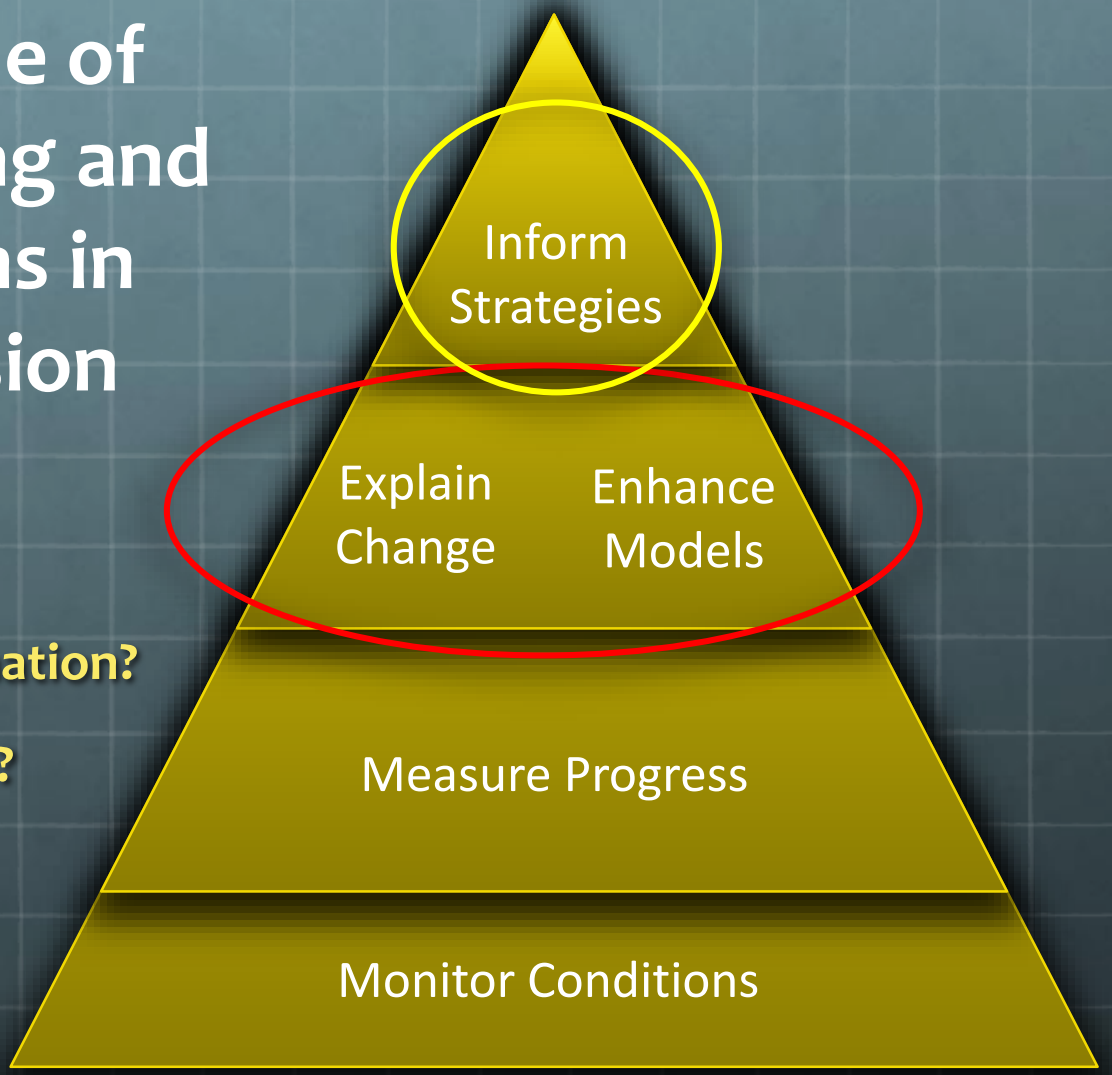
Expanding the Role of Observed Monitoring and Trend Explanations in Partnership Decision Making

How would you like your information?

Fire hose, funnel, or spoon?



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- This session will preview available monitoring results and planned products that are being prepared to support the MPA and WIP development. Topics include:
  - 1) ITAT Jurisdictional team as the principal strategies for bringing results to jurisdictional representatives
  - 2) priorities for explanation of monitoring trends, including timing and format.
    - Nontidal Results and explanations
    - Tidal Integration
  - 3) how to visualize long term monitoring trends and supporting data in order to better inform the development of the Phase III WIP Planning Targets.

