Virginia Water Central

Virginia Water Resources Research Center Blacksburg, Virginia November 2005 (No. 36)

A September scene on the South Fork Roanoke River in Montgomery County, Va. For stream flow data over the past several months, please see the Water Status Report.

ALSO IN THIS ISSUE

FEATURE ARTICLE 1

Focus on Water Supply

This Feature has two parts: part one presents perspectives by three water-supply experts; part two describes the Western Virginia Water Authority, the Roanoke area's regional entity for water and wastewater services.

Part One

Three Perspectives on Virginia Water Supply Issues

On October 12, 2005, as part of its National Water Research Symposium in Blacksburg, the Water Center organized a panel discussion on water supply and management in Virginia. In this article, *Water Central* presents excerpts of the remarks of the three panelists.

Virginia's New Water Supply Planning Regulation

By Scott Kudlas, Virginia Department of Environmental Quality/Office of Water Planning

From 1999 to 2002, Virginia experienced an unusually severe drought. In response, Governor Mark Warner and the State Water Commission directed the Virginia Department of Environmental Quality (DEQ) to put together a stakeholder group to investigate ways to improve water-supply planning in Virginia.

During its 2003 session, the Virginia General Assembly passed, and the governor signed, SB 1221, requiring the DEQ to initiate a process to develop criteria for local and regional water-supply planning.

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CHANGES AT THE WATER CENTER

A New Academic Home

The Virginia Water Resources Research Center was established at Virginia Tech in 1965 under the federal Water Resources Research Act of 1964. The Water Center was designated as a state agency by the 1982 Virginia General Assembly (*Virginia Code* Sec. 23-135.7:8). When the Water Center was first established at Virginia Tech, the university president delegated oversight of the Center to a committee of the Engineering College dean, the Agriculture College dean, and a university vice-president. In 1969, oversight was transferred to the newly formed Research Division, and the Water Center has benefited since then from a constructive relationship with this university division.

In recent years, the Water Center has had to adapt to fast-changing managerial and technological environments as it sought to maintain an efficient operation and stable program. To help the Center meet these goals, administrative oversight for the Water Center has been transferred from the University Research Division to the College of Natural Resources (CNR), effective in Fall 2005. The CNR is an administrative host that is in tune with the Water Center's mission and can provide stability and better opportunities for the Water Center to reach its potential. For example, the CNR affiliation will resolve the Water Center's chronic space problem, provide information-technology and managerial support, and facilitate fund-raising opportunities. In return, the Water Center will strengthen the CNR's academic and outreach programs in water resources and environmental protection. At the same time, the Water Center will maintain its identity as an independent state and university center.

I am confident that the new arrangement will allow the Water Center to remain a viable and dynamic program, serving Virginia Tech, Virginia's other colleges/universities, and the citizens of the Commonwealth.

Tamim Younos, Interim Director
Virginia Water Resources Research Center

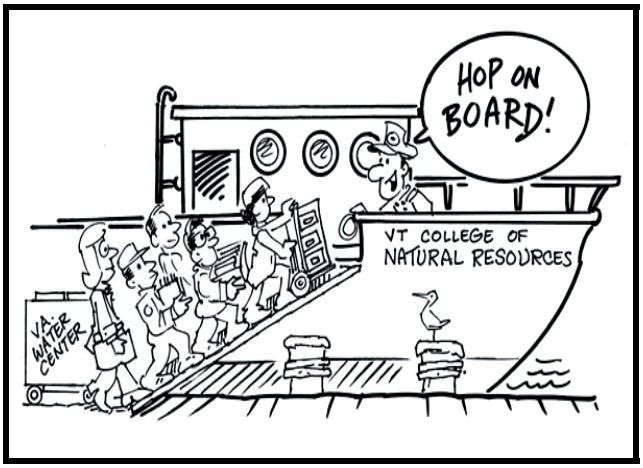
A New Permanent Director

Good things come to those who wait, and that is the feeling within the Virginia Tech College of Natural Resources concerning finalization of the decision to move the Virginia Water Resources Research Center under the administrative umbrella of the College.

The proposal to move the Center into the College was begun during the final year of Greg Brown's term as dean of the College. From that start, it took us about two years to "jump through all the hoops" needed to make the change. Now that the change has occurred we look forward to the long-term growth of the Center as water resources take on more significance across the Commonwealth.

One of the first tasks after the Center moved to the College was to conduct a search for a permanent director of the Center. We had an excellent pool of applicants for the position and we are very pleased to announce that Dr. Stephen Schoenholtz from Oregon State University will be the new director, beginning in Summer 2006. The funding for the director's position represents a new investment on the part of the College and the university, and it is a clear indication of the commitment of the College to the future growth of Center programs. Dr. Schoenholtz brings a wealth of experience to the position and will provide the leadership to build the partnerships needed to realize the full potential of the Center.

Michael Kelly, Dean
Virginia Tech College of Natural Resources



Water Supply Focus Part 1, continued from page 1

Part of the stakeholder process was the work of 30-member Water Policy Technical Advisory Committee (TAC), including representatives from agriculture, the electric-utility industry, environmental groups, fishing groups, higher education, home builders, local government, manufacturing, water suppliers, and government agencies at the federal, state, regional, and local levels.[1]

In October 2004, after nearly 18 months of work, the TAC completed a consensus **Water Supply Planning Regulation** that was submitted to the State Water Control Board (SWCB). This regulation went through an aggressive public-comment process (nine public hearings were held across the state in May 2005). The regulation became effective on November 2, 2005; it is listed in the *Virginia Administrative Code* as 9 VAC 25-780.

Following is a **summary of the features** of the regulation:

- All counties, cities, and towns will submit a plan to the SWCB, individually or as part of a region.
- Local governments and community water systems will coordinate and cooperate with each other in the development of the plan.
- The regulation does not change existing water rights.
- The regulation establishes a planning process and criteria that local governments will use in the development of the local and regional plans.
- Local governments are required to submit their plan to the board within three to six years, according to a staggered schedule based on population. Regional groups have six years to submit a plan.
- The DEQ will review all local and regional plans to determine compliance with the regulation and consistency with the State Water Resources Plan.
- Localities are to review their plans every five years to assess water-supply adequacy. Any significant changes require DEQ review.
- The required elements of a local or regional plan include the following: description of existing water sources; description of existing water use; assessment of projected water demand; statement of future need; an analysis that identifies potential alternatives to address projected deficits in supplies; description of existing water resource conditions; description of water management actions; and various administrative records (ordinances, resolutions, public comments, etc.).

The information developed for the local and regional water-supply plans is to be incorporated into a State Water Resources Plan.

To **assist local governments** in the development of local programs, the DEQ will do the following:

- provide technical and financial assistance;
- provide guidance on compliance options;
- facilitate acquisition of data and examples of best practices and post on its website;
- identify acceptable methods for the projection of future water demands;
- provide any information regarding known conflicts relating to the development of alternatives;
- at the request of the applicant, convene a technical evaluation committee meeting; and
- provide Internet postings of local public hearing(s).

The DEQ will give also public notice on our Web site for every tentative and final decision to determine local program compliance.

The **cost of developing a local or regional plan** that complies with this regulation will vary due to a number of factors, including the level of local staff involvement, the size of the locality or region, the complexity of the current sources of supply and delivery systems, the degree of local need for additional supply, and the types of strategies that are locally identified to address any need in the plans. During development of the regulation in 2005, DEQ estimated that local costs may range from $13,000 to $115,000, depending on a locality's need for external consultants. The total cost of developing these plans was estimated at between $4.5 million and $6.5 million.

The DEQ will provide both **financial and technical assistance** for development of local and regional plans. In FY 2005, the department has $300,000 available for local and regional technical assistance grants, seven full-time employees to provide planning assistance; and two full-time employees to provide groundwater data and technical assistance.

The Water Supply Planning Regulation is envisioned as a program where all Virginians can come together to meet our water-supply needs and manage our water resources for all beneficial in-stream and off-stream uses.

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[1] Please see the January 2004 *Water Central*, p. 13, for a previous article on the Water Policy Technical Advisory Committee, including a list of the participants.

Participants at the October 12, 2005, panel discussion on Virginia water supply and management: (l. to r.) Frank Sanders, Jr., Scott Kudlas, William E. Cox, and Jesse Richardson (facilitator).

Through the Eyes of Water Suppliers

By Frank Sanders, Jr., Winchester Department of Public Utilities

I speak about the new Water Supply Planning Regulation from several points of view. I was a member of the Water Policy Technical Advisory Committee (TAC) representing the Virginia Municipal League and the [Shenandoah] Valley region of Virginia, and I was on the steering committee formed within the TAC. I am currently the public utilities director for the City of Winchester, serving a population of about 30,000. Previously I worked about eight years in the Hampton Roads area in the water industry. Finally, I am considered a "moderate" when it comes to the work on the TAC.

I will attempt to provide you with insight into the TAC process through the eyes of the water suppliers. First, here are some observations on some major issues addressed in the TAC process:

Streamlining. This was one of the primary objectives of the water suppliers on the TAC. It is felt that there is a significant need to minimize the amount of time for governmental review, whether it leads to approval or disapproval. In partial answer to this concern, the new regulation includes a provision that the DEQ will convene a Technical Evaluation Committee made up by various water-related agencies to review and comment on proposed plans submitted by localities.

Advocacy. Another major objective of the water suppliers was advocacy by the state. Advocacy would provide that the state, having reviewed and approved a project, would stand behind their review. Historically there have been examples of projects in Virginia that have suffered due to slow, seemingly never-ending reviews (for example, the Lake Gaston/Virginia Beach pipeline project and the King William reservoir). But the state indicated early in the TAC process that they were *not* able to address advocacy.

Cost. Financial assistance, particularly for smaller municipalities, was a concern and request by water suppliers. The state has included provisions, on a limited basis, for both financial and technical assistance.

Burden of planning requirements on municipalities. The DEQ found itself in a "Catch 22" position: Municipalities complained about the burden of writing a plan but did not want DEQ to prepare the plan. To help minimize the impact of the regulation, the development of a local plan is to be based upon *existing* data, rather than requiring new data collection.

Conservation/drought plan. The regulation requires a conservation/drought-management plan.

Linkage between water plan and permitting process. The DEQ stated up front in the TAC process that approval of a local water *plan* would not ensure approval of a future *permit* application. Therefore, water suppliers took the position that there should not be formal approval of local water plans. The philosophy was that it would be better to "fight the fight" during the permit process than during the plan process.

To conclude, let me offer my views of what different groups of the TAC might think of the results of the water-planning regulation process.

The DEQ. It was mandated by the General Assembly to get a water-planning regulation written. I believe the DEQ feels that it not only met the Assembly's requirements but also has put into place the requirements for the development of a State Water Plan.

Industry. During the TAC process, industry representatives generally saw the process as primarily one with which *municipalities* had to deal; that is, it was not seen as a major industry concern.

Environmentalists. Environmental representatives were most concerned with the inclusion of provisions for in-stream beneficial uses. They were successful and I imagine pleased to some degree.

Planners. Planners tended to take a position on issues most like those of the environmental representatives.

Water suppliers. As mentioned above, water suppliers were looking for streamlining the regulations, securing advocacy by the state for approved projects, and financial assistance to help

with the planning process. The state is providing the financial assistance, but suppliers failed on obtaining significant streamlining and state advocacy.

The Public. It is easy to imagine that the average citizen, when asked what they think of the new water planning regulations, would probably say "I would have thought that there would already be requirements for water planning." So I would imagine that the average citizen would be pleased that the regulations have been written, particularly if they prove successful.

