

The role of monitoring data in model development

Gary Shenk – CBPO

WQGIT 10/25/2021

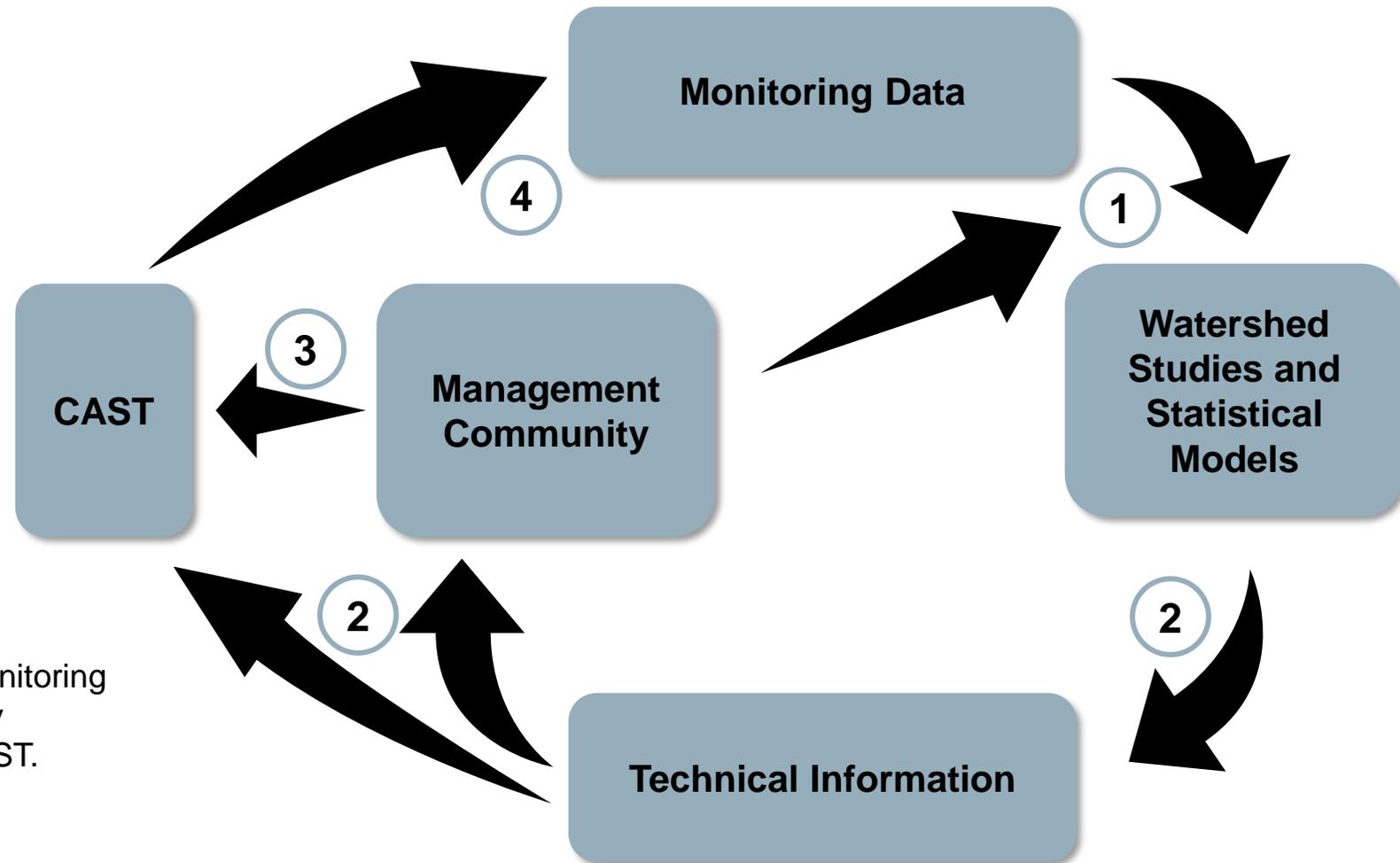
CAST is built on a foundation of monitoring data

1 Watershed studies and statistical models analyze and interpret monitored water-quality data to address priority concerns identified by the management community.

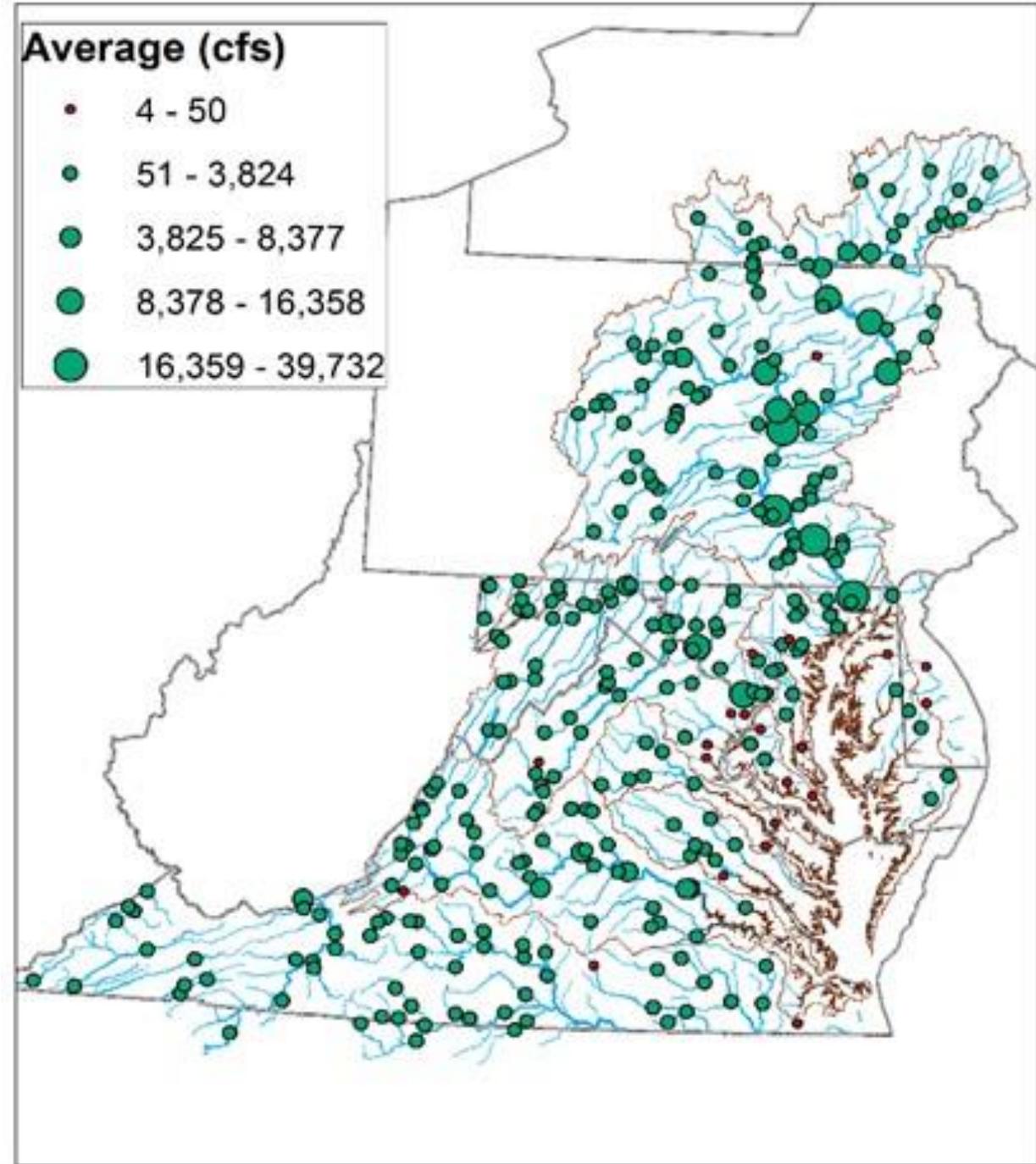
2 Watershed studies and statistical models provide technical information that is communicated to the management community and used to inform and improve CAST.

