

## CLEANING UP THE CHESAPEAKE

Before sunrise on Chesapeake Bay, some 4,300 watermen are already offshore in their boats—raising crab pots near Annapolis, hauling nets near Solomons, dredging up mollusks off Tilghman Island. Since the 19th century—the heyday of Bay fishing—Chesapeake watermen have supplied U.S. markets with up to half the annual harvest of oysters, clams, and blue crabs.

Lately the catch is getting skimpy. This year, oystermen will bring fewer than one million bushels to market, compared to 12 million in 1880. Rockfish and shad are so scarce that fishing for them in Maryland waters is now illegal.

The culprits are overharvesting and pollution. Today, the “queen” of America’s estuaries is an ecosystem in decline.

The Chesapeake is big. Its watershed covers 64,000 square miles; it stretches 200 miles from Norfolk, Virginia, to the mouth of the Susquehanna River, and has 4,600 miles of shoreline. The Susquehanna, Potomac, James, and four other major rivers (plus 150 lesser tributaries) feed the estuary, where fresh waters mix with Atlantic tides. Though shallow, the Bay has a deep central channel that serves large ships.

But population growth has put a big strain on the Chesapeake. Today, 12.7 million people live on its watershed, up from 3.7 million in 1940. Some 200 major sewage treatment plants spew 1.6 billion gallons of phosphorus- and nitrogen-laden waste water into the Bay each day. Local



factories—e.g., steel and plastics—spill toxins and heavy metals (lead, zinc) into its waters. Rainwater run-off from soybean and tobacco fields washes pesticides and fertilizers into its tributaries.

One result of this pollution is a nutrient-rich broth that sustains “algal blooms.” Microorganisms cloud the water, block sunlight, and steal oxygen (creating “anoxia”), killing rooted underwater plants and bottom-dwelling organisms such as oysters. Meanwhile, near industrialized areas such as Baltimore, heavy metals poison the food chain, and pesticides and toxins collect in crustaceans and fish. Due to the Bay’s shape and sluggish circulation, only a small fraction of the pollution flows out into the Atlantic.

In 1983, Virginia, Maryland, Pennsylvania, and the District of Columbia launched their own

cleanup efforts—amounting to \$47 million per year. To reduce run-off, the states are stressing “no-till” farming; to lower waste discharges, they are cracking down on “point-sources”—notably treatment plants and factories. Maryland and Virginia recently banned the sale of products containing phosphates; Annapolis is regulating Maryland’s shoreline development.

Since 1983, U.S. agencies have spent roughly \$690 million in the Bay area on sewage treatment plants. Recently, Maryland began installing overdue nitrogen controls at two treatment plants, after studies by marine biologists proved sewage-borne nitrogen could be more harmful than phosphorus is to the Bay’s health.

The cleanup has made some progress: Between 1980 and 1983, the Bay’s annual phosphorus load fell nearly 20 percent, although no one knows how much phosphorus remains in the Bay’s sediments. In Maryland’s Anne Arundel County, only four creeks among hundreds are closed for health reasons. But other signs are not as encouraging. Of Maryland’s sewage treatment plants, 30 percent exceed their discharge limits. Overall, rapid suburban, urban, and industrial development is outstripping conservation efforts.

Trying to clean up the Bay, says William C. Baker, president of the Chesapeake Bay Foundation, is “like rowing three knots against a four-knot current.”

### THREE AFFLICTIONS OF THE CHESAPEAKE

The Chesapeake Bay supports an intricate web of life: Animals, plants, and insects must coexist under proper soil, water, and weather conditions. Otherwise, the ecosystem begins to break down.

Man is the chief threat to the Bay's health, as he is elsewhere. Because of extensive sewage dumping and run-off from city streets and farmlands, the Bay, in parts, has become too rich in phosphorus and nitrogen. Feeding on these nutrients, phytoplankton are breeding out of control, and mottling the waters.

