An Integrated Curriculum For The Washington Post Newspaper In Education Program

Revival in the Waters

- Post Reprint: “Reviving ‘dirtiest’ D.C. waterway”
- Case Study: 3 Ways to Keep Rivers Clean
- Post Reprint: “Dolphins thrive — in the Potomac”
- KidsPost Reprint: “Sturgeon are making a comeback in America’s waterways”
- KidsPost Reprint: “Gardeners slowly restore Jamaica’s ‘forest under the sea’”
- Discussion Questions: Forest Under the Sea
“Deer poop. Canada goose poop. Sewage runoff, as well as industrial runoff and other pollutants. All the yucky, invisible bacteria that can find its way into one of the nation’s largest urban national parks after a rainstorm — a rainstorm much like the one that pummeled the city the night before.” Just another day for a Riverkeeper volunteer.

Read “Reviving ‘dirtiest’ D.C. waterway” to learn about the work of Riverkeeper volunteers, public actions taken to monitor and government efforts to restore local D.C. rivers. The Case Study | 3 Ways to Keep Rivers Clean gives students the first steps in fair reporting of different points of view. Three Potomac Riverkeepers’ projects are the focus of study.

Dolphins and sturgeon also indicate positive changes in the Potomac and James rivers. These Post and KidsPost articles report on the present water quality as well as the historic background. They are strong models for student reporting in context.

Other efforts to monitor and to revive life in the waters is illustrated in the KidsPost article, “Coral gardeners slowly restore Jamaica’s ‘forest under the sea.’” Map reading, vocabulary development and discussion questions guide reading of the article and NOAA coral reef projects.

Problems and poor water quality readings do exist, but there is refreshing good news happening through the efforts of volunteers, private and government projects.
Reviving ‘dirtiest’ D.C. waterway

BY JUSTIN WM. MOYER

*Originally Published August 19, 2019*

At Melvin Hazen Run, a thin Rock Creek feeder stream off Connecticut Avenue in Northwest Washington, Bill Sittig is on the lookout for poop.

Deer poop. Canada goose poop. Sewage runoff, as well as industrial runoff and other pollutants. All the yucky, invisible bacteria that can find its way into one of the nation’s largest urban national parks after a rainstorm — a rainstorm much like the one that pummeled the city the night before.

Sittig, a former Library of Congress employee who volunteers for the nonprofit Anacostia Riverkeeper, is awash in rubber gloves, sample bottles and a thermometer he pulls from a cooler. He descends through underbrush to the muddy shores of the Melvin Hazen Run, gets his samples and emerges with water that subsequent testing showed was teeming with bacteria.

“I didn’t fall in, but my feet got wet,” he said. “I’m still alive.”

Sittig, 77, is one of 120 Anacostia Riverkeeper volunteers tasked with monitoring water quality in the Potomac and Anacostia rivers, as well as Rock Creek. Partly funded by a $140,000 grant from the D.C. Department of Energy and Environment (DOEE), the nonprofit started scrutinizing bacteria levels and other water quality indicators at 22 sites in May, joining other agencies that monitor the health of the watershed.

The results surprised water-watchers. They found that the Anacostia River, despite its reputation, is cleaner than many people think, and Rock Creek, where children wade, is often really filthy.

“Rock Creek is dirtiest in terms of bacteria,” said Robbie O’Donnell, a project coordinator for Anacostia Riverkeeper, which began monitoring its namesake river before expanding to include the city’s three largest waterways. “It’s one of the biggest polluted areas in D.C.”

Weekly test results released Thursday showed that most test sites — including those on the Potomac and Anacostia — failed, perhaps because of recent rain. But all eight Rock Creek sites failed, and fail more consistently, O’Donnell said. DCist was first to report on Rock Creek’s repeated test failures.

Melvin Hazen Run, for example, registered a bacteria level of more than 2,400 MPN per 100 milliliters — that’s the “most probable number” of colony-forming units per sample. Or, as O’Donnell put it: “Basically how much bacteria is in that 100-milliliter sample we collect.”

