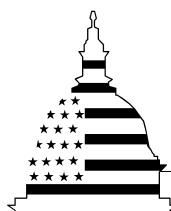


October 2005

# CHESAPEAKE BAY PROGRAM

## Improved Strategies Are Needed to Better Assess, Report, and Manage Restoration Progress



G A O

Accountability ★ Integrity ★ Reliability



Highlights of [GAO-06-96](#), a report to congressional requesters

## Why GAO Did This Study

The Chesapeake Bay Program (Bay Program) was created in 1983 when Maryland, Pennsylvania, Virginia, the District of Columbia, the Chesapeake Bay Commission, and EPA agreed to establish a partnership to restore the Chesapeake Bay. Their most recent agreement, *Chesapeake 2000*, sets out an agenda and five broad goals to guide these efforts through 2010 and contains 102 commitments that the partners agreed to accomplish. GAO was asked to examine (1) the extent to which appropriate measures for assessing restoration progress have been established, (2) the extent to which current reporting mechanisms clearly and accurately describe the bay's overall health, (3) how much funding was provided for the effort for fiscal years 1995 through 2004, and (4) how effectively the effort is being coordinated and managed.

## What GAO Recommends

GAO recommends that the Administrator of EPA instruct the Chesapeake Bay Program Office to (1) complete its efforts to develop and implement an integrated assessment approach; (2) revise its reporting approach to improve the effectiveness and credibility of its reports; and (3) develop a comprehensive, coordinated implementation strategy that takes into account available resources. In commenting on this report, the signatories to the *Chesapeake 2000* agreement generally agreed with GAO's recommendations.

[www.gao.gov/cgi-bin/getrpt?GAO-06-96](http://www.gao.gov/cgi-bin/getrpt?GAO-06-96).

To view the full product, including the scope and methodology, click on the link above. For more information, contact Anu Mittal at (202) 512-3841 or [mittala@gao.gov](mailto:mittala@gao.gov).

# CHESAPEAKE BAY PROGRAM

## Improved Strategies Are Needed to Better Assess, Report, and Manage Restoration Progress

### What GAO Found

The Bay Program has over 100 measures to assess progress toward meeting certain restoration commitments and providing information to guide management decisions. However, the program has not yet developed an integrated approach that would allow it to translate these individual measures into an assessment of overall progress toward achieving the five broad restoration goals outlined in *Chesapeake 2000*. For example, while the Bay Program has appropriate measures to track crab, oyster, and rockfish populations, it does not have an approach for integrating the results of these measures to assess progress toward the agreement's goal of protecting and restoring the bay's living resources. The Bay Program has recognized that it may need an integrated approach for assessing overall progress in restoring the bay and, in November 2004, a task force began working on this effort.

The *State of the Chesapeake Bay* reports are the Bay Program's primary mechanism for reporting the current health status of the bay. However, these reports do not effectively communicate the bay's current conditions because they focus on the status of individual species or pollutants instead of providing information on a core set of ecosystem characteristics. Moreover, the credibility of these reports has been negatively impacted because the program has commingled various kinds of data such as monitoring data, results of program actions, and the results of its predictive model without clearly distinguishing among them. As a result, the public cannot easily determine whether the health of the bay is improving or not. Moreover, the lack of independence in the Bay Program's reporting process has led to negative trends being downplayed and a rosier picture of the bay's health being reported than may have been warranted. The program has recognized that improvements are needed and is developing new reporting formats.

From fiscal years 1995 through 2004, the restoration effort received about \$3.7 billion in direct funding from 11 key federal agencies; the states of Maryland, Pennsylvania, and Virginia; and the District of Columbia. These funds were used for activities that supported water quality protection and restoration, sound land use, vital habitat protection and restoration, living resource protection and restoration, and stewardship and community engagement. During this time period, the restoration effort also received an additional \$1.9 billion in indirect funding.

The Bay Program does not have a comprehensive, coordinated implementation strategy to better enable it to achieve the goals outlined in *Chesapeake 2000*. Although the program has adopted 10 key commitments to focus partners' efforts and developed plans to achieve them, some of these plans are inconsistent with each other or are perceived as unachievable by program partners. The limited assurances about the availability of resources beyond the short term further complicate the Bay Program's ability to effectively coordinate restoration efforts and strategically manage its resources.

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## Abbreviations

EPA	Environmental Protection Agency
SAV	submerged aquatic vegetation

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United States Government Accountability Office  
Washington, D.C. 20548

October 28, 2005

The Honorable Barbara A. Mikulski  
Ranking Minority Member  
Subcommittee on Commerce, Justice, and Science  
Committee on Appropriations  
United States Senate

The Honorable Paul S. Sarbanes  
United States Senate

The Honorable John W. Warner  
United States Senate

Recognized by Congress as a national treasure, the Chesapeake Bay is the nation's largest estuary, with its watershed spanning 64,000 square miles, including parts of six states and the District of Columbia. The Chesapeake Bay is also biologically diverse, providing habitat for more than 3,600 species of plants, fish, and shellfish. With the highest land-to-water ratio of any estuary in the world, the bay is particularly susceptible to activities that take place on surrounding lands. For example, urban sprawl significantly affects the bay's ecosystem. From 1950 to 2000, the population in the watershed nearly doubled, from just over 8 million to nearly 16 million. By 2020, it is estimated that the population in the bay's watershed will reach approximately 18 million.

Concerns about the bay's overall health surfaced as early as the 1930s. Signs of deterioration in the bay's condition—declines in water clarity, oyster populations, and underwater grasses that provide habitat for shellfish—became even more apparent in the 1950s and 1960s. In the 1970s and early 1980s, the Environmental Protection Agency (EPA) found that excess nutrients from agricultural development, population growth, and discharges from sewage treatment plants were the primary causes for the decline in the bay's condition.

Responding to the public outcry about the degraded state of the Chesapeake Bay, the states of Maryland, Pennsylvania, and Virginia; the District of Columbia; the Chesapeake Bay Commission—a tristate legislative assembly representing Maryland, Pennsylvania, and Virginia; and EPA agreed in 1983 to protect and restore the Chesapeake Bay. Their agreement established the Chesapeake Executive Council and resulted in the Chesapeake Bay Program (Bay Program) a partnership that directs and

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conducts the restoration of the bay. The Bay Program currently includes partners at the federal, state, and local levels, as well as academic institutions and nonprofit organizations. EPA's Chesapeake Bay Program Office provides support to the Chesapeake Executive Council and, among other things, is responsible for developing and providing information on the environmental quality and living resources of the Chesapeake Bay ecosystem. In addition, the Chesapeake Bay Program Office is responsible for coordinating EPA's activities with other federal agencies and state and local authorities participating in the restoration effort.

Subsequent agreements in 1987, 1992, and 2000 reaffirmed the signatories' commitment to bay restoration. The most recent, *Chesapeake 2000*, envisions a Chesapeake Bay watershed that includes abundant, diverse populations of living resources and healthy, clean streams and rivers that can sustain strong local and regional economies. *Chesapeake 2000*—identified by the Bay Program as its strategic plan—sets out an agenda and goals to guide the restoration and protection efforts through 2010 and beyond. In *Chesapeake 2000*, the signatories agreed to 102 commitments—including management actions, such as assessing trends of particular species, as well as actions that directly affect the health of the bay. These commitments are organized under the following five broad restoration goals:

- *Protecting and restoring living resources*—14 commitments to restore, enhance, and protect the finfish, shellfish and other living resources, their habitats and ecological relationships to sustain all fisheries and provide for a balanced ecosystem;
- *Protecting and restoring vital habitats*—18 commitments to preserve, protect, and restore those habitats and natural areas that are vital to the survival and diversity of the living resources of the bay and its rivers;
- *Protecting and restoring water quality*—19 commitments to achieve and maintain the water quality necessary to support the aquatic living resources of the bay and its tributaries and to protect human health;
- *Sound land use*—28 commitments to develop, promote, and achieve sound land use practices that protect and restore watershed resources and water quality, maintain reduced pollutant loadings for the bay and its tributaries, and restore and preserve aquatic living resources; and

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- *Stewardship and community engagement*—23 commitments to promote individual stewardship and assist individuals, community-based organizations, businesses, local governments and schools to undertake initiatives to achieve the goals and commitments of the agreement.

Over time, the Bay Program has been lauded as a model for intergovernmental cooperation and for its extensive studies on the bay and its problems. Recently, however, the Bay Program has come under increasing scrutiny as some have questioned whether the Bay Program has overstated the progress made in restoring the bay's health.

In this context, you asked us to examine (1) the extent to which the Bay Program has established appropriate measures for assessing restoration progress, (2) the extent to which the reporting mechanisms the Bay Program uses clearly and accurately describe the bay's overall health, (3) how much funding was provided for restoring the Chesapeake Bay for fiscal years 1995 through 2004 and for what purposes, and (4) how effectively the restoration effort is being coordinated and managed.

To determine the extent to which the Bay Program has established appropriate measures for assessing progress and clearly and accurately reporting on the bay's health, we obtained and analyzed documents on measures the Bay Program uses to assess progress in restoring the bay's health, and we reviewed Bay Program reports. In addition, we convened a panel of nationally recognized ecosystem assessment and restoration experts. The panel discussed (1) critical elements of an effective assessment process, (2) how progress in restoring an ecosystem should be assessed, and (3) key attributes of effective reports on ecosystem health. To determine the amount of funding provided for the restoration effort from fiscal years 1995 through 2004, we obtained and analyzed financial information from key federal agencies,<sup>1</sup> Maryland, Pennsylvania, Virginia, and the District of Columbia. Key federal agencies were identified as those that participated in Chesapeake Bay Program committees or that provided more than \$250,000 annually, on average, in direct funding. For the purposes of this report, we defined direct funds as those that are

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<sup>1</sup>Key federal agencies include the Department of Agriculture's Farm Service Agency, U.S. Forest Service, and Natural Resources Conservation Service; Department of Commerce's National Oceanic and Atmospheric Administration; Department of Defense's Army, Army Corps of Engineers, and Navy/Marine Corps; Department of the Interior's U.S. Fish and Wildlife Service, U.S. Geological Survey, and National Park Service; and EPA.



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provided exclusively for bay restoration activities (e.g., increasing the oyster population) or those that would no longer be made available in the absence of the restoration effort. To determine how effectively the restoration effort is being coordinated and managed, we obtained and analyzed planning documents and agreements from Bay Program partners. In addition, to address all of our objectives, we interviewed a wide range of program partners, including representatives of federal, state, and local agencies; the Chesapeake Bay Commission; interest groups, such as the Chesapeake Bay Foundation and Alliance for the Chesapeake Bay; and academia. We also interviewed nonpartner groups, such as the Maryland Watermen's Association. In addition, we reviewed associated studies. A more detailed description of our objectives, scope, and methodology is presented in appendix I. We performed our work between October 2004 and October 2005 in accordance with generally accepted government auditing standards.

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## Results in Brief

The Bay Program has established a large number of measures to assess progress for some of the commitments in *Chesapeake 2000*, but it has not yet developed an approach that would allow it to integrate these measures and assess overall progress toward achieving the five broad restoration goals. Specifically, the Bay Program has developed 46 measures that are appropriate to assess progress toward meeting those restoration commitments that are quantifiable. For example, the program has established measures that are appropriate to assess changes in (1) the oyster population to meet its commitment to achieve a tenfold increase in native oysters by 2010 and (2) the acreage of bay grasses, which serve as habitat for crabs and other species, for its commitment to restore 185,000 acres of bay grasses by 2010. In addition, the Bay Program has developed 55 other measures that do not directly assess progress toward meeting specific commitments; instead, they provide information to guide management decisions. Despite having over 100 measures, the Bay Program lacks an integrated approach that would allow it to collectively determine what the individual measures mean for the overall health of the bay and the achievement of the five broad restoration goals. For example, while the Bay Program has measures to track crab, oyster, and rockfish populations, it does not have an approach for integrating the results of these measures to assess progress toward the overarching goal of protecting and restoring the bay's living resources. The Bay Program has recognized that it may need an integrated approach for assessing overall progress in restoring the bay and, in November 2004, a task force began working on this effort.

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The Bay Program's primary reporting mechanism—a report entitled the *State of the Chesapeake Bay*—is neither an effective reporting tool nor does it provide credible information on the bay's current health status. These reports are not effective because they do not provide an overall assessment of the bay's health; instead, they focus on the status of individual species and pollutants. Moreover, the reports do not explain the relative impact that opposite trends for different species, such as a decreasing oyster population and an increasing rockfish population mean for the bay's health. Our expert panel agreed that the reports lacked a clear, overall picture of the bay's health. These reports are also not credible because they commingle the results of management actions and the results of a predictive model with monitoring information on the bay's health. Because the results of management actions and the predictive model tend to be more positive than the results of monitoring data, such an approach tends to downplay any lack of improvement in the condition of the bay. Our expert panel noted that the Bay Program reports are overly oriented to reporting on the progress of the program's management actions at the expense of communicating information on the health status of the bay. The credibility of the Bay Program's reports is also impaired by the lack of an independent review process. The officials who manage and are responsible for the restoration effort also analyze, interpret, and report the monitoring data to the public. We believe this lack of independence in reporting has led to the Bay Program projecting a rosier view of the health of the bay than may have been warranted. Our expert panelists believe that either establishing an independent review panel to review the *State of the Chesapeake Bay* reports before they are issued or establishing an independent group to analyze and report on the bay's health would significantly improve the credibility of the Bay Program's reports. The Bay Program has recognized that improvements in its current reporting approach are needed and is developing new reporting formats that it hopes will more clearly describe the bay's current health and the status of the restoration effort.

About \$3.7 billion in direct funding was provided for the restoration effort (as reported by 11 key federal agencies; the states of Maryland, Pennsylvania, and Virginia; and the District of Columbia) from fiscal years 1995 through 2004. This funding was used for the following purposes:

- \$1.7 billion for water quality protection and restoration activities, such as upgrades to wastewater treatment plants and technical assistance for the implementation of agricultural best management practices;

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- \$1.1 billion for sound land use activities, such as land acquisition and support for smart growth initiatives;
  - \$491 million for vital habitat protection and restoration activities, such as wetland restoration and studies for determining the best methods for protecting and restoring submerged aquatic vegetation;
  - \$233 million for living resource protection and restoration activities, such as oyster studies and creating fish passages in areas of blockage; and
  - \$156 million for stewardship and community engagement activities, such as educational programs, publications, and informational forums.

An additional \$1.9 billion in indirect funding—which we define for the purposes of this report as funds not provided exclusively for bay restoration (e.g., activities that are part of a broader agency effort) and that would continue to exist in the absence of the restoration effort—was provided for activities that contribute to the restoration effort. For example, the Department of Agriculture’s Natural Resources Conservation Service provides funding for programs that help farmers implement agricultural best management practices. This assistance is part of the agency’s nationwide efforts and would continue even if the bay restoration effort did not exist.

The Bay Program does not have a comprehensive, coordinated implementation strategy, which has impacted its ability to achieve the goals laid out in the *Chesapeake 2000* agreement. Although the Bay Program has focused its efforts on developing plans to implement 10 key commitments, some of these plans are inconsistent with each other and are often perceived to be unachievable within the 2010 time frame. As a result, Bay Program partners have been left without a clear understanding of which work plan should be followed or what actions need to be taken. Moreover, the Bay Program is limited in its ability to strategically target resources because it has no assurance about the level of funds that may be available beyond the short term. Nonetheless the program has, in some cases, used its limited resources to develop work plans that ultimately could not be implemented because funds were not available. More importantly, the plans describe the actions that are needed to restore the bay but may not reflect what can be realistically accomplished by the program with available resources.

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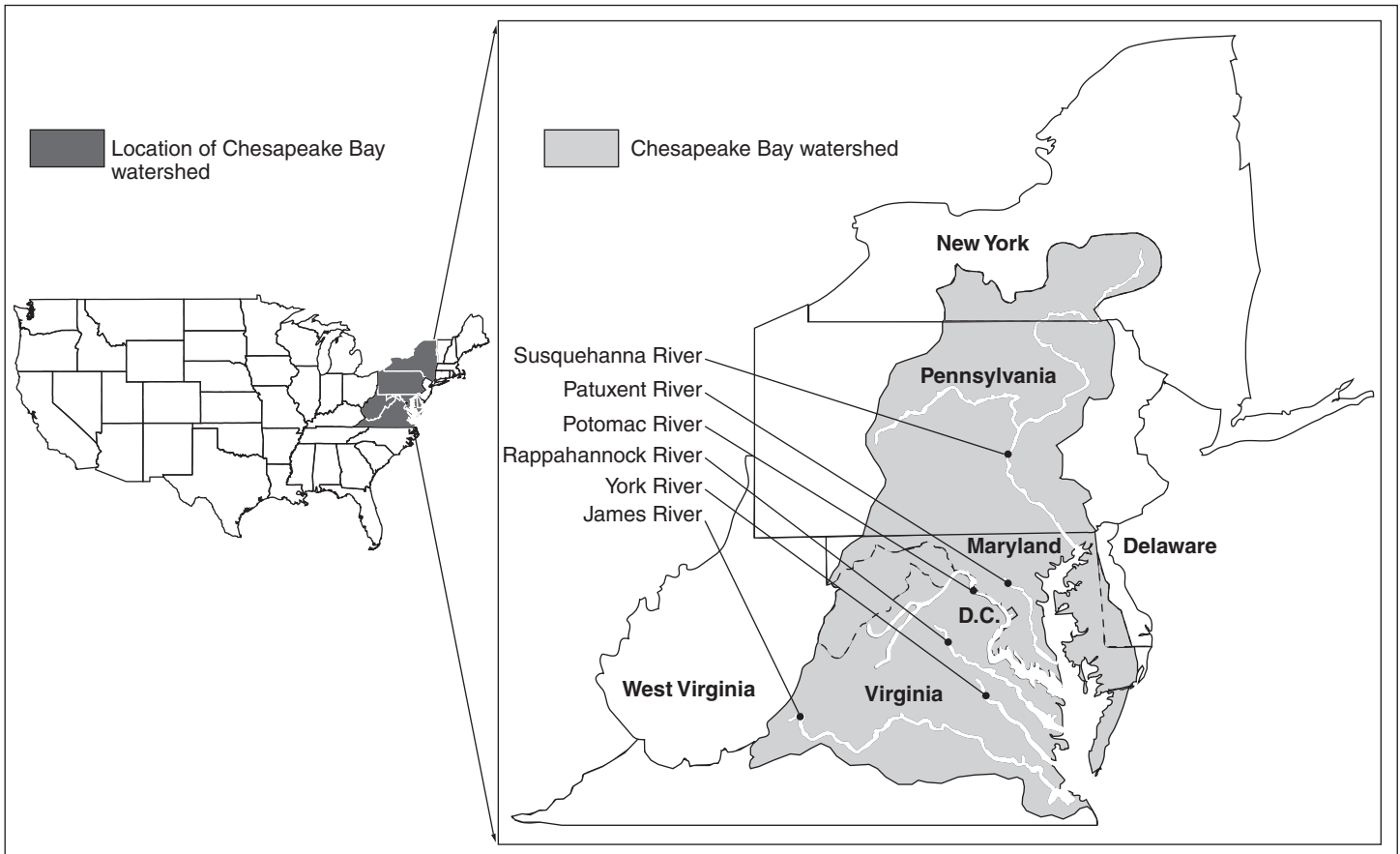
To improve the Bay Program's ability to assess, report, and manage the restoration effort, we are recommending that the Administrator of EPA instruct the Chesapeake Bay Program Office to (1) complete its efforts to develop and implement an integrated assessment approach; (2) revise its reporting approach; and (3) work with Bay Program partners to develop a comprehensive, coordinated implementation strategy that takes into account available resources. In commenting on our report, the signatories to the Bay Program generally agreed with our recommendations.

