Pre-Workshop Materials: Marsh Adaptation Scenarios and Strategies

Advancing Tidal Marsh Adaptation in the Chesapeake Workshop

Partnership-Building and Identification of Collaborative Marsh Adaptation Projects

Friday January 19, 2024 | 9:30 AM - 2:00 PM

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Tiered Data Analysis Approach

The approach integrates additional datasets and information as the analysis advances to targeting project opportunities.

- Tier 1 – VA and MD
  - Identify areas of need based on resilience, ecological indices, and social vulnerability criteria.
  - Identify alignment between Tier 1 areas and partner interest/activity locations.
  - Select two areas for potential projects.

Where is the need?

- Tier 2 – Supplemental regional datasets
  - Integrate additional datasets (i.e., detailed site conditions, habitat features, land attributes) to support partnership building and potential project identification.
  - Integrate additional datasets to identify projects aligned with specific opportunities, such as habitat priorities and funding tools.

Where are the opportunities?

Tier 2 Data to support project identification, site evaluation, and scenario development

Tier 2 analysis uses data and information specific to the focus areas and partner interests to identify and evaluate potential project opportunities.

Examples of Tier 2 data and information for consideration include:

- Marsh resilience
  - Chesapeake Bay Coastal Wetlands Synthesis data (elevation, tidal range, lifespan)
  - ETM, TMM marsh migration models (where available)
  - State- or location-specific tools (i.e., VA WetCAT Vulnerability data, MD DOT Flood Nuisance data)
- Habitat
  - Species-specific (i.e., Fish GIT recommends Hardened Shoreline, Atlantic Coastal Fish Habitat Partnership Diadromous Fish Habitat)
  - Habitat transition and projected habitat type
- Policy and land attributes (land use, ownership, boundaries)
- Funder priorities and opportunities (i.e., required or high priority project components for key funding sources)

Marsh Adaptation Scenarios and Strategies

This section describes potential marsh adaptation scenarios and strategies and show examples using data analysis focused on the Guinea Marsh Complex in the Middle Peninsula, Virginia.

Detailed worksheets that include the full set of maps are available in the pre-workshop materials for both Guinea Marsh Complex and the Wicomico River area.

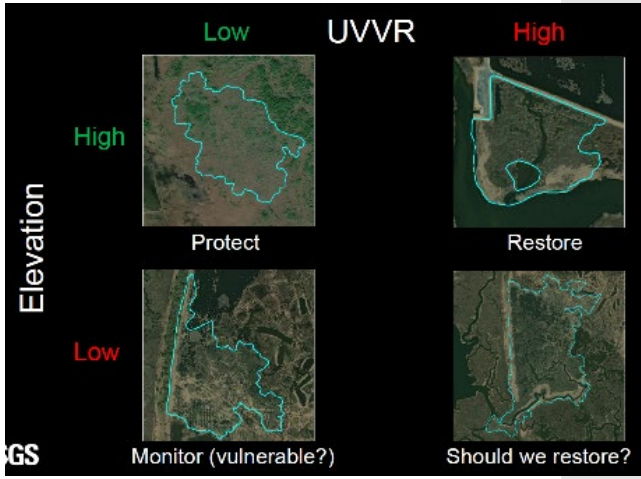
Tier 2 Analysis: Potential Example Scenarios

These scenarios are based on the NOAA Landscape Scale Marsh Resilience Framework marsh resilience categories and a decision matrix shared by Neil Ganju and team's geospatial analysis, which correlated elevation and UVVR to guide marsh actions.

1 - Protection Scenario: Use data to identify *healthy marshes* that are susceptible to SLR and have the potential to migrate. Indicators:

- Good Existing Marsh Integrity (UVVR)
- High Climate Change Risk (subject to SLR)
- High Adaptive Capacity (migration potential, public lands)

Indicator	Data Layer
High Marsh Integrity	UVVR
High Vulnerability to Sea Level Rise	Existing Tidal Marsh Layer NOAA Sea Level Rise Scenarios (2050 and 2090 Intermediate and Intermediate High) Sea Level Rise Inundation (NOAA) 2-4 ft
High Adaptive Capacity	Marsh Migration Models (MMCE) Protected Lands



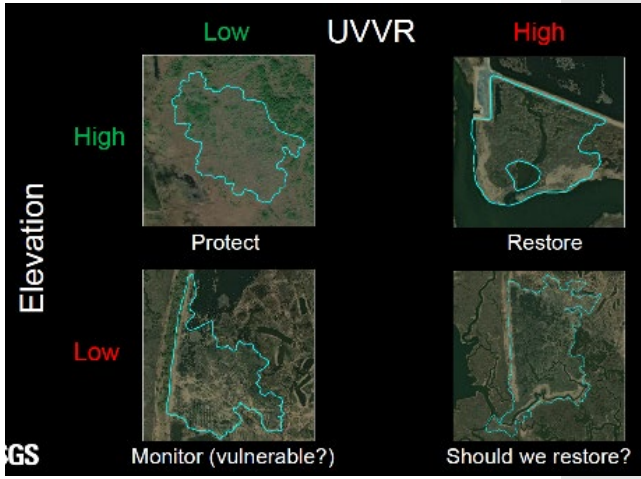
Tier 2 Analysis: Potential Example Scenarios

These scenarios are based on the NOAA Landscape Scale Marsh Resilience Framework marsh resilience categories and a decision matrix shared by Neil Ganju and team's geospatial analysis, which correlated elevation and UVVR to guide marsh actions.