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ITAT-Jurisdictional Team

- Why:
  - Share and discuss technical results for use in water-quality decision making
- What:
  - Watershed and tidal trends
  - Explaining factors affecting trends, including practices
  - Inform Phase III WIPs and implementing practices,
  - Ways to assess progress
- Who: Lead investigators and jurisdictional reps.
- When: Monthly calls; bring selected items to GIT

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ITAT Jurisdiction Team

Name	Jurisdiction	Agency	Name	Jurisdiction	Agency
Diane Davis	DC	DOEE	James Davis-Martin	VA	DEQ
George Onyullo	DC	DOEE	Roger Stewart	VA	DEQ
John Schneider	DE	DNREC	David Montali	WV	DEP
Bruce Michael	MD	DNR	Karl Berger	Regional	MWCOG
Jason Keppler	MD	MDA	Mukhtar Ibrahim	Regional	MWCOG
Jim George	MD	MDE	Tanya Spano	Regional	MWCOG
Lee Currey	MD	MDE	Jennifer Keisman	FED	USGS
Jason Dubow	MD	MDP	Joel Blomquist	FED	USGS
Sara Latessa	NY	DEC	Scott Phillips	FED	USGS
Amy Williams	PA	DEP	John Wolf	FED	USGS
Veronica Kasi	PA	DEP	Doug Moyer	FED	USGS
Kristen Wolf	PA	DEP			

Role of Monitoring Data

- **Targeting** of more pollutant load reduction effective practices in higher loading watersheds
- **Inform implementation** of practices at the local level
- **Assessing progress** based on monitoring
- Consider changes **loading targets**.
  - state-basins, Bay segment watershed, and source sector
- Enhanced understanding and the ability to **better simulate lag times** and delivery factors of nutrients and sediments
- Identify **areas of shorter lag times.**
- Decisions on how to **address the infill of Conowingo Dam** and its reservoir.
- Decisions on how to account for the ongoing and projected effects of **climate change** on Bay watershed pollutant loads and Bay water quality
- **Programmatic and policy implications of the explanations of observed long term trends** in watershed and tidal water quality and biological resource monitoring data
- **Demonstrate** where monitoring data is showing **positive trends** in response to management actions taken as well as areas where there is little improvement or **degrading trends** in local and regional water quality.

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Proposed Approach:

- Continue to analyze and report nontidal and tidal trends.
- Develop “evolving” topical synthesis products for Nontidal trends
- Foster tidal trend explanation products
- Provide access to data and visualization through CBP tools

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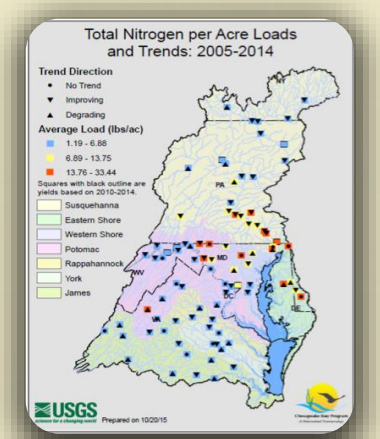
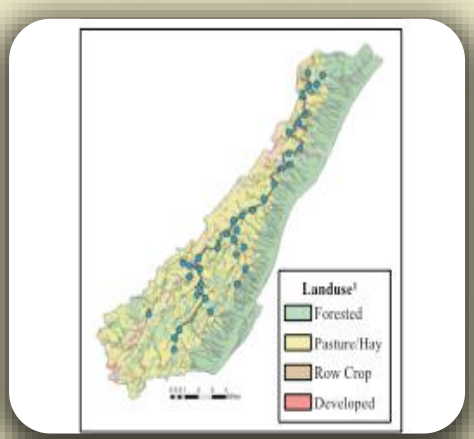
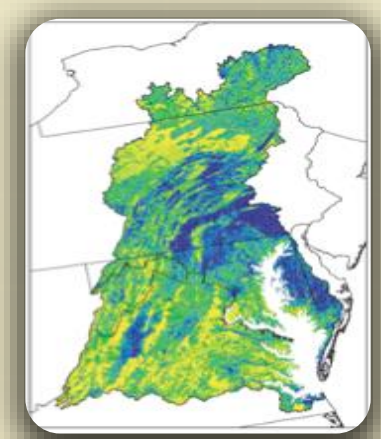
Building Blocks for Trend Explanation







Data

- Yields
- **Load Change**
- **Land Use**
- **Ag Sources**
- **BMP**
- **Wastewater**
- **Deposition**

