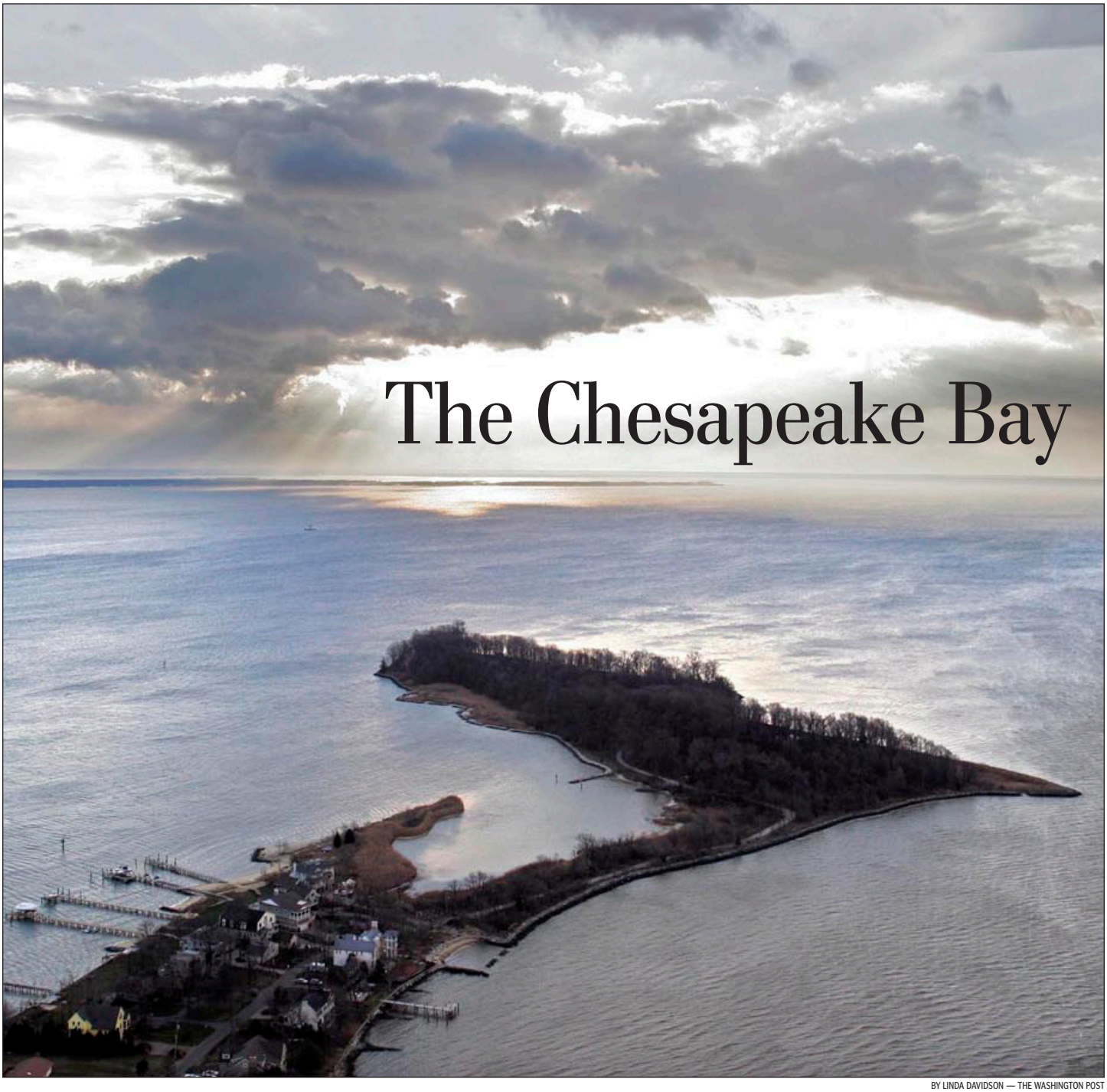
[The Washington Post]

VOLUME 6, ISSUE 6

The Chesapeake Bay



BY LINDA DAVIDSON — THE WASHINGTON POST

The Chesapeake Bay, near Annapolis

INSIDE

April 17, 2007

A Word about Chesapeake Bay

Four hundred years ago, John Smith reported the natural abundance of the Chesapeake Bay. More than 35 years ago the first Earth Day was held in 1970 to call attention to man's relation to the environment. And in the decade after the 2000 goals for cleaning up the Chesapeake Bay were unmet, regional and national leaders and environmentalists are still seeking the best means to eliminate or reduce pollution and restore the bay.

The articles included in this guide are a sampling of *Post* coverage of the Chesapeake Bay and the Chesapeake Bay watershed. This is a continuing story. Many disciplines are involved in finding a solution: government (policy, legislation and oversight), history (uses and misuses of the Bay's resources), science (ecology and biology, discovering sources of pollution and clarifying solutions), mathematics (graphs and analysis of data), English (writing in many genre to express the beauty, power and resources, and restoration and loss of the bay), and journalism (playing the role of watch dog and informing the public).

Continue to read the News, Metro, Sports and Weekend sections; watch for Science page reporting of conditions and discoveries that influence this area; and peruse News, Outlook, Metro and Sunday Source sections of Sunday's *Post* for news, features and commentary.

Lesson: The Chesapeake Bay and its watershed provide an important case study of environmental and political decisions, the interaction of communities and species, and the balance between recreation, business and natural environment.

Level: Low to high

Subjects: Biology, Environmental Science, Geography

Related Activity: Social Studies, Journalism, Careers

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Send comments about this guide to Margaret Kaplow, Educational Services Manager, kaplowm@washpost.com.

Chesapeake Bay

Read KidsPost

"Water Under the Bridge" appeared in KidsPost on April 20, 2006. Give students a copy to read. The dates could be used to begin a timeline of inhabitation and development of the Bay. What do students find to be the most interesting facts? Which relate to the flora and which to the fauna of the Bay? How many of the suggested activities have they done?

Map It

- Using a large map of the Chesapeake Bay, measure the miles of coastline (perhaps using thread or string). Use the map key to determine the total miles. Compare it with a measure of the West Coast of the United States.
- What towns are located where the water is saltier? Students could color their "Water Under the Bridge" maps to indicate these areas.
- Compare a map of the Bay from the early 1600s with a current map. What differences are noted? What appears to be the same?
- What do students know about the Bay? Using the map that is included or a more detailed one, discuss the places to live, to fish and to do other activities. If they were to plan a trip to the Bay where would they go and what would they do? Select a town or area they have never visited or know little about. Find ten pieces of information about it through reading, a Web search or interviewing someone who has been there.

Hold a Meeting of the Animal Minds

Lorton Station (Va.) Elementary School teacher Sally E. Chadbourn suggested the following activity.

What if the animals in our community sat down to talk about how to stop pollution of the Chesapeake Bay or how to preserve trees and green space in downtown Washington, D.C.? Imagine the conversation! As a class, gather articles from *The Washington Post* Science and Metro sections and other resources that describe local habitats and environmental problems or issues. After reading about local ecology, allow each student to select one animal to research. Students should complete an animal data chart to include information such as the animal's name, foods, shelter, defense mechanisms, raising young, hibernation, migration, and camouflage.

Explain to students that they will be writing and discussing topics in local ecology from the perspective of their animals. Have students write a paragraph from the perspective of the animal each has selected to describe important characteristics and activities to know about the creature. Students can also create illustrations, trading cards, or business cards to represent their animals.

As a class, brainstorm local environmental problems or issues that would be important to animals. Choose several issues to discuss in-depth and have students write two to three sentences to describe their (animal) opinions about each issue to prepare for the Meeting of the Animal Minds. Students should also write two to three open-ended questions about local ecology to pose to their (animal) classmates at the meeting. You may wish to create props or nametags.

The following day, have students bring their notes and open the meeting by allowing each animal to introduce himself or herself. Discussion may begin by asking students to identify the best and

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Read About the Bay

Awesome Chesapeake: A Kid's Guide to the Bay
Bell, David Owen and Mary Dunn Ramsey (illus.)
Tidewater Publishers, 1994 (Grades 3-7)
Illustrated book about the Bay, its plants and animals

Chesapeake Bay Walk
Bell, David Owen and Jennifer Heyd Wharton (illus.)
Tidewater Publishers, 1998 (Ages 4-8)
Introduce the youngest students to the Chesapeake Bay's ecology.

Disappearing Islands of the Chesapeake Bay
Cronin, William
The Johns Hopkins University Press, 2005 (Grades 9 and above)
Until 1900, the water level of the Bay rose at a rate of 3 feet every thousand years. In the 20th century, it rose one foot. Retired oceanographer Cronin surveys 40 islands from Garrett to Gwynn. Photographs of A. Aubry Bodine, colonial and state records, newspaper articles and Cronin's own experience combine to present islands slipping from sight.

Fishes of Chesapeake Bay
Eo, Murdy
Smithsonian, 2002 (Ages 14 and above)
With keys to the orders, families and species, 267 species of fish from batfish to whalesuckers found in the Bay are presented. Geographic distribution, economy and fishing interests as well as appearance of each species.

Life in the Chesapeake Bay
Lippson, Alice Jane and Robert L.
The Johns Hopkins University Press, 2006 (Grades 9 and above)
After an overview of bay ecology, readers learn of life in shallow waters, marshes and deeper waters. Satisfying illustrated guide to a North American tidal estuary.

CONTINUED FROM PAGE 3

worst aspects of the local habitat. Allow students to talk about local ecology using issues from the brainstorming session and their questions. Conclude the meeting by asking students to share the most important initiative or action to do for the future to preserve the local habitat.

Students may complete a written reflection about the Meeting of the Animal Minds.

Read News About the Bay

Give students "A Revitalized Chesapeake May Be Decades Away" to read after an introduction to the Bay. "A Revitalized Bay" provides discussion questions to use with this January 5, 2007, article.

Ask students to read *The Washington Post* for one week to locate more current information on clean-up efforts, life on the estuary and policy changes.

Use Graphics

Give students "A Clean Bay Behind Schedule."

What information is provided by the map? You might consider:

- What states in addition to Pennsylvania, Maryland and Virginia should be included in Chesapeake Bay agreements? (West Virginia, New York and Delaware are part of the watershed.)
- Rivers that flow into the Chesapeake Bay
- Where the most developed areas are in the Chesapeake Bay watershed and their impact on water pollution.

What information is provided in the bar graphs?

