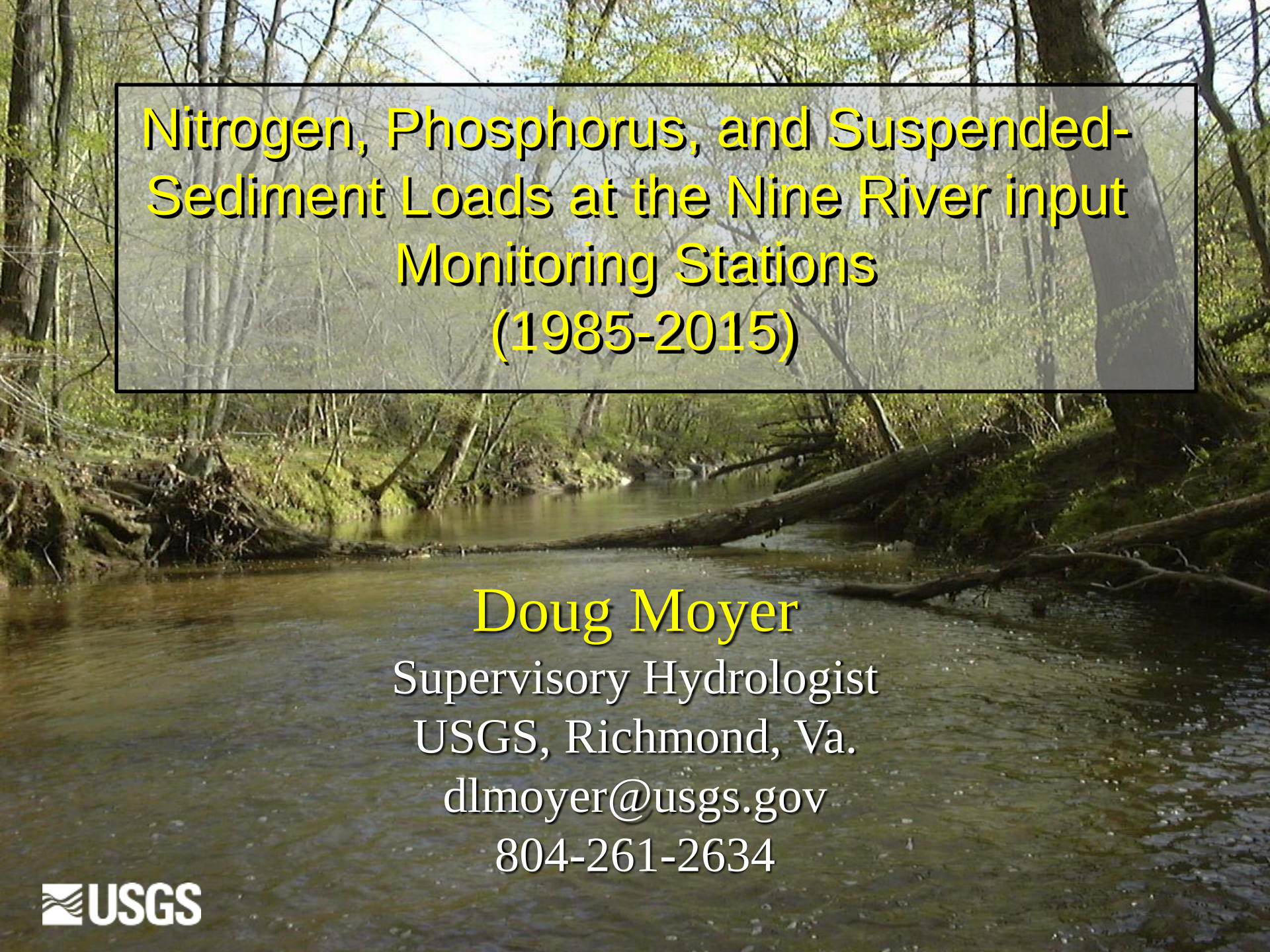

Nitrogen, Phosphorus, and Suspended-Sediment Loads at the Nine River input Monitoring Stations (1985-2015)

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Objective

- Communicate the latest (through 2015) nitrogen, phosphorus, and suspended-sediment load and trend results for nine River Input Monitoring stations in the Chesapeake Bay nontidal network

Questions

(1) How are nitrogen, phosphorus, and suspended-sediment loads responding to restoration activities and changing land use across the bay watershed?

(2) What are the trends in nitrogen, phosphorus, and suspended-sediment loads being delivered to the bay from the nontidal portions of the watershed?

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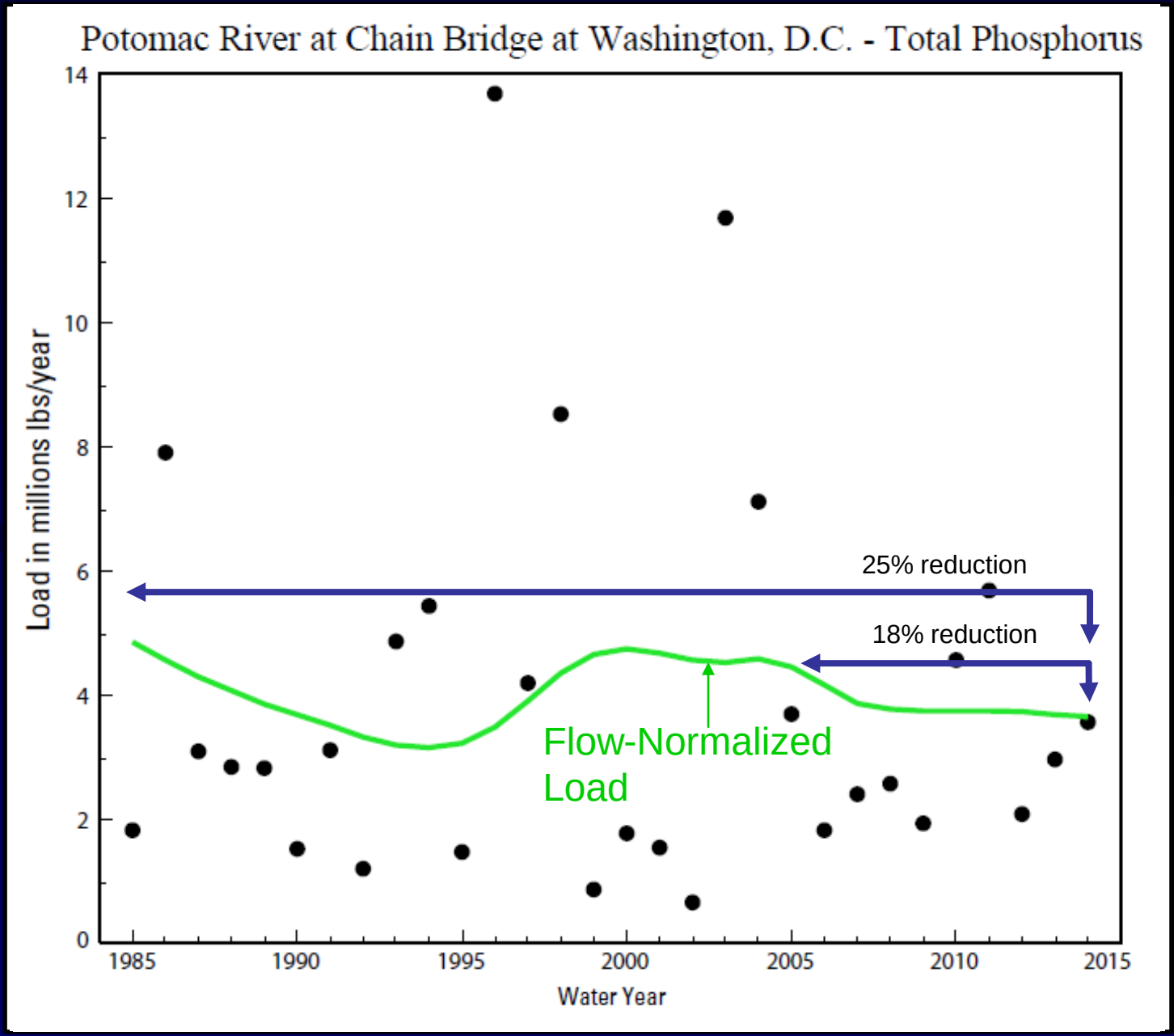
WRTDS Load and Trend Example: Potomac River Total Phosphorus

