OFFICE OF INSPECTOR GENERAL

Catalyst for Improving the Environment

Audit Report

EPA Grants Supported Restoring the Chesapeake Bay

Report No. 2006-P-00032

September 6, 2006

Report Contributors: Randy Holthaus
Jennifer Hutkoff
Michael Rickey
Matthew Simber

Cover photo: This photo shows part of an EPA-funded best management practice at a farm in Lebanon County, Pennsylvania. Pictured is a pipeline that distributes storm water flow through the pipe and on to splash pads after removal of manure from a cow feeding pen. Previously, the manure was not contained and had flowed downhill during rain storms. (Source: Office of Inspector General)

U.S. Environmental Protection Agency
Office of Inspector General

2006-P-00032
September 6, 2006

At a Glance

Catalyst for Improving the Environment

Why We Did This Review

Chesapeake Bay partners and the media have expressed concerns on the slow progress of Bay cleanup. The U.S. Environmental Protection Agency (EPA) recently stated that key water quality and wildlife habitat restoration goals of the Chesapeake 2000 Agreement will not be met by 2010 as planned. We conducted this audit to answer the question: Has EPA effectively targeted funds toward grant projects that should maximize environmental benefit in the Chesapeake Bay?

Background

The Chesapeake Bay and its tributaries have been on EPA's impaired waters list since 1998. The Chesapeake 2000 Agreement established the goals and commitments to restore and protect the Chesapeake Bay ecosystem and its living resources.

For further information, contact our Office of Congressional and Public Liaison at (202) 566-2391.

To view the full report, click on the following link:
www.epa.gov/oig/reports/2006/20060906-2006-P-00032.pdf

EPA Grants Supported Restoring the Chesapeake Bay

What We Found

EPA awarded assistance agreements (grants) that contributed toward meeting the goals of the Clean Water Act and the Chesapeake 2000 Agreement. These grants funded activities designed primarily to: reduce the nutrients and sediment entering the Bay and its tributaries, monitor ongoing efforts to restore Bay water quality, and model (estimate) the results of Bay implementation strategies.

In fiscal years 2003, 2004, and 2005, Congress appropriated $23 million each year for EPA's Chesapeake Bay Program. In each of those years, EPA awarded about $8 million for State implementation grants and $7 million for technical and other grants for specific projects. EPA used the remaining $8 million to fund EPA personnel and office management, interagency agreements, and congressional earmarks.

EPA funded State restoration programs that designed and installed best management practices, monitored the progress and results of ongoing projects, and informed EPA's partners and the public of their impacts on Bay water quality. EPA also funded technical project grants to: collect and track data on implementation efforts; model (estimate) future pollution levels and reductions gained from activities; monitor water quality and pollution levels; restore and protect fish and other living organisms; and educate the public and stakeholders about Bay restoration progress, obstacles, and strategies. These efforts contributed to EPA's overall Bay restoration program. EPA estimated, based on computer modeling, that as of March 2006 the program partners had achieved 37 percent of the nitrogen reduction goal, 53 percent of the phosphorus reduction goal, and 47 percent of the sediment reduction goal.

EPA's Chesapeake Bay Program Office responded to the draft report and concurred with our conclusion. The report does not contain recommendations.

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
WASHINGTON, D.C. 20460

OFFICE OF
INSPECTOR GENERAL

September 6, 2006

MEMORANDUM

SUBJECT: EPA Grants Supported Restoring the Chesapeake Bay
Report No. 2006-P-00032

TO: Donald S. Welsh
Regional Administrator, EPA Region 3

Rebecca W. Hanmer
Director, Chesapeake Bay Program Office

This is our report on assistance agreements awarded by the U.S. Environmental Protection Agency's Chesapeake Bay Program Office conducted by the Office of Inspector General (OIG). This report does not contain findings or recommendations. The estimated cost of this report – calculated by multiplying the project's staff days by the applicable daily full cost billing rates in effect at the time – is $187,667.

Action Required

Because this report contains no recommendations, you are not required to respond to this report. We have no objections to the further release of this report to the public. This report will be available at http://www.epa.gov/oig.

If you or your staff have any questions regarding this report, please contact me at 202-566-0847 or roderick.bill@epa.gov, or Janet Kasper at 312-886-3059 or kasper.janet@epa.gov.