Not only do these microorganisms steal oxygen from the water (especially when they decay), but they also block sunlight from rooted underwater plants. Since 1950, the amount of the Bay's water showing "anoxia" (no dissolved oxygen) during the summer months has increased 15-fold. Today, much of the water below 40 feet is anoxic from mid-May through September, along a stretch reaching from the Bay Bridge to the mouth of the Rappahannock River [see Figure 1]. Anoxic waters are especially lethal to "benthic" organisms, such as clams and oysters.

Mainly because of lost sunlight and herbicide run-off from farms, 10 species of "submerged aquatic vegetation" (SAV)—e.g., coontail, water nymph, widgeongrass, and horned pondweed—have been steadily dying off. SAV now occupies only 25 percent of the area it did two decades ago [see Figure 2]. The loss of these underwater plants has upset the Bay's ecological balance, since they provide habitats and spawning grounds for many fish and shellfish, as well as food for waterfowl. SAV also cleanses and reoxygenates the Bay's sometimes stagnant waters.

Compounding these troubles, the sediments on the Bay's bottom, close to heavily industrialized Baltimore and Norfolk, are tainted with high levels of toxins, pesticides, and metals. In Baltimore Harbor, some 480 toxic compounds have been detected. Many of the metals (e.g., cadmium, chromium, copper, iron, zinc, and lead) first enter the James, Potomac, and Susquehanna rivers before going into the Bay. In modest quantities, such metals are not harmful; but when their concentrations become too high, as they now are in certain Bay waters [see Figure 3], they can be hazardous to marine life and human beings.

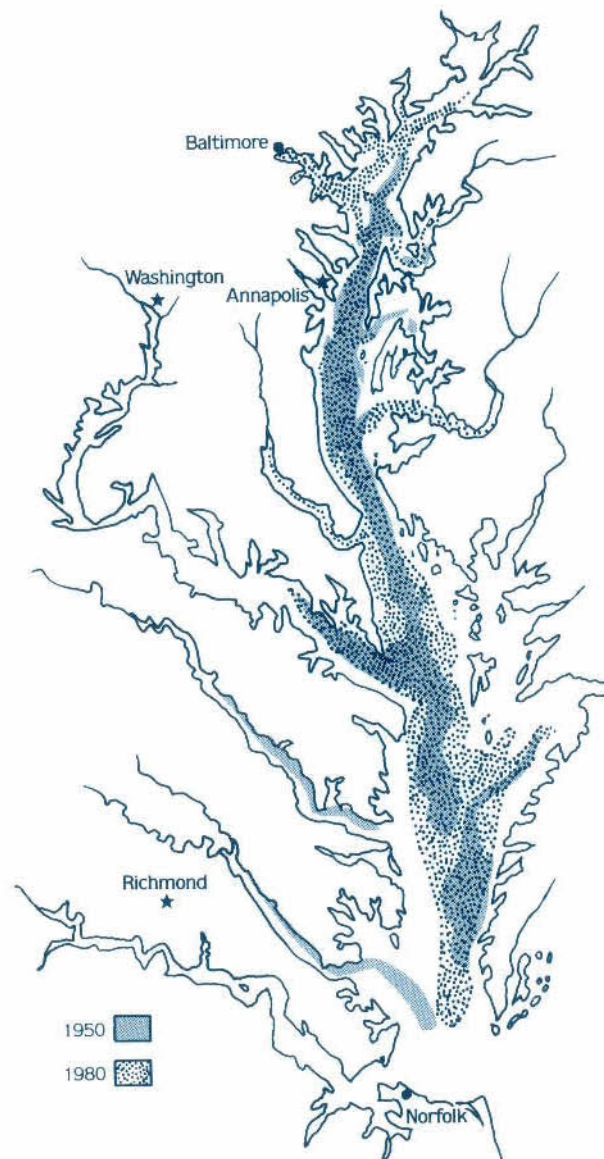


Fig. 1: Areas of the Bay with little or no dissolved oxygen in the water, 1950 vs. 1980.

