

## IN AND OUT OF THE NEWS

### May 2010 Issue Supplement

This document provides additional news items beyond the May 2010 issue (Issue #53) of *Virginia Water Central*. The items below are based on information in the source(s) indicated in parentheses at the end of each item. Most of the items were reported in news media or by governmental agencies between March 3 and June 1, 2010. Except as otherwise noted, all localities mentioned are in Virginia and all dates are in 2010. All Web sites listed were functional as of June 15, 2010. Frequently used abbreviations: DEQ = Virginia Department of Environmental Quality; DCR = Virginia Department of Conservation and Recreation; EPA = U.S. Environmental Protection Agency; SWCB = Virginia State Water Control Board; VMRC = Virginia Marine Resources Commission.

### Aquatic Systems, Water Quality, and Restoration (including Chesapeake Bay)

- In September 2009, the U.S. Army Corps of Engineers, the Nature Conservancy, and the Interstate Commission on the Potomac River Basin began a 2.5-year project called the **Middle Potomac River Watershed Assessment**, designed to determine “environmentally sustainable flows—flows that sustain healthy river ecosystems and the goods and services that humans derive from them,” according to the Commission’s Web site on the project. In September 2010 in Shepherdstown, W. Va., the organizations will hold a workshop for experts to develop recommendations for sustainable flow levels in the Potomac and major tributaries. ([Middle Potomac River Watershed Assessment](#), Interstate Commission on the Potomac River Basin Web site, accessed 6/1/10).
- According to the Center for Coastal Resources Management (CCRM) at the Virginia Institute of Marine Science (VIMS), **Virginia has about 9197 miles of shallow water shoreline**—that is, shoreline where the water is less than six feet deep up to 40 feet from shore. This compares to 1785 miles of deep-water shoreline. Shallow areas provide food and habitat to a range of aquatic species and the accompanying wetlands, and their relatively low wave action helps reduce erosion of shoreline properties. Such areas are seeing increasing demand, however, for dredging to allow access for larger boats. CCRM reports that, in 2008, dredging permits were requested for over 2.3 million square feet of shallow habitat, resulting in conversion of over 560,000 square feet to deeper water. In order to reduce the impacts of dredging, CCRM has four recommendations: 1) encourage property owners to match boat access to the existing depth of water (e.g., only canoe or kayak access in very shallow areas); 2) encourage property owners with larger boats to build piers out to deeper water; 3) time dredging projects to avoid aquatic animals’ spawning or migration periods; and 4) maintain wide buffer areas between dredging areas and wetlands or submerged aquatic vegetation. (VIMS Center for Coastal Resources Management’s Rivers & Coast newsletter, Winter 2010)
- A February 23, 2010, report from the Weldon Cooper Center for Public Service at the University of Virginia assesses the **economic impacts of expenditures on agricultural Best Management Practices (BMPs)** needed to achieve goals outlined in the 2005 *Commonwealth of Virginia Chesapeake Bay Nutrient and Sediment Reduction Strategy*. The study, requested by the Chesapeake Bay Foundation, estimates that \$804 million (revised to 2010 dollars, from the Strategy’s 2005 estimate of \$735 million) would be needed to implement the recommended BMPs. Typically such practices involve 75 percent of public money and a 25 percent landowner cost-share, so the public cost is estimated at \$603 million and the private share at \$201 million. The report estimates that this investment would result in \$940 million of “total industrial output” (defined by the study as “the value of all industry production including sales of intermediate inputs for use in production as well as sales of products to final consumers”). The expenditures on BMPs would generate an estimated 11,751 “person-years” of employment. The report, *Economic Impacts of Implementing Agricultural Best Management Practices to Achieve Goals Outlined in Virginia’s Tributary Strategy*, is available online at <http://www.cbf.org/Document.Doc?id=467>. (*Richmond Times-Dispatch*, 3/17/10)
- On March 17, scientists attending the **ninth annual Back Bay forum** reported that this Virginia Beach estuary continued to show ecological improvements in 2009. Back Bay has a 104-square mile watershed and about 40 square miles of open water in the southeastern corner of Virginia. Aquatic life and habitat conditions began deteriorating in Back Bay in the 1980s, but in 2005 scientists began seeing improvements. Results from 2009 showed increases in fish populations, waterfowl, and submerged aquatic vegetation (which provides key habitat). Scientists and water-resource officials attribute the improved conditions to several factors, including

land conservation, agricultural best management practices, fewer hog farms in the area, and public education about pollution prevention. More information about Back Bay is available from the Back Bay Restoration Foundation at <http://www.bbrf.org>. (*Virginian-Pilot*, 3/18/10)

• In a research paper published in March, 20 out of 40 sampling sites on **large streams or rivers showed statistically significant temperature increases** over periods of record ranging from 21 to 98 years and ending between 2003 and 2007. The most rapid rate of increase was 0.077 degrees Celsius per year (0.14 degrees F) at the Delaware River near Chester, Penn., from 1965 to 2007. The Potomac River near Washington, D.C., increased about 0.046 degrees C (0.08 degrees F) per year from 1922 to 2006. The Jackson River at Hot Springs, Va., decreased about 0.1 degrees Celsius (0.18 degrees F) per year from 1979 to 2003, one of only two sites to show statistically significant decreases in temperature. The authors attribute the temperature increases to urbanization and global climate change, and they state that increased stream temperatures can have such ecological impacts as increased eutrophication, increased toxicity of stream contaminants, and reduced biodiversity. The paper, “Rising stream and river temperatures in the United States,” was published in the March 23, 2010, online version of *Frontiers in Ecology and the Environment*. The lead author, Sujah Kaushal, is at the University of Maryland Center for Environmental Science, and one of the co-authors, Michael Pace, is now at the University of Virginia’s Department of Environmental Sciences.

• In April, the **Chesapeake Bay Program released its annual “Bay Barometer,”** an assessment of progress toward restoration goals for the Bay. The most recent report assessed the 2009 status of “Bay Health” indicators and of restoration and protection actions. The Bay Health indicators (water quality, habitats/lower food web, and fish/shellfish) had a 2009 score of 45 percent of stated restoration goals (100 percent would indicate a fully restored Bay); this was an increase over the score of 39 for the conditions in 2008. The restoration/protection effort indicators (reducing pollution, restoring habitats, managing fisheries, protecting watersheds, and fostering stewardship) has a 2009 score of 64, an increase over the 2008 score of 61. The report states that despite the modest progress, the Bay overall remains “degraded” and “in poor condition,” and “pollution from urban and suburban areas continues to hinder the effectiveness of restoration efforts.” More information and access to the report is available online at <http://www.chesapeakebay.net/indicators/home.aspx?menuitem=14871>. (Chesapeake Bay Program, 4/7/10)

Then, in May, the **University of Maryland’s Center for Environmental Science released its annual “report card”** on the status of biology and water quality in the Chesapeake Bay. The Center analyzes state and federal agency data to see how close three water-quality indicators and three biological indicators are to established thresholds or goals, in response to pollution-reducing and habitat-improving actions and to annual precipitation variation. This year’s report, for conditions in 2009, had an overall “grade” of C (“moderate ecosystem health”), compared to a C-minus for 2008 conditions; this year’s grade is the highest since 2002. Grades among the 14 Bay regions ranged from B-minus (moderate to good) to F (poor). The report is available online at <http://www.eco-check.org/reportcard/chesapeake/2009/>. (University of Maryland Center for Environmental Science News Release, 5/18/10).

• In late April, the Chesapeake Bay Program reported that the **acreage of submerged aquatic vegetation (SAVs) in the Bay** (also called “underwater grasses” or “Bay grasses”) increased by 12 percent from 2008 to 2009. Increases were seen in all three major segments of the Bay (upper, or Bay Bridge north; middle, Bay Bridge south to the Potomac River; and lower, south of the Potomac), although some areas—such as several Anne Arundel County, Md., rivers (in the upper Bay)—had decreased or even non-existent vegetation areas (Submerged vegetation provides oxygen, food, and habitat for many Bay fish, crustaceans, and other animals, and the extent of submerged vegetation is a water-quality indicator. The 85,899 acres of vegetation recorded in 2009 is the highest seen since 2002 and is about half of the Bay-restoration goal of 185,000 acres. (Chesapeake Bay Program News Release, 4/27/10; and *Annapolis Capital*, 5/1/10)

• On April 20, the non-profit organization Potomac Conservancy—headquartered in Silver Spring, Md., and with a Shenandoah River office in Winchester—began a new “Fish Mystery” campaign calling for more research into the causes of intersex characteristics—animals showing both male and female characteristics—in Smallmouth Bass and other fish in the Potomac River and some of its tributaries. Besides the occurrence of intersex characteristics in Potomac basin fish, a U.S. Geological Survey (USGS) study published in August 2009 found **“widespread” occurrence of intersex characteristics in samples of Smallmouth Bass and Largemouth Bass** between 1995 and 2004 in several U.S. rivers basins (USGS News Release, 9/14/09; the study, “Widespread occurrence of intersex in black basses from U.S. Rivers, 1995-2004,” is in the August 13, 2009, online edition of *Aquatic*

*Toxicology*). Responding to such findings, in December 2009 U.S. Rep. James Moran (Va.-8<sup>th</sup>) introduced the Endocrine Disruption Prevention Act (HR 4190) in Congress. According to the Library of Congress' Thomas site (<http://thomas.loc.gov/>), the bill would "amend the Public Health Service Act to authorize the National Institute of Environmental Health Sciences to conduct a research program on endocrine disruption, to prevent and reduce the production of, and exposure to, chemicals that can undermine the development of children before they are born and cause lifelong impairment to their health and function, and for other purposes." As of June 15, the bill was still in committee. (Associated Press, 4/20/10. For a previous *Water Central* item on intersex fish and the USGS study: Nov. 2009, p. 34.)

