



# Applying BayStat to Restore Chesapeake Bay

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# Comparison Guanabara Bay Chesapeake Bay

	Guanabara Bay	Chesapeake Bay
<b>Population</b>	12 million people	18 million people
<b>Watershed</b>	4080 KM <sup>2</sup>	166,760 KM <sup>2</sup>
<b>Surface Area</b>	412 KM <sup>2</sup>	11,600 KM <sup>2</sup>
<b>Average (Max) Depth</b>	5.7 M (58 M)	6.4 M (53 M)



## *BayStat...*

*is a powerful tool to assess, coordinate and target Maryland's Bay restoration programs, and to inform our citizens on progress.*

***We can't manage what we can't measure.***





# Origins of 'stat-ing' in New York City

- CompStat (Computer statistics) developed in mid-1990s

- Jack Maple & Bill Bratton

- Led to reductions in crime


**Police Department  
City of New York**


Michael R. Bloomberg Mayor  
 Raymond W. Kelly Police Commissioner

**CompStat** 84th Precinct  
 Report Covering the Week of 11/03/2008 Through 11/09/2008

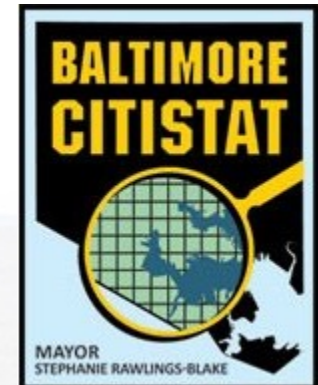
	Week to Date			28 Day			Year to Date			2 Year	7 Year	15 Year
	2008	2007	% Change	2008	2007	% Change	2008	2007	% Chg	% Chg (2001)	% Chg (1991)	% Chg (1991)
Murder	0	0	****	0	0	****	1	2	-50.0	****	-50.0	-50.9
Rape	0	0	****	0	0	****	2	3	-33.3	-60.0	-60.0	-88.8
Robbery	10	8	25.0	39	20	95.0	215	199	8.0	18.7	-11.8	-80.7
Fel. Assault	5	0	****	19	11	72.7	122	152	-19.7	-7.5	-33.3	-69.0
Burglary	2	2	0.0	19	15	26.6	119	134	-11.1	-11.1	-54.4	-83.2
Gr. Larceny	8	18	-55.5	40	57	-29.8	493	565	-12.7	-15.5	-21.1	-48.4
G.L.A.	2	0	****	7	0	****	51	46	10.8	-16.3	-58.8	-92.0
<b>TOTAL</b>	<b>27</b>	<b>28</b>	<b>-3.57</b>	<b>124</b>	<b>103</b>	<b>20.39</b>	<b>1,803</b>	<b>1,101</b>	<b>-8.90</b>	<b>-8.57</b>	<b>-30.54</b>	<b>-73.89</b>





# CitiStat developed in Baltimore

- Mayor Martin O'Malley
- Initially used for crime which led to major crime reductions
- Expanded to all city services



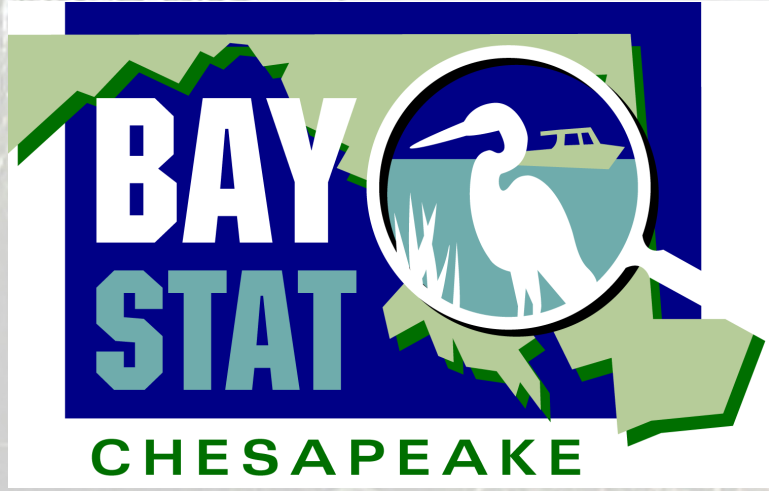
## CitiStat: 10 years of measuring progress

During its first decade, CitiStat has made government more accountable and effective



# BASIC TENETS

- Accurate and timely intelligence shared by all.
- Rapid deployment of resources
- Effective tactics and strategies
- Relentless follow-up and assessment





# How it works

**ASSESS...** our progress to evaluate what's working and what's not, and adapt our efforts accordingly.

**COORDINATE...** across agencies and scientific disciplines, pooling resources, expertise and programs to maximize results

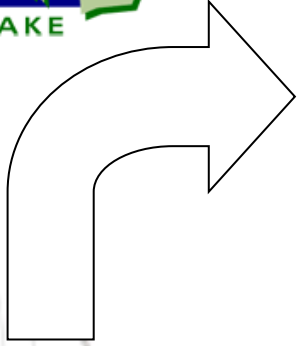




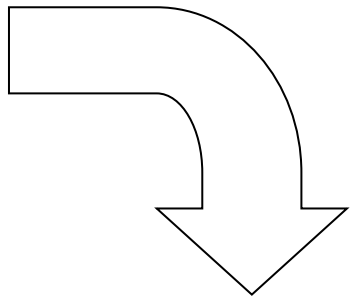
**TARGET**... limited resources for maximum efficiency, effectiveness and benefits.

