Tiered Implementation of the Bay TMDL

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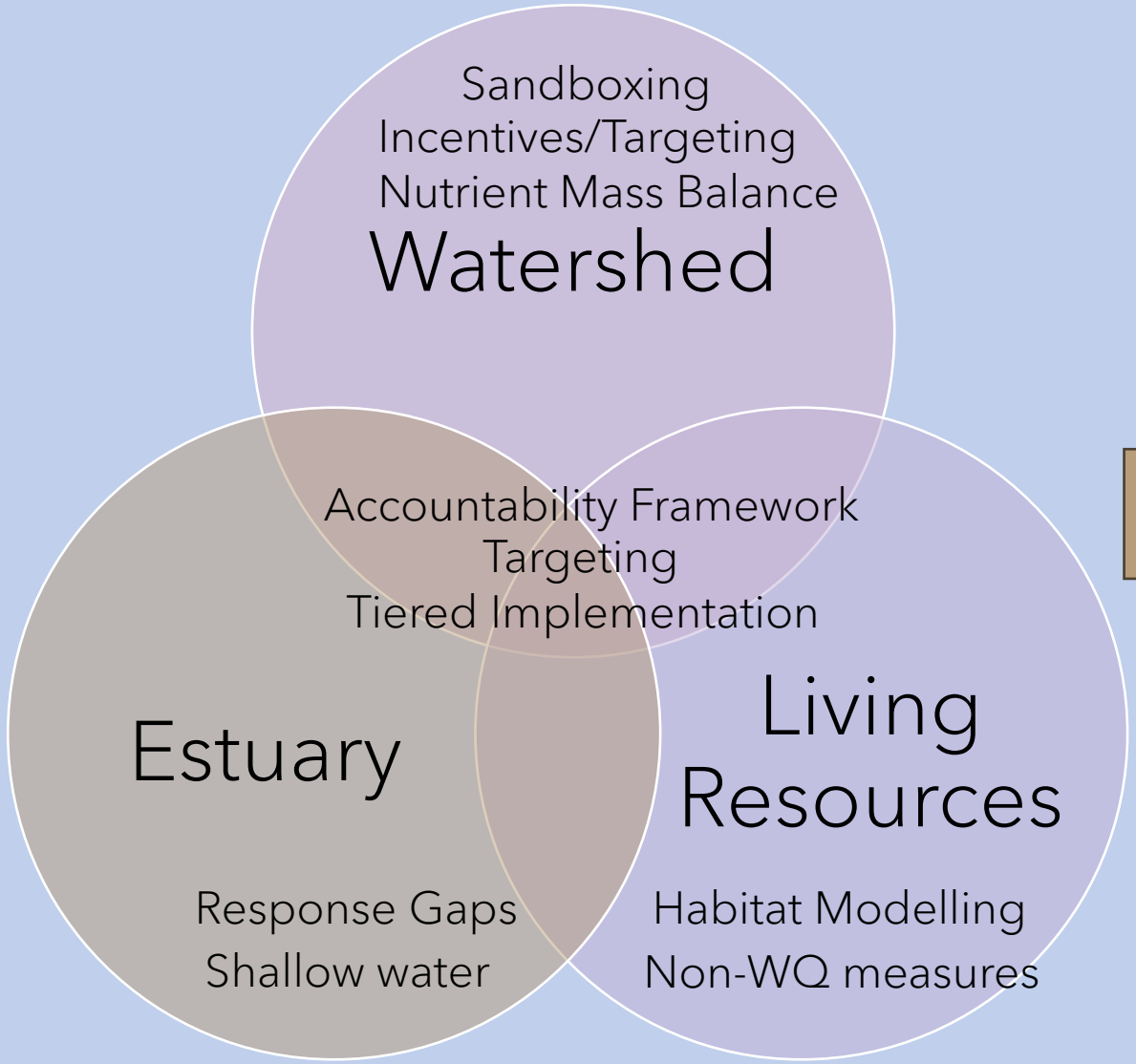
Evolution Opportunities



CESR Outreach Committee for "How"

Basic premise to "Tiered TMDL"

CESR Finding: 100% achievement of Bay WQ standards is distant & uncertain

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"

Response to date: Overwhelmingly positive, but questions arose about "how" to implement (B25).

