SAV Restoration Review

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DRAFT FOR COMMITTEE REVIEW

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The charge – in a nutshell

- Submerged aquatic vegetation (SAV) has declined dramatically in the Bay and worldwide
- Direct restoration is seen as a strategy for increasing SAV because of the potential to "kick-start" seagrass recovery by providing seed sources and enhancing recruitment
- Past SAV restoration has shown mixed results in terms of generating persistent beds and inducing new bed development
- ***Are current restoration techniques generating sufficient returns on investment?***

Review Approach

1. Define restoration success
   - Operational success (progress towards 1000-acre goal)
   - Functional success (persistence and spread of planted beds and performance of SAV ecosystem functions)
   - Programmatic success (knowledge gained towards achieving restoration goals and disseminated)
2. Evaluate program techniques
   - How were sites chosen?
   - Which planting techniques were used?
   - Was adaptive management used?
3. Evaluate monitoring results
   - Was monitoring adequate?
   - Where and when have viable beds been produced?
   - Is there evidence that SAV beds have expanded beyond the immediate restoration site?
4. Evaluate barriers to and opportunities for successful restoration

Findings: Potential for restoration success

- Work in the coastal bays clearly reveals the program's large scale SAV restoration techniques are viable for overcoming apparent recruitment limitation for *Zostera marina*
- Program has developed the most successful eelgrass (*Z. marina*) large scale restoration methods in history (esp. seed production & planting methods)
- Program received about 15% of funds estimated to be necessary to achieve 1000-acre goal and planted ~15% of goal = operational success

Findings: Barriers to success

- Widespread failure of SAV restoration in the Bay is not primarily a methodological, but an environmental limitation
- Without water quality improvements, SAV restoration in the Bay proper is not yet a viable, large-scale alternative
- The apparent failure of the site selection process to screen sites unsuitable for eelgrass survival contributed significantly to restoration failure and signals an important research need

Findings: Threats from climate change

- Rising temperatures in the mid-Atlantic are likely to make shallow eelgrass beds extremely vulnerable to temperature stress
- If continued, such increasing temperatures alone will threaten eelgrass populations in Chesapeake Bay and make future attempts at eelgrass restoration difficult and risky

Recommendations

- Only limited SAV restoration efforts in the Chesapeake Bay are warranted in areas of historical success
- Site selection criteria need to be improved through full inclusion of the wide range of forecasting techniques available and quantitative and/or statistical evaluation of:
  - Temperature
  - Optical water quality criteria
  - Sediment type
  - Wave exposure
  - Temporal dynamics of limiting factors
- The program should test whether understanding of multiple stressors, their interactions and their temporal sequencing can be used to identify appropriate restoration sites before undertaking further large-scale restoration efforts
- Other target SAV species should be considered and techniques developed for cultivation and propagation