



Chesapeake Bay Program
Science. Restoration. Partnership.

Tiered Implementation Discussion

Stakeholders Advisory Committee Meeting
October 6, 2026

Lee McDonnell, EPA @ CBPO

Goal for Today



Photo by Charlie Nick/Chesapeake Bay Program

- Talk about the process of how we get to planning targets and Watershed Implementation Plans (WIPs)
- Primer on Tiered Implementation

Path to Planning Targets with New Opportunities*

1) Establishment of relative effectiveness of each state basin on tidal segment WQS achievement

2) Evaluate the hockey stick allocation method

*3) Check new results based on evaluation of all DO criteria

- Do we have areas that don't meet DO criteria if we execute some scenario where DW/DC are satisfied?

*4) Layer on Habitat Suitability

- More on this shortly

*5) Determine what options are available for planning targets

*6) Watershed Implementation Plans

- Tiered Implementation

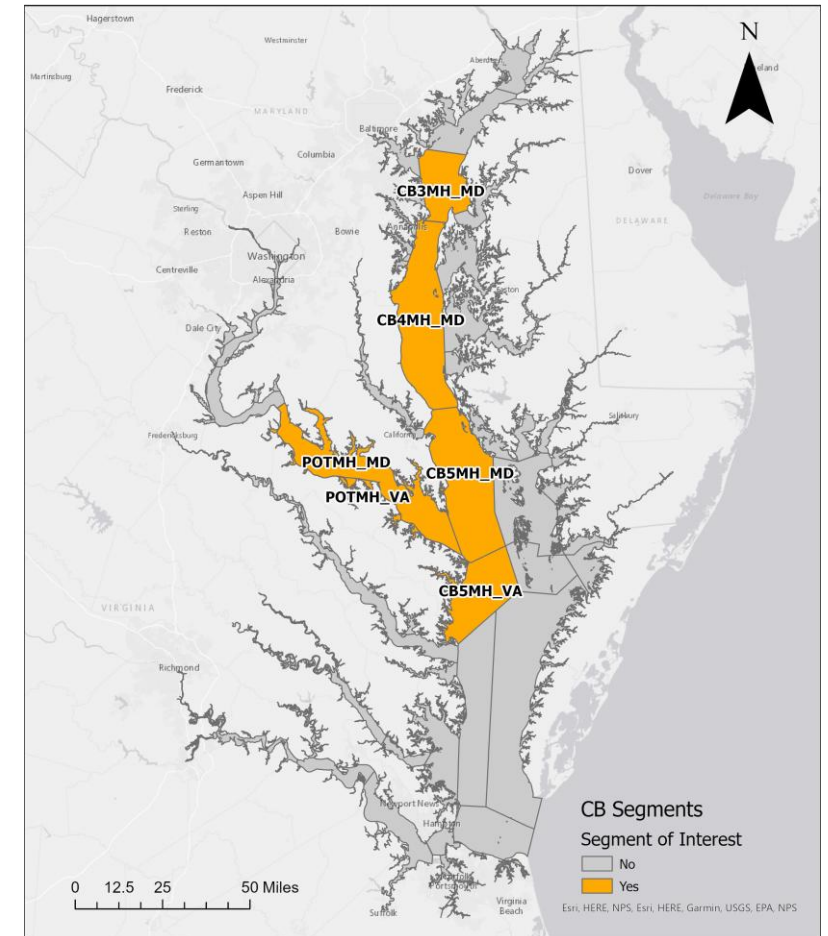
**Note, each of the steps needs a technical review the Modelling Workgroup and a management/policy review by the Clean Water Goal Team.*

Past Practice

- CB3MH, CB4MH, CB5MH, POTMH were chosen because:
 - These segments were most sensitive to loads from all parts of the watershed
 - Considered “most restrictive” or most difficult to achieve

Divide up
the work

Chesapeake Bay Segments 3, 4, 5, and
Potomac Mesohaline



Estuarine Delivery Informs Influence of Equal Loads from Each Basin on DO in DW/DC

