Virginia Water Central

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FEATURE ARTICLE

Dive! Dive!—Into the Depths of the New Water-Quality Reports

A number of media articles around Virginia accompanied the release on July 10, 2002, of two reports by the Virginia Department of Environmental Quality (DEQ) on water quality in the state. The reports were the **305(b) Water Quality Assessment Report** and the **303(d) Report on Impaired Waters** (the numbers refer to the respective sections of the 1972 federal Clean Water Act). The reports generated headlines—such as "Waterways Added to Polluted List" in Norfolk's *Virginian-Pilot* (July 11) and "River Pollution Up Across Virginia" in Lynchburg's *News & Advance* (July 15)—about contaminated and threatened bodies of water around the state and what actions are needed to address them.

By late summer, however, media attention on water-related issues had generally turned to the drought. But these two reports will be a key element in how Virginia—both its government and its citizens—manage their water resources for at least the next two years. So in this article *Water Central* takes a deeper look at these important and detailed reports. We approach the topic in terms of four questions:

1) What are these reports?
2) What's done with the reports?
3) What's in the reports?
4) What tools are available for citizen access to the information in the reports?

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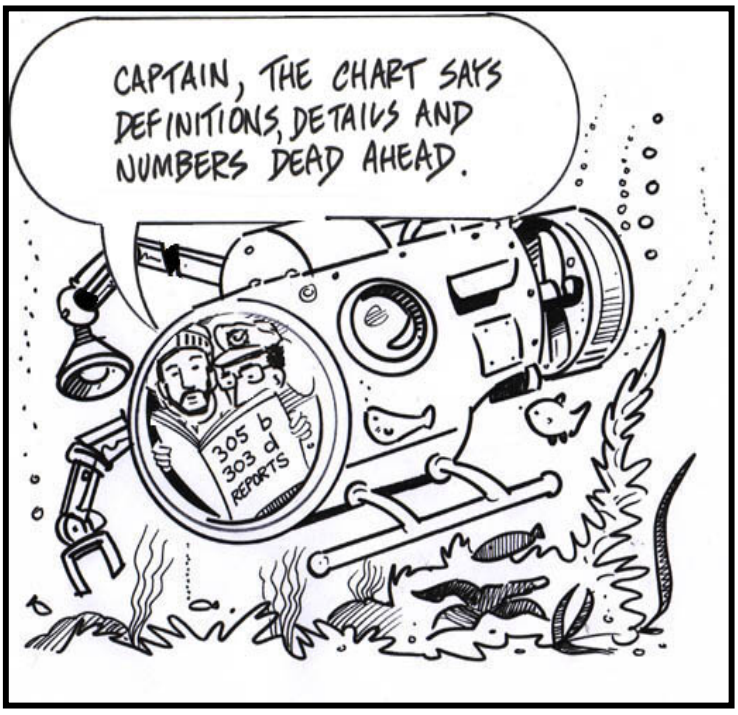

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Virginia Tech
VIRGINIA POLYTECHNIC INSTITUTE
AND STATE UNIVERSITY

Q1: What Are These Reports?

All states are required by the U.S. Congress under terms of the 1972 Clean Water Act (CWA) to monitor their streams, rivers, lakes, estuaries, and other bodies of water for contamination. States are also required to assess regularly the data resulting from that monitoring to identify bodies of water that are "impaired" and to report these assessments to the U.S. Environmental Protection Agency (EPA). In Virginia, state law (the 1997 Water Quality Monitoring, Information and Restoration Act[1]) also requires the DEQ, along with the Department of Conservation and Recreation (DCR), to monitor and assess the quality of the state's waters.

Put simply, in the 305(b) report the DEQ publishes the results of its water-quality monitoring, and in the 303(d) report it publishes the list of which state water bodies it assesses as impaired. The 303(d) also includes lists of Virginia waters that DEQ assesses as being *under threat* of becoming impaired ("waters of concern") and those waters that are slated for removal from the list of impaired waters.

The reports are due to the EPA every two years, and in the past the EPA has required that the water-quality assessments in the reports also *be based on* only the past two years' data. Beginning with this reporting cycle, however, the EPA is allowing states to base assessments on data collected over the previous *five* years. The DEQ contends that this provides more accurate information about water quality.[2]

The DEQ is responsible for assembling the reports even though other agencies participate in the process. In the introduction to the 305(b) report on the DEQ Web-site, the department states the following about how it approaches its mandate:

> "Virginia has nine major river basins with an estimated 50,415 miles of perennial rivers and streams and approximately 2,500 square miles of estuaries. The overall water quality for Virginia is assessed based on the ability of citizens to safely enjoy the **designated uses** of the waters as described in the Virginia water quality standards. These uses are aquatic life, fish consumption, shellfish consumption, swimming, and public water supply." [Bolding added to original.]

In the quote above, the term "designated uses" is highlighted because the term is necessary for understanding impaired waters and the 303(d) lists. A water body is designated as "impaired" when it *does not "fully support" its designated uses* (the uses designated as part of state water-quality standards); that is, it fails to support one or more of its designated uses.[3]

To be able to compile these reports and assess the quality of the state's waters, the DEQ has to gather data. One way the DEQ gathers water-quality data is its **Ambient Water-quality Monitoring Program**, in which it monitors physical and chemical conditions at specific stations on streams, lakes, or estuaries. From January 1996 to December 2000, DEQ staff took samples at approximately 1680 ambient water-quality stations. Each monitoring station is assumed to reflect conditions for 10—25 miles upstream.[4] Here's the

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[1] § 62.1-44.19:5 in the *Code of Virginia*.

[2] See the 305(b) report, Introduction (pp. vii) and Chapter 3.2 (p. 3.2-1).

[3] At www.deq.state.va.us/water/305b.html, 12/19/02. Designated uses are described in more detail in Chapter 3.2, pp. 3.2-2 to 3.2-4 of the 305(b) report.

[4] Introduction, p. 4, of the 303(d) report.

DEQ's description of how it chooses and monitors these stations: [5]

> "Stations are located to gather information from industrial, urban, rural, and undeveloped areas of the state. These data are gathered near industrial and municipal discharges, nonpoint source areas, public water supplies, unaffected areas, and previously unassessed areas. In this way, stream miles at risk from major pollution sources are well documented, as are those where pollution risk is suspected or unknown. Regional office personnel who are most familiar with local conditions and concerns determine station locations, parameters sampled and frequency…
>
> "All stations are monitored for conventional parameters, about one-third are monitored for toxics in the sediments, and a smaller number are monitored for toxics in the water column (primarily trace metals). [6] Areas with potentially greater risk are sampled more frequently, with more types of samples being collected. As the risk decreases, the sampling frequency and the number of the types of samples collected decreases."

A second way that the DEQ gathers data for the 305(b) report is through its **Fish Tissue and Sediment Monitoring Program**. The DEQ monitors chemical contaminants (heavy metals and organic pollutants) in fish and shellfish tissue at a minimum of 24 fish-sample stations per year, as required by the state monitoring law mentioned earlier). The number of stations actually sampled ranged from 43 in 1997 to 72 in 2000. This program is known as "Tier I" sampling, described as a "screening study of a relatively large number of sample stations to identify sites where concentrations of contaminants in…fish indicate potential health risks to human consumers."[7] Each year, on a rotating basis, two of the state's major basins are targeted for screening. If the screening samples indicated a potential health risk, more intensive "Tier II" sampling is undertaken.

A third source of data for the 305(b) report is the DEQ's **Benthic Macroinvertebrate Monitoring Program**, which monitors bottom-dwelling organisms such as immature insects, snails and other mollusks, crayfish and other crustaceans, and worms. In this program, 150—170 stations are examined annually.

The DEQ does not have the money or the staff, however, to monitor regularly every stream mile, lake acre, or estuary square mile. DEQ makes clear in its reports that citizen groups and independent organizations are invited to participate in the monitoring of Virginia waters. The agency categorizes information provided by other groups as "monitored" data if the groups use methods approved by the DEQ or by the EPA (also referred to as "Quality Assured/Quality Controlled," or QA/QC methods).[8]

Even with additional data provided by quality-assured sources outside the DEQ, only 19 percent of Virginia's total river/stream miles were monitored for the 2002 305(b) report (a much higher percentage of lakes and estuarine waters were monitored). So, besides data from *monitoring*, the DEQ also uses another source of information, called "*evaluated* data."

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[5] Chapter 3.1, p. 3.1-1 of the 305(b) report.