Processes

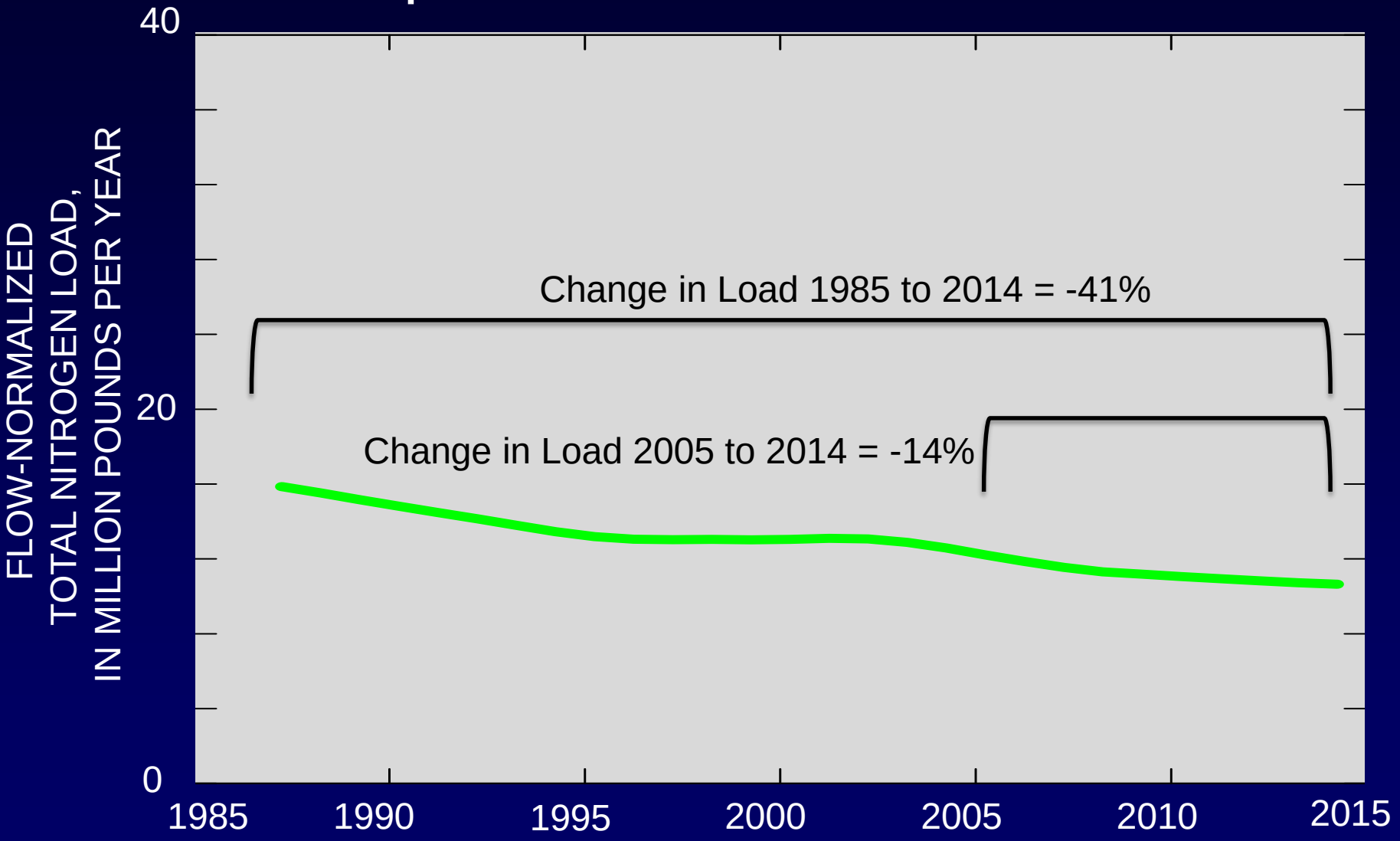
- **Hydrology**
- **GW models**
- **Small Watershed**
- **Source Characterization**
- **Reservoir Studies**
- **Sediment Budgets**
- **Sediment lags**
- **Phosphorus Studies**
- **BMP studies**

Integration

- **Cluster and Correlation**
- **SPARROW models**
  - Decadal
  - BMP
  - Delta
  - Nitrogen Dynamic
  - Phosphorus Dynamic
- **SEM Models**
- **CB WSM**

Flow-Normalized Nitrogen Load

Susquehanna River at Towanda



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Total Phosphorus per Acre Loads and Trends: 2005-2014

Loads per acre

- Above average in PA
- Eastern part of basin

Bay Watershed trends:

- Improving Trends : 68%
- Degrading Trends : 20%
- No Trend : 12%

PA trends: Majority improving

- Improving: 14
- Degrading: 3
- No change: 1

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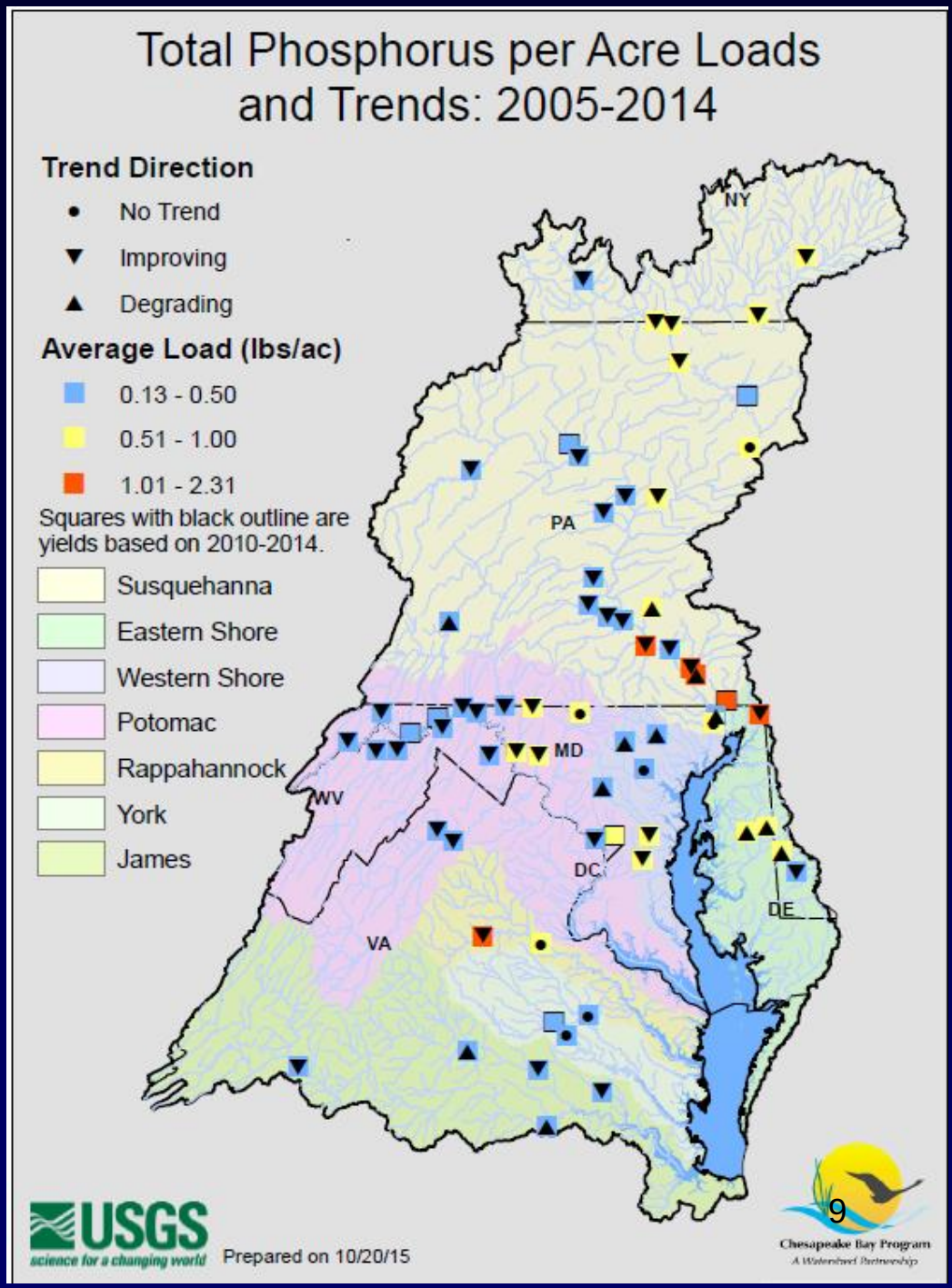
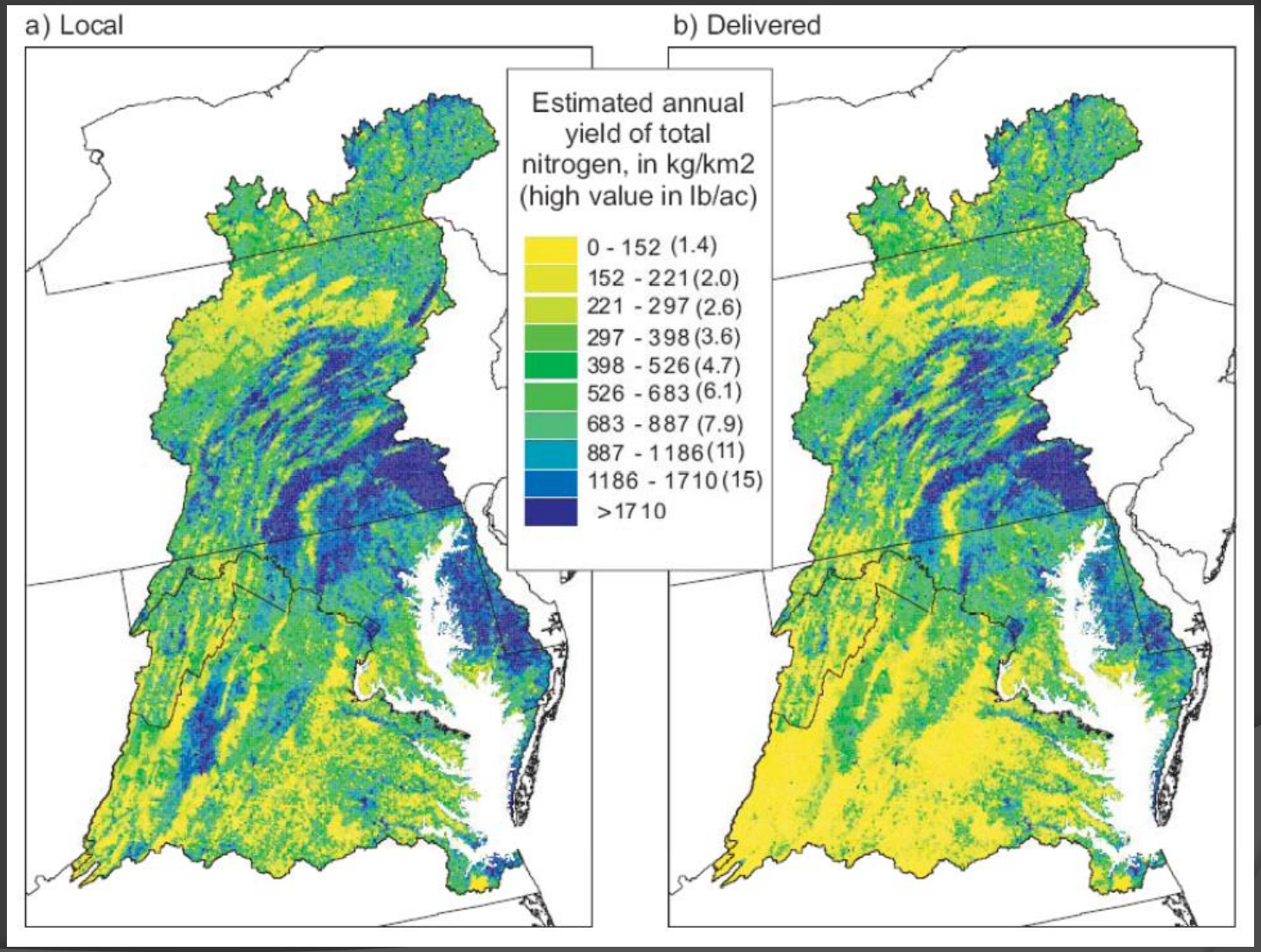
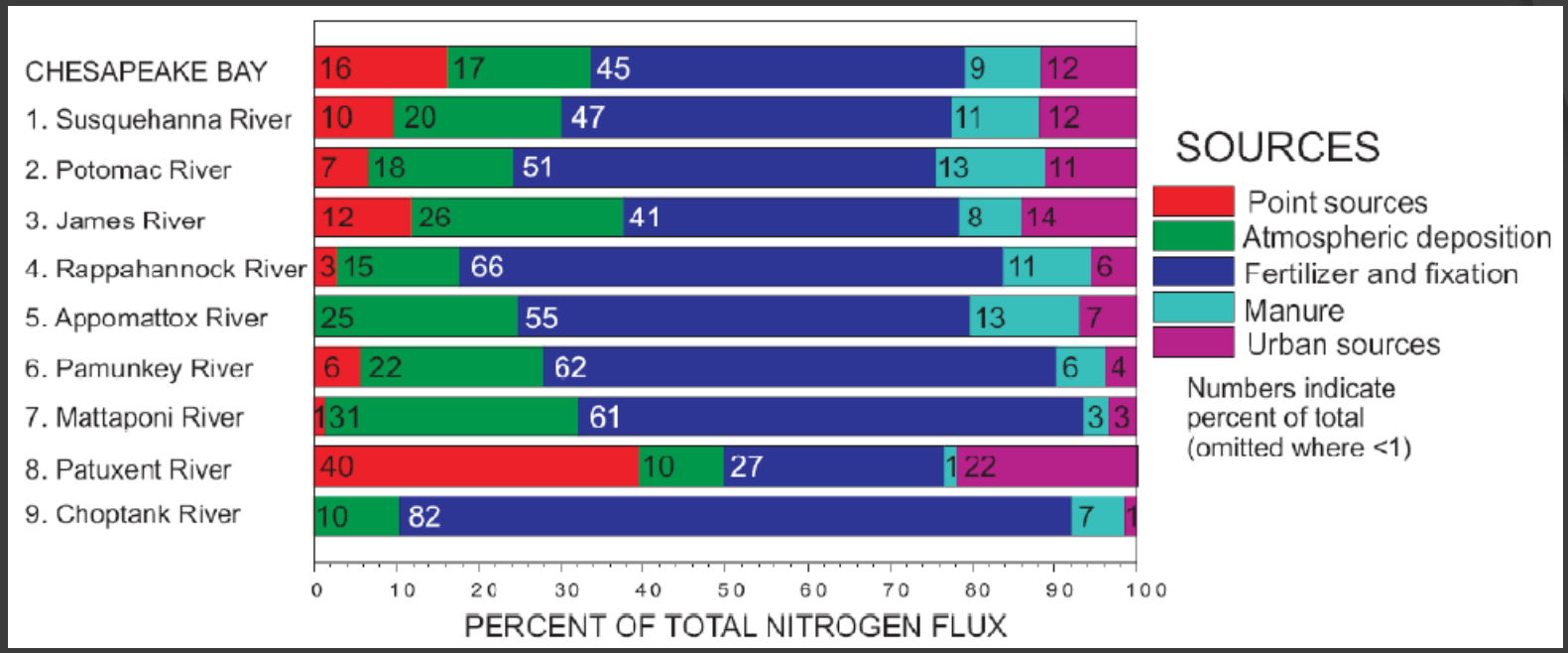