Divide up the work

- Oxygen decrease ($\mu\text{g/l}$) per million lbs delivered = Δ 25th percentile of DO per DU when increasing TN, TP, and TSS for each basin in isolation

- A pound of N from the Susquehanna has:
 - ~Half the oxygen effect as P from the Susquehanna
 - ~Twice the oxygen effect as N from the Rappahannock (Above RIM)
 - ~6x the oxygen effect as N from the James (Above RIM)

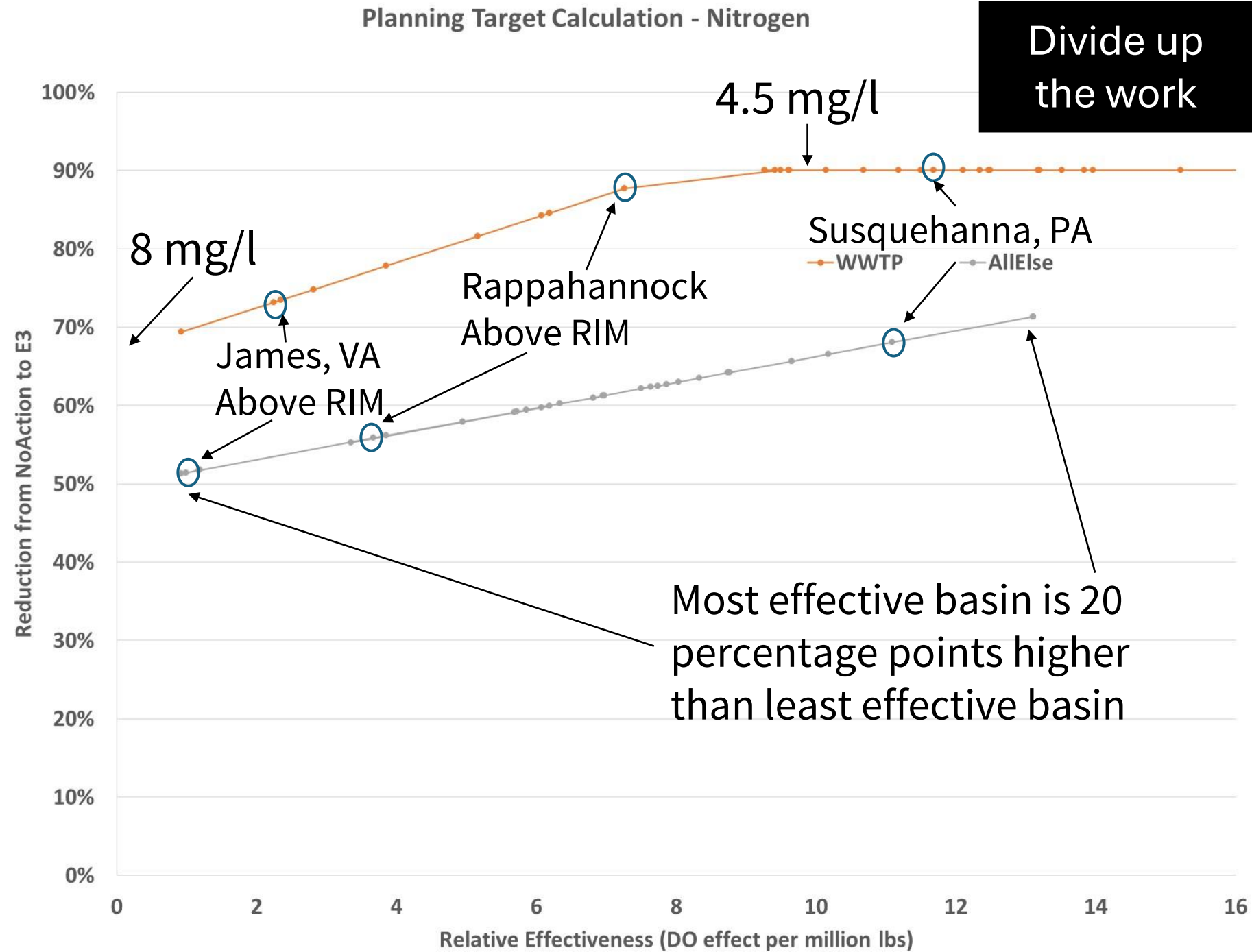
Oxygen decrease per million pounds

GeoBasin	N	P
Susquehanna	16.325	38.503
Western Shore	14.109	35.264
Patuxent AFL	10.931	27.505
Patuxent BFL	13.514	35.667
