Tracking, accountability, transparency, and innovation of best management practices in Chesapeake Bay

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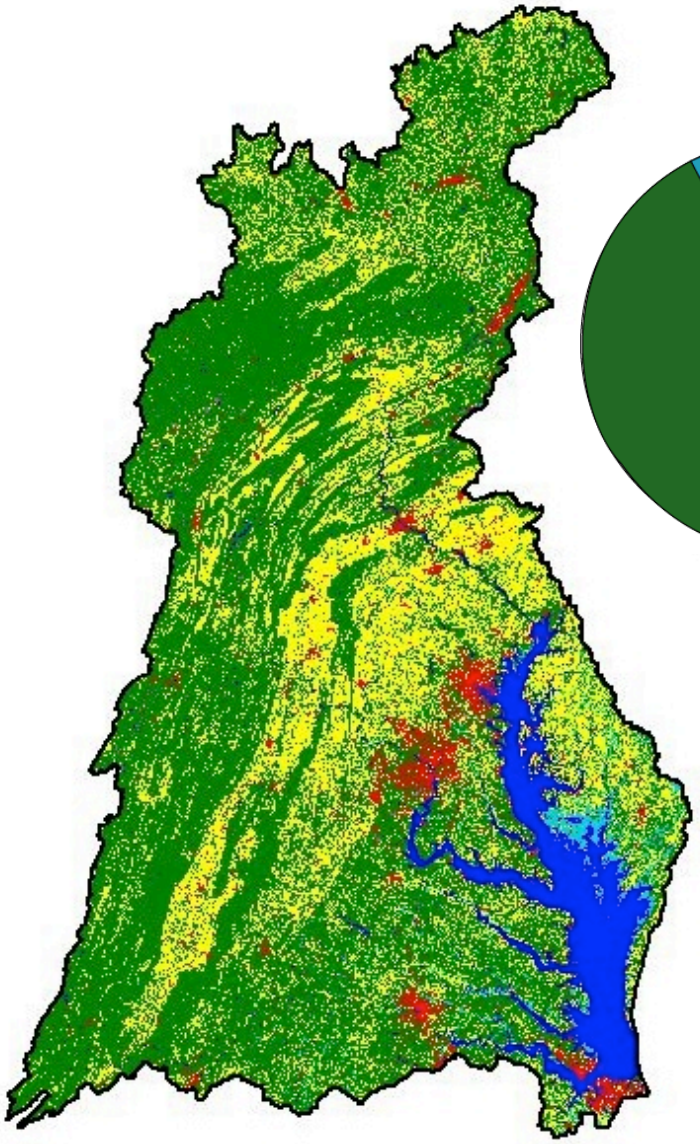
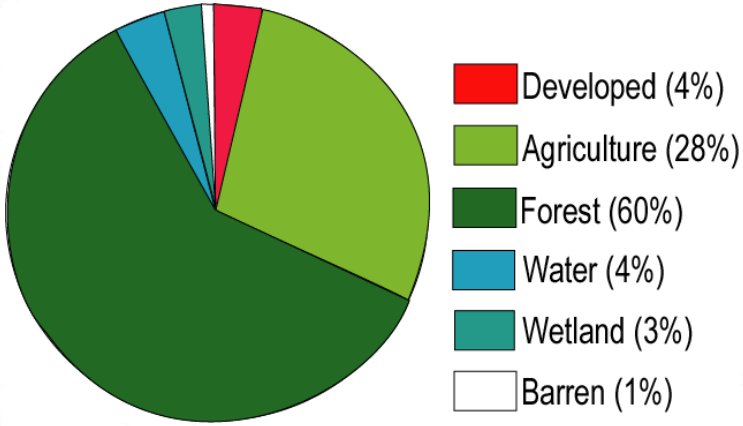
A Shallow Bay with a Large Watershed

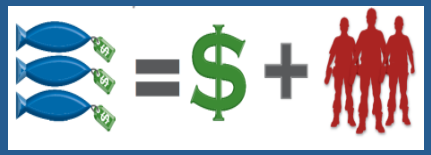




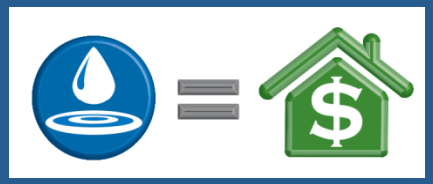
Watershed: 166,000 km^2
Ave Depth: 6 m
Max Depth: 50 m
Population: 16 million

The Chesapeake Bay is the Economic Engine of the Region

INVESTMENT: **$1 of water and sewer infrastructure investment increases private output (Gross Domestic Product) in the long term by $6.35.**



FISHERIES: **Commercial seafood industry in Maryland and Virginia contributed $3.39 billion in sales, $890 million in income, and almost 34,000 jobs to the local economy. (2009 Fisheries Economics of the U.S. report)**

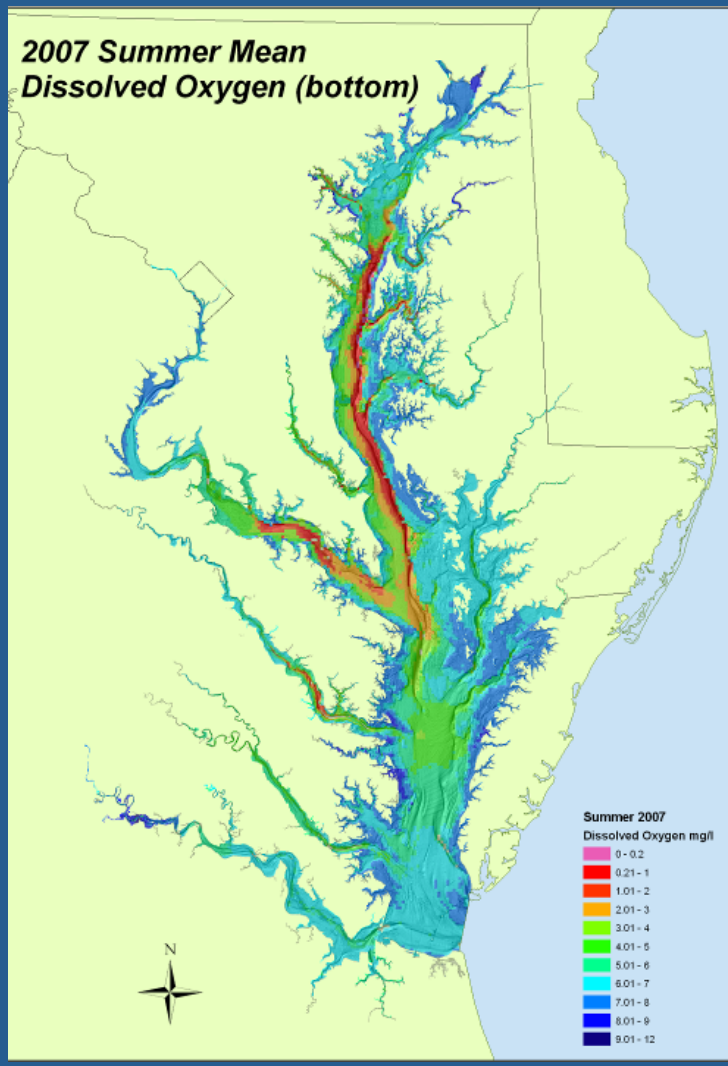


PROPERTY VALUES: **An EPA study indicated that clean water can increase the value of single family homes up to 4,000 feet from the shoreline by up to 25 percent.**

Source: Chesapeake Bay Foundation, 2012 "The Economic Argument for Cleaning Up the Chesapeake Bay and its Rivers