Sincerely,

Bill A. Roderick
Acting Inspector General

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Purpose of Audit

The Chesapeake 2000 Agreement, established by the Chesapeake Bay partners to set goals for restoring the Bay's ecosystem, stated that while the individual and collective accomplishments of the Bay partners' efforts have been significant, greater effort will be required to address the enormous challenges that lie ahead. There have also been numerous media reports recently on the slow progress of the Bay cleanup. In 2000, the U.S. Environmental Protection Agency (EPA), along with five other signatory partners, had committed to restoring the Bay's waters by 2010. However, EPA recently stated in its draft Strategic Plan for 2006-2011 that key water quality and wildlife habitat restoration goals for the Bay will not be met by 2010 as planned.

We conducted this audit to answer the following question: Has EPA effectively targeted funds toward grant projects that should maximize environmental benefit in the Chesapeake Bay? To answer this question, we sought to determine whether EPA funded grant projects for the Bay that met the goals of the Clean Water Act and the Chesapeake 2000 Agreement. We defined "projects that should maximize environmental benefits" as those projects that contribute toward fulfilling the goals of the Clean Water Act and the Chesapeake 2000 Agreement. The Clean Water Act directs EPA's Administrator to maintain a Chesapeake Bay Program Office and for that Office to assist Bay partners in developing and implementing action plans to carry out the Chesapeake Bay Agreement. EPA is required to fund project grants to nonprofit organizations, State and local governments, colleges, universities, and interstate agencies to help meet the Chesapeake 2000 Agreement. EPA and the partners, by signing the Agreement, established a comprehensive set of goals to restore the Bay.

We did not assess State decisions regarding the type or location of best management practices they implemented. We also did not review grant proposals that EPA chose not to fund. Finally, we did not assess the adequacy of the Chesapeake 2000 Agreement. Additional details on the scope and methodology for our review are in Appendix A.

Background

The Chesapeake Bay is North America's largest and most biologically diverse estuary. The watershed area is home to more than 16 million people and 3,600 species of plants, fish, and animals. The watershed covers 64,000 square miles and includes parts of 6 States – Delaware, Maryland, New York, Pennsylvania, Virginia, and West Virginia – and all of the District of Columbia. The Chesapeake Bay watershed includes thousands of miles of waterways feeding into the Bay. This main Chesapeake Bay waterway is approximately 189 miles long and runs from the Susquehanna River in the north to the Atlantic Ocean in the south. Contributing waterways are referred to as "tributaries."

The Chesapeake Bay and its tributaries have been on EPA's impaired waters list since 1998. Nutrients and sediment are the Bay's two primary pollutants:

- **Nutrients:** The primary sources of nutrients (nitrogen and phosphorus) are agricultural, urban, and suburban runoff; sewage treatment facilities; and the deposition of air pollution from numerous sources, such as power plants. Excess amounts of these two

nutrients cause conditions ("algal blooms") that greatly reduce the amount of oxygen in the water that fish, crabs, and other aquatic organisms need to live.

- **Sediment:** Sediment is loose particles of clay, silt, and sand that suspend in a body of water and eventually settle to the bottom. In the Chesapeake Bay, sediment diminishes water quality by preventing light from penetrating to the leaves and stems of underwater grass and other vegetation.

The Chesapeake 2000 Agreement established the goals and commitments to restore and protect the Chesapeake Bay ecosystem and its living resources. The Chesapeake Bay partnership began in 1983 and was formalized through a series of agreements, the most recent in 2000. The signatories of the 2000 Agreement were EPA, Maryland, Pennsylvania, Virginia, the District of Columbia, and the Chesapeake Bay Commission. Collectively, these signatories are known as the Chesapeake Executive Council. The ultimate goal of the Agreement is to improve the Bay and its tributaries' water quality and have them all removed from the impaired waters list by 2010. Because restoration needs differed from State to State, the signatory States each developed their own tributary strategy to meet their Chesapeake 2000 Agreement water quality restoration commitments. Tributary strategies are river-specific cleanup strategies. West Virginia, New York, and Delaware are neighbors of the signatory States, and although they did not sign the Bay Agreement they have also made a commitment to participate in improving Bay water quality.

