

2013: The Chesapeake Bay

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The Chesapeake Bay: Problems and Solutions
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Chesapeake



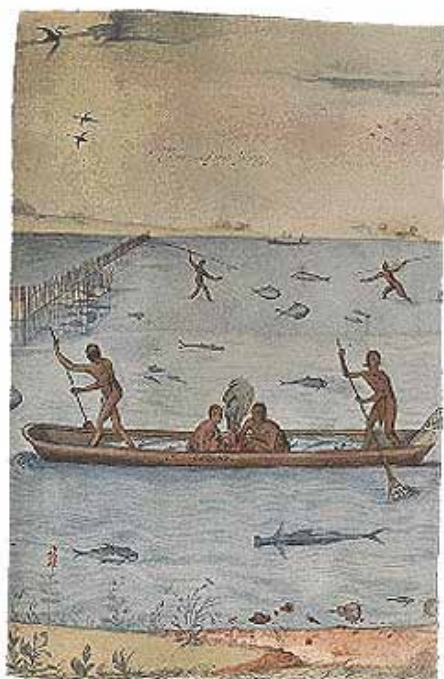
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In the early 1600s Captain John Smith wrote of the land and waters he explored. Hardwood forests gave way to terraced fields and marshlands as the landscape descended to the Potomac and Anacostia rivers. In his *Historie* Smith describes what he observed: “The river above this place maketh his passage downe a low pleasant valley overshadowed in manie places with high rocky mountains from whence distill innumerable sweet and pleasant springs.”

The K’che-se-piak, meaning “land along the big river,” provided native inhabitants a rich habitat in which to farm, fish and hunt. Archaeologists testify to mounds of shells from oyster feasts.

What would the Algonquian-speaking people who lived in the village of Nacotchtank on the Anacostia, or “anaquash” which means a village trading center, think of today’s Potomac and Anacostia rivers? Would they or others who lived in chiefdoms lament the waters they once paddled in canoes or the abundant fish they caught in their weirs?

The Patowmack, “a great trading place,” inspires today’s leaders and individuals to assess resources, trade ideas and find solutions to return the waters to their pristine abundance.



COURTESY OF THE TRUSTEES OF THE LONDON MUSEUM

**Algonquian Indians Fishing by John White
(created 1585-86)**

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

BY DAVID A. FAHRENTHOLD

Washington Post Staff Writer

• Originally Published Jan. 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



LINDA DAVIDSON/THE WASHINGTON POST

In Queen Anne's County, Md., development along the Chesapeake Bay area continues on the Kent Island narrows, where the Chester River joins the bay. Studies of the Chesapeake have found that manure, lawn fertilizer and human waste are the worst pollutants. Cleanup is unlikely to meet a 2010 deadline without unprecedented funding.

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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,

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.

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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 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



LINDA DAVIDSON/THE WASHINGTON POST

The sun rises over the Claiborne community on the northern tip of Talbot County, Md., by Eastern Bay. Clean up of the Chesapeake Bay will require about \$28 billion to complete.

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.

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.” ■

A Clean Chesapeake Bay by 2010?

For decades local residents, fishermen, scientists and environmentalists have been concerned about the quality of water in the Chesapeake Bay and the many rivers that feed into it. Goals have been set and revised to clean it up and return its abundant aquatic life. In 2007 *Washington Post* reporter David Fahrenthold wrote about the state of The Bay and likelihood of reaching goals set to clean it up by 2010.

1. J. Charles Fox divides dealing with a problem into three stages: defining the problem, defining the solution and implementing the solution. In this front page news story, David Fahrenthold indicated which of the three stages have been completed?
2. From where do the worst pollutants come?
3. The 2000 clean up deadline was missed. What goals were set for the next decade?
4. What are three (3) successes mentioned in the article?
5. What can farmers do to help clean up the Chesapeake Bay?
6. What can homeowners and sewage plants do to help water quality on The Bay?
7. Why is the EPA's Chesapeake Bay Program being blamed for much of the problem?
8. Read what the Blue Plains Advanced Wastewater Treatment Plant has done since 2007 to improve its facilities. [<http://www.dewater.com/education/default.cfm>] What are three ways DC Water is meeting goals set in the Chesapeake Bay Agreement?
9. The Chesapeake Bay Foundation issues an annual *State of the Bay Report*. [Scientists look at 13 indicators of health in three main categories — pollution, habitat and fisheries.] Review the most recent report. In what areas have improvements taken place?
10. Find another source to update attempts to clean the Bay. In addition to indicating the source, give examples of successful projects. Which projects proved to be disappointing? Compare and contrast this source with the most recent *State of the Bay Report*.



