Update - Fish Habitat Assessments in both Nontidal and Tidal Waters of the Chesapeake Bay

Presentation topics:

- Background Info
- Nontidal Pilot
- Tidal Pilot
- Joint Pilot
  - Tributary Selection
  - Timeline
- Next Steps

Background and Drivers

- 2014 Chesapeake Bay Agreement – Fish Habitat Outcome

- 2018 Science and Technical Advisory Committee (STAC) Workshop

- Stakeholder Interviews and Report
  - Use finest spatial scale possible
  - Include data not available for national and regional assessments
  - Try to correlate stressors on habitat condition and fish response

Data Surveys and Compilation

- Initial data survey conducted for 2018 STAC Workshop – 441 datasets in 15 categories

- Survey of tidal water fish data sets in 2020 – conducted by Tetra Tech

  https://www.chesapeakebay.net/documents/FishHabitatInventory FinalReport2020.pdf

- USGS compilation of fish survey data from nontidal monitoring programs

  Krause, K.P. and K.O. Maloney. 2021 Community metrics from inter-agency compilation of inland fish sampling data within the Chesapeake Bay Watershed: U.S. Geological Survey. https://doi.org/10.5066/P9D6JU4X

Inventory & Evaluation of Environmental and Biological Response Data for Fish Habitat Assessment

Contract No. 16804
June 2020

PRESENTED TO

Sustainable Fisheries Goal Implementation Team, Chesapeake Bay Program
410 Severn Avenue
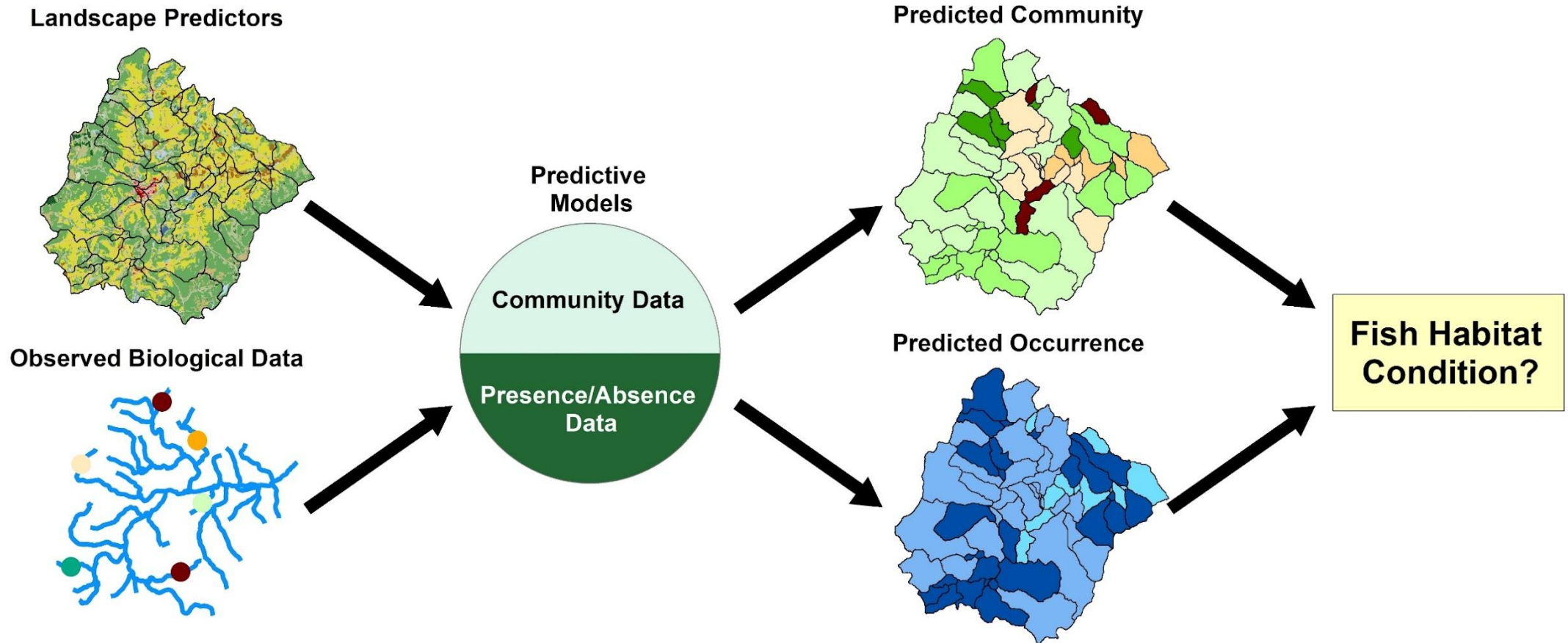Suite 112
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Assessment on **nontidal** freshwater streams and rivers Maloney, Krause, Young et al. 2022
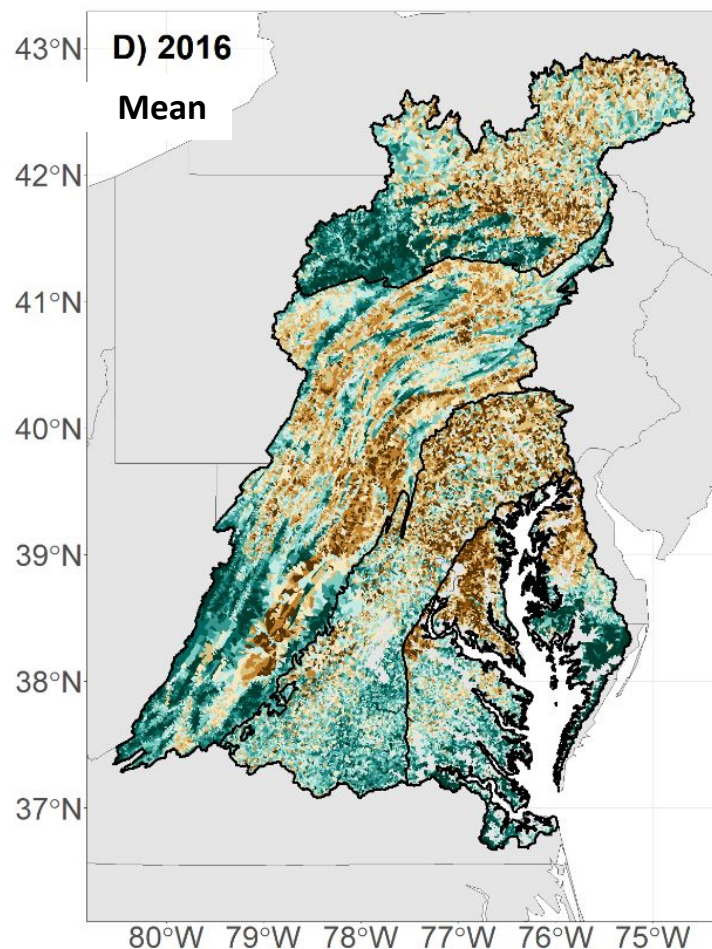
Nontidal Assessment Results - Community