To pass the test, Melvin Hazen Run would have had to score no more than 126 MPN per 100 milliliters. Around 2,400 MPN is the limit of Riverkeeper’s bacteria test — a number 19 times higher than what’s needed to pass.

“Values could potentially be higher,” O’Donnell said. “Yeah, they’re not great.”

Three Rock Creek sites also failed pH tests, proving too acidic or too alkaline, and two failed turbidity tests, which measures the clarity of a water sample, O’Donnell said.

Rock Creek’s persistent yuckiness is partly an infrastructure problem. A $2.7 billion project scheduled for completion in 2023 is limiting runoff to the Potomac and Anacostia, routing it to the Blue Plains wastewater treatment plant in Southwest Washington through 18 miles of four underground tunnels before entering the Potomac.

One tunnel, which started operating in 2018, already is showing results. Though
swimming in D.C. rivers is banned, officials began allowing permitted swim events in the Potomac in 2012 and the Anacostia last year (though none have been held). The Anacostia also passed an annual health-check from the Anacostia Watershed Society — earning a “D” — for the first time last year.

The plan to build a similar tunnel for Rock Creek — which would have directed wastewater to the Blue Plains facility for treatment — was changed about three years ago. Instead, officials decided on a “green infrastructure plan” to bring green roofs, porous pavement and rain gardens to the area to limit runoff.

“The updated plan will provide water quality improvements sooner, offer additional environmental benefits, improve affordability, and support local jobs,” an explanation of the plan from D.C. Water said.

Though it’s too soon to know, officials are trying to determine whether the efforts are sufficient to combat pollution in Rock Creek, which is downstream from suburban Maryland.

“I don’t know exactly how effective it’s been,” O’Donnell said. “Some are working. How they’re working in Rock Creek remains to be seen because obviously it’s still dirty.”

John Cassidy, the Clean Rivers Project program manager at D.C. Water, said it’s not clear that a tunnel, or “gray infrastructure,” would be more effective than the “green” program already begun. The costs of both programs were estimated to be about the same, he said, and the agency is studying the effect of green improvements to see whether it makes sense to switch back to a tunnel.

“Green infrastructure offers the opportunity for other community benefits that building a sewer pipe does not,” he said.

Whether improvements end up being green or gray, officials say Rock Creek’s health can improve. Regular tests help to identify trouble spots in waterways. Then, armed with results, officials can find construction projects that need to contain runoff, for example, or pinpoint problems that might contribute to failing grades.

Efeturi Oghenekaro, an environmental protection specialist with DOEE, called the volunteer program a “high priority.”

“We want them to have high-quality data,” she said. “With this, we can identify issues with pollution. We can investigate.”

Normanstone Run, another Rock Creek feeder near the U.S. Naval Observatory with an off-the-charts bacteria count, is a good area for such an investigation, said DOEE spokesman Jeffrey Seltzer. With further study, officials can determine the source of bacteria in the creek, whether construction, businesses or an aging sewage system.

He said Anacostia Riverkeeper’s “citizen science” program helps his agency direct its resources.

“It’s a valuable tool for us to help us focus our efforts,” Seltzer said. “We will try to do just that.”

An hour after Sittig finished at Melvin Hazen, fellow volunteers Stacy Janes and Sara Robinson tiptoed into Normanstone Run. The testing spot, where a tree was tagged with a biodegradable orange ribbon, was hard to locate, but they found it, stepping out of the stream with their sample kit a few minutes later.

“It’s amazing that the watershed wouldn’t be clean enough to use recreationally,” Janes said. “We’re doing anything we can do to aid that process.”
Case Study

3 Ways to Keep Rivers Clean

The Potomac Riverkeepers Network works “to protect the public’s right to clean water in our rivers and streams. [They] stop pollution to promote safe drinking water, protect healthy river habitats, and enhance public use and enjoyment.”

