Enhancement of the Nontidal Water Quality Monitoring Network in the Susquehanna River Basin

SRBC Water Quality Advisory Committee Meeting
September 27, 2011

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@ US EPA Chesapeake Bay Program Office

Outline

- Overview of current and enhanced Chesapeake Bay watershed-wide nontidal water quality monitoring network (NTN)
- Overview of enhancements to Susquehanna River Basin (SRB) portion of watershed
- Future plans for the network
- Monitoring and assessment products

NTN

Monitoring: (88-sites)

- Maryland
- Virginia
- West Virginia
- Pennsylvania
- West Virginia
- New York
- Delaware
- SRBC
- USGS

Approach:

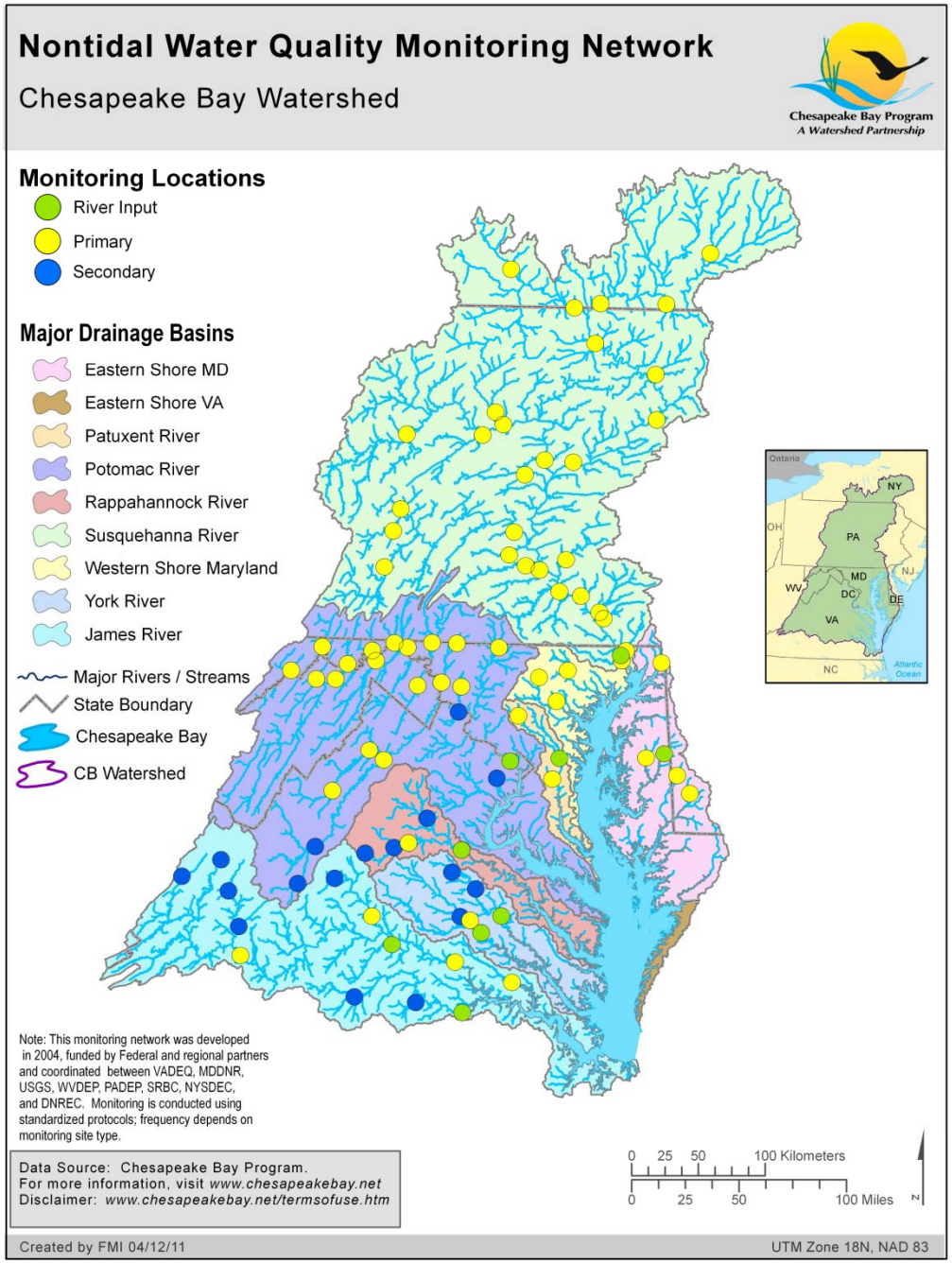
- Consistent sampling and analytical methods

Analysis and Reporting

- Trends
- Loads
- Stream flow
- Calibrate and verify watershed models

Annual communication:

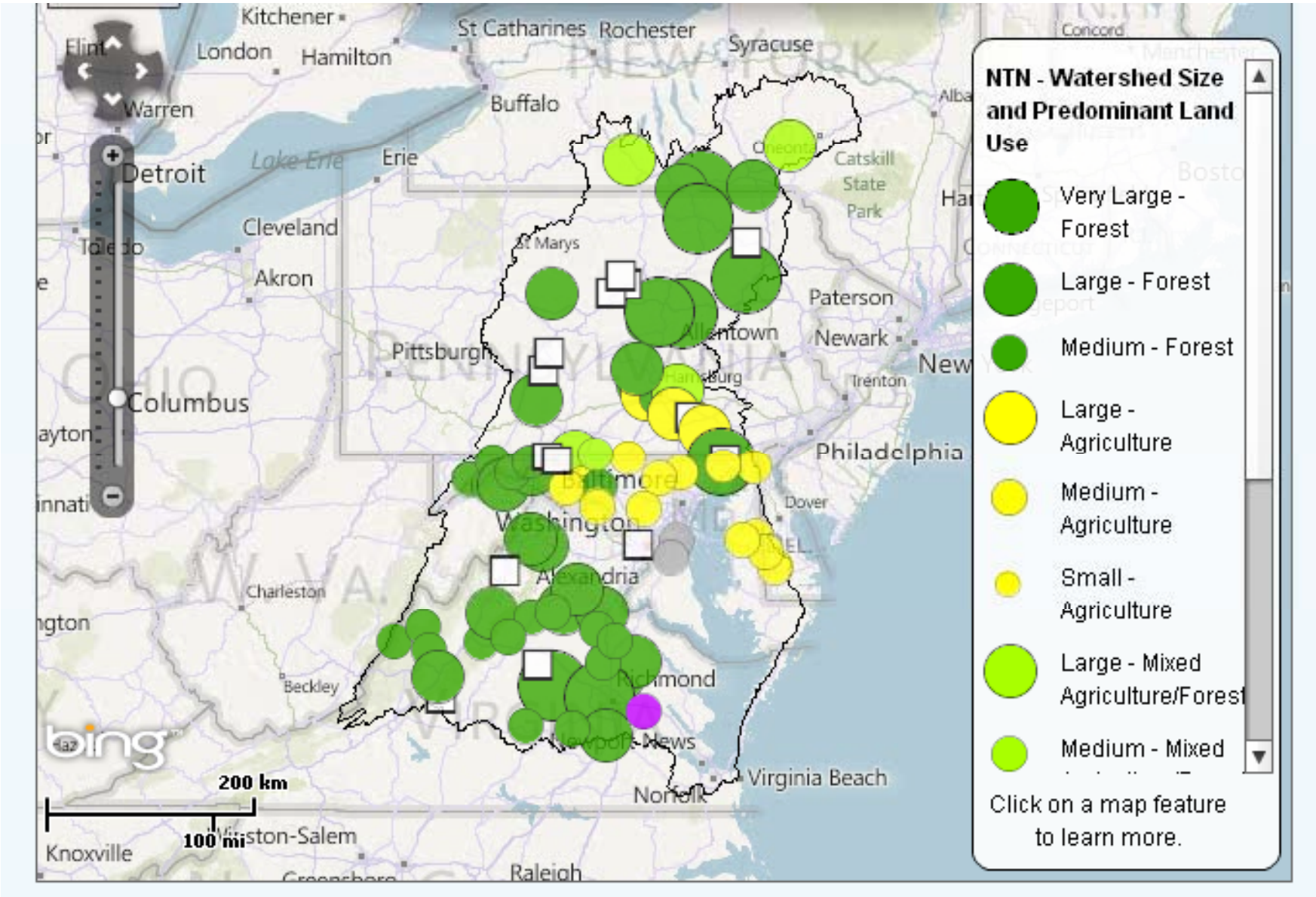
- Science Community
- Management Community
- Public



