

# REPORTER



C. Dalpra

Established beds of milfoil growing in Piscataway Bay peek out from the glare on the water in May. The early lush growth seen in Piscataway and other embayments portends a good year for submerged plant growth in the middle Potomac. Submerged plants provide many water quality and habitat benefits for the river. Like many middle Potomac embayments, Piscataway erupted with hydrilla in the early 1980s, but after a few years, a significant amount of the stands died off. Piscataway and other embayments now hold diverse stands of several species. *See story inside.*

## Region's Scientists Investigate Lower Potomac Fish Kill

Experts from state agencies in Maryland and Virginia, as well as the Interstate Commission on the Potomac River Basin (ICPRB) have analyzed collected data to determine the cause of a fish kill that occurred in the lower tidal Potomac River on June 2-4.

The carcasses of 7,000 to 8,000 fish washed onto the Potomac's Virginia shore in Westmoreland County between Colonial Beach and Coles Point. Affected species included striped bass, croaker, perch, spot, shad, and cow-nosed rays. The diverse array of species killed points to an environmental factor rather than disease, noted ICPRB Associate Director for Aquatic Habitats Claire Buchanan. Diseases, such as the mycobacterial infection afflicting striped bass stocks, tend to be more species-specific.

Researchers currently are examining

dissolved oxygen levels and algae populations in the area in the weeks leading up to the kill. Initially, a 17-million gallon spill of untreated sewage at Blue Plains wastewater treatment plant on May 19 was linked to the kills, but there is no strong connection between the two events. The sewage volume was less than one percent of the flow over the fall-line that day, and less than one percent of the volume of the adjacent downstream one-mile-long river segment. However, raw sewage has nutrient concentrations that are orders of magnitude higher than Potomac River water. A look at algae concentrations from the District of Columbia downstream to the kill area found no strong relationship between the spill and algae levels. Overall, algae levels were moderate, noted Buchanan. More important is the type of algae that was blooming, a dinoflagellate

***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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species that can be toxic.

Continuous monitoring buoys show that dissolved oxygen concentrations did drop below five milligrams per liter (mg/l) in mid-May at the mouth of the Potomac estuary. For the two weeks between the spill and the fish kill, concentrations in the upper and middle estuary were mostly above five mg/l, the concentration needed for healthy fish populations. Researchers from Morgan State University Estuarine Research Lab, sampling in the area of the fish kills on June 5, observed anoxia in bottom waters off the Virginia side of the Potomac. Strong westerly winds occurred over the weekend, and the researchers suspect that the winds pushed surface waters toward the Maryland side, and pulled anoxic bottom waters to the Virginia side of the river. These conditions are known to create "crab jubilees" and fish kills.

Chlorophyll data from DNR continuous monitoring buoys indicate that a very large algal bloom occurred in the lower river in April, two to five weeks prior to the sewage spill (Fig. 1). The type of algal bloom was not reported, but was likely diatoms, an important group of phytoplankton. The April bloom subsided and a smaller bloom developed in mid-May.

Water samples collected in the lower Potomac estuary by Maryland and Virginia monitoring programs between May 31 and June 5 indicate the May/June phytoplankton community composition was dominated by several potentially harmful dinoflagellate species, particularly *Karlodinium micrum*. Other dinoflagellate taxa include *Prorocentrum minimum*, *Heterocapsa rotundatum*, and *Heterocapsa triquetra*. Euglenoids, diatoms, cryptomonads, and zooflagellates are also common in the samples.

High densities of *Karlodinium micrum* (54-million per liter) were first documented in the St. Clements, Md., area of the lower Potomac mainstem, between Swan Point and Piney Point two days before the sewage spill at Blue Plains, more than 80 miles upstream. The sewage spill was not the proximal cause of the dinoflagellate bloom. *Karlodinium* concentrations in the fish kill area on June 5 were 65-million per liter, and tests indicate Karlotoxin, the toxin given off by the algae, was present.

The dense populations of dinoflagellates and the positive toxicity tests indicate that algal toxins were a potential cause of the fish kills. The rise and fall of very high chlorophyll concentrations in the lower Potomac during April and the onset of the dinoflagellate bloom in mid-May suggest the dinoflagellate populations were initially fueled by the decomposition of the preceding bloom in the lower estuary, rather than sewage nutrients from upstream.

