

REPORTER



J. Odenkirk/VDGIF

An earlier survey shows the range of sizes of snakeheads in Dogue Creek, Va. The captured fish include a young-of-year fish (140 mm) to a fish of at least three years (550 mm). The ranges are similar to those found recently in the creek's headwaters.

At Least They're Delicious

Snakeheads are Here to Stay

The bounty from the brown waters of Dogue Creek in Virginia have put to rest any doubt about the northern snakehead fish finding at least part of the Potomac a comfortable new home. Several anglers snagged and netted about 80 snakeheads in the upstream reaches of the Potomac tributary downstream of Mount Vernon during the aftermath of the heavy storms that swelled the region's waterways. The anglers described the scene to Virginia Game and Inland Fisheries Regional Biologist John Odenkirk. They told him there were easily hundreds of fish swimming upstream with schools of minnows after about seven inches of rain had turned the trickle of a stream to a torrent on October 10.

The species, a native of China, is a relative newcomer to the river, where they were first found May 2004, sometime after

the release of an unknown number of individual(s) to the river. Although the fish seemed established last summer, some resource managers still clung to the hope that the fish would not be as successful as it now appears. Introduction of the invasive species has raised concerns that, without significant predation on them, snakeheads will do a lot of predation themselves, perhaps out-competing sportfish such as bass for food, and preying on young bass. The Potomac's largemouth bass fishery has a national reputation and is a significant economic force.

The waters had receded somewhat and the procession of snakeheads, sunfish, killifish, and other minnows had ceased when Odenkirk and other biologists visited the stream on October 12. Using electroshocking equipment, they captured more than 200 snakeheads. "It was

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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J. Dixon/VDGIF

Biologists led by John Odenkirk electroshock for snakeheads in the headwaters area of Dogue Creek.

absolutely stunning,” said Odenkirk, noting that 70 snakeheads had been previously captured over the whole summer.

He was at a loss to explain why the huge gathering of fish was seen miles upstream in a segment of the creek that is quite small under normal conditions. “It’s hard to say what caused the fish to behave that way. Was it a water quality issue with 7.5 inches of rain after two months of drought? The oxygen level, temperature, flow?” he asked. They might have been moving with all tasty sunfish, killifish, and brown bullhead that also were present, he noted.

The captured fish were a range of sizes, but primarily young. Although he is still logging the data, Odenkirk estimated that about 70 percent of the fish were Age 0 (less than a year old). Another 20 percent of the snakeheads were in their second year. Even in the young fish, there was a range of sizes, leading Odenkirk to wonder if the new Potomac strain of snakeheads have a long spawning season or if the fish are spawning multiple times during the summer. “It could be both,” he said. The Age 0 fish average about six to seven inches long, a prolific growth rate that speaks to their voracious appetite.

Resigned to the presence of a strong population of the species, at least in Dogue Creek, Odenkirk and other biologists are learning as much as they can about their behavior. Odenkirk was far from finishing examinations of the captured fish, but was already adding to the knowledge base about the species. Immediately apparent was the young snakeheads’ preference for banded killifish, a small (2-4 inches), common fish sometimes used as bait by anglers. About 90 percent of the identifiable stomach contents were killifish, Odenkirk said. Sunfish also were found in the snakeheads’ bellies, but seemed to have

no taste for the brown bullhead, a favorite of bass. Odenkirk has a theory about the different preferences. The fish taken by the toothy, aggressive snakehead are being eaten tail-first. Bass usually swallow fish head-first, avoiding problems with the sharp spines in the bullheads' fins. Other information about the species' habits in its new environment are likely to follow as the fish are further studied. Some plans are being formed to tag and track some snakeheads to see how they spend the winter months.

While Odenkirk believes that attempts at management can help in the future, he sees it as an uphill battle. The first steps will require getting a much better picture of how the species behaves and adapts to the Potomac environment. Other efforts should focus on containing the fish as much as possible and preventing its spread to other river systems, requiring regional

cooperation. The fish are not very tolerant of salt in the water, so is likely not a threat to the lower Potomac and Chesapeake Bay. The fish prefer stiller waters with good vegetation, are tolerant of areas with low dissolved oxygen, and actually breathe atmospheric air as well as using gills. A number of Odenkirk's samples lived in a cooler for more than 24 hours, with just a little water to keep them moist. "They were still in fine shape," Odenkirk said.

Perhaps the best shot at management of the species is to increase their desirability among recreational anglers. Those who have caught them think that they put up a great fight. Odenkirk is doing his part by noting that snakeheads make a wonderful meal. "They are an exceptional freshwater fish," he said. He likes them fried. "The flesh is firm and dense, a little chewy, and mild-tasting. They take on the flavor of any sauce you use," Odenkirk said.