Three different rivers have been a focus of the Riverkeepers. Select one of the three cases to read more about the situation that existed, how the river came to their attention, and how it addresses the goals of the Potomac Riverkeepers Network. Summarize the information that you gain from each source. What is your opinion of the outcome?

Mattawoman | Charles County, Maryland

> Potomac Riverkeeper Network Files Notice of Intent to Sue Charles County Board of Public Works

> Maryland Independent Coverage
  https://www.potomacriverkeepepernetwork.org/charles-co-wastewater-treatment-sewage-discharges/

> Mattawoman Office (Utilities)
  https://www.charlescountymd.gov/pw/utilities/mattawoman-office-utilities

> Wastewater and Septic Systems
Verso Corporation | Luke (Maryland) Paper Mill Campaign

- Potomac Riverkeeper Network Files Notice of Intent to Sue Verso Corporation (Luke Paper Mill)
  https://www.potomacriverkeepernetwork.org/project/verso-corp-luke-paper-mill-campaign/

- “It was the backbone of this town for 131 years. Now Luke paper mill is gone.”
  https://www.washingtonpost.com/local/it-was-the-backbone-of-this-town-for-131-years-now-luke-paper-mill-is-gone/2019/05/31/d4e53198-82d1-11e9-95a9-e2c830afe24f_story.html

- “Regulators pressed Western Maryland paper mill to cut pollution but preserve jobs. Now, both will vanish.”

Cacapon River | The Keep the Cacapon Clean Initiative

- The Keep the Cacapon Clean Initiative
  https://www.potomacriverkeepernetwork.org/project/keep-the-cacapon-clean/

- American Heritage Rivers
  http://www.cooperativeconservation.org/viewproject.aspx?id=916

- Friends of the Cacapon River
  http://cacaponriver.org

- “Environmental Writer Barbara J. Tufty, 84”
  https://www.washingtonpost.com/wp-dyn/content/article/2008/09/01/AR2008090102684.html
Dolphins thrive — in the Potomac

Researchers thrilled as population booms along increasingly clean river beyond the Beltway

BY KARIN BRULLIARD

Dolphins thrive — in the Potomac

Researchers thrilled as population booms along increasingly clean river beyond the Beltway

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REEDVILLE, Va. — Five decades ago, President Lyndon B. Johnson declared the polluted Potomac River a “national disgrace.” Although it is now much cleaner, officials in Washington are still not convinced the water is safe for humans to swim in.

But many miles downriver, where the Potomac widens to lakelike proportions as it flows toward the Chesapeake Bay, it teems with a different species of swimmers whose presence may signal healthier waters: dolphins.

During the past four years, researchers who study the common bottlenose dolphins swimming this part of the Potomac have hardly been able to keep up with their numbers. Dolphins are easily identified by their distinct fins or marks on their bodies, and in 2015, scientists identified about 200 individuals in one section of river off Virginia’s Northern Neck. Now they have counted well over 1,000 dolphins,
which sometimes congregate in groups of more than 200.

But an even more unusual development in this effort to understand the dolphins in “the nation’s river” came in August, when researchers with the project, based at Georgetown University, witnessed evidence of a dolphin birth. It was only the third documented observation of a wild dolphin birth, and those present say they hope it makes area residents view the Potomac differently.

“There are dolphins here, and there’s breeding and birthing going on, and this is connected to D.C. — such a populated, urban area,” Ann-Marie Jacoby, associate director of the Potomac-Chesapeake Dolphin Project, said on a recent morning while scanning the lower Potomac from the 18-foot skiff that serves as a research vessel. “You follow it further down and there’s all this wildlife here. And what people are doing up there, it does affect wildlife. They are directly linked to this oasis.”

Sun glittered on calm water as the boat, driven by a research assistant, motored alongside three dolphins that popped up and down as they swam south. Bald eagles and pelicans flew above. Occasionally, the dolphins approached to “bow ride” waves created by the front of the boat — perhaps for fun, though no one knows for sure.

