

# REPORTER



C. Dalpra

Diverse beds of aquatic plants have flourished in the upper tidal Potomac in the last few decades, providing many benefits.

## A River of Grass (and Some Invasive Plants)

The U.S. Geological Survey (USGS) boat eased out onto the Potomac from Gunston Cove to spend another day checking on the status of the numerous beds of submerged aquatic vegetation (SAV) hugging the shoreline of the tidal fresh portion of the river.

The sunny September day found USGS aquatic biologist Nancy Rybicki checking out the Maryland shoreline from Piscataway Creek, about 10 miles from Washington, D.C., downstream and into Mattawoman Creek, one of the most productive tributaries in the tidal Potomac. The stretch is just a part of the region she studies, on both sides of the river from Washington, D.C., downstream to Potomac Creek where the river makes a big turn toward the northeast.

The cruise was notable for confirming both the health of aquatic grasses in the upper tidal Potomac, and the presence of a new invasive species found for the first

time in the river, water lettuce (*Pistia stratiotes*), which could pose a serious new impact.

The day-long cruise was one of a series of trips that Rybicki makes each summer and fall since the early 1980s, creating a detailed account of the emergence and growth of SAV on the tidal freshwater Potomac. For more than a decade before that, the area was devoid of SAV, Rybicki noted, brought on by increasing pollution and massive, persistent algal blooms. A detailed assessment of the area's SAV resurgence coauthored by Rybicki is available on the web at [http://aslo.org/lo/toc/vol\\_52/issue\\_3/1195.pdf](http://aslo.org/lo/toc/vol_52/issue_3/1195.pdf).

Today, things are much different, with extensive stands of mixed species of plants hugging the river's shoreline. "It's been a very good year," for the growth of SAV in the tidal freshwater Potomac, Rybicki said. "Coverage is as high as any year [since plants returned to the river], and the

***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.***

## **ICPRB COMMISSIONERS**

DISTRICT OF COLUMBIA: **Hamid Karimi,\* Anne D. Snodgrass,** Alternate; **Lloyd Preslar; John R. Wennersten,** Alternate

MARYLAND: **Gov. Martin O'Malley, Robert M. Summers,\*** Alternate; **James H. Gilford, Minny Pohlmann,** Alternate;

PENNSYLVANIA: **John T. Hines,\* Lori Mohr,** Alternate; **Rep. Dan Moul, Rep. Bob Bastian,** Alternate; **Ronald Stanley, Roger C. Steele,** Alternate

VIRGINIA: **Walter Alcorn; Del. Joe T. May; David K. Paylor, Scott W. Kudlas,** Alternate;

WEST VIRGINIA: **Marten R. Jenkins, Jr., Phyllis M. Cole,** Alternate; **Del. Harold K. Michael; Stephanie R. Timmermeyer, William D. Brannon,\*** Alternate;

UNITED STATES: **J. Winston Porter,\* Frederick R. Eames,** Alternate; **George Reiger, Mel M. Baughman,** Alternate; **Jane G. Witheridge, Howard Graeffe,** Alternate

\*Executive Committee Member

ICPRB Officers:

**Robert M. Summers,** Chairman  
**John T. Hines,** Vice Chairman  
**Joseph K. Hoffman,** Executive Director  
**Robert L. Bolle,** General Counsel

Commissioners and their alternates are appointed by the state's governors, the mayor of the District of Columbia, and the President of the United States.

diversity of species is high in many places," Rybicki said. The resurgence of SAV in portions of the Potomac has been one of the "good news" stories for the river for the last quarter-century. Increasing stands of SAV have helped to clear murky water, decrease nutrients in the water that cause algae blooms (see July/August 2007 *Reporter*), serve as a food source for a variety of organisms, and provide habitat for fish and other creatures on which they prey.