**INFORM**... Maryland's citizens so the process is transparent and their government is accountable.





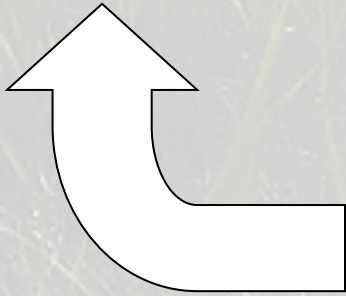
**BayStat Meeting**  
Last Tuesday of the month  
Jeffrey Building, Annapolis



**Briefing Memo**  
24 hours prior to meeting  
Governor and staff only



**Follow-up Memo**  
Approx. 48 hours after meeting  
Action items for next meeting



**Agency Submissions**  
Due 8 days prior to meeting

- White paper memo
- Spreadsheet of metrics
  - GIS data layers
  - Website content





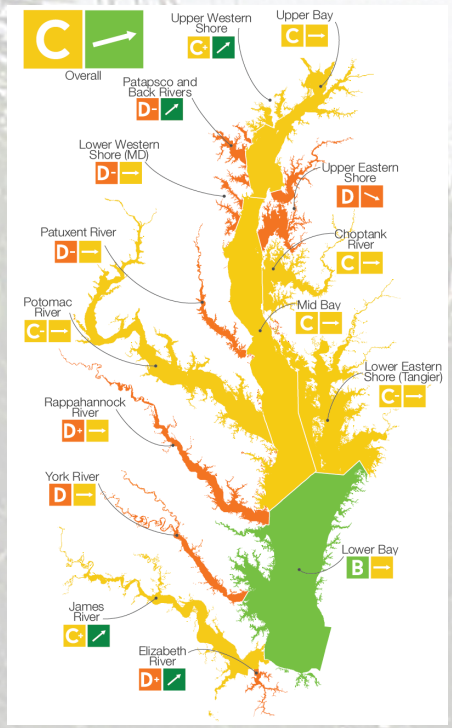
# Developed to track progress in Chesapeake Bay restoration

- Socratic method of interrogating senior government officials
- Monthly meetings
- Few presentations

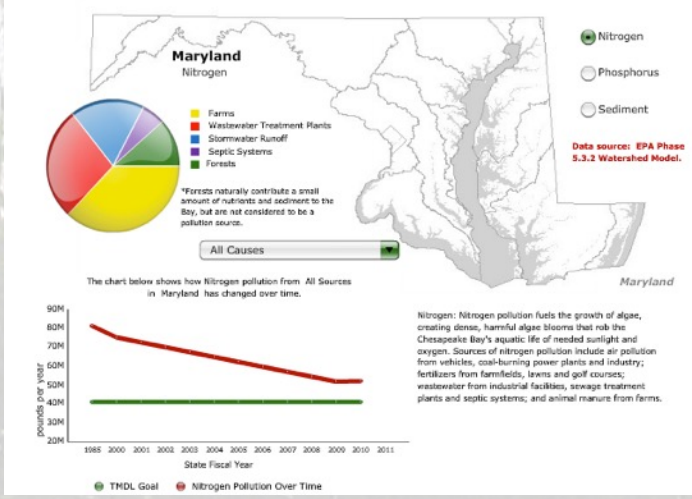




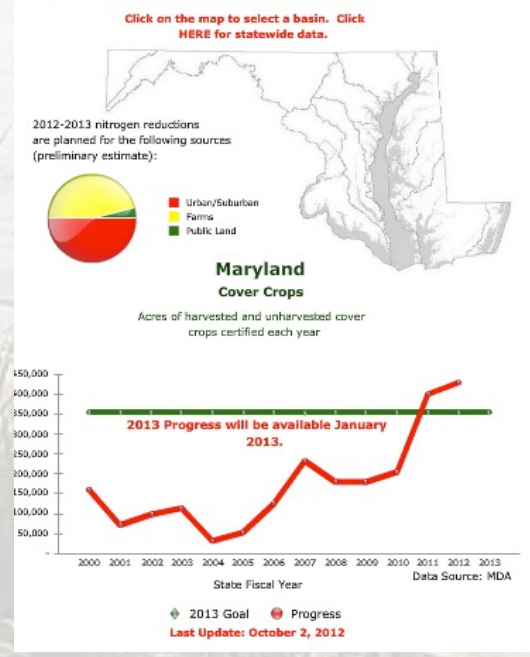
# BayStat tracks health, pressures and solutions