From the Executive Director's Desk

Commitment

Hurricane Katrina's devastation of the Gulf Coast, and particularly the destruction and flooding in New Orleans, holds many lessons for the rest of the country, including our Potomac River and Chesapeake Bay watersheds.

Here, we are trying to restore the river and bay in the face of rapid population increase, development, and land-use change. In Louisiana, the catastrophe followed decades of planning and debate about the loss of wetlands and questions about the adequacy of a levee system to survive a major hurricane. Over the years, officials assessed the problems, even to the point of conducting model exercises eerily similar to what actually occurred. Cost estimates to restore wetlands and engineering were estimated, at one point, to cost about \$14 billion (on a par with Boston's Big Dig project, which was aimed only at relieving traffic congestion). Those numbers are similar to estimates to restore Chesapeake Bay.

Through denial of the problem and inaction due to a lack of commitment, the price tag to be paid by all Americans in the aftermath of Katrina just got much larger. The first \$10.5-billion committed by the Administration is only a starting figure. Some estimates put the recovery and rebuilding costs at about \$200 billion.

With the rest of the Chesapeake Bay watershed, Potomac residents and their governments are involved in a similar dangerous game. As with Katrina's effect on New Orleans, the problem has been defined, and we pretty much know what

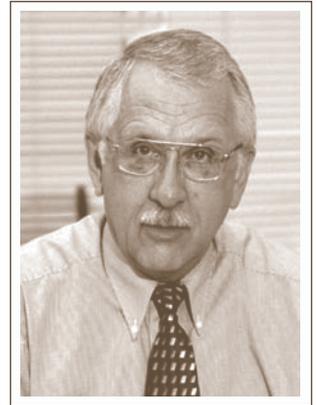
needs to be done. Like the New Orleans situation, we know with fair certainty the end result of continued lack of commitment.

The biggest difference between the two is that planners in Louisiana were preparing for a single instantaneous catastrophe that they knew would eventually come. Here in Potomac country, there will be no single defining moment. Instead, we are watching predictions slowly come to pass in the form of river and bay segments with depleted oxygen, diseased fish, and algae blooms. New Orleans had a heart attack. Our region is afflicted with a slow-growing cancer.

Sedimentation, nutrient enrichment, and the negative effects of multiple sources of contaminants are not the sudden calamity of an advancing Category 5 hurricane. Collectively and over time, they can have just as devastating an effect.

Without a "defining moment" that will call all collectively to action, it is up to the watershed's residents and decision-makers to look clearly at the problem, and to commit, through actions and dollars, to preserve the region's quality of life and heritage.

--Joseph K. Hoffman



Potomac Dissolved Oxygen Levels Improve Somewhat; Better Monitoring Proposed

Monitoring stations along the tidal Potomac River showed dissolved oxygen levels improving somewhat in September, but remained, for the most part, below average for the season (see August/September *Reporter*).

Meanwhile, although conditions improved somewhat in the mainstem Chesapeake Bay in late August and September, researchers recently reported that the 2005 summer will be the worst on record for the volume of anoxic, or oxygenless water. About 5.1 percent of the mainstem registering oxygen levels of less than five milligrams per liter (mg/l). In its first forecast of summer conditions, bay program scientists in May predicted that dissolved oxygen levels would likely be moderate to severe, and could rank among the five worst summers in the past 20 years.

The numbers represent an average for the summer, with the anoxic zone of bottom water in the bay mainstem climbing to as high as about 10 percent of bay volume when assessed during the second week of August. At that time, about 41 percent of the bay's mainstem waters were below 5 mg/l, a condition stressful for many aquatic animals.

Of the several stations on the Potomac, the worst conditions have been recorded at Point Lookout at the river's mouth. September's average at the station was a meager 0.2 mg/l—still anoxic, but recovered slightly from an August average of less than 0.15mg/l. Across the river's mouth at Smith Point, the September average of 3.6 mg/l was a big improvement over August, but still well below average. Upriver at Ragged Point, oxygen levels rose to 1.2 mg/l in September, still well below the average of 2.45 for the month. In 2004, the station averaged about 6.2 mg/l. Further upstream at Morgantown, Md., an area where the river transitions from the fresher water upstream to a more bay-like environment, oxygen jumped from 1.45 mg/l in August to 5.55 mg/l in September, reflecting a more-seasonal adjustment. Stations further upstream returned to more-normal conditions in September, but were generally still low for the time of year.