Enhancements address several recommendations

- STAC Monitoring Realignment Action Team (MRAT 2009)
- Recent findings of the National Academy of Scientists' report (NAS 2011)

NTN sites in mostly large/forested watersheds

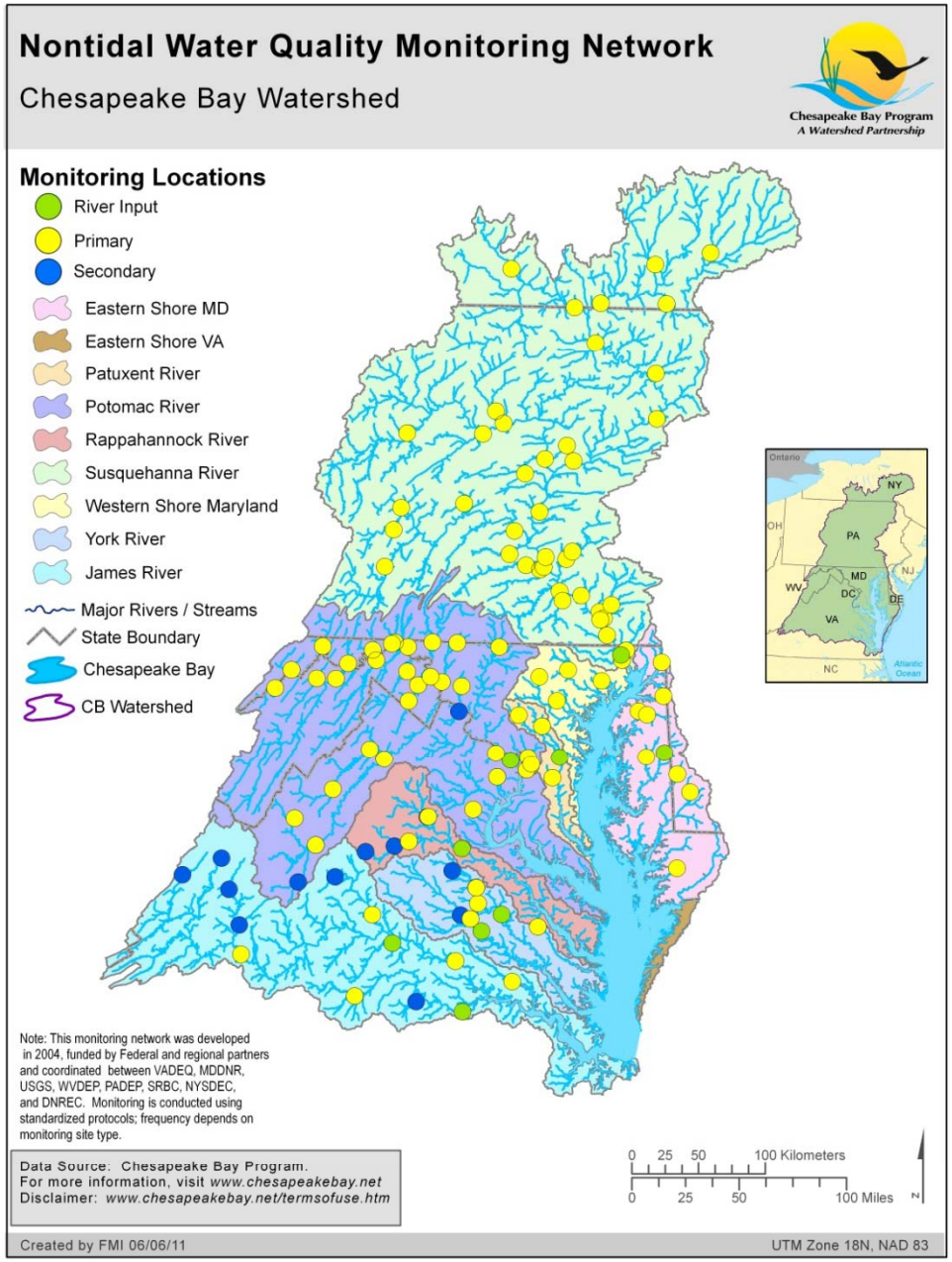


Enhancements will help track progress towards the TMDL

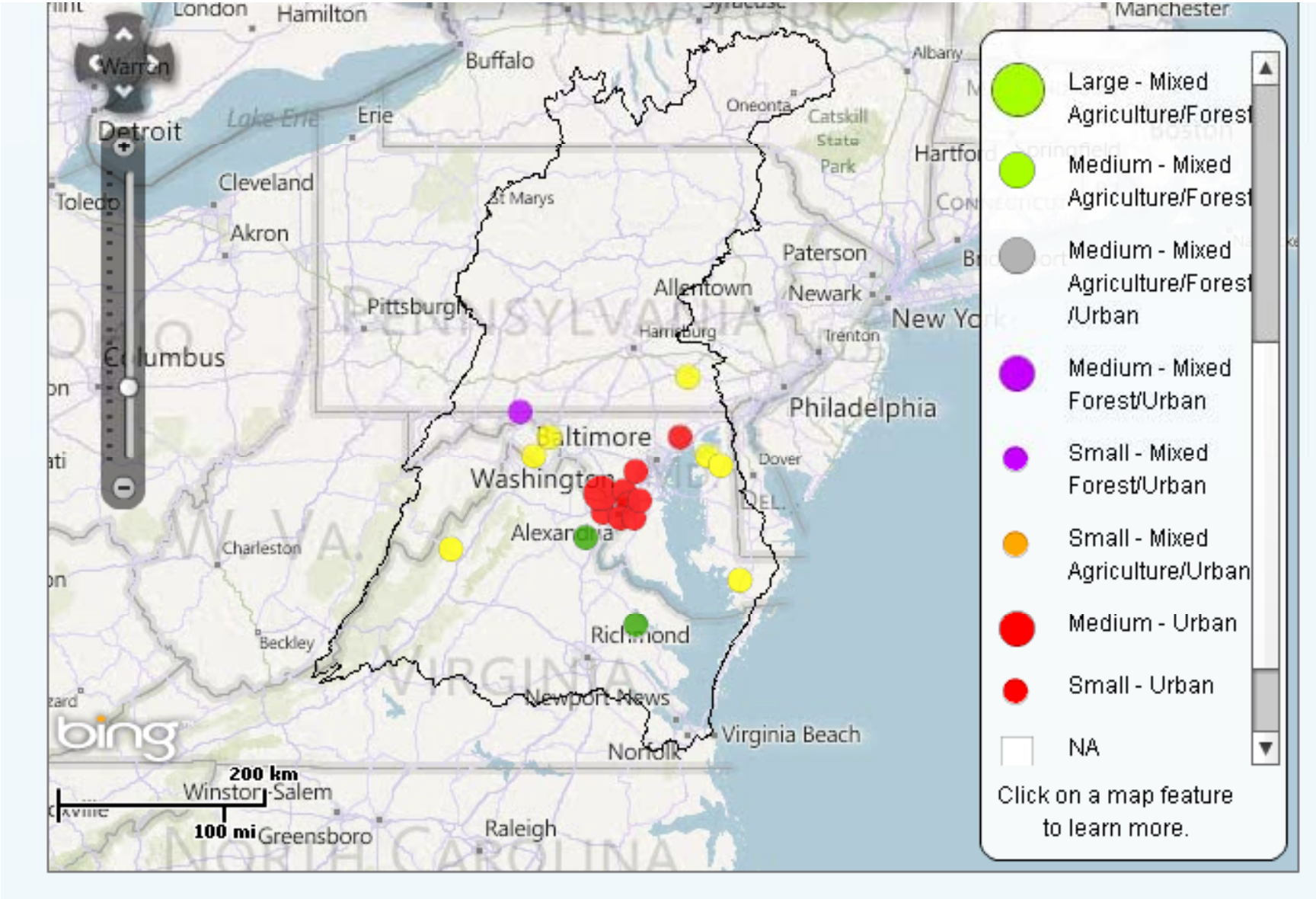
- Increased monitoring in major source sectors (agricultural, urban, suburban areas)
- Enhanced monitoring in watersheds with increased BMP implementation to document water-quality improvements of priority BMPs
- Increased monitoring sites in areas where there are gaps to enhance the CBP watershed model for the 2017 TMDL re-evaluation
  - Coastal plain, small watersheds

