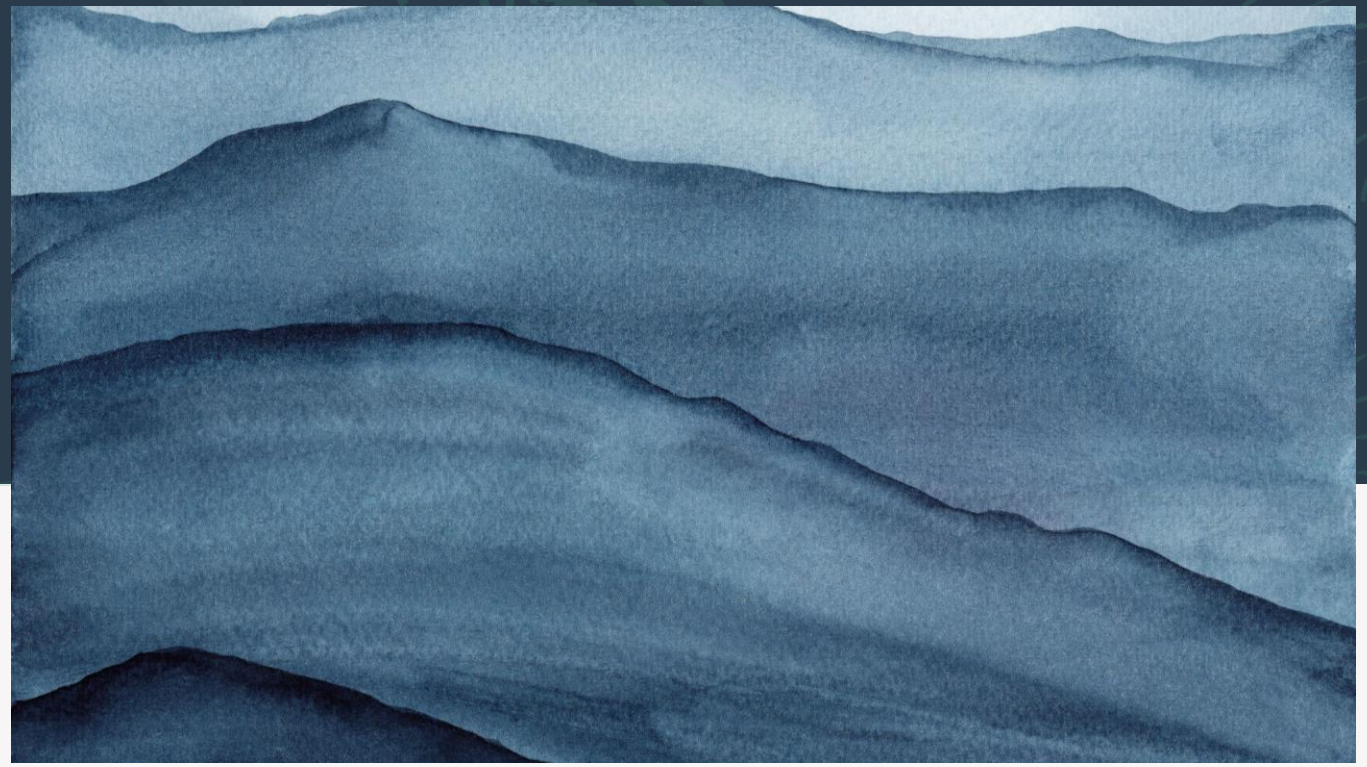


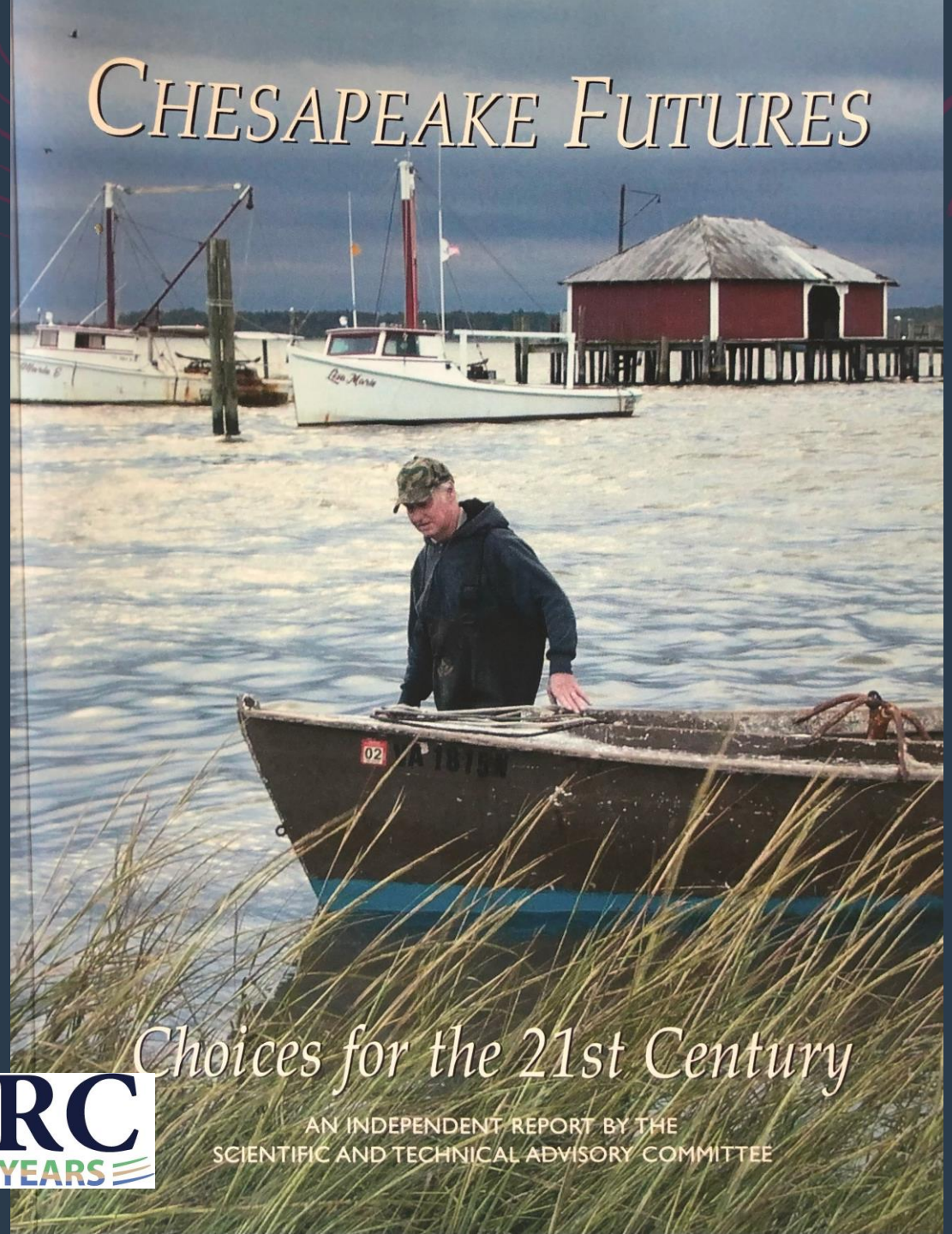
Comprehensive Evaluation of System Response; Intent, Process, and Followup

STAC Strategic Retreat

June 2025

ORC 50 YEARS

Intent



CHESAPEAKE FUTURES
Choices for the 21st Century

edited by
Donald F. Boesch
and
Jack Greer

An Independent Report by the
Scientific and Technical Advisory Committee

March 2019 STAC Mtg; Benham, Easton, Stephenson

Chesapeake Bay: State of the Science 2025

Engage STAC to generate a consensus report that assess the level of confidence in existing and future management efforts to achieve existing water quality standards.

