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Chesapeake Bay Program

Progress

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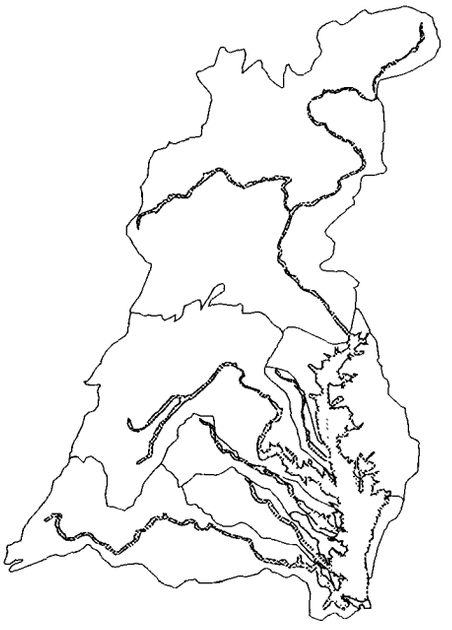

Progress in 1992 and 1993

The Chesapeake Bay Program's first decade was ushered to completion with larger schools of rockfish and more acres of vital underwater grasses in the Bay. The amount of phosphorus flowing into the Bay has decreased significantly in the past 10 years, primarily because of a basinwide ban on phosphate-containing detergents begun in the early 1980s, but also because of better technological upgrades on wastewater treatment plants. The steady rise of nitrogen flowing into the Bay was brought to a virtual standstill, in part through the control of runoff from agricultural land, as well as expanded technology for nitrogen removal in wastewater treatment plants.

The final two years of the restoration partnership's first decade also brought with them a much more comprehensive understanding of how the Chesapeake Bay ecosystem lives and breathes. The knowledge of how many of the Bay's species react to different impacts—pollutants and otherwise; understanding the depth of the Bay's response to nutrient inputs from a multitude of sources; and gaining a more comprehensive knowledge of toxic loadings and impacts all were vital to the continuing effort to restore and protect the Chesapeake.

This knowledge, bolstered by the "in the water" progress of the Chesapeake Bay Program's first 10 years, will guide the restoration effort as the Chesapeake Bay Program embarks on its second decade.

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Dear Friend of the Chesapeake Bay:

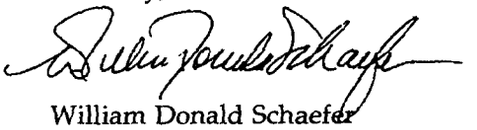
The Chesapeake Bay is one of the nation's most valuable and treasured natural resources. The challenge of cleaning up this productive estuary is spearheaded by the Chesapeake Bay Program, a unique public-private endeavor comprised of citizens, businesses, and governments in Pennsylvania, Maryland, Virginia, and the District of Columbia working together with the federal government to restore the Chesapeake Bay.

Both 1992 and 1993 mark years of achievement for the Bay Program. In, 1992, we pledged to increase the recovery of submerged aquatic vegetation, or Bay grasses, as an essential measure of living resources in the Bay; the Bay Program's revolutionary 3-D model was completed and now allows scientists for the first time to predict the effects of pollution on the Bay; and more citizens than ever before became stewards of the Chesapeake and participated in hands-on community cleanup efforts. This year we are conducting an important Baywide toxics reduction reevaluation to prevent future sources of toxics from impacting the Chesapeake.

As Chairman of the Chesapeake Executive Council, I joined fellow council members last August and signed new amendments to the historic 1987 Chesapeake Bay Agreement. Governor Casey, Governor Wilder, Mayor Kelly, then EPA Administrator Reilly, and Chesapeake Bay Commission Chairman Fowler pledged to intensify the Bay restoration by moving our cleanup efforts upstream into the Bay's tributaries. We established specific nutrient reduction goals in ten of these tributaries to help us reaffirm the need to reduce nutrients by 40%, and more importantly, establish a new commitment to maintain that 40% reduction level into the future.

Read this progress report and see for yourself why the Bay Program is a national model, both for its Bay research and policy development, and its abilities to involve a diverse audience in outreach efforts to restore the Chesapeake. I encourage you to join our efforts and learn more about how you can help protect the Chesapeake Bay for future generations.

Sincerely,



William Donald Schaefer
Governor of Maryland
Chariman, Chesapeake
Executive Council

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Restoring the Chesapeake

The Chesapeake Bay is the nation's largest estuary and the first to be targeted for restoration as a single ecosystem. The Chesapeake Bay Program—the cooperative compact forged to spearhead the cleanup—has become a model for other estuary recovery efforts across the country.

The Chesapeake estuary was created 10,000 years ago as the Atlantic Ocean crept up the Susquehanna River valley in the wake of retreating ice-age glaciers. Its waters and wetlands teemed with shellfish, finfish, and waterfowl when human settlements first appeared along its shores. But unrestrained harvests and decades of degradation had sharply impaired the Chesapeake's health and productivity by the mid-1970s, when Congress directed the U.S. Environmental Protection Agency to launch a major study of the Bay's decline.

Findings and recommendations from the $27 million research program laid the foundation for the first Chesapeake Bay Agreement signed in 1983. In that compact, the governments of Virginia, Pennsylvania, Maryland and the District of Columbia, the Chesapeake Bay Commission, and the U.S. Environmental Protection Agency agreed to develop and implement coordinated plans "to improve and protect the water quality and living resources of the Chesapeake Bay estuarine system."

That basic declaration of intent was expanded to a series of 29 commitments in the second Chesapeake Bay Agreement signed in December 1987. The commitments spelled out steps to be taken in six areas: living resources; water quality; population growth and development; public information, education and participation; public access; and governance.

