

# Living Resources Feasibility Charette: An Update for STAC

June 16, 2025  
Dr. Kaylyn S. Gootman, EPA-CBPO

# Big Picture View

- Fast track to complete a habitat suitability model for the 92 tidal segments of the Chesapeake Bay by 2026
- This project is a priority of the CBP
- Analysis is a step to:
  - 1) Implement recommendations of the CESR report
  - 2) Identify target areas for tiered implementation of the TMDL and
  - 3) First step to implementing the Fish Habitat Outcome under the revised Bay Agreement

# Priority Living Resource Habitat Area – identification/quantification

<b>Group Assigned</b>	Fisheries GIT
<b>Task Description</b>	Develop Priority Living Resource Habitat Areas for 92 segments of the Tidal Bay
<b>Task Rationale</b>	CESR report suggests that focus should be given to shallow waters/living resources in addition to meeting the goals of the Bay TMDL. This activity will identify priority living resource areas and give scoring metrics to assist in prioritization of restoration and conservations efforts.
<b>Task Outcome/ "End" User</b>	WIP/Milestone Developers - Will provide critical information to allow/support <b>tiered implementation targets/focused restoration efforts</b>
<b>Assignment (Objective)</b>	Develop a habitat suitability model that focuses on shallow water <ul style="list-style-type: none"> <li>Select species/life stages representative of Bay LR</li> <li>Determine appropriate habitat variables to evaluate for the above               <ul style="list-style-type: none"> <li>Water quality</li> <li>Physical characteristics</li> <li>Temperature</li> <li>Etc.</li> </ul> </li> <li>Develop habitat rating/scoring for geographic area's of the bay (all 92 segments)</li> <li>Develop GIS based data visualization of LR habitat suitability at the highest resolution available.</li> </ul>
<b>MB Champion:</b>	VA/MD/DC should have oversight
<b>Coordination Requirements (MB check-in frequency)</b>	<ul style="list-style-type: none"> <li>January 1, 2026 – draft habitat suitability model complete</li> <li>July 1, 2026 – habitat suitability scoring matrix complete</li> <li>January 1, 2027 - data visualization tool to utilize suitability model and scoring matrix complete</li> <li>Should be reported on with Tiered Implementation Targets</li> <li>Should be reported on with Priority Living Resource Scoring Matrix</li> </ul>
<b>Delivery Date (Month or Quarter / Year)</b>	January 1, 2027
<b>CBPO Support</b>	GIS Team, Modeling Team, LR data manager

## Motivation & Context

### Priority Living Resource Habitat Area -Identification/Quantification

-Task meant to drive a result, not just to improve understanding

-Tie to management priority, tie to water quality and improve living resource outcomes



# Ties Directly to Fish Habitat Outcomes

Sustainable Fisheries GIT and Fish Habitat Action Team

## Fish Habitat Outcome

- Achieve and maintain suitable shallow water fish habitat in tidal and non-tidal areas for key species through focused water quality, conservation and restoration improvements informed by a synthesis of fisheries science and habitat assessments.

## Target

- Continually improve the quantity and quality of shallow water fish habitat in tidal areas above baseline conditions as determined by a Bay-wide assessment of fish habitat conditions completed in 2026.
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# Why a Charette?



**Charette: pitch idea to “do-ers”, connects to management context, why it is relevant**

Here is what we are thinking of doing

What issues do you see: data, methods, data availability, timeliness, feasibility?

Get a sense of what is feasible at the end

Leave with a work plan, people assigned to specific tasks, timeline and buy in

Prioritized tasks



**Need buy-in from the “do-ers”**

Who has time and energy to do this?

Commitments and buy-in for people.

Specific guidance on what we are expecting them to do.