EPA administers Chesapeake Bay Program funding under Section 117 of the Clean Water Act. Section 117 directs EPA to maintain the Chesapeake Bay Program Office and provide support to the Chesapeake Executive Council and Chesapeake 2000 Agreement signatory partners. Section 117(b) lists the types of projects and activities EPA is authorized to fund. Under Section 117(d), EPA awards technical assistance and other assistance agreements to nonprofit organizations, State and local governments, colleges, universities, and interstate agencies for specific projects to implement the goals of the Chesapeake 2000 Agreement. Under Section 117(e), EPA awards assistance agreements to States for overall implementation and monitoring.

The EPA Office of Inspector General has initiated a series of studies to examine challenges and opportunities affecting the ability to achieve and sustain water quality goals in the Chesapeake Bay. In this series, we are focusing on principal contributors of point and nonpoint source contamination. This audit of Bay grants complements this series.

EPA Assistance Agreements Supported Restoring the Bay

In fiscal years 2003, 2004, and 2005, Congress appropriated $23 million each year for EPA's Chesapeake Bay Program. In each of those years, EPA awarded about $8 million for State implementation grants and $7 million for technical and other assistance agreements (project grants). EPA used the remaining $8 million to fund EPA personnel and office management, interagency agreements, and congressional earmarks. Details on what we found regarding the implementation grants and specific project grants follow.

EPA awarded assistance agreements (grants) that contributed toward meeting the goals of the Clean Water Act and the Chesapeake 2000 Agreement. These grants funded activities designed primarily to: reduce the nutrients and sediment entering the Bay and its tributaries, monitor ongoing efforts to restore Bay water quality, model (estimate) the results of Bay implementation strategies, and accomplish the goals of the Chesapeake 2000 Agreement. The funded activities included the States' restoration programs, which designed and installed best management practices, monitored the progress and results of ongoing projects, and informed EPA's partners and the public of their impacts on Bay water quality. These major areas of concentration have contributed to EPA's efforts in restoring the Chesapeake Bay.

EPA estimated, based upon computer modeling, that as of March 2006 the program partners have achieved 37 percent of the nitrogen reduction goal, 53 percent of the phosphorus reduction goal, and 47 percent of the sediment reduction goal.

Figure 1 below is a brief representation (logic model) of how funded grant activities contribute to restoring the Bay. For a more detailed picture, see *Detailed Logic Model on Chesapeake Bay Program Use of Assistance Agreements* – which we prepared – in Appendix B.

Figure 1: Logic Model on Chesapeake Bay Program Assistance Agreement Use

Activities	Outputs	Short-Term Outcomes	Long-Term Outcomes
Implementation grants	Nutrient reduction strategies designed and installed	Site-specific load reductions	Bay waters, habitats, and living resources restored
Monitoring	Ongoing efforts measured	Known water quality results and status	Bay waters removed from Impaired List
Modeling	Estimates of results	Improved implementation strategies	Strategies achieve water quality restoration
Outreach	Publications on Bay health and progress	Increased public awareness of how daily actions impact the Bay	Bay partners and the public continue to maintain water quality

Source: EPA Office of Inspector General analysis

State Implementation Grants Focused on Reducing Nutrients and Sediment Entering the Bay

During 2005, EPA provided $2.3 million each to Maryland, Pennsylvania, and Virginia in overall implementation grants for the Chesapeake Bay Program. States were required to match that amount. State workplans described the activities the States planned to conduct to achieve their State tributary strategies. Each of the tributary strategies provided long-term goals for nutrient and sediment reductions to restore the Bay. Further, each State spent significantly more than the Federal funding they received for restoring the Bay. For example, according to Maryland officials, the State spent $292 million in 2005 on restoring the Bay; of that amount,

10 percent came from the Federal Government (EPA as well as other Federal agencies). Details on activities undertaken by the three States follow.