Whatever the actual cause, it does not seem to have repeated itself; there have

been no subsequent reports of fish kills in the area. The intense storms that deluged the parched Potomac basin at the end of June have likely washed away any remaining clues that might help researchers to define the causes. "What was there is gone now," Buchanan said. "The nutrients and algae that were there have washed away, and been replaced by other nutrients carried by the stormwater. We're likely to never find a 'smoking gun,'" she said.

## Governments Join Forces to Address Contamination

The Interstate Commission on the Potomac River Basin (ICPRB) is coordinating a regional pollution control plan among several jurisdictions that may prove to be a template for future cooperative control efforts.

The District of Columbia, Maryland, and Virginia are working together with ICPRB, and the U.S. Environmental Protection Agency to create a total maximum daily load (TMDL) plan to address the contamination of Potomac estuary fish from polychlorinated biphenyls (PCBs), a suspected carcinogen. A TMDL is a plan that defines a particular contaminant and devises a plan to reduce the contaminant, allowing the water body to meet its designated uses. While responsibility for reducing levels of PCBs ultimately lies with each jurisdiction, working together will provide a single plan that will produce a comprehensive, regional strategy for reducing the impacts of PCB contamination while saving time and money through collaborative modeling, data collection, and outreach efforts.

The three jurisdictions have agreed to cooperate on a single TMDL development effort to share data and collection efforts, construction of a single model for analysis, and coordination of stakeholder and public involvement efforts. The ICPRB is coordinating agency data collection, analyzing data to compute loadings, and running the constructed TMDL model. When complete, the TMDL plan will identify sources and concentrations of the PCBs, and how those concentrations can be most effectively reduced. Public meetings about the plan are being held periodically throughout its development. The plan is

scheduled for completion by September 30, 2007.

The PCBs have been around a long time, and will be difficult to remove from the environment. The man-made compounds were commonly used in a variety of electrical gear, and were common additives in a range of chemical products and manufacturing processes. Their manufacture and use were banned in the late 1970s, but by that time, were already spread far and wide. Studies have found PCB contamination around the world, including the polar regions. Most humans have detectable concentrations of PCBs. The chemicals are extremely long-lived in the environment. Concentrations of the chemicals, which are stored in fatty tissues in fish accumulate from prey to predator, with larger individuals containing the highest amounts. Humans consuming fish continue to concentrate the substance in their bodies over time.

In addition to being a suspected human carcinogen, the compounds are blamed with causing developmental problems in children, and other health effects. Field



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**The goal of the PCB TMDL is to allow anglers to safely harvest and consume their catch.**

studies have noted a number of possible effects to fish health, including impaired reproductive, endocrine, and immune system function, and increased lesions and tumors.

Some species of fish in the Potomac estuary have been known to have elevated PCB levels for many years, and the jurisdictions have issued fish consumption advisories for several species. Each jurisdiction has issued advisories which vary somewhat in the recommendations on how much fish is safe to consume over time. All the advisories are more stringent for children or women of child-bearing age. The contamination issue is one of many water quality challenges for the Potomac that were known, but have gone largely unaddressed. In the mid 1990s, the District of Columbia settled a lawsuit against it for water quality violations by entering into an agreement, known as a consent decree, with the court. The decree required the District to complete a cleanup plan for PCBs by September 30,

2007. Maryland and Virginia are not bound by the date, but are participating in the plan, which would in any case be required of them at some later date.

Much of the tidal Potomac is included in the effort, where both fish tissue and samples of water containing PCB levels that exceed standards. The Potomac PCB TMDL will create an action plan to ultimately reduce PCB levels in water and in fish that will allow human consumption.

The ongoing data collection effort will produce information to determine sources and amounts of PCBs from point sources, such as wastewater treatment plants and industrial outfalls, as well as from nonpoint sources, primarily stormwater runoff. These loadings, along with a margin of safety, will determine the amount and sources of PCBs that need to be removed from the environment to allow the tidal Potomac to meet water quality standards.

The coordinated nature of the effort has added complexity, but should pay dividends in the long run. The primary goal among the states is to produce an understandable, comprehensive strategy to address PCB contamination. "The waterbody is shared, so the activities of one jurisdiction can affect the other jurisdictions," said Monir Chowdhury, a D.C. Department of Environment representative in the process. He noted that each jurisdiction has different standards and methods of assessment, and separate TMDLs for each jurisdiction would cause problems. "The effort will benefit greatly from the consistency that will come from working together," Chowdhury said. To bolster the process, ICPRB is strongly engaging stakeholders and the public in the TMDL development process.