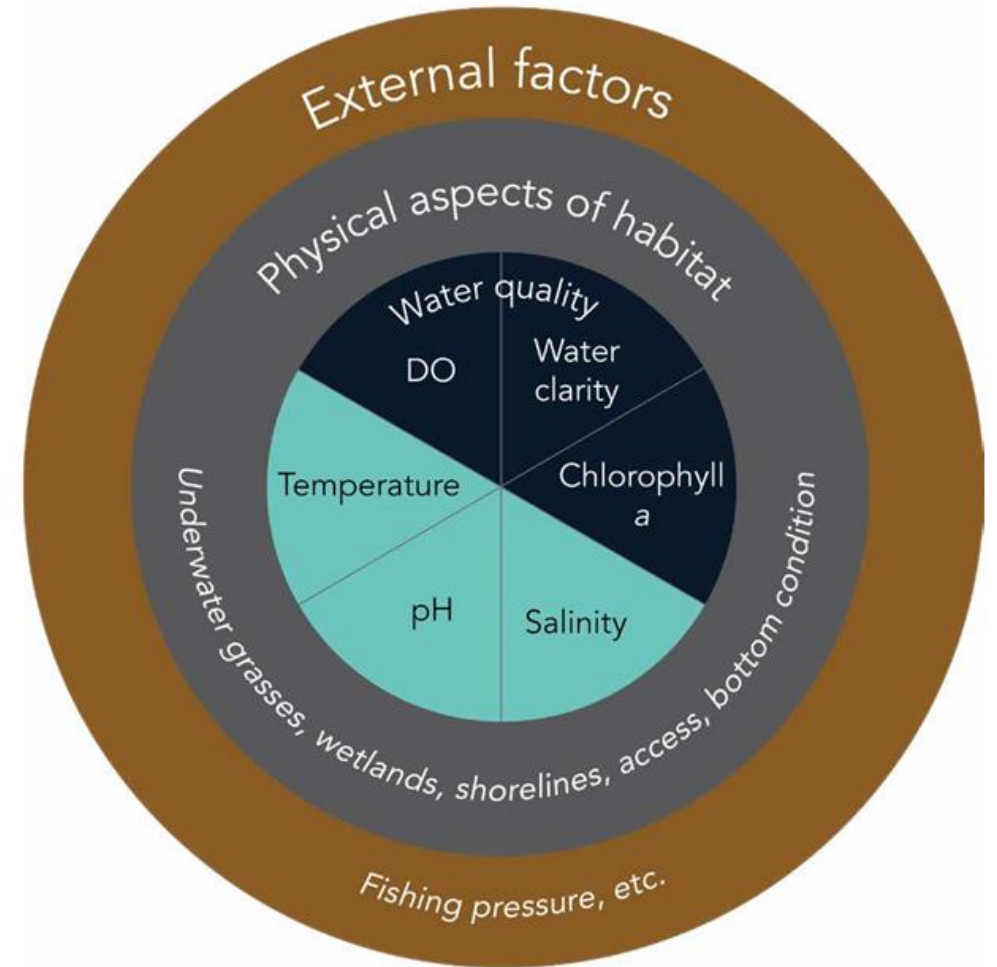
**Seeking input for the best/most feasible approach, given constraints**

Ultimately, final decision will come from Fish GIT, NOAA, and EPA

# Opportunity to Link

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1. Water quality management decisions
2. Potential improvements in tidal living resource responses



Managed by Bay water quality standards

Generally unmanaged and impacted by changing environmental conditions

# Overall Charette Objective, Goals, Structure

May 6 – May 7, 2025

Smithsonian Environmental Research Campus

# Objective

Determine the approach to target and track linked responses of living resources, structural habitat, and water quality while considering known constraints, including ability of approach to meet objectives at zero cost, and generate a workplan, including a timeline and who is contributing to this effort.



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# Charette Goals

1. Define project outcomes that would have the most potential for Bay Program partnership implementation.
2. Assess the feasibility of different analysis approaches to link living resources, structural habitat, and water quality through the lens of what the CBP could have influence on.
3. Develop a draft workplan.

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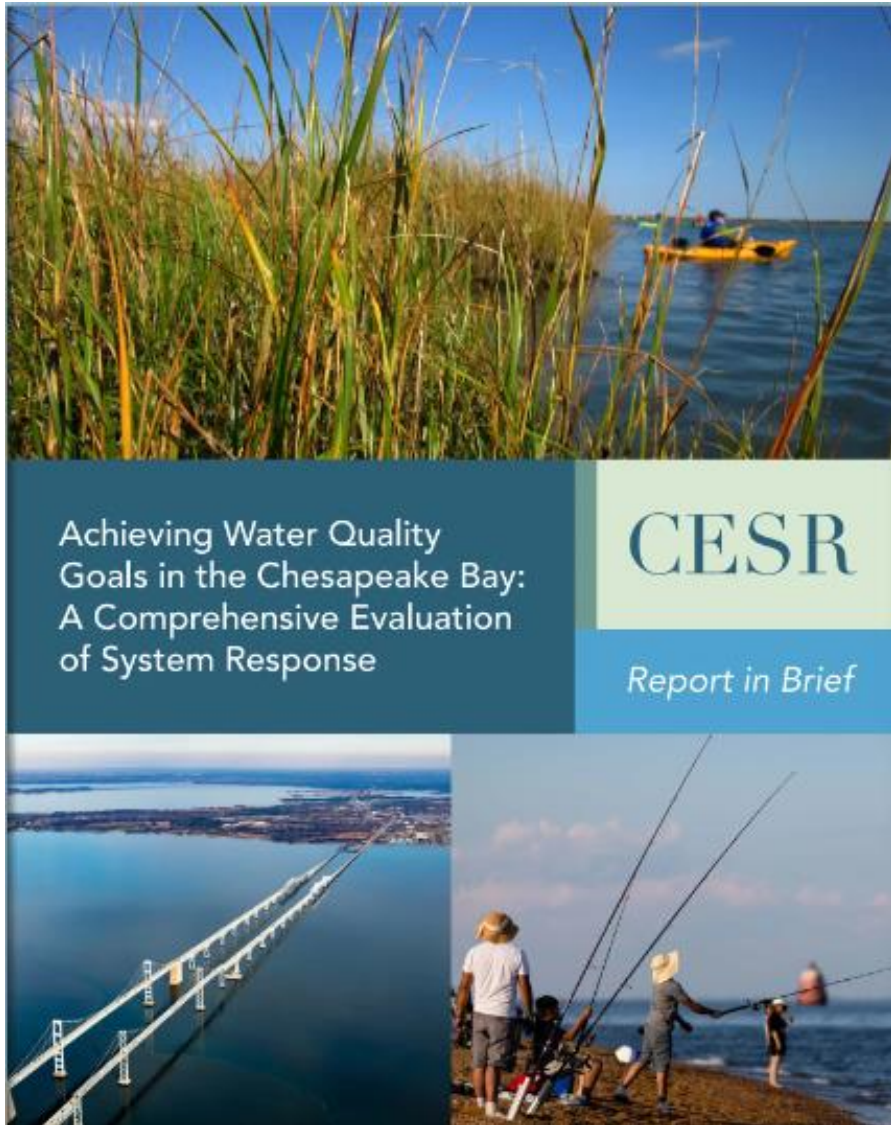
Day 1