That’s not the only unknown when it comes to common bottlenose dolphins. They are indeed common, occupying temperate and warm oceans worldwide, and they are one of the best-studied marine mammals. But that isn’t saying much, said Janet Mann, a Georgetown biologist who founded the Potomac project and has studied bottlenose dolphins off Western Australia for three decades.

“There’s so much we don’t know. It’s a challenge of studying marine mammals, in that they dive, and you can’t see everything they’re doing,” Mann said. “There’s still lots of mystery around understanding their lives and what it means to be a dolphin, and what are they doing with their big brains. … I think that’s what fascinates people about these animals.”

Key questions about the Potomac dolphins: Is their

Ann-Marie Jacoby, co-director of the Potomac-Chesapeake Dolphin Project, looks for wild dolphins along the Potomac River near Reedville, Va

PARKER MICHELS-BOYCE FOR THE WASHINGTON POST. PHOTOGRAPH TAKEN UNDER NMFS PERMIT NO. 19403.
Common bottlenose dolphins surface in the Potomac River near Reedville, Va., on Sept. 25. PARKER MICHELS-BOYCE FOR THE WASHINGTON POST. PHOTOGRAPH TAKEN UNDER NMFS PERMIT NO. 19403.

population growing? If so, is it because the river is cleaner? How do warming waters affect their movements?

Newspaper accounts indicate the animals (known then as porpoises) swam near Alexandria in the 19th century. “The recent visit of porpoises to the harbor here has not been paralleled since 1843,” read one snippet in the “Alexandria Affairs” section of The Washington Evening Star on July 17, 1883.

But sightings have been scarcer in recent times, and outside the Beltway. Mann, one of the world’s foremost dolphin experts, didn’t even know they used the Potomac until spotting them on the 2012 day she closed on a vacation cottage near Reedville, VA.

“So much is known about every single species in the Potomac and Chesapeake, except for the charismatic megafauna — bottlenose dolphins,” Mann said. “That just astounded me.”

An outbreak of cetacean morbillivirus that killed thousands of dolphins along the Mid-Atlantic from 2013 to 2015 convinced Mann and her colleagues that the animals deserved study. The dolphins that spend time in the area are believed to represent two or three migratory and “residential” populations, and understanding where individuals hail from and how they interact could shed light on the spread of disease, Mann said.

A pilot study launched in 2015, and the project now surveys the dolphins from May through October in about 14 square miles of the Potomac. It has documented dolphins as far north as the Potomac River Bridge, about 50 miles south of Washington.

The researchers take photos of each animal for a sort of dolphin yearbook; those are also added to a vast Mid-Atlantic Bottlenose Dolphin Catalog managed by Duke University, where Jacoby is a doctoral student. Individual dolphins’ actions — from traveling to foraging to mating, which Mann said she has seen lots of — are recorded, making the Potomac project one of the largest dolphin behavior studies in the world, Mann said.

Given their proximity to Washington, Mann decided to name them after political and historical figures. The first was Benjamin Franklin, because, she explained, “he was a scientist! And a politician and a great thinker. It had to be Benjamin Franklin.”

About 600 others have since been
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Sturgeon are making a comeback in America’s waterways

The endangered fish was killed for its eggs, but it’s reappearing in rivers and streams.

Originally Published July 10, 2019

Sturgeon were like vanishing dinosaurs, armor-plated beasts that crowded rivers until humans’ craving for eating caviar (fish eggs) pushed them to the edge of extinction.

But more than a century later, some U.S. populations of the massive bottom-feeding fish are showing signs of recovery.

Increased numbers are appearing in the cold streams of Maine, the lakes of Michigan and Wisconsin and Florida’s Suwannee River. A 14-foot Atlantic sturgeon was recently spotted in New York’s Hudson River. The Chesapeake Bay-area population was feared to be extinct in the mid-1990s. Now thousands of them are believed to be there.