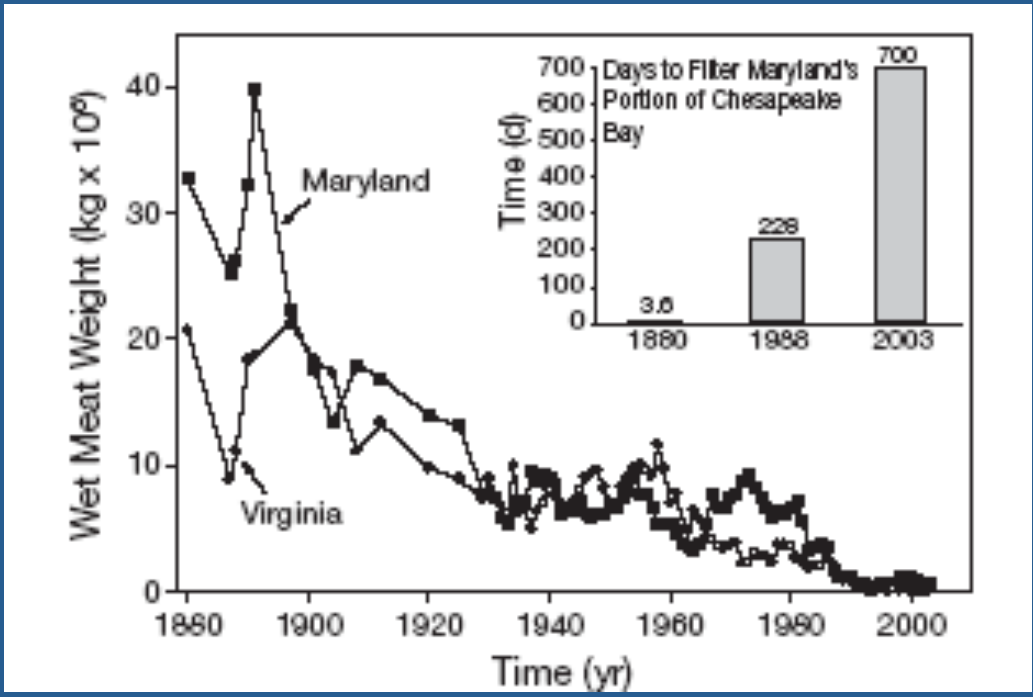
Chesapeake Bay Challenges

- water quality impaired by pollution
  - Extensive low to no summer dissolved oxygen conditions
- historic overfishing
- population growth
- poor land use management
- loss of habitat
- invasive species
- climate change and sea level rise



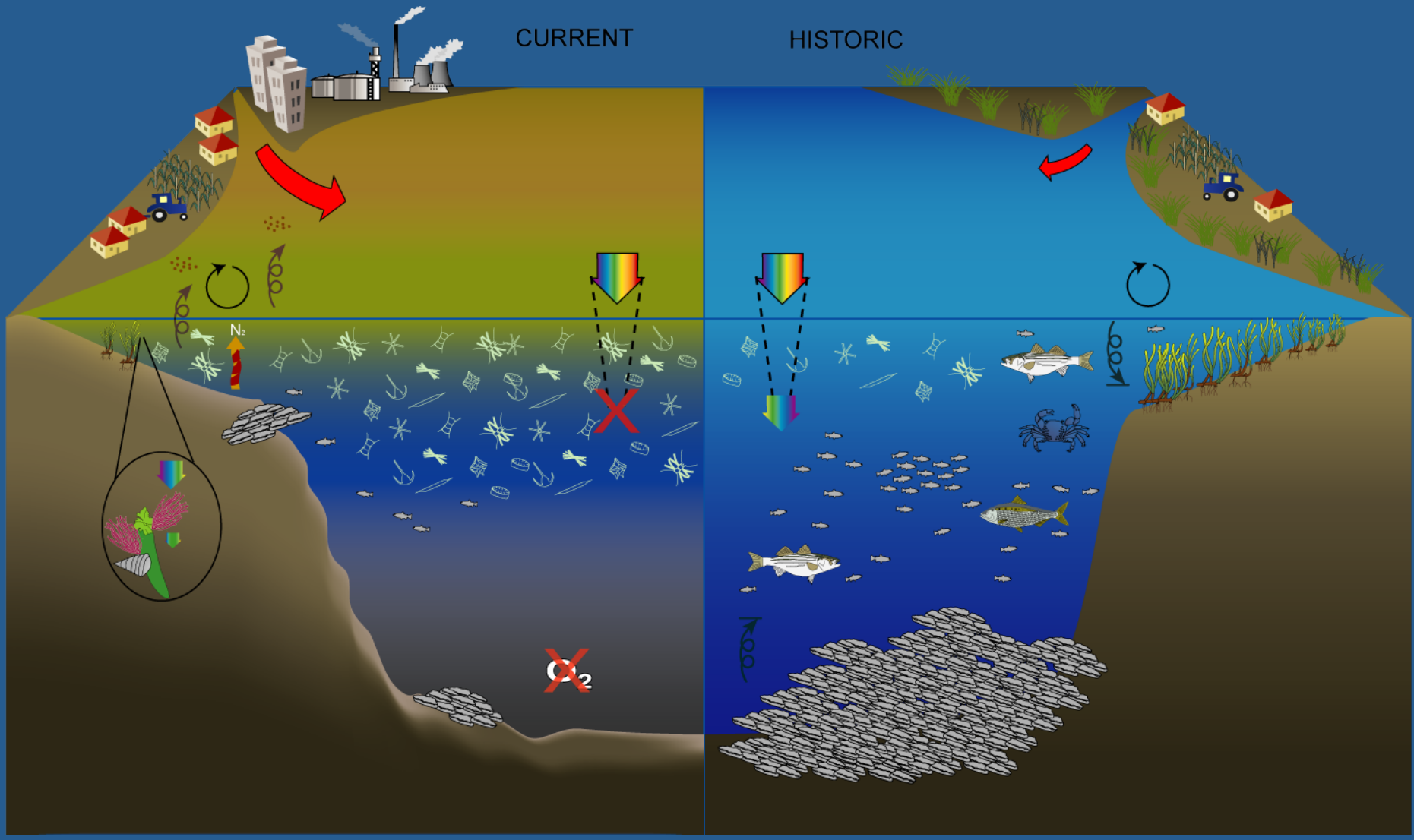
Key Habitats Declined

- Oysters are at 0.3% of historic populations
  - Decline caused by overfishing and disease
  - Oyster reefs are important
  - Economic potential
  - filtration of water
  - Only natural hard substrate
  - Increase biodiversity
  - Sanctuaries and targeted restoration programs
  - Stable (but small) population is increasing