Historical and Institutional Aspects of Water Planning in Virginia

By William E. Cox, Virginia Tech Department of Civil and Environmental Engineering

The current initiative to create local water-supply plans and, subsequently, a state water plan is an important step in reversing the neglect of water supply that has occurred over the last decade or two. The deficiencies created by this neglect were emphasized by the multi-year drought beginning in the late 1990s. Some localities had given insufficient attention to water-supply adequacy and reliability, with the result that substantial hardship and uncertainty were experienced. State government was not prepared to respond to this situation as well as is desirable, because much of the state planning program had been dormant in recent years. This inactivity had followed a period of more intense action in the 1970s and 1980s, based on authority for comprehensive water planning in effect since 1966 (and assisted by a federal grants program).[2]

At the state level, the problem is an indication of a long-term practice of allocating few financial resources to natural-resources management. Virginia has a substantial slate of water programs, but they often have been added to the responsibilities of existing agencies without significant additional resources for administration. Placing emphasis on one area has often had to be accompanied by reduction in activity in another. This appears to have occurred during the 1980s and 1990s as water-supply planning diminished while water-*quality* planning and management programs expanded.

Neglect at the state level has been partly the result of shifts in federal policies and programs. The most immediate federal influence during the last two decades was the elimination of the water-planning assistance program that previously had operated under the federal Water Resources Planning Act of 1965. Another more subtle but significant influence arose from the increase in federal mandates and support for increased water quality planning and other activities under the federal Clean Water Act (CWA).

At the same time that these federal influences were impacting state programs, the federal institutional framework itself became increasingly hostile to water-supply operations, especially where development of physical water-supply infrastructure is concerned. A major example of this hostility is the CWA Section 404 permit program, which requires permits for most construction activities in surface waters, including water-supply facilities. Under the somewhat unusual arrangements for administration of this permit program, the U.S. Environmental Protection Agency (EPA) can veto the required permits (which the U.S. Army Corps of Engineers is authorized to issue) based on the sole criterion of unacceptable environmental impact. The federal courts have upheld EPA's position that exercise of the veto does not require EPA to consider the need for the project or the availability of alternatives.

As Virginia's new water-planning initiative moves forward in this less than supportive environment, several issues must be resolved in order for effective implementation to occur: provision of adequate resources for local planning, acceptance of the planning responsibility by local

[2] For more on the history of water planning in Virginia, please see Dr. Cox's article in the November 2004 *Water Central* (starting on p. 1).

government, achievement of cooperation and coordination among localities, re-establishment of necessary state planning capacity, and serving as a liaison between localities and federal agencies. I will discuss each issue briefly.

Resources to support planning. Availability of resources for expanding water-supply planning varies substantially among localities, making state support an important consideration. Such support is needed in the form of *funding and technical support*. Plans for state funding are in place, and efforts to increase Virginia Department of Environmental Quality staff to provide technical assistance are underway. Assistance will be needed in such areas as assessment of existing water supplies, evaluation of water conservation and drought response plans, projection of population and water demand, and assessment of water resource and environmental resources.

Local responsibility. The success of the water planning initiative also depends on the willingness of local government to embrace the water planning mandate fully and not view it as a burden to be satisfied with the least amount of effort. Water supply has always been viewed primarily as a local responsibility, and many decisions necessary in plan formulation involve local values and preferences. Planning will be most effective if it is accepted by each locality as an opportunity to ensure a better future.

Regional cooperation. Many aspects of water supply transcend local boundaries and require a broader perspective. Some of these broader considerations must be addressed by state government, but various water planning issues require a regional perspective involving local cooperation and coordination. Sources of water supply, as well as service areas for provision of supply, frequently cross local political boundaries, making independent water-supply planning by individual localities an impractical approach. Water-supply planning, as well as actual provision of water supply, at a regional scale has several potential advantages. Thus, incentives in the current planning initiative for regional planning—such as a longer time period for planning—are an important program feature. Creation of permanent institutions for regional water supply, such as the Western Virginia Water Authority, is a positive development that will enhance water-supply reliability.

State-level capacity. Increased water-supply planning capacity at the state level in some ways is the most fundamental factor upon which success of the current initiative depends. Local and state water-management efforts depend on understanding the water resource. A basic role for state planning, therefore, is to address information deficiencies that exist in many areas. For instance, knowledge about the resource potential of *groundwater* is inadequate over much of the state, especially in areas west of the Fall Line. Enhanced state planning capacity is also essential if state government is to provide the needed assistance to local planning efforts. In addition, state-level planners must verify local planning results, combine local plans at the river basin scale, and assess cumulative impacts of proposed water uses in terms of *potential conflicts* among localities as well as between off-stream uses and instream (environmental) needs.[3]

Liaison role. The state role in planning should also include serving as a liaison between local and federal decision makers during plan implementation when federal regulatory proceedings arise. State government should communicate the relationship of individual proposals to overall state plans and policies and provide support for actions consistent with state interests in the water resource.

The time has arrived to elevate water planning to a new level commensurate with the importance of the water resource to the continuing welfare of the state and its citizens. Within overall water planning, water-supply planning should be given the same weight as water-quality planning: quantity and quality cannot be considered in isolation of each other, and a balanced approach is needed. Water-supply management should be viewed as a joint enterprise of state and local government, with mechanisms for interaction as demonstrated in the current planning initiative. Planning should be viewed as a continuous process and not as a temporary activity to produce a "plan." Planning documents are among the most perishable of commodities when not supported by an active planning process.

An enhanced status for water planning in an essential action if the citizens of the Commonwealth are to continue to enjoy the range of benefits that traditionally have been associated with the water resource.

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[3] *Identification* of potential conflicts is an important aspect of planning. *Resolution* of likely conflicts may be facilitated by state-assisted negotiations but ultimately will require application of state regulatory procedures and water-allocation law *subsequent to planning*.

Water Supply Focus, Part Two

The Roanoke Valley's Regional Approach

On July 1, 2004, the water and wastewater operations of the City of Roanoke and Roanoke County consolidated to become the Western Virginia Water Authority (the Authority). As of Summer 2005, this new entity was providing water to 155,000 customers and wastewater treatment to more than 186,000 people in the city, county, and outlying areas. Through this merger, customers are better served in three fundamental ways: reliability, cost savings, and rate stability.

This article describes the development of the Authority and discusses the benefits of the merger. I conclude with some lessons we've learned that may be useful for other jurisdictions considering a regional water or wastewater arrangement.

The Need

Like communities throughout the world, the City of Roanoke and Roanoke County's growth and stability is dependent upon secure natural resources. A drought in 1999, followed by the most severe drought in East Coast history in 2001-02, convinced Roanoke City and Roanoke County officials that a regional approach to developing and managing water resources was needed. In addition, the city and county were feeling the regulatory pressure experienced nation-wide to upgrade sewer infrastructure and improve wastewater treatment. The two jurisdictions mapped out a plan to become true partners in meeting the water and wastewater treatment needs of their citizens and businesses for the future.

Planning and Development

Discussions for the City of Roanoke and Roanoke County to collaborate on water and sewer issues began in the late 1990s. Serious talks began during the record East Coast drought of 2001-02. Integration of assets and operations was achieved not only through meetings between elected officials and administrators of the two jurisdictions, but also through the work of 22 employee teams, each composed of city and county employees. Involving and uniting staff members from both operations in the blueprint for the Authority was especially important, not only because of their detailed knowledge of facilities and operations but to help create a unified, new Authority culture. Citizens—the stakeholders of the Authority—were informed of planning through numerous community meetings in 2003, televised forums by local officials, local news media coverage, and the *Roanoke Citizen* magazine (sent free to all city residents). After just two years of planning, the utility departments of both jurisdictions consolidated their operations on July 1, 2004.

The following timeline outlines the steps taken to achieve the consolidation.

- Summer and Fall 2002: City and county staff held monthly meetings to outline an initial planning phase.
- February 27, 2003: The Roanoke City Council and the Roanoke County Board of Supervisors voted to authorize and direct their staffs jointly to plan and create a regional water and wastewater authority. From this date forward, employees from both jurisdictions worked in 22 teams to consolidate utility operations.
- Fall 2003: Community meetings were held in the City of Roanoke and Roanoke County to receive public input on the Authority.
- Late 2003: Seven individuals were selected to serve on the Authority's Board of Directors by the governing bodies of the City of Roanoke and Roanoke County. The two bodies each selected three board members: an elected official, an administrator, and a citizen from each jurisdiction. The seventh, a citizen of an adjoining jurisdiction, was selected by the six board members and confirmed by the city council and the county board of supervisors. Terms are staggered to ensure continuity. The Authority intends to be governed by an all-citizen board upon the expiration of the present directors' terms.
- Early 2004: Both jurisdictions formally approved the formation of the Authority.
- March 2, 2004: The Commonwealth of Virginia approved the Articles of Incorporation to create the Authority.
- June 10, 2004: Two public hearings were held on the Authority's rates and proposed budget.
- June 11, 2004: The Authority board passed the $39.2 million operating and capital budget and adopted a current city and county water and sewer rate schedule. Different rates were set for the city and county initially, but the rates will equalize by 2010. The six-year equalization period is designed to maintain stable revenues yet also be sustainable for residents, businesses, and industry.
- July 1, 2004: The Western Virginia Water Authority began operations.

Benefits

As mentioned above, customers in Roanoke, Roanoke County, and other areas are benefiting from greater reliability, cost savings, and rate stability. Greater *reliability* results because the sharing of water sources across several jurisdictions gives citizens in individual areas better drought protection and emergency backup. More dependable water and wastewater service also is a springboard to greater economic development in the Roanoke Valley. *Cost savings* were realized by merging operations, including the billing system and standby crews. The Authority's FY05 operating budget was $39.2 million, $1 million less than the FY04 combined operating budgets of the city's and county's utilities operations. Finally, customers benefit from greater *rate stability*, because single localities no longer have to bear the burden of water and wastewater capital expenditures alone. This is especially important for the city, whose population has decreased in recent years while the county's population has increased.

Besides Authority customers, several other parties also benefit from the merger:

- Local government elected officials, administrators, and staff—Creation of the Authority has relieved local governments of direct responsibility for providing and maintaining the essential services taken on by the Authority. Additionally, included in the Authority's mandate is the management of stormwater, which is currently under the auspices of individual jurisdictions. If the Authority does in fact take on stormwater management, this responsibility shift would further assist local governments.
- Authority staff—The Authority's staff, currently at 258 people, enjoys greater professional autonomy. With its own visual identity and culture, Authority staff members are distinct from public works or utility employees of the jurisdictions. Furthermore, blending staff members from the two jurisdictions allowed for the sharing of ideas and development of more efficient operations. No water or wastewater employee lost employment due to the creation of the Authority; staff numbers will be trimmed as appropriate through attrition to reduce costs.

The future holds potentially greater benefits. Other jurisdictions in the Roanoke Valley are welcome to join the Authority at any time, which would further increase the customer base and allow for greater sharing of costs and resources.

Perhaps most importantly, the Authority's regional approach is watershed based, or based upon the limits and resources of the land, on which the Roanoke Valley's stability depends more than anything else. Water and wastewater resources are determined by watersheds, not local government boundaries, and the Authority's existence reflects a local understanding of watershed realities.

Lessons Learned

Many water and sewer authorities exist in Virginia, but the Western Virginia Water Authority is unique as the only authority formed from two existing entities that administer and provide water and wastewater treatment. As such, its experience is relevant for other Virginia localities considering regional arrangements. While all water and wastewater operations differ according to geography, demographics, and natural-resource limitations, many of the steps the Authority took to merge two distinct operations could be replicated in other Virginia communities. Below, I offer four fundamental lessons from our experience.

Plan with the long-term economic interests of communities and citizens in mind. Freshwater resources continue to dwindle planet-wide, and wastewater treatment costs increasingly mount. Short-term hurdles of consolidating facilities and operations are psychologically easier to overcome when all parties recognize the long-term economic gains that will be realized.