Scientists are seeing increased numbers of them in some rivers because of cleaner water, dam removals and fishing bans. These discoveries provide some hope for a fish that is among the world’s most threatened.

“It’s really been a dramatic reversal of fortune,” said Greg Garman, a Virginia Commonwealth University ecologist who studies Atlantic sturgeon in Virginia’s James River. “We didn’t think they were there, frankly. Now, they’re almost every place we’re looking.”

Sturgeon swam with the dinosaurs. Bony plates line their bodies. Whisker-like fibers hang from their chins. Their toothless mouths telescope out and vacuum up anything from worms to mussels. Their meat fed Native Americans, the starving settlers of Jamestown, and the Lewis and Clark expedition.

Then came caviar. The Russian delicacy of salt-cured sturgeon eggs became a fad for Europe’s new middle class — and that took a heavy toll on American sturgeon.

After the late 1800s caviar rush, America’s nine sturgeon species and subspecies were plagued by pollution, dams and overfishing. Steep declines in many populations weren’t fully apparent until the 1990s.

“However, in the past three decades, sturgeon have been among the most studied species in North America as a result of their threatened or endangered status,” said James Crossman, president of the North American Sturgeon and Paddlefish Society, a conservation group.

But the U. S. sturgeon population is a tiny fraction of what it once was — and the health of each species and regional populations varies widely.

It will take decades to measure a population’s recovery, experts say. Sturgeon sometimes live longer than humans. Environmentalists warn that more conservation efforts are still needed.

Last fall, Matthew Balazik, a sturgeon research ecologist at VCU and the U.S. Army Corps of Engineers, netted more than 200 baby Atlantic sturgeon in the James River — the first seen there in years. “This could be a kind of a comeback generation,” Balazik said.

— Associated Press
OCHO RIOS, Jamaica — Everton Simpson squints at the Caribbean from his motorboat, scanning the dazzling bands of color for hints of what lies beneath. Emerald green indicates sandy bottoms. Sapphire blue lies above seagrass meadows. And deep indigo marks coral reefs. That’s where he is headed.

He steers the boat to an unmarked spot he knows as the “coral nursery.” “It’s like a forest under the sea,” he says, fastening his oxygen tank before tipping backward into the azure waters. He swims straight down 25 feet carrying a pair of metal shears, fishing line and a plastic crate.

On the ocean floor, small coral fragments dangle from suspended ropes, like socks hung on a laundry line. Simpson and other divers tend to this underwater nursery as gardeners mind a flower bed — slowly and painstakingly plucking off snails and fireworms that feast on immature coral.

When each stub grows to about the size of a human hand, Simpson collects them in his crate to individually “transplant” onto a reef, a process akin to individually planting each blade of grass in a lawn.

Even fast-growing coral species add just a few inches a year. And it’s not possible to simply scatter seeds.

A few hours later, at an underwater site called Dickie’s Reef, Simpson uses fishing line to tie clusters of staghorn coral onto rocky outcroppings — a temporary binding until the coral’s limestone skeleton grows and fixes itself onto the rock. The goal is to jump-start the natural growth of a coral reef. And so far, it’s working.

Almost everyone in Jamaica depends on the sea, including the energetic 68-year-old Simpson. Once a spear fisherman and later a scuba-diving instructor, he started working as a “coral gardener” two years ago — part of grass-roots efforts to bring Jamaica’s coral reefs back from the brink.

Coral reefs are often called “rainforests of the sea” for the astonishing diversity of life they shelter.

Just 2 percent of the ocean floor is filled with coral, but the branching structures sustain a quarter of all
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marine species. Clown fish, parrotfish, groupers and snappers lay eggs and hide from predators in the reef’s nooks and crannies, and their presence draws eels, sea snakes, octopuses and even sharks. In healthy reefs, jellyfish and sea turtles are regular visitors.

