

REPORTER

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C. Dalpra

USGS Scientist Nancy Rybicki inspects an extensive grass bed in a Maryland cove several miles downstream of Washington. Rybicki has monitored plants in the river since the early 1980s.

New Study Documents Potomac Improvements

Reductions in nutrient and suspended sediment concentrations during the last 18 years have led to large increases in submerged aquatic vegetation (SAV) abundance and diversity in the metropolitan Potomac River, according to a recently published study. The long-term assessment covers a 50-mile segment of the mainstem tidal freshwater Potomac from Washington, D.C., downstream to Charles County, Md.

Aquatic plant populations are an important indicator of improved river health, and are used to gauge progress in the Chesapeake Bay cleanup. As plants establish in the river, they create new habitat by trapping sediment that increases water clarity, allowing needed sunlight to penetrate further into the water. Extensive

stands of aquatic grasses create an environment where fish and other aquatic species can flourish. Aquatic grass growth also increases important levels of dissolved oxygen in the water. The plants consume the still plentiful amounts of nutrients in the water to grow. They deny those nutrients to algae that can bloom on the river's surface, blocking sunlight and consuming oxygen when they die off and decay.

"Improvements to plant communities living at the bottom of the river have occurred nearly in lock step with decreases in nutrients and sediment in the water and incremental reductions in nitrogen effluent entering the river from the wastewater treatment plant for the Washington, D.C., area," said U.S. Geological Survey (USGS)

Our mission is to enhance, protect, and conserve the water and associated land resources of the Potomac River and its tributaries through regional and interstate cooperation.

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scientist Nancy Rybicki, one of the report's authors. She noted that during the study period, nutrient loads entering the tidal Potomac from upstream were fairly stable, and so were not a major factor in the metropolitan area reductions.

The plant, the Blue Plains regional advanced wastewater treatment plant, collects sewage waste from the District of Columbia, Maryland, and Virginia, treating more than 300 million gallons of sewage on an average day (see related story). The plant has been continuously upgraded, with about a billion dollars spent during the last decade. Blue Plains' latest permit will remove even more nitrogen when the latest \$950-million project is completed in several years. The previous and future reductions are occurring even while the region's population continues to grow.

Rybicki has been assessing aquatic plants on the freshwater tidal Potomac since 1979, but she wasn't seeing many when she started. The river was described as almost barren in an earlier USGS study that covered 1978-1981. Things changed around 1983, with the discovery of hydrilla, a non-native plant that was at first mistaken for elodea, a native plant that had disappeared from the river. Some of the initial reaction to the accidental introduction of the exotic species, which has choked some waterways in Florida where it is an expensive management problem, was negative.

Regional managers eventually decided on a program of mechanically mowing hydrilla with specialized vessels to allow access to high-traffic channels, marinas, and docks. The growing hydrilla stands in the metropolitan Potomac eventually helped change the habitat to allow the return of more than a dozen native plant species that again occupy the river.

Hydrilla had already established itself strongly in the metropolitan Potomac at the beginning of the study period, which covers the years 1990 to 2007.

The study's authors analyzed measurements of plant species abundance, nutrient effluent from Blue Plains, and water quality during the study period. The study revealed that during the 18 years, native aquatic plant cover increased tenfold, from 288 to 3,081 acres, while total plant coverage doubled from 4,207 to 8,441 acres. At the same time, the diversity of species increased. In 1990, hydrilla was 10 times more abundant than any other species. In 2007, the abundance of the seven most common species are more evenly matched. In 1990, hydrilla accounted for more than 80 percent of the total SAV; in 2007, hydrilla accounted for only 20 percent.

"People want to know that money spent on ecosystem restoration is having tangible results, but many feel that efforts to

clean up the Chesapeake bay have so far had limited success,” said Henry Ruhl of the National Oceanography Centre, Southampton, UK, a report co-author.

“Upgrades to the wastewater treatment plant have benefitted SAV habitats 50 miles downstream. These findings underscore the benefits of nutrient reduction efforts on a major tributary to the Chesapeake Bay,” Rybicki said.

Over the years, ICPRB staff have accompanied Rybicki on her summertime excursions out on the river to assess plant populations. Observations on these trips were impressive. As Rybicki’s boat would move toward extensive grass beds hugging the river’s shoreline, the Potomac remained in its usual green-tinged form, with visibility of perhaps a foot. After the boat penetrated the stand, the picture changed completely in only a few feet. Protected from the mainstem, water on the shore side of the plant stands was gin clear, with fish and invertebrates easily visible several feet below the surface. Is this some semblance of how the river looked hundreds of years ago?

