

# The Chesapeake Bay Watershed:

## *National Treasure, Regional Challenges*

### Introduction

The Chesapeake Bay is North America's largest estuary, home to 3,700 species of plant and animal life, including oysters, more than 200 species of fish, and the blue crab. The Bay has served as a rich natural resource for at least 10,000 years, sustaining Native Americans and, more recently, the European migrations that began in the sixteenth century. Today, the Bay's watershed is home to nearly 17 million people.

Since the 1970s, when initial studies indicated the Bay had serious water quality problems, management of the Chesapeake Bay has increasingly become a regional and national issue. The challenges facing the ecosystem are substantial and varied: toxic heavy metals and industrial chemicals from areas like the ports of Baltimore and on the James River, treated wastewater and land runoff from urban areas, agricultural runoff from the northern and inland reaches of the watershed, as well as broader concerns of overfishing and climate change. Population growth is also a major concern, as the watershed is growing by about 130,000 residents annually and is expected to include 2.6 million additional residents by 2020.

Managing such a complicated ecosystem would be difficult under any conditions. However, the Bay's watershed covers 64,000 square miles and also encompasses six states: Delaware, Maryland, New York, Pennsylvania, Virginia, and West Virginia, as well as the District of Columbia. The core premise has been to collaboratively manage and conserve the Bay's resources and incorporate representatives from each of these states, as well as resource experts, watermen, environmental groups, industry representatives, residents and federal agencies.

The Chesapeake Bay restoration and conservation effort is arguably one of the most comprehensive environmental



*The Chesapeake Bay from Space*

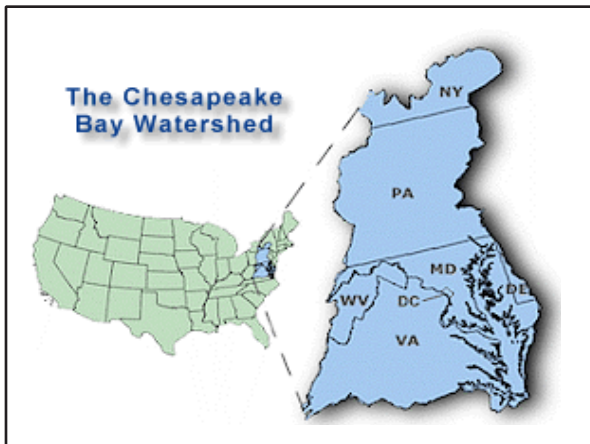
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management programs ever attempted. From the establishment of the Chesapeake Bay Commission in 1980 to the Chesapeake 2000 and subsequent guidelines, these voluntary management efforts have resulted in a series of multi-state, inter-agency agreements that attempt to equitably manage the Bay's resources and address stakeholders' disparate needs.

### Chesapeake Bay Program Collaborative Responses

Maryland and Virginia established the **Chesapeake Bay Commission** in 1980 to help both states cooperatively manage their portions of the Chesapeake Bay. Pennsylvania joined the Commission in 1985. The Commission was the result of a 1978 study by the joint Maryland-Virginia Chesapeake Bay Legislative Advisory Commission, which had been convened to evaluate existing and proposed management resource structures for the Bay. After considering a range of cooperative management options, the Advisory Commission recommended the establishment of a bi-state Commission. The creation of the Chesapeake Bay Commission offered several advantages: it involved no federal statutory limitations, it highlighted state responsibility for the Bay, and it strengthened policy ties between the two states. The Commission was established with the following objectives:

- to assist the legislatures in evaluating and responding to mutual Bay concerns;
- to promote intergovernmental cooperation and coordination for resource planning;
- to promote uniformity of legislation where appropriate;
- to enhance the functions and powers of existing offices and agencies; and
- to recommend improvements in the management of Bay resources.



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Since its creation, the Chesapeake Bay Commission has initiated a range of environmental protection and restoration efforts. The Commission has promoted policy initiatives in the areas of nutrient reduction, fisheries management, toxics remediation, pollution prevention, habitat restoration and land management. The Commission develops and sponsors legislation in each member state, works directly with federal agencies like the Environmental Protection Agency (EPA), and coordinates public meetings and education efforts. Recent projects include the 1996 establishment of the Bi-State Blue Crab Advisory Committee (BBCAC), which in 2001 and 2003 reported its proposed strategies to stabilize the Bay's blue crab population. Despite closing the BBCAC in 2003 due to budget shortfalls, the Commission published a Blue Crab report in 2005. The report found that the 2001 agreements to reduce the crab harvest have brought only erratic annual reductions and the actual number of blue crabs living in the Bay remains below long-term average. The most recent work has been guidance from the 2008 Farm Bill (see box) and the development of a Bay-wide Forest Conservation Directive.

