Water-Quality Trends and Yields in the Chesapeake Bay Watershed: 2012 updated

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U.S. Geological Survey

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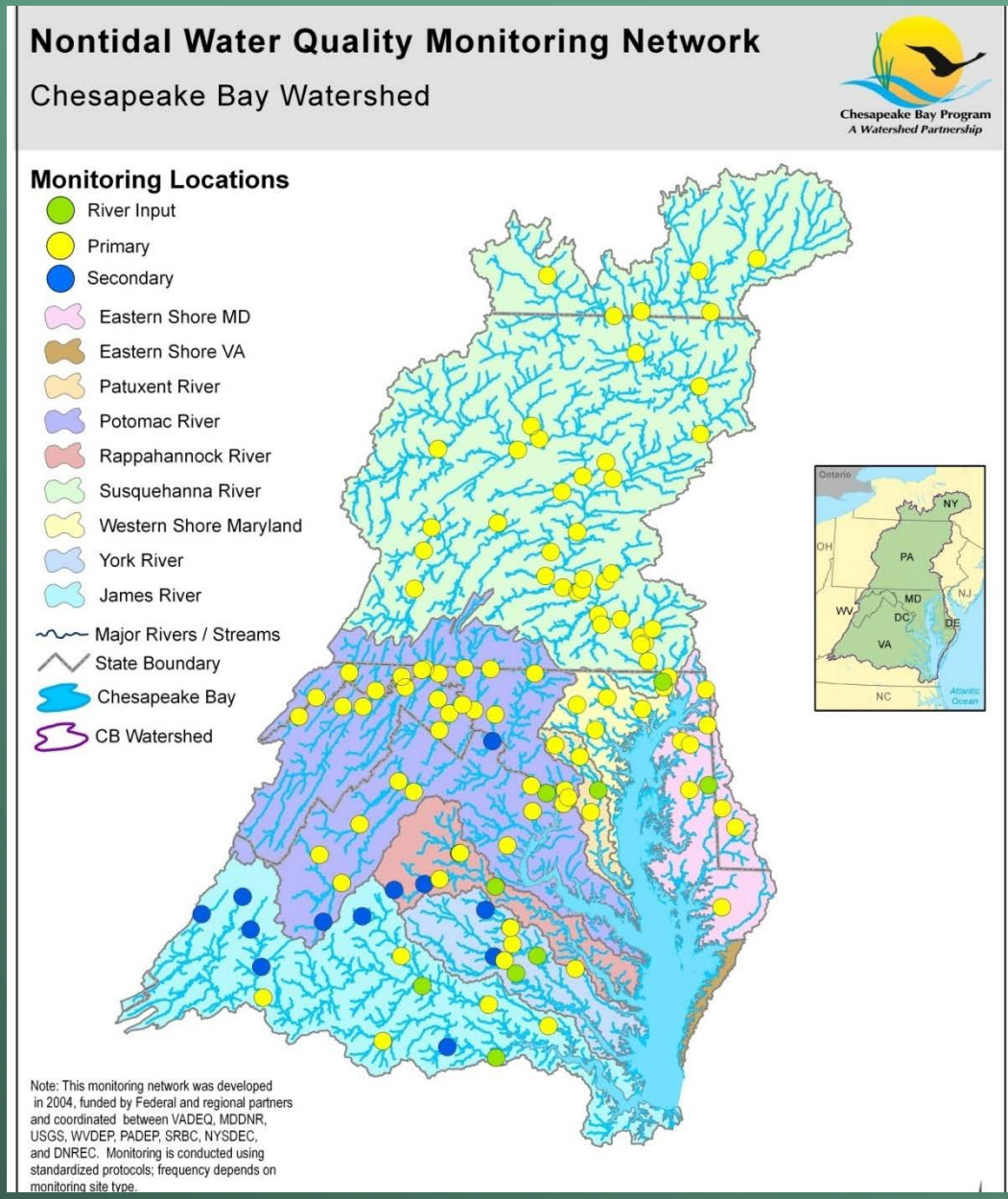
Watershed Monitoring

- **Nutrients and Sediment:**
  - 125 watershed sites
  - States, EPA, USGS, SRBC
- **Used to provide…**
  - Loads to the Bay
  - Trends in nutrients and sediment
  - Yields
- **Assess progress toward TMDL and WQ standards**