1. Are management efforts (current and planned) sufficient to achieve target nutrient/sediment load reductions (delivered, not modeled)?
2. If current nutrient/sediment load reduction goals are achieved, will those reductions be sufficient to achieve existing water quality standards?
3. Identify the level of confidence in existing and future management efforts to achieve water quality standards and assess the potential of alternative management policies to improve the probability of achieving water quality standards.
4. Assess the consequences for living resources if existing water quality standards can not be attained.

Chesapeake Bay: State of the Science 2025

Potential Proactive STAC Assessment Effort

What Level of Support is Optimal?

Enthusiastic support is necessary

Lukewarm support is good enough

High Stakes	Overall Importance	Low Stakes
Long-term Impact	Duration of Impact	Short-term Only
Tough Problem	Difficulty of the Problem	Simple Problem
High Investment	Stakeholder Buy-In	Low Investment
High Autonomy	Empowerment of Group Members	Low Autonomy

Courtesy of Sherry Witt

When we began the effort.....

President Trump Gives Speech Regarding Mueller

On March 2, President Trump gave a speech regarding the ongoing Mueller inv
Russia probe and election investigation has surfaced in the past few months,
Cohen, went in front of the Supreme Court. Mueller is expected to hand in his rep
(BBC)

Anti-Vaccination Bills Passed

On March 6, at least 11 states passed anti-vaccination bills despite the outbreak of previously eliminated
bills expand the reasons for parents to opt out of vaccinations for their kids. The bills also state tha
provide more information regarding the risks of the vaccines. The intention is to eliminate the
surrounding the world of vaccinations. (CNN)

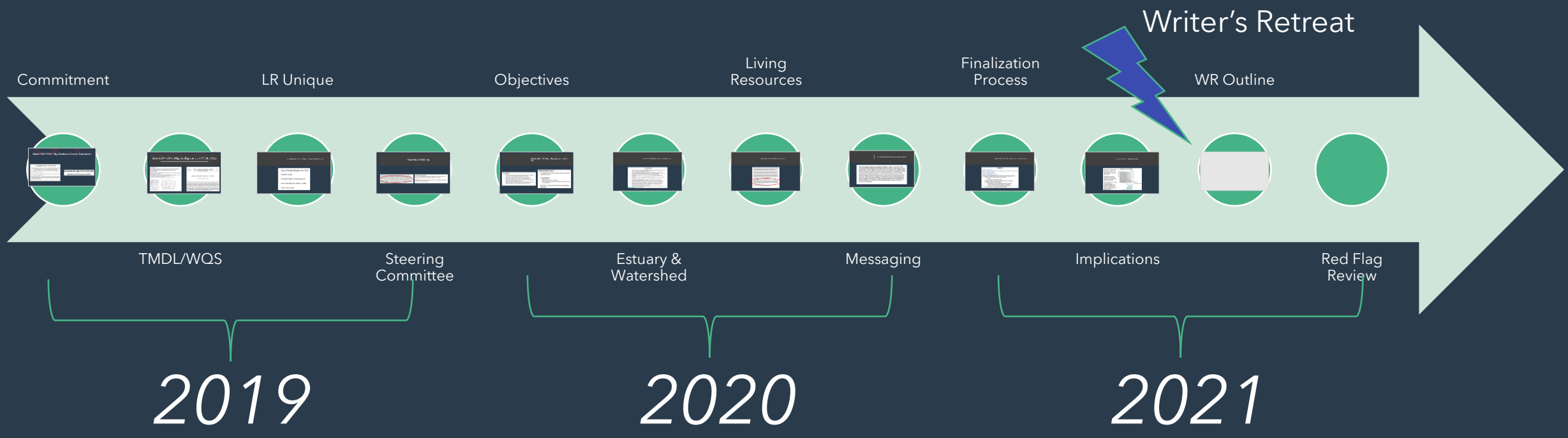
College Admission Cheating Scandal

On March 12, the Department of Justice announced that over 50 people have been arrested in connection with a college admissions scheme. The scam included cheating on standardized tests and bribing admission administration. Many Hollywood, such as Lori Loughlin and Felicity Huffman, have been indicted on charges. (CNN)

