Developing Success Criteria & Performance Standards for in-kind SAV mitigation projects

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3.15.23

Background & Current Approach

- Increase in MD projects where SAV mitigation/restoration is required (~3 this year)
  - Have been other "self-mitigating" projects and out-of-kind mitigation projects
- Performance standards/success criteria are based off tidal wetland metrics
  - Annual monitoring
    - Minimum % cover required after 3 years → Replant/Reseed if not met
    - Minimum % cover required after 5 years → Contingency if not met
- Consider reference sites and regional trends

Existing Guidance

- Fonseca et al. *Guidelines for the Conservation and Restoration of Seagrasses in the United States and Adjacent Waters*, 1998
  - "unassisted persistence of the required acreage of seagrass coverage for a prescribed period of time (suggested minimum of 5 years)"

- Massachusetts Division of Marine Fisheries Eelgrass Restoration and Monitoring Technical Guidance, 2009
  - "…successful transplant should demonstrate at least 25% expansion of areal coverage within 1 year of transplanting. …After the first 3 years the parameters should be on a trajectory approaching reference levels."
  - Short et al. (2000) method

Existing Guidance

- California Eelgrass Mitigation Policy and Implementing Guidelines, 2014
  - "Restored eelgrass habitat is expected to develop through an initial 3 year monitoring period such that, within 36 months following planting, it meets or exceeds the full coverage (area) and not less than 85 percent of the density relative to the initial condition of affected eelgrass habitat. Restored eelgrass habitat is expected to sustain this condition for at least 2 additional years."

- Florida DEP *Guidance on Surveys for Submerged Aquatic Vegetation Compensatory Mitigation Projects, 2020*
  - Success criteria generally reflect the site has achieved (or is trending toward) the acreage and level of ecological function scored by the department, considering the monitoring duration and the time-lag applied to the project. The success criteria for the mitigation site will typically be based on comparisons with the reference site(s), which the department has determined 1) will provide functions similar to the impacted community and 2) the mitigation site is likely to resemble over time.
  - Success criteria are typically based on the net-acreage and percent cover by all seagrass species

Existing Guidance

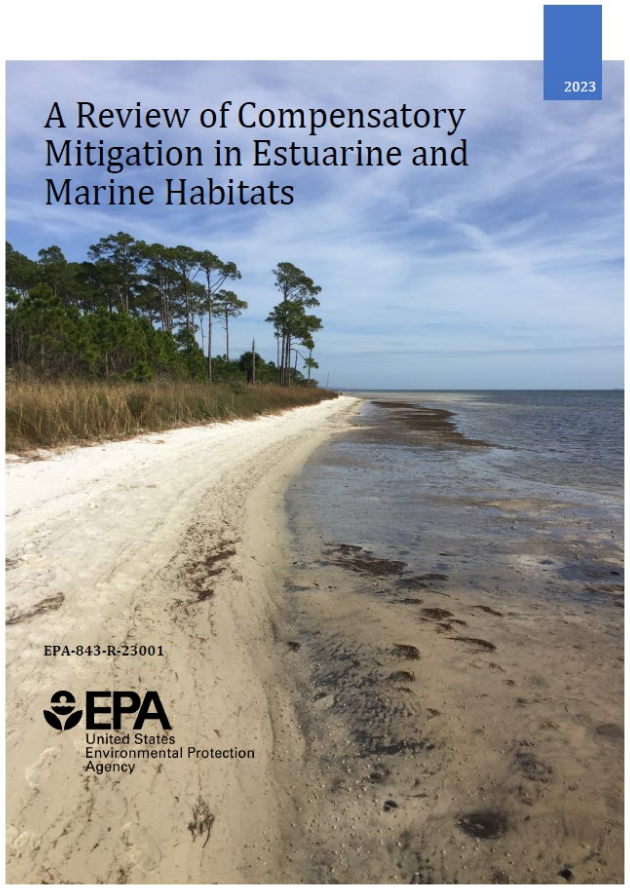
Box 2- Common practices for monitoring seagrass mitigation sites

Common monitoring metrics: Percent cover, shoot density, area, canopy height

Other monitoring metrics: Wasting disease, water quality improvement, qualitative assessments of epifauna, nekton, macroalgae, or bioturbation

Monitoring types: In-situ survey, aerial survey, sonar survey

Performance standards: Typically involved yearly documentation of progress toward an acreage, percent cover and/or shoot density goal compared to reference site(s)