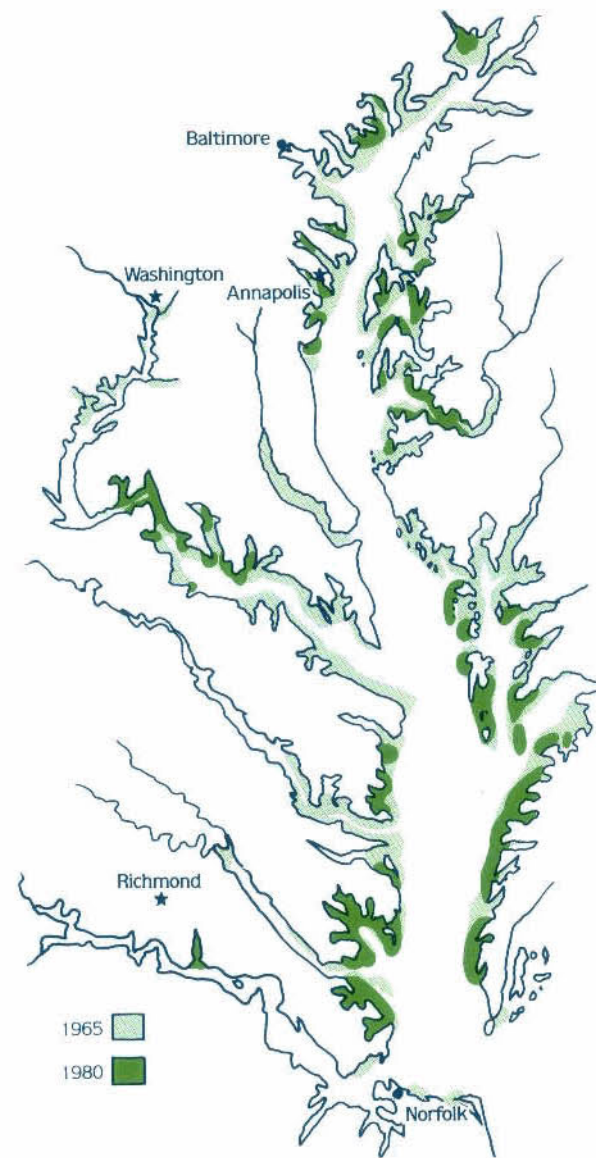


Fig. 2: Areas of the Bay where submerged aquatic vegetation still grows, 1965 vs. 1980.