37 new/upgraded sites proposed

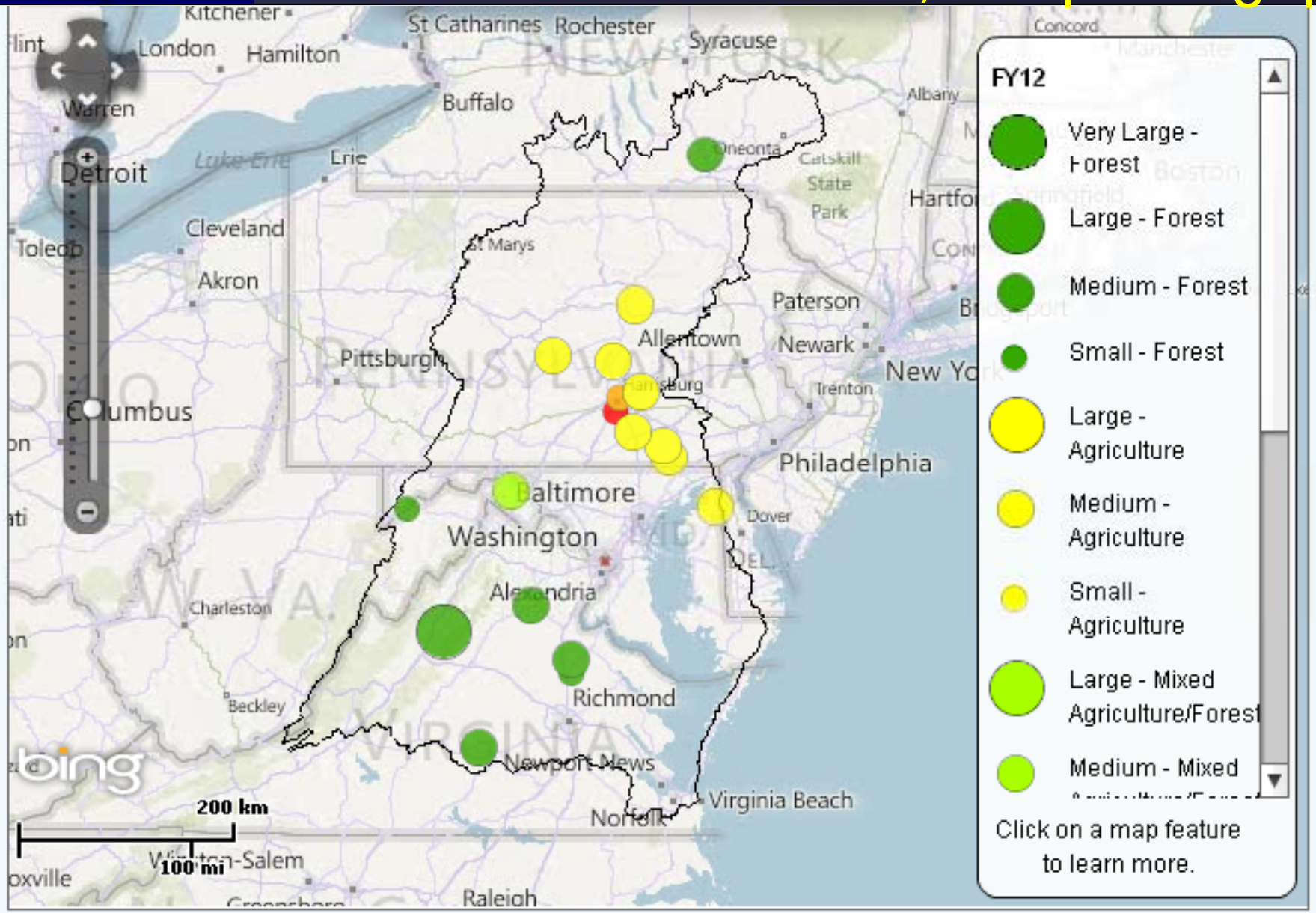
- 32 new sites, 5 upgraded sites for a total of 120 sites by the end of 2012
- In 2010, the shared cost of the network was $3.7M
- The additional sites supported by an additional $2M of USEPA funds provided to the jurisdictions



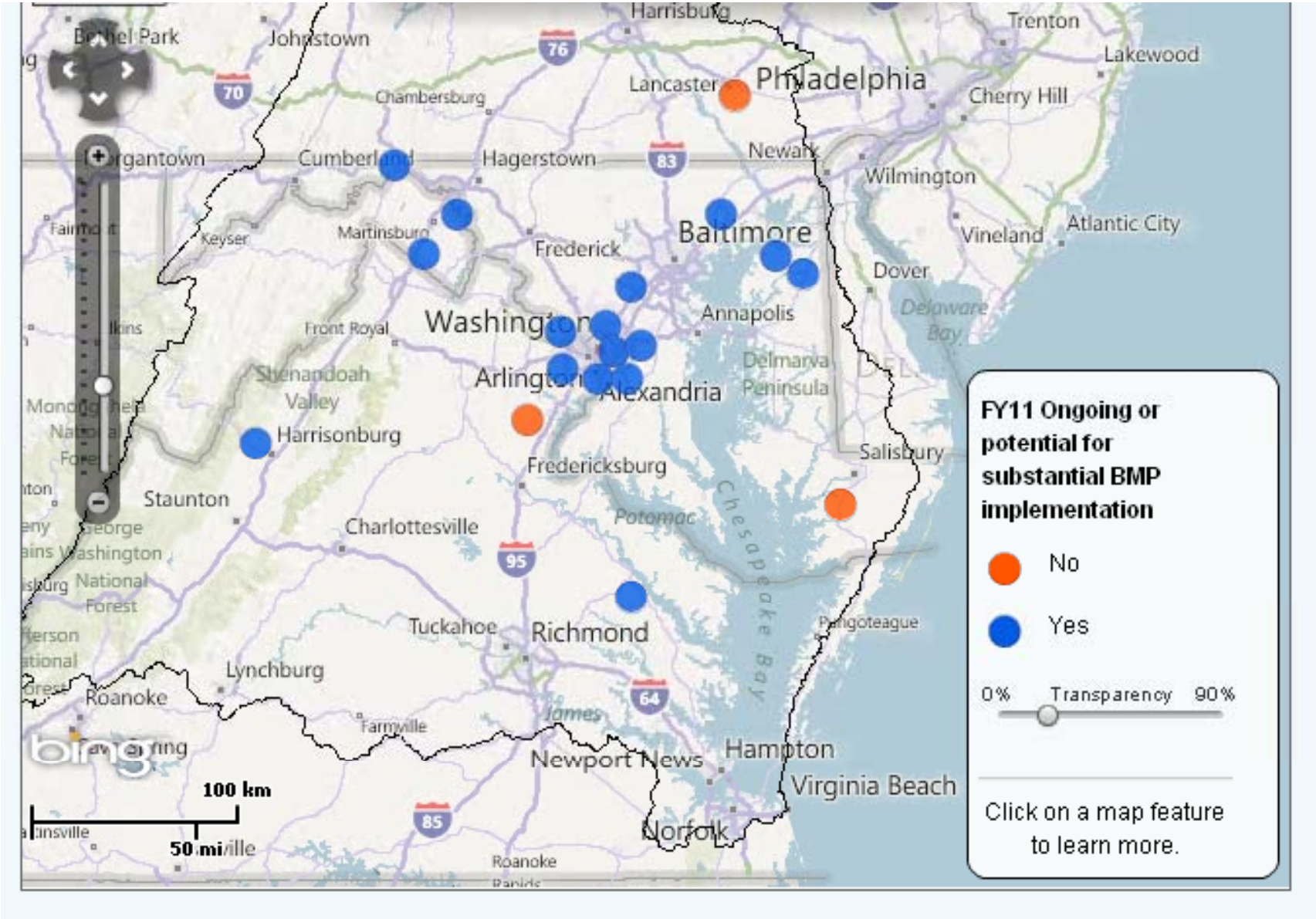
FY11 focus on smaller urban and ag watersheds