At the core of this milestone regional compact was the firm declaration that the "productivity, diversity and abundance" of the estuary's living resources — shellfish, finfish, other aquatic creatures and vegetation — are "the best ultimate measures of the Chesapeake Bay's condition."

With the Chesapeake Bay Agreement as a basic charter, the Chesapeake Bay Program has become a unique regional institution, guiding and coordinating Bay-related activities of literally hundreds of federal, state, and local government agencies, and working as well with dozens of non-government business, civic, and environmental organizations.

The evolution of the Chesapeake Bay Program also provided a pattern for the National Estuary Program, which was established by Congress to stimulate the restoration of other coastal water bodies deemed to be of national significance. Twenty-one estuaries are now part of the National Estuary Program.

The Chesapeake Executive Council at its annual meeting in August 1992 renewed the commitment to a 40 percent reduction in nutrients entering the Bay and pledged to maintain those lower levels into the next century.

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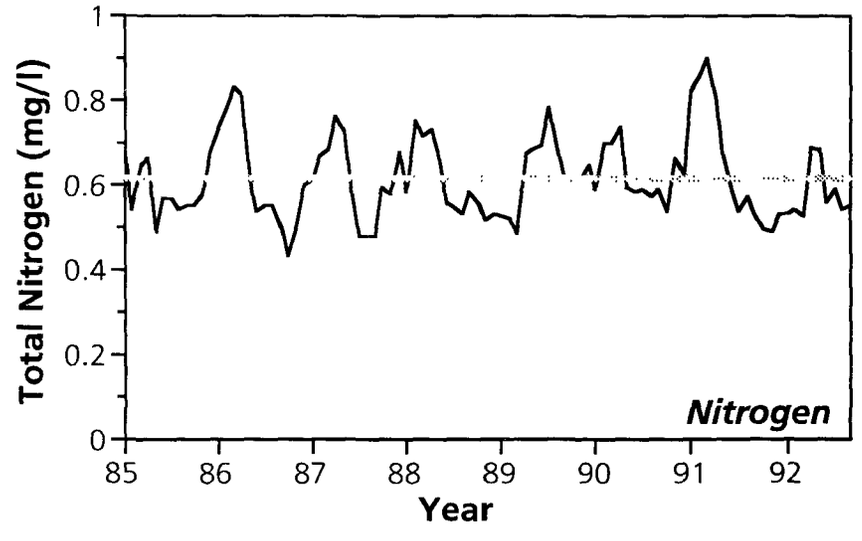
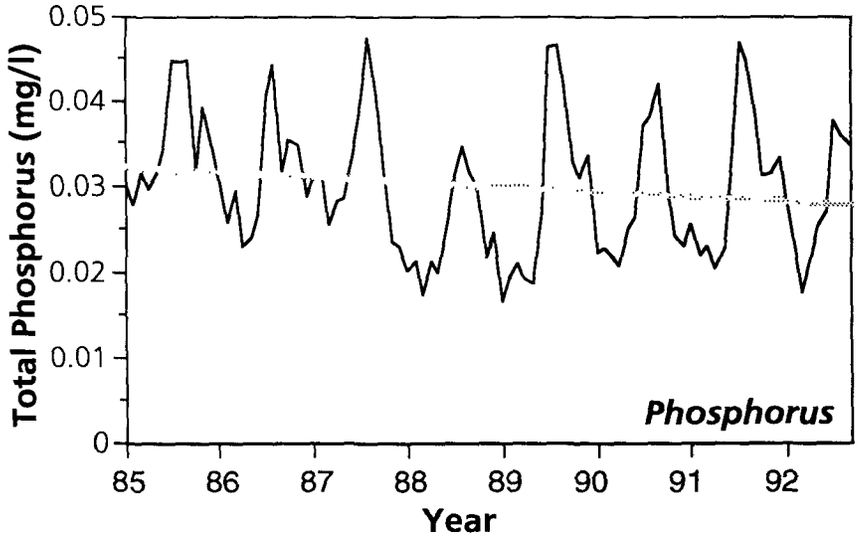
Restoring the Nutrient Balance

The arithmetic of the Chesapeake's restoration and protection is at least, in part, a simple matter of addition and subtraction: too much of the nutrients nitrogen and phosphorus added to the Bay subtracts oxygen and, at times, life itself from the estuarine waters.

Both nitrogen and phosphorus are essential elements of the Chesapeake's life-support system. But an excess of these nutrients also fosters dense populations of algae which degrade other Bay life such as its finfish, shellfish, and vegetation. When the algae are alive, they blanket the surface of the Bay's waters, cutting off sunlight necessary for the survival of the vital underwater vegetation that serves as habitat and food for many Bay species. When the algae die, they sink to the bottom where their decomposition uses up dissolved oxygen, diminishing the capacity of the water to support aquatic life.





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The need to break up this destructive cycle prompted the adoption of the 40% nutrient reduction goal as the linchpin commitment of the 1987 Chesapeake Bay Agreement. The Agreement—signed by Pennsylvania, Maryland, Virginia, the District of Columbia, the U.S. Environmental Protection Agency, and the Chesapeake Bay Commission—called for the achievement of the nutrient reduction goal by the year 2000, but it also provided for an interim reevaluation of the 40% target in 1992, when better science and new information from modeling, monitoring, and research studies since 1987 could be incorporated.