Inform citizens of all significant planning stages. Change is usually unsettling to a community, and residents are more assured when they know about the progress of large-scale events. Establish good ties with local media to ensure their assistance in communicating important information. Organize and publicize community meetings so that citizens can meet and ask questions of the decision makers.

Involve staff early and throughout the consolidation process. Mergers can be stressful to employees. Enlisting their help will reassure them of their future with the new entity and also will make good use of their institutional knowledge in developing a new enterprise.

Diplomacy, diplomacy, diplomacy. Relinquishing control of facilities and operations that jurisdictions and their elected officials highly value takes much swallowing of pride. All parties involved should take time to recognize and commend the sacrifices and compromises a jurisdiction is taking for the good of citizens.

—By Carol Davit

Carol Davit is the environmental communications coordinator for the Western Virginia Water Authority.

FEATURE ARTICLE 2

Enhancing Virginia's Environment *and* Economy by Improving Water Quality

In this Feature, *Water Central* prints remarks made by Virginia Secretary of Natural Resources W. Tayloe Murphy, Jr., on October 11, 2005, at the National Water Research Symposium held by the Virginia Water Resources Research Center in Blacksburg. *Water Central* thanks Secretary Murphy's office for granting permission to print the secretary's remarks and for providing an electronic copy.

Thank you for inviting me to be with you today to address some of the most important water quality issues that we face in Virginia, and some might argue, in the United States.

But before I begin my remarks, I would like to congratulate the conference organizers. The topics before you—from water-supply planning to Chesapeake Bay water quality, to TMDL development, to resolving water resource conflicts—are at the cutting edge of water issues today. [T]hese issues are not going away, and we will continue to need forums like this one to develop and refine solutions and to have the kind of information and exchange that is envisioned here at this conference.

I would also like to extend my thanks and my congratulations to the Virginia Water Center Resources Research Center, here at Virginia Tech, as it celebrates its 40th anniversary year. I applaud the work of the Center over the last 40 years and all that it has contributed to the scientific and public policy arenas.

I know that there are many participants at this Symposium who have a greater technical understanding of the issues than I have; however, I have had a unique opportunity to see these issues from both the legislative and executive branches of our state government. Today, I will talk about some of the experiences I have had during my public career, and about how I see the water programs we have put in place shaping the future quality and quantity of our waters. I will also try to relate our land use and economic policies to water issues.

Let me begin by focusing on the significant initiatives that have been developed during Governor Warner's administration for nutrient and sediment reductions in the Chesapeake Bay.

I submit to you that the water-quality management programs we have developed for the Chesapeake Bay and its tidal tributaries, when implemented, will lead to a more sustainable future in both economic and environmental terms.

Virginia Secretary of Natural Resources Tayloe Murphy. Photo courtesy of Secretary Murphy's office.

At this point, I think a bit of history would be appropriate and helpful.

Virginia has been a partner in the regional efforts to restore the Chesapeake Bay since the signing of the first Chesapeake Bay Agreement by Governor Robb and his counterparts in 1983. Just as our understanding of the Chesapeake Bay estuary in scientific terms has advanced, the policy response, as embodied in the various Chesapeake Bay Agreements, has advanced as well. In 1987, Governor Baliles led the effort to add greater specificity and measurable goals to the second agreement among Maryland, Pennsylvania, Virginia, the District of Columbia, the U.S. Environmental Protection Agency, and the Chesapeake Bay Commission. Finally, in the year 2000, a third agreement was signed by Governor Gilmore and his counterparts that, even with its faults, is still considered a model for ecosystem management worldwide.

In my opinion, the centerpiece of the "Chesapeake 2000" agreement is the commitment to improve water quality sufficient to remove the Chesapeake Bay and its tidal tributaries from the

EPA list of impaired waters. In less bureaucratic terms, it means that we are committed to make the waters of the bay healthy enough for the survival of plants and animals that inhabit them.

Clearly, this is an ambitious task. Some would even argue that it is unachievable, especially in the timeframe envisioned in 2000. Despite the fact that this task may take longer than originally planned, the efforts we have made in the past and those that are currently underway have not been a waste of time. In many respects, the reductions we have made so far have allowed us to hold the line against further degradation in the face of a fast-growing population. We have certainly made progress through the efforts of farmers, local governments, sewage treatment plant operators, industries, developers, and many others who, through incentives or by regulation, have installed and maintained nutrient- and sediment-reduction practices.

Now, however, we must dramatically reduce the flow of nitrogen, phosphorus, and sediments into the Bay and its tributaries in order to achieve healthy waters. We know that we cannot improve conditions in the Bay and its tidal tributaries unless we cap annual nitrogen and phosphorous loadings throughout the watershed at 175 million pounds and 12.8 million pounds, respectively. In order to accomplish this, we must control nutrient pollution from all sources. We must change the way we farm, the way we develop land, the way we treat wastewater, the way we use septic tanks, the way we manage storm water, and the way we control air pollution. These changes will call for significant action by everyone.

Unless we take action to address each of these sources, we must be prepared to tell the citizens of Virginia, and of this region, that they are unlikely to see any meaningful, permanent improvement in the health of the Bay and its tributaries.

Since the adoption of nutrient cap limits by the Chesapeake Bay partners, there has been a good deal of discussion with respect to the cost of implementing the tributary strategies that have been developed by the partners, which now includes Delaware, New York, and West Virginia in addition to Maryland, Pennsylvania, Virginia, and the District of Columbia. If the states, the federal government, and the localities fail to make substantial financial contributions to meet our goals to conserve our natural resources, the cost will be imposed on someone else. As I have frequently said: there is no such thing as a free lunch. Environmental degradation always places a cost on someone, and usually not the individual causing the damage. A waterman, or a seafood processor, or some other business person who depends on water quality will tell you they have picked up the tab over and over again.

We, as a society, have apparently decided that the best policy is to pass the buck to those least able to afford it.

In a book published last year entitled *Hope's Horizon: Three Visions for Healing the American Land*, the following statement was attributed to former United States Senator Gaylord Nelson of Wisconsin: "The economy is a wholly owned subsidiary of the environment." We must continue to make the point that the health of our economy depends in large measure upon the health of our natural resources. A degraded environment will almost certainly promote economic disaster. I have always made the case that the foundation of our quality of life, and indeed our economic prosperity, is based on our natural resources.

It has always troubled me when I hear someone talk about economic development in Virginia only in terms of the amount of concrete poured or the number of new factories that have opened. When they speak about job losses, they tend to dwell only on the number of large businesses that have moved off-shore or closed their doors here in the Commonwealth. They never seem to take notice of the incremental losses in employment resulting from dwindling natural resources.

Many of you know that I am from the Northern Neck of Virginia, the peninsula bounded by the Potomac River, the Rappahannock River, and the Chesapeake Bay. When I am at home, it deeply saddens me to ride by one abandoned oyster shucking house after another – by lifeless crab picking facilities that today stand empty – all monuments to a once thriving commercial seafood industry that no longer exists because we placed on that industry the cost of our failure to keep its workplace clean and healthy. The economic losses experienced in areas like the Northern Neck can be seen there every morning, simply by observing the number of sons and daughters of watermen who now commute to Northern Virginia and other urbanized communities to find work. They make these daily trips, *not* as a matter of choice, but as a matter of necessity. They no longer have the option of working productive waters in their own backyards.

When the Chesapeake Bay was placed on EPA's impaired waters list in 1999, we entered a new era in the regulation and management of

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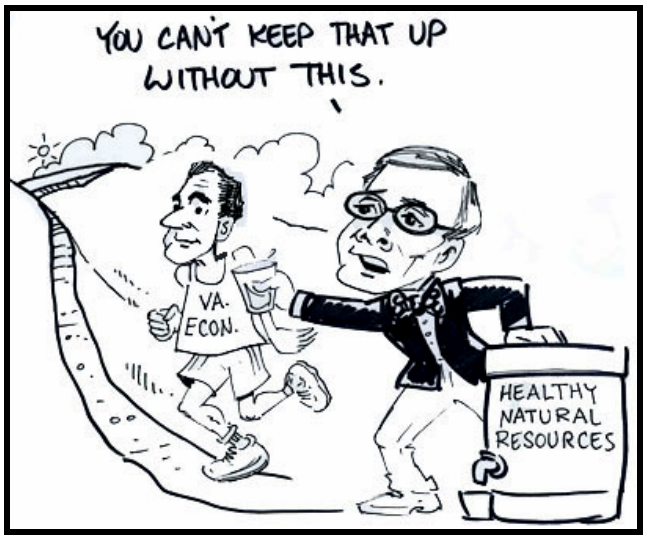


nutrients and sediments. The goals we are obliged to achieve establish the maximum amount of nitrogen, phosphorus, and sediment that can enter the Chesapeake Bay and its tidal tributaries from all sources and still meet water quality standards. Once reductions from current levels are made, we will need to operate under these levels, or caps, in the face of an ever-increasing population, additional treatment plant flows, and a changing landscape.

I believe we have responded to this challenge, and over the last three years we have built the foundation for reducing nutrients in Virginia and capping them over time. In concert with the General Assembly, we have pursued an aggressive regulatory program, legislative actions, and budgetary support that put Virginia at the forefront in this region and nationwide.

We began by setting nutrient and sediment loading allocations for each of our Bay tributary rivers, and then developing tributary strategies that define the management actions necessary to achieve the reductions.

We have revised our tidal water-quality standards to reflect the direct needs of living resources. Dissolved oxygen standards in our tidal waters, for example, are keyed to the needs of fish and shellfish in the various "zones" of the bay, from nursery and spawning areas to deep-water habitat. Increased abundance of submerged aquatic vegetation now constitutes the standard for water clarity. We now have in place a narrative chlorophyll standard for all our tidal waters; however, we expect to adopt a numeric chlorophyll standard for the James River before the end of the year.

We have also constructed the regulatory framework necessary to address nutrient reduction from point sources by adopting technology-based regulations and assigning specific loading allocations to each of our significant municipal or industrial facilities.

The programs we have pursued in Virginia recognize the new reality that we must learn to live under nutrient caps. As I have said: To meet our obligations under the Chesapeake 2000 Agreement means that new and expanded nutrient- and sediment-reduction efforts are necessary. It also means that the measures we put in place now, as well as in the future, must be operated and maintained so that we can achieve our reduction goals, and thereafter, remain under our cap loads over the long term.

Moreover, I would argue that living under a loading cap will drive innovation and new technology. Smart entrepreneurs, business owners, and public servants will find ways to maximize nutrient reduction in order to meet and maintain our goals, and there will be significant economic value associated with those reductions.

I firmly believe that technologies that reduce nutrients beyond what is now possible will be in exceedingly great demand, and I suspect that there are a number of individuals here at Virginia Tech with the ability to meet this demand for improved technology.

At the last session of the General Assembly, a nutrient-credit exchange program was created that will place an economic value on the pounds of nutrients that make up the loading allocations assigned to each significant discharger. Thus, market forces will be brought to bear on nutrient reduction, and assist in achieving our goals.

I am confident that point-source permittees will beat a path to the first engineering firm, or wastewater facility, that develops a technology that reduces nitrogen concentrations in wastewater to a milligram per liter, or less, and it can be hoped that wealth will be created by virtue of such technological innovation.

Even without advances in technology, the simple fact that there are hundreds of sewage treatment plants in this region that will—over the course of the next decade or so—require upgrades means there will be plenty of work for engineers and contractors trained to perform this work.

Likewise, the millions of acres of agricultural and urban lands that will need the installation of management practices, or the retrofit of existing infrastructure, will generate environmental benefit and new economic activity.

Certainly, the environmental benefits of improved water quality are obvious. Reduced nutrient and sediment inputs will lead to improved oxygen levels and water clarity and a

reduced amount of algae, all of which will lead to the restoration of aquatic habitat that has been severely compromised. In simple terms, crabs and fish will be able to breath in the Chesapeake Bay and aquatic plants will be able to grow. We should see more abundant fisheries. In addition, we will see the restoration of aquatic populations whose place in the web of life, and the food chain, is irreplaceable.