[6] Chapter 3.1, p. 3.1-2, the 305(b) report lists the 29 water parameters and 3 sediment parameters measured in the DEQ's ambient monitoring program.

[7] Chapter 3.1, p. 3.1-2 of the 305(b) report.

[8] See Chapter 3.2, pp. 3.2-1 of the 305(b) report for the DEQ's process for accepting non-DEQ data in its monitoring program.

Most simply, "evaluated data" are data that have *not* come from a monitoring program using quality-assured (QA/QC) methods. Within this definition fall a broad range of information sources: monitoring data from a non-quality-assured program, reports of events such as fish kills or contaminant spills, land-use information, and the *lack* of any Virginia Department of Health (VDH) fish-consumption advisory on a given stream. Harry Augustine, with the DEQ's water-quality monitoring and assessment program in Richmond, said in a recent interview that the agency *does not use evaluated data to designate a water body as impaired*. Should evaluated data suggest a water body or segment is potentially impaired, he said, the agency slates it for monitoring. Table 1 (below) shows the extent of Virginia's water monitored vs. evaluated for the 2002 305(b) report.[9]

Table 1. Amount of Waters Assessed in Virginia's 2002 305(b) Report.

	Total in Virginia	Monitored for 2002 305(b) Report	Evaluated for 2002 305(b) Report
Rivers/streams (miles)	50,415	]9,805 (19%)	40,610 (81%)
Publicly owned lakes (acres)	162,230	127,618 (79%)	20,844 (13%)
Estuaries (square miles)	2,500	2,174 (87%)	326 (13%)

Source: Virginia 2002 305(b) report, Introduction, pp. 1.1-3 to 1.1-4, and Chapter 2.1, p. 2.1-2.

[9] The distinction between monitored and evaluated data is discussed in Chapter 3.2, pp. 3.2-1 to 3.2-2, of the 305(b) report.

Q2: What's Done with the Reports?

As noted earlier, the DEQ is required to file the 305(b) water-quality report and the 303(d) list of impaired waters with the EPA every two years. Other requirements of the process is that the reports be made available to the public before they become final, that a period of at least a month be allowed for the public to respond, and that the final draft submitted to the EPA contain the public's comments and the state's responses.

After the DEQ released the draft reports in July 2002, public comments were solicited between July 15 and August 15, and three public meetings were held in summer and early fall. Once the public responded to the DEQ's draft, the DEQ made certain revisions, included the public comments in the report, and submitted final drafts to the EPA on September 30, 2002. The EPA reviews and either approves or rejects the reports.

An important consideration in the EPA's review is the list of impaired waters that the DEQ provides in the 303(d) Report (again, these are waters that do not "fully support" their designated uses). For each such water (and each identified cause of an impairment), the state will have to go through a rigorous process of developing plans known as Total Maximum Daily Loads, or TMDLs (please see the December 2001 *Water Central* for a description of the TMDL process and situation in Virginia). In 1998, the EPA responded to the DEQ's reports by adding another 98 waters or segments to the state's 303(d) list, based on its own assessment of Virginia's waters.[10]

[10] Already faced with a dramatically increasing TMDL workload, the DEQ asked for more time to complete its work, and the EPA allowed the agency to submit only a 305(b) Report in 2000.

For now, at least two big questions surround the reporting process in Virginia. One question is when EPA will approve the water quality reports DEQ submitted at the end of September. The agency, according to Darryl Glover, with the DEQ's water-quality monitoring and assessment program, had been hoping for EPA approval in December 2002. But, as he told *Water Central* in a telephone interview on December 16, the EPA's review may last until mid-February 2003. The EPA will submit a number of questions to the DEQ, Glover said, and DEQ must supply answers before EPA gives final approval of the reports and the impaired waters list.

Q3: What's In The Reports?

(Please see the last page of this article for a list of the contents of the reports.)

The basics of what the 305(b) and 303[d] Report contain and how they are compiled are described under Question 1 above. Here we provide additional detail about the assessment categories applied to state waters and some of the actual data from the reports.

Using the information for the assessment period of January 1, 1996 through December 31, 2000, the 305(b) report places stream segments, lakes, or portions of tidal waters into categories for each assessed designated use. The Introduction to the 303(d) report defines the categories as follows:

1. Fully Supporting Designated Use: Waters meet water quality standards that have been assessed and support Virginia's designated use.

2. Fully Supporting But Threatened: Waters meet water quality standards and designated use, but there is an apparent decline in water quality. Due to a change in EPA's definition of "threatened", these waters are called "Waters of Concern" in the 2002 303(d) Report.

3. Partially Supporting: Waters exceed [do not meet] water quality standards for a designated use *by some frequency* and are considered moderately impacted.

4. Not Supporting: Waters exceed [do not meet] water quality standards for a designated use *at a greater frequency* and are considered severely impacted. [Emphasis added to original.]

Waters in categories 3 and 4 are designated as impaired.

The most important parts of the reports, from a regulatory standpoint, are those that identify what waters are impaired, the impaired designated use(s), the **causes** of the impairments, and the **sources** of the impairments. An impairment *cause* is the environmental or biological condition that does not meet a state standard; for example, temperature that is too high or dissolved oxygen that is too low. Table 3.3-4, in Chapter 3.3 of the 305(b) report, lists the causes of impairment and the number of river miles, lake acres, or estuary square miles impaired by each cause. An impairment *source* is, in most cases, a land-use activity that results in the environmental or biological conditions causing the impairment; for example, urban runoff may be a source of chemicals that impair aquatic life. Table 3.3-5, in Chapter 3.3 of the 305(b) report, lists the sources of impairment and the number of river miles, lake acres, or estuary square miles impaired by each source.

Information about support of designated uses and impairment is presented on a number of levels. In the 305(b) report, Chapter 3.3 presents data on the state as a whole, Chapter 3.4 presents data for each of the state's nine major river basins, and Chapter 3.5 focuses on the Chesapeake Bay. Appendix B or the 305(b) report provides data for each monitoring station (number of samples and times that a standard was not met). The 303(d) report, on the other

hand, focuses on individual impaired waters, with a Fact Sheet for each water indicating the impairment's location, cause, and source.

Table 3.3-2 in the 305(b) report, from which we developed this article's Table 2 (next page), provides the statewide summary of the quality of Virginia's waters. For rivers/streams, about 44 percent of monitored miles were impaired; for lakes, about 90 percent of monitored acres were impaired; and for estuaries, about 76 percent of monitored square miles were impaired.[11]

As noted above, Chapter 3.4 of the 305(b) report presents data for each of the nine major river basins in Virginia, and provides details on the causes and sources of impairments in each basin. The section for each basin includes a summary table of the waters that support designated uses and those that are impaired (see, for example, Table 3.4-1-1 for the Potomac-Shenandoah Basin). In this article's Table 3 (next page), we have compiled information from the nine separate basin tables to show the extent of supporting waters and impaired waters for each basin.

Q4: What Tools are Available for Citizen Access?

The DEQ has entered the electronic age in a big way with these reports, in an effort to save money and to expand the range of choices readers can make about the types and layers of information they want. The 305(b) and 303(d) reports are available on-line at www.deq.state.va.us/water/305b.html and www.deq.state.va.us/water/303d.html, respectively. Printed versions, the DEQ reports, were limited and so are in extremely short supply; it's almost certain that anyone requesting a printed copy will be told that none are available. Readers may find a printed copy in larger libraries that receive government documents (state depository libraries). But the agency is accepting requests (at both Web-sites listed above) for compact disk versions of both reports. The CD's will be completed and mailed to all who request them once EPA approval is granted and final versions of the reports are generated early in 2003.

For readers who have Internet access, the Web-site versions are accessible, readable, and able to be downloaded. Readers can choose to download the complete reports or view and print certain sections.

At least two tools are also available on DEQ's Web-site that can aid in understanding what the reports say, and what they don't say, about water quality in Virginia. One is a broad, illustrated summary of the reports. Its 25 pages include colorful charts and graphs depicting such information as the top-10 causes of impairments statewide, the miles of streams and extent of other waters that were monitored, and the top-10 sources of the contaminants that contribute to impairments. The summary also includes comparisons of the findings in these reports to those from earlier reporting periods and brief explanations of procedures (such as monitoring and assessment). This summary is available at www.deq.state.va.us/water/305b/reports.pdf.