FY12 focus on small/medium ag and urban watersheds, fill spatial gaps



Many sites added in FY11 and 12 have increased BMP implementation



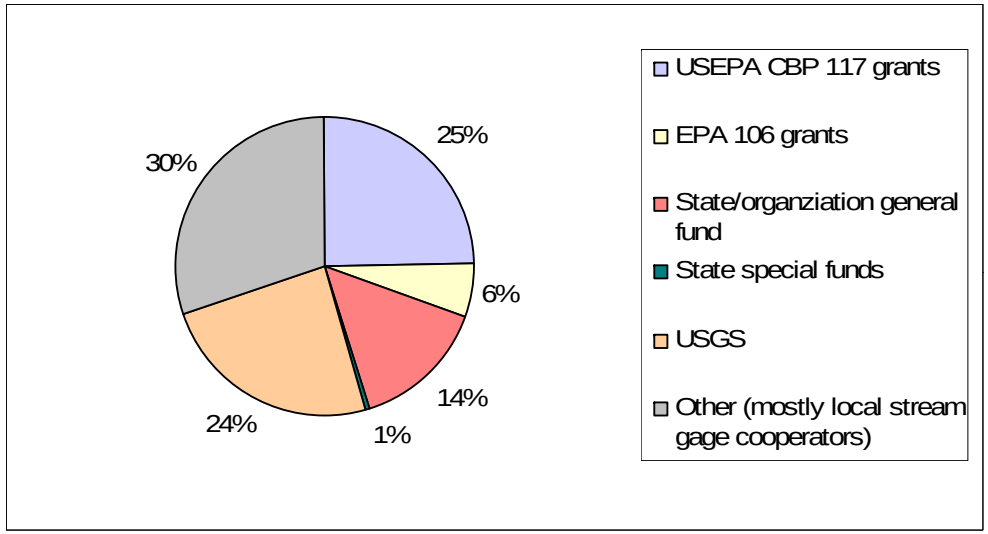
Funding details by jurisdiction

Jurisdiction	# Stations in existing network	Current CBP funding (approx. $)	# New stations FY 11	# New gages FY 11	Proposed FY11 CBP funding ($)	# New stations FY 12	# New Gages FY 12	Proposed FY 12 CBP funding ($)	Monitoring or potential monitoring organization	Total cost to maintain network ($/yr)
District of Columbia	0	0	4	4	244,000	0	0	0	DDOE, ICPRB, USGS	184,000
Maryland*	18	139,589	6*	1	291,000	1	1	61,000	MDDNR, USGS,SRBC	1,150,000
Pennsylvania	28	372,000	1	0	46,000	9	7	519,000	PADEP, USGS, SRBC	1,748,000
New York	5	62,000	0	0	0	1	0	46,000	SRBC	276,000
Virginia	31	254,500	5	0	238,100	5	1	218,100	VADEQ, USGS	1,416,000
West Virginia	4	80,000	3	2	168,000	2	1	107,000	WVDEP, USGS, WVDA	414,000
Delaware	2	8,000	0	0	0	0	0	0	DNREC	92,000
Total	88	916,089	19	7	987,100	18	10	951,100		5,280,000

*2 of the sites will be funded by MD DNR funds to comply with grant guidelines; funding is offset by matching funds to support for 2 existing MD NT sites.

Multiple NTN Funders

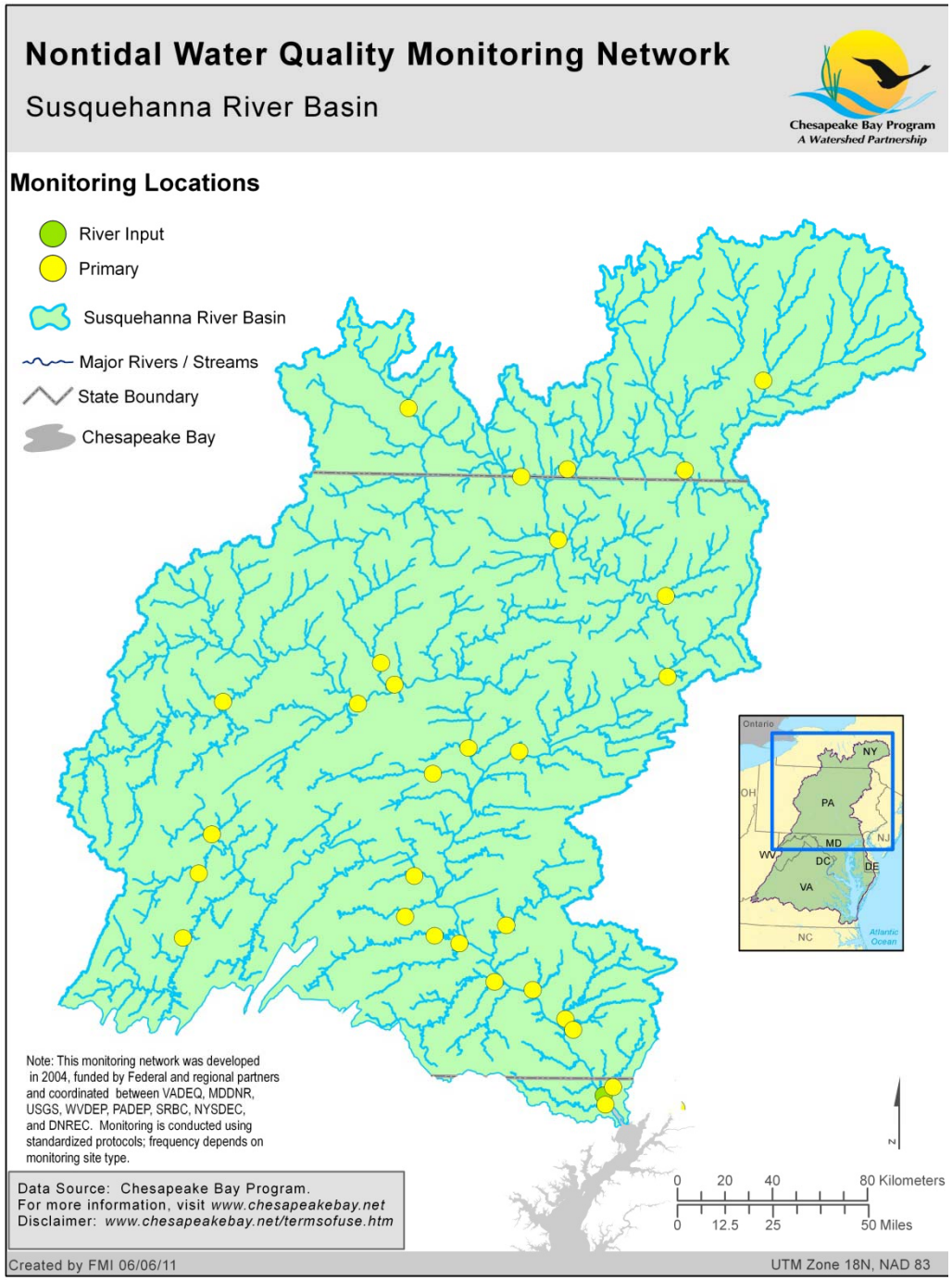
- NTN funded with existing funds from multiple partners
- The network is vulnerable to budget shortfalls
- A multi-agency commitment to maintaining the network is necessary



Monitoring in the Susquehanna River Basin (SRB)

