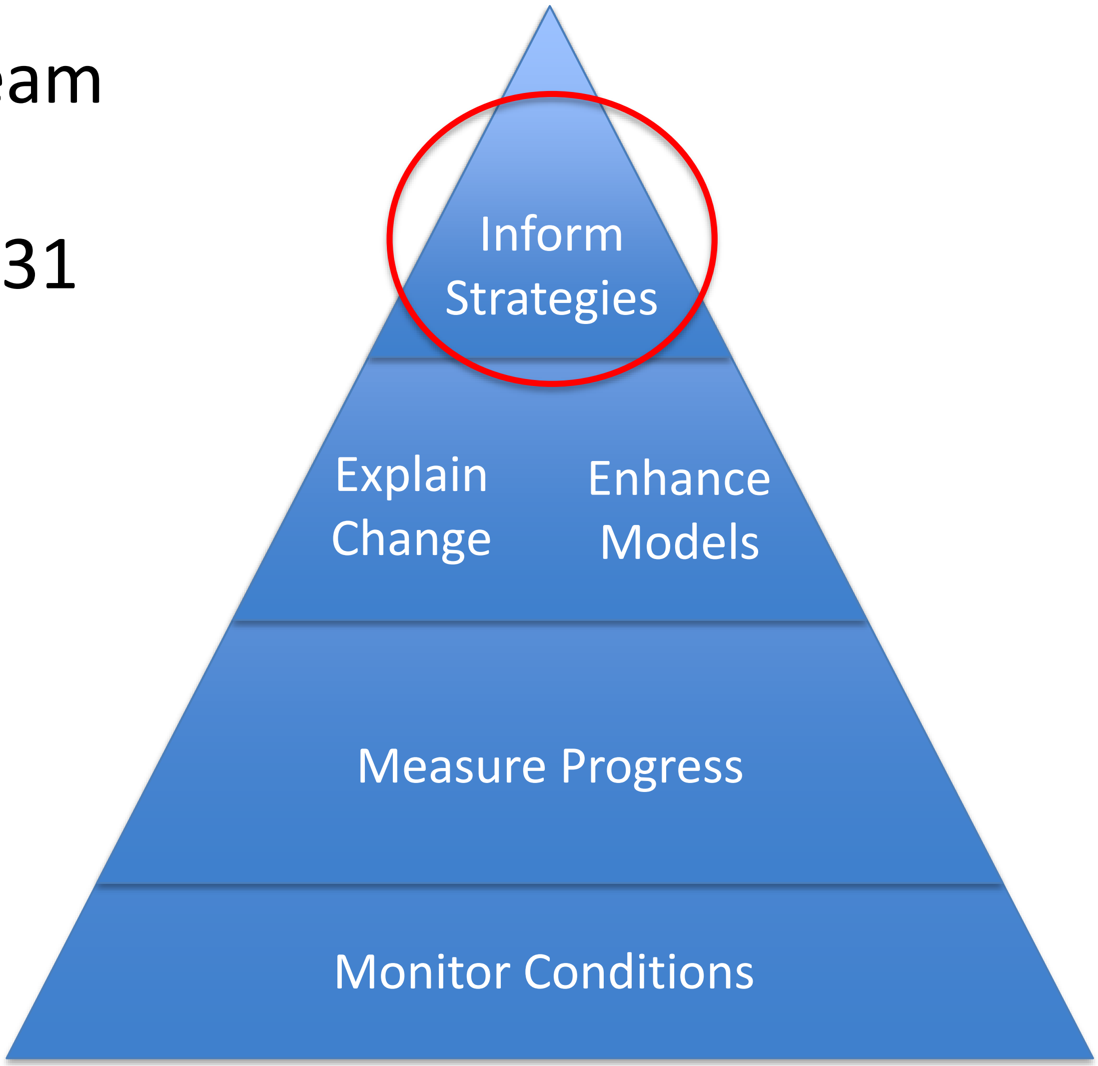
ITAT Jurisdictional team

Notes from August 31

Joel Blomquist
jdblomqu@usgs.gov



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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

Jurisdictional Team Schedule (DRAFT)

- January 30, 2017
  - Small-watershed results and implications for MPA—Webber and Hyer
  - Follow-up on Visualization tool – Wolf * not confirmed *
  - Reintroduction to SPARROW targeting—Blomquist
- March 6, 2017
  - RIM synthesis (or components) Joel Doug
  - Ag source change -- Jenni
  - BMP histories – Andy S.
- April 3, 2017
  - Understanding Decadal Trends in Nitrogen and Phosphorus Loads— Ator
  - Groundwater lag story—Judy- Ward
- May1, 2017
  - Regional trends component- or overview Ator, Webber, Chanat
  - Something from Trends in the Estuary—Murphy
- June 5, 2017
  - Sediment/ geomorphic synthesis components. (Probably need sooner than later)
- July 10* 2017
  - NTN results through 2016 – at least preliminary findings – how much detail on 2014-2016
- August 7 2017
  - New insights from linking lag times with regional SPARROW models- Smith
- September 11*, 2017
  - Insights from linking changes in source inputs to changes in riverine export: a different way to explain change- Chanat
- October 2, 2017
- November 6, 2017
- December 4, 2017

  - Evaluate role of J team into 2018?

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January 31, 2017
Technical Topics

Regional SPARROW targeting- A different way of looking at loads (Blomquist)

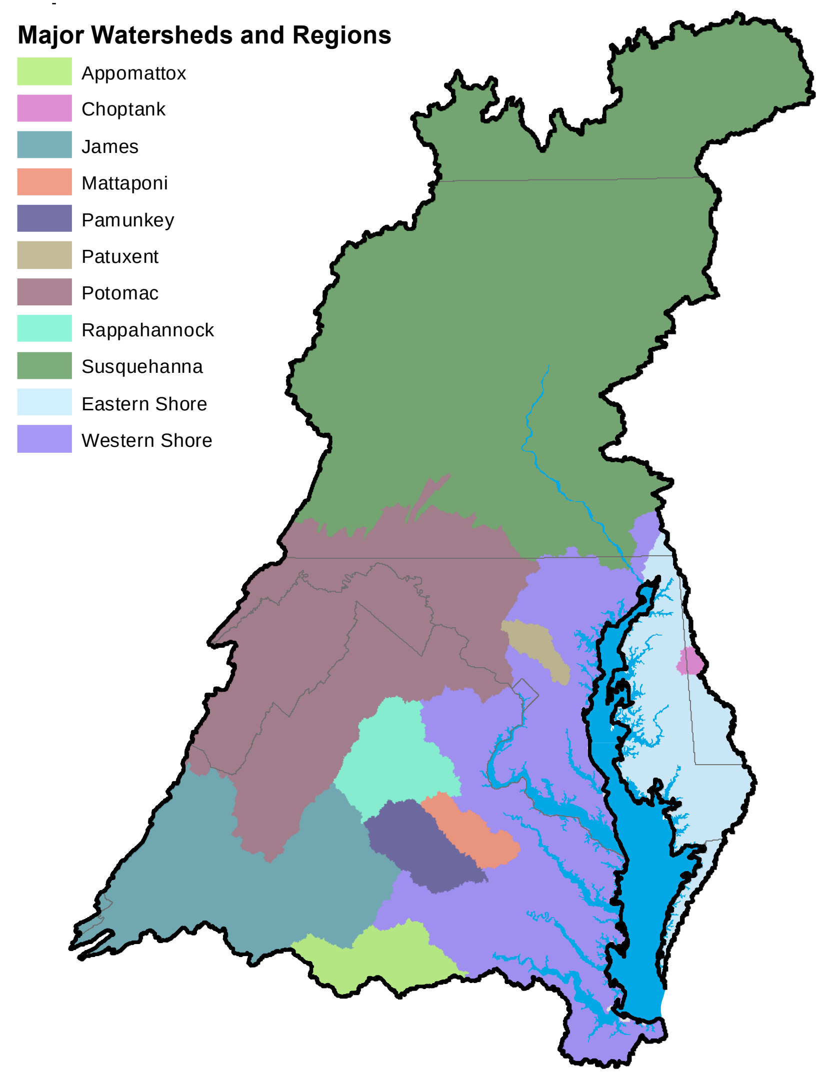
Findings from small watershed studies (Webber)