Potomac AFL	14.045	22.210
Potomac BFL	13.201	22.165
Rappahannock AFL	8.065	11.765
Rappahannock BFL	9.278	15.453
York AFL	4.630	9.111
York BFL	5.165	8.681
James AFL	2.647	7.673
James BFL	2.351	7.434
Upper Eastern Shore	10.709	31.840
Middle Eastern Shore	11.244	43.196
Lower Eastern Shore	9.782	25.243
Virginia Eastern Shore	15.214	20.404

Phase III WIP Target for TN

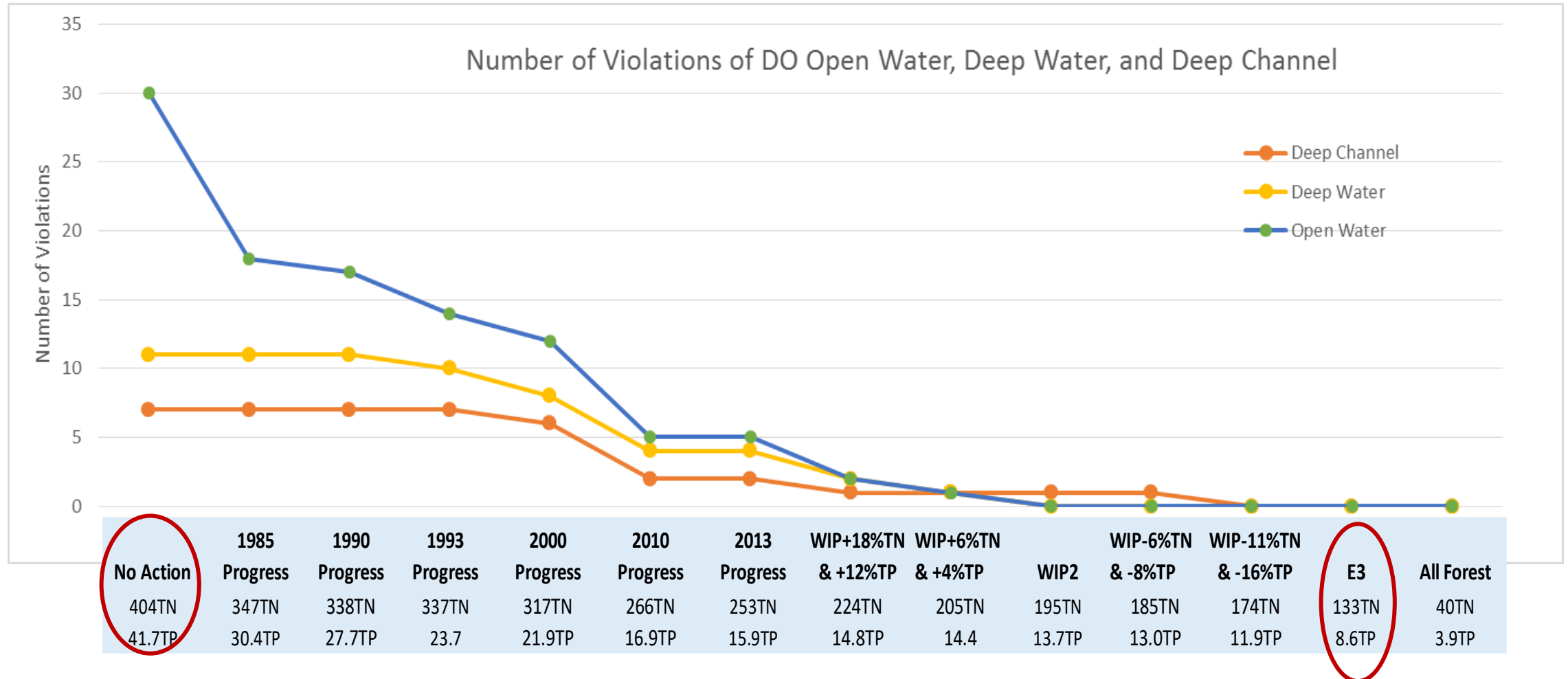
2010
Scenario
Base Year

6



E3 Scenario Assumptions

Assimilative capacity (maximum amount of nutrient load the Bay can handle for the whole Bay) is explored by comparing scenarios.