Objectives

- Review the Proposed Approach
- Gain Workgroup Consensus
- Recommend a reasonable and consistent approach for future projects

Proposed Approach

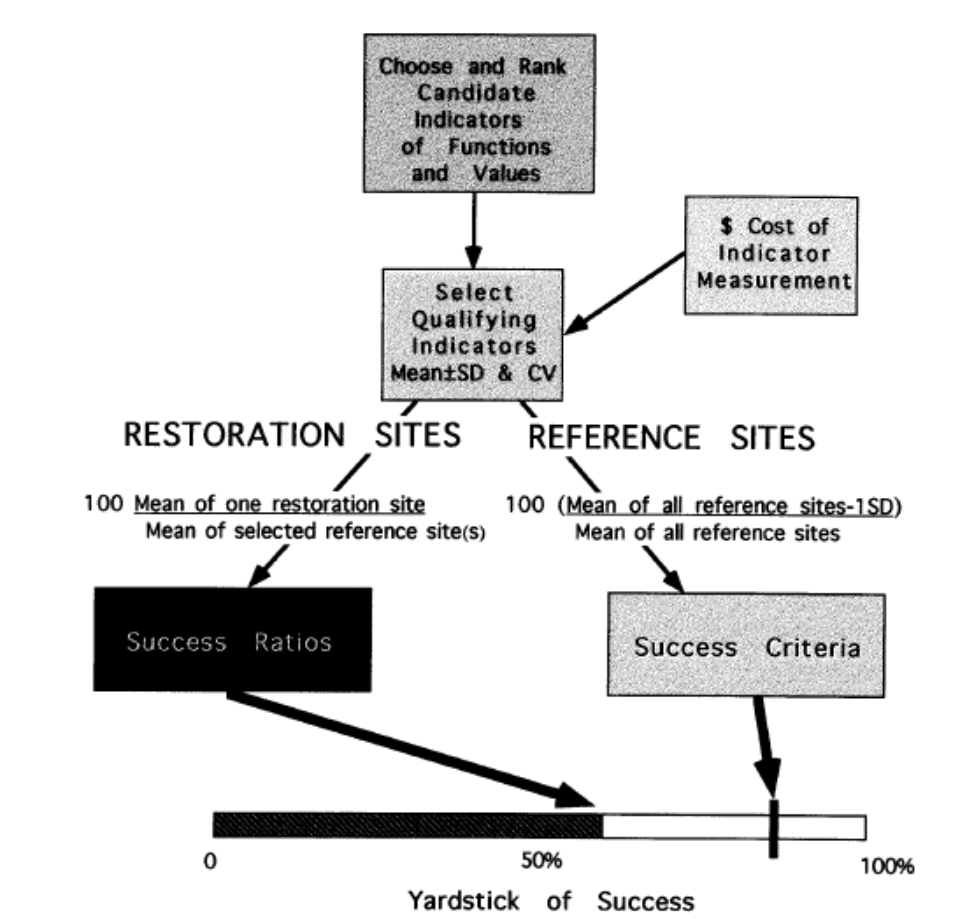


Fig. 2. Flow diagram for the SC and SR development process.

Short et al. (2000)

BOX 4.2: HOW TO MEASURE SUCCESS USING THRESHOLD VALUE AND QUALITY RATIO

For example, shoot density per m^2 in the restored bed can be compared with the reference bed(s) using a minimum of 10 randomly placed quadrats in each bed. Shoot density in the restored bed after five years was averaged to 515 shoots per m^2.

The shoot density of the reference beds was measured at an average of 560 ± 102 (mean ± SD) shoots per m^2. Thus, the quality ratio is 515/560 = 0.92. Threshold value = (560-102) / 560 = 0.82.

Quality ratio > threshold value (0.92 > 0.82). This means that the restoration was successful.

The threshold value can also be used to determine whether there have been increases in (i) biomass, (ii) maximum depth distribution (iii) sediment variables, and (iv) the abundance and diversity of fish and invertebrates.

A threshold value is a point at which a significant change has occurred within the restored bed:

Threshold value = (average of parameter *a* – 1 SD in reference beds) / (average of parameter *a* in reference beds). Note: parameter *a* can be any parameter (e.g. shoot density or extent).

