

Overview of expanded USGS Status and Trends efforts: compilation and analysis of additional monitoring data to describe change

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Goal: Overview of the available nontidal monitoring data sets from the USGS Status and Trend effort that:

- 1. You may not know about**
- 2. Could be used to inform water quality and co-benefits modeling in the phase 7 model.**

Overview of the Nontidal Monitoring Network (NTN): monitoring and analysis

Total Nitrogen per Acre Loads
and Trends: 2009-2018

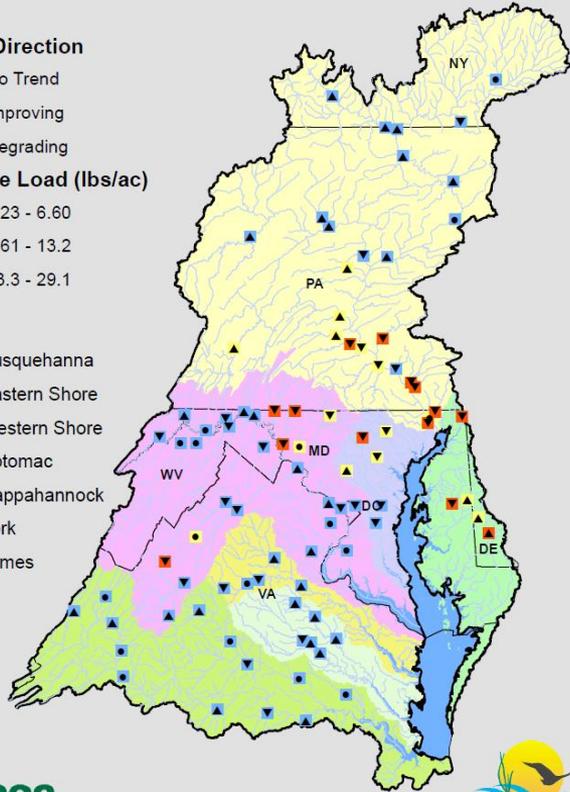
Trend Direction

- No Trend
- ▼ Improving
- ▲ Degrading

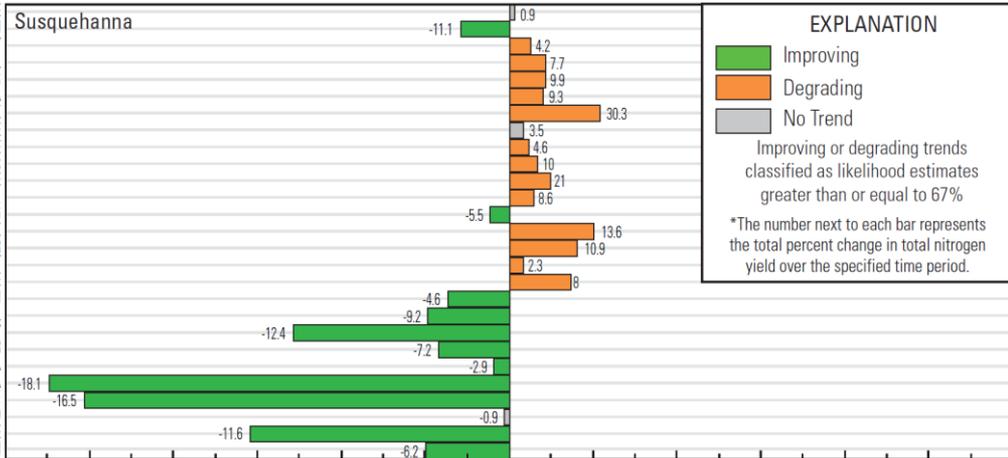
Average Load (lbs/ac)

- 1.23 - 6.60
- 6.61 - 13.2
- 13.3 - 29.1

- Susquehanna
- Eastern Shore
- Western Shore
- Potomac
- Rappahannock
- York
- James



- JUNADILLA RIVER ROCKDALE
- JUEHANNA RIVER CONKLIN
- JUEHANNA RIVER WAVERLY
- OHIOCTON RIVER CAMPBELL
- HEMUNG RIVER CHEMUNG
- JEHANNA RIVER TOWANDA
- OCK CREEK TUNKHANNOCK
- UNNA RIVER WILKES-BARRE
- JUEHANNA RIVER DANVILLE
- JEHANNA RIVER KARTHHAUS
- PINE CREEK WATERVILLE
- JUEHANNA RIVER JERSEY S
- HANNA RIVER LEWISBURG
- ENNS CREEK PENNS CREEK
- IN BRANCH JUNIATA RIVER
- JUNIATA RIVER NEWPORT
- IN CREEK SHERMANS DALE
- UINET CREEK HOGESTOWN
- REECHES CREEK CAMP HILL
- SWATARA CREEK HERSHEY
- VAGO CREEK MANCHESTER
- JEHANNA RIVER MARIETTA
- ESTOGA RIVER CONESTOGA
- JUEA CREEK MARTIC FORGE
- HANNA RIVER CONOWINGO
- ARO CREEK RICHARDSMERE
- DEER CREEK DARLINGTON