3 The management community uses CAST to develop management strategies.

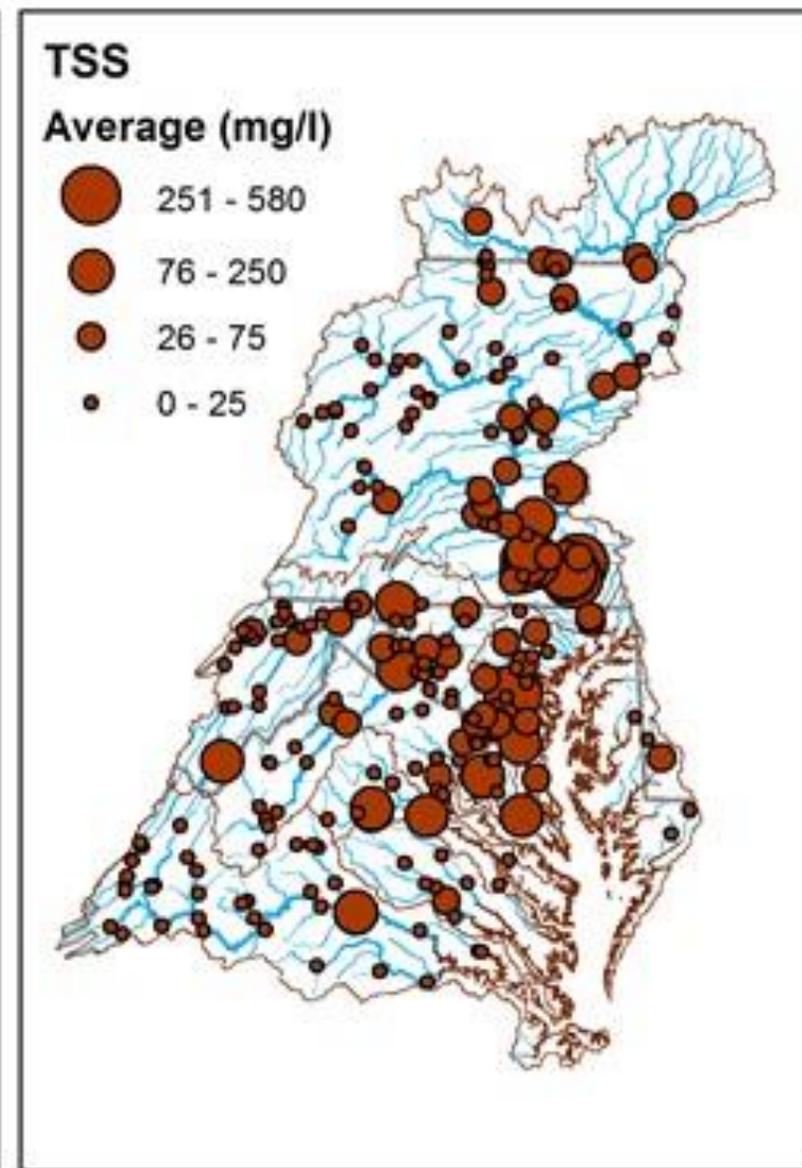
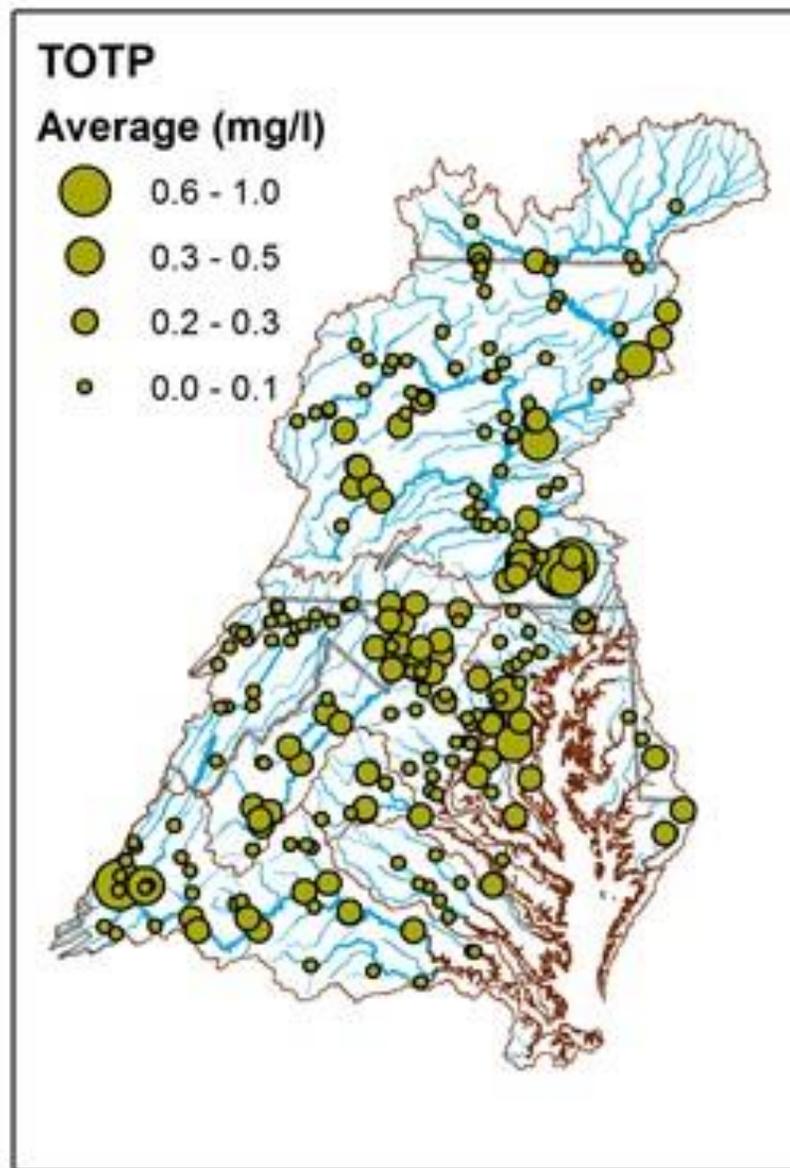
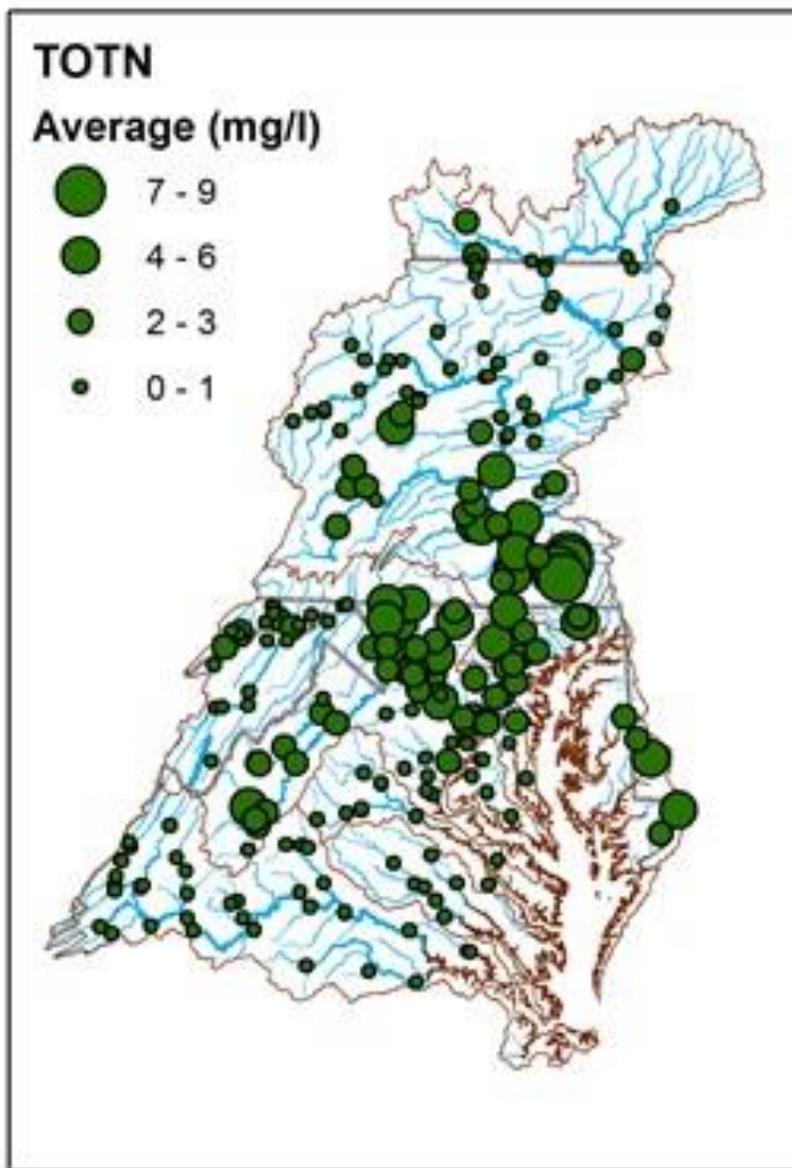
4 Estimates from CAST are compared against monitoring data to develop new insights about water-quality conditions and to improve future versions of CAST.