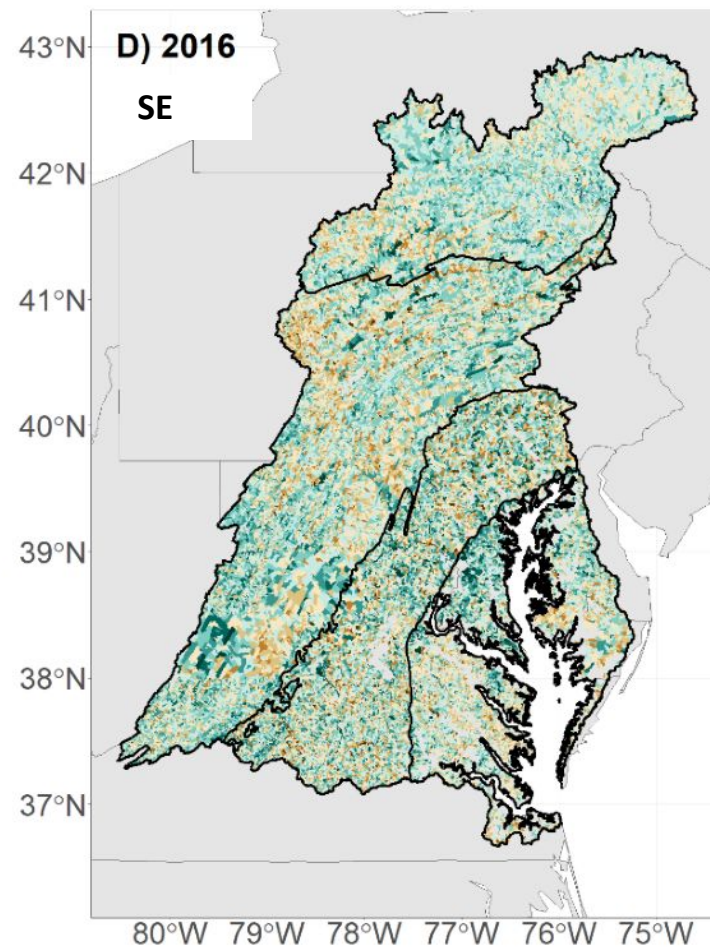Mean of metric deciles for each aggregated ecoregion