As the boat nosed over to the Maryland shoreline, the beds were indeed impressive, with some stands stretching more than the length of a football field into the morning haze. Hydrilla (*Hydrilla verticillata*), an invasive plant that was one of the first to appear in the river's resurgence of plants in 1981, remains a major species on the river. The improving river conditions allowed another 11 species to quickly establish. Another foreign plant, Eurasian watermilfoil (*Myriophyllum spicatum*), is a major presence, joined by natives such as wild celery (*Vallisneria americana*), coontail (*Ceratophyllum demersum*), waterweed (*Elodea canadensis*), and water stargrass (*Heteranthera dubia*). Other species appear less frequently. The large stands generally occupy a shallow swath of riverbed from near the shoreline out into the river more than 50 yards, where sunlight penetration allows for strong growth.

The survey method is fairly direct: Motor slowly into the bed, the boat moving in a semi-circle deep into the bed toward shore and back out again. Rybicki pulls samples out with a metal garden rake, checking for the different species present, and transferring data on species makeup and bed size onto a map. Once out of the bed, the process stops to clear the matted outboard motor propeller before moving down the shoreline.

The short trips into the grass beds are amazing, lending a view of what the river generally might have looked like centuries earlier (except for the different species composition). Out in the channel, the river water is its usual summertime green from the single-cell algae that limits visibility to a couple of feet. After penetrating the beds, the view from the boat is startlingly different. Stands of lush plants rise from the river bed to the surface. Empty pockets between bunches of plants allow a view through gin-clear water to the bottom, three feet or more below. Small fish can be clearly seen as they dart about in the cover that means safety from predators, and a source of food in the many other small creatures that call the beds home. The view is not unlike that of a well-kept aquarium.

The expansion of about a dozen species of SAV in the upper tidal Potomac has come on the heels of improved water quality, primarily from improved wastewater



Nancy Rybicki checks on SAV beds south of Piscataway Bay.

C. Dalpra

suggested dosing the open river with herbicides. As the plant grew strongly, boaters began calling for action as propellers fouled and engines overheated. But the feared hydrilla monoculture never occurred. Instead, the plant helped to create conditions that supported the growth of other species.

In effect, the beds create and support small habitats that seem totally different from the open water a short distance away.

treatment in the metropolitan area that reduced loads of nitrogen and phosphorus. The nutrient reductions helped to abate the annual large algae blooms, increasing water clarity and creating habitat that allowed plant beds to establish. Continued growth of the plant beds filters more silt and nutrients, cascading the creation of suitable plant habitat.

While the river's strong improvement led to the reestablishment of the aquatic plants in the area in 1981, the environment that supports that community still is fragile. In addition to general water quality, plant populations also are affected by high river flows that can physically scour the beds as well as dump huge loads of silt and

The beds of plants trap sediment, clearing the water and opening up new territory where sunlight can penetrate and the plants can grow. The SAV also use some of the excess nutrients that feed the growth of green-water algae.

The survey proceeded through about 10 nautical miles of shoreline, sampling the large beds, and up into Mattawoman Creek. Grass beds are thick in the creek, one of the river's most-productive tributaries and a focal point for many bass tournaments. Rybicki was especially interested in a stand of the relatively rare American Lotus that had been reported some distance up the creek.

As the boat ducked into several large beds of mixed plants, a few stood out both for their bright color and their height above the water's surface, looking like they didn't belong. They didn't. The plant, not seen before in the Potomac, was water lettuce, a plant commonly found in many backyard ponds and sold widely by the aquatic gardening industry. The invasive plant could create real problems in the river, if it becomes established. Rybicki was worried about this newcomer, and for good reason (see related story). The plants likely entered the river after being discarded by someone whose pond became overgrown, were washed into the river from a pond or other facility, or came off a visiting boater's trailer. The small batch of the floating plants was retrieved by Rybicki with her rake. After traveling a short distance, another stand was found and removed. And then another. And another. It quickly became obvious that this small effort would do little good in the great scheme of things. The invasive plant programs at USGS and the Maryland Department of Natural Resources were notified of the discovery.

Overall, a visit to the upper tidal Potomac's "gardens" is an uplifting experience, especially to anyone familiar with the area when plants were not to be



Water lettuce harvested by Rybicki's rake.

C. Dalpra

nutrients that fuel algae growth and rob plants of the sunlight needed for photosynthesis.

