Potomac Basin
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C. Dalpra

A housing development along the Potomac north of Washington. Restoration efforts for the Potomac and Chesapeake Bay have had a hard time keeping up with the pace of the region's growth and development.

Will Renewed Efforts Bring Restoration?

A series of actions beginning late last year signal a renewed effort in the decades-long effort to restore the Chesapeake Bay, and with it, its second largest tributary, the Potomac River. While the recent flurry of activity is seen as a new sign of hope by the states and the federal government, others are looking for assurances that the new approach will result in better and more timely improvements than seen with earlier commitments.

Recognizing that the 2010 goals for bay restoration (and by implication, the Potomac's as well) would not be met, state and federal officials have spent the first half of 2009 creating a new set of goals, and new methods to reach them. At the same time, a new wave of non-governmental efforts are working to apply pressure to empower and oversee those goals. This article touches on these recent changes, and what they might mean to the future of the bay and the Potomac.

At its annual meeting In November 2008, the Chesapeake Executive Council, comprised of the governors of Maryland, Pennsylvania and Virginia; the administrator of the U.S. Environmental Protection Agency (EPA); the mayor of the District of Columbia; and the chair of the Chesapeake Bay Commission, a legislative body serving Maryland, Pennsylvania, and Virginia, met to begin setting new goals and methods for the restoration. They also discussed the new regulatory action that will help guide the new efforts–the writing of a total maximum daily load (TMDL) plan for how the bay will meet its nutrient and sediment reduction goals.

A TMDL is a formal plan that sets a pollution budget for a watershed or waterway segment. The plan assesses the pollution types and loads for a waterway, identifies

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contaminant sources, and provides guidance about actions to bring the waterway into compliance with water quality standards. Unlike the goals set by the states, TMDLs are legally binding in that they set standards for permit conditions and can be used as the basis of lawsuits against responsible agencies, as has happened with some regularity.

A Chesapeake Bay TMDL (including its tidal tributaries) avoided for years while the state agencies and EPA worked on meeting goals voluntarily, is now scheduled to be in place by December 2010. The bay TMDL (comprising many smaller plans) will focus on the bay's main problems: unacceptable loads of nutrients--nitrogen and phosphorus, and sediment loads that carry nutrients and cloud the water with other substances.

At the 2008 meeting, the council committed to formulating two-year goals after analyzing new data, and reached out to the incoming Obama Administration for more federal support. The group also worked toward other ways of increasing accountability.

Last January, the nonprofit Chesapeake Bay Foundation (CBF) filed a lawsuit in federal court requesting that EPA set up a pollution budget, and that it back the budget with strong enforcement actions if goals are not met. The suit is pending.

In March, EPA signaled an increased focus on the bay cleanup by appointing Charles Fox as its senior advisor for the Chesapeake Bay effort, who will report directly to EPA administrator Lisa Jackson. Fox is well known in the bay community, with a long career in various roles for EPA, Maryland state government, and the environmental nonprofit sector.

In April, the Chesapeake Bay Foundation issued its annual bay report card (another "D"), with foundation President Will Baker declaring that "the federal government has made a mockery of the Clean Water Act." Baker went on to push for a much stronger federal role in the cleanup.

Those sentiments were echoed later in the month at a briefing given to Maryland's congressional delegation, at which there was general agreement that the pace of restoration needed to accelerate.

In May, the bay program's Executive Council held its 2009 annual meeting, moving the event to spring to take advantage of new data, which it used to announce a new set of two-year goals, or milestones, promising to dramatically accelerate the pace of bay and river restoration.

The milestones, set to be met by the end of 2011, included watershed-wide goals of accelerating the progress in reducing nitrogen by 77 percent, or a reduction of about 15.8 million pounds, and phosphorus

reduction efforts by 79 percent, for a reduction of 1.1 million pounds. Additionally, Maryland, Virginia, and Pennsylvania made individual commitments related to nutrient reduction. The bay program noted that by meeting these and future milestones, the bay jurisdictions will be on course to have all of the needed pollution controls in place by 2025.