Our current efforts of restoration are driven, in part, by the economic benefits that will come from restored fisheries in both the commercial and recreational sectors, especially from tourism, and more specifically, the fastest growing segment of the tourism market—eco-tourism. There will also be significant economic activity associated with the industries that support these industries, from the marine trades to sellers of equipment to transportation—and the list goes on.

In addition to the economic benefits that will accrue from restored waters, the intangibles of an improved quality of life and a healthier population will flow from improved water quality. I do not know how to place a dollar value on the wonder of the natural environment that can be seen in the eyes of a child who catches his first crab, or in the decisions a business owner makes about the happiness of his employees by locating in an attractive place. I do believe, however, that in some sense these things do have value, perhaps not the value that an accountant can measure, but value nonetheless.

The future I see goes well beyond the installation of best management practices on farms and developed areas, and the upgrades to sewage treatment plants. In my view, there are broad implications for how we grow and develop as a society and the value we place on our landscapes, and how the landscape sustains us in the future.

In simple terms, I believe a nutrient cap will be the impetus for changes in the way we value the use of land.

First, I see the potential for more robust agriculture and forestry in Virginia. Under the framework of the nutrient-credit trading program, when wastewater-treatment facilities expand beyond their current capacity or build new plants, they will be required to offset any additional nutrient load from those facilities by installing (or overseeing the installation of) best management practices on land to capture nutrients that would otherwise run off into adjoining waters.

This will mean that farm and forest land will take on value as a location for nutrient reductions. Farmers should benefit from a new stream of income arising out of the installation and maintenance of best management practices on their property under contacts with the owners of wastewater treatment plants. I can also see where a municipality might purchase an easement on a farm or forestland to ensure that they have lands available for the installation of nutrient- and sediment-reduction practices in order to accommodate growth in the future.

I anticipate that we will better integrate our land use planning with our water-quality obligations. Local governments, as they deal with meeting nutrient caps, will need to do a better job in aligning their need for sewage treatment, and the nutrient impacts of growth, with the decisions they make about development and conservation of land. I can see a future where conservation of land has equal footing with so-called economic development. The value associated with preserved lands, in this nutrient-based economy, may rival those of developed lands.

I foresee a time when we will place a significant value on what are termed the "ecological services" that trees, wetlands, and pastures provide.

At a conference in St. Louis sponsored by the White House Council on Environmental Quality in August [2005], United States Secretary of Agriculture Michael Johanns announced that USDA will be creating programs that will allow farmers to accumulate what he called "ecological credits" that could provide a cash flow in exchange for conservation practices. Although Secretary Johanns may have had in mind international pressure on the U.S. to reduce the amount paid to farmers in the form of crop subsidies, I hope that we are thinking along the same lines. Conservation, whether driven by the World Trade Organization or by nutrient caps in the Chesapeake Bay watershed, can be a source of cash in the pockets of farmers and the owners of forestland in this region.

In some measure, I think that with these nutrient caps we will stop passing the buck and feasting on a free lunch actually paid for by someone who should not bear that responsibility. The conservation of our natural resources will become more integral to our economic future and in many ways the true cost of nutrient reduction will be borne by those who generate those excess nutrients.

Even though I may sound optimistic about the future, I would not suggest that it will be easy. We have significant challenges facing us particularly in the reduction and control of *nonpoint* nutrient pollution. As you know, they

come from everywhere: from farm fields and suburban lawns, from septic tanks and rooftops, and from the air. The management framework for nonpoint sources is quite different from the permitting systems we have available for point sources. I hope that conferences such as this will help address this great challenge.

Before I conclude, I hope you will allow me to offer some observations about our efforts to restore the Chesapeake Bay, and some of the realities we face in realizing the future that I have outlined and that I hope will be realized.

I am certain, regardless of the outcome of this year's gubernatorial election, as well as future elections, that Virginia will continue to be an active partner in the Chesapeake Bay Program. We fully understand our geographical place in the Chesapeake Bay region. We are downstream from our partner jurisdictions and it is certain that we will not meet our water quality goals absent concerted action by our upstream friends. We are grateful for their efforts, but we are also cognizant of our own responsibilities to restore water quality in our own rivers whether or not they affect water quality in the main stem of the Bay.

I know that the path we are on will continue to be difficult because, on a statewide basis, support for Chesapeake Bay restoration efforts can wane.

Lately I have been disturbed by some self-appointed pundits who have been loud in their criticism of the Chesapeake Bay Program, and its inability to solve all the Bay's problems all at once.

Apparently, they have apparently just discovered that politics shape governmental responses to the Bay's problems. I do not mean politics in a partisan sense; I mean politics as it is practiced in the decisions that are made by the executive and legislative branches. The simple fact is that natural resource managers are, and always have been, in direct competition with healthcare, public safety, education, transportation, and all the other so-called "core" functions of government for the resources necessary to achieve our goals. The allocation of those resources is a political process. As much as those of us who are given the responsibility of protecting our natural resources would like, we cannot simply wave a wand to garner the necessary political and financial support for our priorities. We cannot do it alone. Legislative and executive branch leaders must be convinced that their constituents, colleagues, neighbors, and friends are willing to take the actions necessary to achieve the ambitious goals before us.

The simple fact is that political leadership will be necessary to sustain any permanent change to the way we protect our natural resources in Virginia. Simple legislative or regulatory actions, such as allowing significant deviations from the nutrient caps we are establishing, will nullify the environmental and economic future I have described. I solicit your support to keep this from happening.

TEACHING WATER

Especially for Virginia's K-12 teachers

This Issue and the Virginia Standards of Learning

Below are suggestions for Virginia Standards of Learning (SOLs) that may be supported by this issue's Feature articles, Science article, and Water Status Report. 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; GOVT = Va. and U.S. government; LS=life science; PH=physics; WG = world geography.

Newsletter Section	Science SOLs	Social Studies SOLs
Feature 1 (Water Supply Focus)	6.9, LS.12, ES.7	CE.7, WG.7, GOVT.8, GOVT.9, GOVT.16
Feature 2 (Tayloe Murphy)	6.5, 6.7, 6.9, LS.12, ES.7, ES.9, ES.11, BIO.9	CE.7, CE.9, WG.2, WG.7, GOVT.9, GOVT.16
Science (Hurricane Review)	4.6, 6.3, 6.6, LS.11, ES.13, BIO.9, PH.7	WG.2, WG.12, GOVT.5, GOVT.16
Water Status (Stream Flow)	6.1, 6.7, ES.3, ES.7	None

SCIENCE BEHIND THE NEWS

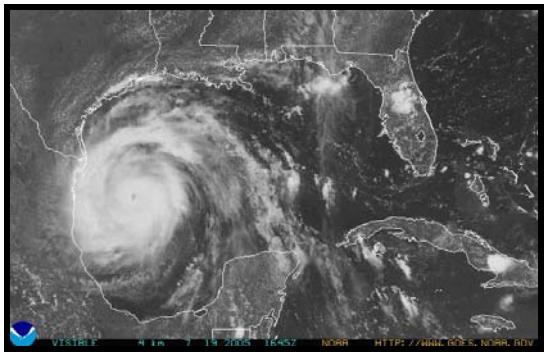
A Review of the 2005 Atlantic Tropical Storm Season

The Virginia Water Resources Research Center staff expresses condolences for the victims of this year's storms and our hope for continuing recovery in all the affected communities, homes, and lives.

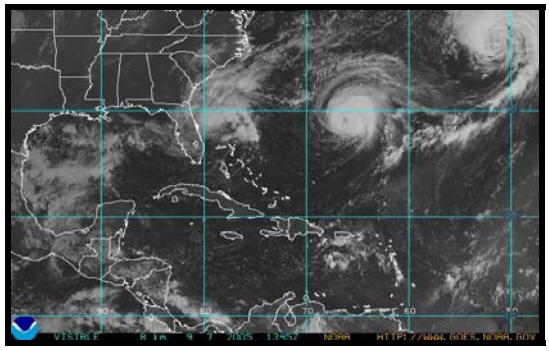
In this section, *Water Central* briefly reviews the record-breaking and devastating 2005 tropical storm season and suggests some sources to help readers comprehend the season's historic events.

A Gallery of Satellite Storm Photos

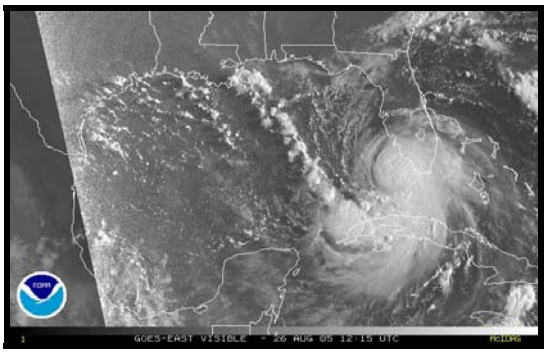
All photos were taken from the National Oceanic and Atmospheric Administration's (NOAA) Geostationary Satellite Server Web site at www.goes.noaa.gov on the date indicated.



Hurricane Emily, 7/19/05, 12:45 p.m. EDT.

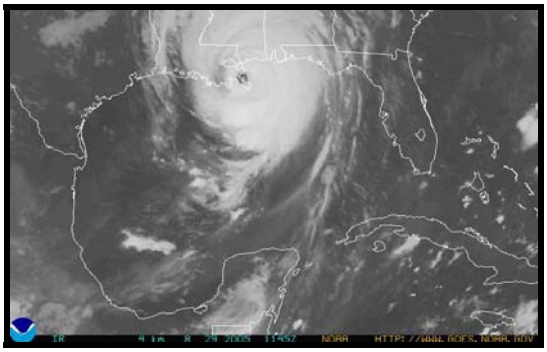


Tropical Storm Maria (upper right), Hurricane Nate (center), and Tropical Storm Ophelia (left, near Florida), 9/7/05, 9:45 a.m. EDT.

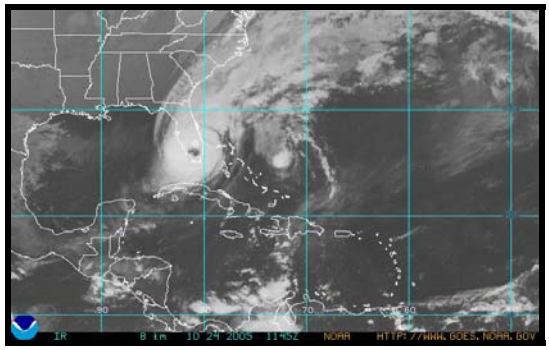


Hurricane Katrina over Florida, 8/26/05, 8:15 a.m. EDT.

Hurricane Rita, 9/23/05, 1:15 p.m. EDT



Hurricane Katrina approaching Mississippi, 8/29/05, 7:45 a.m. EDT.



Hurricane Wilma (over Florida) and Tropical Storm Alpha (southeast of Florida), 10/24/05, 7:45 a.m. EDT.

Key Facts of the 2005 Atlantic Tropical Storm Season[1]

- A record 24 named storms (winds of at least 39 mph) (previous record: 21 in 1933).[2]
- A record 13 hurricanes (winds of at least 75 mph) (previous record: 12 in 1969).
- 7 Major Hurricanes (at least Category 3).[3]
- A record 15 storms making landfall.
- A record $100+ billion in total damages.
- Over 2,770 confirmed fatalities .
- U.S. areas experiencing the most significant impacts: Alabama, Arkansas, Florida, Georgia, Louisiana, Mississippi, New England, New Jersey, New York, North Carolina, South Carolina, Tennessee, and Texas.
- Areas other than the U.S. experiencing the most significant impacts: Atlantic Canada, Bahamas, Caribbean (generally), Cayman Islands, Costa Rica, Cuba, Dominican Republic, El Salvador, Grenada, Guatemala, Haiti, Honduras, Jamaica, Mexico, and Nicaragua.