ORC 50 YEARS

Process

CESR Timeline
March 2019 – December 2021



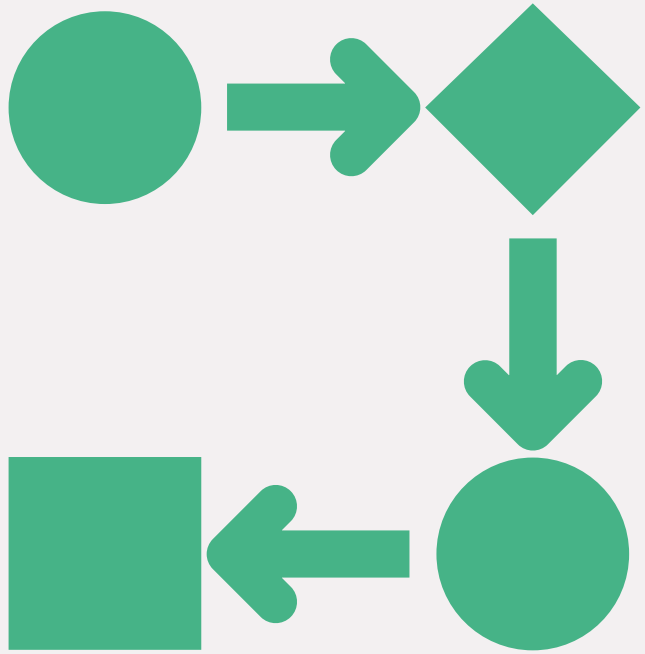
Wikipedia's definition of consensus

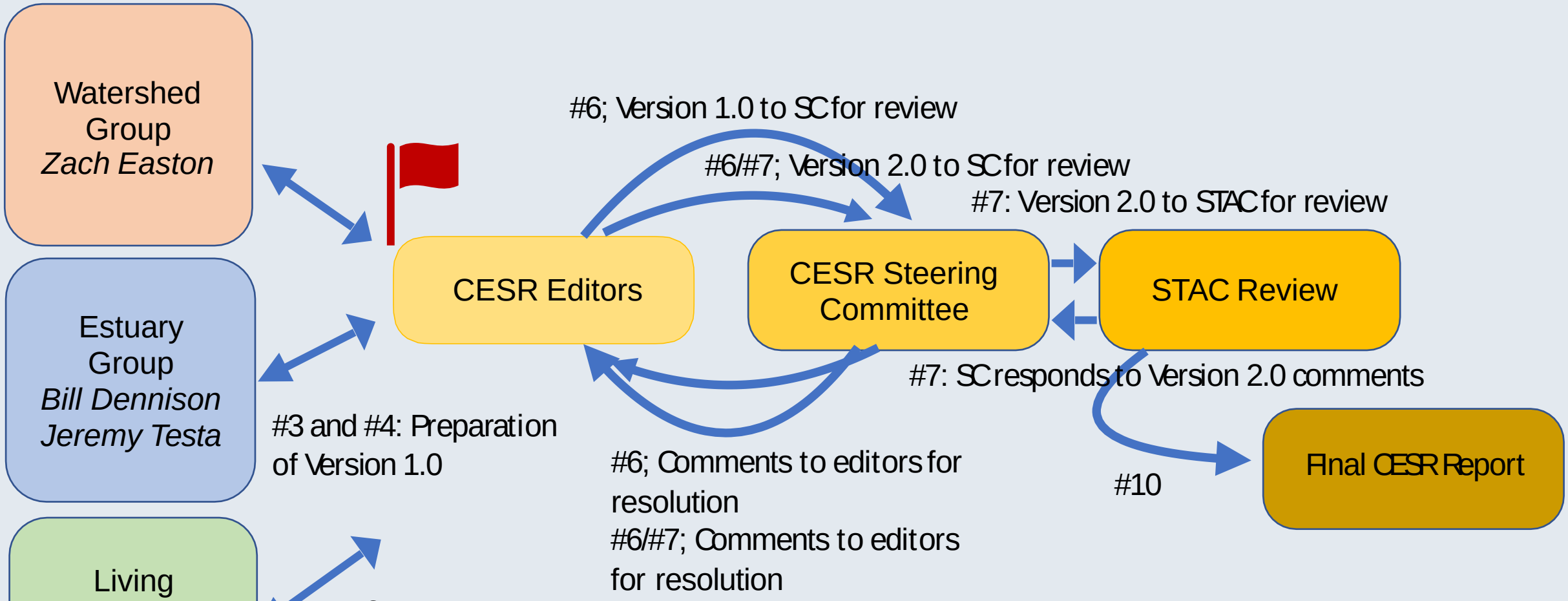
- Consensus is a group discussion where everyone's opinions are heard and understood, and a solution is created that respects those opinions. Consensus is not what everyone agrees to, nor is it the preference of the majority. Consensus results in the best solution that the group can achieve at the time.

https://en.wikipedia.org/wiki/Wikipedia:What_is_consensus%3F; accessed 3/7/2022

Process Design Objective

- To provide support for the preparation of the CESR Report, in a way that provides defensibility, efficiency, and consensus, so that the partnership is supported in decision-making as it approaches the 2025 deadline.





Steps:

#1 Preliminary "stitching together" of summaries and draft text for Framing Outline

#2 Framing Outline to Steering Committee for approval; identification of scope of CESR Report versus alternative destinations for additional products; presentation of format, draft Summary, and draft Implications to STAC

#3 Preparation of Version 1.0 by DHW and KS

#4 Preparation/Iteration of Version 1.0 by *Writer's Group* and supporting personnel

~~#5 Additional product(s) to CRC for support and drafting of plan~~

#6 Version 1.0 report to Steering Committee for major notes for Version 2.0; submittal to Reader

#6/#7. Version 2.0 to Steering Committee with resolution of comments

#7 Presentation of Version 2.0 to STAC for consensus review; Steering Committee resolves STAC comments

~~#8 CRC admin support of publishing of associated products through appropriate channels~~

#9 Planning/Partnership with CBP for Outreach Plan (CESR and others)

#10 Publishing of signed Version 2.0

Red Flag Review by at-large membership (September through December 2021)

"Both the Summary and the Implications are consensus pieces that were constructed in outline format at the 2-day Writer's Retreat held in August, and were drafted by myself based on these outlines. While the Resource Documents allows authors flexibility to explore related issues beyond the confines of the framing questions, the Summary and Implications sections need to be succinct and representative of STAC. Thus, we are presenting both sections to you tomorrow, and asking you to review them for the following:

1. Identify any points that are not understandable in their current form; we will address these comments as we write the Summary and Implications sections.

2. Flag points that you find objectionable for inclusion, i.e., "deal breakers"; we will address resolution of these in a follow up process.

3. Propose points for Implications that appear to be missing.

Final Report

Initiated in March 2019; publishing date August 2022

First STAC "consensus" report (not everything we want, but we can all live with what is in there) in 20 years

Committed to communicating all of the work; decision to publish foundational work as "Resource Documents"

Achieving Water Quality Goals in the Chesapeake Bay: An Evaluation of System Response

Table of Contents

Supplemental Reports (listed, but not included, in the report and published by CRC separately):

Easton, Z., K. Stephenson, B. Benham, J.K. Bohlke, C. Brosch, A. Buda, A. Collick, L. Fowler, E. Gilinsky, C. Hershner, A. Miller, G. Noe, L. Palm-Forster, T. Thompson. 2022. *Evaluation of Watershed System Response to Nutrient and Sediment Policy and Management*, STAC Publication Number 22-XXX. Chesapeake Bay Program Scientific and Technical Advisory Committee (STAC), Edgewater, MD. XX pp.

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Lessons to Date on Communicating CESR

We came, we saw, we conversed…….

DHW 4 June 2024

27

Tracked presentations by Stephenson & Wardrop pre-CESR publication (May 2023)