The **Chesapeake Bay Agreement**, signed in 1983, directly involved the federal government in the Bay's management for the first time. The Agreement also incorporated the Commonwealth of Virginia, the State of Maryland, the Commonwealth of Pennsylvania, the District of Columbia, the EPA, and the Chesapeake Bay Commission as signatories. In the Agreement, the signatories agreed to three actions: (1) establishment of

### **The Federal Farm Bill**

In 2007, the Chesapeake Bay Commission in partnership with governors of Pennsylvania, Delaware, Maryland, Virginia, West Virginia, and the Mayor of the District of Columbia presented Congress with recommendations for allocating Farm Bill funds to support cost-effective agricultural practices for pollution reduction. Their priorities for funding were:

- \* Increasing flexibility in the delivery of federal funds.
- \* Reducing the financial risk of farming in the region.
- \* Increasing funding and technical assistance for conservation-related programs.

In May, 2008, The Federal Farm Bill was reauthorized and directs \$188 million in new funding to support Bay watershed restoration over the next five years. This is close to double the roughly \$80 million a year now available to farmers in the watershed through multiple conservation programs administered by the U.S. Department of Agriculture.

a Chesapeake Executive Council (including the governors of the signatory states, the EPA administrator, the Chair of the Bay Commission, and the mayor of DC) to “assess and oversee the implementation of coordinated plans to improve and protect the water quality and living resources,” (2) establishment of a Council subcommittee to coordinate the development and evaluation of management plans, and (3) establishment of an EPA-based liaison office for Chesapeake Bay activities.

The Agreement also established the Chesapeake Bay Program (CBP) partnership. Between 1983 and 1987, this program partnership focused primarily on estuarine research and restoration programs. In 1987, these research findings provided the foundation for a second Bay Agreement that, for the first time, outlined a series of specific goals, objectives and commitments for managing and restoring the Chesapeake Bay. For example, the 1987 Agreement update committed the signatories to achieving a 40 percent reduction of nitrogen and phosphorus entering the main stem of the Bay and to incorporating public input into decision-making processes.

The 1983 Chesapeake Bay Agreement, updated in 1987 and 1992, has provided a powerful, flexible framework for the three states, the District of Columbia, the federal government, and the Chesapeake Bay Commission to coordinate research and policy goals. Using the CBP partnership, these signatories first assessed the condition of the Bay's natural resources and then developed policy options. Over time, as research yielded new findings and new policy options were developed, the partnership was able to incorporate these options into the Agreement through amendments.

In June of 2000, the signatories to the Chesapeake Bay Agreement signed the **Chesapeake 2000** agreement. The agreement states that:

*“In order to achieve our existing goals and meet the challenges that lie ahead, we must reaffirm our partnership and recommit to fulfilling the public responsibility we undertook almost decades ago. We must manage for the future. We must have a vision for our desired destiny and put programs in place that will secure it.”*

This agreement builds on its predecessor in several important ways. Chesapeake 2000 focuses on five broad goals: living resource protection and management, vital habitat protection and restoration, water quality protection and restoration, sound land use and stewardship and community engagement. Additionally, the Chesapeake 2000 agreement establishes and reaffirms the following goals:

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- achieve a tenfold increase in native oysters by 2010;
- identify and rank non-native, invasive aquatic and terrestrial species;
- 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;
- recommit to the existing goal of protecting and restoring 114,000 acres of submerged aquatic vegetation;
- achieve a no-net loss of existing wetlands acreage;
- continue efforts to achieve the 40 percent nutrient reduction goal agreed to in 1987; and
- restore 2,010 miles of riparian forest buffer areas by 2010.

These are collectively known as the **2010 goals**.

The Chesapeake 2000 agreement also made several new policy provisions. Under the agreement, government signatories must expand their use of clean vehicle technologies and fuels. Delaware, New York and West Virginia, Maryland, the District of Columbia and Virginia have signed the water quality section of the Chesapeake 2000 Agreement.