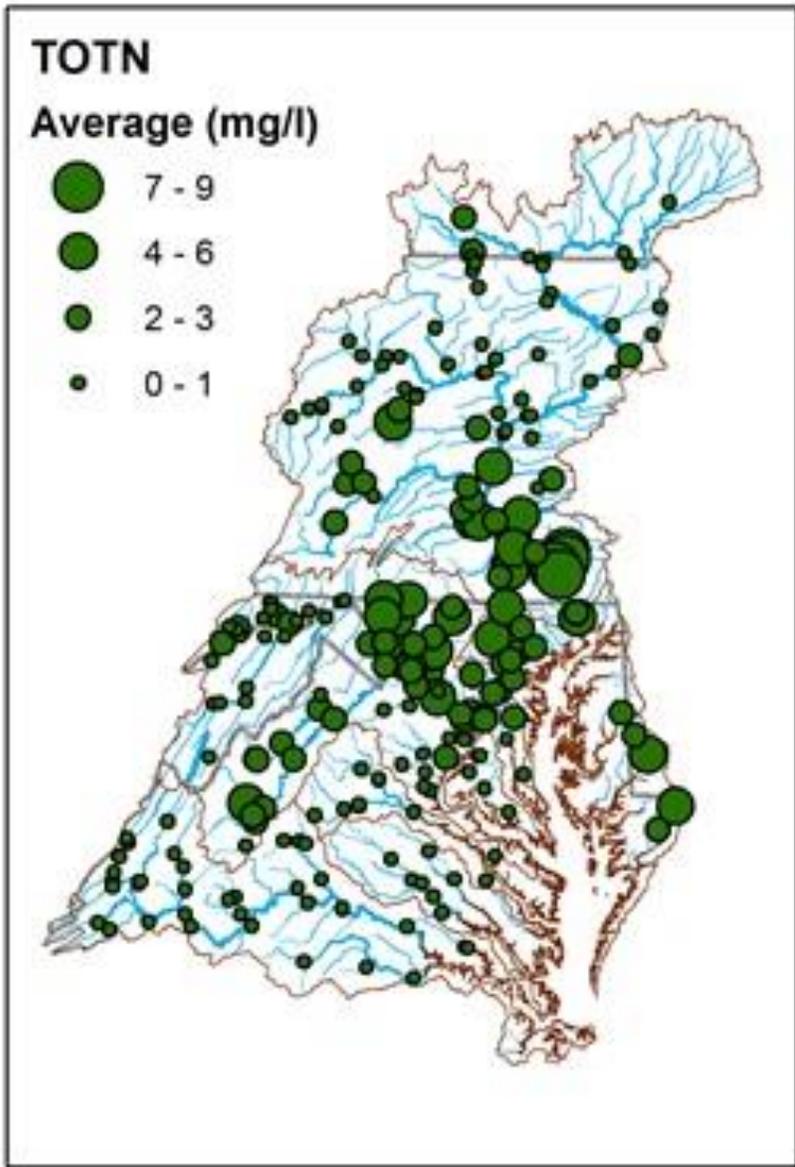
Phase 6 flow stations



Monitoring Stations



USGS Analysis Products – WRTDS loads



CAST - Calibration Inputs - Anim: x +

cast.chesapeakebay.net/documentation/NonTidalWaterQualityDashboard

Apps CBPO Scheduler Sign in to Concur... Citi Commercial Car... Chesapeake Bay Ge... https://gis.chesape... Priority Agricultural... Priority Agricultural... Reading list

Chesapeake Assessment Scenario Tool