Total reduction in RIM total nitrogen:
1985 to 2014 = -25%
2005 to 2014 = -18%



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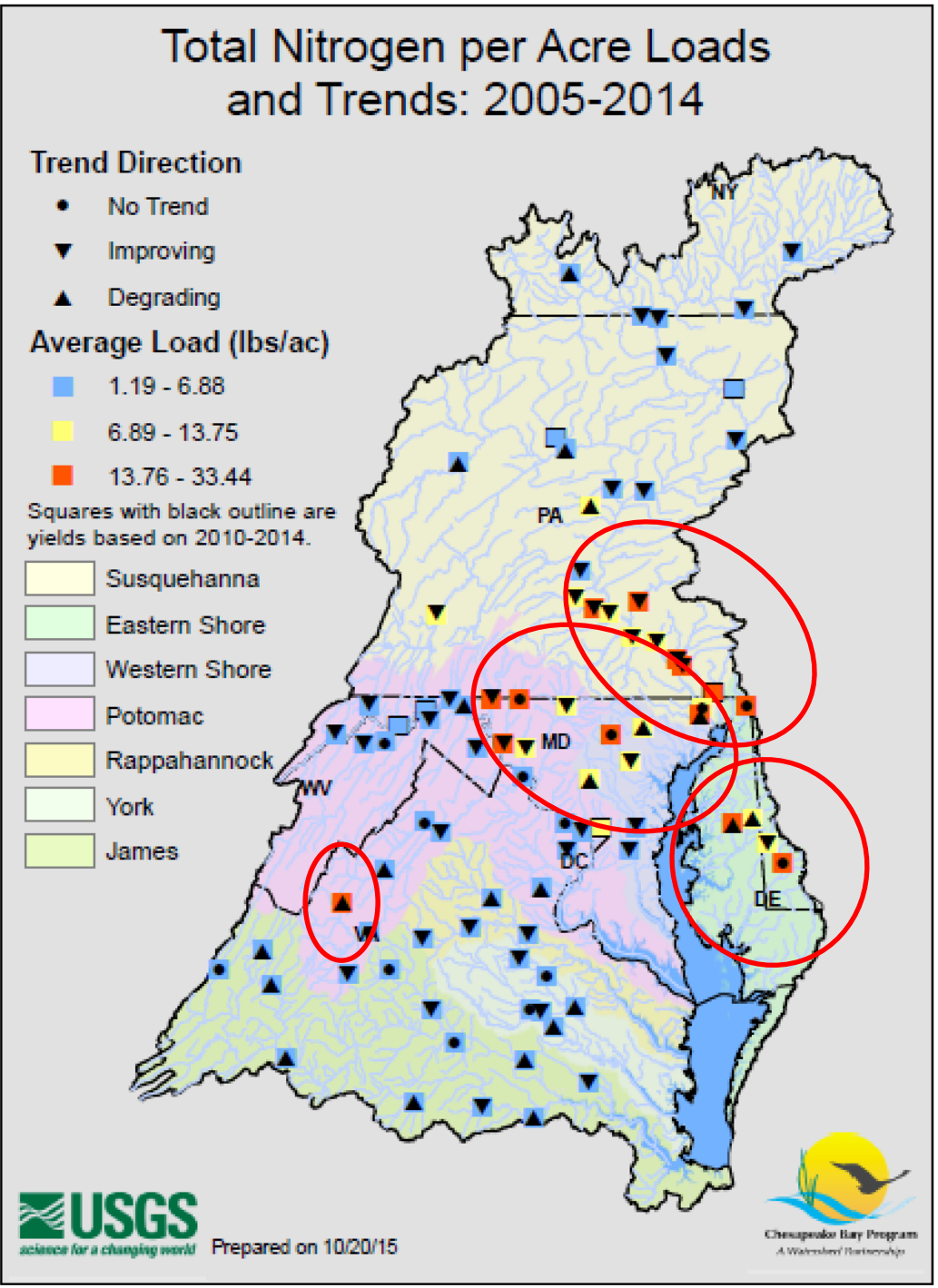
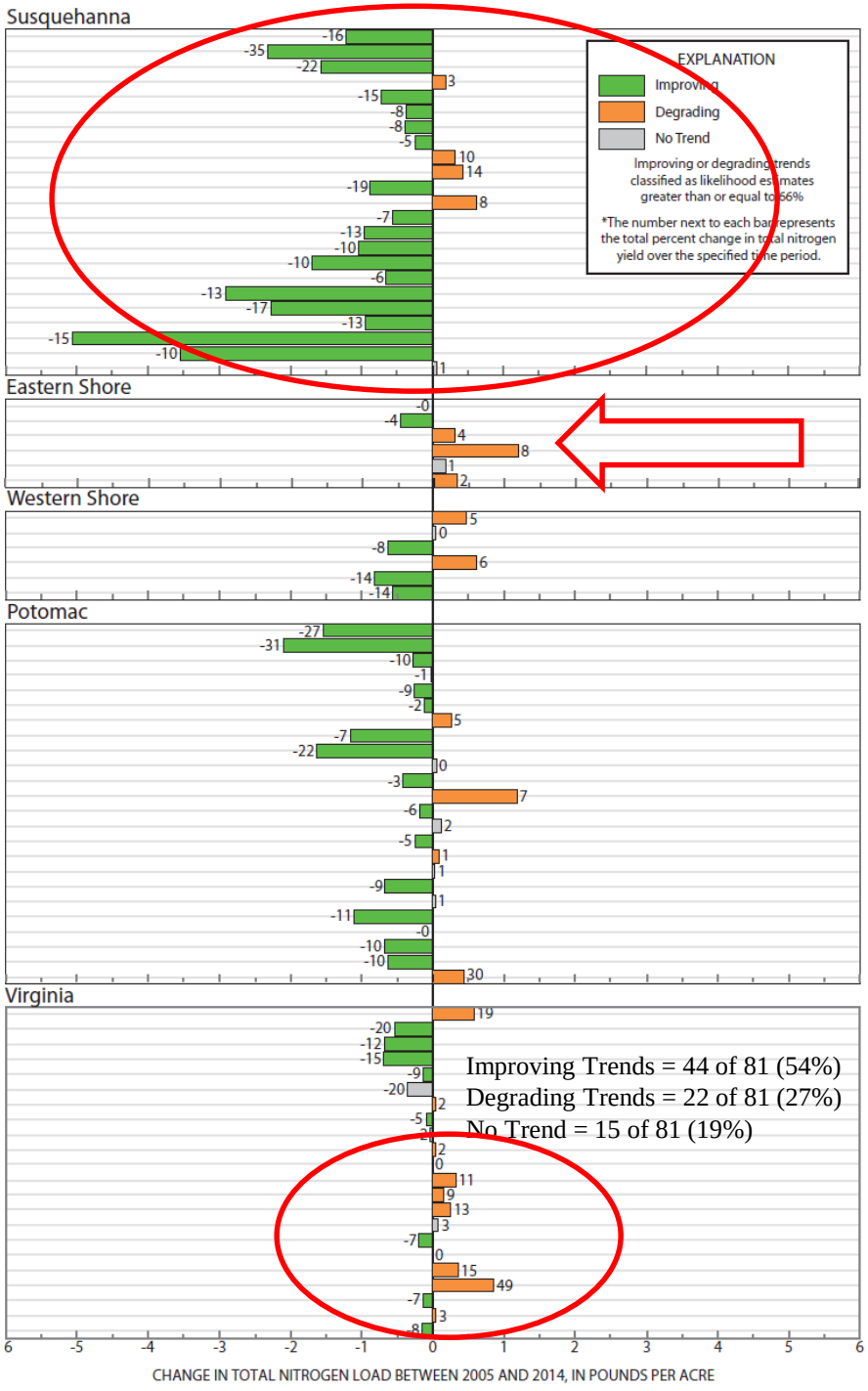
Total Nitrogen per Acre Loads and Trends: 2005-2014





USGS Nontidal Web Page

http://cbrim.er.usgs.gov/

USGS science for a changing world

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Water-Quality Loads and Trends at Nontidal Monitoring Stations in the Chesapeake Bay Watershed

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Welcome

This web site is dedicated to providing water-quality load and trend results for the nontidal rivers of the Chesapeake Bay watershed.