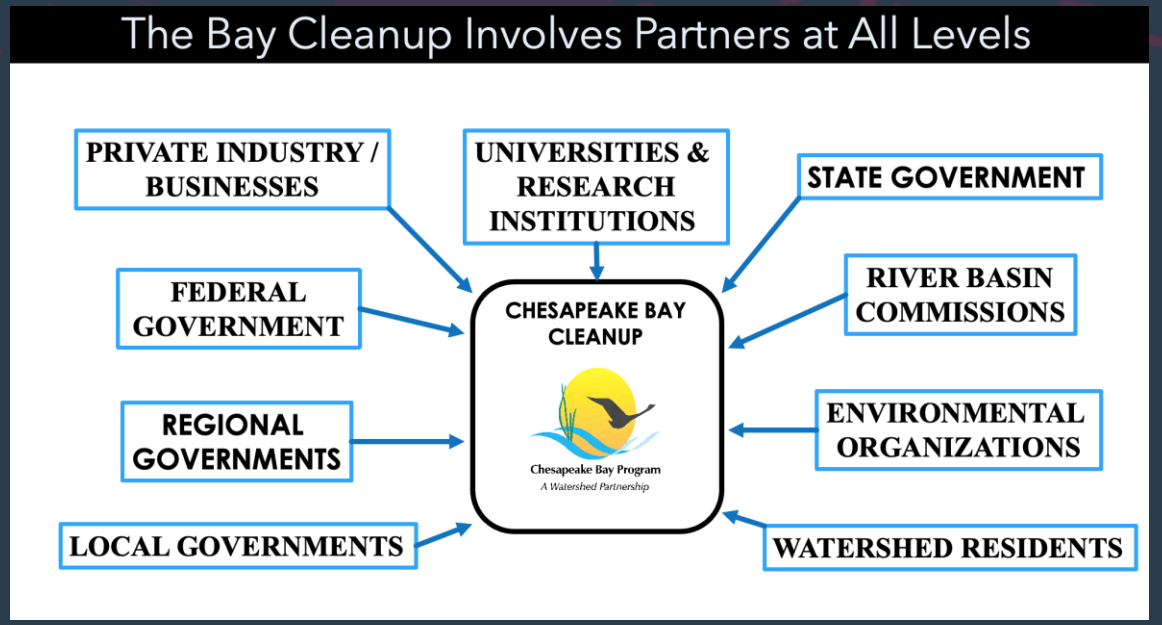
>70

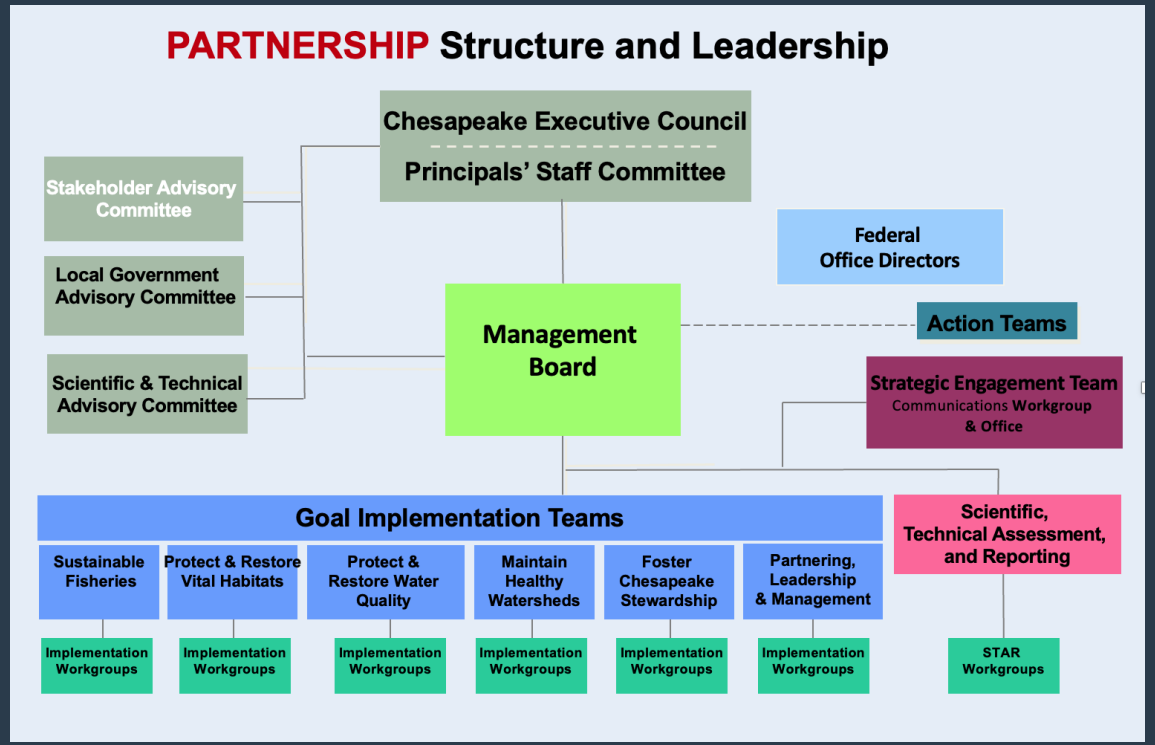
Tracked presentations by Stephenson & Wardrop to date since CESR publication; significant numbers by others

Points of Change

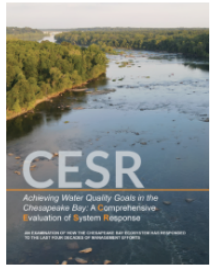
Push and Pull; Surround

- GITs/STAR/Advisory Committees
- Management Board/Principal's Staff Committee/Chesapeake Bay Commission
- CBP Gatherings (SRS Biennial Symposium)
- Legislators
- Other NGOs
- General public (MPT)
- Other Advisory Committees
- University groups
- Bay Program Personnel (past and present)

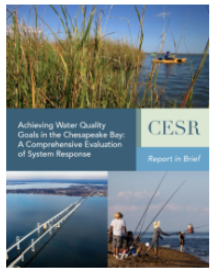




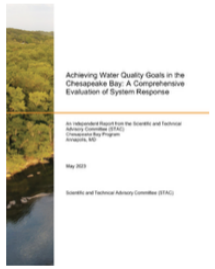
The Report



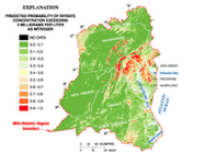
CESR Executive Summary



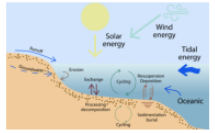
CESR Report In Brief



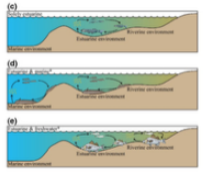
Achieving Water Quality Goals in the Chesapeake Bay: A Comprehensive Evaluation of System Response



Resource Document: Evaluation of Management Efforts to Reduce Nutrient and Sediment Contributions to the Chesapeake Bay Estuary

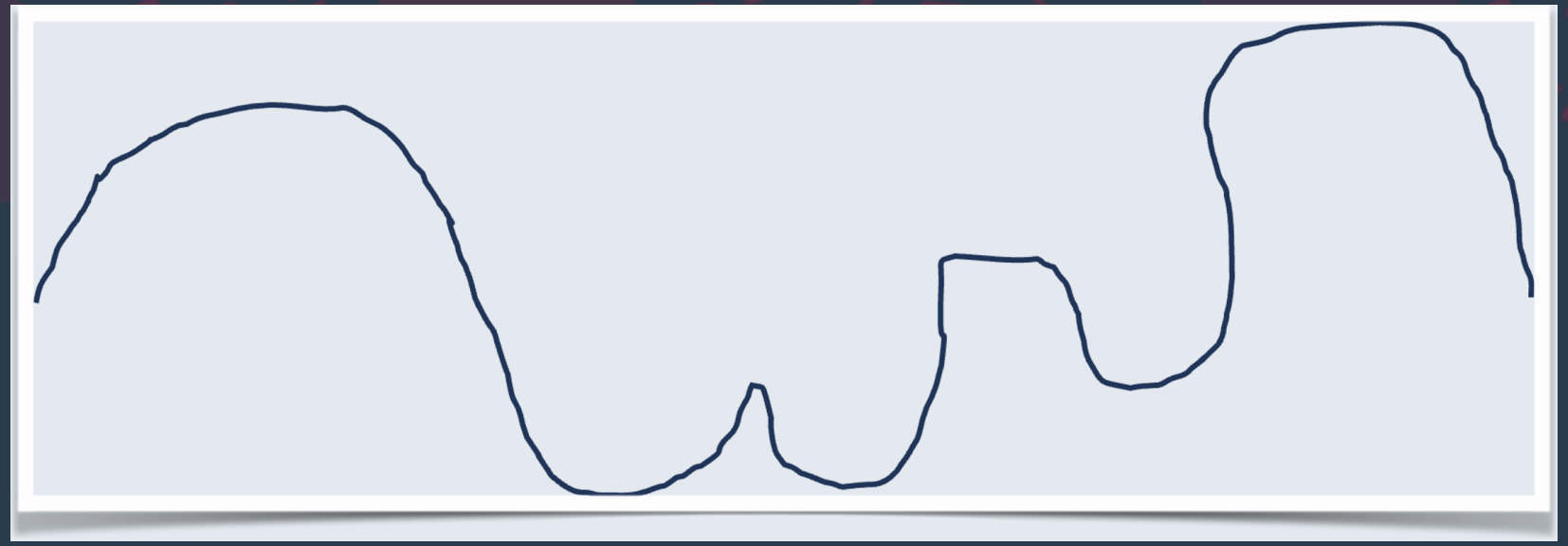


Resource Document: Knowledge Gaps, Uncertainties, and Opportunities Regarding the Response of the Chesapeake Bay Estuary to Restoration Efforts