Rybicki noted that she would expect the expansion of aquatic plants in the river to continue as nutrient levels decrease,

bringing with them improved water clarity, increased dissolved oxygen, fewer algae blooms, and increased habitat for wildlife.

The nutrient pollution that continues to degrade the Potomac basin and the Chesapeake Bay is a major issue that will be regulated by the Chesapeake Bay TMDL. Nutrient loadings from treatment plants are a fraction of the segment’s nitrogen and phosphorus loads. Other contributors from upstream and from the area include agriculture and from urban and suburban runoff, which are much more difficult to address. Further, nutrient pollution is just one of many challenges to the river’s health. Nutrient reduction will not address chemical contaminants such as fertilizers, pesticides, and endocrine disruptor compounds.

“New, emerging contaminant issues are important, but we don’t have a very good understanding of them. But with nutrients, we do understand them, and we have shown how reduction efforts are working,” Rybicki said. “Hopefully, as we understand more about these other contaminants, we will find ways of addressing them as well,” she said.

The paper is accessible at www.pnas.org/content/early/2010/08/31/1003590107.full.pdf+html.

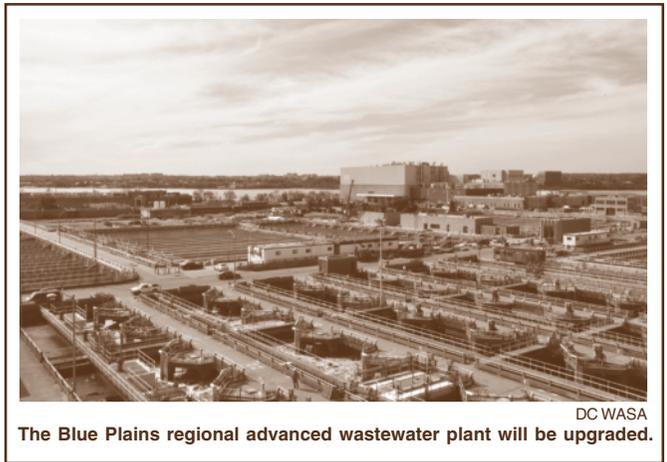
New Blue Plains Permit Will Decrease Nutrient Loads

A new five-year operating permit issued to the regional Blue Plains advanced wastewater plant will require a reduction of 3.8 million pounds of nitrogen per year, a decrease of 45 percent. The new permit limits were announced at a September 10 press conference.

The facility, the largest advanced treatment plant in the world, processes the bulk of the Washington metropolitan area’s sewage, which averages about 330 million gallons per day. The plant is the largest single point source discharger of nitrogen in the Chesapeake Bay watershed.

The permit requires a nitrogen reduction from 8.5 million pounds of nitrogen down to 4.7 million pounds per year. Upgrades to the plant to achieve the reductions have already begun and are scheduled for completion by 2015.

The U.S. Environmental Protection Agency (EPA) mid-Atlantic Regional Administrator Shawn Garvin noted that the facility is by far the largest of 483 significant wastewater facilities in the bay watershed, of which 81 are industrial wastewater plants. In total, the facilities discharge more than 3 billion gallons of



wastewater per day. Most of those facilities will be upgraded with more stringent pollution permits by 2015.

Garvin noted that during the past 25 years, nutrient pollution from wastewater treatment plants has been reduced by 55 percent, more than any other sector. Agricultural pollution has been reduced by 31 percent, while urban/suburban pollution has increased by 15 percent. The reductions have been achieved while the region’s population increased by 25 percent.

The enhanced facilities at Blue Plains also will assist in the control of combined sewer overflows, another major pollution reduction project in the District.

Bay, Tributary Restoration Program Advances

The Chesapeake Bay total maximum daily load (TMDL) plan, an ambitious program to restore the bay and its tributaries, has begun to take shape as the U.S. Environmental Protection Agency (EPA) provided draft load reduction targets and state governments are devising implementation plans that will guide how the target loads will be attained.

The Chesapeake Bay TMDL will provide a “pollution budget” that will establish maximum allowable amounts of nitrogen, phosphorus, and sediment for the bay and its tributaries, with a cap that can not be exceeded. The TMDL comes after almost three decades of efforts to restore the Chesapeake Bay through voluntary, cooperative efforts that, while significantly decreasing pollution, repeatedly failed to attain the goals set by the bay jurisdictions and the federal Clean Water Act. The TMDL process also incorporates several court-ordered consent decrees and settlement agreements, some dating back to the 1990s.