## Causes of the Problems



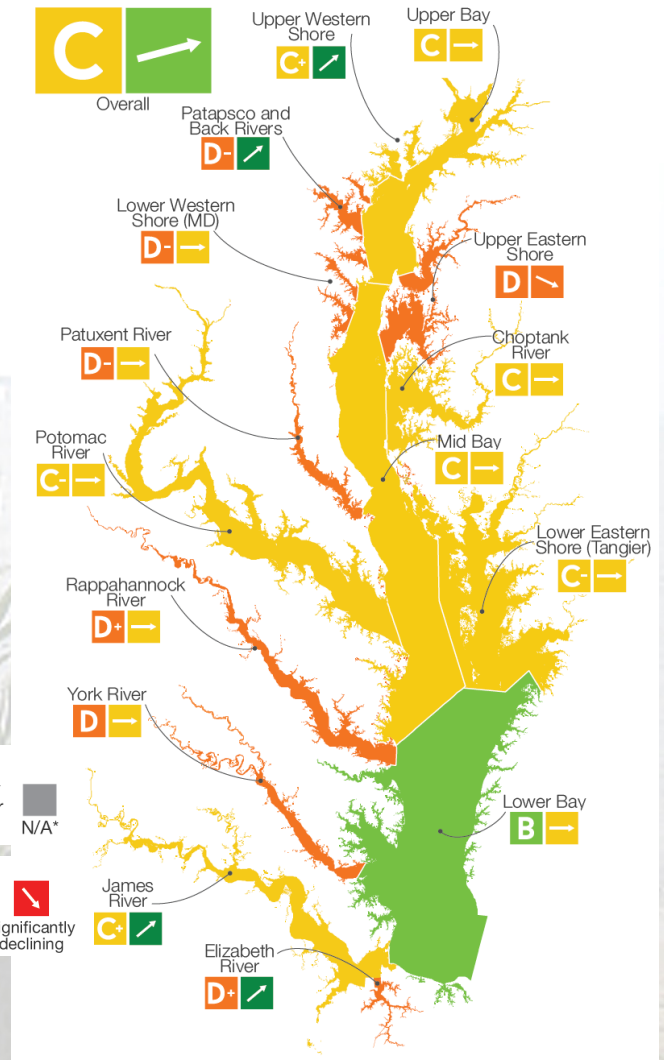
## one Goals and Progress Report





# Current Bay Health

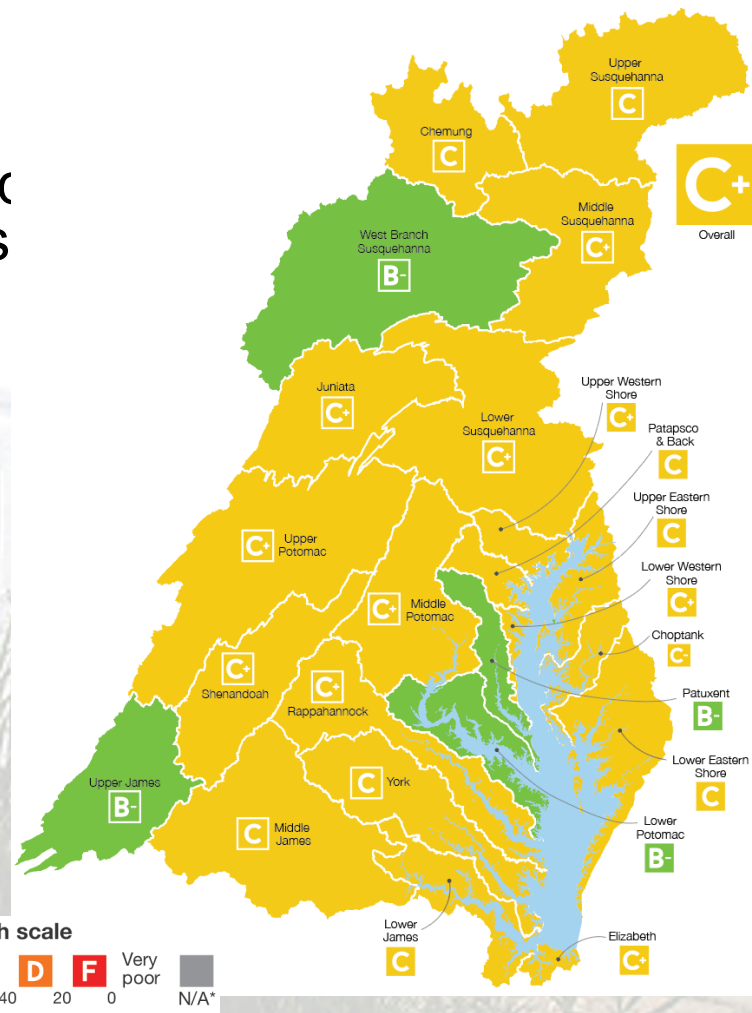
- ▶ UMCES bases the Bay Health Index on 7 Indicators
- ▶ These indicators include:
  - ▶ Water Clarity
  - ▶ Dissolved Oxygen
  - ▶ Total Nitrogen
  - ▶ Total Phosphorus
  - ▶ Aquatic Grasses
  - ▶ Benthic community
  - ▶ Chlorophyll a