Update on visualization tool development (Wolf)

Regional SPARROW targeting- A different way of looking at loads

Joel Blomquist USGS
Baltimore, MD

This information is preliminary and is subject to revision. It is being provided to meet the need for timely best science. The information is provided on the condition that neither the U.S. Geological Survey nor the U.S. Government shall be held liable for any damages resulting from the authorized or unauthorized use of the information."



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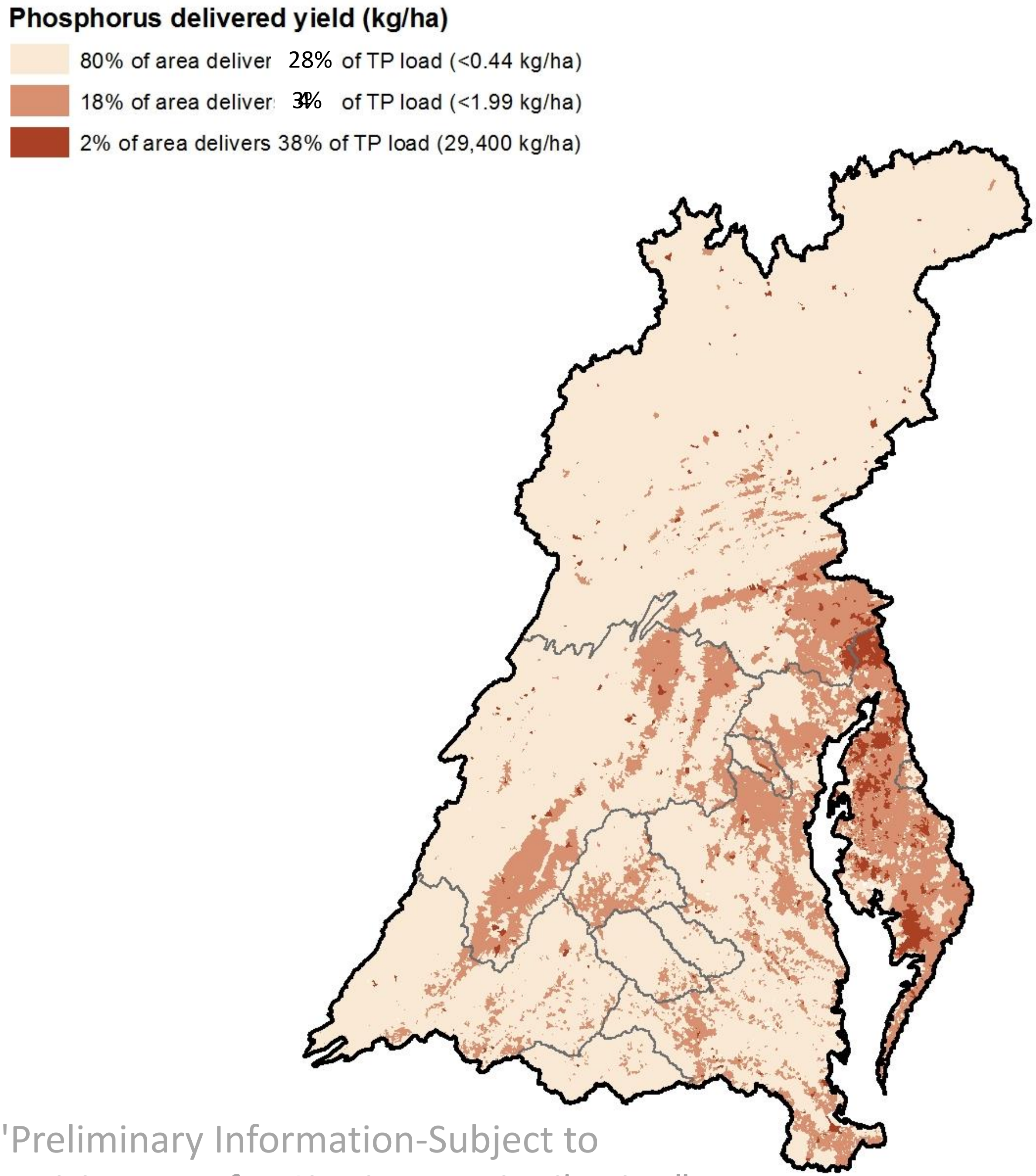
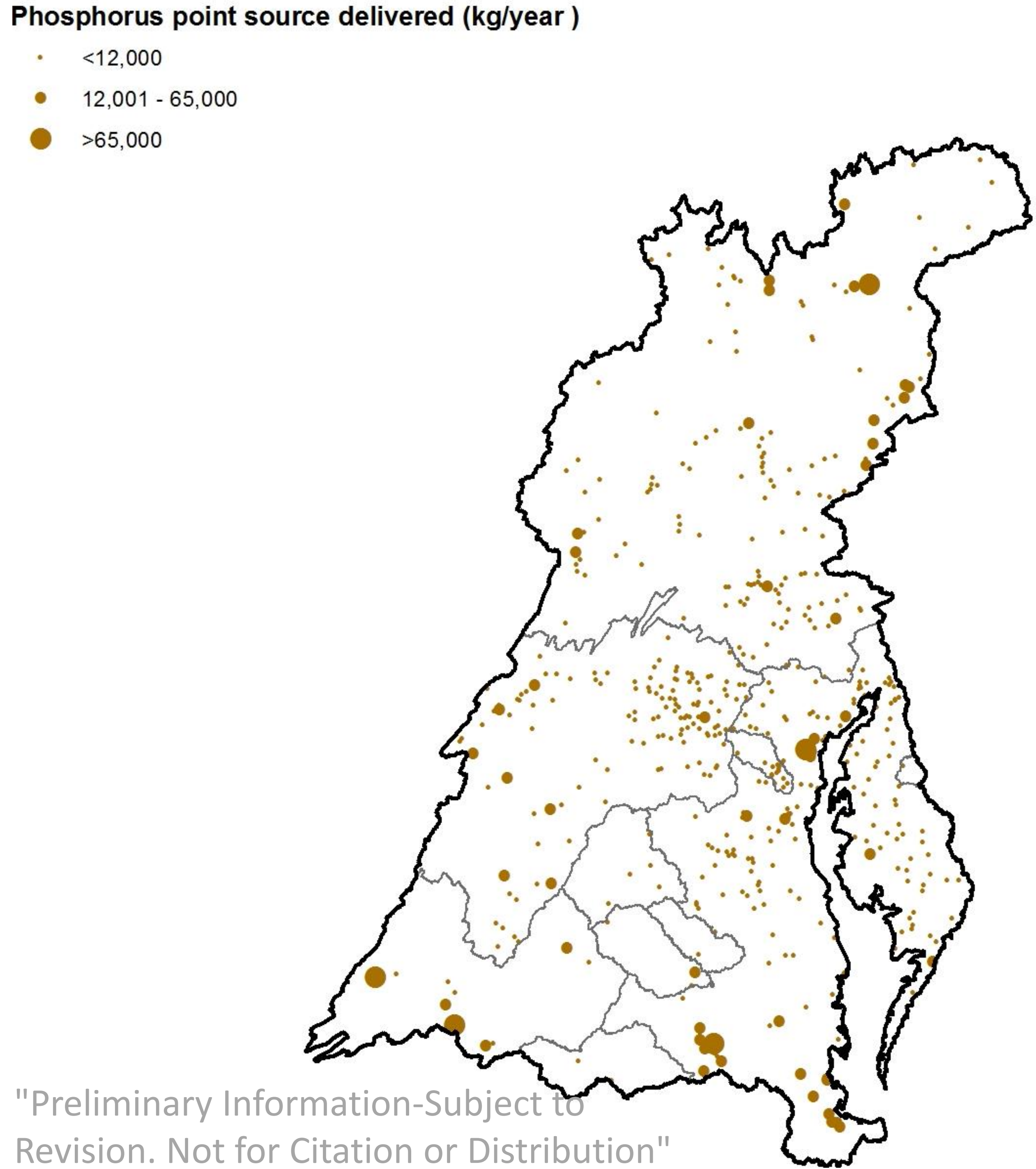
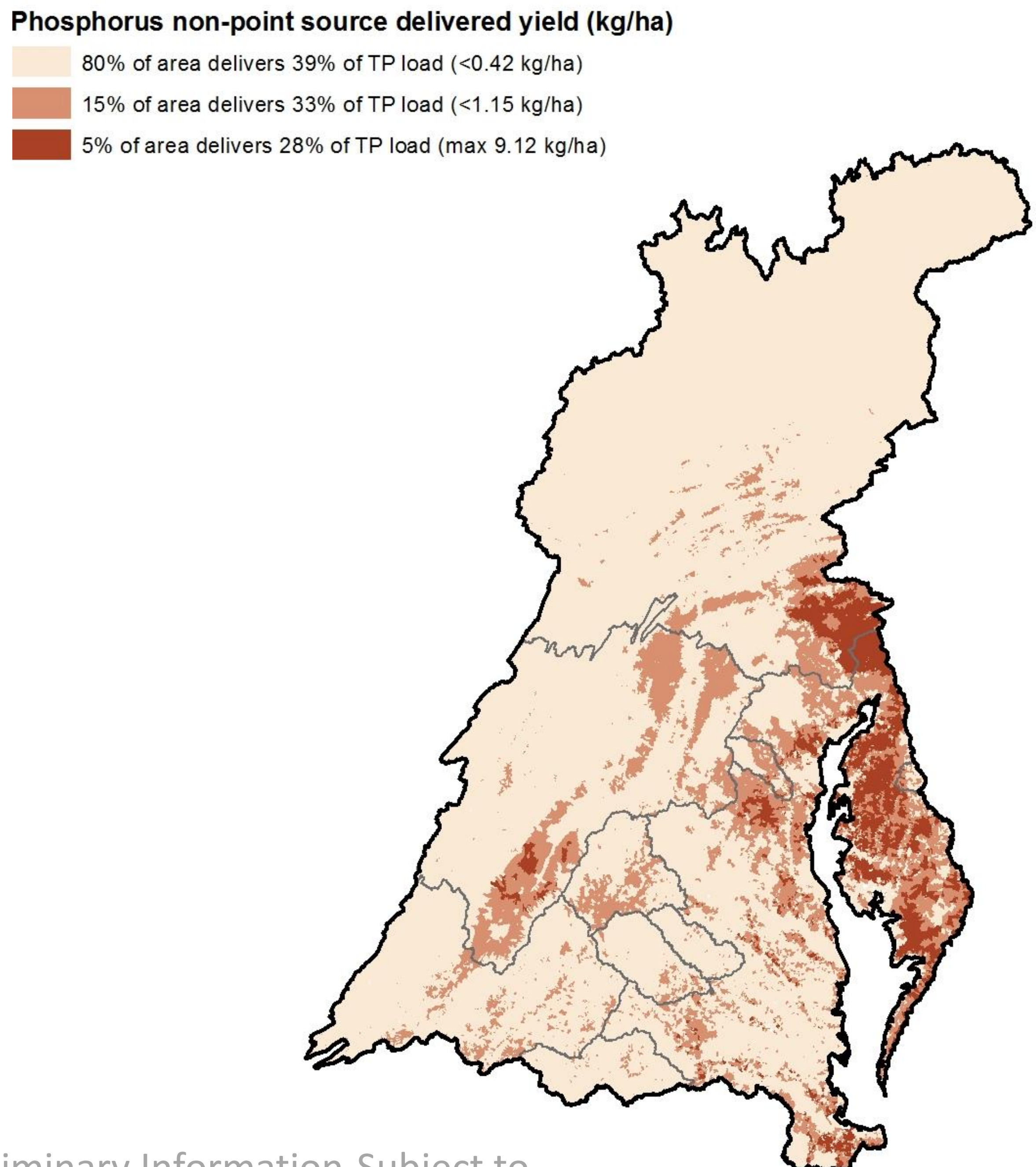


"Preliminary Information-Subject to Revision. Not for Citation or Distribution"