This reevaluation was carried out over a two-year period and completed by a Chesapeake Bay Program workgroup in 1992. It involved the development of a first-of-its kind, time-variable, three-dimensional water quality computer model of the Bay that enabled the Chesapeake Bay Program to develop a range of "what-if" scenarios to evaluate the potential of alternate nutrient pollution control strategies. By the culmination of the reevaluation, the Chesapeake Bay Program had developed a better understanding of the impacts of nutrient pollution on the Bay and the ability to better manage nutrient reductions. This led to:

- Reaffirming the 40% goal by the Chesapeake Executive Council in 1992 in the form of the 1992 Amendments to the Chesapeake Bay Agreement;

- Establishing the initial overall nutrient reduction target for the Bay of 74.1 million pounds a year for nitrogen and 8.43 million pounds a year for phosphorus; and

- Focusing the nutrient reduction program at the source of the nutrients—upstream in the watersheds of the Bay's tributaries.

The Chesapeake Bay Program subsequently designated specific nutrient reduction targets for the major river basins within three broad geographic regions. Targets have been established to further refine the overall 40% Baywide nutrient reduction goal. The reductions to be achieved annually by the four jurisdictions are:

Pennsylvania: *For the Susquehanna River basin and that part of the Potomac River watershed within the state;*
- *19.8 million pounds of nitrogen, and*
- *2.46 million pounds of phosphorus.*

Maryland: *For the state's major tributaries, Eastern Shore streams, and the state's share of the Potomac basin;*
- *22.7 million pounds of nitrogen, and*
- *2.11 million pounds of phosphorus.*

Virginia: *For Virginia's portion of the Potomac River basin;*
- *7.7 million pounds of nitrogen, and*
- *790,000 pounds of phosphorus.*

Baywide modeling has shown that Virginia's rivers south of the Potomac have less effect on the Bay than the rivers to the north. Nutrient reductions there will improve local conditions, however, so Virginia and the Bay Program are developing reduction targets for these rivers based

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on additional tributary-specific modeling. Between now and 1997, when this special study is completed, Virginia will implement an interim 40% reduction strategy.

District of Columbia: *For its share of the Potomac basin;*

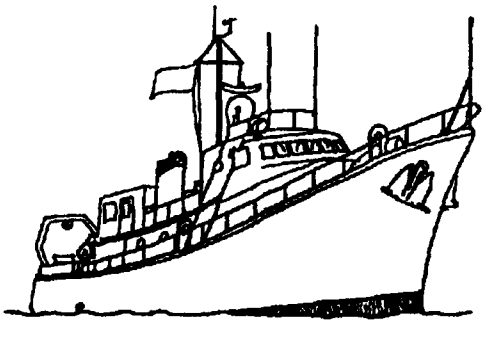
- *3.5 million pounds of nitrogen, and*
- *500,000 pounds of phosphorus.*

Limiting or reducing nutrients touches almost every facet of everyday life in urban, suburban, and rural communities. Nutrients are found in fertilizer and manure, wastewater treatment plant discharges, runoff from highways, streets, and driveways, in car exhausts, from coal burning power plants, and more.

For 1993, the three states and the District specifically targeted this immense problem through the development of tributary-specific strategies designed to achieve the targeted reductions and to attain the water quality requirements necessary to support aquatic species and other wildlife. These tributary-specific strategies will be the tools by which the jurisdictions will meet the Baywide 40% nutrient reduction goal.

To develop these strategies, each of the jurisdictions conducted a series of "town meetings" throughout the year to gather ideas from the public about how to reduce nutrients at their source. General public meetings as well as targeted meetings for groups such as local government officials, farmers, wastewater treatment plant operators, local planning officials, and local watershed restoration groups were all part of the "town meeting" concept. Relative cost effectiveness, environmental considerations, equity, and many other factors were included in the development of these strategies which are expected to be completed and implementation begun later this year or early next year.

Keeping Watch on the Bay



Monitoring data collected continuously since 1984 provided essential data to set up the Chesapeake Bay Program's sophisticated modeling system—and served as a necessary "reality check" once the model was up and running.

The sampling program that began nearly a decade ago now produces data on 19 chemical and physical water quality characteristics including salinity, temperature, dissolved oxygen levels, and nutrient concentrations. Samples are taken biweekly or monthly at various depths at 49 stations in the mainstem of the Bay and 110 stations in tributary streams.

This extensive sampling system has been supplemented over the years with other techniques for keeping current with the state of the Bay. Regular aerial overflights provide information on the distribution of grasses in the Bay. The EPA's national Electronic and Assessment Program (EMAP) provides data on Chesapeake watershed land use and land cover, key indicators of the kinds and quantities of pollutants that reach the Bay.

The Chesapeake Bay Program is at the leading edge of technology in collecting and measuring inorganic and organic constituents in rainfall. It is the first estuarine system with a fully operational network analyzing atmospheric deposition of toxics and nutrients.

All of these sources contribute to a steadily expanding data base that is the benchmark for measuring progress and the effectiveness of cleanup actions as the restoration program continues.

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Meeting the Nutrient Reduction Goal

Parallel to the development of the tributary-specific strategies, ongoing efforts by the Chesapeake Bay Program and the jurisdictions to reduce nutrients continued. These efforts have already brought about progress—both in terms of actual reductions as well as in significantly reducing increases. This has brought about, according to a progress report of the nutrient reduction reevaluation, "positive trends in water quality and the return of underwater grasses to some of the Bay's shorelines." Overall:

- A 16% drop in phosphorus concentrations from 1984 through 1992 was realized in the Bay's mainstem.
- Nitrogen levels remained essentially unchanged during the same time period.