# Current Watershed Health

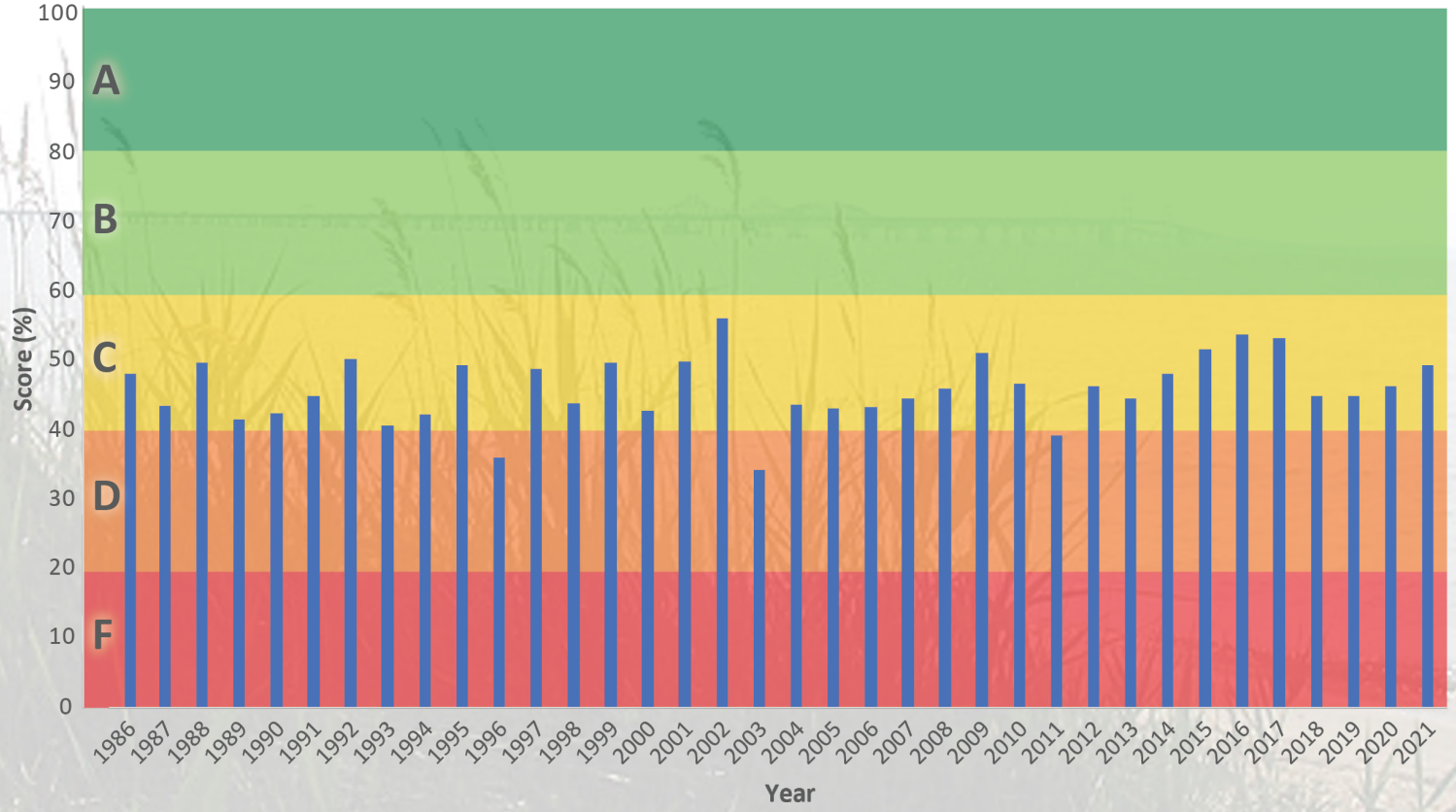
- ▶ UMCES bases the Watershed Health Index on 11 Indicators
- ▶ These indicators include:
  - ▶ Ecological
    - ▶ Water quality
    - ▶ Stream benthic community
    - ▶ Protected lands
  - ▶ Societal
    - ▶ Stewardship
    - ▶ Walkability
    - ▶ Heat Vulnerability
    - ▶ Social Index
  - ▶ Economic
    - ▶ Housing affordability
    - ▶ Income inequality
    - ▶ Jobs growth
    - ▶ Median income





# Bay Health Over Time

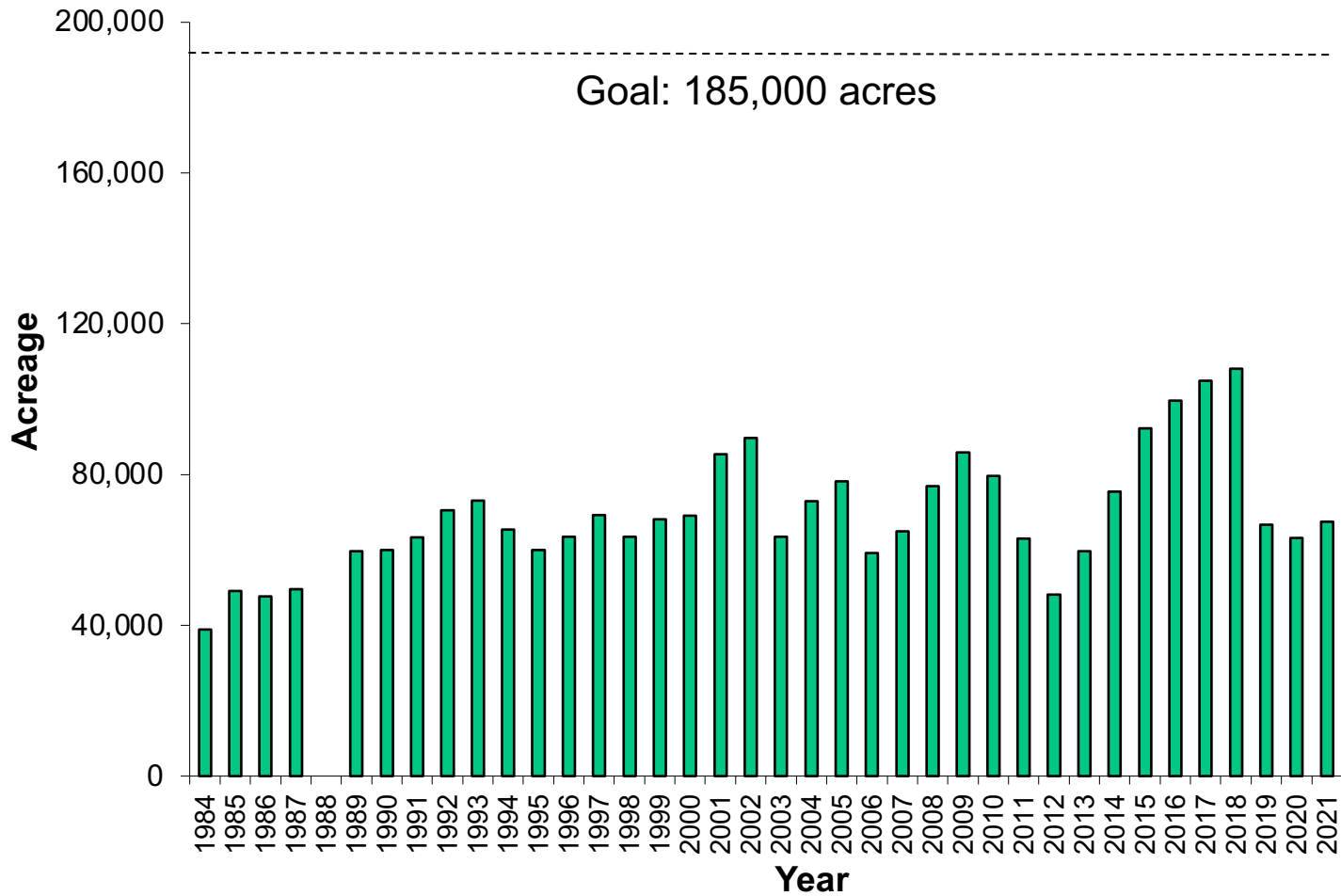
UMCES Chesapeake Bay Health Index 1986-2021





