

2012
STATE OF THE
BAY



CHESAPEAKE BAY FOUNDATION
Saving a National Treasure

cbf.org

PRESIDENT'S MESSAGE

Almost every day, I get asked how the Bay is doing. For several years now, I have been responding with an answer that gives me great hope. There are encouraging signs of improvement. In our 2012 State of the Bay report, five of 13 indicators improved, seven stayed the same, and only one declined. Overall, the score advanced one point since it was last issued in 2010, when it jumped three points. That is an improvement of over 10 percent in less than five years.

We can be proud of the progress we have made. It demonstrates what can happen when government, businesses, and individuals work cooperatively. But, we cannot rest. A Bay health index of 32 on a scale of 1 to 100 should be a sobering reminder that there is a great deal left to do.

Make no mistake: The Bay and its rivers and streams are still a system dangerously out of balance. Much of the Bay and local waterways still cannot provide healthy habitat for oysters and other aquatic life. EPA lists the Chesapeake and its tidal tributaries as impaired. Health departments still caution people to stay out of the water for 48 hours after a heavy rain. Fish consumption warnings continue. Human health is at risk. And tens of thousands of jobs have been lost in fishing and related industries alone.

“While hopeful, a Bay health index of 32 on a scale of 1 to 100 should be a sobering reminder that there is a great deal left to do.”

work. Good science is producing solutions that are working. But ongoing threats to derail progress mean we must ramp up the pace of putting science and solutions to work.













For a moment, let's celebrate. The progress we describe in the 2012 State of the Bay report is the result of decades of education, advocacy, and hard work.

Some say it's THE Moment in time for the Chesapeake. I agree. We have never had a better opportunity to save the Bay. And if we fail, we will continue to have polluted water, human health hazards, and lost jobs—at a huge cost to society. The choice is ours. Let's finish the job! Our children and grandchildren will thank us.



William C. Baker
President

STATE OF THE BAY IN 2012

POLLUTION	 <p>F/D N Score=16 P Score=27</p> <p>+4</p>	 <p>D Score=25</p> <p>+6</p>
	 <p>F Score=16</p>	 <p>D Score=28</p>
HABITAT	 <p>B+ Score=58</p>	 <p>D- Score=20</p> <p>-2</p>
	 <p>C+ Score=42</p>	 <p>D+ Score=32</p> <p>+1</p>
FISHERIES	 <p>A Score=69</p>	 <p>F Score=6</p> <p>+1</p>
	 <p>B+ Score=55</p> <p>+5</p>	 <p>F Score=9</p>

32

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





DEFENDING THE BLUEPRINT

OUR BEST HOPE

Perhaps the most important question facing Bay restoration is how to ensure funding and efficient, cost-effective, and successful clean-up plans.

CBF believes solutions exist. Innovative technologies, creative approaches to reducing pollution, and long-term financing will all be necessary.

The projected costs are already dropping in many jurisdictions. For example, a year ago, Frederick County, Maryland, estimated reducing polluted runoff might cost \$4.3 billion. That number dropped to \$1.5 billion when the state provided information about approved techniques. We believe these costs will continue to decrease.

The states and counties are not alone. The federal government will continue to be an important partner, providing conservation funding for the agricultural community. In addition, there will be several proposals in the next Congress to provide local assistance for stormwater and sewage treatment plant upgrades. CBF will be working hard on Capitol Hill to ensure the federal government continues to play an important role.

In addition, EPA, in conjunction with the University of Maryland's Environmental Finance Center, is scheduling forums across the watershed to work with local governments to identify and understand financing issues related to implementation of the Clean Water Blueprint.

More needs to be done. Pennsylvania must increase efforts to reduce pollution from agriculture and stormwater. Maryland needs to provide money and technical assistance to local jurisdictions through the Bay Trust Fund. And Virginia must remain a partner with local governments, utility operators, and farmers by providing state funding.

The progress we document in the 2012 State of the Bay report demonstrates what can be done when government, businesses, and individuals work together. The Chesapeake Clean Water Blueprint is working. We can be proud of the modest progress we have made since the 2010 report, but we cannot rest. Still, the Bay and its rivers and streams are far from healthy. We have a clear choice: clean water to restore habitat, benefit our children, and create jobs or delay, resulting in polluted water, human health hazards, and lost jobs—at a huge cost to society.