Spatial Distribution of TN



Ator and others, USGS SIR 2011-5167

Nitrogen Source Shares



Ator and others, USGS SIR 2011-5167.

Nontidal Synthesis Topics

(initial and final dates)

- Influence of Susquehanna reservoirs on loads and water quality in the Bay (Oct 2016, June 2017)
- Explaining trends at RIM sites (Dec 2016, Dec 2017)
- Explaining yields and trends at sites throughout the watershed (Jan 2016, June 2018)
- Influence of groundwater on surface-water trends (June 2017, June 2018)
- Sediment sources, transport, delivery (Dec 2016, Dec 2017)

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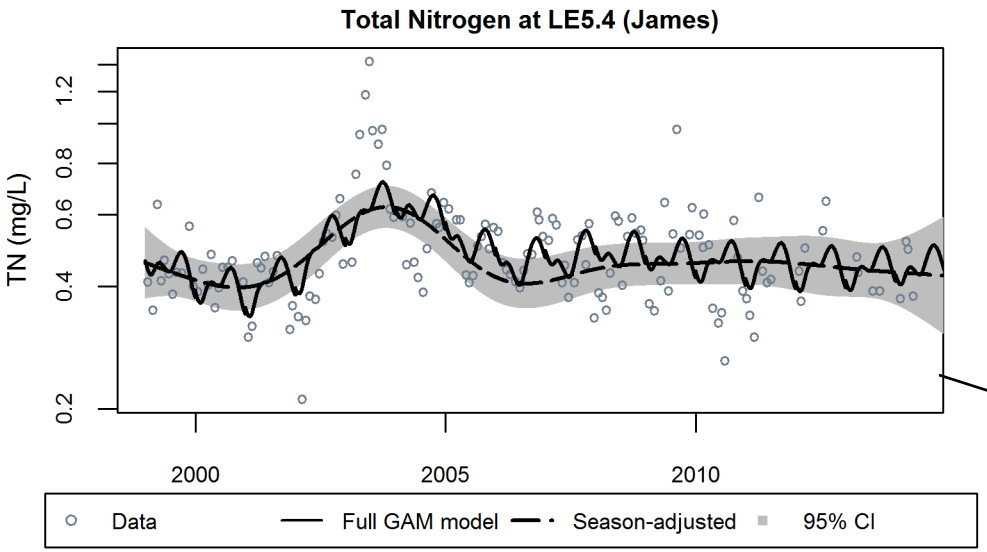
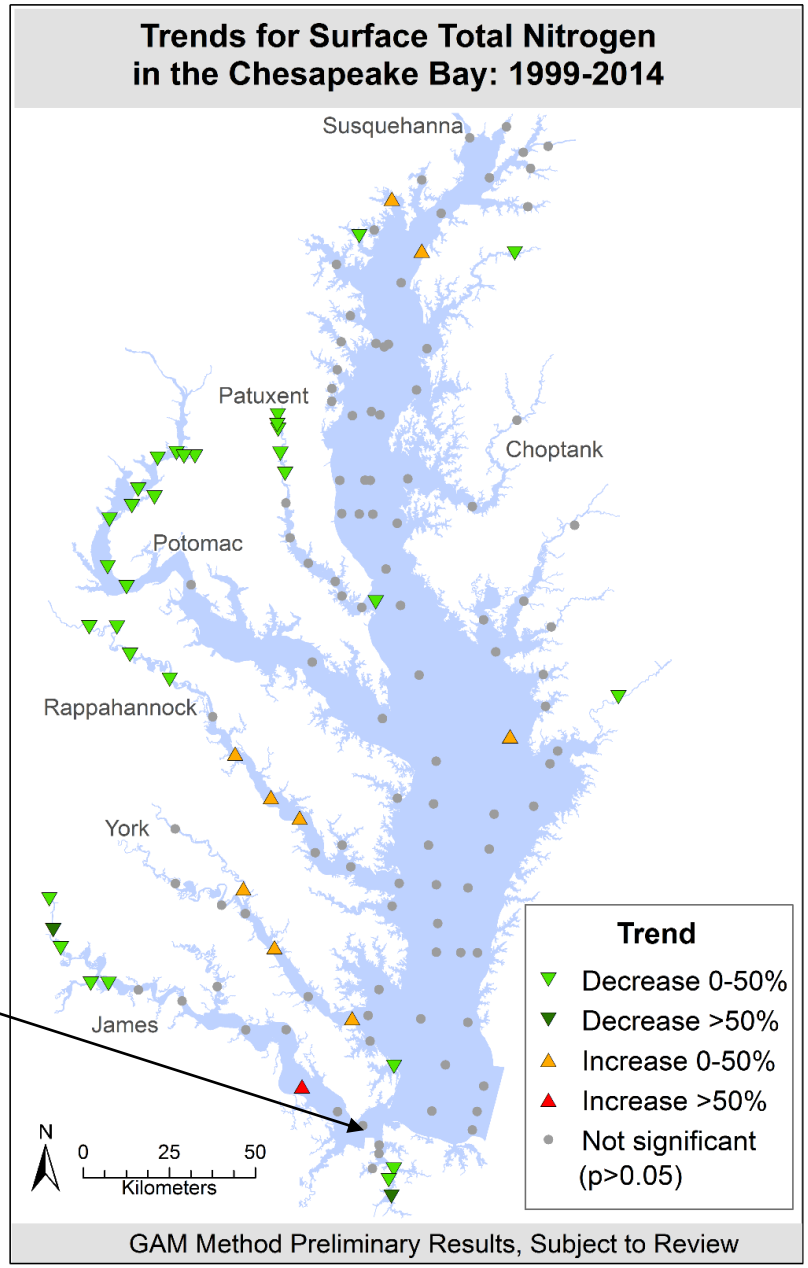
Trends in tidal water quality

