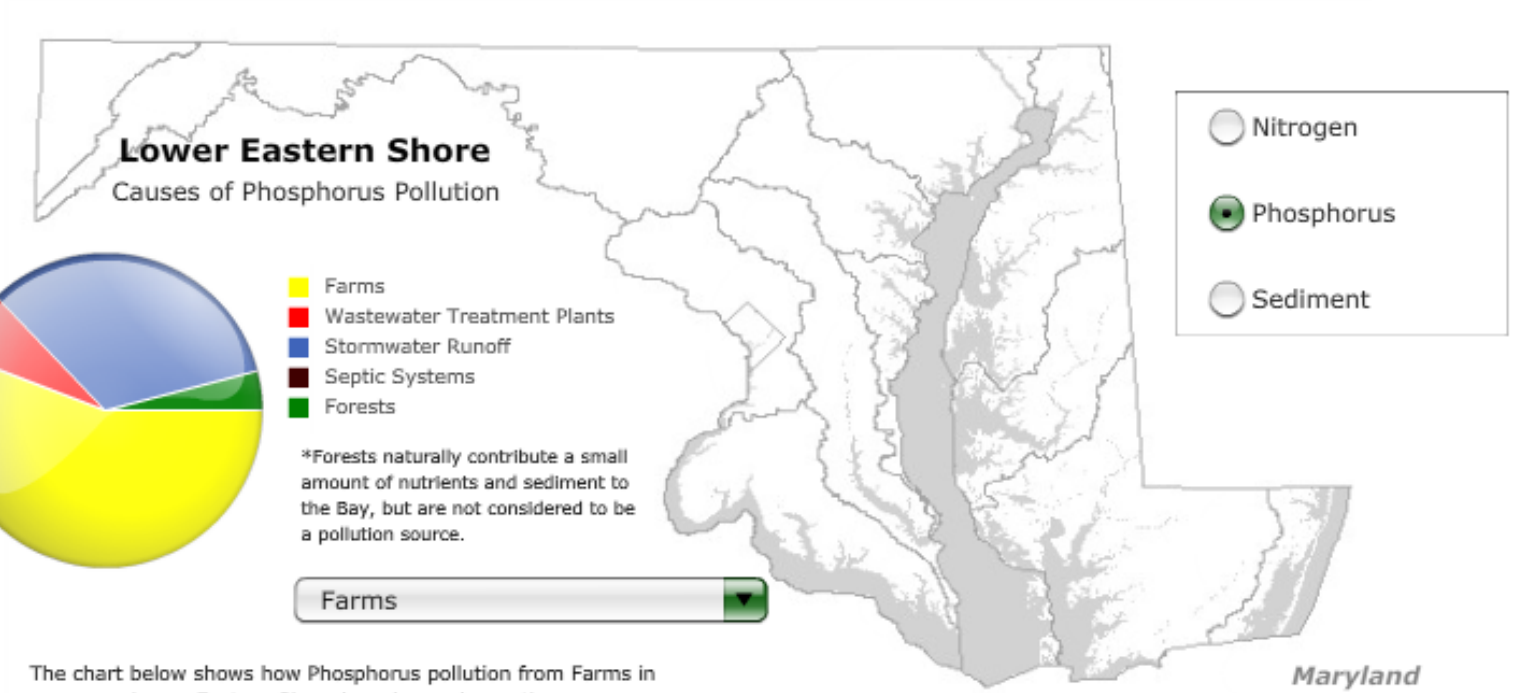
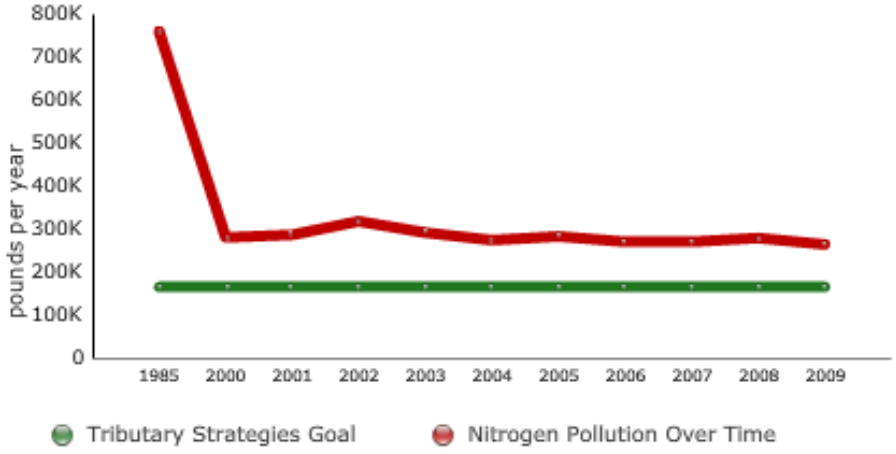
Causes of the Problems