EXPLANATION

- Improving
- Degrading
- No Trend

Improving or degrading trends classified as likelihood estimates greater than or equal to 67%

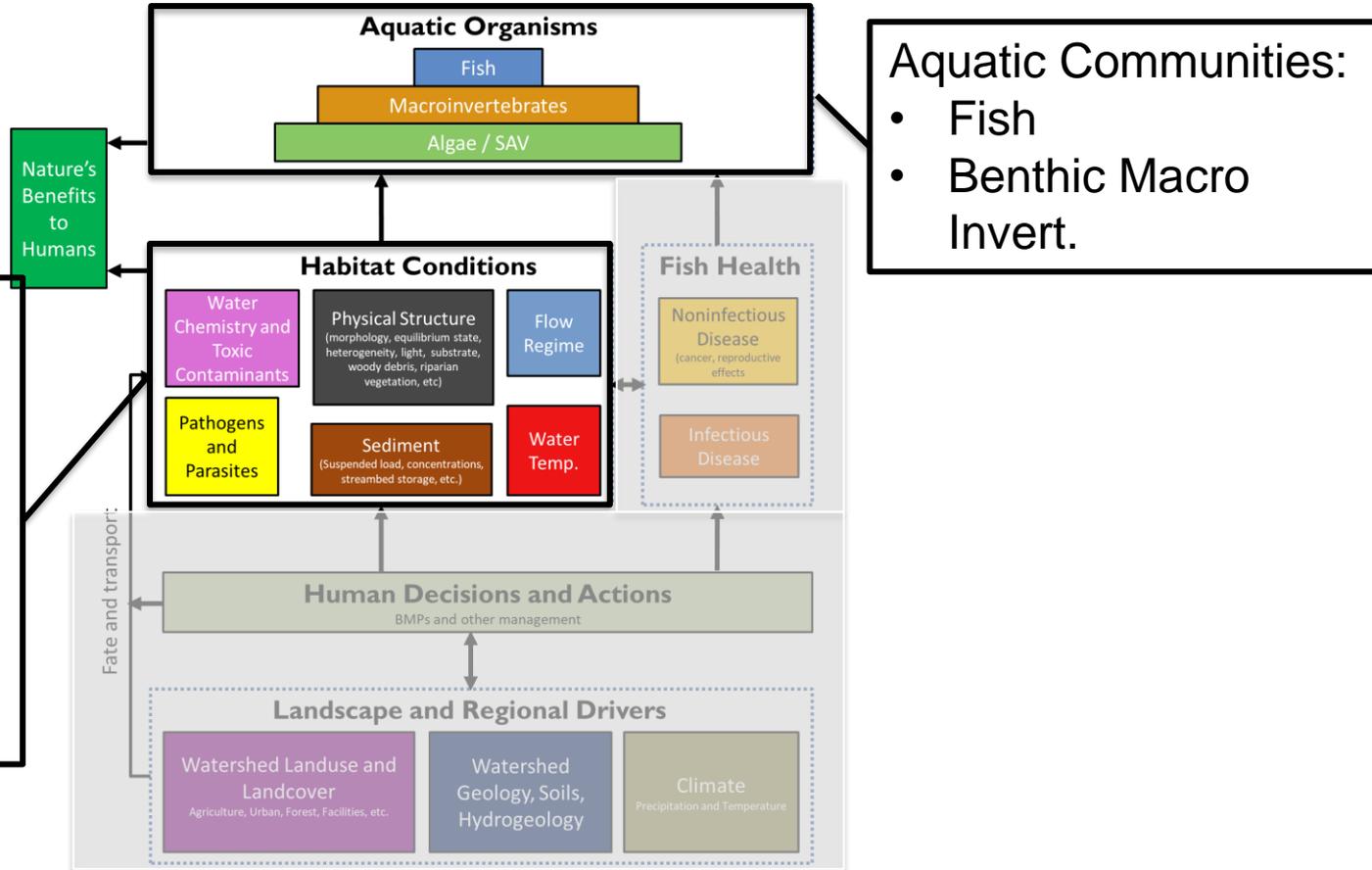
*The number next to each bar represents the total percent change in total nitrogen yield over the specified time period.

