



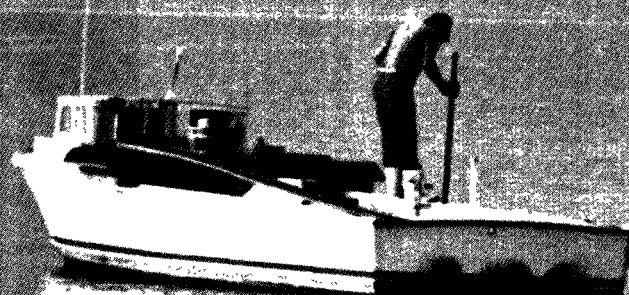
Cleaning Up of the Chesapeake Bay

The Federal Role

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U.S. Environmental Protection Agency
Region III Information Resource
Center (3PM52)
841 Chestnut Street
Philadelphia, PA 19107

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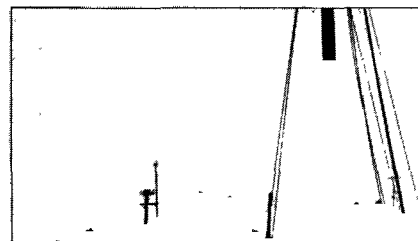
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A National Treasure

The Chesapeake Bay is the country's largest estuary, but it is not size alone that makes the Chesapeake a national treasure. Despite more than three centuries of increasingly intensive use, the Chesapeake Bay is still a rich source of oysters, soft-shell clams, and fin-fish and continues to be the world's largest producer of blue crabs. The Bay provides a huge habitat for waterfowl and other wildlife, serves as a key commercial waterway, and offers an almost endless array of recreational pursuits on the water and along its shores.

Time has taught, however, that this wonder of nature has been wounded by the works of man. Persistent symptoms of environmental decline loom like the dark clouds of an oncoming summer squall over the future of the Bay. Oyster yields are less than half those of the early 1970s. Dwindling populations of rockfish have prompted moratoriums in Maryland and Virginia. Perch also are protected in Maryland waters because of their increasing scarcity. Underwater grasses that offer food and shelter to both fowl and fish have disappeared in many reaches of the Bay.

The people and the governments of the Chesapeake Bay watershed are not conceding that this wondrous waterway is beyond environmental salvation, however. Public and

private agencies are joined in a long-term effort to restore and protect the Bay and its tributaries. The U.S. Environmental Protection Agency (EPA) has had a key role in this rescue operation from the beginning.

Congress directed EPA in 1975 to undertake a comprehensive investigation into the causes of the estuary's decline. This study was carried out over the next seven years at a cost of \$27 million.

EPA's research findings and recommended remedies led to the signing of the 1983 Chesapeake Bay Agreement, forging the first links in what has become an enduring commitment to the restoration of the Chesapeake among Maryland, Pennsylvania, Virginia, the District of Columbia, the Chesapeake Bay Commission, and EPA.

A second Agreement, signed in December 1987, goes well beyond the original compact, establishing major objectives and specific commitments for action to achieve the overall goals of the Chesapeake Bay Program.

Both the federal Clean Water Act and the 1987 Agreement give EPA a continuing role in the Chesapeake Bay Program. Nine other federal agencies also are active participants in the restoration effort.





What's Wrong with the Bay?

The Chesapeake Bay basin is a giant, 64,000-square-mile ecosystem that defies simple cause-and-effect equations. The EPA study of the Bay focused on three key areas: nutrient enrichment, toxic contamination, and a decline in submerged aquatic vegetation (SAV). These are still primary areas of concern for the Bay Program as a whole.

Nutrient Enrichment. Nitrogen and phosphorus are essential elements in the Bay's productivity but in excess they lead to the low levels of dissolved oxygen that periodically threaten the survival of fish and shellfish in parts of the estuary, especially in the hot summer months. Sewage treatment plants, animal manures, and chemical fertilizers used on farmland, lawns and gardens feed nutrients to the Bay. The overabundance triggers dense growths of algae that block off sunlight needed by underwater plants. When these algae die and sink to the bottom, they consume precious oxygen as they decompose, further handicapping the survival of other species of life in the Bay.

The 1987 Bay Agreement calls for a 40 percent reduction by the year 2000 in nitrogen and phosphorus reaching the Bay. Computer modeling shows that reductions of this

magnitude will achieve a significant improvement in oxygen levels in many areas of the Bay.

Toxic Contamination. Literally thousands of toxic substances reach the Bay in wastewater discharges from industrial and municipal treatment plants, in runoff from fields and urban areas, and in groundwater that reaches streams and the Bay. During the EPA study of the Bay, researchers found high concentrations of toxic metals and organic compounds in industrialized areas such as the Elizabeth and Patapsco rivers, and metal contamination in sediments in the upper Potomac, the upper James, sections of the Rappahannock and York rivers, and in some mid-Bay areas.

