Achievement of Chesapeake Bay Water Quality Standards

A New Indicator @ ChesapeakeBay.net

Achievement of Chesapeake Bay Water Quality Standards

Results for 2009-2011 indicated that 30% of the Bay was attaining water quality standards.

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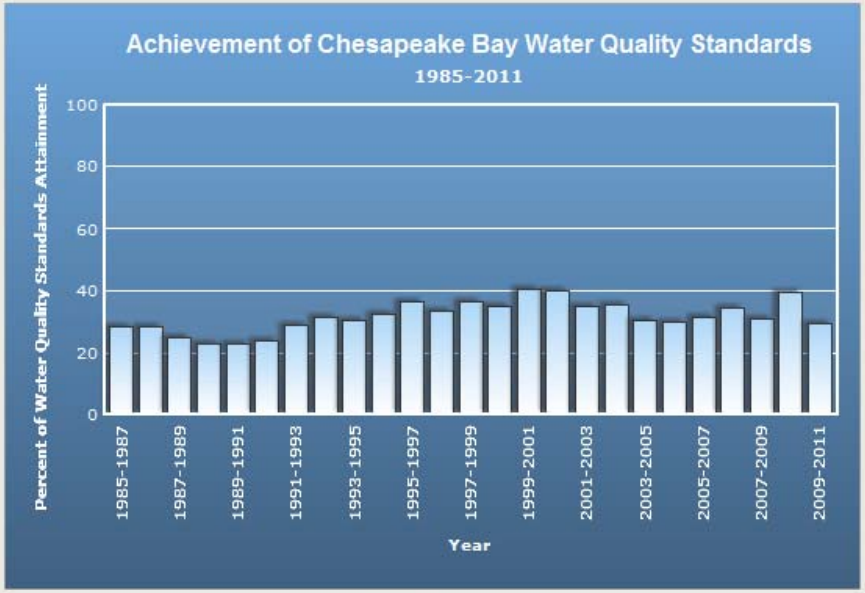

Data File (20.48 KB)

Analysis and Methods File (48.6 KB)

Importance

This indicator measures progress towards the achievement of water quality standards for dissolved oxygen, water clarity/underwater bay grasses and chlorophyll a for each 3-year assessment period beginning in 1985. The indicator is fully consistent with how Delaware, the District of Columbia, Maryland, and Virginia currently list their portion of the Bay's tidal waters, and provides a means for illustrating improvements through time. Additionally, this indicator is being used to measure progress toward the Chesapeake Bay Executive Order Strategy's water quality outcome.

Trends

Long-term Trend (1985-2011)
An informal linear trend analysis suggests a gradually increasing (i.e., improving) trend since 1985 for every 3-year assessment period. Formal, statistically rigorous long-term trend analyses have not been completed on the attainment of water quality standards.

Short-term Trend (2001-2011)
An informal linear 10-year trend analysis suggests no trend since 2001 for every 3-year assessment period. Formal, statistically rigorous trend analyses have not been completed on the attainment of water quality standards.

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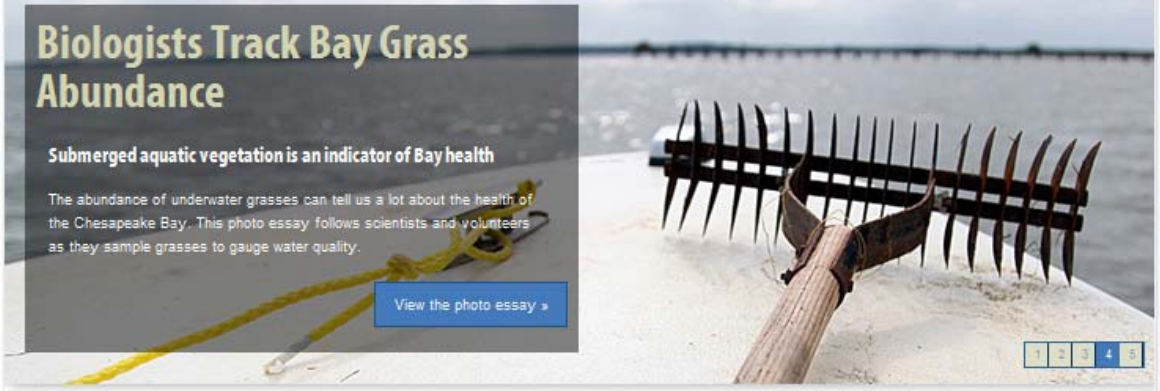

Chesapeake Bay News

August 31, 2013

Letter from Leadership: The value of water monitoring volunteers

Volunteer-collected water quality data is a critical part of Chesapeake Bay restoration.