A steering committee that includes representatives of the agencies developing the TMDL is guiding the process, assisted by a technical advisory committee and issue-specific workgroups. Workgroups focused on monitoring, loadings (data about quantities), standards and endpoints (how the TMDL will address differing state requirements), and implementation will guide those efforts.

The process is moving forward on several fronts. Sampling of water, sediments, and point source discharges is continuing to provide timely information on loadings, and will be completed soon. A mathematical model is being constructed, based on a number of sources. This fall, the completed model will begin to analyze the collected data. Model runs will be used with other information to estimate loads from different source categories, and workgroups will meet to discuss the load calculations. A round of public meetings on the results will be held next year.

While the effort will benefit from other TMDL PCB plans already written, it is unique and complicated in the level of

coordination required. Yet, the plan may be the first of many to come. The District's Chowdhury sees the effort as a beginning to do more. "This effort will set an example for how we work in the future," he said. He added that what is being learned in the collaborative process may also be used to revisit some of the hundreds of TMDLs the District has already performed.

In coming years, as more contamination issues are addressed by the Potomac basin jurisdictions that share water bodies, they are likely to be addressed through the TMDL process. "The need for a watershed approach by the jurisdictions, as well as the economic realities of environmental restoration makes the Potomac PCB TMDL both a template and a laboratory that can guide us in the future," said ICPRB Executive Director Joseph Hoffman. The future of TMDLs in the Potomac watershed will be covered in an upcoming issue of the *Reporter*.

Further information on the Potomac PCB TMDL development and meeting dates is available at ICPRB's website, [www.potomacriver.org](http://www.potomacriver.org).

## Shenandoah, Potomac Partnerships Prosper

Cattle waded belly-deep in the river and stared down boaters as they passed. Huge sycamores loomed over the water, just next to large swaths of steep, eroded banks. Clear, shallow water slowly moved over strips of bedrock and cobble bars. According to Trace Noel, owner of Shenandoah River Trips, the North Fork of the Shenandoah River has gotten wider and shallower in recent years, mostly from the unstable bank eroding sediment into the river. Noel has been operating on the river for more than 20 years and has noticed the changes in the river's character. The ICPRB's quarterly business meeting put ICPRB commissioners, staff, local leaders, and local organization staff in canoes and kayaks, with Noel in the lead, and sent them down the North Fork to learn more about the issues associated with the Potomac's largest subwatershed, including farms, development, and recreation. More importantly, the meeting helped forge a stronger partnership between several watershed groups.

At the forefront of the river's issues are its many uses. Farms are important to the Shenandoah's heritage and economy, but can be harmful for the river's health. Noel noted the empty banks as the group paddled down the river. Trees help hold the bank in place, but there are places where the banks have been mowed to the edges and trees cannot grow. The banks erode



Cows with free access to the stream is just one of the challenges observed in a short paddle on the North Fork Shenandoah River.

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## Watching the River Flow

April and May Potomac River flows were about half the norm, according to the U.S. Geological Survey (USGS).

Provisional data collected near Washington, D.C., showed the river's April flow at about six billion gallons per day (bgd), 48 percent below the normal flow of 13 bgd. Daily extremes ranged from a high of about 23 bgd on April 25 to a low of about 3 bgd on April 1. Water withdrawn for drinking use averaged about 348 million gallons per day (mgd). Freshwater inflow to the Chesapeake Bay averaged about 43 bgd, 54 percent below the historical average. The Potomac contributed about 21 percent of the total.

Flows in May reflected the year's continued lack of precipitation. Average flows for the month were about five bgd, 48 percent below the normal 10 bgd. Flows ranged from a high of about 8.6 bgd on May 18 and a low of about 1.7 bgd on May 31. Water withdrawn for drinking use averaged 378 mgd. Freshwater inflow to the Chesapeake Bay averaged 34 bgd, 46 percent below the historical average. The Potomac contributed about 20 percent of the total.

Water supplies for the region remained stable in the face of the continued drought conditions. The River dipped low enough in June to trigger increased monitoring of river flows, which was ended after the basin-wide storms that inundated the watershed at the end of the month.

into steep walls of bare soil that slump into the river with storms.

The Shenandoah region also has an inconsistent development history, a concern for many local leaders. Senior Planner of the Northern Shenandoah Valley Regional Commission (NSRVC) Tom Christoffel noted that the area was somewhat developed in the 1960s and 70s by urbanites seeking second homes. The development was initially for recreation and retirement, but has since become year-round housing. The earlier developments lack public infrastructure. Newer developments are centered around towns where public infrastructure controls water and sewer. These and other differences can trigger river use conflicts.