•Several researchers at Virginia Tech and at the University of Illinois are collaborating on a four-year project to **investigate how farmers can reduce air emissions of ammonia from manure and poultry litter**. Ammonia—a nitrogen-based compound—released to the air can eventually result in nitrogen deposition onto the Chesapeake Bay and other waterways that suffer from excessive nitrogen. Air deposition is estimated to be the source for about seven percent of the total nitrogen reaching the Chesapeake. (*Southeast Farm Press*, 5/21/10)

#### •**Chesapeake Bay Blue Crab Developments**

••Between December 2009 and March 15, 2010, 66 Virginia watermen participating in the **Marine Debris Removal Program recovered over 9,000 lost crabbing pots (so-called “ghost pots”)** and other marine trash that can trap Blue Crabs or other aquatic animals. The program, started in 2008 and coordinated by the Virginia Institute of Marine Science (VIMS), pays watermen \$300 per day and covers fuel costs. The \$1-million annual cost of the program so far has been covered by U.S. Commerce Department funds as a result of the September 2008 federal fishery disaster declaration for the Chesapeake Bay. Discarded or lost fishing gear has created aquatic wildlife problems in several other states, as well, including Alaska, Florida, Massachusetts, Washington, and the U.S. Virgin Islands. The Marine Debris Program of the National Oceanic and Atmospheric Administration (NOAA) has been studying the problem since 2005. (*Eastern Shore News*, 3/31/10; and *USA Today*, 5/18/10)

••On April 14, Virginia Governor Robert McDonnell and Maryland Governor Martin O'Malley announced that the most recent winter dredge survey of the **Chesapeake Bay Blue Crab population** showed a 60-percent increase over the previous year, to 658 million crabs, the highest population estimate since 1997. The winter dredge survey, conducted since 1990, samples crabs at 1,500 sites in the Bay from December to March. The two governors attributed the population increase to actions taken by the two states, starting in 2008, to reduce harvests of Blue Crabs, especially females. The survey also found that crab reproduction this year was the sixth highest in the 21 years of the survey. With the increased populations, last year's increased harvest—including a 30-percent increase in Virginia, according to preliminary estimates—took about 43 percent of available crabs; scientists have estimated that a 46-percent harvest rate is sustainable. (Virginia Governor's News Release, 4/14/10)

••**Virginia's 2010 Chesapeake Bay Blue Crab season** opened on March 18 with 1,864 commercial crabbing licenses (some crabbers hold more than one license), a decrease of 359 licenses following Virginia's license buy-back program last year. The license buy-back was one of several state actions to reduce harvest pressure on the Blue Crab population following the federal government's declaration of a Blue Crab Fishery Disaster in 2008. (*Daily Press*, 3/20/10)

••On May 25, the Virginia Marine Resources Commission approved continuation of several **Blue Crab harvest restrictions** that were imposed in 2009. The continued restrictions include another one-year ban on winter dredging for female crabs, an extension for at least one more year of the moratorium (first implemented in 1999) on new crabbing licenses, and continued prohibition of crabbing in sanctuary areas. The VMRC did move up by two weeks (from July 15 to July 1) the start of the season during which may harvest pregnant crabs, known as “sponge crabs.” And on April 20, the Virginia Court of Appeals upheld Virginia's ban on winter dredging. A Norfolk waterman had sued the Commonwealth to overturn the ban. (*Virginian-Pilot*, 5/26/10 and 4/28/10)

#### •**Chesapeake Bay Oyster Developments**

••Lynnhaven River Now's Save Oyster Shells, an **oyster-shell-recycling program** begun in 2006, has grown into an ongoing partnership with at least 11 restaurants saving oyster and clam shells, two public shell drop-off sites, and pick-up of shells from oyster roasts (according to the organization's Web site, <http://www.lynnhavenrivernow.org/save-oyster-shells.aspx>, 4/5/10). The collected shells are currently being used to restore reef habitat in the Lynnhaven and other Hampton Roads area water bodies. Oyster-shell recycling is also underway in Maryland. In March, Maryland's Oyster Recovery Partnership began the Oyster Shell Recycling

Alliance, the first such effort in the state. The collaboration among watermen, restaurants, seafood wholesalers, oyster-shucking operations, and volunteers will work to collect oyster and clam shells from restaurants and caterers in the Baltimore, Annapolis, and Washington, D.C., areas. The shells collected in this program are used as attachment substrate for oyster “spat” attachment at the oyster hatchery at the University of Maryland’s Environmental Science Center at Horn Point, prior to placement in the Chesapeake Bay and tributaries. (*Southern Maryland Online*, 3/26/10)

••In early May on the campus of VIMS at Gloucester Point, the Chesapeake Bay Foundation (CBF) led about **70 volunteers in constructing 50 concrete “reef balls.”** The roughly conical structures will several openings will be used as artificial oyster reefs in oyster-restoration projects in the Lafayette and Piankatank rivers. Oyster-restoration efforts in Maryland have successfully used reef balls, but this will be the first use in Virginia. CBF plans to construct a total of 200 reef balls for Virginia efforts this year. (*Bay Daily*, 5/7/10). For previous Water Central items on artificial reefs: Dec. 2008, p. 20; and May 2007, p.24.)

## Awards and Achievements

•Over the past two years, the **Lipton Tea plant in Suffolk has reduced to zero any waste** going to a solid-waste landfill. Instead, the company uses recycling, composting, and some waste-to-energy processing to handle waste material from its six-billion tea bag per year operation. The company estimates that its waste-reduction efforts have saved \$150,000. The efforts also earned Lipton a Gold Award in the 2010 Virginia Governor’s Environmental Excellence Award program (Lipton was one of four Gold Award winners). (*Virginian-Pilot*, 5/3/10)

## Boats and Ships

•On March 9, the Virginia Department of Environmental Quality (DEQ) approved the final permit needed for the Virginia Port Authority and the U.S. Army Corps of Engineers to fill about 600 acres of the Elizabeth River to **expand Craney Island and create a new marine terminal.** The DEQ permit requires a \$65-million mitigation plan that includes cleaning of sediments in the Elizabeth River, creation of wetlands, and oyster-reef restoration. The land-building and terminal construction project, estimated to cost \$2.2 to \$2.5 billion, would also increase the capacity of Craney Island to receive sediments dredged from Hampton Roads waterways. Funding for the project has not yet been secured, however. The Port Authority’s executive director has said that the increased capacity provided by the expansion won’t be needed until 2025 at the earliest. (*Daily Press*, 3/12/10)

•On March 26, the United Nations’ International Maritime Organization adopted a rule—proposed by the United States and Canada in 2009—that will require (starting in 2012) **ocean-going vessels to use low-sulfur fuel within 200 nautical miles** of either nation’s coastline. The rule is intended to reduce by 85 percent vessel-generated emissions of nitrogen oxides and particulates, which can contribute to respiratory disease. The U.S. EPA has estimated that all ships will be in compliance by 2015, at a cost of about \$3.2 billion. (Associated Press, as reported in the *Washington Post*, 3/26/10)

## Drinking Water Issues

•On March 22, U.S. EPA Administrator Lisa Jackson announced that the agency is developing a **new approach to regulating drinking-water contaminants**, which will follow four principles: 1) addressing contaminants as groups rather than one at a time, in order to be more cost-effective; 2) fostering development of new drinking water technologies to address health risks posed by a broad array of contaminants (complementing principle #1); 3) using the authority of various federal statutes for drinking water protection; and 4) seeking partnerships with states on data-collection and —sharing from monitoring by public water systems. Administrator Jackson also announced the agency’s plans to seek stricter regulations for the following four carcinogenic chemicals: tetrachloroethylene, trichloroethylene, acrylamide, and epichlorohydrin. EPA currently is considering regulatory revisions for 14 other chemicals, as well; that list includes arsenic, atrazine, chromium, copper, fluoride, lead, and perchlorate. (U.S. EPA News Release, 3/22/10)

•On March 29, the U.S. EPA announced that it is **listing Bisphenol A (BPA) as a “chemical of concern”** and will be gathering information on BPA levels in surface water, groundwater, and drinking water to determine if BPA levels present a health risk. The agency also plans to require manufacturers of BPA to provide data on potential health impacts. According to the EPA, BPA is “used in the manufacture of a wide range of consumer and industrial products,” including use as a hardener in soda cans, baby bottles, and food containers. EPA News Release, 03/29/10; and *Washington Post*, 3/30/10.

## Energy Use and Developments/Climate Change Developments

### Climate

•In March, Radford University physics professor Rhett Herman led **11 university and high-school students on a two-week trip to study Arctic Ocean ice off the coast of Barrow, Alaska**. The research is investigating effects of climate change on the extent and thickness of the sea ice. Dr. Herman led similar trips in 2003, 2006, and 2008. Point Barrow, a few miles north of the town of Barrow, is the northernmost point in the United States. (*Roanoke Times*, 3/31/10)

•On March 29, the U.S. EPA officially announced that no **stationary sources of carbon dioxide or other greenhouse gases** will be required to get permits under the Clean Air Act before January 2011 at the earliest. The March 29 announcement is the first action implementing the phased schedule for regulating greenhouse gases that EPA Administrator Lisa Jackson had outlined in February 2010. The agency expects to issue greenhouse-gas standards for vehicles “shortly,” according to the news release announcing the delay for stationary-source regulations. (U.S. EPA News Release, 3/29/10)

•Here are some developments following the February 16, 2010, **filing by Virginia Attorney General Kenneth Cuccinelli** of a petition to the U.S. EPA asking the agency to reconsider its December 2009 finding that carbon dioxide and five other greenhouse gases endanger human health by contributing to climate change.