2 - Restoration Scenario: Use data to identify *degraded marshes* that are susceptible to SLR and have the potential to migrate.

- Degraded Existing Marsh Integrity/Condition
- High Climate Change Risk
- High Adaptive Capacity

Indicator	Data Layer
Low Marsh Integrity	UVVR
High Vulnerability to Sea Level Rise	Existing Tidal Marsh Layer NOAA Sea Level Rise Scenarios (2050 and 2090 Intermediate and Intermediate High) Sea Level Rise Inundation (NOAA) 2-4 ft
High Adaptive Capacity	Marsh Migration Models (MMCE) Protected Lands

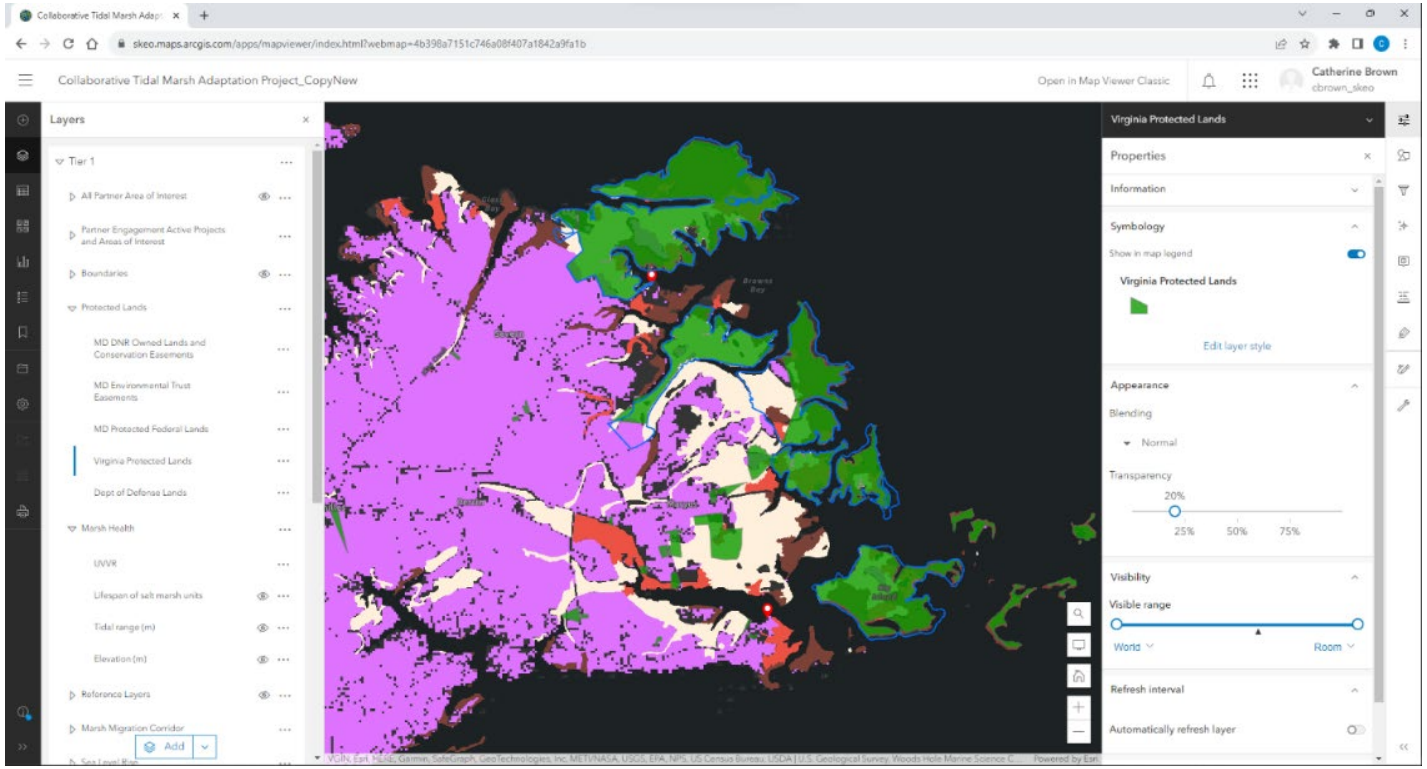


Applying scenario studies for Guinea Marsh Complex

Guinea Marsh Complex Protection Scenario

A significant amount of marsh within the protected lands is unstable or at the stability threshold based on UVVR data. However, the protected land adjoins areas with extensive healthy marsh and potentially suitable migration corridors.