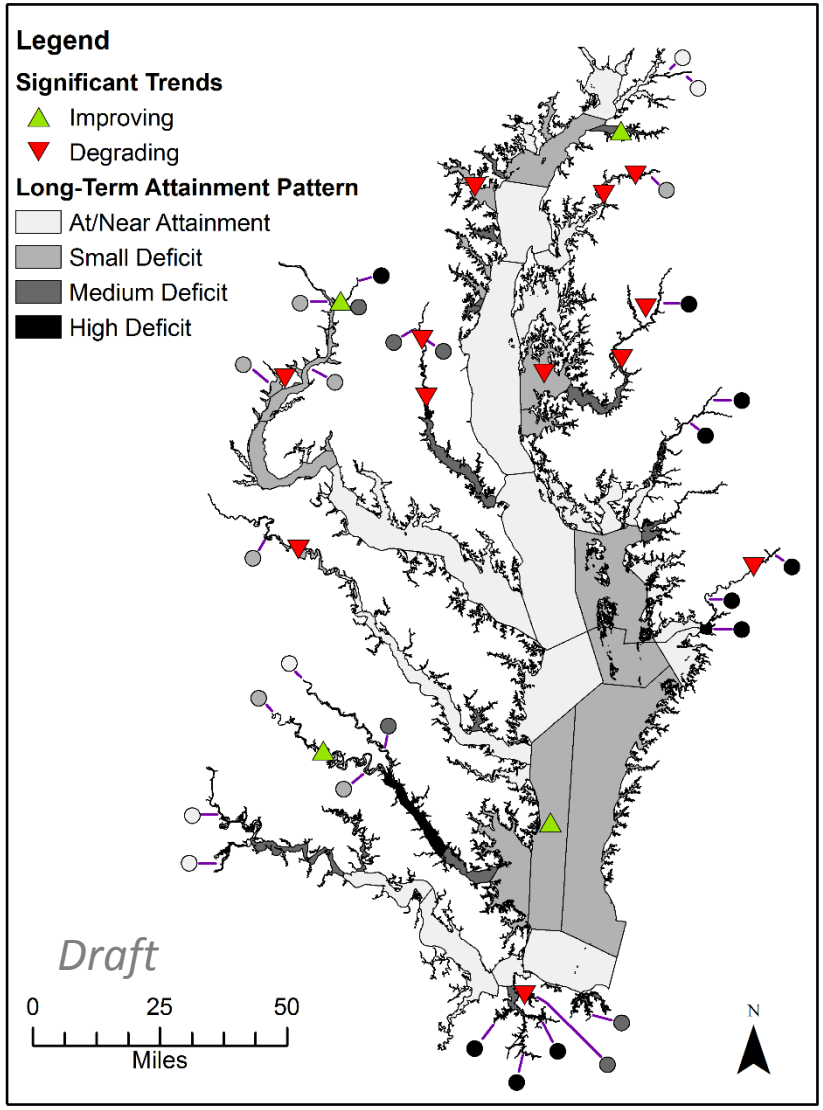
Rebecca Murphy, UMCES-CBPO





Segment Level Analysis

Long-Term Attainment Patterns: Open Water DO 1985-2014



Category	Count	Category	Count
At/Near Attainment	36	Medium Deficit	21
Small Deficit	23	High Deficit	12

Trends	
Significant ↑	4
Significant ↓	12

Majority of segments are doing well.

More trends are decreasing than increasing.

Tidal trends products

Trends in water quality and water quality standards attainment

- December 2016: report on website; maps, presentation

Potomac River Basin Synthesis

- March 2017: presentation of findings

SAV Synthesis

- March 2017: presentation on new insights from the SAV Technical Synthesis III
- June 2017: presentation on factors affecting eelgrass abundance and distribution the southern bay
- Fall 2017: new findings on factors affecting trends in SAV abundance and distribution

