

# Chesapeake Bay and Agriculture

October 2006

Number 0609

## Key Points:

- The Chesapeake Bay is the largest, most productive estuary in North America. Because of the high land to water ratio, every conservation action in the watershed benefits the Bay.
- The Chesapeake Bay Program is a regional partnership of local, state, and federal agencies along with non-governmental organizations that has led and directed the restoration of the Chesapeake Bay since 1983.
- About 25 percent of the Chesapeake Bay Watershed is in crop and pasture uses, non-federal forest land accounts for 47 percent, while developed land has risen to 12 percent (2003 National Resources Inventory).
- Major environmental challenges in the Chesapeake Bay region include landscape change (development and ecosystem fragmentation), excess nutrients, sediments, toxic chemical contaminants, and air pollution.

## Contact:

NRCS Web site at [www.nrcs.usda.gov](http://www.nrcs.usda.gov).

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*Helping People Help the Land*

## Overview

The Chesapeake Bay is the largest estuary in North America, home to more than 3,600 species of plants, fish and animals. Nearly 16 million people live in the Bay watershed.

The basin that drains into the Bay covers nearly 44.5 million acres over six states and the District of Columbia. The Chesapeake Bay has the highest land to water ratio of any estuary in the U.S. Land-based activities heavily influence the condition of the Bay.

Major environmental challenges in the Chesapeake Bay region include landscape change, excess nutrients, sediments, toxic chemical contaminants, and air pollution (Chesapeake Bay Program, 2006).

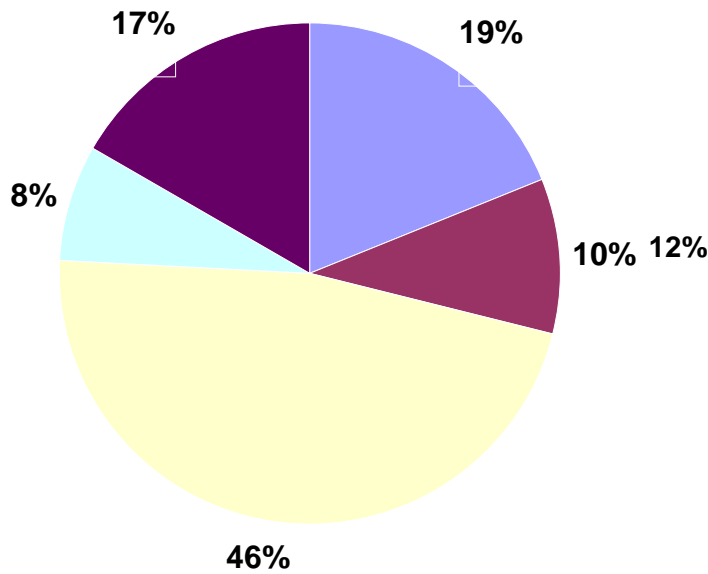
Conversion of land from agricultural to other uses creates a complex interaction among resource concerns, including increased runoff. Urban and suburban areas deliver the highest pollutant loads on a per acre basis and occupy over 5 million acres of the watershed. Agriculture is identified as another top contributor of non-point source pollutants because it occupies such a large share of the non-forested portion of the watershed, approximately 10 million acres.



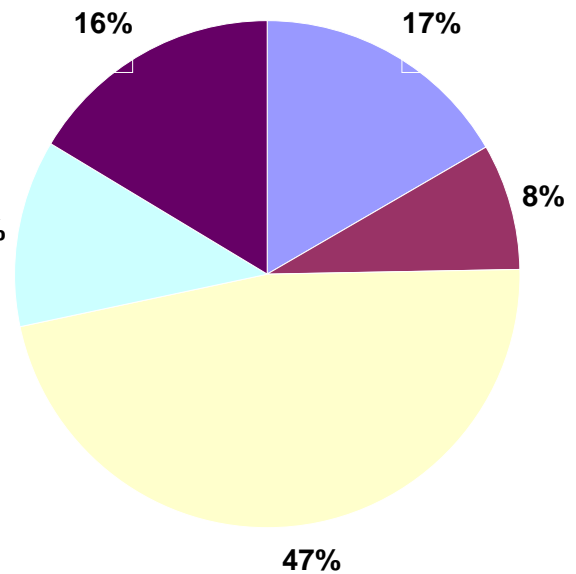
The NRCS National Resources Inventory (NRI) in 1982 indicated that approximately 75 percent of the Chesapeake Bay watershed was in agriculture and non-federal forested lands with approximately 29 percent in agriculture. In 2003, the NRI estimate for agriculture and non-federal forested lands was a total of 64 percent, an 11 percent decrease in the Bay watershed. 12 percent of the watershed is estimated to be developed land.