••On March 19 the Southern Environmental Law Center (SELC), headquartered in Charlottesville, filed a motion to intervene in support of the EPA decision; the SELC is representing the Norfolk non-profit organization Wetlands Watch (*Roanoke Times*, 3/22/10).

••As of March 20, 14 other states along with Virginia had joined the legal challenge to the U.S. EPA’s December 2009 finding. The 14 states who had joined by then are Alabama, Florida, Hawaii, Indiana, Kentucky, Louisiana, Mississippi, Nebraska, North Dakota, Oklahoma, South Carolina, South Dakota, Texas, and Utah. (*Richmond Times-Dispatch*, 3/22/10)

••On March 26, the Virginia Air Pollution Board voted 4-3 to inform the U.S. EPA that Attorney General Cuccinelli was not acting on behalf of the board when he filed the February 2010 petition. (*Washington Post*, 3/26/10)

••On April 23, Attorney General Cuccinelli sent a civil investigative demand, or CID, to the University of Virginia, seeking documents related to climate-change research between 1999 and 2005 by former UVA professor Michael Mann, who is now at Penn State. In early, a UVA spokesperson said that the university would comply with the request, but in late May the university changed its position and moved in Albemarle Circuit Court to set aside the attorney general’s subpoena of the documents. Dr. Mann is widely known as the lead author of a 2004 research article (published in the July 2004 issue of the scientific journal *Nature*) that included the so-called “hockey stick” graph showing a dramatic global temperature rise in the past 100 years, compared to temperatures between 1400 and 1900. (*Charlottesville Daily Progress*, 5/3/10 and 5/28/10)

•On May 25, the Virginia Court of Appeals denied the **appeal by the Southern Environmental Law Center (SELC)**, representing several environmental groups, of the **air-emissions permits for Dominion Virginia Power’s coal-fired power plant under construction in Wise County**. The groups were appealing the August 2009 decision by the Richmond Circuit Court rejecting the plaintiffs’ **claim that carbon emissions should be regulated** as part of the air permits, issued by the Virginia Air Pollution Control Board in 2008. SELC’s senior attorney on the case said that Dominion has agreed to voluntary carbon offsets that will reduce the net carbon output of the Wise plant by 1.1 million tons per year. The appeal followed resolution in September 2009 of another aspect of the lawsuit, regarding mercury. While rejecting the carbon-emissions claim, the August 2009 ruling accepted the plaintiffs’ argument to invalidate the original permit because of its mercury provisions, which would have allowed the plant to emit mercury beyond the permit’s limits if the plant were not able to meet the limit. On September 2, 2009, the Va. DEQ issued a new air permit for the plant, removing the provision for exceeding the permit limit. The limit remains the same, at 4.45 pounds of mercury per year. (*Bristol Herald Courier*, 5/26/10 and 10/1/09; and *Richmond Times-Dispatch*, 8/3/09. For a previous *Water Central* item: Nov. 2009 SUPP, p. 6.)

### Energy

•In the March 18 Federal Register, the U.S. EPA announced that it will conduct a study of the **potential water-quality and public-health impacts of the hydraulic fracturing method of recovering natural gas** from bedrock reserves, such as the **Marcellus shale formation** that underlies parts of New York, Pennsylvania,

Maryland, West Virginia, and a small part of Virginia. The technique, which has been used for several decades, involves injecting a mix of water and chemicals underground to displace natural gas from rock. Following a large increase in natural gas drilling using this technique in the Marcellus formation in the past two or three years, concerns have been raised about the water supply needed for the process, how to treat wastewater that is recovered, and what impacts may occur from the drilling water that remains underground. In the first part of the study process, EPA has requested its Science Advisory Board to review and evaluate the agency's approach to the research. The agency is applying \$1.9 million in Fiscal Year 2010 funds to the study and a request for additional funding is in the president's Fiscal Year 2011 budget proposal. "EPA Initiates Hydraulic Fracturing Study: Agency seeks input from Science Advisory Board," U.S. EPA News Release, 3/18/10)

After several years of being in the news in Virginia's northern neighbors, the Marcellus shale story has now reached the Commonwealth. As of late April, the Carrizo LLC company of Houston, Texas, had met all requirements for the Virginia Department of Mines, Minerals and Energy to issue the company a **state permit to drill a natural-gas exploration well in Rockingham County**. The permit would allow a maximum 3,700-foot exploration well in the Bergton area of the county. The well would seek to tap the Marcellus shale. If Carrizo receives the state permit, it would still need a special-use permit from Rockingham County. The county board of supervisors tabled the company's special-use permit request on February 24 in order to gather more information about the exploratory drilling process and its potential environmental impacts. (*Harrisonburg Daily News-Record*, 4/28/10)

**Additional information on the Marcellus shale phenomenon:** Interest in, and production of, natural gas from the Marcellus shale formation has increased dramatically in recent years, particularly following a 2008 Penn State and State University of New York study indicating that the formation might hold up to 50 trillion cubic feet of recoverable natural gas. Production from the formation typically involves horizontal drilling and use of hydraulic fracturing (or "fracking"), which injects a water/sand/chemical mix to break up gas-bearing rock. The increased exploration and drilling activity, particularly in Pennsylvania and New York, has generated substantial economic activity (an estimated \$2 billion to the Pennsylvania economy, according to "New Yorkers warily eye Pa. drilling boom," *Land Letter*, 5/27/10) but has also led to concerns over the drilling's water-supply use, wastewater disposal, potential groundwater impacts, and impacts on communities. (The increased activity in the Marcellus shale formation in Pennsylvania "hit the [Susquehanna River Basin Commission 'like a tsunami,' just like it did every other impacted agency in the state," according to Tom Beauduy, deputy director of the Commission.—"Extra protection in place for water amid drilling," *Wilkes-Barre (Pa.) Times Leader*, 5/30/10). New York State, for example, expects by summer 2010 to have new natural gas-drilling regulations regarding fracking chemicals, testing of private wells prior to drilling, greenhouse gas-emissions, and visual and noise impacts ("New Yorkers warily eye Pa. drilling boom," *Land Letter*, 5/27/10). [For previous *Water Central* items on Marcellus shale developments in other states: Jun., 2009, p. 31; Aug. 2009, p. 30; and Nov. 2009 Supplement, pp. 12-13.]

- On March 2, Maryland's two U.S. senators joined with senators from Connecticut, Oregon, and Washington in co-sponsoring S. 3056 (chief sponsor Sen. Ron Wyden of Oregon), which would repeal Section 311 of the federal Energy Policy Act of 2005 and return to states the authority for siting liquefied natural gas terminals. The 2005 bill gave that authority to the Federal Energy Regulatory Commission (FERC). The involvement of Maryland's senators corresponds to their opposition to the **proposal by Virginia-based AES Corporation to build a liquefied natural gas (LNG) terminal** on the Sparrows Point peninsula in Baltimore County, Maryland (the project would also include an 88-mile pipeline to Pennsylvania). Opponents have cited concerns over potential damage to the Chesapeake Bay and Patapsco River and the proximity to residences and schools. Proponents have cited the project's capacity to help meet regional energy needs and an estimated 50 permanent jobs and 375 construction jobs that the facility would generate. In January 2009, the Federal Energy Regulatory Commission (FERC) approved the terminal and pipeline, but Maryland elected officials planned to continue to oppose the project through the remaining permitting processes by the U.S. Fish and Wildlife Service, U.S. Coast Guard, and U.S. Army Corps of Engineers. As of 6/15/10, S. 3056 was still in the Senate Committee on Energy and Natural Resources. (Capital News Service, 3/3/10; *Baltimore Examiner*, 1/16/09; and *Baltimore Sun*, 5/20/08. For a previous *Water Central* item: Sept. 2008, p. 7)

- On March 25, the federal Nuclear Regulatory Commission (NRC) announced that it had completed the environmental impact statement for a **proposed third reactor at Dominion Virginia Power's North Anna Power Station in Louisa County**. The report concluded that environmental impacts should not preclude development of a third reactor, should Dominion decide to do so. The report noted that water-use impacts, though small in normal years, would be moderate in drought years, and the construction would generate impacts the

Dominion could mitigate with practices to minimize soil and water erosion and by avoiding placement of a transmission line near streams. Dominion has applied to the NRC for a “combined license” that would allow it both to build and operate a third reactor. A decision by the NRC is expected in 2011. (*Fredericksburg Free Lance-Star*, 3/26/10. For a previous special news item on this topic, please see the June 2006 *Water Central*, p. 19.)

•Here are some recent developments on **Old Dominion Electric Cooperative’s (ODEC) proposed coal-fired power plant in southeastern Virginia**. 1) In April, ODEC and the Town of Dendron filed a motion in Surry County Circuit Court for dismissal of a lawsuit filed on March 2 by four Surry County residents and owners of property near the proposed plant site. The lawsuit plaintiffs allege that the Town violated state law when it voted on the conditional permit and rezoning request for the project on February 4, following a public hearing. The complaint asserts that legally required public advertisements for the meeting held that night did not state that a vote would be taken and that the advertisements did not include certain other necessary details. Meanwhile, federal and state agencies are proceeding with studies related to environmental permits needed for the plant. 2) In early May, Dominion announced that it has purchased—for \$14.3 million--the two properties in Dendron on which it intends to build the plant. The company also has purchased—for \$1.1 million—4.1 acres along the James River in Surry County, where the water intake for the plant would be placed. (*Daily Press*, 3/3/10, 4/20/10, and 5/7/10. For a previous *Water Central* item on the proposed plant: Feb. 2010, p. 16.)

