



Chesapeake Bay REPORT CARD 2011



Poor 2011 Chesapeake Bay health

Chesapeake Bay health in 2011 (D+; 38%) was the second lowest since assessments began in 1986. This poor report card score was due to the lowest measured water clarity score, second lowest chlorophyll *a* score, and a large drop in the aquatic grass score. Both mainstem and tributary regions had lower scores than in 2010.

A sequence of events contributed to 2011 health

Spring Rains

A wet spring caused increased nitrogen and phosphorus (N+P) to wash into the bay. This decreased light levels which in turn affected aquatic grasses.

Hot, Dry Summer

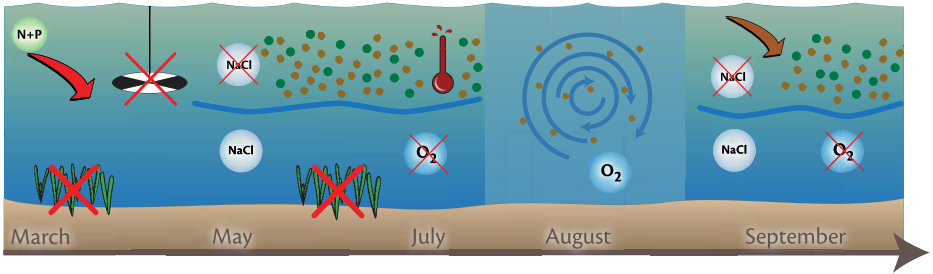
The hot, dry summer promoted chlorophyll *a* in fresher surface waters, and low dissolved oxygen in saltier bottom waters.

Hurricane Irene

Winds from Hurricane Irene (August 27–28) mixed the bay waters, increasing dissolved oxygen.

Tropical Storm Lee

Rain from Tropical Storm Lee (September 7) brought tons of sediment and fresh water to the mainstem, setting up conditions similar to the hot, dry summer.



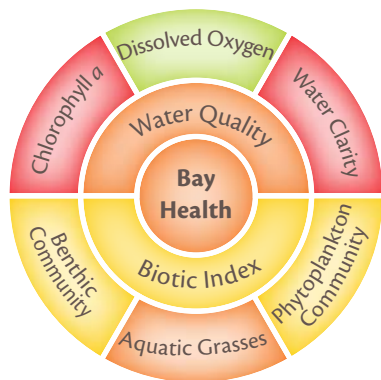
Tropical Storm Lee effects: Flood waters from the Susquehanna River watershed during Tropical Storm Lee brought up to 4 centimeters (~1½ inches) of sediments to the Upper Bay.¹ The Susquehanna River flow was strong enough to scour tons of sediments from behind the Conowingo Dam on the Lower Susquehanna River. This new layer of muddy sediments may affect next year's aquatic grass and benthic community scores.

Restoration efforts: There have been major accomplishments regarding Chesapeake Bay restoration in 2011, including record cover crops on Maryland farm fields, sewage treatment upgrades that are ahead of schedule (e.g., Blue Plains facility in Washington D.C.), and recovering blue crab populations. Yet the poor scores in Chesapeake Bay health reflect the lag times for restoration efforts to be apparent in Bay health. These report card results also underscore the need for more aggressive and widespread restoration efforts.



Sediment from Tropical Storm Lee flows down the Bay mainstem on Sept 12, 2011.

- A
- B
- C
- D
- F



Overall Bay health is made up of six indicators, three water quality and three biotic indicators. The overall health of Chesapeake Bay declined for the second year in a row, to 38%. The overall grade was a C- in 2010 and is now a D+ in 2011. Only two reporting regions, the Lower Western Shore (MD) and the Patapsco and Back Rivers, improved this year, while the rest remained the same or declined.

Western Shore tributaries

C Upper Western Shore

Moderate ecosystem health—second highest ranked region. While the benthic community score improved, the chlorophyll *a* and aquatic grass scores declined.

D- Patapsco and Back Rivers

Poor ecosystem health. Both phytoplankton and benthic community scores considerably improved compared to 2010, which improved the overall grade to a D-.

D Lower Western Shore (MD)

Poor ecosystem health. Greatest improvement from 2010 (F to D). Strong scores in phytoplankton and benthic communities offset small declines in dissolved oxygen.

F Patuxent River

Very poor ecosystem health—second lowest ranked region. Declines in dissolved oxygen and phytoplankton community brought the overall grade down to an F.

D Potomac River

Poor ecosystem health. Declines in water clarity and benthic community brought down the score slightly, but not enough to change the grade for 2011.

D+ Rappahannock River

Poor ecosystem health. Significant declines in the aquatic grasses score changed the overall grade from a C- to a D+. Other indicators showed minimal changes.