Brief Refresher on Bay Water Quality Standards

Designated Use: Support of Aquatic Life (Living Resources)

Numeric Criteria

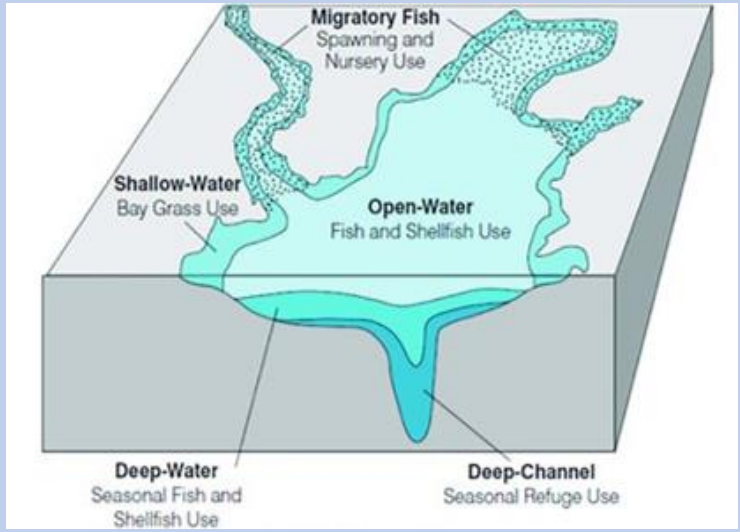
Dissolved Oxygen (DO) (30 day avg, 7 day avg, instantaneous):

Water Clarity/Aquatic Vegetation

Chlorophyll a

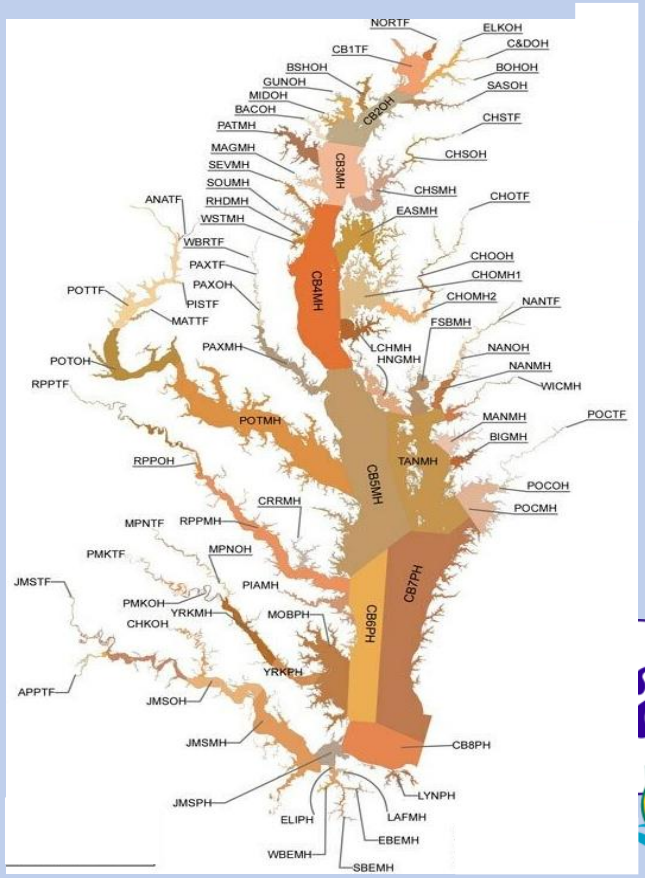
within

5 Bay habitats



across

92 "segments"