•On April 13, Va. Gov. Robert McDonnell announced that the EcomNets company—headquartered in Herndon—will invest \$1.9 million to move its “green technology” operations to Danville, including a **plant to produce energy-efficient computers**. The company is expected to invest \$1.9 million and generate 160 jobs. State incentives to bring the company included \$500,000 in Tobacco Region Opportunity Funds, training assistance by the Virginia Department of Business Assistance through the Virginia Jobs Investment Program, eligibility for the company for a Major Business Facility Job Tax Credit. (Virginia Governor’s News Release, 4/13/10)

•Students, faculty, administrators, and staff at **Ferrum College** (Franklin County) are involved in **several initiatives to conserve energy** and implement other environmentally sustainable practices. The efforts include getting about 30 percent of the college cafeteria’s food from local farms (including the college’s own farm), with a goal of 50-percent local food, and monitoring campus buildings to identify energy-saving opportunities, such as using energy-efficient bulbs, replacing dirty air filters, and using power strips to reduce energy use from electronic devices that can continue to use energy even when turned off. The college plans ultimately to install a biomass-based power plant on campus that could use locally grown switchgrass or wood chips from local logging operations. (*Roanoke Times*, 4/7/10)

•In late April, the U.S. EPA reported that it had found **no public-health threat from contaminants in the soil beneath the Battlefield Golf Club’s course in Chesapeake**. The area is the subject of a \$1-billion lawsuit by more than 400 Chesapeake residents over alleged groundwater contamination from **coal combustion by-products (fly ash)** used in 2002 to construct the golf course. The material came from Dominion Virginia Power’s Deep Creek Power Plant. Since 2008, the EPA had paid a contractor to test 22 golf-course wells and 55 nearby residential wells. In those tests, arsenic, lead, and other contaminants were found in the golf-course test wells, but EPA concluded that these materials were not moving from the golf course to the residential wells. Lead has been found in some residential wells and the EPA offered to do further tests on those wells. Dominion is to continue monitoring the golf course wells four times annually, under oversight by the Virginia Department of Environmental Quality. **Here is some background on the lawsuit:** Starting in 2002, some 1.5 million tons of ash from Dominion Virginia Power’s Deep Creek Power Plant were used in building the golf course. Starting in March 2008, a series of *Virginian-Pilot* articles described the use of the ash and alleged impacts on nearby groundwater. In August 2008, Dominion offered to provide up to \$6 million to extend water-supply lines to the area near the golf course. On March 26, 2009, a lawsuit was filed on behalf of 400 Chesapeake residents against Dominion over alleged impacts to groundwater from the fly ash. On January 21, 2010, in Circuit Court in Chesapeake, Dominion Virginia Power presented arguments for its motion of dismissal of the lawsuit; Judge Randy Smith said that he would research other similar cases before ruling on Dominion’s motion. (*Virginian-Pilot*, 4/23/10, 1/22/10, and 5/3/09.

In a related item: On May 4, the U.S. EPA announced **proposed regulations for disposal of coal-combustion residuals** (also referred to as CCR, coal ash). According to the EPA Web site on the proposed rule (<http://www.epa.gov/epawaste/nonhaz/industrial/special/fossil/ccr-rule/index.htm>), the proposed regulations “will provide for the first time on a national basis that liners and ground water monitoring are in place at new landfills handling coal ash in order to prevent leaching of contaminants to groundwater and resulting risks to human

health. ..EPA is adopting measures intended to phase out the wet handling of CCRs and existing surface impoundments; ...existing impoundments would require liners, which will create strong incentives to close these impoundments and transition to safer landfills which store coal ash in dry form.” The proposed regulations will call for public comment on two options for enforcing requirements for landfill liners, groundwater monitoring, etc.: one would set up a system of required federal and state permits; the second would depend on citizen lawsuits (with states able to act as “citizens”). The proposed regulations would also address the structure of dams used to create coal ash storage lagoons, such as the one that broke near Kinston, Tennessee, in December 2008, leading to a large spill. EPA will have a 90-day public comment period following publication of the proposed rule in the *Federal Register*, expected on June 21. (U.S. EPA News Release, 5/4/10)

•In early May, Osage BioEnergy said that it expects to begin in July produce its **first ethanol fuel from barley at the Appomattox BioEnergy plant being built in Hopewell**. Barley harvesting in the region around Hopewell begins in May. *Commercial scale* of ethanol production—using about 30 million bushels of barley to produce about 65 million gallons of ethanol annually—is expected to begin in August. (*Richmond Times-Dispatch*, 5/10/10; for a previous *Water Central* item on the plant: Aug. 2009, p. 23.)

•Here are several **wind-energy** items:

••On March 1, the Virginia State Corporation Commission (SCC) gave final approval to the **19-turbine wind-energy project in Highland County**. The SCC had approved the project in 2007, but in August 2009 the Virginia Department of Historic Resources (DHR) filed a complaint that the project developers had not adequately consulted with the department over the potential impacts of the project on views from Camp Alleghany Battlefield. The SCC dismissed the DHR’s complaint based on a state law that disallows the SCC from considering issues of views of the project because the Highland County Board of Supervisors had already done so when it granted the project a conditional use permit. The SCC case number is PUE-2009-00092, and one can search for case documents at <http://docket.scc.virginia.gov/vaproduct/main.asp>. (*Roanoke Times*, 3/2/10. Previous *Water Central* items on the Highland project: 8/09 p. 23 and 11/09 supplement p.5.)

••In early March, Chicago-based Invenergy announced its intention to develop a **15-turbine wind-energy project on Poor Mountain in Roanoke County**. First estimates for the project are that it would cost \$80-100 million, generate enough electricity for about 8000 households, employ 50 to 100 people during construction and three people in permanent jobs, and occupy a small part of a 2000-acre area that Invenergy has leased. The company would need permits from the Federal Aviation Agency, Roanoke County, the Virginia State Corporation Commission, the Virginia Department of Environmental Quality, and the Virginia Department of Game and Inland Fisheries. In 2006, Invenergy investigated the possibility of building a wind-energy project in the same area. (*Roanoke Times*, 3/3/10)

••On March 16, the **York County** Board of Supervisors approved an ordinance allowing small wind-energy turbines as an accessory to residences or businesses. At least two other southeastern Virginia localities, Suffolk and Virginia Beach, have also enacted wind-energy ordinances. (*Daily Press*, 3/16/10)

••At the Southwest Virginia Technology Council’s third annual energy technology summit in Wise on April 19, a spokesperson for Dominion Virginia Power said that the company still hopes to build a wind-energy facility on East River Mountain in Tazewell County, despite the February 2<sup>nd</sup> passage by the Tazewell County Board of Supervisors of an ordinance that would prevent structures as high as the turbines that would be used in the project. A second spokesperson in Richmond told the *Bristol Herald-Courier* that the company believes county elected officials eventually will change their minds on the project. Dominion is also continuing to pursue a wind-energy project in Wise County. (*Bristol Herald Courier*, 4/20/10. Dominion’s Web site on its wind-energy projects in Virginia is <http://www.dom.com/about/stations/renewable/virginia-wind-projects/index.jsp>.)

••And in an item outside of Virginia, but important to a potential wind-energy industry in the Commonwealth: On April 28, U.S. Secretary of the Interior Kenneth Salazar gave **final federal approval for the Cape Wind project**, a 130-turbine, 25-square-mile wind-energy project to be built in Massachusetts’ Nantucket Sound by the New England-based company Energy Management, Inc. Cape Wind is the first federally approved offshore wind-energy project. The approval followed nearly 10 years of permit reviews and political controversy over the project’s potential impacts on tourism, sea birds and other wildlife, and the culture and history of two local tribes. A group of project opponents announced on April 28 that they plan to challenge the decision in court. (*Washington Post*, 4/29/10)

## Fishing and Fisheries

•In March, a committee of Waynesboro Downtown Development, Inc., presented a plan to develop a **Center for Coldwaters Restoration along the South River in Waynesboro**. The proposed center would be an advanced hatchery for Brook Trout and could support research and education on the water-resources impacts of climate change, land use, development, and chemical contamination. Proponents assert that the facility could provide 50 jobs. The committee is seeking \$5 million for construction and the first five years of operation and hopes to the facility by 2012. (*Waynesboro News Virginian*, 4/14/10. For a previous *Water Central* item on mercury in the South River: Feb. 2010, p. 14.)