Phosphorus point source delivered (kg/year)
<12,000
12,001 - 65,000
>65,000



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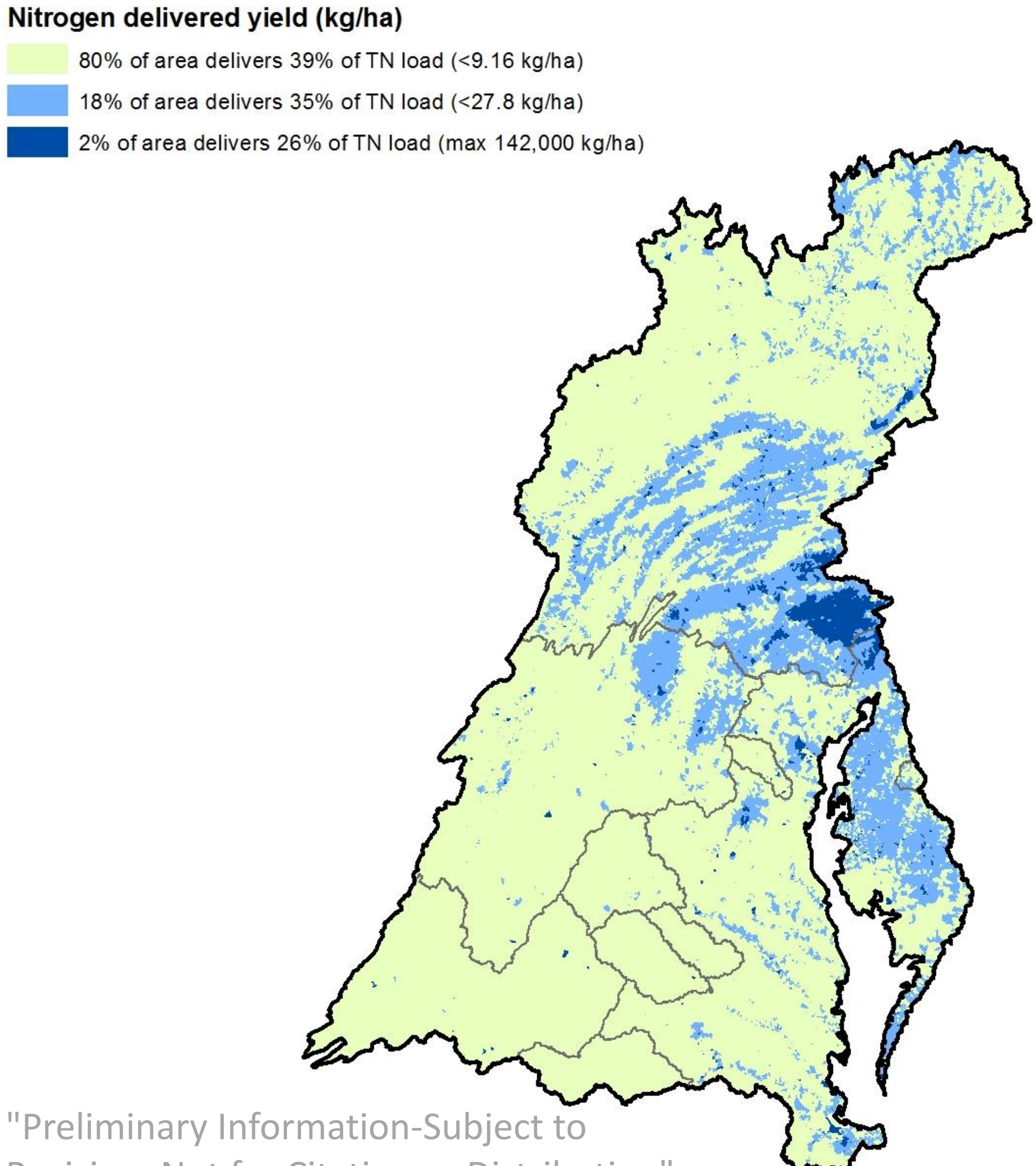

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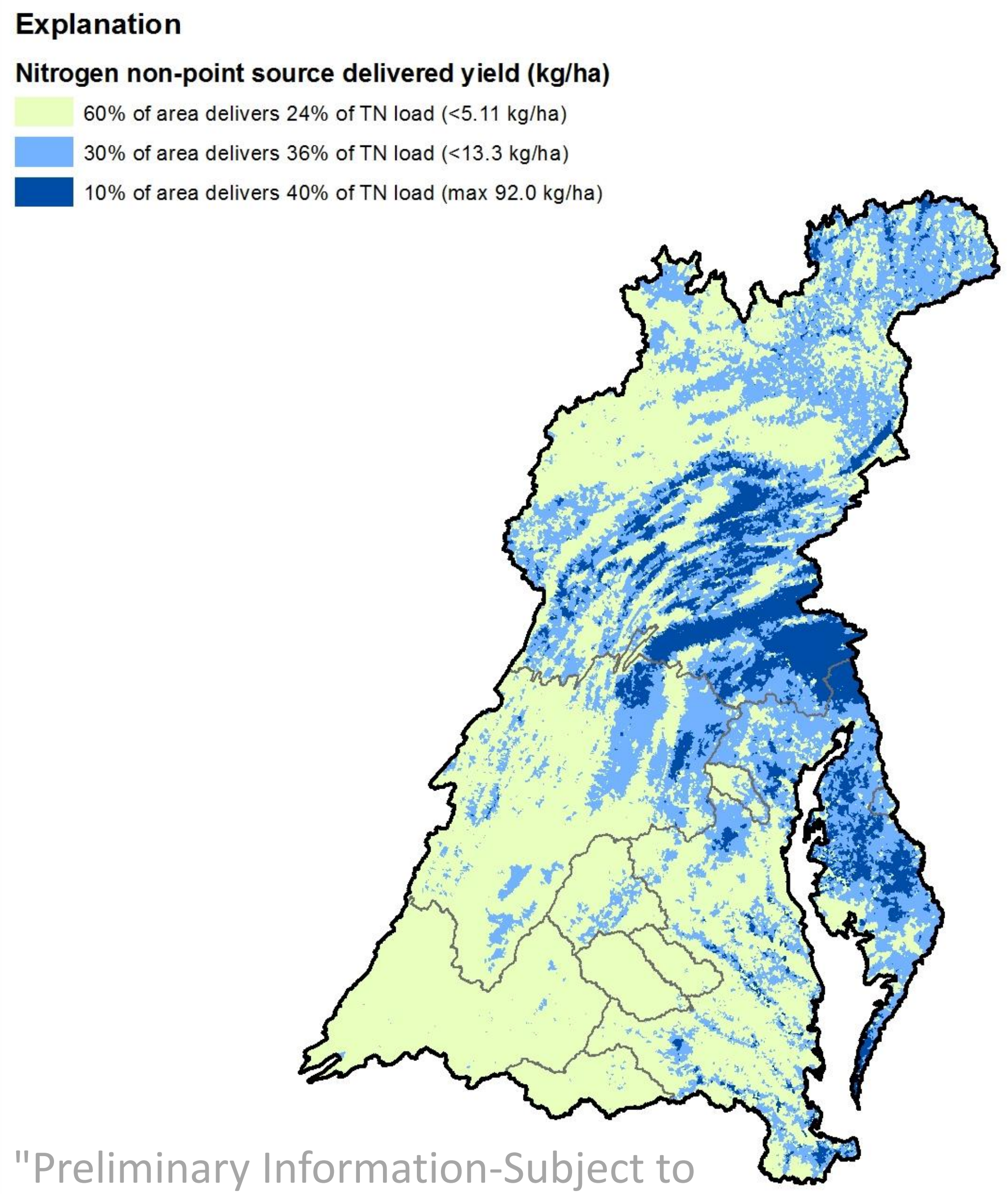

Explanation
Nitrogen non-point source delivered yield (kg/ha)
60% of area delivers 24% of TN load (<5.11 kg/ha)
30% of area delivers 36% of TN load (<13.3 kg/ha)
10% of area delivers 40% of TN load (max 92.0 kg/ha)

Summary

- SPARROW can be used to guide restoration in order to focus energy where a greater return on investment.
- Spatial analysis can be fine tuned to areas of interest such as State, Region, or Watershed.
- Supplemental information may be needed for VERY local focusing, as portions of the models are based on downscaled regional information.

