

## **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

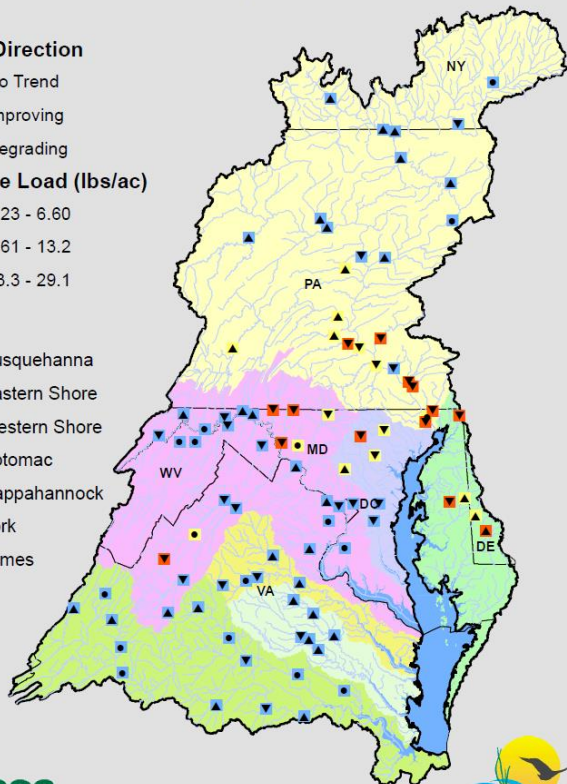
### Trend Direction

- No Trend
- ▼ Improving
- ▲ Degrading

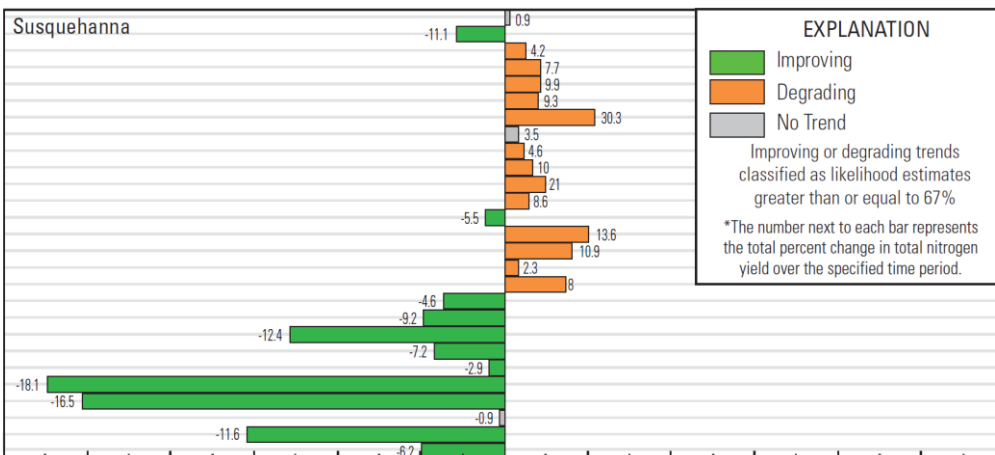
### Average Load (lbs/ac)

- 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  
OHOCTON RIVER CAMPBELL  
JHEMUNG RIVER CHEMUNG  
JUEHANNA RIVER TOWANDA  
OCK CREEK TUNKHANNOCK  
JUNNA RIVER WILKES-BARRE  
JUEHANNA RIVER DANVILLE  
JUEHANNA RIVER KARTHAUS  
PINE CREEK WATERVILLE  
JUEHANNA RIVER JERSEY S  
HANNA RIVER LEWISBURG  
ENNS CREEK PENNS CREEK  
/N BRANCH JUNIATA RIVER  
JUNIATA RIVER NEWPORT  
IN CREEK SHERMANS DALE  
JUNNET CREEK HOGSTOWN  
REECHES CREEK CAMP HILL  
SWATARA CREEK HERSHEY  
VAGO CREEK MANCHESTER  
JUEHANNA 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%