Information Resources for This Exceptionally Stormy Year

Here are a few suggested information sources for this remarkable tropical-storm year. *Many more exist!*

Situation reports from the **Virginia Department of Emergency Management** are an excellent source of information on the public and private responses to storms that affected, or threatened to affect, Virginia. Reports issued during 2005 are available online at www.vdem.state.va.us/newsroom/sitreps/2005/. The VDEM Public Affairs Office phone is (804) 897-6626; e-mail: pio@vdem.virginia.gov.

The **November 2005 issue *Natural Hazards Observer***, published by the Natural Hazards Center at the University of Colorado at Boulder, contains the publication's "Focus on Katrina," with articles, essays, Web site links, and other items on many aspects of that storm. One particularly useful item is a list of recent reports on the storm by the Congressional Research Service (such as "Disaster Evacuation and Displacement Policy: Issues for Congress"). *Natural Hazards Observer* is available online at www.colorado.edu/hazards. For more information, phone (303) 492-6818 or e-mail hazctr@colorado.edu.

The **Wikipedia Free Encyclopedia's** "2005 Atlantic Hurricane Season" page, online at http://en.wikipedia.org/wiki/2005_Atlantic_hurricane_season, covers the history and impacts of each of the season's tropical storms. The site includes links to several other sites (such as the National Hurricane Center) and to information on *Pacific Ocean* tropical storms, as well. Please note that this site deletes some items over time.

Newspapers in storm-affected areas are great sources of detailed and timely information. Here are Internet links (as of 11/15/05) to three newspapers' archives on Katrina, Rita, and Wilma, respectively, the three worst U.S. storms this year. (Please note: Hurricane Stan was one of the year's most serious storm *outside of* the United States, causing over 1,100 deaths in Mexico and Central America).

- Biloxi, Mississippi's *Sun-Herald* on Katrina: www.sunherald.com/mld/sunherald/news/special_packages/hurricane_katrina/.
- *Houston Chronicle* on Rita: www.chron.com/content/chronicle/special/05/rita/index.html.
- *Tampa Tribune* on Wilma: http://tbo.com/hurricane2005/wilma/.

Other valuable newspaper archives and reports are available online, some for free and others requiring subscription or a one-time payment.

The **Mississippi Georesources Institute** at Mississippi State University has information about Katrina online at www.gri.msstate.edu/eid/hurricanes/katrina.php?sr=0. To contact the Institute, phone (662) 325-9573 or email dshaw@gri.msstate.edu.

Environment and Energy Publishing has an online archive of Katrina articles related to Congress' and federal agencies' responses. The Web site is www.eenews.net/specialreports/katrina/sr_katrina.htm

For Previous Years

A **Unisys Corporation** Web site, http://weather.unisys.com/hurricane/atlantic/, has archives of hurricane tracks, wind/pressure data, and impacts for every year since 1851. Extensive information about storms in past years is also available at the **National Hurricane Center's** Web site www.nhc.noaa.gov.

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[1] **Source:** Wikipedia Free Encyclopedia, "2005 Atlantic Hurricane Season," online at http://en.wikipedia.org/wiki/2005_Atlantic_hurricane_season, as of 11/20/05.

[2] Systematic air monitoring of tropical storms has been conducted since 1944, according to the National Oceanic and Atmospheric Administration.

[3] Category 3 hurricanes (Saffir-Simpson Scale) are those reaching sustained winds of at least 111 miles per hour.

VIRGINIA WATER STATUS REPORT

This section of *Water Central* presents recent and historical data on Virginia's precipitation, stream flow, and groundwater levels (one topic per issue, rotating among the three topics).

Recent Stream Flow in Virginia: Mostly Below Normal

The graphs on this page, taken from the U.S. Geological Survey's Internet site, "WaterWatch—Current Water Resources Conditions,"[1] compare recent Virginia stream flow to historical records. The data in the graphs come from 88 sites that have at least 30 years of records. The top graph covers October 1—November 14, 2005; the bottom graph covers July 1999 through mid-November 2005. Each graph uses a "**stream flow index**," which measures how a site's average streamflow *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 88 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 a record low flow 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 that 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;

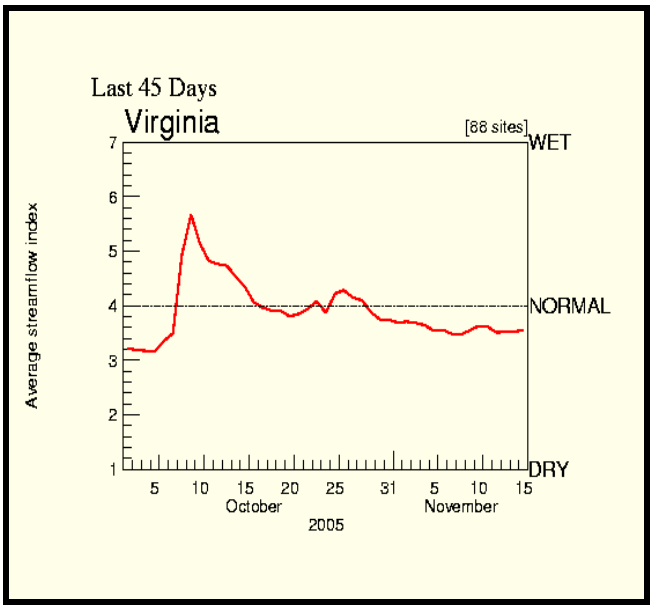
7 = average daily flow for the graphed date is a record high flow for that date.

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

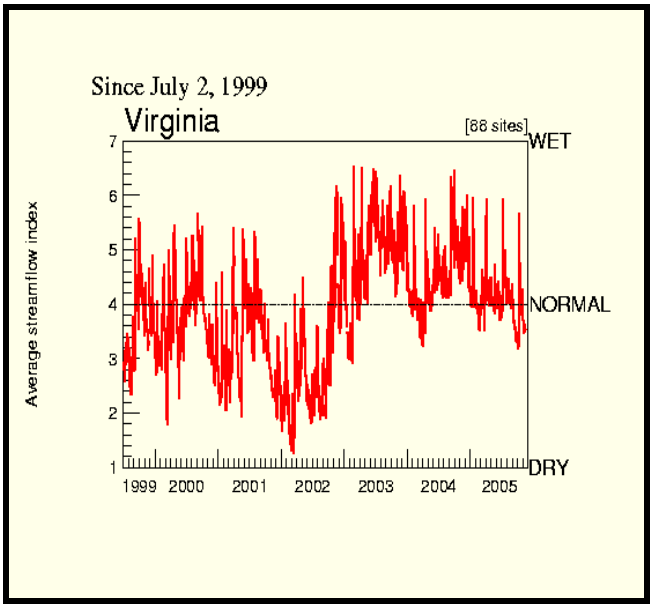
[1] Water.usgs.gov/waterwatch/index.html, 11/15/05. At this site, click on Virginia on the U.S. map, then click on "Time Series Plot of Real-time Streamflow."

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

For October 1—November 14, 2005



For July 1999—November 2005



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

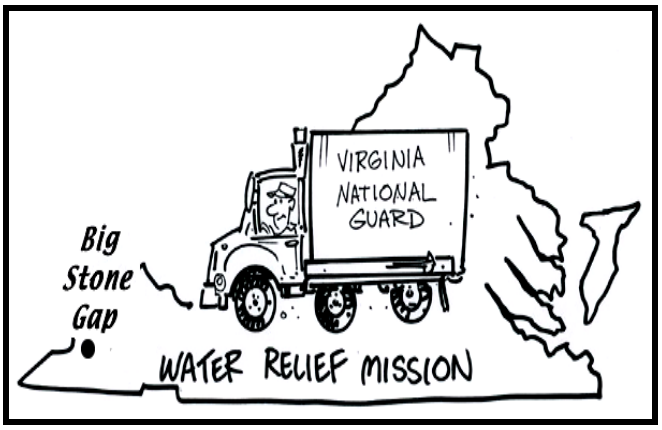
The following summaries are based on information in the source(s) indicated in parentheses, usually at the end of each item. Selection of this issue's items ended in mid-November 2005. Except as otherwise noted, the localities mentioned are in Virginia and the dates are in 2005.

In Virginia

•**Dry weather** began affecting Virginia in late August and worsened during an exceptionally dry September. By September 20, all of the state was either "abnormally dry" or in a "moderate drought," according to the U.S. Drought Monitor map (drought.unl.edu/dm) for that day. The Virginia Agricultural Statistics Service reported in mid-September that over 75 percent of the state had inadequate topsoil moisture, compared to only 38 percent in August (*Chatham Star-Tribune*, 9/29/05). Such conditions persisted until mid-October, when the remnants of Tropical Storm Tammy improved conditions throughout the state, except for southwestern Virginia (*Richmond Times-Dispatch*, 10/12/05). As of November 15, the Drought Monitor map showed abnormally dry conditions had returned to much of southern Virginia, with moderate drought in the far southwest. On that date, drought of some degree (from abnormally dry to "extreme drought") also affected more than 30 other states.

As of November 2, 44 Virginia counties were involved at some point in the **federal disaster-area designation** process, due to agricultural impacts of the dry conditions, with Fauquier County the only area that had actually been declared a drought disaster area. (Va. Dept. of Emergency Management Press Release, 11/2/05)

Also in November, the **Town of Big Stone Gap** (Wise County) continued to suffer a water shortage due to the dry weather and to a construction-related release of water from the town's reservoir. The Town began mandatory conservation measures on September 27 and Governor Warner declared a local state of emergency in the Town and Wise County on October 7. Various state agencies and surrounding localities worked with the town to provide alternative water sources, including delivery by the Virginia National Guard of water-storage units and bottled water. (*Bristol Herald-Courier*, 10/7/05; and Va. Dept. of Emergency Management: Situation Report, 10/8/05, and Press Release, 11/2/05)



•Some **invasive species items**:

••In September, an advisory panel began drafting a **comprehensive, statewide plan** for fighting nonnative, invasive plants and animals. The advisory group hoped to present the draft plan in November to the Virginia Invasive Species Council. (*Richmond Times-Dispatch*, 9/6/05)

••Also in September, contractors for the state began aerial spraying of a relatively new herbicide to control the **invasive plant *Phragmites*** in coastal areas. Virginia has been spraying stands of *Phragmites* since 2000. Previously using the herbicide Rodeo® (active ingredient Glyphosate), this year Virginia began using Habitat® (active ingredient Imazapyr), which was approved by the U.S. EPA in 2003 for use in or around aquatic areas. The herbicide's label warns against direct contact, so state officials close access to treated areas prior to spraying. (*Virginian Pilot*, 9/15/05)

••**Northern Snakeheads** are here to stay, at least in the **Potomac River**. On October 9, two fishermen caught 80 snakeheads in Dogue Creek, a Fairfax County tributary to the Potomac. The next week, Department of Game and Inland Fisheries (DGIF) officials caught 200 snakeheads in the same creek. John Odenkirk, a DGIF biologist, stated that eradication of the species could "never be accomplished" now and DGIF is not trying to do so. (*Washington Post*, 10/11/05; and *Baltimore Sun*, 10/13/05. For a previous item, please see the Aug. 2004 *Water Central*, p. 18)

•In October, a conference was held at James Madison University to discuss the **massive fish kills in the Shenandoah River** in 2004 and 2005. Members of a task force studying the kills said that they've found no immediate chemical or biological cause. The Spring 2005 kill affected an estimated 80 percent of Smallmouth Bass and Redbreast Sunfish. To help identify the cause, the task force has called for more intensive monitoring of river water quality and more specific testing of fish samples. (Associated Press, 10/25/05. For a previous item, please see the Aug. 2005 *Water Central*, p. 18.)