D York River

Poor ecosystem health. While there were decreases in water clarity, aquatic grass, and benthic community scores, these changes were minor and the grade remained the same as 2010.

D+ James River

Poor ecosystem health. The phytoplankton and benthic communities were notably worse than 2010, bringing the overall grade down from a C in 2010 to a D+ in 2011.

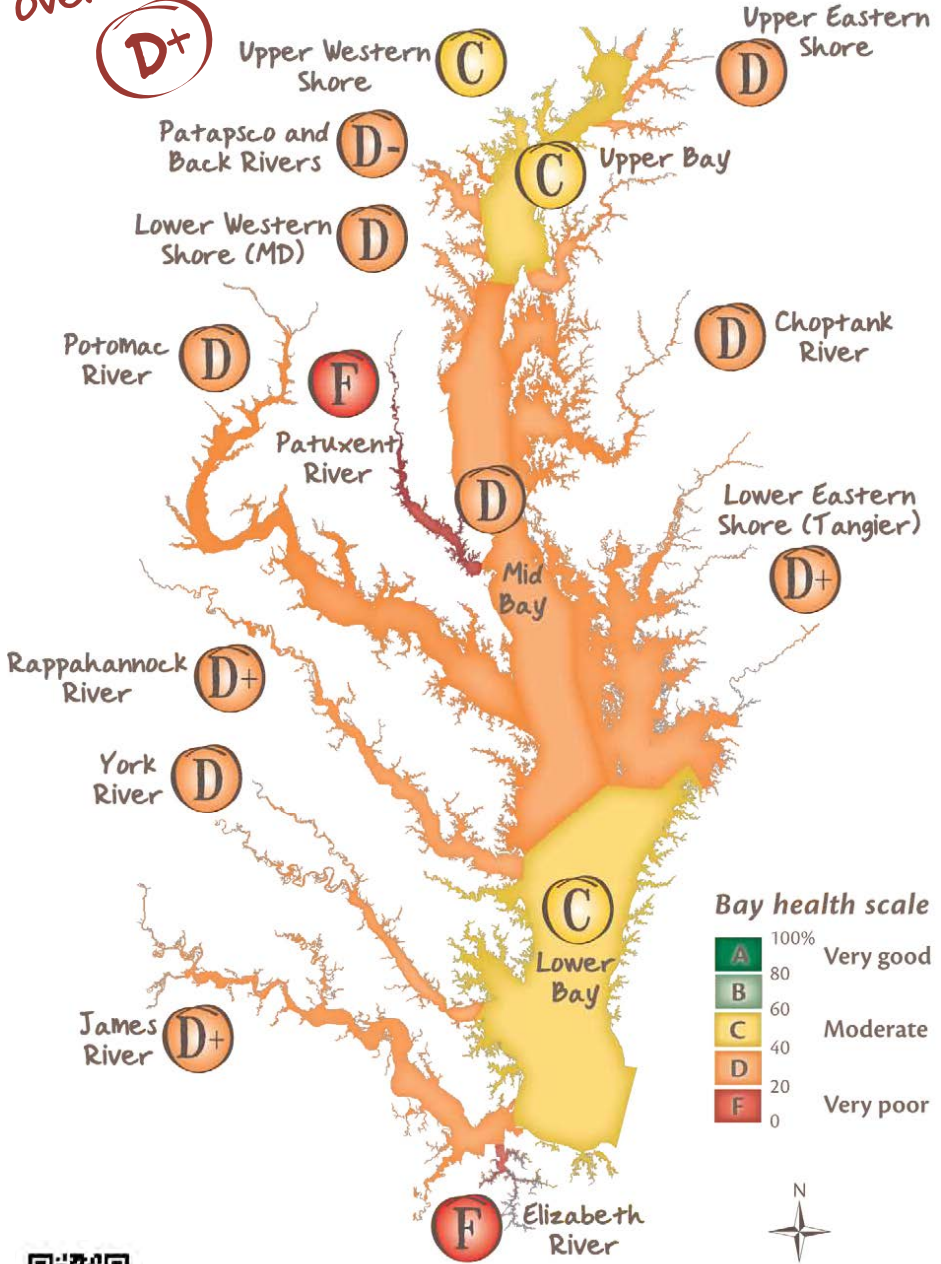
F Elizabeth River

Very poor ecosystem health—lowest ranked region in the Bay. This is the first year where this region has received a grade. Three of the indicators, water clarity, phytoplankton community, and benthic community, each scored a 0%.