Lower deciles = poorer relative condition

Higher deciles = better relative condition

Mean standard error (SE) of metric deciles for each aggregated ecoregion

Lower deciles = lower SE

Higher deciles = higher SE

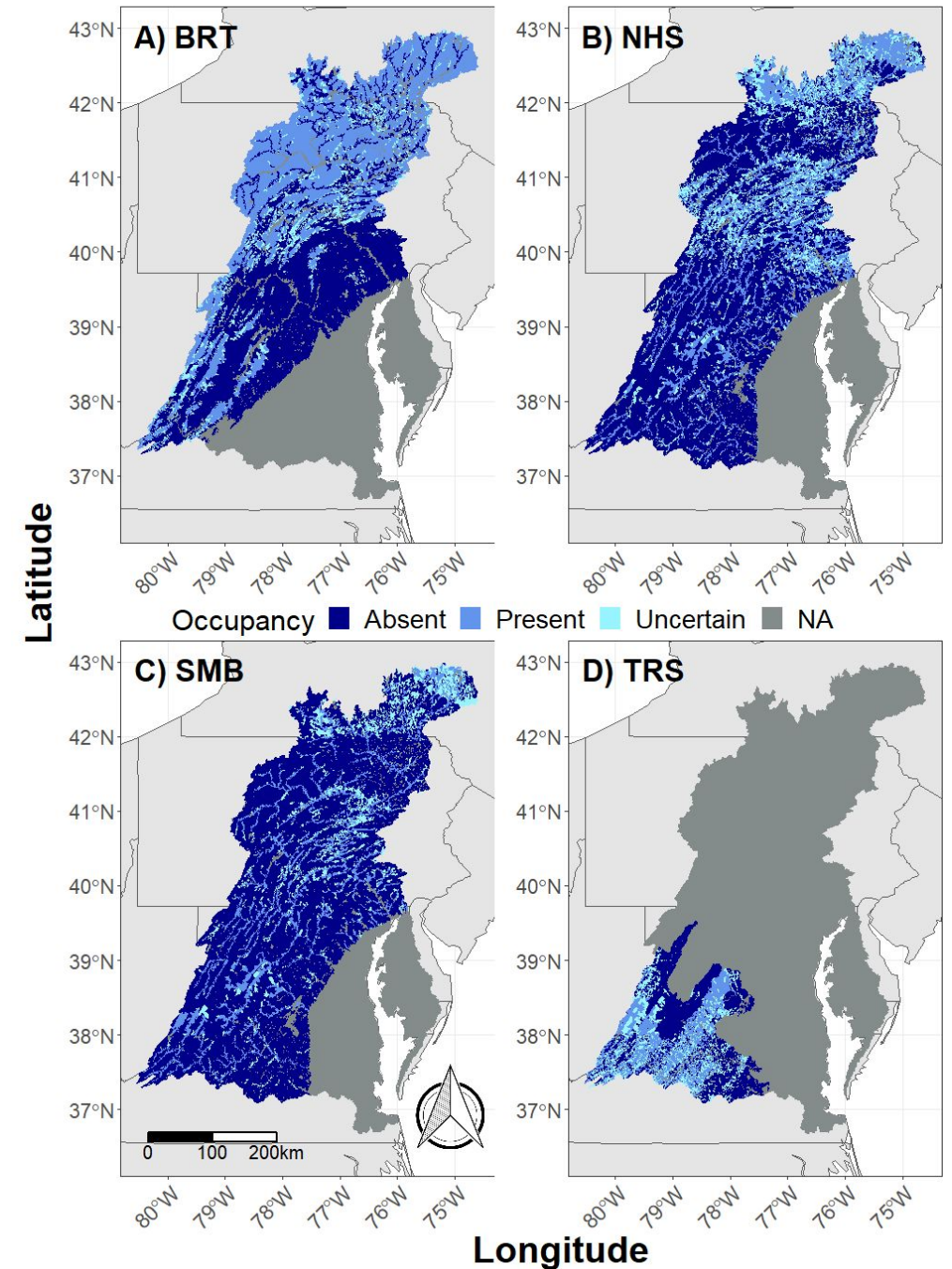Decile: <10th, 10-20th, 20-30th, 30-40th, 40-50th, 50-60th, 60-70th, 70-80th, 80-90th, >90th