Though privately owned, these lands are largely undeveloped unlike many other large-scale suitable migration corridors areas along Virginia's coastline. The opportunity to facilitate marsh migration on undeveloped tracts through easements, partnerships or land acquisition can support long-term coastal resilience.

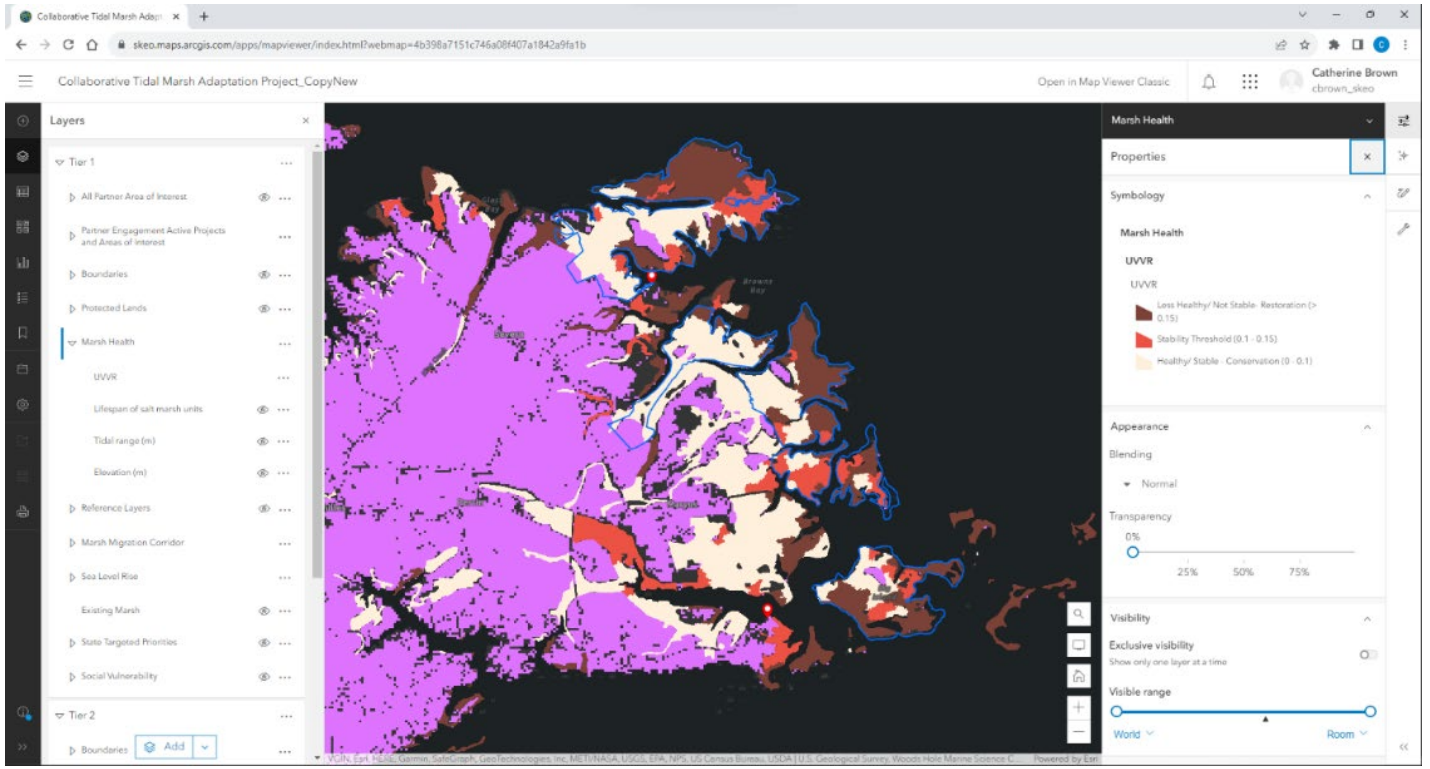


Protection example: Marsh Health (UVVR) and Marsh Migration Corridor Envelope (2') with VA Protected Lands layer

Applying scenario studies for Guinea Marsh Complex

Guinea Marsh Complex Restoration Scenario

Significant areas of stable marsh exist adjacent to potential marsh migration corridors. Protecting those marshes can help facilitate migration. Smaller marshes that are less stable (red and burgundy) adjacent to potential marsh migration areas highlight opportunities for restoration efforts to facilitate future migration.