POLLUTION



F 16 ↔

NITROGEN

no change from 2010

D 27 ↑

PHOSPHORUS

+4 from 2010

Bay-wide nitrogen loads were similar to 2010, but phosphorus loads decreased. These loads are highly related to river flows and stormwater runoff that carries pollutants off the land. Flows from the Susquehanna River last fall were above average, partially as a result of Tropical Storm Lee. Average annual flows from the Bay's other major rivers, however, were lower in 2012 relative to 2010. These rivers carry proportionally more phosphorus than nitrogen, compared to the Susquehanna, which is the main reason why the phosphorus score improved, but nitrogen did not.

Pollution loads will always be influenced by rainfall, but two recent scientific studies suggest there is reason for optimism that pollution-reduction strategies are working. The first, conducted by the U.S. Geological Survey, indicates that long-term pollution trends in some, but not all, of the Bay region's large rivers, are downward. The other study, conducted by the University of Maryland and Johns Hopkins University, suggests that Bay-wide nitrogen pollution reductions have resulted in a downward trend in the size of the dead zone.

We are still far from achieving the pollution limits that scientists say are necessary for a restored Bay and healthy rivers and streams. We have, however, a clear path forward: the Chesapeake Clean Water Blueprint.



F 16 ↔

WATER CLARITY

no change from 2010

Water clarity dropped markedly between 2010 and 2011, but improvement was evident in 2012, leading to no change in the score of this indicator. Scientists measure water clarity by the depth to which sunlight can penetrate. Sunlight is critical to growth and reproduction of underwater grasses, an exceptionally important component of the Chesapeake ecosystem. Grasses provide shelter for juvenile fish and crabs, food for migrating waterfowl, and filter systems to remove pollutants from the water. Hence, greater water clarity leads to a healthier ecosystem.

Both algal blooms, fed by nitrogen and phosphorus pollution, and suspended sediment particles from runoff negatively affect water clarity. Although clarity can be affected by the weather—wet years tend to have poorer water clarity compared to dry years—we can take actions that will make this indicator less susceptible to the vagaries of nature. These actions include better stormwater management in our urban and suburban areas and conservation measures on farms that will keep soil and nutrients in place.



D 25



DISSOLVED OXYGEN

+6 from 2010

During the summer of 2012, the average size of the Chesapeake’s dead zone (the area without sufficient amounts of oxygen for aquatic life) was the second smallest since 1985. That is good news.

First, it means the Bay did not suffer from residual effects of the heavy pollution additions that occurred in the fall of 2011 when the region suffered a one-two punch from Hurricane Irene and Tropical Storm Lee. Some scientists were concerned that these storms might contribute to a large dead zone in 2012.

Second and most important, it just might be a sign that we are seeing the benefits of our pollution-reduction efforts. A recent study attributed a long-term downward trend in the size of the late summer dead zone to reductions in nitrogen pollution.

Despite this good news, a substantial amount of habitat still remains unavailable each summer to fish, crabs, and oysters. Consistent improvement will be achieved only if we stay the course and implement the Clean Water Blueprint.



D 28



TOXICS

no change from 2010

A draft report by the Chesapeake Bay Program, “Toxic Contaminants in the Chesapeake Bay and its Watershed: Extent and Potential Biological Effects” summarizes information on the extent and severity of toxic contamination in the Bay and its watershed. The report, to be released in early 2013, finds that 72 percent of the Bay and its tidal river segments are fully or partially impaired as a result of the presence of toxic contaminants. Moreover, there is evidence linking exposure to toxic chemicals with adverse health effects in fish, including increased incidence of disease, feminization of largemouth and smallmouth bass, and tumors in brown bullhead catfish and mummichogs.

In addition, the report concludes that concentrations of persistent chemicals like PCBs (polychlorinated biphenyl) in tissues of many species of Chesapeake Bay wildlife have not declined, even though PCBs have been banned since the 1970s. Also of concern is the limited knowledge we have about the potential effects of personal care products and pharmaceuticals released from wastewater treatment plants, septic systems, combined sewer outflows, and animal agriculture in the Bay region. Overall, the report highlights the fact that progress to reduce toxic contamination in the Bay has been slow.





BUILDING CLEAN-WATER INFRASTRUCTURE

WELCOME TO GREEN

Little Edmonston, Maryland, with a population around 1,500, has a big story to tell. It has transformed its main street into what it describes as “a fully environmentally responsible street...the first of its kind in Maryland, and perhaps on the East Coast.”