The non-native plants hydrilla and milfoil are the dominant species in the upper tidal Potomac although the others are firmly established, and the beds observed usually contain three or more species. When hydrilla began establishing itself in the river in the early 1980s, there were concerns that it would crowd the river and out-compete any native plants. At the time, an emergency committee established by ICPRB heard from some experts who

found. The return of SAV is helping to cleanse the river, and the benefits are apparent to the large numbers of anglers who focus their fish-catching efforts on the productive grass beds.

As the boat was being put away at Gunston Cove, the day ended with a chance meeting with a group of researchers from George Mason University, also focused on the grass beds. Led by Assistant Professor of Fish Ecology Richard Kraus, the team is probing the beds to assess how they have affected fish populations and other living resources. While not ready to scientifically quantify what's happening, Kraus noted that he is finding high concentrations of various fish species using the beds. Sunfish and smaller residents like killifish, a major prey species for many larger fish, are present in high concentrations. The crew also is interested in large snails that are thick in Gunston Cove, and likely present in other areas of the river. Japanese mystery snails are another foreign transplant in the river that use the beds. It is unknown how the species got in the river, but they also could have come from the pond trade, sold as trapdoor snails. The snails feed on rotting material and phytoplankton, and don't consume the plants. Not much is known about them, or effects they may have on the complicated, intricate system that is the biology of the Potomac. Their young may be preyed upon by crayfish, including the rusty crayfish, another foreign invasive species that is becoming more common in the Potomac.

Unfortunately, the success of SAV in the upper tidal Potomac is fragile, and beds could decrease if water quality is allowed to slip. The success in this section of the river has not yet flowed downstream to the lower



C. Dalpra

**Grass beds can bring frequent propulsion problems.**

Potomac, which as far as plants are concerned is a different kind of river. Downstream of the Route 301 Bridge at Morgantown, Md., the river is much larger, has higher salinity, and is home to different, more salt-tolerant species.

Eelgrass in the lower Potomac has suffered the same fate as other Chesapeake Bay tributaries, where silt and nutrient loadings have caused die-backs exacerbated by increasing water temperature. Rybicki, with history as a guide, said that "Once they [plants] are gone, it's much harder to bring them back," because a number of conditions must all occur together. Seeds or propagules must be present to take advantage of the right temperature, salinity, and sunlight, and other water quality conditions needed to support the plants. Strong water quality efforts could someday bring a blooming renaissance to that portion of the river in the future.

Editor's note: Nancy Rybicki reported finding numerous other bunches of water lettuce throughout the area since the earlier trip.

## **Keep Water Lettuce and Other Invasives Out of the Potomac!**

The sighting of water lettuce (*Pistia stratiotes*) is an alarming revelation to anyone familiar with the plant, including many aquatic gardeners. As a landscaping feature, ponds are growing rapidly, and water lettuce and water hyacinth are readily available at most stores that sell pond plants. What isn't apparent at many stores are strong warnings about containing these plants (and fish) in ponds and ensuring they are not released to the environment. Water lettuce and other plants and animals not native to the river also can be carried by boat trailers or by floods that carry new species into the river from commercial or private ponds.

Whether water lettuce, a tropical plant, can get a foothold in the river permanently is unknown. In area ponds, the plant starts



C. Dalpra

**A single floating water lettuce quickly colonize an area, creating a dense floating mat in a few weeks.**

to die back at water temperatures much below 60 F. However, the plant does

produce seeds that fall to the river bed, and could produce plants in the spring.

In area ponds, a gardener need only buy one or two of the floating plants. The plant produces seeds, but spreads rapidly by sending out runners (stolens) where new leaf clusters quickly form. Under optimal conditions, the plants can double their number in just a few weeks, and over a summer, will take over a pond without regular harvesting.

The plants have the potential to take over coves in the Potomac. The attractive plants float on the surface, and extend long root structures more than a foot into the water. The plants form dense mats that can:



## Watching the River Flow

Potomac River flows, measured near Washington, D.C., were low in late summer, continuing a steep decline in the early fall, according to provisional data provided by the U.S. Geological Survey.