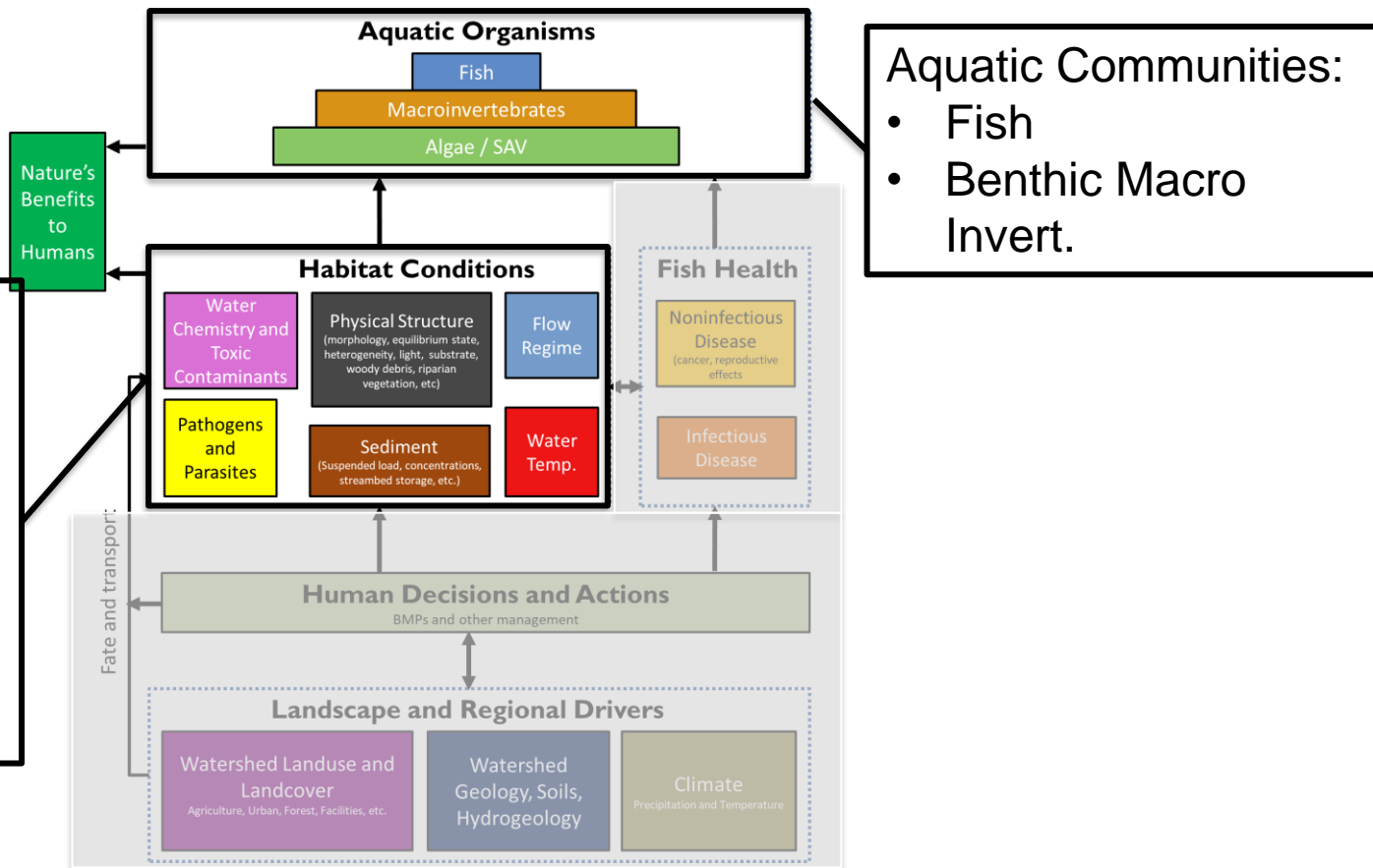
\*The number next to each bar represents  
the total percent change in total nitrogen  
yield over the specified time period.