The challenge ahead will be to continue working toward the 40% reduction goal and, once that is achieved, to maintain these reduction levels into the next century despite the pressures of population growth and development. This challenge is reinforced by the Chesapeake Executive Council, which stipulated in the 1992 Amendments to the Chesapeake Bay Agreement that the nutrient reduction target levels must be maintained beyond the year 2000. The levels are 229.9 million pounds for nitrogen and 15.44 million pounds for phosphorus. Reaching and maintaining these levels will be achieved through reductions in both point and nonpoint sources of both nutrients.

Point Source Reductions

Point sources—primarily municipal wastewater treatment plant discharges—account for 34% of the phosphorus and 23% of the nitrogen entering the Bay.

- Point source discharges for phosphorus have already met the 40% reduction goal.
- This reduction has been achieved through;
    - A ban on phosphate-containing detergents in effect regionwide since 1990.
    - Technology upgrades for wastewater treatment plants and stricter compliance with limits set in discharge permits.
- Point source discharges for nitrogen continue to rise as population growth swells and wastewater flows increase, however;
    - Curbs on nitrogen are now beginning to keep pace as nitrogen removal upgrades to wastewater treatment plants are implemented.
    - Such upgrades include the expanded use of the innovative biological nutrient removal (BNR) technology.
- Thirty-nine municipalities have planned upgrades that will further reduce nitrogen discharges.

Modeling Takes on a New Dimension

The Chesapeake Bay Program's pace-setting modeling program scored another breakthrough with completion of a $3.5-million 3-D model, vastly expanding opportunities for mathematical exploration of the Bay. The sophisticated model played a major role in the comprehensive reevaluation of the program's 40 percent nutrient reduction goal.

It enables policy makers to run a range of "what-if" scenarios to evaluate the potential of alternate pollution control strategies, ensuring that always-limited funds are allocated to actions promising the biggest bang for the buck. It is a valuable diagnostic tool as well, helping scientists to better understand the biological and chemical processes occurring in the Bay.

The new model is marvelously complex: it runs on a Cray, the world's fastest supercomputer, at the U.S. Army Engineer Waterways Experiment Station in Vicksburg, Mississippi, and the EPA facility at Research Triangle Park, North Carolina. Even with this advanced hardware, it can take 30 hours to run through a single scenario reflecting effects on water quality a given set of assumptions might produce over a 10-year period. Such a run entails about 15 billion calculations. The model has been acclaimed as the most sophisticated of its kind anywhere in the world.

The water quality model works in tandem with the previously developed watershed model, which churns out data on nitrogen and phosphorus loads generated throughout the 64,000-square-mile Bay basin. Together, the two models can show how various nutrient-control actions on land are likely to alter the water quality of the Bay.

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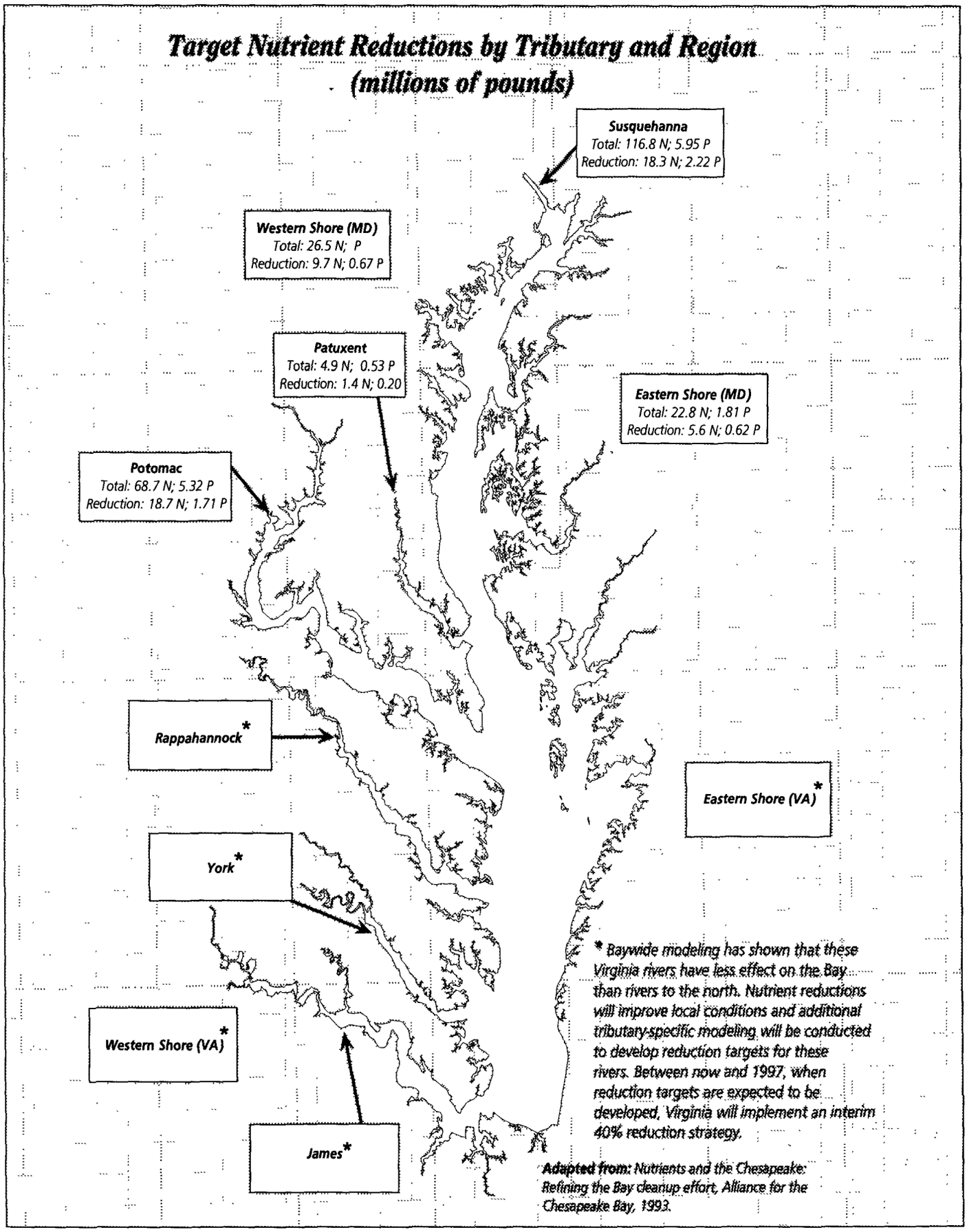