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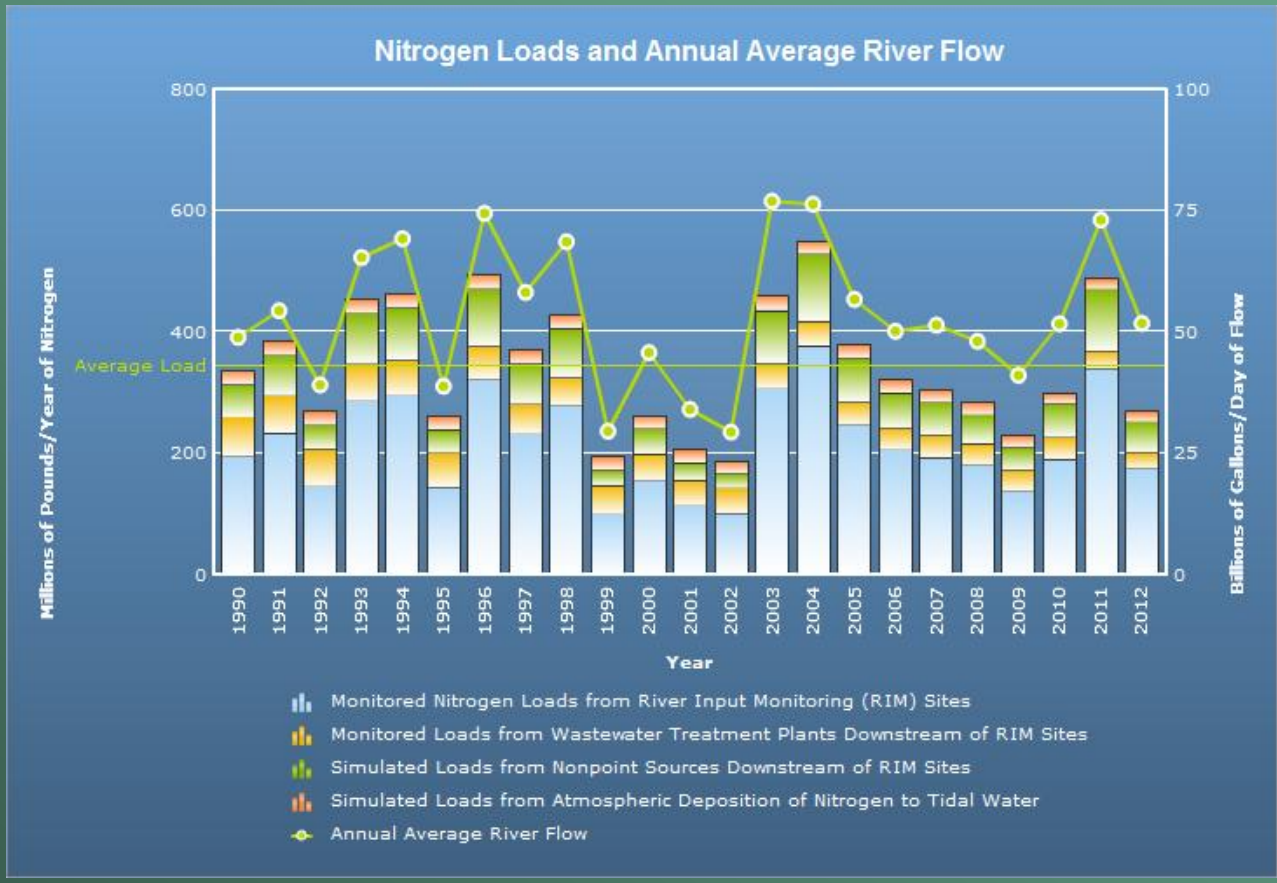
Total Load to the Bay

- Streamflow
- Nitrogen
- Phosphorus
- Sediment



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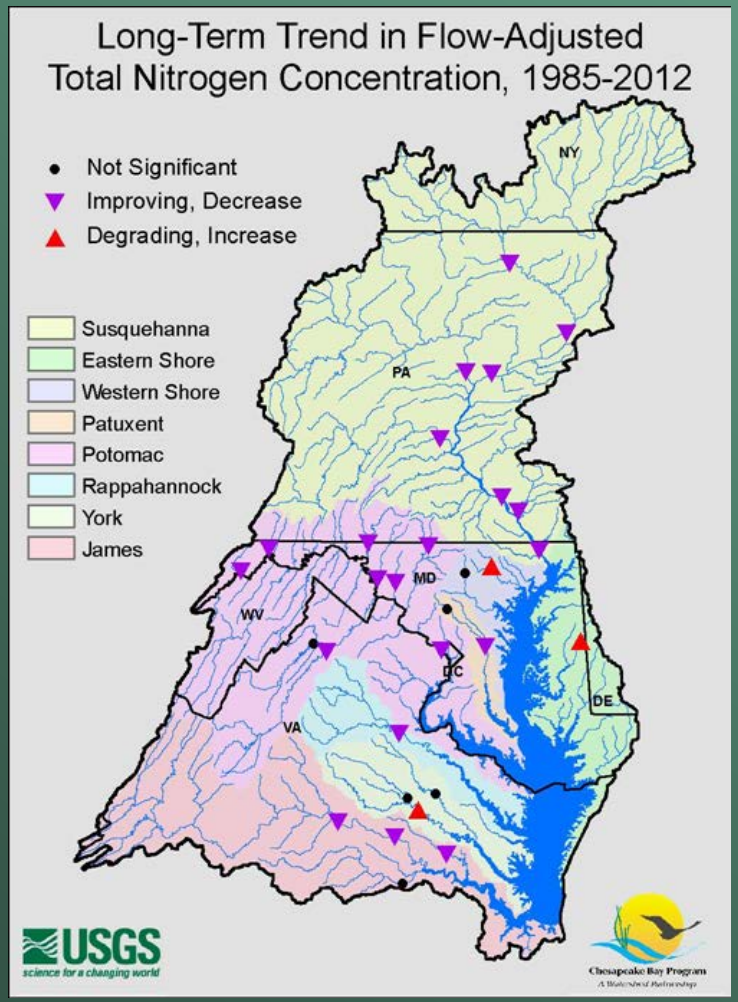
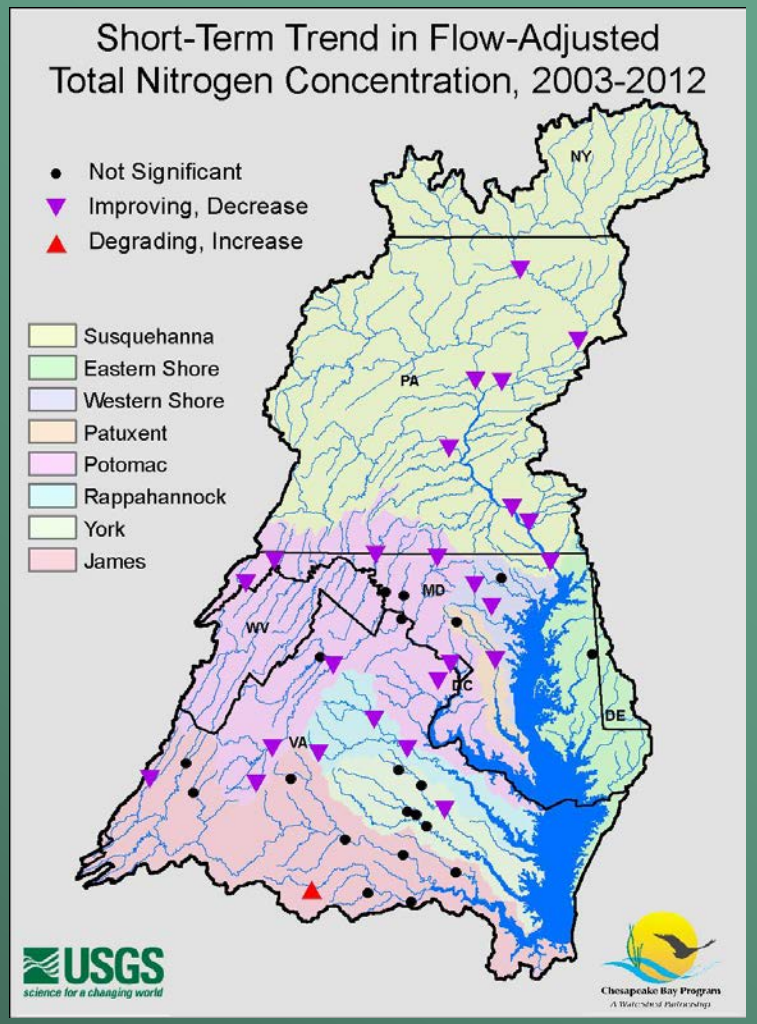
Nontidal Indicators: Nitrogen