- Why is it important to know the levels of nitrogen and phosphorus in water?
- Where has the most progress been made?

Have students prepare bar or circle graphs to express information they have about the Chesapeake Bay.

What Can Be Done?

Read "What Would It Take to Clean Up the Bay by 2010?" Questions that might be considered include:

- What are the sources of the worst pollutants?
- Have there been successes? If so, name three.
- What is needed to accelerate the restoration of the bay?
- What can each of the following do to reduce pollution: homeowners, sewage plants, farms, and public officials?

Read "Rock Creek Fish Head Home Again." Use this article as a case study of the federal government (NPS) and non-governmental groups (Woodrow Wilson Bridge Project) working together to reach a solution to benefit nature. Include in your discussion:

- How did projects to improve transportation and aesthetics around Rock Creek impact fish?
- Why is it necessary to have fish migrate up Rock Creek?
- In what ways did environmental engineers find ways around, over or through eight obstacles that prevented fish from migrating upsteam?

Read, Research and Role Play

No one wants the Chesapeake Bay to be polluted.

When it comes time to take action, priorities and perspectives emerge: Who should pay for it, who is coordinating the efforts, and who has oversight of expenditures? What

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On the Web

Chesapeake Bay Foundation
www.cbf.org
Student section includes science project ideas and tips, trips and "What Did Captain John Smith See?"

Chesapeake Bay Program
www.chesapeakebay.net/
Areas include "Habitats," "Water Quality" and "Watersheds." News, maps and "Critter of the Month" are worth your attention. "Animals & Plants" cover many areas and link to Virginia Naturally, Maryland DNR Chesapeake Bay and Alien Ocean.

Chesapeake Bay Week
http://www.mpt.org/bayweek/programming.shtml
April 22-29, 2007, Maryland Public Television, annual special week of shows "explore the Chesapeake's challenges, celebrate its triumphs." Includes Jamestown and John Smith segments. Check out Bay links.

Climate Crisis
www.climatecrisis.net/
Educational guide to accompany *An Inconvenient Truth*, former Vice President Al Gore's argument for action against global warming

Environmental Kids Club
www.epa.gov/kids/
Activities, diagrams, pictures, coloring book

Friends of the Captain John Smith Chesapeake National Historic Water Trail
www.friendsofthejohnsmithtrail.org/
As part of the 400th Anniversary of Jamestown's founding, the National Historic Trail, the nation's first all-water national historic trail, was established. Reflect on the 3,000-mile exploration of Smith and his crew between 1607 and 1609. Site includes overview of native peoples of John Smith's Bay.

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should be done and what outcomes should be demanded? Where should efforts begin — miles from the bay or in the bay? When can funding begin? Why are certain projects being done and why should everyone care? How much it will cost and how long it will take?

Read "What Would It Take to Clean Up the Bay by 2010?" Use the information in this article and the questions posed to guide a research-based project.

Individual students or pairs should be assigned different roles. They will research that agency's/organization's perspective, plans and purpose for caring about the state of the Chesapeake Bay. In addition to *Post* articles, teachers may wish to have copies of studies and reports available in a resource center, including those mentioned in *The Post* articles (EPA, U.S. Government Accountability Office). A list of recommended Web sites would also be helpful to guide research. Many organizations have Web sites where students can pose questions to be answered; professors and other experts are often available for Internet interviews.

Citizens and organizations that could be represented include

- Chesapeake Bay Commission (different jurisdictions)
- Chesapeake Bay Foundation
- D.C. Water and Sewer Authority
- Environmental Protection Agency
- Maryland Department of Natural Resources
- Maryland Farm Bureau
- Pennsylvania dairy farmer
- Virginia Institute of Marine Science
- Homebuilders Association or a home construction company with developments in the Chesapeake Bay watershed
- Major shipping company located in Baltimore
- Bethlehem Steel
- Individual whose livelihood depends on oysters
- Individual whose livelihood depends on fishing

After research is completed, students will write a report for class. This may be in the form of a research paper, proposal or executive report.

Hold a symposium over several days in which panels composed of different viewpoints, debates and public forums are held. By the end of the period, every student will have represented his or her interest group.

This project may end with students writing a personal reflection essay in which they relate their views before research, after research and after the symposium. Journalism students may be asked to write an editorial or a feature article focusing on why students in their school should care about the Chesapeake Bay, certain actions/inactions taking place in their communities or how students can begin to make a difference in the quality of the watershed.

Listen to the Radio

Supplement print coverage with radio programs and podcasts. Listen to one or more segments of the suggested radio shows in the "Radio Nature" sidebar. Discuss the content and the use of sound to convey the setting.

Take a Walk

Before taking students on a walk in nature, give them practice in really hearing the natural environment. You might begin by having them close their eyes and quietly listen to the sounds in the classroom setting. Do they hear the hum of an air

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Read About the Land

Alone Across the Arctic: One Woman's Epic Journey by Dog Team
Flowers, Pam.
Alaska Northwest Books, 2001 (Grades 7 and above)
Flowers' journal and photographers explore her adventure from Point Barrow, Alaska, along the Arctic Ocean, to Repulse Bay, Canada.

Field Trips: Bug Hunting, Animal Tracking, Bird-Watching, Shore Walking with Jim Arnosky
Arnosky
HarperCollins, 2002 (Grades 6-9)
Ideas and tips include where to go, what to look for, and how to document what you discover; sketches illustrate the habitats and serve as models

Forest Explorer: A Life-Size Field Guide
Bishop, Nic
Scholastic Press, 2004 (Grades 3-8)
Seven habitats showing more than 130 animals in natural settings

Here Is the Tropical Rain Forest
Dunphy, Madeleine
Web of Life Children's Books, 2006 (Ages 4-8)
Diversity of life found in an endangered environment; beautifully illustrated by Michael Rothman

Our Natural Homes
Collard III, Sneed B.
Charlesbridge, 1996 (Grades 3-7)
An introduction to the terrestrial biomes of North and South America

Silent Spring
Carson, Rachel
Houghton Mifflin Company, 2002 (40th Anniversary Edition)
A call to change agricultural practices and a reminder that humans are part of the natural world. Visit Web site for an introduction (*www.rachelcarson.org*).

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conditioner, students in the hall or the nearby classroom, or a fly that wandered into their space? What about street or playground noise entering through an open window?

Sounds are important to locating place — and time. What sounds of nature relate a spring morning, the middle of an autumn evening, night in the country, and a crisp winter day? To these sounds add human activity that enhances the time of year and events taking place. This montage of sound should be true to life to communicate with the listener.

Soundscapes stories are built around montages. Check out "The Pond" on the BBC's Nature, which bills it as an "evocative acoustic journey," and several Nature Watch pieces.

If you have recorders, bring them on your walk for students to use. If not, at intervals ask students to be quiet and record the sounds they hear. Include these sounds in their observations of a natural or urban setting.

Take a Field Trip

Read "Rock Creek Fish Head Home Again." Study Rock Creek in an area that has at least two of the obstacles removed. Teachers can take photographs of the area and conduct a virtual field trip, arrange for a class field trip, or meet students and their families on the weekend at a designated location. Observe plant and animal life in the area to be plotted.

Read "Nature Calls." Make a list of the trails that are described and the wildlife that can be found in each area. Either as a field trip or a family outing, have students visit one of the nearby trails. Have them make a three-column log: the wildlife that according to the author has been spotted on this trail, the wildlife they observe when hiking, and a description of the animal and where they see it.

Trollinger's claim that "somewhere within the boundaries of Virginia, you can find every species of wildlife and every habitat to be found from southern Maine to Florida" offers quite a challenge. Where in the state would one go to find the different species? Review the list of wildlife compiled from reading the article. Identify them by species. What other sources are available to code a map of Virginia by location of species?

Write an Editorial

Read "Cleaning the Bay," a *Post* editorial from April 6, 2007. What point of view is presented? Annotate the editorial to deconstruct the argument that is made. What happens when potential proceeds, politics and personal interest intersect?

Teachers may wish to review editorial writing before reading this editorial. Download "Talk of the Town" (www.washpost.com/nie.) January 6, 2003). This guide focuses on the writing of editorials at *The Post*. "How to Write an Editorial," "Building an Editorial Argument," and an interview with a *Post* editorial writer are included.

Community Programs in The Post

• Originally published December 17, 2006
Rescued Bald Eagle Part Of Educational Program
Bird Rescue: Maryland Natural Resources Police last week rescued a bald eagle from certain death last week, when they found the male bird in Frederick County and took it to a veterinary clinic.

The eagle, once in danger of extinction, "is now thriving and is often spotted in wetland habitats of Maryland's state forests and parks," state park ranger Steve McCoy said in a statement. This particular one had broken its wing and was starving. Now it is part of the department's Scales & Tales educational program in which members of the Maryland Park Service showcase non-releasable native wildlife.

The program offers several programs that include topics such as "Threatened and Endangered Species of the Chesapeake Bay," "Animal Sounds" and "Owl Prowl," where participants seek out the birds after an educational session.

Radio Nature

Living on Earth

www.loe.org/
A weekly environmental news program (news, features, interviews and commentary). It provides examples of nature, health and ecology reporting. Download the current show and read the transcript. A tremendous resource for content and models of approaches. Pieces done with students from Queen of Peace High School (www.loe.org/series/QoPHS/) showcase student work.

Nature

www.bbc.co.uk/radio4/science/nature.shtml
On this BBC site listen to podcasts in "Nature Programmes" and "Previous Programmes"

Nature Stories Podcast

http://podcast.prx.org/nature/
Weekly podcasts on the natural world, curated by Atlantic Public Media, sponsored by The Nature Conservancy and the Public Radio Exchange

Nature Watch

www.naturewatch.com
Daily 90-second pieces that through the "mind's eye" takes listeners to the meadow, mountain and forest. Produced by the National Geographic Society.

Washington Post Radio

www.washingtonpost.com/wp-srv/wtwpradio/index.html
Review the daily schedule and podcast archives for related shows.

