

# 2007 STATE OF THE BAY

Our leaders  
have inherited  
a Chesapeake  
in critical  
condition.

Their choice:  
Continue the  
politics of  
postponement  
or take action  
to save the Bay.

HEALTH  
INDEX  
**28**



**CHESAPEAKE BAY FOUNDATION**  
*Saving a National Treasure*

## Message from the President



Over the last two decades, nearly three million people have moved into the Bay region, reducing the beneficial impact of our pollution-reducing and other programmatic progress. Since the Chesapeake Bay Foundation (CBF) began measuring the *State of the Bay* in 1998, the net improvement to Bay health has been slight. To overcome population growth pressures, our elected officials will have to act quickly and decisively to reach their stated goal of a 110 million pound annual reduction of nitrogen pollution entering the Bay by 2010.

Still, there are successes for which we can all be very proud. The number of striped bass in the Bay remains high, despite stresses from pollution, diminishing food sources, and unhealthy habitat. The Bay watershed states have committed nearly \$2 billion in funding for upgrading sewage treatment plants, including a \$250 million commitment from Virginia in early 2007. Watershed-wide, nitrogen pollution from these point sources will, over time, be reduced by at least 20 million pounds (18.5 percent of the 110 million pound goal). This past summer, Pennsylvania established an innovative new funding mechanism to support agricultural conservation: The Resource Enhancement and Protection Act (REAP) will help reduce nitrogen pollution and other runoff from agricultural farms and fields.













**In spite of this, the *State of the Bay* index has dropped one point this year from 29 to 28.**

The lessons are clear. We must all voice our outrage so that those with the power to effect change—the governors and legislators at the state and federal levels—do more to implement the known solutions of reducing pollution and restoring nature’s filters. As Maryland Governor O’Malley, the current chairman of the Chesapeake Bay Executive Council, said at a U.S. Senate hearing on Climate Change and the Chesapeake Bay, “The time to act is past. The time to catch up is now.”

A handwritten signature in black ink, appearing to read "Will Baker". The signature is fluid and cursive, written in a professional but personal style.

William C. Baker  
President

# State of the Bay in 2007

<b>POLLUTION</b>	 <p><b>F</b> N Score=17 <b>D-</b> P Score=23</p> <p>-6</p>	 <p><b>F</b></p> <p>Score=16</p>
	 <p><b>F</b></p> <p>Score=14</p> <p>-1</p>	 <p><b>D</b></p> <p>Score=27</p>
<b>HABITAT</b>	 <p><b>B+</b></p> <p>Score=56</p>	 <p><b>F</b></p> <p>Score=18</p>
	 <p><b>C+</b></p> <p>Score=42</p>	 <p><b>D</b></p> <p>Score=29</p>
<b>FISHERIES</b>	 <p><b>A+</b></p> <p>Score=71</p>	 <p><b>F</b></p> <p>Score=4</p>
	 <p><b>C</b></p> <p>Score=36</p> <p>-2</p>	 <p><b>F</b></p> <p>Score=10</p>

**28**

- A** EXCELLENT
- B** GOOD
- C** FAIR
- D** POOR
- F** CRITICAL



**F 17** ↔

## Nitrogen

no change from 2006

**D- 23** ↓

## Phosphorus

-6 from 2006

Reducing nitrogen and phosphorus pollution is key to restoring the Bay and its rivers and streams. Sadly, scores for these indicators do not reflect progress this year and remain far from what is required to achieve clean water and a healthy Bay.

Pollution loads are highly related to river flows and stormwater runoff that carry pollutants off the land. This year, heavy rains in the early spring delivered large amounts of phosphorus and nitrogen to the Bay, offsetting the reduced delivery of these pollutants during summer drought conditions. And while pollution loads from the Susquehanna were similar to last year, pollutants from other major rivers—such as the James and Potomac—that deliver a higher percentage of phosphorus than nitrogen to the Bay, increased.