With fish and coral, it’s a codependent relationship — the fish rely on the reef to evade danger and lay eggs, and they also eat up the coral’s rivals.

After several natural and man-made disasters in the 1980s and 1990s, Jamaica lost 85 percent of its once-bountiful reefs. Meanwhile, fish catches declined to a sixth of what they had been in the 1950s, pushing families depending on seafood closer to poverty.

Many scientists thought most of Jamaica’s coral reef had been permanently replaced by seaweed, like jungle overtaking a ruined cathedral. But today, the corals and tropical fish are slowly reappearing, thanks in part to careful interventions.

The growth of this thriving, transplanted elkhorn coral near Vega Baja, Puerto Rico, is evident in 2009 (left), 2010 (middle), and 2014 (right).

The delicate labor of the coral gardener is only one part of restoring a reef. Convincing lifelong fishermen to curtail when and where they fish and controlling the surging waste dumped into the ocean are even trickier endeavors.

Still, the comeback effort is slowly gaining momentum.

“When you give nature a chance, she can repair herself,” says Stuart Sandin, a marine biologist at the Scripps Institution of Oceanography in La Jolla, Calif. “It’s not too late.”

Sandin is studying the health of coral reefs around the world as part of a research project called the “100 Island Challenge.” His starting assumption was that the most populated islands would have the most degraded habitats, but he found instead that humans can be either a blessing or a curse, depending on how they manage resources.

When Jamaica’s fish populations began to collapse two decades ago, something had to change.

In the past 10 years, more than a dozen grass-roots-run coral nurseries and fish sanctuaries have sprung up, supported by small grants from foundations, local businesses such as hotels and scuba clinics, and the Jamaican government.

This story, part of a series, was produced in partnership with the Howard Hughes Medical Institute’s Science Education Department.
Forest Under the Sea

Clown fish, snappers, eels, sea turtles and sharks are among the creatures that depend on healthy coral reefs. In “Coral gardeners slowly restore Jamaica’s ‘forest under the sea,’” learn about efforts of governments, private organizations and individuals to undo what man and nature have done to imperil a quarter of all marine species.

1. Before reading “Coral gardeners slowly restore Jamaica’s ‘forest under the sea’” locate the island on a map.
   a. In what sea is the island located?
   
   b. Is Jamaica north or south of the equator?
   
   c. Locate Ocho Rios on the map. What does Ocho Rios mean in Spanish?

2. Before reading the article by Cristina Larson, define the following words:
   - brink
   - nursery
   - codependent
   - pluck
   - curtail
   - restore
   - degraded
   - sanctuary
   - jump-start
   - transplant

3. Why is Everton Simpson heading to the deep indigo waters off the north shore of Jamaica?

4. Describe what he does with the metal shears, fishing line and plastic crate.

5. In what ways are fish and coral reefs in a codependent relationship?

6. The reporter uses similes to help readers better understand the process and situation. Select one of them. Explain how effective it was.
7. Dates, numbers and percentages are included by the reporter. Select an example and explain how it added to your understanding of the importance of coral reefs.

8. The reporter states that there are several components to restoring a reef. The coral gardener is one part. Who else must become stakeholders if the project is to be successful?

9. The U.S. NOAA has a project to restore damaged coral reefs. Fragments of coral that were smashed are gathered underwater and taken to coral nurseries in the waters around Florida, Puerto Rico and the U.S. Virgin Islands.
   a. Locate these places on the map. Which is the furthest east?

   b. Review the three photographs (below). What do they reveal about restoring a coral reef?

How NOAA Uses Coral Nurseries to Restore Damaged Reefs

The growth of this thriving, transplanted elkhorn coral near Vega Baja, Puerto Rico, is evident in 2009 (left), 2010 (middle), and 2014 (right).

10. The Scripps Institution of Oceanography found in its “100 Island Challenge” that “humans can be either a blessing or a curse” to habitats. What does the Jamaica coral reef restoration initiative demonstrate about this idea?