Summer QUARTERLY MEETING – August 21st, 2024

Chesapeake Bay Program

SAV Mitigation and Monitoring Guidance

SAV Workgroup 2024

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

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SAV Workgroup Meeting

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

Performance Standards

Performance standards or success criteria for SAV are based on the net-acreage and visual percent cover of SAV and generally show that the site has achieved the acreage and level of ecological function of the reference site, which should be chosen based on similarity with the impacted site.

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

Gamble, C., Glover, A., Debney, A., Bertelli, C., Green, B., Hendy, I., Lilley, R., Nuuttila, H., Potouroglou, M., Ragazzola, F., Unsworth, R., & Preston, J. (Eds.) (2021). *Seagrass Restoration Handbook: UK and Ireland*. Zoological Society of London.

Post-restoration monitoring should be completed for five years following implementation of SAV mitigation. To determine restoration success each year, use the **Threshold Value & Quality Ratio** defined by Gamble et al. 2021. These ratios account for environmental factors that may impact SAV restoration success by comparing the restored bed to a reference site rather than to the original condition of the impacted site.

- To determine the Threshold Value and Quality Ratio from the monitoring data collected each year, apply the following formulas:

$$\textbf{Threshold Value} = \frac{\text{(average of parameter } a\text{* - 1 SD in reference beds)}}{\text{(average of parameter } a \text{ in reference beds)}}$$

$$\textbf{Quality Ratio} = \frac{\text{(average of parameter } a \text{ in the restored bed)}}{\text{(average of parameter } a \text{ in the reference bed)}}$$

- If the **Quality Ratio** is greater than the **Threshold Value**, the restoration project is a success for that year.

For example, shoot density per m2 in the restored bed can be compared with the reference bed using a minimum of 30 randomly placed quadrats in each bed.

Shoot density in the restored bed was averaged at 515 shoots per m2.

The shoot density of the reference bed was measured at an average density of 560 shoots per m2 with a standard deviation of 102 shoots per m2.

The Threshold Value is (560-102)/560 = 0.818

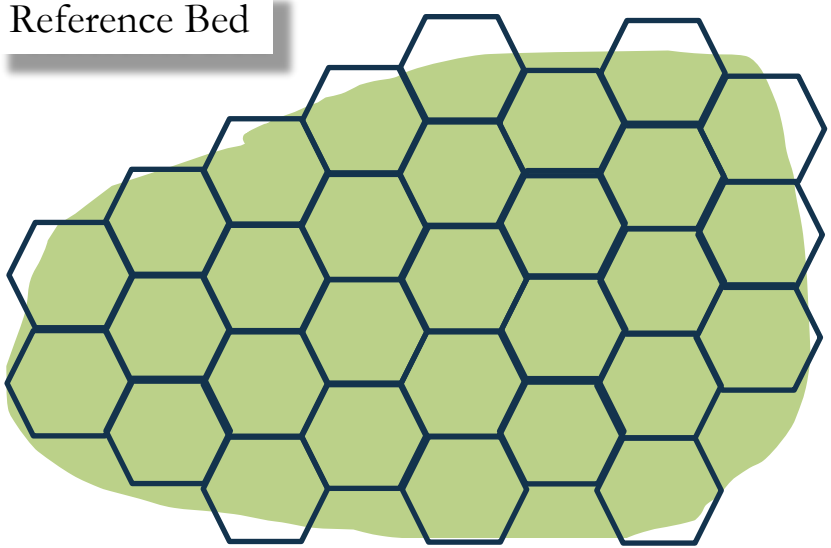
The Quality Ratio is 515/560 = 0.92

The Quality Ratio > Threshold Value (0.92 > 0.82). This means that the restoration was successful *in that year.*

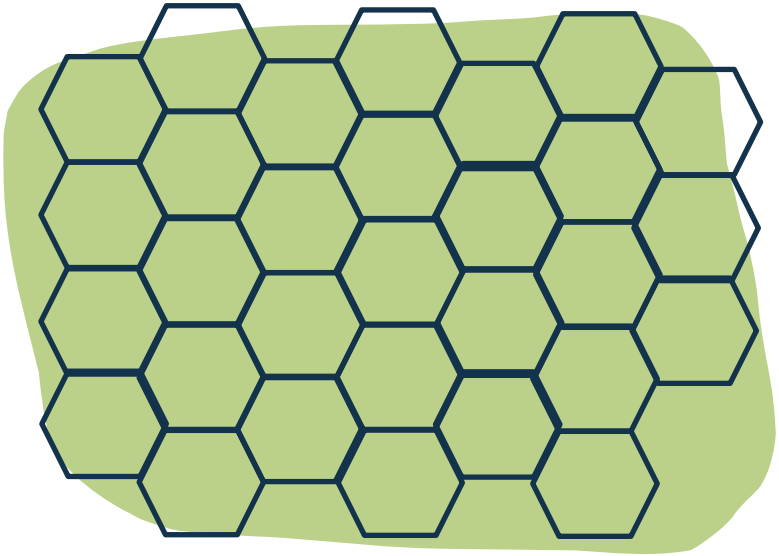
*Note: parameter *a* can either be a shoot count or visual percent cover and SD is the standard deviation of the average value.