Objectives completed in the initial phase of the study:

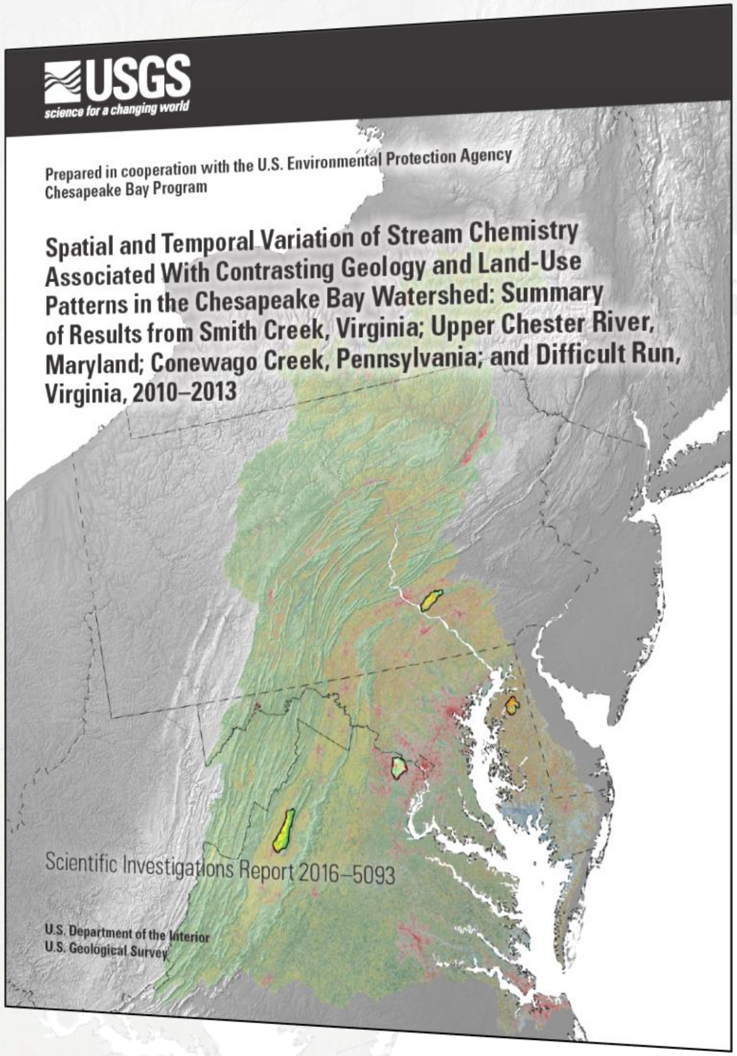
To characterize current water-quality conditions.

To identify the dominant sources, sinks, and transport process of nitrogen and, to a lesser extent, phosphorus.

To quantify the implementation of conservation practices

Underway: To transfer the knowledge gained in these basins to the rest of the Chesapeake Bay watershed

Within 3-5 Years: To directly link trends in water quality to conservation practices



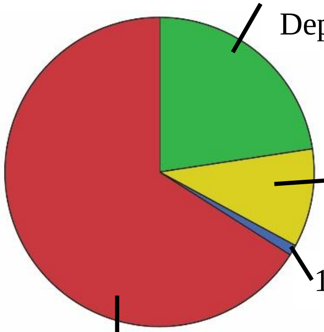
Report available online
https://pubs.er.usgs.gov/publication/sir20165093

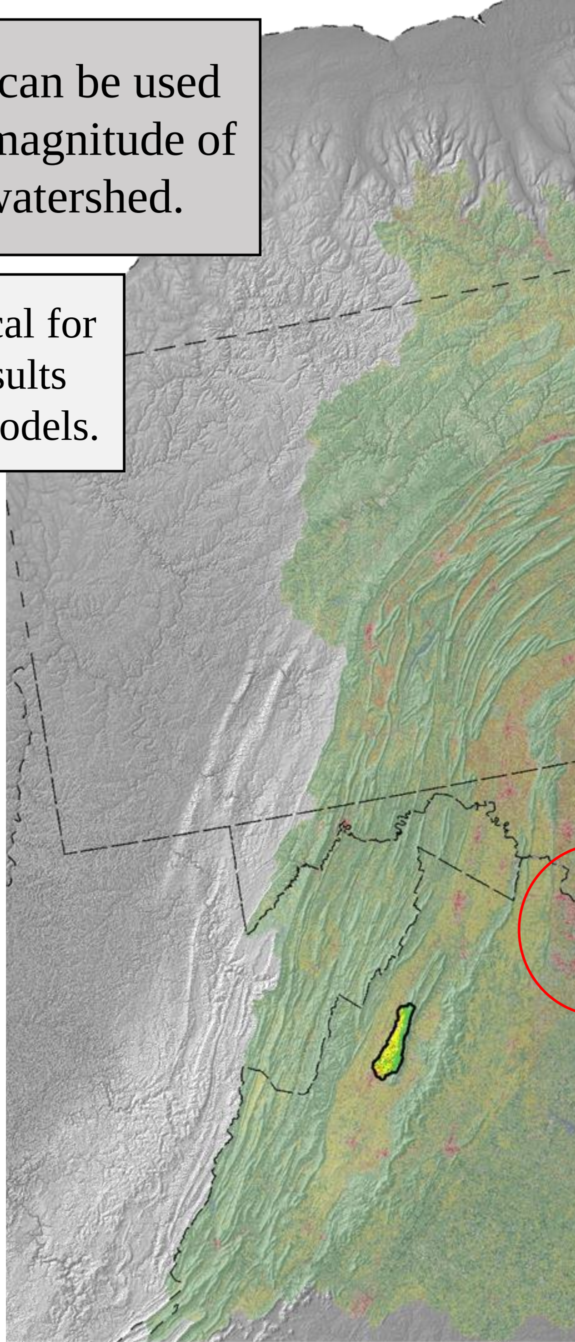
Hyer and others, 2016
https://pubs.er.usgs.gov/publication/sir20165093

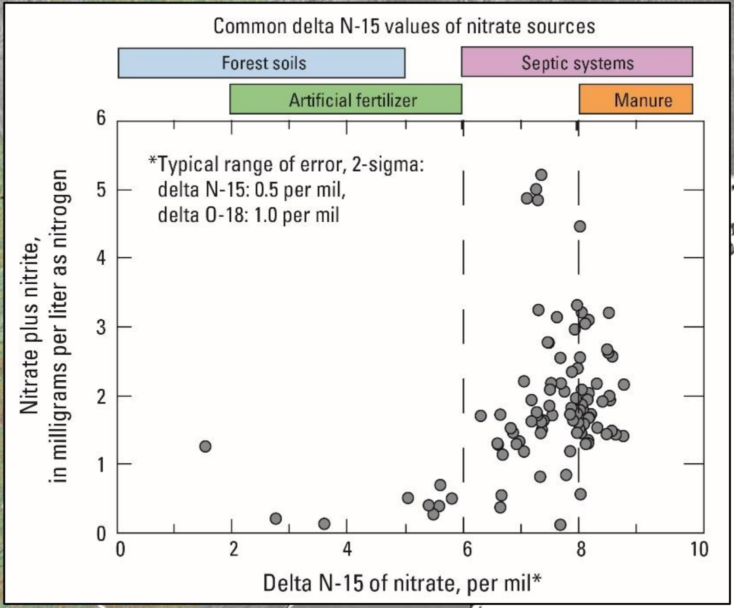
Water-quality monitoring can be used to identify the source and magnitude of nutrient loads within a watershed.