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## Background

The Chesapeake Bay is the largest of the nation's estuaries, measuring nearly 200 miles long and 35 miles wide at its widest point and, with its tributaries, the bay covers more than 4,500 square miles. However, the bay is relatively shallow, averaging only 21 feet deep. Roughly half of the bay's water comes from the Atlantic Ocean, and the other half is freshwater that drains from the land and enters the bay through its many rivers and streams in the watershed basin. The Susquehanna River, which flows through Maryland, New York, and Pennsylvania, provides about 50 percent of the freshwater that enters the bay. As shown in figure 1, the bay's watershed covers 64,000 square miles and spans parts of six states—Delaware, Maryland, New York, Pennsylvania, Virginia, and West Virginia—and the District of Columbia.

**Figure 1: Chesapeake Bay Watershed**



Sources: Chesapeake Bay Program Office and GAO.

The Chesapeake Bay is also biologically diverse, providing habitat for a wide variety of fish, shellfish, other animals, and plants. Blue crab, ducks, herring, oysters, shad, and striped bass are just some of the resources that live in or on the bay.

Over time, the bay's ecosystem has deteriorated. The bay's "dead zones"—where too little oxygen is available to support fish and shellfish—have increased, and many species of fish and shellfish have experienced major declines in population. The deterioration has occurred primarily because of excess amounts of nutrients entering the bay, which damage species and plant populations; the single largest source of these pollutants is agricultural runoff. Overharvesting key species, such as oysters and crabs,

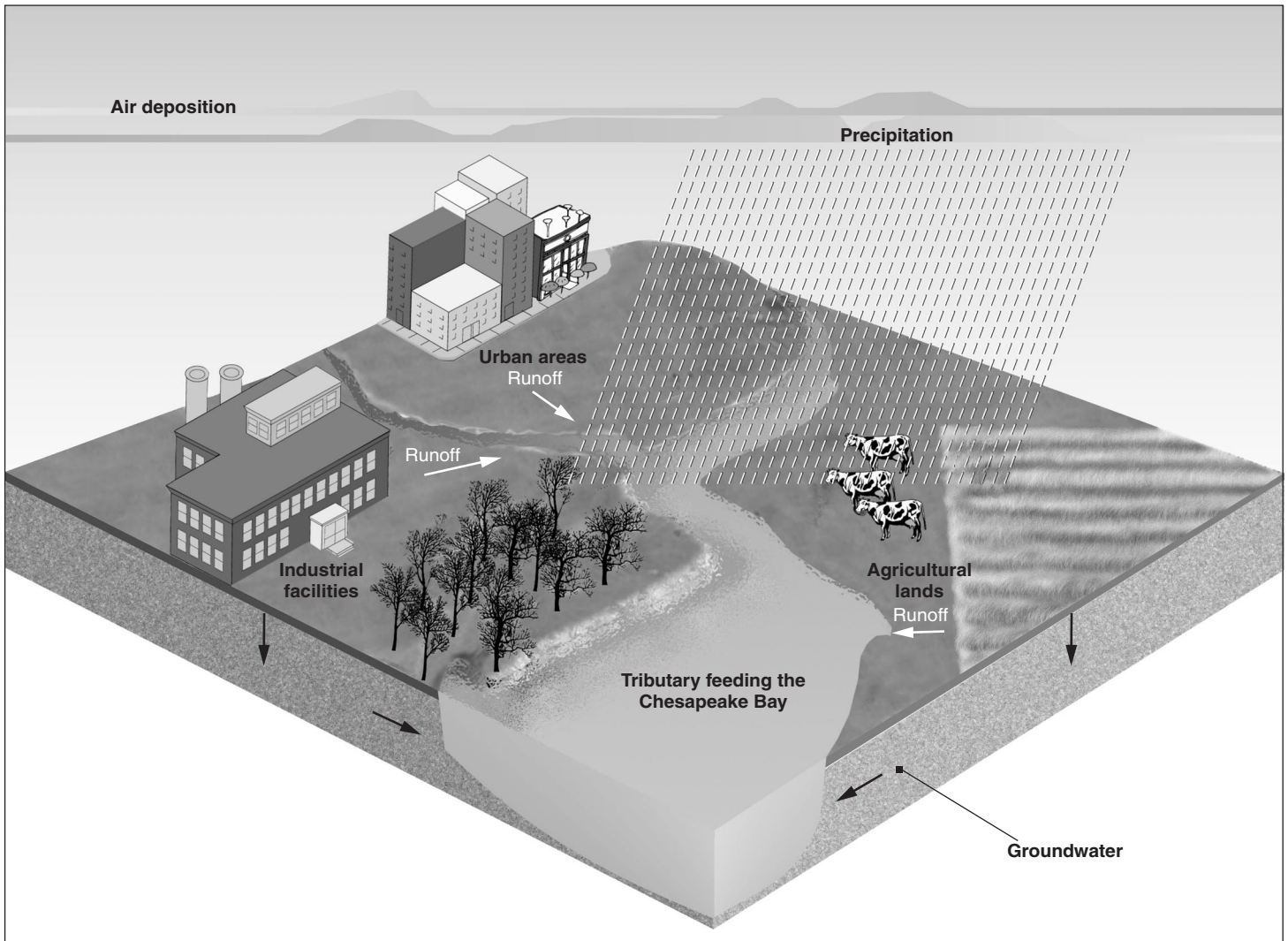
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has also contributed to the deterioration of the ecosystem. In addition, population growth and development have further stressed the ecosystem. For example, in the past decade, the amount of land in the watershed covered by impervious surfaces—surfaces through which water cannot flow—increased by about 41 percent, increasing the amount of polluted runoff that enters into streams and rivers and eventually runs into the bay.<sup>2</sup> With a very high land-to-water ratio, the bay is particularly sensitive to activities on land. Figure 2 shows some of the land activities that contribute to pollution in the bay’s ecosystem.

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<sup>2</sup>For a fuller discussion of the effects of development on ecosystems, see GAO, *Environmental Protection: Federal Incentives Could Help Promote Land Use That Protects Air and Water Quality*, [GAO-02-12](#) (Washington, D.C.: Oct. 31, 2001).

**Figure 2: Examples of Sources of Pollution in the Bay Ecosystem**



Source: GAO (data), Art Explosion (images).

The decline in the bay's living resources has been cause for a great deal of public and political attention. Efforts to manage the bay's ecosystem and protect its living resources began as early as the 1930s and have continued through the present. In 1980, Maryland and Virginia, later joined by Pennsylvania, established the Chesapeake Bay Commission to serve as an advisory body on the Chesapeake Bay to their state legislatures and as a liaison to Congress. On December 9, 1983, the Governors of Maryland and

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Virginia; the Lieutenant Governor of Pennsylvania; the Mayor of the District of Columbia; the Administrator of EPA; and the Chair of the Chesapeake Bay Commission signed the first Chesapeake Bay agreement. Their agreement resulted in the Chesapeake Bay Program, a partnership that directs and conducts the restoration of the bay. The signatories to the agreement reaffirmed their commitment to restore the bay in 1987 and again in 1992. They signed the most current agreement, *Chesapeake 2000*, on June 28, 2000.

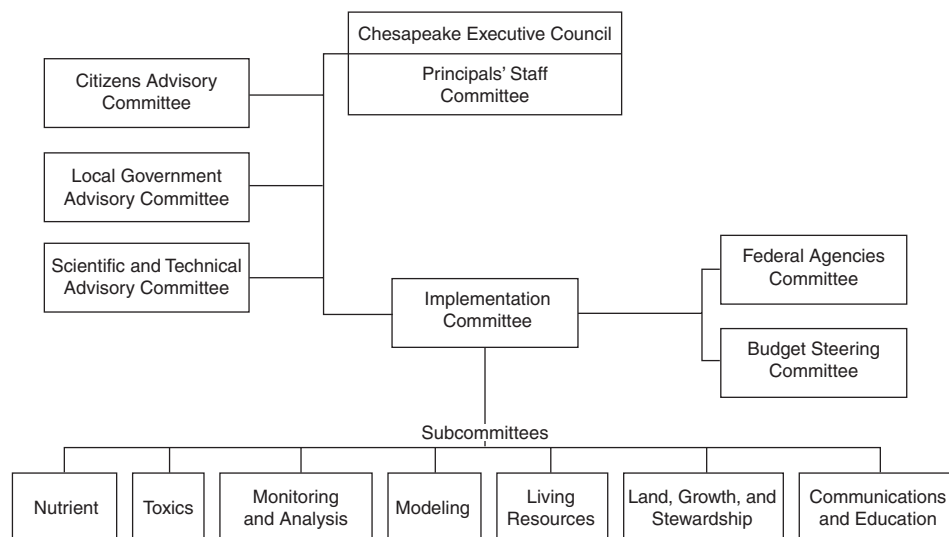
*Chesapeake 2000* envisions an ecosystem with abundant, diverse populations of living resources fed by healthy streams and rivers that sustain strong local and regional economies and a unique quality of life. The agreement has served as the Bay Program's strategic plan, and it outlines five broad goals and 102 commitments for the restoration effort. Appendix II lists the goals and commitments outlined in *Chesapeake 2000*.

The Bay Program, led by the Chesapeake Executive Council, has many partners, including federal agencies, states, academic institutions, and others (see app. III for a list of partners). While the Chesapeake Bay Program is a voluntary partnership among the states and the federal government, some activities of the Chesapeake Bay Program are implemented to meet the requirements of federal or state law. For example, the responsibility to establish water quality standards is both a commitment under the *Chesapeake 2000* agreement and a requirement under the federal Clean Water Act.

The Bay Program has seven committees and eight subcommittees, which form the organizational and planning structure for the restoration effort. In addition, the subcommittees have many work groups that plan and implement various aspects of the restoration effort. The organizational structure of the Bay Program is shown in figure 3.



**Figure 3: Chesapeake Bay Program Organizational Chart**



Source: Chesapeake Bay Program Office.

As the only federal signatory to the Chesapeake Bay agreements, EPA is responsible for spearheading the federal effort within the Bay Program through its Chesapeake Bay Program Office. Amendments to the Clean Water Act direct the Chesapeake Bay Program Office to provide support to the Chesapeake Executive Council. Specifically, the Chesapeake Bay Program Office is to, among other things,

- develop and make available information about the environmental quality and living resources of the Chesapeake Bay ecosystem;
- in cooperation with appropriate federal, state, and local authorities, help the signatories to the Chesapeake Bay agreement develop and implement specific plans to carry out their responsibilities; and
- coordinate EPA's actions with those of other appropriate entities to develop strategies to improve the water quality and living resources in the Chesapeake Bay ecosystem.

In addition, the Administrator of EPA, in coordination with other members of the Chesapeake Executive Council, must ensure that management plans are developed and that the signatories implement the plans to achieve and maintain, among other things, (1) the nutrient goals for the quantity of

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nitrogen and phosphorus entering the Chesapeake Bay and its watershed and (2) the water quality requirements necessary to restore living resources in the Chesapeake Bay ecosystem. The amendments to the Clean Water Act also directed the Administrator of EPA to submit a report to Congress every 5 years on the condition of the bay's ecosystem.

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## The Bay Program's Measures Have Not Been Integrated to Assess Overall Restoration Progress

Although the Bay Program has established 101 measures, it has not yet developed an integrated approach that would allow it to translate these individual measures into an assessment of overall progress toward achieving the five broad restoration goals outlined in *Chesapeake 2000*. Instead, the Bay Program's measures either assess progress toward achieving the restoration commitments that are quantifiable or provide information for making management decisions. The Bay Program has recognized that it may need an integrated approach to assess the overall progress of the restoration effort and established a task team to undertake this effort.

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## The Bay Program Has Established 101 Measures for Some of its Commitments

The Bay Program has established 101 measures, of which 46 are appropriate for assessing progress made in achieving 18 of the 21 quantifiable commitments contained in *Chesapeake 2000*.<sup>3</sup> The number of measures associated with each of these commitments varies; the more complex the assessment the more measures the Bay Program has developed and uses to assess progress. For example, assessing progress toward the commitment of correcting the nutrient- and sediment-related problems in the Chesapeake Bay and its tidal tributaries by 2010 under the *Water Quality Protection and Restoration* goal is complex, requiring the measurement of several pollutants and various aspects of water quality. The Bay Program uses 17 measures to assess progress for this commitment. In contrast, it is less complex to assess the commitment under the *Sound Land Use* goal to, by 2010, expand by 30 percent the system of public access points to the bay, its tributaries, and related resource sites in an environmentally sensitive manner. For this commitment, the Bay Program uses only one measure to track the number of new and enhanced public access sites within the Chesapeake Bay

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<sup>3</sup>Of the 102 commitments contained in *Chesapeake 2000*, 21 are quantifiable, and 81 are nonquantifiable. The 21 quantifiable commitments are associated with four of the five broad goals. The *Stewardship and Community Engagement* goal has no quantifiable commitments.

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watershed. According to the Chesapeake Bay Program Office, because no other restoration effort had developed measures that they could use, the program had to develop nearly all of the underlying science and methodologies for their measures. In addition, to ensure the appropriateness of these measures, the Chesapeake Bay Program Office requires a rigorous review of all of the measures before they are adopted. For the most part, our expert panel agreed that the Bay Program has established appropriate measures to assess specific aspects of the restoration effort. Several members of the Bay Program's Scientific and Technical Advisory Committee echoed this view.

The remaining three quantifiable commitments, for which the Bay Program has not yet established any measures, include the following:

- By 2010, establish a goal of implementing plans to preserve key wetlands while addressing surrounding land use in 25 percent of the land area of each state's bay watershed.
- By 2010, the District of Columbia, working with its watershed partners, will reduce pollution loads to the Anacostia River in order to eliminate public health concerns and achieve the living resource, water quality, and habitat goals of *Chesapeake 2000* and past agreements.<sup>4</sup>
- By 2003, develop partnerships with at least 30 interpretive sites to enhance their presentation of bay-related themes.<sup>5</sup>

The Bay Program has also developed 55 other measures to provide information it needs to make management decisions. For example, under the *Water Quality Protection and Restoration* goal, the Bay Program has made a commitment to assess the effects of airborne nitrogen compounds and chemical contaminants in the bay ecosystem and to help establish reduction goals for these contaminants. To help inform decision making for this commitment, the Bay Program has a measure for estimated vehicle emissions compared with vehicle miles traveled. In addition, for the

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<sup>4</sup>Although the Bay Program has not established measures for this commitment, the District of Columbia has developed a number of measures for assessing its progress in meeting this commitment.

<sup>5</sup>Although the Bay Program has not established measures for this commitment, the National Park Service, which has responsibility for this commitment, has developed a measure for assessing its progress in meeting this commitment.

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commitment under the *Living Resource Protection and Restoration* goal to restore fish passage to more than 1,357 miles of river, the Bay Program has two measures that provide information about fish population levels. The Bay Program also uses three measures—the number of residents in the Chesapeake Bay watershed, the relationship between this population and the amount of municipal wastewater flow, and the volume of river water flowing into the Chesapeake Bay—to track general information about the Chesapeake Bay watershed.

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### The Bay Program Lacks an Integrated Approach for Assessing Progress Toward Goals

While the Bay Program has established measures to assess progress made in meeting some of the individual commitments of *Chesapeake 2000*, it has not developed an approach that can be used to assess progress toward achieving the five broad restoration goals. For example, the Bay Program has measures for determining

- trends in individual fish and shellfish populations, such as crabs, oysters, and rockfish, but it has not yet devised a way to integrate those measures to assess the overall progress made in achieving its *Living Resource Protection and Restoration* goal;
- the acres of bay grasses in the bay, the acres of wetlands restored, and the miles of forest buffers restored, but it has not developed an approach for integrating those measures to assess the overall progress made in achieving its *Vital Habitat Protection and Restoration* goal; and
- attributes of water quality—such as levels of dissolved oxygen, water clarity, and chlorophyll a<sup>6</sup>—but has not developed an approach for combining these measures to determine progress toward achieving its goal of *Water Quality Protection and Restoration*.

According to our expert panel, in a complex ecosystem restoration project like the Chesapeake Bay, overall progress should be assessed by using an integrated approach. This approach should combine measures that provide information on individual species or pollutants into a few broader scale measures that can be used to assess key ecosystem attributes, such as biological conditions. One such framework was developed in 2002 by EPA's

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<sup>6</sup>Chlorophyll a is a measure of aquatic algae, which provides food for fish and other organisms. Too much aquatic algae reduces water clarity and depletes oxygen.

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Science Advisory Board and can serve as a tool to assist Bay Program officials in deciding what ecological attributes to measure and how to aggregate measurements into an understandable picture of ecological integrity.<sup>7</sup>

In developing such an approach, the Bay Program also faces the challenge of finding a way to incorporate the results achieved in implementing the 81 nonquantifiable commitments contained in *Chesapeake 2000* with the results achieved in implementing the 21 quantifiable commitments. For example, under the *Water Quality Protection and Restoration* goal, the Bay Program has a nonquantifiable commitment to reduce the potential risk of pesticides flowing into the bay by educating watershed residents on best management practices for pesticide use. Not only does the Bay Program currently have no method for measuring the progress made on this commitment, but it also has no approach for integrating these results with the results of the other 19 commitments listed under the water quality goal. Consequently, the program cannot currently assess the progress made in meeting the water quality goal.

According to an official from the Chesapeake Bay Program Office, it is difficult to assess progress made in restoring an ecosystem that is as scientifically complex as the bay. The official also noted that the partners have discussed the need for an integrated approach over the past several years but have disagreed on whether the Bay Program could develop an approach that is scientifically defensible, given their limited resources. Recently, however, the partners are more optimistic that an integrated approach can be developed that will provide a clearer sense of the overall health of the bay, as well as restoration progress.

In November 2004, a Bay Program task force began an effort to develop, among other things, a framework for organizing the Bay Program's measures and proposed a structure for how the redesign work would be accomplished by the Bay Program's subcommittees. The Bay Program's Implementation Committee adopted this framework in April 2005. In July 2005, the Bay Program's Monitoring and Analysis Subcommittee created a work group to head this effort. The Bay Program plans to have an initial integrated approach developed by January 2006.

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<sup>7</sup>Environmental Protection Agency, *A Framework For Assessing and Reporting on Ecological Condition: A Science Advisory Board Report* (Washington, D.C.: June 2002).

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## The Bay Program's Reports Do Not Effectively Communicate the Status of the Bay's Health

Mirroring the shortcomings in the program's measures, the Bay Program's primary mechanism for reporting on the health status of the bay—the *State of the Chesapeake Bay* report—does not provide an effective or credible assessment on the bay's current health status. This is because these reports (1) focus on individual species and pollutants instead of providing an overall assessment of the bay's health, (2) commingle data on the bay's health attributes with program actions, and (3) lack an independent review process. As a result, when these reports are issued, they do not provide information in a manner that would allow the public and stakeholders to easily determine how effective program activities have been in improving the health of the bay. The Bay Program has recognized that improvements in its current reporting approach are needed and is developing new reporting formats that it hopes will more clearly describe the bay's current health and the status of the restoration effort.

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## Bay Program Reports Do Not Effectively Communicate the Current Health Status of the Bay

The *State of the Chesapeake Bay* report has been issued approximately every 2 to 4 years since 1984 and is intended to provide the citizens of the bay region with a snapshot of the bay's health.<sup>8</sup> The Bay Program included the 2002 report as part of its required report to Congress on the status of the bay in 2003.<sup>9</sup> However, the *State of the Chesapeake Bay* report does not effectively communicate the current health status of the bay because instead of providing information on a core set of ecosystem characteristics it focuses on the status of individual species or pollutants. For example:

- The 2002 and 2004 *State of the Chesapeake Bay* reports provided data on oysters, crab, rockfish, and bay grasses, but the reports did not provide an overall assessment of the current status of living resources in the bay or the health of the bay. Instead, these data were reported for each species individually, with graphics showing current levels as well as trends over time.
- The 2004 *State of the Chesapeake Bay* report shows a graphic that depicts oyster harvest levels at historic lows, with a mostly decreasing trend over time, and a rockfish graphic that shows a generally increasing

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<sup>8</sup>In the last 10 years, the Bay Program has issued four *State of the Chesapeake Bay* reports. These reports were issued in 1995, 1999, 2002, and 2004.