August 30, 2013

Photo Essay: Chesapeake Bay ospreys serve as sentinels for pollution

Monitoring the buildup of chemical compounds in ospreys helps scientists track toxics in our waterways.

August 28, 2013

Patapsco River dam removal will restore miles of fish passage

A free-flowing river would open up valuable habitat to migrating herring, alewife and American shad.

August 19, 2013

Restoration Spotlight: Baltimore marina works to clean the

Critter of the Month

September's Critter - The monarch butterfly is known for its bright orange and black wings.

By the Numbers

64,000

Square miles make up the Chesapeake Bay watershed

Featured

Chesapeake Bay TMDL

The EPA established a "pollution diet" to reduce nutrients and sediment in the Bay.

Bay Executive Order

Calls on the federal government to lead a renewed effort to restore the Bay

How is the Bay Doing?

Planting Forest Buffers

Between July 2011 and July 2012, about 285 miles of forest buffers were planted along streams and rivers in the watershed.

How To Help the Bay

Compost Fallen Leaves

Instead of spending hours raking, blowing and bagging fallen leaves, try composting them instead.

In The Headlines

News Media | The Bay Journal | Twitter

Daughter of Bay seeks to honor island's heritage, preserve future | *Bay Journal 09/02/2013*

Bay Conservation Corps welcomes new class |

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Track Our Progress

The Chesapeake Bay Program tracks the progress in the restoration of the Chesapeake Bay watershed. We track Bay Health, which provides information about the status of Bay water quality, habitats and lower food web, and fish and shellfish abundance as well as restoration and protection efforts.

What Guides Us

The Chesapeake Bay Program has developed a series of commitments over its history to its Bay restoration and protection efforts. These science-based goals help Bay Program partners track critical health measures and implementation of restoration activities. Goals are updated each year to reflect the previous year's health status and restoration efforts.

Tracking Tools

Chesapeake Bay Program partners use several tools to track progress toward Bay restoration goals. These tools help Bay Program partners and other stakeholders visualize data to help identify priorities and reveal funding gaps. Learn more about these tools and how they help Bay Program partners lead the restoration of the Chesapeake Bay.

Indicators A-Z

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American Shad Abundance

American shad form an important link in the Bay food web. Shad feed on zooplankton and are preyed upon by larger fish, including bluefish, weakfish and striped bass. Historically, local economies flourished from the annual shad run in the spring, when the fishes' upriver migration begins. But shad populations were decimated in the 1970s by overfishing, pollution, and dams and other blockages that prevent the fish from reaching their upstream spawning grounds. (Read More)

Bay Watershed Forest Cover

Forests protect and filter drinking water for 75 percent of the Bay watershed's residents. They also provide valuable ecological services and economic benefits, including carbon sequestration, flood control, wildlife habitat and forest products. Forests are the most beneficial land use for the Bay. They capture, filter and retain water, thereby reducing pollution and improving water quality. Forests also absorb air pollution and retain up to 85 percent of the airborne nitrogen from sources such as automobiles and power

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  - Watershed & River Health
  - Factors Impacting Bay Health
- Restoration
- Tracking Tools

Health

Scientists evaluate Chesapeake Bay health by monitoring important habitats, fish and shellfish, and water quality measures in the Bay and its watershed. They also track pollution, population and other measures that affect the Bay's health.

Bay Health

The Bay's health has slowly improved in some areas. However, the ecosystem remains in poor condition. The Bay continues to have polluted water, degraded habitats, and low populations of many fish and shellfish species.

River Health

The Bay watershed's streams, creeks and rivers eventually flow to the Bay, so their health directly affects the entire Bay. The Bay Program uses the most current monitoring data to assess the health of the rivers and streams that flow to the Bay.

Factors Impacting Bay Health

Everything that happens on the land affects the health of the Bay and its local waterways. Human activities and natural factors have a significant influence on the health of the Bay and its watershed.

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Bay Health

Scientists evaluate the Chesapeake Bay's health by monitoring important habitats, fish and shellfish, and water quality measures. These indicators are useful tools to gauge the overall health of the Bay and the animals that live in it.