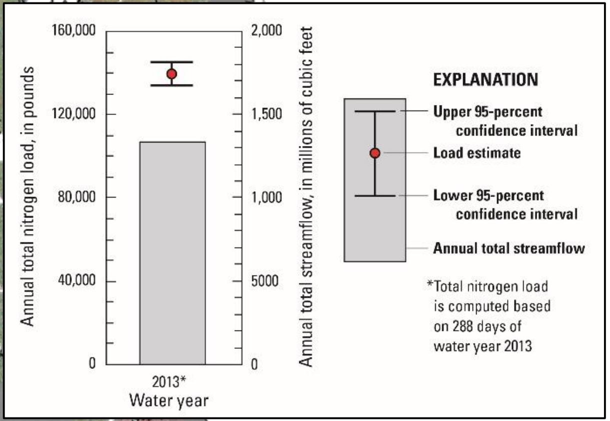
These empirical data are critical for validating and enhancing results from regional water-quality models.

Percent of TN sources to the total load within Difficult Run, VA as generated by the 2002 Chesapeake Bay TN SPARROW model[1]







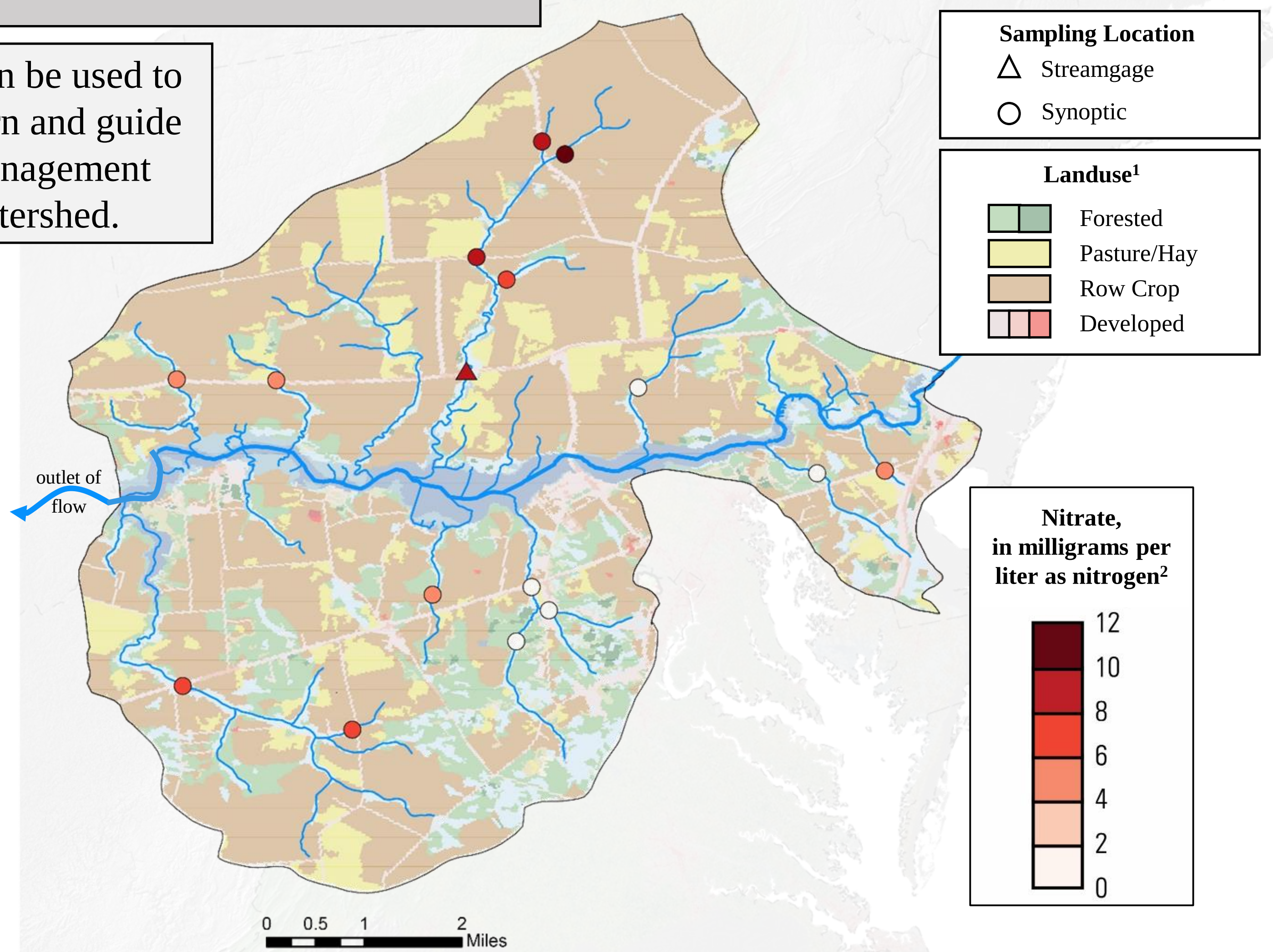


[1]Ator and others, 2011

Hyer and others, 2016
https://pubs.er.usgs.gov/publication/sir20165093

The spatial variability of nitrogen and phosphorus concentrations within a single watershed can be as large as the range in conditions observed throughout the entire Chesapeake Bay watershed.

Targeted monitoring can be used to identify areas of concern and guide the most effective management actions within a watershed.