What are the Objectives of the Chesapeake Bay Nontidal Monitoring Program?

- Quantify nutrient and sediment loads in the nontidal rivers of the Chesapeake Bay watershed. These loads are defined as the mass of nutrient or sediment passing a monitored location per unit time.
- Estimate changes over time (trends) in sediment and nutrient loads, in a manner that compensates for any concurrent trend in stream discharge. Trends estimated in this manner can indicate changes in the watershed, such as the effects of best management practices that cannot be attributed primarily to climatic fluctuation.

How the Program Works

- Monitoring data are collected by numerous agencies through the nontidal monitoring partnership.
- Results are updated on even-numbered water years for the network of water-quality monitoring stations distributed throughout the Chesapeake Bay watershed.

What Data and Related Information Are Available?

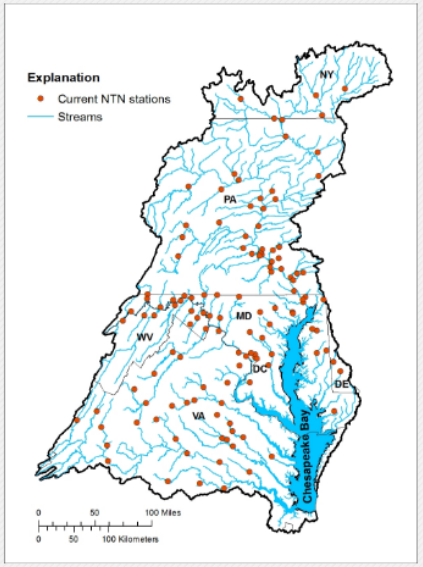
Methods, data, results, and interpretations are available for

- Nutrient and sediment loads and yields (per-acre loads)
- Trends in nutrient and sediment loads

NEW Water Year 2015 load and trend results are now available for the following 9 major rivers with the longest water-quality records:

- Choptank River near Greensboro, Md, (01491000)
- Susquehanna River at Conowingo, Md. (01578310)
- Patuxent River near Bowie, Md. (01594440)
- Potomac River at Chain Bridge at Washington, D.C. (0164580)
- Rappahannock River near Fredericksburg, Va. (01668000)
- Pamunkey River near Hanover, Va. (01673000)
- Mattaponi River near Beulahville, Va. (01674500)
- James River at Cartersville, Va. (02035000)
- Appomattox River at Matoaca, Va. (02041650)

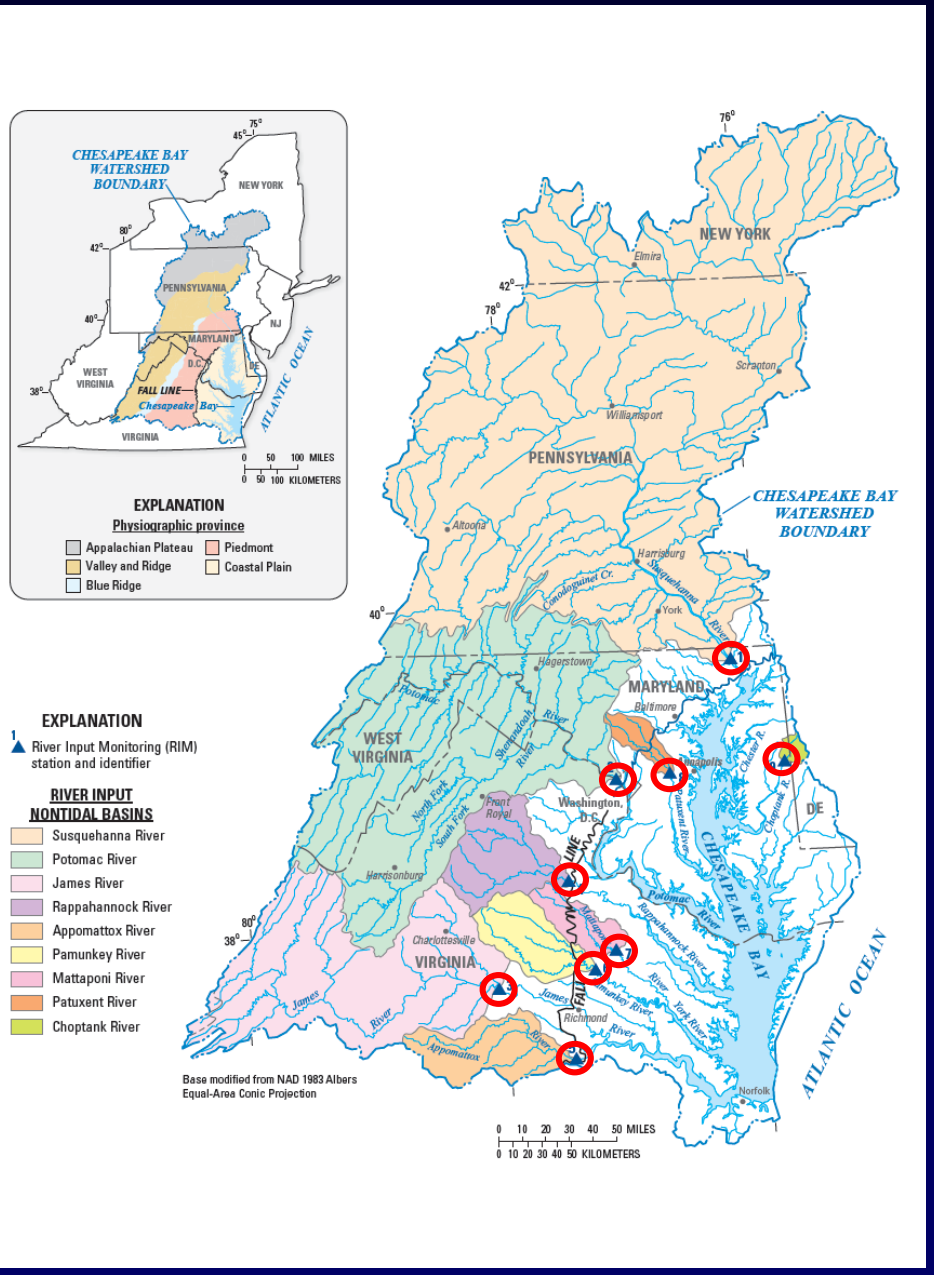
NEW DOWNLOAD 2015 Results



Click on the image above to access the interactive map

USGS

Chesapeake Bay Nontidal Monitoring Network



- What are the trends in nitrogen, phosphorus, and suspended-sediment loads being delivered to the bay from the nontidal portions of the watershed?
- To answer this question, we look to the loads delivered from the nine River Input Monitoring stations.