To achieve clean water we must reduce nitrogen and phosphorus runoff from agricultural, suburban, and urban lands; restore naturally filtering wetlands and forested buffers; and continue minimizing loads from sewage treatment plants. The health of the rivers and streams that feed the Bay must be less dependent on the vagaries of weather. These efforts will become even more important in the future, as scientists predict increasing intensity and frequency of storms in the region as a result of global climate change.



**F 14** ↓

## Water Clarity

- 1 from 2006

Water becomes cloudy in the presence of excess sediment, algae, and other particles suspended in the water column. This summer, extensive algal blooms occurred from Baltimore Harbor, Maryland, down to the mouth of the Chesapeake Bay at Virginia Beach, Virginia. A “mahogany tide,” caused primarily by the harmful algae, *Karlodinium*, lasted more than two months in the Potomac River. The Hampton Roads/Norfolk area was plagued by blooms of another potentially harmful algae, *Cochlodinium*, from August to September. In fact, some scientists reported 2007 among the worst years for harmful algal blooms in recent memory.

Scientists also expressed concerns about adverse effects of reduced water clarity on underwater grasses. Dense blooms of algae cloud the water and block sunlight, without which these underwater plants are unable to grow and survive. To improve water clarity we must reduce the nitrogen and phosphorus pollution that feed the algal blooms by restoring natural filters like riparian buffers and wetlands, enforcing existing regulations to limit stormwater runoff, and maintaining progress in upgrading the region’s sewage treatment plants.



**F 16** ↔

## Dissolved Oxygen

no change from 2006

This year, the score for dissolved oxygen, which usually follows the nitrogen and phosphorus indicators, remains unchanged. In a typical year, the amount of pollution that enters the Bay and its rivers during the spring largely drives the size of the dead zone—the area without sufficient levels of oxygen to support aquatic life. The reason: Spring pollution loads spur summertime blooms of algae that suck up dissolved oxygen when they die and decompose. Based on conditions this spring, scientists predicted that dissolved oxygen conditions in the Bay would be worse than last year.

But the size of the dead zone is also influenced by summertime weather. The dry and sometimes windy conditions this summer helped to limit the extent of oxygen-deprived water, and this year's dead zone was not quite as large as predicted. In particular, relatively strong winds in late July helped mix the Bay's oxygen-rich surface waters with the oxygen-deprived waters near the bottom. Nonetheless, dissolved oxygen conditions in the Bay still receive a failing grade. This score will only improve when we reduce the flow of nitrogen and phosphorus pollution from all sources.



**D 27** ↔

## Toxics

no change from 2006

Progress to reduce toxic pollution in the Chesapeake Bay watershed continues to be slow. One reason is that many of the problem chemicals are very persistent. Mercury and PCBs are responsible for the majority of fish consumption advisories in the watershed. Metals and petroleum compounds remain at high concentrations in sediments in urban areas like Baltimore Harbor and the Elizabeth River. Adding to this problem, a myriad of new chemicals—in products as diverse as antibiotics, birth control pills, lotions and face creams, detergents, and hand soaps—are flushed down the drain each year.

We know very little about the environmental effects of the majority of these new chemicals, but growing evidence suggests cause for concern. Recently, researchers at Johns Hopkins University discovered triclocarbon (the active ingredient in many antibacterial hand soaps) in streams, drinking water, and sewage treatment plant wastewater. Although antibacterial soaps have proven no more effective than traditional soap and water, their overuse may result in the evolution of resistant bacteria. To avoid potentially cascading environmental problems, we must rein in the unnecessary use of these and other chemicals.



**B+**

**56**



## Forested Buffers

no change from 2006

Once again, with CBF providing key leadership, Pennsylvania led the Bay states in restoring riparian forested buffers, planting more than 600 miles in 2006. Unfortunately, the pace of restoration has slowed in Virginia and Maryland, with the miles planted in these two states dropping to the lowest point in several years. To improve water quality in the Bay and its rivers and streams, we need to ramp up our efforts watershed-wide to restore these vital natural filters.