Water Under The Bridge

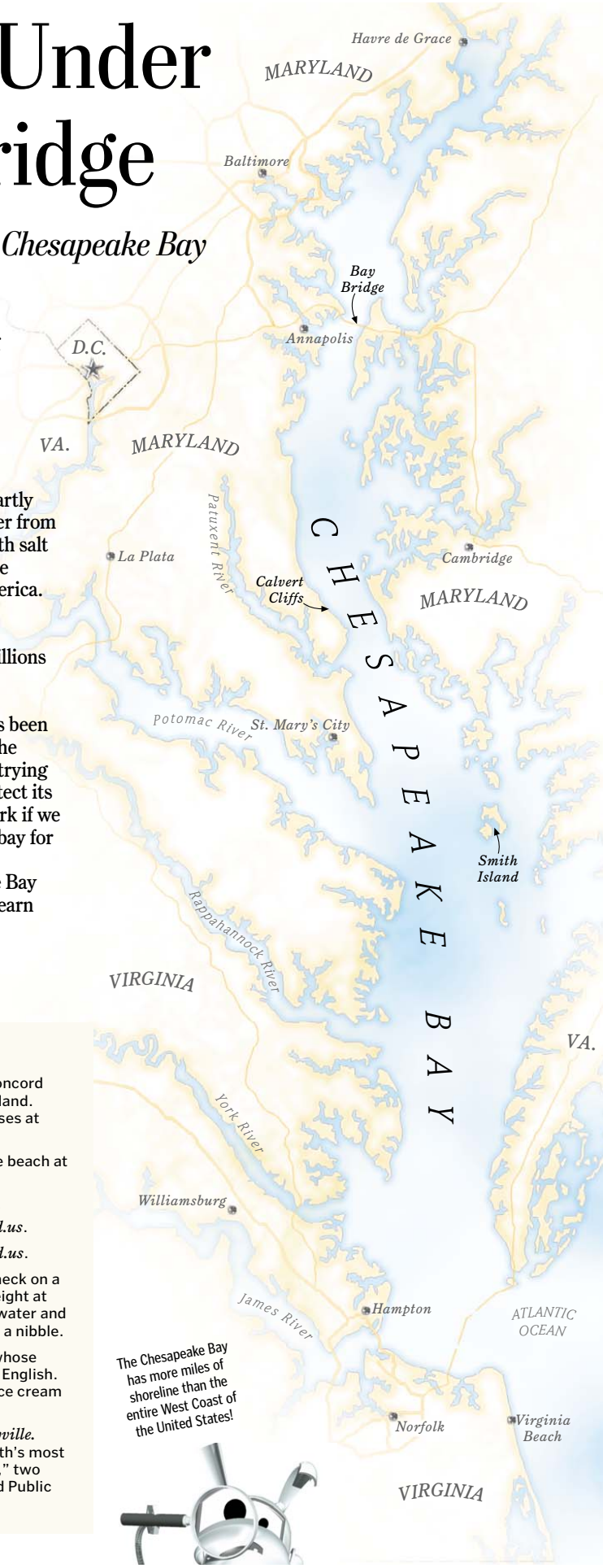
A Spotlight on the Chesapeake Bay

Many of you know the Chesapeake Bay from driving over it on the way to and from the beach. But the bay is an incredibly complex and interesting waterway that's worth getting to know up close.

The bay is an estuary, a partly closed area where fresh water from rivers and streams mixes with salt water from the ocean. It's the largest estuary in North America. In addition to supporting thousands of species, the Chesapeake is enjoyed by millions of people for its beauty and recreational fun.

Unfortunately, the bay has been damaged by pollution over the centuries. Many groups are trying to restore its health and protect its future. This is important work if we want to be able to enjoy the bay for years to come.

April 22-29 is Chesapeake Bay Week. It's a perfect time to learn about and explore this local treasure.



The Chesapeake Bay has more miles of shoreline than the entire West Coast of the United States!

MAP BY LARIS KARKLIS — THE WASHINGTON POST

To-Do List

- Visit a lighthouse such as Concord Point in Havre de Grace, Maryland. Read about the bay's lighthouses at *cblights.com*.
- Hunt for sharks' teeth on the beach at Calvert Cliffs.
- Paddle a kayak or canoe. For information: *www.dnr.state.md.us*.
- Go fishing. *www.dnr.state.md.us*.
- Catch a crab. Tie a chicken neck on a string or fishing line with a weight at the bottom. Lower it into the water and lift it out slowly when you feel a nibble.
- Ferry over to Smith Island, whose residents speak 18th-century English. Fill up on steamed crabs and ice cream (but not at the same time!).
- Explore the bay online at *bayville.thinkport.org*. Learn about Earth's most vital resource on "Planet H2O," two 30-minute shows on Maryland Public Television, Sunday at 4 p.m.

- The bay holds more than **18 trillion gallons of water** — half from the ocean, half from the 100,000 rivers and streams that empty into it. The average depth is 21 feet.
- Bay water is most **salty** near the mouth of the bay (close to the ocean). It is also saltier on the eastern shore because Earth's rotation pushes the heavier salt water that way.
- The Chesapeake produces more than 500 million pounds of **seafood** each year.

VIRGINIA INSTITUTE OF MARINE SCIENCE

The oyster toadfish. What a cutie.

- The bay supports **3,600 species** of plants, fish and animals. The ugliest creature has to be the oyster toadfish.
- The **Bay Bridge** is 4.3 miles long and 186 feet above the water. The first span opened in 1952, the second in 1973.
- Melting glaciers formed the bay about 10,000 years ago.
- **Native Americans** lived in the region for 2,500 years before Europeans showed up. The first colonist to fully explore the area was **Captain John Smith** in 1608.
- Overhunting caused the **disappearance of beavers** 300 years ago. They were brought back in the 1900s, and now they're everywhere! Chomp!
- **Environmental concerns** arose in the mid-1600s because of the waste produced by intense fishing.
- Today's problems include **mud** that buries underwater grasses where baby fish and crabs live, and fertilizer chemicals that wash in from streams.
- **Oysters** keep the water clean, but pollution has reduced their numbers. There used to be enough oysters to filter the entire bay every week. Now it takes a year.

Reporting by Margaret Webb Pressler

SOURCES: Chesapeake Bay Program, Chesapeake Bay Foundation, Maryland Transportation Authority, Maryland Public Television

Name _____ Date _____

A Revitalized Bay

On January 5, 2007, *Post* writer David A. Fahrenthold reported a meeting of the Chesapeake Bay Commission 20 years after "local and federal officials pledged to clean up the estuary by 2000." Answer the following questions based upon information provided by Fahrenthold. Use your own paper.

1. For what purposes do area people use the Chesapeake Bay?
2. Name different groups that have been involved in the effort to clean the bay.
3. Summarize the Environmental Protection Agency (EPA) official's statement.
4. State three sources of pollution of the Chesapeake Bay.
5. The clean-up effort is not entirely dismal. Where has there been success? Give two examples.
6. Which best characterizes the current state of the bay?
   a. Officials claim, as a result of their multi-billion dollar plan, the bay is nearly as pristine today as when John Smith explored it.
   b. Efforts have failed to meet clean-up goals.
   c. After missing deadlines, the Chesapeake 2000 Agreement is on target to meet its 2010 goals.
7. To what extent do you support the Chesapeake Bay Fund's suggestion that a "green fund" be created for "pollution-reduction projects"? What stipulations would you place before funding projects?

TERMS TO KNOW

Agreement
Aquatic
Biome
Concede
Dead Zone
Ecosystem
Estuary
Pledge
Pollution
Projection
Revitalize
Rhetoric
Stringent
Watershed

BY LINDA DAVIDSON — THE WASHINGTON POST

Thomas Point Park, near Annapolis, is where the Chesapeake Bay, left and its tributary, the South River, converge.

Name _____ Date _____

Special Assignment: Bring an Experience to Life

Two individuals share their experiences of being on Chesapeake Bay — one is Angus Phillips, *The Post*'s Outdoor columnist, and the other is an area citizen who was published in the Metro section's Page Three column for guest writers. For both, the Chesapeake Bay is an integral part of the story.

Read them the first time for the pure enjoyment of sharing an experience. On the second reading, take a closer look at how they structured their stories. Answer the following questions on your own paper.

"At Mouth of Chesapeake, an Abundance of Riches"

1. Summarize the fishing trip of Angus Phillips. Include the starting and end points, length, highlights and his attitude about it.
2. In what way does the use of quotations enrich the storytelling?
3. What factual information is included? What does this add to the piece?
4. How does Angus Phillips frame his fishing trip?
5. What attitude is added by the final word, "Yet"? What is its impact as a one-word sentence?
6. Characterize the Chesapeake Bay as presented by Phillips.

"Bay Swim Takes More Than Mettle"

7. What tone is used by Adele Levine to introduce herself and to relate her experience?
8. Levine uses similes to describe the experience. List them. What do the similes add to the picture she paints with words?
9. Why does the man yell "Shut up, Man!" at her?
10. How does Levine use the juxtaposition of the jetty experience, another year's overheard comment, and her encounter with a plastic bag to communicate why she participates in the annual four-mile swim?
11. What does "mettle" mean? What is *The Post* editor communicating in this headline? In what way is it a summary of the slice of life selection and a teaser to encourage the reader to stop to read this selection?
12. Characterize the Chesapeake Bay as presented by Levine.

Now that you have thought about how a writer recreates an experience within a particular setting, write about an experience you have had in an outdoor setting. Use one or more of the techniques that these writers have used.

A Clean Bay Behind Schedule

Efforts to clean up the Chesapeake Bay, which were supposed to produce a clean estuary by 2010, have fallen far off the pace. For many of the 2010 goals, staggering amounts of work — and funding — are still needed.

The bay's watershed is 64,000 square miles and spans six states and the District.

Problems

Agriculture

Animal manure and fertilizer wash off farm fields, bringing down large amounts of the pollutants nitrogen and phosphorus, which feed oxygen-depleting algae blooms in the Chesapeake.

Progress toward reaching 2010 cleanup goal

Reducing nitrogen	***44%***
Reducing phosphorus	***49%***

Sewage plants

The hundreds of sewage plants in the Chesapeake watershed dump out at least 20 percent of the nitrogen and phosphorus that find their way to the bay.

Progress toward reaching 2010 cleanup goal

Eliminating nitrogen	***61%***
Eliminating phosphorus	***80%***

Septic systems

Many older systems do not do enough to keep nitrogen, found in human waste, from seeping into groundwater. The problem accounts for relatively little pollution but is extremely diffuse: About 1 million systems need fixing.

Progress toward reaching 2010 cleanup goal

Replacing systems	***3%***

What's Left to Be Done

At least 80,000 farms in the watershed are in need of pollution-control measures, such as the use of cover crops to hold soil in place or fences to keep cows out of streams.