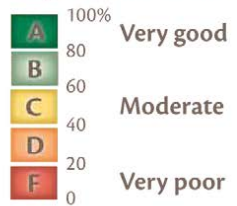
CHESAPEAKE BAY 2011 REPORT CARD

Overall score:

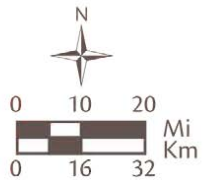
D+



Bay health scale



chesapeakebayreportcard.org



Eastern Shore tributaries and mainstem Bay

D Upper Eastern Shore

Poor ecosystem health. Declines in most of the indicators were offset by strong improvements in the benthic community score. Overall, there was minor improvement since 2010.

D Choptank River

Poor ecosystem health. This region had the greatest decrease in water clarity but aquatic grasses and benthic community improved. Overall score remained steady.

D+ Lower Eastern Shore (Tangier)

Poor ecosystem health. While small improvements occurred in dissolved oxygen and chlorophyll *a* scores, benthic community declined. This region continues to bounce between C and D grades.

C Upper Bay

Moderate ecosystem health—highest ranked region in the Bay. Improvements in chlorophyll *a* and phytoplankton community scores offset decreases in water clarity and aquatic grass scores.

D Mid Bay

Poor ecosystem health. With the biggest decline since 2010 (-13%), the Mid Bay health decreased due to considerable declines in chlorophyll *a*, water clarity, and phytoplankton community scores.

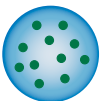
C Lower Bay

Moderate ecosystem health. Overall health remained the same, with an improved phytoplankton community and moderately decreased water quality scores.

Indicators used in the report card

Due to Hurricane Irene and Tropical Storm Lee, methods for the benthic community condition and aquatic grasses were altered for 2011. The aquatic grass scores for the Patuxent and Potomac River regions are estimates based on partial 2010 and 2011 data. Please see ian.umces.edu/ecocheck/report-cards/chesapeake-bay/2011/methods for more information.

The aim of this report card is to provide a transparent, timely, and geographically detailed assessment of 2011 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.



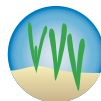
Chlorophyll *a*



Dissolved oxygen



Water clarity



Aquatic grasses



Phytoplankton community

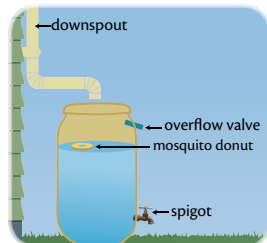


Benthic community

Improve water clarity—Live Bay Friendly!

Water clarity was at an all-time low (5%) in 2011 in Chesapeake Bay. We can improve water clarity, which helps aquatic grasses grow, promotes the right balance of phytoplankton (algae) in the water column, and influences benthic communities (clams and worms living in the sediment) in the following ways:

Around your home



Stop sediment and nutrients from running off your property into storm drains. Divert rainwater into rain barrels, rain gardens, and natural areas. Reduce fertilizer use and re-use materials by composting.

In your community



Support local initiatives that convert hard surfaces like parking lots into green spaces like rain gardens. Report turbid water running off from public sites, such as construction areas, to your local government.

Through your lifestyle



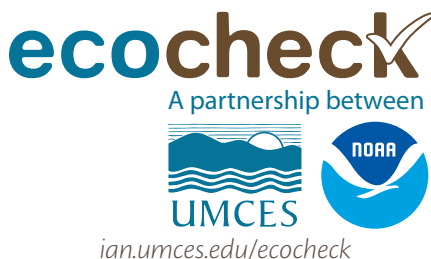
Use public and alternative transportation where possible to decrease the particulates from exhaust that enter waterways. Support state and federal initiatives for low-impact and environmentally friendly development.

Acknowledgements

Report card produced and released in April 2012 by EcoCheck (NOAA–UMCES Partnership) and the Integration and Application Network, University of Maryland Center for Environmental Science.

The data and methods underpinning this report card represent the collective effort of many individuals and organizations working within the Chesapeake Bay scientific and management community. The following organizations contributed significantly to the development of the report card: Chesapeake Bay Program, University of Maryland Center for Environmental Science, National Oceanic and Atmospheric Administration, Maryland Department of Natural Resources, Virginia Department of Environmental Quality, Virginia Institute of Marine Science, Versar Incorporated, U.S. Environmental Protection Agency, Maryland Department of the Environment, Interstate Commission on the Potomac River Basin, Old Dominion University, Morgan State University, and U.S. Geological Survey.

¹Preliminary findings by Dr. Cindy Palinkas, UMCES



CONGRATULATIONS TO THE WINNERS OF THE 2011 REPORT CARD PHOTO CONTEST!

2011 Photo Contest winner: Benjamin Reed (front cover top—Bald Cypress swamp, headwaters of the Nanticoke River, DE)

2011 Photo Contest finalists: Jim Kidd (front cover bottom left—Town Creek, Choptank River, MD); Guy W. Willey, Sr. (front cover bottom middle—Elliot's Island, Dorchester County, MD); Danny Poet (front cover bottom right—mainstem Bay)