Other local leaders, including the chairman of the Regional Water Resources Policy Committee of the NSRVC's River Use Committee, Randy Sprouse, spoke about the Shenandoah's increasing recreational use and a need for keeping the river clean in the public access areas. Since the removal of the Harrisonburg Dam, there are many more recreational opportunities on the river. Sprouse noted that there was at least one spot, Compton Rapid, that attracts about 500 people each weekend. The area has no public facilities to deal with trash or human waste, making it a major stressor on the river. Sprouse hopes that the new partnerships stemming from the meeting and paddle will help bring new ideas and support for dealing with recreation and other issues facing the watershed.

Shenandoah Valley Pure Water Forum Director Bruce Lundeen believes it is important to connect with Potomac and Chesapeake Bay neighbors to communicate concerns, educate citizens, and network with other communities about watershed health. The Forum began ten years ago with the mission to network, educate, and act on Shenandoah-specific issues, but now Lundeen hopes to expand the networking to include its neighboring watersheds. The Forum is collecting a database of Shenandoah information to determine problems in the watershed, how watershed groups are addressing the problems, and



M. Baughman

The group inspects an eroding shoreline on the North Fork. A number of local groups are addressing this and other problems in the watershed.

with the municipalities and will enable the committee to learn more, faster,” said Christoffel. He noted that the local utilities have small crews and cannot cover growing issues, which is an ideal niche for ICPRB to fill. Christoffel also noted that “With ICPRB’s help, we can apply techniques and knowledge faster to help the watershed.”

The ICPRB is looking forward to working closely with the Shenandoah River groups to share information, expertise,

and networks. As the Potomac’s largest tributary, the Shenandoah plays an important role in the health of the watershed’s downstream ecosystem, including its citizens.

“In many ways, the Shenandoah watershed serves as a microcosm for the Potomac basin,” said ICPRB Executive Director Joseph Hoffman. “What local groups can accomplish with assistance from ICPRB and other agencies can be used to solve similar issues in other parts of the Potomac watershed,” he said.

how groups could work together to advocate for the watershed. The database will enable the citizen groups to better express needs to larger watershed neighbors. “We need a formalized relationship so we can begin to be a force in the Shenandoah watershed,” Lundeen said.

Christoffel also noted the importance of a partnership between the watershed groups. “The NSRVC’s Regional Water Resources Policy Committee parallels what ICPRB is trying to do for the whole basin. The ICPRB has the expertise and networks

## A Profusion of Aquatic Plants in Potomac

A May overflight of the Potomac River from the District of Columbia to Quantico, Va., revealed strong stands of submerged aquatic vegetation (SAV), primarily water milfoil. Milfoil, one of the first plants to grow during the season, was evident in stands along the shoreline in many areas from Broad Creek (just downstream from the Woodrow Wilson Bridge) to Quantico, Va.

The early spring observations support an earlier prediction of summer conditions by scientists at the Chesapeake Bay Program, who called for a small increase in SAV coverage in the lower Potomac River and a likely expansion in the mid to upper regions of the tidal Potomac, covered during the flight. Nancy Rybicki, a U.S. Geological Survey (USGS) Scientist who has studied Potomac SAV for decades, was impressed with the coverage seen so early in the season.

Visits to some of the observed beds near the shore in the following weeks was even more encouraging. Rybicki described the SAV in the Potomac from Wilson Bridge to Mount Vernon as diverse (eight different species found), thick, green, and healthy.

Submerged plants are critical to the health of the Potomac and the Chesapeake Bay. Plants increase water clarity by trapping sediments and reducing shoreline erosion, adding oxygen to the water through photosynthesis, and providing shelter and a source of food to many creatures. Submerged plant coverage and density also is an important indicator for waterway health because they are not under harvest pressure and their health is closely linked to water quality. The middle and upper tidal Potomac has met Chesapeake Bay Program goals, although the lower section has achieved only about 30 percent of the desired coverage. The Anacostia subwatershed remains without significant SAV. Overall, the Chesapeake Bay has achieved about 42 percent of the goal of 185,000 acres of SAV.

Rybicki and fellow researchers were again examining grass beds immediately after the huge storm that hit the watershed at the end of June, and still found plenty of SAV. Anglers who frequent the area and rely on the grass beds as largemouth bass habitat have reported that the beds have

remained largely intact.