•On May 5, ground was broken in Melfa (Accomack County) for the **Robert S. Bloxom Eastern Shore Agricultural Complex**, which will house a **new seafood storage-facility**, a regional office for the Virginia Department of Agriculture and Consumer Services, and the offices of the Eastern Shore Soil and Water Conservation District. The seafood-storage facility is intended to allow fish harvesters more opportunity to match deliveries of their catch with market demand. (Virginia Governor's Office News Release, 5/5/10)

•On May 5, the Atlantic States Marine Fisheries Commission (ASMFC) voted to have a **scientific review committee examine the Commission's current harvest limits for Menhaden** and determine whether the current population-level goals and harvests are resulting in a sustainable Menhaden population. The Commission's decision followed their review of the latest report (or stock assessment) estimating Menhaden populations, which found that populations in 2008 were only slightly above the level presumed to indicate the ability of the population to replenish itself; harvests that reduce the population below this level are considered "overfishing." The stock assessment is available online at [www.asmfc.org/speciesDocuments/menhaden/reports/stockAssessments/menhaden2010StockAssessmentOverview.pdf](http://www.asmfc.org/speciesDocuments/menhaden/reports/stockAssessments/menhaden2010StockAssessmentOverview.pdf). The region's only industrial-scale Menhaden harvesting operation is run by Omega Protein out of Reedsville, Virginia. A May 5 news release by Omega emphasized that the new stock assessment did not find that overfishing is occurring. Any proposed changes to Menhaden quotas would require a public review and comment period. (*Annapolis Capital*, 5/7/10. For a previous *Water Central* item on Menhaden management: Jan. 2007, p.19.)

## Groundwater

•A Culpeper County man's attempt to dispose of vegetable oil resulted in an **expensive lesson about the connections between groundwater and surface waters**. Believing the material would break down in the soil and not spread (according to his statements), the man on about April 20 poured about 300 gallons of vegetable oil into a groundhog hole an estimated 30 to 40 feet from an unnamed tributary of the Hazel River (in turn, a Rappahannock River tributary). The oil reached the unnamed tributary and by mid-May was within several feet (and may have entered) the Hazel River, according to a Virginia Department of Environmental Quality pollution-response investigator. The DEQ spent over \$14,000 to remove the oil and affected soil and to take several other actions. As of mid-May, the DEQ's Central Office had not yet decided whether to issue the Culpeper man a notice of violation or seek to recover from him any of the clean-up costs. (*Culpeper Star-Exponent*, 5/19/10)

## Land Use

•On April 19, the U.S. EPA announced that the **City of Roanoke** will receive a \$200,000 grant to help **identify "brownfields" in the city and develop a clean-up plan**. Brownfields are properties that have been contaminated by past industrial activities or other uses. EPA's brownfields program seeks to help communities restore such properties to productive uses. Roanoke was the only Virginia community to receive one of the 304 grants, totaling \$78.9 million, in the Fiscal Year 2010 brownfields funding. The list of awardees and more information about EPA's brownfields grants are available online at [http://www.epa.gov/brownfields/pilot\\_grants.htm](http://www.epa.gov/brownfields/pilot_grants.htm). (*Roanoke Times*, 4/20/10)

•On April 23, Governor McDonnell's office announced that the Virginia Department of Forestry, the Virginia Department of Conservation and Recreation, Isle of Wight County, and the Nature Conservancy will purchase—and **place under permanent conservation easement—2507 acres of forest land in Isle of Wight**. The property was purchased with \$850,000 in federal Forest Legacy funds; \$566,000 from the Virginia Land Conservation Fund; and \$75,000 from the U.S. Fish and Wildlife Service through the North American Wetlands Conservation Act program. The tract includes over five miles of **riverfront along the Blackwater River** and is

considered prime habitat for Longleaf Pine, a once-widespread tree in the southeastern United States that now has been reduced to a small percentage of its original area. (Virginia Governor's News Release, 4/23/10)

• **Plants** are a key part of the environment surrounding water bodies. By late 2012, anyone who wants to know about plants that live near Virginia's waters—or about any of over 3,500 plants found in Virginia—will be able to consult the *Flora of Virginia*. Expected to be 1,400 pages long, the *Flora* will be the result of years of effort by professional and amateur botanists in the state. The *Flora* will provide common and scientific names, descriptions, habitat information, and more. (*Bulletin of the Virginia Native Plant Society*, Winter 2010)

## Military

• In May, Robert Real, the environmental coordinator for Defense Base Closure and Realignment Commission, said the **clean-up of Fort Monroe in Hampton will cost an estimated \$60-70 million**, considerably less than previously reported estimates. The U.S. Army will leave the 570-acre facility in 2011. Areas requiring environmental clean-up work include weapon ranges that extend into the Chesapeake Bay, underground storage tanks, an old landfill, and a former automotive repair area. After the Army leaves, the Commonwealth will own the facility and the Fort Monroe Federal Area Development Authority will manage it, possibly to offer education about the area's military history and natural environment. (*Daily Press*, 5/7/10)

## Mining

• On April 1, the U.S. EPA issued a regulatory guidance to its regional offices in Appalachian states that details **stricter permitting requirements on disposal of mountaintop-removal mining waste in stream valleys, or "valley fills."** According to the agency press release on the action, the new permitting guidance does the following: 1) "Incorporates the latest scientific information in clarifying how CWA permits should assure compliance with existing water quality standards to protect the use of streams by communities and to ensure healthy aquatic life;" 2) "Clarifies how CWA requirements apply to the disposal of mining overburden in streams to reduce the size and number of valley fills, to limit water quality contamination of streams near mining operations, and to prevent significant environmental degradation of streams and wetlands;" and 3) "Improves opportunities for the voices of adversely affected Appalachian communities to be heard in the process of reviewing proposed new mining operations." EPA estimates that about 2,000 miles of small, headwater streams in the Appalachians have been covered by waste from mountaintop mining. The agency will seek public comment on the guidance, but the document became effective immediately for all *new* permits. EPA's Web site for all the guidance-related documents is "Surface Coal Mining Activities under Clean Water Act Section 404," at <http://www.epa.gov/owow/wetlands/guidance/mining.html>. According to accounts of the announcement in April 2 editions of the *Bristol Herald-Courier* and the *Washington Post* (4/2/10), the action was applauded by various environmental and Appalachian community groups who oppose mountaintop-removal/valley fills, while various representatives of the coal industry and mining associations asserted that the new rules will increase coal-mining costs, increase the time for getting permits, change the design of mining operations, disrupt the fuel supply to coal-fired power plants, harm the economies of areas dependent on miners' incomes, and, in general, "strictly limit coal mining in Appalachia" (quote from Luke Popovich of the National Mining Association, in the *Washington Post*). (U.S. EPA News Release, 4/1/10; *Bristol Herald-Courier*, 4/2/10; and *Washington Post*, 4/2/10. For the most recent previous *Water Central* items: Aug. 2009, p.25; Nov. 2009 SUPP, p.9)

• Through the middle of the 1900's, coal mining routinely produced **large piles of rock and waste coal, known as "gob piles."** According to the Department of Mines, Minerals and Energy, Virginia has hundreds of gob piles, some as large as 20 acres and several hundred feet thick. The piles can collapse (a collapse in Dickenson County in the 1950s killed two people), slide into homes, contaminate waterways, and catch fire spontaneously, producing toxic air emissions. Eight companies in Virginia mine the coal from the piles, eventually removing them, but only seven are currently being mined and only 15 have been removed. The new Dominion coal-fired power plant under construction in Wise County is designed to burn the waste coal in gob piles, and this is expected to help reduce the number of piles in the area. The mile-long Hurricane Creek pile along the Hurricane Fork of Dumps Creek in Russell County is expected to be one of the first gob piles used by the new plant. (*Bristol Herald-Courier*, 3/7/10)

• On April 29, the **Virginia Tobacco Commission approved \$200,000 for a study of the socioeconomic effects of proposed uranium mining** and milling in Pittsylvania County. Virginia Uranium Inc. (VUI) proposes to mine an estimated 119 million pounds of uranium ore in the Coles Hill area of the county, near the town of Chatham. At least three other studies of the proposed mining are planned or occurring: 1) a study by the

National Research Council on environmental, health, safety, and scientific aspects of uranium mining and processing in Virginia; 2) a regional socioeconomic study by the Danville Regional Foundation; and 3) a study by Virginia Beach of the potential downstream impacts if flooding were to occur during uranium mining at the proposed site. (*Lynchburg News & Advance*, 4/30/10. For a previous *Water Central* item on Pittsylvania uranium: Feb. 2010, p. 17.)

## Oceans

•From March to May, the U.S. EPA took public comment on **ocean acidification** as it relates to Clean Water Act section 303(d) (also known as the Total Maximum Daily Loads, or TMDL, Program). Ocean acidification (OA) refers to the decrease in the oceans' pH caused by the uptake of carbon dioxide from the atmosphere. A *Federal Register* notice was published on March 22, 2010; the 60-day public comment period ended May 21, 2010. EPA was soliciting specific input on what considerations the agency should consider when deciding how to address listing of waters as threatened or impaired for ocean acidification under the 303(d) program. By November 15, 2010, EPA will complete a memorandum that describes how the agency plans intends to proceed with its section 303(d) program in light of the responses to the notice. More information and a link to the Federal Register notice are available online at [http://www.epa.gov/owow/tmdl/oceanfrMarch\\_2010/](http://www.epa.gov/owow/tmdl/oceanfrMarch_2010/).

