



Chesapeake Bay REPORT CARD 2010





How does the Bay's water quality affect me?

Healthy water quality provides better habitat conditions for crabs, fish, and other aquatic species. Dissolved oxygen is essential to the survival of all these organisms; good water clarity is needed for aquatic grasses, which are habitat and nursery areas for aquatic organisms; and low chlorophyll *a* levels indicate a balanced ecosystem, which benefits both humans and aquatic species alike. These three indicators are incorporated into a Water Quality Index. The Chesapeake Bay Water Quality Index scored a C- in 2010, which is considered moderately poor.

Western Shore tributaries

C- Upper Western Shore

Moderate ecosystem health. For the first time since 2007, this is not the highest-ranked region. Benthic community scores dropped sharply, and very poor water clarity persists in this region.

F Patapsco and Back Rivers

Very poor ecosystem health. Four indicators—chlorophyll *a*, water clarity, phytoplankton community, and aquatic grasses—scored 0%.

F Lower Western Shore (MD)

Very poor ecosystem health—lowest-ranked region in the Bay. Despite last year's slight improvement, this region's health continues to decline. Five of the six indicators scored an F.

D- Patuxent River

Poor ecosystem health. No improvement in overall health of this region. While water quality indicators declined, phytoplankton and benthic communities improved.

D Potomac River

Poor ecosystem health. This region had the second largest decline of all regions, from a C in 2009 to a D in 2010. Four of the six indicators dropped in score.

C- Rappahannock River

Moderately poor ecosystem health. All water quality indicators and the overall score declined, but phytoplankton community and aquatic grasses scores improved.

D York River

Poor ecosystem health. Overall health is slightly better for the third year in a row. This region is one of only two regions to improve in 2010. Water clarity score improved, but is still very poor.

C James River

Moderate ecosystem health. This region increased the most, from a C- in 2009 to a C in 2010. Water quality indicators remained steady. This was the only region in which none of the indicators declined.