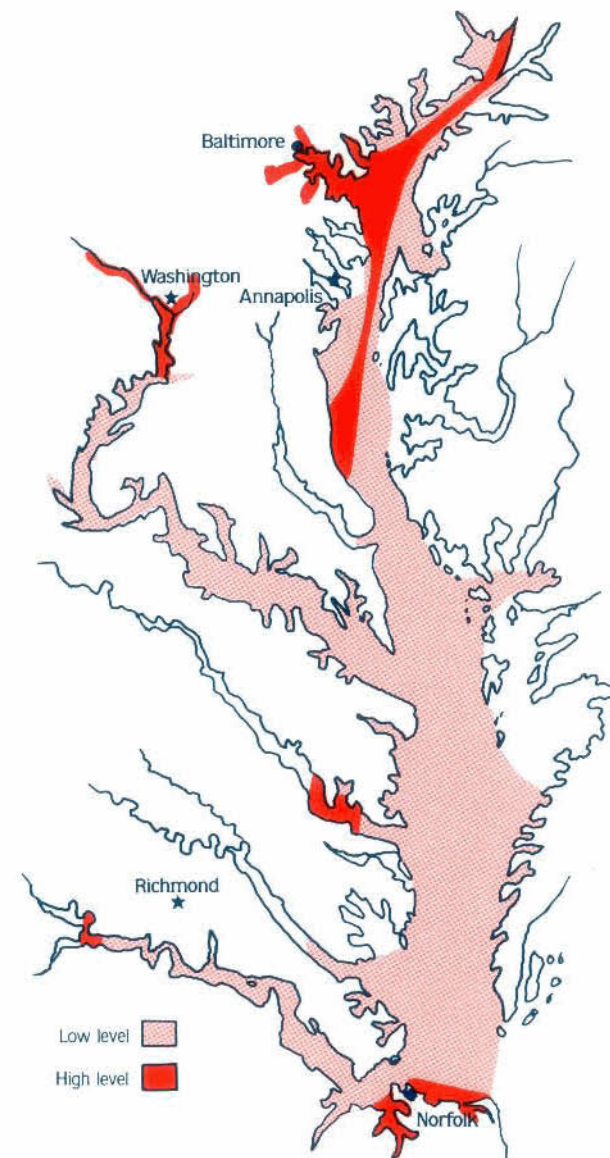
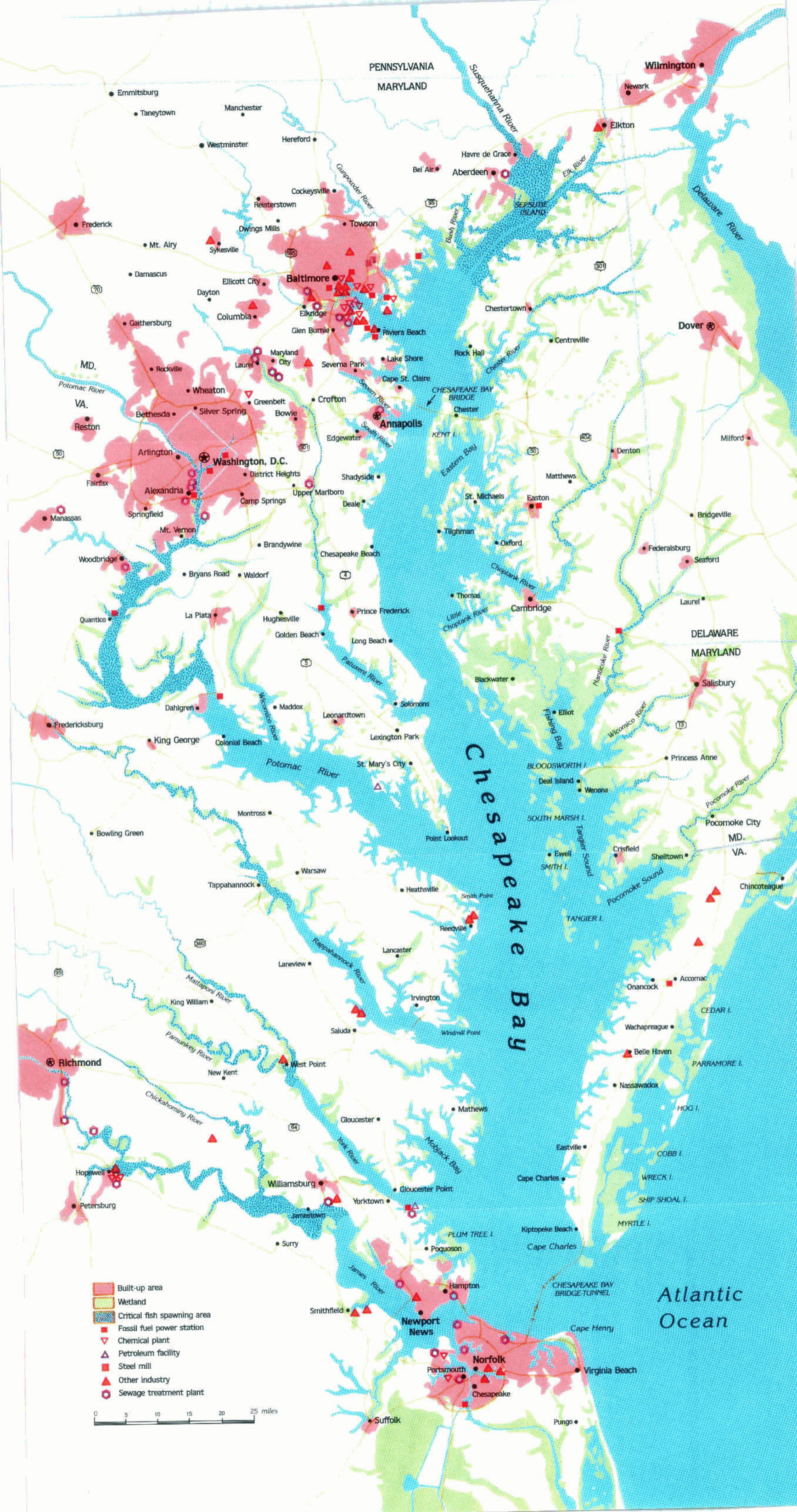


Fig. 3: Areas of the Bay now contaminated by metals, based on the EPA's contamination index.