## Spills, Accidents, and Other Incidents

•On March 26, a **Chesapeake and Albemarle Railroad train derailed on a trestle over the Intracoastal Waterway** in Chesapeake. The accident left the train locomotive dangling from the trestle for most of one day until a crane barge and a second train removed it. The accident ruptured the locomotive's fuel tank, spilling about 1,700 gallons of diesel fuel into the Waterway. About 70 percent of the fuel had been removed within a day, and the U.S. Coast Guard expected the rest to be recovered by the second day. The Waterway was closed for about one day. (*Norfolk Virginian-Pilot*, 3/26/10; and *Daily Press*, 3/29/10)

•By late March, a spill that occurred on or about March 3 of over **11,000 gallons of gasoline from a service station in western Henrico County** apparently had been contained without contamination of public water supplies or of damage to nearby stream, according to Virginia DEQ officials coordinating the clean-up. The incident resulted from a leaking underground storage tank at the service station. (WWBT Television, 3/24/10; and *Richmond Times-Dispatch*, 3/18/10)

## Stormwater

•In February, Wetlands Studies and Solutions (WSS), a natural resources consulting company in Gainesville, published **information challenging an estimate in a 2005 research paper** that the area of pavement and other **impervious surface in the Chesapeake Bay watershed increased by 41 percent from 1990 to 2000**, a period during which the watershed's population increased by about 8 to 10 percent. WSS's paper estimates that the increase in impervious surface was only about 14 percent. The 41-percent figure, compared to the 8-percent population estimate (WSS uses 10.3 percent as the population increase for the decade) has been widely cited by the U.S. EPA and others in discussion of with stormwater management and its role in Chesapeake Bay restoration efforts. Wetland Studies and Solutions paper, "An Analysis of Impervious Area Increase vs. Population Growth in the Chesapeake Bay Watershed between 1990 and 2000" (dated 2/23/10), is available online at [www.wetlandstudies.com/portals/4/TMDL/2010-02-23\\_Impervious\\_Increase\\_with\\_Appendices.pdf](http://www.wetlandstudies.com/portals/4/TMDL/2010-02-23_Impervious_Increase_with_Appendices.pdf). Additional information is available in "The Debate on Impervious Area and Population Growth in the Chesapeake Bay Watershed," in *Field Notes*, Wetland Studies newsletter, 3/31/10, online at <http://newsletters.wetlandstudies.com/fieldNotes.cfm?id=54>. The article on which the 41-percent statements have been based, "Urbanization and the Loss of Resource Lands in the Chesapeake Bay Watershed," was published in the scientific journal *Environmental Management* (Vol., 36, No. 6, December 2005, pp.808-825); see specifically the sub-section, "Impervious Surface Maps," in the Results section.

•In a consent order signed in February, the Virginia Department of Conservation and Recreation required the **developer of eight-household Ivy Creek Farm in Lynchburg to restore 650 feet of a stream, remove sediment from a pond, and pay an \$8,000 fine for sediment runoff** from the development site. Such penalties are relatively rare, according to a DCR inspector who said he's seen only about six situations in two years result in penalties. Erosion-control problems at the site, beginning in 2008, had focused attention on

problems in the City's erosion and sediment control program and ordinance enforcement, leading the City to combine its inspection and enforcement programs. (*Lynchburg News & Advance*, 4/5/10)

•In March, the **Virginia Zoo in Norfolk received designation as a "Virginia Green" attraction.** The Virginia Green program, coordinated by the Virginia Department of Environmental Quality, the Virginia Tourism Corporation, and the Virginia Hospitality and Tourism Association, recognizes Virginia tourism businesses that reduce environmental impacts. The Norfolk Zoo received the recognition for various practices, including the following: recycling and solid-waste reduction, reducing water use in cleaning animal enclosures, eliminating use of styrofoam, reducing use of electricity by using more natural lighting and sensors to turn off lights when not in use, limiting irrigation of gardens and using drip irrigation, using rain gardens to help filter stormwater, restoring wetlands at the Zoo, removing invasive plants, practicing organic gardening, and building a demonstration **"green roof" to reduce rainwater runoff from a dog house.** (*Daily Press*, 3/17/10)

•Here's a **local-government stormwater "snapshot."** In April, the **Accomack County Board of Supervisors received an extensive briefing on existing, upcoming, and potential stormwater-management regulatory options.** In late 2008 and early 2009, the board had considered a local stormwater-management ordinance—based on a model state ordinance—but in 2009 decided to seek more information. The recent workshop included representatives from the Virginia Department of Conservation and Recreation, the Virginia Department of Transportation, the U.S. Army Corps of Engineers, the U.S. Natural Resource Conservation Service, local departments, and private engineering firms. According to the news account of the workshop, the following were key points made at the workshop; the three points frame the current and future stormwater situation for Accomack and are applicable to other, similar Virginia localities. 1) Stormwater management is now optional for many Virginia localities (except as required under federal stormwater regulations for industries, construction, and municipalities of a certain size), but may be required under new state stormwater regulations (now delayed under sometime in 2011). 2) Accomack already does much of what the new regulations would require, because of erosion/sediment-control regulations and because of being subject to Chesapeake Bay Preservation Act rules. 3) A stormwater ordinance would give the county a tool for managing local flooding not addressed by other regulations, developing stormwater-management plans for watersheds, requiring long-term maintenance of stormwater ponds and other facilities, and collecting fees to administer stormwater management. (*Eastern Shore News*, 4/14/10)

•On April 20, the U.S. EPA and K. Hovnanian Homes—a large, nationwide home-building company—announced a **settlement over an alleged 591 Clean Water Act violations in 18 states and Washington, D.C., related to stormwater management at construction sites.** Seventy of the sites in the EPA complaint are in Virginia. The settlement includes a \$1-million fine and requirement for Hovnanian to develop a company-wide stormwater-management plan, increase site inspections, improve training, and submit annual reports to the EPA. EPA estimates that the settlement will result in a decrease of 366 million pounds in sediment runoff from Hovnanian sites nationwide and an 81-million pound decrease in the Chesapeake Bay watershed. EPA information about the settlement is available online at <http://www.epa.gov/compliance/resources/cases/civil/cwa/hovnanian.html>. (*Fredericksburg Free Lance-Star*, 4/23/10; and *Annapolis Capital*, 4/25/10).

•On May 3, Virginia Attorney General Kenneth Cuccinelli filed a complaint in Richmond Circuit Court, and simultaneously announced a proposed consent decree, over **alleged construction stormwater violations by Flour Lane LLC**, the main construction contractor on the project to build 14 miles of new high-occupancy, or HOT, lanes on the Capital Beltway in Virginia. Under the proposed settlement, the company will pay a \$66,540 fine for alleged violations and will implement an improved stormwater maintenance and inspection program, including weekly reviews by an independent auditor. The proposed settlement would allow construction to continue on the \$1.4-billion project. The Virginia Soil and Water Conservation Board will publish the proposed consent decree, provide a 30-day public-comment period, and evaluate any comments received to determine whether or not to seek amendments to the consent decree. (Virginia Attorney General's Office News Release, 5/5/10; and personal communication from the director of communication for the Attorney General Office, 5/10/10.)

## **Waste Management (including solid and toxic waste)**

•The Augusta Regional Landfill, servicing Augusta County and the cities of Waynesboro and Staunton, is one of many facilities throughout Virginia seeking to use **landfill-generated methane as an energy source.** On March 22, the Waynesboro City Council approved a resolution in support of such efforts by the Authority, a

necessary step for the Authority to seek grants. The Staunton City Council and Augusta County Board of Supervisors were expected to pass similar resolutions. (*Staunton News Leader*, 3/23/10. For the most recent previous *Water Central* item on landfill methane use, please see the June 2009 issue, p. 26.)

•On March 30, the Virginia DEQ issued the latest **annual Toxics Release Inventory**, covering data reported for 2008. The report lists types and amounts of chemicals released and reported by industries. According to a DEQ news release, Virginia had “51.6 million pounds of chemicals released on-site to the air, water, and land (a 20.4 percent decrease from 2007); 84 million pounds of chemicals transferred off-site for treatment, recycling, energy recovery, or disposal (a 5.8 percent decrease from 2007), and 860.5 million pounds of chemicals managed on-site by treatment, recycling, or energy recovery (a 10.4 percent increase from 2007).” According to the *Roanoke Times*, DEQ spokesperson Bill Hayden said that most of the 455 industries reporting in the TRI were in compliance with state and federal regulations, and the top three releasing industries on the list were as follows: Radford Army Ammunition Plant, Pulaski County, 14.3 million pounds; Chesterfield Power Station, 3.8 million pounds; and MeadWestvaco’s paper mill in Covington, 3.3 million pounds. The Web site for the report is <http://www.deq.virginia.gov/sara3/3132008.html>. (Virginia DEQ News Release, 3/30/10; and *Roanoke Times*, 3/31/10)

## Wastewater

•In a February 25 letter to the Virginia DEQ, the County Administrator for Campbell County requested that the DEQ reject an **application by Nutri-Blend, Inc., to land-apply biosolids** (treated sewage sludge) on 35 Campbell county land tracts because, the county asserted, landowner names on 12 tracts do not match county records. The county asserted that they raised the issue of **property ownership verification** with Nutri-blend in 2006, during a previous permit-modification request. The county also questioned whether the DEQ’s permit-review procedures are adequate to ownership of properties intended for biosolids application. Nutri-Blend responded on March 5 that the discrepancies resulted from land transfers during a two-year permit-application process, and both the company and the DEQ have said that the discrepancies in the permit application had been corrected. The head of the DEQ’s biosolids program, however, said that the agency would review its permitting procedures for ensuring that biosolids land-application occur only where property owners have given permission. (*Lynchburg News & Advance*, 3/4/10 and 3/5/10; and *Altavista Journal*, 3/21/10)

•Trial was scheduled for May 2010 in Alexandria Circuit Court over a **dispute between the Alexandria Sanitation Authority and a landowner** who is challenging a **\$20-million assessment of 10 acres** that the Authority has taken, through eminent domain, for expanding and upgrading its wastewater-treatment plant (in part to comply with Chesapeake Bay-related nutrient requirements). The landowner, Charles Hooff, asserts that a developer was prepared to pay \$48 million for the property. The trial will determine the price to be paid for the property. (*Alexandria Gazette Packet*, 3/4/10)