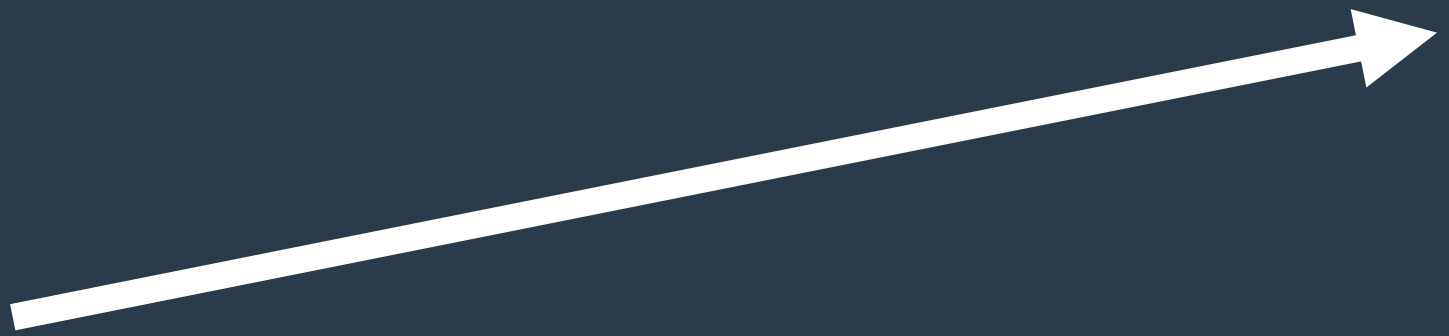


Resource Document: A Proposed Framework for Analyzing Water Quality and Habitat Effects on the Living Resources of Chesapeake Bay

Comprehensive Evaluation of System Response, a Six Volume Set and a Video



The journey looked like this, but we often turn it into:



Above the Line

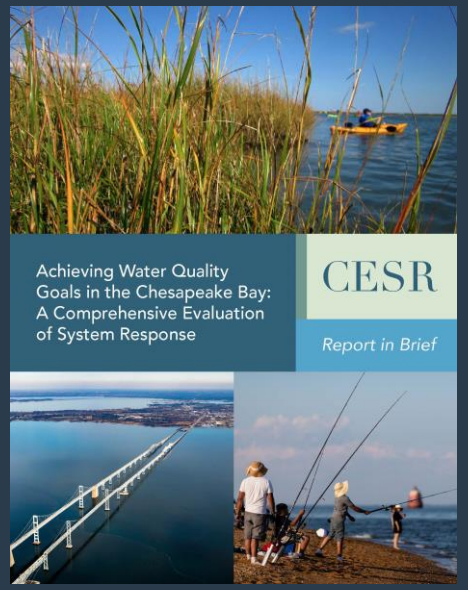
What has mattered

- A process that engaged all of STAC (thank you Brian Benham) and had 60 contributors (STAC and beyond)
- A solution to keeping original three resource documents while writing a report that followed framing questions (thank you Leonard Shabman)
- A consensus report with 60 contributors (STAC and beyond)
- A review process with multiple levels (USGS, NOAA)
- A professional communications team (thank you Green Fin Studios) and multiple medias
- A pre-release socialization of messages
- A willingness to constantly revise
- Most of all, CONTINUED AND SUBSTANTIVE ENGAGEMENT BY PAST AND PRESENT STAC MEMBERS

Below the Line

It’s all about the learnings

- Better ihighlighting of other STAC products (e.g., Rising Temps, Overcoming the Hurdles)
- Faster production of Report-in-Brief
- What CESR doesn’t say as it is what it does say
- Incomplete sketches of opportunities
- Managing expectations
- An enormous investment of time not planned for



The Universe Provided

Fortunate circumstances

- Timing
- Ann Swanson and Senator Elfreth
- Champions in unexpected places
- Fresh leadership
- A willing community

STAC Approvals/Presentations to date

- Report Objectives (approved by STAC)
- Formation of Steering Committee (approved by STAC)
- Proposed production and review process (approved by Steering Committee, presented to STAC)
- Revised report format (approved by Writer's Group, presented to STAC)
- Sections 1 and 2 (general review by STAC)
- Framing questions to Watershed, Estuaries, and Living Resources (approved by Steering Committee, presented to STAC)
- High level summary of responses to Framing Questions (approved by Writer's Group, presented to STAC)
- High level summary of major points for Implications (approved by Writer's Group, presented to STAC)
- Red Flag Review by STAC

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Red Flag Review Results

- All comments are compiled (6 pages!) and will be used as Version 1.0 is being prepared
- Most were editorial in nature, e.g., pertaining to tone, additional material to include, general presentation notes (Category #1)
- Content that was judged by members to be sensitive, or comments that were the result of considerable time and care, were discussed via one-on-one phone conversations
- None of the major points outlined in the summary were judged to be disagreeable at this point, and so document preparation is following the complete outline summary as presented (Category #2)
- No additional implications were identified (Category #3)
- Steering Committee will assess whether comments have been addressed to satisfaction

Report Steering Committee

Brian Benham, Virginia Tech
Anthony Buda, USDA Agricultural Research Service.
Bill Dennison, University of Maryland Center for Environmental Science
Zachary Easton, Virginia Tech
Ellen Gilinsky, Ellen Gilinsky LLC
Andy Miller, University of Maryland, Baltimore County
Mark Monaco, NOAA, National Centers for Coastal Ocean Science
Kenny Rose, University of Maryland Center for Environmental Science
Leonard Shabman, Resources for the Future
Kurt Stephenson, Virginia Tech
Jeremy Testa, University of Maryland Center for Environmental Science

STAC Members

List

Other Contributors

Carl Hershner, Virginia Marine Institute (retired)
Peter Tango, USGS

Report Editors

Kurt Stephenson, Virginia Tech
Denice Wardrop, Chesapeake Research Consortium

STAC Staff

Annabelle Harvey, Chesapeake Research Consortium
Meg Cole, Chesapeake Research Consortium

Achieving Water Quality Goals in the Chesapeake Bay: An Evaluation of System Response

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Patience is not simply the ability to wait - it's how we behave while we're waiting. Joyce Meyer

Thank you

March 2019 STAC Mtg; Benham, Easton, Stephenson

Chesapeake Bay: State of the Science 2025

Engage STAC to generate a consensus report that assess the level of confidence in existing and future management efforts to achieve existing water quality standards.

1. Are management efforts (current and planned) sufficient to achieve target nutrient/sediment load reductions (delivered, not modeled)?
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4. Assess the consequences for living resources if existing water quality standards can not be attained.