Continued on second page following

[11] If one bases the percentage of impaired river/stream miles on monitored *and* evaluated miles, then the impairment percentage is only 19 percent (the percentages do not change much for lakes and estuaries a larger percentage of those water bodies are monitored rather than evaluated). The DEQ's Web-site introduction to the 305(b) report, however, states the percentages as we have done above, on the basis of monitored miles. As noted earlier in this article, the DEQ uses only monitored data to determine impairments.

Table 2. Amount of Virginia Waters Supporting Designated Uses vs. Impaired, 2002.

	Fully Supporting All Designated Uses	Fully Supporting but Threatened	Impaired	Total Monitored
Rivers/streams (miles & percent of monitored)	4,541 (46%)	946 (10%)	4,318 (44%)	9,805
Public Lakes (acres & percent of monitored)	9,335 (7%)	2,908 (2%)	115,376 (90%)	127,619
Estuaries (square miles & percent of monitored)	23 (1%)	496 (23%)	1,655 (76%)	2,174

Source: Virginia 2002 305(b) report, Chapter 3.3, Table 3.3-2.

Table 3. Amount of Impaired Waters in Virginia's Major River Basins, 2002.

Basin	Size Monitored*	Size Impaired**	Designated Use Most Often Unsupported**
Potomac-Shenandoah	R – 1957 mi. L – 3245ac. E – 46.14 sq.	R – 1413.64 mi. L – 1945 ac. E – 37.21	R – Swimming L – Aquatic Life E – Fish Consumption
James	R – 2886.12 mi. L – 9786.96 ac. E – 243.89 sq.	R – 1044.01 mi. L – 7964.95 ac. E – 296.14 sq.	R – Swimming L – Aquatic Life E – Aquatic Life
Rappahannock	R – 353.29 mi. L – 235 ac. E – 152.14 sq.	R – 450.50 mi. L – 0 ac. E – 164.88 sq.	R – Swimming E – Aquatic Life
Roanoke	R – 1468.97 mi. L – 95,134,59 ac. E – 0 sq.	R – 905.54 mi. L –121,202 ac.	R – Swimming L – Fish Consumption
Chowan River-Dismal Swamp	R – 756.33 mi. L – 29.00 ac. E – 82.90.	R – 1098 mi. L – 29 ac. E – .72 sq.	R – Aquatic Life L – Aquatic Life E – Swimming
Tennessee-Big Sandy River	R – 1080.66 mi. L – 3797 ac. E – 0 sq	R – 602.14 mi. L – 3387 ac.	R – Aquatic Life L – Aquatic Life
Chesapeake Bay & Small Coastal Regions	R – 103.07 mi. L – 515 ac. E – 1571.16 sq.	R – 98.44 mi. L – 131 ac. E – 1180.42	R – Aquatic Life L – Aquatic Life E – Aquatic Life
York River	R – 483.21 mi. L – 10,000 ac. E – 77.41 sq.	R – 264.35 mi. L – 3160 ac. E – 84.56 sq.	R – Swimming L – Fish Consumption E – Aquatic Life

Notes

***R** = River or stream, **L** = Lake, **E** = Estuary; **mi.** = miles, **ac**. = acres, **sq.** = square miles.

**Up to five designated uses may be considered for each monitored water or segment, and each failure to support a designated use represents an impairment that must be addressed. Thus there can be as many as five impairments for each monitored water or segment. This explains how the number of miles, acres, or square miles of impaired waters in a basin can exceed the total number of miles, acres, or square miles monitored. The five designated uses in Virginia's water-quality standards are Aquatic Life, Fish Consumption, Shellfish Consumption, Swimming, and Public Water Supply.

**More miles, acres, or square miles failed to meet standard for this designated use than for any of the other four designated uses.

Source: Virginia 2002 305(b) report, Chapter 3.4.

Continued from page 6

A second tool offers much detail about specific monitoring locations. Using the Geographic Environmental Mapping System, available at http://lexington.yesvirginia.org/, one can view a map showing every DEQ monitoring site. One can "zoom in" on these sites, first viewing them in relation to all others around the state, then to all others within a given basin, then to all others on a particular body of water or specific stream segment. Graphic symbols as well as written information provide details about the findings at each site.

The problem with this tool, however, is its dependence on the speed of one's Internet connection and the power of one's computer. Those equipped with fairly low-speed modem connections and/or older computers without much memory capacity may be frustrated with the time needed to shift from one level of detail to the next on this map. Better to use this tool only if equipped with other tools of equal sophistication—a high-speed connection and lots of random-access memory (RAM).

The EPA maintains a multi-layered and information-rich Web-site on water-quality at www.epa.gov. From this location, one can access histories of the Clean Water Act, definitions of TMDLs, and other facts about water-quality monitoring and assessment. In addition, EPA offers a site called Surf Your Watershed, at www.epa.gov/surf/ that offers interactive maps and other programs providing detailed data on water quality in Virginia's streams, rivers, lakes and estuaries. Please note, however, that the data on the EPA site is likely to be older than the data in the latest DEQ reports, at least for awhile.

Conclusion: Looking Toward the Next Round

According to the DEQ's Darryl Glover, this water-quality reporting round will mark the end of the EPA's requirement that states submit two separate reports. When the next reporting period arrives, DEQ and its equivalent agencies around the country will be allowed to submit a single report that accomplishes both tasks—detailing the state's efforts to maintain and expand proper monitoring, and identifying its impaired waters.

One question on the minds of state water-quality managers nationwide is, *when* will the EPA require the next round of reports? Responding to comments from environmental agencies in many states that TMDL workloads are increasing while state budgets for water clean-up and environmental workers are shrinking, EPA is considering putting off the next reporting period to 2006 rather than 2004. Even though the Virginia DEQ hopes it may have the extra time before the next reporting round, monitoring goes on and the task of compiling data for the next report begins in January 2003.

—By David Mudd and Alan Raflo

Water Central thanks Harry Augustine, III, and Darryl Glover, both with the Va. Dept. of Environmental Quality, for their assistance with this article.

Contents Of Virginia's 2002 305(B) Report (9/30/02 Version)

Contents Of Virginia's 2002 303(D) Report (9/30/02 Version)

Lots of News Stories Talk about Nutrients (Nitrogen and Phosphorus):

- "Too Much of a Good Thing Led to Chesapeake's Nutrient Woes."—*Bay Journal*, October 2002
- "The Relationship of Stream Channel Size to Nitrogen Inputs to the Gulf of Mexico." Urban Harbors Institute's *Coastlines*, August 2002
- "Nutrient Goals for Bay Within Striking Distance."—*Bay Journal*, January-February 2001
- "EPA Draft Rivers and Streams Guidance Requires Nutrient Standards."—*Inside EPA's Water Policy Report*, October 27, 1999
- "Midwest Farm Runoff Causes 'Dead Zone' in Gulf, Scientists Say."—Associated Press, January 25, 1999

So SCIENCE BEHIND THE NEWS...

...will return next issue with a look at nutrients and water quality.

PROPOSED STATE WATER POLICY LEGISLATION

The following is the text of a December 13, 2002, press release from the Virginia Governor's Office on water-related legislation the governor intends to propose to the 2003 Virginia General Assembly. This excerpt omits quotes of reactions to the proposal and the final paragraph that discussed other legislation the governor intends to propose. The full press release is available on-line at www.governor.state.va.us/Press_Policy/Releases/Dec02/1213c.htm (as of 12/19/02).

Governor Mark R. Warner announced today that he will propose water policy reform legislation to the 2003 session of the General Assembly that will implement long-range water supply planning for the first time in Virginia history.

Governor Warner also signed Executive Order 39 [which follows, next page], which will maximize the state's existing resources for meeting the needs of Virginians for clean, safe drinking water. The Virginia Water Supply Initiative sets as a goal providing clean, safe drinking water to an additional 25,000 Virginians within the next five years. The Governor will be asking relevant agencies to set annual targets to meet this goal. The Initiative also sets a goal of cleaning 450 impaired streams in the Commonwealth by 2010.

The Governor's reforms will:

Initiate Comprehensive Water Supply Planning. The state has been required to engage in water supply planning since 1966, but little meaningful action has ever been taken. As a result, too many areas do not have adequate water supplies, particularly in times of drought. The Governor's proposal directs the Department of Environmental Quality to work as a partner with local governments and other interested parties to develop local and regional water supply plans. It sets a deadline of three years for the completion of the water supply plans, with preliminary plans in one year.

Coordinate State Water Programs to Improve Service. Currently, the Department of Health manages the drinking water fund and the Department of Environmental Quality manages the much larger wastewater fund. In many instances, better coordination of these funds could generate more money to provide safe drinking water for our citizens.