Day 2

# Motivation

Why Living Resources and Why Now?

# CESR Implication

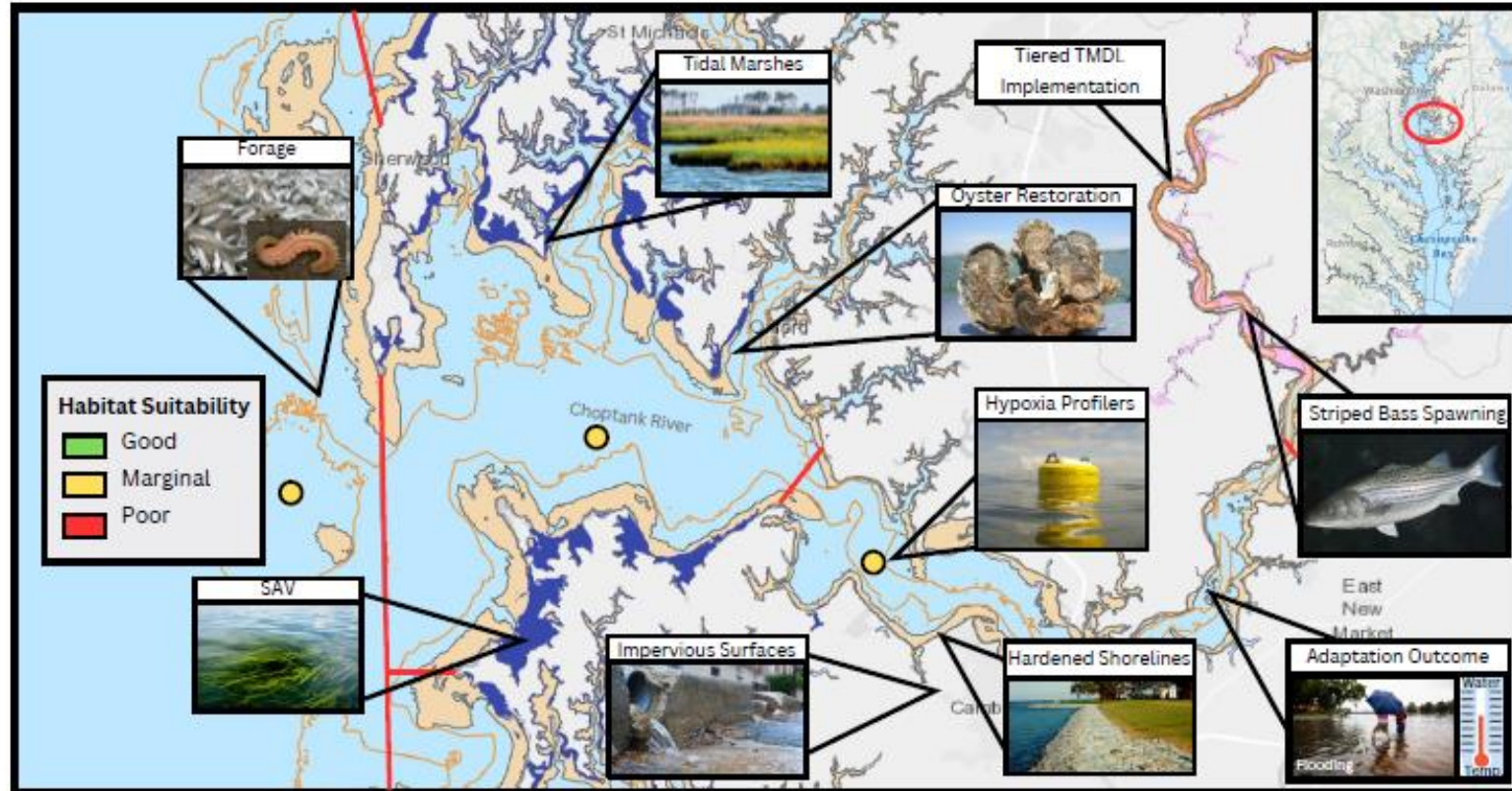


One option was to consider “tiered TMDL” that prioritizes implementation across space and time to maximize living resource response (CESR, pp. 82-83) --- e.g. “provide the most potential lift to living resources while working toward the final TMDL goal”

CESR: Opportunity in Shallow-Water Habitats to Link Living Resources and Water Quality Outcomes