Definition

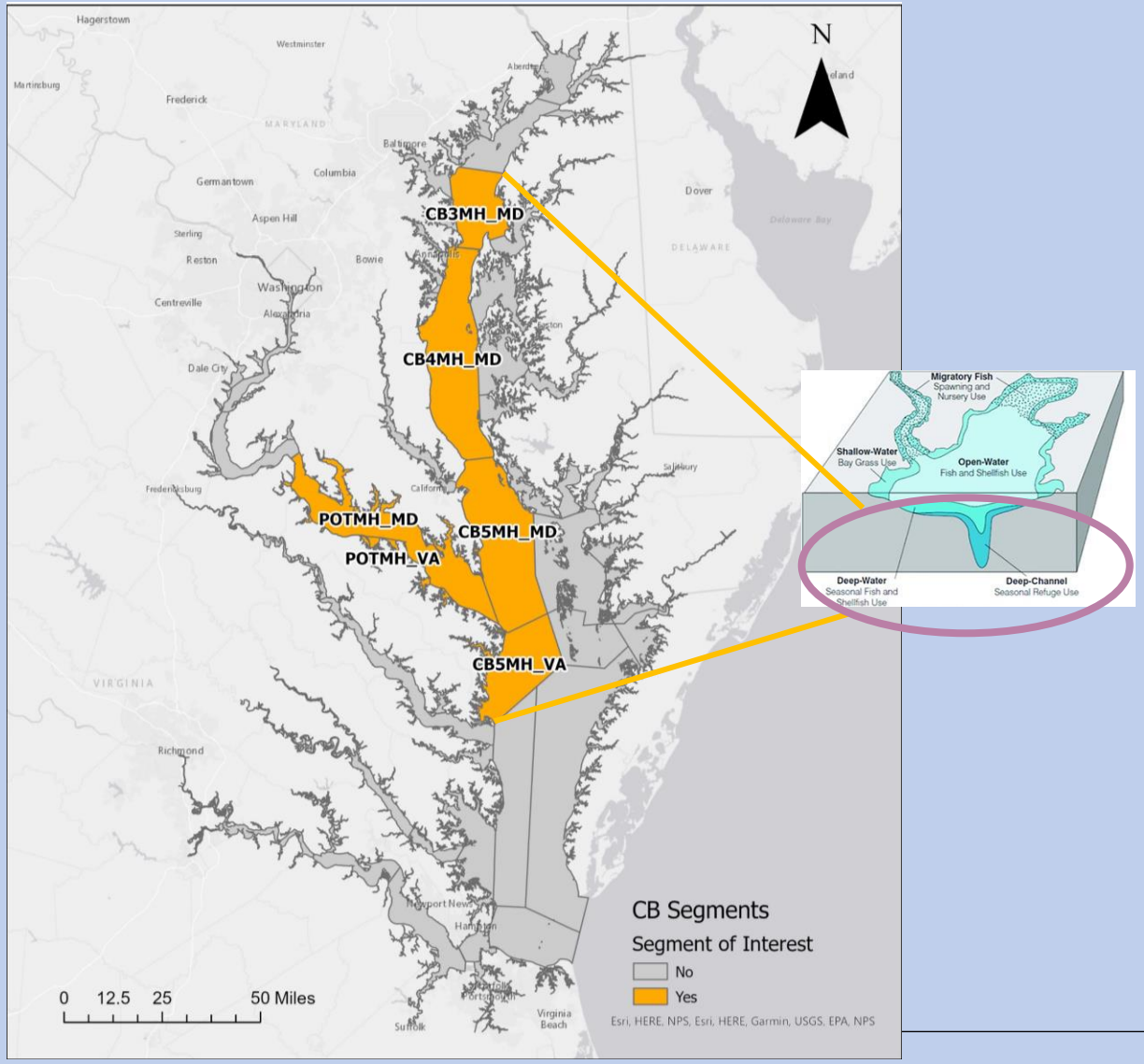
A tiered approach to TMDL implementation establishes staggered timelines, with interim goals that prioritize pollutant load reductions to local (segment/habitat) regions of the Bay that can provide the greatest anticipated benefit to living resources

Approaches to Implementing the Chesapeake Bay TMDL

Table 1: Approaches to Implementing the Chesapeake Bay TMDL

	Tiered Approach	Conventional Approach
Planning priorities for nutrient reduction	Local areas for living resource benefit	Deep channel dissolved oxygen in the mainstem of the Bay
What type of implementation?	Water quality + other habitat factors	Water quality
What is the implementation horizon?	10-15 yrs for interim goals	10-15 yrs for final TMDL target
What are final TMDL nutrient and sediment targets?	Same	Same
What are TMDL permittee obligations?	Same	Same