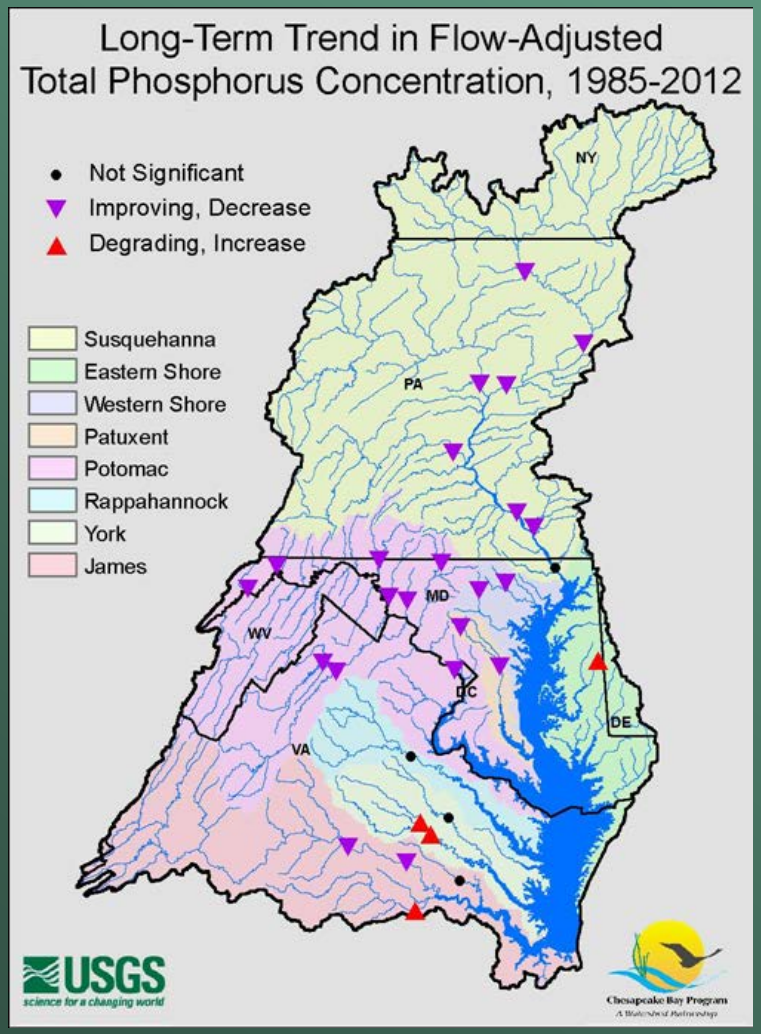
Long Term

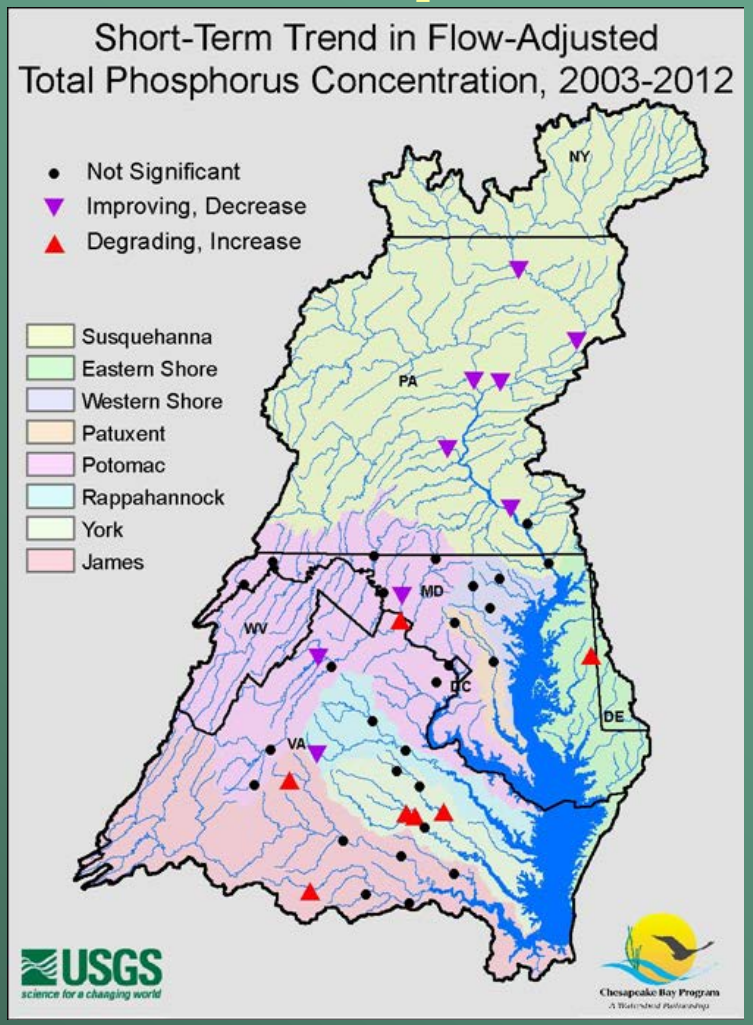
- 21 of 30 sites improving
- 3 sites degrading