PENNSYLVANIA  
MARYLAND

Wilmington  
Newark

Emmitsburg  
Taneytown  
Manchester  
Westminster  
Hereford

Susquehanna River  
Elkton  
Bel Air  
Aberdeen  
Havre de Grace  
Elix River

Delaware River

Frederick  
Mt. Airy  
Damascus  
Dayton  
Columbia

Gunpowder River  
Cockeysville  
Reisterstown  
Dwings Mills  
Towson  
Baltimore

SEPSLITE ISLAND  
Chestertown  
Centerville  
Chester River

Rockville  
Bethesda  
Silver Spring  
Greenbelt  
Bowie  
Arlington

Elkridge  
Glen Burnie  
Riviera Beach  
Lake Shore  
Cape St. Claire  
Annapolis

Chesapeake Bay Bridge  
Kent I.  
Eastern Bay  
St. Michaels  
Easton

Dover

Wheaton  
Washington, D.C.  
District Heights  
Camp Springs  
Upper Marlboro  
Shadyside  
Deale

Severna Park  
Crofton  
Edgewater  
Chesapeake Beach  
Prince Frederick  
Long Beach

Choptank River  
Little Choptank River  
Cambridge  
Thomas  
Tilghman  
Oxford

Milford  
Bridgeville  
Federalsburg  
Seaford

Reston  
Springfield  
Mt. Vernon  
Bryans Road  
Waldorf  
Quantico  
La Plata

Palmyra River  
Solomons  
Lexington Park  
St. Mary's City  
Point Lookout

Choptank River  
Fishing Bay  
Wicomico River  
Nantuxet River  
Princess Anne

DELAWARE  
MARYLAND

Fredericksburg  
King George  
Colonial Beach  
Montross  
Bowling Green

Palmyra River  
Leonardtown  
Solomons  
Lexington Park  
St. Mary's City  
Point Lookout

Choptank River  
Fishing Bay  
Wicomico River  
Nantuxet River  
Princess Anne

Salisbury

Fredericksburg  
King George  
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Princess Anne

Pocomoke Sound  
Chincoteague

Richmond  
Hopewell  
Petersburg

Williamsburg  
Yorktown  
Gloucester Point  
Yorktown  
Suffolk

James River  
Hampton  
Newport News  
Norfolk  
Portsmouth  
Chesapeake  
Virginia Beach  
Pungo

Atlantic Ocean

- Built-up area
- Wetland
- Critical fish spawning area
- Fossil fuel power station
- Chemical plant
- Petroleum facility
- Steel mill
- Other industry
- Sewage treatment plant



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people is a fundamental part of our environment.”

Reagan's stray remarks—e.g., “80 percent of air pollution comes not from chimneys and auto exhaust pipes, but from plants and trees”—hinted that he took a more radical view. But, as political scientist Michael E. Kraft later recalled, environmental issues were seldom discussed during the campaign; none of Reagan's statements point “with any clarity to a well-defined environmental policy agenda.”

As William Ruckelshaus was to note, the new administration misinterpreted Reagan's stunning 44-state electoral sweep in 1980. The White House mistook the public's apparent wish to streamline environmental regulations for a desire to change course altogether.

Taking office in January 1981, Reagan chose a conservative activist, James Watt of Colorado, as secretary of the interior. He picked a little-known Watt protégée, former Colorado state legislator Anne Gorsuch (later, Burford), to head the EPA. As president of the Denver-based Mountain States Legal Foundation, Watt had spearheaded the Sagebrush Rebellion's courtroom attacks against restrictions on the uses of federally owned lands in the West.