Existing Approach to TMDL Implementation

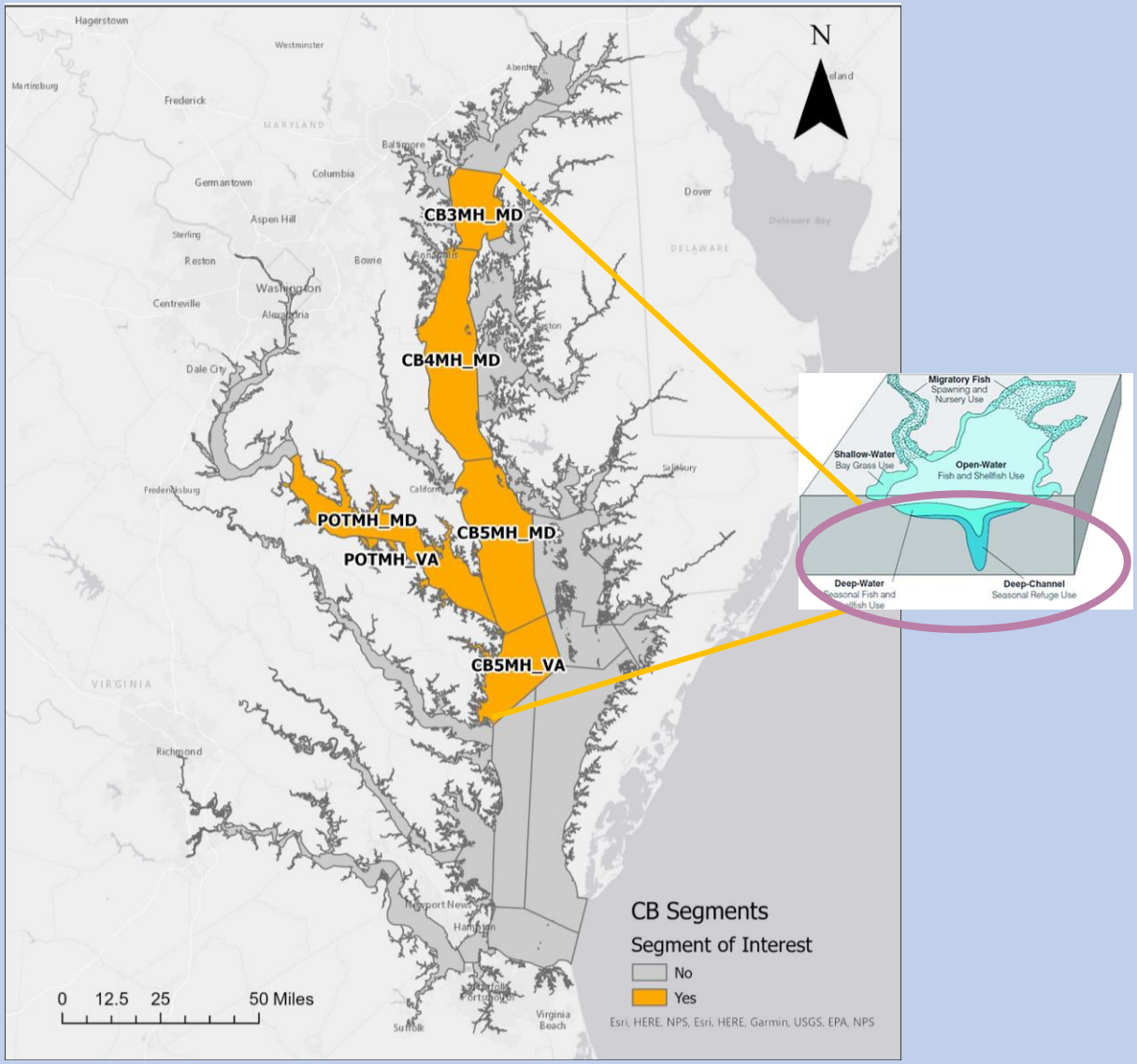


Temporal:
15-year deadline (with milestones)

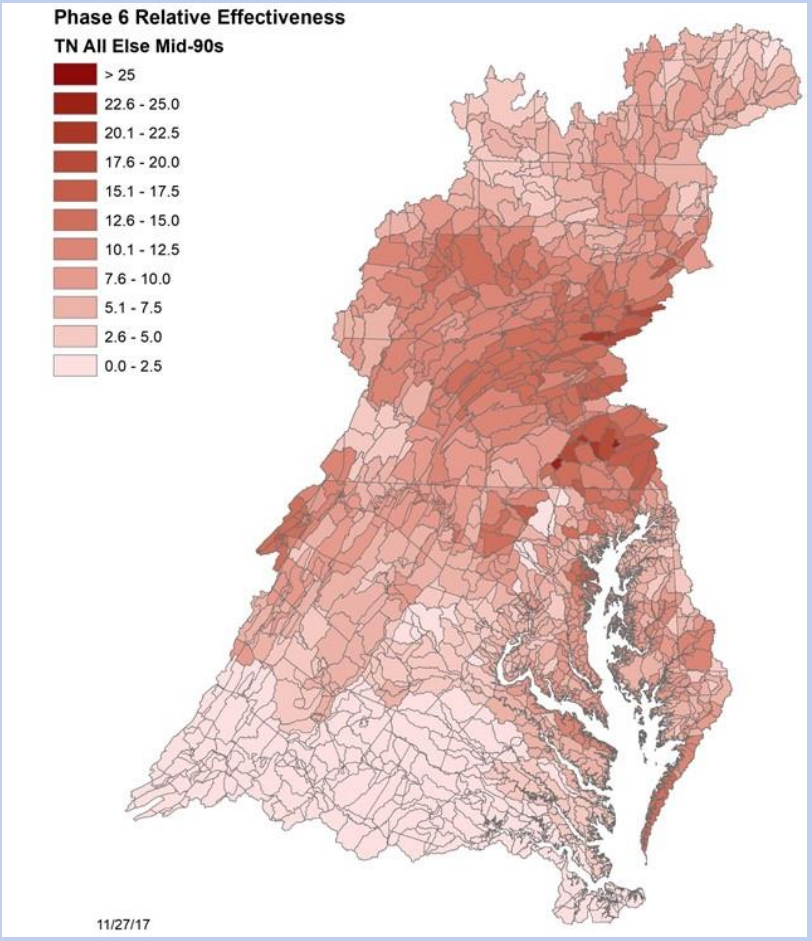
Spatial:
Nutrient load targets set to 100% WQS, focus on most challenging to achieve: DO criteria in deep water habitats in 4 segments (orange, left).