August Potomac River flow averaged about 2.10 billion gallons per day (bgd), or about 61.5 percent of the long-term average. River flow ranged from a low of about 1.24 bgd on August 19 to a high of about 5.57 bgd on August 24. Water withdrawn from the Potomac for metropolitan area water supply averaged about 400 million gallons per day (mgd).

September low flows were more severe, running at about 1.40 bgd, or only 38.2 percent of the long-term average. Daily extremes ranged from a high of about 2.00 bgd on September 1 to a low of about 1.00 bgd on September 27. Water withdrawn from the river for water supply again averaged about 300 mgd.

Although releases of stored water have not been needed to date, continuation of the drought conditions through the winter and spring could trigger active management of the river for water supply next summer.

lower dissolved oxygen levels by covering the water surface; crowd out other surface plants and kill off SAV by reducing sunlight; restrict water flow and increase flooding; provide an ideal breeding environment for mosquitoes; and hamper boating and fishing.

Water lettuce is just the latest new species found in the Potomac, joining several other aquatic plants, snakehead fish, the rusty crayfish, Japanese mystery snail, and others.

Stewardship is key to limiting these introductions, through keeping foreign plants or animals from entering the river. Natural resources agencies in the Potomac basin note that introduction of foreign species is a growing problem, and urge people to:

- \*Dispose of plants properly;
- \*Do not put unwanted plants or animals in local waterways;
- \*Check and clean boat trailers and other equipment used in angling, diving, or boating;
- \*Do not dump live bait;
- \*Do not transport bilge, live-well, or other water from one area to another.

## Rusty Crayfish Move into Monocacy River

The rusty crayfish (*Orconectes rusticus*) is the latest in a string of non-native invaders, including hydrilla, snakeheads, and water lettuce (see related article), now found in the Potomac watershed.

The crayfish hail from the Ohio River basin, but have spread to the Great Lakes area and the northeast U.S., including southern Pennsylvania, where they have also become a nuisance, and even into parts of Canada. The rusty crayfish has eliminated native crayfish in Wisconsin and consumed aquatic vegetation and fish eggs in the upper midwest region's lakes. According to the Federal Aquatic Nuisance Species Task Force website, the rusty crayfish has been reported as an invader in many waterways since the 1930s.

Rusty crayfish were first identified in the Potomac watershed in June 2007 during a Maryland Biological Stream Survey (MBSS) in Marsh Creek, a tributary to the Monocacy River. Since that initial survey, the crayfish also have been found in the mainstem Monocacy River. Maryland Department of Natural Resources (DNR) Biologist Jay Killian said, "The crayfish have been in Pennsylvania, just north of the Monocacy River for a while. It was not unexpected to find them in Maryland." Killian said his group is monitoring this month to find the extent of the crayfish and track its spread.

The rusty crayfish out-compete native

crayfish for the best habitat, devouring submerged vegetation, fish eggs, macroinvertebrates, and any other food sources in their path. They can reduce the number of species of plants, macroinvertebrates, and fish quickly. Rusty crayfish are less likely to succumb to predators when young, as many native crayfish are, because they grow so fast. In turn, the rusty crayfish will eat fish egg masses and the lack of submerged vegetation leaves young fish that do survive more vulnerable to predators.

Killian indicated that the group samples 75 meters of river at each of 21 sites they are reviewing in the Monocacy watershed from the Mason-Dixon line to the mouth of

the river. Their first site yielded 800 rusty crayfish. The only other species present were virile crayfish (*Orconectes virilis*), another non-native invasive species that has made Potomac waterways its home.

As of now, there is no control or eradication for the crayfish. It is suspected that the crayfish was transported to the watershed by fishermen using them for bait. The DNR is working on gathering the baseline data to assess the impact of this invasive species. Fishermen can be on the lookout for the invader by checking for small rusty-colored patches on the sides of the crayfish. If you have questions about rusty crayfish, contact DNR at (410) 260-8610.