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Tom Toles

November 23, 2012



1. Editorial cartoonists use very few words so the words they do use are important. What does the signage indicate?
2. Select two of the visual details on the west side of the cartoon. What do they illustrate?
 - a.
 - b.
3. To what does Tom Toles' alter ego, in the lower right corner, refer?
4. Editorial cartoons are visual commentary.
 - a. What issue does Toles address?
 - b. What is Toles' point of view on the issue?
5. Give the editorial cartoon a title.

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The Chesapeake Bay: *(Left side of graphic)*

You drive across it on the way to the beach, but have you ever thought about this amazing natural resource?'

The Chesapeake Bay

Problems

When European colonists arrived in the 1600s, they settled by the bay, fished the waters and cut down forests to clear land for farming. As cities grew and the human population increased, the bay became polluted and depleted.

AGRICULTURE

Farming without conservation practices can pollute the bay with

- **sediments** from fields plowed for row crops such as corn and from farm animals wading through streams,
- **nitrogen and phosphorus** from animal waste and fertilizers not used by crops,
- **germs** from farm animals,
- **pesticides and herbicides** used to kill bugs and weeds.

DEVELOPMENT

The building of suburbs on what was once farms and forests removes the trees and other plants that help keep the air and water clean. Rainwater runs quickly off **roads, roofs** and **parking lots**, eroding the land and carrying sediments and pollution into the bay. Wildlife habitats are broken up, and weedy, nonnative plants move in. Air pollution increases as people drive more.

AIR POLLUTION

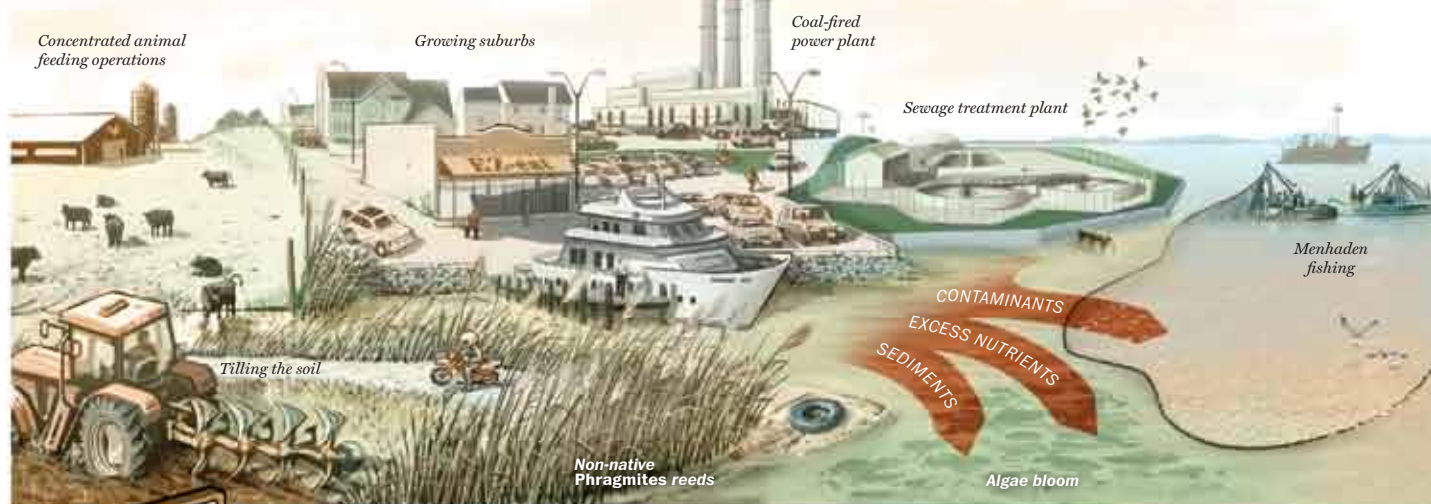
About a third of the nitrogen polluting the bay comes from chemicals in the air produced by **power plants, factories, motors** and **animal farms**. Pollutants dissolve in rain or snow or they fall directly into the bay. They also fall to the ground where they are washed into local waterways.