Nutrient effectiveness across watershed set based on DO impact in these areas

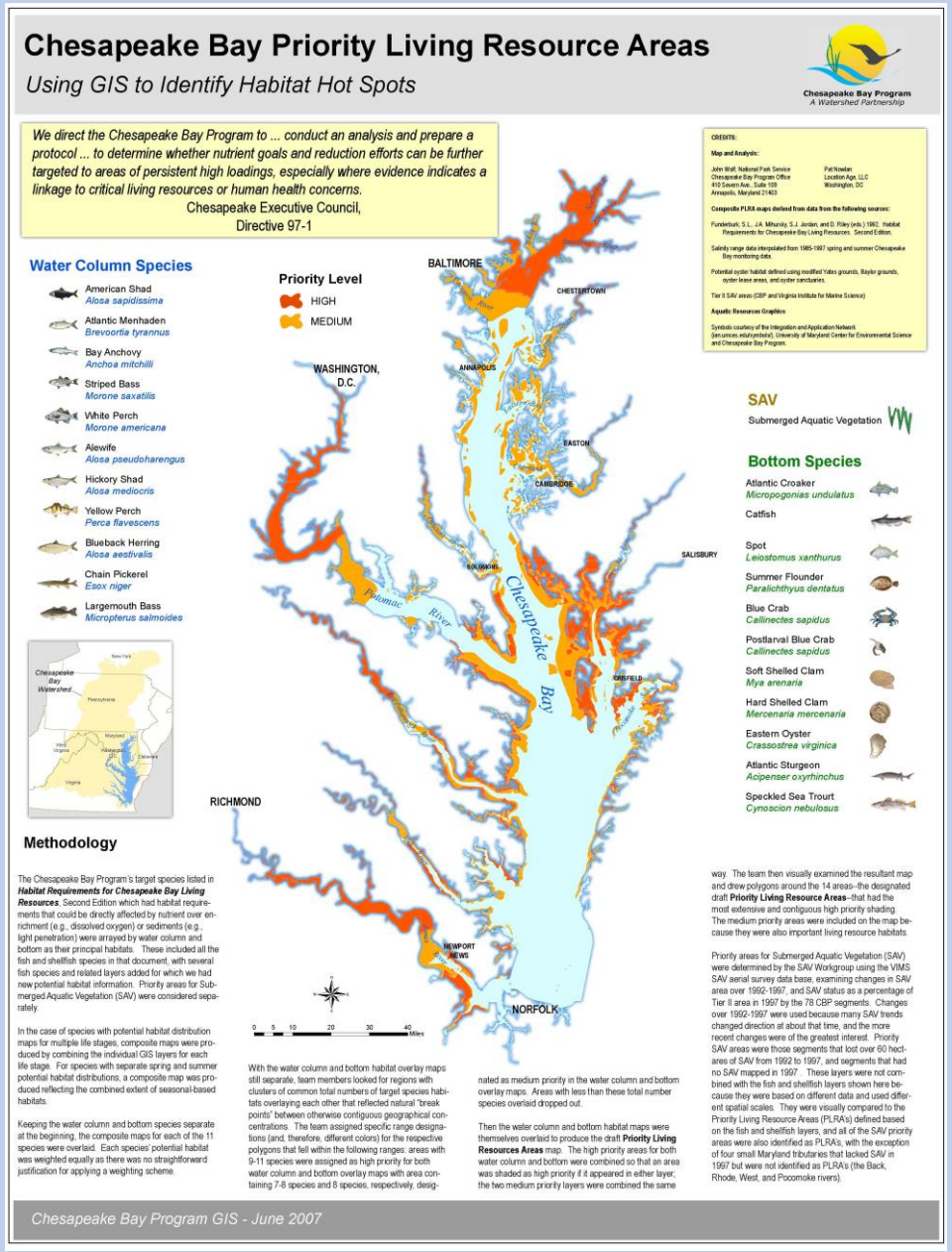
Existing Approach to TMDL Implementation