Maryland: The State's 2005 implementation grant addressed four major objectives: water quality protection and restoration, vital habitat protection and restoration, stewardship and community engagement, and governance. Under the State's work plan, staff are expected to carry out many tasks, including:

- Provide grants to Maryland farmers to install best management practices.[1]
- Manage nutrient removal projects from specific facilities.
- Compile discharge monitoring data from 310 point sources and 10 industrial wastewater treatment facilities.
- Analyze and estimate nutrient loads to show the State's progress in meeting nutrient reduction goals.
- Analyze and assess trends in water quality, habitat, and aquatic species relative to nutrient load changes.
- Educate farmers so they can become certified to write their own nutrient management plans.
- Train 150 producers in 14 counties on how to calibrate their equipment and take manure and soil samples.

All of the above activities contributed to Maryland's tributary strategy by either focusing on reducing nutrients and sediments entering the Bay or monitoring ongoing efforts to assess impact and effectiveness. Maryland's 2010 tributary strategy goals were to reduce nitrogen and phosphorus by 69 percent from 1985 levels and sediment by 43 percent.

Pennsylvania: The State's 2005 State implementation grant included 10 objectives. Under these 10 objectives, Pennsylvania proposed to:

- Complete 132 total maximum daily load studies.
- Submit data to EPA on point and nonpoint source reductions.
- Conduct nutrient monitoring.
- Provide training to technical field staff.
- Educate various audiences, including farmers and local government officials.
- Install 300 best management practices.
- Complete 150 nutrient management plans.
- Prepare or revise 38 County Implementation Plans.
- Install 17 miles of stream bank fencing.
- Conduct two Watershed Academy training courses.

The workplan also included funding for technicians, engineers, and engineering assistants in the conservation districts. The technicians help landowners develop nutrient management plans and install best management practices. The engineering specialists

[1] EPA's Chesapeake Bay Program Office uses the term "best management practices" to describe practices used by all sectors to reduce point and nonpoint source pollution.

and assistants provide technical assistance to the conservation districts for design and analysis of engineering work related to installing best management practices. All of the State implementation grant activities are targeted toward Pennsylvania's Tributary Strategy to meet the 2010 Goals of the Chesapeake 2000 Agreement. Pennsylvania's Tributary Strategy goals were to reduce nitrogen by 40 percent, phosphorus by 44 percent, and sediment by 20 percent from 1985 levels.

Virginia: The State's 2005 State implementation grant addressed three major objectives: water quality protection and restoration, sound land use and stewardship, and community engagement. Under the workplan, staff are to:

- Create and revise nutrient management plans that affect 52,000 acres of land.
- Review 150 waste permits.
- Take and test 1,400 soil samples.
- Make over 500 inspections and field visits to farms, tidal areas, and other sites.
- Engage 150 local governments and key stakeholders in tributary strategies.
- Participate in a multitude of roundtable and educational events.

All projects focused on reducing nonpoint source pollution in the Chesapeake Bay and implementing the Chesapeake 2000 Agreement and Virginia tributary strategies. Virginia's 2010 tributary strategy goals were to decrease the State's 1985 baseline nitrogen load level by 47 percent, lessen its phosphorus load level by 57 percent, and reduce its sediment amount by 44 percent.

EPA has two primary means to ensure results and outcomes from State implementation grants – review State-submitted data, and review the States' semi-annual progress reports. States submit data to EPA from monitoring and implementation efforts. Monitoring efforts produce data on water quality and nutrient and sediment levels, enabling EPA to track progress, estimate future pollution levels, and assess the overall condition of the Bay. Implementation efforts produce data – such as the location of and type of best management practices installed – that EPA can use to estimate future pollution levels. States also submit semi-annual progress reports to EPA detailing accomplishments under the grants. The States provide information specific to each workplan objective, including: a comparison of actual versus anticipated accomplishments, reasons why anticipated outcomes were exceeded or not met, and information on the rate of expenditure under the grant versus progress. States submitted the required data to EPA timely, and progress reports adequately detailed State progress under the implementation grants.