At present, about 300 million pounds of nitrogen and 12.4 million pounds of phosphorus enter the bay in an average year. To reach a healthy bay, those numbers need to go down to 170 million pounds of nitrogen and 12.4 million pounds of phosphorus.

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Settling basins at Blue Plains Regional Wastewater Treatment Plant. Nitrogen reductions scheduled for the plant will reduce the loading from the largest point source of nitrogen on the Potomac.

"We have charted a new course for the Chesapeake Bay's recovery that will succeed because it includes the short-term goals necessary to make steady progress and is backed by federal and state leaders who share a profound conviction to protect our environment," said Virginia Governor and Executive Council Chairman Timothy Kaine. The goals for each state are available at the bay program website, *www.chesapeakebay.net*.

Also in May, President Obama issued an executive order declaring the bay a national treasure. The order established a bay federal leadership committee, directed EPA to use its powers under the federal Clean Water Act (which includes provisions for creating TMDLs), and mandated reduced water pollution from federal facilities, improved agricultural conservation practices, and expanded public access to the bay.

Later in May came the announcement of a new coalition formed to push the process along. The Chesapeake Bay Watershed Coalition, comprised of 64 environmental organizations with hundreds of thousands of members from all the jurisdictions sharing the bay launched the Choose Clean Water Campaign designed to demand a stronger federal role. The coalition's membership runs the gamut from small watershed groups to national groups such as the National Wildlife Federation and the Natural Resources Defense Council.

Noting Obama's executive order, coalition director Hilary Harp Falk, who works for member organization National Wildlife Federation, said, "The President's executive order is a unique opportunity to shape the federal role in assuring that local communities will have the legal authority and resources to clean up local streams and rivers, protect fishable and swimmable waters and ensure that all of our region's citizens can enjoy their right to clean water."

The coalition will focus on three areas: ensuring that all sources of bay pollution are reduced to levels that sustain bay health, specific changes to transportation policy that reduces roadway runoff pollution and conserves land, and strong climate change legislation. These three points are shared by the Executive Council. Most important to the coalition is the upcoming TMDL process, during which it will press for strong regulation and penalties for noncompliance.

Does all this activity signal a new push forward that will finally attain the cleanup goals for the bay and its tributaries? It certainly is a step in the right direction, and pushes forward the many projects and programs already undertaken to restore the bay. Johns Hopkins University Emeritus Professor Gordon Wolman, at an ICPRB conference on the biological status of the Potomac River several years ago noted that the slow pace of improvement, or even holding the line on water quality might be considered a quite admirable accomplishment, given the pace of development and population increases in the watershed.

Despite all the hard work of previous decades and the money spent, the fact remains that the goal is to restore the bay and the Potomac to some sustainable level of health, and that, as Wolman said, "We have been picking at the low-hanging fruit," in restoration efforts. Many researchers, environmental organizations, and some decision makers realize that reaching the goals is going to cost a lot more money and require a lot more regulation. The new goals by the states and the federal government (beyond the two-year goals) lack specifics on exactly what will be done, where the money will come from, and the consequences for non-attainment.

The bay TMDL, when developed, will be an enforceable order to restore the bay and its tributaries, but will not guarantee action.

Around the Chesapeake, thousands of TMDLs have been written. The TMDLs are tools to use in restoration, but they are plans that must be implemented to succeed. When completed, the bay TMDL will be the largest and most complicated in existence.

The EPA is working with many stakeholders in developing the TMDL, noted Bob Korancai, of EPA Region 3, which will be asked to approve the plan. He noted that the bay program Water Quality Steering Committee includes state and federal officials, as well as groups like CBF, has been meeting to help formulate the plan. The group has been analyzing modeling results that will assign allowable loadings of nitrogen, phosphorus, and sediments for subwatersheds. In all, the bay will be broken into about 20 regions that will be assigned loads. It will be up to the states to determine exactly how to meet the loads in their jurisdictions. Korancai noted that a draft TMDL is scheduled to be available for public review by June 2010, with the final plan finished by December 2010.