Restoration example: Marsh Health (UVVR) and Marsh Migration Corridor Envelope (2')

Tier 2 Analysis: Vulnerable communities

Social Vulnerability

This analysis uses Tier 2 data to illustrate the increasing vulnerability of underserved communities as sea level rise leads to potential changes in land use, protection, infrastructure, and habitat.

Relevant data to consider:

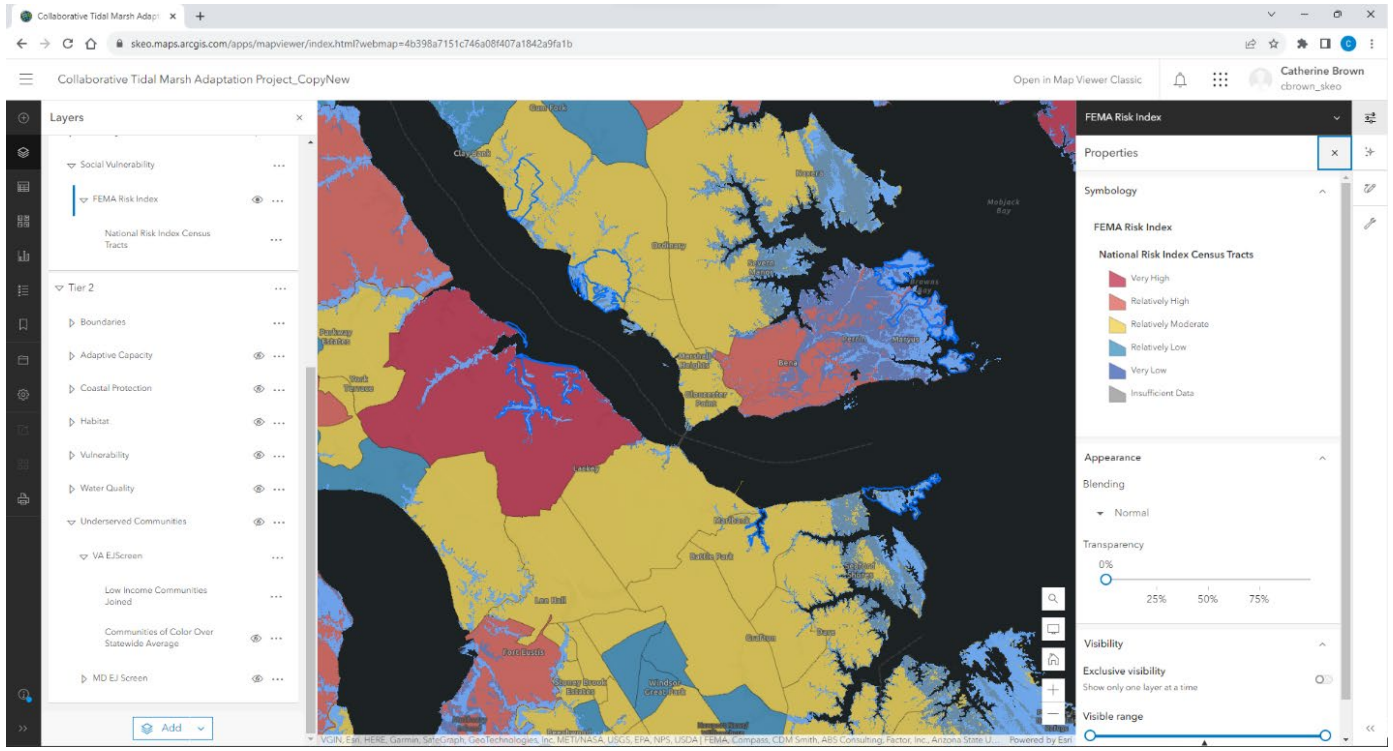
- Vulnerability: Sea level rise
- Underserved Communities: VA EJ Screen, FEMA Risk Index
- Adaptive Capacity: Marsh Migration Corridors
- Land Use: Agriculture, Development, Forests
- Habitat: Projected habitat transition, projected marsh change

Applying social vulnerability analysis for Guinea Marsh Complex

Guinea Marsh Complex Preliminary Vulnerability Summary

Although Guinea Marsh Complex does not include high risk communities (due to low population present), data illustrates that adjacent areas are at risk, and will be highly vulnerable as sea level rise extends inland beyond Guinea Marsh complex. The Guinea Marsh complex supports coastal protection for nearby vulnerable populations.

Marsh Migration Corridors adjacent to Guinea Marsh complex present potential opportunity to increase protection for inland communities particularly as sea level rises. Land use of the area adjacent to Guinea Marsh complex also indicates a unique opportunity to consider marsh migration strategies in an undeveloped area to increase coastal protection of nearby population centers.



FEMA Risk Index, NOAA SLR Int High (2050, 2090)