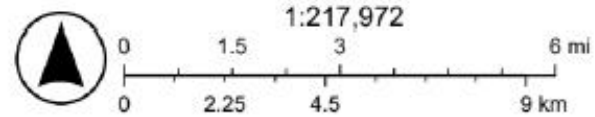
# Tidal Fish Habitat Interconnectivity



3/14/2025

## Legend

- Tidal segment boundary line
- 5m shallow water contour
- 2m shallow water contour
- SAV (2019-2023)
- Striped bass spawning habitat
- Hypoxia Buoy Profilers

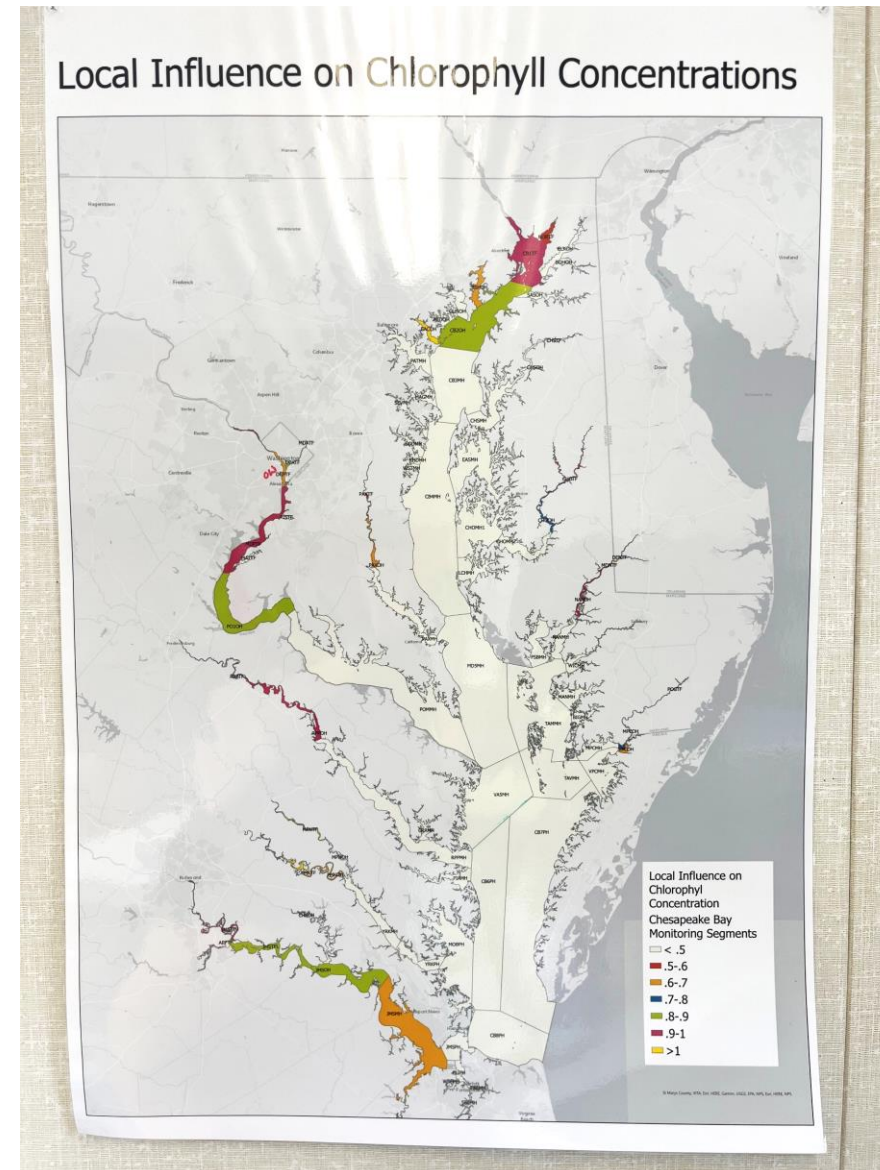


VITA, Esri, HERE, Garmin, USGS, EPA, NPS, SAV Ecology, Monitoring, & Restoration Program, Virginia Institute of Marine Science, Esri, HERE, NPS

