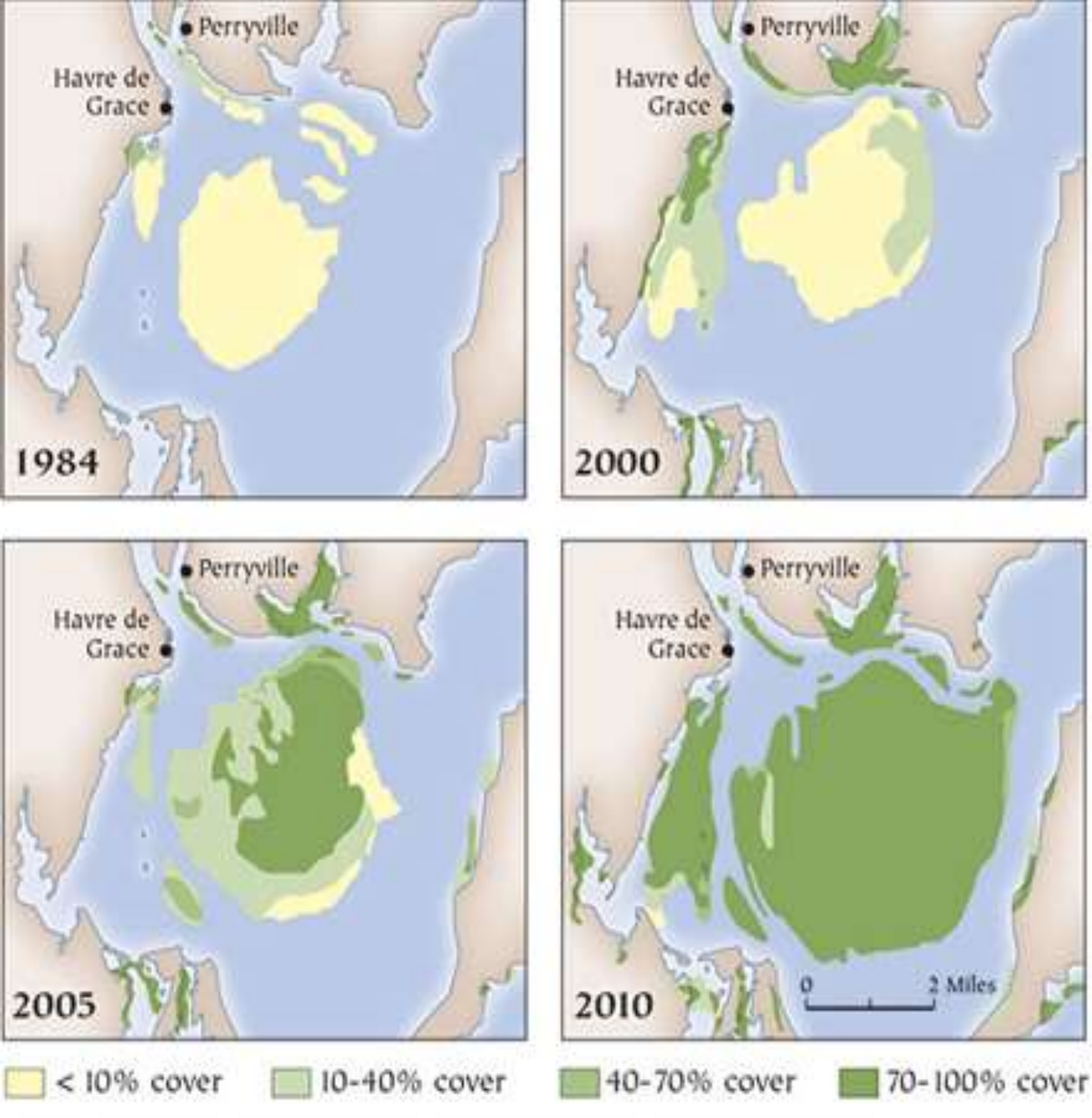
Real World Implementation in a Model World:

Why the Data are Needed to "Tell the Story"