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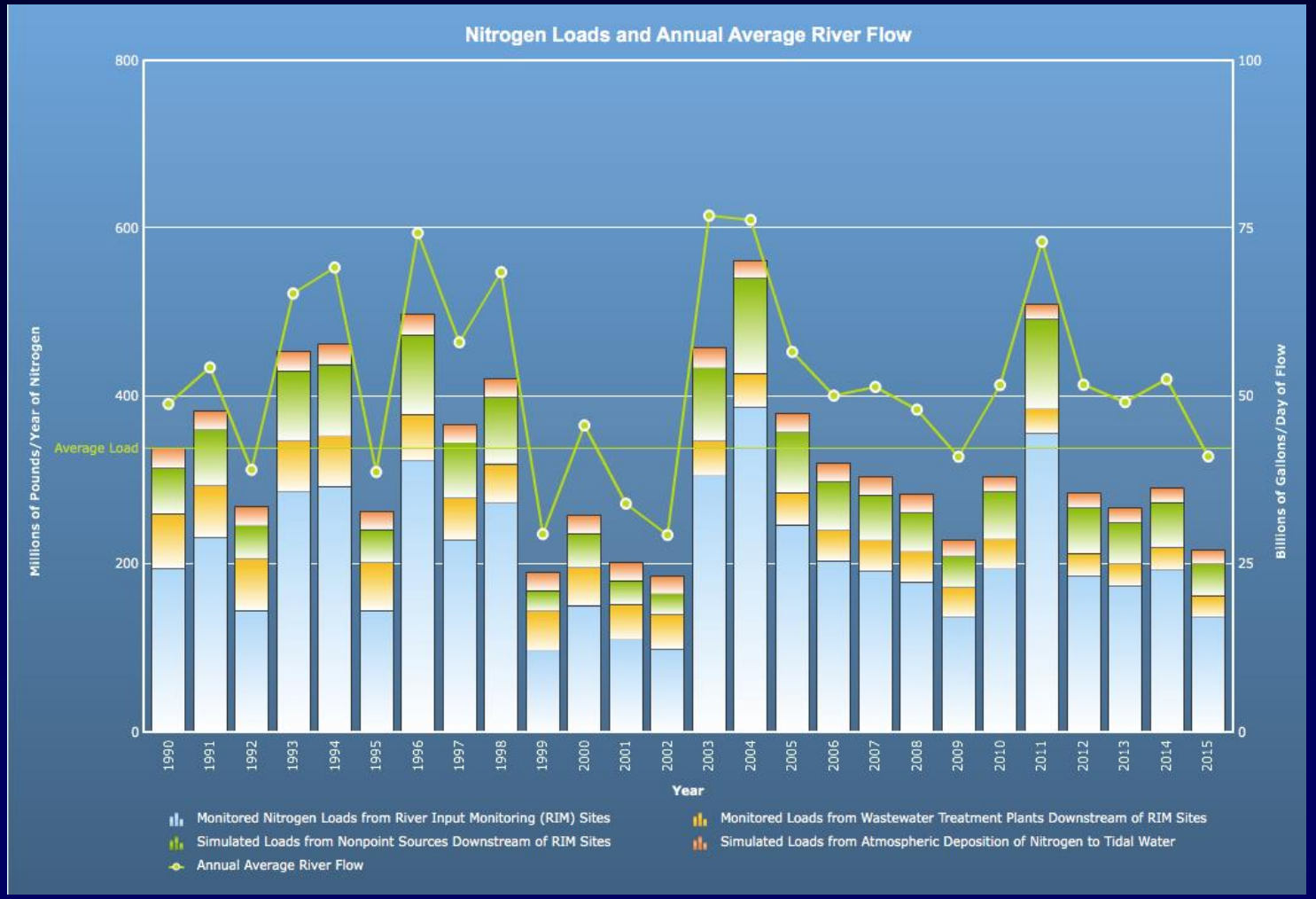
Total Nitrogen Delivered to the Bay

The cumulative total nitrogen load from the 9 RIM stations accounts for 63% (on average) of the total nitrogen load delivered annually to the bay.



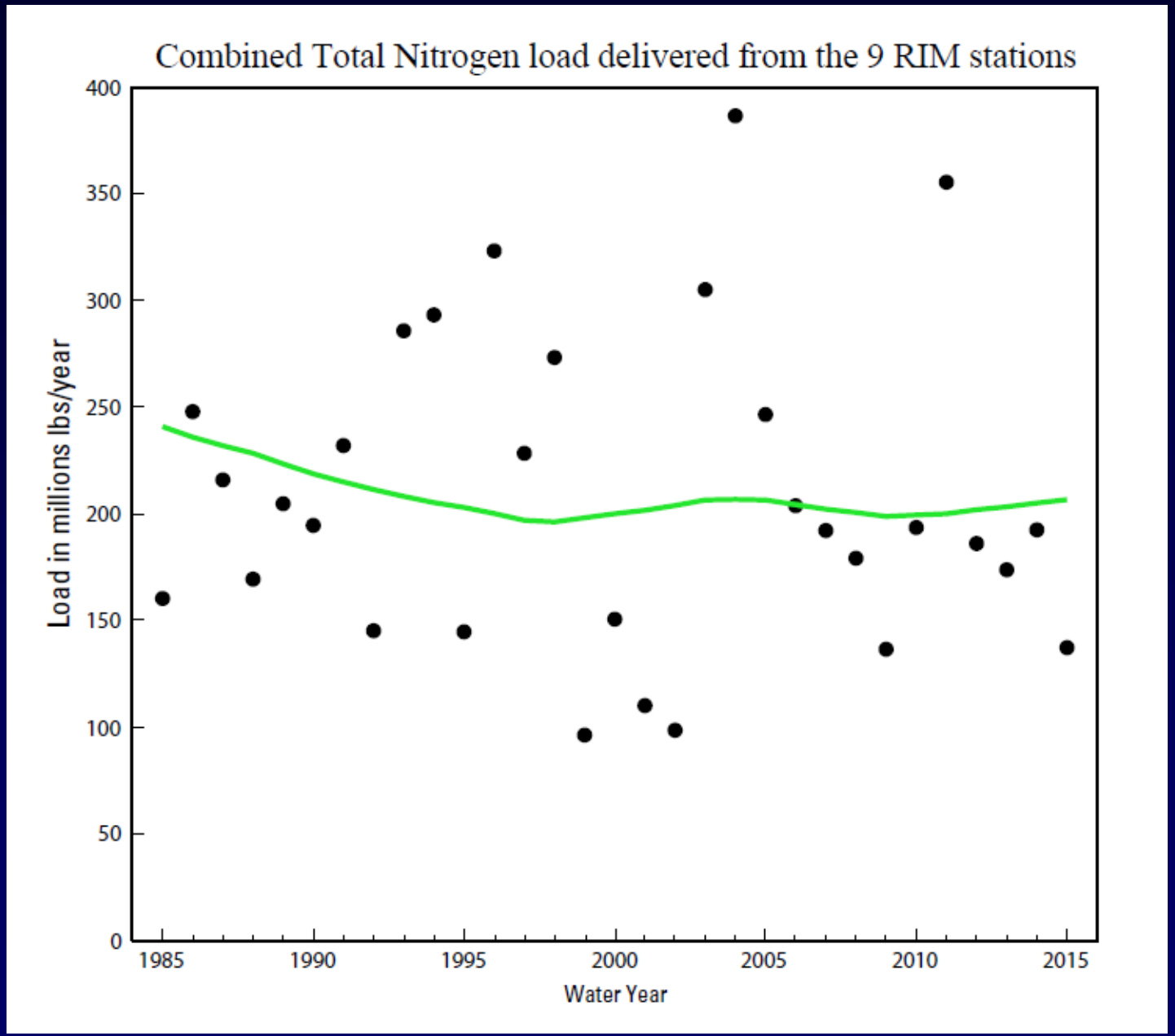
Source: Chesapeake Bay Program
http://www.chesapeakebay.net/indicators/indicator/nitrogen_loads_and_river_flow_to_the_bay1