Greatest challenge: *Farmers say changes will be too expensive to make without financial help.*

Estimated cost: *$2 billion**

Many plants need costly overhauls to reduce the amount of nitrogen and phosphorus they dump out in processed waste.

Greatest challenge: *In many cases, the changes will take years, regardless of funding available.*

Estimated cost: *$6 billion**

Of the roughly 1 million septic systems that needed to be fixed, only about 36,000 have been.

Greatest challenge: *Repairs or replacement can cost thousands of dollars.*

Estimated cost: *$4.6 billion**

*Cost estimates are from the report of the Chesapeake Bay Watershed Blue Ribbon Finance Panel, October 2004.

Proposals

Federal

Environmentalists hope the 2007 federal farm bill will include more money to pay for conservation on bay watershed farms.

Virginia

One proposal calls for $250 million in bonds to help pay for upgrades at sewage plants.

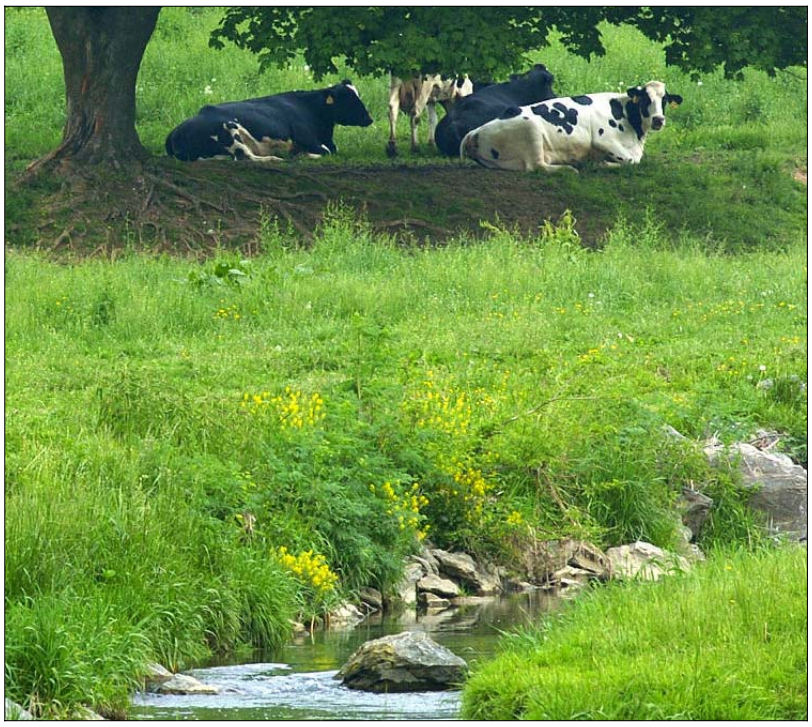
Maryland

A proposed Green Fund might provide $50 million per year for pollution-reduction projects.

Pennsylvania

A proposed tax credit would provide up to $150,000 per farm for upgrades.

THE WASHINGTON POST



BY RICKY CARIOTI — THE WASHINGTON POST

POLLUTION **Manure from cows resting by the west branch of Little Conestoga Creek in Manor Township, Pa., can pollute water that eventually flows into the Chesapeake Bay. Cow manure, lawn fertilizer and human waste are among the worst of the pollutants that have affected the bay.**

BY MORT FRYMAN — VIRGINIAN-PILOT VIA ASSOCIATED PRESS

OYSTERS **Restoring the oyster population is among the goals of the Chesapeake Bay cleanup, but efforts have produced no breakthroughs.**

An Integrated Curriculum For The Washington Post Newspaper In Education Program

A Revitalized Chesapeake May Be Decades Away

EPA Official Warns of Slow Progress Toward 2010 Goals

BY JAMES A. PARCELL — THE WASHINGTON POST

Pelicans summer on Spring Island in the Chesapeake Bay, which local governments pledged to clean up by 2010.

By David A. Fahrenthold
Washington Post Staff Writer

• *Originally published January 5, 2007*

The multibillion-dollar cleanup of the Chesapeake Bay, which government officials had pledged would succeed by 2010, will likely miss that deadline by a wide margin — and, at the current pace, might drag on for decades more, an Environmental Protection Agency official acknowledged yesterday.

Rich Batiuk, an associate director of the EPA's Chesapeake Bay Program, made that projection at a meeting of the Chesapeake Bay Commission, an advisory group that includes state officials from Maryland, Virginia and Pennsylvania.

His talk was a blunt, and public, admission of something that the EPA had conceded in an agency report last year. A pledge to "save the bay," made six years ago in the so-called Chesapeake 2000 Agreement, is falling drastically short. "If we go at the current rate that we're doing, we're talking about restoring the Chesapeake decades from now, a generation or two," Batiuk said.

The news means a continued struggle for one of this area's most cherished bodies of water, one that Washingtonians turn to for seafood, sailing, recreational fishing and weekend scenery. It is also bad news for such Chesapeake tributaries as the Potomac River, where the pollution and runoff bring mud, algae blooms and dangerous chemicals on the way to the bay.

Batiuk's assessment was not news to many environmentalists, who have said for years that roads and suburbs in the watershed were growing too fast and that cleanup efforts at farms and sewage plants were moving too slowly for the deadline to be met.

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Some of them said yesterday that they were heartened that the EPA was admitting the shortfall but wished the acknowledgment had come sooner.

"Duh," said Roy Hoagland, a vice president of the Chesapeake Bay Foundation, after hearing Batiuk's talk in Annapolis. "We've been arguing for at least four years that in order to reach those goals, they need to accelerate implementation [of cleanup efforts]. ... That is not new information."

Bay cleanup has a history of broken deadlines. In 1987, local and federal officials pledged to clean up the estuary by 2000. The current agreement, written after the first one failed, was signed by the governors of Maryland, Virginia and Pennsylvania, the mayor of Washington and the administrator of the EPA.

The officials pledged to make enormous improvements in everything from low-oxygen "dead zones" to underwater grasses to oyster populations.

In the 6 1/2 years since, Batiuk said, there have been notable successes: The northern bay has seen a huge regrowth of the grasses, which provide oxygen and shelter for aquatic life. Changes at sewage plants around the watershed have reduced their output of nitrogen and phosphorus, two pollutants linked to dead zones downstream.

But the overall picture, Batiuk said, shows a cleanup effort that is far off the pace set out in 2000. Crab populations are still below historic levels. The amount of oxygen, which fish and crabs need to live, is just 29 percent of the goal set for 2010, he said. The bay's native oysters are at just 7 percent.

Even underwater grasses, which are doing slightly better than other indicators, stand at just 42 percent of the level they're supposed to reach by 2010.

"If you draw that line out there," Batiuk said, pointing to the slow upward trend in their population, "you're at about 2040 for the grasses to come back."

One major reason for the shortfall, Batiuk said, was rapid population growth in the bay's watershed, which stretches 64,000 square miles from southern Virginia to Cooperstown, N.Y. An additional 800,000 people moved in between 2000 and 2005, bringing more neighborhoods, more cars, more lawns — all sources of bay pollutants — and canceling out improvements, he said.

But environmentalists have also blamed local governments, and the bay program itself, for not being more aggressive.

They have said the past six years have been consumed by research efforts and voluntary pollution-reduction programs, when new laws or stringent enforcement might have accomplished more.

One advocate of a more confrontational approach was sworn in as Maryland's attorney general Tuesday: Douglas F. Gansler (D), who has pledged an "all-out assault" on bay polluters. The Chesapeake Bay Foundation has also pushed the Maryland legislature to do more in the new session, calling for a "green fund" of up to $50 million a year for pollution-reduction projects.

Batiuk's talk yesterday reflects a serious shift in rhetoric for the EPA's bay program. For years, program officials had maintained that the 2010 goal was still within reach.

But last year, bay program Associate Director Mike Burke said, officials were asked to submit goals for an EPA-wide strategic plan. Employees would be evaluated on their progress toward the goals, Burke said.

If the 2010 deadline is not met, officials said, state governments could be made to compile a "pollution budget" for the bay, listing what is coming downstream now, where it comes from and by how much it needs to be reduced.

In the meantime, a new Chesapeake agreement, with another deadline, could also be worked out.

But the past two decades have soured some people on agreements. Bernie Fowler, a former Maryland state senator who has been an outspoken voice for the Patuxent River and the bay, said he was tired of people making promises that the bay would be fixed soon.

"A lot of those very people have left the planet and haven't seen it done," said Fowler, who is 82. "I don't want that to happen to me."

An Integrated Curriculum For The Washington Post Newspaper In Education Program

At Mouth of the Chesapeake, an Abundance of Riches

By Angus Phillips
Special to The Washington Post

• *Originally published December 17, 2006, E11*

KIPTOPEKE, Va.

The Chesapeake Bay Bridge Tunnel runs nearly 18 miles across the mouth of Chesapeake Bay here, linking Cape Charles at the tip of the Delmarva Peninsula with Cape Henry near Norfolk. Through this broad gap, Capt. John Smith and a small band of explorers forged almost 400 years ago to settle Jamestown in 1607, then spent the next few years probing the rich, protected waters around it.

Smith was amazed by the abundance of fish, fowl and shellfish and sent back glowing reports to England, which helped fuel the westward rush that finds us with a population of 300 million. Everything changes, as that remarkable statistic confirms, but some things don't change as much as you might think.

Last week, rockfish were so thick around the mouth of the bay you could almost visualize Capt. Smith's ancient claims of rivers so gorged, you could walk across the water on their backs.

Three of us made the four-hour haul from the Washington area to fish the CBBT, as the bridge-tunnel is known. Halfway there, we phoned Capt. Skip Slomski, our guide for the following day, who was already on the water with another party. "Can't talk now," he said. "We're in a feeding frenzy."

That evening we caught up with him at Sting-Ray's, the popular restaurant/gas station at the tip of Delmarva where you can fill up on regular, then step inside to a fine shrimp, oyster or crab cake dinner — complete with French wine!

"Okay, Skip," we demanded, "exactly how many rockfish did you catch?"

"Um, that's hard to say," he replied sheepishly. "We kind of lost count after the first few dozen. Three hundred?"

It's in the nature of anglers to exaggerate, and we dismissed the preposterous estimate with a laugh. By the next day's end, we weren't so sure.

It's December, and it seems as though every decent-size rockfish from the vast reaches of the tidal Chesapeake and its tributaries is fleeing south, bound for the open ocean to spend the winter in the cobalt deeps somewhere off Cape Hatteras, N.C.