Short Term

- 25 of 46 sites improving
- 1 sites degrading

Nontidal Indicators: Phosphorus





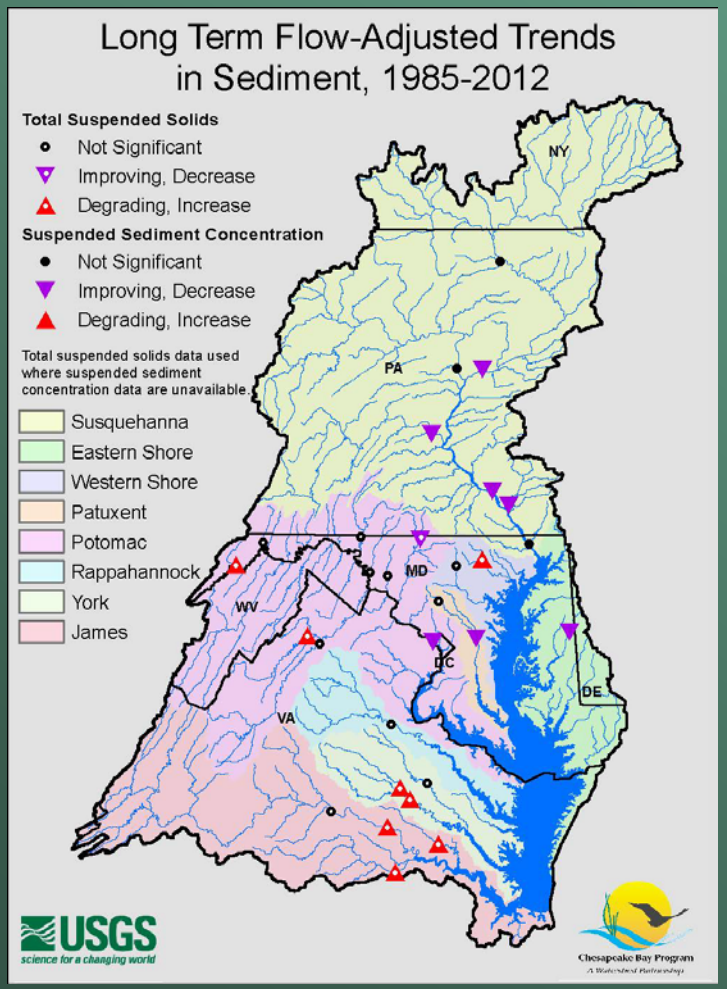
Long Term

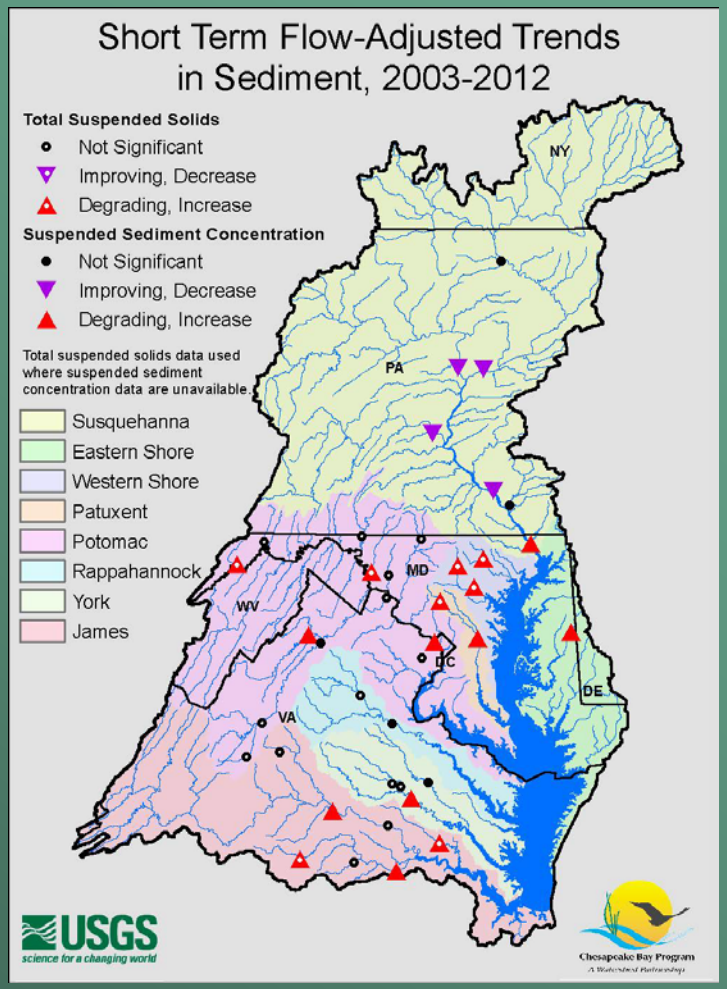
- 22 of 30 sites improving
- 4 sites degrading