Performance Standards – additional details

Reference Bed



Mitigation Site

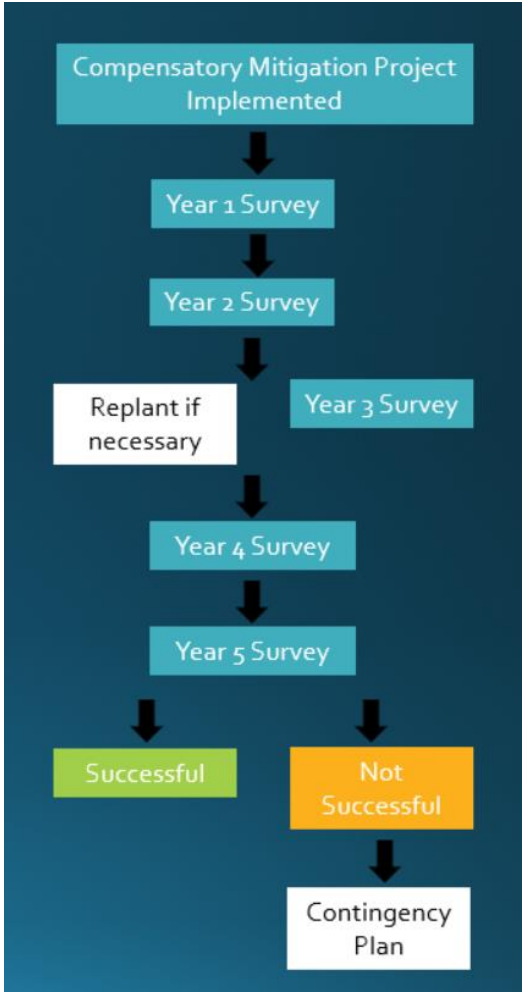


Map the extent of each bed (reference and planted) and use grid cells to ensure random points within each are evenly distributed. This will ensure that if the reference bed shrinks, that is accounted for in subsequent year sampling.

Monitoring and Assessment Timeline

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 is successful, no further monitoring required
- If the quality ratio < the threshold value, project not successful; require contingency



Maryland Department of the Environment is working on a resource mitigation guidance document for Maryland and it will include a chapter on SAV…

Guidance for SAV Restoration/Creation Mitigation Plans

Table of Contents

"This document serves as a guide for a compensatory mitigation plan for SAV restoration/creation mitigation projects… for approval before the issuance of a Tidal Wetlands license/permit."

…but Maryland Department of the Environment is working on one for Maryland.

Guidance for SAV Restoration/Creation Mitigation Plans

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3:1 for in-kind SAV mitigation
6:1 for out-of-kind mitigation

At this time, the most input is needed regarding the performance standards and monitoring requirements, as well as more details on reference site selection.

Monitoring Requirements

SAV Monitoring at mitigation sites should be conducted for five years post project implementation and should include in-situ, non-destructive methods; should occur during peak biomass of the dominant species (including *Zannichellia*); should include visual percent cover and/or shoot density; and should include a determination of area/bed extent.

The following monitoring guidelines are summarized and expanded on from *Small-scale SAV Restoration in Chesapeake Bay: A Guide to the Restoration of Submerged Aquatic Vegetation (SAV) in Chesapeake Bay and its Tidal Tributaries.*

- Collect data on-site by surveying at least two transects per restoration area. Surveys will be most successfully conducted by snorkeling or by using SCUBA. Along each transect, lay a PVC quadrat (0.5 x 0.5 m is a good size) at fixed intervals and visually estimate the percent cover of restored SAV within the quadrat and/or the number of shoots per quadrat (shoot counts can be conducted within smaller quadrats if necessary for ease of counting).
- If a transect approach doesn't make sense for the site, you may also map the perimeter of the restored SAV bed (the entire area where seeds were distributed) with a handheld GPS. Once you map the perimeter, conduct at least 30 random quadrat surveys within the perimeter using a PVC quadrat and collect the same data as you would along a transect.
- To monitor SAV at the reference site, use the same methods as at the mitigation site.
- Use this data to calculate the Threshold Value and Quality Ratio to determine restoration success or failure at that time.

Monitoring Requirements… Questions for the Workgroup

Regarding monitoring in general…

1. Transects or random points?
2. If points, how many? 30? 20?
3. Visual percent cover within quadrats or shoot count within smaller quadrat, or both?

Regarding reference sites….

1. If the SAV mitigation project is 1 acre, should data be collected from 1 acre of the reference site, or the whole site? (this is a question that was asked recently)
2. Some guidance should be provided for a change in reference site bed size. The Quality Ratio only accounts for the parameters measured.

Questions?