The significance of toxic contamination for the Bay as a whole is not well understood, however. The basinwide toxics reduction strategy adopted under the 1987 Bay Agreement emphasizes action to correct known problems while more information on the distribution and concentrations of other contaminants is gathered through monitoring and research. A Toxics Loading Inventory is being developed as a tool to identify major sources of toxic contamination and provide



a practical measure of progress in achieving reductions. The long-term goal of the strategy is a toxics-free Bay. By the year 2000, discharges are to be reduced to levels that ensure no toxic or bioaccumulative effects on life in the Bay or on human health.

Submerged Aquatic Vegetation. Unlike toxics and nutrient enrichment, SAV is an environmental asset to be conserved rather than a contaminant to be controlled. SAV functions as a critical link among the different levels of the Bay food web and the physical environment. It provides food and habitat for fish and fowl. More than any other single group of organisms, SAV provides a biological index of the health of the Bay's shallow

waters. The sharp decline of SAV throughout the Bay, especially in its upper reaches, was one of the early indications that the estuary was in trouble.

EPA's research study concluded that nutrient enrichment was the primary factor in the decline of SAV beds in the Bay. By fueling the growth of algae, nutrients cause a decrease in water clarity and an increase in the number of organisms that grow on the leaves of the plants. Both of these responses, in turn, cause a decrease in life-giving light available to the vegetation. Suspended sediments also block light, contributing to the decline of SAV.

What's Being Done to Save the Bay?

Along with the control of nutrients and toxics, the 1987 Bay Agreement calls for action on many other fronts to safeguard living resources, to protect tidal and non-tidal wetlands, to broaden the participation of local governments and the public in the restoration program, to strengthen efforts to manage population growth and development, and to begin or continue dozens of other activities that will contribute to the preservation and protection of the Bay.

Implementation of the Agreement is building on the progress already achieved in the past decade. Millions of dollars have been invested in improved treatment of sewage and industrial wastes. Thousands of farmers have put into practice "best management practices" to keep animal wastes, chemical fertilizers, and toxic pesticides from the waters of the Chesapeake system. Builders have accepted as standard practice the use of techniques to prevent erosion of construction sites that sends sediment into streams and the Bay.

These steps are encouraging, but the challenging agenda set forth in the Bay



Agreement demonstrates that the restoration program has far to go. Decades of environmental abuse and over-use of the Bay are not readily reversed. Population growth in the watershed (an overall 20 percent increase projected by the year 2020) will add considerably to the environmental stress on the Bay and challenge and test the will and commitment of governments and the public for years to come.

Role of the Federal Government

EPA established a Chesapeake Bay Liaison Office in Annapolis in 1984 to coordinate cleanup initiatives of federal and state agencies. Amendments to the Clean Water Act enacted in 1987 made maintenance of the Liaison Office a matter of law and directed the agency to continue its ongoing assessment and reporting on Bay problems. The 1987 legislation also authorized EPA to spend up to \$13 million a year on Bay activities, with most of that money going into matching grants that help fund state programs.

Through its Liaison Office, EPA provides administrative and technical support to the network of regional committees, subcommittees and work groups that runs the Bay Program under the overall direction of the Chesapeake Executive Council. Under the terms of the 1987 Agreement, the Administrator of EPA represents the federal government on the Council. The other Council members are the governors of Pennsylvania, Maryland and Virginia, the mayor of the District of Columbia, and the chairman of the Chesapeake Bay Commission.

Along with other support activities, EPA's Liaison Office maintains a computer center for the entire Bay Program. Information gathered from monitoring stations up and down the Bay and along its major tributaries is reviewed, processed, and analyzed at the center. Monitoring data also are used in building mathematical models used to estimate pollution loads and project the impact on Bay water quality of various control alternatives.

EPA has supported public information, education and participation activities in the Bay basin since 1977 through grants to the Alliance for the Chesapeake Bay, a non-profit federation of citizen groups, business enterprises and other organizations active since 1971 in stimulating support for the preservation of the Bay. Since 1984, these grants also have funded the Alliance's citizen monitoring program along selected tribu-

taries and administrative support for the Chesapeake Executive Council's Citizen Advisory Committee (CAC).

The CAC had a significant role in the development and public review of the 1987 Bay Agreement and continues to provide a cross-section of citizen opinion on restoration plans and policies.