Previous years of wet, dark springs with high sediment loads have slowed the spread of SAV in the Potomac somewhat, and the bay program prediction for improved SAV on the Potomac was based on the mild winter and dry spring. Other factors affecting grass growth include nutrient loads, wind speed, water clarity, and other site-specific factors.

A hydilla harvester in an inaugural mowing in 1986. A program to mow traffic lanes for vessels began with the heavy growth of hydrilla, but was discontinued when plant density and area declined somewhat. Worries that hydrilla would crowd out native species have proved wrong.



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## Deluge Derails Drought Watch

The extremely dry spring had staff of the ICPRB Section for Cooperative Water Supply Operations on the Potomac (CO-OP) wondering if releases of stored water for water supply would be needed this year. The CO-OP is responsible for coordinating water supply withdrawals and reservoir releases so that the metropolitan Washington water utilities can meet their demands.

As river levels dropped to historic lows in June, staff began daily monitoring of river levels and water demands. Odds that active water supply management would be needed before fall began to increase as river levels continued their fall, along with lowering groundwater levels.

What a difference a few days makes! Heightened monitoring was cancelled after an end-of-month deluge that dropped as much as 11 inches of rain in some parts of the basin. River flows have remained above normal, and groundwater levels are rebounding. While CO-OP staff breathed a sigh of relief, other ICPRB staff were pumping out their basements. When it rains, it really does pour!

## ICPRB Biologist Jim Cummins Honored for American Shad Project



ASA CEO Mike Nussman with awardees Congressman John Dingell and ICPRB's Jim Cummins (left to right).

The American Sportfishing Association (ASA) bestowed its most prestigious honors on "two life-long sportfishing advocates," at an evening reception during National Fishing and Boating Week. The ICPRB Director of Living Resources, Jim Cummins received the Future of Fishing Award for his work restoring American shad populations in the Potomac. Congressman John D. Dingell also was honored with the Norville Prosser Lifetime Achievement Award. The event was held at the Dirksen U.S. Senate Office Building in Washington, D.C.

The American shad, one of the most

abundant and economically important species on the river, had crashed to almost nothing by the mid 1970s, a victim of pollution, overfishing and reduction of habitat. Despite improvements in water quality and a moratorium on harvest in the following years, stocks of the fish remained appallingly low. Cummins restocking effort began in 1995, with the help of watermen, students, community volunteers, and the U.S. Fish and Wildlife Service's Harrison Lake Hatchery. Since 1995, the program has placed 15.6-million American shad fry in the Potomac, upstream of the

Little Falls Dam, which was modified in 2000 to allow upstream fish passage.

"I'm honored to be the recipient of the "Future of Fishing Award," Cummins said. "Receiving this award is certainly a high point of my career and the successful effort to restore American shad to the Potomac River is one of the most rewarding. However, I share this award with hundreds of volunteers and others who put their collective hearts and souls into this project. From students to anglers to commercial watermen to state agency and federal fish hatchery staff; it was their enthusiasm and

passion that brought this project to fruition,” Cummins said.

The award included a stipend that will be used to continue ICPRB fishery restoration projects. “We are pleased that the American Sportfishing Association chose to recognize Jim Cummins’ vision in the commitment ICPRB has made to the

river’s health through this project,” said ICPRB Executive Director Joseph Hoffman. The ASA also honored Congressman Dingell of Michigan with the Norville Prosser Lifetime Achievement Award for his distinguished career in protecting hunting and fishing through support for a wide range of federal projects.

## Join ICPRB for an October River Ramble

The ICPRB is offering a look at the Potomac River on one of its prettiest stretches at one of the its most attractive times. The fall ICPRB River Ramble will take a group of paddlers through the famous Paw Paw Bends on the weekend of October 12-15. The trip will begin at Old Town, Md., passing through the bends and finishing at Little Orleans, Md. A hike through the nearly mile-long Paw Paw Tunnel, a part of the C&O Canal National Historic Park, will share the bill with colorful fall foliage, geology, and river history.

The River Rambles are an ongoing series of weekend canoe/kayak trips designed to provide an intimate meeting of the river for Potomac decision makers, citizens, and students. “We hope that



people walk away with a new-found sense of this river that is so important to the lives of millions of people. A personal knowledge of the river by the watershed’s residents is a first step in preserving the river’s values for posterity,” said ICPRB Executive Director Joseph Hoffman.

For more information and to register for the trip, visit ICPRB’s website at [www.potomacriver.org](http://www.potomacriver.org), or call Jen Dotson at (301) 984-1908 ext. 109.



Potomac Basin

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