A recent study by the Stroud Water Research Center in Pennsylvania provides even greater impetus for accelerating restoration. For years, scientists have known that healthy forests bordering streams improve water quality by trapping pollutants and preventing them from reaching the water, as well as providing shade that helps cool water temperatures. New research by Stroud found streamside forest buffers also multiply a stream's ability to cleanse itself of many pollutants, processing and removing two to eight times as much in-stream nitrogen as sections of streams devoid of forest buffers. This study strongly reaffirms forest buffers' status as a cost-effective tool for reducing pollution.



**C+**

**42**



## Wetlands

no change from 2006

According to the Chesapeake Bay Program, state programs that regulate wetlands report an acreage gain over the last several years. Much of this gain, however, is offset by losses due to land subsidence (sinking), erosion, and illegal filling of wetlands.

Other manmade threats are growing as well. If unmitigated, climate change could lead to increases in regional sea level by as much as two to four feet by the end of the century. This would inundate thousands of acres of tidal wetlands. Another threat: The federal government issued an extremely weak wetland permitting policy, leaving thousands of acres of sensitive wetlands and streams unprotected nationwide. Finally, hundreds of acres of wetlands remain at risk from large, proposed construction projects like the King William Reservoir in Virginia and the Intercounty Connector, a major highway project in Maryland.

Wetlands play critical roles in a healthy Bay ecosystem. They are natural filters that improve water quality by trapping and retaining runoff containing nitrogen, phosphorus, and sediment pollution. They also provide important habitat for fish and wildlife, and protect shorelines and nearby lands from the effects of flooding and erosion.



F

18



## Underwater Grasses

no change from 2006

Overall, abundance of underwater grasses throughout the Bay changed little from 2006. Eelgrass beds, particularly in the lower parts of the Bay, are still recovering from the 2005 die-off that occurred due to elevated summer water temperatures. And while some areas such as Tangier Sound near Smith and Tangier Islands and the Susquehanna Flats reported healthy, dense grass beds this summer, reports from a similar number of other areas, such as the Chester River and Watts Island in Pocomoke Sound, were down. Bay-wide, underwater grass beds remain at only a fraction of their historic acreage.

Underwater grasses provide crucial food and habitat for a host of aquatic organisms, including crabs and the numerous species of fish which depend on them for refuge from predation. Underwater grass communities also remove substantial amounts of nitrogen and phosphorus from the water column, add oxygen through photosynthesis, trap and filter sediment, and slow erosion. Grasses are a vital component of the effort to restart a positive restoration cycle in our waters; restoring these natural “biofilters” is essential to a healthy and resilient Bay.



D

29



## Resource Lands

no change from 2006

Although efforts to protect crucial, filtering resource lands—especially forests—continue, the threats to the Bay region’s land resources are still very real. Pennsylvania’s farmland preservation program maintained its funding in 2007 and has protected more than 360,000 acres over the years. Maryland’s land conservation funds dedicated to similar purposes were fully restored in 2007. Virginia’s transferable conservation tax credit, while modified, continued to produce conservation gains.

On the other hand, despite a slowing housing market in 2007, the pace—and cost—of sprawling new development is still high; 150,000 people are added to the region’s population each year. Although farmland losses, substantial in the 1990s, appear to have slowed, the watershed’s forests continue to decline at a rate estimated at 100 acres per day (36,500 acres per year, nearly the area of Washington, D.C.). As the cost of land preservation continues to climb, state and local growth management policies take on added importance. Absent significant changes in land use laws and practices, and in the face of continued pressure to build large projects outside of urban areas, losses of our valuable resource lands will continue.



A+

71



## Rockfish

no change from 2006

Rockfish (striped bass) are near historic high levels in the Chesapeake Bay, but they suffer from degraded habitat conditions. The high spawning potential of the rockfish population has led to a pattern of consistently strong reproduction since the early 1990s; that pattern continued in 2007. Strict fisheries conservation practices defined by an interstate management plan are primarily responsible for the rockfish recovery after the Bay rockfish population's near collapse in the early 1980s.