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

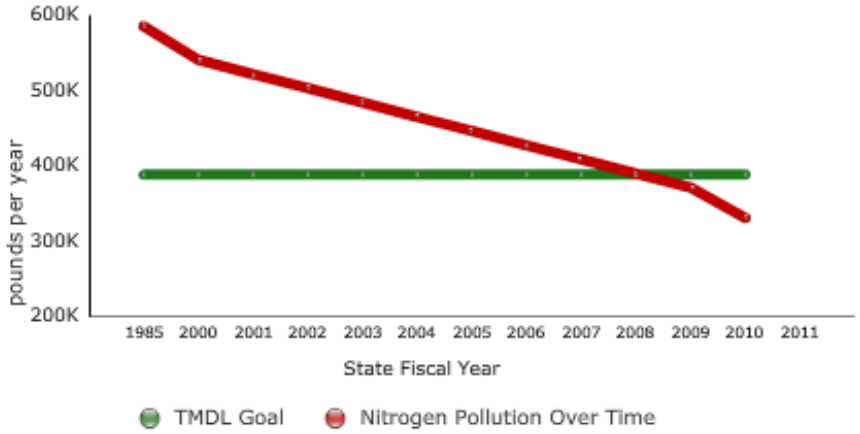


Phosphorus pollution fuels the growth of algae, creating dense, harmful algae blooms that rob the Chesapeake Bay's aquatic life of needed sunlight and oxygen. Phosphorus often attaches to soil and sediment particles on land, entering the Bay many years later when stream banks erode or rainwater washes it into streams, rivers and the Bay. Sources of phosphorus pollution include fertilizers from farmlands, lawns and golf courses; eroding soil & sediment from stream banks in urban and suburban neighborhoods; animal manure from farms; and wastewater from industrial facilities and sewage treatment plants.

The MD Baystat website shows large P reductions in all three Eastern Shore tribs for 1985-2000, especially the lower Eastern Shore. The narrative for what actions generated these reductions is largely absent.