Governor Warner's proposal also would consolidate permitting of wastewater treatment plants and review of wastewater plans and specifications in one agency, the Department of Environmental Quality. Currently, this function is spread across both the Department of Health and the Department of Environmental Quality. This consolidation will streamline processes for the regulated community and help pool the state's wastewater engineering talent in a single agency.

The drinking water revolving fund, which pays for drinking water works construction and upgrades, will remain under the oversight of the Department of Health, with increased collaboration from the Department of Environmental Quality. The fund provided nearly $34 million in financing for 30 water supply projects last year.

Governor Warner's proposal also would merge water quality reporting by the Department of Conservation and Recreation and the Department of Environmental Quality into one report to provide a comprehensive look at water quality in the Commonwealth.

Prepare for Future Droughts. The Governor has directed the Drought Coordinator to work with state agencies, local governments, and the private sector to develop a drought management plan for the future by April 1, 2003 to implement the lessons learned from the drought of the past several years. Such a plan might include a study of water resource conservation, compiling accurate information on river levels, and working with localities in targeted regions on short and long-term water conservation planning.

Sets a State Goal of Meeting the Needs of 25,000 Virginians for Clean Safe Drinking Water. By executive order [Executive Order 39], the Governor will create the Virginia Water Supply Initiative. The initiative makes drinking water a priority in grants that state agencies apply for and in grants and loans that they award; identifies strategies for improving how many citizens and how many communities are served with existing programs; through the Department of Housing and Community Development and with the involvement of local stakeholders, and works to assist local planning and engineering efforts to get more appropriate projects ready for available financing. The Initiative also sets a goal of having 450 streams that are currently impaired meet water quality standards by 2010.

THE VIRGINIA WATER SUPPLY INITIATIVE

The following is the text of the Executive Order 39, released from Governor Mark Warner's office on December 13, 2002. The order is available on-line at www.governor.state.va.us/Press_Policy/Executive_Orders/html/EO_39.html (as of 12/19/02).

By virtue of the authority vested in me as Governor under Article V and Article XI of the Constitution of Virginia and under the laws of the Commonwealth including, but not limited to, Chapter 1 of Title 2.2 of the Code of Virginia, and subject to my continuing and ultimate authority and responsibility to act in such matters, I hereby establish the Virginia Water Supply Initiative.

Importance of the Initiative

An adequate supply of clean, safe drinking water is an essential component of any modern society. Today, too many people in the Commonwealth lack access to clean, safe drinking water. This problem is not limited to any single region or type of locality. Urban, suburban, and rural residents alike face growing concerns about the long-term adequacy of their water supplies to meet public health, economic development, and agricultural needs.

The adequacy of our water supplies is a significant public health, quality of life, conservation, and economic development issue. Prudent use of Virginia's water resources is crucial to the health and welfare of the citizens of Virginia, continued economic prosperity, and the conservation of fish and wildlife resources. Moreover, the protracted drought that the Commonwealth is now experiencing emphasizes the need for more proactive water policy planning, more efficient and effective water delivery systems, and more innovative financing methods to maximize available resources for drinking water improvements. Given the critical need for adequate water supplies across the Commonwealth, it is essential that state agencies efficiently and effectively coordinate their efforts with respect to major water supply functions. Accordingly, I hereby direct the Secretaries of Commerce and Trade, Health and Human Resources, and Natural Resources to accomplish the following by June 30, 2003:

1. Establish a plan for meeting the drinking water needs within the next five years of an additional 25,000 Virginians who currently lack access to a reliable source of clean drinking water. This plan should include annual targets for how many people can be helped in each year.

2. Conduct outreach with local communities to identify drinking water needs and to heighten awareness of existing state resources.

3. Develop innovative strategies for financing drinking water needs in the Commonwealth.

4. Develop and issue guidelines for giving drinking water a priority in the application for and award of discretionary grants by state agencies.

5. Work with local government and other stakeholders to develop and implement a plan for tailoring state drinking water financing programs to encourage regional solutions to water supply needs.

6. Work through appropriate state agencies, with the involvement of local stakeholders, to get more appropriate projects ready for available financing.

7. Develop performance measurement standards for all water financing programs at the state level to provide meaningful measurements of the effectiveness of each program and to identify needed improvements.

8. Develop and implement a strategy for ensuring an additional 450 currently impaired streams meet water quality standards by 2010.

In addition, I hereby direct my Drought Coordinator to prepare a preliminary drought response assessment and plan by April 1, 2003.

Applicability of the Order

This Executive Order shall be effective immediately upon its signing and shall remain in full force and effect until June 30, 2003, unless amended or rescinded by further Executive Order.

IN AND *OUT OF* THE NEWS
Newsworthy Items You May Have Missed

The following summaries are based on information in the source(s) indicated at the end of each item. Selection of this issue's items ended December 18, 2002. Unless otherwise noted, all localities mentioned are in Virginia and all dates are in the year 2002.

Drought-Related News

Above-normal rainfall in Virginia in Fall 2002 began to ease the multi-year drought (please see Table 1 below). On November 12, Governor Mark Warner lifted the water-use restrictions that the governor's Executive Order 33 of August 30 had imposed on much of the state. This action removed state-level restrictions on car washing, outdoor watering, refilling swimming pools, and watering golf courses. The action did not remove water-use restrictions imposed by separate *local* action, but many localities—particularly those that rely on surface water rather than groundwater—removed or reduced their local restrictions in response to the increased fall precipitation (please see Table 2 below).

Table 1. Precipitation Departures (Variation from Long-term Average) for Virginia Regions, in Inches and Percentage.

Region	3 months (9/02—11/20/02)	1 Year (12/01 to 11/20/02)	3 Years (12/99 to 11/20/02)
Tidewater	+3.75 in. (143%)	-1.61 in. (96%)	-7.01 in. (95%)
E. Piedmont	+4.68 in. (155%)	-2.49 in. (94%)	-15.31 in. (88%)
W. Piedmont	+5.10 in. (157%)	-3.39 in. (92%)	-20.93 in. (84%)
Northern	+4.14 in. (148%)	-1.33 in. (97%)	-9.19 in. (92%)
Cent. Mts.	+6.83 in. (185%)	+0.91 in. (102%)	-6.72 in. (94%)
Southwestern	4.27 in. (156%)	+1.82 in. (104%)	-7.92 in. (94%)
Statewide	**+4.75 in. (156%)**	**-1.03 in. (98%)**	**-11.38 in. (91%)**

Source: Virginia Drought Monitoring Task Force's "Drought Status Report" of Nov. 25, 2002, accessed at www.deq.va.state, 12/9/02.

Table 2. Local Water-use Restrictions at Virginia's Public Water Systems, August—November 2002, as Reported to Virginia Department of Health Field Offices.

Date of Record	# Systems with Mandatory Local Restrictions	# Systems with Voluntary Local Restrictions	# Systems with No Local Restrictions
Aug. 19, 2002	20	39	52
Sept. 20, 2002	102	4	12
Oct. 21, 2002	68	25	32
Nov. 25, 2002	44	26	49

Note: Total number of systems varies because some systems did not report during a given period.
Source: Virginia Drought Monitoring Task Force's "Drought Status Reports" of Aug. 19, Sept. 20, Oct. 21, and Nov. 25, 2002, accessed at www.deq.va.state, 12/9/02.

On November 7, Gov. Warner announced creation of the **Dry Well Replacement Program**, to be administered by the Va. Dept. of Housing and Community Development (DHCD). As of October 15, over 6200 private wells had gone dry in 2002, compared to only about a dozen in a typical year. The program will allow eligible residents to get up to $5000 per well. To be eligible, residents must earn no more than 80 percent of the average income in their area. Funds will come from allocation of $1.5 million from the Indoor Plumbing Rehabilitation and Community Development Block Grant programs in FY 2002, with another $1 million from the Block Grant program for FY 2003. Information about the well-replacement program is available from DHCD at (804) 371-7000. (Office of the Governor Press Release, 11/7/02)

The November 25 drought-status report from the **Virginia Drought Monitoring Task Force**[12] included the following other points:

•**Streamflows** across the state had mostly returned to the normal range for this time of year;

•**Groundwater** levels "showed little consistent improvements" from recent precipitation but are expected to improve in the coming months;

•Large **reservoirs** were full or expected to be so in the next several weeks;

•In **forests**, materials that fuel forest fires were "saturated," so little wildfire activity was expected before the spring fire season begins in February;

•On **farms**, above-normal autumn rain improved hay and pastures conditions and provided enough soil moisture for fall grain planting.