Of particular note is the town’s commitment to stormwater retention and filtration. By diverting polluted stormwater away from storm drains to rain gardens that beautify the street, 62 percent of runoff is absorbed into the ground and kept out of the overloaded sewer system. An additional 28 percent of the runoff is absorbed through permeable pavers. In total, 90 percent of all rain showers in a typical year are filtered. The Anacostia and Potomac Rivers and the Bay are better as a result.

At the other end of the population spectrum, Montgomery County—Maryland’s most populous county—is also ahead of the curve in reducing polluted runoff. Just outside of Washington, D.C., Montgomery County was the first county in Maryland to create a stormwater utility fee to help fund improvements to the county’s drainage system. The county’s standards for managing stormwater are actually higher than the state’s. Montgomery County has studied all its watersheds, developed a plan of improvement for each one, and is steadily implementing that plan. The county has begun restoration projects that will treat runoff from 4,000 acres (equivalent to over 6¼ square miles) of hard surfaces. In the process the county is creating 3,300 construction and engineering jobs.

In Pennsylvania, Lancaster City has developed and begun to implement a Green Infrastructure Plan to address stormwater runoff. The plan has partnered city government, businesses, and non-profits with neighborhood residents to set up infrastructure improvements around the city.

These stories should serve as positive examples as state and local governments begin to fund and implement the Clean Water Blueprint.



B+

58



FORESTED BUFFERS

no change from 2010

The basis of our score is an estimate of the proportion of the basin’s 110,000 miles of streams and shoreline that are buffered with riparian forests (trees along streams or shoreline banks).

Gains in forested buffer plantings slowed over the last two years. Nonetheless, roughly 240 stream miles of buffer were planted in 2011. However, severe storms such as Hurricane Irene caused extensive flooding that resulted in the loss of many existing buffers.

A slowing trend combined with storm-related losses is troubling because forested buffers are one of the most cost-efficient pollution-reduction measures available. Planting trees is one of the best things we can do for our environment. In addition to serving as filters that prevent nutrient and sediment pollution, forested buffers also provide habitat for wildlife and help reduce greenhouse gases by removing carbon. The states are relying on additional riparian buffers to help restore local rivers, streams, and the Bay and to meet the Clean Water Blueprint pollution-reduction targets. To accelerate progress, we must develop new incentives and approaches for encouraging protection and restoration of these critical pollution filters.



C+

42



WETLANDS

no change from 2010

Wetlands, both tidal and non-tidal, are among the most important natural resources found in the Chesapeake Bay watershed. Wetlands include swamps; bogs; marshes; many shallow areas of our rivers, creeks, and the Bay; and even some forested areas. Some of their most important functions include providing habitat for wildlife and nursery areas for fish, and filtering pollutants from uplands and surface waters. A recent study highlighted the important role that tidal marshes can also play in reducing greenhouse gases.

Historically, the Bay supported roughly 3.5 million acres of this critical natural resource. Approximately 42 percent are remaining, the basis of our indicator score. Through the Clean Water Blueprint for the Chesapeake, a goal of 30,000 acres by 2025 has been established. To date, the states have achieved roughly 12 percent of that goal. However, many of the reported acres were wetlands built explicitly to treat stormwater. These wetlands will help reduce pollution, but they are not necessarily designed to provide the other functions that natural wetlands provide. We need to ensure our restoration efforts also include wetlands that provide the full suite of ecosystem services.



D- 20



UNDERWATER GRASSES

- 2 from 2010

From 2010 to 2011, the acres of underwater grasses in the Bay and its tidal rivers decreased by roughly 20 percent. Experts agree that extreme weather conditions contributed to the decline. These conditions included high water temperatures that caused eelgrass die-offs in the lower Bay and heavy rains in the spring and fall of 2011 that caused runoff of sediment and other pollutants that clouded the water and blocked sunlight. By most accounts, the condition of grasses was not substantially improved in 2012.

However, despite these Bay-wide losses, there is some good news. The huge, dense grass bed on the Susquehanna Flats—which has tripled in size over the past 20 years—survived Hurricane Irene and Tropical Storm Lee in 2011, showing how healthy grasses are resilient to extreme conditions. Grasses in some areas like the Severn and Tred Avon Rivers were more abundant in 2012, and volunteer planting events such as those led by CBF in the James and Potomac Rivers will help the recovery of this critical ecosystem component.