### USDA NRCS National Resources Inventory

**1982 NRI Land Use**



**2003 NRI Land Use**

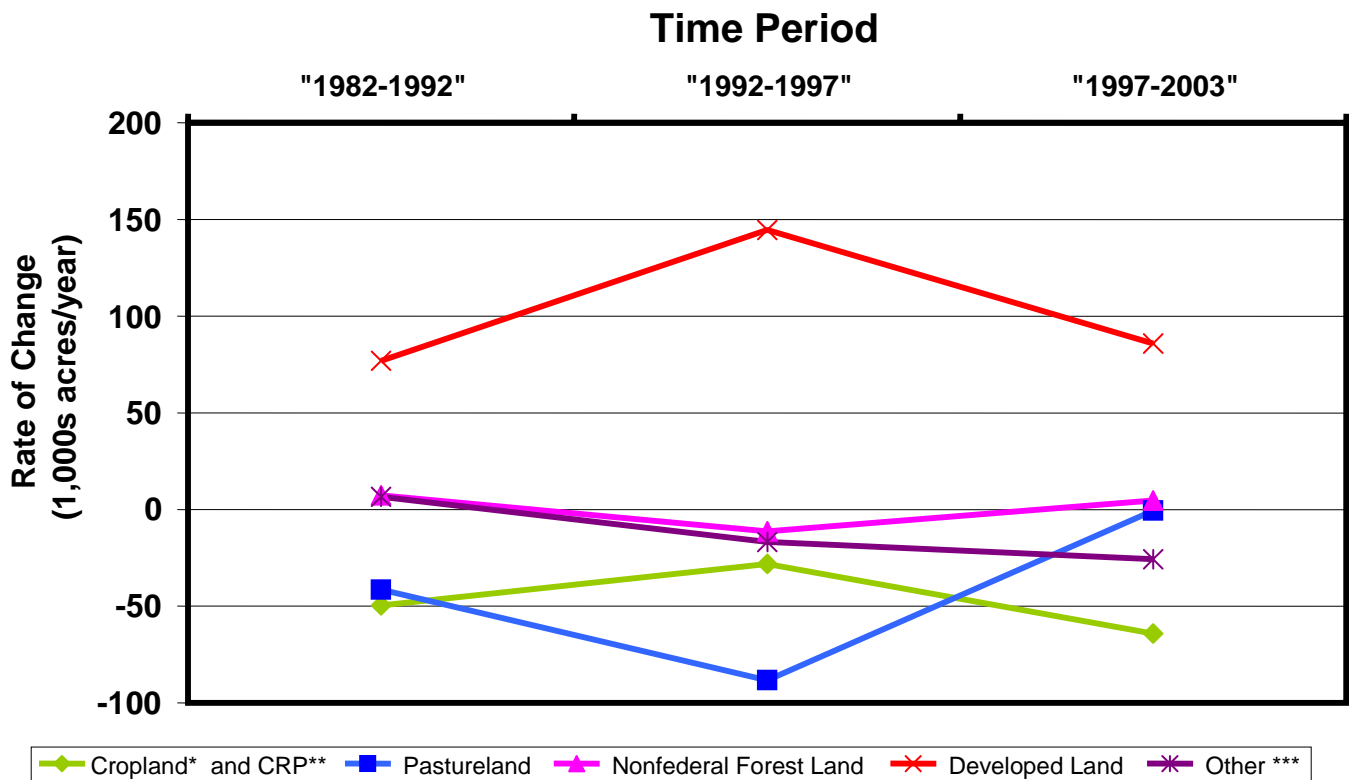


■ Cropland\* and CRP\*\* ■ Pastureland ■ Nonfederal Forest Land ■ Developed Land ■ Other \*\*\*

There are approximately 16.6 million people now living in the Bay watershed, according to U.S. Geological Survey scientists at the Bay Program. This is up 5.2 percent from 2000, when 15.8 million people were estimated to live in the watershed. By 2020, scientists project that the population of the watershed will exceed 18 million.