Nationwide, many states have seen the drought's severity lessen since early Fall 2002. The December 3 U.S. Drought Monitor map (available on-line at www.drought.unl.edu/dm/monitor.html) showed 32 states with at least part of the state under some level of drought, compared to 46 states on the map of September 17.

During Summer and Fall 2002, national drought maps often showed **Colorado** to be one of the hardest-hit states. As of December 3, much of the state (along with several other western and Great Plains states) was still experiencing extreme or exceptional drought. For perspective on what our western compatriots have been facing, here's a sample of the drought impacts in Colorado this past summer: below-normal **reservoir levels** in Denver are likely to persist for three more years; ranchers had to sell **cattle** they could no longer feed; drought reduced the quantity and quality of **barley** available for beer making; water shortage threatened **housing development** in one area; beekeepers expected to have too little **honey** to sell (beyond the bees' needs); heat threatened the Yampa River's **trout** population; wildlife officials feared dry conditions would force **bears** closer to humans; and the city of Boulder expected a $2-million drop in **water revenues** (about a six-percent decrease) due to conservation. (*Colorado Water*, Aug. 2002)

Other News in Virginia…

•On October 15, the Chesapeake Bay Foundation released its fifth annual **State of the Chesapeake Bay** report, indicating **little change in monitored Bay conditions**. The status report combines several environmental and biological measurements into a rating from 0 to 100, with 100 representing the conditions presumed to exist 400 years ago, before European settlement. This year's rating was 27, the same as in 1998 and 2001 (scores were 28 in 1999 and 2000). No one expects Bay conditions ever to reach a 100 score; rather, the Bay Foundation hopes to see scores around 40 by 2010, 50 by 2020, and 70 by 2050. The only improvement in 2002 indicated by the report was an increase in the shad population, attributed to removing obstacles to the species' upstream-migration routes. All five State of the Bay reports are available on-line at www.cbf.org; to enquire about printed copies, call the Bay Foundation's Virginia office at (804) 780-1392. (*Washington Post*, 10/16/02)

The status of the **Blue Crab** is a key consideration in the overall health of the Bay. Recently published research at the Virginia Institute of Marine Science (VIMS) by Romuald Lipcius and W. T. Stockhausen[13] documents simultaneous and ongoing reductions in several related measures of Blue Crab reproduction since 1992. Specifically, their work shows an 81-percent decrease in the number of spawning females; an 8-percent decrease in the size of these females; a tenfold decrease in the number of larvae (an immature stage); and a tenfold decrease in post-larval recruitment (the number of a more mature—but still not adult—stage that returns to the Bay after developing in the ocean). The decreases occurred dramatically from 1990 to 1992, with the lower levels persisting since then. Data such as these have been a factor in decisions

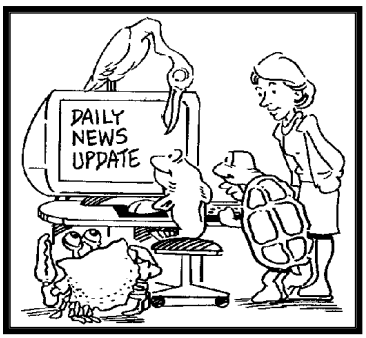
[12] The November 25 report is the eleventh in 2002 from the drought task force. The reports are available on-line at www.deq.state.va.us.

[13] W. T. Stockhausen in now at Woods Hole Oceanographic Institute in Massachusetts.

by the Virginia Marine Resources Commission to expand the Chesapeake Blue Crab sanctuary (an area closed to crab harvesting from June 1 to September 15) in 2000 and 2002. (*Va. Marine Resources Bulletin*, Fall 2002)

•On October 3, the State Water Control Board (SWCB) adopted two **general-permit regulations for stormwater discharges under "Phase II"** of federal stormwater regulation. The U.S. Environmental Protection Agency's (EPA) Phase II regulations extend federal stormwater-management requirements to municipalities with population less than 100,000 and construction sites of one-to-five acres. (Phase I regulations, promulgated in 1990, applied the requirements to municipalities of greater than 100,000 people and construction sites exceeding five acres.) The Phase II regulations were published by the EPA in the December 8, 1999, *Federal Register*, and incorporated into the Virginia Pollution Discharge Elimination System (VPDES) Permit Regulation as of September 27, 2000. Under the EPA regulation, "small municipal separate storm sewer systems" (small "MS4s") in Census-defined urbanized areas must apply for a VPDES permit by March 10, 2003, and "small" construction sites had to begin applying for VPDES permits on December 4, 2002. The regulation that the SWCB approved in October establishes the permitting process.

Detailed information about the Phase II regulatory process in Virginia is available on-line at the Virginia Regulatory Town Hall Web-site, www.townhall.state.va.us/index.cfm. The Virginia Department of Environmental Quality (DEQ) administers the regulations, and the DEQ contact for Phase II information is Burt Tuxford, (804) 698-4086, TDD (804) 698-4021, e-mail: brtuxford@deq.state.va.us. (For a **previous article on stormwater**, please see the February 2000 *Water Central*, p. 1.)



Can't get through the snow to the newspaper box? Find water news in the "Daily News Update," on-line at www.vwrrc.vt.edu.

•Also at its October 3 meeting, the SWCB began consideration of several streams for designation as "**exceptional waters**" (also referred to as "Tier III waters"). The federal Clean Water Act requires states to have an exceptional-waters program under which the highest-quality water bodies can be designated to receive special protection (for example, no new discharges may be added to an exceptional water). As of July 2002, nominations of exceptional waters can come to the SWCB either from citizens or from the DEQ staff.

At the October meeting, the SWCB received *citizen* petitions for the following waters:
Bottom Creek, Montgomery/Roanoke counties;
Little Stony Creek, Giles County;
Ragged Island Creek, Isle of Wight County.

The Board received *DEQ* proposals for the following waters on federal lands:
Brown Mountain Creek, Amherst County;
Laurel Fork, Highland County;
North Fork/Buffalo River, Amherst County;
Pedlar River, Amherst County;
Ramseys Draft, Augusta County;
Whitetop Laurel Creek, Washington County; and
Lake Drummond, Chesapeake/Suffolk cities.

DEQ staff will now do notifications and comment periods and report back to the Board with recommendations. (Va. Regulatory Town Hall Web-site, www.townhall.state.va.us/index.cfm, 12/12/02; for a **previous item on exceptional waters**, please see the August 2002 *Water Central*, p. 5.)

•"My well is full of [methane] gas…One time it blew up my well house and I never was able to find it." In **Wise County's Virginia City**, 175 families hope such explosive events—reported by one resident—are a thing of the past. In October, a $2.1 million project was completed that will bring public water to these families, two churches, and a restaurant. Methane and other groundwater problems in the area are attributed to impacts from nearby coal mining, and the Coastal Coal Company cooperated with state and federal officials to provide the water line. (*Bristol Herald Courier*, 10/29/02)

•**Old wells**—that is, out-of-use wells that have **not been properly "abandoned"**—have been getting effective attention recently in **James City County**. According to the James City Service Authority (JCSA), the county has some 400 improperly abandoned wells. Abandoned wells can be a safety hazard and provide a route for surface contaminants to reach groundwater supplies. The JCSA's "Cap It" program properly abandons residents' old wells at no cost to the well

owner. In 2002, using $34,000 in JCSA funds and DEQ grants, the program capped 60 wells; the JCSA expects to cap another 33 wells in 2003. In June, the program won an EPA-Region III Source Water Protection Award. (Lisa Meddin, JCSA Water Conservation Coordinator, 12/12/02)

•The 15-year-old controversy continues over Newport News Waterworks' **proposal to build a 1,500-acre, $160-million reservoir in King William County**. Several southeastern Virginia localities would use water from the reservoir, first proposed in 1987. On October 1, U.S. Army Corps of Engineers Gen. M. Stephen Rhoades ruled that Newport News can obtain a key federal permit for the reservoir, if the city does the following: 1) revises a plan to replace 437 wetland acres expected to be damaged by construction; 2) completes an agreement on historical resources that may be damaged; and 3) obtains coastal-zone certification, which in turn requires a permit from the Virginia Marine Resources Commission.