The Bay's health has slowly improved in some areas. However, the ecosystem remains in poor condition. The Bay continues to have polluted water, degraded habitats, and low populations of many fish and shellfish species.

Habitats and Lower Food Web

Overall, the Bay's habitats and lower food web remain far below what is needed to support thriving populations of underwater life.

- Bay Grasses: In 2012, there were an estimated 48,191 acres of underwater grasses in the Chesapeake Bay achieving 26 percent of the 185,000-acre goal.
- Phytoplankton: A baywide assessment could not be completed in 2012 due to an incomplete data set. In 2011, 56 percent of the Bay's surface waters met the phytoplankton goal.
- Bottom Habitat: In 2012, 45 percent of the Bay and its tidal tributaries met the bottom habitat goal.
- Tidal Wetlands: As of 2005, there were approximately 283,946 acres of tidal wetlands in the Bay region.

Fish and Shellfish

Many of the Bay's fish and shellfish populations are suffering due to pollution, diseases, overharvesting and lack of food and habitat.

- Blue Crabs: The abundance of spawning-age female blue crabs in the Chesapeake Bay increased to 147 million in 2013, compared with 97 million in 2012.
- Oysters: According to 2008 data, there are an estimated 3 billion grams of oyster biomass in the Bay and its tidal tributaries.
- Striped Bass: Female striped bass spawning stock biomass measured 111.44 million pounds in 2010.
- American Shad: American shad abundance in the Bay in 2012 was 34 percent of the goal.
- Atlantic Menhaden: Researchers in Maryland caught menhaden in 25 percent of their hauls in 2010.

Water Quality

The Bay's water quality remains very poor. Too much pollution flows to the Bay and its streams, creeks and rivers.

- Achievement of Chesapeake Bay Water Quality Standards: Results for 2009-2011 indicated that 30% of the Bay was attaining water quality standards.
- Chemical Contaminants: Based on 2010 assessments, 28 percent of analyzed tidal waterways had no impairment for chemical contaminants.

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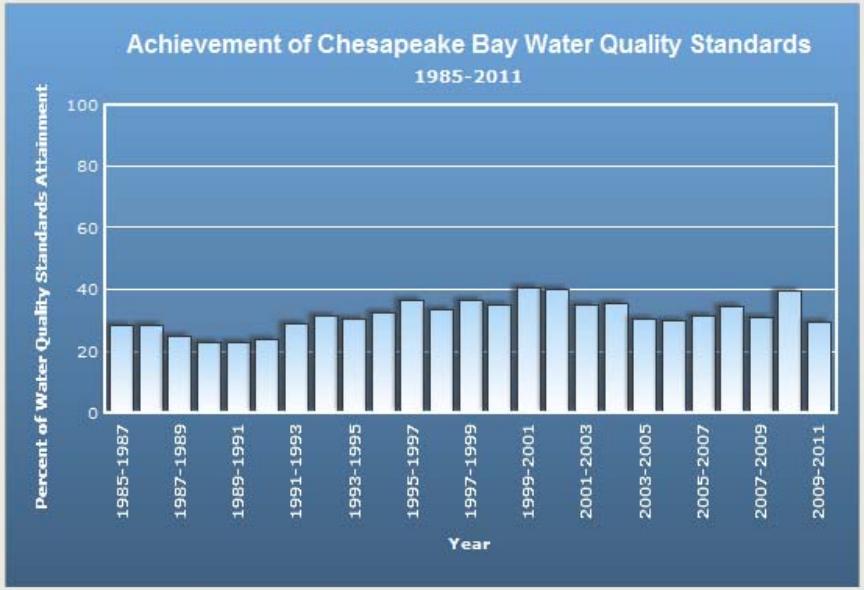

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Short-term Trend (2001-2011)
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Change from Previous Year
Results for 2009-2011 indicated that 30% of the Bay was attaining water quality standards. These results are not significantly different from those of the previous assessment year (2008-2010) in which 40% of the Bay was attaining water quality standards.

Additional Information

Nutrients, along with sediments, are the primary causes of impairments to the Chesapeake Bay and its tidal tributaries. To meet the objectives of the Clean Water Act, the EPA's implementing regulations specify that states must adopt criteria that contain sufficient parameters to protect existing and designated uses. In 2003, EPA Region III developed Ambient Water Quality Criteria for Dissolved Oxygen, Water Clarity, and Chlorophyll a for the Chesapeake Bay and Its Tidal Tributaries. This was developed in order to achieve and maintain water quality conditions necessary to protect the aquatic living resources of the Chesapeake Bay and its tidal tributaries from the effects of nutrient and sediment pollution. Within the publication, five designated uses were identified and described, that when adequately protected, will ensure the protection of the living resources therein.