Causes of the Problems

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



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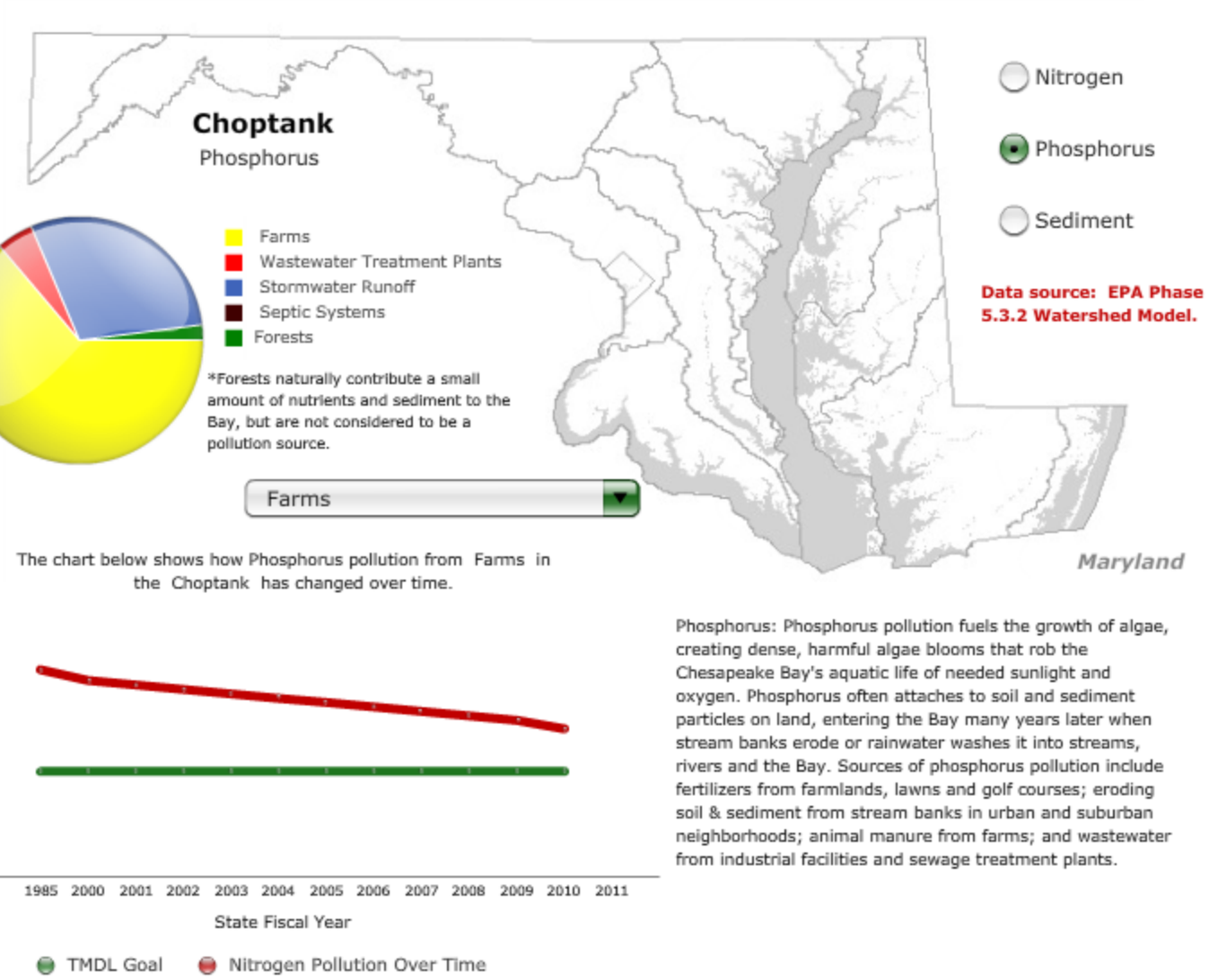
Causes of the Problems



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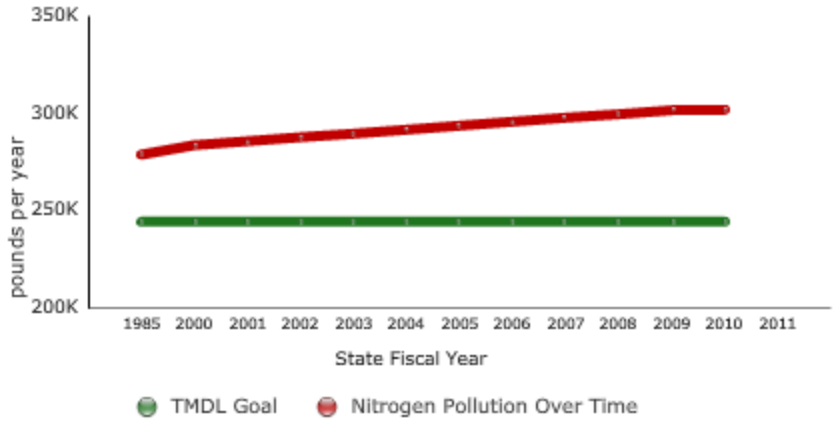
Causes of the Problems

The chart below shows how Phosphorus pollution from Farms in the Upper Eastern Shore has changed over time.