Researchers noted weather factors that magnified the problem. As bay and river sailors may have noticed, average wind speeds during the summer were very low, and bottom water temperatures were elevated. Breezes help mix bottom and more-oxygenated surface water, reducing the problem. Higher bottom water temperatures promote the bacterial activity that breaks down dying algae and removes dissolved oxygen in the process. Those weather conditions only amplify the real



reasons for the problem: heavy loads of nitrogen and phosphorus deposited through stormwater flow and atmospheric deposition. These loads are most intense during strong spring storms that bring huge loads into waterways.

The several stations on the Potomac provide an incomplete picture of the nutrient and dissolved oxygen problems plaguing segments of the river. More comprehensive monitoring can help attribute nutrient sources and how to manage them.

As new water quality standards for dissolved oxygen and other parameters are implemented, the need for good data will increase. To that end, a proposal for intensive monitoring of the shallow water has been proposed to the Chesapeake Bay Program, noted Bruce Michael, the Maryland Department of Natural Resources Tidewater Ecosystem Division director. The proposal would help bring the needs and resources of many agency and university stakeholders studying the Potomac into greater coordination. The three-year monitoring regime would help researchers "see the big picture" for the Potomac, Michael said.

The study, which would be guided by Maryland and Virginia's natural resources agencies, calls for an enlarged network of monitoring stations and real-time monitoring efforts. The work would help assess new criteria for dissolved oxygen, water clarity, and chlorophyll, evaluate submerged plant habitat and restoration sites, and assess the effectiveness of nutrient and sediment reduction strategies aimed at attainment of water quality standards. As always, funding is a major challenge to instituting the monitoring program.

In the meantime, the early October storms that dumped more than seven inches of rain in some parts of the watershed brought with it high winds that, with the cooler temperatures, should mix and dissipate the anoxic zones in the bay and the river. Unfortunately, heavy loads of nutrients built up on land during the drought entered the system with the stormwater, providing fuel for more problems next year.

Drinking Water Group Exploring Concerns

Continuing reports about nutrients, toxics, and other pollutants that affect the river environment and the creatures that live in it, have a growing number of the watershed's residents wondering how it may directly affect them, with the quality of drinking water a primary concern.

That concern is shared by a growing organization, the Potomac River Basin Drinking Water Source Protection Partnership, comprised of water suppliers, federal, state, and local agencies, and other groups with responsibility for drinking water or the systems that provide it around the basin. The group formed in 2004 as a means for members to share information and concerns about issues that could impact the safe, reliable production and delivery of drinking water.

The group has held several strategy meetings, including two recent workshops that updated members on emerging contaminant issues and pathogens, the possible effects of which can range from increased drinking water processing costs to elevated threats to public health.

The group's June workshop focused on pathogens, primarily *Cryptosporidium*. The parasite can cause diarrhea and other symptoms, with some severe cases causing pulmonary disease.

The microbe, which lives in the intestinal tract, is transferred through contact with fecal matter. It can survive for lengthy periods outside a host and also resists many common disinfectants. Workshop attendees were briefed by experts on the parasite's prevalence, methods and technologies for identifying sources and

tracking movements, and strategies for avoiding contamination.

The group held a September workshop on emerging contaminants, potentially toxic substances whose effects or presence are poorly known, often because these chemicals have only begun to enter the human water or food supply. They include pesticides, other toxics, pharmaceuticals, and endocrine disrupting compounds, which can mimic the actions of human and animal hormones. In addition to presentations on these compounds, attendees also were brought up-to-date on possible effects already seen in the watershed, including the intersex smallmouth bass found in several segments of the Potomac (see May/June 2005 *Reporter*).

Emerging contaminants are being found with greater frequency in area waterways, now that attention is being drawn to them. Many of these substances are not removed by wastewater treatment plants, and may be only partially removed by most potable water treatment systems.

"There is much to be gained through coordination of utilities and other water-related agencies that will be facing these issues, and providing a way for all to pool their knowledge and ideas in addressing these issues now and in the future," said Julie Kiang, ICPRB associate director for Water Resources and a coordinator for the group.



The Greening of Williamsport

Byron Memorial Park in Williamsport, Md., will receive a leafy facelift come spring 2006. The ICPRB and Maryland Department of Natural Resources (DNR) Forest Service are developing rain garden and riparian buffer plans specific to the park's needs. The buffer and garden will improve wildlife habitat, filter storm water, and reduce nutrients and sediment flowing into an unnamed tributary of Conococheague Creek flowing through the park. The ICPRB and Maryland Forest Service partnered earlier this year, along with DNR's Tree-Mendous Maryland, Community Commons, and The Clover Hill Civic Association for a successful riparian buffer planting in the Clover Hill III Community Park in Frederick, Maryland.