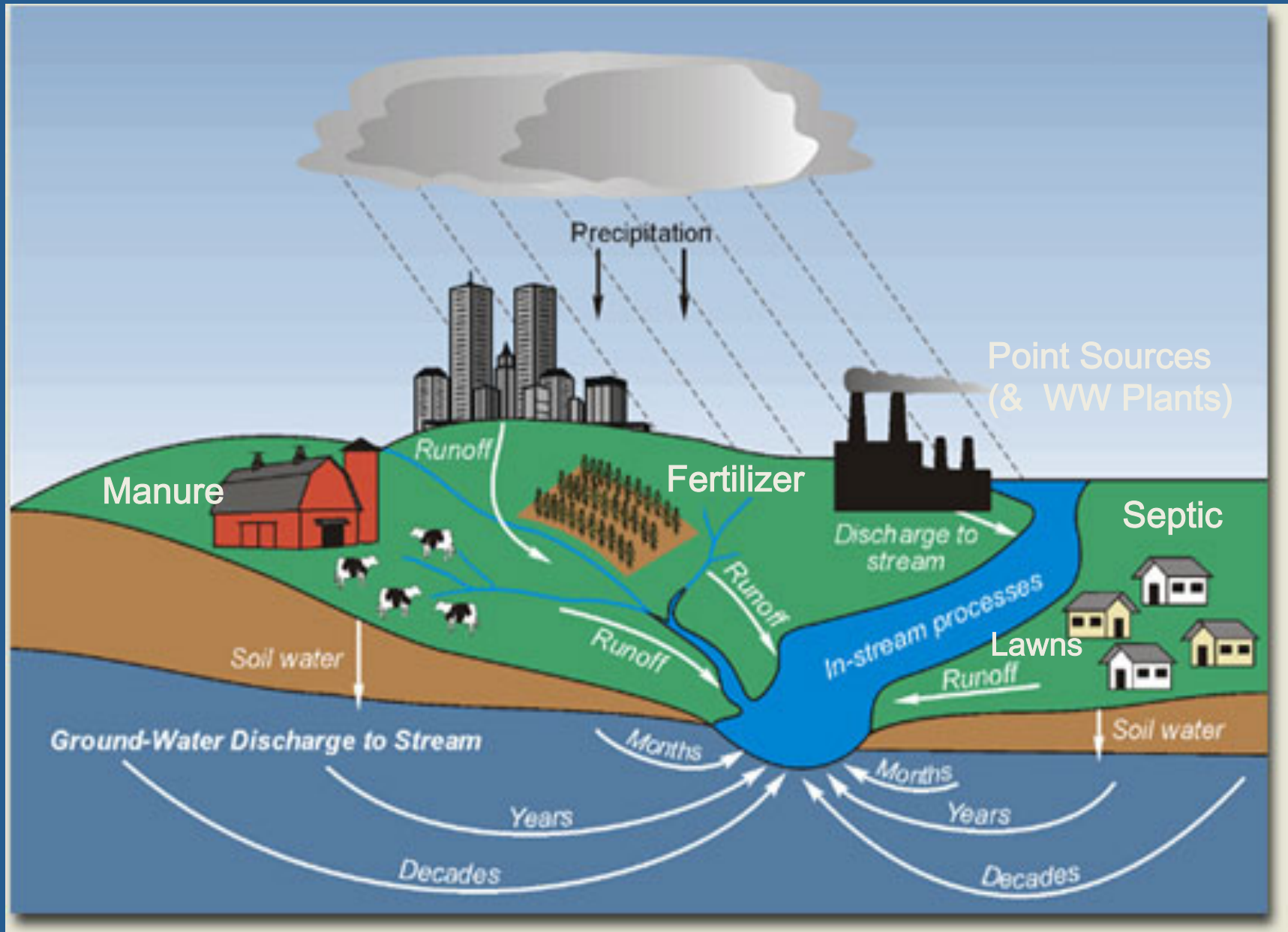


Big Challenge: Nutrient Over-enrichment

Causes fundamental, pervasive alteration of the ecosystem



Nutrients come from all sectors



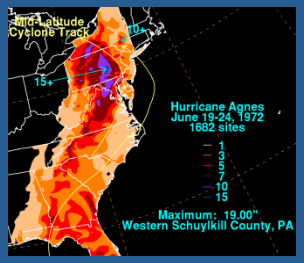
Chesapeake Bay Management: 25 Years

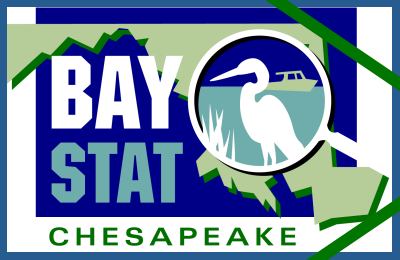
Ches Bay Agreement: 1987-2000

- Reduce nutrients by 40% from all controllable sources by 2000
- Focus on *modeling* and monitoring

Accountability Phase: 2003-2008

- Focus on *monitoring* and modeling
- Cost and nutrient reduction effectiveness assessments





Governments Work Together: 1983 -1987

- Md, Pa, Va, DC, and USEPA
- Recognize degradation of Bay after Tropical Storm Agnes (1972)

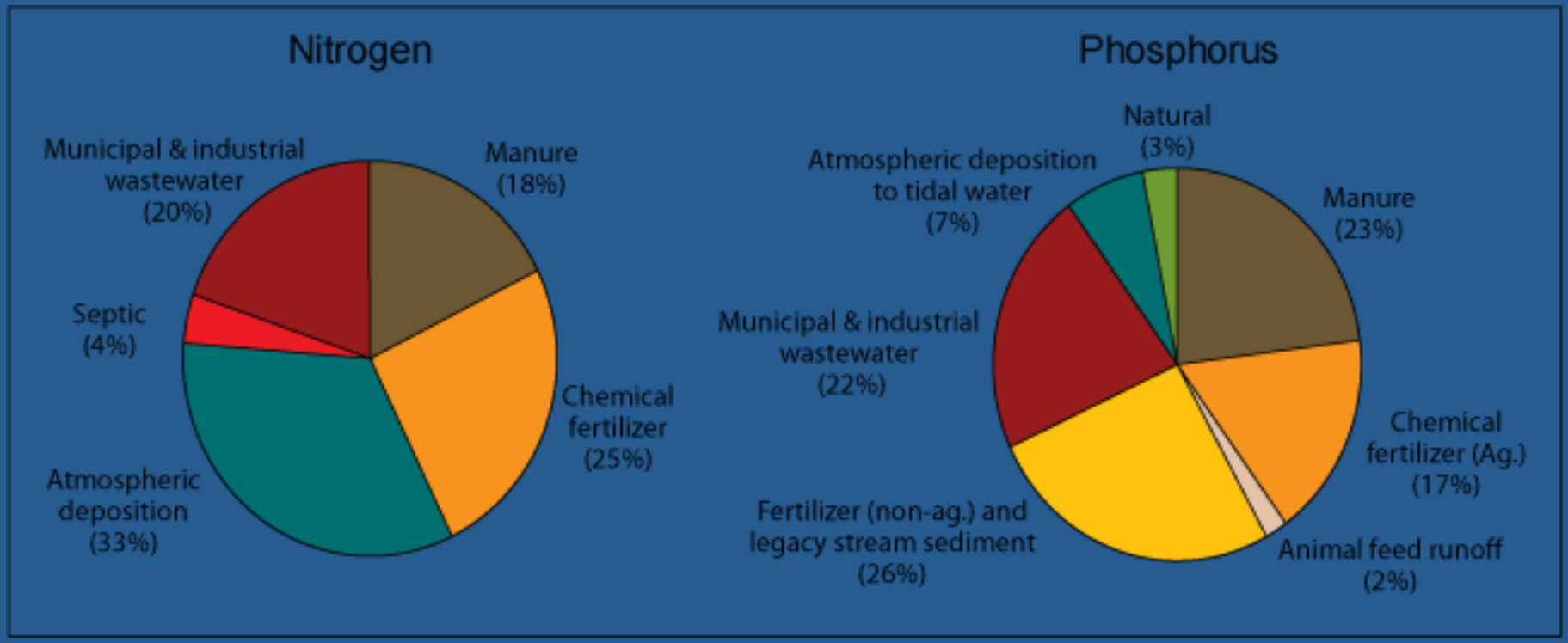
Chesapeake 2000:

- 1987 nutrient goals remain unmet
- Begin Enforcement of TMDL in 2010
- Establish over 100 new goals – many unrelated to nutrients

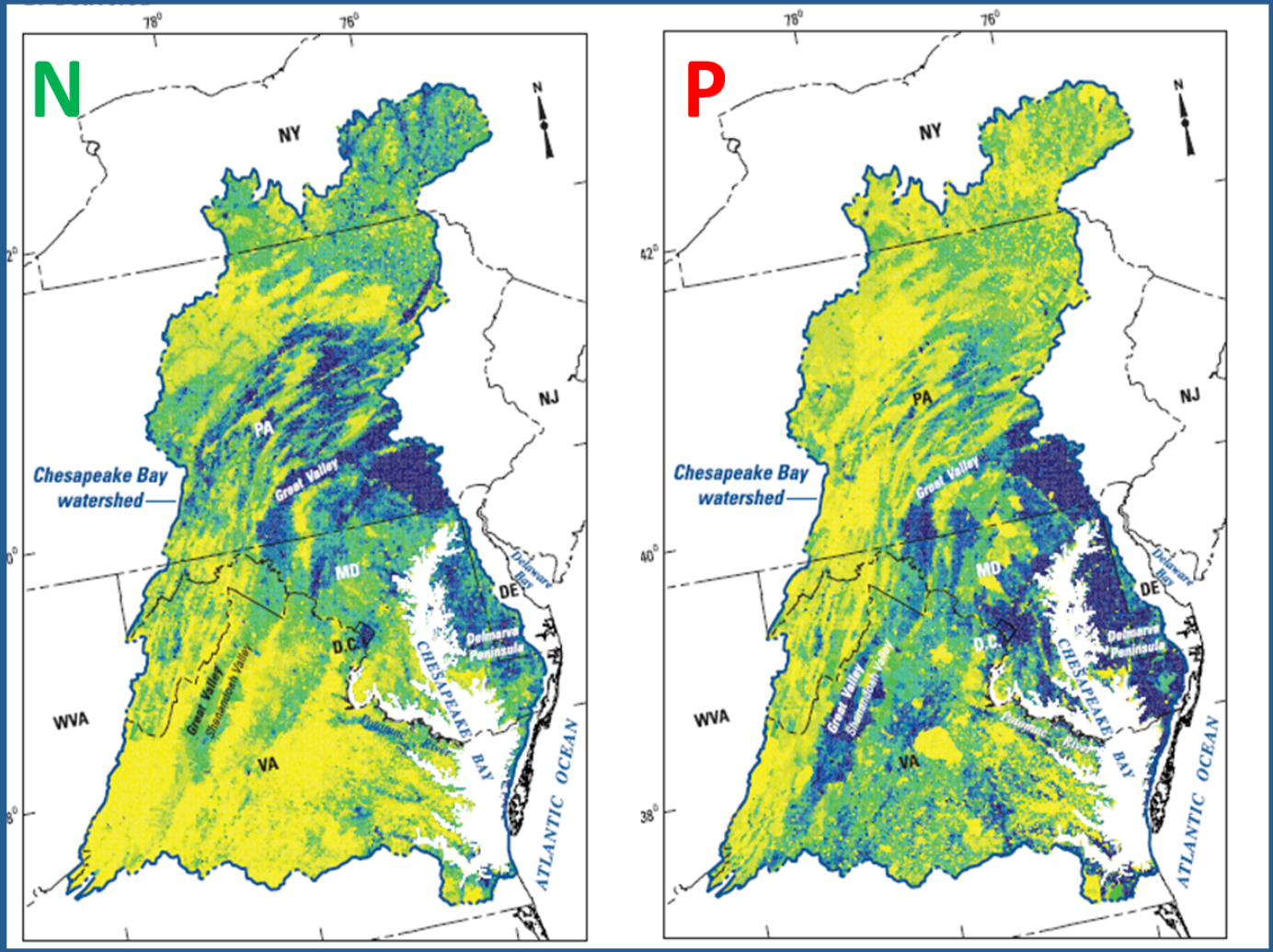
Adaptive Management 2009 - Future

- 2 Year Goals to hold politicians accountable
- Enforce TMDL beginning in 2011
- Target problem areas & focus on Bay response

Sources of N and P to the Bay are Diverse



Geography Matters
Delivered loads of Nitrogen and Phosphorous

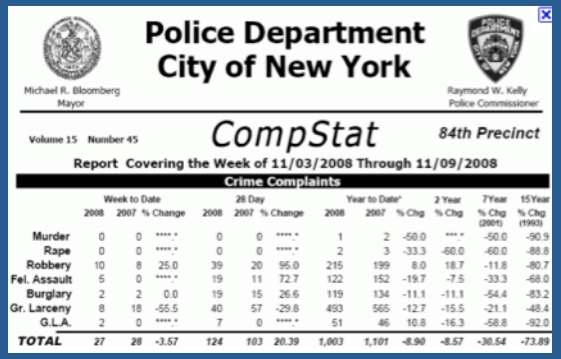


Based on the SPARROW model, U.S. Geological Survey . 2011. Scientific Investigations Report 2011-5167.

Applying Adaptive Management Principles

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

Volume 15 Number 45

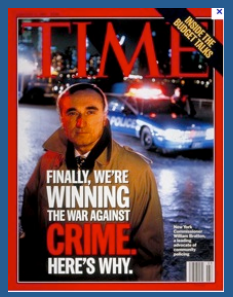
CompStat

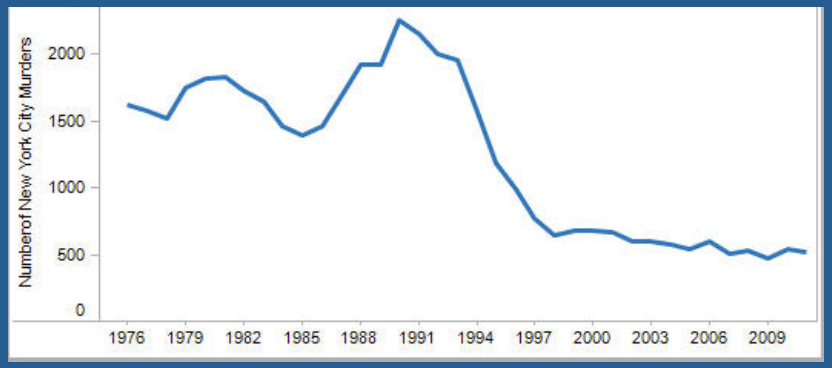
84th Precinct

Report Covering the Week of 11/03/2008 Through 11/09/2008

Crime Complaints

	Week to Date			28 Day			Year to Date*			2 Year	7Year	15Year
	2008	2007	% Change	2008	2007	% Change	2008	2007	% Chg	% Chg	% Chg (2001)	% Chg (1993)
Murder	0	0	**** *	0	0	**** *	1	2	-50.0	**** *	-50.0	-90.9
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	-68.0
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
TOTAL	27	28	-3.57	124	103	20.39	1,003	1,101	-8.90	-8.57	-30.54	-73.89