Current NTN in SRB

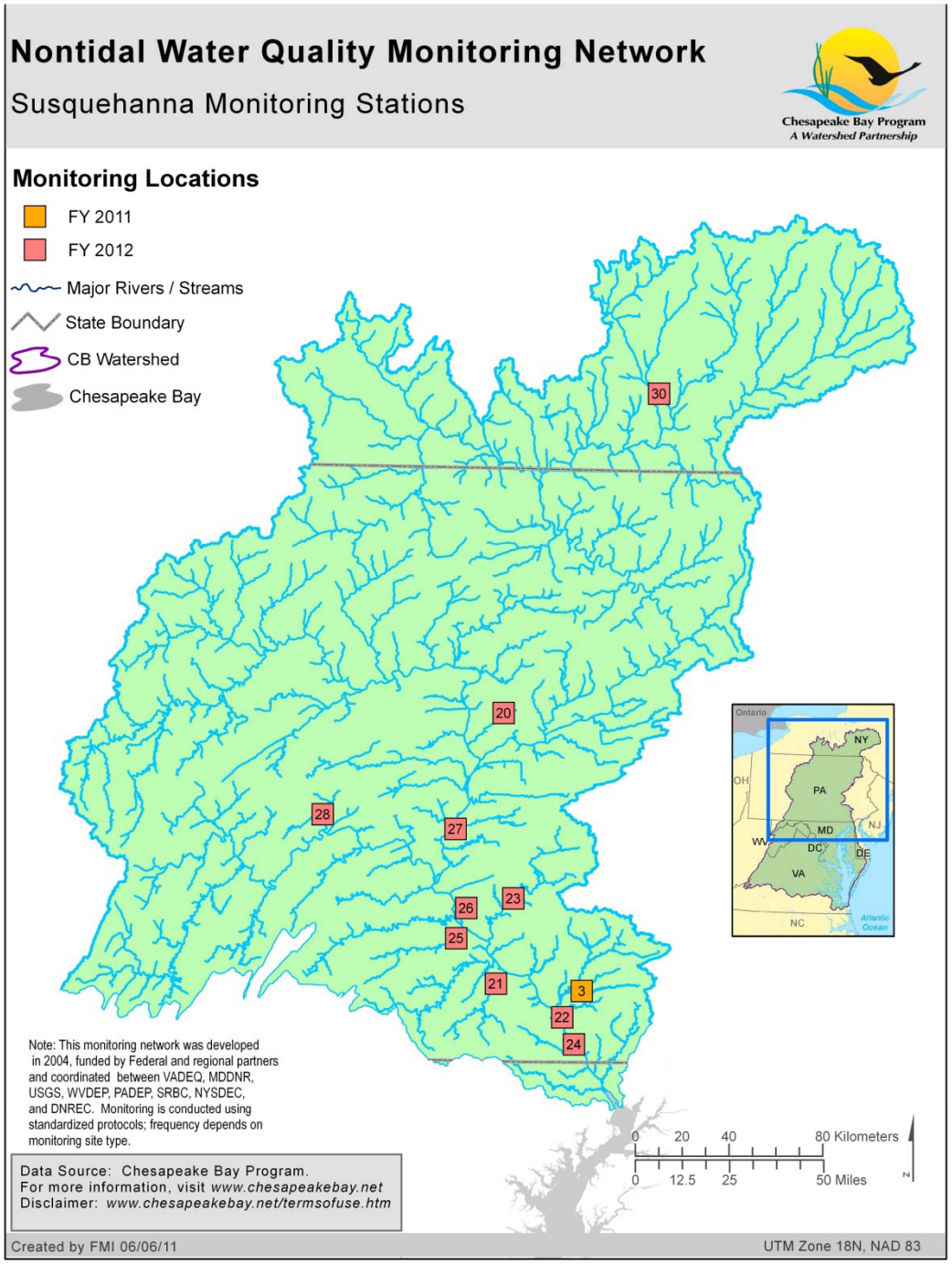
- 30 sites in SRB monitored by: SRBC, USGS, PADEP, MDDNR
- Monthly and storm sampling for nutrients, sediment, and stream flow



New in FY11-12

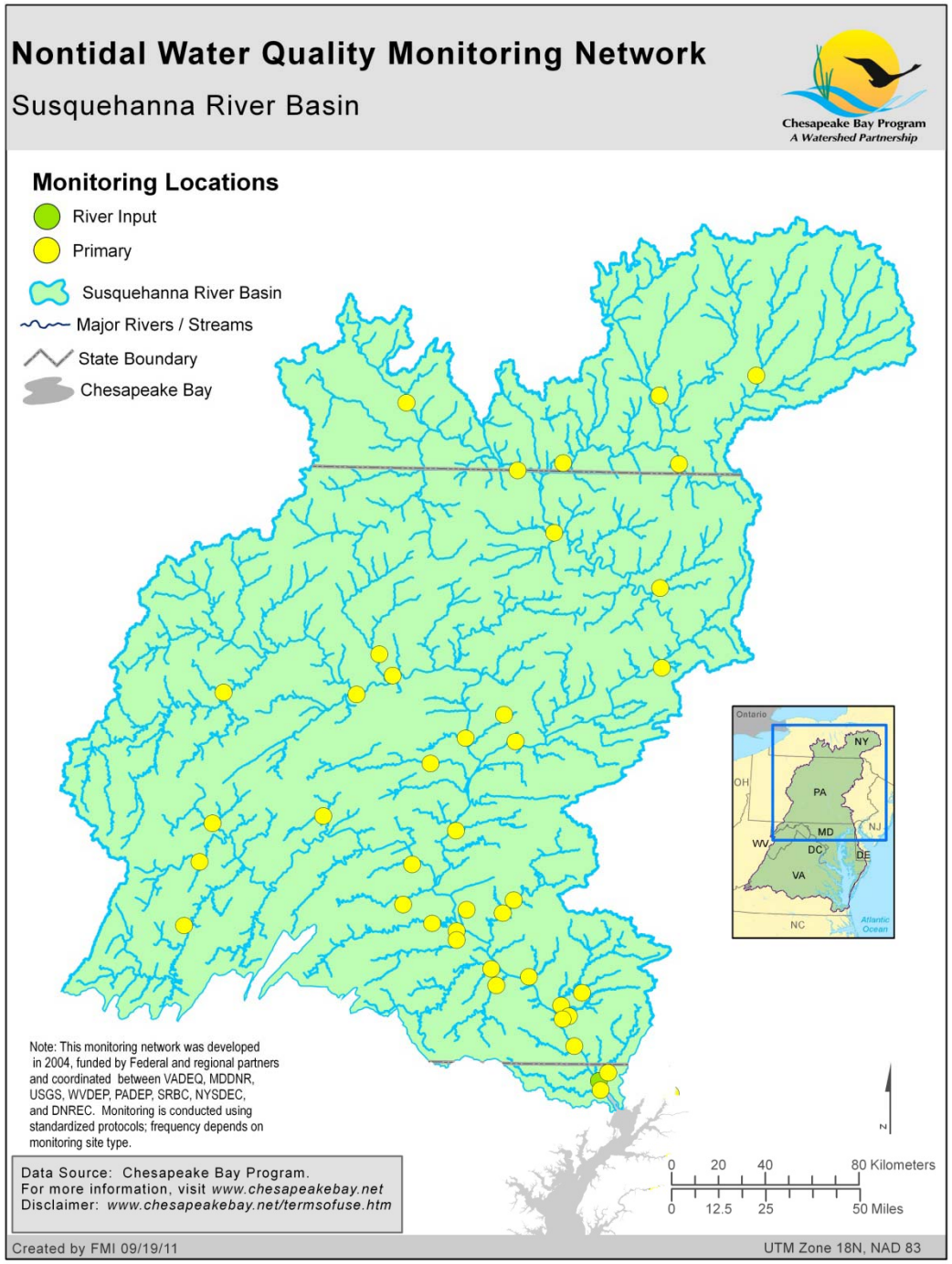
11 new sites in total

- 7 new gages
- 5 sites with BMP implementation
- 8 in ag areas
- 2 in urban areas
- 3 in small watersheds



Enhanced NTN in SRB

41 total sites



Site Name	Map Key	Small or Moderately Small Watershed? (<50 square miles) (Y)	Predominate Land use Influence	In the Coastal Plain? (Y)	Ongoing/potential for substantial BMP implementation? (Y)	Monitoring Agency	Gage Construction (Y)	Gage Operation (Y)	FY11 cost ($)	FY12 cost ($)
Big Spring Run	3	Y	Ag			PADEP/USGS		Y	46,000	
Chillisquaque @ Washingtonville	20		Ag		Y	PADEP/USGS	Y	Y		61,000
Codorus Ck nr Pleasureville	21		Ag		Y	PADEP/USGS	Y	Y		61,000
Pequea Ck at Strasburg	22		Ag		Y	PADEP/USGS	Y	Y		61,000
Quittapahilla Ck	23		Ag		Y	PADEP/USGS	Y	Y		61,000
Spring Cr nr Harrisburg, PA	25	Y	Urban			PADEP/USGS	Y	Y		61,000
Muddy Creek	24		Ag			SRBC	Y	Y		61,000
East Mahantango at Dalmatia	27		Ag			SRBC		Y		46,000
Kishacoquillas at Reedsville	28		Ag		Y	SRBC		Y		46,000
Tioughnioga at Itaska	30		Forest			SRBC		Y		46,000
Paxton Creek nr Harrisburg, PA	26	Y	Urban with Ag			SRBC	Y	Y		61,000