Rhoades' decision reversed a 1999 ruling by the Corps' Norfolk District that the project should *not* go forward; the 1999 ruling cited a lack of need and potential damage to wetlands and historic sites of Native American tribes. Later, former Gov. James Gilmore asked the Corps' North Atlantic Division to review the district-level decision. Before Rhoades' October ruling, several environmental groups had asked Gov. Warner to halt Virginia's request for a review, but the governor refused to intervene. (Associated Press, published in *Richmond Times-Dispatch*, 11/7/02)

•On November 20, the Federal Energy Regulatory Commission (FERC) approved Duke Energy/East Tennessee Natural Gas's proposed **"Patriot Extension" natural gas pipeline** across several southern Virginia counties. The $289-million, 93-mile project will place a 24-inch pipeline to carry 200—700 million cubic feet of natural gas per day to several Duke Energy partners or affiliates in Virginia, North Carolina, Tennessee, and Georgia. The pipeline is to go under the New River and 28 other rivers or streams, and cross more than 200 other water bodies. The National Committee for the New River and other groups opposed the project, partly because of potential impacts on water resources, which they contend FERC did not consider adequately in its review. (*Roanoke Times*, 11/21/02 and 12/18/02)

•In September, **Botetourt County resident and businessman Steve Rossi** was the only U.S. citizen among 100 participants at a **conference in Kabul, Afghanistan**, on rebuilding the country's infrastructure, including water-related systems. At the "Urban Vision: Cities of Afghanistan" conference and in other meetings, Mr. Rossi presented the idea of re-opening and operating a concrete plant in Kabul to make pre-mold concrete for sewage, water, and telecommunication systems. An estimated one million people in the Afghani capital city lack adequate clean water, sewage, electricity, and phone service. (*Roanoke Times*, 12/3/02)

•On December 9, U.S. Supreme Court **Special Master Ralph I. Lancaster** issued an opinion that Virginia *does* have the **right to water from the Maryland-owned Potomac River**, free from regulation by Maryland. The opinion addresses issues arising from Maryland's refusal in 1996 to grant Fairfax County a permit to build an intake pipe in the middle of the river. While Maryland owns the river under a 1632 king's charter, Virginia claims the right to use the river under a 1785 compact between the two states. Virginia sued Maryland over the issue in 2000. The intake pipe ultimately was permitted and built, but Virginia pressed its Supreme Court suit to settle the question for possible future projects. No date has been set for the Court to consider the special master's recommendations, which it may accept, reject, or modify. Maryland intends to file an exception to the opinion. (*Washington Post*, 12/10/02. **For previous items on this issue**, please see the *Water Central* of April 2000 [p. 9], April 2001 [p. 15], and August 2001 [p. 23].)

…and Outside of Virginia

•In **Mexico**, an estimated **13 million people** (about 13 percent) **lack access to potable water**, according to a recent report by *El Economista*, a Mexican business and financial newspaper. The report also estimated that 24 percent of the country's freshwater supplies are seriously polluted and that 25 percent of its water-treatment plants operate inadequately. (Arizona Water Resources Research Center, *Arizona Water Resource*, Jul.-Aug. 2002)

•In **Arizona**, Tucson Water is using a series of **22 monitoring stations to measure water quality throughout its distribution system**. The devices take continuous readings of pH, chlorine, temperature, and total mineral content and upload the readings every 60 seconds to the utility's computer. The information is made available daily on the utility's Web-site (www.ci.tucson.az.us/water/). The monitoring stations were funded by a $400,000 grant from the U.S. EPA. (Arizona Water Resources Research Center, *Arizona Water Resource*, Jul.-Aug. 2002)

•In **Louisiana**, Shell Oil Company pledged $3 million in August to fund a new **wetland-restoration public education campaign** by the state. The campaign's goal is to raise state and national support for a program—estimated to cost $14 billion—to restore Louisiana's coastal wetlands. The state wants to make a case for the national economic importance if its wetlands. (Environmental Law Institute, *National Wetlands Newsletter*, Sept.-Oct. 2002)

•In **Maryland**, as of mid-October the **Washington Suburban Sanitary Commission**—which provides water to 1.6 million Maryland residents—had nearly completed its **system-wide vulnerability assessment**. Because of the events of September 11, 2001, U.S. water systems of all sizes face new mandates to assess vulnerability and increase security. Assessment from 400 large public utilities are due to the U.S. EPA by March 2003, while medium-sized and small systems have somewhat more time. (*Washington Post*, 10/17/02)

•In **California**, **Maine**, and **Michigan**, voters in November approved **measures that would provide funds for water or wastewater infrastructure**. In California, a proposal to provide $3.4 billion for protecting water from attacks or natural disasters, which will provide money for drinking-water infrastructure, passed with 55 percent of the vote. In Maine, a $24.1-million bond initiative, which included almost $14 million for water and wastewater facilities, passed with 58 percent of the vote. And in Michigan, a $1-billion bond package, which will provide an extra $180 million annually over 10 years to the state's Clean Water Revolving Loan Fund, passed with 60 percent of the vote. Over $530 billion will be needed *nationwide* for water-related infrastructure over the next 20 years, according to an estimate by the U.S. EPA. (*Inside EPA's Water Policy Report*, 11/18/02. For a **previous item on water-infrastructure funding**, please see the October 2002 *Water Central*, p. 21.)

•In **Oregon** and **Washington**, **aerial spraying of pesticides** directly onto water bodies has been found to be within the jurisdiction of the Clean Water Act (CWA). As a result, such spraying requires a permit under the National Pollutant Discharge Elimination System. The U.S. Forest Service had argued that its spraying in national forests in the two states was a "silvicultural nonpoint source" of pollution, which would place it outside of CWA jurisdiction. On November 4, the U.S. Court of Appeals for the Ninth Circuit disagreed, ruling that the spraying clearly fits the CWA's definition of a *point* source of pollution. (*Inside EPA's Water Policy Report*, 11/18/02.)

•Off the **Spanish coast** on November 13, the single-hull **oil tanker *Prestige* ruptured**, leaked one-to-two million gallons of fuel oil, and sank six days later, still holding another 20 million gallons of oil. The disaster brought new attention to three related and complicated issues. First, liability for the accident is unclear: entities from nine nations were involved in various aspects of the tanker's construction and operation. Second, the age of the ship—26 years—"raised an outcry in Europe about the use of aging rust buckets to carry toxic cargo." Third, countries have set regulations banning single-hulled tankers, but it may be 2015 before double-hulled ships are completely in place. (*Christian Science Monitor*, 11/21/02; quote from Peter Ford, *Monitor* staff writer)

•In **Nevada** in late November, Great Basin Mine Watch and the Mineral Policy Center sued the U.S. Bureau of Land Management for its approval of a gold-mining project, claiming that surface water flow in five streams would be reduced or eliminated by **groundwater pumping** associated with the mining (up to 25,000 gallons per minute over 13 years from the aquifer under the mine). The groups claim that the impacts would threaten the surface waters' designated uses under the federal Clean Water Act and under state water-quality standards. The suit, against the Newmont Company, was filed in U.S. District Court. (*Inside EPA's Water Policy Report*, 12/2/02)

A Closing Note

In June, two students from the Arava Institute for Environmental Studies in Israel assisted with the Potomac Sojourn, a week-long canoe trip organized by the Interstate Commission on the Potomac River Basin. Panteha Haverim, a U.S. citizen of Iranian descent who is Jewish, and Anees Feran, an Israeli citizen of Arab descent who is Muslim, wrote an essay on their experience for the July/August issue of *Potomac Basin Reporter* (a publication of the Commission). Here is their closing comment: "Who knows, maybe a multi-ethnic, multi-national Jordan River Sojourn could help usher our conflicted region into an era of peaceful environmental partnership."

—By Alan Raflo

Water Central thanks Cindy Berndt and Burt Tuxford, both of the Va. Dept. of Environmental Quality, for providing information for this section.

N O T I C E S

On the DEQ Public Calendar

The Va. Dept. of Environmental Quality's "Public Calendar" is located at www.deq.state.va.us/info/. The phone number for the DEQ's Central Office in Richmond is (800) 592-5482 (toll-free in Virginia).

•**January 7, 2003**—Public hearing on proposed discharge permit modification for Newport News Shipbuilding. DEQ Tidewater Office, Virginia Beach, 7 p.m. For more information, contact John Godfrey, e-mail: jpgodfrey@deq.state.va.us, or by phone at the number listed above.

•**January 22**—Public meeting on proposed regulation on financial assurance for tidal dredging projects. DEQ Tidewater Office, Virginia Beach, 1 p.m. For more information, contact Ellen Gilinsky, e-mail: egilinsky@deq.state.va.us, or by phone at the number listed above.