Short Term

- 9 of 43 sites improving
- 7 sites degrading

Nontidal Indicators: Sediment





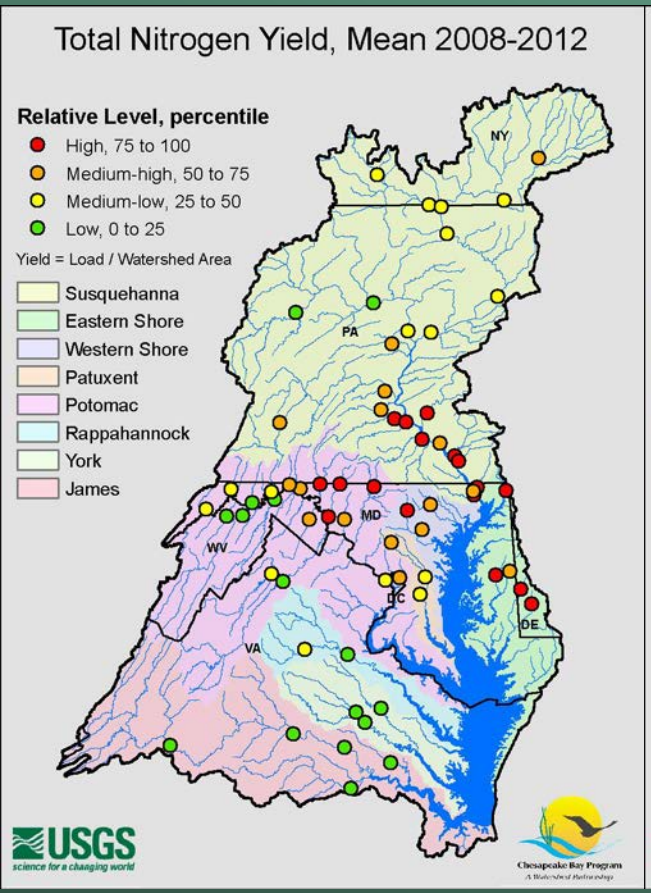
Long Term

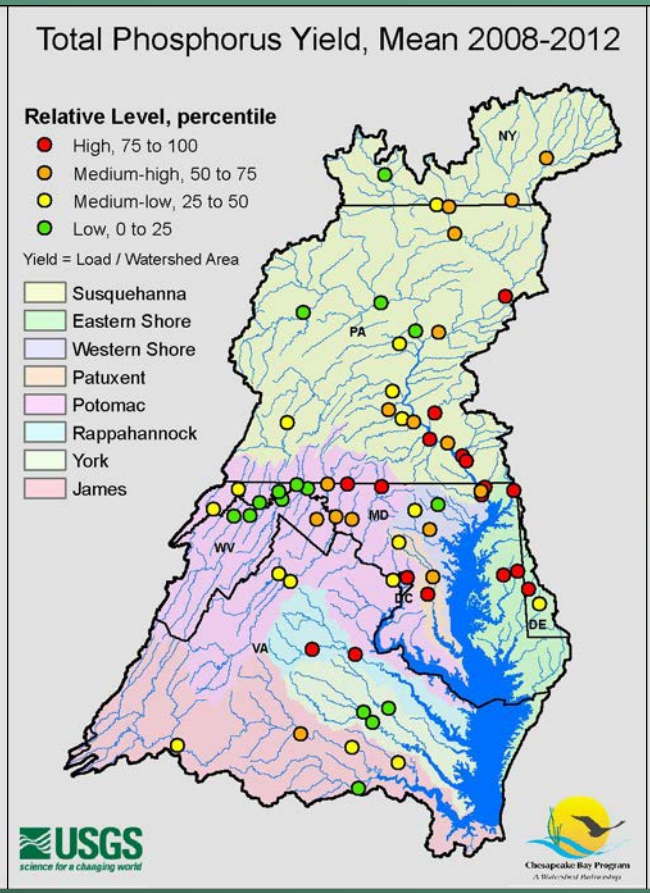
- 8 of 29 sites improving
- 8 sites degrading

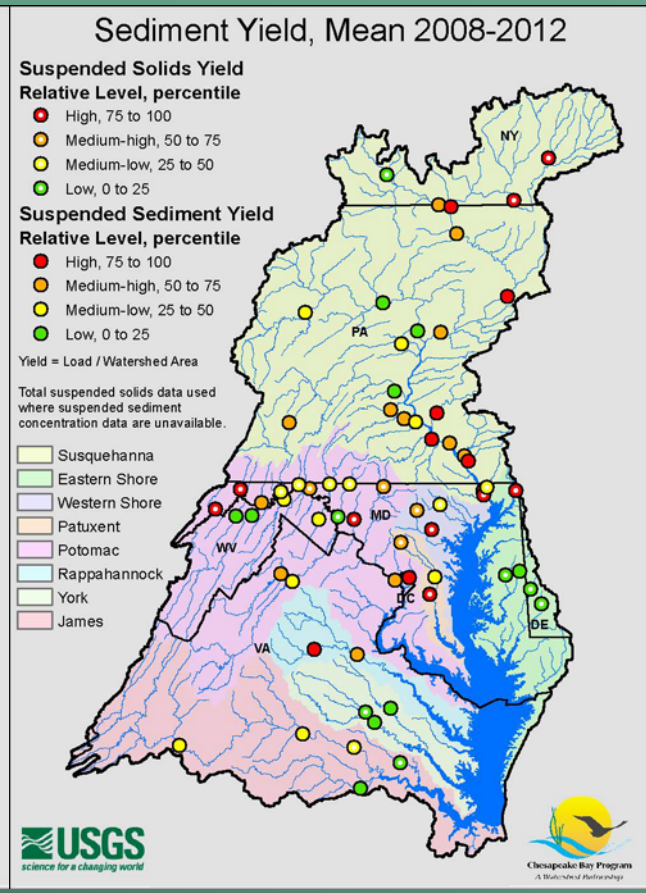
Short Term

- 4 of 39 sites improving
- 16 sites degrading

Relative-Yield Indicator







Nitrogen Yields

- Range: 0.33 to 9.87 tons per square mile
  - About (1-33 lb/Acre)
- High range greater than 3.4 T/mi2