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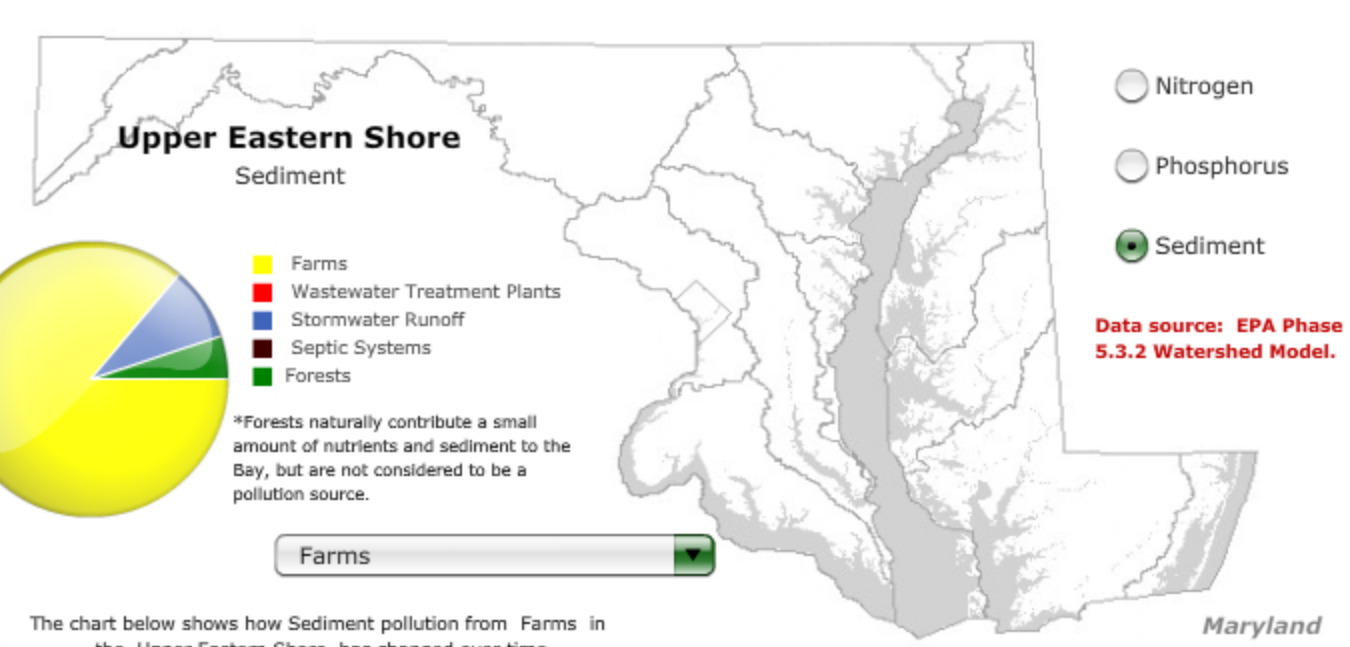
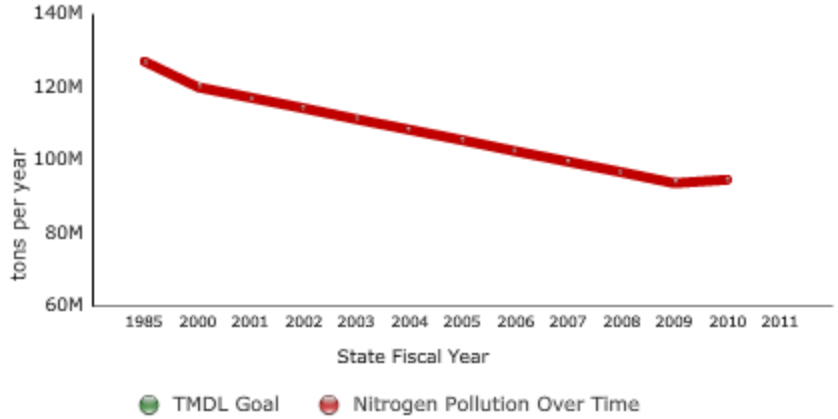
Causes of the Problems



