harvesting Workshop**. Organized by Virginia Tech, the Virginia Dept. of Conservation of Recreation, and the Potomac Watershed Roundtable. More information: Robert Slusser, (540) 351-1590 or bob.slusser@dcr.virginia.gov. Nov. 17-19, Breaks Interstate Park: **Eastern Coalfield Watershed Training Series**. The workshop series covers water monitoring, grant writing, and organizational development. Organized by the Eastern Coal Regional Roundtable. More information: (304) 294-1003 or info@easterncoal.org; Web site: www.easterncoal.org/A/index.htm.

Events Elsewhere

Oct. 27-30, Ocean City, Md.: **11th Annual Watersheds and Wetlands Workshop**. Organized by the Wetlands and Watersheds Work Group. More information: Frank Reilly, (540) 286-0072; Web site: www.wetlandsworkgroup.org.

Nov. 3-6, Asheville, N.C.: **Biennial Southeast Regional Stream Restoration Conference**. Organized by North Carolina State University. More information: (919) 515-6780 or cathy_smith@ncsu.edu; Web site: www.ncsu.edu/sri.

Nov. 17-19, Shepherdstown, W. Va.: **The Water-Energy Nexus. 2008 Mid-Atlantic Regional Water Resources Research Conference**. Please see the larger notice on the next page.

Mar. 22-25, 2009, Baltimore, Md.: **Ecosystem Based Management: The Chesapeake Basin and Other Systems**. Organized by the Chesapeake Research Consortium. More information: (410) 798-1283; Web site: www.chesapeake.org.

Also Out There...

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

“Beyond the Tap”—A series of articles on water-supply resources and infrastructure in Lynchburg, Va., and six surrounding counties. Includes a valuable interactive map of the region’s water supplies. *Lynchburg News & Advance*, 7/26-8/30/08; online at www.newsadvance.com/lna/news/water.

“River Restoration: Arizona’s Oft Neglected Waterways Get Overdue Attention”—case studies of river restoration efforts in Arizona, with sidebars on river-restoration fundamentals. *Arroyo*, Winter 2008 (Arizona Water Resources Research Institute); online at <http://cals.arizona.edu/azwater>; or contact the Arizona center at (520) 791-9591 or wrrc@cals.arizona.

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; Web site www.vwrrc.vt.edu.

New Publications Available

The following new Special Report is available online at www.vwrrc.vt.edu/special_reports.html:

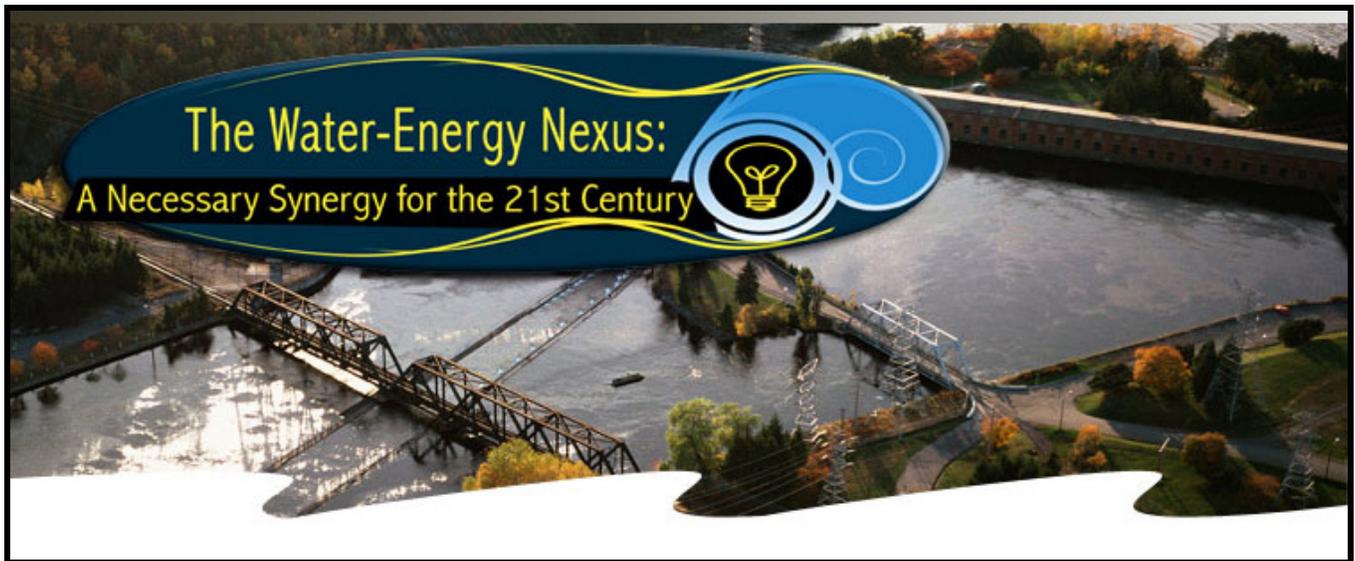
Analysis of Water and Energy Conservation of Rainwater Capture System on a Single Family Home, by Caitlin Grady and Tamim Younos, SR39-2008.