USGS

Changes in Total Nitrogen Delivered to the Bay Estuary from the 9 RIM Stations

Percent of total RIM load

Susquehanna = 66%
Potomac = 24%
James = 5%
Rappahannock = 2%
Appomattox = <1%
Pamunkey = <1%
Mattaponi = <1%
Patuxent = <1%
Choptank = <1%



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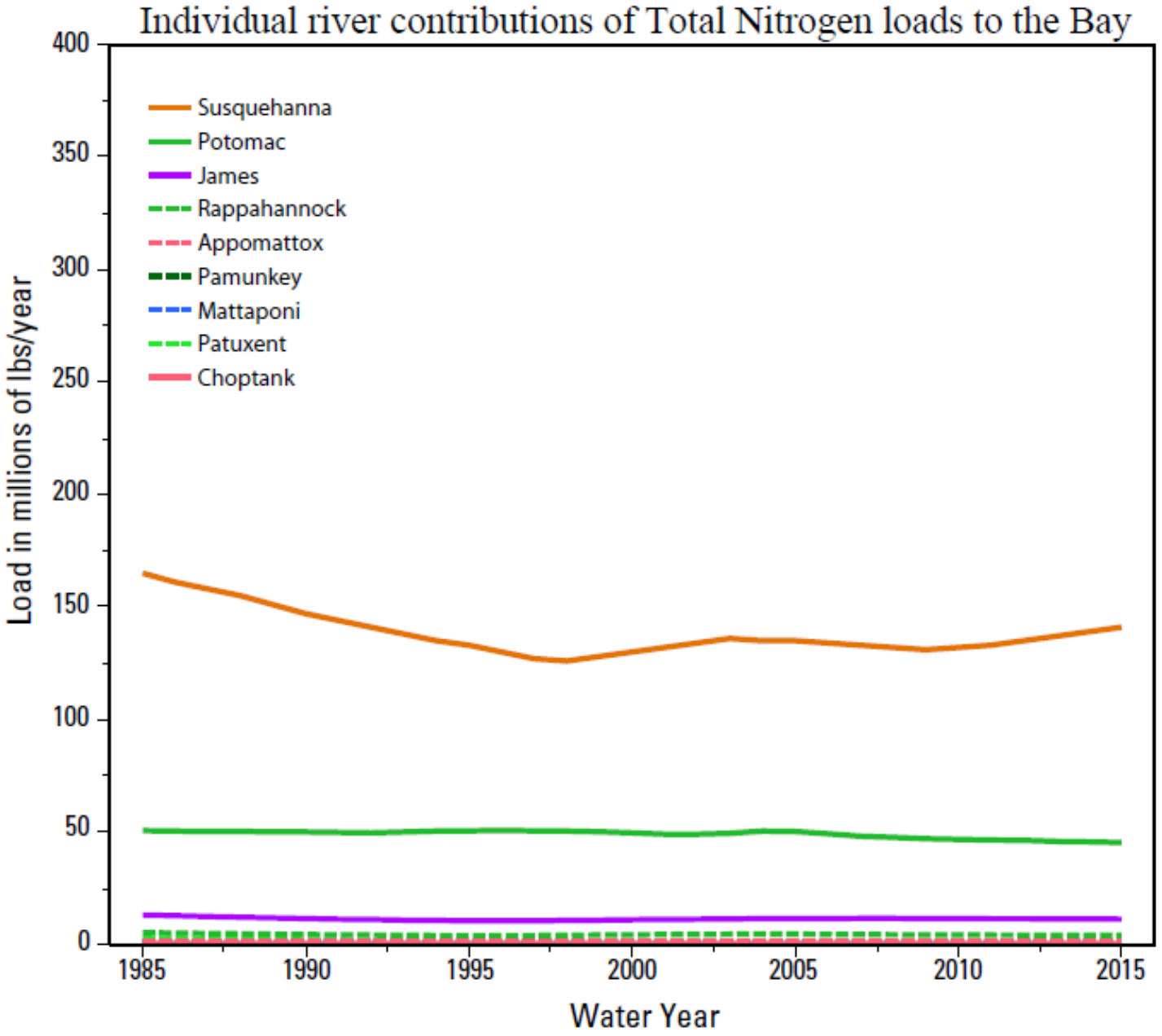
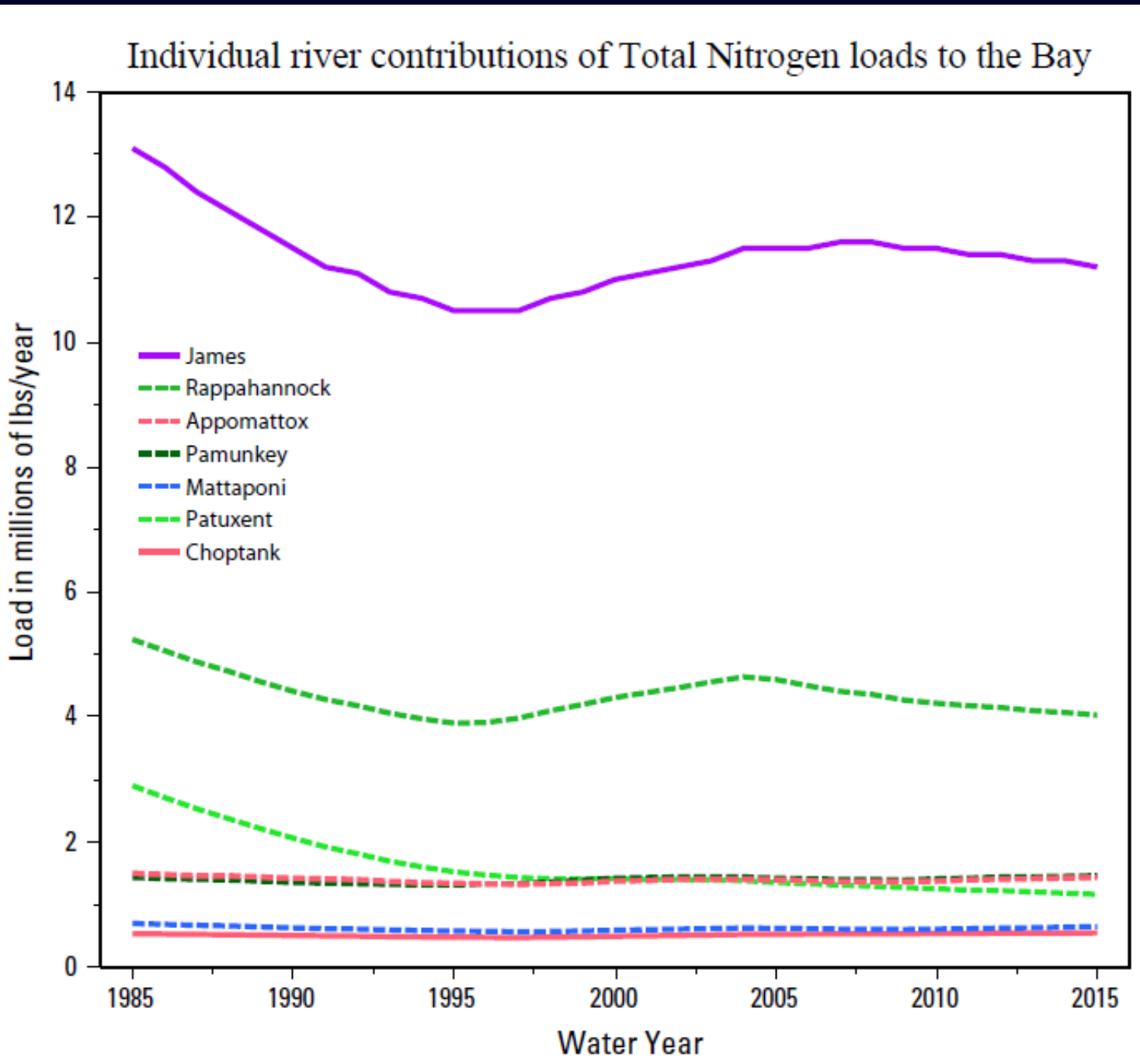