# Bay Grass

## Underwater Bay Grass Abundance



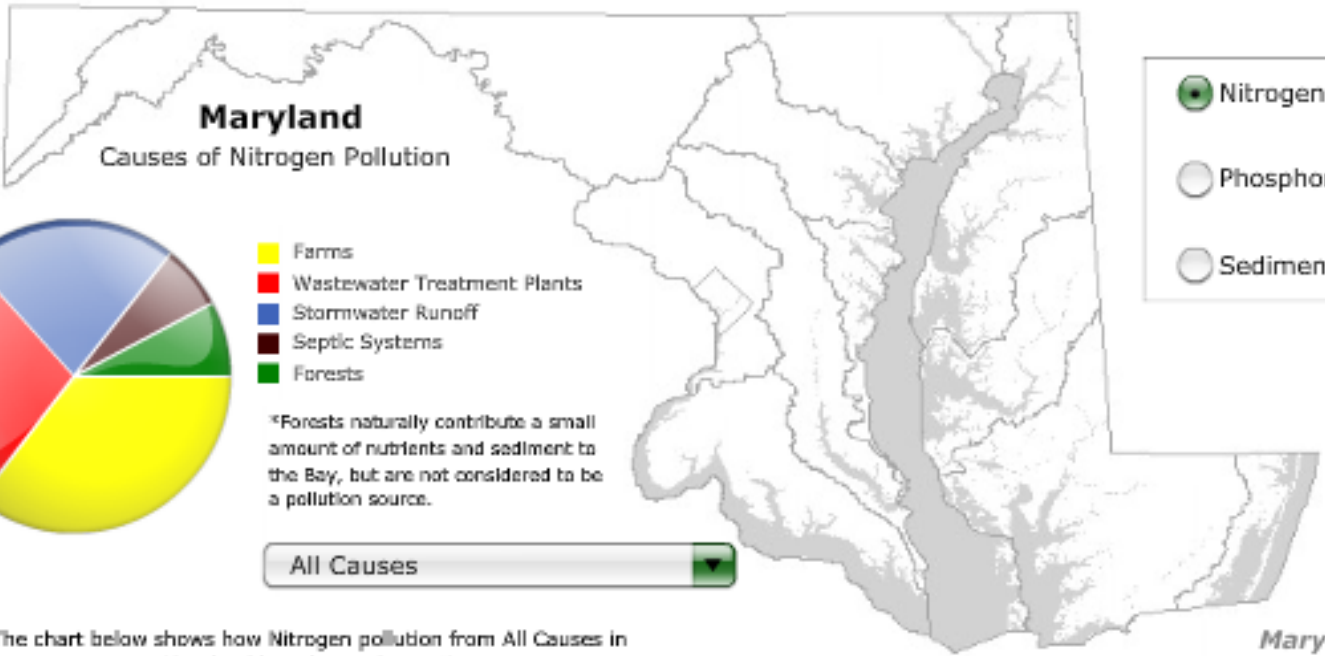


# CAUSES

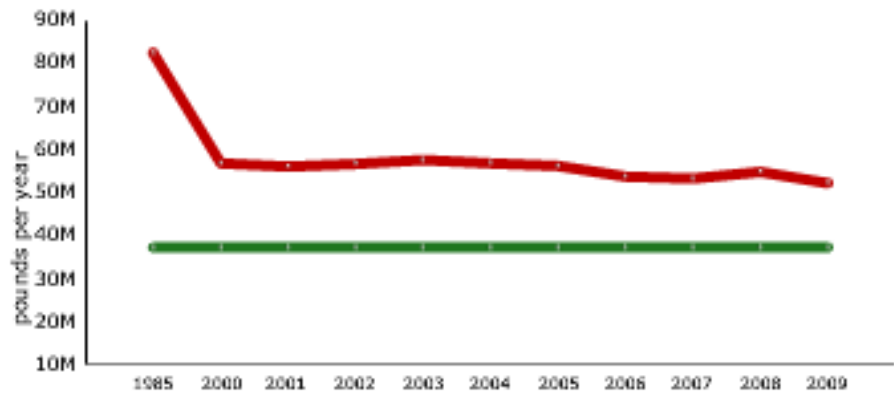




# Causes of the Problems N – All Sectors



The chart below shows how Nitrogen pollution from All Causes in Maryland has changed over time.