WASTEWATER

Although **sewage treatment plants** are effective at removing much of the nitrogen from wastewater, significant amounts of harmful nutrients still get into the bay, killing off plants and animals. Our vitamins and medicines can't be removed by the treatment plants and pass through the system into the bay.

FISHERIES

People love to eat the crabs, fish and oysters from the bay. But taking too many of them from the bay — that's called **overharvesting** — harms the balance of the bay's ecosystem. At one time, there were so many oysters that they could clean, or filter, the whole bay in a week. Fish such as **shad**, which used to migrate far upstream, are now few in number due to pollution, overfishing and dams that block spawning streams.



The ailing bay is challenged by increasing population and development, excessive pollution and sediment, overfishing and the major loss of forests and wetlands that once filtered water flowing into its rivers and streams. A bay with exhausted resources cannot sustain the jobs of people who make their living from the Chesapeake's fish, crabs and other resources.

Dead zones are caused by excess nutrients (nitrogen and phosphorus), which result in dense algae blooms, which block out sunlight and severely deplete oxygen dissolved in the water, making it deadly for bay life.

Excess sediments cloud the water, overwhelming oysters and making it difficult for underwater vegetation to grow. Without bay grasses, the water has less oxygen and young fish and crabs have nowhere to hide from predators.

Striped bass, or rockfish, though abundant in number, have recently been observed to be underweight, some having open sores. This may be because their favorite food, a small fish called **menhaden**, is being heavily fished in the lower bay.

Blue crabs seem abundant now, although scientists are still concerned about the numbers of females. Crabs need the safety of the bay's underwater grass beds as a hiding place when they are soft or young and vulnerable.

YOUR YARD

Mowing grass close to the ground reduces the ability of the ground to soak up and filter rainwater. Pesticides, fertilizers and pet waste eventually run off into the bay, creating a pollution problem. Gas mowers, weed whackers and leaf blowers release 10 times the pollution of a car running for the same amount of time.



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The Chesapeake Bay: *(Right side of graphic)*

You drive across it on the way to the beach, but have you ever really thought about this amazing natural resource?

Estuaries (where rivers meet oceans) are some of the most productive habitats. The Chesapeake is North America's largest estuary and the world's third-largest. • Half a billion pounds of seafood are harvested from the bay every year. • 150 rivers from six states and Washington, D.C., drain into the bay. • 17 million people live within the area drained by the bay. • On average, the bay is about 21 feet deep, but a deep channel runs through the middle — the trace of a prehistoric Susquehanna River. • Native Americans called the bay "Tschiswapeki," or "great shellfish bay." • The bay is 200 miles long and, at its widest, 30 miles across. • It holds 15 trillion gallons of water.

Solutions

The bay was at its sickest in the 1980s. About 80 percent of its underwater grasses had disappeared and 98 percent of its oysters were gone. Since then, environmental laws and efforts to restore the bay's health are slowly improving its chances.

FISHERIES

Biologists are trying to help oysters return to the bay with **hatcheries** that introduce young oysters to the bay. Limits have been set on the harvest of menhaden, a fish that eats plankton (filtering the bay like oysters do) and is itself eaten by bigger fish. Blue crab numbers have improved dramatically due to regulations on the harvest of female crabs.

+ HOW YOU CAN HELP

- Stay out of bay-grass beds in shallow waters.
- Avoid using lawn fertilizers.
- Use proper catch-and-release fishing methods.

WASTEWATER

Sewage treatment plants are gradually upgrading by adding extra steps to their **nutrient-removal** process.

- Compost your kitchen scraps, rather than sending them down the disposal.
- Don't pour chemicals and medicines down the drain. Use natural cleansers.
- Reduce your wastewater by taking shorter showers. Flush the toilet less often, following this rule:

*If it's yellow, let it mellow.
If it's brown, flush it down.*

AIR POLLUTION

Clean, **alternative energy sources**, such as wind and solar power, are more available.