The CBP partners designed, developed, and began implementation of the first version of the **Chesapeake Action Plan (CAP)**. This was communicated in their July 2008 Report to Congress, *Strengthening the Management, Coordination, and Accountability of the Chesapeake Bay Program*.

The CAP includes four primary components, each of which is described in the report to Congress: 1) a strategic framework that unifies CBP's existing planning documents and clarifies how CBP partners will pursue the restoration and protection goals for the Bay and its watershed; 2) an activity integration plan with comprehensive, quality assured data for 2007 that identifies and catalogues CBP partners' implementation activities and corresponding resources; 3) dashboards, which are high-level summaries of key information, such as clear status of progress, expected progress toward certain Chesapeake 2000 goals, summaries of actions; and 4) an adaptive management process that begins to identify how this information and analysis will provide critical input to CBP partners' actions, emphasis, and future priorities.

The Chesapeake Bay agreements and amendments published between 1983 and 2000 represent earnest attempts at voluntary state and federal policy coordination and regional resource management. The agreements acknowledge the variety and severity of challenges facing

### **A Closer Look:**

#### **Virginia's Oyster Management Strategy**

Throughout the twentieth century, oysters were the most heavily harvested animal in the Chesapeake Bay. In Maryland and Virginia's Bay waters, the oyster population also had to contend with substantial loss of reef habitat, pollution and disease. In the early 1900s, annual oyster catches in Virginia exceeded 9 million bushels. In contrast, total landings for the 1997-98 season were just 14,295 bushels, only 1% of catch levels even 35 years ago. The oyster, a keystone species which serves as a natural water filter, has accordingly been targeted by each of the succeeding Bay agreements between 1983 and 2000 for urgent policy and research action.

In Virginia, the Virginia Department of Environmental Quality's Coastal Zone Management (CZM) Program and the Virginia Marine Resources Commission launched the Virginia Oyster Heritage Program in March 1999. Building on recent efforts, the Program was created to bring more partners into reef restoration efforts in the Commonwealth, provide greater financial resources for reef construction, and to take a new approach to earlier reef building efforts by establishing three-dimensional reefs surrounded by enhanced harvest areas. The Program also includes funding for ongoing reef monitoring research, volunteer training, and educational materials. The Virginia Oyster Heritage Program exemplifies how each signatory to the Bay agreements can pursue targeted, inter-agency strategies to reach regional goals. Between 2002 and 2009 Virginia CZM invested over \$2.6 million in the Virginia Oyster Heritage Program, a public-private partnership initiated by the Program. This partnership constructed over 80 sanctuary reefs and 1000 acres of harvest area in Virginia's coastal waters.(VA DEQ 2011)

the Bay watershed; recognize the reality and implications of changing research and policies and accordingly incorporate flexibility into the documents; set long term objectives; and attempt to balance research and policy making. Above all, the agreements recognize the need for immediate and significant action. Unfortunately, on-the-ground results have been mixed, and the Bay remains severely impaired.

#### **Commonwealth of Virginia Responses**

The Virginia General Assembly enacted the Chesapeake Bay Preservation Act in 1988 in order to establish a cooperative nonpoint source pollution program between the state and the eighty-four local governments of Tidewater, Virginia. The Bay Act Program is designed to improve water quality

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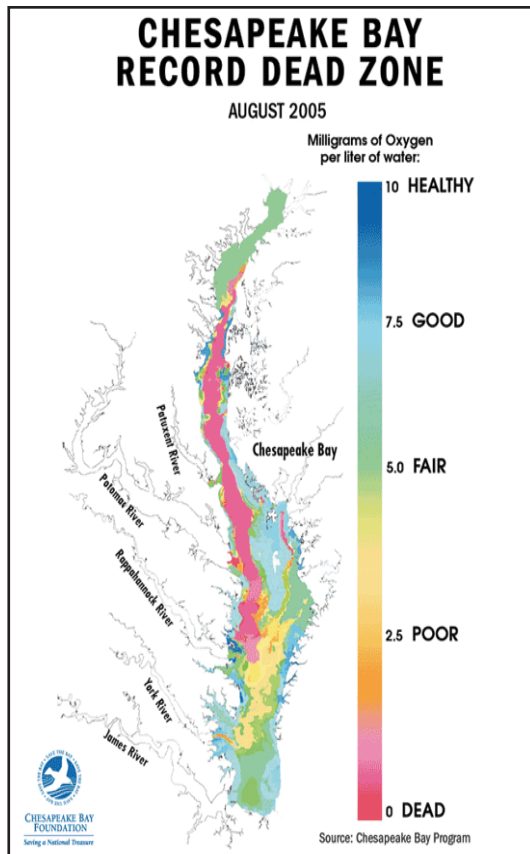