Individual river contributions of Total Nitrogen loads to the Bay
Susquehanna
Potomac
James
Rappahannock
Appomattox
Pamunkey
Mattaponi
Patuxent
Choptank
Load in millions of lbs/year
400
350
300
250
200
150
100
50
0
1985
1990
1995
2000
2005
2010
2015
Water Year

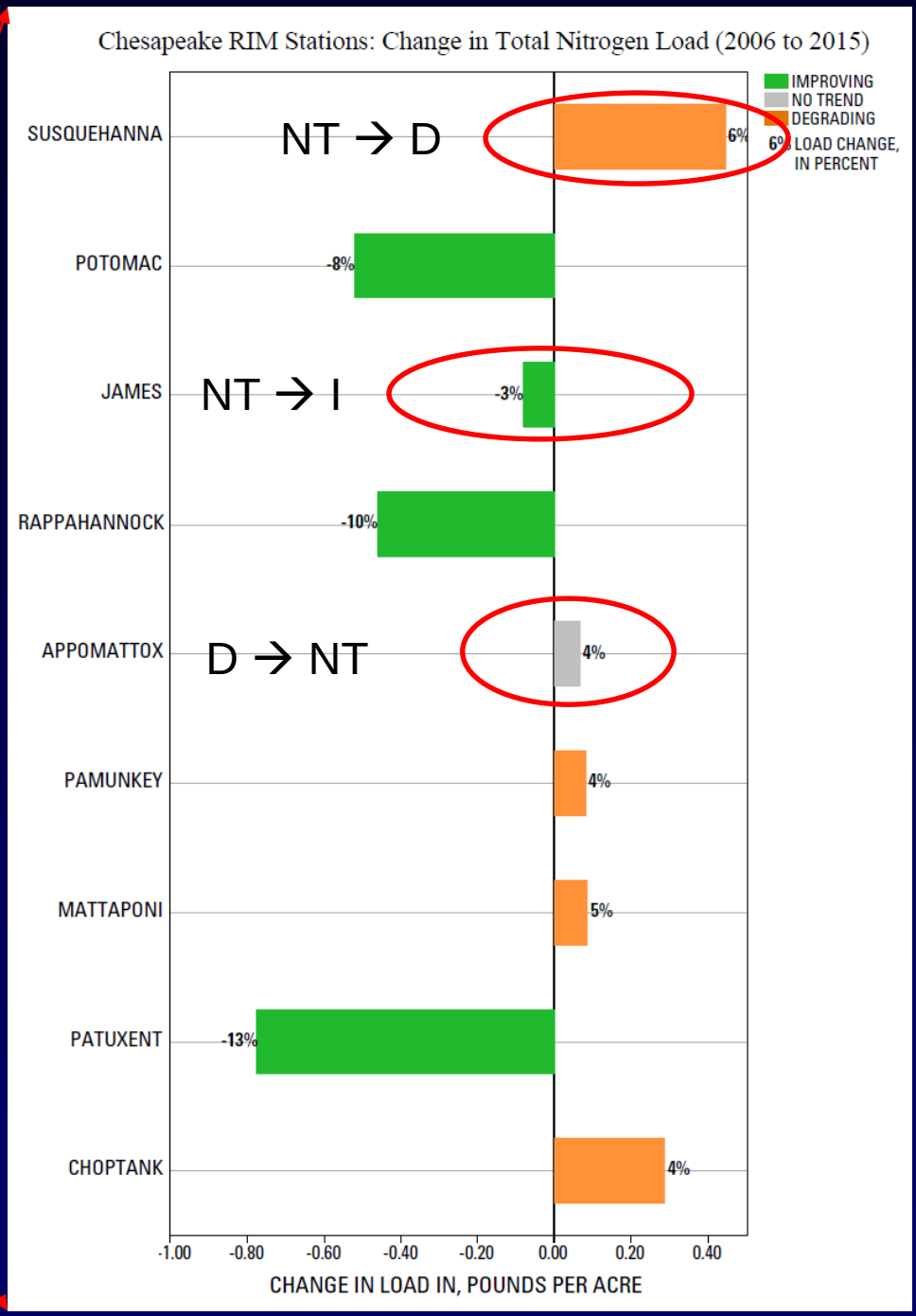
USGS


Individual river contributions of Total Nitrogen loads to the Bay
Load in millions of lbs/year
Water Year
James
Rappahannock
Appomattox
Pamunkey
Mattaponi
Patuxent
Choptank
0
2
4
6
8
10
12
14
1985
1990
1995
2000
2005
2010
2015

USGS

Changes in Total Nitrogen Delivered to the Bay from the 9 RIM Stations

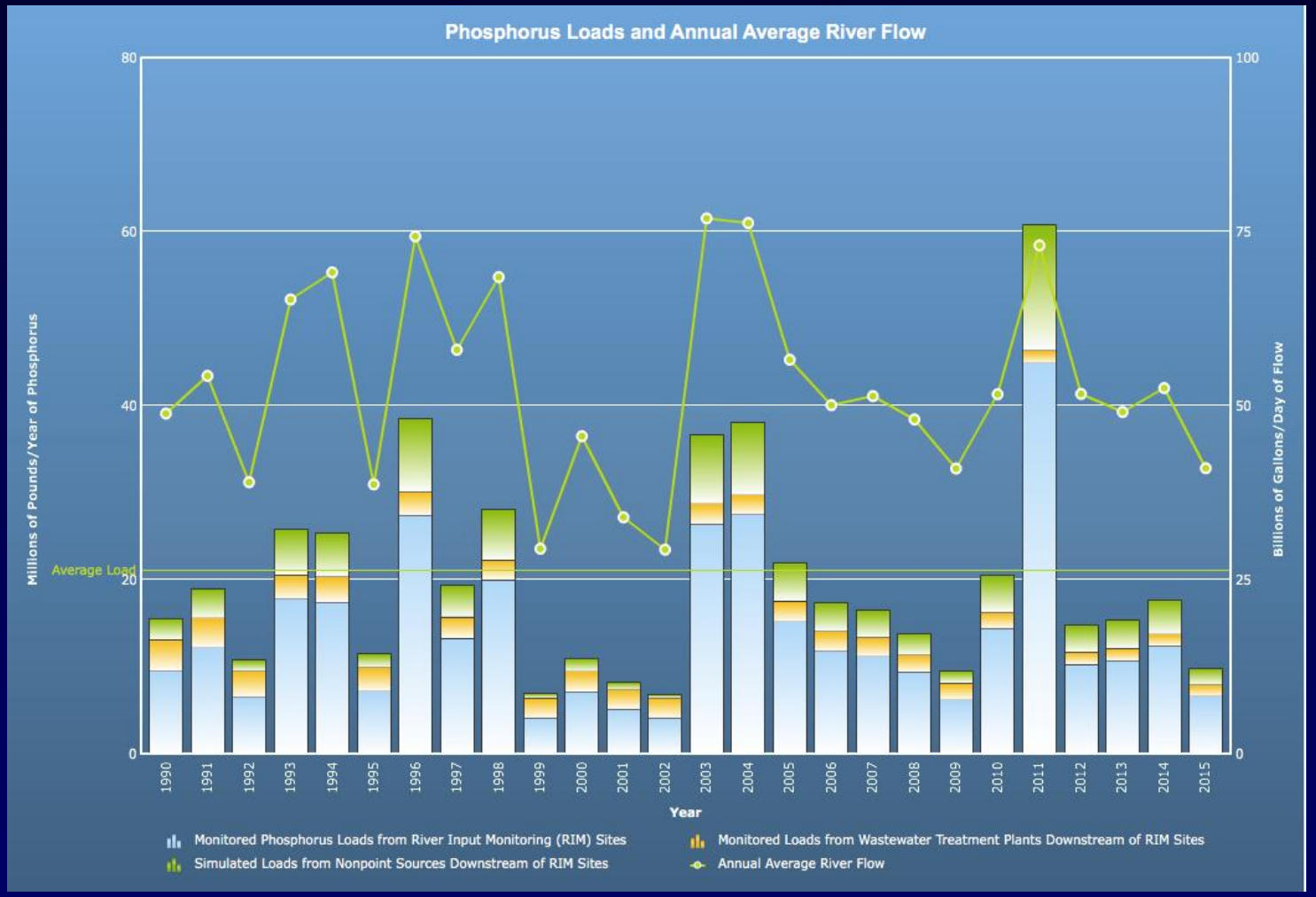
Monitoring station	Total nitrogen load	
	Long term	Short term
SUSQUEHANNA RIVER AT CONOWINGO, MD	Improving	Degrading
POTOMAC RIVER AT WASHINGTON, DC	Improving	Improving
JAMES RIVER AT CARTERSVILLE, VA	Improving	Improving
RAPPAHANNOCK RIVER NR FREDERICKSBURG, VA	Improving	Improving
APPOMATTOX RIVER AT MATOACA, VA	No Trend	No Trend
PAMUNKEY RIVER NEAR HANOVER, VA	No trend	Degrading
MATTAPONI RIVER NEAR BEULAHVILLE, VA	Improving	Degrading
PATUXENT RIVER NEAR BOWIE, MD	Improving	Improving
CHOPTANK RIVER NEAR GREENSBORO, MD	Degrading	Degrading