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Parameter: Total nitrogen

Station: 1578310

Avg Annual Load (Lbs/Yr)
137,192 4,201,100,000

Annual Load

Trends (through 2014)

Long Term: Improving
Short Term: No Trend

5-year mean yield (2008-2012)

Total Nitrogen: 8.280

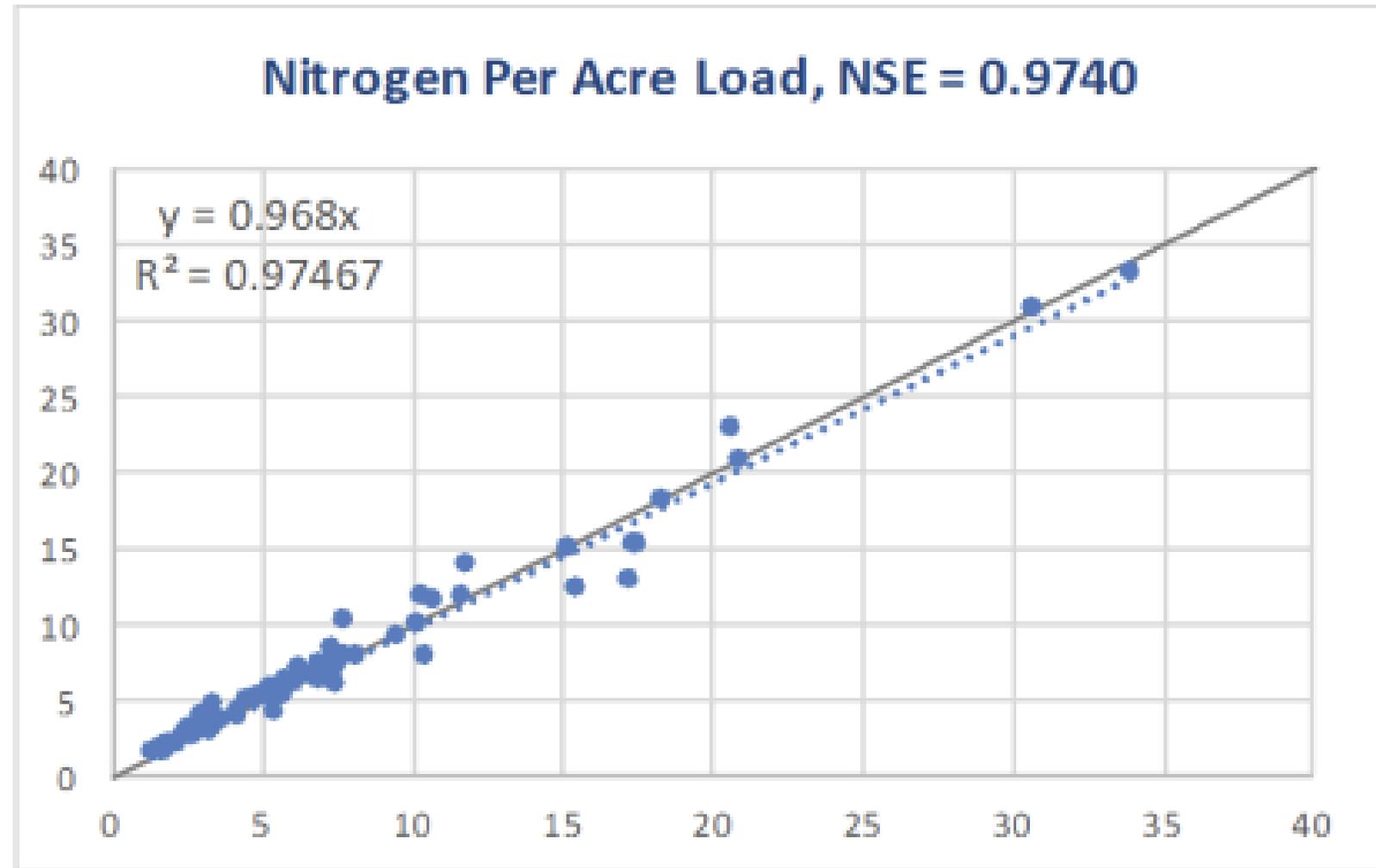
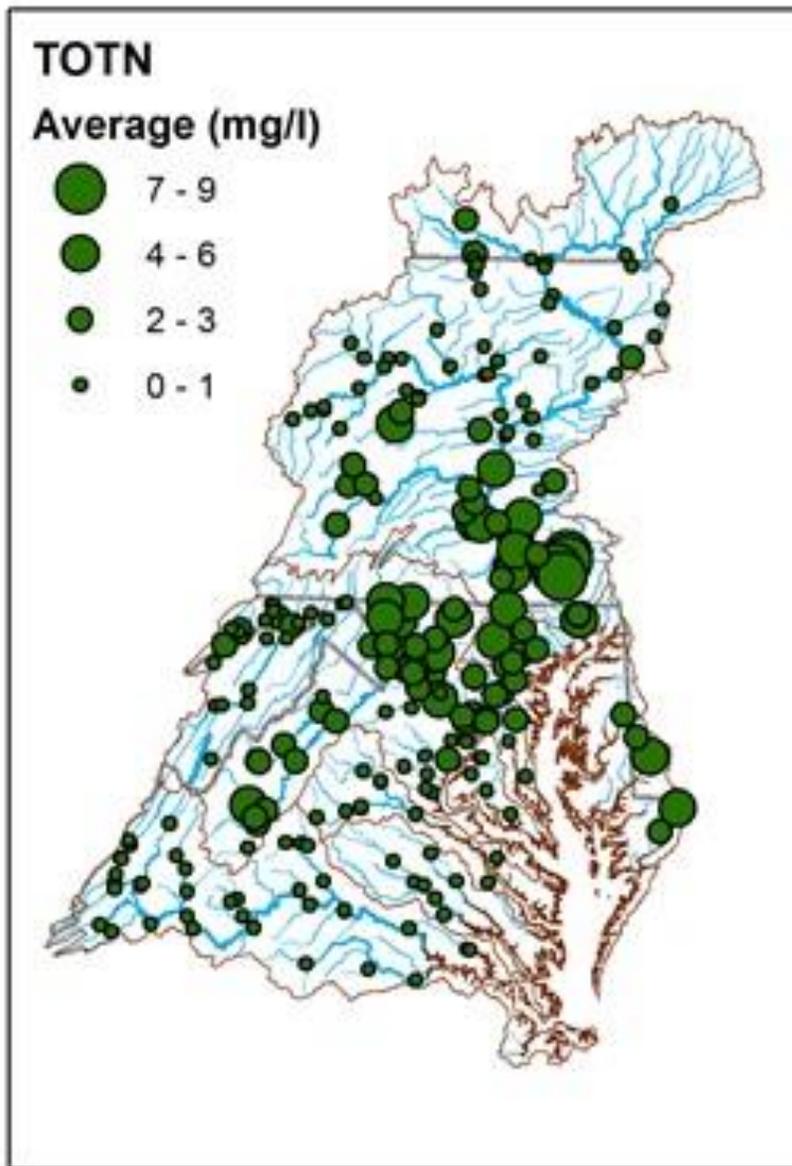
[blue, lower yields; green, medium yields; orange, higher yields; yields in tons per square mile]