BayStat: 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

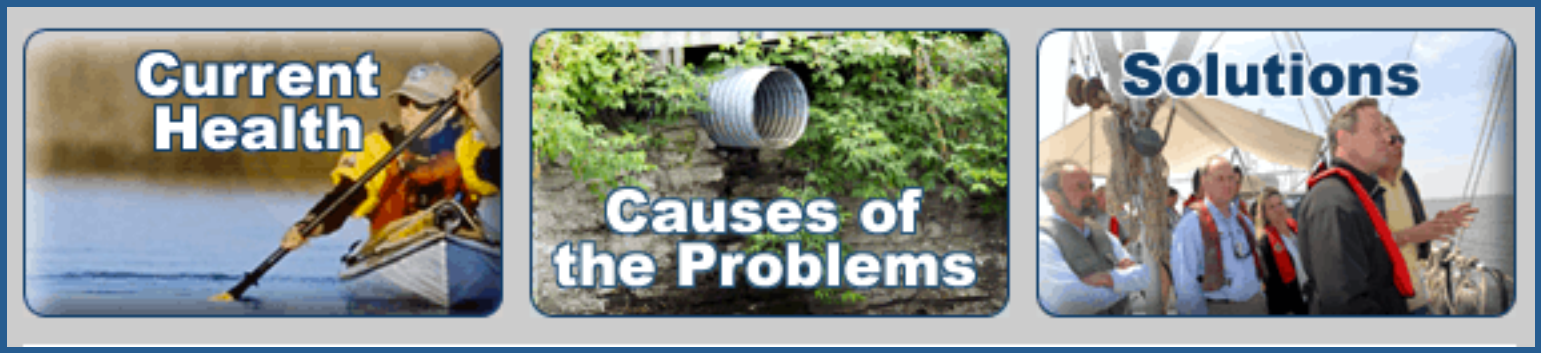
Developed to track progress in Chesapeake Bay restoration

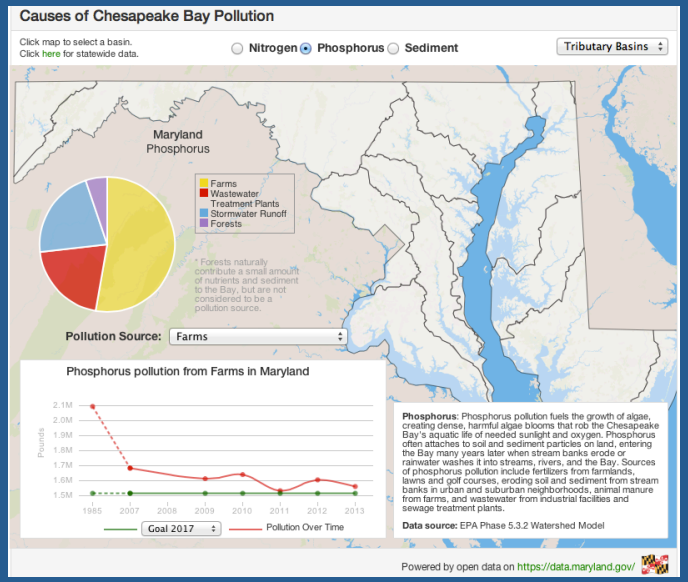
- Socratic method of questioning senior government officials
- Monthly meetings
- Few presentations
- Few participants

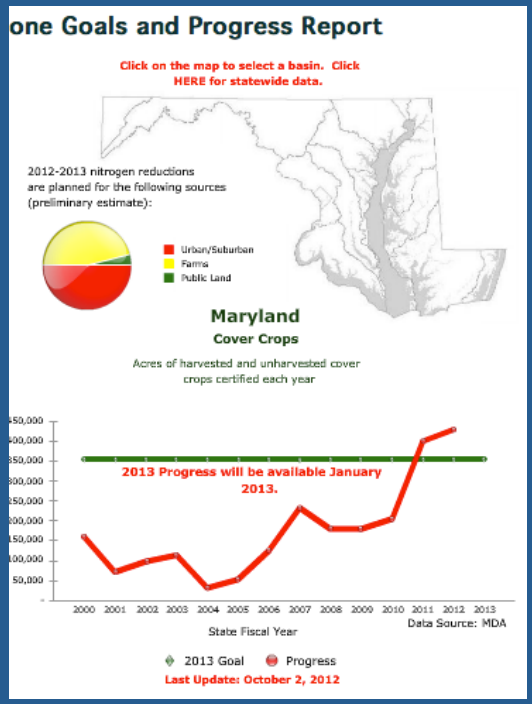
2 Year Milestones

- 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

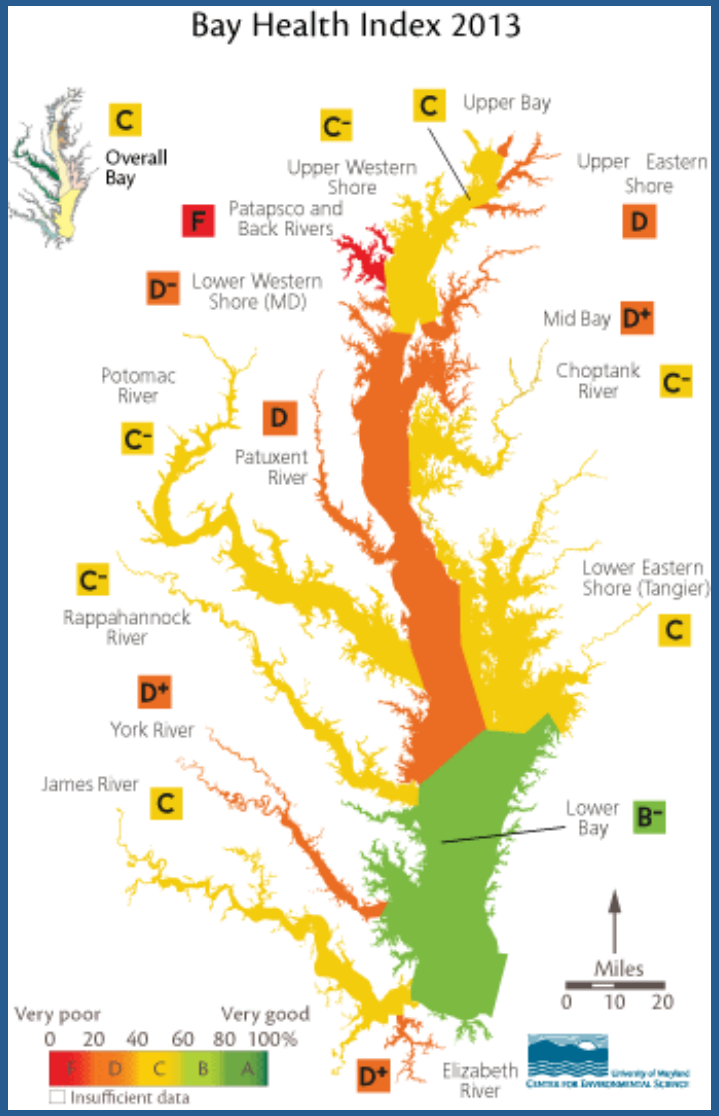
BayStat tracks health, pressures, and solutions







