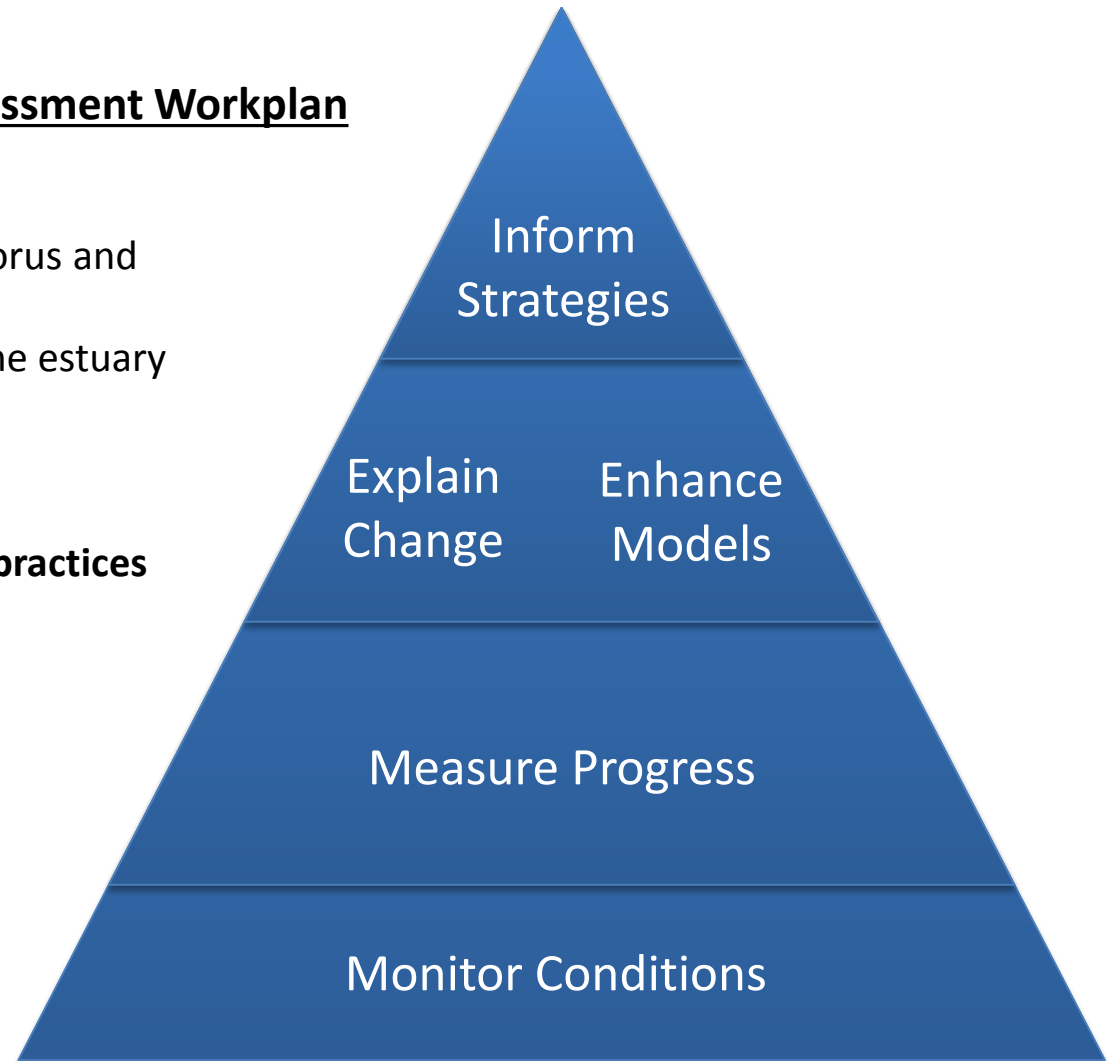


USGS-USDA-EPA Collaboration

STAR work to Assess and Explain Change for MPA

Elements of STAR Mid-Point Assessment Workplan

1. Measure progress
 - Trends of nitrogen, phosphorus and sediment in the watershed.
 - Trends of water quality in the estuary
2. **Explain water-quality changes**
 - **Showcase watersheds**
 - **Response to management practices**
3. Enhance CBP models
4. Inform management strategies
 - WIPs
 - Water-quality benefits
 - Ag priority watershed (CBI)