[1]Landuse from NLCD 2011

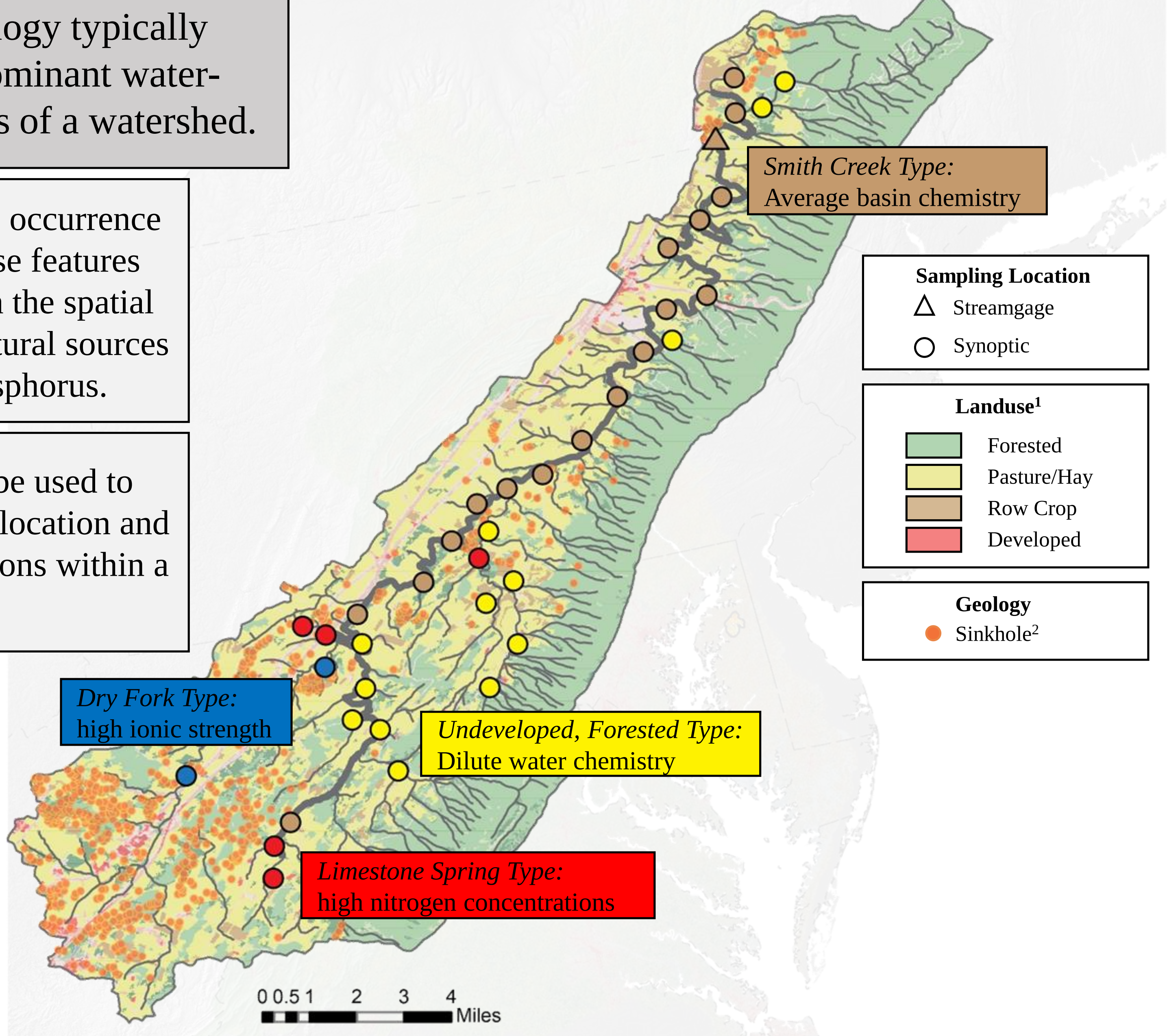
[2]Nitrate concentrations from April 2013 synoptic sampling event.

Hyer and others, 2016
https://pubs.er.usgs.gov/publication/sir20165093

Land use and geology typically accounts for the dominant water-quality characteristics of a watershed.

An understanding of the occurrence and distribution of these features typically coincides with the spatial and anthropogenic or natural sources of nitrogen and phosphorus.

This information can be used to guide the most effective location and type of management actions within a watershed.



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[1]Landuse from NLCD 2011

[2]Sinkholes from Hubbard (1983)

[3]Cluster groups assigned to samples during May 2013 synoptic sampling event.

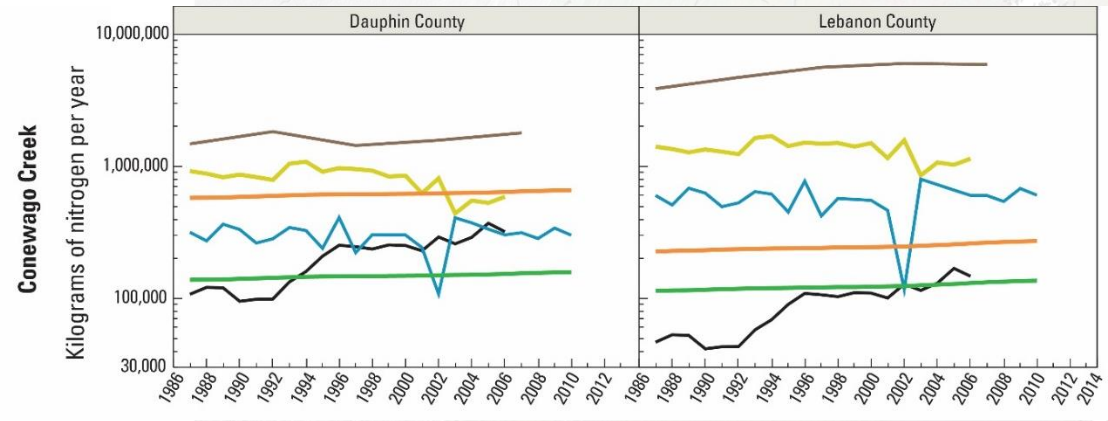
Hyer and others, 2016
https://pubs.er.usgs.gov/publication/sir20165093

Management actions that target improvements of in-stream nutrient loading should focus on removing or reducing the input of nitrogen and phosphorus to a watershed

Potential water-quality improvements from to the implementation of conservation practices may be offset by increased nutrient inputs to the landscape.

Number of USDA-compliant conservation practices implemented in the Showcase Watersheds

Watershed	2007	2008	2009	2010	2011	2012	2013	Total
Conewago Creek	131	50	110	90	122	86	93	682
Smith Creek	292	66	99	117	202	312	316	1,404
Upper Chester	183	120	117	210	200	276	88	1194



Nitrogen Sources

- Manure
- Atmospheric Deposition
- Fertilizer (farm)
- Fertilizer (nonfarm)
- Septic
- Sanitary Sewer

Hyer and others, 2016
https://pubs.er.usgs.gov/publication/sir20165093

The level of information used to guide watershed management decision making is a function of costs and priorities.

Financial and Time Investment	Management Priority	Information Gained	Action
Relatively Low			Use land use data and existing regional models to target sources and areas of concern.
Intermediate			• Perform some spatial monitoring to target management locations • Confirm sources inferred from land use and models with isotopic analyses.
High			Perform full-scale water-quality monitoring using multiple tracers and spatial sampling events to better understand local sources, transport processes, and spatial patterns.

Any level of investment is better than taking no actions to inform your watershed management.

