



2007

Chesapeake Bay

REPORT CARD

A geographically detailed and integrated assessment
of Chesapeake Bay health

2007 AT A GLANCE

An overview of Chesapeake Bay health

Bay health remained in poor condition in most regions

The health scores were generally poor in 2007, but did vary from region to region. With some exceptions, the regions in the middle of the Bay scored worse than the upper and lower regions.

An overall improvement compared to 2006

Bay health in many regions improved in 2007 compared to 2006. The most improved regions were the Upper Western Shore and Choptank River. Improved health may be due in part to the summer drought conditions.

Summer drought

Record low rainfall occurred in many regions of the Chesapeake Bay watershed this past summer. The summer drought led to lower-than-average levels of sediment and nutrients flowing into the Bay from June to September. However, annual nitrogen loads were similar to the long-term (1990–2007) average due to slightly higher winter and spring flow conditions.

Slight improvement in aquatic grasses

The area covered by aquatic grasses increased in many regions of the Bay in 2007. The largest percent increase occurred in the Upper Bay and Upper Western Shore regions. Decreases did occur in some regions, including the Patuxent River, Lower Western Shore, and Upper Eastern Shore regions.

Continued poor water clarity

Overall, water clarity improved slightly in 2007, with the highest score since 2002. However, the slight improvement did not reverse the downward trajectory of baywide water clarity. The reasons for the baywide water clarity decline are under investigation.

Harmful algal blooms and fish kills

Numerous harmful algal blooms were recorded around the Bay in 2007, mostly in the Potomac River, Lower Western Shore (MD), and Patapsco and Back Rivers regions. Many of the blooms led to fish kills due to algal toxins and/or depleted dissolved oxygen levels caused by the decaying algal blooms.

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Scores based on the Bay Health Index

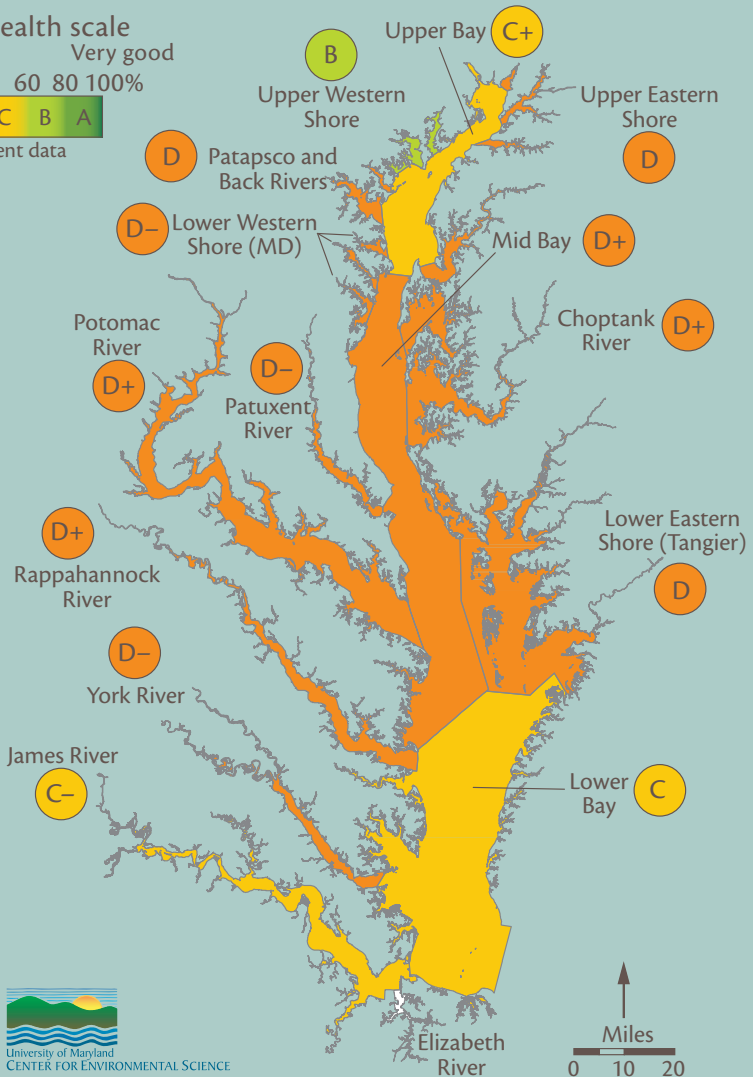
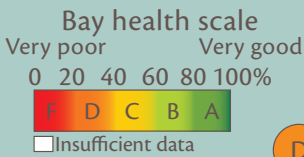
WESTERN SHORE TRIBUTARIES