Chesapeake Bay: State of the Science 2025

Potential Proactive STAC Assessment Effort

June 2019 STAC Mtg; Background on TMDL, WQS

Short Communication

Chesapeake Bay's water quality condition has been recovering: Insights from a multimetric indicator assessment of thirty years of tidal monitoring data

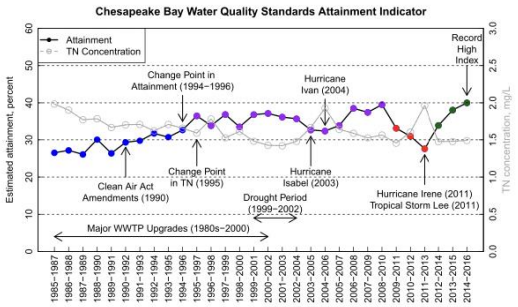
Qian Zhang [a,*], Rebecca R. Murphy [a], Richard Tian [a], Melinda K. Forsyth [b], Emily M. Trentacoste [c], Jennifer Keisman [d], Peter J. Tango [e]

[a] University of Maryland Center for Environmental Science/U.S. Environmental Protection Agency Chesapeake Bay Program, 410 Severn Avenue, Annapolis, MD 21403, USA
[b] University of Maryland Center for Environmental Science, Chesapeake Biological Laboratory, 146 Williams Street, Solomons, MD 20688, USA
[c] U.S. Environmental Protection Agency, Chesapeake Bay Program, 410 Severn Avenue, Annapolis, MD 21403, USA
[d] U.S. Geological Survey, MD-DE-DC Water Science Center, Catonsville, MD 21228, USA
[e] U.S. Geological Survey/U.S. Environmental Protection Agency Chesapeake Bay Program, 410 Severn Avenue, Annapolis, MD 21403, USA

HIGHLIGHTS

- Chesapeake Bay's water quality history was assessed by using an indicator framework.
- The indicator has a positive long-term trend ($p < 0.05$) and reached its peak in 2014–2016.
- The indicator was responsive to extreme weather events but can recover afterwards.
- Improvement of indicator score in 2014–2016 over its long-term average was driven by open water and deep channel dissolved oxygen.
- The improvement in Baywide attainment was statistically linked to the decline of total nitrogen input.

GRAPHICAL ABSTRACT



JOURNAL OF THE AMERICAN WATER RESOURCES ASSOCIATION
AMERICAN WATER RESOURCES ASSOCIATION

DERIVING CHESAPEAKE BAY WATER QUALITY STANDARDS[1]

Peter J. Tango and Richard A. Batiuk[2]

ABSTRACT: Achieving and maintaining the water quality conditions necessary to protect the aquatic living resources of the Chesapeake Bay and its tidal tributaries has required a foundation of quantifiable water quality criteria. Quantitative criteria serve as a critical basis for assessing the attainment of designated uses and measuring progress toward meeting water quality goals of the Chesapeake Bay Program partnership. In 1987, the Chesapeake Bay Program partnership committed to defining the water quality conditions necessary to protect aquatic living resources. Under section 303(c) of the Clean Water Act, States and authorized tribes have the primary responsibility for adopting water quality standards into law or regulation. The Chesapeake Bay Program partnership worked with U.S. Environmental Protection Agency to develop and publish a guidance framework of ambient water quality criteria with designated uses and assessment procedures for dissolved oxygen, water clarity, and chlorophyll *a* for Chesapeake Bay and its tidal tributaries in 2003. This article reviews the derivation of the water quality criteria, criteria assessment protocols, designated use boundaries, and their refinements published in six addendum documents since 2003 and successfully adopted into each jurisdiction's water quality standards used in developing the Chesapeake Bay Total Maximum Daily Load.

- September 2019 STAC Mtg; LR presentation by K. Rose

Very Different Situation to "WQ"

- Questions change
- Not specific targets for living resources
- Not an established set of data or models
- Greater uncertainties

December 2019 STAC Mtg; Watershed Group Report-out

Watershed Group

~~State of the Science~~

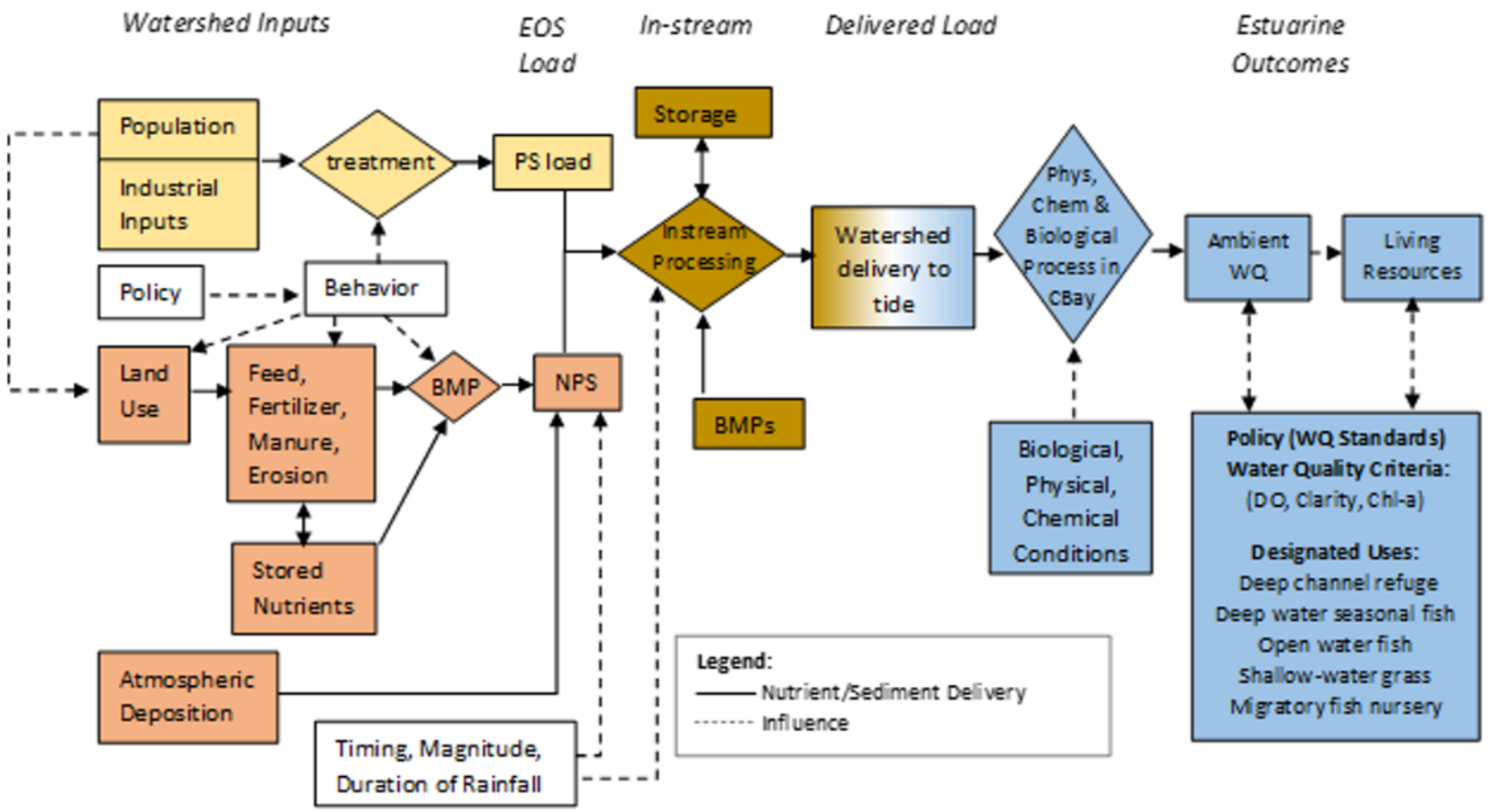
~~Scientific Gap Analysis~~

~~Assessment of System Response~~

~~Evaluation of System Response~~

Update

Science Gap/Uncertainty Issues: Watershed Group



System Diagram of Processes Impacting Chesapeake Bay Water Quality

- December 2019 STAC mtg

STAC Scientific Gap Analysis (SGA): Workgroup Introduction—*SGA Steering Committee*
Between the September and December quarterly meetings, the SGA Steering Committee has met to discuss concerns on the direction of the effort. The Steering Committee (SC) wants to ensure everyone is committed to the effort and understands the intended outcome. The EB also met in October to revise the introduction document and further define the scope. The introduction includes an outline for the report, organized by workgroup and ending with synthesis. Kurt Stephenson (VT) started by addressing any concerns about the direction of this effort so that everyone is on the same page.