## ICPRB Uses Drought Conditions to Study Water Supply

The very dry conditions during the summer and fall have caused serious problems for some in the Potomac basin, with farmers in some areas losing crops, and drinking water shortages in some communities that rely on small reservoirs or groundwater in areas where the water table has been dropping. These conditions also have brought renewed media interest in the status of drinking water systems throughout the region.

For the Washington metropolitan area water suppliers and the ICPRB Section for Cooperative Water Supply Operations on the Potomac (CO-OP), the extended dry period has led to added responsibilities and opportunities. The organizations have increased flow monitoring of the Potomac River, prepared for the possibility of augmenting Potomac flow to meet the drinking water demands, and using these low-flow conditions to learn how to more efficiently operate the reservoirs that serve as a “savings account” to ensure that the metropolitan area’s drinking water demands can be safely met even in the worst of droughts.

In October, CO-OP staff took advantage of very low Potomac River flows and a rainless forecast to conduct time-of-travel tests in the river. The small releases of stored water from the Jennings Randolph Reservoir were monitored to assess the time needed for water to travel some 200 miles down the river to the metropolitan area water intakes for the three major water suppliers, Fairfax Water, Washington Aqueduct, and the Washington Suburban Sanitary Commission. Collectively, the suppliers serve more than 4.1-million residents of the area.

The cooperative water supply system, the product of decades of research and refinement, has kept the region from needing to implement water restrictions when the flow of the Potomac can’t meet demands while leaving enough water in the river to protect its ecology. “The billions of gallons of water stored in the reservoir serves as a ‘bank account’ for the region’s water supply,” explained CO-OP Operations Director Erik Hagen. “As with any savings account, we want to keep it full so that it is available when it’s needed most,” he said.

The tests increase the system’s efficiency by increasing understanding of how long it takes for released water to get to the intakes, about nine days under previously tested conditions. With better knowledge of how the system responds, managers can release just the amount needed to satisfy water demands and environmental needs, leaving the rest for use later. Time-of-travel can vary depending on the amount of water released, and the background flow condition of the river. Generally, higher background flows or release rates decrease travel time. “These tests can show us how to release less water than called for under current operating rules, and still meet the targets,” said Hagen. One of the test releases arrived in about seven days, Hagen added. Further testing can help hone the operating rules for greater efficiency. “The information we can gain from these tests could inform management for decades,” Hagen said.

As this newsletter goes to press, the CO-OP staff are closely monitoring river levels, precipitation forecasts, actual and forecast demands from the water suppliers, and groundwater levels in the basin. The data is

used as important information in the process that guides the timing and size of potential water supply releases. As the region continues under a drought, the likelihood of actual releases increases, and could occur this fall. Annual testing of the system through drought simulations and periodic assessments of future demand leave area water managers confident that the metropolitan area will have enough water, even during a drought worse than any in recorded history.

Any releases this year likely would be small, but if drought conditions continue through the winter, releases could be more common next summer and fall. The fall and winter traditionally is a time when reservoirs refill and groundwater tables, which provide the base flow for the area's streams and rivers, recharge. More information about how the metropolitan water supply works and updates on its status are available at [www.potomacriver.org/water\\_supply/](http://www.potomacriver.org/water_supply/)

[status.htm](#).

The U.S. Geological Survey has noted that groundwater levels, which were normal or above normal earlier in the summer, are continuing to drop and some are now reaching very low levels. A winter with normal precipitation would allow groundwater recharge, which will make rivers and streams more resistant to periods of low rainfall. Some streams in the watershed have hit historic lows, although the mainstem Potomac remains far from a new record.

The efforts of CO-OP and the water suppliers focus on meeting the drinking water demands of the residents of the region. At the same time, everyone is encouraged to be a part of conserving our valuable water resources, whether the source is a water supplier or a private well. There are many ways to conserve water year-round. To learn more, visit [www.wisewateruse.com](http://www.wisewateruse.com).



### Students Meet River Residents

ICPRB staffer Jim Cummins shows students the kinds of bugs that can be caught in the river and used to help determine water quality. The collection of live critters were part of a World Water Monitoring Day event held in Alexandria, Va., on September 18. More information on the international event, sponsored by the Water Environment Federation and International Water Association, can be found at [www.worldwatermonitoringday.org](http://www.worldwatermonitoringday.org).