Estimated effectiveness of N reductions on deep water main channel segments



Tiering TMDL Implementation



Temporal

Intermediate goal: 10-15 years

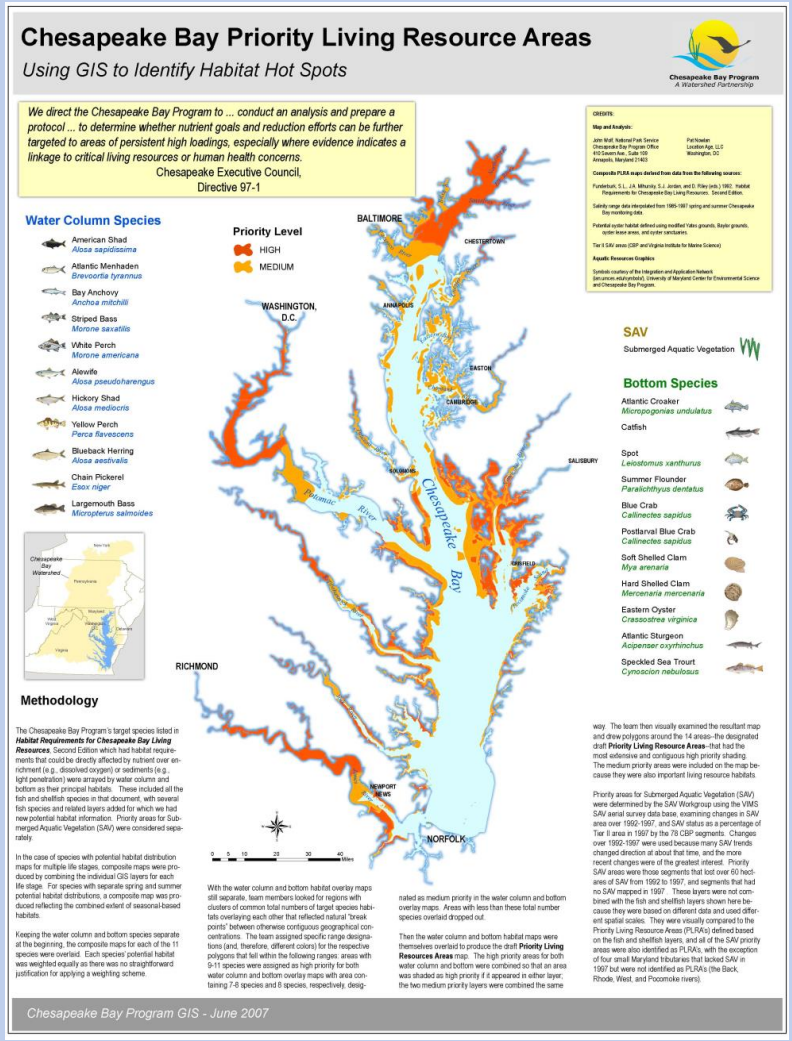
Spatial:

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

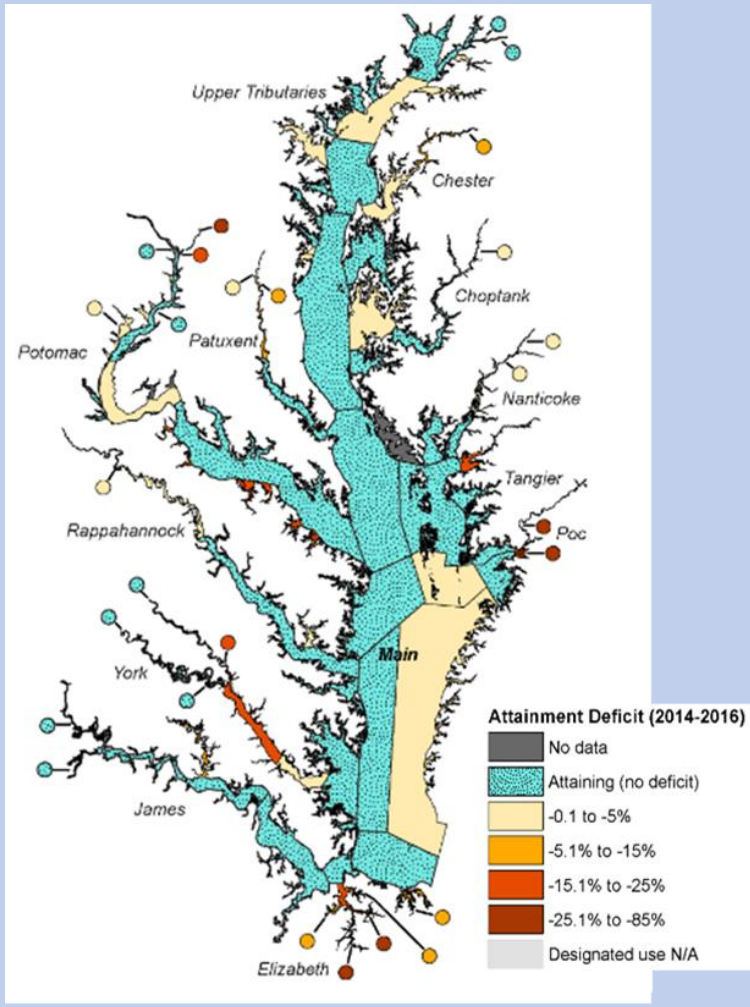
- interdependence across areas (including progress in main channel);
- importance of local, non-WQ living resource factors/stressors.