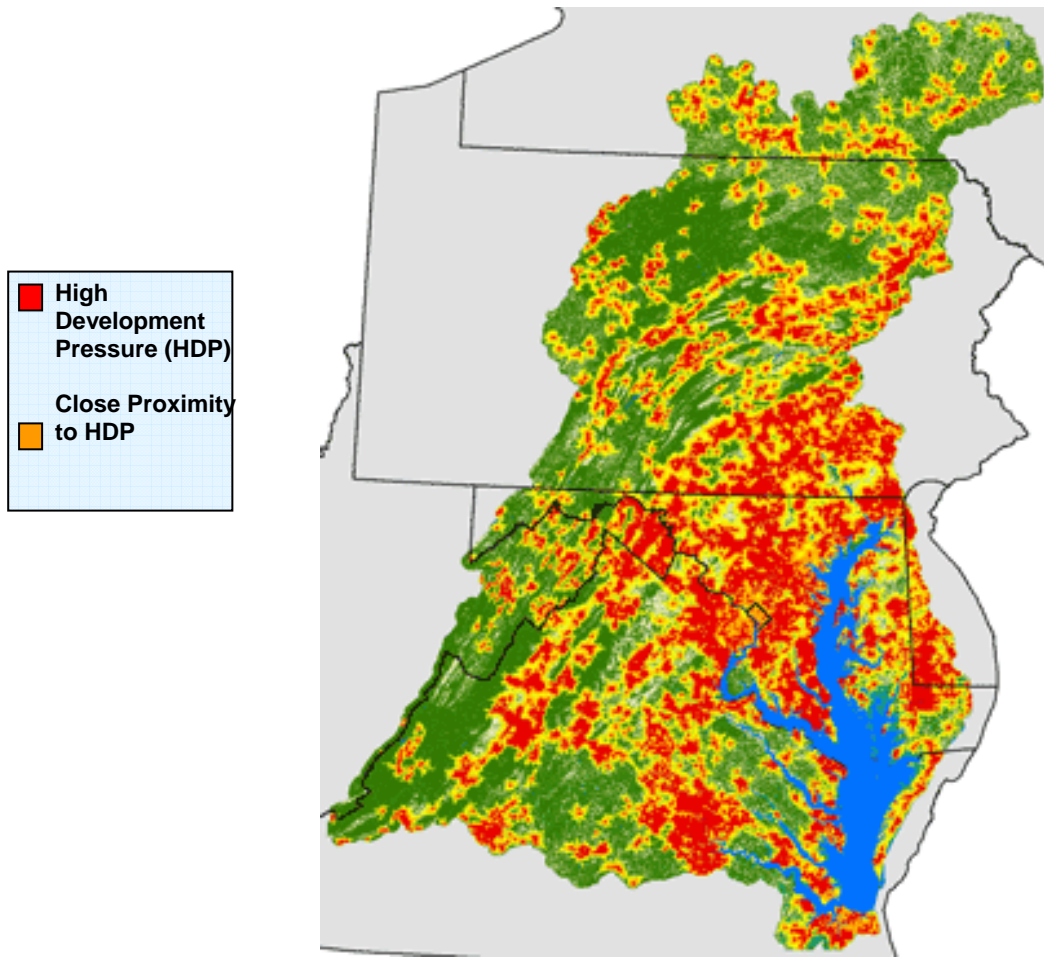
The graphic below, Trends in Land Use Change, indicates that between 1982 and 1992, agriculture (cropland and CRP) declined at a rate of approximately 50,000 acres/year. The rate slowed in the period between 1992 and 1997 to an annual loss of approximately 28,000 acres, but since 1997 the rate of loss has increased to over 64,000 acres annually. Pastureland decreased less than 1,000 acres/year since 1997, but experienced much greater loss rates (88,000 acres/year) between 1992 and 1997. In contrast, developed land experienced increases throughout the time periods with a peak rate of increase of over 144,000 acres/year between 1992 and 1997.