Unfortunately, the poor health of resident fish suggests that habitat improvement has not kept up with fishery conservation. The Chesapeake can no longer support the high numbers of rockfish it did until recently. Low body weight, increased disease, and reduced survival have all been widely observed in Chesapeake rockfish. Research is ongoing, but scientists believe that low numbers of their favorite food fish, Atlantic menhaden, and poor water quality are likely causes of these problems.



C

36



## Blue Crabs

-2 from 2006

Habitat and harvest pressures continue to depress the Bay's blue crab population. Poor reproductive success in 2006 contributed to reduced numbers in 2007. The 2005 die-off of eelgrass in the lower Bay (see p. 7), a critical protective habitat for juvenile crabs, probably remains a key factor. The crab catch, which has been about 30 percent below average for the last eight years, is projected to be about the same for 2007, but even this reduced catch represents overfishing at the current population size. The goal of rebuilding the spawning stock (the number of female blue crabs mature enough to breed) will not be met if this continues.

Most crabs are caught as soon as they reach legal size, which means that there are few large crabs and the fishery is highly dependent on the new crabs spawned each year. This is an unstable situation for both the crab and the crabber; it is a problem that no single state, or organization, can solve. There is only one blue crab population in the Chesapeake, and it will take partnerships between the states to return the crab population to historic levels and restore a sustainable fishery. Maryland and Virginia leaders must make a renewed commitment to Bay-wide crab management if this iconic species is to be saved.





F

4



## Oysters

no change from 2006

A balance of positive and negative indicators suggests little overall change in oysters' Baywide numbers in 2007. In a dry year with increased salinities, both high disease mortality and good reproduction ("spatset") were expected. Fall surveys will better document these dynamics, but neither seems to have been widespread. One exception is the Great Wicomico River in Virginia, which appears to have experienced a very good spatset, likely a result of concentrated restoration efforts there.

On the negative side, intense blooms of harmful algae in many tributaries may have reduced spatset by impairing the survival of oyster larvae. Restoration efforts were also compromised as hatcheries in both Maryland and Virginia had difficulty overcoming the influx of unhealthy water from the region's rivers. As a consequence, oysters stocked in the Bay this year will probably fall well short of the record number planted in 2006. Government funding for restoration is also in transition as federal funds were cut and state funds enhanced. The Virginia Blue Ribbon Oyster Panel recommended increased funding, and a similar effort just underway in Maryland may well inject new momentum into the effort.



F

10



## Shad

no change from 2006

Shad migrations into Bay tributaries showed mixed success in 2007. In Pennsylvania, the number of shad returning to the Susquehanna River—the Bay's largest tributary—was down, continuing the reversal of the upward trend exhibited a few years ago. Furthermore, the inability of many shad to navigate a series of dams in the lower river hampers their access to upper river spawning grounds. In contrast, the Potomac had a very good run and leads Bay tributaries in shad recovery. Runs in Virginia tributaries were average, but possibly hampered by cold weather.

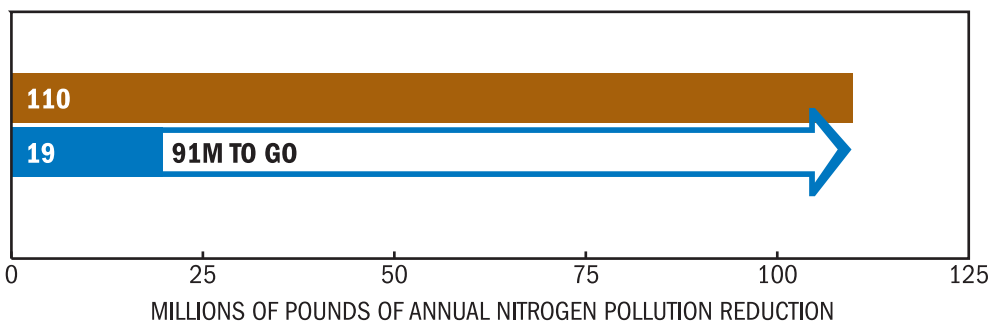
Shad reproduction also showed a mixed pattern in 2007. Virginia's juvenile finfish survey found low numbers of shad, while in Maryland near record numbers of juvenile shad were caught. Variable stream flows and inconsistent weather make 2007 a hard year to interpret. To assist in the recovery of shad populations, states outlawed shad fishing in the ocean two years ago. However, lack of consistent improvement in shad returns has led to speculation that incidental harvest (also called bycatch) of shad in the ocean may be limiting numbers.