Yields and Changes in Nitrogen: 2005- 2014

Yields:

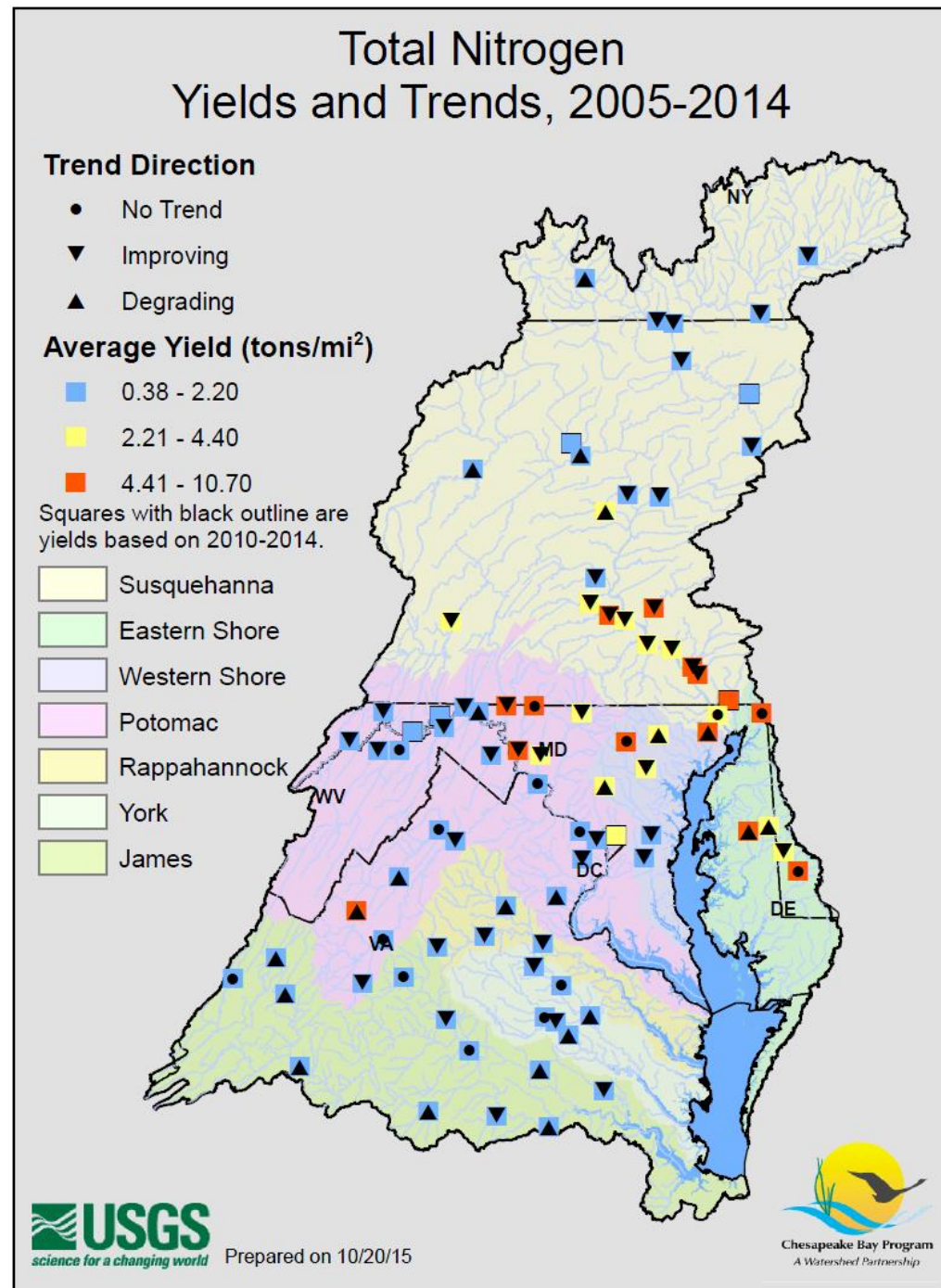
- Vary by land use
- Highest in ag areas
- Lowest in forested areas