Matt Johnston

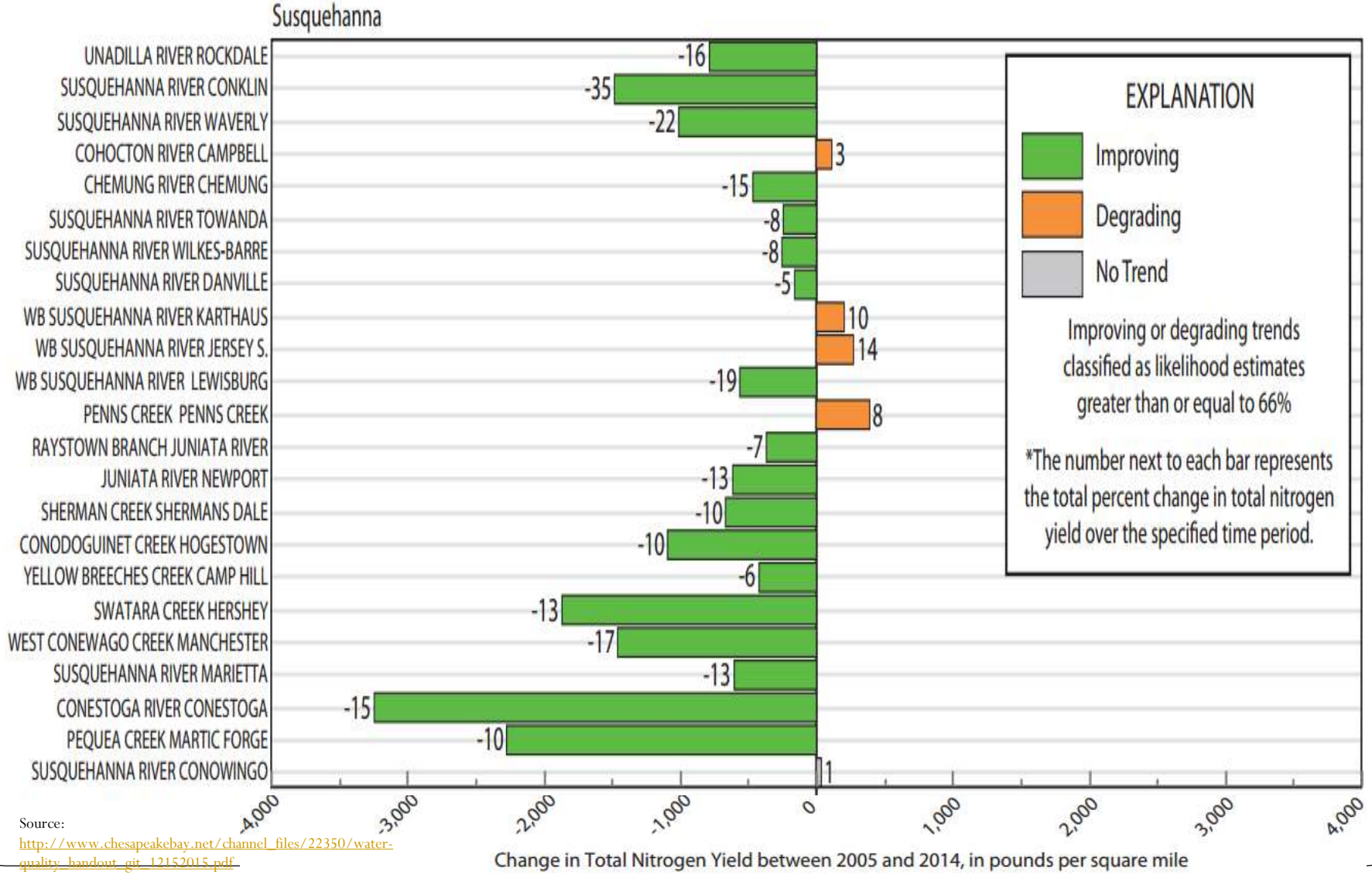
University of Maryland

Chesapeake Bay Program's Non-Point Source Data Analyst



SOURCE: UNIVERSITY OF MARYLAND, CENTER FOR ENVIRONMENTAL SCIENCE; SEA GRANT, MARYLAND

Trends in USGS Nitrogen Monitoring Data for Susquehanna Stations



Source: http://www.chesapeakebay.net/channel_files/22350/water-quality_handout_git_12152015.pdf