•As of early March, the **Town of Altavista** (in Campbell County) was attempting to develop a **plan for addressing polychlorinated biphenyls (PCBs) that were found in the town’s wastewater lagoons in 2000**. Town officials believe the PCBs have been in the lagoons since the 1970s. The town has been in a voluntary remediation program with the Virginia DEQ since 2002, but the town faced an April deadline to provide DEQ with a definite remediation plan or some sign of action. Remediation options include hauling the PCB-laden sediments away, burning the sediments and capturing the toxin, or biological remediation with bacteria (in July 2009, the VDEQ gave verbal approval for the town to investigate using bacteria to break down the PCBs). (*Altavista Journal*, 3/12/10; and *Lynchburg News & Advance*, 7/15/09)

•On March 22, the State Water Control Board (SWCB) took public comments on the application of Synagro Central LLC to **land-apply biosolids (treated sewage sludge) on about 140 acres in northern Amherst County about 500 feet from the Virginia Blue Ridge Railway Trail and the Piney River**. Local concerns and opposition have focused on the potential for the application to discourage prospective trail users and possible impacts on the river. Current Virginia regulations allow land-application of biosolids 50 feet from perennial streams (35 feet if incorporated into the soil, and 100 feet if on slopes 7 percent or greater and during the period November 16-March 15). The SWCB is currently considering possible changes to regulations for land-application of biosolids; the proposed changes would add a new buffer of 400 feet from water-supply reservoirs and 100 feet from all perennial streams and tributaries used as a public water supply (information online at <http://www.townhall.state.va.us/L/ViewStage.cfm?stageid=5374>). Neither the existing regulations nor the

proposed changes establish a set-back from trails (only from “improved roadways”—10 feet, 5 feet if incorporated). Information from the Virginia Department of Environmental Quality on biosolids is available online at <http://www.deq.virginia.gov/vpdes/sewage.html>. Current Virginia biosolids buffer distances (“set-backs”) are listed in Virginia Pollution Abatement regulation 9 VAC 25-32-560 (online at <http://leg1.state.va.us/cgi-bin/legp504.exe?000+reg+9VAC25-32-560>). (*Lynchburg News & Advance*, 3/23/10)

- In early April, the **Fairfax County** Board of Supervisors was considering **increased sewer fees** as part of a plan to cover a projected \$257-million budget shortfall in the coming fiscal year as well as to help pay for Chesapeake Bay-related requirements to remove more nitrogen from wastewater. At public hearings beginning April 6, the supervisors considered sewer rate increases that would, on average, cost about \$60 more per household annually, raising an estimated \$18 million per year in the coming year. (*Washington Examiner*, 4/6/10)

- In April, **Stafford County** and the Virginia DEQ agreed to a **consent decree over several incidents in 2009 at wastewater-system pumping stations in the county**, resulting in spills of about 2.5 million gallons of sewage into county streams. Under the consent decree, the county would pay a \$43,225 fine, of which \$38,902 would be used by the Tri-County/City Soil and Water Conservation district for conservation projects in the Aquia Creek watershed, where the spills occurred. The county also would be required to improve its remote monitoring and reporting from its pump stations and treatment plant. The consent order was subject to a public comment period for 30 days (May 11-June 10), then consideration by the SWCB. A copy of the order is available online at [www.deq.virginia.gov/export/sites/default/enforcement/publicnotices/AquiaWWTP-CO-facilitysignature.pdf](http://www.deq.virginia.gov/export/sites/default/enforcement/publicnotices/AquiaWWTP-CO-facilitysignature.pdf). (*Fredericksburg Free Lance-Star*, 5/13/10)

Also in April, the **Louisa County Water Authority** and the Virginia DEQ agreed to a consent decree regarding **violations of wastewater-discharge limits and reporting requirements** in 2008-2009 at the Zion Crossroads Wastewater Treatment Plant in Louisa. Under the order, the Authority would pay a \$58,050 fine and submit to the DEQ a plan to correct problems that led to the violations. The consent order was subject to a public comment period for 30 days (May 7-June 10), then consideration by the SWCB. The Louisa consent order is available at [www.deq.virginia.gov/export/sites/default/enforcement/publicnotices/LouisaCoWaterAuthCO.pdf](http://www.deq.virginia.gov/export/sites/default/enforcement/publicnotices/LouisaCoWaterAuthCO.pdf). (*Fredericksburg Free Lance-Star*, 5/17/10)

A list of all DEQ consent orders currently available for public comment is available at [www.deq.virginia.gov/enforcement/notices.html](http://www.deq.virginia.gov/enforcement/notices.html).

- In an April 21 warning letter, the Virginia DEQ said the **City of Charlottesville had 40 sewage overflow violations occurred in the city between July 2008 and March 2010**. The City’s overflows occur when stormwater enters cracks in aging pipes in the sanitary sewer system. (A January 2010 video by a Charlottesville citizen, posted on YouTube at <http://www.youtube.com/watch?v=KgXewYjz5Xg>, shows an example of such overflows.) Charlottesville learned in January 2008 that needed repairs and upgrades to its sewer system could cost \$26.7 million over the next five years. After the warning letter, the DEQ met with the City to hear of its plans to spend \$28 million to repair or replace wastewater infrastructure, and the DEQ considered the City’s efforts adequate at that point, according to a City public works spokesperson. (NBC 29, 5/25/10; and *Charlottesville Daily Progress*, 1/8/08)

- On May 27, the Hampton Roads Sanitation District and the Canadian company Ostara formally dedicated a **\$5-million facility at the Nansemond wastewater treatment plant in Suffolk that will convert struvite**—a material caused from phosphorus build up—into a usable fertilizer. The Suffolk struvite-conversion facility, which began operating in early May, is only the second one in the United States (the first opened in 2009 in Oregon). The process does not remove any additional phosphorus from the wastewater, but it does improve the plant’s performance by removing pipe-blocking build-ups of struvite, and it makes use of a product that previously has been burned in the sewage plant’s incinerator. The slow-release phosphorus fertilizer generated is being marketed by Ostara as “Crystal Green” and is being sold in the Hampton Roads area. (*Virginian-Pilot*, 5/28/10)

## Water Supply and Conservation

- The Halifax County Service Authority will receive \$1,072,146 in American Recovery and Reinvestment Act (the 2009 federal stimulus) funds for a waterline extension north of the Town of Halifax to serve an area where wells were contaminated by a leaking underground storage tank. The extension may also allow for economic development in new areas of the county. The grant comes from \$200 million in federal stimulus funds allocated by

the U.S. EPA nationwide for the Leaking Underground Storage Tank Trust Fund. (*South Boston News and Record*, 4/26/10)

•Here are some recent developments in **water-supply planning in the Albemarle-Charlottesville area.**

••On February 23, the Lynchburg engineering firm Wiley & Wilson presented to the Charlottesville City Council their review of the concept of building a pipeline from the South Fork Rivanna River reservoir to an expanded Ragged Mountain reservoir. The \$25,000 Wiley and Wilson study asserted that the concept is “reasonable” and estimated the cost of the pipeline project at \$63 million (this does not include the costs of the Ragged Mountain reservoir expansion). This study is one of several revisiting various aspects of a long-term water-supply plan approved by the city and by Albemarle County in 2006. The new studies followed increased costs estimates in 2008 for the Ragged Mountain expansion and continuing local calls for reexamining other options, particularly dredging the South Fork reservoir. (*Charlottesville Daily Progress*, 2/24/10)

••In April, Rivanna Water and Sewer Authority (RWSA) Executive Director Thomas Frederick reported to the Charlottesville City Council that a revised preliminary design and cost estimate for the Ragged Mountain Reservoir expansion is due from Schnabel Engineering in late May, and a feasibility study on dredging the South Fork reservoir is due from HDR Engineering in June. Mr. Frederick also said that RWSA does not have staff or funds to complete a new demand-analysis study, which Mayor David Norris requested because a decrease in water use in the area since 2006 has raised questions about the demand projects upon which the Ragged Mountain Reservoir expansion plan was based. (*Charlottesville Daily Progress*, 4/7/10)

••Later in April, the RWSA authorized \$30,000 for a review of the demand-analysis done in 2004 by the consultant Gannett Fleming. At that time, Gannett Fleming estimated that the RWSA service area would require 18.7 million gallons per day of capacity in 2055 to meet safe-yield requirements. (*Charlottesville Daily Progress*, 5/5/10)

For a previous update on water-supply planning in the Albemarle-Charlottesville area, please see the Aug. 2009 *Water Central*, p.27. Also, for a review of the recent history of long-term water-supply planning in the Albemarle-Charlottesville area, see the *Charlottesville Tomorrow* Web site, [http://cvillettomorrow.typepad.com/charlottesville\\_tomorrow\\_/2009/07/rwsa\\_july2009.html](http://cvillettomorrow.typepad.com/charlottesville_tomorrow_/2009/07/rwsa_july2009.html)

## Weather

•On March 28, **3.53 inches of rainfall were recorded in Danville**, according to the National Weather Service’s Blacksburg Forecast Office. The amount is a record for that day of the year (records going back to 1948), eclipsing the previous record of 1.37 inches set on March 28, 1994. According to BFO’s [“Precipitation Extremes” Web page](#), the single day rainfall record for *any* day of the year at Danville is 5.81 inches on August 27, 2008, with another nine days having rainfall of 4.17 inches or greater.