The chronic failure to meet restoration goals resulted in the Clean Water Act-mandated TMDL process, which will require that the jurisdictions meet pollution reduction obligations or face federal regulatory “consequences.” Those consequences, also referred to as “backstops” may include stricter permits for wastewater treatment plants, stormwater systems, and concentrated animal feeding operations, and requirements for permits of currently unregulated discharges, (such as smaller stormwater systems). The EPA could even deny permits for new treatment plants or restrict federal funding.

The TMDL includes pollution limits to meet state water quality standards, and provides a way to ensure that all the necessary pollution control measures are implemented by 2025; with 60 percent of the actions required to be completed by 2017.

During the summer, EPA set draft pollution goals that require a 25 percent reduction in nitrogen and phosphorus, and a 16 percent reduction in sediments during the next 25 years. These reductions were further divided up among the bay jurisdictions and among major watersheds based on sophisticated modeling tools, extensive monitoring data, peer reviews, and work with the jurisdiction partners. As the bay’s tributary watersheds are brought up to their water quality standards, the healthier tributaries will provide better water for a healthier bay.

The next step in the process required the bay jurisdictions to complete watershed implementation plans (WIPs) that provide a roadmap for how and when jurisdictions



C. Dalpra

The Bay TMDL can change how we manage environmental health on the water and the land.

will meet their pollution allocations. The plans include identification of how various pollution sources will be managed, assessments of what will be needed to reach the targets, a description of how the work will be tracked and monitored, identification of alternative strategies, and a timetable. The jurisdictions all submitted draft WIP plans in September, which were reviewed by EPA.

In the Potomac basin, the Maryland and Washington, D.C., plans were accepted by the agency, with minor changes. The Virginia, Pennsylvania, and West Virginia WIPs did not meet one or more of the pollution reduction goals. None of the plans fully provided the required “reasonable assurance” that identifies the resources and programs that will be used to meet the goals. The jurisdictions can adjust their WIPs until final versions are due at the end of November, when EPA will again review them and determine the level of backstops needed for the goals to be met.

The EPA will review all the plans and consider public comments and additional input from the jurisdictions before establishing the final Chesapeake Bay TMDL by the end of 2010.

Next year, the states are scheduled to submit Phase 2 WIPs that will carry the earlier plans that allocate pollution loads to a geographically smaller scale and identify actions needed on the county or municipal level. Eventually, Phase 3 WIPs will be completed in 2017 to ensure that all the actions are in place by the 2025 deadline.

Additionally, the jurisdictions must all identify two-year “milestones” that will be used to assess short-term progress and determine the need for alternative strategies or enhanced backstops.

If this all sounds very complicated, it is. To help build familiarity with and support for

the process, EPA has been holding a series of public meetings throughout the bay watershed, some attracting hundreds of attendees. Some of the jurisdictions also have been holding meetings with the support of EPA personnel.

At the well-attended meetings, federal and state scientists and administrators provided the basics of why the TMDL was happening, and discussed the general schedule for the program. At each meeting, EPA officials reminded attendees that the restoration to date had decreased nutrient pollution to a degree, but that the TMDL regulatory approach had come only after decades of failure to meet restoration goals. They noted that the agency's actions were required under consent decrees and other court orders because the formerly voluntary program was not fully successful in restoring the bay and its tributary watersheds.

The process has already experienced resistance from some state governments and stakeholders. In rural areas, representatives of the agricultural community have warned that increased regulation of farming will hurt the economy and put some of them out of business. Some representatives noted that agriculture within the Chesapeake Bay watershed would be regulated to a much higher degree than in other parts of the country, putting them at a severe competitive disadvantage.

Farm bureaus outside the Chesapeake Bay also are concerned, and worry that agricultural regulation within the watershed will serve as a template nationally. Some environmental groups are welcoming that

idea, noting that the majority of bay pollution comes from agricultural activities, which as non point sources of pollution are not regulated under the Clean Water Act.

Some members of the construction and homebuilding industry are concerned that the program will drive up the cost of housing and restrict development through more stringent permitting and enhanced stormwater management requirements.

Some state and many local governments are concerned about the required upgrading of sewage treatment plants and other required pollution reductions, which would cost small communities millions of dollars and result in increased taxes and fees.

To that end, EPA and the Obama Administration have received letters asking for delays in the process for reasons ranging from inadequate public comment time, inadequate planning time, and that the models used to determine the levels of pollution reduction have serious flaws.

Environmental groups counter that the process has already been years in the making and that none of these actions should be surprising.

The real concern for all the groups is about the price tag for the TMDL, which is unknown, and who in the end will have to pay. Some organizations and politicians have said that there are too many unknowns and that the whole program is moving too quickly.