The TMDL does offer more opportunities for "consequences" through lawsuits against EPA for violation of the Federal Clean Water Act. Even when court cases are won, the process is lengthy and expensive, and both time and money are in short supply for the restoration.

Enforcement of water quality standards was a main reason for the CBF lawsuit, a process that began during the Bush Administration, noted Jon Mueller, CBF's litigation director. "The bay TMDL is number one on the list–it can't be a run-of-the mill TMDL. It must be strongly worded," Mueller said. He added that the Clean Water Act, applied correctly, should restrict any new discharges from being permitted on a waterway that is impaired.

The group has corresponded with EPA, and provided a list of actions that will be needed for the new TMDL to be successful. "We have told EPA that we will be very active, particularly on the part of the TMDL that provides for 'reasonable assurance' that the plan will be implemented," Mueller said.

Other bay watchers are suspicious as well, particularly those who have observed the process since it began more than 25 years ago. Former Maryland State Senator Gerald Winegrad, who now teaches a course on bay restoration at the University of Maryland, and Howard Ernst, a political science associate professor at the Naval Academy and author of "Chesapeake Bay Blues," gave voice to some of that mistrust in a May 24 op-ed piece in the *Washington Post*. They noted that the recent goals for the bay were "modest" and that "for some states are weaker than the formal goals, and once again provided no sanctions for failing to meet cleanup targets."

While a lot of inertia stands in the way of restoring the bay and Potomac, the increasing visibility of the challenges and solutions is something that can only help push the process forward. If that visibility can translate into strong public support for the restoration, the bay and Potomac will regain their health.

Right as Rain: Looking Ahead While Remembering Droughts

In the last two months, plenty of precipitation has fallen on the formerly parched Potomac watershed to boost our groundwater levels back to normal and beyond. The region's rivers and streams depend on groundwater to help keep them flowing in the summer months when rain sometimes doesn't fall for weeks and flows dwindle. How soon we forget the droughts of 1999 and 2002, when flows were so low that the ICPRB's Cooperative Operations for Water Supply on the Potomac (CO-OP) released stored water from Jennings Randolph and Little Seneca reservoirs to meet metropolitan area drinking water demands and ecological flow-by requirements.

Stored water for infrequent releases, along with comprehensive planning by the metropolitan Washington water suppliers and CO-OP during the last several decades avoids problems experienced in other parts of the country. The ICPRB also, is focusing on the need for comprehensive water resources planning for the rest of the Potomac basin.

Prolonged droughts in California affecting farms, recreation, ecological health, and myriad other things are a good reason to take a closer look at the water supply situation here in the Potomac watershed. Many rivers in California, particularly those near farms, are fully appropriated, leaving little water to maintain river ecology. Now that a federal judge has mandated that some of the water be diverted from farms back to the Sacramento-San Joaquin River Delta for fish health, farmers and other water users are upset. The water resources juggling act happens throughout the country, including the Potomac watershed.

Nearly four million people depend on the Potomac River for drinking water and

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The Potomac River and Washington Channel. A growing metropolitan Washington population relies on the Potomac for its drinking water.

about two million people depend on other surface and ground water supplies in the watershed, according to ICPRB Water Resources Planner, Karin Bencala. Compared to other systems throughout the country, the Potomac is well-equipped to handle the needs of its current residents, even during drought situations. However, with decades of planning to keep water supplies flowing from the tap and maintain ecological health, the Potomac is able to support a growing metropolitan area population into the foreseeable future, at least through 2030, according to the CO-OP's *Water Supply Reliability Forecast for the Washington Metropolitan Area, Year 2025*, and preliminary data for the 2030 reliability forecast.