<sup>9</sup>The first report to Congress on the condition of the Chesapeake Bay ecosystem, required by amendments to the Clean Water Act, was submitted in 2003.

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population trend over time. However, the report does not provide contextual information that states how these measures are interrelated or explain what the diverging trends mean about the overall health of the bay.

- The 2004 *State of the Chesapeake Bay* report shows water clarity and algae trends in the bay's major tributaries. These data include some varying trends, but the report provides no context for how these trends relate to one another or what the data show, collectively, about the overall health of the bay.

According to our expert panel, effective reports on the health of an ecosystem should contain information on key ecological attributes—derived from a broader set of indicators that portray ecosystem conditions. The *State of the Chesapeake Bay* report, however, does not provide such an overall assessment of the bay's health. Instead, our expert panel noted that the Bay Program has many fine scale indicators that measure individual aspects within the ecosystem, such as the oyster population or nutrient concentrations. While the expert panel agreed that the 2004 report was visually pleasing, they thought that it lacked a clear, overall picture of the bay's health. They noted that without an overall assessment of the bay's health, the public would probably not be able to easily and accurately assess the current condition of the bay from the information reported.

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## Bay Program Reports Lack Credibility

The credibility of the *State of the Chesapeake Bay* reports has been undermined by two key factors. First, the Bay Program has commingled data from three sources when reporting on the health of the bay. Specifically, the reports mix information on the bay's health status with results from a predictive model and the results of specific management actions. The latter two results do little to inform readers about the current health status of the bay and tend to downplay the bay's actual condition. Second, the Bay Program has not established an independent review process to ensure the objectivity and accuracy of its reports. According to our expert panel, establishing such a process would significantly improve the credibility of the Bay Program's reports.

## Bay Program Commingles Data on the Bay's Health with Other Data

The Bay Program uses the following three kinds of data when preparing the *State of the Chesapeake Bay* reports:

- *Monitoring data* describe the actual status of individual species or pollutants in the bay, such as the number of acres of bay grasses or the

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concentration of nutrients in the tributaries. Generally, these data tend to show a more negative picture of bay health. For example, monitoring data on the blue crab population show that this population is at risk, with below-average levels in all but 2 years since 1991. Similarly, water clarity, which is critical to the health of underwater grasses that provide important habitat for many bay animals, is degrading in 17 areas in the bay and its tributaries, improving in only 1 area, and unchanged in 22 areas. In addition, while trends in the number of acres of bay grasses and dissolved oxygen levels have held relatively constant, the rockfish population has generally increased.

- *Data on management actions* include information on the extent to which the Bay Program has met its management commitments, such as the number of wetland acres that have been restored and the miles of forest buffers that have been established. Generally, these data tend to be more positive. For example, the 2004 *State of the Chesapeake Bay* reported that the program is over half way toward meeting its commitment to restore 25,000 acres of wetlands by 2010. In addition, the miles of forest buffers restored have increased every year since 1996. These actions are important because they contribute to the bay's health in the long term. However, they do not immediately affect the bay's health and do not describe its current health condition.
- *Results from the Bay Program's predictive model* provide estimates of the long-term effect that certain management actions may have in reducing nutrient and sediment loads in the bay. The results from the predictive model are estimates and also tend to depict a positive picture. For example, because the model results indicate that loadings of phosphorus, nitrogen, and sediment have all been reduced since 1985, the 2004 *State of the Chesapeake Bay* reported that phosphorus loading decreased from approximately 27 million pounds per year to less than 20 million pounds per year by 2002. These statements, however, are based on estimates from the model and are not based on actual monitoring data of phosphorus concentrations in the bay. While the modeling results provide important forecast data on future impacts of various management actions, these results, like the results of management actions, do not describe the actual health conditions of the bay.

Even though only one of these three types of data describe actual health conditions in the bay, all three types of data are commingled in the Bay



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Program's *State of the Chesapeake Bay* reports. For example, in the 2002 report, the Bay Program reported an increase in the number of river miles opened for migratory fish, which is the result of a management action; in the same section, it also reported a decrease in the oyster population, which is an important factor in determining the bay's health.<sup>10</sup> Similarly, on a two-page spread in the 2004 report, the Bay Program presented monitoring data on five health indicators and information on three management indicators; the report also includes model results indicating improvements in nitrogen loadings.

We believe that by commingling the data in this manner, the Bay Program not only downplays the deteriorated condition of the bay but also confuses the reader by mixing information that is relevant with information that is irrelevant to understanding the current condition of the bay. Our expert panel agreed that a key attribute that influences the credibility of reports on ecosystem health is whether they contain relevant information. Our expert panel also noted that the Bay Program reports are overly oriented to reporting on the progress of the program's management actions at the expense of communicating information on the health status of the bay. Similarly, while they agreed that models can provide useful information about the impact of management actions on the future state of an ecosystem, these results should not be used in a report on actual health conditions.

Several Bay Program partners that we spoke with also noted that the reports tend to be unduly positive and have not effectively communicated the status of the bay's health. They believe that the reports failed to clearly distinguish between information on health and progress made in implementing management initiatives. In addition, several partners told us that the use of the predictive model to report on the actual health of the bay is inappropriate because the model forecasts potential outcomes of management actions and does not represent the actual health conditions of the bay.

The Bay Program recognizes that improvements in its current reporting approach are needed. The program is also developing new reporting formats that it believes will more clearly describe the bay's current health and the status of the restoration effort. As part of this effort, the Bay Program plans to issue separate reports in January and March 2006, one

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<sup>10</sup>The Bay Program uses oyster harvest levels to report on the oyster population.

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that would focus on the results of management actions and the other on the bay's health status. The Bay Program also believes that their current efforts to develop an integrated approach for assessing progress will contribute to their efforts to more effectively report on the bay's health.

### The Bay Program Lacks an Independent Report Review Process

The credibility of the *State of the Chesapeake Bay* reports is further impaired because the Bay Program does not have an independent review process to ensure that its reports are accurate and credible. The officials who manage and are responsible for the restoration effort also analyze, interpret, and report the data to the public. No process currently exists to involve any other organization or group in this process. For example, according to a member of the Bay Program's Scientific and Technical Advisory Committee, this committee, which has responsibility for providing scientific and technical advice to the Chesapeake Bay Program, is not involved in developing the reports and is not part of the review process. Instead, the reports are developed by the Communications and Education Subcommittee using data provided by the Monitoring and Analysis Subcommittee. The reports are then reviewed by representatives from each of the signatory jurisdictions prior to publication. We believe this lack of independence in reporting has led to the Bay Program projecting a rosier view of the health of the bay than may have been warranted. According to representatives of two of the signatories to the agreement, the signatories find it advantageous to positively report on the bay's health, because positive trends help sustain both political and public interest as well as support for the effort. Therefore, the Bay Program has an incentive to present the most positive picture to the public of the progress that has been made in restoring the bay's health. Chesapeake Bay Program officials acknowledged that concerns have been expressed that past reports projected a rosier view than was warranted. The officials noted that they believe that the 2004 *State of the Chesapeake Bay* report is less positive and pointed out that the report states that the bay and its watershed are in peril.

Our expert panelists believe that an independent review panel—to either review the bay's health reports before issuance or to analyze and report on the health status independently of the Bay Program—would significantly improve the credibility of the program's reports. Some program partners we interviewed also echoed the need for an independent review panel and stated that it would help improve the Bay Program's reports. For example, according to one partner, an independent group with no vested interest in the outcome of the reports could improve credibility.

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## Federal Agencies and States Have Provided Billions of Dollars in Both Direct and Indirect Funding for Restoration Activities

An estimated \$3.7 billion in direct funding was provided to restore the Chesapeake Bay from fiscal years 1995 through 2004.<sup>11</sup> This funding was provided for such purposes as water quality protection and restoration, sound land use, vital habitat protection and restoration, living resource protection and restoration, and stewardship and community engagement. An additional \$1.9 billion in indirect funding was also provided for activities that affect the restoration effort. These activities are conducted as part of broader agency efforts and/or would continue without the restoration effort.

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### Direct Funding for Restoration Activities

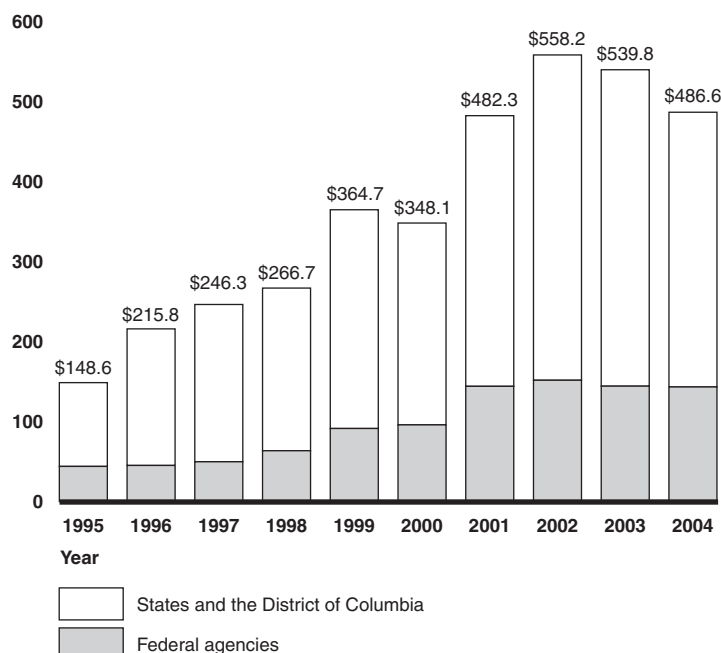
Eleven key federal agencies; the states of Maryland, Pennsylvania, and Virginia; and the District of Columbia provided almost \$3.7 billion in direct funding from fiscal years 1995 through 2004 to restore the bay. As shown in figure 4, the states typically provided about 75 percent of the direct funding for restoration, and the funding has generally increased over the 10-year period.

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<sup>11</sup>For the three states, the fiscal year runs from July 1 to June 30. For the District of Columbia, the fiscal year runs from October 1 to September 30.

**Figure 4: Direct Funding Provided by the Federal Agencies, States, and the District of Columbia, Fiscal Years 1995 through 2004, in Constant 2004 Dollars**

Dollars in millions



Source: GAO analysis of agency data.

Federal agencies provided a total of approximately \$972 million in direct funding, while the states and the District of Columbia provided approximately \$2.7 billion in direct funding for the restoration effort over the 10-year period. Of the federal agencies, the Department of Defense's U.S. Army Corps of Engineers provided the greatest amount of direct funding. Of the states, Maryland provided the greatest amount of direct funding—more than \$1.8 billion—which is over \$1.1 billion more than any other state. Table 1 shows the amount of direct funding these entities provided.

**Table 1: Direct Funding Provided by the Federal Agencies, States, and District of Columbia, Fiscal Years 1995 through 2004, in Constant 2004 Dollars**

Dollars in millions	
Federal agency	Amount of direct funding
<b>Department of Defense</b>	
Army Corps of Engineers	\$293.5
Army	56.1
Navy/Marines	5.8
<b>Total—Department of Defense</b>	<b>\$355.4</b>
<b>EPA (total)</b>	<b>\$253.7</b>
<b>Department of Agriculture</b>	
Farm Service Agency	167.0
Natural Resources Conservation Service	51.5
U.S. Forest Service	11.9
<b>Total—Department of Agriculture</b>	<b>\$230.4</b>
<b>Department of the Interior</b>	
U.S. Fish and Wildlife Service	45.7
U.S. Geological Survey	24.2
National Park Service	7.5
<b>Total—Department of the Interior</b>	<b>\$77.4</b>
<b>Department of Commerce</b>	
National Oceanic and Atmospheric Administration	\$55.5
<b>Total—federal agencies</b>	<b>\$972.4</b>
<b>State</b>	
Maryland	1,862.4
Virginia	752.6
District of Columbia	41.8
Pennsylvania	28.1
<b>Total—all states</b>	<b>\$2,684.8</b>
<b>Grand total</b>	<b>\$3,657.2</b>

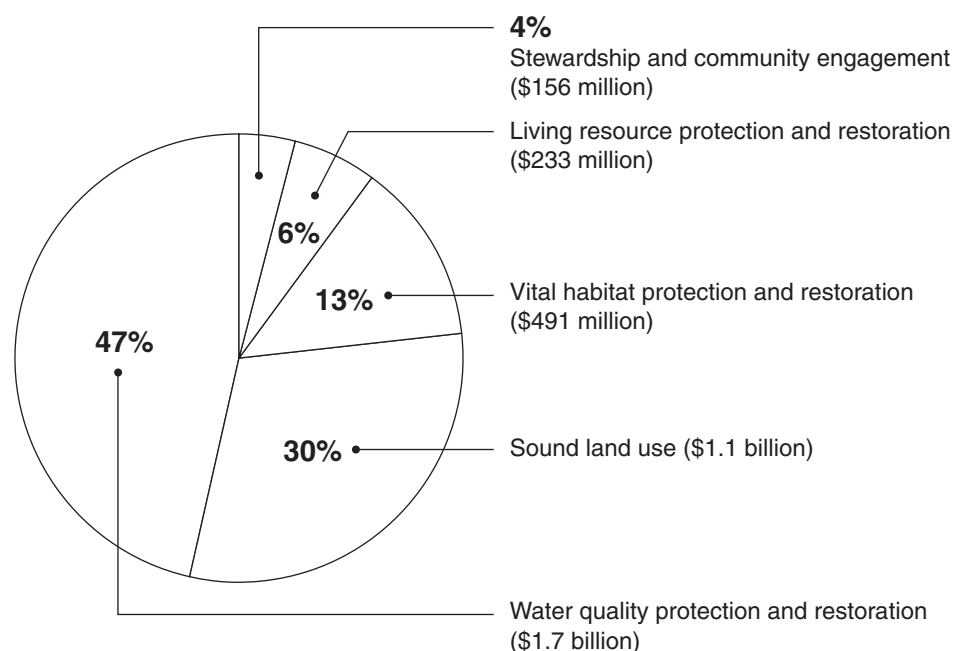
Source: GAO analysis of agency data.

Note: Totals may not add due to rounding.

The percentage of direct funding provided for each of the five goals in *Chesapeake 2000* varies. The largest percentage of direct funding—approximately 47 percent—went to water quality protection and

restoration. The smallest percentage of direct funding—about 4 percent—was provided for stewardship and community engagement. Figure 5 shows the percentage of direct funding provided for each of the goals.

**Figure 5: Percentage of the Total Direct Funding Provided for Addressing Each of the Five *Chesapeake 2000* Goals, Fiscal Years 1995 through 2004**



Source: GAO analysis of agency data, in constant 2004 dollars.

Note: Examples of water quality protection and restoration activities include upgrades to wastewater treatment plants and technical assistance for the implementation of agricultural best management practices. Examples of sound land use activities include land acquisition and support for smart growth initiatives. Examples of vital habitat protection and restoration activities include wetland restoration and studies for determining the best methods for protecting and restoring submerged aquatic vegetation. Examples of living resource protection and restoration activities include oyster studies and creating fish passages in areas of blockage. Examples of stewardship and community engagement activities include educational programs, publications, and informational forums.

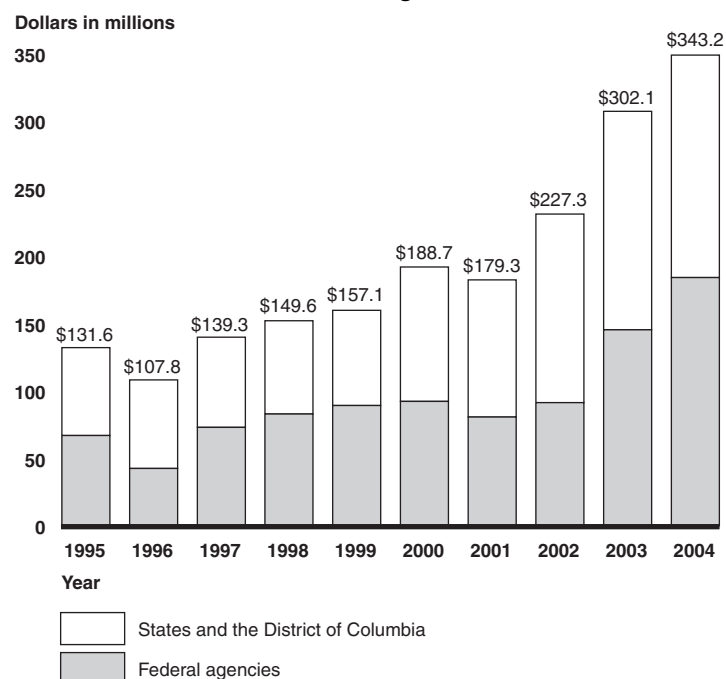
## Indirect Funding for Activities That Affect the Restoration Effort

Ten of the key federal agencies, Pennsylvania, and the District of Columbia provided about \$1.9 billion in additional funding from fiscal years 1995 through 2004 for activities that have an indirect impact on bay restoration. These activities are conducted as part of broader agency efforts and/or would continue without the restoration effort. For example, the Department of Agriculture's Natural Resources Conservation Service

provides funding for programs that assist farmers in implementing agricultural best management practices. This assistance is part of the agency's nationwide efforts and would continue even if the bay restoration effort did not exist. Similarly, the majority of Pennsylvania's funding is included in the total for indirect funding because, while the state's restoration efforts are important for restoring the bay, such as reducing agricultural runoff, bay restoration is not the primary purpose of the funding.

As with direct funding, indirect funding for the restoration effort has also generally increased over fiscal years 1995 through 2004. As shown in figure 6, federal agencies typically provided about half of the indirect funding for the restoration effort.

**Figure 6: Indirect Funding Provided by Federal Agencies, States, and the District of Columbia, Fiscal Years 1995 through 2004, in Constant 2004 Dollars**



Source: GAO analysis of agency data.

Federal agencies provided approximately \$935 million in indirect funding, while Pennsylvania and the District of Columbia provided approximately \$991 million in indirect funding for the restoration effort over the 10-year

period. Of the federal agencies, the Department of Agriculture provided the greatest amount of indirect funding, primarily through the Natural Resources Conservation Service. Of the states, Pennsylvania provided the greatest amount of indirect funding. Table 2 shows the amount of indirect funding these entities provided.