USGS

Total Phosphorus Delivered to the Bay

The cumulative total phosphorus load from the 9 RIM stations accounts for 69% (on average) of the total phosphorus load delivered annually to the bay.



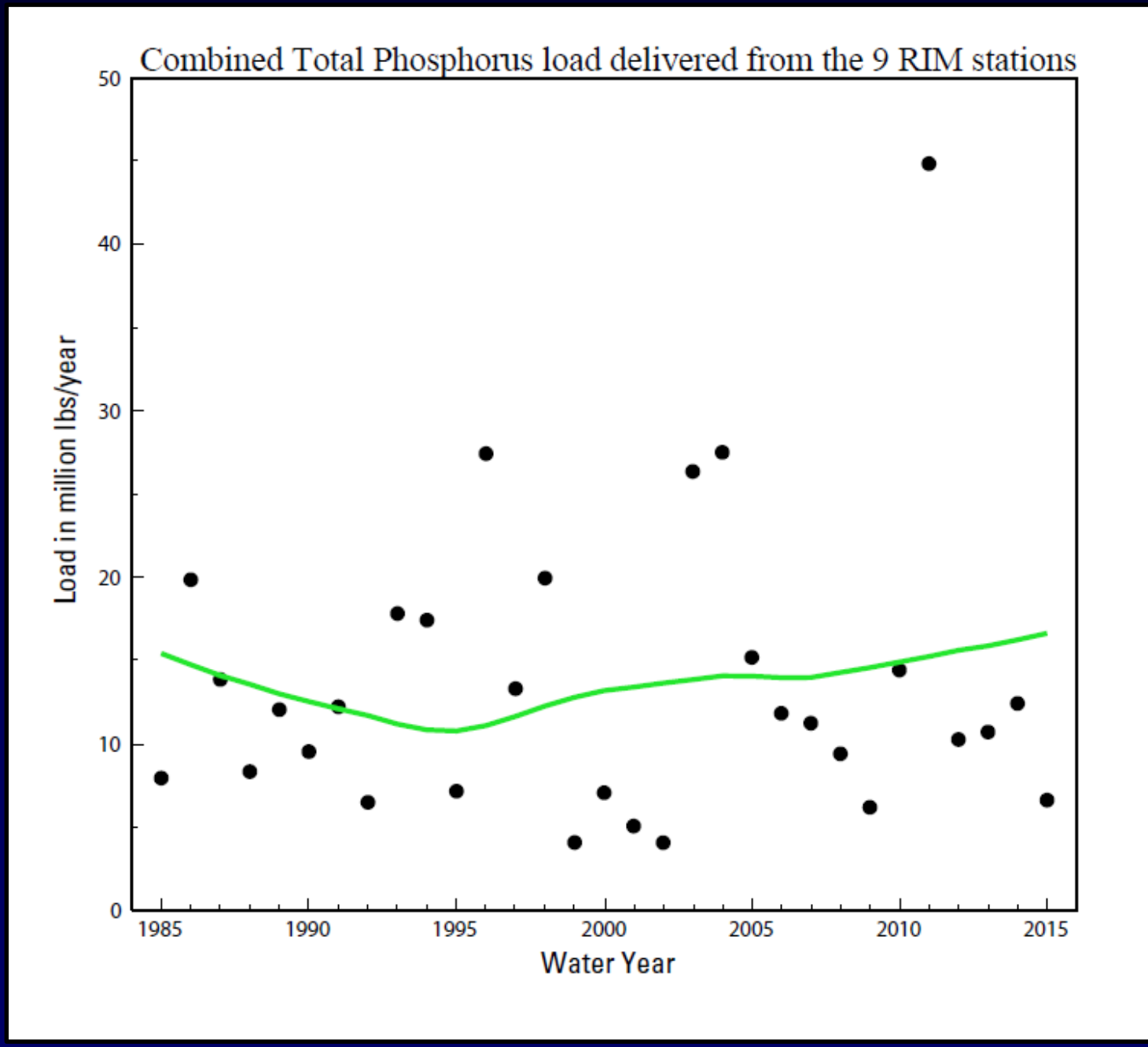
Source: Chesapeake Bay Program
http://www.chesapeakebay.net/indicators/indicator/phosphorus_loads_and_river_flow_to_the_bay

USGS

Changes in Total Phosphorus Delivered to the Bay Estuary from the 9 RIM Stations

Percent of total RIM load

Susquehanna = 45%
Potomac = 28%
James = 18%
Rappahannock = 5%
Appomattox = 1%
Pamunkey = 1%
Mattaponi = <1%
Patuxent = <1%
Choptank = <1%