Nontidal Assessment Results - Species

Native Species:

- Brook Trout (BRT) predicted in smaller stream sizes (≤1,288 km2) in native range

- Northern Hog Sucker (NHS) predicted in most stream sizes in native range

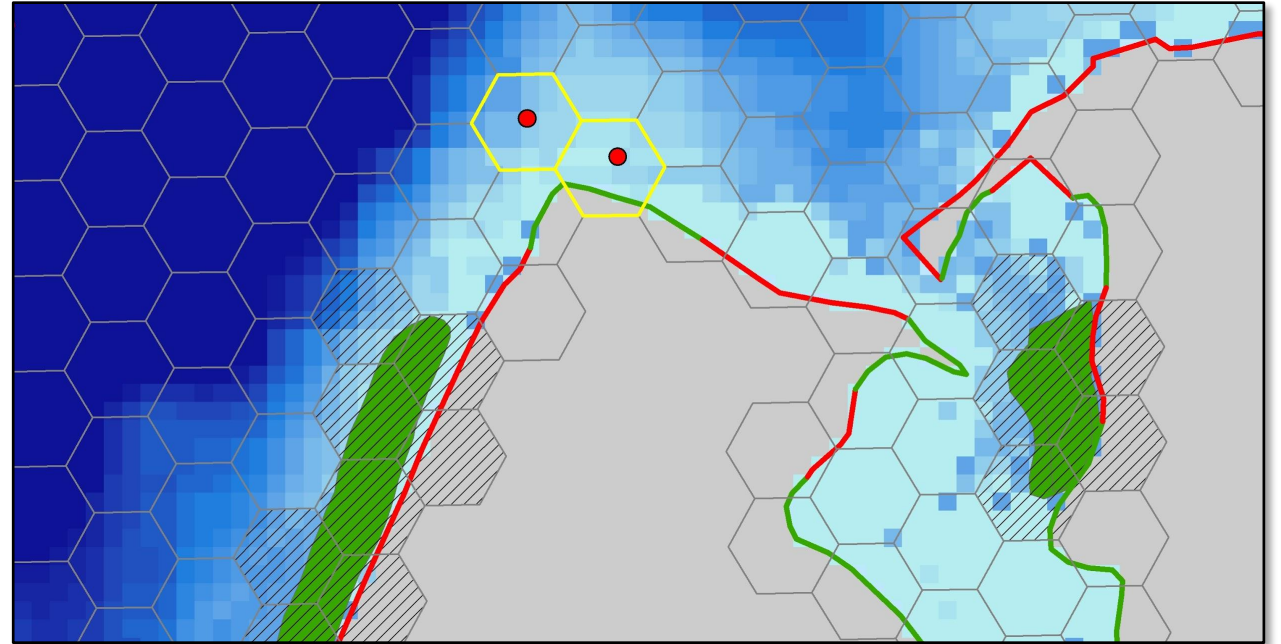- Torrent Sucker (TRS) predicted in smaller stream sizes (≤5,567 km2) in native range HUC8s

Non-Native Key Management Species:

- Smallmouth Bass (SMB) predicted in most stream sizes except for Coastal Plains

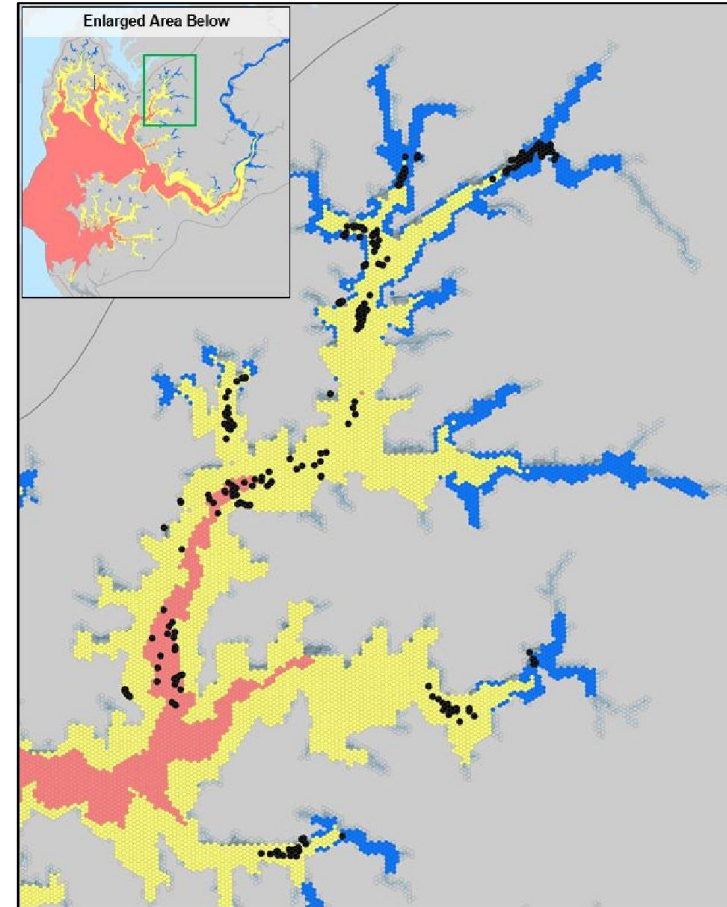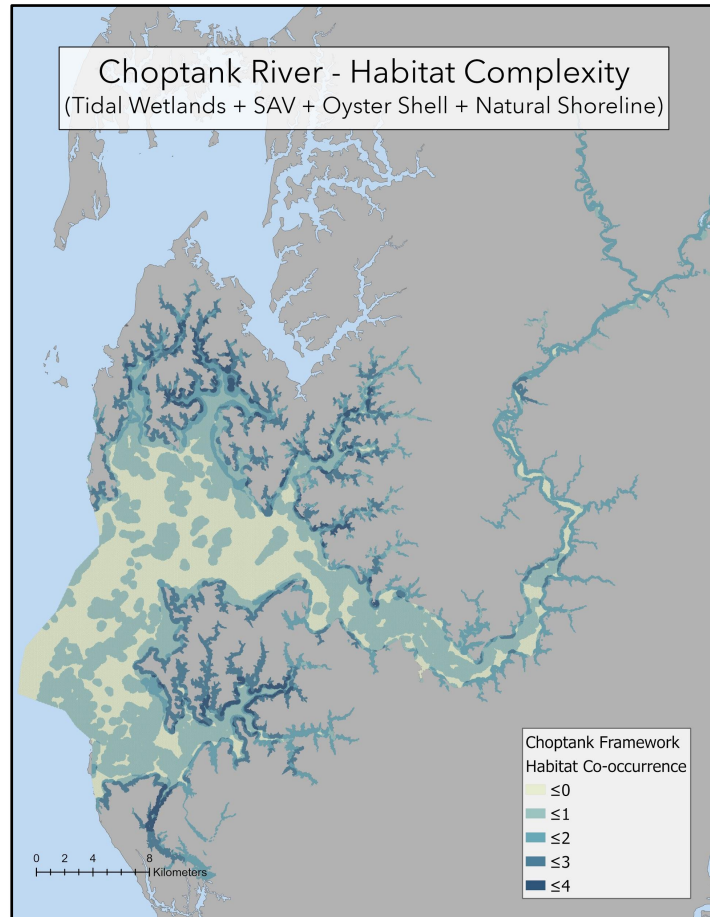# **Tidal Waters** Pilot Assessment of the Choptank River

- Team Leads:
  - NCCOS – A.K. Leight, John Christensen
  - NCBO – David Bruce

- Proposed new analytical framework

- Incorporated variety of data layers

- Developed example framework applications

- Conducted two subject matter expert workshops

Closeup of framework structure (2000m² hexagons) and different types of data that might be assimilated into it

Tidal Waters Pilot Assessment

Example Application: Habitat co-occurrence, showing the locations of tidal wetlands, submerged aquatic vegetation (SAV), oyster shell, and natural shoreline

Example Application: Predicted encounter of species X. Blue areas were classified as high probability, yellow as medium, and red as low. Black symbols show locations of observations from the survey data sets used.