**Table 2: Indirect Funding Provided for the Chesapeake Bay Restoration Effort, Fiscal Years 1995 through 2004, in Constant 2004 Dollars**

Dollars in millions	
<b>Federal agency</b>	<b>Amount of indirect funding</b>
<b>Department of Agriculture</b>	
Natural Resources Conservation Service	\$306.1
Farm Service Agency	136.5
U.S. Forest Service	54.0
<b>Total—Department of Agriculture</b>	<b>\$496.5</b>
<b>EPA (total)</b>	<b>\$181.4</b>
<b>Department of Commerce</b>	
National Oceanic and Atmospheric Administration	\$114.0
<b>Department of Defense</b>	
Navy/Marines	69.9
Army	17.3
Army Corps of Engineers	0
<b>Total—Department of Defense</b>	<b>\$87.2</b>
<b>Department of the Interior</b>	
U.S. Fish and Wildlife Service	51.8
National Park Service	2.2
U.S. Geological Survey	1.7
<b>Total—Department of the Interior</b>	<b>\$55.7</b>
<b>Total—federal agencies</b>	<b>\$934.9</b>
<b>State</b>	
Pennsylvania	863.8
District of Columbia	127.2
Maryland	0
Virginia	0
<b>Total—all states</b>	<b>\$991.0</b>



(Continued From Previous Page)

Dollars in millions

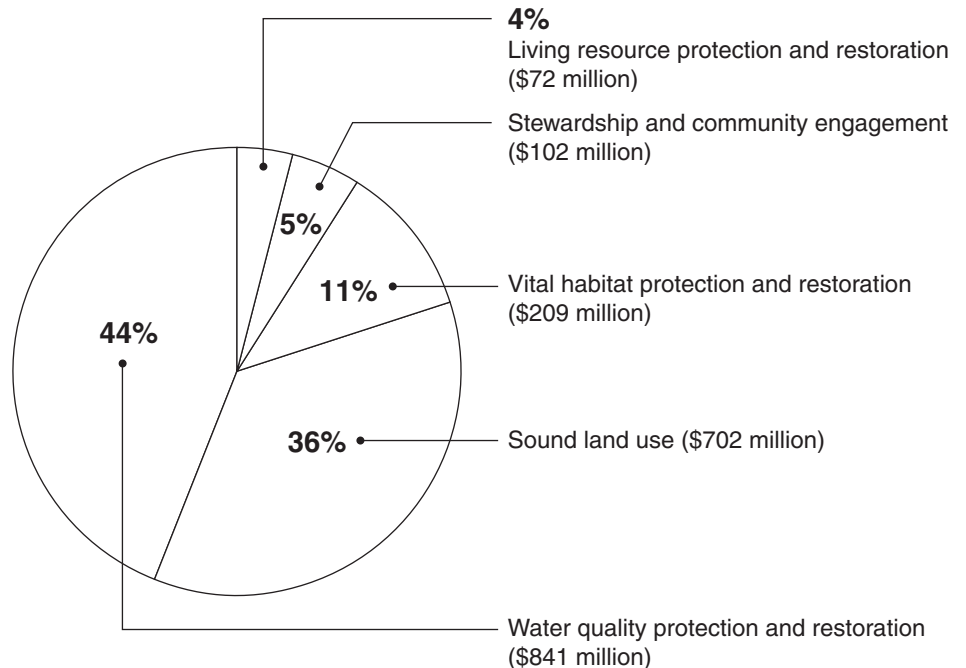
Federal agency	Amount of indirect funding
<b>Grand total</b>	<b>\$1,925.9</b>

Source: GAO analysis of agency data.

Note: Totals may not add due to rounding.

The percentage of indirect funding provided for each of the five goals in *Chesapeake 2000* varies. The largest percentage of indirect funding—approximately 44 percent—went to water quality protection and restoration. The smallest percentage of indirect funding—approximately 4 percent—went to living resource protection and restoration. Figure 7 shows the percentage of indirect funding that was provided for each of the five goals.

**Figure 7: Percentage of the Total Indirect Funding Provided for Addressing Each of the Five *Chesapeake 2000* Goals, Fiscal Years 1995 through 2004**



Source: GAO analysis of agency data, in constant 2004 dollars.

Appendix V contains additional details on funds obligated for the restoration of the Chesapeake Bay from fiscal years 1995 through 2004.

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Although almost \$3.7 billion in direct funding and more than \$1.9 billion in indirect funding has been provided for activities to restore the Chesapeake Bay, estimates for the amount of funding needed to restore the bay far surpass these figures. A January 2003 Chesapeake Bay Commission report estimated that the restoration effort faced a funding gap of nearly \$13 billion to achieve the goals outlined in *Chesapeake 2000* by 2010. In addition, the report found that the *Water Quality Protection and Restoration* goal faced the largest funding gap. Subsequently, in an October 2004 report to the Chesapeake Executive Council, the Chesapeake Bay Watershed Blue Ribbon Finance Panel estimated that the restoration effort is grossly underfunded.<sup>12</sup> The finance panel found that the lack of adequate funding and implementation has left the bay effort far short of its goals and recommended that a regional financing authority be created with an initial capitalization of \$15 billion of which \$12 billion would come from the federal government.

In addition to the funding provided for the restoration of the bay, EPA provided more than \$1 billion to Maryland, Virginia, and Pennsylvania through its Clean Water State Revolving Fund program during fiscal years 1995 through 2004. The states use this funding, along with a required 20 percent match, to capitalize their state revolving funds. The funds provide low-cost loans or other financial assistance for a wide range of water quality infrastructure projects and other activities, such as implementing agricultural best management practices and urban storm water management. The District of Columbia, which is exempted from establishing a loan program, received more than \$58 million from the program as grants for water quality projects during the same time period. Some of the projects funded may contribute to the bay's restoration. For example, a \$100 million loan was made to Arlington County, Virginia, in 2004 for upgrading a wastewater treatment facility to enhance nutrient removal.

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<sup>12</sup>The Chesapeake Bay Watershed Blue Ribbon Finance Panel was established to identify funding sources sufficient to implement basinwide cleanup plans so that the bay and tidal tributaries would be restored sufficiently by 2010 to remove them from the list of impaired waters under the Clean Water Act. The panel was composed of 15 leaders from the private sector, government, and environmental community.

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## The Bay Program Has Not Always Effectively Coordinated and Managed the Restoration Effort

Although *Chesapeake 2000* provides the overall vision and strategic goals for the restoration effort along with short- and long-term commitments, the Bay Program lacks a comprehensive, coordinated implementation strategy that will enable it to achieve the goals laid out in the agreement. Although the Bay Program has adopted 10 keystone commitments to focus the partners' efforts and developed several planning documents, these plans are sometimes inconsistent with each other. Furthermore, the Bay Program is limited in its ability to strategically target resources because it has no assurance about the level of funds that may be available beyond the short term. According to Bay Program officials, they recognize that inconsistent strategies have been developed and are currently determining how to reconcile these various strategies.

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## The Bay Program Lacks a Coordinated Implementation Strategy

*Chesapeake 2000* and prior agreements have provided the overall direction for the restoration effort over the past two decades. However, the Bay Program generally lacks a comprehensive, coordinated implementation strategy that could provide a road map for accomplishing the goals outlined in the agreement. Several Bay Program partners we interviewed expressed frustration because the Bay Program has not developed a clear, realistic plan for how it will meet the restoration goals. For example, a signatory to the Chesapeake Bay agreements noted that while *Chesapeake 2000* contains the correct goals and appropriately identifies actions needed to restore the bay, the Bay Program does not have a plan in place that will allow the program to meet these goals. Similarly, a federal partner in the effort expressed frustration with the Chesapeake Executive Council for not convening a meeting of partners after the agreement was signed to decide how to proceed with the restoration effort and for not having a clear, overall plan for achieving program goals. According to one state partner, there is no clear strategy for how the restoration goals should be achieved, and such a strategy is needed to help ensure better progress toward achieving the *Chesapeake 2000* commitments.

Recognizing that it could not effectively manage all 102 commitments outlined in *Chesapeake 2000*, in 2003, the Bay Program adopted 10 keystone commitments as a management strategy to focus the partners' efforts. The program believes that these commitments, if accomplished, will provide the greatest benefit to the bay. These commitments include the following:

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- By 2010, achieve, at a minimum, a tenfold increase in native oysters in the Chesapeake Bay, based upon a 1994 baseline.
  - By 2007, revise and implement existing fisheries management plans to incorporate ecological, social, and economic considerations; multispecies fisheries management; and ecosystem approaches.
  - By 2002, implement a strategy to accelerate protection and restoration of submerged aquatic vegetation beds in areas of critical importance to the bay's living resources.
  - By 2010, work with local governments, community groups, and watershed organizations to develop and implement locally supported watershed management plans in two-thirds of the bay watershed covered by the agreement. These plans would address the protection, conservation, and restoration of stream corridors, riparian forest buffers, and wetlands for the purposes of improving habitat and water quality, with collateral benefits for optimizing stream flow and water supply.
  - By 2010, achieve a net resource gain by restoring 25,000 acres of tidal and nontidal wetlands.
  - Conserve existing forests along all streams and shorelines.
  - By 2010, correct the nutrient- and sediment-related problems in the Chesapeake Bay and its tidal tributaries sufficiently to remove the bay and the tidal portions of its tributaries from the list of impaired waters under the Clean Water Act.
  - Strengthen programs for land acquisition and preservation within each state that are supported by funding and target the most valued lands for protection. Permanently preserve from development 20 percent of the land area in the watershed by 2010.
  - By 2012, reduce the rate of harmful sprawl development of forest and agricultural land in the Chesapeake Bay watershed by 30 percent measured as an average over 5 years from the baseline of 1992-97, with measures and progress reported regularly to the Chesapeake Executive Council.

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- Beginning with the class of 2005, provide a meaningful bay or stream outdoor experience for every school student in the watershed before graduation from high school.

To achieve the 10 keystone commitments, the Bay Program has developed numerous planning documents, such as subcommittee and work group plans, state tributary strategies, and species-specific management plans. These planning documents, however, are not always consistent with each other. For example, a work group of the Bay Program's Living Resources Subcommittee developed a strategy for restoring 25,000 acres of wetlands by 2010—a commitment under the *Vital Habitat Protection and Restoration* goal. This plan, developed in 2000, describes a strategy of restoring 2,500 acres per year through 2010. Subsequently, each state within the bay watershed and the District of Columbia developed a tributary strategy that describes the actions needed to achieve and maintain nitrogen and phosphorus load reductions necessary to remove the bay and its tributaries from the impaired waters list by 2010—a commitment under the *Water Quality Protection and Restoration* goal. In these strategies, the states describe actions for restoring over 200,000 acres of wetlands—far exceeding the 25,000 acres that the Bay Program has developed strategies for restoring.<sup>13</sup> Similarly, a work group of the Nutrient Subcommittee developed a plan in 2004 to restore at least 10,000 miles of forest buffers by 2010—a commitment under the *Vital Habitat Protection and Restoration* goal. However, the tributary strategies developed by Pennsylvania and Virginia describe actions to restore a total of about 45,000 miles of forest buffers by 2010—more than four times the amount called for in the Bay Program's plan.

While we recognize the partners have the freedom to develop higher targets than established by the Bay Program, having such varying targets causes confusion, not only for the partners, but other stakeholders regarding what actions are actually needed to restore the bay. Moreover, such an approach appears to contradict the underlying principles of the partnership that was formed because the partners recognized that a cooperative approach was needed. According to the Chesapeake Bay Program Office, the program recognizes that inconsistent strategies have been developed and is now determining how to reconcile these various strategies. The officials also noted that some strategies, like the tributary strategies, have only recently

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<sup>13</sup>The restoration of over 200,000 acres of wetlands includes actions to be taken by New York and Delaware.

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been developed and the partners did not realize, until these strategies were developed, the extent of the additional work that would be required to meet the water quality commitments in *Chesapeake 2000*.

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## The Bay Program Is Limited in Its Ability to Strategically Target Resources

Since 2000, Bay Program partners have devoted a significant amount of their limited resources to developing strategies for achieving the commitments outlined in *Chesapeake 2000*. However, as various partners have acknowledged, several of these strategies are either not being used by the Bay Program or are believed to be unachievable within the 2010 time frame.

According to a Bay Program official, some work groups have invested significant resources in developing detailed plans for accomplishing specific commitments, but after the plans were developed, the program realized it had no resources available to implement the plans. For example, the Toxics Subcommittee invested significant resources to develop a detailed toxics work plan for achieving the toxics commitments in *Chesapeake 2000*. Even though the Bay Program has not been able to implement this work plan as planned because personnel and funding have not been available, program officials told us that the plan is currently being revised. It is unclear to us why the program is investing additional resources to revise this plan when the necessary resources are not available to implement it, and it is not one of the keystone commitments. According to the Chair of the Toxics Subcommittee, the work groups are generally responsible for developing strategies for achieving the commitments in *Chesapeake 2000* without knowing what level of resources will be available to implement the strategies. Strategies are often developed in this way because, according to a Bay Program official, while they know how much each partner has agreed to provide for the upcoming year, they do not know how much funding partners will provide in the future. This funding challenge was recognized by the Chesapeake Bay Watershed Blue Ribbon Finance Panel, which reported that no summary cost of all needed restoration activities is available. The panel also noted that the lack of adequate funding and implementation has left the Bay Program far short of its goals. Without knowing what funding will be available to accomplish restoration activities, the Bay Program is limited in its ability to target and direct funding toward those restoration activities that will be the most cost effective and beneficial.

The Bay Program has also spent a significant amount of resources developing strategies that some partners believe are unachievable. For

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example, the Bay Program has developed an oyster management plan for its commitment to achieve, by 2010, a tenfold increase in oysters, based upon a 1994 baseline. Maryland and Virginia have also developed state-specific plans for implementing the strategies laid out in the oyster management plans. Although the Bay Program has developed these detailed strategies and implementation plans, it also states in the oyster management plan that it will be unlikely to achieve the commitment because of low abundance, degraded habitat, and disease. Several partners also told us that they believe that the oyster commitment will be impossible to achieve. Similarly, states have spent years developing tributary strategies, but several Bay Program partners have told us that these strategies are not feasible, particularly given current funding levels and time frames. A member of the implementation committee told us that, even if the necessary funding was provided, the Bay Program does not have the personnel or equipment needed to implement all of the strategies that have been developed. Furthermore, it is not possible to meet the commitment of removing the bay and its tributaries from the impaired waters list by 2010. According to several partners we spoke with, while point source reductions called for in these strategies are achievable, nonpoint source reductions are not.<sup>14</sup> In addition, several partners told us that other goals are also unachievable. For example, several local government representatives told us that, overall, the Bay Program's goals are unachievable. They believe that the lack of a realistic plan that is based on available resources has discouraged partners and stalled the restoration effort.

The Chesapeake Bay Program Office recognizes that some of the plans that have been developed are unachievable but stated that the plans were developed to identify what actions will be needed to achieve the commitments of *Chesapeake 2000*. The office also recognizes that there is a fundamental gap between what needs to be done to achieve some of the commitments and what can be achieved with the current resources available. Chesapeake Bay Program Office officials noted that the development of an overall implementation plan that takes into account available resources had been discussed, but that no agreement could be reached among the partners.

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<sup>14</sup>Point sources of pollution are discrete conveyances, such as pipes and drains from wastewater treatment plants and industrial facilities from which pollutants are discharged. Nonpoint sources of pollution are sources of pollution that are not from a specific source, for example, agricultural runoff.

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## Conclusions

Restoring the Chesapeake Bay is a massive, complex, and difficult undertaking. The ultimate success of the restoration hinges on several factors, of which a well-coordinated and managed implementation approach is key. To its credit, the Bay Program has made significant strides in developing over 100 different measures of progress, publishing dozens of reports on the state of the bay, and creating several documents that lay out strategies for fulfilling commitments outlined in *Chesapeake 2000* that are intended to move the Bay Program closer to meeting the overall restoration goals. However, despite the extensive efforts that have gone into managing the restoration program, the lack of (1) integrated approaches to measure overall progress, (2) independent and credible reporting mechanisms, and (3) coordinated implementation strategies is undermining the success of the restoration effort and potentially eroding public confidence and continued support. We believe that the combined impact of these deficiencies has already resulted in a situation in which the Bay Program cannot effectively present a clear and credible picture of what the restoration effort has achieved, what strategies will best further *Chesapeake 2000*'s restoration goals, and how limited resources should be channeled to develop and implement the most effective strategies.

With over two decades of restoration experience to rely on, we believe that the Bay Program is well positioned to seriously reevaluate how it measures and reports on both restoration progress and the actual health status of the bay. Given the billions of dollars that have already been invested in this project and the billions more that are almost certainly needed, stakeholders and the public should have ready access to reliable information that presents an accurate assessment of restoration progress and the actual health status of the bay. Moreover, the long-term partnership is uniquely positioned to undertake a hard look at what strategies have been the most cost effective and beneficial to the restoration effort and use this information not only to inform their future actions but also to ensure that they are not developing strategies that will be at cross-purposes or develop unrealistic implementation plans that do not reflect available resources.



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## Recommendations for Executive Action

To improve the methods used by the Bay Program to assess progress made on the restoration effort, we recommend that the Administrator of EPA instruct the Chesapeake Bay Program Office to complete its plans to develop and implement an integrated approach to assess overall restoration progress. In doing so, the Chesapeake Bay Program Office should ensure that this integrated approach clearly ties to the five broad restoration goals identified in *Chesapeake 2000*.

To improve the effectiveness and credibility of the Bay Program's reports on the health of the bay, we recommend that the Administrator of EPA instruct the Chesapeake Bay Program Office to take the following three actions to revise its reporting approach:

- include an assessment of the key ecological attributes that reflect the bay's current health conditions,
- report separately on the health of the bay and on the progress made in implementing management actions, and
- establish an independent and objective reporting process.

To ensure that the Bay Program is managed and coordinated effectively, we also recommend that the Administrator of EPA instruct the Chesapeake Bay Program Office to work with Bay Program partners to take the following two actions:

- develop an overall, coordinated implementation strategy that unifies the program's various planning documents, and
- establish a means to better target its limited resources to ensure that the most effective and realistic work plans are developed and implemented.

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## Agency Comments and Our Evaluation

We provided a draft of this report to the signatories of the *Chesapeake 2000* agreement—the Administrator of EPA; the Governors of Maryland, Pennsylvania, and Virginia; the Mayor of the District of Columbia; and the Executive Director of the Chesapeake Bay Commission—for their review and comment. EPA, Maryland, Virginia, the District of Columbia, and the Chesapeake Bay Commission generally concurred with the report's findings and recommendations. Although Pennsylvania did not specifically comment on the report's findings and recommendations, it noted—as did

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other commenters—that the Bay Program is undertaking actions to address the issues discussed in our report. We are encouraged that the signatories generally agree with our recommendations. Without such actions, we believe that the program will be unable to change the status quo and move forward in a more strategic and well-coordinated manner.

In their written comments, all of the signatories also emphasized the importance of the tributary strategies developed by the states to the restoration effort. Virginia stated that these strategies will serve as the basis of the comprehensive implementation plan that we recommended, but noted that any regional implementation plan developed must provide states with the flexibility to operate within their own cultural, legal, and political environments. Maryland echoed this concern, stating that while a comprehensive, coordinated strategy is important, each jurisdiction must maintain the ability to implement strategies that it believes will be most successful in achieving the collective goal of reducing nutrient and sediment inputs into the Chesapeake Bay. We recognize the importance of the tributary strategies and agree that states need flexibility in implementing these strategies. However, we continue to believe that it is important to develop an overall, coordinated implementation strategy for the Bay Program that unifies the various planning documents developed. In its comments, EPA stated that the tributary strategies have been developed to guide the restoration effort to eventual success and indicated that the Bay Program is now aligning its management plans to take better advantage of available resources for the restoration effort. EPA also provided technical comments and clarifications that we incorporated, as appropriate. The signatories' written comments are presented in appendixes VI through XI.

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As agreed with your office, unless you publicly announce the contents of this report earlier, we plan no further distribution until 30 days from the report date. At that time, we will send copies to the appropriate congressional committees; the Administrator of EPA; the Governors of Maryland, Pennsylvania, and Virginia; the Mayor of the District of Columbia; the Executive Director of the Chesapeake Bay Commission; and the Director of the Office of Management and Budget. We also will make copies available to others on request. In addition, the report will be available at no charge on the GAO Web site at <http://www.gao.gov>.

If you or your staff have any questions about this report, please contact me at (202) 512-3841 or [mittala@gao.gov](mailto:mittala@gao.gov). Contact points for our Offices of

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Congressional Relations and Public Affairs may be found on the last page of this report. GAO staff who made major contributions to this report are listed in appendix XII.