REGION	SCORE(%)	COMMENTS
Upper Western Shore	65	Top-ranked grade: B <ul style="list-style-type: none">• A large improvement compared to 2006 score (38) due to improved aquatic grasses, benthic community, and chlorophyll <i>a</i> conditions.• Health of this region tends to vary greatly between years.
Patapsco and Back Rivers	26	Bottom-ranked grade: D <ul style="list-style-type: none">• Slight improvement compared to 2006 score (13), mostly due to a better benthic community score.• Water quality in this region has been consistently poor over the past two decades of monitoring.
Lower Western Shore (MD)	20	Bottom-ranked grade: D- <ul style="list-style-type: none">• Similar overall score as 2006 (21); health remained in poor condition.• The lowest-ever benthic community score and second consecutive year of aquatic grasses loss.
Patuxent River	20	Bottom-ranked grade: D- <ul style="list-style-type: none">• Slight decrease compared to 2006 score (23); health remained in poor condition.• Worst chlorophyll <i>a</i> score recorded and aquatic grasses have declined in recent years.
Potomac River	39	Mid-ranked grade: D+ <ul style="list-style-type: none">• Small improvement compared to 2006 score (35); health remained in poor condition.• Aquatic grasses continued to expand but water clarity remained very poor for the fifth year in a row.
Rappahannock River	36	Mid-ranked grade: D+ <ul style="list-style-type: none">• Similar overall score as 2006 (34); health remained in poor condition.• Chlorophyll <i>a</i> and water clarity scores have been declining over the past two decades.
York River	24	Bottom-ranked grade: D- <ul style="list-style-type: none">• Slight decrease compared to 2006 score (28), leading to lowest score since 1991.• Recent declines in chlorophyll <i>a</i>, aquatic grasses, and benthic community scores recorded.
James River	44	Mid-ranked grade: C- <ul style="list-style-type: none">• Similar score to 2006 (45) and remained in moderate condition.• Aquatic grasses continued to recover, with the highest score reported in 2007.
Elizabeth River	23*	Incomplete assessment (*score based on average of 4 indicators) <ul style="list-style-type: none">• Improved dissolved oxygen compared to 2006.• Worse scores for phytoplankton community and chlorophyll <i>a</i> compared to 2006.

CHESAPEAKE BAY

REGION SCORE(%) COMMENTS

Overall Bay	42	Overall grade for Chesapeake Bay : C- <ul style="list-style-type: none"> Slight improvement compared to 2006 (39); health remained in moderate-poor condition. Overall bay health has increased slightly since a record low in 2003, largely driven by improvements in phytoplankton community and chlorophyll <i>a</i> scores.
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EASTERN SHORE TRIBUTARIES

REGION	SCORE(%)	COMMENTS
Upper Eastern Shore	33	<p>Mid-ranked grade: D</p> <ul style="list-style-type: none"> • Similar score to 2006 (35); health remained in poor condition. • Benthic community and aquatic grasses scores declined for the third year in a row.
Choptank River	37	<p>Mid-ranked grade: D+</p> <ul style="list-style-type: none"> • Large improvement compared to 2006 score (21), but health remained in poor condition. • Health of this region is variable, showing some large changes between years.
Lower Eastern Shore (Tangier)	34	<p>Mid-ranked grade: D</p> <ul style="list-style-type: none"> • Decreased health compared to 2006 (45), leading to one of the lowest recorded scores. • Decreased chlorophyll <i>a</i>, water clarity, and benthic community scores.

MAINSTEM BAY

Upper Bay	59	<p>Top-ranked grade: C+</p> <ul style="list-style-type: none"> • Slight improvement from 2006 (56), leading to one of the highest recorded scores. • Water clarity continued to recover after record low in 2003.
Mid Bay	36	<p>Mid-ranked grade: D+</p> <ul style="list-style-type: none"> • Slight improvement compared to 2006 score (34); health remained in poor condition. • Water clarity and chlorophyll <i>a</i> scores have declined over the past two decades.
Lower Bay	46	<p>Mid-ranked grade: C</p> <ul style="list-style-type: none"> • Slight improvement compared to 2006 (44); health remained in moderate condition. • Chlorophyll <i>a</i> and water clarity remained very poor for the fifth year in a row.

Water Quality Index, Biotic Index, and Bay Health Index Scores

	Patuxent River	Lower Western Shore (MD)	York River	Patapsco and Back Rivers	Upper Eastern Shore	Lower Eastern Shore (Tangier)	Rappahannock River	Mid Bay	Choptank River	Potomac River	James River	Lower Bay	Upper Bay	Upper Western Shore	Elizabeth River*
Water Quality Index	27	23	27	19	41	42	38	39	49	42	51	37	52	55	30
Biotic Index	13	18	22	32	24	26	33	33	25	35	36	55	67	75	0
Bay Health Index	20	20	24	26	33	34	36	36	37	39	44	46	59	65	23*

(*score based on average of 4 indicators)

The aim of this report card is to provide a transparent, timely, and geographically detailed assessment of 2007 Chesapeake Bay health. Bay health is defined as the progress of three water quality indicators and three biotic indicators 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 score. Detailed methods available at www.eco-check.org.

Water quality indicators



Chlorophyll a is used as a measure of phytoplankton (microscopic, floating algae). Excess nutrients stimulate phytoplankton, reducing water clarity, and can lead to reduced dissolved oxygen.



Water clarity is a measure of how much light penetrates through the water column. Suspended sediments and phytoplankton reduce light penetration.



Dissolved oxygen is critical to survival of aquatic life. Decomposing phytoplankton can lead to reduced dissolved oxygen.

Biotic indicators



The **Benthic Index of Biotic Integrity** is a measure of the condition of bottom-dwelling animals (e.g., clams and worms). Low dissolved oxygen levels in bottom waters are detrimental to these animals.



The **Phytoplankton Index of Biotic Integrity** is a measure of the condition of phytoplankton communities. Light and nutrient availability affects these microscopic, floating algae.



Aquatic grasses, or submerged aquatic vegetation, are one of the most important habitats of the Bay. Light and nutrient levels affect aquatic grass survival.

See www.eco-check.org

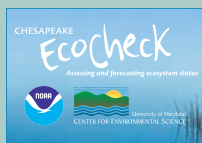
for additional reporting region information, including long-term datasets.

ACKNOWLEDGMENTS

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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, US Environmental Protection Agency, Maryland Department of the Environment, Interstate Commission on the Potomac River Basin, Old Dominion University, and Morgan State University.

Note: Some 2006 scores have changed slightly from those reported last year due to an updated, more comprehensive assessment of some indicators.