# “The time for action has passed. The time to catch up is now.”

Governor Martin O’Malley, September 26, 2007

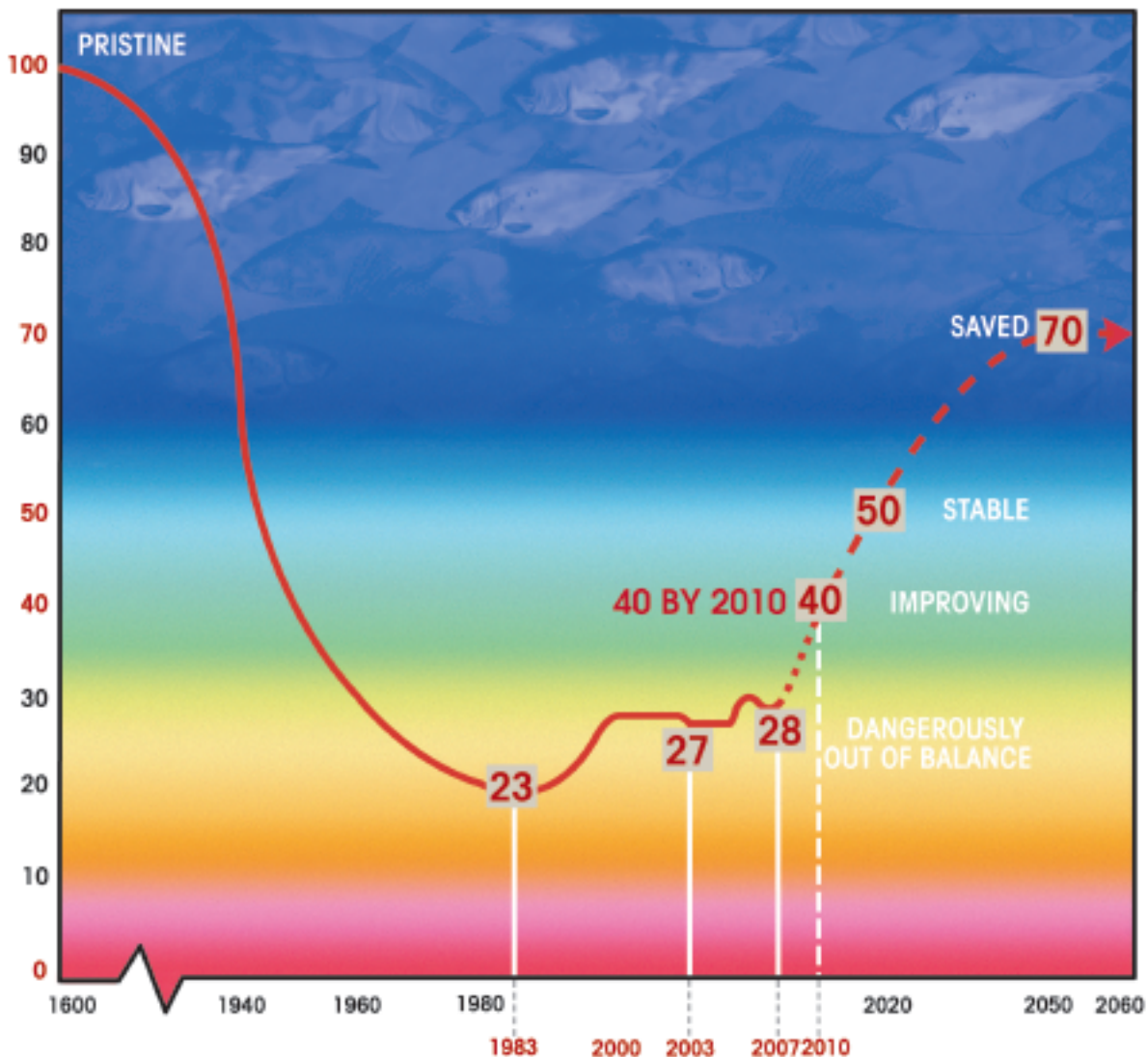
With the *State of the Bay* down one point this year, CBF calls upon our leaders to take an honest and aggressive stance on saving the Bay. The Executive Council—the Governors of Pennsylvania, Maryland, and Virginia, the Mayor of the District of Columbia, the Chairman of the Chesapeake Bay Commission, and the Administrator of the U.S. EPA—is already seven years into the Chesapeake 2000 Agreement’s commitment to remove the Chesapeake Bay from the EPA’s “dirty waters” list. This deadline, committed to in 2000 and overwhelmingly supported by Bay-region citizens, will expire in a year during which Governors O’Malley, Kaine, and Rendell will have been in office. With only three years remaining, current estimates from the EPA establish that we have achieved only approximately 19 million pounds (17.5%) of the 110 million pound nitrogen pollution reduction goal since the signing of the Chesapeake 2000 Agreement. We will not see a healthy Bay unless government increases and accelerates programs and funding.