*A violation occurs when a segment doesn't meet water quality standards under a given loading scenario.

4D Interpolator: A Tool for More Complete Criteria Assessment

DO criteria that currently can be evaluated with existing approaches and data

Table 1. Chesapeake Bay dissolved oxygen criteria.

Designated Use	Criteria Concentration/Duration	Protection Provided	Temporal Application
Migratory fish spawning and nursery use *	7-day mean ≥ 6 mg liter ⁻¹ (tidal habitats with 0-0.5 ppt salinity)	Survival/growth of larval/juvenile tidal-fresh resident fish; protective of threatened/endangered species.	February 1 - May 31
	Instantaneous minimum ≥ 5 mg liter ⁻¹	Survival and growth of larval/juvenile migratory fish; protective of threatened/endangered species.	
	Open-water fish and shellfish designated use criteria apply		June 1 - January 31
Shallow-water bay grass use	Open-water fish and shellfish designated use criteria apply		Year-round
Open-water fish and shellfish use	30-day mean ≥ 5.5 mg liter ⁻¹ (tidal habitats with 0-0.5 ppt salinity)	Growth of tidal-fresh juvenile and adult fish; protective of threatened/endangered species.	Year-round
	30-day mean ≥ 5 mg liter ⁻¹ (tidal habitats with >0.5 ppt salinity)	Growth of larval, juvenile and adult fish and shellfish; protective of threatened/endangered species.	
	7-day mean ≥ 4 mg liter ⁻¹	Survival of open-water fish larvae.	
	Instantaneous minimum ≥ 3.2 mg liter ⁻¹	Survival of threatened/endangered sturgeon species. ¹	
Deep-water seasonal fish and shellfish use	30-day mean ≥ 3 mg liter ⁻¹	Survival and recruitment of bay anchovy eggs and larvae.	June 1 - September 30
	1-day mean ≥ 2.3 mg liter ⁻¹	Survival of open-water juvenile and adult fish.	
	Instantaneous minimum ≥ 1.7 mg liter ⁻¹	Survival of bay anchovy eggs and larvae.	
	Open-water fish and shellfish designated-use criteria apply		October 1 - May 31
Deep-channel seasonal refuge use	Instantaneous minimum ≥ 1 mg liter ⁻¹	Survival of bottom-dwelling worms and clams.	June 1 - September 30
	Open-water fish and shellfish designated use criteria apply		October 1 - May 31

*Note a 30-day mean 6 mg/L MSN value is evaluated for purpose of the WQ indicator.