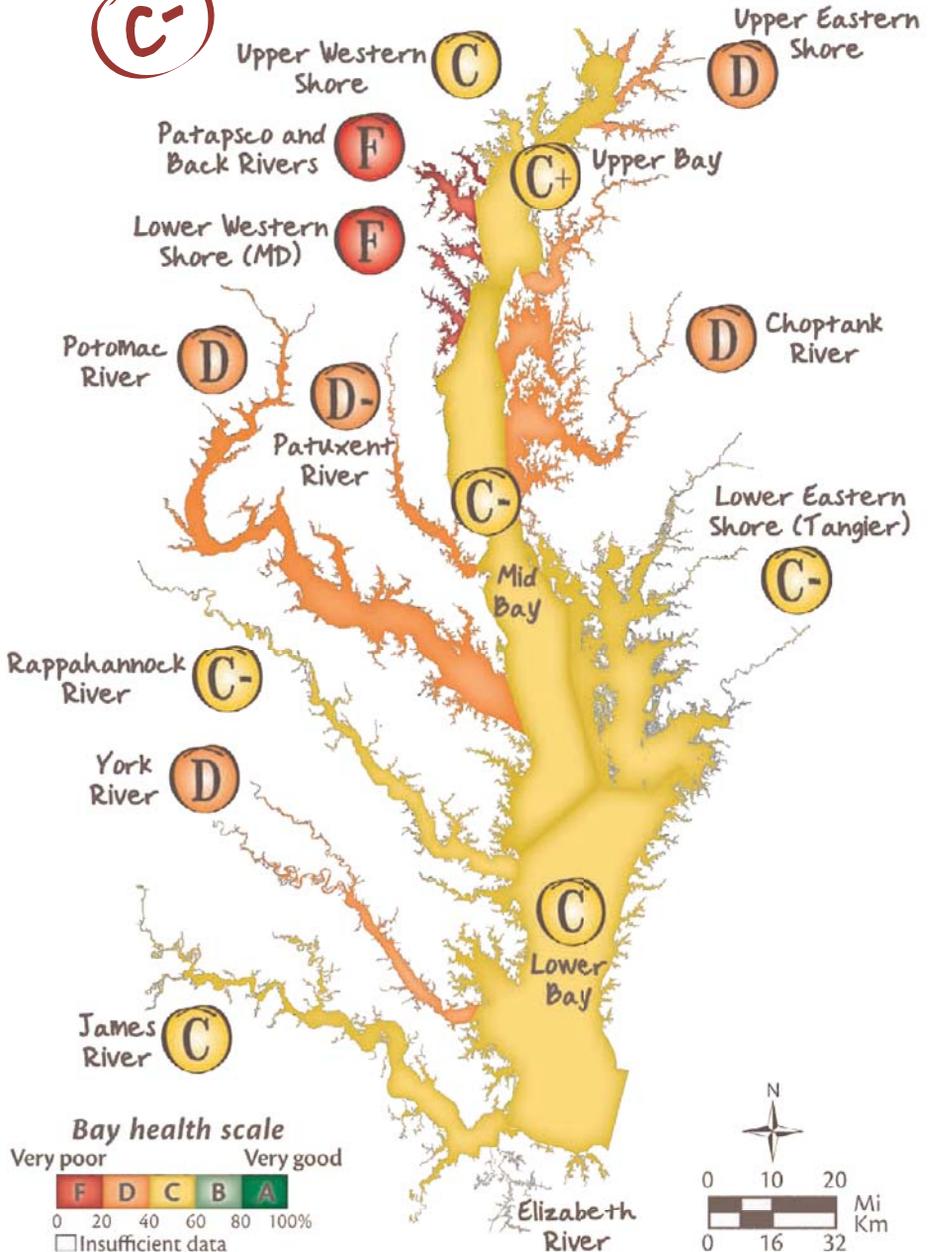
Elizabeth River

Incomplete assessment. Phytoplankton community condition continues to be very poor with a 0% for the fourth year in a row. Water quality indicators remained steady from last year. An overall health score can not be calculated due to insufficient biotic data.

CHESAPEAKE BAY 2010 REPORT CARD

Overall score:

C-



Eastern Shore tributaries and mainstem Bay

D Upper Eastern Shore

Poor ecosystem health. While water quality indicators declined, biotic indicators stayed the same. Despite last year's improvement, this region's health seems to be declining.

D Choptank River

Poor ecosystem health. This region had the greatest increase in water clarity scores, but all biotic indicators declined. Overall score remained steady.

C- Lower Eastern Shore (Tangier)

Moderately poor ecosystem health. Water clarity scores decreased after several years of improvement. There is no phytoplankton community score for this region.

C+ Upper Bay

Moderate ecosystem health—highest-ranked region in the Bay. Overall health dropped slightly from last year. Benthic community score decreased from an A- in 2009 to a B in 2010.

C- Mid Bay

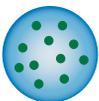
Moderately poor ecosystem health. While all water quality indicators declined, phytoplankton community continues to improve and scored the highest in 19 years.

C Lower Bay

Moderate ecosystem health. The overall health of this region remained the same as last year. Benthic community scores declined the most of all indicators, followed by water clarity.

Indicators used in the report card

The aim of this report card is to provide a transparent, timely, and geographically detailed assessment of 2010 Chesapeake Bay health. Chesapeake Bay health is defined as the progress of **three water quality indicators** (chlorophyll *a*, dissolved oxygen, and water clarity) and **three biotic indicators** (aquatic grasses, phytoplankton community, and benthic community) toward scientifically derived ecological thresholds or goals. The six indicators are combined into one overarching Bay Health Index, which is presented as the report card overall score. Detailed methods available at www.eco-check.org/reportcard/chesapeake/.



Chlorophyll *a*



Dissolved oxygen



Water clarity



Aquatic grasses



Phytoplankton community



Benthic community

Chesapeake Bay health declined in 2010

Based on water quality and biotic indicators, the overall health of Chesapeake Bay declined for the first time in four years, by 4%. The overall grade declined from C in 2009 to C- in 2010, which indicates moderately poor health. Only two reporting regions (James River and York River) had improved grades in 2010, three were unchanged, and nine declined. The highest-ranked region in previous years, the Upper Western Shore, decreased to fourth highest. The Upper Bay (C+) became the top-ranked region in 2010.