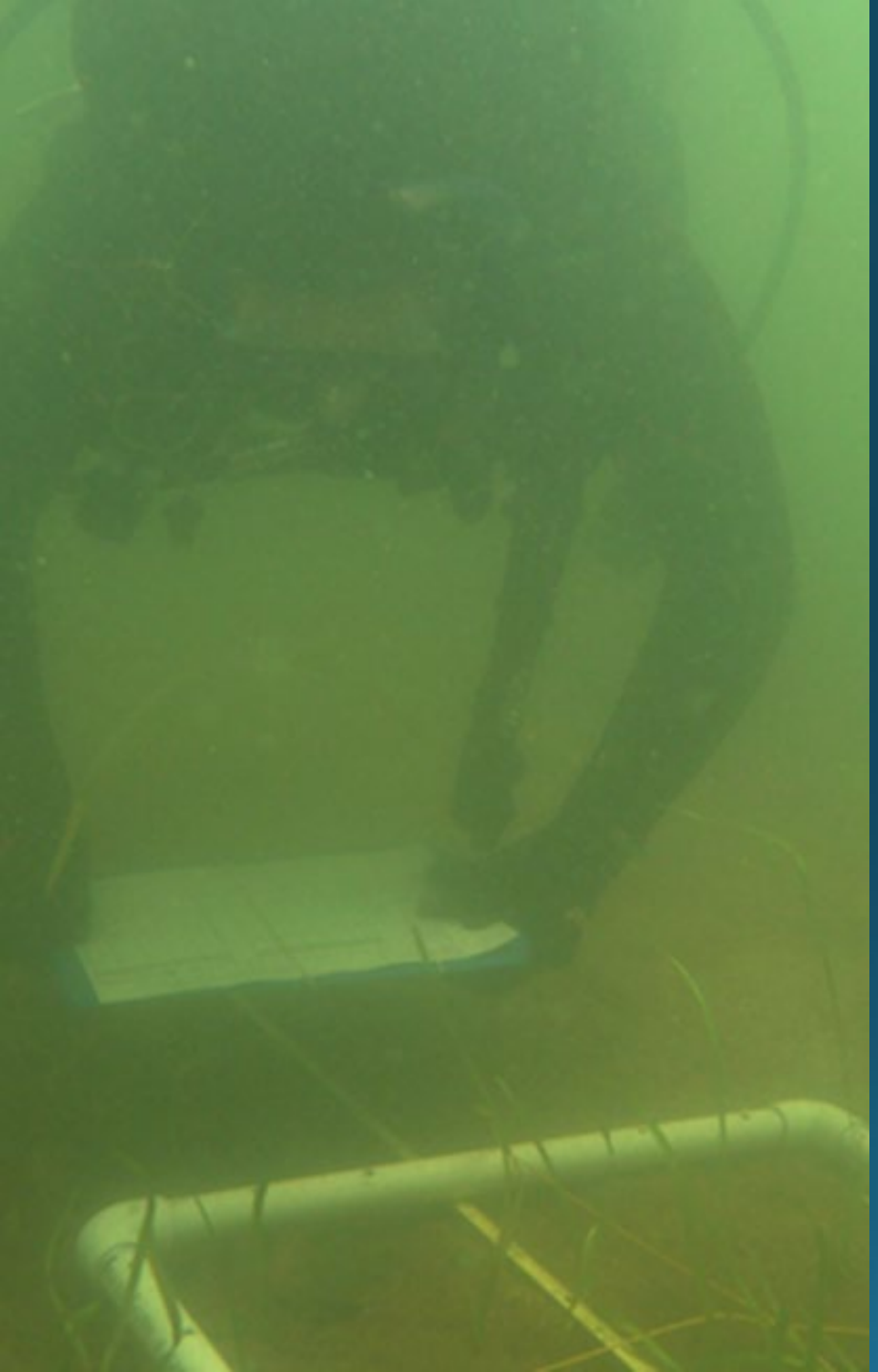
Where SD is the standard deviation.

Quality ratio = (average of parameter *a* in the restored bed) / (average of parameter *a* in the reference bed)

If the quality ratio is greater than the threshold value, the restoration project has been a success.