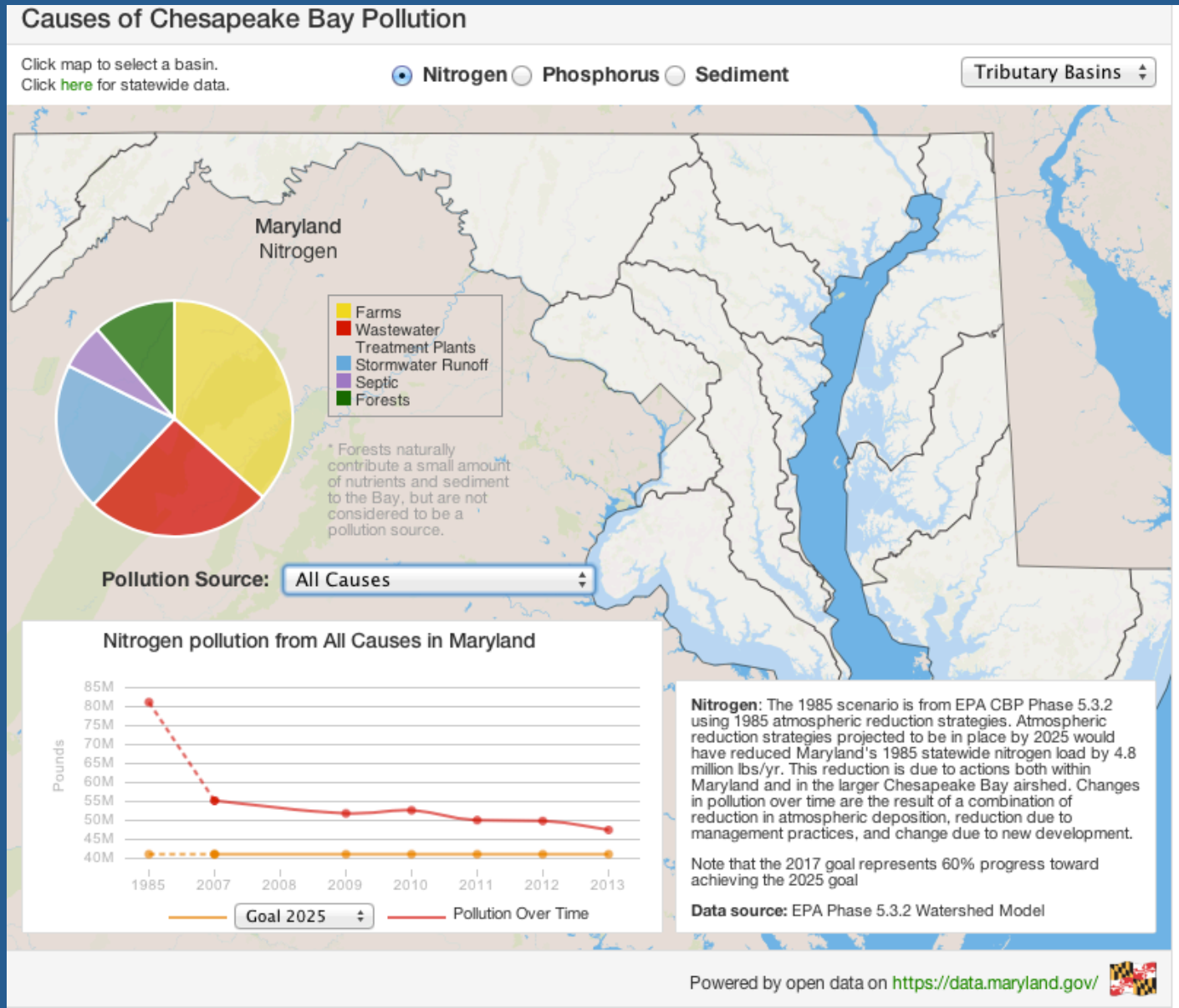
Current Health



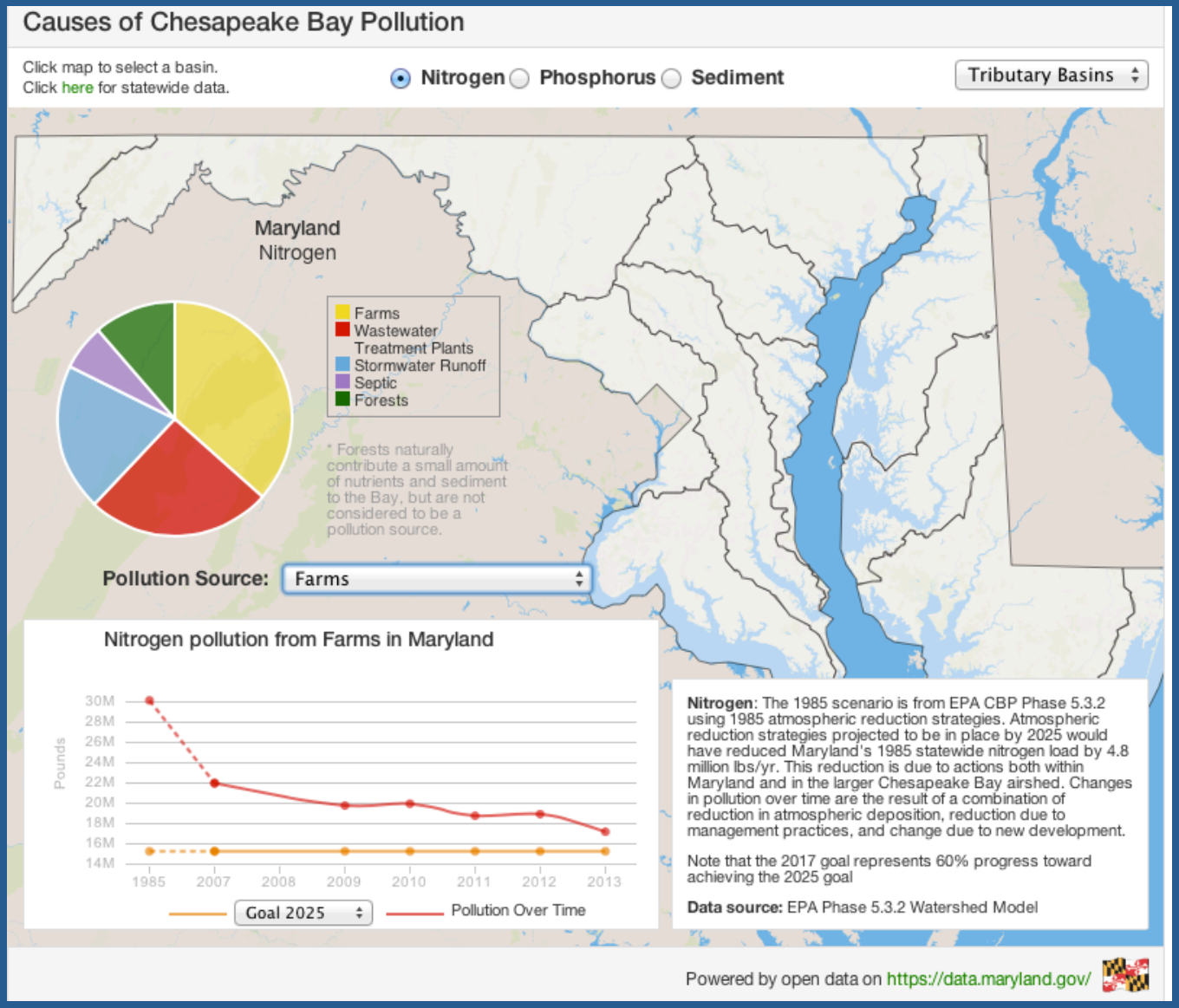
- UMCES bases the Bay Health Index on 7 indicators
- These indicators include:
  - Water Clarity
  - Dissolved Oxygen
  - Nitrogen Concentrations
  - Phosphorus Concentrations
  - Aquatic Grasses
  - Phytoplankton Community
  - Chlorophyll *a*