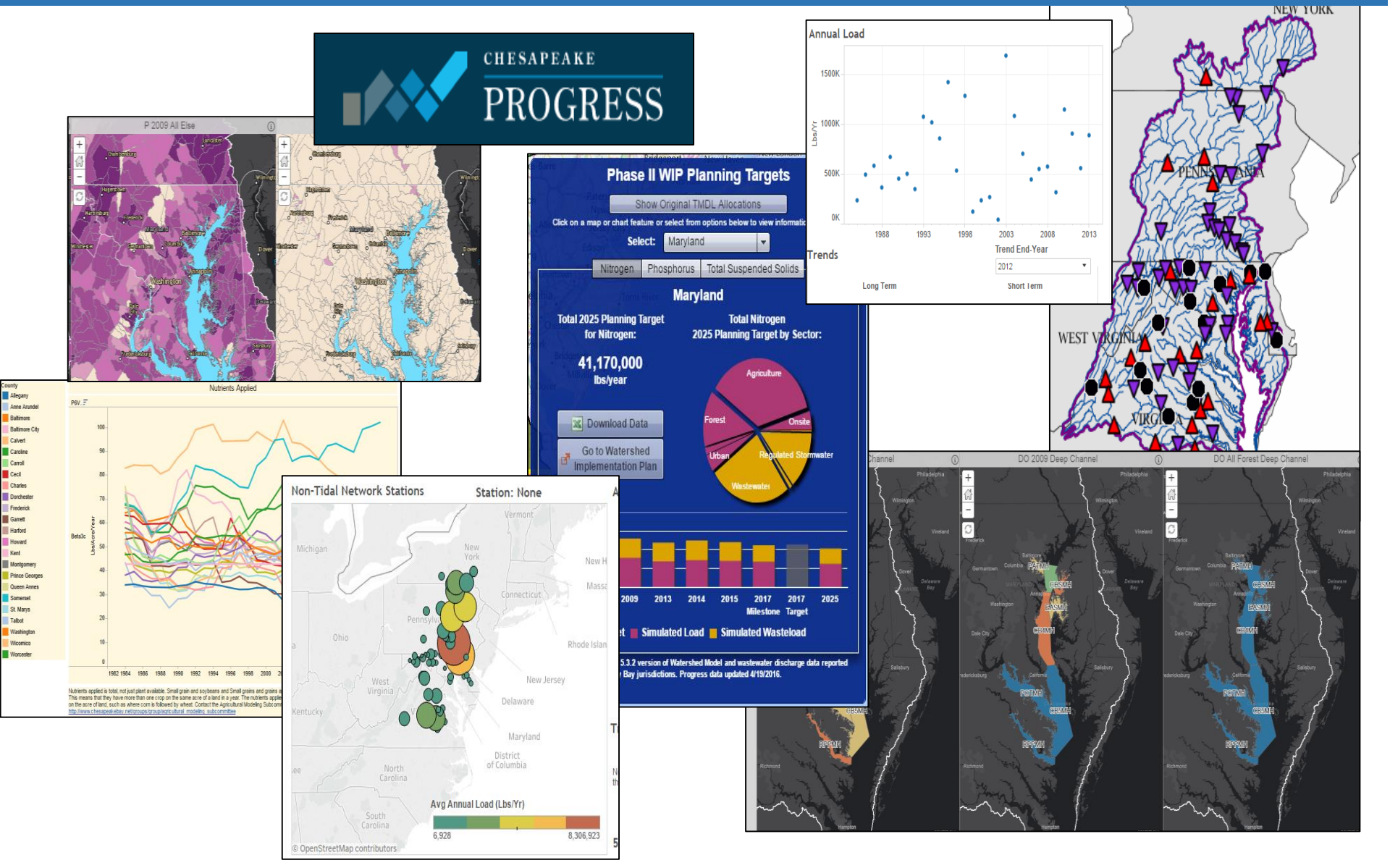
Tidal water quality synthesis

- March 2017: summary report on explaining long-term trends in tidal water quality

Tidal water clarity synthesis

- March 2017: presentation on current understanding of factors affecting trends in tidal water clarity

Data Visualization and the Midpoint Assessment



Addressing Primary and Secondary Audience Needs

- Primary: Watershed Jurisdictions, WQGIT, MB, PSC
- Secondary:
  - Regional Partners (MWCOG, SRBC, ICPRB)
  - State associations of local governments
  - Associations of Conservation Districts
  - Interested NGO's and Oversight groups (CBF, Choose Clean Water, Watershed Organizations)
  - Agribusiness association, State Farm Bureau
  - Conservation Districts
  - Homebuilder Associations
  - Counties, townships, municipalities
- Tertiary:
  - Interested public

Potential Visualization Products

- Data Exploration Tools
  - Exposing monitoring and modeling data
- Decision Support Tools
  - Interactive mapping
  - “What-if” tools (e.g. CAST)
- Data Driven Stories
  - Sector-based stories
  - Place-based stories
  - Topic-based stories (e.g. Conowingo)

Potential Visualization Products

Monitoring & Explanation of Trends

- Nontidal Trends – WRTDS
- Nontidal Loads and Yields
- Tidal Trends – GAMs
- SPARROW Yields
- WQ Standards Attainment by Designated Use

Other

- Land Use/Land Cover
- Basin Characteristics
- Ranging Scenarios from WSM
- WIP III Planning Targets
- WSM Inputs from CAST
- CAST Model Outputs
- BMP Implementation Levels