Project Grants Measured and Reported Results

The remainder of EPA's Bay grant funding is awarded for an assortment of specific projects. In fiscal years 2003, 2004, and 2005, EPA awarded a total of 110 grants for Bay projects for $20.9 million. We reviewed 23 of these grants, totaling nearly $4.7 million, as categorized in Table 1:

Table 1: Grant Project Categories

Category	Number of Grants Reviewed	Amount of Funds Awarded
Modeling	5	$ 1,187,860
Outreach	4	1,261,834
Chesapeake Bay Executive Council Support	2	879,176
Monitoring	3	833,531
New Practices Research	4	255,394
Protecting and Restoring Fish and Living Organisms	4	221,500
Coordination	1	60,000
Total Reviewed	**23**	**$ 4,699,295**

Source: EPA Office of Inspector General analysis

The Maryland Assistant Secretary for Bay Programs, who is also a member of the Chesapeake Bay Budget Steering Committee, told us that modeling and monitoring activities in particular are critical. Modeling uses mathematical representations of the real world to estimate the effects of complex and varying environmental events and conditions. Monitoring is the collection of comprehensive data for a current description of the Bay. Over time, monitoring data may reveal trends regarding Bay water quality. Maryland's Assistant Secretary said one should not implement best management practices until one knows how potential areas can affect the Bay (by modeling) and also know if, ultimately, water quality is improving (by monitoring). Additional information on what we found for each category follows.

Modeling: States used the modeling information to set priorities and strategies for restoring the Bay. For example, EPA awarded two assistance agreements to the University of Maryland for nonpoint source data analysis. The university took State implementation data and entered it into a computer watershed model; once input, the recipient produced reports showing the costs versus the results of State implementation efforts.

Outreach: EPA funded projects in support of the Clean Water Act and Chesapeake 2000 Agreement goal to implement outreach programs for public information and to increase awareness. Outreach efforts are aimed at updating residents within the watershed on the quality of the Bay as well as how residents' actions can affect the Bay. Activities included organizing media events, producing e-newsletters for the Bay program's Website, disseminating fact sheets and brochures, and producing *The Bay Journal*.

Chesapeake Bay Executive Council Support: One grant provided staff to Council subcommittees to carry out functions per Clean Water Act Section 117(b)(2)(B). The Act directs EPA to provide support to the Chesapeake Executive Council by implementing and coordinating support services and developing and making available information pertaining to the environmental quality and living resources of the Chesapeake Bay ecosystem. The other grant was to analyze Federal farm programs and provide recommendations to the Council regarding potential changes that could be applied in the Bay restoration effort, and determine whether reauthorization of Federal farm programs could be used to authorize additional funding for agricultural conservation practices.

Monitoring: These grants provided data analysis and monitoring information to EPA's partners and stakeholders on the status and trends of Bay water quality. Monitoring grants enable grantees to collect water samples for analysis to measure the nutrient and sediment levels. EPA grantees monitored water quality in the tributaries, shallow waters, and the Bay main stem to measure water quality improvement progress.

New Practices Research: Some grants funded research into new best management practices. One grantee received a grant to develop ideas to achieve low-cost reductions at wastewater treatment facilities and encourage other systems to implement similar strategies, and produced several suggestions that signatory States used. The other three project grants looked at ammonia emissions from agricultural and urban sources, to develop best management practices to reduce emissions. Ammonia contributes nitrogen to the Bay, and data collected led to a best management practice that reduces the amount of ammonia deposited in water and on land.

Protecting and Restoring Fish and Living Organisms: EPA funded grants to install fish passages. Barriers such as large drains, dikes, water diversions, and dams prevent fish from migrating, keeping fish from important habitats for spawning and growing. As a result, several fish populations have died off or have been greatly reduced in number. Fish passage projects improve the ability of fish to swim upstream, past these barriers. Protecting and restoring living resources is a goal of the Chesapeake 2000 Agreement and a requirement of the Clean Water Act Section 117.

Coordination: The grant provided for the examination of local ordinances and comparison of those ordinances to model ordinances to see how local regulations can be revised. Recognizing that growth in the Bay area will continue, the grant is designed to support low impact development to minimize the amount of stormwater runoff.

Conclusion

We determined that EPA effectively awarded grant funds toward projects that should maximize environmental benefits in the Chesapeake Bay. The State implementation grants and project grants we reviewed contributed toward EPA's Clean Water Act goals or one or more of the goals of the Chesapeake 2000 Agreement. EPA funded activities, such as implementation and outreach, which contributed to localized load reductions. Monitoring the effects of those activities allowed EPA to measure progress toward achieving improved water quality. Modeling estimates long-term effects and demonstrates what reductions and results EPA and its partners should expect from future efforts. Lastly, EPA awarded other project grants that increased citizens' awareness of how their practices at home can impact the Bay, developed new best management practices, and helped to restore the Bay's living resources. While EPA and its partners agree that there is much work to be done, the grants we reviewed should provide environmental benefits that contribute to restoring the Bay.