Image courtesy of the Chesapeake Bay Foundation

in the Chesapeake Bay and its tributaries by requiring wise resource management practices in the use and development of environmentally sensitive lands. The Chesapeake Bay Local Assistance Board, which was created by the Act, is responsible for promulgating regulations that establish criteria for local Bay Act Programs.

In 2006, the General Assembly allocated \$270 million for point source pollution reduction and an additional \$40 million for non-point source pollution reduction—the single largest budget allocation for the Bay in Virginia’s history. This substantial sum funded upgrades to existing sewage treatment plants and local Soil and Water Conservation District projects with hundreds of farms in the Chesapeake Bay watershed. Virginia state agencies have developed strategies to sustain Virginia’s blue crab and oyster populations (see box). In 1998, the Virginia Riparian Buffer Initiative published a Riparian Buffer Implementation Plan that targeted the restoration of 610 miles of riparian forest buffers in Virginia by 2010 using a combination of incentives, conservation efforts, and education programs. This goal was met in 2002. In

### The Chesapeake Bay Dead Zone

Each summer, scientists track the size of the Chesapeake Bay’s “dead zone,” the area in which dissolved oxygen drops below 0.2 milligrams/liter of water. The graphic at left illustrates the dissolved oxygen thresholds for key Bay species—most cannot survive even at levels above the 0.2 mg/l “dead zone.” The largest dead zone on record occurred during July of 1993, but the summer of 2003 was another record-setter because of heavy rains that led to more sedimentation and nutrient-loading in Bay tributaries. Similar patterns of above-average rainfall in 2005 washed significant suburban wastewater and farmland fertilizer into the bay, producing algae blooms and crippling fisheries. Summer 2006 saw a decrease in the size of the dead zone, which is likely due to lower rainfall. As of August, 2006, 125 square miles of the Bay had  $\leq 0.2$  mg/l of dissolved oxygen.

In the mid summer of 2011, the dead zone is on track to be the largest on record. The dead zone covers a third of the Bay, and stretches beyond the Potomac into Virginia (Washington Post, 07/11).

2000, the state legislature developed the Virginia Pollution Abatement (VPA) General Permit Regulation for Poultry Waste Management to help address the issue of non-point source pollution in the Commonwealth.

In addition, Virginia’s Tributary Strategy Initiative was developed to meet Virginia’s Bay Program commitment to a 40% reduction in controllable stream and river sediment loads. Stakeholders like farmers, business and citizen groups developed management strategies and goals for their respective watersheds. In January 2005, the office of the Secretary of Natural Resources released the final Nutrient and Sediment Reduction Tributary Strategy for Virginia’s Chesapeake Bay Basins.

### The Rocky Road to Recovery

Despite over 20 years of attention and activity thus far at the state, regional and federal level on behalf of the Chesapeake Bay Watershed, current and past efforts have proven insufficient to address the challenges facing the Bay.

In October 2005, the **U.S. Government Accountability Office** (GAO) issued the report, *Chesapeake Bay Program: Improved Strategies are Needed to Better Assess, Report and Manage Restoration Progress*. The GAO report recommended that CBP:

- complete efforts to develop and implement an integrated

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assessment approach;

- revise its reporting approach to improve effectiveness and credibility; and
- develop a comprehensive, coordinated implementation strategy that takes into account available resources.

In December 2007, Congress passed the Consolidated Appropriations Act of 2008. The Act's Explanatory Statement directed EPA to:

- immediately implement all of the recommendations of the 2005 GAO Report;
- submit a report to Congress and to GAO, with supporting evidence, that demonstrates the GAO recommendations have been implemented; and
- develop a Chesapeake Action Plan (CAP) for the remaining years of the Chesapeake 2000 agreement that contains specified components (i.e., realistic annual targets, actual activities, amount and source of funding, process to track and measure progress).