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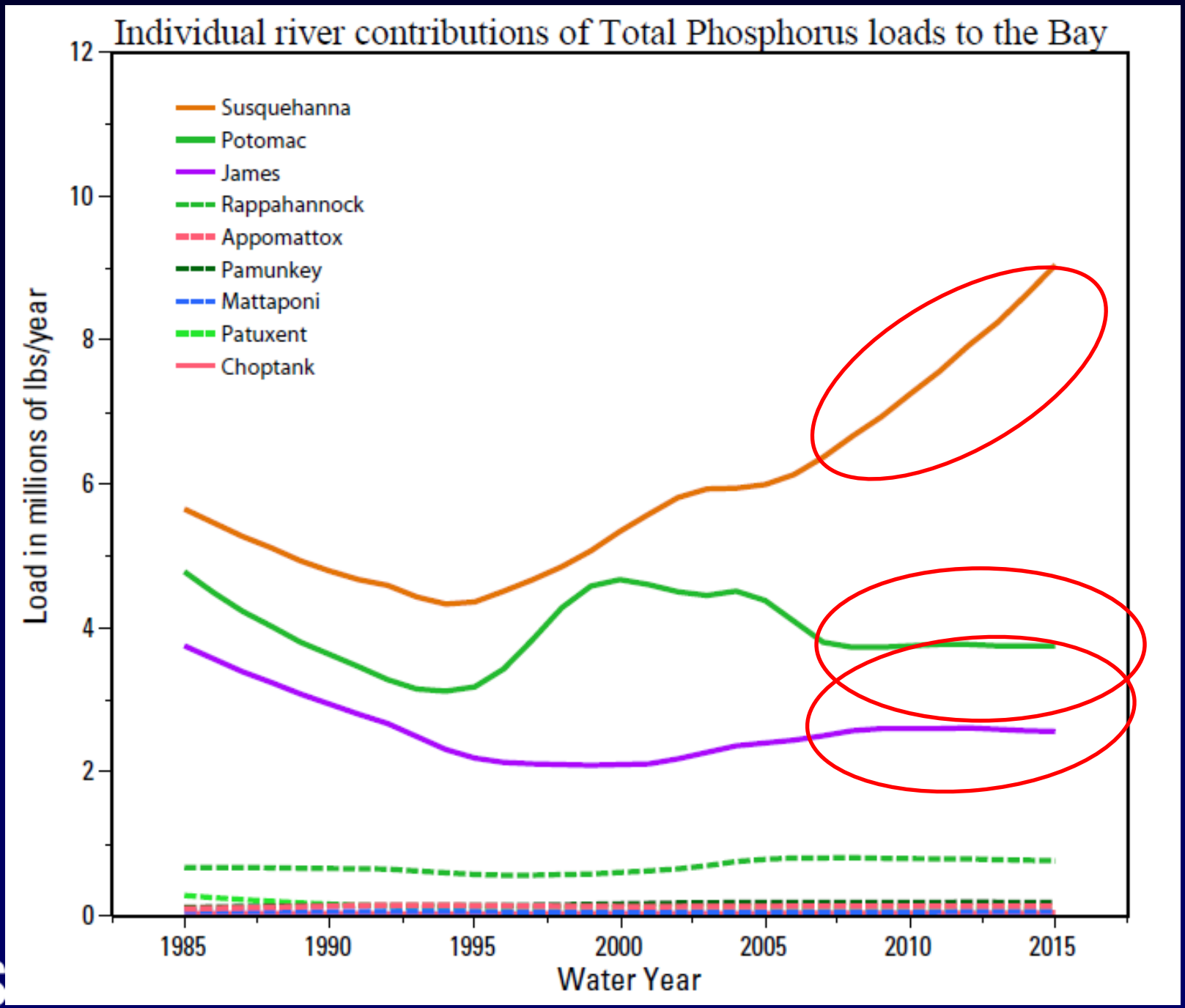
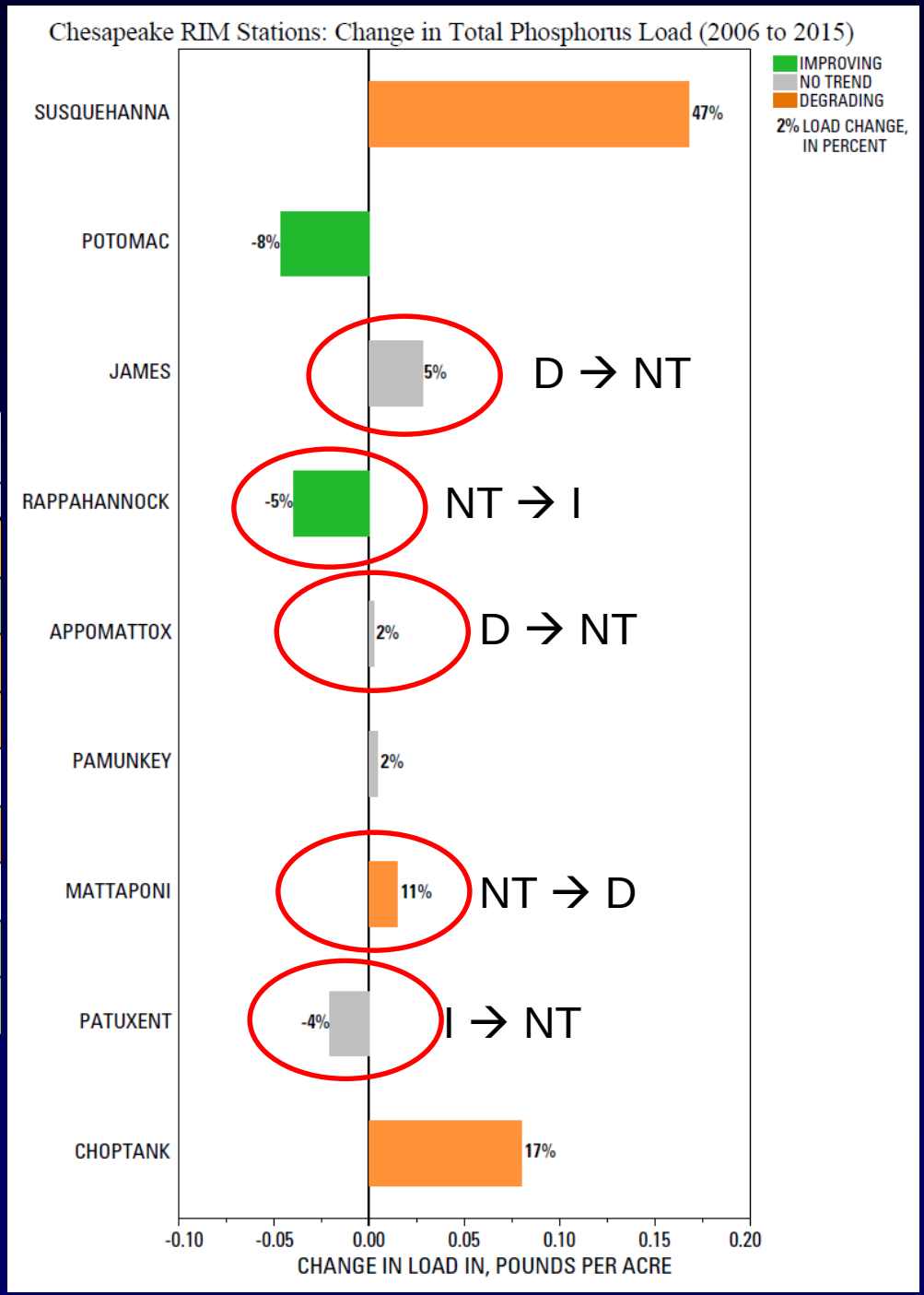

Individual river contributions of Total Phosphorus loads to the Bay
Susquehanna
Potomac
James
Rappahannock
Appomattox
Pamunkey
Mattaponi
Patuxent
Choptank
Load in millions of lbs/year
0
2
4
6
8
10
12
1985
1990
1995
2000
2005
2010
2015
Water Year

USGS

Changes in Total Phosphorus Load Delivered to the Bay from the 9 RIM Stations

Monitoring station	Total phosphorus load	
	Long term	Short term
SUSQUEHANNA RIVER AT CONOWINGO, MD	Degrading	Degrading
POTOMAC RIVER AT WASHINGTON, DC	Improving	Improving
JAMES RIVER AT CARTERSVILLE, VA	Improving	No Trend
RAPPAHANNOCK RIVER NR FREDERICKSBURG, VA	Degrading	Improving
APPOMATTOX RIVER AT MATOACA, VA	Degrading	No Trend
PAMUNKEY RIVER NEAR HANOVER, VA	Degrading	No trend
MATTAPONI RIVER NEAR BEULAHVILLE, VA	No Trend	Degrading
PATUXENT RIVER NEAR BOWIE, MD	Improving	No Trend
CHOPTANK RIVER NEAR GREENSBORO, MD	Degrading	Degrading



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Summary

- Nontidal Network Trends in Loads
  - Loads and trends are available for nitrogen, phosphorus, and suspended sediment for the period of (through 2014).

    http://cbrim.er.usgs.gov
- Loads Delivered to the Bay (9 RIM Stations) (2005-15)
  - Total Nitrogen: Improving trends at 4 and degrading trends at 4 RIM stations.
  - Total Phosphorus: Improving trends at only Potomac and Rappahannock and degrading conditions at 3 RIM stations.
  - Suspended Sediment: Improving trends at Potomac and Rappahannock and degrading trends at 4 RIM stations
- Next Steps
  - Influence of Susquehanna reservoirs on loads and water-quality in the bay
  - Explaining trends the RIM sites
  - Explaining yields and trends at sites throughout the watershed

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