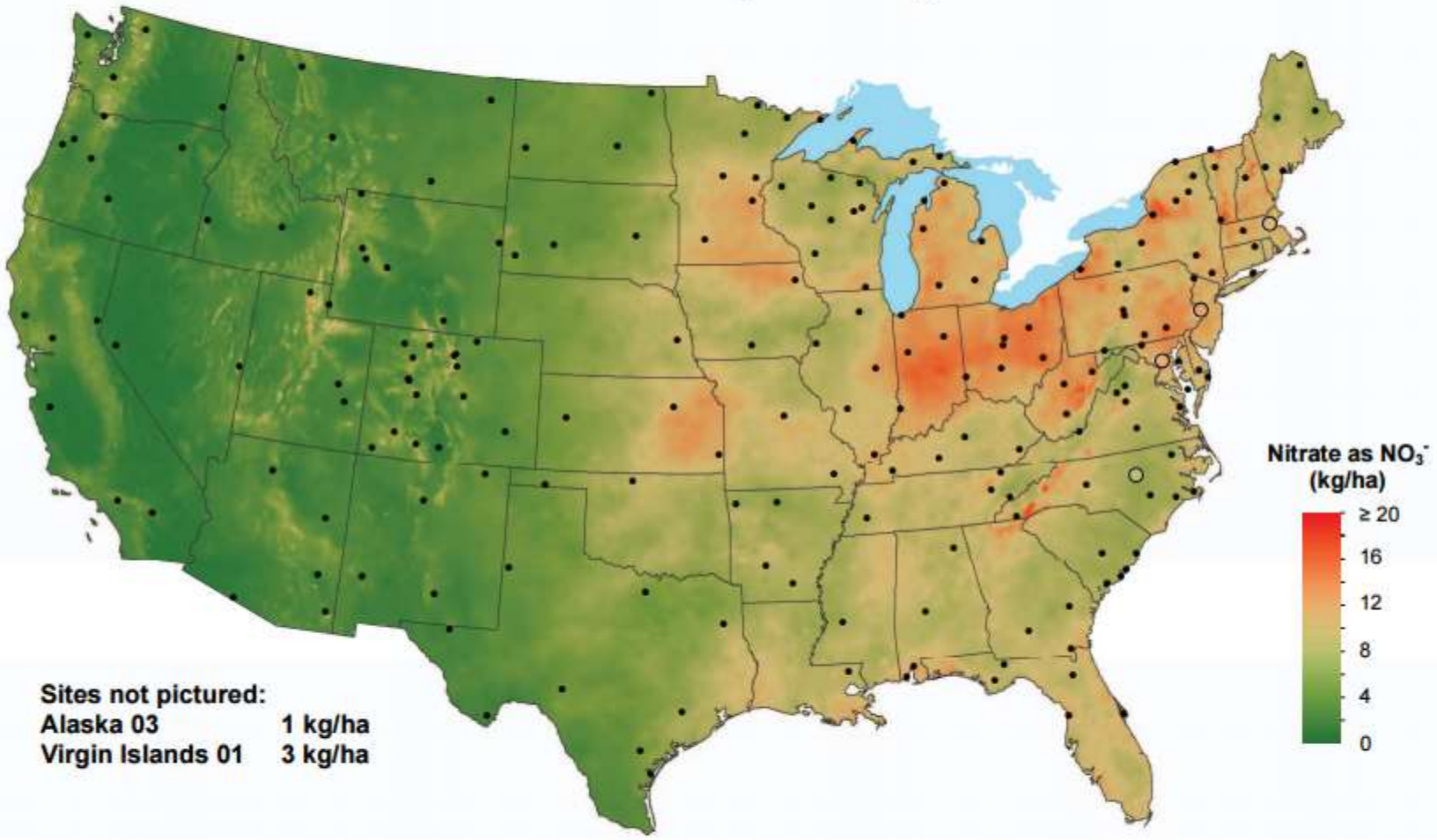
Factors Affecting Trends

- The USGS is in the process of assessing which factors are leading to reductions in pollutants in the Susquehanna.
- They are looking to many data sources, including the Chesapeake Bay Program to help explain why loads are going down.
- Excerpt re: Susquehanna trends from USGS, 2000 Factors Affecting Nutrient Trends report:
  - "The greatest load reduction from BMP implementation occurred in the lower