Phosphorus Yields

- Range: 0.036 to 0.57 tons per square mile
  - (.12 – 1.9 lb/Acre)
- High range greater than .19 T/mi2

Sediment Yields

- Range: 9.3 to 648 tons per square mile
  - (31 – 2,200 lb/Acre)
- High range greater than 200 T/mi2

Flow Adjusted Trend Summary

Constituent	Long Term Trend (1985-2012)			Short Term Trend (2003-12)		
	Improving	Degrading	Not Significant	Improving	Degrading	Not Significant
Total Nitrogen (sites)	21	3	6	25	1	20
(% of sites)	70%	10%	20%	54%	2%	43%
Total Phosphorus (sites)	22	4	4	9	7	27
(% of sites)	73%	13%	13%	21%	16%	63%
Suspended Sediment and Solids (sites)	8	8	13	4	16	19
(% of sites)	28%	28%	44%	10%	41%	49%

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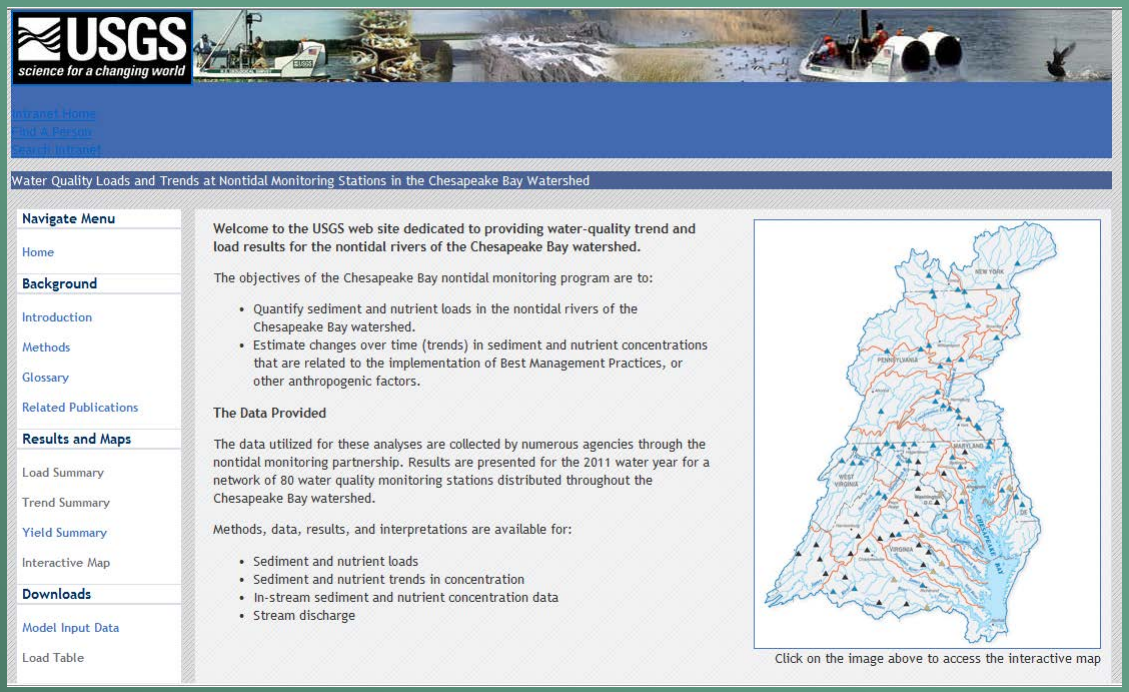
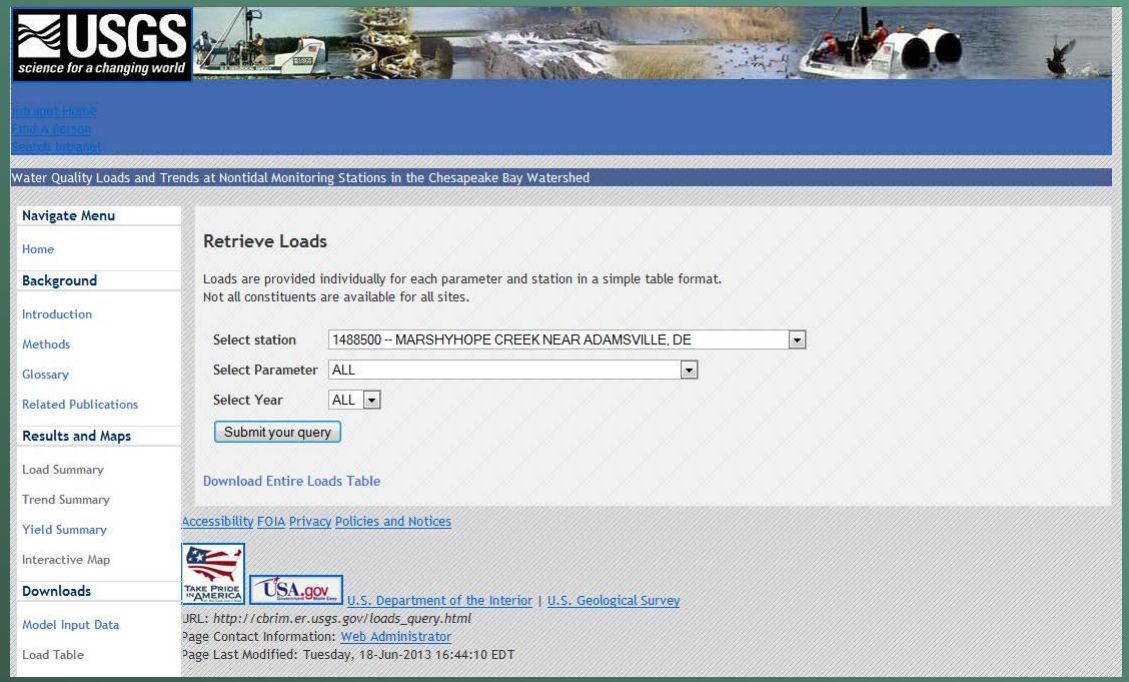
WEB Updates