Potomac River health declines in 2010 following high winter flow

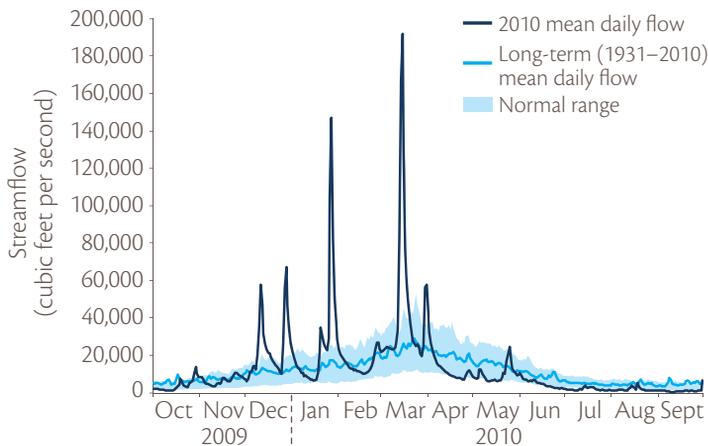
The Potomac River region's overall health score decreased from 49% in 2009 to 34% in 2010, changing the overall grade from a C to a D. This decline in score may be related to several factors, including high streamflow in late winter and early spring.

While total streamflow to Chesapeake Bay was within the normal range during the 2010 water year (October 2009–September 2010), Potomac River daily flow was frequently higher than average, especially during late winter. Two major storm events—January 27 and March 15, 2010—contributed to this high flow. The streamflow pattern was unique because it is unusual to have two very high flow events so close together, and because these conditions were followed by prolonged periods of lower than average flow in late spring and summer.

A large percentage of the phosphorus and sediment loading in a year can result from just one or two high flow events.¹ The high winter flow in the Potomac likely contributed an above average amount of nitrogen, phosphorus, and sediment to the estuary in early 2010. Four of the six water quality and biotic indicator scores decreased sharply this year, possibly as a result of increased winter loads followed by decreased summer loads. The phytoplankton community score was the lowest in 14 years, the chlorophyll *a* score was the lowest since monitoring began in 1986, and the water clarity and benthic community scores declined following multiple years of improvement. More information is available at http://www.eco-check.org/reportcard/chesapeake/2010/summaries/potomac_river/.



High-flow event in Great Falls Park along the Potomac River in March 2010.



2010 Potomac River streamflow compared to the long-term average. Two storm events contributed a large amount of nutrients and sediments to the river. Data: USGS; normal range is 25–75%.

What do the grades mean?



All water quality and biological health indicators meet desired levels. Quality of water in these locations tends to be very good, most often leading to very good habitat conditions for fish and shellfish.



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There is a mix of good and poor levels of water quality and biological health indicators. Quality of water in these locations tends to be fair, leading to fair habitat conditions for fish and shellfish.



Some or few water quality and biological health indicators meet desired levels. Quality of water in these locations tends to be poor, often leading to poor habitat conditions for fish and shellfish.



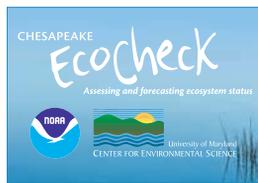
Very few or no water quality and biological health indicators meet desired levels. Quality of water in these locations tends to be very poor, most often leading to very poor habitat conditions for fish and shellfish.

Acknowledgements

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Front cover: top photo–istockphoto.com; bottom photos–Chesapeake Bay Program. *Inside flap:* Great Falls National Park.

¹Jastram JD, Moyer DL, Hyer KE, 2009, A comparison of turbidity-based and streamflow-based estimates of suspended-sediment concentrations in three Chesapeake Bay tributaries: U.S. Geological Survey Scientific Investigations Report 2009–5165, 37p.