New Published Research

Lohani, V. K. and T. Younos. 2008. "Implementation and Assessment of an Interdisciplinary NSF-REU Site on Watershed Sciences." *Proceedings of the Annual Conference of the American Society of Engineering Education*, Pittsburg, Penn., AC 2008-1402. Available at www.vwrrc.vt.edu/pdfs/nsf_reu/NSF_REU_ASEE_paper.pdf.

New Grant Received for Water/Energy Work

The Institute for Critical Technologies and Applied Sciences (ICTAS) at Virginia Tech has provided a \$25,000 seed grant to encourage research on decentralized energy and water systems. Decentralized water systems refer to small-scale water supply and energy systems (such as rooftop rainwater harvesting) and renewable energy sources (such as solar and wind energy). The work will be done by an interdisciplinary team of researchers coordinated through the Water Center. For more information, please contact Tamim Younos at tyounos@vt.edu or (540) 231-8039.



The Water-Energy Nexus: A Necessary Synergy for the 21st Century will be held **November 17-19, 2008**, at the National Conservation Training Center of the U.S. Fish and Wildlife Service in Shepherdstown, West Virginia. The West Virginia Water Research Institute is the lead sponsor. Co-sponsors are the Virginia Water Center and the state water centers of Delaware, the District of Columbia, Maryland, New Jersey, New York, and Pennsylvania. For more information, please visit the conference Web site at vwri.nrcce.wvu.edu/conferences/2008/WRR/I/; phone (304) 293-2867, ext. 5450; or e-mail 2008waterconferenceinfo@mail.wvu.edu.

Registration deadline is November 10.



Virginia Water Central

Published by the Virginia Water Resources Research Center (0444), 210 Cheatham Hall, Blacksburg, VA 24061; (540) 231-5624; fax (540) 231-6673; Stephen Schoenholtz, director. *Water Central* staff: Alan Raflo, editor (araflo@vt.edu); George Wills, illustrator; photographs by Alan Raflo, unless otherwise noted.

Opinions expressed herein are not necessarily those of the Water Center or Virginia Tech, nor does the mention of trade names, commercial products, or services constitute an endorsement. Reproduction of articles, with proper credit, is welcomed.

Virginia Tech does not discriminate against employees, students, or applicants on the basis of race, color, sex, sexual orientation, disability, age, veteran status, national origin, religion, or political affiliation. Anyone having questions concerning discrimination or accessibility should contact the Equal Opportunity and Affirmative Action Office, 336 Burruss Hall, Blacksburg, Virginia 24061-0216, (540) 231-7500, TTY (540) 231-9460; eooffice@vt.edu; www.oeo.vt.edu.

Water Central is available online at www.vwrrc.vt.edu/watercentral.html. If you would like an e-mail notification when new issues are posted, please notify us at (540) 231-5463 or araflo@vt.edu. Also, please let us know if your e-mail address has changed or if you no longer wish to receive the e-mail notification.

If you do not have Internet access and would like a photocopy of the newsletter, please contact us.
Thank you!

YOU GET THE LAST WORD

Please answer the following questions to let us know whether the newsletter is meeting your needs. Please mail this page to the Water Center address listed in the box above, or e-mail your responses to araflo@vt.edu. Thank you.

1. Would you rate the content of this issue as good, fair, or poor?
2. Would you rate the appearance as good, fair, or poor?
3. Would you rate the readability of the articles as good, fair, or poor?
4. Is the newsletter too long, too short, or about right?
5. Do the issues come too frequently, too seldom, or about right?
6. Please add any other **comments** you wish to make.