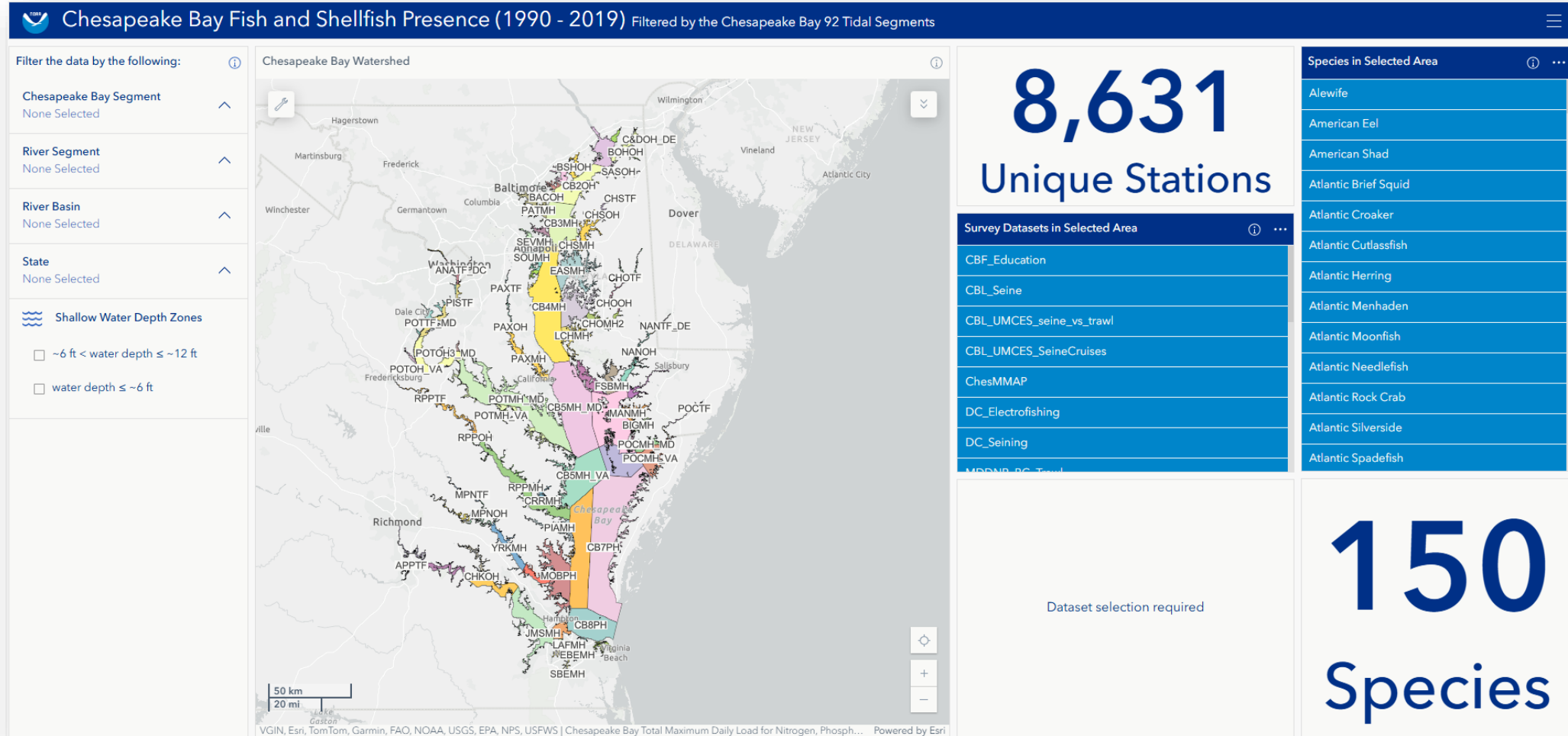




# Acknowledging Local Influence



# Diverse Data Sources



<https://www.arcgis.com/apps/dashboards/b17988e1612e49d193a0223441b0a639>

# Tiering TMDL Implementation

## Chesapeake Bay Priority Living Resource Areas

Using GIS to Identify Habitat Hot Spots

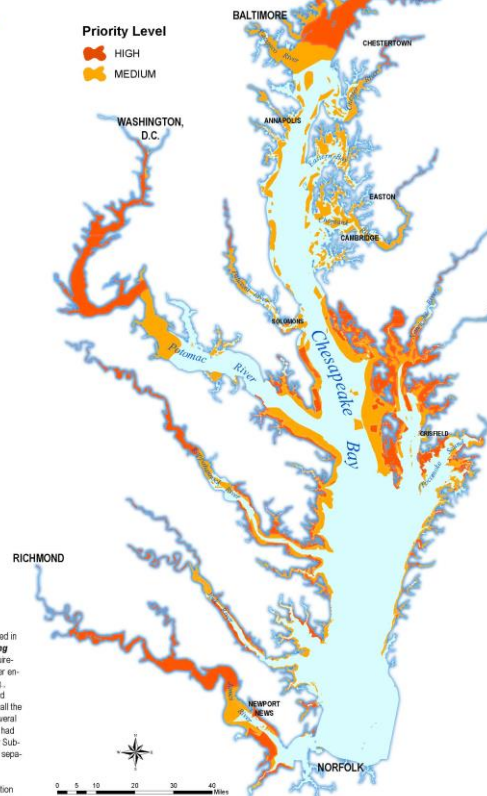


We direct the Chesapeake Bay Program to ... conduct an analysis and prepare a protocol ... to determine whether nutrient goals and reduction efforts can be further targeted to areas of persistent high loadings, especially where evidence indicates a linkage to critical living resources or human health concerns.  
Chesapeake Executive Council,  
Directive 97-1

### Water Column Species



### Priority Level



**CREDITS:**  
**Map and Analysis:**  
John Wolf, National Fish Service  
Chesapeake Bay Program Office  
610 South Ave., Suite 100  
Annapolis, Maryland 21403  
**Fieldwork:**  
Location Age, LLC  
Washington, DC  
**Composite PLRA maps derived from data from the following sources:**  
Furber, S.L., J.A. Minicelli, S.J. Jordan, and D. Riley (eds.) 1982. Habitat Requirements for Chesapeake Bay Living Resources. Second Edition.  
Safety range data interpolated from 1985-1987 spring and summer Chesapeake Bay monitoring data.  
Potential oyster habitat defined using modified Vohr grounds, Barker grounds, oyster lease areas, and oyster sanctuaries.  
Tier II SAV areas (CBP and Virginia Institute for Marine Science)  
**Aquatic Resource Graphics:**  
Symbols courtesy of the Integration and Application Network  
(see [www.ianigdl.org](http://www.ianigdl.org)), University of Maryland Center for Environmental and Chesapeake Bay Program.