D+ 32



RESOURCE LANDS

+1 from 2010

Overall, there is a mixed picture with respect to resource land protection and land use change across the watershed. On the positive side, over the last four years, Pennsylvania and Virginia have been adding, on average, 37,000 and 23,000 acres of forest respectively each year. Maryland, however, has been losing some 8,000 acres annually.

The states also continued to permanently preserve land. Pennsylvania slightly increased its previous pace, protecting 13,000 acres of farmland in 2011, while Virginia added some 58,800 acres of resource lands. Under budget pressure, however, Maryland cut its 2010 added resource land protection acreage nearly in half in 2011, to 13,654 acres.

Maryland deserves praise, however, for passing the Sustainable Growth and Agriculture Preservation Act, which helps reduce sprawl development on forests and farmland. With the improving economy, land development has begun increasing. Without effective policies like this one to shape and better locate the new development that occurs, it is likely that more resource land will be converted across the watershed, adding more pollution to local rivers, streams, and the Bay.



THE MOST IMPORTANT FISH IN THE SEA

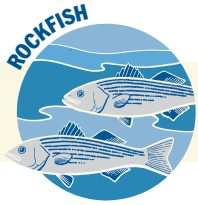
The mighty menhaden find themselves at the epicenter of a hotly debated issue in the Chesapeake Region.

Menhaden are a primary food source for commercially and recreationally valuable species, including rockfish. Our *State of the Bay* report describes rockfish as “dying at higher rates in recent years, possibly because of *Mycobacteriosis*, a disease probably triggered by stress from low oxygen levels and poor nutrition from lack of forage species like menhaden.” Other marine mammals and birds feed on menhaden, too. They also play an important ecological role as they feed on algae. And, menhaden are important to Virginia’s economy. They provide the basis for a significant “reduction” fishery which catches and processes approximately 170,000 metric tons of menhaden annually into fish meal and fish oil. Menhaden are also the bait of choice for most commercial crabbers, and recreational anglers use them, as well.

Data show that menhaden are currently experiencing overfishing and have been for at least 32 of the past 54 years. In fact, the population is at its lowest recorded level. In response, the Atlantic States Marine Fisheries Commission, which sets the coastwide management framework, has recommended a 20 percent reduction in menhaden harvest to conserve and begin restoration of menhaden.

More than 80 percent of the total Atlantic Coast catch is landed in Virginia. In the Commonwealth, menhaden are managed by the state legislature. (All other coastal fisheries in the Commonwealth are managed by the Virginia Marine Resources Commission.)

When Virginia’s General Assembly convenes in January 2013, Virginia legislators will have the opportunity to continue a long-term, coast-wide partnership with the Atlantic States Marine Fisheries Commission that has brought us successful restoration of species such as striped bass. CBF believes they should.



A

69



ROCKFISH

no change from 2010

Rockfish (striped bass) declined from their all-time peak in 2003, but they remain above their management target. A new stock assessment now underway should provide better data next summer. Spawning success hit an all-time low in 2012, but the 2011 hatch was the fourth highest on record, demonstrating how much influence winter and spring weather has on egg and larval survival in Bay tributaries. The cold, wet weather of early 2011 was conducive to survival, and the dry, warm spring of 2012 was not. Nevertheless, the strong 2011 class indicates the numbers of spawning adults is sufficient when conditions are right.

Scientists expect the new assessment to show increasing numbers of adults, because the very good 2001 class has now matured enough to enter the spawning stock. How much increase depends on how well those fish survived their first four to eight years while living in Chesapeake Bay. Resident stripers have been dying at higher rates in recent years, possibly because of *Mycobacteriosis*, a disease probably triggered by stress from low oxygen levels and poor nutrition from lack of forage species like menhaden. Improvements in both will enhance striped survival and bolster future rockfish populations.



B+

55



BLUE CRABS

+5 from 2010

The Bay's blue crab population continued its recovery in 2012, reaching the highest winter survey results since the mid-1990s (750 million crabs). After new management practices were put in place in 2008, our indicator score jumped 15 points in 2010. This year's number was driven by large numbers of juvenile crabs from exceptional reproduction in 2011.

The score did not jump more, however, because the number of adult crabs found in the survey declined for the second year in a row. The low number of adults contributed to poor harvests in 2012, and the 2011 juveniles did not boost the catch late in the year as much as expected. Competition, predation, and cannibalism are all factors that can dampen large year classes, but crabbers should see improved catches in 2013.