Where there is wide agreement is that the Chesapeake Bay watershed, of which the Potomac is the second-largest basin, is embarked on a new restoration course, that if successful, will serve as a national template for watershed restoration.

Chesapeake Bay TMDL Potomac Basin Nutrient, Sediment Reductions

While the actual programs and methods for reaching the pollution reduction targets for the Potomac basin are still being worked out, compliance will be a mix of many wastewater treatment plant upgrades, improvements to stormwater collection systems, use of green building principles in new developments, retrofitting of older development, and better management practices for agriculture. The Phase 2 WIPs, due in 2011, will provide a more detailed picture.

The following table shows the draft overall

reduction for the Potomac watershed by state. The numbers represent thousands of pounds per year.

Jurisdiction	2009 Sediment Load/Draft TMDL	2009 Phosphorus Load/Draft TMDL	2009 Nitrogen Load/Draft TMDL
D.C.	36/11.16	0.14/0.12	2.85/2.32
Maryland	776/ 682.33	1.00/0.90	18.51/ 15.70
Pennsylvania	306/ 233.93	0.53/0.42	6.11/4.72
Virginia	1,084/ 810.07	1.94/1.47	19.57/14.76
West Virginia	347/ 248.11	0.90/0.74	5.75/4.67

Potomac Watershed Trash Summit

Mix of Regulation, Cooperation, Behavior Change Can Clean Up Waterways

After another very successful Potomac Watershed Cleanup last spring (nearly 252 tons of trash removed), the Alice Ferguson Foundation hosted its many partners at its fifth annual Potomac Watershed Trash Summit in Washington, D.C., on September 22. More than 300 people from across the region attended the summit. The effort follows decades of annual river cleanups by the foundation, whose executive director, Tracy Bowen, has often said that while the outpouring of volunteer support over the years is inspiring, it can never

solve the problem. “We want to put ourselves out of business when it comes to trash,” she said. In 2005, the foundation launched the Trash Free Potomac River Watershed Initiative to grow a coalition and focus support on the problem.

While many government agencies, including ICPRB, have toiled to improve the basin’s water quality and related resources, the river’s physical appearance had been a secondary concern. Yet, to the public who must be engaged and supportive of those efforts, physical appearance is very important. If every stream in the watershed was restored to a “fishable, swimmable” state, a goal of the federal Clean Water Act, few would notice the improvement or view them as clean if the banks of those streams were still lined with trash.

The summit serves as an annual assessment for the large coalition of government agencies and other organizations that have committed to the goal of a trash-free Potomac watershed by 2013. At this year’s summit, 21 area leaders added their names to the more than 140 elected officials who have already signed the Potomac Watershed Trash Treaty, a commitment to implement strategies and education efforts aimed at reducing trash. The ICPRB is a supporter of both the annual trash cleanups and the trash free initiative.

The biggest news discussed at the summit was the recently completed total maximum daily load (TMDL) plan for trash abatement in the Anacostia River, one of the Potomac watershed’s trashiest. The TMDL, based on assessments by several organizations, including ICPRB, sets out a plan for reducing trash pollution, and details mandatory actions by Maryland and the District of Columbia, which must collectively remove an additional 600 tons of trash per year through a variety of methods. A part of that goal will be met by new stormwater permits being approved by EPA. Montgomery and Prince George’s counties, Md., and the District of Columbia are all in various stages of new stormwater plan implementation. The stormwater plans and the trash TMDL will rely on trash traps at stormwater outfalls, street sweeping, enhanced recycling efforts, and other removal strategies, along with educational programs. Failure of the jurisdictions to reach TMDL goals could result in fines or other sanctions.

The Anacostia effort is the first interstate trash TMDL in the country, and the leaders of the trash free initiative hope that its eventual success can serve as a template



Watching the River Flow

Very dry conditions continued in the basin in August and September, causing continued low river flows, according to provisional data collected by the U.S. Geological Survey. Provisional data has not been reviewed for accuracy.

The August average flow of the Potomac was about 1.6 billion gallons per day (bgd), about 53.8 percent less than the long-term average of 3.4 bgd. Daily extremes during the month ranged from a low of about 1.09 bgd on August 3, rising to a high of about 3.89 bgd on August 18. Water taken from the river for metropolitan water supply averaged about 527 million gallons per day (mgd).

September flow further declined, averaging about 1.2 bgd, or about 67.3 percent less than the long-term average of about 3.6 bgd. The river’s flow ranged from a low of about 800 mgd on September 9, rising to a high of about 4.6 bgd on September 30. Water taken for municipal supply averaged about 437 mgd.