### SAV

Submerged Aquatic Vegetation

### Bottom Species



### Methodology

The Chesapeake Bay Program's target species listed in *Habitat Requirements for Chesapeake Bay Living Resources*, Second Edition which had habitat requirements that could be directly affected by nutrient over enrichment (e.g., dissolved oxygen) or sediments (e.g., light penetration) were arrayed by water column and bottom as their principal habitats. These included all the fish and shellfish species in that document, with several fish species and related layers added for which we had new potential habitat information. Priority areas for Submerged Aquatic Vegetation (SAV) were considered separately.

In the case of species with potential habitat distribution maps for multiple life stages, composite maps were produced by combining the individual GIS layers for each life stage. For species with separate spring and summer potential habitat distributions, a composite map was produced reflecting the combined extent of seasonal-based habitats.

Keeping the water column and bottom species separate at the beginning, the composite maps for each of the 11 species were overlaid. Each species' potential habitat was weighted equally as there was no straightforward justification for applying a weighting scheme.

With the water column and bottom habitat overlay maps still separate, team members looked for regions with clusters of common total numbers of target species habitats overlaying each other that reflected natural "break points" between otherwise contiguous geographical concentrations. The team assigned specific range designations (and, therefore, different colors) for the respective polygons that fell within the following ranges: areas with 9-11 species were assigned as high priority for both water column and bottom overlay maps with area containing 7-8 species and 8 species, respectively, design-

ated as medium priority in the water column and bottom overlay maps. Areas with less than these total number species overlaid dropped out.

Then the water column and bottom habitat maps were themselves overlaid to produce the draft *Priority Living Resource Areas* map. The high priority areas for both water column and bottom were combined so that an area was shaded as high priority if it appeared in either layer; the two medium priority layers were combined the same

way. The team then visually examined the resultant map and drew polygons around the 14 areas—the designated draft *Priority Living Resource Areas*—that had the most extensive and contiguous high priority shading. The medium priority areas were included on the map because they were also important living resource habitats.

Priority areas for Submerged Aquatic Vegetation (SAV) were determined by the SAV Workgroup using the VIMS SAV aerial survey data base, examining changes in SAV area over 1992-1997, and SAV status as a percentage of Tier II area in 1997 by the 78 CBP segments. Changes over 1992-1997 were used because many SAV trends changed direction at about that time, and the more recent changes were of the greatest interest. Priority SAV areas were those segments that lost over 60 hectares of SAV from 1992 to 1997, and segments that had no SAV mapped in 1997. These layers were not combined with the fish and shellfish layers shown here because they were based on different data and used different spatial scales. They were visually compared to the Priority Living Resource Areas (PLRA) defined based on the fish and shellfish layers, and all of the SAV priority areas were also identified as PLRAs, with the exception of four small Maryland tributaries that lacked SAV in 1997 but were not identified as PLRAs (the Black, Rhode, West, and Pocomoke rivers).