The low numbers of adult crabs indicate that the blue crab recovery is still a work in progress. Still, progress over the last four years has been extraordinary. Continuing that approach and reducing nitrogen pollution, which has been shown to limit crab habitat, are essential to a full recovery of Chesapeake blue crabs.



F

6



OYSTERS

+1 from 2010

Oysters seem to have turned a corner, with improved survival and a dedicated, science-based restoration effort. Well over a billion oysters have been planted since 2010, and the good spatset (the annual production of young oysters that began as plankton and attached to shell or some other hard surface to mature) from that year appears to be thriving. Even with conservative assumptions about survival, numbers should be increasing, but there will be no definitive estimates until scientists complete a new Bay-wide assessment in the next couple of years. At the end of 2011, 92 percent of oysters sampled in Maryland waters had survived the year (the most since 1985). The dry conditions in 2012 have led to good spatset, a hopeful sign, but a second dry year could increase disease mortality.

State and federal agencies are collaborating better than ever under an approach targeting whole river systems and a goal of restoring twenty tributaries by 2025. The biggest challenge will be creating enough bottom substrate for establishing reefs. Oyster shells, the preferred natural substrate, are limited in quantities, so scientists are trying alternative materials. Continued good survival and regular spatset will be key in the high salinity lower Bay, where shells degrade naturally if not replenished. Dedicated funding will be essential to overcome these challenges.



F

9



SHAD

no change from 2010

The numbers of American shad along the Atlantic coast and in Chesapeake tributaries continue to be very low. As a result, a coastwide management plan will require states to close all shad fisheries in 2013 unless they can demonstrate sustainability. Shad are anadromous, which means they spawn in the spring by migrating upstream from the ocean to freshwater, where they face dams blocking their migration and degraded habitat on their spawning grounds.

While programs to remove obstacles to migration in spawning rivers and stock hatchery-reared shad in target tributaries have shown success, shad numbers have not responded consistently. The 2012 spring run was relatively good in Chesapeake tributaries with the exception of the York and Susquehanna Rivers. It was a good egg-collection year, so hatchery programs met their stocking goals. However, fish passage around dams, especially on the Susquehanna, continues to be a major impediment. The current relicensing of hydroelectric dams on the river must require dramatically improved passage efficiencies. Assessing and reducing shad bycatch in large-scale fisheries in the Atlantic continues to be the most vexing obstacle to progress.