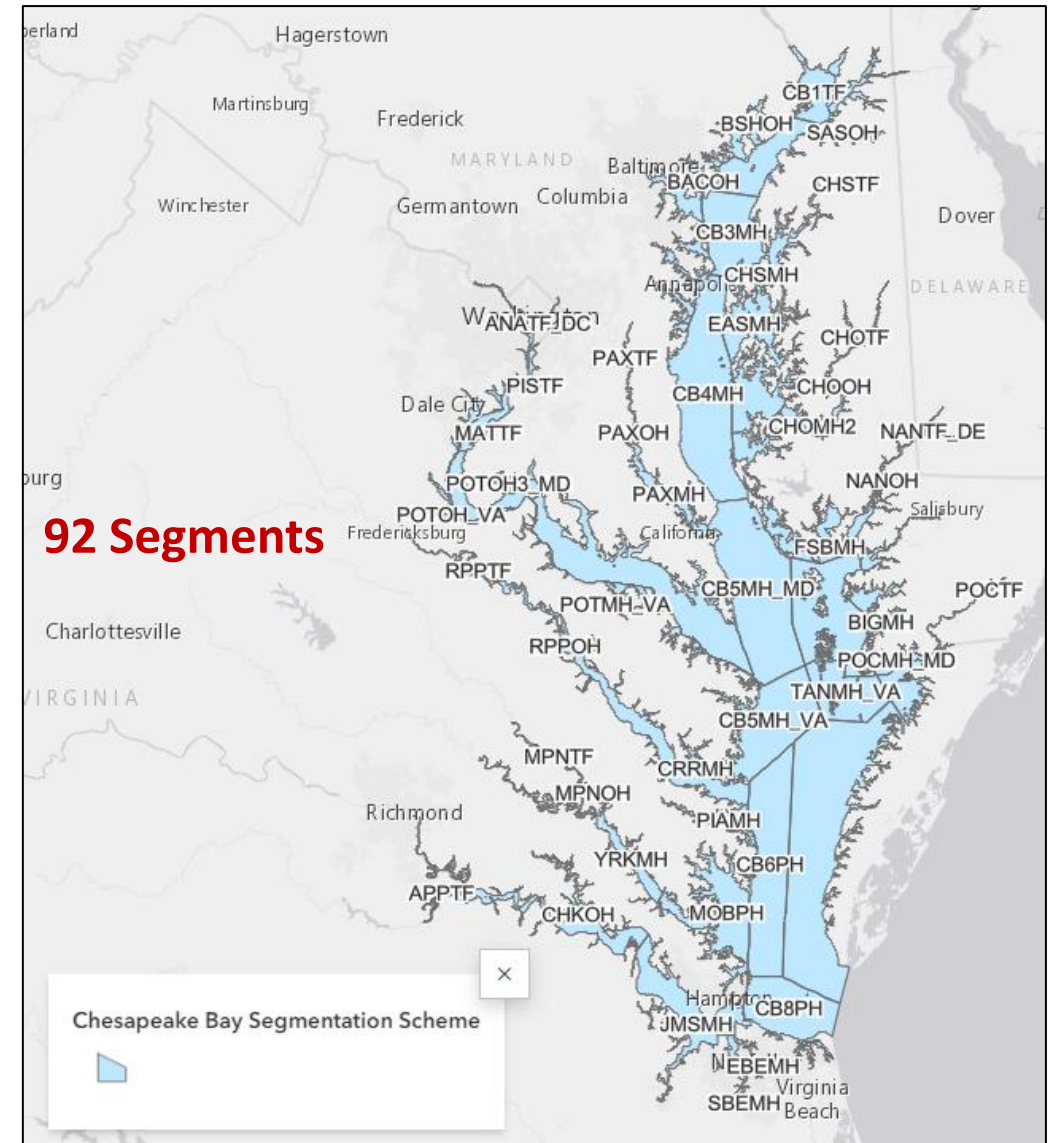
Enables evaluation of short-duration criteria and 10 additional load lines for model scenarios; may reflect more local conditions

¹ At temperatures considered stressful to shortnose sturgeon (>29°C), dissolved oxygen concentrations above an instantaneous minimum of 4.3 mg liter⁻¹ will protect survival of this listed sturgeon species.

Chesapeake Bay Segmentation Scheme

92 segments reflecting unique physical, chemical or biological characteristics

- Salinity
- Marine life
- Water depth
- Circulation patterns
- Segments used
 - Monitoring and measure water quality standards attainment
 - Set pollutant-load distributions
 - Connect segment to discrete land area (segment-shed)