The methodology used for the calculation of the indicator considers the achievement or non-achievement of the dissolved oxygen, water clarity/underwater bay grasses, and chlorophyll a water quality standards applicable to a designated use within a segment. Rather than reporting progress only when all designated uses are met within a segment, this methodology reports when a water quality standard is met for each of the designated uses in that segment; therefore, rather than reporting on the 92 Chesapeake Bay segments used for the establishment and management of the Chesapeake Bay Total Maximum Daily Load (TMDL), this methodology reports on 291 designated-use segments contained within.

This indicator uses a surface area-weighted approach, which multiplies the surface area of each of the 92 segments times the number of applicable designated uses and criteria for that segment. This approach factors in the relative size of each segment, ensuring we report the best available measure of how much of the Bay tidal waters were achieving water quality standards. At the same time, this approach gives equal weight to achievement of the criteria protective of each designated use and segment, preventing any need to weigh differently the importance of restoring dissolved oxygen versus bringing back underwater bay grasses. Restoration of a fully functioning Chesapeake Bay ecosystem requires attainment of all five designated uses and their applicable criteria. This indicator consolidates the baywide results in the final calculations and reports percent of Bay water quality standards in attainment.

Who to Contact

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University of Maryland Center for Environmental Science (UMCES)
(410) 295-1321

Source of Data

Chesapeake Bay Program

Related Indicators

- Dissolved Oxygen
- Underwater Bay Grass Abundance (Baywide)
- Mid-Channel Water Clarity
- Chlorophyll a

Dissolved Oxygen

Data gathered from 2010 to 2012 indicate that 35 percent of the combined volume of open-water, deep-water and deep-channel water of the Bay and its tidal tributaries met dissolved oxygen standards during summer months.

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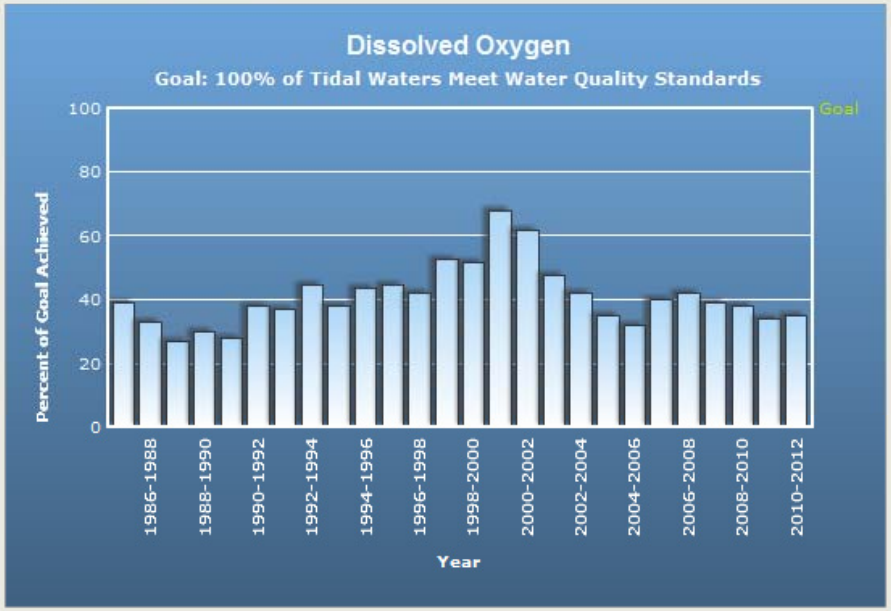

Data (43 KB)

Analysis & Methods (70 KB)

Importance

Just as is the case for animals on land, oxygen is essential for all aquatic plants and animals to survive. In water, oxygen is present in a dissolved form. Adequate concentrations of dissolved oxygen in water are necessary for healthy ecosystem function; without the required amounts of oxygen in the water to support healthy ecosystem function, the Bay's ability to support aquatic life is compromised.

The necessary amount of dissolved oxygen varies by aquatic species, season and location within the Bay. Generally, aquatic animals need higher oxygen levels in shallow waters during spring spawning season. Slightly lower oxygen levels are acceptable during other times of the year, particularly in deeper waters.