Susquehanna River Basin, especially in the Conestoga River sub-basin, where BMP implementation led to an estimated 13-percent decrease in nitrogen loads." –
    - Source: http://va.water.usgs.gov/online_pubs/WRIR/00-4218text.pdf.

What is Causing the Reductions in Nitrogen in the Conestoga River?

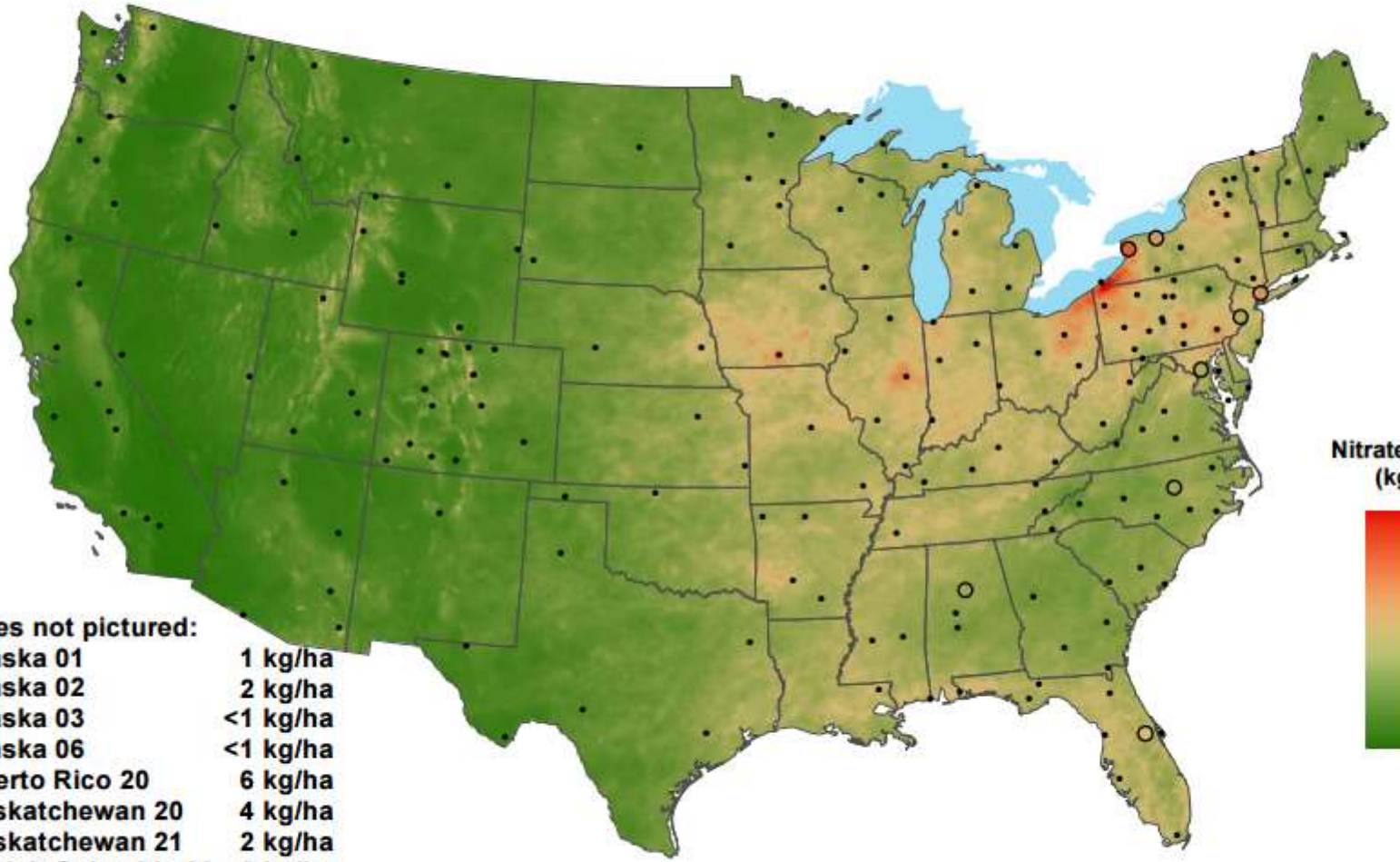
- Air Deposition Reductions?
- Wastewater Reductions?
- Animal Manure Reductions?
- Best Management Practice Implementation?
- Other Causes?