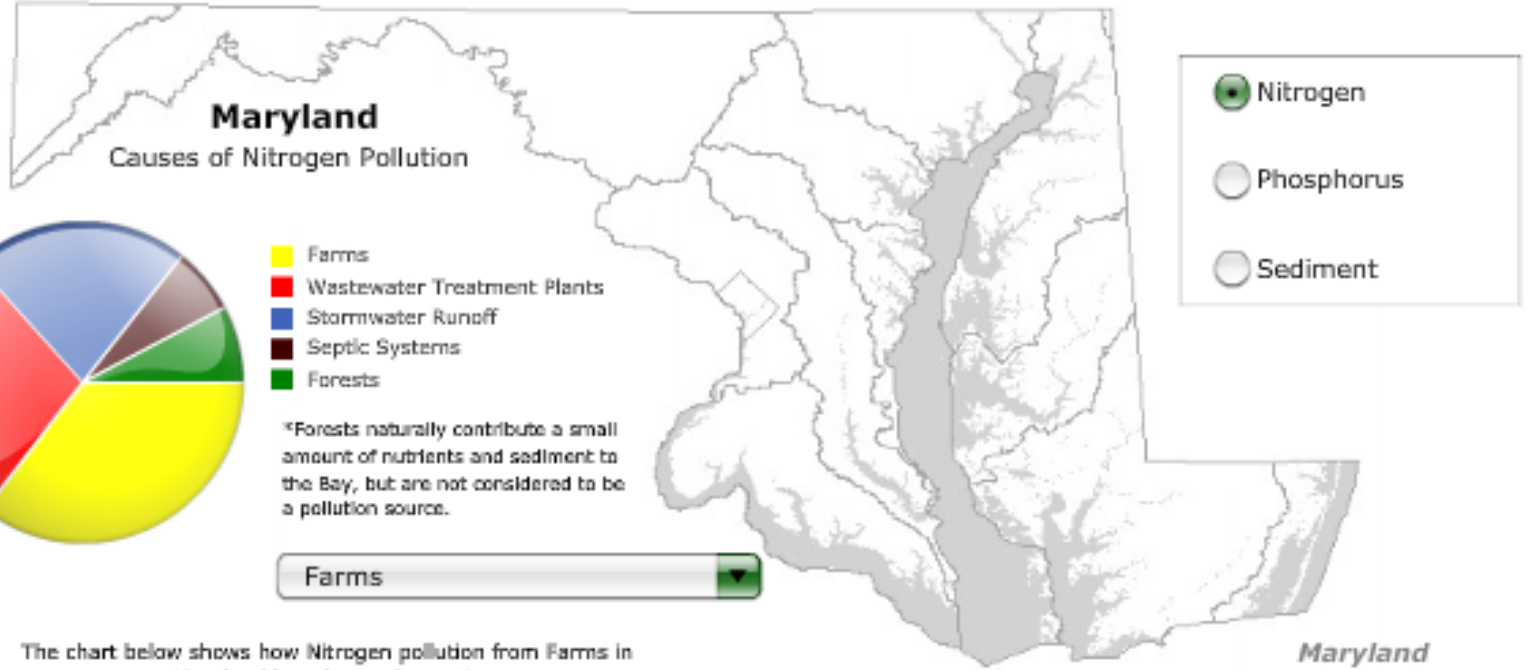


Nitrogen pollution fuels the growth of algae, creating dense, harmful algae blooms that rob the Chesapeake Bay's aquatic life of needed sunlight and oxygen. Sources of nitrogen pollution include air pollution from vehicles, coal-burning power plants and industry; fertilizers from farmfields, lawns and golf courses; wastewater from industrial facilities, sewage treatment plants and septic systems; and animal manure from farms.



# Causes of the Problems

## Example – Farms Statewide



The chart below shows how Nitrogen pollution from Farms in Maryland has changed over time.