CAUSES

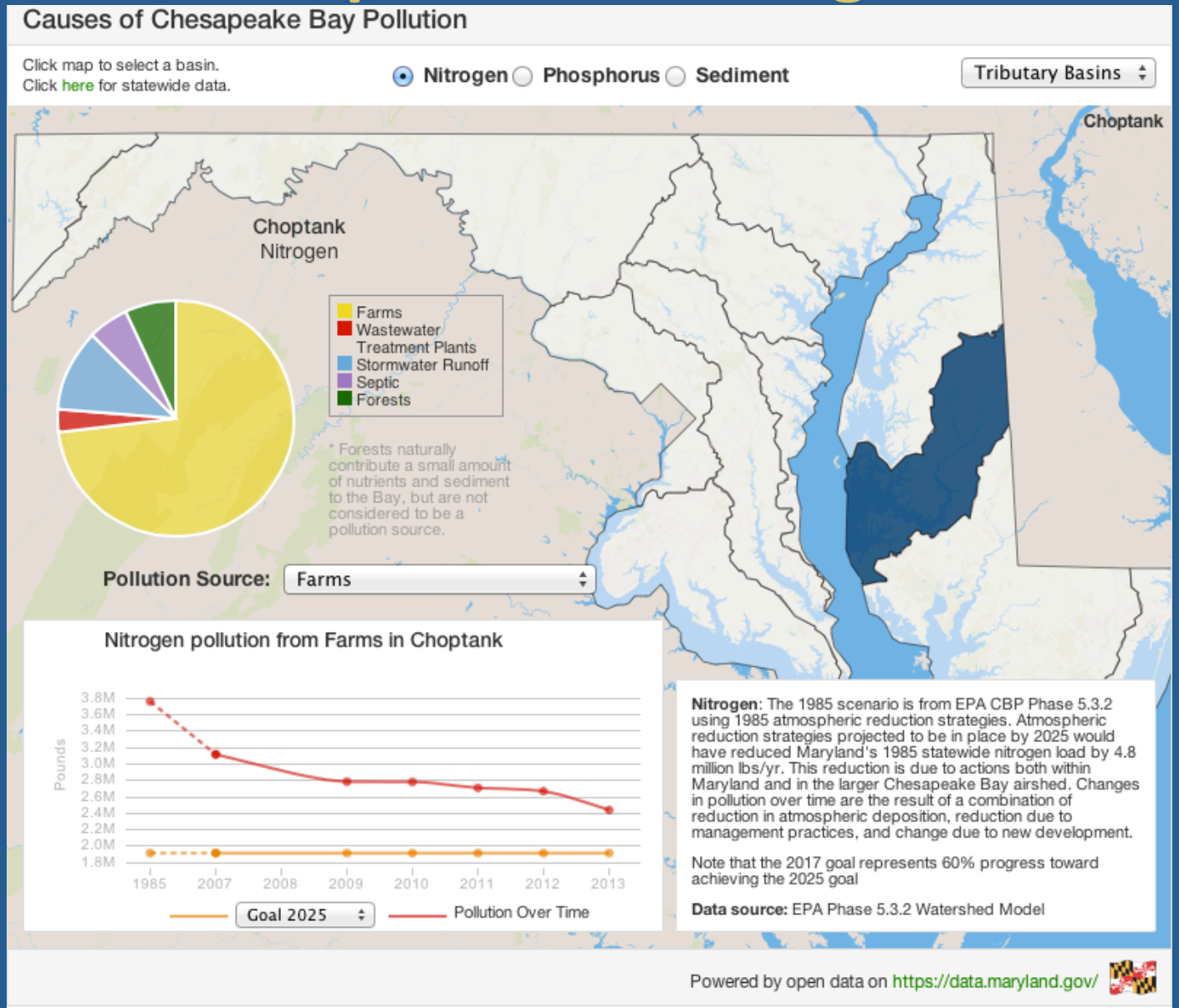
Causes of the Problems
N – All Sectors



Causes of the Problems
Example – Farms Statewide



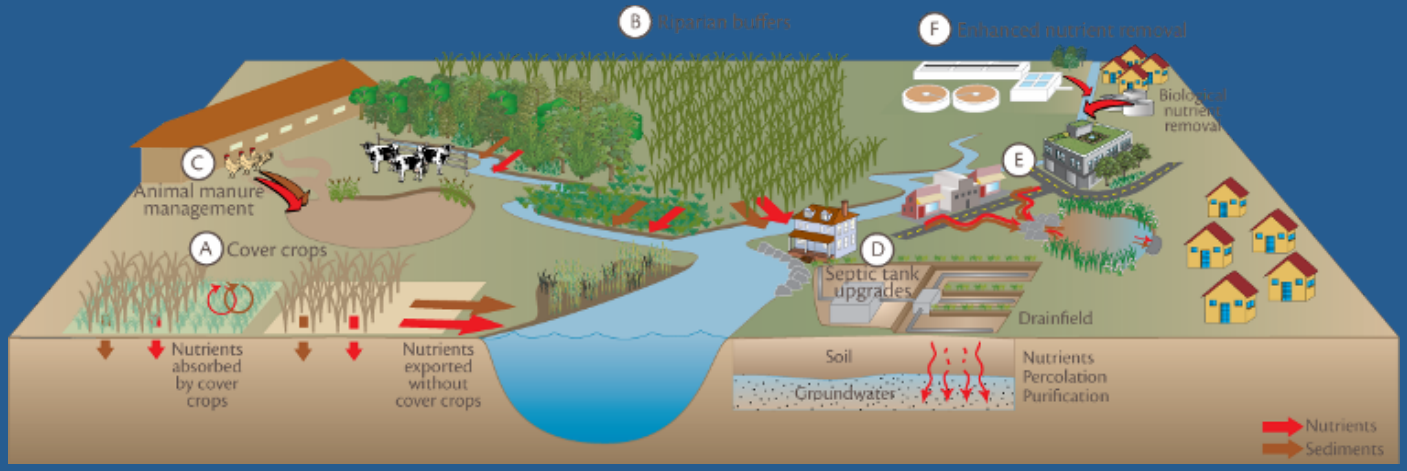
Causes of the Problems
Example – Farms Region



SOLUTIONS

Solutions must also be diverse

- Critical Areas Law (1984) – protection of shorelines (revised in 2008)
- Phosphate Laundry Detergent Ban (1988) – reduced phosphorous loads
- Water Quality Improvement Act (1998)– nutrient management on farms
- Bay Restoration Fund (2005) – primarily for waste water treatment plant upgrades, also funds cover crops and septic upgrades
- Water Resources Element of Comprehensive Plans (2006) - ensure water and sewer capacity available for growth
- Chesapeake Bay 2010 Trust Fund (2008) – reduce non-point sources of pollution



Solution – 2 Year Milestone

Maryland's 2014 - 2015 Milestone Goals and Progress Report

Maryland can only restore the health of the Bay by implementing proven solutions called **Best Management Practices** (BMPs) on the most lands.

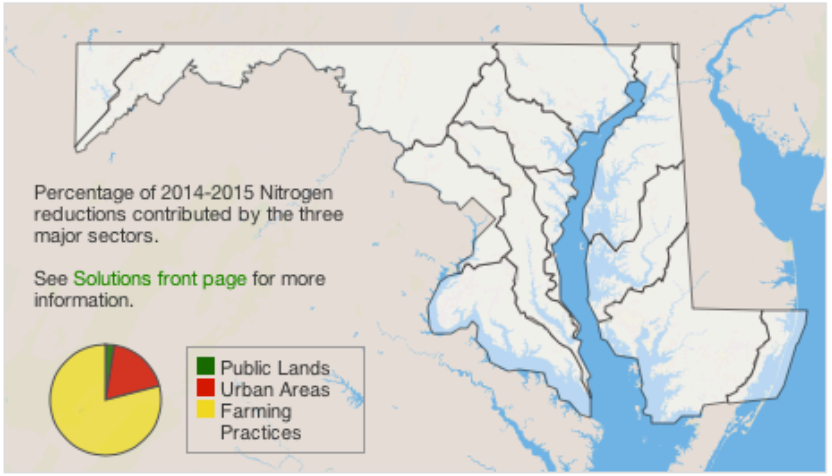
Click map to select a basin.
Click here for statewide data.