IMPLEMENTING THE BLUEPRINT

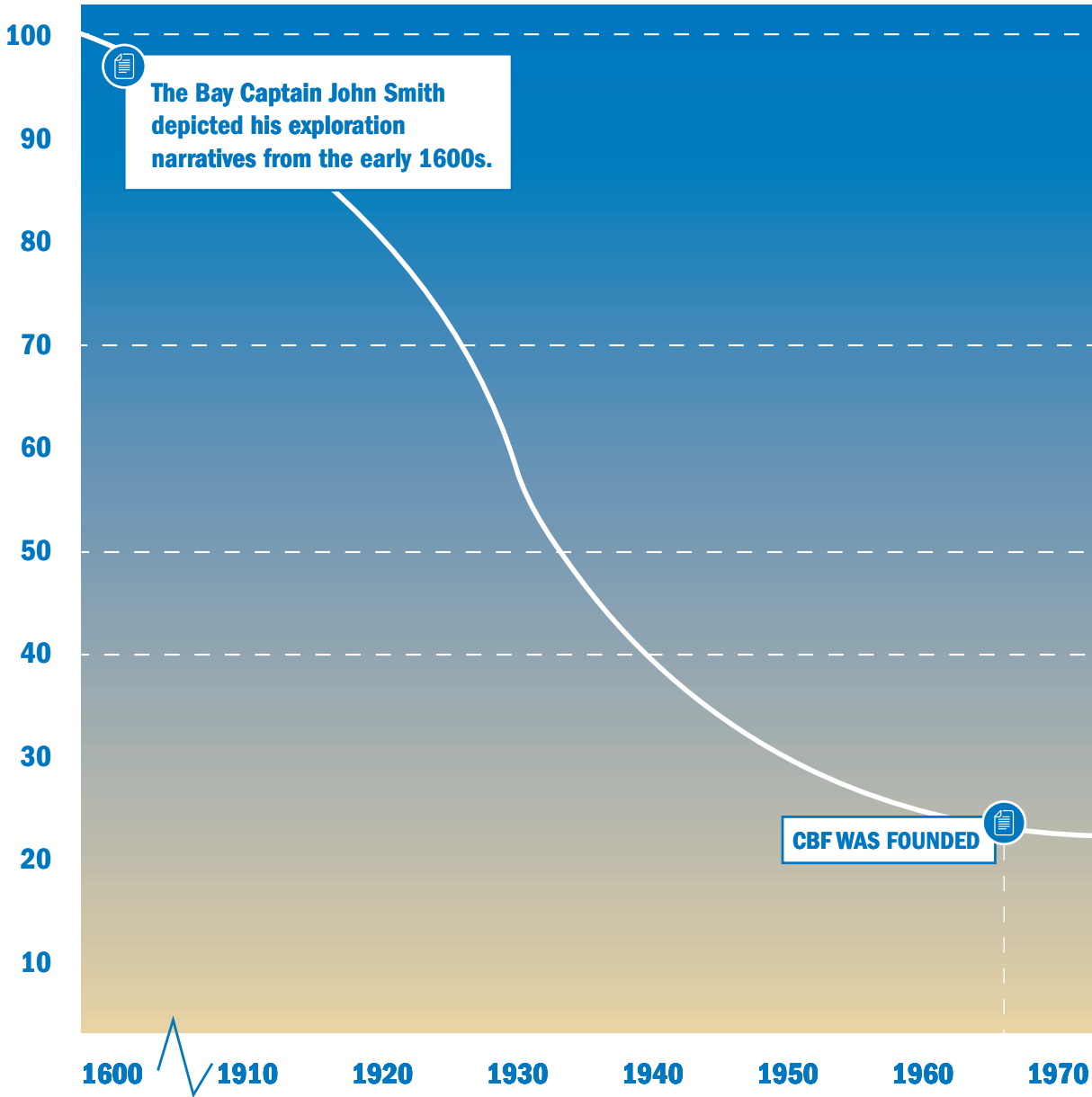
BACK TO THE FUTURE: SMITH CREEK FARMERS CONSERVE WITH INNOVATION

Many farmers in the Smith Creek watershed of Virginia's Shenandoah Valley have been working to install conservation practices on their farms. These practices comprise a large portion of Virginia's Clean Water Blueprint for the Chesapeake Bay, significantly helping the Commonwealth in its pursuit of its clean-water goals.

One effective conservation practice has been fencing cattle out of local streams. Cows allowed in streams can erode sensitive stream banks, muddy streams, and increase the risk of hoof and udder problems. As a result, instead of expending energy to produce milk, in-stream cows use some of their energy to fight disease. Simply by fencing cows out of the streams, farmers have seen improved local water quality, better herd health, more productive farm operations, and a better bottom line.

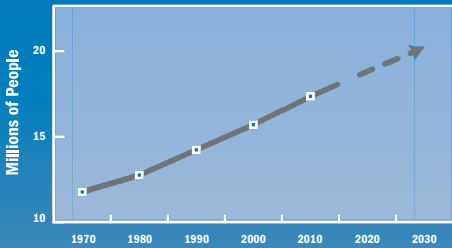
Another successful practice has been rotational grazing. With rotational grazing, cows graze on one portion of a pasture while other portions "rest." After a period of time determined by the size of the herd and the area of the pasture, the animals are moved to another portion of the pasture, allowing the grazed area to recover. This grazing technique benefits the environment by capturing more rainfall on pastures so that less runs off to nearby streams and by helping to build healthy soil through vigorous vegetation growth. Rotational grazing reduces the amount of fertilizer needed on acres converted to grazing; distributes manure across a wide area, instead of concentrating it near waterways and feedlots; and decreases the farmer's cost to feed his herd.

Smith Creek farmers model a true win-win. And, because agricultural conservation practices are the most cost-efficient pollution-reduction strategies, state and federal governments make wise investments when they provide cost-share monies for farmers.