Conceptual model for explaining change of stream health, fish habitat, and aquatic conditions in relation to stressors and management activities

Theme 1: Status and Trends

Stressors –

- Q/Ecological Q
- Water Temperature
- Water Quality
- Toxic Contaminants
- Specific Conductance
- Channel Geomorphology

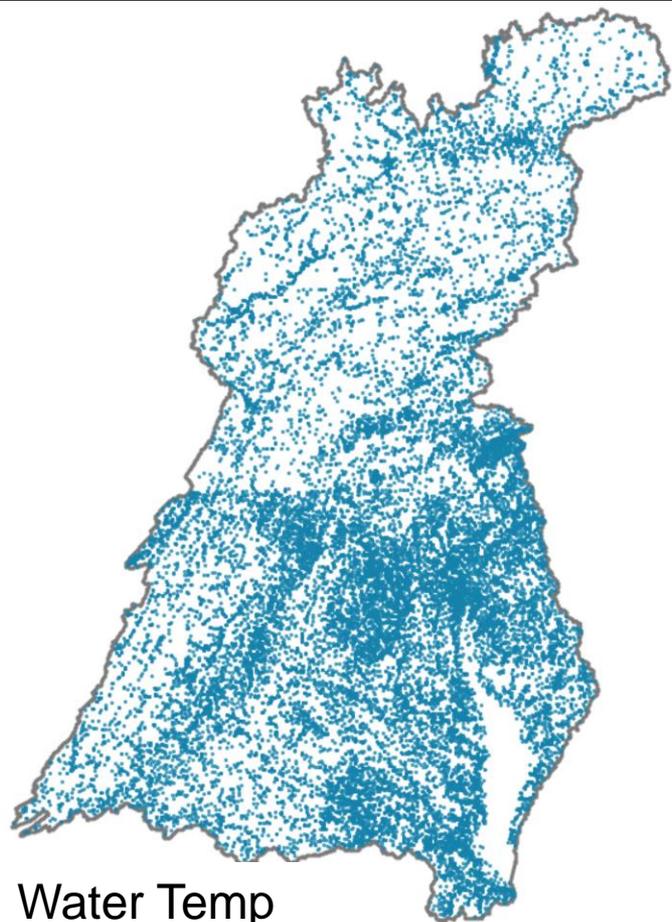


USGS Status and Trends effort

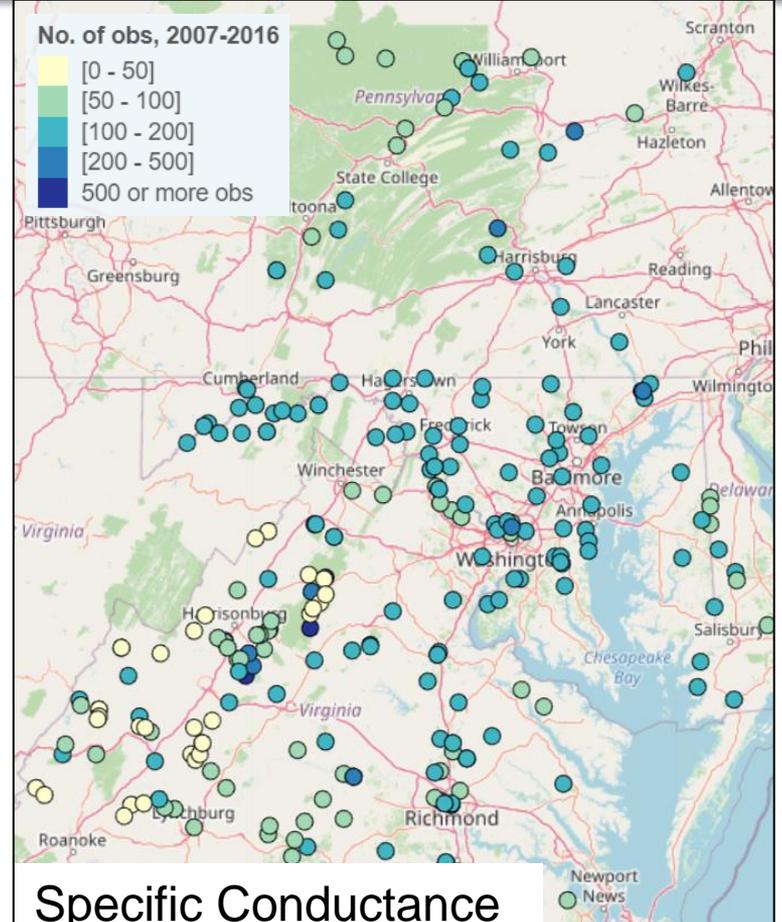
Tasks and Timeline:

- What data are available for inclusion that represent stream health, fish habitat and fish health? **FY2020-21**
- What variables have data sufficient for computation of status and trends and are relevant to Chesapeake Bay Management and Researchers?
 - What variables should be represented by Status and Trend? **FY2022**
 - What is the best statistical approach to determine Status and Trend?
- Communicate results and implications for management **FY2023**