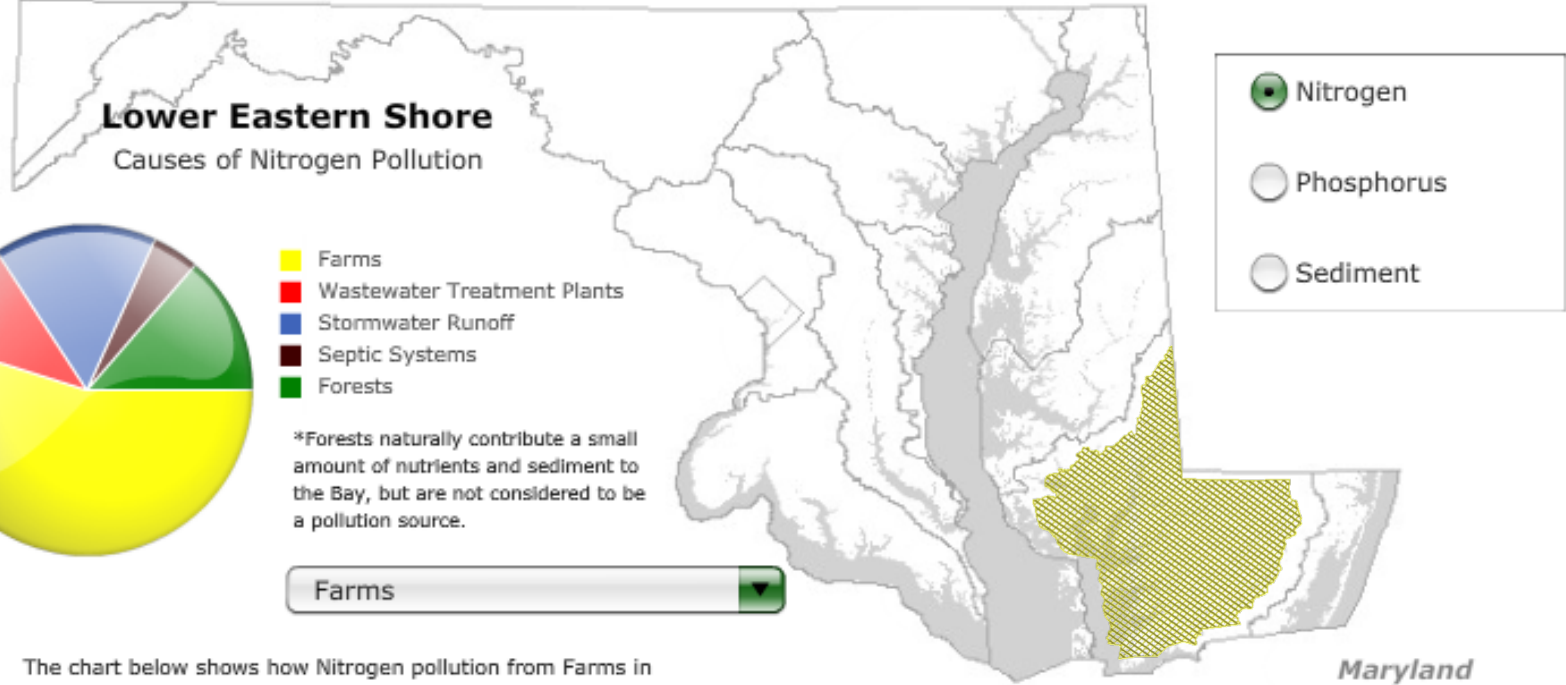


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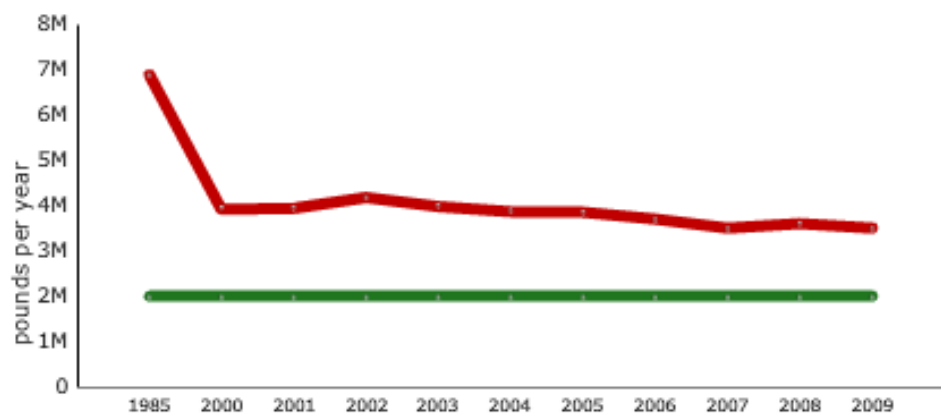


# Causes of the Problems

## Example – Farms Region



The chart below shows how Nitrogen pollution from Farms in Lower Eastern Shore has changed over time.



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# SOLUTIONS



# 2 Year Milestones

- In the past, political leaders would set goals that were 10-20 years into the future and well beyond their terms in office
- In 2009, 2 year milestones were established to meet interim goals and report in “real time”
- Ultimately, the goal is to meet EPA (federal) Total Maximum Daily Load goals by 2025 or face a regulatory mandated restoration plan



2 Year Plan

# Solution – 2 Year Milestone Example – Cover crops

## Maryland's Bay Restoration Plans: 2-Year Milestones

Maryland can only restore the health of the Bay by implementing proven solutions called Best Management Practices (BMPs) on the most lands. For each category below, the most effective BMPs are listed in order of greatest impact.

Last Update: July 25, 2011

Cover Crops  
2-Year Milestone Progress  
(2009-2011)

Farms: Managing the Land
<b>Cover Crops</b>
Soil Conservation & Water Quality Plans
Water Control Structures
Stream Protection with Fencing
Stream Protection without Fencing
Farms: Fertilizers and Animal Waste
Farms: New Technologies
Farms: Natural Filters
Reducing Pollution from Urban Areas
Restoring Natural Filters on Public Lands
Conserving High Priority Lands

### Farms: Managing the Land Cover Crops

Cover crops are small grains such as wheat or rye that are planted in the fall after the harvest of corn, soybeans and other summer crops to absorb unused fertilizers that may remain in the soil. Cover crops also provide a ground cover to prevent soil erosion in the winter.



# Solution – 2 Year Milestone Example – Septic Retrofits

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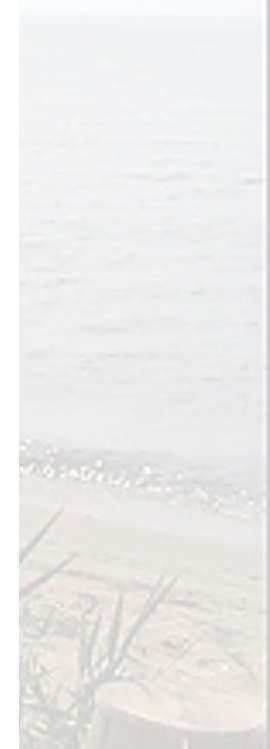
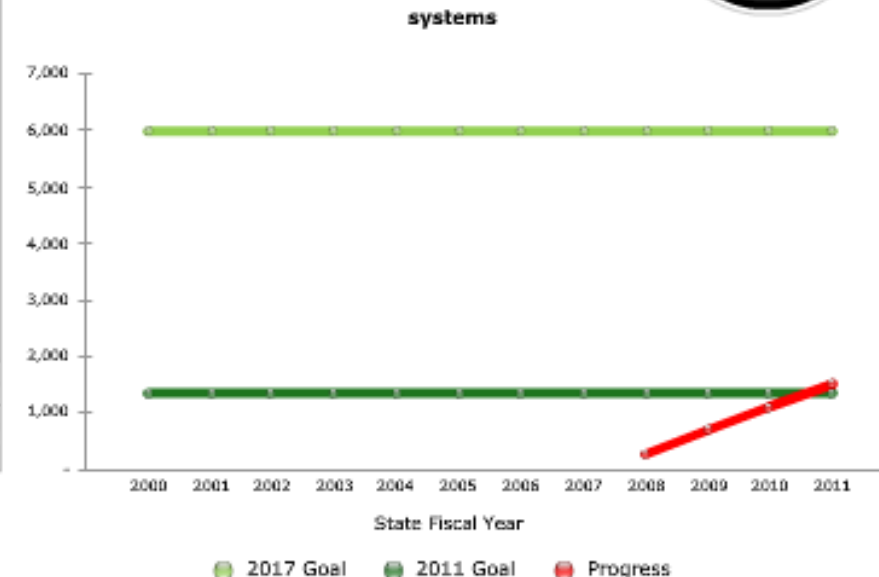
*Last Update: July 25, 2011*