In Washington, the abrasive new secretary of the interior pledged to “unlock” more than 500 million acres of protected federal lands to ranchers, coal miners, and loggers, and to lease up to one billion acres of offshore tracts for oil exploration. To promote “administrative efficiency,” Gorsuch slashed \$300 million from the EPA's \$1.3 billion budget, forced out dozens of senior staffers, and slowed the flow of new regulations and lawsuits against polluters to a trickle. In the *Washington Post*, Russell E. Train, EPA administrator under Nixon and Ford, deplored the EPA's “demoralization and institutional paralysis.” Gorsuch, he suspected, was actually trying to destroy the EPA.

### Washington's Green Giant

In March 1982, the leaders of 10 environmental and conservation groups—the so-called green lobby—issued a much-publicized 227-count “indictment” of the president. They charged that he had “broken faith with the American people” and “veered radically away from the broad bipartisan consensus” in favor of strict environmental protection.

Many Americans seemed to agree. The actions of Watt and Burford revived the sagging fortunes of the National Audubon Society, the Environmental Defense Fund, and their allies. The Sierra Club's membership nearly tripled (reaching 310,000) during the two years after Reagan's election. (All told, the national organizations claimed more than five million members.) Opinion surveys showed that public sentiment in favor of environmental regulation “regardless of cost” was soaring—hitting 58 percent by 1983.

In 1981, lobbying on Capitol Hill, a coalition of Washington-based groups scuttled Reagan-backed efforts to eviscerate the Clean Air and

### WHO WILL STOP THE RAIN?

"Right as rain" and "pure as the driven snow" are the expressions of a sweeter, bygone era, laments Harvard's Roy Gould. "Now the storms that sweep across eastern North America carry an acid rain—a rain gone sour."

The debate over the nature and menace of acid rain—what former Environmental Protection Agency (EPA) administrator William D. Ruckelshaus calls "the most difficult, complex public policy issue" of his career—is flavored by all the rhetorical excesses (on both sides) of an earlier era. It has also divided scientists, deadlocked Congress, embarrassed the Reagan White House, and strained U.S. ties with the conservative government of Canada's Prime Minister Brian Mulroney. "You can't continue to dump on us the garbage that you are producing on your own property," warned Canada's former environment minister, Charles Caccia.

A decade ago, few Americans had heard of acid rain. It was a local phenomenon, barely noticed until long after Congress passed the Clean Air Act in 1970. In response to the act's strict local air quality standards, utility companies in the industrial Midwest built "tall stacks" (up to 1,200 feet) to shoot soot and smoke high into the air, where it would be swept away by the jet stream. By the end of the decade, scientists in upstate New York and in Ontario were puzzled by the gradual acidification and "death" of hundreds of freshwater lakes. They began to target the tall stacks after they learned that Scandinavian scientists had linked similar problems in Sweden to rising sulfur dioxide emissions from the factories of Great Britain and Central Europe.

In 1984, Sweden persuaded nine other nations to join a "30 Percent Club," whose members pledged to cut their sulfur dioxide output by almost one-third within 10 years. Notable nonmembers: the United States and Great Britain.

President Reagan has been reluctant to endorse sweeping controls. Instead, he has proposed a five-year, \$2.5 billion research effort, even though most researchers (including Reagan's own blue-ribbon advisory panel) agree that coal-burning industrial plants are the chief source of the problem. But then uncertainty sets in. Is acid rain responsible for all of the ills blamed on it? The charges, says the Hudson Institute's William M. Brown, range "from reasonably convincing to far-fetched."

Endangered Species acts. When Watt attempted to win congressional approval of oil and gas leasing in some federal wilderness areas after the year 2000, the "green lobby" persuaded the House of Representatives to vote overwhelmingly for a perpetual ban on such leasing. The Senate demurred, but Watt nevertheless had to retreat. Washington, said *Fortune*, was "in the grip of the Green Giant."

But even Ronald Reagan showed little grief when Burford and Watt were forced to resign in 1983. Burford departed under a cloud after being cited for contempt for refusing to release documents to a congressional committee investigating EPA mismanagement of the Superfund.

Scientists have pinned the blame firmly on acid rain for the "death" of some 400 alpine lakes in New York's Adirondack Mountains. These "dead" lakes are now as acid as vinegar, devoid of plant life, trout, bass, and many bacteria. From the air, the lake surfaces are an unnaturally beautiful shade of blue, "like flowers at a funeral," as one naturalist expressed it. Lakes in Vermont, New Hampshire, and Ontario are probably also victims of acid rain.