Catchment Area Land Cover (NLCD 2011)

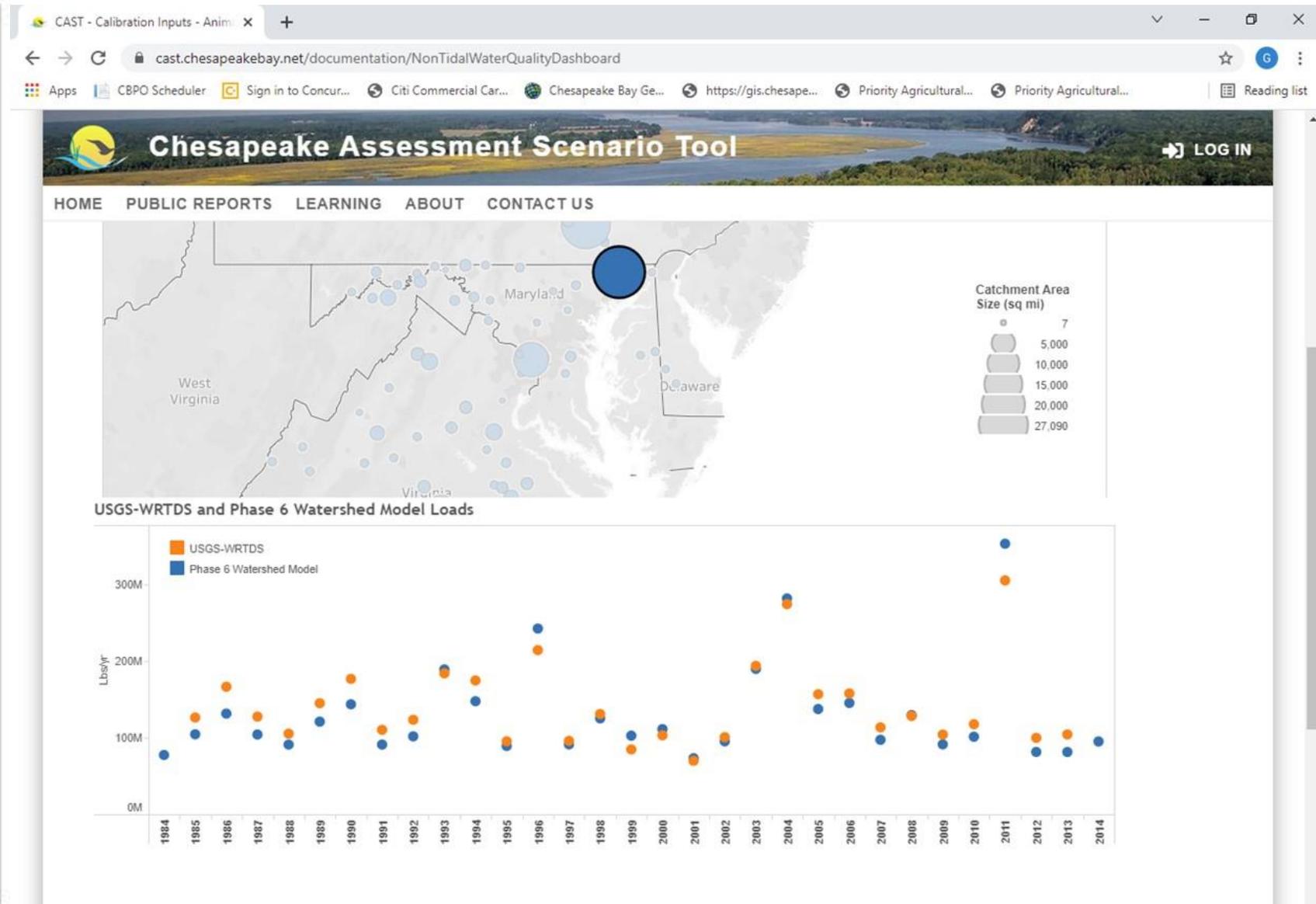
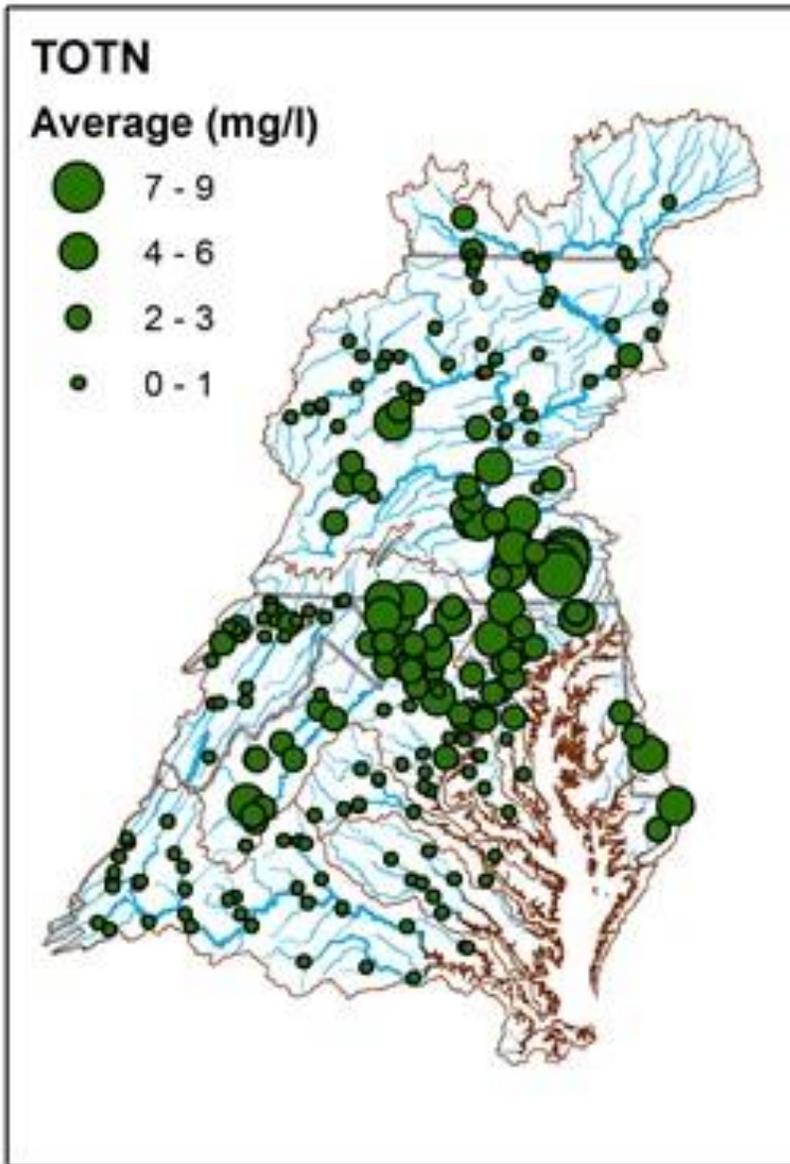
| Land Cover | Value |
|-------------------------------|-------|
| Barren Land | 0.35 |
| Cultivated Crops | 10.14 |
| Deciduous Forest | 46.32 |
| Developed, High Intensity | 0.31 |
| Developed, Low Intensity | 1.98 |
| Developed, Medium Intensity | 0.80 |
| Developed, Very Low Intensity | 5.11 |