STAC SGA Workgroup Discussion
With the remainder of the afternoon, the three SGA groups met individually to assess system response, discuss section formatting, and begin brainstorming their sections.

ACTION: All, SGA groups will continue working together between quarterly meetings to make progress on their workgroup document.

- March 2020 STAC Mtg; Objectives set, Sections 1 & 2

The Objectives

- Identify gaps and uncertainties in system response —physical, chemical, biological, and socioeconomic— that impact efforts designed to attain WQS.
- Identify recent scientific developments that can shed light on the gaps and uncertainties in system response to advance efforts to attain WQS, and
- Recommend research strategies that improve understanding of system response to support informed decision making to attain WQS.
- *Recommend strategies for integrating scientific and technical analysis with active adaptive management in order to aid decision-making under uncertainty.*

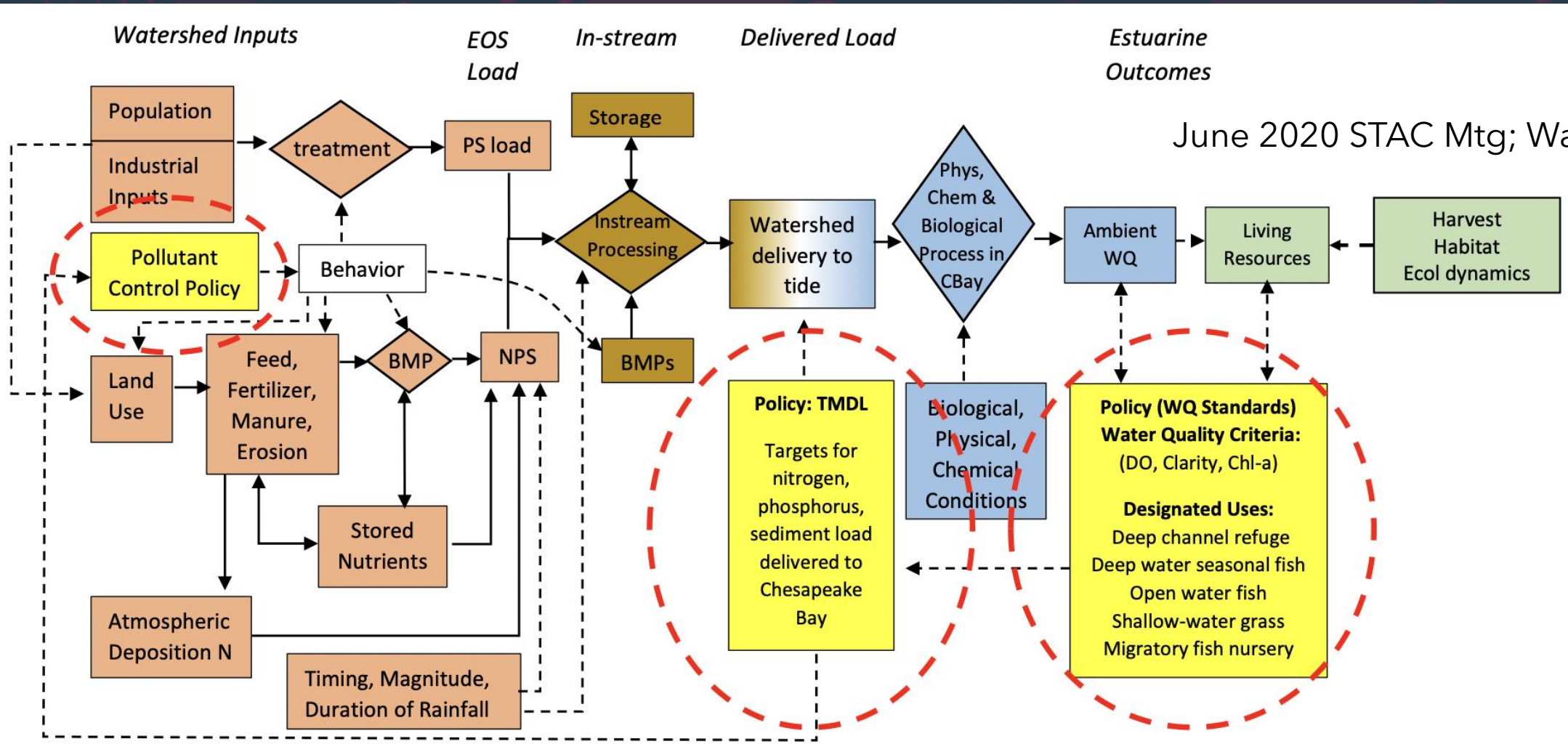
Feedback on Sections 1 and 2

We would like substantive comments, ideas, & feedback on sections 1 and 2

Getting Feedback:

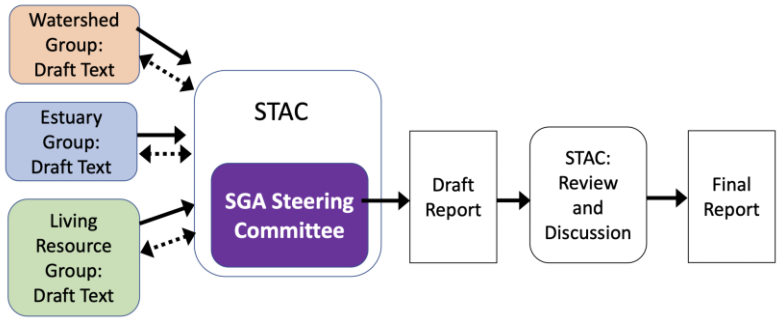
- Today's discussion
- Send remaining comments to Annabelle
- We will post collective comments and subsequent revisions to everyone on SGA Google Drive

Reminder: final edits responsibility of the SGA Steering Committee



June 2020 STAC Mtg; Watershed report c

Process



- June 2020 STAC Mtg; Estuary Group Report-out

Key points

1. Shifting to a focus on accelerating ***restoration processes***, rather than the historical focus on slowing and preventing degradation processes.
2. Creating a ***collaborative integration approach*** in which diagnostic science is used to understand the underlying processes and predictive science is employed to forecast future trajectories by integrating monitoring, modeling, and research approaches.
3. Understanding the dynamics of ecosystems at the ***land-sea interface (triblets)*** in Bay restoration.
4. Investigating the impact of ***tipping points (ecological thresholds)*** in estuarine restoration dynamics.
5. Accounting for ***climate change*** in Bay restoration and expectations of restoration.
6. Using ***shallow water benthos*** as an example of an ecosystem for application of an integrative monitoring, modeling, and research approach at the land-sea interface, and particularly with regard to investigation of tipping points and climate change effects .
7. Developing a ***future vision*** of Chesapeake Bay management that better embraces and addresses decision making in the face of uncertainty by incorporating adaptive management and potential major interventions.
8. Identifying ***new tools, approaches, and personnel*** that will feature in Chesapeake Bay restoration science and analysis.