EPA also funds the program's Scientific and Technical Advisory Committee and a new panel, the Local Government Advisory Committee, which was formed in 1988 to carry out an Agreement commitment aimed at broadening participation in the program among Bay basin governing bodies.

EPA's national environmental programs—including Superfund, hazardous waste management requirements, ground water protection, wastewater treatment regulations, and air quality standards—also contribute to the protection of the Bay.

Other federal agencies cooperate in the Bay Program, generally working under formal written agreements with EPA. Their Bay-related programs reach every part of the watershed. Participating agencies include the Soil Conservation Service, Forest Service, Agricultural Stabilization and Conservation Service, and Cooperative Extension Service of the Department of Agriculture; the Fish and Wildlife Service and the Geological Survey, Department of the Interior; the National Oceanic and Atmospheric Administration, Department of Commerce; the Department of Defense and, under a separate agreement, the Army and its Corps of Engineers. Interior's National Park Service and the National Highway Administration and Coast Guard in the Department of Transportation also participate in the Bay Program but have not entered into formal agreements with EPA.

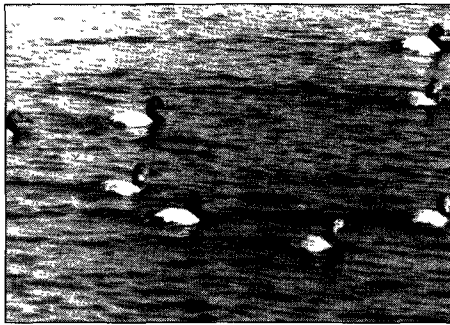
The roles these agencies play in the Bay Program are as varied as the programs they administer. Here's a sampling of the federal

activities under way in support of the restoration of the Bay:

Fish and Wildlife Service. FWS efforts focus on the living resources of the Bay and their habitat. The agency's wide-ranging research program includes studies of migratory birds, nutrient dynamics, contaminants and submerged aquatic vegetation (SAV). Its SAV program also includes monitoring, transplanting, field guide development and education.

Working with Maryland and Virginia, FWS has raised, tagged and released more than 1,000,000 striped bass since 1985 as part of the program to restore this traditional fishery.

The agency spends about \$1 million a year on restoration and protection activities and related public education and information projects.



Soil Conservation Service. SCS was the first Agriculture Department agency to become an active partner in the Bay program. Working through state and local soil and water conservation districts, SCS provides technical and financial assistance to individual farmers and public and private organizations.

The agency has assigned 31 people and budgeted more than \$1 million a year to a special Bay support effort, supplementing a staff of more than 200 people and an annual allocation of \$12.5 million for ongoing programs directly related to water quality in the Bay watershed.

SCS provides technical expertise to train state and local conservation staffs and to develop standards, specifications and guide-

lines for agricultural practices that reduce amounts of nitrogen and phosphorus reaching the Bay. An SCS staff member has been assigned to EPA's Chesapeake Bay Liaison Office since 1984 to coordinate Agency activities Baywide. Another staff member assists with development of Bay computer models at the Liaison Office.



National Oceanic and Atmospheric Administration. NOAA's Estuarine Program Office spends about \$1.5 million annually on fisheries stock assessment, the improvement of fisheries statistics, oxygen depletion studies, data management and other programs specific to the Bay restoration.

Another \$2 million a year funds Bay-related research by NOAA Sea Grant programs in Maryland and Virginia. The Bay restoration also benefits from \$4 million a year NOAA channels to coastal resources programs of these two states and agency funding for research on shad, striped bass and river herring. NOAA also participates in Bay monitoring, modeling, and data management programs. A NOAA staff member works full time with Bay living resources programs.

Army Corps of Engineers. CoE has a lead role in the development of a new generation, time-variable computer model that will generate highly sophisticated projections of the effects population growth and alternative environmental actions would have upon the water quality of the Bay. Other Corps programs specific to the Bay include Hydrilla management in the Potomac River, an examination of the potential of reservoirs as a means of maintaining freshwater flows at



levels beneficial to estuarine habitats, and shoreline protection studies.

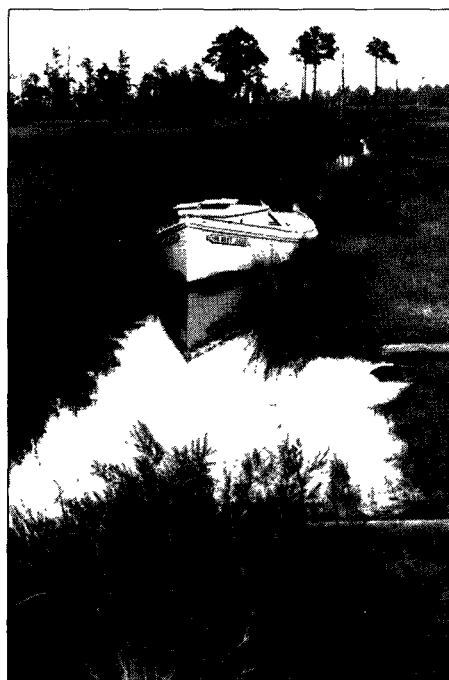
CoE exercises authority over dredge and fill proposals affecting wetlands, carries out research related to dredging and the use of dredged materials, and performs site specific and comprehensive water quality planning. The Corps is responsible for the design and construction of facilities for the Army, which has a number of major installations in the Bay watershed.