## Trends in Land Use Change (USDA NRCS National Resources Inventory)



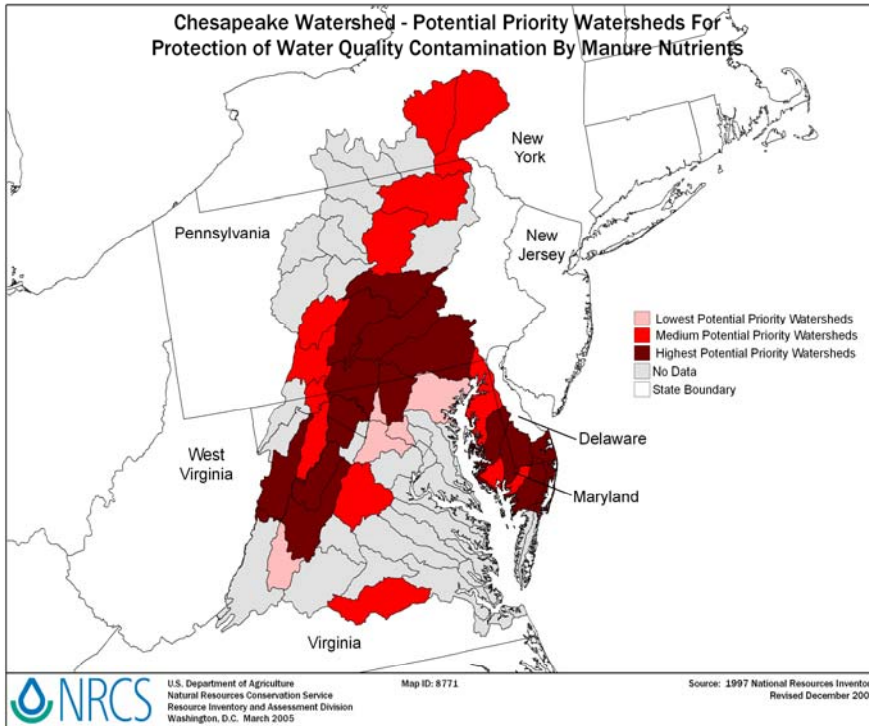
# Chesapeake Bay Watershed Development

## Areas of Highest Development Pressure in the Watershed



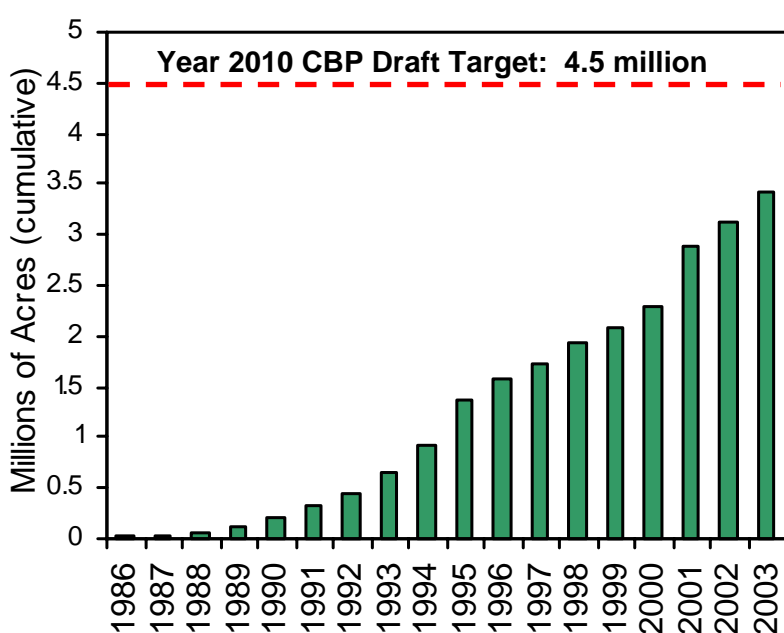
Source: Chesapeake Bay Program Office

# Nutrients in the Bay



An estimated 23,000 confined livestock and poultry operations are within the Bay watershed. This figure identifies sub-watersheds where the combination of livestock concentration and soil and land use factors make manure management a priority to prevent potential water quality problems. It does not imply that manure in these watersheds is mismanaged or is contributing to water quality problems.

# Acres Under Nutrient Management Plans



The Chesapeake Bay Program has set a goal to establish nutrient management plans on 4.5 million acres of cropland to support achievement of the nutrient reduction goal.

According to data collected from participating state and federal agencies, 3.42 million acres of cropland and hayland in the Bay watershed were placed under nutrient management plans between 1985 and 2003.

Note: Acreage from DE, NY, and WV are not included in totals prior to 2000. 2003 data include "enhanced" nutrient management. Year 2010 draft target is based on most current version of tributary strategies from DE, MD, PA, VA, and WV.  
 Source: Chesapeake Bay Program Office.