Joint Pilot Project: Background

- Identified in Previous Fish Habitat Logic and Action Plan (2020-2021)
- Initial Milestone:

ACTIONS – 2020-2021					
Action #	**Description**	**Performance Target(s)**	**Responsible Party (or Parties)**	**Geographic Location**	**Expected Timeline**
2.7	Build on non-tidal and tidal analytical and assessment work to identify options for joint NOAA-USGS pilot with non-tidal and tidal habitats.	Options to identify means of achieving better understanding of habitat, stressor and species relationships from headwaters to estuary.	USGS and NOAA/NCCOS, NOAA/NCBO	Chesapeake Bay Watershed	October 2021

Criteria for Selecting Pilot Tributary

- All four habitat types (cold headwater, large nontidal river, tidal fresh, and tidal salt)
  - Western shore rivers are more prevalent in matrix as they have cold headwater habitat

- Fish data availability, quality, and consistency

- Relative complexity of data sources – e.g. fewer fishery management jurisdictions

- Stakeholder needs

Joint Pilot Project: Decision Matrix

Blue highlighted factors relate to habitat types, geographic size and jurisdictions

Green and Yellow highlighted factors relate to fish data

General
- HUC8 Names
- HUC8 Codes
- Total Area
- State
- Habitat Types (cold headwater, large-nontidal river, tidal freshwater, tidal estuarine)
- Fishery Management Jurisdiction(s)
- Known Specific Audience/Stakeholder (excluding state agencies)
- Audience or Stakeholder Need

Nontidal
- Nontidal Network Stations
- Availability of Landscape-level predictors of Fish Habitat
- Quality of Landscape-level predictors of Fish Habitat
- Consistency of Landscape-level predictors of Fish
- Nontidal Fish Community Data Spatial Coverage
- Nontidal Fish Data Access
- Nontidal Fish Data Age
- Mean Nontidal Fish Data Criteria Score
- Total Fish Samples
- Fish Community Data Samples
- Potential Nontidal Species of Focus

Tidal
- Tidal Water Fish Data Spatial Coverage
- Tidal Water Fish Data Access
- Tidal Water Fish Data Age
- Mean Tidal Fish Criteria Score
- Total Tidal Fish Samples
- Principal Tidal Water Surveys
- CBP WQ Monitoring Stations
- Potential Tidal Species of Focus