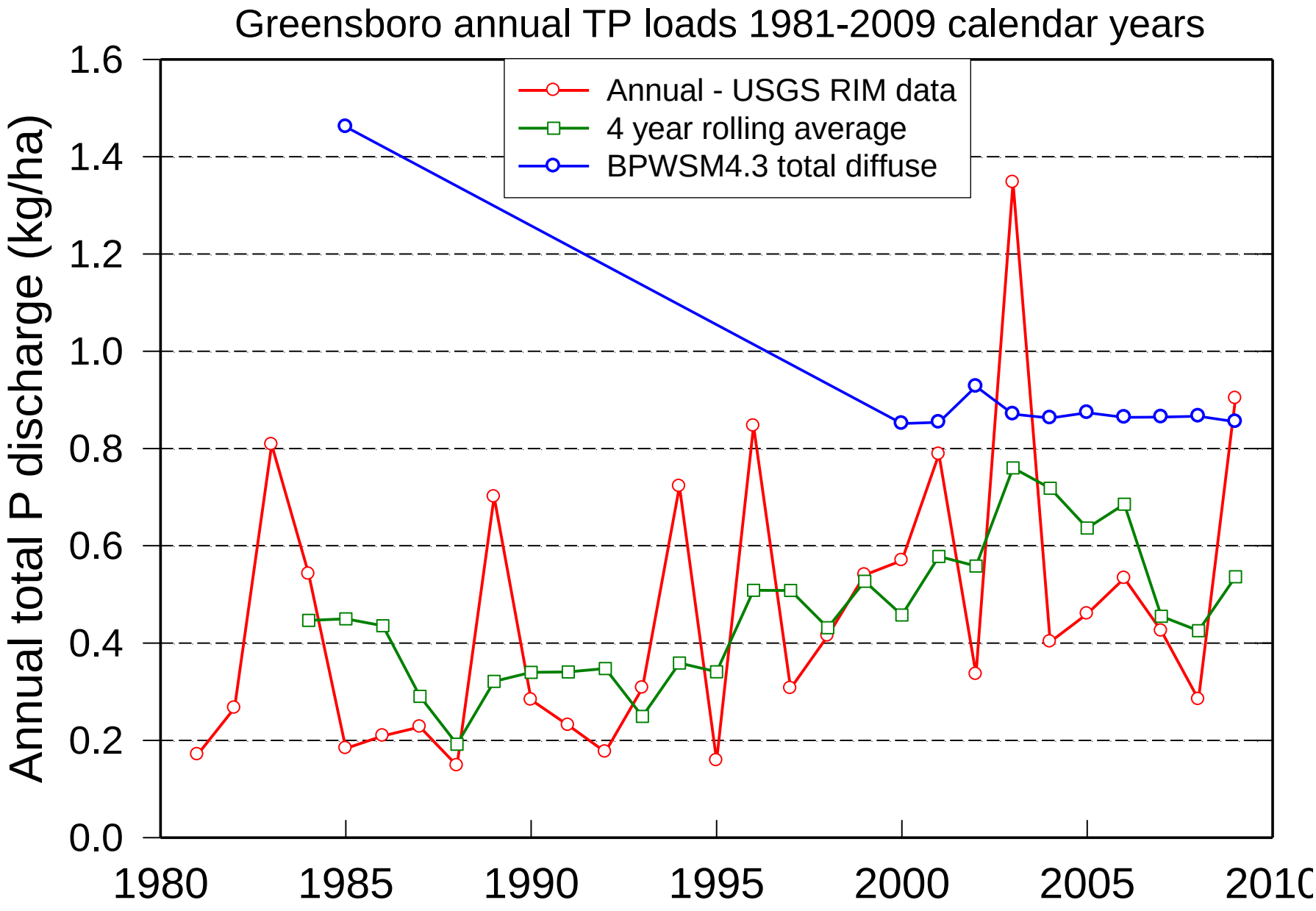
The chart below shows how Sediment pollution from Farms in the Upper Eastern Shore has changed over time.