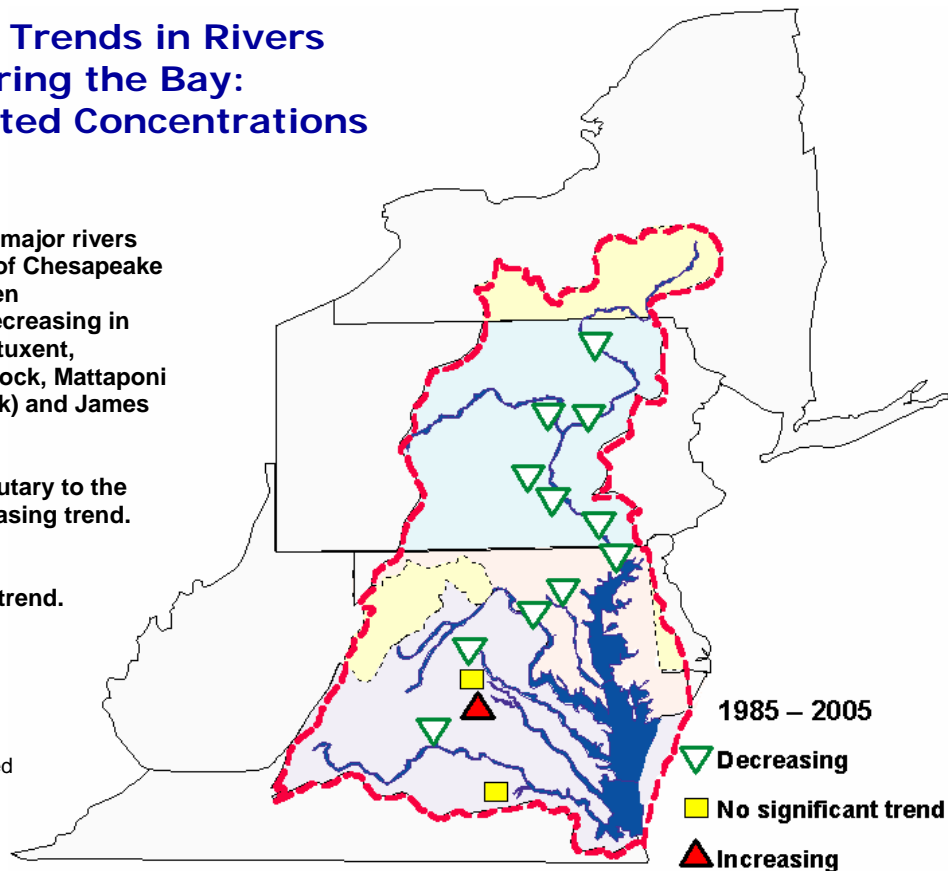
## Nitrogen Trends in Rivers Entering the Bay: Flow Adjusted Concentrations

Monitoring data from major rivers entering tidal waters of Chesapeake Bay show that nitrogen concentrations are decreasing in the Susquehanna, Patuxent, Potomac, Rappahannock, Mattaponi (a tributary to the York) and James rivers.

The Pamunkey (a tributary to the York) shows an increasing trend.

The Appomattox shows no significant trend.

Source: USGS and Susquehanna River Basin Commission, PA. Results are shown for flow adjusted trend analyses using the earliest complete data set collected since 1985.

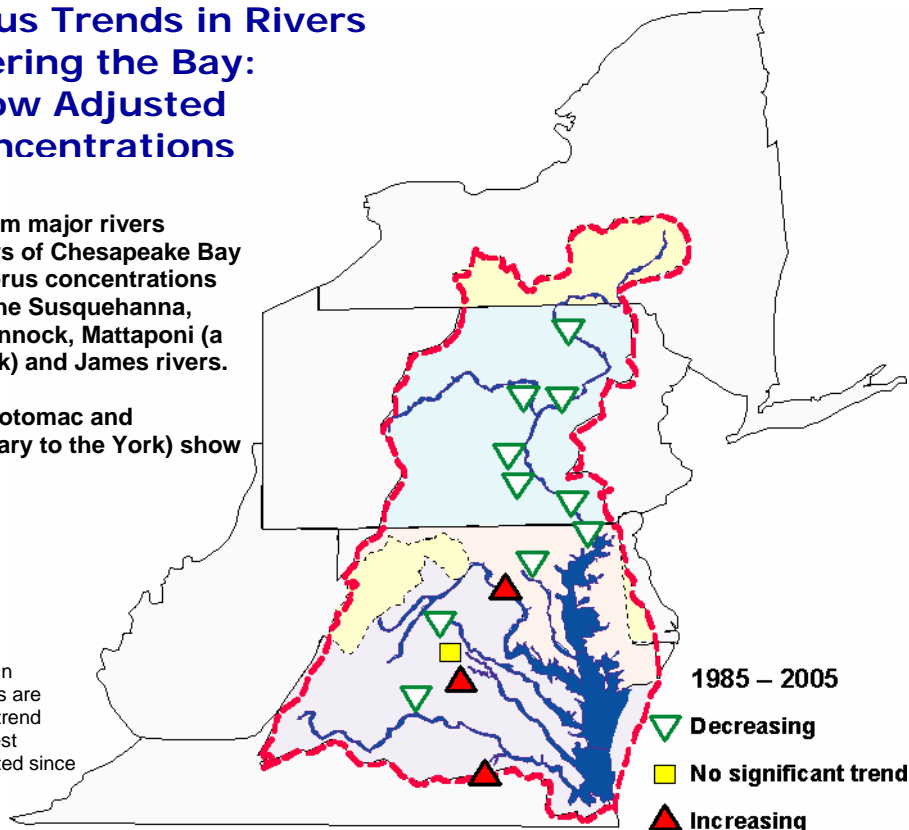


## Phosphorus Trends in Rivers Entering the Bay: Flow Adjusted Concentrations

Monitoring data from major rivers entering tidal waters of Chesapeake Bay show that phosphorus concentrations are decreasing in the Susquehanna, Patuxent, Rappahannock, Mattaponi (a tributary to the York) and James rivers.