One issue that has not helped California's situation is their water appropriation system. Many western states have water laws based on "prior appropriation" water rights, while most eastern states' laws are based on "riparian" water rights. Prior appropriation rights are based on "first in time, first in right," meaning that the first person who claimed water rights by diverting the water and using as much as they wanted would always have the same amount of water they historically used. A waterway could become fully appropriated, meaning that all its water had been claimed, and theoretically, no other water appropriations could be issued for that waterway. Though the water is used by the landowners, the state owns the water.

If water is in short supply, junior users, or users that were issued rights after the first user, may not be able to take any water, with the last appropriated user losing water first. However, the senior user would continue to take the same amount of water, regardless of other users or how much water was left. In addition, in the prior appropriation system, water must be used or the privilege is lost.

Riparian water rights also are not without their shortcomings. Under this system, any riparian landowner has the right to reasonable use of that water, whether he exercises that right or not. Reasonable use is not well-defined and is often disputed. Only people owning land bordering the waterway would have a right to the water. While the state of Maryland owns the land under the Potomac River, the water can be used by anyone who has riparian access. Maryland uses a regulated riparian water rights system that allows users, some of which are not located next to a waterway to have access to water through a permit system. Virginia uses riparian water rights with some permitting. Pennsylvania uses riparian water rights with permits issued pursuant to the Water Rights Act of 1939 for public water supply agencies that take from surface water supplies. West Virginia does not have permitting to regulate withdrawals from surface- or ground-water supplies.

How Do Water Rights Affect Water Quality?

It seems an indirect connection, but water rights can significantly impact water quality if a river's water is fully appropriated or overallocated, as is the case with farms near the Sacramento-San Joaquin River Delta in California. These areas couldn't be farmed without irrigation from the Delta. Though drought has been ongoing for three years, a federal judge recently ruled that water previously directed toward the farms had to be reduced because the Delta needed the water to maintain its biological community, particularly for an endangered smelt. Because some of the farms in the area were last to sign up for water rights, they will be the first to lose water, under the prior appropriation water law. Many farmers who depend on the land for their livelihood are outraged that water was taken from the farms and redirected back to the Delta for fish health.

The Potomac River also has multiple users, including farmers, outdoor enthusiasts, water suppliers, industry, and homeowners, who all have differing notions about how the river should be used. The Potomac River has a minimum low flow requirement of 300 million gallons per day (mgd) between Great Falls and Little Falls and 100 mgd between Little Falls and Chain Bridge to keep fish and other critters healthy and still allow water suppliers to take water from the river. The river is tidal downstream of Chain Bridge and so is not really affected by withdrawals.

The ICPRB, in partnership with The Nature Conservancy and the Army Corps of

Engineers, is working on a watershed assessment for the Potomac River basin. The assessment will consider water supply, environmentally sustainable flow, drought preparedness, ecosystems protection and watershed management. During the study, there will be an effort to determine the adequacy of the minimum flow requirements and how flows affect the river's ecological systems. The project will also categorize and investigate a variety of other water resource issues confronting the Potomac River.

While the droughts of 1999 and 2002 did not show negative impacts on the biological communities of the river even when it neared the 100 mgd minimum, those flows were not endured for long periods. The project might answer questions about how long the river's biological community could withstand such low flows and if a different minimum flow rate would be more beneficial. "The goal is to meet water supply demands while protecting a diverse aquatic habitat," said Joe Hoffman, ICPRB's executive director and CO-OP chief.

In addition to redirecting water for farming, the state of California has doubled its population in only 50 years from 15 to 30 million. The Potomac watershed is facing a similar issue with increasing growth each year. However, "water use has remained stable or decreased since laws for low-flow fixtures and green building practices have been implemented," said Bencala. In addition, droughts in the Potomac watershed have so far not been as severe or prolonged as those in California.