- September 2020 STAC Meeting; General

Kenny Rose (UMCES) presented the Living Resources Workgroup's current progress. Unlike the Water Quality section, Living Resources (LR) does not have an established set of data or models to use and has increased uncertainty. Rose explained this is not a gap analysis nor an assessment but instead it is a plan for implementation of a set of analyses in order to do the assessment – not the actual analyses. The report framework uses the results of the watershed and estuarine sections, describes how to translate these changes into responses of living resources (habitat suitability, recruitment and population, stages in subregions, and the food web) and is written for 2025 and beyond. Foundational concepts such as complex life cycles and life history strategies will be explained with real-world Chesapeake Bay LR examples. The text will provide guidance to help identify missing analyses by showing clear linkages from LR to water quality and habitat. Although this section is different from the other workgroup sections, Rose believes the linkage between WQ and LR is well established, this is an opportunity to deal with LR in a more comprehensive manner, and that this project could provide a strong foundation for further analysis.

Larry Sanford (UMCES) questioned what we are defining as a LR within the report as there are a number of things that might be part of multiple groups (e.g. oysters are LRs but also habitat, non-fished clams). Miller suggested they should be included in both sections. Testa wondered if there was an opportunity for this process to be species-specific or if this procedure is inclusive of different species. Stephenson suggested to build off the policy questions that make the argument why this model is necessary.

ACTION: All, continue working on the CESR Workgroup documents.

- December 2020 STAC Mtg; Wondering/Wandering!

CESR: Key messages, linkages, and preparing for facilitator in March—*Andy Miller (UMBC)*
Miller closed out the meeting with a membership-wide hour dialogue on key message, linkages, and facilitation for CESR. Alongside Wardrop and Fowler, Miller stressed the need to have clear takeaway messages for managers and decision makers about STAC's recommendations. Beyond this, a consensus is needed to transition from one section of the report to another. Miller stated he expects Workgroups will need to produce shorter documents for the governors and Cabinet Secretaries involved in the Partnership to consult; documents will be created with the help of the CBP Communications Workgroup. The document should 1) set clear expectations about the condition of the Bay and its living resources going forward, and 2) identify the most important benefits of restoring the Bay and its watershed system, as well as our ability to measure and manage them.

- March 2021 STAC Mtg; Implications and new process

Report

Section 1: Introduction
Section 2: Gaps and Uncertainties in System Response to Meet Water Quality Standards
Section 3: Watershed Response
Section 4: Estuary Response
Section 5: Living Resource Response

Section 6: Implications *(some illustrative emerging ideas*)

A. System response: Implications for achieving WQS
   - TMDL
   - Achievement of water quality criteria

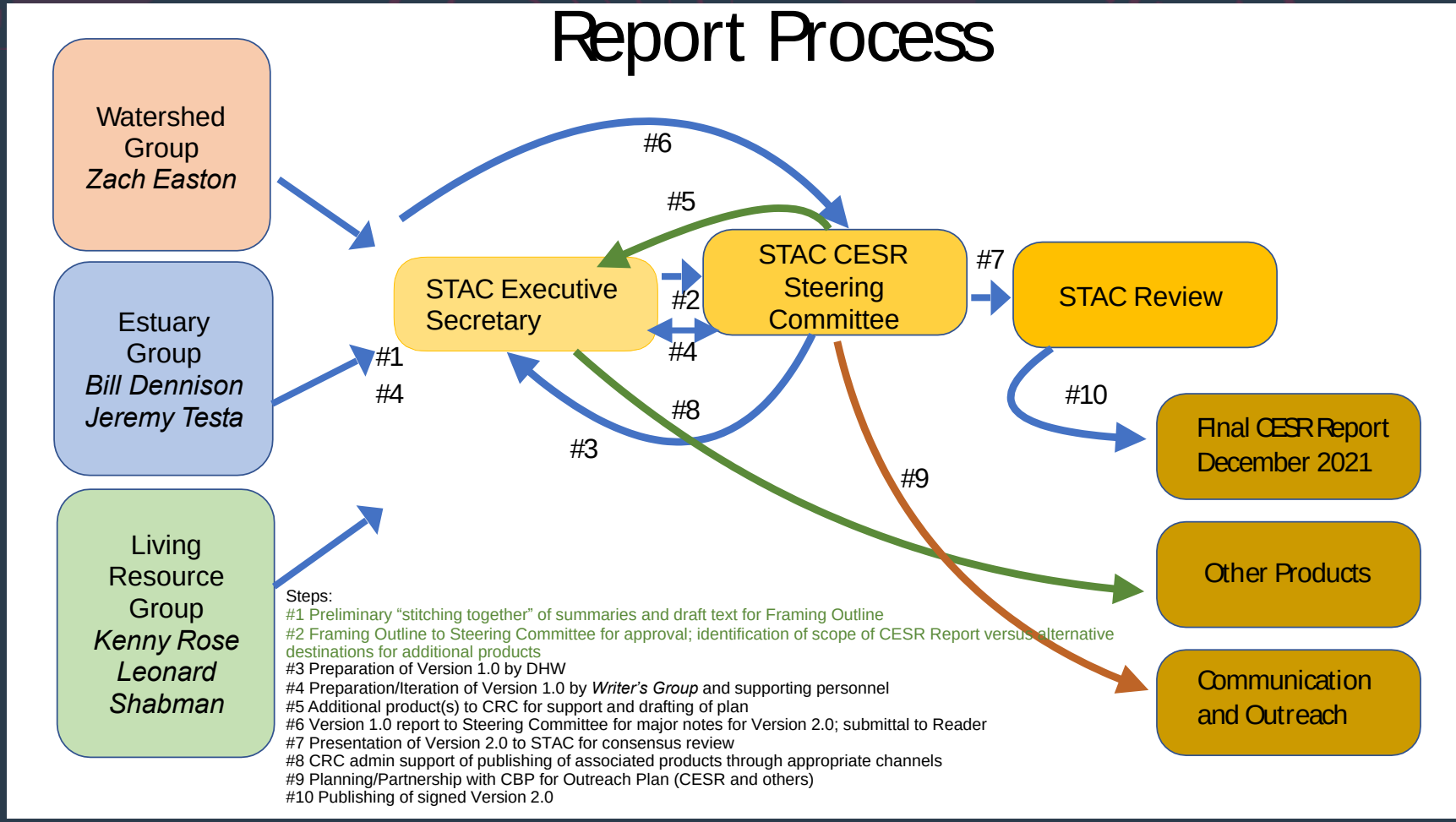
B. Adaptive management: Improving response in the face of uncertainty

C. Implications for water quality standards
   - Improvements for monitoring and assessment of WQ criteria
   - Criteria, monitoring, modeling for shallow water habitats
   - Consideration of living resource-based water quality criteria.

D. Future Visions for the Chesapeake Bay Water Quality

Process Objectives

To provide support for the preparation of the CESR Report, in a way that provides **defensibility, efficiency, and consensus**, so that the partnership is supported in decision-making as it approaches the 2025 deadline.



- June 2021 STAC Mtg; Implications

Section 6: Implications

Where are we relative to our expected response in achieving existing WQS?

What management/policy investments can we make to improve system response (shift blue curve to the right)?

What questions and issues need to be confronted in evaluating/deciding the next generation of water quality standards (including implications for living resources and restoration goals)?