•Newport News' proposed **King William Reservoir** moved closer to final approval with three developments: 1) the U.S. Fish and Wildlife Service decided not to challenge the project over its impacts on wetlands; 2) the City received its Army Corps of Engineers construction permit; and 3) the Virginia Supreme Court rejected several claims made by the Mattaponi Tribe and upheld the permit granted by the State Water Control Board. The high court did return the case to a trial court to determine if the project would violate a 1677 treaty with the Mattaponi and if compensation is due to the tribe from impacts on their religious and cultural practices. (*Daily Press*, 9/2/05; and *Richmond Times-Dispatch*, 10/27 and 11/5/05. For a previous item, please see the Nov. 2004 *Water Central*, p. 19.)

•A study by Virginia's Joint Legislative Audit and Review Commission identified "limitations in federal, state, and local oversight" of **land application of biosolids** (treated sewage sludge). The study also noted that the Virginia Department of Health (VDH) (which oversees biosolids applications) has not been fully collecting fees that biosolids contractors are required to pay, and that funds that *have* been collected are underutilized by localities for monitoring and enforcement. VDH officials said they agreed with the study's recommendations for increased department oversight. The report, *Review of Land Application of Biosolids in Virginia*, is available at jlarc.state.va.us/pubs_rec.htm. (*Richmond Times-Dispatch*, 1012/05. For a detailed article on biosolids, see the Aug. 2005 *Water Central*, p. 7.)

Chesapeake Bay Items

•On August 17, the Atlantic States Marine Fisheries Commission (ASMFC) imposed the first-ever **limit on the harvest of menhaden in the Chesapeake Bay**. Menhaden are valued for the ecological roles they play and as a commercial source of fish oil, pet food, and nutritional supplements. The ASMFC set the limit at 105,000 metric tons per year; the Omega Protein Company, which operates a menhaden-processing plant in Reedville, had asked the Commission to set a voluntary cap of 131,000 metric tons/yr. The AFSMC represents 15 Atlantic states, including Virginia, which joined North Carolina in voting against the cap (the vote was 12-2). For the limit to take effect in Virginia, the General Assembly must approve it during its 2006 session; if it does not, the state could face litigation or federal sanctions. (*Virginian-Pilot*, 7/13 and 8/18/05; and *Baltimore Sun*, 8/18/05. For a previous items, please see the Jan. 2005 *Water Central*, p. 9.)

•At its September 27 meeting, the **State Water Control Board** adopted rules setting **nutrient-discharge limits** applicable in the Eastern Shore, Rappahannock, and Shenandoah-Potomac basins. The James and York and James were to be added to the regulatory program when the board met again on November 21. State grants are expected to pay up to 75 percent of the costs of sewage-treatment plant upgrades needed to meet the new requirements. The upgrades are expected to reduce Virginia's nitrogen discharges by about eight million pounds per year, one-third of the reduction needed to meet Virginia's commitment under the Chesapeake Bay 2000 agreement. Plants that reduce nutrient discharges more than required will be able to sell credits, under the state's new nutrient-credit trading program. (*Richmond Times-Dispatch*, 9/28/05)

•At its September 27 meeting, the Virginia Marine Resources Commission (VMRC) approved an emergency measure to open eight of nine **oyster-harvesting areas** on October 1, instead of the usual staggered opening dates starting in December. The change was in response to the impacts of Hurricanes Katrina and Rita, which destroyed much of the Gulf Coast oyster fleet and processing industry. Prior to Katrina, 90 percent of the oysters processed in Virginia came from the Gulf Coast, according to the Virginia Seafood Council. The VMRC also voted to increase the daily harvest limit from eight bushels to 12 but did not change *seasonal* limits or open new harvesting areas. (*Fredericksburg Free Lance-Star*, 9/2/05; and *Daily Press*, 9/28/05)

At its October 25 meeting, the VMRC held a public hearing on the Virginia Seafood Council's proposal to put 10,000 sterile, **non-native oysters** (*Crassostrea ariakensis*, the so-called "Asian oyster") on a public-harvest ground in the

Piankatank River. This would be the first trial of placing the non-native oysters in open waters. The Commission voted 7-1 to approve the plan, but under a state law passed in 2005 the head of the VMRC is to make the decision (within 60 days). According to the *Richmond Times-Dispatch* (10/26/05), the proposal "sets up a possible confrontation between the state and the Army Corps of Engineers about which entity will decide if or when non-native oysters will be allowed in the Bay." After the VMRC meeting, the Corps wrote to Governor Warner to reiterate its authority over the matter, based on the federal Rivers and Harbors Act and the Clean Water Act (the latter act gives the Corps permitting authority for activities involving dredged or fill materials, including oyster shells, in U.S waters). (*Richmond Times-Dispatch*, 10/24, 10/26, and 10/28/05; and *Virginian-Pilot*, 10/26/05. For the latest previous item on non-native oysters, please see the Aug. 2005 *Water Central*, p. 21.)

In a related item, the U.S. Army confirmed in November that it is conducting a **criminal investigation** of how the Norfolk District of the Corps of Engineers has been handling funds designated for restoration of *native* oysters in the Bay watershed. (*Virginian-Pilot*, 11/2/05)

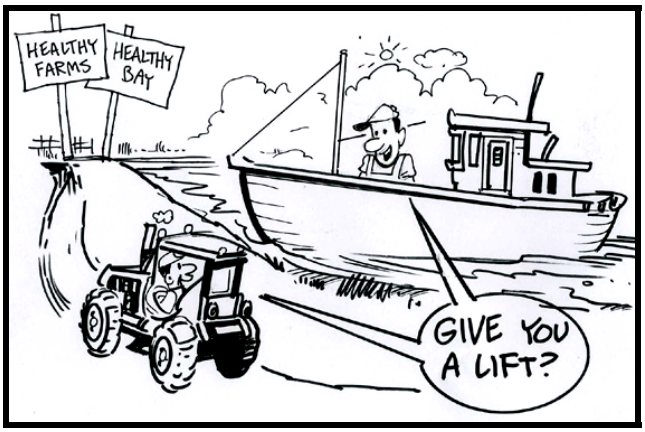
•According to a study in the June issue of *Frontiers in Ecology and the Environment*, 4,700 **stream-restoration projects**, affecting 2,200 miles of rivers and streams, have been done in the Bay watershed since 1990—the most of any watershed in the country. The study also found, however, that only five percent of these projects had documented monitoring of their long-term results; only 10 percent have done so nationally. (*Bay Journal*, July-Aug. 2005)

•In November, the Chesapeake Bay Foundation (CBF) released its annual "**State of the Bay Report**," for the 12-month period ending September 30, 2005. In each report, CBF rates 13 biological and chemical measurements from 0 to 100, with 100 intended to represent "pristine" conditions as they existed before European settlement. The report then averages the scores to give an overall Bay score. This year's average score is 27, the same as the past four years. CBF has set an average score of 40 (indicating "improving conditions") as the goal for 2010. CBF "State of the Bay reports" are available online www.cbf.org; or contact CBF's Virginia office at (804) 780-1392. Following are scores from this year and the past four years:

	2001	2002	2003	2004	2005
Forested Buffers	54	54	55	55	55
Resource Lands	30	30	29	29	29
Submerged Aquatic Veg.	12	12	22	18	20
Wetlands	42	42	42	42	42
Blue Crabs	42	40	38	38	38
Oysters	2	2	2	2	3
Rockfish	75	75	75	73	71
Shad	6	7	9	10	12
Dissolved Oxygen	15	15	12	13	12
Nitrogen	15	16	13	12	13
Phosphorus	15	16	13	16	20
Toxics	30	28	28	27	27
Water Clarity	15	16	14	15	15
AVERAGE	**27**	**27**	**27**	**27**	**27**

In a related item: This summer the **Bay's "dead zone"**—where dissolved oxygen is too low to support aquatic life—was the largest in 20 years. (*Annapolis Capital*, 10/4/05)

•**And another "State of…" report:** In September, the Bay Foundation released *Vital Signs: Assessing the State of Chesapeake Agriculture in 2005*. Based on 12 community, economic, and environmental indicators, the report asserted that Bay watershed agriculture faces "mounting threats, with 10 of the 12 indicators rated weak or unhealthy." CBF also asserted that a healthy agricultural industry in the watershed is vital to restoring the Bay itself. Such statements and CBF's recent calls for Bay states to increase funding and technical assistance for farmers were welcomed by agricultural groups as a change from past disagreements between farmers and Bay-related environmental groups generally. *(Staunton News Leader*, 9/20/05; Capital News Service, 11/3/05; CBF Web site, www.cbf.org, 11/17/05)



•On November 15, the federal **Government Accountability Office** (GAO) released a review of the Chesapeake Bay Program Office, conducted in response to a request by U.S. Senators John Warner (R-Va.), Barbara Mikulski (D-Md.), and Paul Sarbanes (D-Md.). The senators' request followed news reports in 2004 that the Bay Program Office had overstated progress being made in restoring the Bay, and that its assessments relied too heavily on computer models instead of field measurements. The GAO report found the same problems. It recommended that the Bay Program Office make its assessments and reports more effective and credible, and that it "develop a comprehensive, coordinated implementation strategy that takes into account available resources." The report, *Chesapeake Bay Program: Improved Strategies Are Needed to Better Assess, Report, and Manage Restoration Progress*, is available online at www.gao.gov/new.items/d0696.pdf. (GAO Web site, 11/17/05, and *Virginian-Pilot*, 11/16/05)

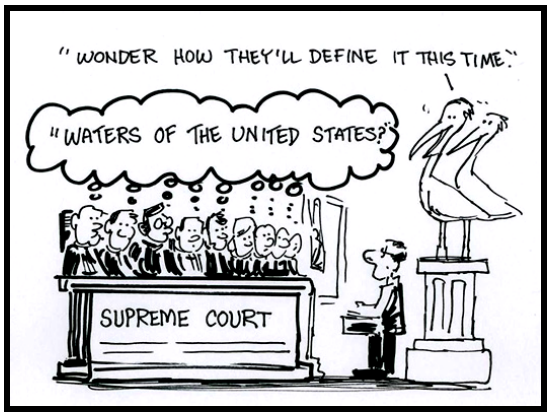
Outside of Virginia

•In April, **Kentucky and Tennessee** completed an agreement to share monitoring data and coordinate other water-quality efforts in watersheds that the states share. The agreement was seen as unique in the country because it covered *all* shared watersheds, not any particular one (distinguishing it, for example, from the interstate Chesapeake Bay agreements). (Inside EPA's *Water Policy Report*, 5/2/05)

•More from Kentucky: A proposed agreement filed in federal district court in October would allow a wastewater treatment facility to address **combined sewer overflows (CSOs)** by reducing discharges in the facility's *watershed* (such as by reducing stormwater flow or fixing faulty septic tanks). CSOs are discharges of untreated or partially treated sewage when wet weather causes excessive flows in combined storm sewer/sanitary sewer systems. Preventing wet-weather sewer overflows has for years been an enforcement priority for the U.S. EPA, and the agency has required many localities to make infrastructure improvements to reduce CSOs. Richmond, Va., for example, has a combined system and has been working under a series of consent orders from the State Water Control Board to make improvements. Kentucky's watershed-based approach to CSO violations is apparently the first in the nation. (Inside EPA's *Water Policy Report*, 10/17/05)

•Concerned about outbreaks of **botulism in waterfowl**, cities across the country have adopted or considered **ordinances to reduce feeding of ducks** and other waterfowl on public property. Havre de Grace, Maryland, for example, considered such an ordinance in September, generating much public opposition. Waterfowl experts maintain bread and other human foods may cause malnutrition and other complications in birds, and that public feeding can exacerbate disease outbreaks by concentrating birds. (*Baltimore Sun*, 9/26/05)

•The **U.S. Supreme Court** announced on October 11 that it will hear appeals of two cases involving the **jurisdictional reach of the Clean Water Act** (CWA). The CWA covers "waters of the United States," which clearly includes interstate waters, navigable waters, and direct tributaries to navigable waters. Less clear is whether the CWA applies to wetlands *not directly connected* to a navigable waterway, referred to as "isolated" wetlands. In a 2001 case (known as the *SWANCC* case), the Supreme Court ruled that migratory-bird use was insufficient to make isolated wetlands subject to the CWA, but the court did not address *other* interpretations claiming CWA jurisdiction for isolated wetlands. Two such interpretations will be the subject of the Supreme Court's review of *Carabell v. U.S. Army Corps of Engineers* and *Rapanos v. Unites States*, both from the 6th Circuit Court of Appeals. (Inside EPA's *Water Policy Report*, 10/1705.)