Station Catchment Area

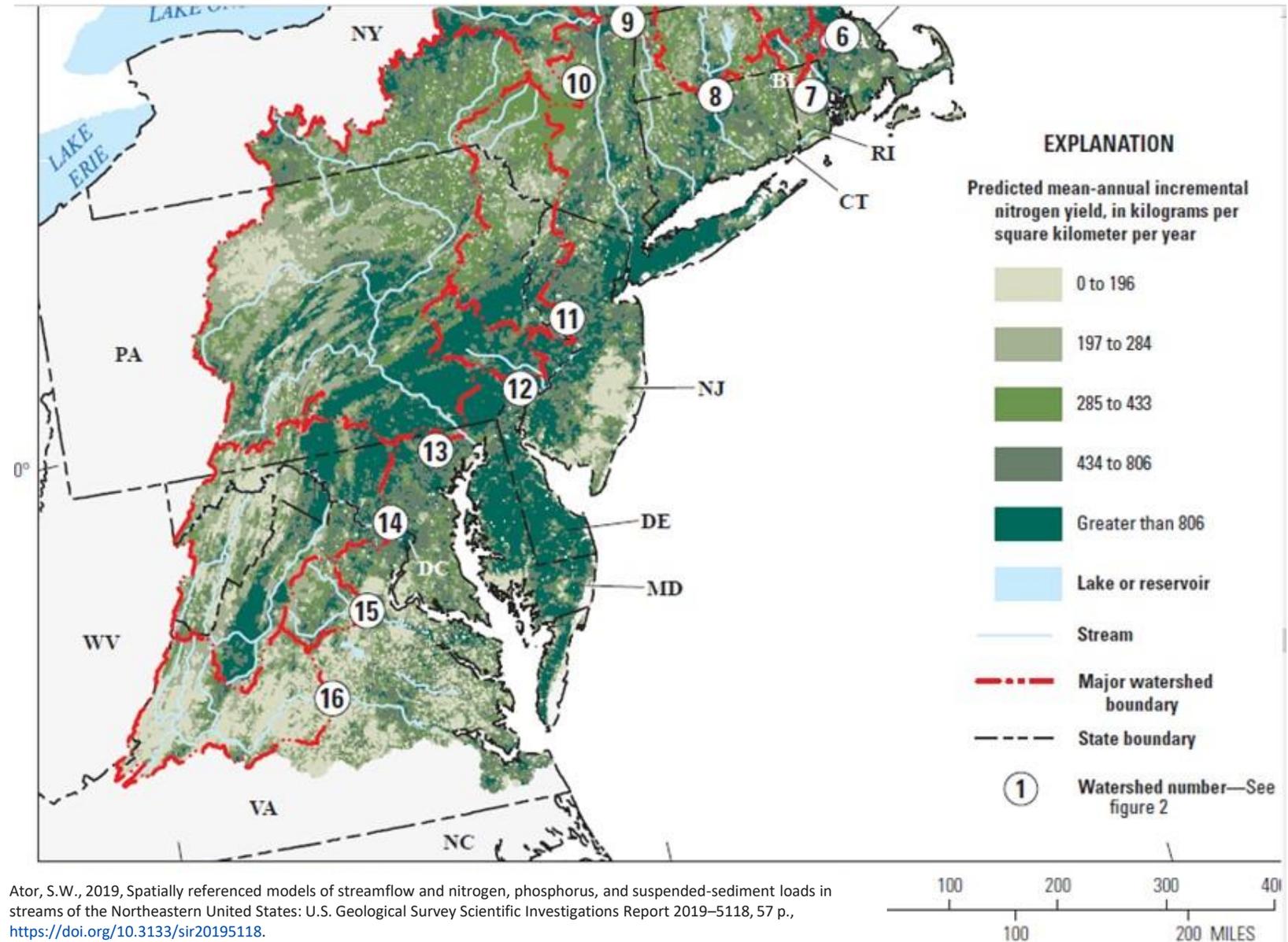
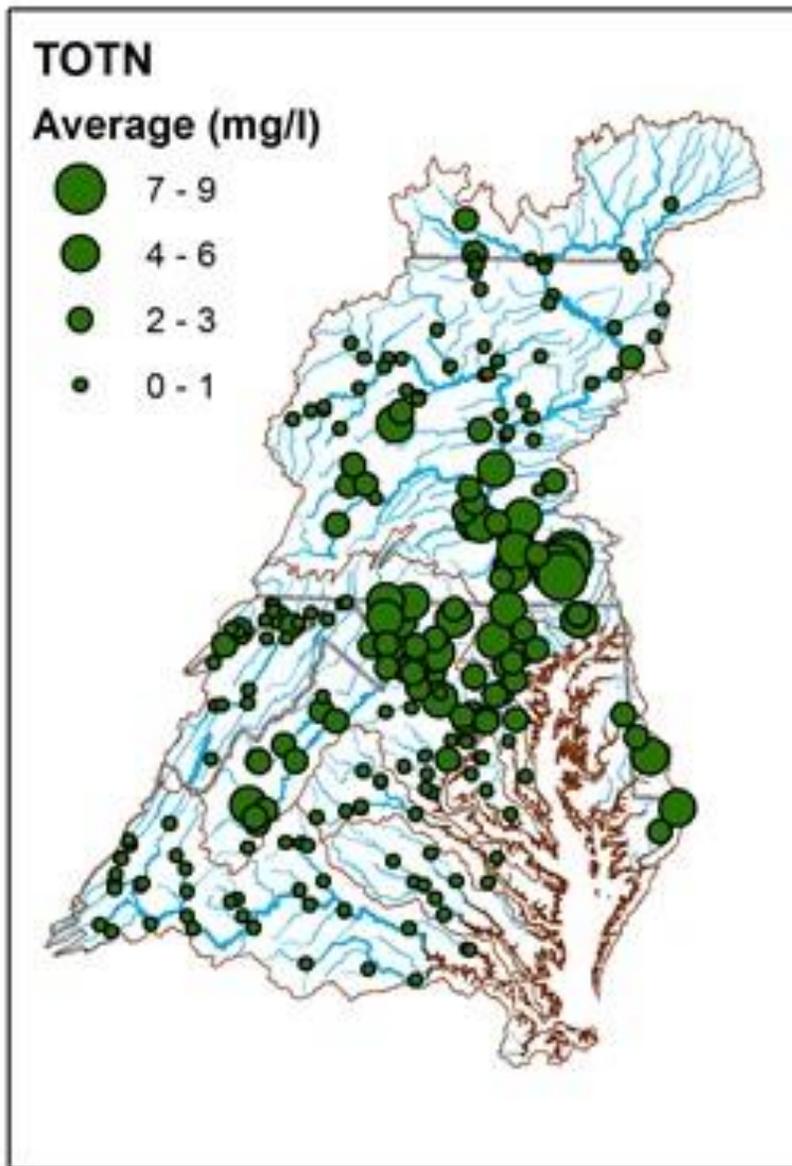
USGS Analysis Products – WRTDS loads