The Appamattox, Potomac and Pamunkey (a tributary to the York) show increasing trends.

Source: USGS and Susquehanna River Basin Commission, PA. Results are shown for flow adjusted trend analyses using the earliest complete data set collected since 1985.



# Erosion and Sedimentation

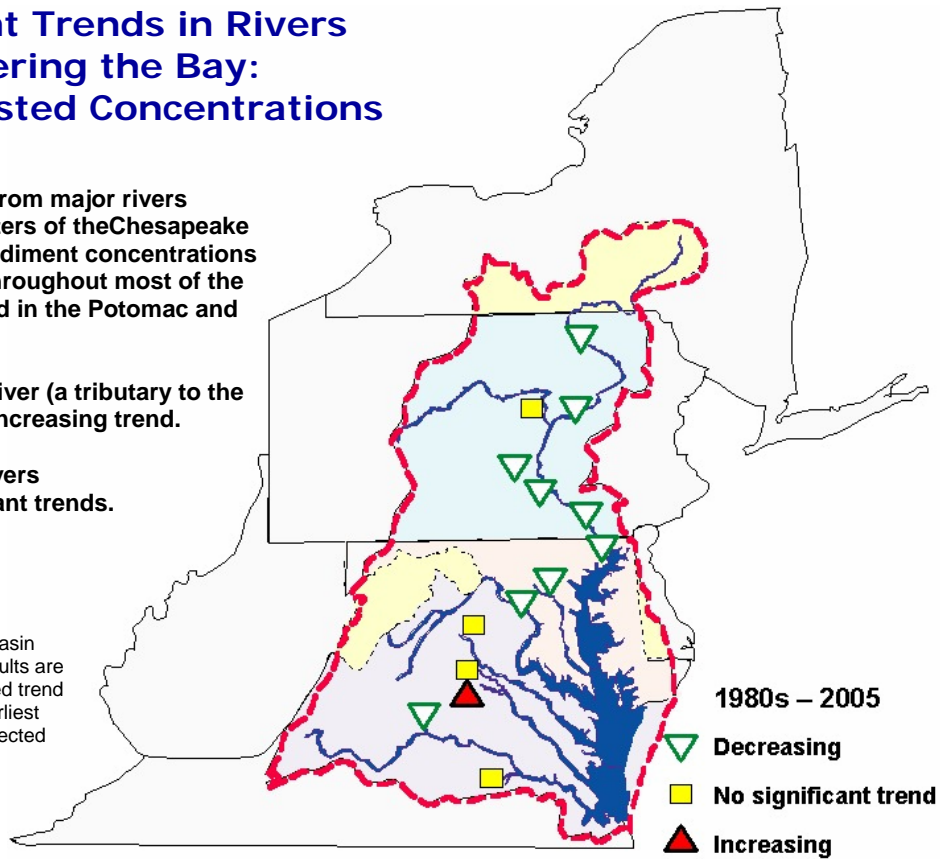
## Sediment Trends in Rivers Entering the Bay: Flow Adjusted Concentrations

Monitoring data from major rivers entering tidal waters of the Chesapeake Bay show that sediment concentrations are decreasing throughout most of the Susquehanna and in the Potomac and Patuxent rivers.

The Pamunkey River (a tributary to the York) shows an increasing trend.