Concentrations of dissolved oxygen are also an important indication of levels of nutrient pollution in the Bay. Low dissolved oxygen levels are primarily the result of excess nutrient pollution, which fuels the growth of algae blooms. These algae eventually die and sink to the Bay's bottom, where they undergo the natural process of bacterial decomposition. During this process, bacteria use up the oxygen present in the water, leaving little for fish, shellfish and other forms of aquatic life. In general, greater quantities of excess nutrients being delivered to the Bay result in larger algae blooms within the receiving waters, leading to an increased amount of areas with low-oxygen concentrations (i.e., dead zones).

Goal

Underwater Bay Grass Abundance (Baywide)

In 2012, there were an estimated 48,191 acres of underwater grasses in the Chesapeake Bay, achieving 26 percent of the 185,000-acre goal.

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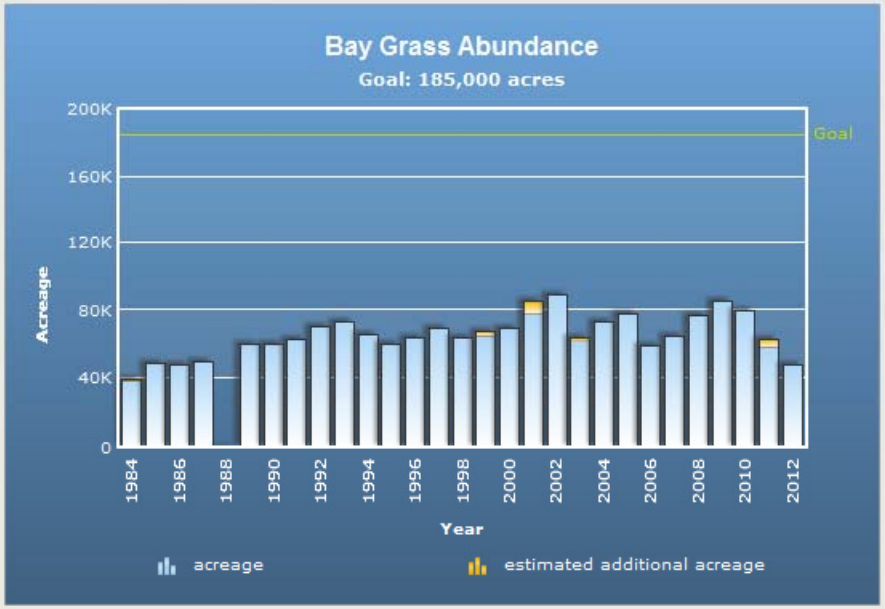

Analysis & Methods (100 KB)

Data (145.62 KB)

Importance

Underwater grasses provide significant benefits to aquatic life and serve many critical ecological functions in the Bay and its tributaries, such as:

- Providing shelter for young striped bass, blue crabs and other species
- Improving water clarity by helping suspended sediment particles settle to the bottom
- Adding oxygen to the water
- Reducing shoreline erosion

Scientists believe that having more grasses in the Bay and rivers will dramatically improve the entire ecosystem. The expectation is that as nutrient and sediment pollution decrease and water clarity improves, underwater grass acreages should expand. Experts closely monitor underwater grasses because their well-being is dependent on good local water quality. Therefore, their abundance is an excellent measure of the Bay's health.

Goal

The goal is to have 185,000 acres of underwater grasses in the Chesapeake Bay. This acreage represents approximate historic

Mid-Channel Water Clarity

In 2011, 5 percent of tidal waters met goals for water clarity. This was a decrease from 2010, when 18 percent met goals.