EPA's Chesapeake Bay Program Office concurred with the conclusion in our draft report. The office's response is in Appendix C.

Status of Recommendations and Potential Monetary Benefits

RECOMMENDATIONS						POTENTIAL MONETARY BENEFITS (in $000s)	
Rec. No.	Page No.	Subject	Status[1]	Action Official	Planned Completion Date	Claimed Amount	Agreed To Amount
		No recommendations					

[1] O = recommendation is open with agreed-to corrective actions pending;
C = recommendation is closed with all agreed-to actions completed;
U = recommendation is undecided with resolution efforts in progress

Appendix A

Scope and Methodology

We conducted this audit in accordance with *Government Auditing Standards*, issued by the Comptroller General of the United States. We obtained an understanding of the program through analysis of the laws, regulations, and guidance pertaining to grants awarded through the Chesapeake Bay Program and an evaluation of internal controls over them. Our understanding of the internal controls was gained through the performance of the procedures previously outlined. We did not test the validity or reliability of the data in the Integrated Grants Management System because the data was not significant to our findings. We performed our audit field work from February to April 2006.

We visited EPA Region 3 in Philadelphia, Pennsylvania, and the Chesapeake Bay Program Office in Annapolis, Maryland. We interviewed the Chesapeake Bay Program Director and Deputy Director, Associate Directors, and project officers. We sought to determine whether EPA effectively targeted funds toward grant projects that maximize environmental benefits based on the goals of the Clean Water Act and the Chesapeake 2000 Agreement. We did not assess State decisions regarding the type or location of best management practices they implemented. We also did not review proposed grant projects that EPA elected not to fund. Finally, we did not assess the adequacy of the Chesapeake 2000 Agreement.