Park settings with waterways are

especially vital areas for installing riparian buffers and rain gardens because they provide plenty of open space for planting and a tremendous opportunity for educating local citizens. Plans are designed to fit into the park's atmosphere, with a combination of native saplings (larger young trees) and seedlings. Once mature, the riparian trees and shrubs will provide summer shade and winter leaf debris, increasing habitat and food for fish and macroinvertebrates. Birds also benefit from the plants' fruits and nuts. The increased root network from trees and shrubs will help stabilize the stream bank soil, filter water, and reduce nutrients and sediment in the stream. Rain gardens offer similar benefits for wildlife and filtration.

The park's new rain garden will provide food for hummingbirds, rare and common

butterflies, and other insects and birds. Runoff from a parking lot will be slowed by shrubs and plants in a wildflower garden before reaching the rain garden, where it will soak into the soil. Plant choices are especially important in a park setting. Native plants and shrubs encourage wildlife and can withstand drought and heavy rain better than non-native plants, decreasing maintenance time and costs. Their flowers, seeds, and stems also will provide year-round interest in the park. Because it is a new concept for the park, visitors will learn about the buffer and rain garden process as they use the park's facilities. Jeff Cline, Williamsport town councilman said, "The addition of the rain garden and the riparian buffer will greatly enhance Byron Memorial Park. As an elected official it is my duty to ensure the natural beauty of this park is protected and passed on for future generations to enjoy." Cline and others are working to improve the access to open spaces while protecting the local watershed.

Signs explaining the rain garden and the buffer strip will help visitors learn about the new wildlife in the park, how trees and plants make a positive difference to the Chesapeake Bay's health, and how their local waterway will be improved by this simple design. In addition, the town will take steps to name the tributary through the United States Geological Survey. Naming the stream will instill pride among residents and encourage more park visitation throughout the year. A project of this size requires cooperation between several agencies and the public.

Several groups came together to offer funding or in-kind services for the Spring 2005 planting at Clover Hill. The Maryland Forest Service donated about 500 seedlings and provided a complimentary forest stewardship plan and Tree-Mendous Maryland donated 15 saplings to the project. Tree-Mendous Maryland offers reasonably priced trees and shrubs for the spring and fall planting seasons. The trees and shrubs must be planted in a community setting, such as a park, school yard, or right-of-way, and groups can choose from many native species. The Chesapeake Bay Trust provided grant money to purchase the remaining materials. The ICPRB will apply for grant money on behalf of the Town of Williamsport to offset some of the installation costs. The town has offered to provide manpower and tools for the ground preparation and planting. The Maryland Forest Service provided the forest stewardship plan.

"Raingardens and riparian buffers, while small in scale, can add significantly to the health of the Potomac basin if the practice becomes commonplace," noted ICPRB Executive Director Joseph Hoffman. "The ICPRB will continue to work with its sister

agencies and local groups to buffer as many streams as possible," he said.

If your organization is interested in a local riparian buffer project or rain garden installation, please contact ICPRB's Jennifer Dotson at (301) 984-1908 x 109.



Watching the River Flow

Precipitation was nearly two inches above normal in the Potomac basin for July, but in August fell short of the average by about half an inch. A very dry September followed. Potomac flows reflect these precipitation patterns.

Provisional data collected near Washington, D.C., by the U.S. Geological Survey reflected the higher July rainfall with flows averaging 5.2 billion gallons per day (bgd), about 60 percent higher than the 3.2 bgd long-term average. Daily extremes ranged from a low of about 2.0 bgd on July 5 to a high of about 17.4 bgd on July 9. Water withdrawn for drinking use averaged about 441 million gallons per day (mgd). Freshwater inflow to the Chesapeake Bay averaged about 24 bgd, slightly below the normal average inflow of 24.4 bgd. The Potomac contributed about 28 percent of the total.

August flows averaged 2.1 bgd, slightly below the normal flow of 2.7 bgd, about 22 percent lower than the historical average. Flows ranged from a low of about 1.5 bgd on August 27 to a high of about 2.6 bgd on August 12. Water withdrawn for drinking use averaged about 454 mgd. Freshwater inflow to the Chesapeake Bay was about 10.3 bgd, far lower than the historical average inflow of 21.7 bgd. The Potomac contributed about 19 percent of the total.

September flows fell to about 0.86 bgd, only 40 percent of the long-term average. Daily extremes ranged from a high of 1.45 bgd on September 1 to a low of about 0.69 bgd on September 29. Drinking water withdrawals averaged about 456 mgd, about five percent more than September 2004. Freshwater inflow to the Chesapeake Bay averaged about 9.0 bgd, or 41 percent of the historical average. The Potomac contribution was about 14 percent.