Also in December 2007, the Chesapeake Executive Council publicly acknowledged that they would fail to meet their cornerstone cleanup goals by 2010, but asserted that they would have policies in place by the end of 2010 that would lead to a clean Bay. They declined to specify a timeline (Blankenship, 2008). However, acknowledging the enormity of the problem, the Executive Council established two-year milestones for each state to serve as guideposts to the cleanup effort.

While these are established at the state level, the EPA has developed federal consequences, known as “backstops”, that could use regulatory power should a state fail to meet its milestones. These backstops could take the form of less federal funding for restoration efforts, or taking a more active role in permits and requirements for Virginia facilities.

### Bay TMDL

#### (Total Maximum Daily Load) Cleanup Plans

The Clean Water Act requires states to survey waterways every two years and report those that fail to meet water quality standards to the EPA. This is known variously as the 303(d) list, the impaired waters list or the “dirty waters” list (not “fishable or swimmable” because of pollution). All jurisdictions

in the watershed released their most current lists in 2008.

Besides listing hundreds of miles of impaired rivers and other waterways, these reports show that virtually all of the Chesapeake and its tidal tributaries fail to meet water quality standards. The reports confirm that the region will not meet one of the keystone goals of the Chesapeake 2000 agreement: to reduce nutrient and sediment pollution enough by 2010 to “remove the Bay and the tidal portions of its tributaries from the list of impaired waters under the Clean Water Act.”

That will mean the region must now do what it had long sought to avoid: develop cleanup plans, known as Total Maximum Daily Loads (TMDL), for those waterways. Key parts of a TMDL include the establishment of the maximum amount of pollution that a body of water may receive and still meet its standards, with a margin of error. That “load” is then “allocated” to sources contributing to the problem, essentially setting a pollution limit for each source. When that source has a permit, the allocation is typically required to be part of the permit.



The graphic above shows the five major Chesapeake Bay basins in Virginia. Source: Chesapeake Bay Program.

The Chesapeake Bay TMDL refers to a coordinated package of new TMDLs on local impaired stream segments in each of the states and introduces 35 new individual TMDLs into the state of Virginia. While there are many existing TMDLs in the watershed designed to protect local waters, these will focus exclusively on nitrogen, phosphorus and sediment loads. The Chesapeake Bay TMDL is the largest and most complex TMDL to date, establishing loadings across all 6 states and the District of Columbia, including the upstream states of Pennsylvania, New York and West Virginia, the estimated source of half of the nitrogen and over a quarter of the phosphorus in the Bay. The TMDL covers an area

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that includes 17 million people, 88,000 farms, 483 significant treatment plants, and thousands of other nonpoint sources.

### Chesapeake Bay Executive Order

On May 12, 2009, President Obama issued Executive Order 13508, the first ever presidential directive on the Chesapeake Bay and the first environmental Executive Order of the Administration. The Administration has linked Executive Order water quality goals to the establishment of TMDLs for the Bay and its eight major river basins. The Order indicates that the EPA will work more closely with other agencies and take a stronger stance on the states' responsibilities for regional water pollution. The Executive Order expressly states that "agencies may begin implementing core elements of restoration and protection programs and strategies as soon as possible" (CBF, May, 2009)

EPA has previously established TMDLs for the Bay and its eight major basins as part of the Chesapeake Bay Program's "Tributary Strategies." The federal action under the Obama administration, however, includes new implementation requirements and enforcement strategies. The new directive requires all Bay jurisdictions including Virginia to submit Watershed Implementation Plans by November 1, 2010 (Phase I) and November 1, 2011 (Phase II). The Phase I Plans provide a mechanism for the States and the District, along with their local partners, to provide information for EPA to consider in establishing the wasteload allocations for point sources and load allocations for nonpoint sources. The Phase II Plans will divide nonpoint source load allocations and any aggregate point source wasteload allocations to a finer scale so that local decision-makers can better understand their responsibilities for reducing pollutant loads

The directive requires that Watershed Implementation Plans (WIP) identify a schedule for enhancing programs and implementing actions as soon as possible and by no later than 2025. In the short-term, the EPA will require states to make two-year milestone commitments for implementing pollutant reduction controls and actions. Prior to the start of each two-year period, EPA will evaluate whether these two-year commitments are sufficient to meet long-term goals. If the states fail to meet expectations or fail to achieve two-year milestone commitments, EPA has made it known that they will take action to include the redirection or conditioning of EPA grants, the increase of NPDES coverage or oversight, the establishment of finer scale load limits and the requirement of net improvement offsets.