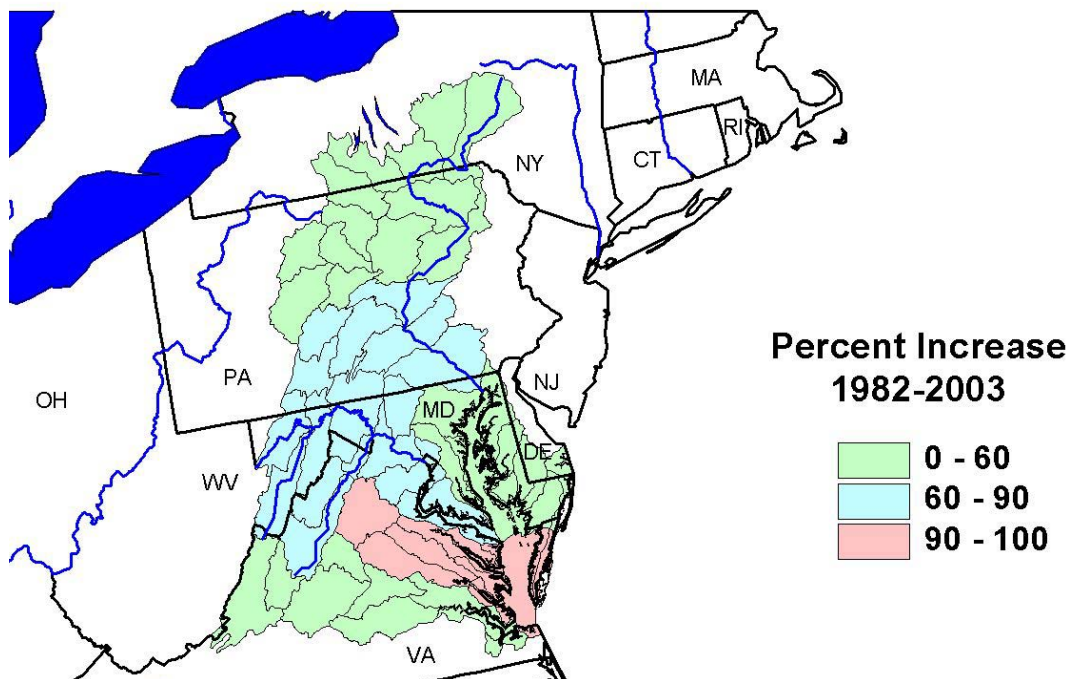
The remaining rivers show no significant trends.

Source: USGS and Susquehanna River Basin Commission, PA. Results are shown for flow adjusted trend analyses using the earliest complete data set collected since 1985.



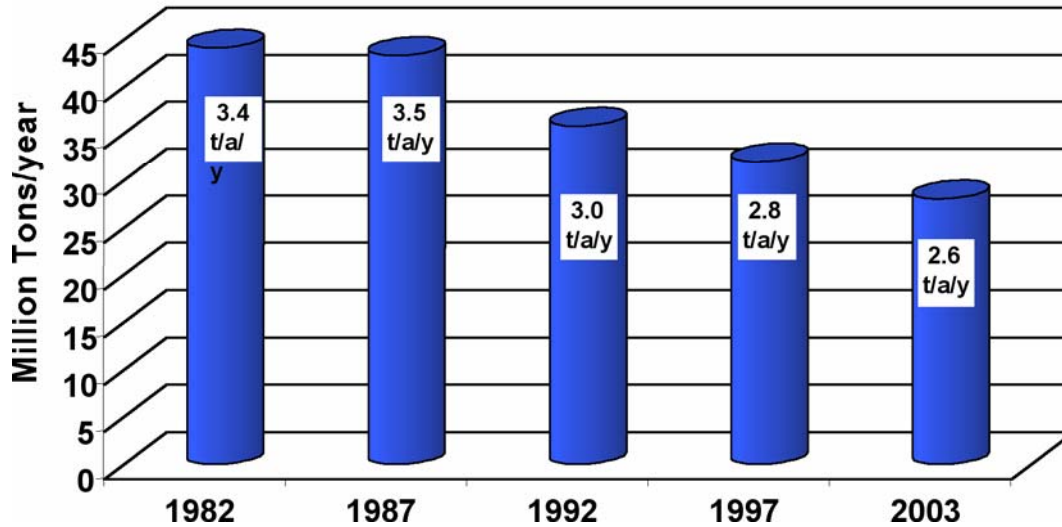
This graphic shows the development trends for 6-digit hydrologic units in the Chesapeake Bay from the 1982 NRI to the 2003 NRI. The greatest net change occurred in the Potomac River Basin with an increase of slightly less than 600,000 acres in developed land. The smallest change occurred in the northern reaches of the Bay's watershed, the Upper Susquehanna River basin, which increased by only 40 percent and less than 200,000 acres. The greatest percent increase occurred in the Lower Chesapeake with an increase of over 95 percent in developed acres. This region corresponds with the only region in the graphic above that experienced a significant increase in sediment loads over a similar time period and may explain why sediment loads increased while erosion and cropland acres continued to decline.