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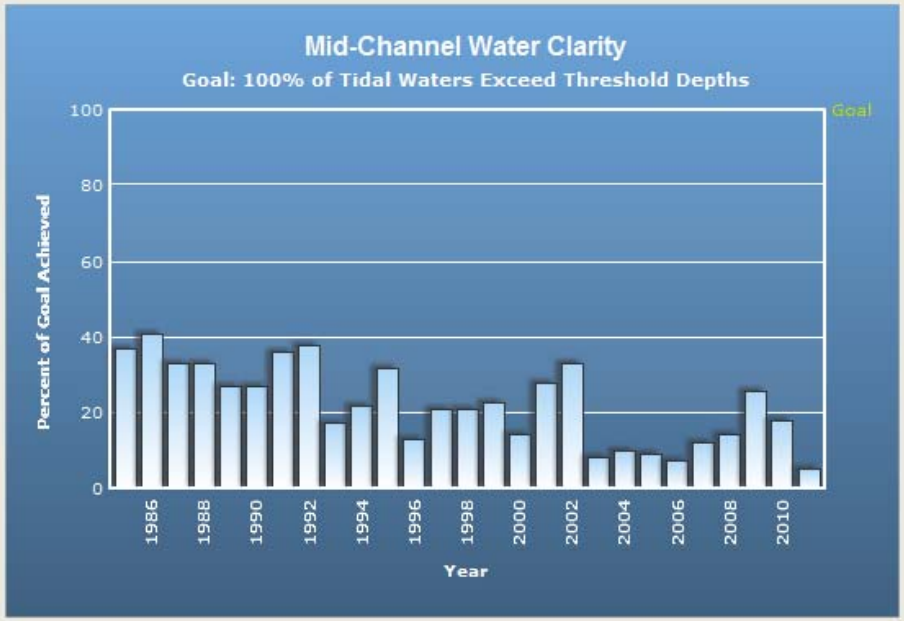

Download Data (87.5 KB)

Download Analysis & Methods (52 KB)

Importance

Water clarity measures the depth to which light can penetrate into the water. It is routinely hindered by the amount of fine sediment, plankton and other debris suspended in the water. Greater water clarity generally leads to a healthier Bay.

Goal

The goal is for 100 percent of the Chesapeake Bay to meet thresholds for water clarity. In general, visibility to a depth greater than 0.65 – 2 meters (depending on salinity of waterbody) during the underwater bay grass growing season is acceptable.

Trends

Long-term Trend (1985-2011)

Interannual variation of Secchi depth is high in the Bay but the long-term trend indicates that Bay water has become more turbid (less clear). Goal achievement has averaged 22 percent and has ranged from 5 percent to 41 percent.

Chlorophyll a

In 2011, 18 percent of tidal waters had chlorophyll a concentrations that achieved the goal. This is a decrease of 4 percent from 2010.

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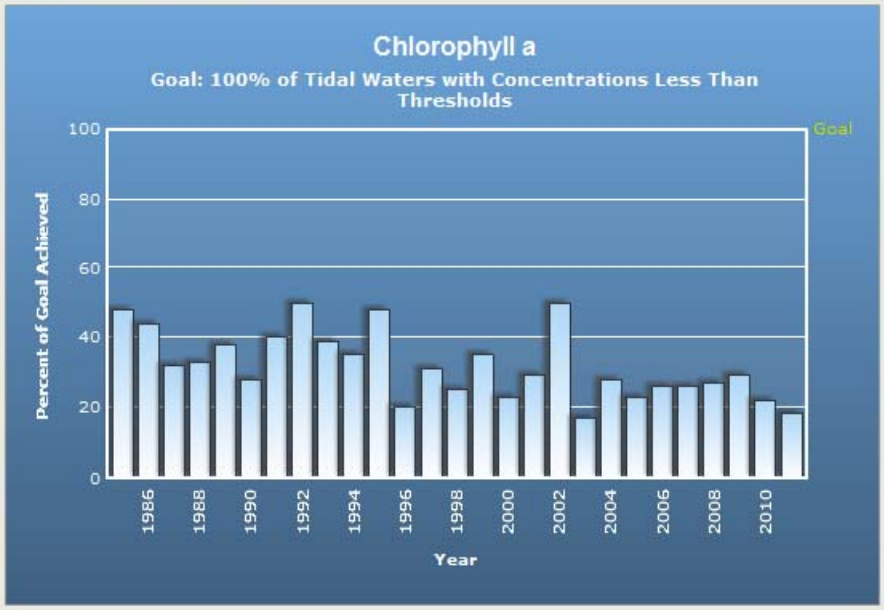


Download Data (66.5 KB)

Download Analysis & Methods (53.5 KB)

Importance

Scientists study chlorophyll a to determine the amount of algae present in the Bay.

Algae are the foundation of the food web and are a necessary part of a balanced ecosystem. However, too much algae can block sunlight from reaching underwater grasses, reducing the habitat and oxygen that underwater life need to survive. The range of acceptable chlorophyll a concentrations varies by season and salinity.