A handwritten signature in black ink, reading "Anu K. Mittal". The signature is written in a cursive, flowing style.

Anu K. Mittal  
Director, Natural Resources  
and Environment

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# Objectives, Scope, and Methodology

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We were asked to address several issues concerning the Chesapeake Bay Program's (Bay Program) restoration effort. Specifically, we were asked to determine (1) the extent to which the Bay Program has established appropriate measures for assessing restoration progress, (2) the extent to which the reporting mechanisms the Bay Program uses clearly and accurately describe the bay's overall health, (3) how much funding was provided for restoring the Chesapeake Bay for fiscal years 1995 through 2004 and for what purposes, and (4) how effectively the restoration effort is being coordinated and managed.

To determine the extent to which the Bay Program has established appropriate measures for assessing restoration progress, we obtained documentation on the measures being used by the Bay Program to assess progress and their linkages to commitments in *Chesapeake 2000*. We analyzed these measures to determine which measures provide information about progress in achieving quantifiable commitments and which provide information needed to make management decisions. We also analyzed the measures to determine their appropriateness for measuring progress toward the quantifiable commitments.

To determine the extent to which the reporting mechanisms the Bay Program uses clearly and accurately describe the bay's overall health, we obtained a variety of reports issued by the Bay Program, including all of the *State of the Chesapeake Bay* reports. We analyzed these reports to identify the types of information included in the reports, the consistency of the information provided over time, and the format and presentation of the reports. We did not assess the reliability of the data provided in the reports.

To identify the critical elements of effective assessment and reporting processes, pros and cons of different assessment and reporting processes, and alternative methods of measuring and reporting progress that may be applicable to the Chesapeake Bay restoration effort, we assembled a panel of recognized experts on the following environmental restoration topics: indicator development, modeling, methods for reporting restoration progress, watershed restoration, and ecosystem restoration. To identify experts on these topics, we used the "snowball" technique. We identified experts through a literature search and Internet search. As we contacted experts, we verified their independence from the Chesapeake Bay Program and asked for additional contacts of experts. We selected 60 environmental restoration experts as potential panelists. From these 60 experts, we chose the final eight panelists on the basis of the following criteria: (1) recommendations we received from others knowledgeable in the field of

environmental restoration; (2) the individual's area of expertise and experience; (3) the type of organization represented, including academic institutions, government, and private industry; and (4) geographic representation. (The names and affiliations of the panel members are listed in app. IV). On May 17, 2005, we held an all-day meeting with the eight panelists at our office in Washington, D.C. Before the meeting, we provided each panel member with a set of eight general discussion questions. At the end of each discussion, we asked the panelists to respond, using an anonymous ballot, to a set of questions that were based on the general discussion topics. We recorded and transcribed the meeting to ensure that we accurately captured the panel members' statements.

To obtain information on the funding provided for the restoration effort, we developed a data collection instrument that we distributed to key federal agencies; the states of Maryland, Pennsylvania, and Virginia; and the District of Columbia. Key federal agencies were identified as those that participated in high-level Chesapeake Bay Program committees or that provided more than \$250,000 annually, on average, in direct funding. For the purposes of this report, we defined direct funds as those that were provided exclusively for bay restoration (e.g., increasing the oyster population) or those that would no longer be made available in the absence of the restoration effort. To make the comparison more meaningful, we present funding data in constant 2004 dollars. Unless otherwise noted, all figures are obligation amounts and include administrative costs. We reviewed the data from the federal agencies and states for consistency and reliability and, when possible, compared the data with data from other sources, such as data collected by the Environmental Protection Agency (EPA) and the Chesapeake Bay Commission. After reviewing the data and comparing it with other sources, we sent the data back to the federal agencies and states for verification and updates as needed. In addition, we asked for explanations of any inconsistencies that we identified. After receiving the verified/updated data, we once again reviewed the data for consistency and reliability. Finally, we contacted the agencies and states with any outstanding questions concerning the data and conducted additional data reliability checks.

To determine how effectively the restoration effort is being coordinated and managed, we obtained documentation on the organizational structure of the program, the roles and responsibilities of the committees and subcommittees, and planning documents developed to address the commitments. We analyzed the planning documents for consistency and

thoroughness. In addition, we obtained information on the status of keystone and other commitments.

To obtain EPA's insights on all four objectives, we met with officials from the Chesapeake Bay Program Office to discuss its monitoring and assessment, reporting, funding, and coordination and management responsibilities. Through these discussions, we obtained an array of documents and perspectives related to all four objectives. To obtain insights from the other signatories of the Chesapeake Bay agreements, we met with officials from the Chesapeake Bay Commission, the District of Columbia, and the states of Maryland, Pennsylvania, and Virginia. Through these efforts, we obtained documents and information related to all four objectives.

To obtain insights from other federal partners to the Bay Program, we met with officials from the Departments of Agriculture, Commerce, Defense, and the Interior. To obtain insights from academic partners to the Bay Program, we met with officials from the Chesapeake Research Consortium, College of William and Mary's Virginia Institute of Marine Science, Smithsonian Environmental Research Center, and University of Maryland's Center for Environmental Science. To obtain insights from other Bay Program partners, we met with the Alliance for the Chesapeake Bay, Chesapeake Bay Foundation, and the Metropolitan Washington Council of Governments. We also met with officials from nonpartner organizations, such as the Maryland Watermen's Association and the Northeast-Midwest Institute.

We conducted our review from October 2004 through October 2005 in accordance with generally accepted government auditing standards.

# Goals and Commitments in *Chesapeake 2000*

*Chesapeake 2000* contains five broad goals and 102 commitments that the partners have agreed to accomplish. These goals and commitments are listed below.

## *Living Resource Protection and Restoration Goal*

Restore, enhance and protect the finfish, shellfish and other living resources, their habitats and ecological relationships to sustain all fisheries and provide for a balanced ecosystem.

### Oysters

By 2010, achieve, at a minimum, a tenfold increase in native oysters in the Chesapeake Bay, based upon a 1994 baseline.

By 2002, develop and implement a strategy to achieve this increase by using sanctuaries sufficient in size and distribution, aquaculture, continued disease research and disease-resistant management strategies, and other management approaches.

### Exotic Species

In 2000, establish a Chesapeake Bay Program Task Force to

work cooperatively with the U.S. Coast Guard, the ports, the shipping industry, environmental interests, and others at the national level to help establish and implement a national program designed to substantially reduce and, where possible, eliminate the introduction of non-native species carried in ballast water; and

by 2002, develop and implement an interim voluntary ballast water management program for the waters of the bay and its tributaries.

By 2001, identify and rank non-native, invasive aquatic and terrestrial species, which are causing or have the potential to cause significant negative impacts to the bay's aquatic ecosystem.

By 2003, develop and implement management plans for those species deemed problematic to the restoration and integrity of the bay's ecosystem.

### Fish Passage and Migratory and Resident Fish

By June 2002, identify the final initiatives necessary to achieve our existing goal of restoring fish passage for migratory fish to more than 1,357 miles of currently blocked river habitat by 2003 and establish a monitoring program to assess outcomes.

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	<p>By 2002, set a new goal with implementation schedules for additional migratory and resident fish passages that addresses the removal of physical blockages. In addition, the goal will address the removal of chemical blockages caused by acid mine drainage. Projects should be selected for maximum habitat and stock benefit.</p> <p>By 2002, assess trends in populations for priority migratory fish species. Determine tributary-specific target population sizes based upon projected fish passage, and current and projected habitat available, and provide recommendations to achieve those targets.</p> <p>By 2003, revise fish management plans to include strategies to achieve target population sizes of tributary-specific migratory fish.</p>
Multispecies Management	<p>By 2004, assess the effects of different population levels of filter feeders such as menhaden, oysters, and clams on bay water quality and habitat.</p> <p>By 2005, develop ecosystem-based multispecies management plans for targeted species.</p> <p>By 2007, revise and implement existing fisheries management plans to incorporate ecological, social, and economic considerations, multispecies fisheries management and ecosystem approaches.</p>
Crabs	<p>By 2001, establish harvest targets for the blue crab fishery and begin implementing complementary state fisheries management strategies baywide. Manage the blue crab fishery to restore a healthy spawning biomass, size, and age structure.</p>
<i>Vital Habitat Protection and Restoration Goal</i>	<p>Preserve, protect, and restore those habitats and natural areas that are vital to the survival and diversity of the living resources of the bay and its rivers.</p>
Submerged Aquatic Vegetation	<p>Recommit to the existing goal of protecting and restoring 114,000 acres of submerged aquatic vegetation (SAV).<sup>1</sup></p>

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<sup>1</sup>In 2003, this commitment was expanded to protect and restore 185,000 acres by 2010.



By 2002, revise SAV restoration goals and strategies to reflect historic abundance, measured as acreage and density from the 1930s to the present. The revised goals will include specific levels of water clarity that are to be met in 2010. Strategies to achieve these goals will address water clarity, water quality, and bottom disturbance.

By 2002, implement a strategy to accelerate protection and restoration of SAV beds in areas of critical importance to the bay's living resources.

## Watersheds

By 2010, work with local governments, community groups, and watershed organizations to develop and implement locally supported watershed management plans in two-thirds of the bay watershed covered by the agreement. These plans would address the protection, conservation, and restoration of stream corridors, riparian forest buffers, and wetlands for the purposes of improving habitat and water quality, with collateral benefits for optimizing stream flow and water supply.

By 2001, each jurisdiction will develop guidelines to ensure the aquatic health of stream corridors. Guidelines should consider optimal surface and groundwater flows.

By 2002, each jurisdiction will work with local governments and communities that have watershed management plans to select pilot projects that promote stream corridor protection and restoration.

By 2003, include the *State of the Bay* report, and make available to the public, local governments, and others, information concerning the aquatic health of stream corridors based on adopted regional guidelines.

By 2004, each jurisdiction, working with local governments, community groups, and watershed organizations, will develop stream corridor restoration goals based on local watershed management planning.

## Wetlands

Achieve a no-net loss of existing wetlands acreage and function in the signatories' regulatory programs.

By 2010, achieve a net resource gain by restoring 25,000 acres of tidal and nontidal wetlands.

To do this, the signatories to the agreement commit to achieve and maintain an average restoration rate of 2,500 acres per year basin wide by 2005 and beyond. They will evaluate their success in 2005.

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Provide information and assistance to local governments and community groups for the development and implementation of wetlands preservation plans as a component of a locally based integrated watershed management plan.

Establish a goal of implementing the wetlands plan component in 25 percent of the land area of each state's bay watershed by 2010. The plans would preserve key wetlands while addressing surrounding land use so as to preserve wetland functions.

Evaluate the potential impact of climate change on the Chesapeake Bay watershed, particularly with respect to its wetlands, and consider potential management options.

## Forests

By 2002, ensure that measures are in place to meet the riparian forest buffer restoration goal of 2,010 miles by 2010.<sup>2</sup>

By 2003, establish a new goal to expand buffer mileage.

Conserve existing forests along all streams and shorelines.

Promote the expansion and connection of contiguous forests through conservation easements, greenways, purchase, and other land conservation mechanisms.

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## *Water Quality Protection and Restoration Goal*

Achieve and maintain the water quality necessary to support the aquatic living resources of the bay and its tributaries and to protect human health.

## Nutrients and Sediments

Continue efforts to achieve and maintain the 40 percent nutrient reduction goal agreed to in 1987, as well as the goals being adopted for the tributaries south of the Potomac River.<sup>3</sup>

By 2010, correct the nutrient- and sediment-related problems in the Chesapeake Bay and its tidal tributaries sufficiently to remove the bay and

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<sup>2</sup>According to the Chesapeake Bay Program Office, this commitment was superseded by commitment number 34.

<sup>3</sup>In 2003, this commitment was expanded to restore at least 10,000 miles.

the tidal portions of its tributaries from the list of impaired waters under the Clean Water Act. In order to achieve this:

By 2001, define the water quality conditions necessary to protect aquatic living resources and then assign load reductions for nitrogen and phosphorus to each major tributary;

Using a process parallel to that established for nutrients, determine the sediment load reductions necessary to achieve the water quality conditions that protect aquatic living resources, and assign load reductions for sediment to each major tributary by 2001;

By 2002, complete a public process to develop and begin implementation of revised Tributary Strategies to achieve and maintain the assigned loading goals;

By 2003, the jurisdictions with tidal waters will use their best efforts to adopt new or revised water quality standards consistent with the defined water quality conditions. Once adopted by the jurisdictions, EPA will work expeditiously to review the new or revised standards, which will then be used as the basis for removing the bay and its tidal rivers from the list of impaired waters; and

By 2003, work with the Susquehanna River Basin Commission and others to adopt and begin implementing strategies that prevent the loss of the sediment retention capabilities of the lower Susquehanna River dams.

## Chemical Contaminants

The signatories commit to fulfilling the 1994 goal of a Chesapeake Bay free of toxics by reducing or eliminating the input of chemical contaminants from all controllable sources to levels that result in no toxic or bioaccumulative impact on the living resources that inhabit the bay or on human health.

By fall of 2000, reevaluate and revise, as necessary, the “Chesapeake Bay Basinwide Toxics Reduction and Prevention Strategy” focusing on:

Complementing state and federal regulatory programs to go beyond traditional point source controls, including nonpoint sources such as groundwater discharge and atmospheric deposition, by using a watershed-based approach; and

Understanding the effects and impacts of chemical contaminants to increase the effectiveness of management actions.

Through continual improvement of pollution prevention measures and other voluntary means, strive for zero release of chemical contaminants from point sources, including air sources.

Particular emphasis shall be placed on achieving, by 2010, elimination of mixing zones for persistent or bioaccumulative toxics.

Reduce the potential risk of pesticides to the bay by targeting education, outreach, and implementation of integrated pest management and specific best management practices on those lands that have higher potential for contributing pesticide loads to the bay.

#### Priority Urban Waters

Support the restoration of the Anacostia River, Baltimore Harbor, and Elizabeth River and their watersheds as models for urban river restoration in the bay basin.

By 2010, the District of Columbia, working with its watershed partners, will reduce pollution loads to the Anacostia River in order to eliminate public health concerns and achieve the living resource, water quality, and habitat goals of the current and past agreements.

#### Air Pollution

By 2003, assess the effects of airborne nitrogen compounds and chemical contaminants on the bay ecosystem and help establish reduction goals for these contaminants.

#### Boat Discharge

By 2003, establish appropriate areas within the Chesapeake Bay and its tributaries as “no discharge zones” for human waste from boats.

By 2010, expand by 50 percent the number and availability of waste pump-out facilities.

By 2006, reassess progress in reducing the impact of boat waste on the bay and its tributaries. This assessment will include evaluating the benefits of further expanding no discharge zones, as well as increasing the number of pump-out facilities.

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*Sound Land Use Goal*

Develop, promote, and achieve sound land use practices which protect and restore watershed resources and water quality, maintain reduced pollutant loadings for the bay and its tributaries, and restore and preserve aquatic living resources.

Land Conservation

By 2001, complete an assessment of the bay's resource lands, including forests and farms, emphasizing their role in the protection of water quality and critical habitats, as well as cultural and economic viability.

Provide financial assistance or new revenue sources to expand the use of voluntary and market-based mechanisms such as easements, purchase, or transfer of development rights and other approaches to protect and preserve natural resource lands.

Strengthen programs for land acquisition and preservation within each state that are supported by funding

and target the most valued lands for protection.

Permanently preserve from development 20 percent of the land area in the watershed by 2010.

Provide technical and financial assistance to local governments to plan for or revise plans, ordinances, and subdivision regulations to provide for the conservation and sustainable use of the forest and agricultural lands.

In cooperation with local governments, develop and maintain in each jurisdiction a strong geographic information system to track the preservation of resource lands and support the implementation of sound land use practices.

Development, Redevelopment,  
and Revitalization

By 2012, reduce the rate of harmful sprawl development of forest and agricultural land in the Chesapeake Bay watershed by 30 percent measured as an average over 5 years from the baseline of 1992-97, with measures and progress reported regularly to the Chesapeake Executive Council.

By 2005, in cooperation with local government, identify and remove state and local impediments to low impact development designs to encourage the use of such approaches and minimize water quality impacts.

Work with communities and local governments to encourage sound land use planning and practices that address the impacts of growth, development, and transportation on the watershed.

By 2002, review tax policies to identify elements that discourage sustainable development practices or encourage undesirable growth patterns. Promote the modification of such policies and the creation of tax incentives that promote the conservation of resource lands and encourage investments consistent with sound growth management principles.

The jurisdictions will promote redevelopment and remove barriers to investment in underutilized urban, suburban, and rural communities by working with localities and development interests.

By 2002, develop analytical tools that will allow local governments and communities to conduct watershed-based assessments of the impacts of growth, development, and transportation decisions.

By 2002, compile information and guidelines to assist local governments and communities to promote ecologically-based designs in order to limit impervious cover in undeveloped and moderately developed watersheds and reduce the impact of impervious cover in highly developed watersheds.

Provide information to the development community and others so they may champion the application of sound land use practices.

By 2003, work with local governments and communities to develop land-use management and water resource protection approaches that encourage the concentration of new residential development in areas supported by adequate water resources and infrastructure to minimize impacts on water quality.

By 2004, the jurisdictions will evaluate local implementation of stormwater, erosion control, and other locally-implemented water quality protection programs that affect the bay system and ensure that these programs are being coordinated and applied effectively in order to minimize the impacts of development.

Working with local governments and others, develop and promote wastewater treatment options, such as nutrient reducing septic systems, which protect public health and minimize impacts to the bay's resources.

Strengthen brownfield redevelopment. By 2010, rehabilitate and restore 1,050 brownfield sites to productive use.

Working with local governments, encourage the development and implementation of emerging urban stormwater retrofit practices to improve their water quantity and quality function.

## Transportation

By 2002, the signatory jurisdictions will promote coordination of transportation and land use planning to encourage compact, mixed use development patterns, revitalization in existing communities and transportation strategies that minimize adverse effects on the bay and its tributaries.

By 2002, each state will coordinate its transportation policies and programs to reduce the dependence on automobiles by incorporating travel alternatives such as telework, pedestrian, bicycle, and transit options, as appropriate, in the design of projects so as to increase the availability of alternative modes of travel as measured by increased use of those alternatives.

Consider the provisions of the federal transportation statutes for opportunities to purchase easements to preserve resource lands adjacent to rights of way and special efforts for stormwater management on both new and rehabilitation projects.

Establish policies and incentives that encourage the use of clean vehicle and other transportation technologies that reduce emissions.

## Public Access

By 2010, expand by 30 percent the system of public access points to the bay, its tributaries, and related resource sites in an environmentally sensitive manner by working with state and federal agencies, local governments, and stakeholder organizations.

By 2005, increase the number of designated water trails in the Chesapeake Bay region by 500 miles.

Enhance interpretation materials that promote stewardship at natural, recreational, historical, and cultural public access points within the Chesapeake Bay watershed.

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By 2003, develop partnerships with at least 30 sites to enhance place-based interpretation of bay-related resources and themes and stimulate volunteer involvement in resource restoration and conservation.

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*Stewardship and  
Community Engagement  
Goal*

Promote individual stewardship and assist individuals, community-based organizations, businesses, local governments, and schools to undertake initiatives to achieve the goals and commitments of the agreement.

Education and Outreach

Make education and outreach a priority in order to achieve public awareness and personal involvement on behalf of the bay and local watersheds.

Provide information to enhance the ability of citizen and community groups to participate in bay restoration activities on their property and in their local watershed.

Expand the use of new communications technologies to provide a comprehensive and interactive source of information on the Chesapeake Bay and its watershed for use by public and technical audiences.