Tiering TMDL Implementation: Where can WQ improvements improve living resource habitats

Critical Habitats

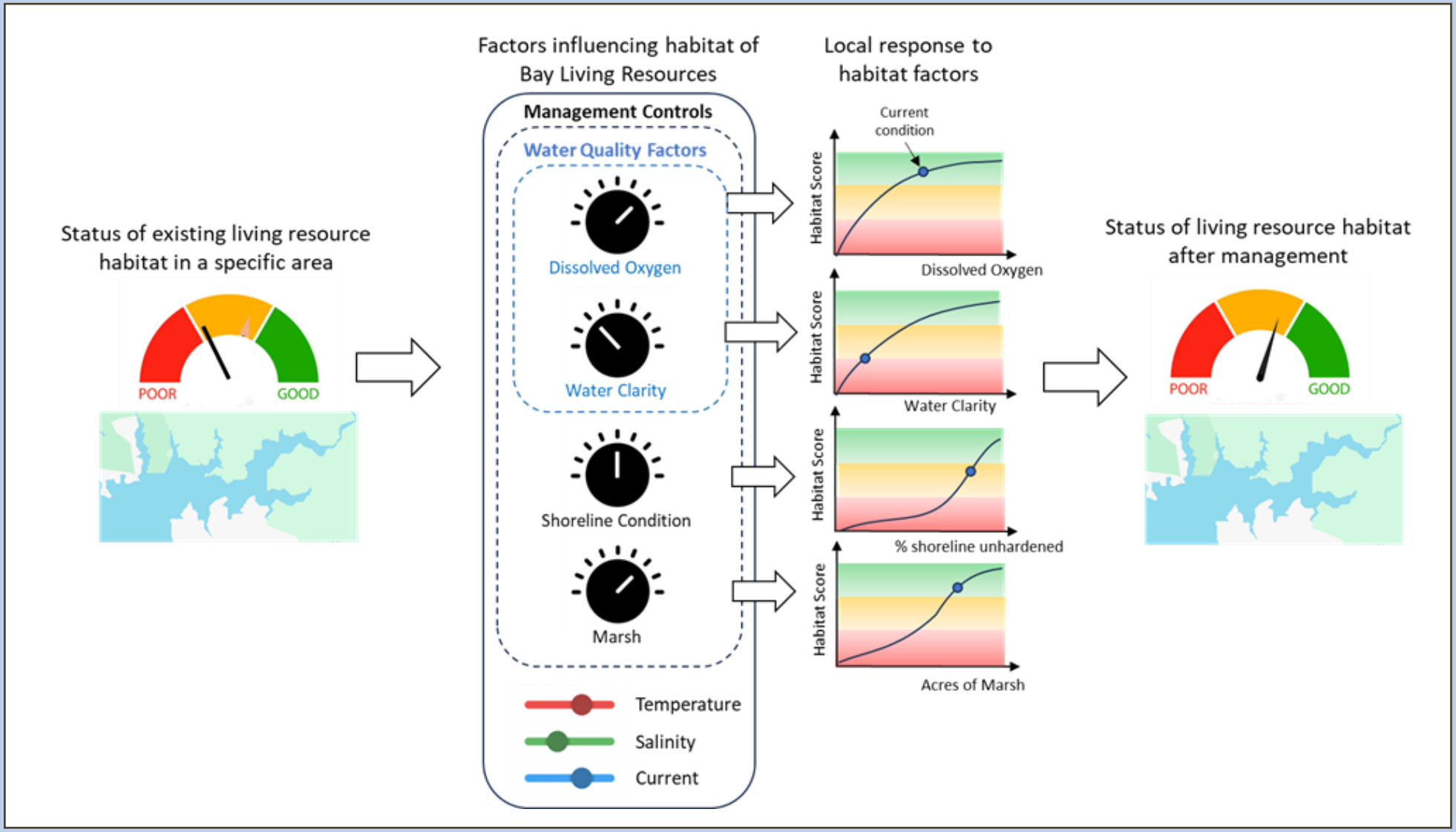


Water quality conditions in those habitats (ex open water DO)