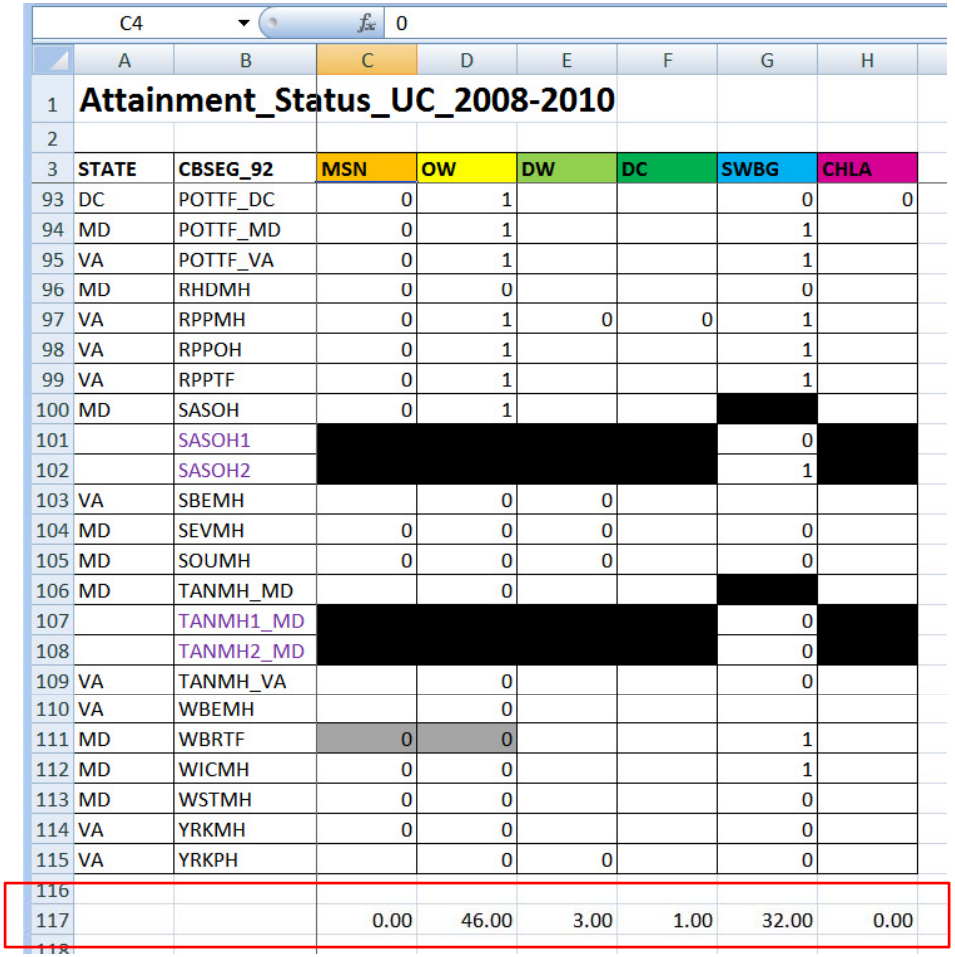
Goal

The goal is for 100 percent of Chesapeake Bay tidal waters to be below certain threshold concentrations of chlorophyll a that are acceptable to underwater bay grasses.

Trends

Long-term Trend (1985-2011)

The area of the Bay meeting (i.e., less than or equal to) its chlorophyll a threshold concentrations has high interannual variability, but has generally shown a decreasing (degrading) trend over the period of record. Goal achievement has averaged 32 percent and ranged



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	A	B	C	D	E	F	G	H
1	**Attainment_Status_UC_2008-2010**							
2								
3	**STATE**	**CBSEG_92**	**MSN**	**OW**	**DW**	**DC**	**SWBG**	**CHLA**
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94	MD	POTTF_MD	0	1			1	
95	VA	POTTF_VA	0	1			1	
96	MD	RHDMH	0	0			0	
97	VA	RPPMH	0	1	0	0	1	
98	VA	RPPOH	0	1			1	
99	VA	RPPTF	0	1			1	
100	MD	SASOH	0	1				
101		SASOH1					0	
102		SASOH2					1	
103	VA	SBEMH		0	0			
104	MD	SEVMH	0	0	0		0	
105	MD	SOUMH	0	0	0		0	
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107		TANMH1_MD					0	
108		TANMH2_MD					0	
109	VA	TANMH_VA		0			0	
110	VA	WBEMH		0				
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112	MD	WICMH	0	0			1	
113	MD	WSTMH	0	0			0	
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