# 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

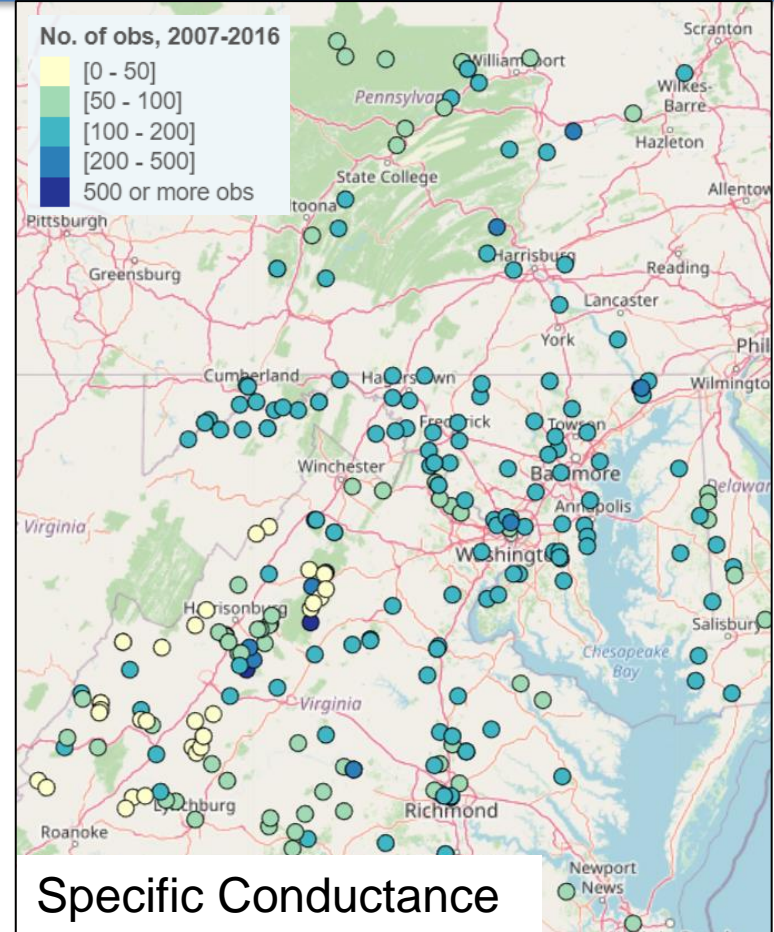
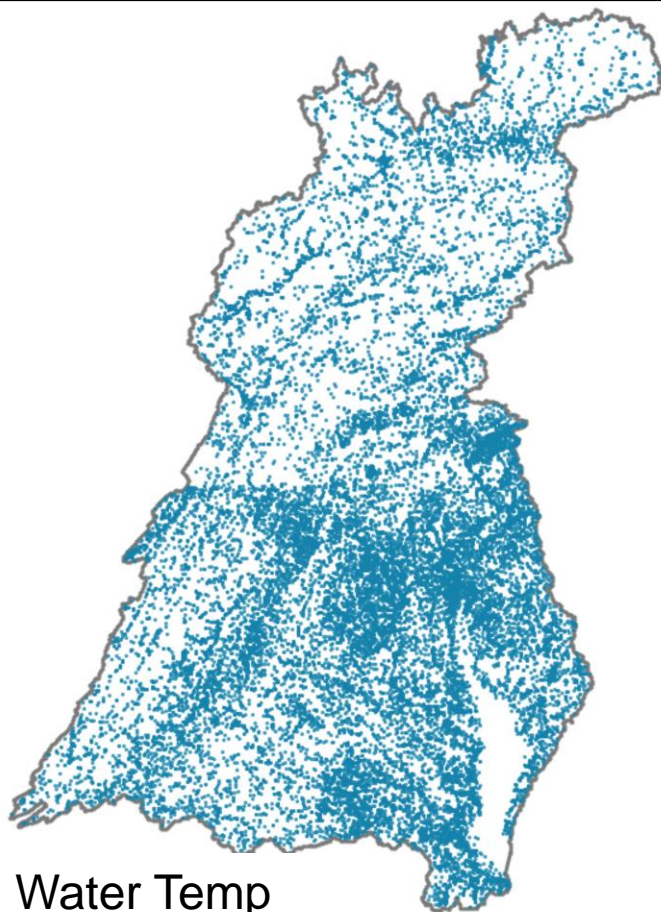