## A LONG WAY TO GO BY 2010



(Data Source: Chesapeake Bay Program)

Maryland Governor Martin O’Malley chairs the Executive Council. CBF urges Governors O’Malley, Kaine, and Rendell to announce their support for increased funding across jurisdictional and governmental lines. The Governors have options. They can endorse current state-level initiatives—the Chesapeake Bay 2010 Trust Fund in Maryland, a major expansion of REAP in Pennsylvania, and dedicated funding for agricultural pollution-reduction programs in Virginia—brought forth by farmers, business leaders, citizen groups, watershed groups, riverkeepers, universities, and legislative leaders in each state. Or, they can announce their own. Their choice is to continue the politics of postponement or take action to save the Bay.



The health of the Chesapeake Bay is dangerously out of balance. Its degraded condition is especially staggering in the context of the public resources and attention focused on Bay health since the 1980s. Clearly, what public officials have done to date is insufficient, and has fallen short of their commitments to restore water quality in the Bay. If we are to significantly reduce pollution, remove the Bay from the nation’s “dirty waters” list, and restore our national treasure, it is time for urgent action; time to hold our government leaders accountable to get the job done.



## CHESAPEAKE BAY FOUNDATION

*Saving a National Treasure*

## How We Create Our Report

The *State of the Bay* Report is based on the best available information about the Chesapeake for indicators representing three major categories: pollution, habitat, and fisheries. Monitoring data serve as the primary foundation for the report, supplemented by in-the-field observations.

We measure the current state of the Bay against the healthiest Chesapeake we can describe—the Bay Captain John Smith depicted in his exploration narratives from the early 1600s, a theoretical 100.

Our number scores correlate with letter grades as follows:

70 or better	A+
60–69	A
50–59	B+
45–49	B
40–44	C+
35–39	C
30–34	D+
25–29	D
20–25	D-
Below 20	F

### ABOUT THE COVER:

Time is running out. The Chesapeake 2000 Agreement requires the leaders of Maryland, Virginia, Pennsylvania, the District of Columbia, the Environmental Protection Agency, and the Chesapeake Bay Commission to remove the Bay's waters from the nation's "dirty waters" list by 2010. As the *State of the Bay* report shows, we remain far from meeting that goal.

Cover photo by Jane Davis.

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page 2: Loren Barnett Appel/CBF Staff

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## CHESAPEAKE BAY WATERSHED



**The Chesapeake Bay's 64,000-square-mile watershed covers parts of six states and is home to more than 17 million people.**



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