C. Dalpra

Volunteers clean the Anacostia Park shoreline. The push for a trash-free watershed is gaining support.

for the rest of the Potomac basin.

Enhanced government efforts to capture and remove trash from the waterways will go only so far—the trash problem must be attacked at its source, which will require raising awareness and changing the public attitudes and behaviors about litter. To that end, the initiative has worked for more than a year with several public relations firms and other stakeholders to study the whys and hows of litter, and to devise a campaign that will transform public attitudes.

Several marketing studies aimed both at the general public and at self-identified chronic litterers provided information on which to base an education campaign, to be launched in 2011. The research included the use of telephone surveys, focus groups, and individual interviews. Some of the major findings were that littering is a widespread problem, with about 17 percent of all adults admitting that they had littered, with 39 percent of the respondents often or sometimes seeing other people littering. Admitted litterers were spread across many demographics. The study also documented strong ignorance of the trash problem: about 77 percent of people did not realize that trash thrown to a street curb ended up in the nearest stream and eventually into the river.

The public's disgust with a trashy environment was strong, according to the research. About two-thirds of the public are bothered "a lot" by litter, and almost half could see themselves asking someone to stop littering.

Although all the jurisdictions have anti-litter laws, they are not considered effective by the public. Most survey respondents (92 percent) believe there is little or no chance that someone will get caught for littering; among chronic litterers, the expectation of being caught was even lower.

Using the survey research, the initiative is developing the public relations campaign, which was discussed in one of the summit sessions. Attendees had a chance to discuss concepts and review some draft products created for the campaign. Plans call for it to start with mostly print media, including billboards,

public transportation posters, bumper stickers, flyers, and print ads, along with radio public service announcements and web-based advertising. As the campaign progresses, it will focus on greater use of radio and TV time to reach more people.

The campaign is already undergoing some pilot tests in Prince Georges County's Deanwood neighborhood, where public opinion is being measured through a visual trash survey, community cleanups, stormwater drain marking, community workshops, and other measures.

The campaign's goal is to reach 50 percent of the metropolitan Washington area in 2011, 75 percent of the Potomac watershed in the following year, and 100 percent of the watershed in 2013.

Arlington and Fairfax counties, Va., Montgomery and Prince George's counties, Md., and the District of Columbia have committed to implementing the campaign.

Other initiative efforts are aimed at regulatory and enforcement efforts. The plastic bag fee initiated in the District last year has been very successful. The five-cent-per-bag fee has led to a 66 percent reduction in plastic bags found in streams. D.C. Council Member Tommy Wells authored the District's bag bill, and is pushing for legislation to address styrofoam, another major element of the trash problem. Other elements of the plan include a push for bottle deposit bills in the region.

Another aspect of the trash-free initiative is in increasing law enforcement. The initiative has worked with a number of police forces through an enforcement roundtable, and in coordinating litter enforcement weeks that will be expanded in the future. The initiative also is exploring the experiences of other areas in using citizens groups in helping with enforcement and educating the public.

The initiative also is supporting business practices to reduce litter, including incentives for businesses to prevent waste, dispose of trash properly, and encourage recycling and composting.

"We feel very enthusiastic about how people and the jurisdictions have bought in to the vision of a trash-free Potomac watershed," said Alice Ferguson Foundation Executive Director Tracy Bowen. "We have had very positive feedback on the anti-litter campaign. People want it to start NOW," she said.

In addition to the campaign, major next steps will come through consideration of the trash free goals in upcoming stormwater system permits to be approved by Maryland and EPA. Another major focus, Bowen said, will be in greater participation in how businesses and industries reduce

their trash loads through increased proper disposal, recycling, and composting. "We really want to engage further with the business community," Bowen said.

The success of the program, Bowen noted, will help to further change public attitudes about the value of the region's rivers and streams in its quality of life.

For more information on the trash free initiative's many activities and projects, visit www.fergusonfoundation.org.



Calling All Watershed Groups: ICPRB Wants to Hear From You

In an effort to maximize the effectiveness of watershed groups within the Potomac River Basin, the new ICPRB watershed coordinator is collecting and compiling information on watershed groups within the basin. The watershed coordinator hopes to establish an information sharing system in the form of a monthly newsletter in which success stories, trials and tribulations, and funding information can be shared.

Work has begun on a first step, creating and maintaining an interactive web-based map that will enable individuals to more easily find and join their local watershed group. Greater communication among the watershed groups can strengthen the activities of each one. Please share your group's name, web address and contact information with Audra Lew at (301) 274-8110 or alew@ICPRB.org.

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Potomac Basin

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