A Final Word

•"It should be saved because it's so historic. George Washington helped get the canal built, and if it's good enough for Washington, it's good enough for us."—Maryland boater Lynn Wait, referring to possible cuts of Corps of Engineering funding for maintaining the Dismal Swamp Canal, considered the oldest operating waterway in the United States. (*Virginian-Pilot*, 10/18/05)

N O T I C E S

Recent State Water Meetings

This section presents a list of most water-related public meetings and hearings that occurred from August 4 to November 14, 2005, as listed on the **Virginia Regulatory Town Hall** Web site, at www.townhall.state.va.us/Intro.cfm. The Town Hall site posts minutes of public meetings by all of Virginia's boards, commissions, and departments. The list below includes the name of a contact person for further information. To find the e-mail address or phone number of the contact people, go to the Regulatory Town Hall Web site, click on Meetings (Future or Past), and then click on the particular event. You can also request state employee phone numbers by calling (800) 422-2319, and you can find the e-mail address of any state employee online at www.employees.state.va.us/directory-search.cfm.

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

Total Maximum Daily Load (TMDL) Meetings

TMDL-related meetings were held regarding the following waters and water-quality impairment issues (listed alphabetically by localities). The contact people listed for TMDL meetings are Virginia Department of Environmental Quality staffers, unless otherwise noted. Information on the status of all TMDLs in Virginia is available online at http://www.deq.state.va.us/tmdl.

Allegheny and Botetourt counties and Covington City—**Jackson River** (James River basin); more information: Jason Hill.

Bedford, Franklin, and Montgomery counties and Roanoke City—**Roanoke River** watershed for bacteria; more information: Jason Hill.

Campbell, Franklin, and Pittsylvania counties—**Pigg River and Old Womans Creek** (Roanoke River basin) for bacteria; more information: Mary Dail.

Fairfax, Fauquier, and Prince William counties—several streams in **Occoquan Watershed** (Potomac River basin) for bacterial and benthic impairments; more information: Kimberly Davis.

Floyd County—**Dodd Creek** (New River basin) for bacteria and temperature; more information: Theresa Carter (Dept. Conservation and Recreation).

Rockingham County—**North River** (Shenandoah River basin) for bacteria and benthic impairment; more information: Robert Brent.

Sussex County—**Spring Branch** (Chowan River and Dismal Swamp basins) for benthic impairment; more information: Chris French.

Various localities—Tidal portion of the **Potomac River** for PCBs (polychlorinated biphenyls); more information: Kimberly Davis.

York County and the cities of Hampton and Poquoson—**shellfish waters** for bacteria; more information: Chester Bigelow.

Other State Meetings and Hearings
(Items are listed alphabetically by agency or group, then by date.)

Advisory Committee to the Invasive Species Council—9/1 in Richmond; more information: David Dowling.

Department of Conservation and Recreation (DCR) **Stormwater Management Subcommittee**—8/24 in Charlottesville; more information: Lee Hill.

DCR Citizen Input Meetings for **2007 Virginia Outdoors Plan**—21 meetings, 10/3 through 11/3, at each of the state's regional planning offices. Virginia has produced a Virginia Outdoors Plan every five years since 1966; this will be the ninth edition. More information: Nathan Lott, DCR Public Relations Specialist, (804) 786-7961.

Department of Mines, Minerals and Energy (DMME) **Abandoned Mine Land Advisory Committee**—9/7 in Norton; more information: Roger Williams.

Department of Environmental Quality (DEQ) public hearing on a draft permit for managing **hazardous waste at the Radford Army Ammunition Plant**—8/15 in Radford; more information: Matthew Stepien.

DEQ public hearing on a draft permit for managing **hazardous wastes at the Wallops Island Flight Facility**—8/19 in Melfa; more information: Dennis Lund.

DEQ public hearing on a draft permit for managing **hazardous wastes at the Navy Naval Surface Warfare Center/Dahlgren Site**—8/24 in King George; more information: Kurt Stafford.

DEQ public information meeting on the **2006 guidance manual for water-quality**

assessment—9/7 in Richmond; more information: Harry Augustine.

DEQ public hearing on a proposed **groundwater corrective action plan at the Halifax County Landfill**—9/21 in Halifax; more information: Larry Syverson.

DEQ **Advisory Committee on mercury in fish** in Blackwater River, Dragon Run/Piankatank River and the Great Dismal Swamp in eastern Virginia—9/30 in Richmond; more information: Alex Barron.

Permit program peer review teams for air, water-discharge, and hazardous waste programs—8/4 in Glen Allen; more information: Kathy Frahm.

Soil and Water Conservation Board study committee on **SWCD agricultural program delivery**—8/8 and 11/9 in Richmond; more information: David Dowling.

State Water Control Board (SWCB) advisory committee on **nutrient criteria for lakes**—8/9 in Glen Allen; more information: Elleanore Daub.

SWCB public meeting on changes to the **regulation for nutrient-enriched waters and dischargers** within the Chesapeake Bay Watershed; and on the **Water Quality Management Planning regulation**—8/11 in Glen Allen; more information: John Kennedy.

SWCB public meeting on proposed **chlorophyll-a criteria for the James River**—8/11 in Glen Allen; more information: Elleanore Daub.

SWCB advisory committee on amendments to the **Virginia Water Protection Permit Regulation and development of a general permit**—met five times, 8/25 to 10/28, in Glen Allen; more information: Catherine Harold.

SWCB public hearing on a proposed **general discharge permit for coin-operated laundries**—8/30 in Glen Allen; more information: George Cosby.

SWCB public hearing on proposed amendments to the **general discharge permit for ready-mix concrete facilities**—8/30 in Glen Allen; more information: Burton Tuxford.

SWCB public hearing on proposed amendments to the **general discharge permit for seafood-processing facilities**—8/30 in Glen Allen; more information: Michael Gregory.

SWCB Advisory Committee assisting in development of a general discharge permit for **point-source discharges of nitrogen and phosphorus** to the Chesapeake Bay Watershed and a **nutrient-trading mechanism**—met three times, 8/31 to 10/17, in Glen Allen/Richmond; more information: Kyle Winter.

SWCB public meeting on notice of intent to issue new regulations on **wastewater reclamation and reuse**—10/24 in Glen Allen. More information: Valerie Rourke.

SWCB information meeting on the development of a general discharge permit for **point-source discharges of nitrogen and phosphorus** to the Chesapeake Bay Watershed and a **nutrient-trading mechanism**—10/25 in Lexington. More information: Kyle Winter.

SWCB meeting (and final time for public comment) on the use of the **Virginia Clean Water Revolving Loan Fund** for FY 2006—11/10 in Glen Allen. More information: Walter Gills.

Regular **Meetings of Statewide Boards and Commissions**

Chesapeake Bay Local Assistance Board—meets March, June, September, and December. The Board's Northern and Southern Area Review Committees, which review compliance by local Bay Preservation Area programs, meet in February, May, August, and October. More information: David Dowling.

Groundwater Protection Steering Committee—meets third Tuesday of odd-numbered months. More information: Mary Ann Massie.

Marine Resources Commission—meets monthly. More information: Jane McCroskey.

Professional Soil Scientists and Wetland Professionals Board—meets quarterly. More information: Mark N. Courtney.

Soil and Water Conservation Board—meets bimonthly. More information: David Dowling.

State Water Control Board: Meets March, June, September, and December. More information: Cindy Berndt.

Waste Management Board—meets about three times per year. More information: Cindy Berndt.

Waterworks and Wastewater Works Operators Board—meets March, June, September, and December. More information: David E. Dick.

Secrets of the Tide

This new book (Horwood Publishing, 2004) by Virginia Institute of Marine Science Emeritus Professor John Boon examines tides, tidal currents, sea-level changes, and storm surges (including during Hurricane Isabel in 2003). The book is available at the VIMS bookstore in Gloucester Point or through online book sellers.

Rain Garden Guide

The Virginia Department of Forestry has produced *Rain Gardens Technical Guide*, a reference for using rain gardens to help solve drainage problems, improve water quality, or provide wildlife habitat. To request a copy in print or on CD, phone (434) 977-6555 and ask for Janet Muncie.

New Online Water Information Center

The U.S. National Academies of Science has launched "Water Information Center," an online collection of scientific reports from the National Academies in seven topic areas: water supply and sanitation; water and soil remediation; hydrologic hazards; water quality in the natural environment; river-basin systems management; environmental assessment, management, and restoration; and water science and research. All reports can be read online or downloaded for free. The site is at water.nationalacademies.org.

Updated Book on Instream Flows

The Instream Flow Council has published a revised edition of *Instream Flows for Riverine Resource Stewardship*. The book is designed for agency managers, other instream flow practitioners, and university teachers. The book is available for sale through the IFC Web site at www.instreamflowcouncil.org/justreleased.htm, or by calling (800) 247-6553.

Report on Global Water Issues

A Silent Tsunami: The Urgent Need for Clean Water and Sanitation is the report from a conference held in April 2005 at the Aspen Institute's Wye River Conference Center in Maryland. The report is available online at www.aspeninstitute.org/EEE/water, or contact Aspen at (410) 820-5236 or publications@aspeninstitute.org.

Upcoming Conferences and Workshops

In Virginia

•**Virginia Water Conference 2006.** March 19-21, 2006, in Richmond. Annual conference of the Virginia Lakes and Watersheds Association. For more information: Stuart Stein, (703) 642-5080 or sstein@gky.com; Web site: www.gky.com/VLWA/.

•**Environment Virginia Symposium.** April 18-20, 2006, in Lexington. Sponsored by Virginia Military Institute. For more information: Justin Spears, (540) 464-7750 or spearsja@vmi.edu; Web site: www.environmentva.org.

Elsewhere

•**"GIS and Water Resources IV,"** May 8-10, 2006, in Houston, Texas; and **"Adaptive Management of Water Resources,"** June 26-28, Missoula, Montana. Both sponsored by the American Water Resources Association. More information: (540) 687-8390 or info@awra.org; Web site: www.awra.org.

Also Out There…

From the many water-related publications that arrive in the Water Center's mail, here's a brief description of some recent detailed articles:

•**"The Deadliness Below"**—A two-part special report on the history (1944-1970) of disposal of military weapons at sea. Published October 30 and 31, 2005, in *The Daily Press* (Hampton Roads). The *Daily Press* main phone number is (757) 247-4600; Web site is www.dailypress.com.

•**"After the Storm: Restoring America's Gulf Coast Wetlands"**—A special report on scientific and public-policy aspects of wetlands and coastal zone issues in the Gulf Coast following the 2005 hurricanes. For sale from *National Wetlands Newsletter*, Environmental Law Institute, Washington, D.C.; (800) 433-5120 or orders@eli.org; Web site: www.elistore.org.