Hyer and others, 2016
https://pubs.er.usgs.gov/publication/sir20165093

CBP Data Visualization and Mapping Tools - ITAT Jurisdictional Team Update

January 30, 2017

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Products Deployed or Under Development

- CAST
  - Watershed Model Data Inputs (existing)
  - Phase 6 – Official BMP Implementation data and load reductions (tentatively planned for April)
- Ranging Scenarios Watershed Model Output
- High Resolution Land Use/Land Cover
- Nontidal and Tidal Trends

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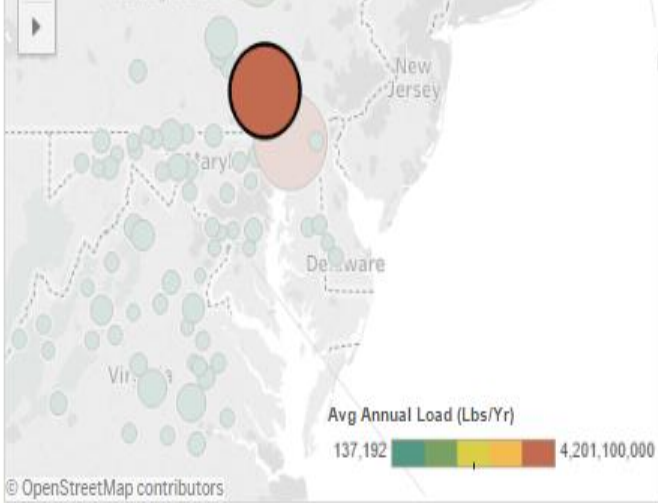
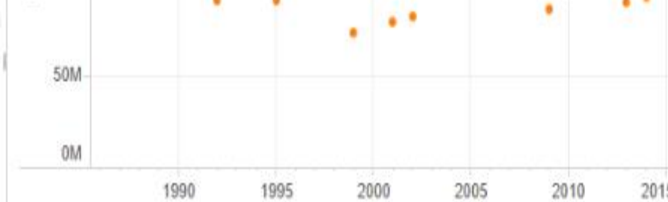
Nontidal Dashboard (Under Development)





Trends (through 2014)

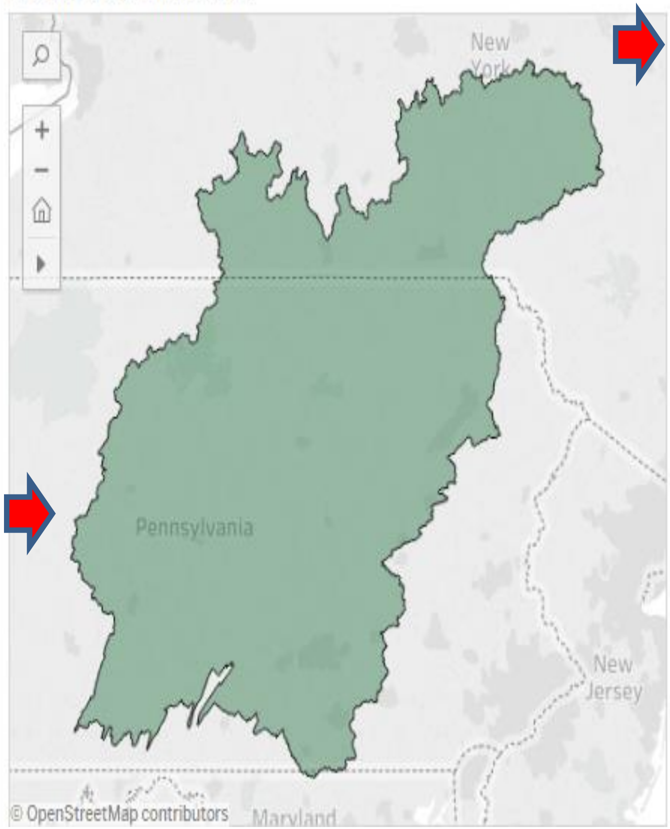
Long Term	Short Term
Improving	Improving

5-year mean yield (2008-2012)

Total Nitrogen	7.090

[blue, lower yields; green, medium yields; orange, higher yields; yields in tons per square mile]

Station Catchment Area



Catchment Area Land Cover (NLCD 2011)

	1576000
Barren Land	0.35
Cultivated Crops	9.32
Deciduous Forest	47.26
Developed, High Intensity	0.29
Developed, Low Intensity	1.84
Developed, Medium Intensity	0.74
Developed, Open Space	4.94
Emergent Herbaceuous Wetlands	0.40
Evergreen Forest	4.92
Hay/Pasture	14.78
Herbaceuous	0.55
Mixed Forest	10.42
Open Water	1.06
Shrub/Scrub	1.75
Woody Wetlands	1.38

% of Total Area by Type

Catchment Total Area: 26,004 sq mi

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Nontidal Dashboard – Next Steps

- Updates through 2016
- Additional Basin Characteristics
- Integration of model output upstream of monitoring stations, including sector based inputs from …
  - SPARROW
  - P6 WSM
- Usability Testing (… ITAT Jurisdictional Team?)

*** To be in place prior to PSC in May/June**

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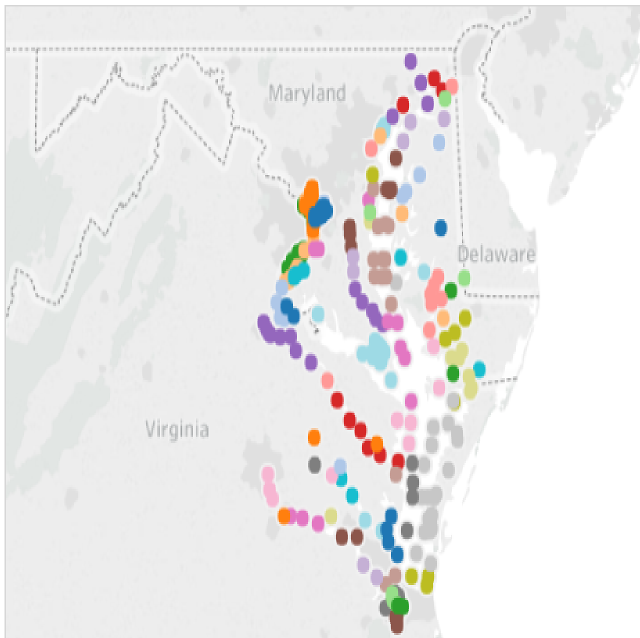
Tidal Dashboard (Under Development)

Segment Pct to Attainment | Monitoring Stations Only

Chesapeake Bay Tidal Monitoring

To select monitoring location, either click an individual Monitoring Station, select drawing tool under the arrow in the toolbar and select multiple or hold the CTRL key and select multiple stations to view the results/comparisons on the graphs below. Next select the parameters, layer and data type to view the results on the graph under the map. To compare 2 stations scroll to the bottom and select monitoring stations from the Compare Station drop-down menus. If Generalized Additive Model (GAM) data are available for the selected station, it will be shown in the associated graph. If no GAM data are available, then a simple trend line generated by Tableau will be displayed. Monitoring station data available from: http://data.chesapeakebay.net/

Monitoring Stations



Parameter
Secchi Depth

Layer
Surface

Date Type
Days

Aggregation
Individual Station Means

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Visualization Summary

- Currently evaluating platforms
- Bringing together readily available data sets
  - Focusing on datasets available in free-standing platforms.
- Identifying highest priority new data sets for visualization

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