# USGS Status and Trends effort

## 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



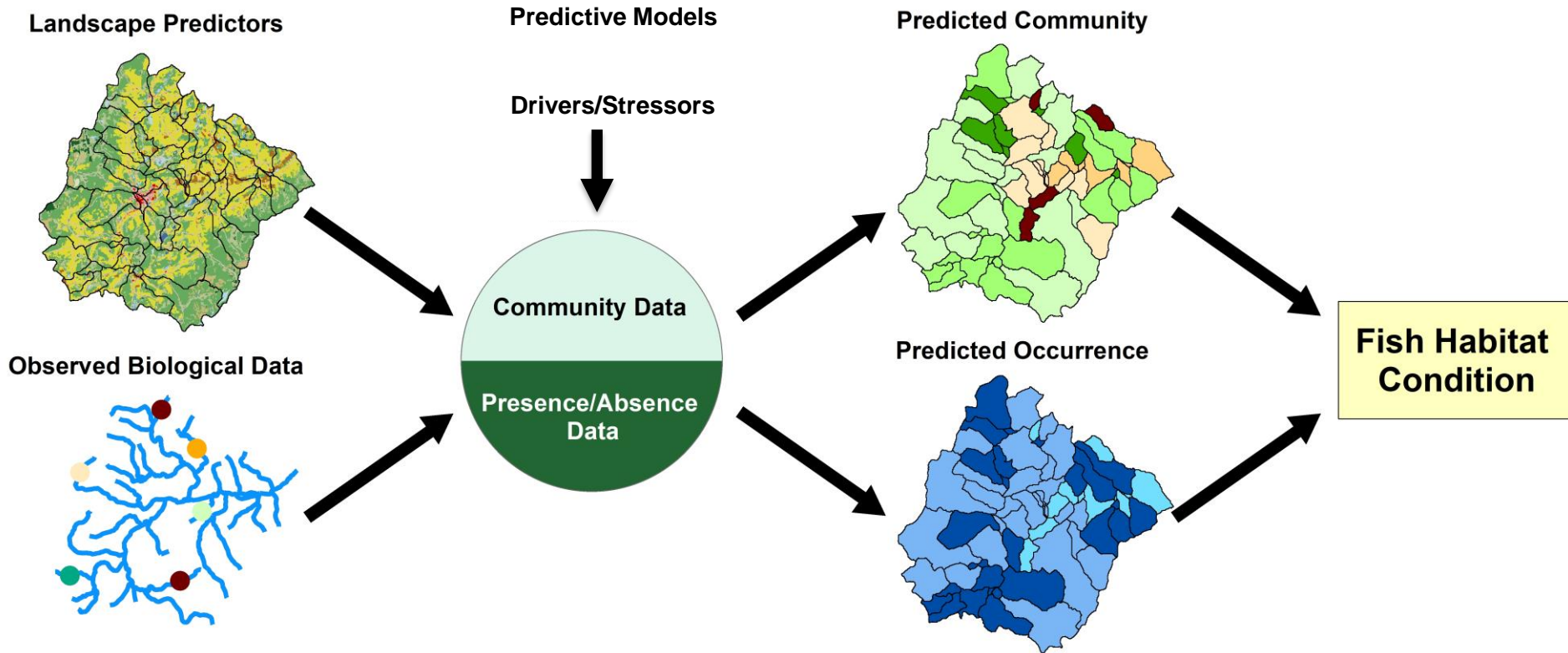
# USGS Status and Trends effort

## 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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