C. Dalpra

## Catoctin Aqueduct to be Restored

The National Park Service's Chesapeake and Ohio Canal (C&O) staff have begun organizing the large stones to be used for restoring the Catoctin Aqueduct over Catoctin Creek near Lock 29 in Lander, Md. The aqueduct featured a unique elliptical center arch, which sagged and eventually failed in 1973. John Noel, the park's partnerships coordinator said the restored aqueduct will "maintain historic integrity, but improve internal infrastructure by using concrete instead of fill." Noel also indicated the restored aqueduct would maintain its elliptical center arch.

The Catoctin Aqueduct is one of 11

aqueducts along the C&O Canal Towpath, all in varying conditions. The Catoctin Aqueduct was completed in 1834 and saw its last canal boat in the 1920s. In preparing for the restoration, C & O Canal Park staff retrieved some stones from the creek, but many were found in the aqueduct prism where they had been collected after the collapse. The find will allow reuse of about 300 of the original stones from the aqueduct. With the recently restored Lander Lockhouse and the newly restored Monocacy Aqueduct, the area will certainly bring history back to life for park visitors.

The total cost for the project is \$3.4

million. Half of the restoration funds will come from Maryland's Transportation Enhancement Program and the remaining half has been or will be raised through donations. The Lander Community Association has been a driving force behind the restoration and fundraising efforts for the aqueduct and was the force behind the Lander Lockhouse restoration.

## Swimming Returns to D.C.

It was just a temporary return, however, for participants in the Nation's Triathlon, held in the District on September 29. The swimming part of the triathlon was cancelled in the previous year's inaugural race, rains just before the race raised bacteria levels in the river above guidelines. Race founder Charles Brodsky hired a laboratory to test the river frequently before both events.

This year, the monitoring convinced officials that the swim part of the race could proceed, and temporarily lifted the ban on water contact. Brodsky noted that the athletes had no complaints about the river swim portion of the triathlon, which is combined with a run and a bicycle race. Then again, die-hard triathletes are used to swimming in places like the Hudson River. District of Columbia Mayor Adrian Fenty, a seasoned triathlete, finished tenth in the elite male category, and spent almost a half-hour in the water.

The project still needs about \$220,000 to move forward with the plan. To donate to the project or for more information, contact Dr. George Lewis of the Lander Community Association at [lewisdvm@aol.com](mailto:lewisdvm@aol.com) or visit the Aqueduct Restoration website at [www.catoctinaqueduct.org](http://www.catoctinaqueduct.org) for more information.

### Too Much Paper?

For those whose mailbox gets just too full, remember that you can read the Potomac Basin Reporter on our web site after getting notified of new issues by email. You may request an email subscription on our website, or send us a note at [info@icprb.org](mailto:info@icprb.org).

Readers who are moving can help ICPRB save some money by letting us know of your new mail or email address. For mail subscribers, please send a note with your current and new mailing addresses. Thanks for helping us keep our costs of keeping you informed as low as possible.

Non-Profit Org.  
U.S. Postage  
PAID  
Rockville, MD  
Permit No. 800



Potomac Basin

# REPORTER

**Editors: Curtis M. Dalpra  
Jennifer D. Willoughby**

Published six times a year by the Interstate Commission on the Potomac River Basin, 51 Monroe St., Suite PE-08, Rockville, MD 20850. (301) 984-1908.

(ISSN 1072-8627)

**E-Mail: [info@icprb.org](mailto:info@icprb.org)  
Internet: <http://www.potomacriver.org>**

**Joseph K. Hoffman, Executive Director**

This publication does not necessarily reflect official Commission policies. Funds for the *Reporter* are provided by the U.S. Environmental Protection Agency and the signatory bodies to ICPRB: District of Columbia, Maryland, Pennsylvania, Virginia, and West Virginia.

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

Address Service Requested

Printed on recycled paper with soy-based ink

September/October 2007