USGS Analysis Products – WRTDS loads

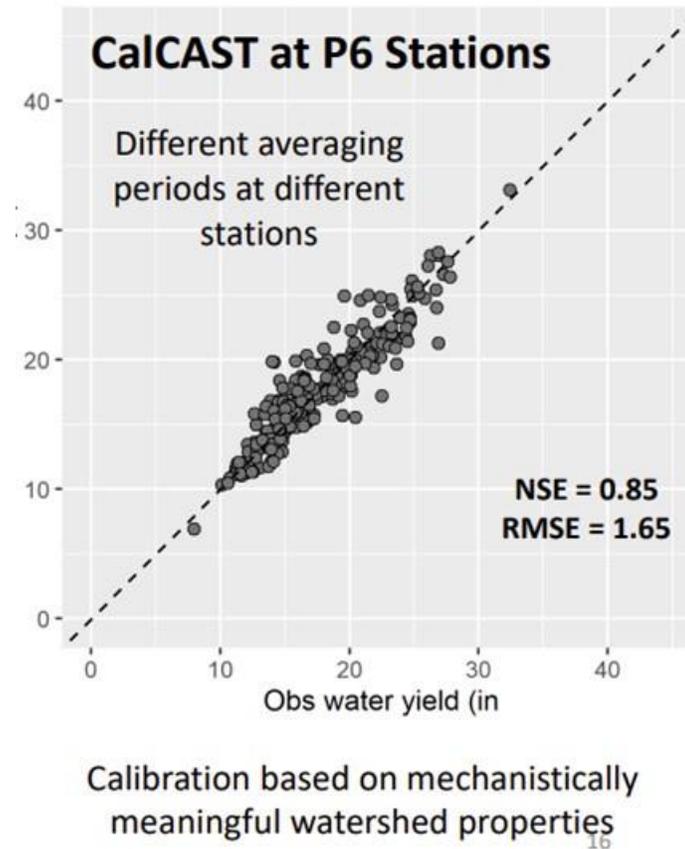
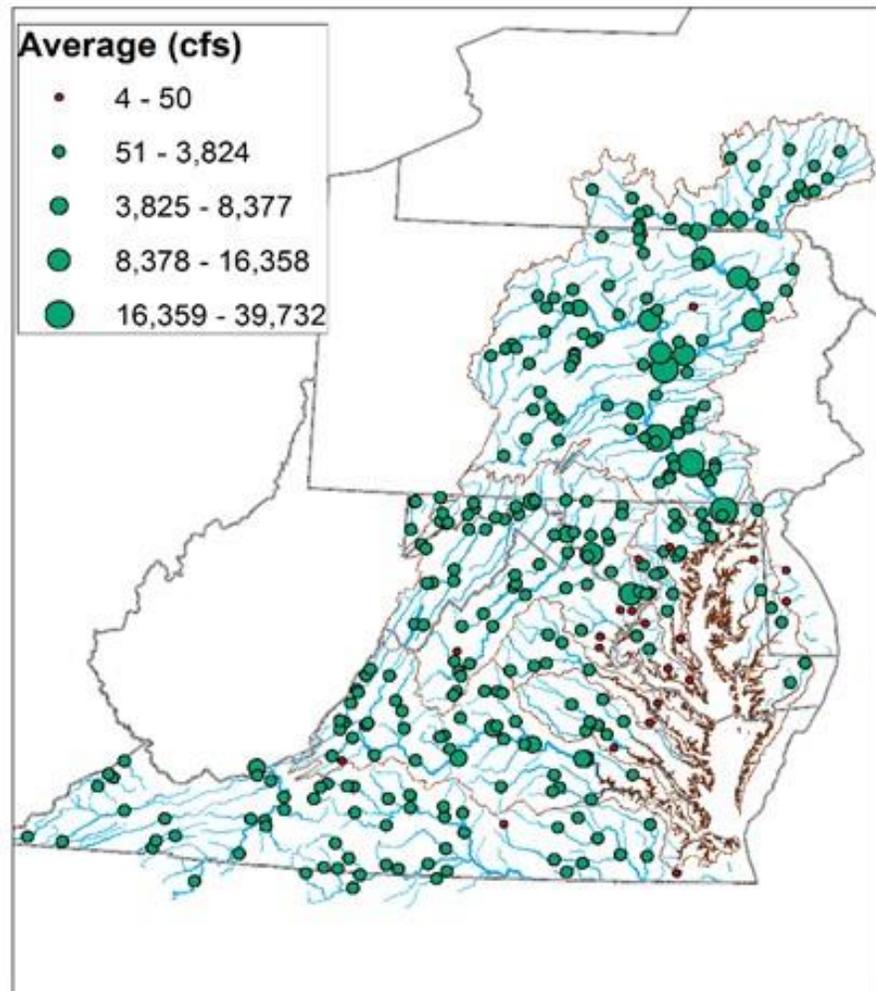