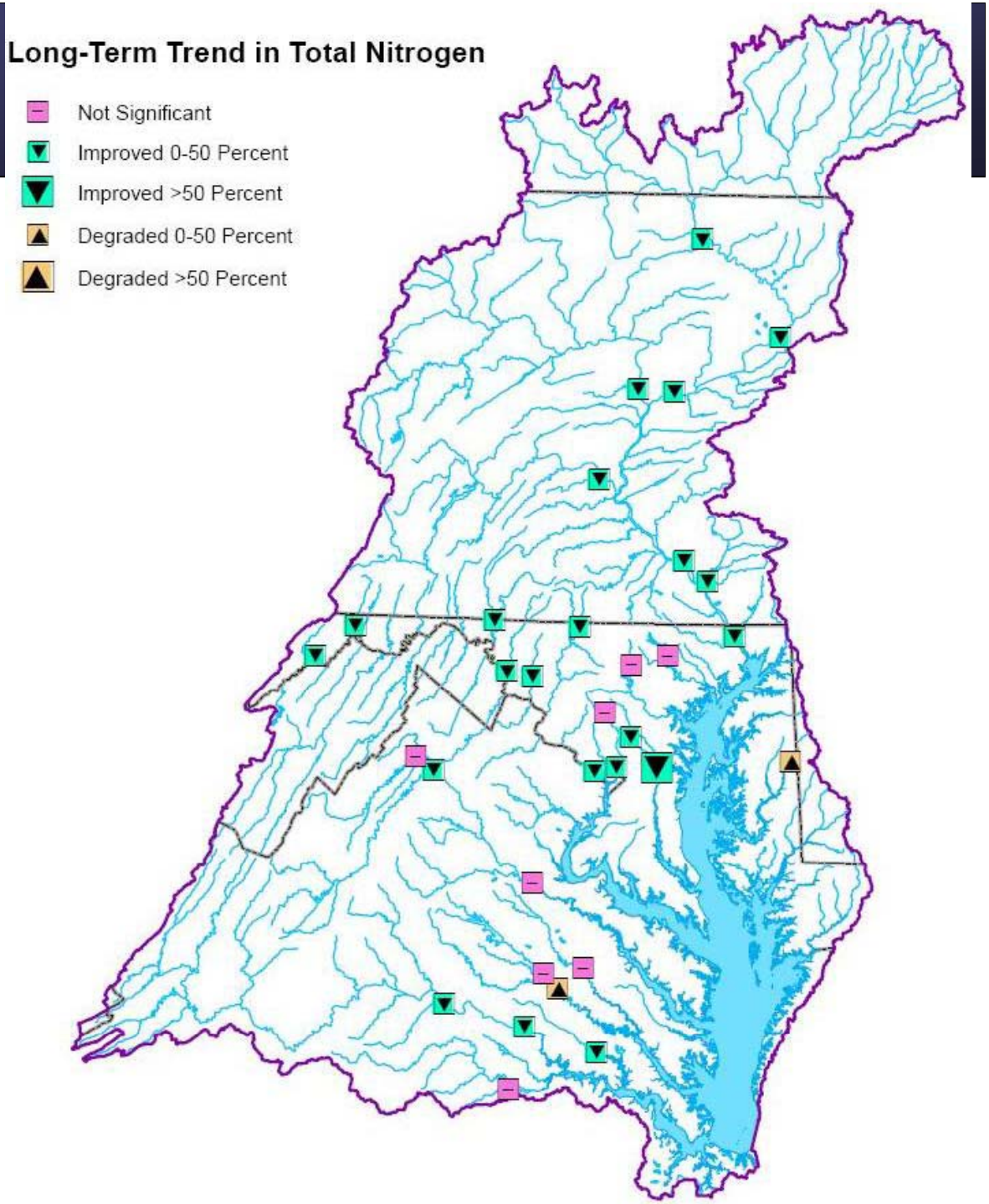
Future plans for network

- Maintain current network funding at the FY12 level ($5.3M/year)
- Incorporate additional non-traditional partner data into the network to improve the spatial scale of monitoring and local involvement in the watershed-wide network

Analytical products derived from NTN data

Long-term Trends: Total Nitrogen1985-2009

Flow-Adjusted Trend

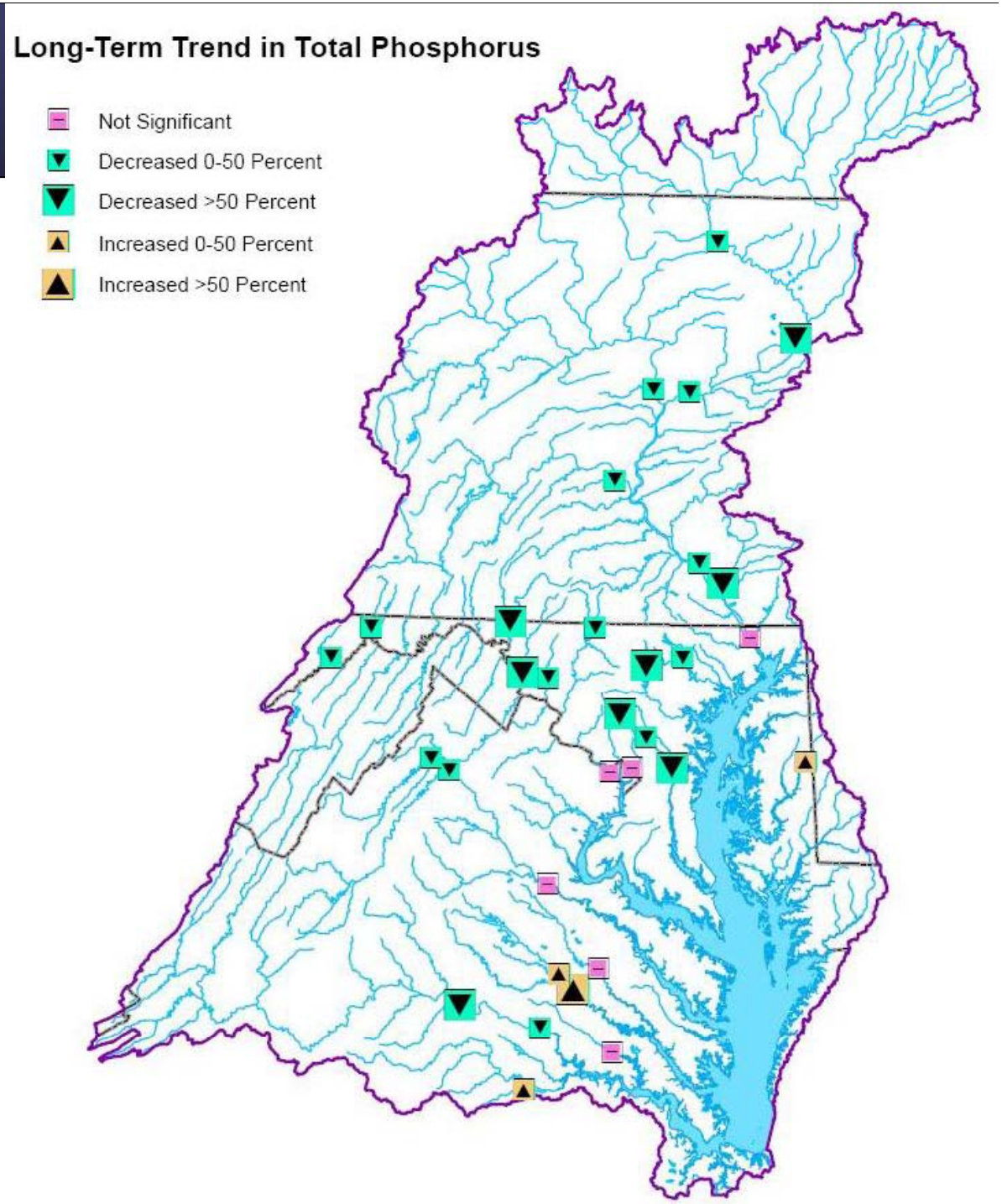


Notes:

- ▼ = Improving water quality/decreasing nitrogen levels
- – = No trend detected in either the up or down direction
- ▲ = Degrading water quality/increasing nitrogen levels