USGS Status and Trends effort: Variability between domains



Water Temp

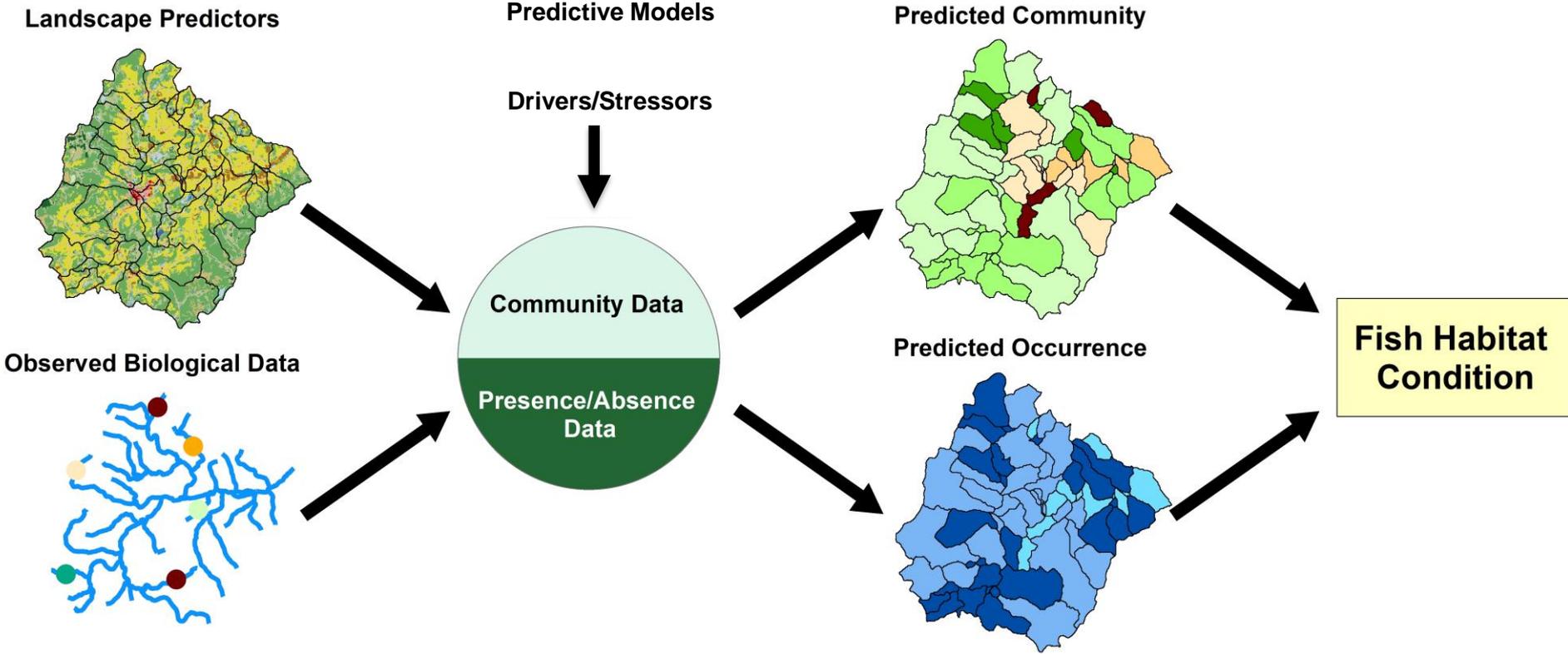


USGS Status and Trends effort

Definitions:

- **STATUS** – Numerical representation of “Current” condition for Response (Habitat, Health, ...) and/or Stressor (Q, WT, ...) variables for a given time period.
 - **Aquatic Communities** – *Richness, diversity, abundance of specific species.*
 - **Water Temp** – *Mean annual, Mean Monthly (could be represented by min/max...)*
 - **Discharge** – *1-, 7-, 30- day, min, max, mean, median*
 - **Water Quality** – *Loads (represented as a yield)*
 - **Specific Conductance** – *Mean/Median Annual/Season SC, deviation from expected, and duration*
 - **Geomorphology** – *Predicted physical habitat score, channel disturbance, channel dimensions*
- **TREND** – Statistical determination of change in status for a given time period

Predictive modeling and co-benefit possibilities



USGS Status and Trends Effort – Technical Contacts

1. **Aquatic Communities** – Fish and Benthic Macroinv. (Krause, Chambers, Maloney)
2. **Ecological Flow** at Gaging Stations(Mason/Austin) and as predicted by Phase 6 Chesapeake Bay Watershed Model (Chanat)
3. **Water Temperature** - (Clune)
4. **Water Quality** – Nutrients and Suspended Sediment (Moyer)
5. **Toxic Contaminants** – PCBs, Pesticides, and Mercury (Majcher)
6. **Specific Conductivity** – (Fanelli)
7. **Geomorphology** – Instream rapid bioassessment data (Cashman)



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