These are fish that have survived three or four years in the bay and are nearing reproductive maturity. While their smaller kin stay behind, gathered in schools to overwinter in deep holes, the large fish head for the sea, where they'll spend most of the rest of their lives, returning to their natal waters only in spring to spawn.

These rockfish are hungry. They're fattening up for the winter and the CBBT, where rushing tides sweep past miles of barnacle-encrusted support columns teeming with life, is the last feeding station on the way.

Most Washington area saltwater anglers have heard about the fine fishing in December on the CBBT, but not too many get around to trying it. The trip down is long, the weather is unpredictable, seas can be big, the water is cold and it's not the kind of place you want to tackle with a boat that's less than completely reliable. You don't want to break down here; with a stiff west wind and an outgoing tide, the nearest land is Bermuda, 600 miles across the Gulf Stream.

Slomski and a few dozen other guides who work the CBBT take the worry and some of the discomfort out (the Chesapeake Guides Association has a full list at http://www.chesapeakeguides.com/guides.htm). Like most, Slomski trailers his 22-foot center-console boat down, and he upgraded this year by adding a canvas wheelhouse so you can get out of the weather. He also keeps regular phone contact with fellow guides, so if anyone has a problem, help is quickly on the way.

Still, the weather is bad frequently enough to force cancellation. "Most people schedule for two days of fishing in case they get weathered out," he said.

We took our chances with a one-day charter and got lucky. When we shot away from the ramp at Kiptopeke State Park at 6 a.m. Monday, the sky was clear and the breeze was light. Twenty minutes later, Slomski pulled back the throttle under the twin spans and plucked spinning rods from the holders. The lure of choice is a lead-head jig of a half-ounce to two ounces, depending on depth and tide, dressed with a plastic tail of four to six inches. Fly rodders favor minnow imitations.

The first traces of ebb tide were just starting to swirl around the pilings. On the third cast, I felt a jarring thump, set the hook on a 21-inch rockfish and fought it quickly to the boat. "I got the first one!" I crowed idiotically, reaching down to unhook it. "Nope," my son Will demurred, tossing back a similar-size fish he'd boated and unhooked without a fuss. Don't you hate when that happens?

And so it began. The tide was perfect, the weather was perfect and rockfish were everywhere, all day long, ranging in length from 20 to 32 inches. (Virginia regulations allow anglers to keep two a day per person, but they must not be between 28 and 34 inches, a protected "slot" designed to keep prime spawners alive so they can return to replenish stocks. The law also allows you to keep fishing for fun after you have your limit, releasing whatever you catch.)

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As fiery sunrise lit the eastern sky, waves of seagulls and a few pelicans soared in from overnight roosts to mass over schools of feeding rock, diving to slash at bait the predator fish drove to the surface. Slomski sped from flock to flock as the birds moved along, working slowly from shallow, five-foot water to the deeps along the main shipping channel as the sun got higher. The deeper the water, the larger the fish.

As noon approached, the tide slowed and we slid under the bridges to toss our lures at the concrete pilings. "They'll feed in the open water as long as the tide is running," Slomski said, "then they come in here when it goes slack." He was not wrong.

Soon enough came the first swirls of incoming tide and we eased back out onto the open ocean side, where diving birds indicated more fish feeding. And on and on it went, and surely will keep going until cold weather drives everything out, each tide in the meantime bringing a groaning board of bait and fish and sport for the angler.

You had the feeling you could go on catching rockfish all day long and into the night, and I honestly believe you could. When we quit at 2 p.m., more boats were launching at the Kiptopeke ramp, skippers brimful of expectation as they geared up for the evening bite.

How long can it go on? Virginia's rockfish season runs until the end of the month, but Slomski said some of the best sportfishing on the CBBT comes in the first few weeks of January, when it's all catch-and-release and few anglers partake.

The horizon will be largely empty then, devoid of people, much as it was 400 years ago when Capt. Smith came creeping into America's largest estuary to find it teeming with such abundance that even four centuries of plunder and pollution hasn't killed it.

Yet.

Bay Swim Takes More Than Mettle

• *Originally published January 4, 2007*

Even at its narrow throat, the Chesapeake Bay is a dauntingly wide piece of water. Swimming across it might not appeal to just anyone, but the annual Bay swim has become so popular that this year's swimmers will be chosen today by lottery. Oh, and the entry fee is $250.

I am not a fanatic about anything, which makes me unusual around here. I am not a wine enthusiast or a political enthusiast, and I have distinguished myself at work by my complete lack of ambition.

But I am an absolute fanatic about the Great Chesapeake Bay Swim.

Every second Sunday of June, about 600 swimmers run into the water and thrash their way across 4.4 miles of open water underneath the twin Bay Bridge spans. It's an event well known in the local swimming community — last year it closed out in 15 minutes online — but otherwise it seems to be a virtual secret.

I have done the Bay swim four times, which is nothing. A handful of people have completed 20 crossings.

We leave the beach like a pack of wild, fighting pigs and swim the quarter-mile out to the bridge, sorting ourselves out as we go. I behave like a simple single-celled amoeba reacting to stimuli. I dodge the clumsy, heavier swimmers, duck under waves, fight my way across the channel currents and desperately try to stay on course. By the three-mile mark, I feel like I am swimming inside a snow globe that someone is shaking aggressively. Nausea racks my body, and I am reduced to a miserable bundle of nerve endings wrapped in a wet suit.

One year I swam too close to a rock piling near the halfway point. The currents swirling around the rock jetty were particularly strong. I spent 30 minutes swimming in place beside the rock jetty, and then I was tossed onto the jetty itself. I was stunned to see a dozen other yellow-capped, black-wetsuited swimmers perched silently on the rocks. It was like stumbling onto another planet.

I was about to say something when one of the rock people stood up. "Shut up, man!" he yelled. "Just shut up!"

I sat down glumly and thought about my past Bay swim exploits: how I once gained notoriety by missing the start. I had been standing in the parking lot, pulling on my wetsuit, when the start gun went off.

I thought about how, a year later, I was hanging onto the side of the food and water boat when a swimmer popped up from the water.

"John! John!" she said, waving at the swimmer treading water beside me. "It's Mary! Have you had a chance to review that proposal?"

I thought of the year that I swam into a large plastic garbage bag while training in Gunpowder River. A mighty struggle ensued, complete with blood curdling submerged screams, as I fought for my life against the plastic bag.

I thought about the friends who were waiting patiently for me on the other side as I sat on this rock in the bay.

I climbed down off the rock and slid back into the cold, green water thinking that, considering everything, four miles is not very far at all.

— Adele Levine, Wheaton
Page Three, Extreme Washington, Metro

An Integrated Curriculum For The Washington Post Newspaper In Education Program

What Would It Take to Clean Up The Bay by 2010?

By David A. Fahrenthold
Washington Post Staff Writer

• *Originally published January 29, 2007*

To deliver on the pledge to save the Chesapeake Bay in three short years, you could start by digging up a million lawns to fix septic tanks that pollute too much.

Then ask 80,000 farmers to make expensive changes in the way their farms work. Overhaul hundreds of sewage plants, each project with a price tag that could run into the millions.

And find about $28 billion — enough for six aircraft carriers — to pay for it all. Right now, authorities are at least $14 billion short.

This month, the Environmental Protection Agency said efforts to restore the bay's health need to be accelerated to meet a 2010 deadline. It turns out that "accelerated" might be understating it: Experts say meeting the goal would require widespread sacrifices from individuals and unprecedented funding from government sources. And even then, it might not be enough.

For now, no such shock-therapy campaign has been proposed. But environmentalists say the bay project's many shortfalls are a lesson: After 19 years, the Chesapeake cleanup is struggling to produce results on par with its promises.

"We have done a truly tremendous job of defining the problem, and we have done a truly tremendous job of defining the solution," said J. Charles Fox, a former head of the Maryland Department of Natural Resources. "But we have not yet succeeded in actually implementing the solution."

The bay cleanup, in its current form, began in 1987 with an agreement between state and federal governments. They promised that the bay, troubled by dirt, algae blooms and toxic chemicals, would be clean by 2000.

"We thought it was going to be Bethlehem Steel. We thought we were going to be able to point to big polluters," said Jack Greer, an official at the Sea Grant program at the University of Maryland.

Instead, they found that some of the bay's worst pollutants came from such things as manure, lawn fertilizer and human waste. Its troubles began on every street, in every sewer, at the back end of every cow.

"I remember politicians just going pale," Greer said.

When the 2000 deadline was missed, an even more sweeping agreement took its place. The leaders of Maryland, Virginia, Pennsylvania, the District and the EPA pledged to fix the bay's water, its oyster population, its beds of underwater grass and other environmental indicators by 2010.

There have been significant successes since then. Maryland passed a "flush tax," a surcharge on water bills to pay for cleaning up the state's sewage plants and farm fields. The bay's rockfish population has continued its remarkable comeback, which began in the 1980s. Small strips of forest, designed to filter runoff, have been planted alongside 5,000 miles of streams.

But all of that hasn't been nearly enough, officials say.

Thousands of farms still need to implement measures to prevent soil, manure and fertilizer from washing downstream — from putting up fences to setting aside areas to regrow as forest. In Virginia, the total is near 1.5 million acres — an area larger than Delaware.

States have said they will need at least $2 billion for these agricultural measures, which often include sending employees out to custom design a plan for each farm and reimbursing farmers for changes. Farmers have said they can't afford the changes themselves.

"If we can't absorb those costs, the only alternative is to get out," said Earl Hance, president of the Maryland Farm Bureau.

Another shortfall: Older septic systems — including some installed as late as 2005 — need to be replaced, or at least updated, so they release less nitrogen into groundwater. In Maryland, the most recent documents say 11,000 of 360,000 systems have been fixed so far.

If homeowners pay, each fix costs hundreds or thousands of dollars. Maryland has money to help homeowners pay for septic upgrades — but not enough to do all of them before 2010. At current funding levels, it would take 580 years.

Also, to make the 2010 deadline, hundreds of sewage plants would need upgrades, so they release less pollution. The cost is estimated at $6 billion.

But money isn't the only problem with reaching the 2010 goal. The upgrades are so complicated, officials say, that they will take years to plan and carry out.

"If I had all the money in the world today, I would guarantee you I could not get it done by 2010," said John T. Dunn, chief engineer of the District's Water and Sewer Authority, whose Blue Plains sewage plant needs such an overhaul. He said that 2014 might be more realistic.