Introducing Habitat suitability

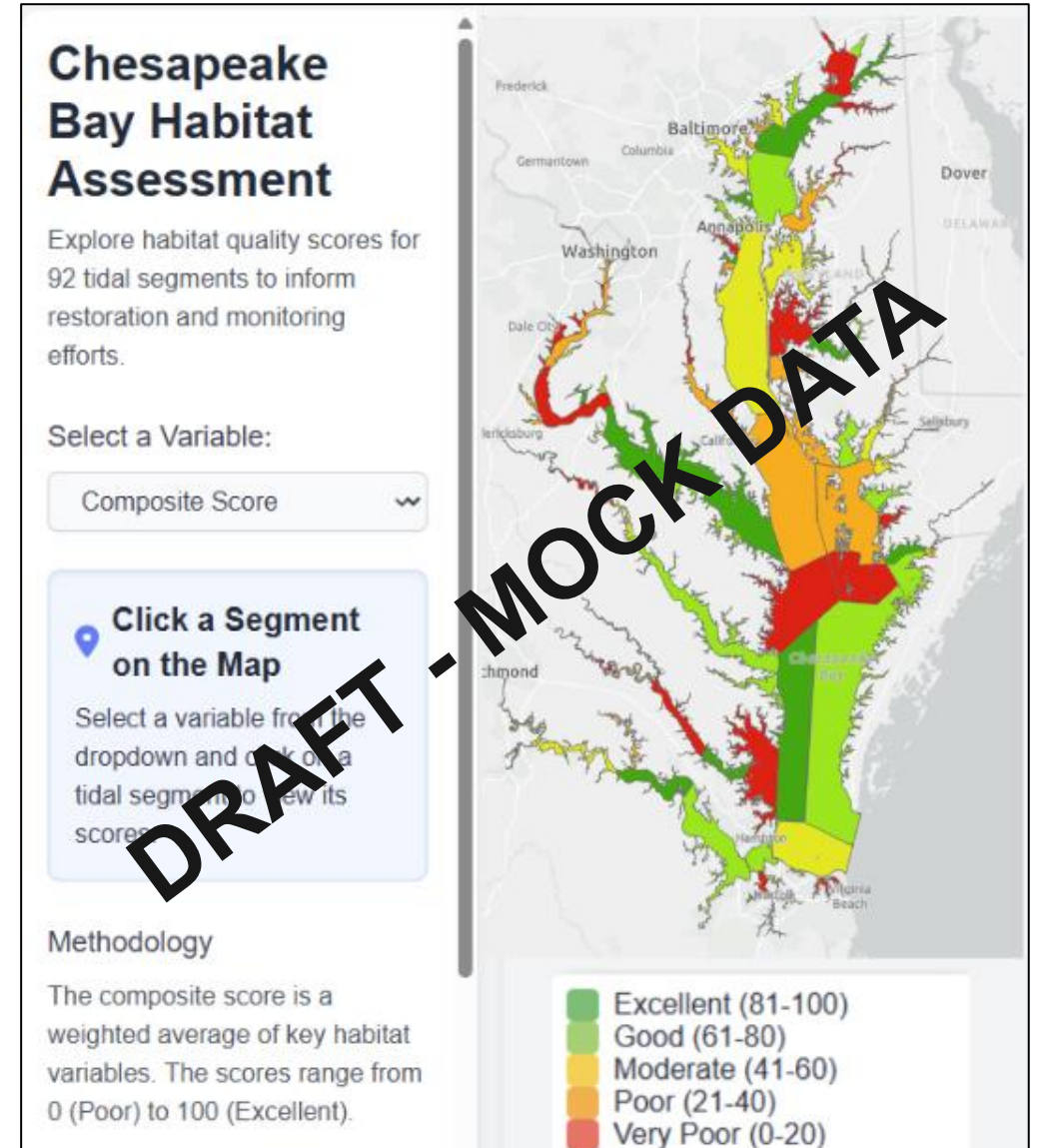
How We Identify Priority Areas



- Use water quality monitoring data, habitat information, and fish data
- Build a Habitat Suitability Index for 92 Bay segments
- Fill data gaps using scientific models
- Identify where small improvements create big ecological gains

Expected Habitat Suitability Analysis Outcomes

- Clear maps showing high-priority restoration areas
- Better-targeted investments
- Support for future planning and habitat restoration
- Improved water quality *and* living resources



**Note, this graphic shows an example of what a visualization might look like and includes made-up data for the mockup.*

Putting It All Together

- Discussed a variety of definition at the meeting with several similarities and some differences
- Overall, the responses agree tiered implementation is about ***targeted, staged, and data-driven implementation*** that ***accelerates progress*** towards ***water quality goals*** and ***further ecological benefits***



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