Implement Best Farming Practices

- **Cover Crops**
- Soil Conservation & Water Quality Plans
- Stream Protection
- Manure Management Structures
- Natural Filters on Private Land

Reducing Pollution From Urban Areas

Public Land Restoration and Conservation



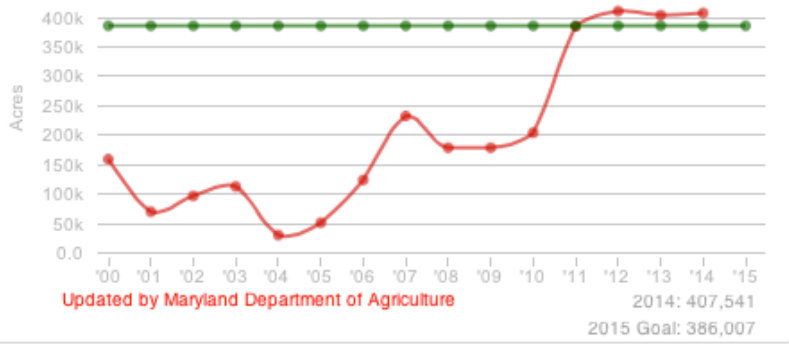
Definition

Cover crops are small grains such as wheat or rye that are planted in the fall after the harvest of coum, soybeans and other summer crops to absorb unused fertilizers that may have remained in the soil.

More Information

Cover Crops: Maryland

Acres of harvested and unharvested cover crops certified each year in Bay watershed.



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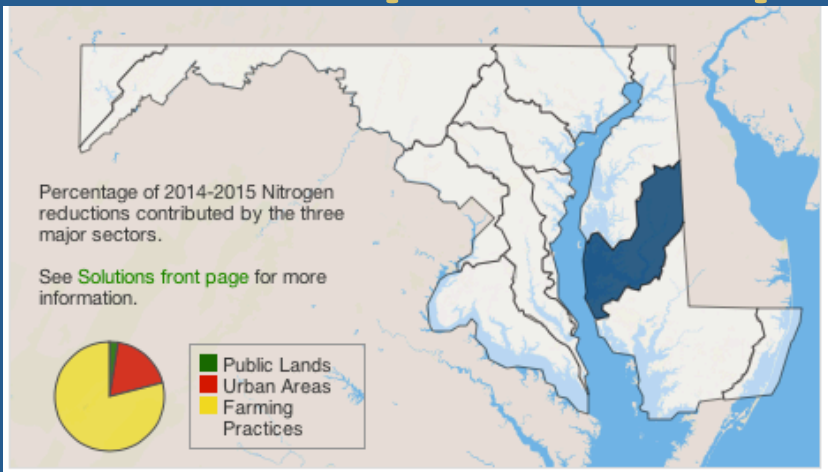
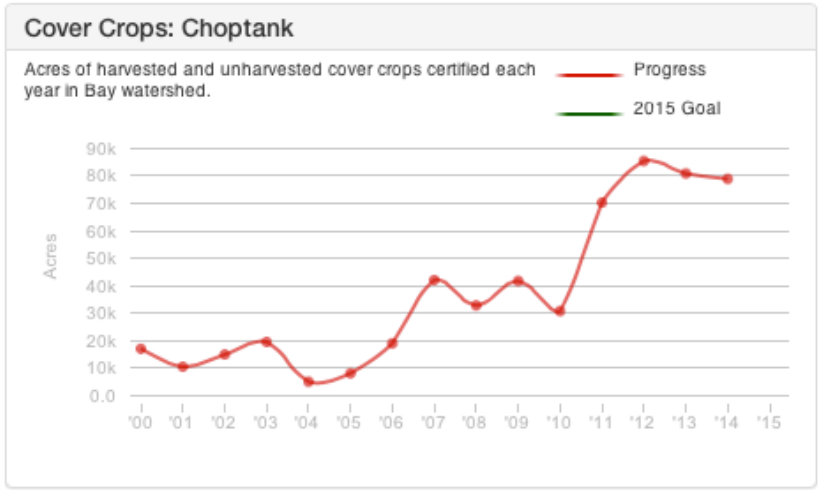
Solution – 2 Year Milestone Example – Choptank Cover Crops and





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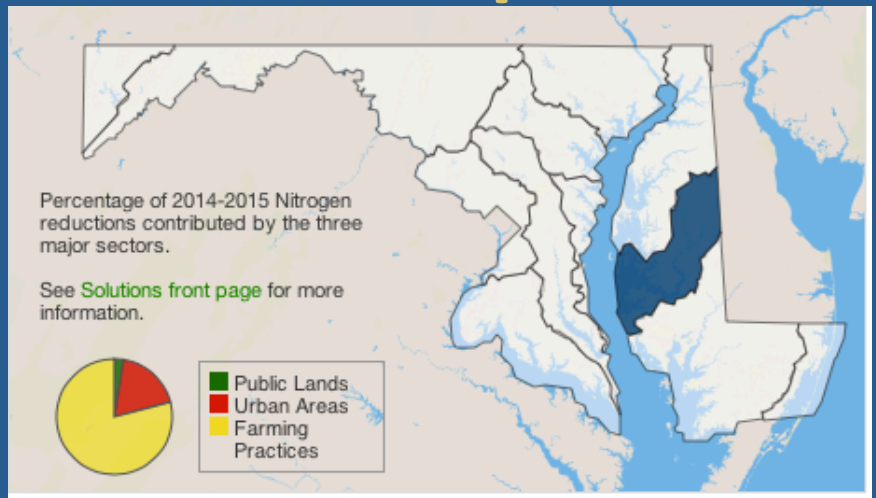

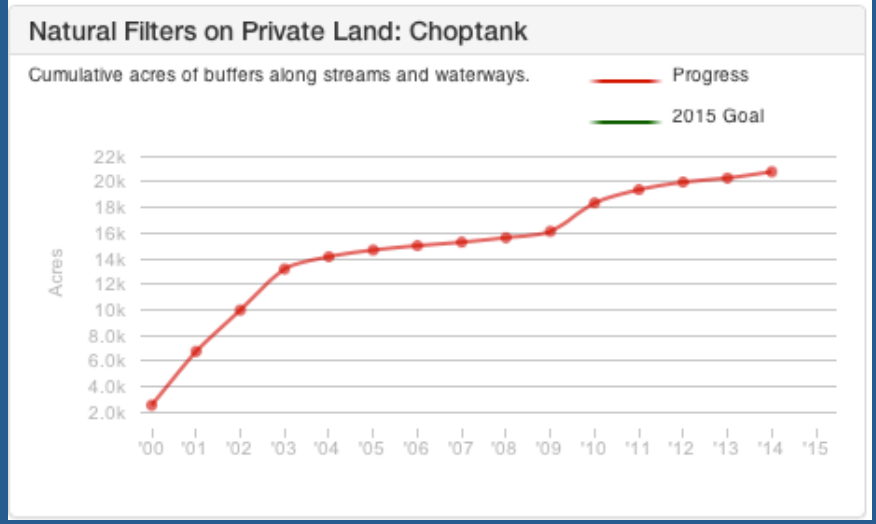

Conclusions

- 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 are 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

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