- Summaries of load, trends, and yields
- Static and interactive maps (loads, yields, and trends)
- Annual load download
- Monthly load download
- Trend and yield results
- Final review of web products still required
- Future:
  - Improved access to monitoring data
  - Flow-normalized Load results





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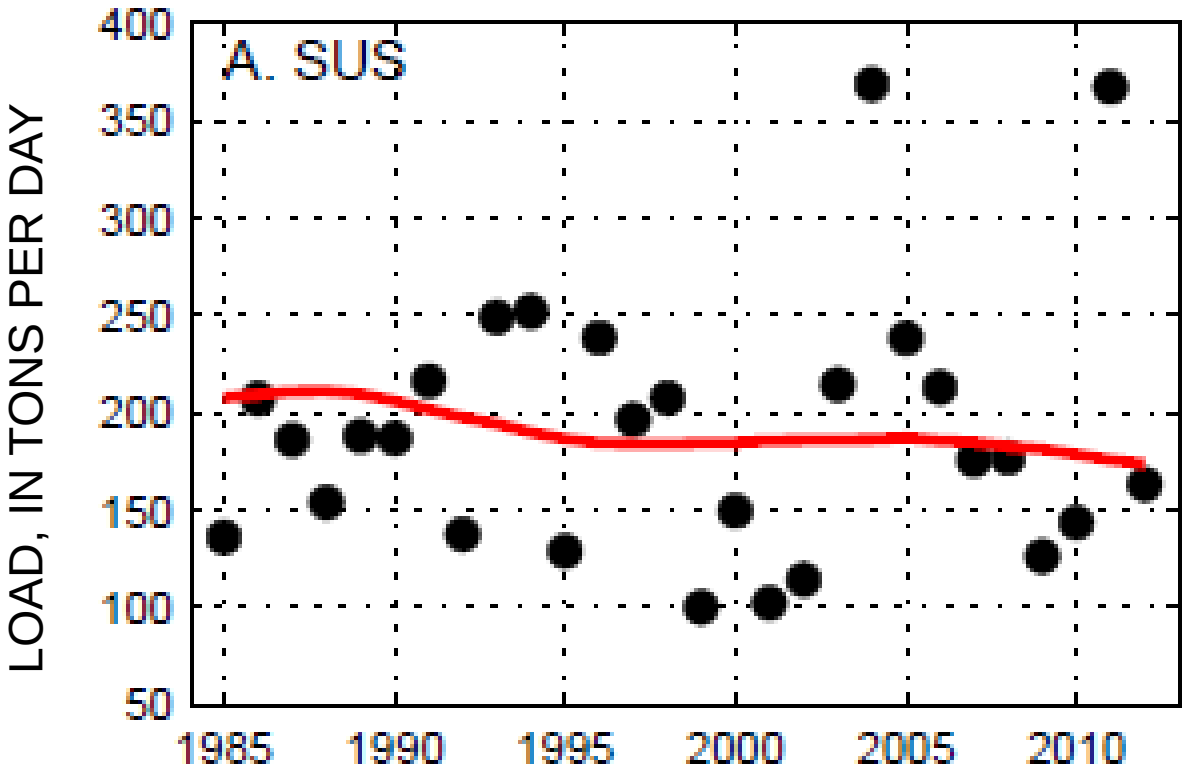
Trends in Total Nitrogen Annual Load

Total Nitrogen Load: Susquehanna (RIM)

- Influence of year-to-year variation in flow

With WRTDS, we now can communicate how annual loads have changed once the year-to-year variation in Q has been removed



Trend in load for:
1985 to 2012 = Total reduction of 16%
2002 to 2012 = Total reduction of 7%

Black Dots = Annual Load Red Line = Flow Normalized Load

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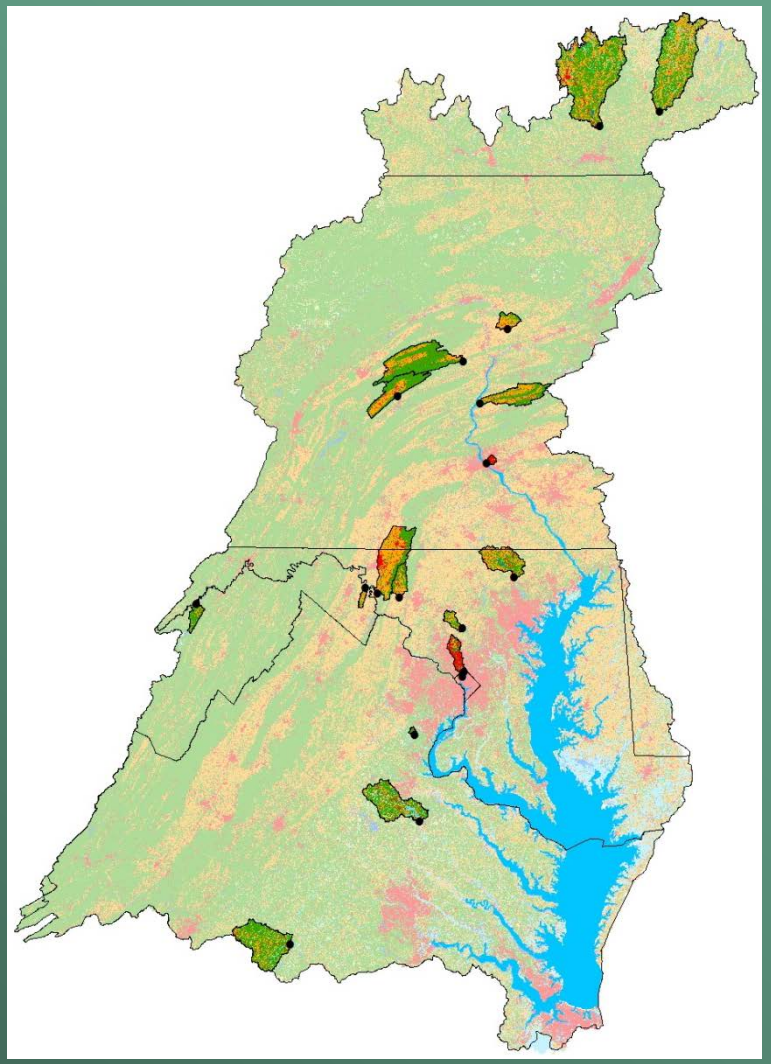
Challenges for 2014: Monitoring Shortfalls

