Water Clarity Workshop Part I

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ITAT Chesapeake Bay Water Quality Workgroup
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Explaining Water Clarity Trends

How Did We Get Here?

- Recent observations and analyses have indicated that water clarity has remained low or has continued to decline since the 1980s across much of Chesapeake Bay's tidal habitats.
- The past several years have seen some dramatic improvements in water clarity around the bay, but we don't know why.
- Understanding both the long-term degradation and the recent improvements is critical to targeting management actions that support continued improvements in water clarity
- A STAC Workshop proposal was funded to synthesize the current state of knowledge regarding trends in water clarity, as well as to identify new analyses for advancing our knowledge.
- Keisman and Batiuk decided to re-organize into a more focused effort comprising two workshops with a smaller group of actively engaged scientists.

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Activities and Decisions To Date

- Five conference calls from September, 2016 through January, 2017
- Identified a list of research questions for advancing our ability to explaining observed water clarity trends
- Identified a set of new analyses that could be conducted with existing data and resources
- Embarked on a "3-pronged approach" to synthesizing the current state of knowledge comprising reviews of:
  - (1) Mid-channel water clarity findings;
  - (2) Processes and feedbacks especially important to shallow water clarity;
  - (3) Trends in loads from the watershed relevant to estuarine water clarity.
- Began analyses to characterize sediment, chlorophyll-a, and organic carbon inputs from the watershed's River Input Monitoring (RIM) stations (Qian and Joel)
- Planned analysis of spatial and temporal relationships among kd, secchi depth, secchi*kd, TSS, chlorophyll-a, and other kd-related parameters (Carl and Jessie)
- Began analysis of the effects of sediment and nutrient loads from the watershed on water clarity (Jeremy, Slava, Qian)

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3-Pronged Approach

Importance of Sediment Inputs:
What?
When?
Where?

different properties?
different drivers?

Shallow and Near-Shore Waters: Inputs vs. internal processes?

Open Water: Inputs vs. internal processes?

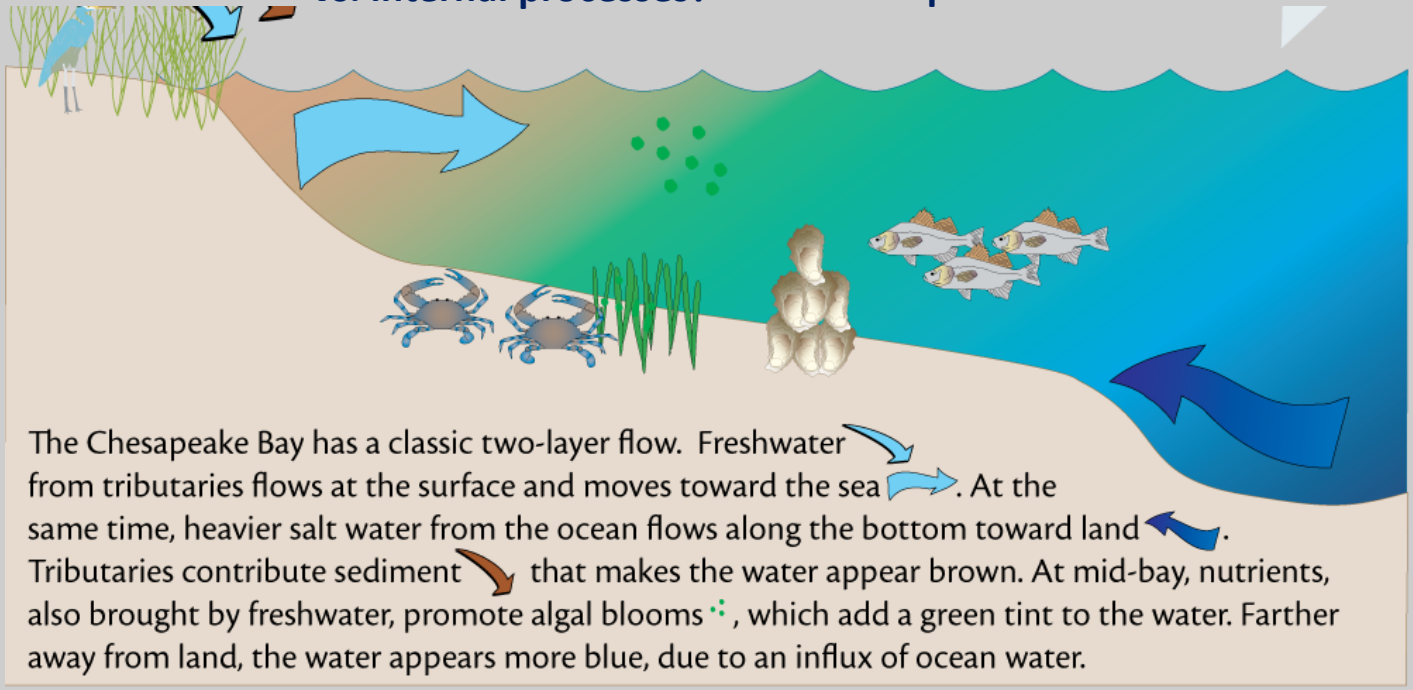

Diagram courtesy of the Integration and Application Network (ian.umces.edu), University of Maryland Center for Environmental Science. Source: Lane, H., J.L. Woerner, W.C. Dennison, C. Neill, C. Wilson, M. Elliott, M. Shively, J. Graine, and R. Jeavons. 2007. Defending our National Treasure: Department of Defense Chesapeake Bay Restoration Partnership 1998-2004. Integration and Application Network, University of Maryland Center for Environmental Science, Cambridge: MD.

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Definitions

Shallow Water

- ≤ 2 meters?
- Something more general?

Water Clarity

- Secchi depth?

- Kd?

- See Mark Trice's summary!

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Workshop Goals

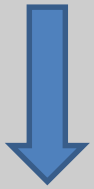
- Share synthesis materials on the current state of our understanding of water clarity trends and their drivers in Chesapeake Bay
- Identify messages from the three synthesis presentations for communicating to the management community
- Discuss managers' current understanding of water clarity and the kinds of answers that they're looking for
- Share preliminary findings from new work
- Identify gaps
- Identify products
- Commit to next steps

Explaining Water Clarity Trends

Day One

Focus on current state of the science

- Understanding bay-wide water clarity patterns
- Processes and feedbacks especially important to shallow water clarity
- Long-term inputs from major tributaries



Synthesis: What have we learned?

- Major findings
- Messages
- Gaps