## Increase in Developed Land (2003 NRI)



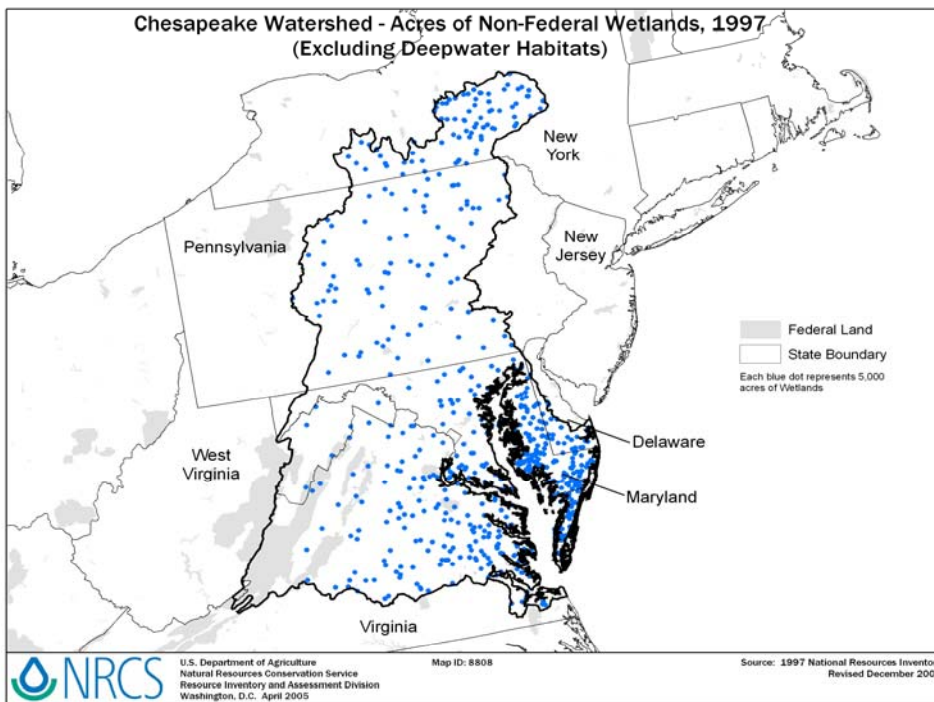


## Sheet and Rill Erosion on Cropland, Pastureland, and CRP in the Chesapeake Bay (2003 NRI)



Between 1982 and 2003, sheet and rill erosion on cropland, pastureland, and lands enrolled in CRP declined from 44.1 million tons per year to 28 million tons per year. The per-acre decrease was from 3.4 tons per acre per year to 2.6 tons per acre per year. During this period, erosion on cultivated cropland decreased from 5.7 tons/acre/year to 5.0, a 12 percent reduction. Total erosion on cultivated lands declined by 39 percent; from 35.8 million tons annually to 21.8 million tons.

## Wetlands



Overall wetlands acreage has remained relatively stable in the Bay watershed, averaging about 2.9 million acres since 1982. The Chesapeake Bay Program has a goal for 2010 of 25,000 acres of wetlands re-established or established. To date, 40 percent of this goal has been achieved.

## Program Activities

### Funding

The Natural Resources Conservation Service administers a wide range of programs to help producers protect, restore, and enhance natural resources on private lands.

#### NRCS Program Funding, Chesapeake Bay Basin States 2002 - 2004

Program	Financial Assistance Funding from 2002 through 2004	Technical Assistance Funding from 2002 through 2004
Conservation Technical Assistance	Not applicable	42,260,686
Conservation Reserve Program (and Enhancement Program)	Not available	9,231,096
Environmental Quality Incentives Program	55,144,410	14,025,107
Conservation Security Program (since 2004)	174,891	145,831
Wetland Reserve Program	5,550,311	669,029
Farm and Ranchland Protection Program	28,207,188	1,486,189
Wildlife Habitat Incentives Program	2,038,299	740,891
Grassland Reserve Program	5,146,676	1,419,315
Small Watershed Protection Program	3,657,228	4,716,620
Emergency Watershed Program	939,775	164,100
<b>TOTAL PROGRAM</b>	<b>106,598,530</b>	<b>7,6701,594</b>
Conservation Innovation Grants (2005)	Over \$4.5 million	Not applicable

CSP watersheds in four States in the Chesapeake Bay Basin

State	Watershed
Delaware	Nanticoke
Virginia	Lower Rappahannock, Mattaponi, South Fork Shenandoah, North Fork Shenandoah
Maryland	Monocacy, Chester-Sassafras, Choptank, Nanticoke
Delaware	Chester-Sassafras, Choptank
Pennsylvania	Raystown (2004 and 2005), Lower Susquehanna-Swatara

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## Conservation Measures

Through its suite of conservation programs, NRCS provides technical and financial assistance to help producers implement conservation practices and systems on private lands. Below are some performance figures from 2002-2004 in the Chesapeake Bay watershed:

Conservation Measure	Applied
Conservation Buffers	54,000 acres
Crop Residue Management	222,000 acres
Nutrient Management	630,000 acres
Pest Management	168,000 acres
Wetlands Created, Restored, or Enhanced	8,000 acres
Comprehensive Nutrient Management Plans	1,200 plans
Farmland protected (state totals)	83,000 acres

USDA NRCS is working cooperatively with its partners in the Bay, state departments of agriculture, and conservation districts to help farmers help the bay. Contact local Conservation Districts for more information.