USGS Analysis Products – SPARROW



Ator, S.W., 2019, Spatially referenced models of streamflow and nitrogen, phosphorus, and suspended-sediment loads in streams of the Northeastern United States: U.S. Geological Survey Scientific Investigations Report 2019–5118, 57 p., <https://doi.org/10.3133/sir20195118>.

CBPO Analysis Products

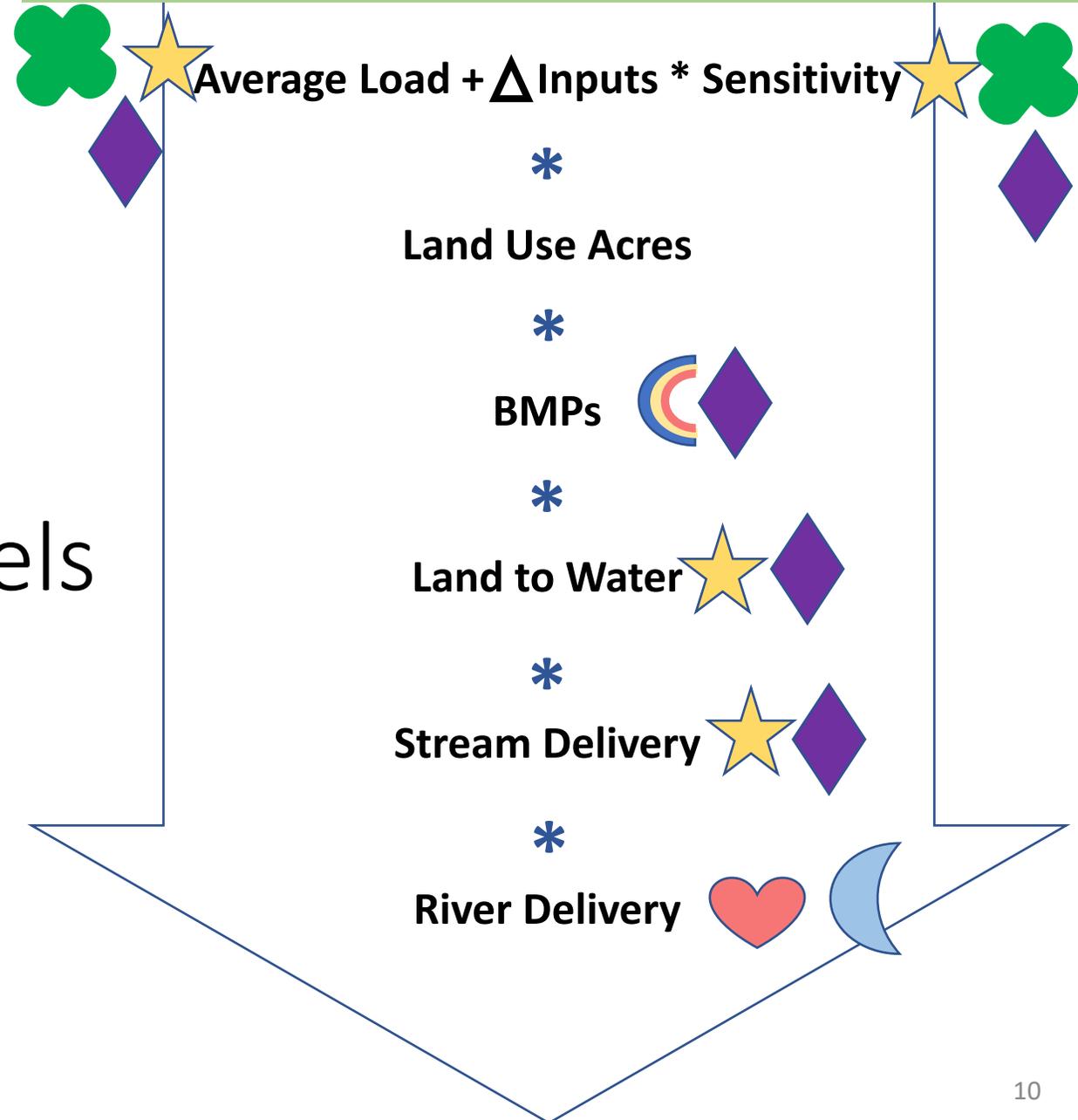


Flow predicted by:
Precip
Temperature
Land use
Groundwater recharge
Abandoned mine drainage
Topographic wetness index

Use of river monitoring data in CAST

-  Concentrations
-  WRTDS
-  Sparrow
-  Calibrated process models
-  Field-scale monitoring
-  Synthesis Products

Phase 6 Model Structure



Summary

- Monitoring is used extensively in modeling
 - Coefficients
 - Calibration
 - Comparison with model predictions of load change
- A new model will use new
 - Observations
 - Synthesis and analysis products