And even if all this effort were expended, experts say some 2010 goals might be impossible. One goal promises that the Chesapeake's oyster population will grow tenfold. But years

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of restoration efforts have produced no breakthroughs.

"If we're not well on the way by now, it's just not going to happen," said Standish K. Allen Jr., a professor at the Virginia Institute of Marine Science.

Blame should be spread across the watershed, environmentalists say, since all governments failed to act as boldly as the 2010 goals demanded and did little to contain sprawl. But the EPA's Chesapeake Bay Program, which oversees the cleanup, has come in for special blame. Last year, the U.S. Government Accountability Office found that the bay program was not doing enough to coordinate environmental efforts or provide updates.

Critics say the program lost valuable time by calling for elaborate plans instead of plunging straight into pollution reductions. And at the end of all this planning, they say, the cleanup had the paralyzing price tag: $28 billion.

"What that number tended to do is make people say, 'Well, it's impossible. We can't do it,'" said William C. Baker, president of the Chesapeake Bay Foundation, an environmental group.

In response to questions about the management of the Chesapeake cleanup, bay program Director Rebecca Hanmer released a two-paragraph statement. It said the EPA was committed to "continue accelerating our progress toward a cleaner, healthier Chesapeake."

For now, the consensus among environmentalists is that the costs of meeting the 2010 goals are prohibitively high. Instead, they have begun pushing for agricultural and sewer-plant funds to aim at 80 percent of the desired pollution reductions.

Even these revised plans would require wrangling an estimated $3 billion more than state and federal governments have allocated.

BY RICKY CARIOTI — THE WASHINGTON POST

A herd of cattle rest below a tree next to the Little Conestoga Creek West Branch in Manor Township Lancaster County, Pa. where some say run-off from farms into streams is polluting water that eventually flows into the Chesapeake Bay.

Nineteen years into the bay cleanup — intended as a model for environmental movements all over the world — even the easy fixes are hard.

"It's not like you can find a place elsewhere that did it better," said Ann Pesiri Swanson, executive director of the Chesapeake Bay Commission, an advisory body to the cleanup. "That's the tragedy."

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Rock Creek Fish Head Home Again

With Obstacles Removed, Herring Return to Spawning Area

By David A. Fahrenthold
Washington Post Staff Writer

• *Saturday, March 31, 2007; A01*

Bill Yeaman spotted the first ones Monday: a school of six silver-sided alewives, swimming in place in the greenish current of Rock Creek.

The fish seemed unexcited. The man was electrified.

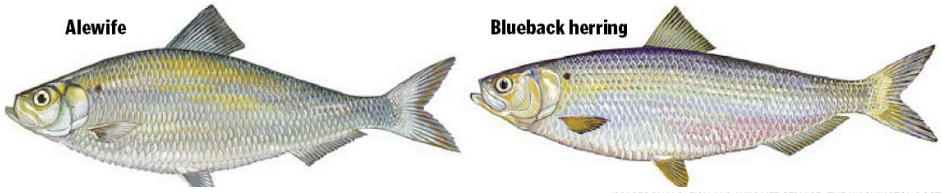
"It was just — boy, I don't know — it's hard to explain the feeling. But, just, jubilation," said Yeaman, a National Park Service ranger. "That all the hard work that all these people were doing had paid off."

Yeaman was at Peirce Mill in Northwest Washington, where since 1904 a dam had blocked the path of fish returning from the Atlantic Ocean to spawn. But over the past three years, environmental engineers found ways around, over or through eight obstacles that prevented fish from passing.

This week, when Yeaman spotted those fish on the other side of the dam — which can now be circumvented via a fish "ladder" — it was a signal that one of Washington's oldest spring rituals was on its way back.

"I was witnessing something that hadn't happened for over 100 years," Yeaman said yesterday, standing at the side of the creek. "That's pretty amazing."

For centuries, this region's spring was punctuated by a series of massive migrations of fish — shad, herring, striped bass — that crowded the area's rivers and provided a bounty for local fishermen. Even in shallow Rock Creek, biologists say, hundreds of thousands of alewives and blueback herring, a nearly identical cousin, swam upstream in an attempt to return to their birthplaces.



IMAGES BY U.S. FISH AND WILDLIFE SERVICE, THE WASHINGTON POST

River herring, 10 to 15 inches long, migrate from deep-ocean habitats in the spring to spawn in freshwater streams.

But then, people blocked the way. They built fords, using rocks or concrete to make the creek bottom passable for vehicles. They laid sewer pipes from bank to bank. And they built the Peirce Mill dam, as the tale is told, to provide some scenery for customers at a tearoom in the old mill building.

The waterfall created by the dam is about 12 feet tall — beyond insurmountable for a foot-long alewife. After a journey from the ocean, through the Chesapeake Bay, up the Potomac River and about 4.5 miles up the creek, the fish would leave their eggs next to the dam.

Upstream, miles of suitable spawning ground were permanently off-limits.

"That was the ultimate obstacle," said Jon Siemien, the head of fisheries research for the D.C. Department of the Environment.

For years, scientists had been looking for a way to remove or circumvent these blockages. Then, finally, help came from an unlikely source: the Woodrow Wilson Bridge Project. That $2.4 billion construction project included some Potomac River dredging, which damaged habitat there. As a kind of environmental community service, the project was required to help improve habitats in Potomac tributaries.

In 2003, bridge project engineers started to remove Rock Creek's fish barriers. To allow the fish to pass over a still-used sewage pipe, for instance, the engineers arranged large rocks in the stream, creating what looks like a natural set of rapids. It's really a carefully planned flow constrictor, designed to make the water pool and rise until it covers the old barrier.

"It's not like we just throw some rocks in a stream and hope for the best," Patrick DiNicola, environmental mitigation manager for the bridge project, said yesterday as he looked at the stream — babbling precisely as it should have been. "But that's what it looks like."

At Peirce Mill, however, going over wasn't an option. Planners had to go around, building a concrete fish ladder that allows the migratory fish to climb one tier at a time. The ladder is a series of small steps, each with a spot for fish to rest before going on to the next.

This was the last piece of the $2 million-plus restoration. About 28 new miles of the stream are now open, extending all the way to Lake Needwood near Rockville.

D.C. scientists had been preparing for this moment for several years, capturing alewives and blueback herring below

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Peirce Mill, and bringing them upstream in a truck. The hope was that their offspring would seek to return to the same spot.

For now, it seems that not all the fish have gotten the message. Yesterday, D.C. biologists were using an electroshocking machine to capture fish below the dam and found that many had already spawned, without exploring further upstream. The alewives' spawning ritual usually involves a female scattering her eggs on the creek bottom, while a gaggle of males follow behind trying to fertilize them.

"They're all spawned out," said fisheries biologist Luke Lyon, holding a foot-long female. She was now as skinny as the males, Lyon said. If she were still carrying eggs, "she'd have a big fat belly."

But scientists said perhaps 100 alewives have actually made the journey up the fish ladder so far. Scientists say they expect a few hundred more, plus blueback herring, when their run begins in early May. They expect that the populations of the two fish will grow in the coming years, because they now have more good habitat in which to spawn. They might also provide targets for area fishermen — although in the District, fishing for these species is prohibited between Porter Street NW and the Maryland line.

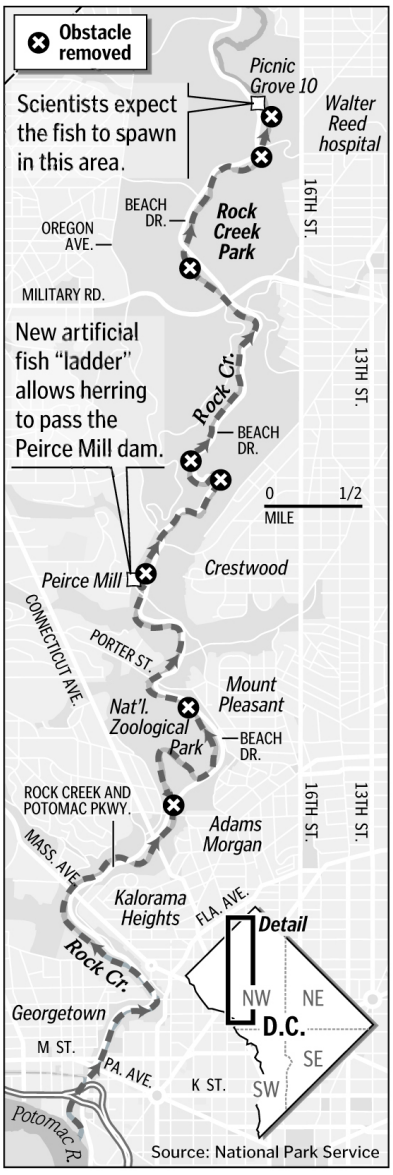
After this year's spawn, the scientists said, many of the adult alewives will head downstream again, returning to the ocean. After a few days, their eggs will hatch into larvae that, if they're not eaten along the way, will grow up, leave and someday return.

"They'll become imprinted to the area," Siemien said. "And then, in another two to four years, these spawn will come back here and make the same trip."

Staff writer John Kelly and staff researcher Meg Smith contributed to this report.

Migration Run Up Rock Creek

Two species of river herring are migrating up Rock Creek for the first time since early last century, when their traditional route was blocked by obstacles. A five-year, $2 million-plus project has removed all obstructions in the District.



BY GENE THORP — THE WASHINGTON POST

Read About the Sea

The Deep-Sea Floor
Collard III, Sneed B.
Charlesbridge, 2003 (Ages 4-8)
Travel a mile below the surface to view the geography and animal life of the ocean floor

Dolphins and Sharks: a Nonfiction Companion to Dolphins at Daybreak
Osborne, Mary Pope
Magic Tree House Research Series, 2003 (Ages 8-9)
Join scuba explorers Jack and Annie in their research, through photographs, and with video and Internet sites.

Journey Under the Sea
Pinkin, Linda
2003, Elementary
Illustrations present populations that live in different ocean habitats; information on adaptations and interactions between populations

The Magic School Bus Takes a Dive
Cole, Joanna
Scholastic Paperbacks, 1998 (Ages 4-8)
Ms. Frizzle takes her class on a field trip to observe coral reefs up close

One Night in the Coral Sea
Collard III, Sneed B.
Charlesbridge, 2006 (Grades 3-6)
A visually stunning reef tour

The Sea Around Us
Carson, Rachel
Oxford University Press, 1951 (Grade 10+)
Classic study of the processes that formed the earth, moon and oceans

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Cleaning the Bay

A measure to help do it is stymied in Maryland's Senate.