Long-term Trends: Total Phosphorus 1985-2009

Flow-Adjusted Trend



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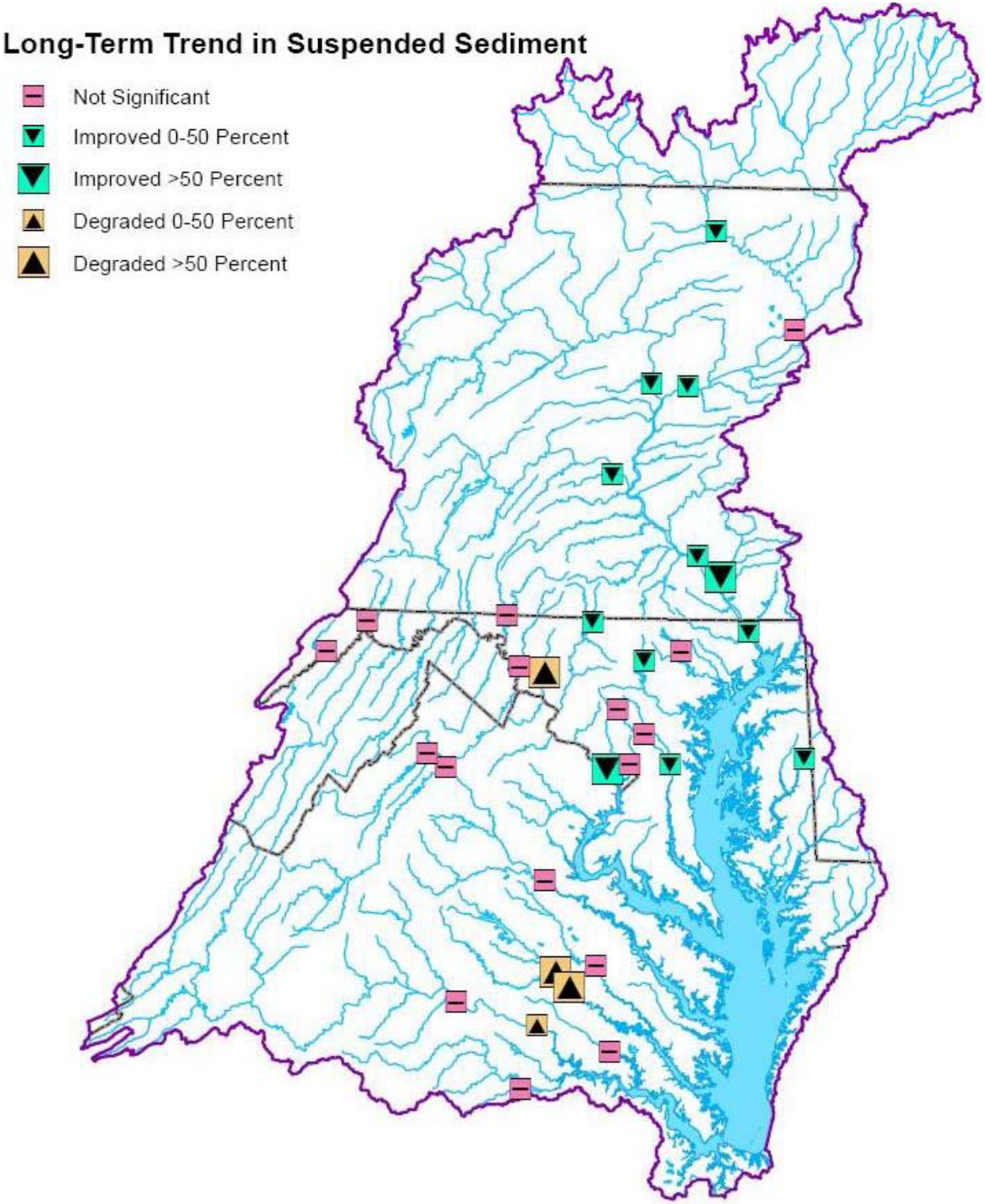
Long-term Trends: Suspended Sediment 1985-2009

Flow-Adjusted Trend



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Relative Condition and Short-Term Trend

Trend:

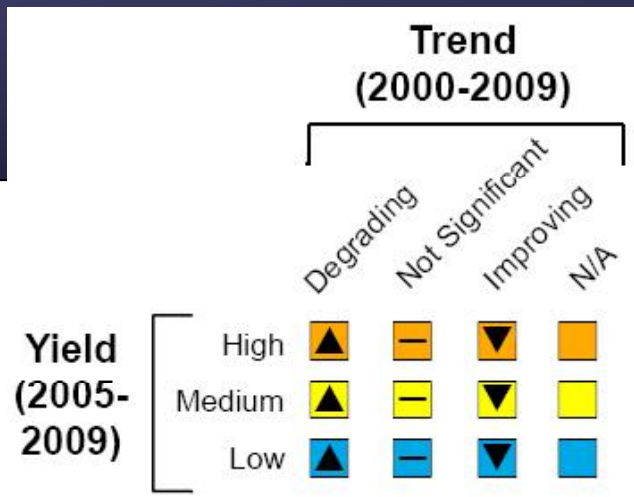
- Flow-Adjusted
- Recent ten-year period

Relative Condition:

- 5 yr median yield (load/area) tons/square mile
- 3 classes of sites(15 in each)

Note:

- Not all sites have 10-year trends



Yield
"Yield" = the amount of Nitrogen (in pounds) per square mile of land that drained to each monitoring site.

Trend
Arrows = trend in environmental condition.

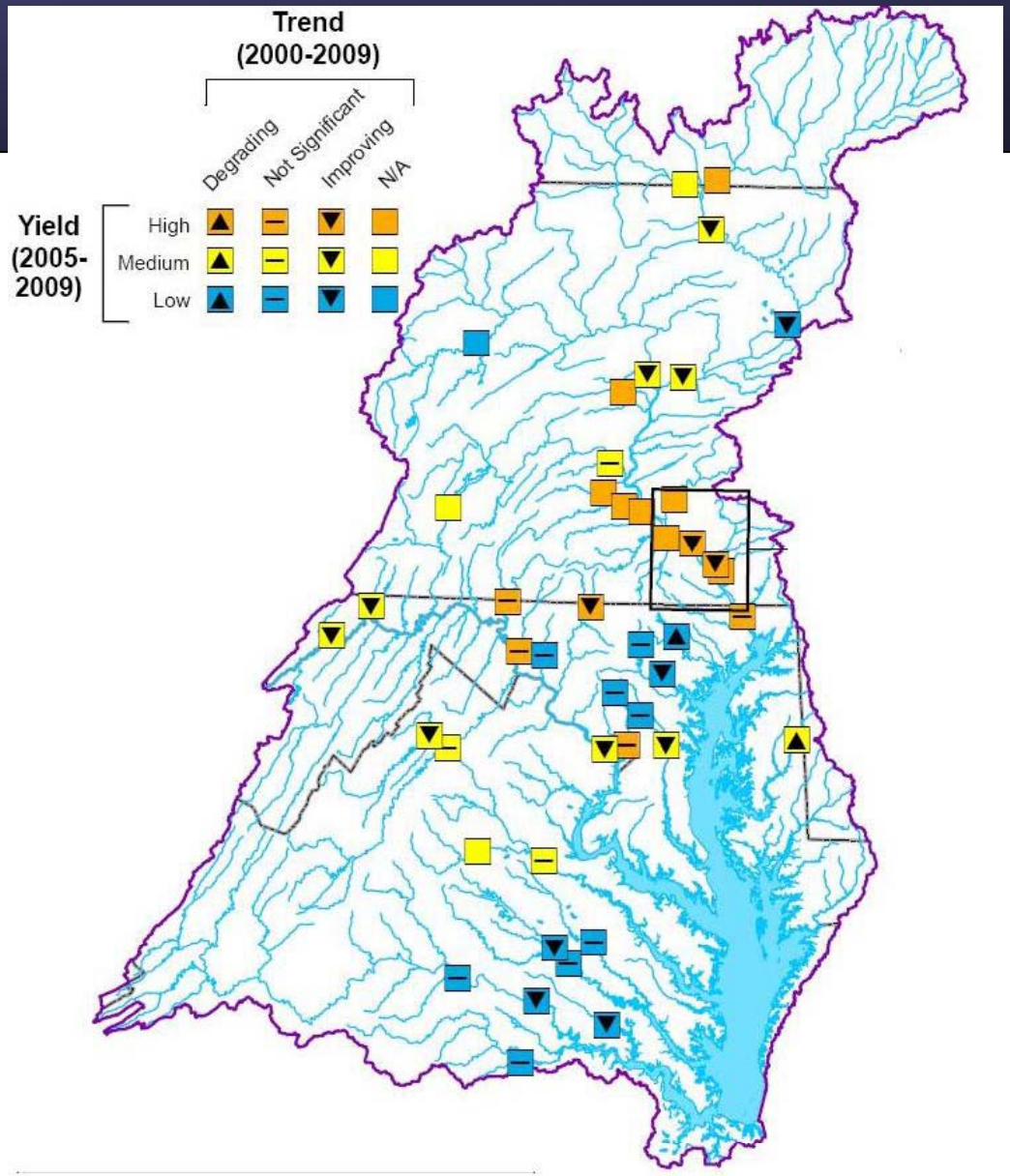
▲ = Degrading water quality/ increasing nitrogen levels