## Temporal

Intermediate goal: 10-15 years

## Spatial:

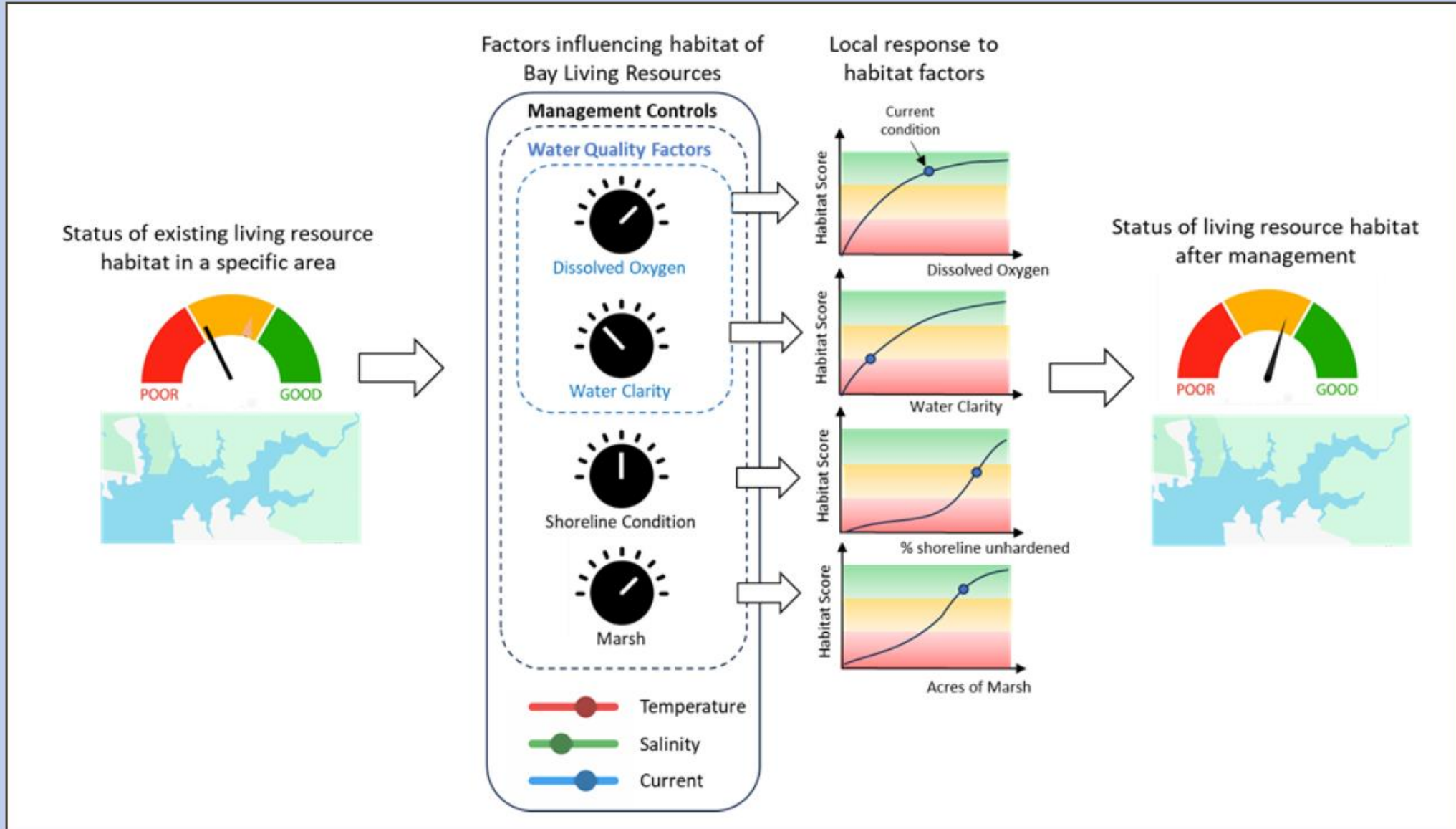
Establish interim nutrient and sediment targets based on places where water quality is factor for living resource potential (red & orange, left), while acknowledging:

- interdependence across areas (including progress in main channel);
- importance of local, non-WQ living resource factors/stressors.

Link 1) Critical Habitats and 2) Water quality conditions in those habitats (e.g., open water DO)



# Assessing local water quality, stressor, and habitat conditions



Tiered approach  
will require  
different  
approaches to  
planning and  
scientific/technical  
analysis



Panel A: Tiered Implementation of Bay TMDL



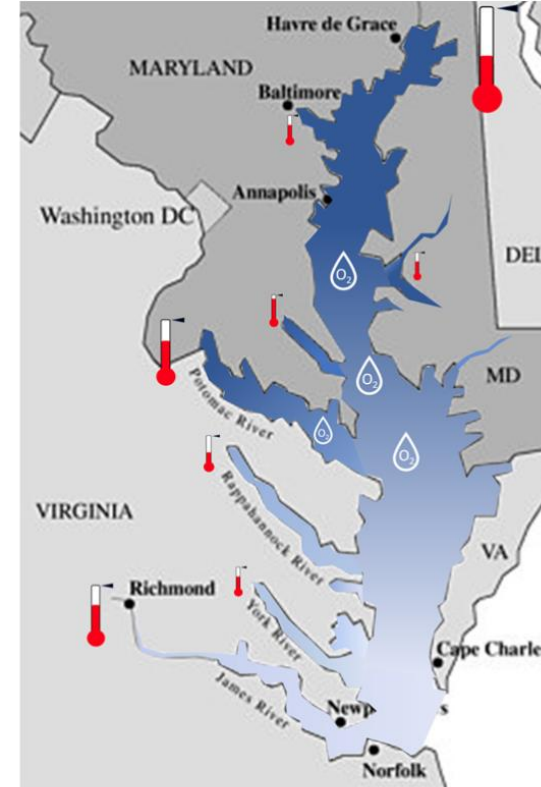
Identify areas where water quality (DO, water clarity) improvements can improve high priority living resource habitats



Identify influence of upstream N, P or sediment on local water quality



Set interim nutrient & sediment targets to achieve water quality improvements in priority areas. Interim limits are also progress toward final targets (Panel B).



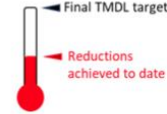
Panel A: Conventional Implementation of Bay TMDL



Identify areas that will be necessary for full attainment of water quality criteria (DO in deep water habitats in main channel)



Identify influence of upstream N, P or sediment on main channel deep water dissolved oxygen



Set nutrient & sediment targets that fully attain water quality standards.