- 2013 funding shortfalls in monitoring
  - States, EPA, USGS, SRBC trying to maintain in 2014
- Evaluate future monitoring options
  - “BASIN” (STAR and STAC)
  - New Bay Agreement
- WQ GIT:
  - Objectives & priorities
    - TMDL, standards, improved understanding
  - Products



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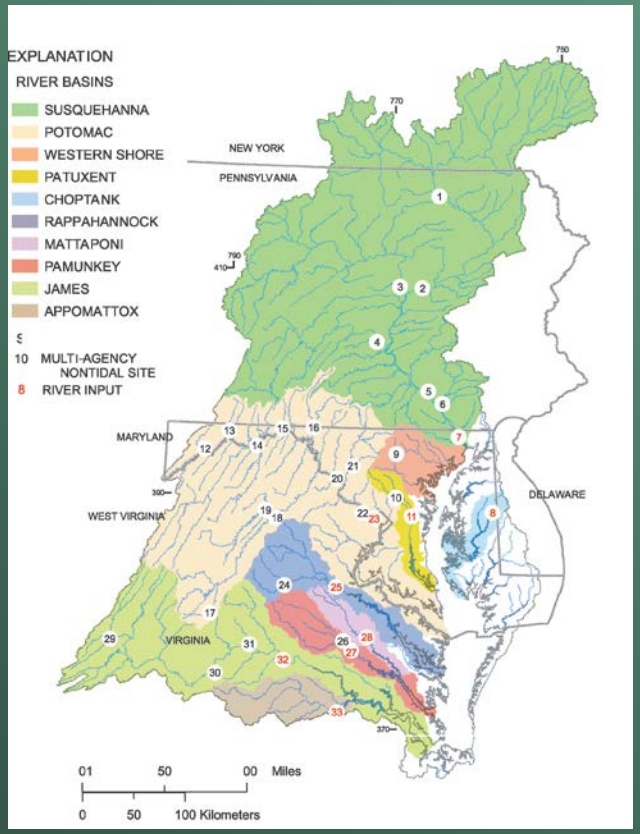
Assess and Explain Trends for MPA



- Enhanced analysis to support decision making for TMDL and WQ standards attainment
  - WQ GIT decision framework
  - STAR (NTWG, TMAW, CBP Modeling team)
- Trends in N, P, sediment in watershed
- Attainment of water quality
- Explain water-quality trends
  - Watershed and Estuary
- Enhance CBP models
- Synthesize and communicate results

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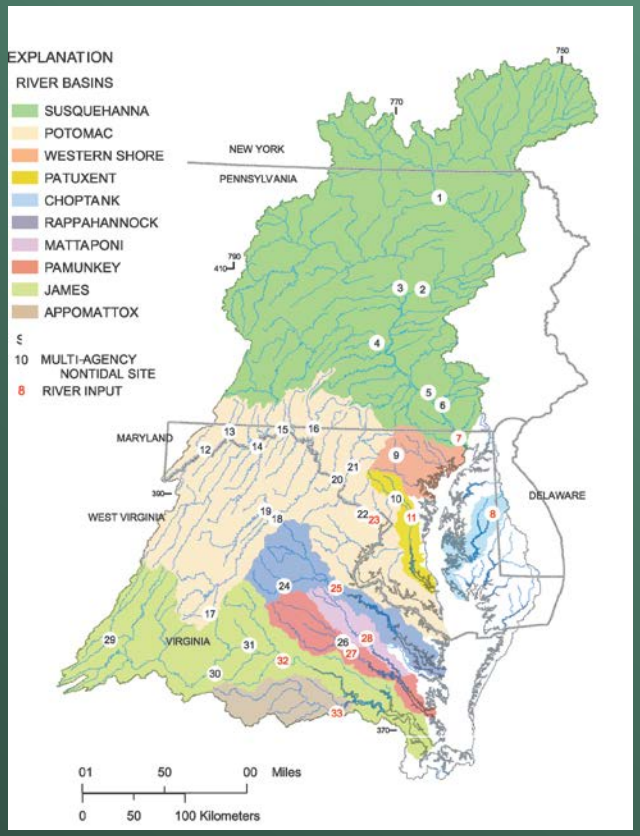
Assess and Explain Trends for MPA: 2014



- Trends in N, P, sediment in watershed
  - Flow-normalized load to the Bay
- Attainment of water quality
  - Combined indicator/GAM approach
- Explain water-quality trends
  - Lessons learned report
  - Eastern Shore Report
  - Potomac
- Enhance CBP models
- Synthesize and communicate results
  - Joint product on BMP reporting, trends in watershed and tidal waters

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More info

- Trends and yields: http://cbrim.er.usgs.gov/index.html

- Bay Barometer
- Contacts:
  - J. Blomquist
  - D. Moyer
  - M. Langland

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