— = No trend detected in either the up or down direction

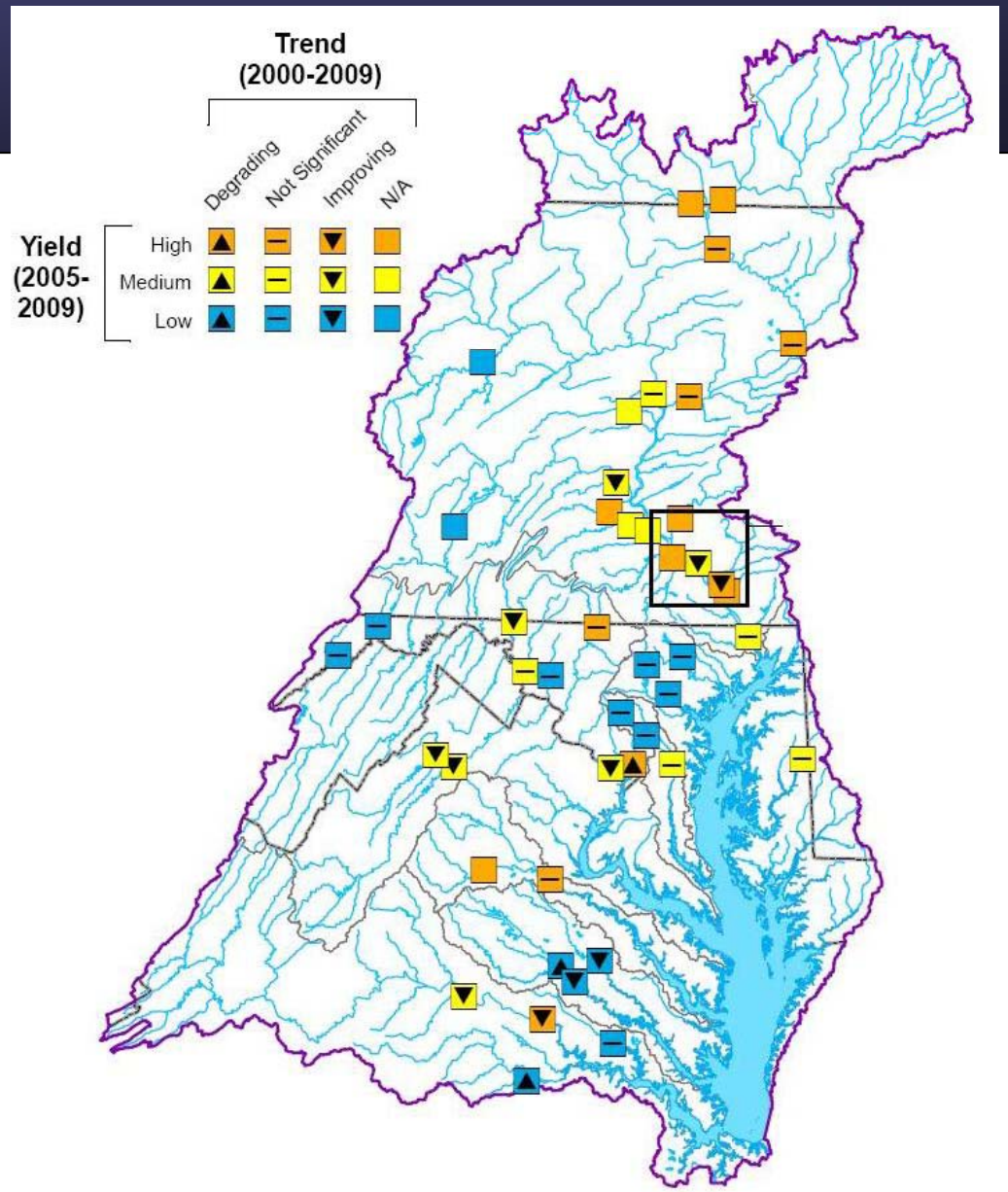
▼ = Improving water quality/decreasing nitrogen levels

□ = Trend not computed due to not having 10 years of information

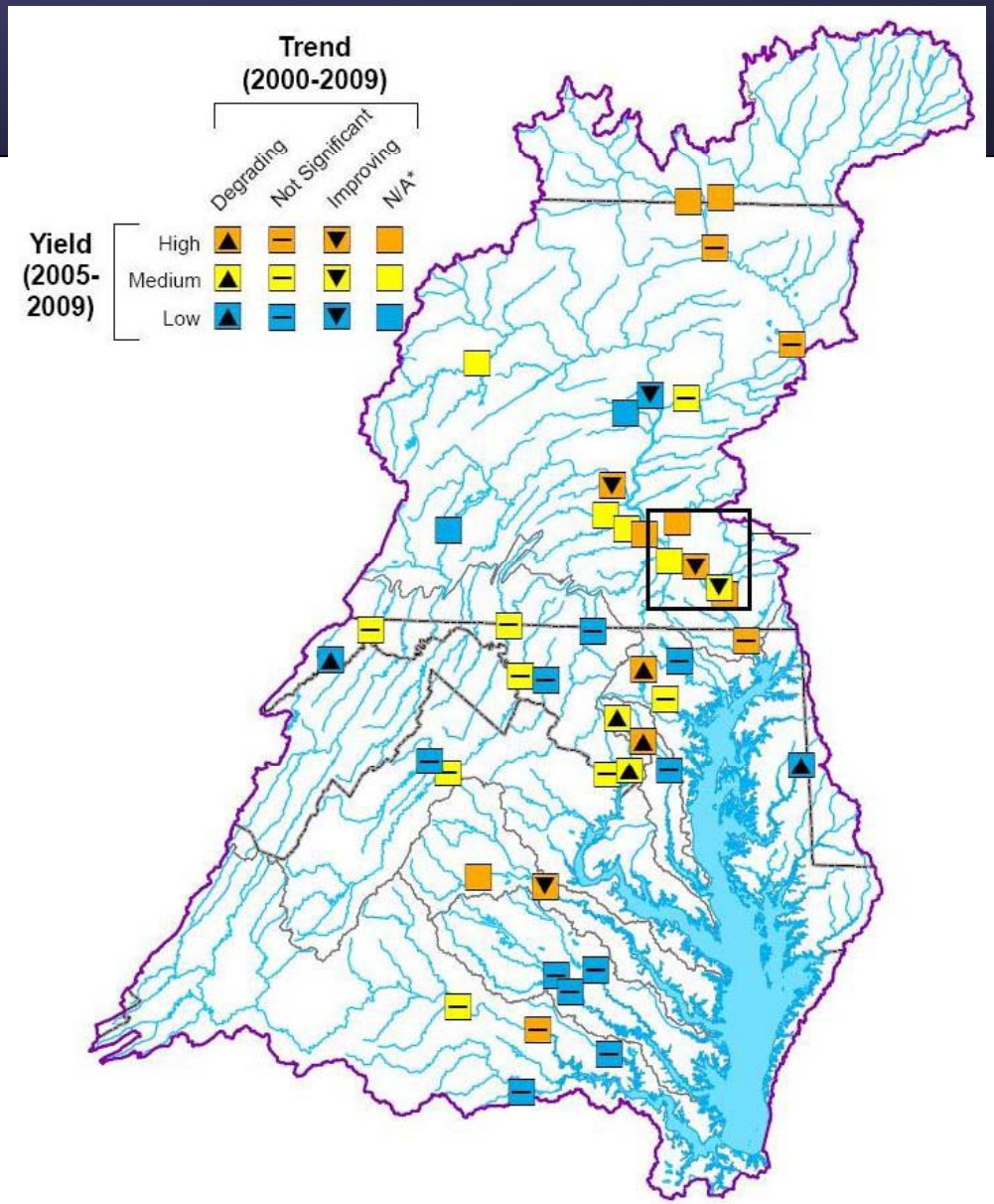
Relative Condition and Short-Term Trend: Total Nitrogen



Relative Condition and Short-Term Trend: Total Phosphorus



Relative Condition and Short-Term Trend: Suspended Sediment



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