Friday, April 6, 2007

HERE'S A snapshot of the precarious state of the Chesapeake Bay, circa 2007: The oyster population has been decimated, and crab stocks are at an all-time low. Fish are sick and dying. Oxygen-starved "dead zones," negligible 40 years ago, now cover up to a third of its area.

Better late than never, Maryland has begun getting serious about its commitment to reduce the pollutants that are choking the bay to death. Measures to cut the flow of nitrogen to the bay — from storm-water-borne fertilizers, pesticides, vehicle exhaust and untreated sewage, among other pollutants — have moved the state about halfway toward the goal it intends to reach by 2010. Now comes an innovative piece of legislation in Annapolis that would raise $100 million a year and make significant strides toward curbing runoff pollution. The legislation easily passed the House of Delegates last month. But it is bottled up in a state Senate committee, where Thomas V. Mike Miller Jr., the Senate president, has apparently decided it will stay. This is folly.

Mr. Miller recently declared that he'd like his legacy to include rescuing the bay. But he has another calling, namely politics, and in particular his pet project, slot machine gambling. He has decreed that no revenue bill will advance in the absence of an omnibus package to fix the state's looming budget deficit. By that he clearly means to include the proceeds from slots, which wiser heads in the legislature have blocked for four years running. So the measure to help the bay languishes.

It would tax developers and homebuilders according to the amount of runoff-producing surfaces they build — pavement, sidewalks, roofs and the like. These fees would add hundreds of dollars to the cost of an average new house, up to a maximum of $1,500 for a large one. The developers of office parks, factories and businesses would also be taxed, to their dismay. The potential benefits are far-reaching. Proceeds would be channeled to farmers, local governments and state agencies for programs designed to keep nitrogen and other pollutants out of the bay. The measures include planting cover crops, promoting shoreline improvements and other systems to control storm water, and limiting sprawl by channeling new building toward growth zones. Environmentalists and farmers, often pitted against each other, both support this legislation. Coupled with previous measures taken by the state, it would reduce the annual flow of nitrogen into the bay by an estimated 15 million pounds — about three-quarters of the goal specified for 2010.

It is true that the state faces a daunting budget crisis. But in just about any scenario to raise revenue, the bay will be a top priority of Maryland's legislators as well as voters. Better, then, to deal with it now, and by creating a dedicated, reliable, recurring funding source. Mr. Miller should stand down.

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Nature Calls

By Caroline Kettlewell

• *Original Date of Publication April 6, 2007, Weekend*

Honestly, I'd always thought "yellow-bellied sapsucker" was a made-up bird, an avian punch line. You have to admit, it is a funny name. Even Steve Living says so, and he's a sober-minded scientist, a wildlife biologist with the Virginia Department of Game and Inland Fisheries. But, lo, it is a real bird (its winter range includes Virginia), and although, if you ask me, it doesn't look all that yellow-bellied, it earned the "sapsucker" part of its name by doing just that: boring little holes in the bark of trees to suck out the sap.

I made the bird's acquaintance earlier this spring through a large piece of bark I picked up off a fallen tree in the Rappahannock River Valley National Wildlife Refuge in Virginia's Northern Neck. The bark in my hand, and in fact the entire tree trunk, was bored with small regularly spaced holes. Termites? A woodpecker? Why so many holes?

Living provided the answer a few days later and a couple of hours southeast on the Greensprings Greenway Interpretive Trail in Williamsburg, where I spotted another tree (this one living) similarly drilled. The yellow-bellied sapsucker, Living told me, was the culprit. As it happens, it is a woodpecker.

My question and its answer were found on recent visits to explore several of the hundreds of sites that make up one of Virginia's newest natural attractions: the statewide Birding and Wildlife Trail. With the spring bird migration upon us, it's a great time to discover the trail for yourself.

Nature's Variety Show

Developed and overseen by the Virginia Department of Game and Inland Fisheries, the trail is divided into three sections: Piedmont, Mountain and Coastal. The Coastal section debuted in 2002, followed by the Mountain portion in 2003 and the Piedmont leg in 2004. Not literally a single trail, it is rather made up of 65 loops over public and private lands, including local, state and national parks; wildlife refuges; nature preserves; museums; beaches; plantations; fish hatcheries; boat landings; rail trails; and a good deal more. If you like your wildlife with a bracing dose of rugged and remote, you can head for such destinations as the Mount Rogers National Recreation Area on the Mount Rogers Loop of the Mountain section. Other locations, including the 400-acre Riverbend Park on the Coastal section's Great Falls Loop, are small jewels of wilderness right at the District's back door, easily accessible when you have only a few hours to spend. Variety is the essence of the trail and what makes it possible to encompass the sheer range of Virginia's natural habitats, from its Eastern Shore to the southwestern mountain highlands.

Jeff Trollinger, who is the watchable (as opposed to huntable) wildlife program manager for the Virginia Department of Game and Inland Fisheries and helped develop the trail, says that "somewhere within the boundaries of Virginia, you can find every species of wildlife and every habitat to be found from southern Maine to Florida."

Organizers hope the trail will help protect the state's natural abundance as well as promote outdoor recreation and tourism and therefore the economic value of open lands and habitats that may be threatened by development.

But the trail's attractions aren't limited to natural features. Historic sites include Civil War and Revolutionary War battlefields, Thomas Jefferson's Monticello estate, the birthplaces of George Washington and Robert E. Lee and the burial place of Patrick Henry, and Jamestowne island. There are beaches and lakes, bike and hiking paths, fishing sites, and areas for picnicking, camping and boating. There are bed-and-breakfasts, botanical gardens, a berry farm, a winery and a Christmas tree plantation.

Browse the trail's Web site (http://www.dgif.state.va.us/vbwt) or leaf through the printed guide, and you'll find each listing provides directions, along with information about features, attractions and the plant, animal and bird life you're likely to find there. Contact information for local chambers of commerce and visitors and tourism bureaus is provided as well. Facts and tips are scattered throughout the printed guide, such as the handy reminder, "Never stick your hand blindly into a hole, burrow, or crevice!" and the intriguing nugget that snakes have only one lung. If you keep a copy of the guide in your car, then any ramble around Virginia could include a spontaneous stop for something wild.

Eagles and Open Land

If you're starting near the District, you might sample the Coastal section first. It includes the Bull Run, Great Falls, Mason Neck and Prince William loops, then stretches south through Fredericksburg and the Northern Neck and on to Richmond, the Tidewater area and across the Chesapeake Bay to the Eastern Shore, 18 loops in all, offering a remarkable mix of environments.

"There are great places up there in Alexandria and Fairfax, such as Huntley

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Meadows and Dyke Marsh [both on the Mason Neck Loop], gorgeous areas that are basically just outside the back door," Trollinger says. "If you want to really get away from things, the Mattaponi or Northern Neck loops are very close to Northern Virginia. But there is very little development, and they are very 'remote' experiences."

The Rappahannock River Valley National Wildlife Refuge, where I'd found the yellow-bellied sapsucker's calling card, is part of the Northern Neck Loop, not far from Tappahannock. The refuge covers nearly 8,000 acres (some in conservation easements) near the Rappahannock River in an area that is part of one of the state's most important bald eagle habitats. With the eagle population rebounding, undeveloped land such as the area is vital for the continued survival and health of the regal birds. At Cat Point Creek on the road to the refuge on a mid-March trip with my family, we stopped to watch several eagles soaring overhead. Other raptors that might be found include osprey, red-tailed hawks and peregrine falcons.

Not all parts of the refuge are open to visitors, while others can be visited by reservation, but the Wilna tract is open daily from sunrise to sunset. It features 120 acres of open fields and the 35-acre Wilna Pond. According to deputy refuge manager Kathryn Owens, the fields are restored grasslands, and in summer they're home to grassland birds such as meadowlarks, dickcissels, indigo buntings, grasshopper sparrows, blue grosbeaks and eastern bluebirds. On our visit, the fields held mostly stubble and briars, so we headed straight to the pond. We had the place almost entirely to ourselves, but for a couple walking a dog across the field in the distance and a lone fisherman in a canoe on the pond. Telltale pointed tree stumps indicated that beavers had been busily at work, and my son found a slender stick at the water's edge from which all the bark had been gnawed away, leaving a delicate pattern over the entire length.

Wilna Pond is the result of the damming of Wilna Creek sometime in the past 50 to 100 years; Owens said opinion varies on just when. It is home not only to beaver but also largemouth bass, bluegill, catfish, American eel and more. The pond has an accessible fishing dock, and a flat gravel path winds along one lightly wooded bank, high above the water. At the far end of the path, the pond dwindles into marsh, where we were treated to that sentinel sound of spring, the chirp of peeper frogs. But for that, there was a kind of serene hush over the afternoon, as though everything lay in quiet anticipation of the rush of life soon to come.

Suburban Sanctuary

The beauty of the Birding and Wildlife Trail is, as previously noted, the very diversity of choices. As Trollinger says, "Wildlife watching is something that you can pretty much do anywhere." That "anywhere" includes hidden treasures in unexpected places.

The Greensprings Greenway trail in the Lower Peninsula Loop of the Coastal section is a pocket of wetlands tucked amid a subdivision, Jamestown High School and Route 5 in Williamsburg. At 8 on a weekday morning, with the sun just breaking through the clouds, the wildlife spotting started with a rabbit hopping into the underbrush as I entered the trail with biologist Living. We heard woodpeckers tapping away their territorial claims, we heard killdeer and crows and the "peter, peter, peter" of a tufted titmouse, we heard geese honking overhead.

The geese and crows I could safely name, but the others I took on Living's word, and as we moved onto a boardwalk over a marshy beaver pond that seemed to be fairly exploding with activity, I had to rely on him to identify much of what we saw and heard. Mallard. Osprey. Swallows. Red-winged blackbirds. Red-headed and hairy and pileated woodpeckers, brown-headed nuthatch, yellow- shafted (or northern) flicker.

Living pointed out a sapling a deer had used to rub off its velvet, and soon we caught sight of deer themselves, slipping through the dry reeds, so perfectly camouflaged that only the occasional flash of white gave them away. A couple of large, muddy heaps covered in sticks, Living said, were beaver lodges. Farther down the trail, three women walking their dogs said they'd spied a beaver the day before; though Living said they're more generally nocturnal animals, we waited in the hope that it might honor us with a return visit. No luck, alas, but there were more osprey to see, one flying overhead with a small fish in its talons, and a great blue heron idling along with a lazy flap of its wings, hauling a bit of nesting material.