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Nonpoint Source Nutrient Reductions

Most of the nutrients entering the Bay—77% of the nitrogen and 66% of the phosphorus—originate from nonpoint sources. Rather than discharging from a single point or pipe, nonpoint sources are dispersed. They include such sources as runoff from feedlots, pastures, croplands, highways, streets, parking lots, lawns, and driveways.

The Chesapeake Bay Program control strategy extends to all these sources, but the primary focus is farmland, the largest contributor of nonpoint phosphorus and nitrogen. The original reliance on soil erosion controls to contain nutrient runoff from farm fields has been augmented with other measures in the Bay basin to build one of the nation's most sophisticated nonpoint source pollution prevention programs.

A key agricultural innovation is nutrient management, a systematic approach that limits fertilizer applications to carefully calculated crop needs, leaving no excess nutrients to wash off into streams or seep into groundwater flows. Despite the progress in containing nonpoint source nutrients, the reevaluation workgroup concluded that existing technologies will control a smaller proportion of nitrogen than originally expected. A significant acceleration in nutrient reductions will be needed to attain the 40% goal by the year 2000, underlining the need for continuing development of pollution prevention and control technologies.

Living Resources of the Bay

Oysters. Blue crabs. Rockfish. Shad. These species come quickly to mind as "living resources" of the Bay.

But the term also includes creatures such as the worms in the mud of Baltimore Harbor, whose welfare may be of particular interest only to scientists tracking cleanup progress in the heavily traveled waters of this busy port.

It includes the eelgrass, widgeon grass, and other submerged aquatic vegetation (SAV) so important as food, nursery, and habitat to many species of fish and fowl. And it includes the many other plants and animals whose health and survival contribute to a balanced ecosystem, motivating the continuing efforts to curb nutrients and toxics and improve the water quality of the estuary.

Accomplishments in restoring and protecting the Bay's living resources have manifested themselves in two ways:

- A resurgence in certain species and/or their habitats; and
- A better understanding of the interrelationships between species' survival and the impacts of water quality, pollutants, loss of habitat, and harvesting.

Resurgences in species and habitat include the following:

- Baywide, SAV covering approximately 70,000 acres is thriving. This coverage represents more than a 75% increase since 1984, significantly reversing the dramatic declines of the mid-1970s.

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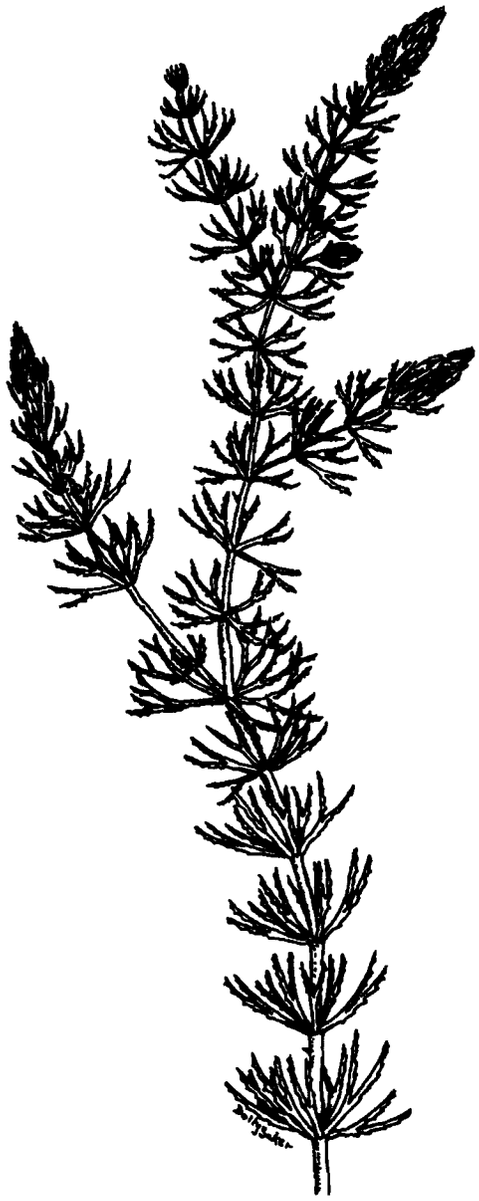

- The continuing resurgence of rockfish reproduction following a fishing moratorium imposed on Bay and tributary waters after the bass population plunged in the 1980s. In 1992, the juvenile index for the popular rockfish rose significantly in both Maryland and Virginia waters.

- Shad, which virtually disappeared from the Bay in the early 1980s, may be on the comeback. An estimated 105,000 shad reached the upper Chesapeake Bay in the spring of 1992, substantially less than the vast multitudes that came home to spawn in Bay waters in past decades but still a healthy increase from a population low of about 3000 in 1980.