Quality ratio > threshold value. Project successful

Gamble et al. (2021)



Indicators

- In-situ, non-destructive methods
- Measured during peak biomass of dominant species (including *Zannichellia*)
- Primary Indicators: Percent Cover and/or Shoot Density
- Area/Extent of Bed should also be determined

Restoration Sites

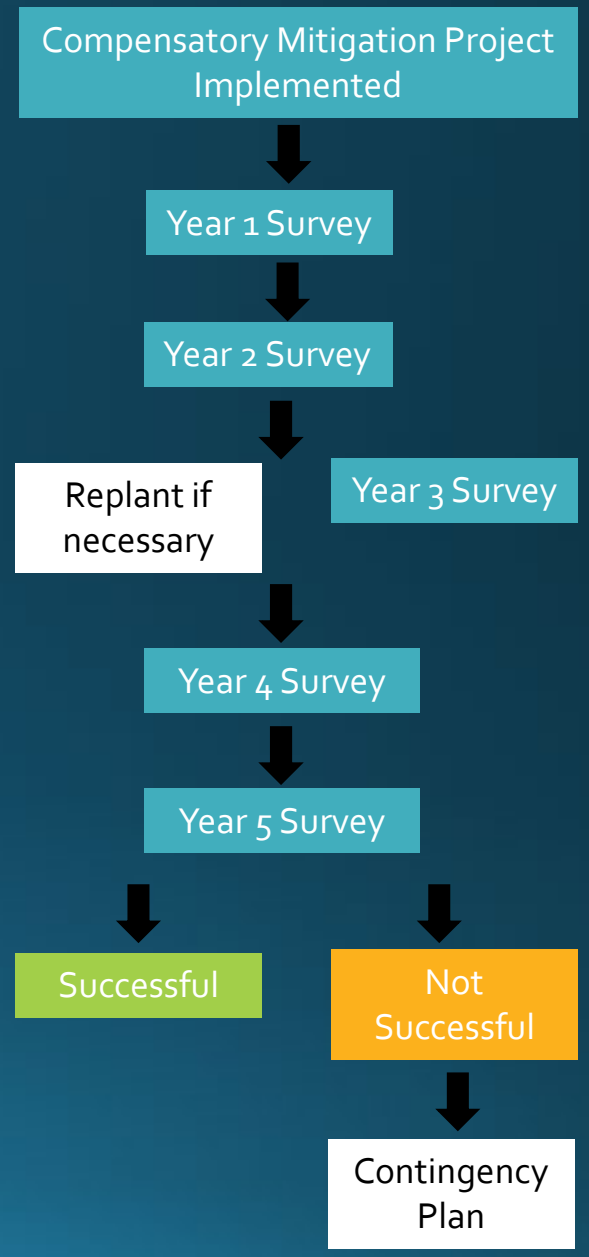
- Permittee will plant or seed SAV at restoration site in accordance with guidance established in "Small-scale SAV Restoration in Chesapeake Bay: A Guide to the Restoration of Submerged Aquatic Vegetation (SAV) in Chesapeake Bay and its Tidal Tributaries" (Jasinski et al, 2021).
- Planting/Seeding should not occur if a suitable restoration site and/or conditions are not found
- Encourage permittee to coordinate with DNR Resource Assessment Service or VIMS

Reference Sites

- Permittee must establish reference site(s)
  - far enough away from impacts
  - close enough to restoration site
  - similar species composition
  - comparable in water depth, water quality, etc.
- Encourage permittee to coordinate with DNR Resource Assessment Service or VIMS

Monitoring Timeline

- Permittee must monitor both the restoration site and reference site(s) for 5 years
  - Recommend an independent third party for monitoring to avoid conflict of interest
- Success each year will be determined using the Threshold Value & Quality Ratio defined in Gamble et al. 2021
  - If at Year 2 of monitoring the quality ratio is < threshold value, the permittee can replant/reseed during spring of year 3
- After 5 years of monitoring:
  - If the quality ratio > the threshold value**, project successful, no further monitoring required**
  - If the quality ratio < the threshold value**, project not successful; require contingency**



Next Steps

- Engage regulatory agencies on recommendations for determining in-kind mitigation success criteria
- Assess restoration success at a variety of locations to inform setting appropriate mitigation ratios
  - Buffer against seagrass variability by planting an area greater than the impact site (a higher ratio of compensation to impact)
- Increase SAV Restoration and Monitoring Capacity
  - Develop SAV Restoration and Monitoring Training and Certification Program
- Investigate permittee responsible mitigation vs. third party mitigation (mitigation bank, in lieu fee programs)