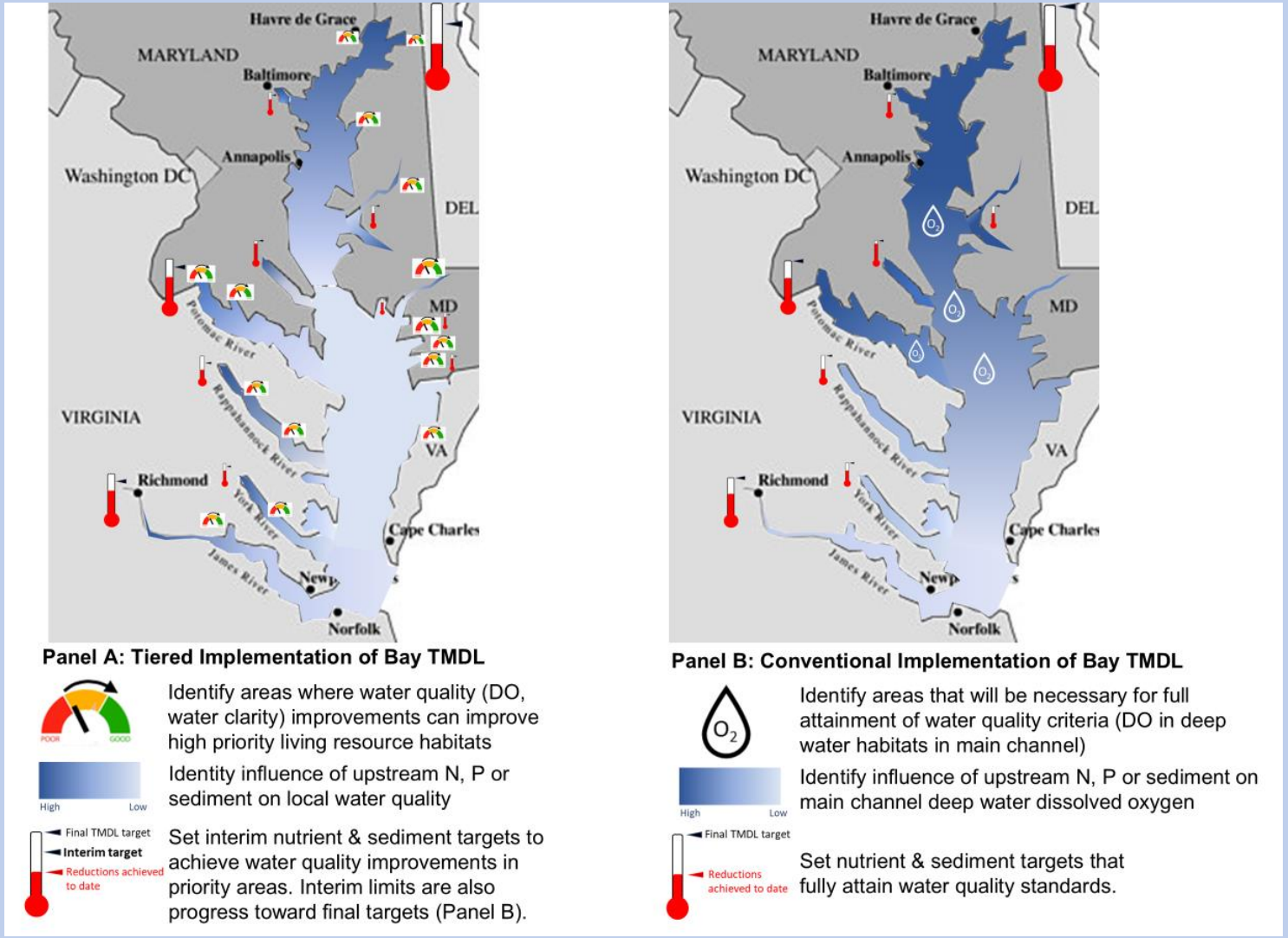


Open Water DO Attainment Status, 2014-16
(Source: Zhang et al. 2018)

Assessing local water quality, stressor, and habitat conditions



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



From Concept to Implementation

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)