Sediment: Maryland did not establish TMDL caps for sediments. Excess sediments -- dirt, clay, silt and sand – hurt the Bay's water quality by blocking the sunlight needed by underwater plants and grasses. Without enough sunlight, these underwater grasses are not able to grow and provide habitat for young fish and blue crabs. In addition to blocking sunlight, sediment pollution can also carry nutrient and chemical contaminates into the bay, and smother oysters, underwater grasses and other bottom-dwelling creatures.

What about monitoring data?

Unfortunately the only long-term site on the Eastern Shore is at Greensboro on the upper Choptank. RIM load data expressed on a per acre basis don't suggest downward trends in TSS, P or N. WS 4.3 sediment loads for the Choptank seem high. LES??


Greensboro annual TP loads 1981-2009 calendar years
Annual total P discharge (kg/ha)
1.6
1.4
1.2
1.0
0.8
0.6
0.4
0.2
0.0
1980
1985
1990
1995
2000
2005
2010
Annual - USGS RIM data
4 year rolling average
BPWSM4.3 total diffuse

Discussions Regarding How P Reductions from Agriculture on the Eastern Shore of Maryland were Projected in the CBP Watershed Model for 1985-2000

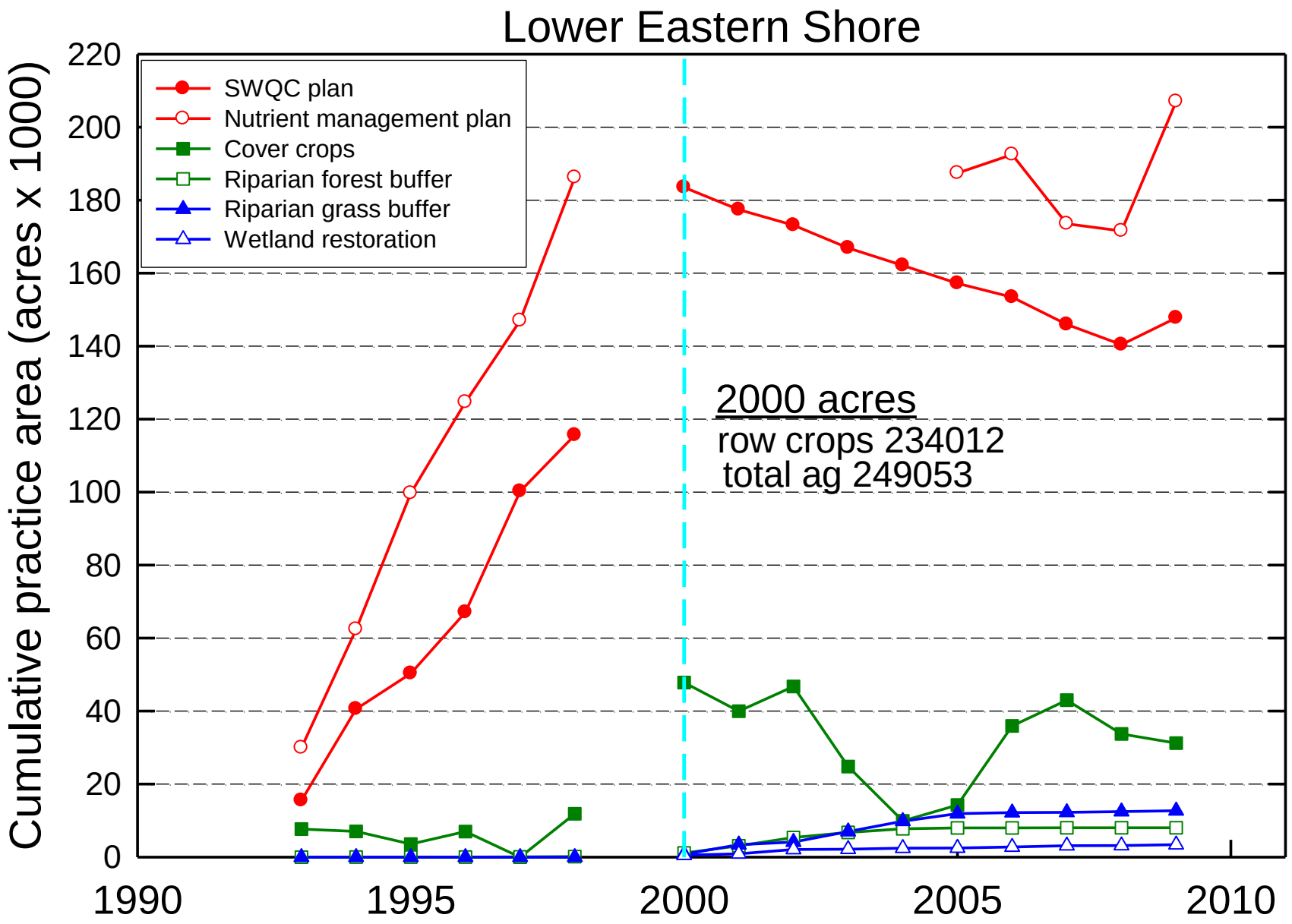
MD DNR

February 16, 2011

Follow-up June 2011

Ken Staver

University of Maryland
College of Agriculture and Natural Resources
Wye Research and Education Center
Queenstown, Maryland


Lower Eastern Shore
Cumulative practice area (acres x 1000)
220
200
180
160
140
120
100
80
60
40
20
0
1990
1995
2000
2005
2010
SWQC plan
Nutrient management plan
Cover crops
Riparian forest buffer
Riparian grass buffer
Wetland restoration
2000 acres
row crops 234012
total ag 249053

The primary question remains:

How were the effects of implementation of N-based NMP and Soil and Water Conservation Plans handled in the WSM to generate such large reductions in delivered P loads from ag on the LES from 1985-2000?