- A second attempt to reintroduce shad, a one-time prosperous fishery in the Bay, above the dams on the James River in Virginia met with success in June 1992. About 50,000 fry, hatched from eggs taken from the James, were released at Richmond after being reared for 20 days in a Pennsylvania hatchery.

- Since 1989, the construction of fish passages in the form of fish ladders, elevators, dam breeches, and others has re-opened nearly 175 miles of tributary waters as spawning grounds and nursery habitat for migratory fish.

Increased understanding of interrelationships include:

- Wildlife specialists and Bay scientists developed Habitat Requirements for Chesapeake Bay Species, pinpointing the essential needs of 31 key "target" species of vegetation, finfish, shellfish, and birds.

- *Submerged Aquatic Vegetation Habitat Requirements and Restoration Targets: A Technical Synthesis* established the water quality requirements for SAV. These plants provide vital habitat and a valuable food resource for many Bay species.

- The development of management plans to protect and foster important species of shellfish, finfish, and waterfowl and the habitat on which they depend have been developed. These plans are modified as continuing research generates new information about the specific conditions necessary to sustain healthy populations of Bay species.

- The creation of a strategy to comprehensively map wetlands and estimate recent losses, as well as assess the reasons for loss of this valuable habitat resource.

- Other projects under way include the development of guidelines for restoring and creating wetlands and the preparation of a handbook on wetlands protection for use by farmers, developers, and local governments.

Efforts to improve or protect other Bay living resources have yet to be realized. Oysters are still a much threatened resource, with recent harvests

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only a fraction of annual hauls in peak years of the past. The decline is attributed to overharvesting, pollution, and the devastating parasitic diseases MSX and Dermo.

- The federal government earmarked research on the lethal parasites for 1992 and 1993. Seeding programs and the construction of artificial oyster reefs also are under way to foster the restoration of these valued shellfish.

  The artificial reefs vary in design but a common combination utilizes old tires and concrete of a specific density—heavy enough to stay in place but light enough not to sink into soft bottom sediments. Some reefs are already in place and others are planned.

  Maryland plans to construct reefs off Tilghman Island and further south off Calvert County's Plum Point. Virginia's Marine Resources Commission has endorsed construction of a six-foot high reef of oyster shell in the Piankatank River to analyze whether larvae attaching to the elevated structure are less prone to disease than those on the river bottom.

- Blue crabs were harder to find in the Chesapeake in 1992, though catches generally have been on the rise in recent years and in 1993, crabs were more abundant. Still, with ever increasing numbers of crabbers on the estuary, the Chesapeake Bay Program crab management plan calls for catch limits in both Maryland and Virginia to prevent the decimation of this valuable species.

Another Look at Toxics

Toxic pollutants come in many guises: chemical wastes from industry...pesticide residues washed from agricultural crop lands and suburban lawns...old batteries or oil improperly discarded by the do-it-yourself car mechanic. All of these substances can be deadly to fish, shellfish, and other life in the Bay or tributary streams.

Protecting the Chesapeake from these types of toxic pollutants through prevention and toxic reductions was the basis of the Basinwide Toxics Reduction Strategy of 1988. In 1992, the Chesapeake Bay Program laid the groundwork for a comprehensive review of its toxics reduction strategy comparable to the reevaluation of the nutrient reduction commitment completed that same year. The Basinwide Toxics Reduction Strategy reevaluation was completed in 1993, and spotlights areas of emphasis:

- A recognition of *pollution prevention* as the preferred approach to reducing toxic risk to human health and living resources.

- A reduction effort consistent with the *regulatory program* centered on the Clean Water Act and Clean Air Act.

- A *regional focus* directing reduction and prevention actions toward regional areas with known or potential toxic problems.

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- Continued assessment of potential toxic impacts to develop more effective management efforts to reduce these impacts on the Chesapeake Bay.

Preliminary findings from reevaluation studies have provided some information on sources and amounts of toxic substances reaching the Bay, though the picture is still far from complete.

No evidence was found of severe, systemwide responses similar in magnitude to the effects seen throughout the Bay because of excessive levels of nutrients. Low levels of toxic substances have been observed, but they are below thresholds associated with adverse impacts.

Industrial facilities are still a major source of toxic substance releases in the Bay watershed, but the actual fates of these substances and their contribution to toxic contamination of tidal waters is uncertain. (The U.S. Environmental Protection Agency reported in 1992 that industrial toxic releases in the watershed declined by 43% from 1987 to 1990—a calculation drawn from Toxic Release Inventory (TRI) reports to the agency by more than 500 facilities. More than 300 chemicals are tracked in the TRI program.)

Atmospheric deposition of metals and organic toxics to tidal surface waters is believed to be within an order of magnitude of quantities contributed by land-based discharges.

Pesticides are a potential source of toxic substances in the watershed. Results from a recent basinwide survey of pesticide use point to heavy applications of many herbicides, but a transfer of effects has not been observed. Applications of insecticides and herbicides have been much lower, however. With funding assistance from the Chesapeake Bay Program, Pennsylvania, Maryland, Virginia, and the District of Columbia have all expanded Integrated Pesticide Management (IPM) activities in the past year to prevent or reduce pesticide runoff that eventually reaches the Bay. Under IPM, pesticides are used against pests or to control weeds only when they directly threaten crops. Broad preventive applications are taboo; non-chemical control techniques are used whenever possible.

The Maryland Cooperative Extension Service reported that farmers who adopted IPM in that state paid some $400,000 for pest monitoring services—and saved $2 to $7 in pesticide costs for every dollar spent on monitoring. The Extension Service is taking lessons learned in agricultural IPM into cities and suburbs, too. Homeowners practicing IPM have reduced their pesticide use by 22%, the service reported.