By 2001, develop and maintain a Web-based clearinghouse of this information specifically for use by educators.

Beginning with the class of 2005, provide a meaningful bay or stream outdoor experience for every school student in the watershed before graduation from high school.

Continue to forge partnerships with the Department of Education and institutions of higher learning in each jurisdiction to integrate information about the Chesapeake Bay and its watershed into school curricula and university programs.

Provide students and teachers alike with opportunities to directly participate in local restoration and protection projects, and to support stewardship efforts in schools and on school property.

By 2002, expand citizen outreach efforts to more specifically include minority populations by, for example, highlighting cultural and historical ties to the bay, and providing multicultural and multilingual educational materials on stewardship activities and bay information.



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Community Engagement

Jurisdictions will work with local governments to identify small watersheds where community-based actions are essential to meeting bay restoration goals—in particular wetlands, forested buffers, stream corridors, and public access and work with local governments and community organizations to bring an appropriate range of Bay Program resources to these communities.

Enhance funding for locally based programs that pursue restoration and protection projects that will assist in the achievement of the goals of this and past agreements.

By 2001, develop and maintain a clearinghouse for information on local watershed restoration efforts, including financial and technical assistance.

By 2002, each signatory jurisdiction will offer easily-accessible information suitable for analyzing environmental conditions at a small watershed scale.

Strengthen the Chesapeake Bay Program's ability to incorporate local governments into the policy decision making process.

By 2001, complete a reevaluation of the Local Government Participation Action Plan and make necessary changes in Bay Program and jurisdictional functions based upon the reevaluation.

Improve methods of communication with and among local governments on bay issues and provide adequate opportunities for discussion of key issues.

By 2001, identify community watershed organizations and partnerships. Assist in establishing new organizations and partnerships where interest exists. These partners will be important to successful watershed management efforts in distributing information to the public, and engaging the public in the bay restoration and preservation effort.

By 2005, identify specific actions to address the challenges of communities where historically poor water quality and environmental conditions have contributed to disproportional health, economic, or social impacts.

Government by Example

By 2002, each signatory will put in place processes to:

Ensure that all properties owned, managed, or leased by the signatories are developed, redeveloped, and used in a manner consistent with all relevant goals, commitments, and guidance of the agreement.

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Ensure that the design and construction of signatory-funded development and redevelopment projects are consistent with all relevant goals, commitments, and guidance of the agreement.

Expand the use of clean vehicle technologies and fuels on the basis of emission reductions, so that a significantly greater percentage of each signatory government's fleet of vehicles use some form of clean technology.

By 2001, develop an Executive Council Directive to address stormwater management to control nutrient, sediment, and chemical contaminant runoff from state, federal, and District of Columbia-owned land.

## Partnerships

Strengthen partnerships with Delaware, New York, and West Virginia by promoting communication and by seeking agreements on issues of mutual concern.

Work with nonsignatory bay states to establish links with community-based organizations throughout the bay watershed.

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# Chesapeake Bay Program Partners

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The Chesapeake Bay Program (Bay Program) is a regional partnership that includes many partners, including federal agencies, states, a tristate legislative commission, academic institutions, and others. As noted below, six of the partners are signatories to the Chesapeake Bay agreements. The six signatories make up the Chesapeake Executive Council, which meets annually to establish policy direction for the Bay Program.

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## Federal Agencies

- U.S. Department of Agriculture
  - Agricultural Research Service
  - Cooperative State Research, Education and Extension Service
  - Farm Service Agency
  - National Arboretum
  - Natural Resources Conservation Service
  - U.S. Forest Service
- U.S. Department of Commerce
  - National Oceanic and Atmospheric Administration
- U.S. Department of Defense
  - Defense Logistics Agency
  - U.S. Department of the Air Force
  - U.S. Department of the Army
  - U.S. Department of the Navy
- U.S. Department of Education
- U.S. Environmental Protection Agency (Signatory)
- U.S. Department of Homeland Security

- U.S. Coast Guard
- U.S. Department of the Interior
  - National Park Service
  - U.S. Fish and Wildlife Service
  - U.S. Geological Survey
- U.S. Department of Transportation
  - U.S. Federal Highway Administration
- U.S. Postal Service
- U.S. General Services Administration
- National Aeronautics and Space Administration
- National Capital Planning Commission

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States

- Delaware
- District of Columbia (Signatory)
- Maryland (Signatory)
- New York
- Pennsylvania (Signatory)
- Virginia (Signatory)
- West Virginia

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Tristate Legislative  
Commission

- Chesapeake Bay Commission (Signatory)

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Academic Institutions

- Academy of Natural Sciences
- Chesapeake Research Consortium
- College of William and Mary
  - Virginia Institute of Marine Science
- Cornell Cooperative Extension (New York)
- Old Dominion University
  - Center for Coastal Physical Oceanography
  - Department of Biological Sciences
- Pennsylvania State University
- Smithsonian Institution
  - Smithsonian Environmental Research Center
- University of Delaware Cooperative Extension
- University of the District of Columbia
- University of Maryland
  - Regional Earth Science Applications Center
  - University of Maryland Center for Environmental Science
- University of Pennsylvania
- University of Virginia
  - Virginia SeaGrant Program
- Virginia Cooperative Extension Office

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- Virginia Polytechnic Institute and State University
  - West Virginia University
    - West Virginia Extension Service

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Others

- Alliance for the Chesapeake Bay
- American Forests
- Anacostia Watershed Society
- Center for Chesapeake Communities
- Center for Watershed Protection
- Chesapeake Bay Foundation
- Chesapeake Bay Information Network
- Chesapeake Bay Trust
- Consortium for International Earth Science Information Network
- International City/County Management Association
  - Local Government Environmental Assistance Network
- Interstate Commission on the Potomac River Basin
- Low Impact Development Center
- Metropolitan Washington Council of Governments
- Montgomery County Environmental Protection
- National Fish and Wildlife Foundation
- Potomac Conservancy
- Susquehanna River Basin Commission

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**Appendix III**  
**Chesapeake Bay Program Partners**

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- Upper Susquehanna Coalition
  - 680 watershed organizations

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# Summary of Expert Panel Observations on Assessing and Reporting on Restoration Progress

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This appendix provides the names and affiliations of our expert panel members and summarizes the discussions held at an all-day meeting. The information presented in this appendix may not represent the views of every panel member and should not be considered to be the views of GAO.

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## Members of Our Expert Panel

The following individuals were members of the GAO expert panel on the Chesapeake Bay restoration effort:

- Allan, J. David, Professor, School of Natural Resources & Environment, University of Michigan;
- Harwell, Mark, Professor, Florida A&M University;
- Gunderson, Lance, Associate Professor, Department of Environmental Studies, Emory University;
- Hill, Brian, Chief of the Watershed Research Branch, Mid-Continent Ecology Division, U.S. Environmental Protection Agency;
- Kusler, Jon, Executive Director, Association of State Wetland Managers;
- Nuttle, William, Consultant, Eco-Hydrology;
- Reed, Denise, Associate Professor, Department of Geology and Geophysics, University of New Orleans; and
- Stevenson, R. Jan, Professor, Department of Zoology, Michigan State University.

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## Summary of Panel Observations

On May 17, 2005, we held an all-day meeting with the eight panelists at our office in Washington, D.C. Before the meeting, we provided each panel member with background information on the Chesapeake Bay Program (Bay Program) and a set of eight general discussion questions. At the end of each discussion, we asked the panelists to respond, using an anonymous ballot, to a series of questions that were based on the general discussion topics. The eight discussion topics covered three overarching themes: (1) assessing the health status of an ecosystem, (2) reporting the health status of an ecosystem, and (3) assessing progress of a restoration effort.



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## Assessing the Health of an Ecosystem

For the first theme of the day, the panelists spoke on three general discussion topics to identify the critical elements of an effective assessment process.

### Discussion Topic 1: Core Set of Ecosystem Characteristics

Panelists agreed that identifying a core set of broad ecosystem characteristics is very important when assessing the health of an ecosystem and needs to be determined for each individual ecosystem. Our panel of experts did not identify these characteristics, saying instead that only experts on the Chesapeake Bay should do so. In assessing the health of an ecosystem, our panel said, bay experts should first gain an understanding of the desired end points—the particular characteristics of the system that end users deem important. However, the panel cautioned that the bay’s experts should identify a limited number of essential characteristics—about four to six. Experience in developing conceptual models for other ecosystems has shown that it is not possible to manage for 100 different characteristics. The Bay Program has over 100 specific indicators of various ecosystem characteristics.

### Discussion Topic 2: Key Indicators

The panelists generally agreed that the Bay Program has the essential indicators that must be used at a minimum to assess the health of an ecosystem. The Bay Program has many indicators that measure individual aspects within the ecosystem, such as the oyster population. However, the Bay Program needs more indicators that provide information about the biological condition of the ecosystem as a whole and that reflect stress and response relationships. Then patterns and status can be determined and trends can be assessed. Criteria for selecting good environmental indicators are available in literature.

The panel also noted that models are useful, but it is important to understand the intended use of the model and its limitations. The Bay Program’s predictive model is intended to help weigh alternative actions and determine how effective different management actions may be in restoring the ecosystem. The model can be used to make predictions about what the condition of the ecosystem may be in particular future years, and the Bay Program can then confirm those predictions with subsequent monitoring. The Bay Program should not use a predictive model to report on current conditions, which should be based on actual measurements.

### Discussion Topic 3: Overarching Indices

Panelists agreed that a limited number of integrated measures can be used to assess an ecosystem. A few integrated measures that describe the overall health of the system are valuable in making an overall assessment

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of the system and are well suited for reporting on the overall health. The overall health of a system can be described in a qualitative sense, with a grade for example. Overarching indicators can be used to assign grades to between four and six different ecological characteristics.

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## Reporting the Health of an Ecosystem

For the second theme of the day, the panelists spoke on three general discussion topics to identify the critical elements of effective reporting.

### Discussion Topic 4: Reporting the Health of the Chesapeake Bay

Panelists generally agreed that, based on information provided in the Bay Program reports, the public would probably not be able to clearly and accurately understand the health of the Chesapeake Bay. While panelists found the 2004 *State of the Chesapeake Bay* report visually appealing, they believed it lacked a clear, overall picture of system health. In addition, Bay Program reports emphasize health and management of the program in one document and are overly oriented to reporting on the progress of the program at the expense of communicating information of the health status of the bay. The panelists believed that an independent assessment of the bay's health is probably necessary to provide a clear and accurate report on the status of the bay's health.

### Discussion Topic 5: Characteristics of Effective Reporting

Panelists agreed that effective reports on the health of an ecosystem contain information that is relevant, accurate, timely, consistent, thorough, precise, objective, transparent, and peer reviewed or verified. Panelists noted that the strength of the Bay Program's reports depends on the public's perception of the Bay Program's integrity and that, if the reports underwent an independent science review before publication, the public would have sufficient trust in the product so that other reports on the bay's health, such as the Chesapeake Bay Foundation report, would not be perceived as needed.

### Discussion Topic 6: Reporting Methods

Panelists generally agreed that the report card method is effective for clearly and accurately reporting ecosystem health. Panelists also noted that it is important to distinguish between management initiatives to reduce stressors within the ecosystem and the biological effects of these initiatives and report on them separately. Instead, the Bay Program often mixes indicators, which causes confusion. A report on the health of the bay should give a measure for the current condition of each ecosystem attribute, such as a grade; an indication of the trend, such as an arrow; and summary text that explains what it all means.

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Assessing Progress of a  
Restoration Effort

For the third theme of the day, the panelists spoke on two general discussion topics to identify how progress in restoring an ecosystem should be assessed.

Discussion Topic 7: Information  
Needed to Determine Progress

*Chesapeake 2000* includes many commitments that are not quantifiable; instead, the commitments are focused on actions to strengthen, develop, or plan for various aspects of the restoration effort. Many of the commitments need to be refined so that they are quantifiable. Panelists noted, for example, that *Chesapeake 2000* has a commitment to conserve existing forests along all streams and shorelines. The commitment raises questions about whether that means every single forest, a particular number of miles, or to prevent or manage the decline so that it is not more than a certain percentage per year. Panelists also pointed out that it is possible to have a program that is progressing very well from a management perspective but is not showing any evidence of cleanup toward the restoration goals. They cited three signs of progress: programmatic progress, progress in reducing stressors to the ecosystem, and progress in achieving desired ecological outcomes. The Bay Program has mixed these measures of progress and has used programmatic progress to imply that the program is achieving ecological outcomes.

Discussion Topic 8: Complicating  
Factors

The panelists agreed that external factors that affect the health of an ecosystem, such as weather and population growth, should be incorporated into an assessment of restoration progress. Similarly, actions taken to restore the ecosystem, such as the implementation of agricultural best management practices, that may not have an impact of the ecosystem for several years should be incorporated into an assessment of progress made in restoring an ecosystem. Panelists also agreed that reports on the health of an ecosystem should be distinctly separate from reports on restoration progress.

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**Appendix IV**  
**Summary of Expert Panel Observations on**  
**Assessing and Reporting on Restoration**  
**Progress**

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# Funding Information

**Table 3: Direct Funding Provided by the Federal Agencies According to Primary Commitment Addressed, Fiscal Years 1995 through 2004, in Constant 2004 Dollars**

Dollars in millions					
Commitment	Army <sup>a</sup>	Army Corps of Engineers	EPA	Farm Service Agency	National Oceanic and Atmospheric Administration
<b>Living Resource Protection and Restoration</b>					
Oysters	\$0.1	\$13.3	\$4.8	\$0.0	\$11.2
Exotic species	0.6	0.6	2.9	0.0	4.1
Fish passage and migratory and resident fish	0.1	14.4	9.9	0.0	0.1
Multispecies management	2.1	0.1	6.0	0.0	8.7
Crabs	0.1	0.0	3.0	0.0	10.1
<b>Total</b>	<b>\$3.0</b>	<b>\$28.4</b>	<b>\$26.6</b>	<b>\$0.0</b>	<b>\$34.2</b>
<b>Vital Habitat Protection and Restoration</b>					
Submerged aquatic vegetation	3.1	2.7	6.1	0.0	1.9
Watersheds	1.4	13.0	15.5	0.0	1.3
Wetlands	1.7	147.3	4.2	5.6	0.5
Forests	1.4	0.1	3.6	4.1	0.0
<b>Total</b>	<b>\$7.5</b>	<b>\$163.0</b>	<b>\$29.5</b>	<b>\$9.7</b>	<b>\$3.7</b>
<b>Water Quality Protection and Restoration</b>					
Nutrients and sediments	11.4	75.2	142.8 <sup>e</sup>	105.5	1.8
Chemical contaminants	10.7	0.0 <sup>d</sup>	8.0	0.0	5.8
Priority urban waters	0.1	26.8	6.5	0.0	0.0
Air pollution	13.6	0.0	3.4	0.0	0.0
Boat discharge	0.1	0.0	2.3	0.0	0.0
<b>Total</b>	<b>\$35.9</b>	<b>\$102.1</b>	<b>\$163.0</b>	<b>\$105.5</b>	<b>\$7.6</b>
<b>Sound Land Use</b>					
Land conservation	0.9	0.0	2.7	51.8	0.0
Development, redevelopment, and revitalization	0.7	0.0	4.5	0.0	0.0
Transportation	0.0	0.0 <sup>d</sup>	2.5	0.0	0.0
Public access	2.5	0.0	2.5	0.0	0.0
<b>Total</b>	<b>\$4.1</b>	<b>\$0.0</b>	<b>\$12.2</b>	<b>\$51.8</b>	<b>\$0.0</b>
<b>Stewardship and Community Engagement</b>					
Education and outreach	2.0	0.1	12.1	0.0	5.6
Community engagement	0.0	0.0	4.7	0.0	0.0
Government by example	3.5	0.0	3.0	0.0	0.0
Partnerships	0.1	0.0	2.7	0.0	4.3
<b>Total</b>	<b>\$5.7</b>	<b>\$0.1</b>	<b>\$22.4</b>	<b>\$0.0</b>	<b>\$9.9</b>
<b>Grand Total</b>	<b>\$56.1</b>	<b>\$293.5</b>	<b>\$253.7</b>	<b>\$167.0</b>	<b>\$55.5</b>

**Appendix V  
Funding Information**


National Park Service <sup>b</sup>	Natural Resources Conservation Service	Navy/Marine Corps <sup>c</sup>	U.S. Fish and Wildlife Service	U.S. Forest Service	U.S. Geological Survey	Total
\$0.0	\$0.0	\$0.1	\$0.0 <sup>d</sup>	\$0.0	\$0.0	<b>\$29.5</b>
0.0	0.0	0.6	4.7	0.0	0.0	<b>\$13.5</b>
0.0	0.0	0.2	0.5	0.0	0.0	<b>\$25.1</b>
0.0	0.0	0.0 <sup>d</sup>	0.0 <sup>d</sup>	0.0	1.8	<b>\$18.6</b>
0.0	0.0	0.0	0.0	0.0	0.0	<b>\$13.2</b>
<b>\$0.0</b>	<b>\$0.0</b>	<b>\$0.9</b>	<b>\$5.2</b>	<b>\$0.0</b>	<b>\$1.8</b>	<b>\$100.0</b>
0.0	0.0	0.8	0.0	0.0	1.9	<b>\$16.4</b>
0.0	0.0	1.4	15.2	2.4	0.0	<b>\$50.1</b>
0.0	0.0	0.6	3.8	1.4	0.6	<b>\$165.7</b>
0.0	0.0	0.4	1.5	2.4	0.0	<b>\$13.4</b>
<b>\$0.0</b>	<b>\$0.0</b>	<b>\$3.1</b>	<b>\$20.5</b>	<b>\$6.2</b>	<b>\$2.5</b>	<b>\$245.7</b>
0.0	51.5	0.1	0.0 <sup>d</sup>	1.2	16.8	<b>\$406.4</b>
0.0	0.0	0.1	1.4	0.0	0.4	<b>\$26.4</b>
0.0	0.0	0.0 <sup>d</sup>	0.0	0.0	0.0	<b>\$33.4</b>
0.0	0.0	0.0	0.0	0.0	0.0	<b>\$17.1</b>
0.0	0.0	0.2	0.0	0.0	0.0	<b>\$2.6</b>
<b>\$0.0</b>	<b>\$51.5</b>	<b>\$0.4</b>	<b>\$1.4</b>	<b>\$1.2</b>	<b>\$17.2</b>	<b>\$485.8</b>
0.0	0.0	0.2	15.7	1.2	1.0	<b>\$73.6</b>
0.0	0.0	0.1	0.2	0.0	0.0	<b>\$5.4</b>
0.0	0.0	0.0	0.0	0.0	0.0	<b>\$2.6</b>
7.1	0.0	0.0	0.3	0.0	0.0	<b>\$12.5</b>
<b>\$7.1</b>	<b>\$0.0</b>	<b>\$0.4</b>	<b>\$16.2</b>	<b>\$1.2</b>	<b>\$1.0</b>	<b>\$94.0</b>
0.0	0.0	0.6	2.3	2.1	1.7	<b>\$26.5</b>
0.3	0.0	0.0	0.1	1.2	0.0	<b>\$6.2</b>
0.0	0.0	0.5	0.0	0.0	0.0	<b>\$7.0</b>
0.0	0.0	0.0	0.0	0.0	0.0	<b>\$7.1</b>
<b>\$0.3</b>	<b>\$0.0</b>	<b>\$1.1</b>	<b>\$2.4</b>	<b>\$3.3</b>	<b>\$1.7</b>	<b>\$46.8</b>
<b>\$7.5</b>	<b>\$51.5</b>	<b>\$5.8</b>	<b>\$45.7</b>	<b>\$11.9</b>	<b>\$24.2</b>	<b>\$972.4</b>

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**Appendix V**  
**Funding Information**

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Source: GAO analysis of agency data.