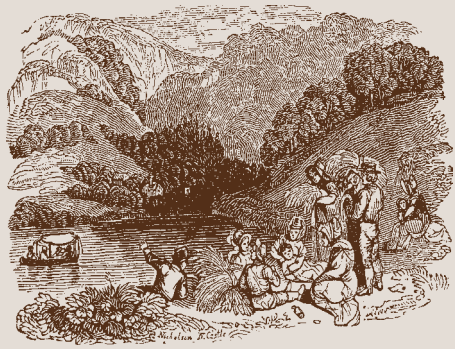
As the area continues to grow, water use will likely remain steady, according to the *Water Supply Reliability Forecast for the Washington Metropolitan Area, Year 2025*. As population increased from 1975 to 2005, water demand only rose slightly, and then only until 1990. It has hovered around 475 million gallons per day since then, despite an increase of about 1.5 million people in that time. According to Bencala, this trend is expected to continue.

Groundwater Impacts Water Supply and Water Quality

Just as water rights can affect water quality, groundwater and what we allow to go into it can directly impact surface water supply and quality. Landowners in Pennsylvania have rights to drill wells, however the Delaware River and Susquehanna River basin commissions do have some control over the groundwater, particularly in the area around Philadelphia. Landowners in Maryland need a permit to drill any well, but only need a withdrawal permit if more than 10,000 gallons per day will be extracted. By contrast landowners in Virginia, unless located in one of two groundwater management areas in the coastal plain, do not need a permit for groundwater withdrawals and landowners in West Virginia need no permits for drilling wells or for groundwater withdrawals.

Rivers and streams can flow in the harshest of droughts because groundwater levels sustain them. In California, "groundwater recharge is much slower though their confined aquifers have a larger recharge area," said ICPRB's Hydrogeologist Jim Palmer. An area supported by a confined aquifer has a limited number of people it can support, whether they are dispersed or crowded together. "Water storage is limited in areas of confined aquifers," said Palmer.

In contrast, most of the Potomac watershed is unconfined aquifers, which means that any precipitation that soaks into the land will fill up pore spaces and



Watching the River Flow

Strong spring storms in late April and May ended a long dry period in the Potomac basin. April's showers brought river levels back to near normal for May, and the Potomac's flow measured near Washington, D.C., rose high above normal, according provisional data from the U.S. Geological Survey. Provisional data has not been reviewed for accuracy.

The April average flow of the Potomac was about 11.6 billion gallons per day (bgd), about 13.1 percent less than the long-term average of 13.3 bgd. Daily extremes during the month ranged from a low of about 7.4 bgd on April15, and rising to a high of about 24.2 bgd on April 22. Water taken from the river for metropolitan water supply averaged about 400 million gallons per day (mgd).

May flow surged, averaging about 17.9 bgd, or about 84.7 percent more than the long-term average of about 9.7 bgd. The river's flow ranged from a high of about 76.3 bgd on May 6, gradually decreasing to the month's low of about 5.6 bgd on May 25**.** Water taken for municipal supply averaged about 400 mgd.

There is little chance of the need for drought supply operations this year.

eventually feed rivers and streams. The groundwater moves through aquifers and may not be limited to the immediate area where it entered the groundwater system. Any one spot, such as where a well is located, can only support a small number of people because its recharge area is small. No matter which kind of aquifer our precipitation falls on, that precipitation will become drinking water. "If there's something on the ground, that goes into the drinking water too," said Palmer. It takes about 30 days for water to reach the aquifer in an unconfined system, but can take thousands of years to reach the aquifer in a confined system."

The Potomac watershed's confined aquifers exist in the coastal plain. "Those areas are beginning to feel the effects of too much development. They have to drill deeper wells because the aquifers they draw on are not being recharged," said Palmer. Without adequate recharge and continued overallocation of water resources, the ability for the system to support us will decrease. "The amount of freshwater is finite," added Palmer.