- Turn off TVs, lights and computers.
- Travel by bike, walk or take public transportation.
- Encourage your parents to use energy-efficient vehicles.
- Get your school to become a "green school."

DEVELOPMENT

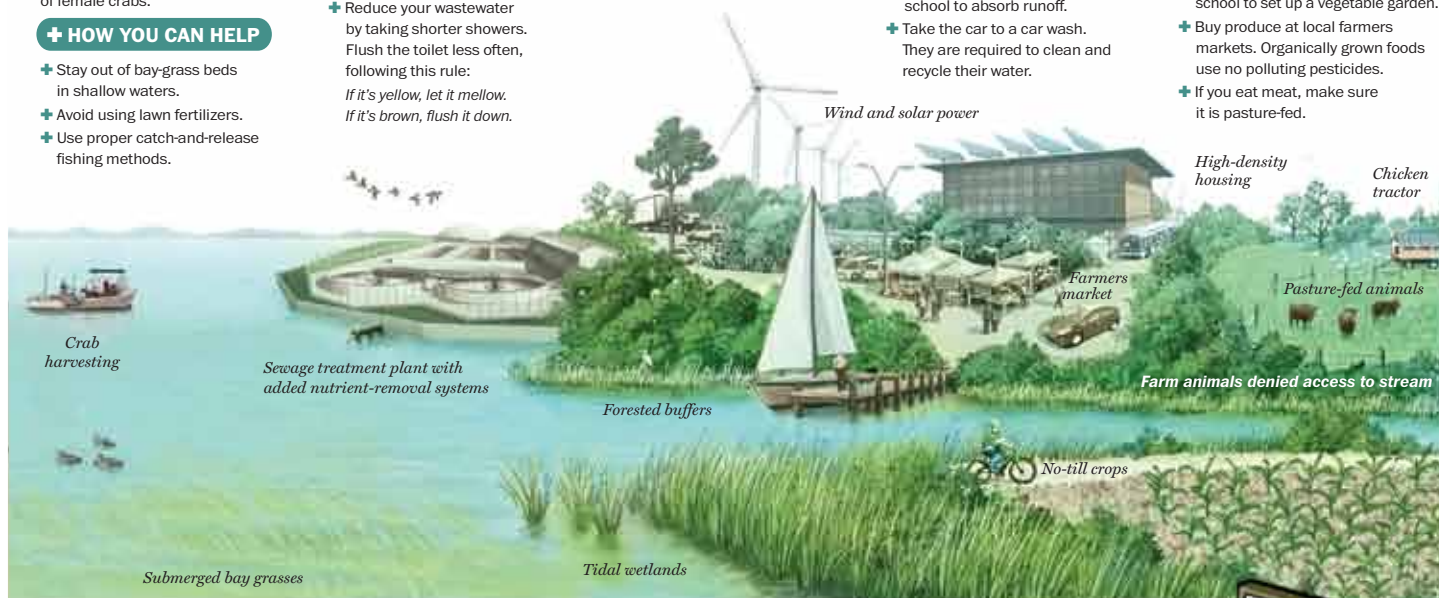
Living close to work or school reduces air pollution (less driving). Runoff is reduced by using **green roofs, pavement that lets water through and rain gardens.**

- Get your family or school to build a "rain garden" that captures runoff from downspouts, keeping it out of storm drains and creeks.
- Plant more plants at home or school to absorb runoff.
- Take the car to a car wash. They are required to clean and recycle their water.

AGRICULTURE

Well-managed farms are excellent filters, soaking up rainwater like a sponge and filtering out sediments and pollutants. Crops can be grown **without plowing the soil**. Farm animals **rotated** through a series of pastures allow grazed lands to recover quickly.

- Find out where your food comes from and how it is raised. Get your school to set up a vegetable garden.
- Buy produce at local farmers markets. Organically grown foods use no polluting pesticides.
- If you eat meat, make sure it is pasture-fed.



A healthy bay would be filled with clean, clear water supporting a food web that begins with plankton (plant and animal microorganisms) that sustains small fish and invertebrates, which are eaten by larger fish preyed upon by birds and mammals. A balanced ecosystem and sustainable fishing industry could support people for generations to come.

Oyster reefs provide habitat for fish, crabs and small invertebrates. Each oyster can filter about 50 gallons of water a day, cleaning the bay.