Give the Gift of Trees

Don't pass up this Tree-Mendous opportunity to donate trees to a Potomac watershed riparian buffer project through Maryland DNR's Tree-Mendous Maryland. The "Gift of Trees" program through Tree-Mendous Maryland allows individuals to purchase and dedicate a sapling to a friend or family member or to celebrate special occasions.

The saplings are then donated to help complete specific projects, such as the buffer planting in Williamsport, which improve the health of local waterways and the Chesapeake Bay. If you would like to donate a sapling, visit Tree-Mendous Maryland's Gift of Trees website at www.dnr.state.md.us/forests/treemendous/giftoftrees.html to fill out the on-line form. If you'd like to donate to the Williamsport riparian buffer planting, type "ICPRB" in the "Name or Occasion" text box in the form. Your 'Gift of Trees' will help improve the



J. Dotson

Volunteers plant donated trees in the Monocacy watershed.

waterways of the Potomac watershed and Chesapeake Bay.

Despite Dry Summer Weather, Taps Still Flow

During the summer months, temperatures, evapotranspiration, and water use are elevated, and water suppliers take special note of precipitation and river flows and levels. Precipitation has been fairly close to normal most of the summer, but September's nearly zero precipitation have many bracing for a drought. Though soil may be dry and plants and trees are stressed, the region's water supply is in good standing, according to Erik Hagen, operations director of the ICPRB Section for Cooperative Water Supply Operations on the Potomac (CO-OP).

Drier summers are normal in this region and can even be beneficial to the river ecosystem. Without increased nutrient and sediment loads from rain events, water clarity increases. Excess nutrients can trigger algae growth, which blocks sunlight from getting to lower water levels. Excessive nutrients and algal growth help create the large zones of oxygen-depleted water in the lower Potomac and central Chesapeake Bay. Clearer water also allows submerged aquatic vegetation to flourish. Seasonal fluctuations in river flows and levels are normal and necessary for ecosystem health.

Trees and lawns may be stressed because of the drier conditions, but water has been flowing from the region's taps with few water-use restrictions around the basin. The drier conditions have led to several small wildfires in the watershed, but none have done major damage. About one-quarter of the Potomac watershed is farmland and slightly dry conditions can stress their crops. Virginia has declared

some areas as agricultural disaster zones because of the drought's affect on crops.

"Even with the current drought conditions, flow in the Potomac has maintained about twice the level of withdrawals due to good baseflow conditions," said Hagen.

Baseflow is the water in the stream that comes from groundwater, and those levels remain in the normal range throughout much of the basin. As the region enters autumn and temperatures drop, trees need less water, and water demand for lawn and farm use is down, the risk of a water supply drought is minimal. "We will be monitoring water levels all winter long so that we are in the best position possible to be prepared in case of a drought next year," said Washington Suburban Sanitary Commission (WSSC) Systems Control Group Leader Karen Wright.

The ICPRB's CO-OP works closely with the water utilities, including WSSC, Fairfax Water, and Washington Aqueduct Division of the Corps of Engineers, to ensure the metropolitan area has adequate water supplies from the Potomac even during droughts. In years when water is plentiful, CO-OP runs a drought simulation exercise to practice operations in preparation for a drought. This year's drought exercise ran from September 26-30. Water was released from Jennings Randolph and Little Seneca reservoirs to gain experience on using new gages that will further fine-tune releases.

Though the water is still flowing from our taps and wells have not gone dry, it is still a good idea to conserve water whenever possible. To keep watch on the water supply April through October, visit the ICPRB's

World Water Monitoring Day on the Anacostia

Sponsors of World Water Monitoring Day were hosted by the Earth Conservation Corps at their Anacostia River facility on October 18, serving as the host site for an annual effort held in more than 50 countries. America's Clean Water Foundation, the lead agency in the event, maintains a database of results around the world. Groups perform simple water testing, and report their results.

The annual event serves as a platform for watershed leaders, educators, and trained volunteers to promote the importance of monitoring as a way that can get everyone interested and involved in the importance of clean water. "No matter who you are or where you live, clean water is essential for drinking, hygiene, agriculture, commerce, and recreation.

World Water Monitoring Day is creating a network of individuals around the world willing to invest in the protection of their community's waterways," noted America's Clean Water Foundation President Roberta Savage. For more information, visit www.worldwatermonitoringday.org.



C. Dalpra

Students from Ketchem Elementary School in Washington, D.C., are assisted in monitoring the Anacostia by Earth Conservation Corps staff.



Potomac Basin

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