Planning Ahead for Water Supply Needs

The ICPRB's CO-OP has projected that though population is expected to increase, water supply needs will remain steady through 2025. An updated reliability forecast that will project the water supply reliability of our reservoirs, rivers, and streams is expected later this year. That report will project through the year 2030. Bencala noted that since 2005, water usage had remained steady and was not expected to increase at the same rate that population increases because federally mandated low-flow fixtures and a focus on greener building techniques have helped to lower water usage. One thing homeowners and businesses can do is reduce the amount of water used for landscaping. "Outdoor watering in the summer is the most significant change homeowners and business owners can make," said Bencala. Even during wet years, allowing water to soak through the soil in a garden rather than heading to the nearest storm drain can help keep waterways cleaner. Though water is plentiful this year, a drought may be just around the corner.

During dry spells, landscapes with lots of different species, rather than turf, will help reduce watering needs. Native plants are adapted to survive the long periods of dry weather, followed by summer deluges, typical in the Mid-Atlantic region. Rain barrels can help conserve water by saving it for drier days.

While conserving water is not urgent, practicing water conservation now will make existing supply systems more robust in the face of growing population, and prepare the region for droughts.

Trash-Free Initiative Reaches Out to Businesses

The Alice Ferguson Foundation's Trash Free Potomac by 2013 Campaign, of which the annual Potomac Watershed Cleanup is a part, realizes that the effort must reach out to more than individuals, thousands of whom have participated in the cleanups. Businesses have an important role as well.

To that end, the campaign recently released a Facility Guidebook providing steps for businesses to create a trash free workplace. The guidebook notes that taking these steps can help businesses save money, reduce waste, save natural resources, empower others to help the environment, and keep the Potomac River trash-free.

Businesses and other organizations can implement practical measures that will help to reduce waste generated and decrease the likelihood of litter coming from their operations. The guidebook introduces the Trash Free Potomac Facility (TFPF) Program, and provides information on how organizations can become a Trash Free Potomac Facility partner and implement a successful waste reduction and litter-prevention program.

Litter is a serious problem in the Potomac River and its major tributaries. There is currently limited research and data available to track the sources of litter watershed-wide. However, litter travels from our streets into storm drains and waterways until it reaches the Potomac River. Trash that has been improperly or intentionally deposited along roadsides and in public and private open spaces is also commonly seen.

The Trash Free Potomac Facility Program currently is focusing on several pilot projects for businesses, which are successfully reducing their trash footprint on the watershed.

To learn how your business can take a step toward "going green," visit *www.trashfreepotomac.org,* or call (301) 292-5665.

Kids Learn about the Potomac, and the Joy of Fishing

Live river critters provided more than 300 metropolitan area school students and teachers to see the many kinds of small animals found in the area's streams at the second annual Nation's River Bass Tournament presented by Living Classrooms on the National Capital Region in May.

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Students from St. Thomas More School examine stream critters at ICPRB's display at the Nation's River Bass Tournament.

The ICPRB exhibit was very popular with the students, who looked at the bugs through magnifying glasses. The bolder students held the creatures in their hands, eliciting "Eewws" from their fellows. The students also learned about why the bugs are important to the river's ecology, and how they can be used to assess the health of a stream, based on the kinds and amounts found.

This year's event was held at National Harbor, benefitting Living Classroom's youth and conservation programs to connect underserved and urban youth to their natural resources. Funds raised through sponsorships will be used by Living Classrooms of the National Capital Region to support and expand existing educational programs using hands-on academic enrichment and workforce development programming on the Potomac and Anacostia rivers. The funds raised also help Living Classrooms to continue the Schools in Schools program, which uses fertilized American shad eggs from ICPRB's shad restoration program that allow students to hatch shad in their classroom, and after studying them, release shad fry into the Potomac River.

The students participated in fishing on land and in bass boats with volunteer guides, visited a range of exhibits and took boat rides on the river. For more information, visit www.livingclassroomsdc.org.

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Jennifer D. Willoughby

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E-Mail: info@icprb.org
Internet: http://www.potomacriver.org

Joseph K. Hoffman, Executive Director

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Interstate Commission on the Potomac River Basin
51 Monroe St., Suite PE-08
Rockville, MD 20850

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