Virginia reported economic benefits of $19 an acre for alfalfa growers using IPM. The state's Department of Agriculture and Consumer Service and Cooperative Extension Service initiated a pesticide use survey for nine major crops to obtain data which will help in developing a state pesticides and groundwater management plan and provide a baseline for measuring subsequent progress in reducing pesticide use.

The Pennsylvania Department of Agriculture is sponsoring a comprehensive education program to encourage adoption of IPM and complementary techniques by farmers. The York County Conservation District

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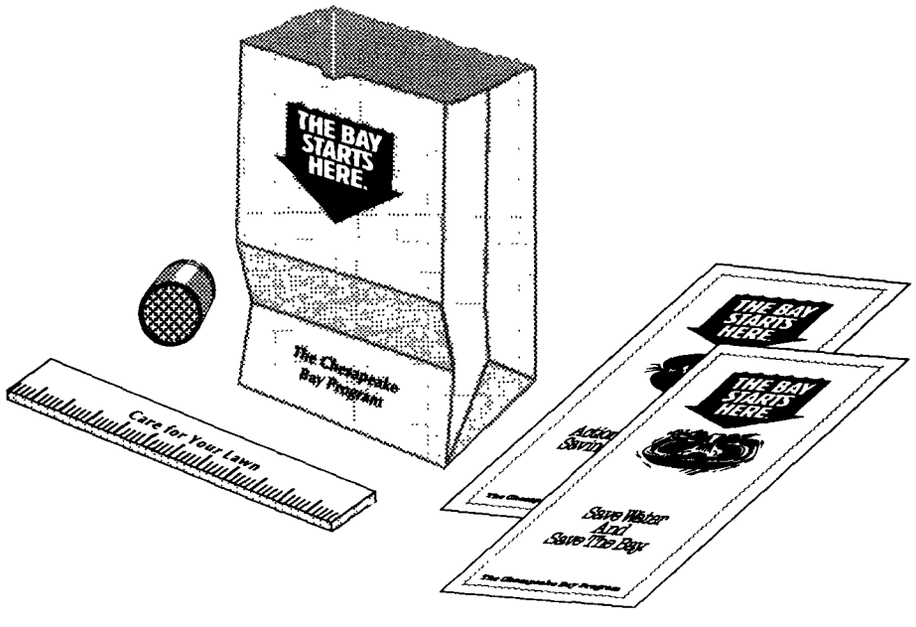
carried out a three-year pilot program to demonstrate the application of IPM in raising corn, soybeans, small grains, alfalfa, and grass hay.

In the District of Columbia, IPM use is encouraged primarily as a water pollution prevention practice for homeowners and urban gardeners. The District's Environmental Regulation Administration has conducted a survey of registered pesticide applicators and a survey of residential pesticides is ready for distribution. Results of the surveys will be used to estimate pesticide loadings to DC water bodies and guide a public education strategy. Currently, the District's IPM information and education activities include urban garden demonstration plots, displays, pamphlets, and presentations.

A Vision for the Future

As the Chesapeake Bay Program enters its second decade, it continues to move forward, developing cutting edge science, implementing new management techniques, enacting pollution prevention measures, and identifying valuable environmental indicators to gauge progress. The coming decade brings with it a Chesapeake under more stress than ever before as more and more people call the watershed home. Like the ever-changing Chesapeake itself, the Chesapeake Bay Program remains a dynamic partnership, constantly developing new scientific understanding and new management tools to meet the restoration and protection challenges of the decades ahead.



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Chesapeake Bay Agreement:

In 1987, Virginia, Maryland, Pennsylvania, the District of Columbia, the Chesapeake Bay Commission and the U.S. Environmental Protection Agency formally agreed to reduce and control point and nonpoint sources of pollution to attain the water quality conditions necessary to support the living resources of the Bay. To achieve this, we agreed to develop, adopt and begin to implement a strategy to equitably achieve by the year 2000 a 40 percent reduction target based on the results of modeling, monitoring and other information available to us.

Based upon the 1991 Nutrient Reduction Reevaluation, we have found that:

- Δ We have achieved significant improvements in water quality and living resources habitat conditions in the mainstem of Chesapeake Bay.
- Δ There is a clear need to expand our program efforts in the tributaries, since most of the spawning grounds and essential habitat are in the tributaries.
- Δ Intensified efforts to control nonpoint sources of pollution, including agriculture and developed areas, will be needed if we are to meet our 40% nutrient goal.
- Δ We are now able to demonstrate the link between water quality conditions and the survival and health of critically important submerged aquatic vegetation (SAV).
- Δ Implementation of the Clean Air Act Amendments will provide additional opportunities to achieve nitrogen reductions.
- Δ Achieving a 40 percent nutrient reduction goal, in at least some cases, challenges the limits of current point and nonpoint source control technologies.

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1992 Amendments

Therefore, to further our commitments made in the 1987 Chesapeake Bay Agreement, we agree:

- Δ To reaffirm our commitment to achieve an overall 40 percent reduction of nitrogen and phosphorus entering the mainstem Chesapeake Bay by the year 2000 and to maintain at least this level of reduction thereafter.
- Δ To amend the water quality goal of the 1987 Chesapeake Bay Agreement to reflect the critical importance of the tributaries in the ultimate restoration of Chesapeake Bay:

  "Reduce and control point and nonpoint sources of pollution to attain the water quality condition necessary to support the living resources of the Chesapeake Bay and its tributaries."