River System Groups Based on Criteria

RIVER SYSTEMS WITH ALL 4 HABITATS AND 1- 2 FISHERY MANAGEMENT JURISDICTIONS

- Patuxent
- Rappahannock
- James

RIVER SYSTEMS WITH 3 HABITATS AND 1- 2 FISHERY MANAGEMENT JURISDICTIONS

- York
- Chester
- Choptank
- Sassafras
- Severn

RIVER SYSTEM WITH ALL 4 HABITATS AND MULTIPLE JURISDICTIONS

- Potomac - large and complex with several jurisdictions

RIVER SYSTEM WITH 3 HABITATS AND MULTIPLE JURISDICTIONS

- Susquehanna - very large headwaters and very small tidal portion

Final Tributary Selection

RIVER SYSTEMS WITH ALL 4 HABITATS AND 1 - 2 FISHERY MANAGEMENT JURISDICTION

- Patuxent-
  - Has cold headwaters, with some brook trout occupancy
  - Sample level tidal and nontidal fish data publicly available ✔
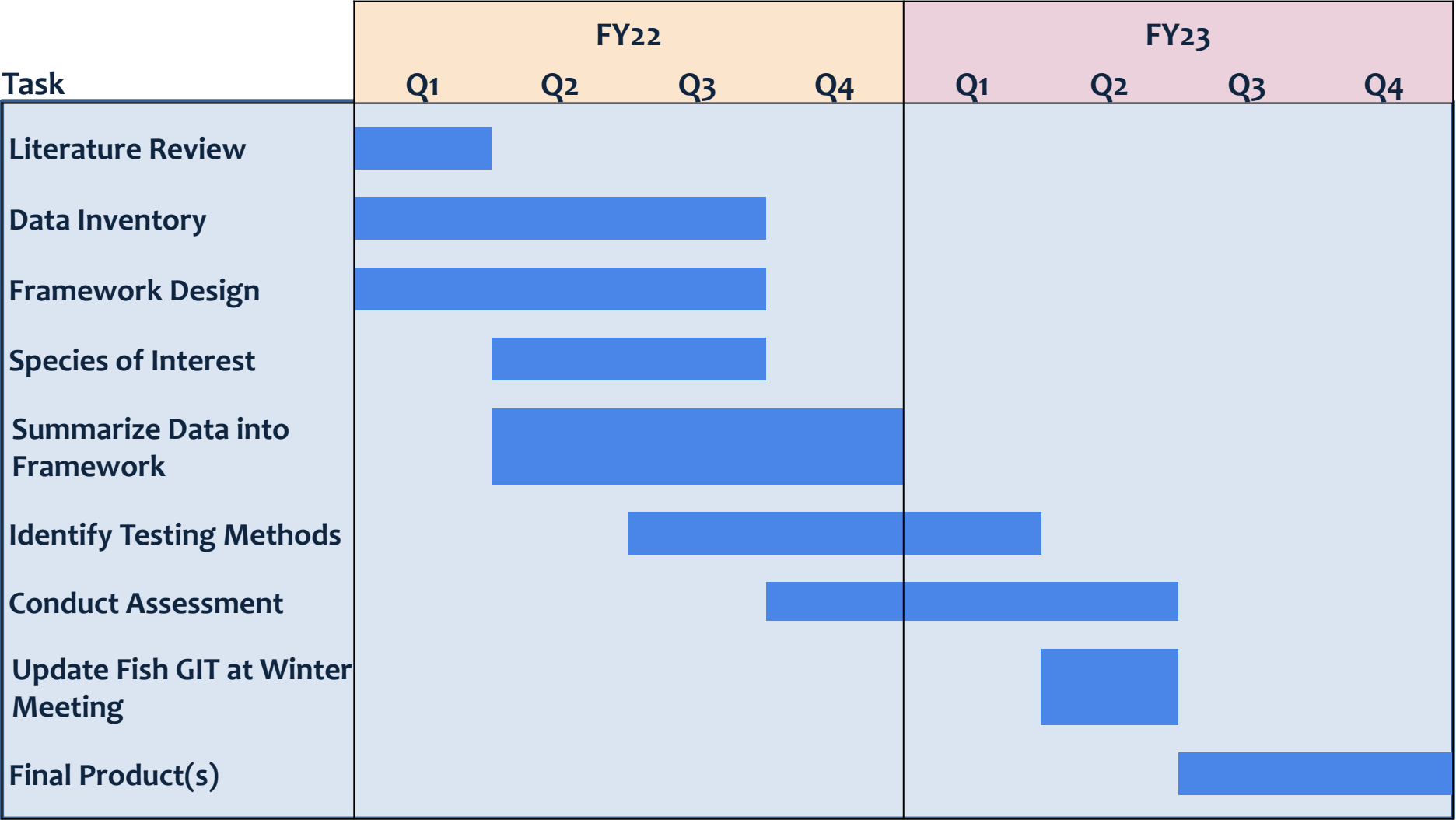 - Relatively small watershed size

- Rappahannock-
  - Other USGS EcoDrought/brook trout studies in headwaters (Shenandoah NP)
  - Aggregated tidal fish data
  - Relatively small watershed size

- James-
  - Has cold headwaters, many EBTJV brook trout patches, Shenandoah NP headwater study catchments
  - Aggregated tidal fish data
  - Much larger in size relative to other two

Additional Assessment Efforts

- Publication of GIS Habitat Analysis (by USGS) - supporting ASMFC American Eel Stock Assessment

- Continued Coordination and Collaboration with other Assessments:
  - NRHA Assessment (led by MAFMC)
  - National Fish Habitat Partnership Activities

- FHAT – Conducting Stakeholder Outreach in Patuxent to Assess Information Gaps and Potential Applications of a Fish Habitat Assessment

Thanks!

Any Questions?