Nitrogen changes:

- 44 are showing decreased loads (improving conditions)
- 22 are showing increased loads (degrading conditions)
- 15: no discernable change

Results also being prepared for P and sediment

Explain patterns: watershed, major basins



Water-Quality Monitoring in the Chesapeake Bay Showcase Watersheds

Report in editorial review

Primary Collaborators

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~120 sites in the NTN

How is the water quality of rivers and estuaries responding to restoration actions and changing land use?

USGS & USDA partnership in 4 Showcase Watersheds (2009 Executive Order)

USDA

USGS

Implement conservation practices

Document current water-quality conditions

Identify nutrient and sediment sources, sinks, and transport processes

Document changes in water quality

Smith Creek

Difficult Run

Conewago Creek

Upper Chester

Benefits

Challenges

Isolate different basin types

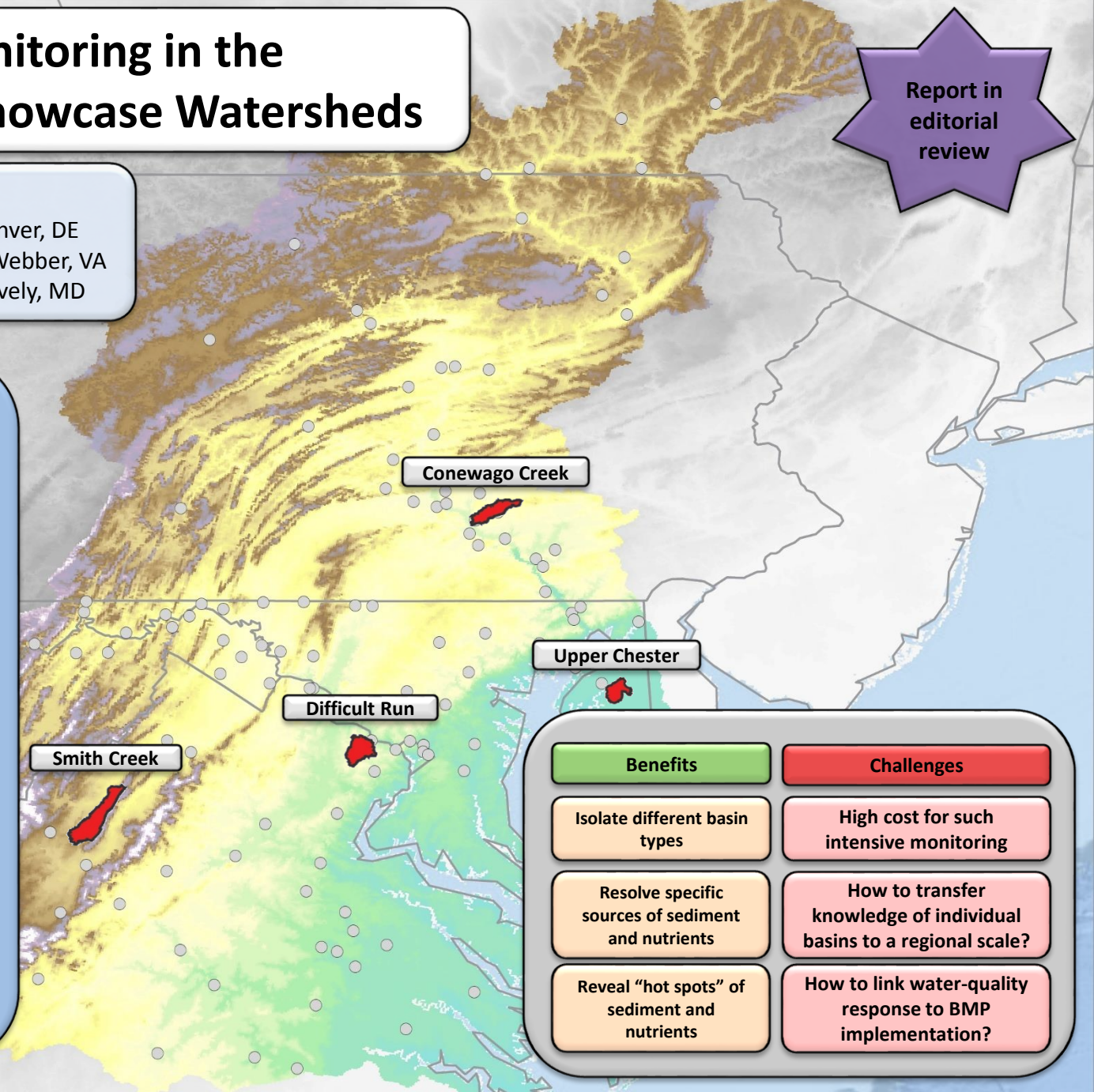
High cost for such intensive monitoring

Resolve specific sources of sediment and nutrients

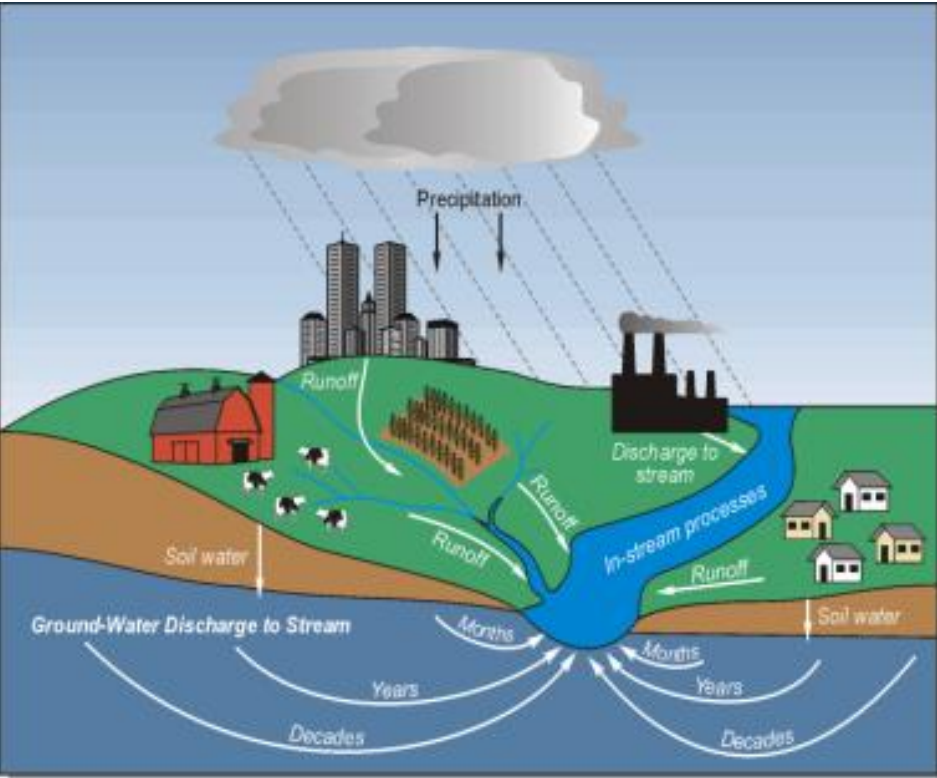
How to transfer knowledge of individual basins to a regional scale?

Reveal "hot spots" of sediment and nutrients

How to link water-quality response to BMP implementation?



Explaining Change in Watershed



- Factors
 - Sources
 - Uptake and storage
 - Land change
 - BMPs
 - Watershed characteristics
- Greatest needs
 - Manure and fertilizer applications
 - Uptake by crops
 - Effects of BMPs
 - Conservation practices through 1619 agreement
 - Change in mass over time: N, P (and sediment)
- Use Multiple Models
 - CBP WSM
 - SPARROW
 - APEX
- Inform progress and WIPs