Note: Totals may not add due to rounding.

<sup>a</sup>Army amounts for fiscal years 1995 through 1997 are based upon the best professional judgment of an Army official and were calculated using an average of the individual commitments from fiscal years 1998 through 2004.

<sup>b</sup>No funding information was provided prior to 2000 due to limited involvement of the National Park Service with the Bay Program.

<sup>c</sup>Navy/Marine Corps amounts do not include funding for administrative activities.

<sup>d</sup>Funding was provided for this commitment but amounted to less than \$50,000.

<sup>e</sup>Prior to 2002, bay watershed-specific data are not available, and thus no Section 319 funds—funds provided in EPA grants to assist states in implementing nonpoint source management programs—are included in the table for the years 1995-2001. According to an EPA official, many Section 319 projects would benefit the nutrient and sediment goals of the Chesapeake Bay Program.

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**Appendix V**  
**Funding Information**

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Appendix V  
Funding Information

**Table 4: Indirect Funding Provided by the Federal Agencies According to Primary Commitment Addressed, Fiscal Years 1995 through 2004, in Constant 2004 Dollars**

Dollars in millions

Commitment	Army <sup>a</sup>	Army Corps of Engineers	EPA	Farm Service Agency	National Oceanic and Atmospheric Administration
<b>Living Resource Protection and Restoration</b>					
Oysters	\$0.0	\$0.0	\$0.0	\$0.0	\$0.8
Exotic species	0.0	0.0	0.0	0.0	12.8
Fish passage and migratory and resident fish	0.0	0.0	0.0	0.0	0.3
Multispecies management	0.0	0.0	0.0	0.0	13.9
Crabs	0.0	0.0	0.0	0.0	0.6
<b>Total</b>	<b>\$0.0</b>	<b>\$0.0</b>	<b>\$0.0</b>	<b>\$0.0</b>	<b>\$28.4</b>
<b>Vital Habitat Protection and Restoration</b>					
Submerged aquatic vegetation	0.0	0.0	0.0	0.0	0.7
Watersheds	0.0	0.0	0.0	0.0	4.2
Wetlands	0.0	0.0	0.0	3.1	7.3
Forests	0.0	0.0	0.0	11.3	0.0
<b>Total</b>	<b>\$0.0</b>	<b>\$0.0</b>	<b>\$0.0</b>	<b>\$14.4</b>	<b>\$12.1</b>
<b>Water Quality Protection and Restoration</b>					
Nutrients and sediments	0.0	0.0	181.4 <sup>f</sup>	16.2	2.2
Chemical contaminants	0.0	0.0	0.0	0.0	3.1
Priority urban waters	0.0	0.0	0.0	0.0	0.0 <sup>d</sup>
Air pollution	5.0	0.0	0.0	0.0	3.6
Boat discharge	0.0	0.0	0.0	0.0	0.0
<b>Total</b>	<b>\$5.0</b>	<b>\$0.0</b>	<b>\$181.4</b>	<b>\$16.2</b>	<b>\$8.9</b>
<b>Sound Land Use</b>					
Land conservation	9.7	0.0	0.0	105.8	6.3
Development, redevelopment, and revitalization	0.0	0.0	0.0	0.0	0.0
Transportation	0.0	0.0	0.0	0.0	9.6
Public access	0.0	0.0	0.0	0.0	0.0
<b>Total</b>	<b>\$9.7</b>	<b>\$0.0</b>	<b>\$0.0</b>	<b>\$105.8</b>	<b>\$15.9</b>
<b>Stewardship and Community Engagement</b>					
Education and outreach	0.0	0.0	0.0	0.0	1.9
Community engagement	0.0	0.0	0.0	0.0	0.1
Government by example	2.6	0.0	0.0	0.0	0.0
Partnerships	0.0	0.0	0.0	0.0	46.7
<b>Total</b>	<b>\$2.6</b>	<b>\$0.0</b>	<b>\$0.0</b>	<b>\$0.0</b>	<b>\$48.7</b>
<b>Grand Total</b>	<b>\$17.3</b>	<b>\$0.0</b>	<b>\$181.4</b>	<b>\$136.5</b>	<b>\$114.0</b>

**Appendix V  
Funding Information**

National Park Service <sup>b</sup>	Natural Resources Conservation Service	Navy/Marine Corps <sup>c</sup>	U.S. Fish and Wildlife Service	U.S. Forest Service	U.S. Geological Survey	Total
\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	<b>\$0.8</b>
0.0	0.0	0.1	2.2	0.0	0.0	<b>\$15.1</b>
0.0	0.0	0.0 <sup>d</sup>	6.9	1.2	0.0	<b>\$8.4</b>
0.0	0.0	0.7	2.5	0.0	0.0	<b>\$17.1</b>
0.0	0.0	0.0	0.0	0.0	0.0	<b>\$0.6</b>
<b>\$0.0</b>	<b>\$0.0</b>	<b>\$0.7</b>	<b>\$32.9<sup>e</sup></b>	<b>\$1.2</b>	<b>\$0.0</b>	<b>\$63.3</b>
0.0	0.0	0.0	0.0	0.0	0.0	<b>\$0.7</b>
0.0	37.0	0.2	1.8	0.0	0.0	<b>\$43.1</b>
0.0	13.1	3.5	5.1	0.0	0.7	<b>\$32.8</b>
0.0	0.8	0.4	2.5	19.5	0.0	<b>\$34.5</b>
<b>\$0.0</b>	<b>\$50.9</b>	<b>\$4.1</b>	<b>\$9.6<sup>e</sup></b>	<b>\$19.5</b>	<b>\$0.7</b>	<b>\$111.3</b>
0.0	221.9	36.1	0.5	6.0	1.0	<b>\$465.3</b>
0.0	0.0	24.9	0.0	0.0	0.0	<b>\$28.0</b>
0.0	0.0	0.3	0.0	0.0	0.0	<b>\$0.3</b>
0.0	0.0	1.2	0.0	0.0 <sup>d</sup>	0.0	<b>\$9.9</b>
0.0	0.0	0.0	0.0	0.0	0.0	<b>\$0.0</b>
<b>\$0.0</b>	<b>\$221.9</b>	<b>\$62.5</b>	<b>\$0.5</b>	<b>\$6.0</b>	<b>\$1.0</b>	<b>\$503.5</b>
0.0	33.2	1.0	1.7	7.8	0.0	<b>\$165.7</b>
0.0	0.0	0.3	0.0	0.0	0.0	<b>\$0.3</b>
0.0	0.0	0.0	0.0	0.0	0.0	<b>\$9.6</b>
1.5	0.0	0.4	2.8	0.0	0.0	<b>\$4.6</b>
<b>\$1.5</b>	<b>\$33.2</b>	<b>\$1.7</b>	<b>\$4.5</b>	<b>\$7.8</b>	<b>\$0.0</b>	<b>\$180.2</b>
0.2	0.0	0.1	2.0	9.7	0.0	<b>\$14.0</b>
0.4	0.0	0.2	0.0 <sup>d</sup>	9.7	0.0	<b>\$10.4</b>
0.0	0.0	0.1	0.0 <sup>d</sup>	0.0	0.0	<b>\$2.6</b>
0.0	0.0	0.5	0.0 <sup>d</sup>	0.0	0.0	<b>\$47.2</b>
<b>\$0.6</b>	<b>\$0.0</b>	<b>\$0.8</b>	<b>\$4.4<sup>e</sup></b>	<b>\$19.5</b>	<b>\$0.0</b>	<b>\$76.6</b>
<b>\$2.2</b>	<b>\$306.1</b>	<b>\$69.9</b>	<b>\$51.8</b>	<b>\$54.0</b>	<b>\$1.7</b>	<b>\$934.9</b>

## Appendix V Funding Information

Source: GAO analysis of agency data.

Note: Totals may not add due to rounding.

<sup>a</sup>Army amounts for fiscal years 1995 through 1997 are based upon the best professional judgment of an Army official and were calculated using an average of the individual commitments from fiscal years 1998 through 2004. An Army official estimated that, in addition to the amounts reported, individual Army installations have environmental budgets ranging from \$2 million to \$7 million for environmental activities that would indirectly impact Bay restoration. The Army did not include those amounts in the table.

<sup>b</sup>No funding information was provided prior to 2000 due to limited involvement of the National Park Service with the Bay Program.

<sup>c</sup>Navy/Marine Corps amounts do not include funding for administrative activities.

<sup>d</sup>Funding was provided for this commitment but amounted to less than \$50,000.

<sup>e</sup>The U.S. Fish and Wildlife Service was unable to categorize federal assistance funding according to the individual commitments addressed. Instead, the amounts for federal assistance funding were listed according to the broad goal that it addressed. As a result, the total for this goal does not equal the sum of the individual commitments.

<sup>f</sup>Prior to 2002, bay watershed-specific data are not available, and thus no Section 319 funds—funds provided in EPA grants to assist states in implementing nonpoint source management programs—are included in the table for the years 1995-2001. According to an EPA official, many Section 319 projects would benefit the nutrient and sediment goals of the Chesapeake Bay Program.

**Table 5: Direct Funding Provided by the States and the District of Columbia According to Primary Commitment Addressed, Fiscal Years 1995 through 2004, in Constant 2004 Dollars**

Dollars in millions

Commitment	Maryland <sup>a</sup>	Virginia	Pennsylvania	District of Columbia <sup>b</sup>	Total
Living resource protection and restoration	\$82.4	\$50.1	\$0.0	\$0.0	<b>\$132.5</b>
Vital habitat protection and restoration	189.3	51.0	0.0	5.0	<b>\$245.3</b>
Water quality protection and restoration	743.6	381.0	28.1	36.7	<b>\$1,189.4</b>
Sound land use	744.8	263.5	0.0	0.0	<b>\$1,008.3</b>
Stewardship and community engagement	102.2	6.9	0.0	0.1	<b>\$109.2</b>
<b>Total</b>	<b>\$1,862.4</b>	<b>\$752.6</b>	<b>\$28.1</b>	<b>\$41.8</b>	<b>\$2,684.8</b>

Source: GAO analysis of agency data.

Note: Totals may not add due to rounding.

<sup>a</sup>Maryland data for 1995 does not include the Departments of State Planning or Education. Maryland data for 1996 to 1999 is based on a draft report. Maryland calculated funding amounts for 2001 by averaging the amounts for 2000 and 2002.

<sup>b</sup>The District of Columbia was unable to provide funding information for fiscal years 1995 and 1996 because its program was configured differently during that time. In addition, the District of Columbia provided obligations where possible with the exception of its contribution to the Blue Plains wastewater treatment facility, which is an estimate of biological nutrient removal implementation, operation, and maintenance costs.

**Appendix V**  
**Funding Information**

**Table 6: Indirect Funding Provided by the States and the District of Columbia According to Primary Commitment Addressed, Fiscal Years 1995 through 2004, in Constant 2004 Dollars**

Dollars in millions

<b>Commitment</b>	<b>Maryland<sup>a</sup></b>	<b>Virginia</b>	<b>Pennsylvania</b>	<b>District of Columbia<sup>b</sup></b>	<b>Total</b>
Living resource protection and restoration	\$0.0	\$0.0	\$8.5	\$0.0	<b>\$8.5</b>
Vital habitat protection and restoration	0.0	0.0	98.0	0.0	<b>\$98.0</b>
Water quality protection and restoration	0.0	0.0	210.8	126.5	<b>\$337.3</b>
Sound land use	0.0	0.0	521.7	0.0	<b>\$521.7</b>
Stewardship and community engagement	0.0	0.0	24.7	0.7	<b>\$25.4</b>
<b>Total</b>	<b>\$0.0</b>	<b>\$0.0</b>	<b>\$863.8</b>	<b>\$127.2</b>	<b>\$991.0</b>

Source: GAO analysis of agency data.

Note: Totals may not add due to rounding.

<sup>a</sup>Maryland data for 1995 does not include the Departments of State Planning or Education. Maryland data for 1996 to 1999 is based on a draft report. Maryland calculated funding amounts for 2001 by averaging the amounts for 2000 and 2002.

<sup>b</sup>The District of Columbia was unable to provide funding information for fiscal years 1995 and 1996 because its program was configured differently during that time. In addition, the District of Columbia provided obligations where possible with the exception of its contribution to the Blue Plains wastewater treatment facility, which is an estimate of biological nutrient removal implementation, operation, and maintenance costs.

# Comments from the Environmental Protection Agency



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY  
REGION III  
1650 Arch Street  
Philadelphia, Pennsylvania 19103-2029

OCT 18 2005


Ms. Anu K. Mittal  
Director  
Natural Resources and Environment  
United States Government Accountability Office (GAO)  
Washington, DC 20548

Dear Ms. Mittal:

Thank you for the opportunity to review and comment on the draft report entitled "Chesapeake Bay Program: Improved Strategies Are Needed to Better Assess, Report, and Manage Restoration Progress." The draft report examines four areas of Program operation and offers three recommendations. The Environmental Protection Agency (EPA) is in general agreement with all three recommendations, and we appreciate the chance to offer brief comments on the draft report.

Your first two recommendations deal with how the Program assesses and reports on the restoration effort. The Program has had a formal effort on these issues underway for a year now, and we are pleased to note that GAO recommends that we complete this effort. Your expert panel and several members of the Scientific and Technical Advisory Committee recognized that the Program requires a rigorous review of all the environmental indicators we use, and these measures are appropriate to assess specific aspects of the restoration effort (pp.14, 67). The Program is now engaged in an effort to aggregate these solid measures into an overall measure of Bay health that can be easily communicated while maintaining the scientific rigor that has been a hallmark of the Program since its inception. Communications products including the "Summer Forecast" and website already reflect the recommendation to split reports on Bay health from those that discuss the management actions which partners are undertaking to restore the ecological health of the Bay and its watershed. This relatively simple change in the way the Program communicates with the public will significantly improve the understanding of our work.

As the draft report indicates, using the examples of wetlands and riparian forest buffers, the extensive set of goals envisioned in *Chesapeake 2000* were significantly beyond the scope of previous Bay Program efforts. Your final recommendation, to develop an implementation strategy that takes into account available resources, also corresponds to efforts already underway. The Program's adaptive management methods led us first to focus on establishing enforceable water quality standards so that the regulatory programs under the Clean Water Act could be brought fully to bear, resulting in this year's adoption of new water quality standards and an interstate strategy for establishing enforceable permit limits for more than 400 wastewater facilities across the watershed. Secondly, comprehensive state tributary strategies have been developed to guide the restoration to eventual success. With a strong focus on implementing

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**Appendix VI**  
**Comments from the Environmental**  
**Protection Agency**

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these strategies, the Program is now further aligning its management plans to take better advantage of “available resources” for the restoration effort and is looking sector-by-sector for the most cost-effective approaches. On October 3, 2005, the partners formally adopted a consensus set of funding priorities that will be especially relevant to this effort.

Finally, we appreciate the thoughtful work of the GAO staff during this review and their constructive engagement with Chesapeake Bay Program Office staff and with representatives of our partner jurisdictions.

Sincerely,



Donald S. Welsh  
Regional Administrator



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# Comments from the Chesapeake Bay Commission



**Chesapeake Bay Commission**  
*Policy for the Bay · [www.chesbay.state.va.us](http://www.chesbay.state.va.us)*

October 14, 2005

Ms. Anu K. Mittal  
Director, Natural Resources and Environment  
U.S. Government Accountability Office (GAO)  
441 G. Street, N.W., Room 2G45  
Washington, DC 20548

Dear Ms. Mittal:

Thank you for your comprehensive review of the Chesapeake Bay Program and the thoughtful recommendations you developed. The Chesapeake Bay Commission, a partner of the Bay Program, supports your efforts and concurs with your findings.

The Bay Program is making strides towards improving the methods used to assess progress made on the restoration of the Bay. We agree with your recommendation that the Bay Program should complete its plans to develop and implement an integrated approach to assess overall restoration progress and that the approach must be closely tied to the five broad restoration goals identified in Chesapeake 2000.

Your second recommendation instructs the Bay Program to improve the effectiveness and “credibility” of its reports on the health of the Bay. The instructions within the recommendation consist of ensuring that the Bay Program’s reporting approach includes an assessment of the key ecological attributes that reflect the Bay’s current health conditions, reporting separately on the health of the Bay and on the progress made, and establishing an independent and objective reporting process. While we agree that these efforts will improve the value of the information presented to the public, we also acknowledge the immense challenge of presenting the results of complex multilayered technical data to the general public while maintaining scientific integrity.

I have put the term “credibility” in quotes to highlight a point: The report acknowledges that developing comprehensive measures of the Bay’s health while necessary, is a great challenge. The Bay Program employs 102 separate indicators to measure health and track progress. Each has its own solid scientific and accounting foundation. In combining these into a few, more big-picture measures, we must be sure to maintain the integrity of the accounting. It must be recognized that an ecosystem assessment on this scale has never been successfully completed. And while the Chesapeake Bay Program is ideally suited to do this work and appreciates the push that the GAO is offering, to undertake this very significant, new, science and communication challenge, we need the continued and amplified support of the Federal government. For the Bay Program to continue “as a [national and international] model” (p.3), the Federal government must remain a strong partner.

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*Virginia Office* GENERAL ASSEMBLY BLDG., ROOM 502B  
910 CAPITOL STREET · RICHMOND, VA 23219  
PHONE 804.786.4849 · FAX 804.371.0659

*Pennsylvania Office* C/O SENATE OF PENNSYLVANIA  
ROOM G-05 NORTH OFFICE BLDG. HARRISBURG, PA 17120  
PHONE 717.772.3651 · FAX 717.705.3548

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**Appendix VII**  
**Comments from the Chesapeake Bay**  
**Commission**

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October 14, 2005

Page two

To improve the credibility of the Bay Program's reports, establishing an independent review panel to review the State of the Bay reports before they are issued or establishing an independent group to analyze and report on the Bay's health is suggested on page 6 of the draft report. We recommend that if such a panel is created, then they should be brought into the process as early as possible. Participation in the development of the reports from an early stage would be beneficial to everyone involved in creating a clear and comprehensive presentation of the restoration progress and the health of the Bay.

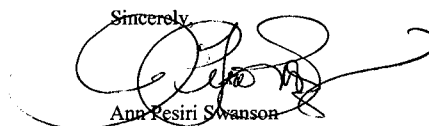
Finally, we are also in agreement with your last recommendation to develop an overall coordinated implementation strategy that unifies the program's planning documents and establishes a means to better target its limited resources. As the Chesapeake Bay Commission stated in our 2004 report, *Cost-Effective Strategies for the Bay*, to get the most benefit from limited resources, the Bay Program partners need to target their pollution control resources toward those practices that result in the greatest reduction of nutrient and sediment pollution per dollar spent -- the most cost effective practices.

The state developed Tributary Strategies that map out state-wide comprehensive plans for restoring the Bay, which will cost billions of dollars to implement. Targeting the available resources is imperative to restoration efforts, but we must not stop there. As the Chesapeake Bay Watershed Blue Ribbon Finance Panel acknowledged in their report to the Chesapeake Executive Council, current funding levels do not begin to meet financing needs for restoring Bay water quality. We must continue to work with our partners to secure additional funding to support their full efforts. For example, we are currently developing regional recommendations for the Federal Farm Bill to direct additional funds to our farmers in the Bay watershed for implementation of agricultural conservation practices.

As noted in your draft report, the Chesapeake Bay's watershed spans 64,000 square miles and traverses six states and the District of Columbia. There are numerous stakeholders involved in the efforts of the Bay Program and any success we achieve in restoring the Bay involves complex partnerships and substantial financial support.

Thank you for this opportunity to provide comments on the GAO's draft report on the Chesapeake Bay Program. We believe we are on track with your recommendations and hope that our collective efforts will lead to a healthier Chesapeake Bay.