•On March 29, the **National Weather Service recognized Virginia Tech** as having completed the hazardous-weather preparations required to receive the Weather Services’ **“Storm Ready” designation**. Virginia Tech is the first Virginia college or university—and the 50<sup>th</sup> in the United States—to receive the designation. Storm Ready preparations include establishing a 24-hour warning location and emergency operations center, having more than one way to receive hazardous weather forecasts and warnings and to alert the community, monitoring local weather conditions, promoting weather readiness through community seminars, and developing and implementing hazardous-weather planning, including training weather spotters and having emergency exercises. (Virginia Tech News, [www.vtnews.vt.edu](http://www.vtnews.vt.edu), 3/29/10)

•On April 28, Governor Robert McDonnell announced that the **federal government approved disaster assistance for Virginia’s recovery** from two winter storms occurring between February 5 and 11, 2010. The assistance will help cover eligible costs of damage to critical infrastructure, debris removal, and related emergency services in 29 counties and eight cities. Assistance was also approved for the costs of snow removal in 13 of these counties and seven of these cities. Other localities may be added to the eligibility list later. Previously, on February 16, Governor McDonnell announced that the federal government approved assistance for 31 counties and nine cities affected by the December 18-20, 2009, snowstorm. (Virginia Governor’s Office News Releases, 4/28/10 and 2/16/10)

## Out of Virginia

- U.S. Rep. Frank Kratovil (Md-1<sup>st</sup>) is seeking federal funding to support the Maryland Department of Agriculture's (MDA) **"Conservation Tracker" and Nutrient Management Program information systems**. The MDA asserts that no system exists currently that comprehensively accounts for agricultural best management practice (BMP) implementation in Maryland. In Maryland and Virginia, farmers at public meetings about the U.S. EPA's Chesapeake Bay TMDL process have called for better recognition of BMPs already being implemented voluntarily (and supported by cost-share funding) that help reduce agricultural runoff. (*American Farm*, 3/22/10)
- In April, workers were nearing completion of a **"living shoreline" project to restore and protect about 1000 feet of Chesapeake Bay shoreline** at the Franklin Manor community in southern Anne Arundel County, Maryland. About \$750,000 in 2009 federal stimulus funds covered most of the project, with the community paying \$32,000 for design work. The project includes six stone breakwaters, around and behind which sand was deposited to support plantings of native marsh grasses (Smooth Cordgrass and Saltmeadow Hay, two species of *Spartina*). The vegetation is designed to help erosion along tributary creeks as well as along the Bay shore. (*Annapolis Capital*, 4/3/10)
- In April, the Center for Progressive Reform, located in Washington, D.C., released a **report asserting that the Maryland Department of the Environment (MDE) is "drastically underfunded"** and its enforcement activities are not keeping pace with an increased number of permits for wastewater and stormwater. The report states that enforcement funds and staff have decreased 25 percent since 2000, and the number of permits assigned to each inspector has tripled since then, to 1,200. The report, "Failing the Bay: Clean Water Act Enforcement in Maryland Falling Short," is available at [www.progressivereform.org/whitePapers.cfm](http://www.progressivereform.org/whitePapers.cfm). (*Baltimore Sun*, 4/7/10)
- In April, the Maryland General Assembly approved an agreement—reached in March among Maryland government officials, representatives of environmental groups, and representatives of developers—on **Maryland's new stormwater-management regulations**, which were scheduled to take effect on May 4, 2010. In general, the new regulations will call for more use of **environmental site design**—techniques to increase or create or retain areas where water can infiltrate into the ground—over traditional stormwater ponds that typically slow and hold water on the surface temporarily. Under the agreement, development projects that received preliminary approval under existing stormwater rules will be allowed to proceed under those rules, as long as they get final local approval by 2013 and are completed by 2017; and redevelopment projects located in designated growth areas and with less than 40 percent impervious surface will receive some waivers from the requirements of the new regulations. On April 5, Maryland officials said that the changes would exempt 1000 to 1500 development projects throughout the state for seven years (more in some cases). Maryland's new standards are being cited as among the strictest in the nation. (*Gazette.net*, 4/15/10; *Maryland Gazette*, 4/10/10; *Baltimore Sun*, 4/6/10 and 3/9/10)
- The 2010 Maryland General Assembly passed legislation (House Bill 974) authorizing an **exchange for nutrient credits to help reduce nitrogen and phosphorus inputs to the Chesapeake Bay watershed**. To support the program, the Maryland Department of Agriculture is providing online credit assessment and registry tools. Maryland's establishment of a nutrient-trading program follows similar Bay-focused efforts in Virginia and Pennsylvania. Information about **Virginia's nutrient-credit trading program**, established in a regulation approved by the State Water Control Board in September 2006, is available online at [www.deq.virginia.gov/vpdes/nutrienttrade.html](http://www.deq.virginia.gov/vpdes/nutrienttrade.html). Information about nutrient-credit trading in Pennsylvania is available online at [www.dep.state.pa.us/river/Nutrient%20trading.htm](http://www.dep.state.pa.us/river/Nutrient%20trading.htm). (*Southern Maryland Online*, 5/10/10)
- On May 22, Maryland Governor Martin O'Malley released his **proposed revisions to how Maryland manages its oyster fishery**. The plan would expand oyster sanctuary areas (where commercial harvests are not allowed) from the current nine percent to about 25 percent of the traditional oystering area. The increased sanctuaries are predicted to reduce annual oyster-harvesting income by about \$500,000 (10-15 percent). The plan also includes leasing 600,000 acres for oyster aquaculture, part of the state's effort to increase that industry. The plan is to be proposed as regulations that will be considered by a special Maryland General Assembly committee, with public hearings expected in July and the regulations potentially in place before Maryland's oyster season opens in October. (*Annapolis Capital*, 5/22/10 and 5/26/10; and Associated Press, 5/23/10)

## Final Words

•“If I do this, what's gonna happen to the bay? What's gonna happen to the watermen, what's gonna happen to the farmers and the developers and all the stakeholders in the community economically, socially, and environmentally?”—Philippe Cousteau, referring to the possible simulated outcomes in the University of Virginia’s **“Chesapeake Bay Game,”** a computer-based tool for learning about how decisions and actions can affect the Bay environment and communities. Mr. Cousteau, grandson of well-known French oceanographer Jacques Cousteau, visited the university in April. The university unveiled the game on Earth Day (April 22) in 2009. Development of the game has involved 11 university departments, under the coordination of the Department of Systems and Information Engineering. It uses over 50,000 mathematical equations to model the relationships between actions and impacts. The game is designed to be an educational tool for the university, but its creators hope it may also eventually be used by citizens, environmental managers, and others. (Quote from WVIR-Charlottesville, 4/8/10; additional information from *Staunton News Leader*, 4/21/09 and *Baltimore Sun*, 4/8/10)

•“For the base and for region Mid-Atlantic and the Navy in general, our goal is to work closely with the Chesapeake Bay Foundation to help clean the bay and help make it a cleaner place for the military and all the residents of Hampton Roads.”—Captain Charles Stuppard, commander, Joint Expeditionary Base Little Creek-Fort Story in Virginia Beach, commenting on an **artificial oyster reef built by the Navy in Virginia Beach’s Little Creek Cove.** The Navy used 4,000 oyster shells to create the reef. (WVEC-TV, 4/28/10)

•“The public is largely unaware that **wetlands store significant amounts of carbon.** People of all political stripes worry about deforestation of the Amazon, but few worry about the burning of Indonesian peat<sup>1</sup> or the melting of arctic permafrost. Wetland advocates should make sure they do.”—Landon Yoder, editorial in *National Wetlands Newsletter*, Jan.-Feb. 2010.

•“It’s been a hard, bitter pill to swallow for municipalities.”—Robert Hawley, environmental program manager for the Pennsylvania Department of Environmental Protection, responding to local officials’ complaints about **increased costs for wastewater treatment upgrades to meet Chesapeake Bay-related nutrient requirements.** (*Williamsport Sun-Gazette*, 12/17/09)

•“**TMDL** means Time, Money, Districts [soil and water conservation districts], and Leadership.”—Pennsylvania Agriculture Secretary Russell Redding, commenting at a March 17, 2010, meeting of Pennsylvania state government officials with U.S. EPA representatives about the development of a Chesapeake Bay Total Maximum Daily Load (TMDL) plan for addressing water-quality and habitat impairments in the Bay. (*PA Environment Digest*, <http://paenvironmentdaily.blogspot.com/>, 3/17/10)

•“The kids absolutely love the clean-up because they get to get dirty and wet.”—Theresa Spliedt, leader of a Girl Scouts troop in Catonsville, Maryland, commenting on **participation by 77 scouts (along with 59 adults) in a clean-up** on March 21 of Herbert Run, a Patapsco River tributary near Baltimore. (*Arbutus [Md.] Times*, 3/24/10)

•“They’re pretty similar to the Gulf oysters—maybe a little smaller and saltier.”—Jason Schauer, owner of Mezza Luna restaurant in Huntsville, Alabama, commenting on **oysters from Virginia’s Chincoteague Island** that the restaurant is using temporarily in response to reduced supplies of oysters from the Gulf of Mexico waters near Apalachicola, Florida, one of the early-summer impacts of the Deepwater Horizon/BP oil spill. (*Huntsville Times*, 6/9/10)

---

<sup>1</sup> Indonesia is believed to contain about five percent of the world’s peatlands (a type of wetlands), and burning peat in that country in 2006 was estimated to release about 900 million tons of carbon dioxide, or about 16 percent of emissions due to deforestation that year. (*Science Daily*, 11/29/09, accessed at <http://www.sciencedaily.com/releases/2009/11/091127132838.htm>, 2/12/10.)