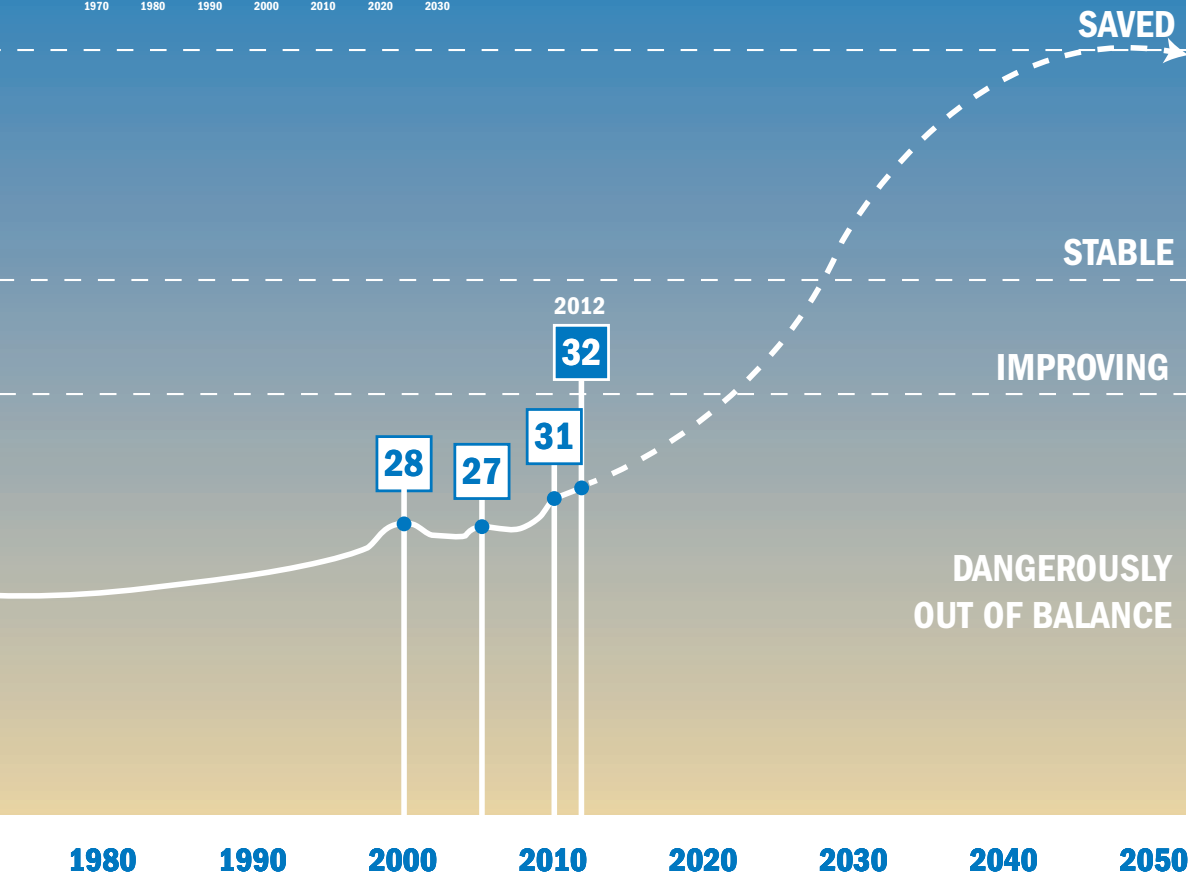


The Bay and its rivers and streams need your help more than any time in CBF’s nearly 50-year history. Why? Because there is a well-funded and highly organized campaign in Congress and federal court to derail the Chesapeake Clean Water Blueprint. The Blueprint represents a partnership between local, state, and federal governments. If fully implemented, it will reduce pollution by the amount scientists say is the minimum needed to restore clean water. It requires that the states achieve pollution-reduction goals and report in two-year increments, culminating in full implementation by 2025. The Blueprint is bi-partisan, fair, and it is working.

Bay Watershed Population



Despite a growing population, pollution-control efforts implemented since CBF was founded in 1967 have prevented additional degradation of the Chesapeake. The Chesapeake Clean Water Blueprint must plan for future growth with programs like nutrient trading.



Sadly, however, some of our Representatives and Senators are sympathizing with lobbyists who want legislation passed to stop the partnership effort in its tracks.

Please contact your elected official in the House and Senate to urge their unwavering support for clean water in the Bay and its rivers and streams. You can find information on how to do this at cbf.org/get-involved.

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.

We assign each indicator a score and then average the scores in the three categories to determine the overall state of the Chesapeake Bay. 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



Lucidity Information Design

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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Saving a National Treasure

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