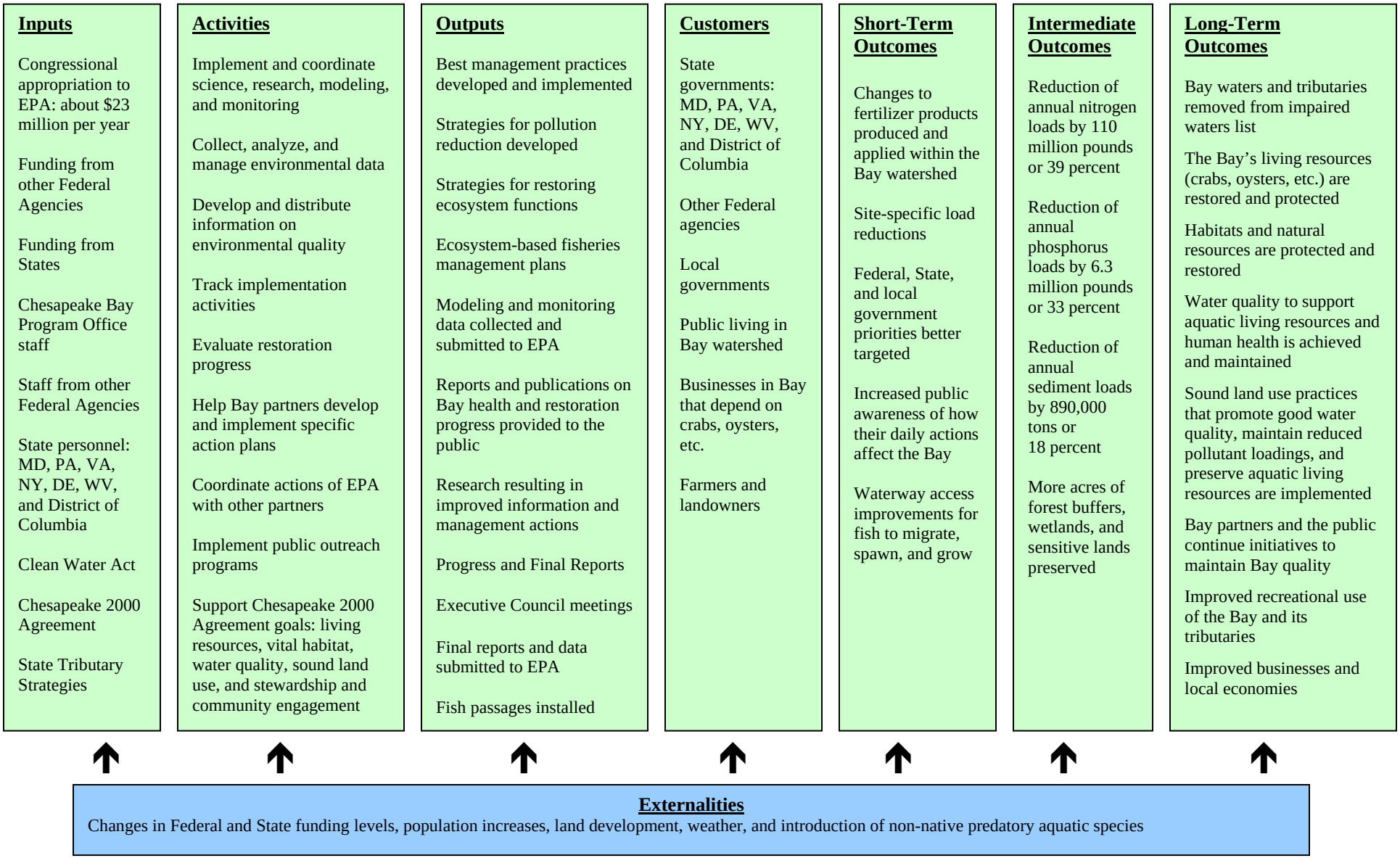
EPA awarded about half of the $15 million in grant funding each year to three States: Maryland, Pennsylvania, and Virginia. We examined all of these State implementation grants for fiscal years 2003, 2004, and 2005. We reviewed the files and visited the Maryland Department of Natural Resources in Annapolis, Maryland; the Pennsylvania Department of Environmental Protection in Harrisburg, Pennsylvania; and the Virginia Department of Conservation and Recreation in Richmond, Virginia. We interviewed the State managers and grants management staff. We visited three sites that implemented best management practices funded through EPA State implementation grants: a "green" roof site in Richmond, Virginia; a dairy farm in Lebanon County, Pennsylvania; and riparian forest buffers in Frederick and Monocacy, Maryland.

We extracted all Chesapeake Bay project grants for fiscal years 2003, 2004, and 2005 from EPA's Integrated Grants Management System. From that list, we selected a random sample for review. Out of the 110 grants awarded during that period totaling $20.9 million, we reviewed the project officer files for 23 project grants totaling $4.7 million while visiting the Chesapeake Bay Program Office. We grouped the project grants into seven general categories. We did not observe any deficiencies in the project officer files, and the workplans and deliverables confirmed the information the project officers provided during the interviews.

Government Auditing Standards require auditors to design the audit to detect violations of legal and regulatory requirements, contract provisions, or grant agreements, including fraud and abuse. The team did not detect any information or documentation that appeared to be fraudulent in nature or suggested a pattern of fraud.

There were no pertinent prior audit reports on the issues that we reviewed.

Detailed Logic Model on Chesapeake Bay Program Use of Assistance Agreements



Source: EPA Office of Inspector General analysis

Appendix C

Agency Response

DATE: August 24, 2006

SUBJECT: Draft Audit Report
EPA Grants Supported Restoring the Chesapeake Bay
Assignment No. 2005-01688

FROM: Rebecca Hanmer
Director, Chesapeake Bay Program Office

TO: Janet Kasper
Acting Director, Assistance Agreement Audits

Thank you for the opportunity to review your Draft Audit Report, No. 2005-01688.

We concur with the conclusion in this review of the Chesapeake Bay Program's assistance agreements. As you know, we devote important resources and oversight to this effort, and we are especially pleased to read your conclusion: "We determined that EPA effectively awarded grant funds toward projects that should maximize environmental benefits in the Chesapeake Bay." (Draft Report, p. 7).

Thank you again for the opportunity to review and comment on this Draft Report. We look forward to receiving the final copy.

Appendix D

Distribution

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