But environmentalists have also contended, less plausibly, that acid rain is stunting or killing off forests, corroding city skyscrapers and other structures to the tune of \$5 billion annually in damage, and driving 50,000 to 200,000 Americans with respiratory ailments to early graves.

Congress seems eager to do *something*, but the peculiar politics of acid rain has tied lawmakers in knots.

An obvious solution to the acid rain problem would be to have utility companies use low-sulfur Western coal. But that would cost some 30,000 coal mining jobs in the Eastern high-sulfur coal mines that now supply the Midwestern utilities. Congress could require all existing utilities to install smokestack "scrubbers"—at a cost of \$100 million to \$300 million apiece—but who would pay? The Edison Electric Institute claims that some consumers might see their electricity bills jump by 50 percent. Proposals for various national acid rain "taxes" also founder: Why should Georgia pay to clean up the Midwest's dirty utility plants and the Northeast's lakes?

Any remedy is expensive. The price for U.S. membership in the 30 Percent Club would be high: \$10 to \$20 billion, or up to "\$6,000 per pound of fish" saved, in the pithy summary of former budget director David Stockman.

Science provides no easy answers to the cost-benefit quandary. "The benefits of a properly functioning ecosystem are much more than matters of dollars and cents," concluded President Reagan's advisory panel in 1983. Only one thing is certain. If Washington delays, and if acid rain is as destructive as many specialists suspect, it may never be possible to correct the damage.



*Mulroney and Reagan*

Watt was tripped up by his own offhand remarks about the "balanced" makeup of an Interior Department advisory commission. The panel, he said, included "a black . . . a woman, two Jews, and a cripple."

When Reagan put William Ruckelshaus back at the helm of the EPA, and a Reagan confidant, William P. Clark, at the Department of the Interior, the storm over environmental policy suddenly ended. The *status quo ante* was restored. In 1984, even a Sierra Club "report card" awarded Ruckelshaus "a gentleman's 'C.'"

Perhaps the most significant legacy of the Reagan years may be the complete absence of any fresh regulatory initiatives. Reagan's election

wrote *finis* to the exuberance of the "environmental decade." "The major role of the Reaganites," concluded Samuel P. Hays, "was to retard or halt emerging action on such matters as acid rain, toxic air emissions, indoor air pollution, and hazardous waste."

Reagan's "wrecking ball," as environmentalists termed it, never did much permanent damage. "Deregulation" did not progress very far at the EPA, though Reagan has carried forward some reforms (e.g., a requirement that all new regulations pass a cost-benefit test) planned by the Carter administration.

Seventeen years after Earth Day, on the eve of a presidential election year, virtually none of the ambitious goals set by Capitol Hill during the "environmental decade" have been met. The nation's air quality remains spotty at best; its rivers and streams are, with a few happy exceptions, little cleaner than they were in 1970.

A few dangerous toxic chemicals, such as 2, 4, 5-T and EDB, have been identified and banned, but thousands more have not even been studied. Ironically, the clearest gains have been recorded in the area of traditional conservation: Congress, for example, has nearly tripled the size of the National Park System since 1970, mostly by the addition of lands in Alaska (in 1980). Private groups have bought and preserved wetlands and wildlife reservations.

Yet, by any conceivable measure, the outlook for the nation's environment is far brighter than it was in 1970—if only because Americans, by all accounts, are now firmly committed to curbing *additional* despoilation of the air, land, and water. The nation's overreaction to the much publicized environmental "crisis" of the early 1970s may have been a necessary spur to awareness; the Reagan "counter-revolution" was an overreaction to the excesses of environmentalism.

Next on the environmentalist agenda are, among other items, control of acid rain and indoor "air pollution," and tighter regulation of toxic wastes and air pollutants (the Clean Air Act is due for revision by next year). As the nation seeks continued improvement in the quality of the environment, its politicians must find rational ways to accommodate scientific realities, ideological visions, and the needs of the economy.

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