Sincerely,



Ann Pesiri Swanson

APS:pwh



# Comments from the Commonwealth of Virginia



## COMMONWEALTH of VIRGINIA

### Office of the Governor

W. Tayloe Murphy, Jr.  
Secretary of Natural Resources

P.O. Box 1475  
Richmond, Virginia 23218

(804) 786-0044  
Fax: (804) 371-8333  
TTY: (804) 786-7765

October 18, 2005

Ms. Anu K. Mittal  
Director, Natural Resources and Environment  
United State Government Accountability Office (GAO)  
Washington, DC 29548

Dear Ms. Mittal:

On behalf of Governor Warner, I want to thank you for the opportunity to comment on the Draft Report ("the Report") on the Chesapeake Bay Program prepared by the United States Government Accountability Office ("GAO").

The Report contains three primary recommendations. First, it calls on the Administrator of the United States Environmental Protection Agency ("EPA") to direct the Chesapeake Bay Program ("the Program") to "complete its efforts to develop and implement an integrated assessment approach."

Although I agree that the Program should complete this task, I believe that any such assessment must be developed with the understanding that the Chesapeake Bay watershed is a complex ecosystem. As you know, the Program is the collective effort of the signatories to the Chesapeake Bay Agreement of 2000, and in some cases the headwater states of Delaware, New York and West Virginia. These partners strive to present to the public through a single voice the condition of the Bay in the most understandable terms possible; however, it is oftentimes difficult to express complex ecological interactions in overly simple terms. Virginia, together with its Bay partners, will continue to support scientifically defensible measures of ecosystem health that can be accurately communicated, and we will offer the expert advice and guidance of our agencies in this effort.

The second recommendation calls upon the Program to revise its reporting approach. Since 2004, the Program has been moving in the direction suggested by GAO, and it continues to refine its reporting to better serve the public and policy makers. I cannot agree with the representation made by two of the signatories, as stated on page 23 of the Report, that all of the Program partners "find it advantageous" to give a rosier view of the Bay's health than conditions warrant. In Virginia, it has been our policy and practice to be honest with the public and policy

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**Appendix VIII**  
**Comments from the Commonwealth of**  
**Virginia**

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Ms. Anu K. Mittal  
October 18, 2005  
Page 2

makers regarding the degraded condition of the Chesapeake Bay. When there is good news to report, we report it, but we have not been shy when reporting bad news as well.

I am also concerned about the frequent allegation that the information presented by the Program is not “credible.” The Report does not suggest that information presented by the Program is not accurate, but rather that it is sometimes presented in an improper context, or in a manner that confuses different types of data. I hope that GAO will review its comments on credibility with this observation in mind and that it will not leave the reader with the impression that the public has been intentionally misled or that the data presented by the Program meets anything but the highest scientific standards.

Finally, GAO recommends that the program develop a “comprehensive implementation plan that takes into account available resources.” I would argue that that the tributary strategies developed independently by each of the Bay partners (signatories and head water states), and the implementation activities associated with them, will serve as the basis for the plan that GAO proposes.

I hope that readers of the report will understand that Virginia has begun implementation of our tributary strategies. For point sources, we have instituted a comprehensive regulatory management program that will reduce and cap nutrient discharges from sewage treatment plants and industrial facilities. We have reinvigorated our grant program to assist municipal facilities with the cost of upgrades.

With respect to non-point sources, we are making significant strides in addressing urban storm water management, and we are working closely with our farmers to reduce the adverse impacts to water quality that result from a variety of agricultural practices. We are also seeking consistent funding for our agricultural grant programs. Moreover, we fully recognize that our tributary strategies are not static documents, and we are committed to making changes and revisions to them in order to adapt to new circumstances and resources as we continue to implement these strategies.

The Commonwealth of Virginia certainly supports thoughtful and achievable implementation plans developed through the Program partnership; however, we believe that the states must be given the flexibility to operate within their own cultural, legal and political environments. The implementation path Virginia chooses must be accomplished in the context of our state law and budgets, and any regional implementation plan must reflect this reality.

I would also suggest that this recommendation highlights the significant role that the federal government must continue to play in the Bay partnership. In the current fiscal year the Governor and the Virginia General Assembly, working together, made the largest appropriation to the Water Quality Improvement Fund in our history. Maryland has begun collecting the Chesapeake Bay Restoration Fee, and Pennsylvania has passed Growing Greener II. These actions are resulting in multi-million dollar investments in water quality by the states at this time,

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**Appendix VIII**  
**Comments from the Commonwealth of**  
**Virginia**

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Ms. Anu K. Mittal  
October 18, 2005  
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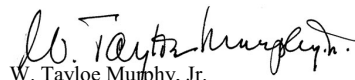
and we will work to insure that it continues in the coming years. We hope that our federal partner will also step up its commitment to match this unprecedented level of state support.

The restoration of the Chesapeake Bay will not be easy or cheap. The partners are engaged in a long-term enterprise that will only be successful through the full participation of federal, state and local governments, as well as the private sector.

I appreciate the time and thought that went into the development of the helpful recommendations by GAO, and I look forward to the implementation of those recommendations. I also look forward to the positive results that can occur only with the continuation of the partnership embodied in the Program.

Thank you again for giving me the opportunity to comment on the Report. If I can be of further assistance, please do not hesitate to contact me.

Sincerely,



W. Tayloe Murphy, Jr.

WTMJr/cbd

# Comments from the District of Columbia

**GOVERNMENT OF THE DISTRICT OF COLUMBIA**  
**Department of Health**  
**Environmental Health Administration**

Office of the Senior Deputy Director



October 17, 2005

Ms. Anu K. Mittal  
Director  
Natural Resources and Environment  
U.S. Government Accountability Office (GAO)  
Washington, DC 20548

Dear Ms. Mittal:

Thank you for giving the District of Columbia the opportunity to review the recent GAO Report on the US Environmental Protection Agency's Chesapeake Bay Program. We welcome Congressional interest in the restoration efforts of the Bay. We appreciate the time and energy your staff has put into the report to ensure its accuracy with respect to the District of Columbia's contribution to the Bay restoration. Overall, The District agrees with the report's findings; however, we believe efforts are already underway at the Bay Program to clarify and improve its assessment and reporting tools.

The restoration of the Chesapeake Bay is an enormous challenge, involving complex partnerships, tremendous financial resources, and strong science. The District of Columbia has committed to help in the Bay's restoration as shown by its signature to the Chesapeake Bay 2000 Agreement, its development and implementation of a Tributary Strategy, and its participation in Bay Program activities. The District is proud to say that it met the original 40% Bay reduction goal for nitrogen and phosphorus. We are now embarked on a Long-Term Control Plan that will reduce combined sewer overflows by 96%. This plan will not only help the Anacostia River, but also the Potomac River and Chesapeake Bay. Additionally, the District has revised its water quality standards to reflect the recommendations of the Chesapeake Bay Program Water Quality Steering Committee. We also have an aggressive urban storm water management program, where we track the installation and maintenance of best management practices. However, all involved in the Bay Cleanup agree that added financial resources are sorely needed to reach the Chesapeake 2000 Agreement's ambitious goals.

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51 N Street NE, Washington, DC 20002, Phone: 202-535-2500, Fax: 535-2881

Comment Letter to Ms. Mittal  
October 17, 2005  
Page 2

Again, the District of Columbia appreciates the opportunity to comment on the GAO's recommendations to the Chesapeake Bay Program.

Sincerely,



Marie Sansone  
Interim Senior Deputy Director

MS/sb

cc: Monica Lamboy, Chief of Operations, DOH  
Cheryl Edwards, Chief of Staff, DOH  
Hamid Karimi, Bureau Chief, DOH EHA

# Comments from the State of Maryland



Robert L. Ehrlich, Jr., Governor  
Michael S. Steele, Lt. Governor  
C. Ronald Franks, Secretary

October 18, 2005

Ms. Anu K. Mittal, Director  
Natural Resources and Environment  
U.S. Government Accountability Office  
441 G Street, N.W.  
Washington, D.C. 20548

Dear Ms. Mittal:

Thank you for your letter to Governor Robert L. Ehrlich, Jr. providing the State of Maryland with the opportunity to comment on the U.S. Government Accountability Office (GAO) proposed report, *Chesapeake Bay Program: Improved Strategies Are Needed to Better Assess, Report, and Manage Restoration Progress* (GAO-06-96). Governor Ehrlich has reviewed your letter and requested that I, as Secretary of the Maryland Department of Natural Resources, respond on his behalf.

In general, we concur with the results and conclusions contained within this report, and believe that many of the issues that have been identified are already being addressed through actions being taken by the State and the Chesapeake Bay Program.

As demonstrated in this report, Maryland has been and continues to be a leader in efforts to restore the Chesapeake Bay (Bay) through two decades of consistent programmatic and funding commitments. As evidenced in the report, from 1995 through 2004, Maryland provided more than \$1.9 billion in direct Bay restoration funding -- \$1.2 billion more than any other state. This commitment by the State of Maryland has allowed us to successfully leverage a variety of federal funding sources including the Chesapeake Bay Implementation Grants.

Our comments are organized in response to GAO's three major recommendations.

**GAO Recommendation:** GAO has recommended that the EPA administrator instruct the Chesapeake Bay Program to complete its efforts to develop and implement an integrated assessment approach.

**Maryland's Response:** Maryland agrees that there is a need to continue efforts to integrate existing measures of Bay health/restoration. However the Chesapeake Bay is a very complicated ecosystem and it is critical that characterizing the health of the Bay not be over simplified (for example with a letter grade).

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Page 2

An “integrated approach” does not necessarily imply a single or combined metric, rather it requires that all of the components be measured and their interactions understood and accounted for. From a management perspective, it is critical to continue to report on separate metrics because they allow us to assess individual components that can be managed. Reporting on separate metrics also allows us to educate the public about the complexity of ecosystems and the fact that some functions will improve while others may get worse, due to many different controlling factors such as weather, actual pollutant loads, the timing and location of those loads, disease, harvesting, and the interaction of all of those factors.

The new Chesapeake Bay Program assessment process that provides for integrated overarching indices in conjunction with diagnostic indicators on ecosystem health, stressors and management actions seems to offer an appropriate approach to address the concerns raised by GAO while maintaining critical information on individual metrics.

**GAO Recommendation:** GAO has recommended that the Bay Program revise its reporting approach to improve the effectiveness and credibility of its reports.

**Maryland’s Responses:** Maryland agrees that we need to continue to develop indicators and formats that more clearly articulate the current state of the Chesapeake Bay. The new indicators framework assessment process currently under development by the Bay Program should address specifically the concerns of having a core set of ecosystem characteristics and the problems of commingling data. Furthermore we concur that the Bay Program’s reporting process needs independent peer review which could be provided by their existing Scientific and Technical Advisory Committee or similar entity.

**GAO Recommendation:** GAO has recommended that the Bay program develop a comprehensive, coordinated implementation strategy that takes into account available resources.

**Maryland’s Response:** The tributary strategies and their associated implementation plans developed by Chesapeake Bay watershed jurisdictions are the comprehensive implementation plans that GAO recommends. Maryland’s Strategy, like other Bay states, is extremely ambitious. New resources and technologies will need to be identified if we are to reach our implementation goals. Recognizing this, Maryland has taken an incremental approach in its draft Tributary Strategy Implementation Plan that sets measurable, near term implementation targets based on available resources and current regulations. In addition, the plan includes new initiatives to acquire additional technical and financial resources as well as those that improve the efficiency and effectiveness of existing programs. The plan will be updated every 2 years, establishing a process to guide state agencies, legislators and the state house as we address policy gaps and funding needs that will move us toward full implementation of the Tributary Strategy, and ultimately restored water quality in Chesapeake Bay.

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**Appendix X**  
**Comments from the State of Maryland**

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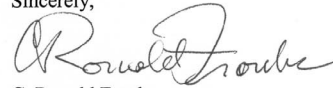
Maryland believes that while a comprehensive, coordinated strategy is important, jurisdictions must maintain their ability to pursue achieving these commitments individually. Tributary Strategies and their implementation plans vary greatly amongst the jurisdictions because of differences in land use, ecological characteristics and political philosophy. However each jurisdiction has developed a strategy that they believe will be most successful in meeting our collective goal of reducing nutrient and sediment inputs into the Chesapeake Bay.

The restoration of the Chesapeake Bay is not a short-term, single solution, single jurisdiction effort. Over twenty years of work have taught us many lessons that have made us collectively wiser as we continue to move forward to restore this national treasure.

Looking forward, Maryland will continue to support the historic use of a mix of regulatory and voluntary programs to achieve Chesapeake Bay Program goals. The combination of voluntary and regulatory programs allows for the flexibility and innovation that are essential in meeting these ambitious goals. In order to be successful we must continue to critically evaluate our progress and be willing to change course when warranted. The GAO report provides us with an independent evaluation of many important components of this effort and we are committed to addressing the recommendations therein.

Once again, thank you for the opportunity to comment. If I may be of further assistance, please do not hesitate to contact me at me at 410-260-8100 or Mr. Frank W. Dawson, Director of Watershed Services, at 410-260-8705, or by email at [fdawson@dnr.state.md.us](mailto:fdawson@dnr.state.md.us).

Sincerely,



C. Ronald Franks  
Secretary

cc: Frank W. Dawson, Director, Watershed Services, DNR



# Comments from the State of Pennsylvania



Pennsylvania Department of Environmental Protection

Rachel Carson State Office Building  
P.O. Box 2063  
Harrisburg, PA 17105-2063

October 18, 2005

Secretary

717-787-2814

Ms. Anu K. Mittal  
Director, Natural Resources and Environment  
United States Government Accountability Office (GAO)  
Washington, DC 20548

Dear Ms. Mittal:

Thank you for your recent Government Accountability Office (GAO) review of several aspects of the Chesapeake Bay Program and your request to Governor Rendell for comments on the report. I am responding on behalf of the Governor, who is committed to ensuring that Pennsylvania's fresh water streams provide sustainable habitat to support its fisheries, provide clean water to maintain safe drinking water systems, and provide the water quality necessary to enhance Pennsylvania and the Chesapeake Bay Watershed's quality of life.

As noted in your report, the Chesapeake Bay Program partners have completed an analysis similar to that undertaken by GAO, and they have moved to address issues of concern. In 2003, the Chesapeake Bay Commission completed its analysis of "The Cost of a Clean Bay," assessing the funding necessary to implement the Chesapeake 2000 Agreement. Rather than analyze past funding, the Bay Program partners estimated future funding needs to position the states to marshal the necessary resources to restore the Bay. This work was further refined for the Chesapeake 2000 Agreement water quality commitments with the development of states' Chesapeake Bay Tributary Strategies.

These Tributary Strategies are the comprehensive, coordinated implementation strategies called for by GAO. They identify the diverse set of management actions that will result in the removal of the Chesapeake Bay from the Clean Water Act list of impaired waters. It is critical that these be "state" strategies, developed with input from local stakeholders. Pennsylvania's Tributary Strategy includes management measures that address all five major goals of the Chesapeake 2000 Agreement.

When Pennsylvania developed its Tributary Strategy, we estimated the implementation costs and found them to exceed our existing resources. Since that time, we have sought to better understand the resources needs and to launch new cost-effective initiatives. In Pennsylvania's portion of the watershed, this calls for a focus on agriculture best management practices. We also recognize the immediate gains that can be made by implementing nutrient reduction technology at wastewater treatment plants. And finally, we recognize that many urban management measures will

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**Appendix XI**  
**Comments from the State of Pennsylvania**

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Ms. Anu K. Mittal

-2-

October 18, 2005

be implemented through normal development practices necessary to comply with state and federal rules for stormwater management. I would like to complete the record by providing information on several of the new initiatives undertaken in Pennsylvania.

Growing Greener:

- Since 2000, the Growing Greener Program has provided funding to preserve farmland and protect open space; clean up abandoned mines and restore watersheds; and provide new upgraded water and sewer systems.
- To date, over 467 projects and over \$52 million have been funded in Pennsylvania's portion of the Bay watershed.
- In July 2005, Governor Rendell signed Growing Greener II, a voter-approved plan that invests another \$625 million over six years. These investments include:
  - \$230 million to clean up rivers and streams; address environmental problems at abandoned mines and contaminated industrial sites; and finance the development and deployment of advanced energy projects.
  - \$217.5 million to preserve natural areas and open spaces; improve state parks; and enhance local recreational needs.
  - \$80 million to protect working farms.
  - \$50 million to revitalize communities through investments in housing and mixed-use redevelopment projects.
  - \$27.5 million to repair fish hatcheries and aging dams.
  - \$20 million for habitat-related facility upgrades and repairs.

Nutrient Management:

- Strengthened Nutrient Management regulations are scheduled for adoption by the State Conservation Commission in October 2005.
- Farms required to implement nutrient management plans will increase from 840 to 5,210.
- Manure importers must have nutrient balance sheets and written agreements with exporters.
- Plans are required to be based on both nitrogen and phosphorus application requirements.

Concentrated Animal Feeding Operations (CAFOs) and Other Livestock Operations:

- New Department of Environmental Protection (DEP) regulations for CAFOs effective in December 2005 will be more stringent than federal requirements.
- The number of farms classified as CAFOs is increased from 160 to 340.
- A 35-foot vegetative buffer or 100 foot setback from streams for manure application is required on 5,210 farms.
- Stricter manure storage requirements are imposed in Special Protection and agriculturally impaired watersheds.

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**Appendix XI**  
**Comments from the State of Pennsylvania**

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Ms. Anu K. Mittal

-3-

October 18, 2005

**Point Source Discharges:**

- Pennsylvania's point source dischargers in the Susquehanna and Potomac watersheds were notified that cap nutrient loads would be included in NPDES permits for all point sources greater than 2,000 gallons per day.
- DEP will also pursue development of a watershed permit through a regulatory initiative.
- DEP has published a Nutrient Trading Policy in the Pennsylvania Bulletin.

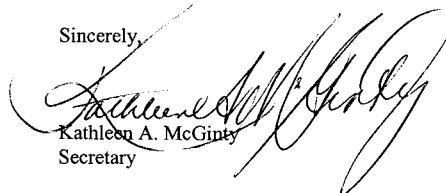
**PennWorks Grants:**

- This \$250 million economic stimulus package was approved by voters in 2004.
- Up to \$50 million in grants, and an additional \$100 million in loans, will be made available through the Pennsylvania Infrastructure Investment Authority (PENNVEST).
- PENNVEST announced \$50 million in grants for sewage facility upgrades related to Nutrient Reduction. Grant awards are anticipated in March 2006.

Thank you for this opportunity to convey to GAO and Congress the work that Pennsylvania is undertaking to meet our commitments under the Chesapeake 2000 Agreement. We recognize the challenges ahead to meet our water quality goals, and urge the Congress and federal government to become full partners as we work to implement our state Chesapeake Bay Tributary Strategies.

If you have any questions regarding this letter, please contact John Hines of Deputy Secretary Cathy Curran Myers' staff by e-mail at [johines@state.pa.us](mailto:johines@state.pa.us) or by telephone at 717-783-4693.

Sincerely,



Kathleen A. McGinty  
Secretary

# GAO Contact and Staff Acknowledgments

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## GAO Contact

Anu K. Mittal (202) 512-3841 or [mittala@gao.gov](mailto:mittala@gao.gov)

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## Staff Acknowledgments

In addition to the contact named above, Sherry McDonald, Assistant Director; Bart Fischer; James Krustapentus; and Barbara Patterson made key contributions to this report. Also contributing to this report were Mark Braza, Liz Curda, Anne Inserra, Lynn Musser, Mehrzad Nadji, Carol Herrnsstadt Shulman, and Amy Webbink.

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