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# From Concept to Implementation

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1. Conduct habitat suitability analysis
2. Assess living resource habitat improvement potential of various segment/habitat combinations (dials) (local conditions to response to stressors reductions)
3. Identify relative contribution of upstream and estuarine N, P and sediment on segment-habitat nutrient levels
4. Set interim N, P, and S targets based on 1-3 (policy decision).
5. A future WIP planning process that includes consideration of other factors that impact living resource habitat and that includes incentives to adapt to observable outcomes (stressor-response)





## Remember:

Outcomes need to have the most potential for CBP partnership implementation *and be feasible*





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*Ability to meet management objectives, resources required, data availability, achievable within timeline, reproducible to track changes over time, includes factors CBP can control*



# Charette Outcomes

## Project Management

Bruce Vogt (NOAA), Kaylyn Gootman (EPA)

## Teams

- 1) Management Relevancy Team (NOAA, EPA, USGS)
- 2) Analysis Team (VIMS, UMCES, NOAA, EPA)

## Workplan

Gannt chart on next slide

# Data Sets



## Water Quality Data

VIMS model for now

Later, Phase 7



## Habitat Data

Substrate

Tidal Wetlands

SAV

Bathymetry

Oysters

Shoreline

Others

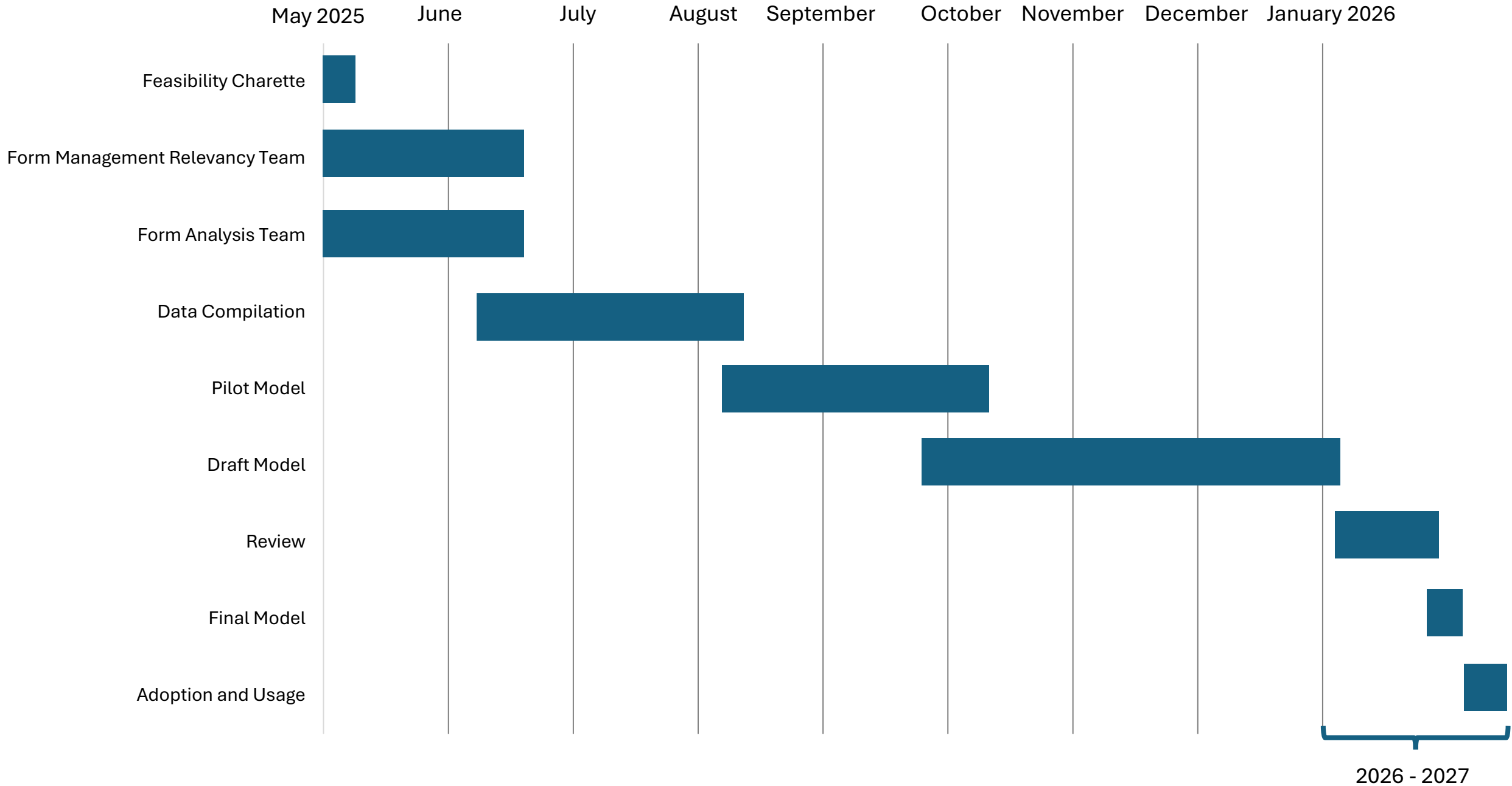


## Fish Data

Juvenile Striped Bass

Bay Anchovy

Croaker





# Thank You!

Dr. Kaylyn S. Gootman

[gootman.kaylyn@epa.gov](mailto:gootman.kaylyn@epa.gov)



**Chesapeake Bay Program**  
*Science. Restoration. Partnership.*