**Septic Retrofits Inside of  
2-Year Milestone Progress  
(2009-2011)**

<b>Farms: Natural Filters</b>
<b>Reducing Pollution from Urban Areas</b>
Wastewater Treatment Plants ENR
Urban Nutrient Management Regulations
MD Healthy Air Act
Blue Plains BNR Upgrade
Stormwater Runoff Management Retrofits
<b>Septic Retrofits Inside of Critical Area</b>
Septic Retrofits Outside of Critical Area
Septic Hookups to WWTPs
<b>Restoring Natural Filters on Public Lands</b>
<b>Conserving High Priority Lands</b>

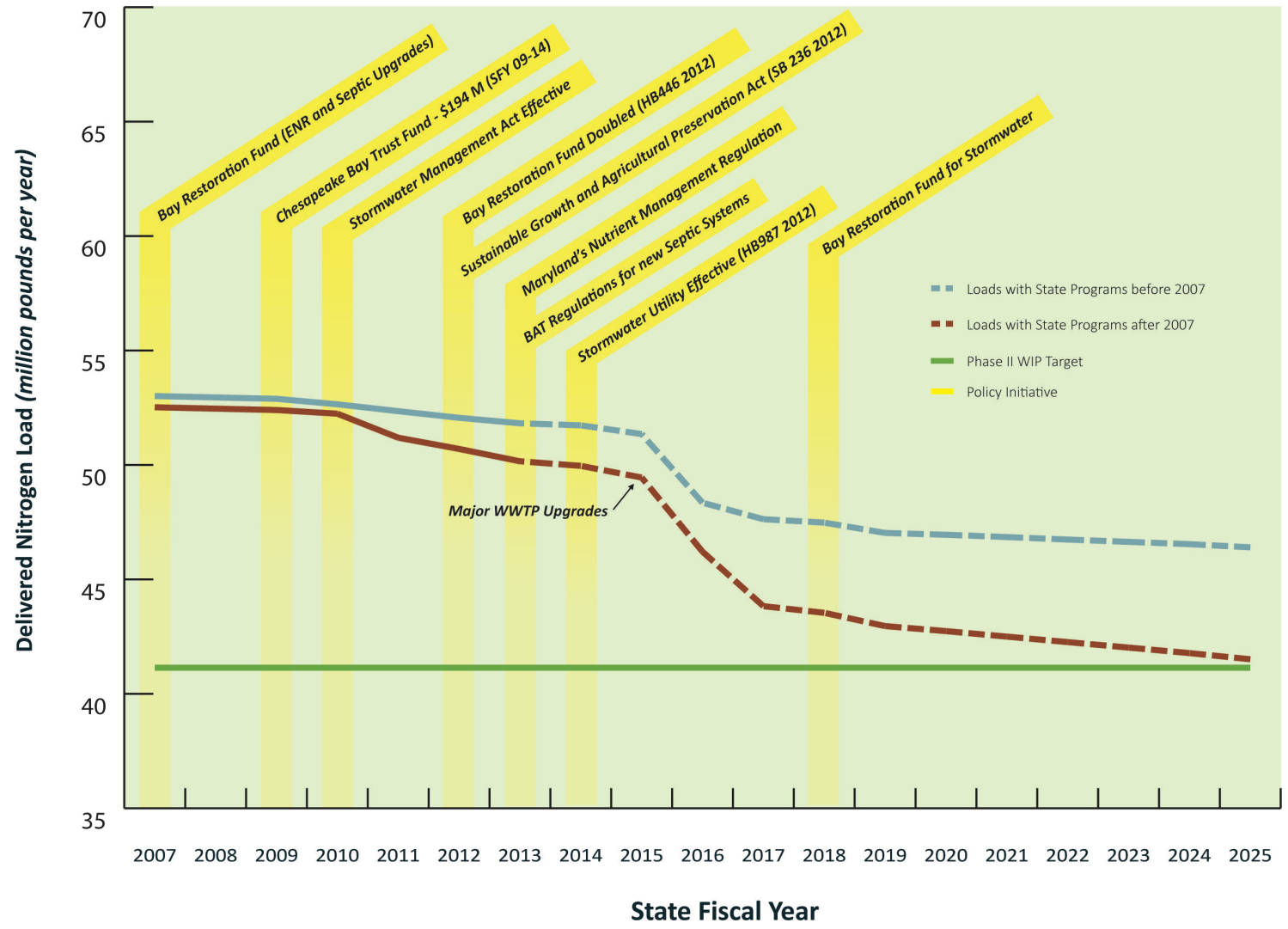
### Reducing Pollution from Urban Areas Septic Retrofits Inside of Critical Area

This technology reduces the discharge of nitrogen from septic systems to the environment thereby improving the quality of both ground and surface water.





# Progress since BayStat (2007)







# Conclusions

- BayStat has been effective tool in applying adaptive management principles through relentless follow-up
- Transparency of data has motivated greater action by the agencies and key stakeholders
- Establishment of 2 Year Milestones has made measuring progress a fundamental part of restoration efforts
- BayStat in combination with 2 Year Milestones has led to a series of new laws and policies accelerating restoration

**BAY  
STAT**  
CHESAPEAKE