Menhaden

Striped bass

Bay grasses reduce shoreline erosion, provide oxygen to the water, collect sediment and create protective cover for young fish, crabs and shrimp.



YOUR YARD

- Skip the fertilizer and learn to enjoy a few weeds in the lawn. Some, such as clover, are good for the soil.
- Compost your leaves.
- Mow high with a push mower to allow grass to build a better root system that will absorb and filter water.
- Plant native plants.
- Pick up after your pet.

The Chesapeake Bay: Problems and Solutions



Use of Color

Problems

Problems

When European colonists arrived in the 1600s, they settled by the bay, fished the waters and cut down forests to clear land for farming. As cities grew and the human population increased, the bay became polluted and depleted.

AGRICULTURE
Farming without conservation practices can pollute the bay with **sediment** from fields plowed by new crops such as corn and from farm animals feeding through manure.

SEWAGE TREATMENT
The building of suburbs on what was once farms and forests increases the taxes and other costs that help keep the air and water clean. Rainwater runs quickly off **roads, roofs** and **parking lots**, pouring the dirt.

AIR POLLUTION
About a third of the nitrogen polluting the bay comes from **emissions** in the air produced by **power plants, factories, vehicles** and **animal farms**. Pollutants stick to rain or snow as they fall directly into the bay. They also fall

WASTEWATER
Although **sewage treatment plants** are effective at removing much of the nitrogen from wastewater, agricultural practices of harmful nutrients still get into the bay, killing off plants and animals that absorb and

FISHING
People have to eat the crabs, fish and oysters from the bay. But taking too many of them from the bay shifts the **ecosystem's balance** — it's called **overfishing** — and the bay's ecosystem. As one fish, there were so many eating that they

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Use of Topography

Problems

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Menhaden

Striped bass

Use of Illustrations

Problems

Problems

Solutions

Name _____ Date _____

The Chesapeake Bay: Problems and Solutions

Understanding Content – Problems

Understanding Content — Solutions

The Chesapeake Bay

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| AGRICULTURE | DEVELOPMENT | AIR POLLUTION | WASTEWATER | FISHERIES |
|--|--|---|---|---|
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If it's brown, flush it down.

AIR POLLUTION

Clean, **alternative energy sources**, such as wind and solar power, are more available.

- Turn off TVs, lights and computers.
- Travel by bike, walk or take public transportation.
- Encourage your parents to use energy-efficient vehicles.
- Get your school to become a "green school."

DEVELOPMENT

Living close to work or school reduces air pollution (less driving). Runoff is reduced by using **green roofs, pavement that lets water through** and **rain gardens**.

- Get your family or school to build a "rain garden" that captures runoff from downspouts, keeping it out of storm drains and creeks.
- Plant more plants at home or school to absorb runoff.
- Take the car to a car wash. They are required to clean and recycle their water.

AGRICULTURE

Well-managed farms are excellent filters, soaking up rainwater like a sponge and filtering out sediments and pollutants. Crops can be grown **without plowing the soil**. Farm animals **rotated** through a series of pastures allow grazed lands to recover quickly.

- Find out where your food comes from and how it is raised. Get your school to set up a vegetable garden.
- Buy produce at local farmers markets. Organically grown foods use no polluting pesticides.
- If you eat meat, make sure it is pasture-fed.

Wind and solar power



A healthy bay would be filled with clean, clear water supporting a food web that begins with plankton (plant and animal microorganisms) that sustains small fish and invertebrates, which are eaten by larger fish preyed upon by birds and mammals. A balanced ecosystem and sustainable fishing industry could support people for generations to come.

Oyster reefs provide habitat for fish, crabs and small invertebrates. Each oyster can filter about 50 gallons of water a day, cleaning the bay.

Menhaden

Striped bass

Bay grasses reduce shoreline erosion, provide oxygen to the water, collect sediment and create protective cover for young fish, crabs and shrimp.

YOUR YARD

- Skip the fertilizer and learn to enjoy a few weeds in the lawn. Some, such as clover, are good for the soil.
- Compost your leaves.
- Mow high with a push mower to allow grass to build a better root system that will absorb and filter water.
- Plant native plants.
- Pick up after your pet.