•**January 27**—Public meeting on proposed aquatic life Total Maximum Daily Load (TMDL) for three streams in Washington County. Patrick Henry High School, Glade Spring, 7 p.m. For more information, contact Nancy Horton, e-mail: ntnorton@deq.state.va.us, or by phone at the number listed above.

•**January 28**— Public meeting on proposed TMDL for Blackwater River in Franklin County. Community Center, Rocky Mount, 7 p.m. For more information, contact Jason Hill, e-mail: jrhill@deq.state.va.us, or by phone at the number listed above.

Spanish Language Information

Internet links to several Spanish-language sources of water-resources information are available at www.nal.usda.gov/wqic/Spanish.html, a Web-site of the Water Quality Information Center at the U.S. Dept. of Agriculture's National Agriculture Library.

Conferences and Other Gatherings

•Stormwater and Karst Workshop

January 30, 2003, University Business Technology Park, Radford, Virginia; sponsored by the Va. Dept. of Conservation and Recreation. Topics will include common stormwater practices in karst areas; VDOT guidelines for stormwater discharge at sinkholes; a case study from Lee County; and karst stormwater ordinances in Virginia. For more information: Joey Fagan, (540) 831-4056; e-mail: jfagan@dcr.state.va.us.

•"Virginia Water Conference 2003"

March 23—25, DoubleTree Hotel, Virginia Beach; sponsored by the Virginia Lakes and Watersheds Association. **Abstracts of proposed presentations accepted until January 15.** For more information: Stuart Stein, (703) 642-5080; e-mail: sstein@gky.com.

•"Valuing North Carolina's Water Resources"

April 1, 2003, Jane S. McKimmon Center, Raleigh; sponsored by the North Carolina Water Resources Research Institute. For more information: N.C. WRRI, (919) 515-2815; www2.ncsu.edu/ncsu/CIL/WRRI/2003conference.html.

•"Saving Our Coastal Heritage"

April 13—16, 2003, Hyatt Regency-Inner Harbor, Baltimore; sponsored by Restore America's Estuaries. The conference brochure calls this "the first nationwide gathering focused solely on the goals and practices of coastal and estuarine habitat restoration." For more information: (703) 524-0287; www.estuaries.org.

Publications

•*Urban Best Management Practices*

This is a CD-ROM from the Lake Barcroft Watershed Improvement District (Fairfax County). The CD presents information gained from a six-year Urban Best Management Practices Demonstration Project. For more information: Lake Barcroft WID, 2428 Mansfield Road, Falls Church, VA 22041; (703) 820-7700.

•*Biosolids Applied to Land: Advancing Standards and Practices*

This book (National Academies Press, 2002, 368 pp.) presents the findings of a National Research Council committee that investigated biosolids (sewage sludge) management, with emphasis on risk assessment and setting standards for toxicants and pathogens in biosolids. The book is available on-line at books.nap.edu/books/0309084865/html/index.htm. To order a print copy, call (888) 624-8373, or visit books.nap.edu/order.html (cost is $44.00; $32.50 if ordered on-line).

•***The State of the Nation's Ecosystems***

This book (Cambridge University Press, 2002, 276 pp.), prepared by the H. John Heinz Center for Science, Economics and the Environment, presents "what we know and what we don't know" about environmental conditions in the United States. For coasts, oceans, farmlands, forests, fresh waters, grasslands, shrublands, and urban and suburban areas, the book proposes key indicators for monitoring ecosystems, summarizes available nationwide data for those indicators, and identifies data gaps. The book is available on-line at www.heinzctr.org/ecosystems/. To order a print copy, call (800) 872-7423, or visit www.us.cambridge.org (cost is $25.00).

•***North America's Environment***

This report (United Nations Environment Program, 2002, 230 pp.) examines 30-year trends in nine major areas of U.S. and Canadian resources: atmosphere, biodiversity, coastal and marine areas, disasters, freshwater, forests, human health and the environment, land, and urban areas. Not available on-line; to order a print copy, call (800) 253-9646; e-mail: publications@un.org; or visit the U.N. Web-site at www.un.org/Pubs/sales.htm.

Also Out There…

(Information on recent, detailed articles on various subjects)

•"Beyond SWANCC"—Continues a series of articles on the effects of the 2001 U.S. Supreme Court's "SWANCC" decision, which restricted federal jurisdiction over isolated wetlands. *National Wetland Newsletter*, Sept.-Oct. 2002; Environmental Law Institute, Washington, D.C., (202) 939-3800, law@eli.org. (The series of articles began in the Jul.-Aug. issue of this newsletter.)

•"Colorado Water Workshop Celebrates Reclamation at the Century Mark"—This and two other articles review the history and speculate on the future of large dam projects in the western United States. *Colorado Water*, Oct. 2002; Colorado Water Resources Research Institute, Fort Collins, (970) 491-6308, cwrri@colostate.edu.

At the Water Center

To reach the Water Center, phone (540) 231-5624; e-mail: water@vt.edu; or visit www.vwrrc.vt.edu.

The Universities Council on Water Resources' (UCOWR) has joined the Renewable Natural Resources Foundation (RNRF), and **Water Center Interim Director Tamim Younos** will be UCOWR's representative. Founded in 1972 and located in Bethesda, Md., RNRF is a consortium of 16 organizations that seek to advance science, the application of science, and public education related to natural resources management and conservation. More information about RNRF is available on-line at www.rnrf.org, or by calling (301) 483-9101. UCOWR, founded in 1962 and headquartered in Carbondale, Ill., represents 86 U.S. universities and affiliates involved in education, research, and public service related to water resources. More information about UCOWR is available on-line at www.ucowr.siu.edu, or by calling (618) 536-7571.

TEACHING WATER

Especially for Virginia's K-12 teachers

This Issue and the Virginia Standards of Learning

This section suggests Virginia Standards of Learning (SOLs) that may be supported by this issue's Feature (p. 1), and For the Record (p. 23) sections. Abbreviations: BIO=biology; C/T=computer technology; ES=earth science; LS=life science.

Feature Article—State Water Quality Reports
Science SOLs: 4.8, 6.11, LS.12, ES.7, ES.9, BIO.9.
Social Studies SOLs: 7.4, 12.6,12.8, 12.13.
Computer Technology SOLs: C/T5.3, C/T8.4.

For the Record—Water Use Sources
Science SOLs: 3.9, 4.8, 6.11, LS.12, ES.7, ES.9.
Social Studies SOLs: 10.9.
Computer Technology SOLs: C/T5.3, C/T8.4.

CORRECTIONS FROM A PREVIOUS ISSUE OF *WATER CENTRAL*

•October 2002 issue, Feature article, page 6:

The article incorrectly stated Jesse Richardson's explanation of groundwater common law. A clarification from Mr. Richardson follows, with brackets [ ] indicating specific references to errors in the original article:

In the United States there have been essentially three [not only two] legal approaches to groundwater issues: the *English Rule*, the *prior appropriation doctrine*, and the *American Rule*. For most of our history, most states east of the Mississippi operated under the English Rule, while most of those west of the river operated under the prior appropriation doctrine [the original article incorrectly stated that western states operated under the American Rule]. The American Rule is a more recent development.

Under the *English Rule*, also known as the "Law of the Biggest Pump," property owners—individuals as well as businesses, corporations, and utilities—may use groundwater for virtually any purpose and in virtually any amount, regardless of the impact that their withdrawals have on groundwater quantity or quality for property owners nearby, *unless the intent of the use is "malicious"* [the original article did not mention the notion of malicious use].

The *prior appropriation doctrine* [not the American Rule, as was stated in the original article] resulted from early struggles over groundwater in the American west. Under this doctrine, both groundwater and surface water rights are based on "first in time, first in right." That is, when a landowner used a certain amount of water, they established a continuing right to use that amount in perpetuity, regardless of impacts on others [users were not "granted" a certain amount of surface water per year, as the original article stated].

The *American Rule* began to emerge in the early 1900's when it became clear to the courts that the English Rule was not appropriate for a more modern society. The courts fashioned the American, or "Reasonable Use," rule as follows: Landowners may use a reasonable amount of groundwater on their property, but pumping water from a site and removing it for use elsewhere is prohibited [the original article *correctly* attributed this principle to the American Rule, but *incorrectly* implied that the principle is followed in western states that use the prior appropriation doctrine].