Cypress and Sea

If you don't happen to have a wildlife biologist handy, a birder will do nicely. Leaving Williamsburg behind, we traveled to First Landing State Park in Virginia Beach (on the trail's Seashore to Cypress Loop), where we encountered Anne and Tom Matey from Salisbury, Md., down for the weekend and watching the seabirds.

"We've been birding for quite a few years," Anne says. "We started out totally on our own. We wanted to get outside." Now they're members of the Maryland Ornithological Society. On the Eastern Shore where they live, Anne says, one of their favorite birding destinations is the Chincoteague area; the Chincoteague National Wildlife Refuge is another site on the trail's Coastal section. Living and the

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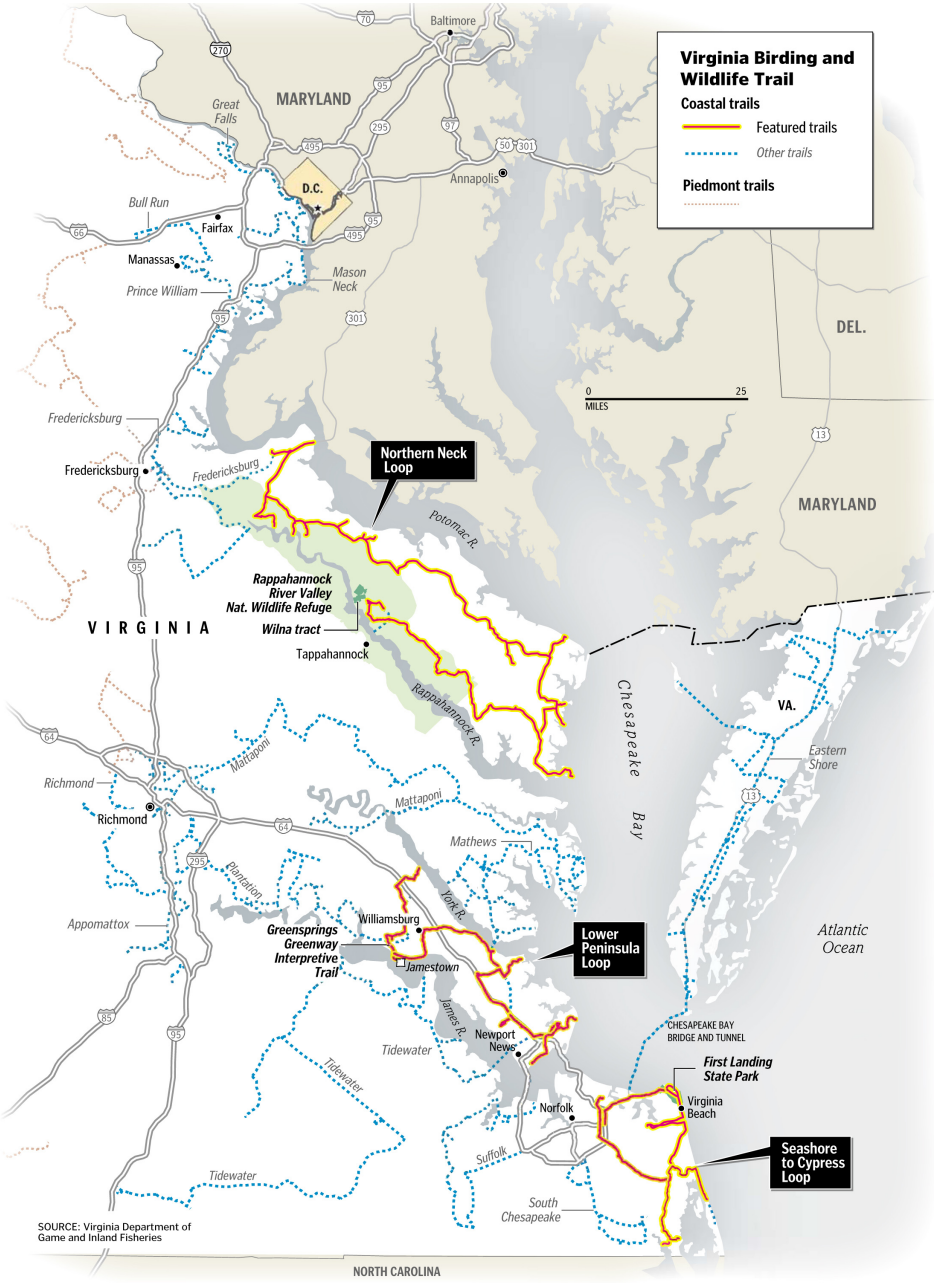
Mateys lapsed into birder talk, which ran quickly from the birds at hand to other birds and other trips, leading to consulting over their bird guides. From all this I learned that it's not often you see two American bitterns in a single day; that a flock of floating birds is called a "raft"; that, contrary to the evidence, all seagulls do not look alike.

Living and the Mateys very nicely explained those things to a rank novice, and all three said that birders are in general a friendly breed happy to share information or tell you what you're looking at. Living recommended joining a local birding club on an excursion to begin learning about birds and their habitats.

The Mateys were enjoying a brisk sea breeze on the shore side of First Landing park, where a sandy bayside beach overlooks the long stretch of water that marks the entrance to the Chesapeake Bay. Cormorants stood like sentries on weathered wooden poles. Gulls bobbed in the water, looking about with that puff-chested, self-important air of their species, as though at any moment they might be called upon to inspect the troops. In the far distance, a flock of unidentified birds wheeled and turned above the water in perfect unison, their wings flashing silver and white as they caught the sunlight.

There is another side to First Landing park as well. Crossing Shore Drive (it's a busy road — probably safest to drive), we entered shaded woodlands that lead to a cypress swamp where still, tannin-blackened waters reflected the ghostly strands of Spanish moss hanging from the trees. It was an entirely different habitat from the one we'd just left, with fallen pine needles muffling our footsteps and only the faintest occasional whisper of a breeze.

We (or to put it more accurately, Living) spied an eastern painted turtle and a spotted turtle sharing a half-submerged log, and what was either a comma or question mark butterfly (it wouldn't hold still for us to definitively call its punctuation). We sniffed the aromatic crumpled leaf of a native wax myrtle. We craned our necks to catch a yellow-rumped warbler (also known among birders, you have it on authority from a biologist, as "butter butts") flitting overhead. We got not quite lost but agreeably diverted for a bit; there are miles of walking and biking trails on this side of the park to amble away a day. When we found our way back to our starting point, the two turtles remained where we'd first seen them, contentedly at home. We had come as guests and took our leave.



Everything Caroline Kettlewell knows about birds she has learned while writing for Weekend. A freelance writer, she can be found online at http://www.carolinekettlewell.com.

Academic Content Standards

This lesson addresses academic content standards of Maryland, Virginia and the District of Columbia.

Maryland

Environmental Science: Students will use scientific skills and processes to explain the interactions of environmental factors (living and non-living and analyze their impact from a local to global perspective (Standard 6)
Objectives (Grade 7)
a. Identify and describe a local, regional, or global environmental issue.
b. Identify and describe that different individuals or groups are affected by an issue in different ways.

Life Science: The students will use scientific skills and processes to explain the dynamic nature of living things, their interactions, and the results from the interactions that occur over time (Standard 3)
Objectives (Grade 5, Science)
a. Identify and describe features of some of the plants and animals living in a familiar environment and explain ways that these organisms are well suited to their environment.
b. Based on information about the features and behaviors of animals and plants from very different environments describe reasons that they might not survive if their environment changed or if they were moved from one environment to another.
c. State reasons why certain animals such as whales, salmon, could not survive in the Chesapeake Bay.
d. Research the kind of environment needed by the Maryland blue crab, the Black-eyed Susan (Maryland's state flower), or another Maryland native organism.

The Maryland Voluntary State Curriculum Content Standards can be found online at http://mdk12.org/mspp/vsc/index.html.

Virginia

Life Science: The student will investigate and understand the natural processes and human interactions that affect watershed systems. Key concepts include
a) the health of ecosystems and the abiotic factors of a watershed;
b) the location and structure of Virginia's regional watershed systems;
c) divides, tributaries, river systems, and river and stream processes;
d) wetlands;
e) estuaries;
f) major conservation, health, and safety issues associated with watersheds; and
g) water monitoring and analysis using field equipment including hand-held technology.

Earth Science: The student will investigate and understand that oceans are complex, interactive physical, chemical, and biological systems and are subject to long- and short-term variations. Key concepts include economic and public policy issues concerning the oceans and the coastal zone including the Chesapeake Bay. (ES.11)

Biology: The student will investigate and understand dynamic equilibria within populations, communities, and economic systems. Key concepts include analysis of the flora, fauna, and microorganisms of Virginia ecosystems including the Chesapeake Bay and its tributaries. (BIO.9)

Standards of Learning currently in effect for Virginia Public Schools can be found online at www.pen.k12.va.us/VDOE/Superintendent/Sols/home.shtml.

Washington, D.C.

Biology: Evolution and biodiversity are the result of genetic changes that occur in constantly changing environments. As a basis for understanding this concept, students explain how a large diversity of species increases the chance that at least some living things will survive in the face of large or even catastrophic changes in the environment (2). (B.5)

Biology: Plants are essential to animal life on Earth. As a basis for understanding this concept, students identify the roles of plants in the ecosystem: Plants make food and oxygen, provide habitats for animals, make and preserve soil, and provide thousands of useful products for people (e.g., energy, medicines, paper, resins) (2); Recognize that plants have a greater problem with "unpredictable environments" because they cannot seek shelter as many animals can. (7). (B.6)

Biology: Stability in an ecosystem is a balance between competing effects. As a basis for understanding this concept, students illustrate and describe the cycles of biotic and abiotic factors (matter, nutrients, energy) in an ecosystem. (1); Investigate and describe how point and non-point source pollution can affect the health of a bay's watershed and wetlands (9); Assess the method for monitoring and safeguarding water quality, including local waterways such as the Anacostia and Potomac rivers, and know that macroinvertebrates can be early warning signs of decreasing water quality (10). (B.8)

Learning Standards for DCPS are found online at www.k12.dc.us/dcps/Standards/standardsHome.htm.