CORRECTIONS

1. The Special Weather Feature, "Time to Stay Ready for Hurricanes," in the August 2005 issue stated incorrectly that the Atlantic tropical storm season runs from June 1 to November 1; actually, the season runs until November 30.

2. An "In and Out of the News" item on page 20 of the August 2005 issue stated that the estimated cost to clean up Virginia's currently impaired waters is $12.5 billion. The item did not make clear that this amount is an estimate for *all* entities involved, not just for state government; that is, it includes estimated costs for local governments, industries, and other private interests, as well.

3. An "In and Out of the News" item on page 18 of the August 2005 issue stated that a barge ran aground in the James River on May 8 and spilled 2,000 gallons of fuel oil. According to the September 1 *Richmond Times-Dispatch*, the U.S. Coast Guard found that the actual amount spilled was almost 25,000 gallons of high-sulfur diesel fuel. About 9,000 gallons were recovered. The Coast Guard initiated a civil-penalty action against the owner and operator of the barge.

AT THE VIRGINIA 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 .

Staff Changes

Kathryn Hoge has joined the Water Center as a temporary administrative assistant to handle the daily operations of the main office, including responding to information requests and helping maintain the Water Center's Web site.

New Publication

A Look Back Over 35 Years of Water News in Virginia, by Alan Raflo and George Wills, Water Center Educational Report No. ER02-2005. This booklet, produced as part of the Water Center's 40th anniversary this year, gives a sample of events, issues, and quotes from the Center's two newsletters, *Water News* (1970-94) and *Water Central* (1998-present). The report is available at the Water Center's online at www.vwrrc.vt.edu/publications/recent.htm; paper copies are also available (phone 540-231-5463).

Water Research Symposium Presentations

The Water Center's 2005 Water Research Symposium in October featured nationally known keynote speakers and Virginia's secretary of natural resources. The symposium featured four invited forums related to water science and policy. A summary of the water science and policy forums, including PowerPoint® presentations, along with full research papers presented at the symposium will be posted on the Water Center's Web site by late December 2005.

Award Winners

At its research symposium in October 2005, the Water Center gave the following awards:

•**Virginia Water Resources Leadership Awards**, for significant long-term leadership in supporting water resources—Paul J. Councill, Jr.; James H. Dillard, II; W. Tayloe Murphy, Jr.; and William R. Walker.

•**William R. Walker Graduate Fellow Award** for 2005-06—Kevin Gilmore.

•**Best Student Presentation Award** for the 2005 research symposium—Amy Villamagna.

Award recipients Tayloe Murphy, (l.) Amy Villamagna, and William Walker (r). with Virginia Tech President Charles Steger, October 12, 2005.

William R. Walker Graduate Fellow award recipient Kevin Gilmore (l.) and Dr. Walker, October 11, 2005.

VIRGINIA WATER RESOURCES RESEARCH CENTER RESEARCH FUNDING AND PRESENTATION OPPORTUNITIES FOR 2006

For more information about the opportunities listed on this page: Please contact Dr. Tamim Younos, Virginia Water Resources Research Center, 23 Agnew Hall, Virginia Tech, Blacksburg, VA 24061-0444; phone (540) 231-8039; FAX (540) 231-6673; or e-mail tyounos@vt.edu. Award application materials and research proposal guidelines are available at the Water Center's Web site, www.vwrrc.vt.edu.

National Institutes for Water Resources/U.S. Geological Survey Water Resources Research—National Competitive Grants Program for FY 2006

The U.S. Geological Survey (USGS) in cooperation with the National Institutes for Water Resources requests proposals for matching grants to support research on the topics of water supply and water availability, which are issues of importance nationwide. Proposals are sought in not only the physical dimensions of supply and demand, but also quality trends in raw water supplies, the role of economics and institutions in water supply and demand, institutional arrangements for tracking and reporting water supply and availability, and institutional arrangements for coping with extreme hydrologic conditions. The amount available for research under this program is estimated to be $920,000 in federal funds. Any investigator at an institution of higher learning in the United States is eligible to apply for a grant through a Water Research Institute or Center established under the provisions of the Water Resources Research Act of 1984, as amended. Proposals involving substantial collaboration between the USGS and university scientists are encouraged. Proposals may be for projects of 1 to 3 years in duration and may request up to $250,000 in federal funds. Successful applicants must match each dollar of the federal grant with one dollar from non-federal sources. Proposals must be filed on the Internet at https://niwr.org/ by 5:00 PM, Eastern Standard Time, **February 10, 2006**, and must be approved for submission to the National Competitive Grants Program not later than 5:00 PM, Eastern Standard Time, February 24, 2006 by the Institute or Center through which they were submitted. Proposals may be filed on the Web site beginning November 1, 2005. The Government's obligation under this program is contingent upon the availability of funds.

To obtain a copy of the RFP, please go to https://niwr.org/ and click on "RFP" under the heading "National Competitive Grants Program–104G." The RPF is also located at the Water Center's Web site.

Undergraduate Research Fellowship Awards

The Water Center awards undergraduate research summer fellowships related to water resources protection and management. The goal of the program is to provide a research opportunity for outstanding undergraduates with anticipation that these students will pursue a graduate degree in a water resources field. **Application materials should be submitted to Tamim Younos, at the contact information listed above, by 5:00 p.m., March 31, 2006.**

Walker Graduate Research Fellow Award

The Water Center's William R. Walker Graduate Research Fellow Award provides up to $2,500 to individuals preparing for a professional career in water resources. Only individuals pursuing graduate work in a field *different* from their field of emphasis as an undergraduate, or individuals with work experience returning to graduate school, are eligible to apply. A special panel selects the award recipient. The award will be effective July 1, 2006, and can be used at the recipient's discretion during residency in a university as a student, for professional development (such as attending workshops and conferences), and purchasing materials that will enhance professional productivity (such as books and software). **Application materials should be submitted to Tamim Younos, at the contact information listed above, by 5:00 p.m., March 31, 2006.**

Water Center Competitive Research Grants

The Water Center will consider research proposals for up to $20,000 and project duration of one year (July 1, 2006—June 30, 2007). Proposals will be considered in areas related to water sciences (including socio-economic topics) and engineering. A useful publication, *Water Research Needs in Virginia* (January 2005) is available online at www.vwrrc.vt.edu/publications/recent.htm. The proposal guidelines are available at the Water Center's Web site at www.vwrrc.vt.edu/proposals/2006vwrrc-rfp.pdf.

Submission of interdisciplinary proposals is encouraged. Research proposals should do the following:
•demonstrate the potential for significant contribution to advancing the scientific foundation for water resources management in Virginia;
•demonstrate the importance of the research to decision making in Virginia; and
•provide research opportunities for graduate and undergraduate students

A detailed budget justification is required. Funds may not be used to purchase office supplies or pay tuition (please see the proposal preparation guidelines for more details).

Grant awardees are expected to submit a final report, present a paper at the Annual Virginia Water Science and Technology Symposium sponsored by the Virginia Water Resources Research Center, and acknowledge the Virginia Water Resources Research Center in all publications that may result from the funded research.

Application materials should be submitted by e-mail to water@vt.edu **by 5:00 p.m., March 31, 2006.** Successful proposals will be announced by May 30, 2006.

Water Center Seed Grants

The Water Center will fund a limited number of research seed grants—of up to $5,000—to be used in support of background studies and preliminary research that will lead to submission of full research proposals to outside funding agencies. Seed grant proposals will be considered in areas related to water sciences (including socio-economic topics) and engineering. A useful publication, *Water Research Needs in Virginia* (January 2005) is available online at www.vwrrc.vt.edu/publications/recent.htm. The proposal guidelines are available at the Water Center's Web site at www.vwrrc.vt.edu/proposals/2006vwrrc-rfp.pdf.

By accepting a seed grant award, the principal investigators commit to the development of a full proposal suitable for submission for full funding to outside funding agencies.

Duration of each award is one year (July 1, 2006 to June 30, 2007). Funds may be used for student support, lab supplies, preliminary analysis to develop a project proposal, and travel to visit a potential research site or to establish appropriate linkages with funding agencies. Funds may not be used to purchase office supplies or pay tuition. Recipients of seed grants are expected to submit to the VWRRC a brief (two pages) progress report by December 30, 2006; and a final report in the form of copy of a full research proposal suitable for submission to a funding agency by June 30, 2007.

Application materials should be submitted by e-mail to water@vt.edu **by 5:00 p.m., March 31, 2006.** Successful proposals will be announced by May 30, 2006.

Call for Papers: Virginia Water Science and Technology Symposium, October 2006

The Virginia Water Center solicits abstracts for inclusion in the 2006 Virginia Water Research and Technology Symposium that will be held on Virginia Tech campus, October 23-25, 2006. Abstracts are requested in the following categories: fundamental and applied research; case studies; technology development and transfer; and workshops (three hours in length) on cutting-edge issues.

Abstracts are accepted in all areas of water resources, but the following are topics of particular interest:
•water supply and management;
•water resources management;
•water quality management;
•urban stormwater management;
•water and wastewater treatment;
•low-impact development;
•ecosystem services and ecosystem management;
•forest hydrology;
•drinking water infrastructure;
•water quality criteria and standards;
•water law, policy, and regulations;
•special topics (such as sensor technologies, water security, desalination, or climate change).

Submissions should include the following information: title of paper; name and affiliation of author(s) and the e-mail address and phone number for the corresponding author; category of submission (research, case study, technology transfer, workshop); topic; and abstract of 150-300 words), contain a concise description of the content of the paper or the proposed workshop.

Deadline: Please submit abstract electronically to water@vt.edu by midnight, **March 31, 2006.**

THE VIRGINIA STEP PROGRAM in SUMMER 2005

Through the **Service Training for Environmental Progress (STEP)** program, students live in Virginia communities while working on a water-related project identified by the community. **If you are a member of community group interested in STEP assistance, or a student interested in a STEP internship,** please contact STEP **by January 31, 2006,** at 23 Agnew Hall (0444), Blacksburg, VA 24061; (540) 231-5463; araflo@vt.edu. You can get more information about STEP at the Water Center's Web site, http://www.vwrrc.vt.edu (click on Education, then STEP). Following are summaries of the three STEP projects in Summer 2005; for a copy of any of the full reports, please contact STEP.

"Surveying Watershed-friendly Practices in Arlington, Virginia," by Catherine Melvin.

Arlingtonians for a Clean Environment (ACE) requested a STEP intern to help create a directory of water-saving and watershed-friendly practices on local properties. Ms. Melvin conducted surveys of private and public properties, photographed representative practices, and created a database that will allow ACE to create Internet and print versions of the directory. Ms. Melvin also assisted with ACE's Water Stewardship Team program by attending team meetings to observe decision-making processes and calculating water savings by four teams.

Catherine Melvin

"Involving Landowners of Clarke County, Virginia, in a Conservation Biology Study of Local Wildlife," by Carleen Woo.

The Clarke County Mapping Project is a model system for involving landowners in surveying their land for biodiversity indicators. Ms. Woo assisted researchers and other interns at the Smithsonian Conservation Research Center in Front Royal, Va., in recruiting and training landowners to conduct surveys of butterflies, native and invasive plants, and deer. She and other interns also conducted surveys on properties where landowners chose not to collect their own data. The data will be compared to digital land use maps to analyze how land uses affect the abundance and quality of wildlife found in the county.

Carleen Woo

"Assisting the Upper Roanoke River Roundtable with a Citizen Monitoring Program along Tinker Creek," by Christian Yates.

The Upper Roanoke River Roundtable sought STEP assistance with implementing a Department of Environmental Quality citizen-monitoring grant on Tinker Creek, which has been on the state impaired-waters list since 1996. Mr. Yates helped complete a Quality Assurance Project Plan, helped establish five biological-monitoring sites, and conducted stream walks upstream from the five sites to photograph and collect data on stream conditions and riparian land uses.

Christian Yates

Virginia Water Central

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