Scientific and Technical Advisory Committee

September 14, 2011

Nutrient Transport in Maryland Coastal Plain Watersheds: What We Know and What Next

Ken Staver

University of Maryland
College of Agriculture and Natural Resources
Wye Research and Education Center
Queenstown, Maryland

Objective 1

To gain an in-depth understanding of how the CBP watershed model currently simulates phosphorus loads from cropland and whether the current simulation approach is consistent with the latest scientific consensus regarding phosphorus transport mechanisms.

Objective 2

To make recommendations regarding how the CBP modeling approach should b restructured to more accurately reflect the latest research findings regarding phosphorus transport processes and what data inputs will be needed to support calibration and verification of a restructured modeling approach.

Richard Feynman - 1986

"For a successful technology, reality must take precedence over pubic relations, for nature cannot be fooled."

"Therefore, things must be learned only to be unlearned again or, more likely, to be corrected… The test of all knowledge is experiment."

Agriculture and Phosphorus Management

The Chesapeake Bay

Edited by Andrew N. Sharpley

Concluding Remarks

"The overall long-term goal of efforts to reduce P losses from agriculture to surface waters should aim to balance off-farm inputs of P in feed and fertilizer with P outputs as produce, along with managing soils in ways that retain nutrients and applied P resources."

Research Bottom Line

1. Soil P concentrations and how we manage P applications are the major drivers for P losses that we can control.

2. Changes in loads only come from changes in drivers. Need high quality pre- and post data sets. Baseline?

3. Small scale monitoring of runoff P losses impractical.