Only Texas still uses the English Rule explicitly, and even there court opinions are beginning to erode its strength. Other western states continue to apply the prior appropriations doctrine to groundwater, while most eastern states have either adopted the American rule, have adopted a permit system, or—as in Virginia—have not yet decided which rule to use. The Virginia Supreme Court last considered groundwater law in the early 1900's and declined to decide whether the English Rule or the American Rule applies in this state. When the question finally comes before the Virginia Supreme Court, I expect the court to rule in favor of the American Rule.

•October 2002 issue, Science article, page 14:

The section on groundwater in the Valley and Ridge province stated, "Ridges and upland areas are often underlain by sandstone and shale…." The rock types that typically *form* ridges are sandstone and conglomerates. Shale, which is typically found in valleys, does occur in uplands but not usually at the very top (typically *not* a ridge-former). But Valley and Ridge geology is complicated, so one can find exceptions to almost any generalization.

THE VIRGINIA STEP PROGRAM in SUMMER 2002

Service Training for Environmental Progress (STEP) is a service-learning program administered by the Virginia Water Resources Research Center in partnership with the Virginia Tech Service-Learning Center. Through STEP, students live in Virginia communities while working on a water-related project identified by the community. Following are summaries of the five STEP projects in Summer 2002. If you would like a copy of any of the full reports, please contact STEP (contact information follows). **If you are a student interested in a STEP internship, or a community group interested in STEP assistance**, you can get more information about STEP at the Water Center's Web-site, www.vwrrc.vt.edu (click on "Education"); by calling (540) 231-5463; by sending e-mail to araflo@vt.edu; or by writing to STEP, 10 Sandy Hall (0444), Blacksburg, VA 24061.

Development of the New River Watershed Roundtable Resource Directory

The New River Watershed Roundtable seeks to provide a forum for dialogue, information exchange, and effective partnerships to maintain and improve water quality in the New River and its tributaries. In order to encourage partnership building, the Roundtable's Steering Committee asked STEP intern Brad Belo to compile a Roundtable Resource Directory. The four main elements of the directory were the following: 1) Partner Summaries; 2) information about Best Management Practices in the New River watershed; 3) current water-quality conditions in the watershed; and 4) erosion and sediment control information. These elements were included in a model Web-site for the Roundtable.

Brad Belo

Groundwater Monitoring in Clarke County, Virginia

Clarke County overlies two regions with different groundwater characteristics: the Blue Ridge Mountains in the east and the Shenandoah Valley in the west. Karst formations of the Valley complicate the county's groundwater situation. STEP intern Mason Jeffries helped the county's planning office, in cooperation with the U.S. Geological Survey, identify wells for a monitoring network that will be used to study the county's groundwater resources.

Mason Jeffries

Flood Mitigation and Drought Assessment in the New River Valley

STEP interns Theresa Kanter and Renee Sigmon helped the New River Valley Planning District Commission on three projects for the Town of Pulaski (Pulaski County) and one for Floyd County. For Pulaski, the interns produced a brownfield-remediation report that described current laws and regulations governing the clean up of unused industrial sites; identified open-space parcels within Pulaski's floodplain that could be officially designated as drainage land for flood events—an element of the Community Rating System (CRS) that can reduce communities' insurance rates under the National Flood Insurance Program; and created a flood-

mitigation newsletter, also as a means of earning CRS points for Pulaski. For Floyd, the interns developed a database for residential-well information to help the county assess its groundwater resources.

Theresa Kanter

Renee Sigmon

Water Quality in Wells Monitored by the Friends of the North Fork of the Shenandoah River, Shenandoah County, Virginia

Collecting and testing well water for the Citizen's Groundwater Monitoring Program is a semi-annual event for the Friends of the North Fork of the Shenandoah River. STEP intern Davian Killmon assisted with Summer 2002 sampling, compiled data from 1998—2001 groundwater-quality samples into a database, and produced graphs of the data. The intern also helped children in local 4-H camps learn about the water cycle and the importance of water.

Davian Killmon

Priority 3 Abandoned Mined Land Inventory Within the Upper Powell River Watershed, Wise County, Virginia

STEP intern Amanda McKee, working with another intern placed by the U.S. Office of Surface Mining and Reclamation, focused on one category of abandoned coal-mine lands ("Priority 3 lands") in the Upper Powell River watershed. At 10 sites, the interns collected water-quality data, global positioning system (GPS) coordinates, and digital photographs and they described specific problem areas. The interns' work will help identify sites that might be appropriate for reclamation funds resulting from an agreement between the U.S. Fish & Wildlife Service and a local coal company.

Amanda McKee

FOR THE RECORD
Sources for Selected Water Resources Topics

Water Use Information Sources

(This topic was covered in the June 1999 *Water Central*, p. 15. This article updates those sources and adds new ones.)

Previously Listed Sources

Estimated Use of Water in the United States in 1995, published by the U.S. Geological Survey (USGS) every five years, informs on water use nationwide. The 2000 issue is in preparation, according to the USGS Web-site. This report, and others prior to 1995 are available on-line at water.usgs.gov/watuse/. Free printed copies are available by calling (888) ASK-USGS. For additional information about water use in Virginia, contact Jason Pope at the USGS, (804) 261-2627, email: jpope@usgs.gov (please note that Mr. Pope is *not* the contact for printed reports).

Virginia Statistical Abstract, published by the Weldon Cooper Center for Public Service at the University of Virginia, has data on water use for irrigation, public supply, industry, and hydroelectric generation. The report is on-line at www.ccps.virginia.edu/Demographics/. Printed copies may be available at your local library. To purchase a copy, contact the Center at P. O. Box 400206, Charlottesville, 22904-4206, phone (434) 982-5704. Printed copies will no longer be available after this edition.

WaterWiser™, a Web-site on water conservation, is a joint project of the American Water Works Association (AWWA), the U.S. EPA, and the U.S. Bureau of Reclamation. The site is at www.waterwiser.org.

The Winter 1998 issue of *On Tap*, published by the National Drinking Water Clearinghouse (NDWC), is devoted to water conservation. Free printed copies are available by contacting the NDWC at (800) 624-8301. An on-line version is also available: www.nesc.wvu.edu/ndwc/.

New Sources

Residential End Uses of Water (AWWA, 1999, 310 pp.) gives information on where water is used in single-family homes, how much is used for different purposes, and how various natural and social factors affect residential water use. Check your local library, or to purchase a copy visit the AWWA Web-site at www.awwa.org/bookstore/, or contact the AWWA by phone by (303) 794-7711.

For information on water use for **irrigation**, refer to the National Resources Inventory (1997). Information includes the status, condition, and trends of soil, water, and related resources in the United States. The report is available on-line at www.nrcs.usda.gov/technical/NRI/. E-mail nri@nhq.nrcs.usda.gov for further information.

In order to fully understand the issues surrounding water use, one may wish to research **how water is supplied**. The following are sources concerning water supply:

•"Virginia's Water Supply: Has Shortage Replaced Abundance?" in the Fall 1999 issue of *Virginia Issues and Answers*. The article examines Virginia's system of supplying water for the public, identifies problems and possible future problems, and suggests ways to make the system more efficient. The article is available at the *Virginia Issues and Answers* Web-site, www.via.vt.edu/backissues.html. For a print copy, contact the editor at 105-C Media Bldg. (0109), Blacksburg, VA 24061, e-mail: csquare@vt.edu, or phone (540) 231-9054. Specify the volume (6), number (2), and article title.

•The Jul./Aug. 1999 issue of *Potomac Basin Reporter* describes the Washington, D.C.-area's water-supply system. An on-line version is at www.potomacriver.org/Re_Archive_99_04.htm. For a print copy, contact Pat Beno at (301) 984-1908, ext. 101, or e-mail: pbeno@icprb.org.

More Information on Water Conservation

The Hampton Roads Water Efficiency Team Web-site has information on water conservation and use for the Hampton Roads area. Much of the information can be applied to other areas of the state. The site is at www.hrwet.org.

Handbook of Water Use and Conservation, by Amy Vickers (Water Plow Press, 2001, 464 pp.) contains information regarding residential, landscape, industrial, commercial, institutional, and agricultural water use and conservation. Check your local library, or to purchase a copy contact the publisher toll free at (866) 367-3300, or visit the website at www.waterplowpress.com.

—By John Yowell

John Yowell, a junior English major at Virginia Tech, served an internship at the Water Center in Fall 2002. Water Central thanks Jason Pope (U.S. Geological Survey, Richmond) for reviewing this article.

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