Department of Defense. DoD has an extensive program under way to carry out recommendations produced in a comprehensive study of its 66 Bay area installations and their potential to pollute. Remedial work is aimed at effective management of hazardous and toxic materials, increased monitoring of conventional and toxic pollutants, and systematic evaluations of pollutants reaching the Bay or tributaries in runoff from DoD facilities.

Other Bay-related Defense projects include cleanup of abandoned waste sites, upgrades of wastewater treatment plants, training of treatment plant operators, programs to preserve undeveloped lands, and the implementation of "best management practices" to protect wetlands, forests, and other natural resources.

Geological Survey. USGS regularly monitors water quality and flow volumes in major tributaries at the "fall line"—the boundary between the coastal plain and the piedmont region. These data help characterize and measure pollutants that come to the Bay from the upper parts of the watershed. The agency also is evaluating the results achieved from agricultural and urban "best management practices." USGS spends about \$1.4 million a year on Bay programs.

Forest Service. Bay programs of this newest member of the state/federal partnership will ensure a continuing focus on the major role trees can play in protecting and preserving shorelines and preventing pollutants from reaching streams and the Bay. The agency manages three national forests in the basin and provides financial and technical assistance to support forestry programs of states, municipalities and private land owners. The Service assigned a forester to the Bay Program in mid-1989 to foster closer coordination with related agencies.



The Course Ahead

"When will rockfish be plentiful again?" . . . "Will redhead ducks return to the Bay some day?" . . . "Are oyster harvests ever going to improve?" . . . "Will the shad come back?"

There are thousands of questions that could be asked about the future of the Bay—questions that environmental scientists simply cannot answer completely now.

Commitments written into the 1987 Agreement range over the gamut of concerns about the Bay and its tributaries, but there are still many unknowns in the environmental equation that defines the Bay ecosystem. The significance of toxic contamination Bay-wide is still a question mark. The long-term effectiveness of measures to control contaminants from farm fields, city pavements and other nonpoint sources has yet to be fully assessed. Changes achieved through cleanup actions must be sorted out from natural variations in water quality and fish and shellfish populations that occur from year to year.

Continued research, monitoring, and practical experience should in time make up much of the shortfall in current knowledge of the Bay system. But complete answers will



not come quickly. Meanwhile, the cleanup effort will pursue the course already charted on the basis of past research. There is no question, for example, that excess nutrients cause an overabundance of algae that rob other species of oxygen they must have to survive. And there is equal certainty that population growth in the watershed will make it all the harder to staunch the flow of nutrients to the Bay unless growth is carefully managed to control its impact on the environment. In short, restoration of the Bay is not so much a question of WHAT must be done but WHO will do it and HOW will the costs be paid.

Role of the Public

The Bay Agreement recognizes that the “understanding and support of the general public and interest groups are essential to sustaining the long-term commitment to the restoration and protection of the Chesapeake Bay system and its living resources.”

EPA’s funding support for the Alliance for the Chesapeake Bay is an important mechanism for offering Bay information to the public and bringing citizen comment and opinion to the government agencies involved in the cleanup.

In addition to its publications and sponsorship of workshops, conferences and other public meetings, the Alliance operates the Chesapeake Regional Information Service (CRIS), a toll-free telephone facility that offers up-to-date information on Bay Program events and topics over a wide range of Bay issues.

Other private organizations and public agencies throughout the Chesapeake basin also are active in providing information about the Bay Program and encouraging direct public participation in the restoration effort.

For More Information

There are many sources throughout the Chesapeake region where individuals or organizations can obtain publications, arrange for speakers, or get answers to questions about the restoration of the Bay.

For more information about the Bay Program, scheduled meetings, or other current activities, call the Chesapeake Regional Information Service toll-free by dialing 1-800-662-CRIS.

For additional information about EPA’s role in the Bay restoration, call or write:

U.S. Environmental Protection Agency
Chesapeake Bay Program
410 Severn Avenue
Annapolis, MD 21403
301-266-6873