Nitrate ion wet deposition, 2005



National Atmospheric Deposition Program/National Trends Network
ttp://nadp.isws.illinois.edu

Nitrate ion wet deposition, 2014



Sites not pictured:

Alaska 01	1 kg/ha
Alaska 02	2 kg/ha
Alaska 03	<1 kg/ha
Alaska 06	<1 kg/ha
Puerto Rico 20	6 kg/ha
Saskatchewan 20	4 kg/ha
Saskatchewan 21	2 kg/ha
British Columbia 22	2 kg/ha
British Columbia 23	1 kg/ha
British Columbia 24	3 kg/ha

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Wastewater? Animal Numbers?

Wastewater Type	2009	2014	Change
Industrial Wastewater	86,287	249,077	189%
Wastewater Treatment Plant	913,053	935,605	2%
Total Wastewater	**999,340**	**1,184,682**	**19%**

Source: CBP Phase 5.3.2 Model for Lancaster County, PA as provided by PADEP

Census of Agriculture Category	2007	2012	Change
Total Acres Harvested	303,222	315,137	4%
Total Cattle and Dairy	541,154	553,458	2%
Total Hogs and Pigs	355,023	359,505	1%
Total Poultry	20,141,800	23,738,774	18%

Source: USDA 2012 Census of Agriculture for Lancaster County, PA

Best Management Practices?

BMP Type	Unit	2009	2014	Change
Forest Buffers	Acres	2,224	2,850	**28%**
Animal Waste Management Systems	Animal Units	108,098	142,363	**32%**
Conservation Tillage	Acres	88,003	119,355	**36%**
Prescribed Grazing	Acres	2,928	4,654	**59%**
Grass Buffers	Acres	116	401	**246%**
Non-Urban Stream Restoration	Feet	22,745	101,949	**348%**

Source: CBP Phase 5.3.2 Model for Lancaster County, PA as provided by PADEP

- BMP data allows the CBP to "tell the story."
- The better the data (both historically and current, the more accurate that story becomes.

Questions Implementation Data can Answer

- Who?
  - State or federal cost share? Non-Profits? Private citizens?
- What?
  - Type of implementation (e.g., forest buffer)
- Where?
  - County of implementation (or more specific geography if available)
- When?
  - Year of implementation, maintenance or inspection
- (Why and How are good to know for communications, but we don't track those explicitly.)

We've Come a Long Way, Let's Tell Everyone Why

An Endangered Susquehanna

Chesapeake Bay Tributary Tops List of Nation's Threatened Rivers

By Elizabeth Williamson

Washington Post Staff Writer

Wednesday, April 13, 2005; Page B01

> "Teeming with raw sewage, animal waste and fertilizer runoff, yet responsible for half the Chesapeake Bay's fresh water, the Susquehanna River is the most endangered river in the United States, according to a report released today by American Rivers, a national conservation group."

- Source: http://www.washingtonpost.com/wp-dyn/articles/A48296-2005Apr12.html.