In 2010 Virginia submitted its Phase I Watershed Implementation Plan and the EPA accepted the plan and included it in the Chesapeake Bay TMDL with minor modifications. In 2011 the EPA provided federal agencies and the seven Bay jurisdictions

with a guide and schedule for developing Phase II WIP Plans and two year milestones. The EPA expects Phase II WIPs to clearly identify key local, state and federal partners who will be involved in meeting TMDL allocations, how the jurisdiction will work with key partners, clear quantitative strategies and goals, and how progress will be tracked and reported.

The table below shows the preliminary planning targets for allowable pollution in Phase II WIPs in Virginia jurisdictions (EPA Letter to State)

<b>Nutrient Targets (July 2010)</b> <i>(millions of pounds/year)</i>		
<b>Jurisdiction/Basin</b>	<b>Nitrogen</b>	<b>Phosphorous</b>
James	23.48	2.34
Potomac	17.46	1.47
Rappahannock	5.84	.90
York	5.41	.54
Eastern Shore	1.21	.16
<b>Total:</b>	<b>53.40</b>	<b>5.41</b>

The Chesapeake Bay Executive Council recently launched the 2011 FY Action Plan, a \$491 million effort aimed at achieving the goals set forth in the Executive Order. The Plan reflects an unprecedented agency coordination and commitment of federal resources to restore clean water, recover habitat, sustain fish and wildlife and conserve land and increase public access. The plan is based on the principles of ecosystem-based management and adaptive management that directly supports state and local efforts. The Council also launched ChesapeakeStat, an innovative monitoring system that continually assesses and displays the progress towards stated goals.

### Conclusions

On several counts, the Chesapeake Bay Agreements illustrate a successful approach to regional resource management. The CBP represents a considerable effort toward collaborative problem solving. Over the past three decades, the signatories have committed substantial resources and expertise to collect data and develop policy actions. The agreements have consistently recognized that each signatory, while ascribing to common goals and timelines, must retain substantial autonomy over the policies necessary to attain those goals. However, the CBP appears to be facing a very difficult battle. It has become clear that the challenges the signatories and the CBP itself face remain considerable. It remains to be seen whether still-stronger Bay TMDL policies and a revised Chesapeake 2000 are enough to meet these challenges.

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Despite a past history of failure, the future of the Chesapeake Bay cleanup gives some reason for hope. The federal government's attention to the problems in the Bay offers tentative promise to Bay advocates. In Virginia, citizens, activists and lawmakers continue to lobby for a dedicated source of funding for Bay clean-up and restoration programs. Until then, annual general fund allocations like the \$270 million dedicated in 2007 will hopefully be put to use improving water quality in all of Virginia's tributaries to the Bay.

*Updated 8/11 by ML*

### **Resources:**

- Chesapeake Bay Program, [www.chesapeakebay.net](http://www.chesapeakebay.net)
- Chesapeake Bay Commission, [www.chesbay.state.va.us](http://www.chesbay.state.va.us)
- Maryland Department of the Environment, [www.mde.state.md.us](http://www.mde.state.md.us)
- Virginia Department of Environmental Quality, [www.deq.state.va.us/bay](http://www.deq.state.va.us/bay)
- U.S. EPA Region III Chesapeake Bay Program Office, [www.epa.gov/region03/chesapeake](http://www.epa.gov/region03/chesapeake)
- Chesapeake Bay Foundation, [www.cbf.org](http://www.cbf.org)
- DCR Division of Chesapeake Bay Local Assistance, [www.cblad.virginia.gov](http://www.cblad.virginia.gov)

Chesapeake Bay Dead Zone Article:

[http://www.washingtonpost.com/national/health-science/alarmed-dead-zone-in-the-chesapeake/2011/-7/20/gIQA-BRKXI\\_story.html](http://www.washingtonpost.com/national/health-science/alarmed-dead-zone-in-the-chesapeake/2011/-7/20/gIQA-BRKXI_story.html)

Chesapeake Stat Monitoring System, [stat.chesapeakebay.net/](http://stat.chesapeakebay.net/)

Chesapeake Bay Executive Order

<http://executiveorder.chesapeakebay.net/default.aspx>

EPA Letter to State

<http://www.epa.gov/reg3wapd/tmdl/ChesapeakeBay/ResourceLibrary.html>