- Δ To develop and begin implementation of tributary-specific strategies by August 1993. These strategies will be designed to:
  1. Meet the mainstem nutrient reduction goals.
  2. Achieve the water quality requirements necessary to restore living resources in both the mainstem and the tributaries.
  3. Incorporate public participation in the development, review and implementation of the strategies, ensuring the broadest possible public involvement.
  4. Advance both cost-effectiveness and equity.
- Δ To use the distribution of submerged aquatic vegetation (SAV) in the Bay and its tidal tributaries, as documented by Baywide and other aerial surveys conducted since 1970, as an initial measure of progress in the restoration of living resources and water quality.
- Δ To incorporate into the Nutrient Reduction Strategies an air deposition component which builds upon the 1990 Amendments to the federal Clean Air Act and explores additional implementation opportunities to further reduce airborne sources of nitrogen entering Chesapeake Bay and its tributaries.
- Δ To continue to explore improved technologies that may be cost-effective in attaining further nutrient reductions.
- Δ To explore cooperative working relationships with the other three basin states (New York/West Virginia/Delaware) in the development of tributary-specific strategies for nutrient reduction.

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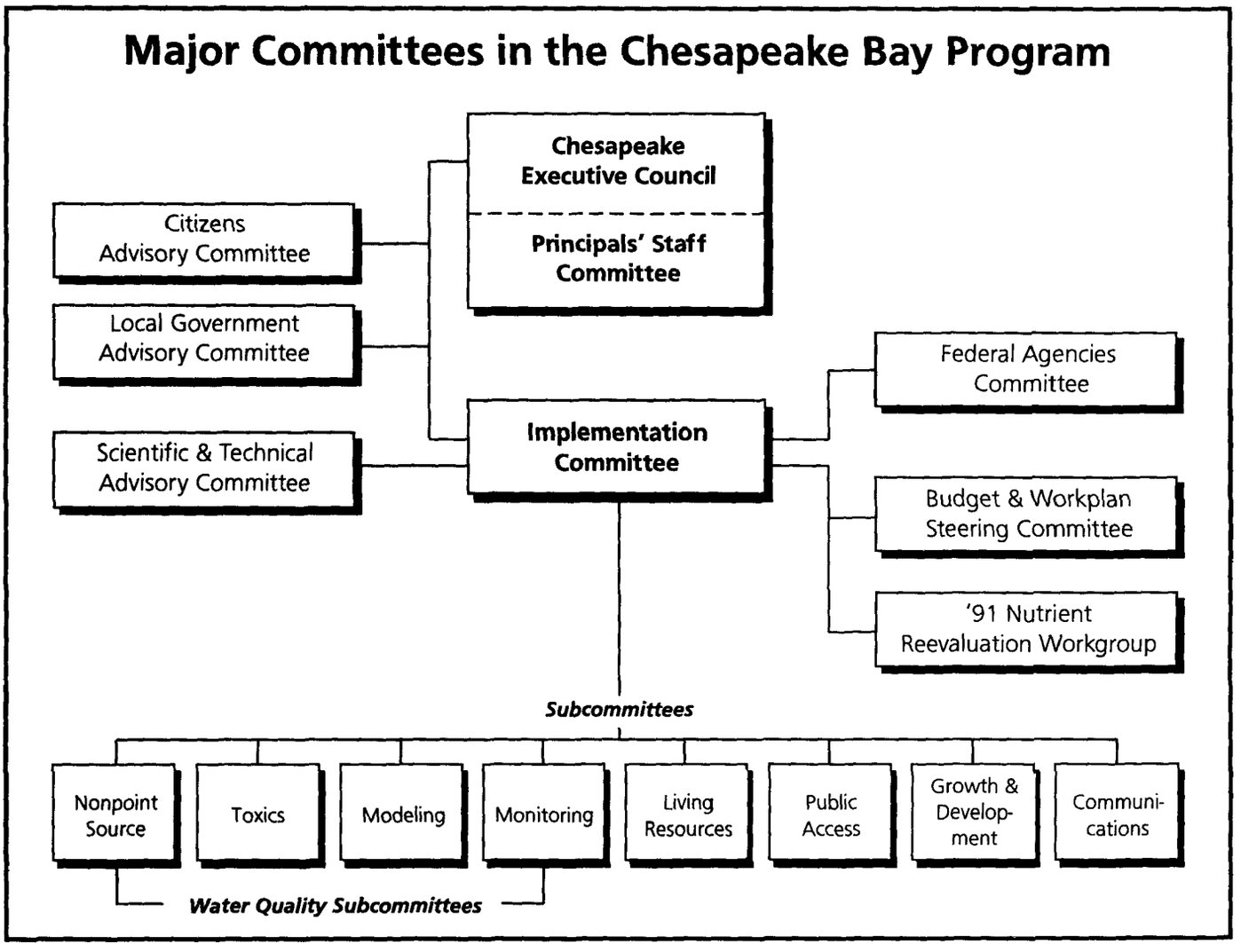

Who to Call

Learn about the problems facing the Bay and what is being done to help solve them. Better still, learn about how you personally can be part of the solution. One of the easiest ways to get information is to call CRIS, the Chesapeake Regional Information Service at 1-800-662-CRIS. Free information is also available from the states and jurisdictions where you live and work.

Virginia Dept. of Environmental Quality		(804) 786-4500
Maryland Chesapeake Bay Communications Office		(410) 974-5300
Pennsylvania Chesapeake Bay Education Office		(717) 236-1006
District of Columbia Dept. of Consumer and Regulatory Affairs, Environmental Regulation Admin.		(202) 404-1136
EPA Chesapeake Bay Program Office		(410) 267-0061
Chesapeake Bay Commission	MD Hdqtrs.	(410) 263-3420
	PA	(717) 232-8199
	VA	(804) 786-4500

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