Growing our Natural Carbon Sinks in Maryland: Update on Blue Carbon

Mitigation Working Group Meeting

August 17, 2021

Focus on Blue Carbon

- Coastal/tidal wetlands
- Seagrasses meadows
- No mangroves

Image Credit: James Lynch, USGS. Public domain.

Image Credit: Chesapeake Bay Program.

2030 Maryland GGRA Plan

Funding Source	Coastal Wetland Acres Restored 2006-2020	Carbon Sequestration MT CO_2e per year	Estimate for additional acres by 2030
Coastal Wetland Initiative	505.6	1,095.3	500
DNR Trust Fund	3.8	8.2	0
Federal Partners	2096.9	4,542.8	2,500
Total	2,606.3	5,646.4	3,000
Estimate of Annual Carbon Sequestration in 2030 =		**11,062.5**	Using RAE/Verra default carbon sequestration rate for created coastal wetlands: 2.16 MT CO2e/ac/yr

2030 Maryland GGRA Plan

Tidal wetlands may be a minor piece of the over 25 million MT of CO_2 reductions needed by 2030 to meet 50% GHG reduction goal…

…but protection and restoration comes with significant co-benefits

Mitigation + Resilience

- Reduce storm damage
- Protection against erosion
- Serve as natural water filters
- Provide fishery enhancements
- Seagrasses may buffer coastal acidification
- Highly efficient carbon sinks

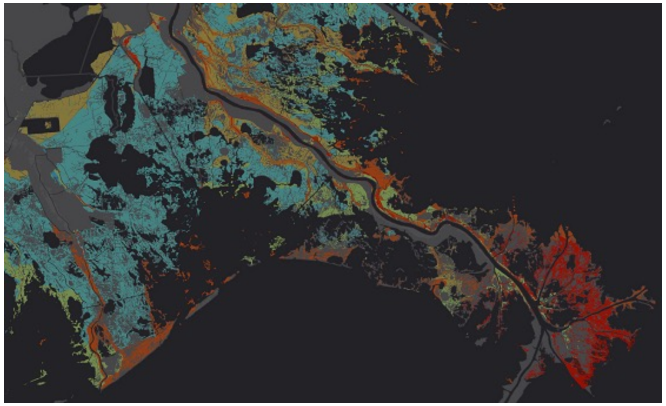
Image Credit: NOAA. Public domain.

Accounting Challenges

- Highly variable rates of sequestration based on natural gradients
- Gains and losses of carbon stocks under range of climate change factors
- Impacts of sea level rise/erosion; role of landward expansion/accommodation
- Methane emissions (net GHG flux)

Ongoing Blue Carbon Research

- How much carbon and where?
- NASA Carbon Monitoring System
  - James Holmquist & Pat Megonigal (SERC)
  - Partnerships with:
    - Coastal Carbon Reserve Coordination Network
    - National Estuarian Research Reserve System
  - Estimating GHG fluxes of tidal wetlands
    - Across salinity, degradation, management practices
  - Workflow builds from current remote sensing based maps of carbon stocks/storage

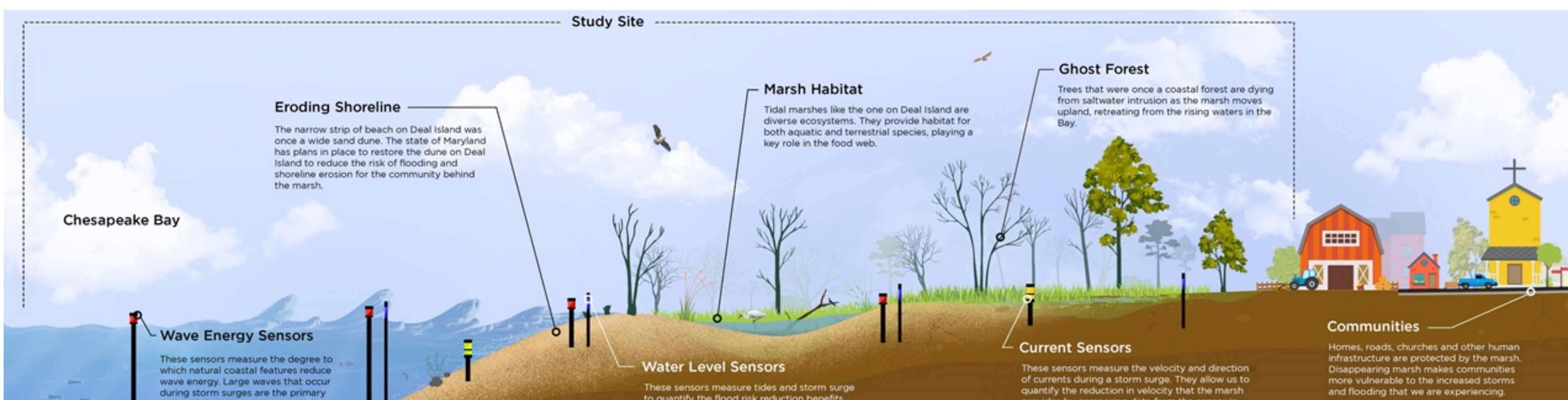


Data and Image Credit: NASA ORNL DAAC; Holmquist et al. 2019

Smithsonian Environmental Research Center

Ongoing Blue Carbon Research

- What are the impacts of ongoing change?
- NOAA Ecosystem Effects of Sea Level Rise (EESLR)
  - Monitor wave attenuation and flooding protection
  - Model statewide flood protection capacity under SLR
  - Value related ecosystem services
  - Improve management to preserve/elevate benefits



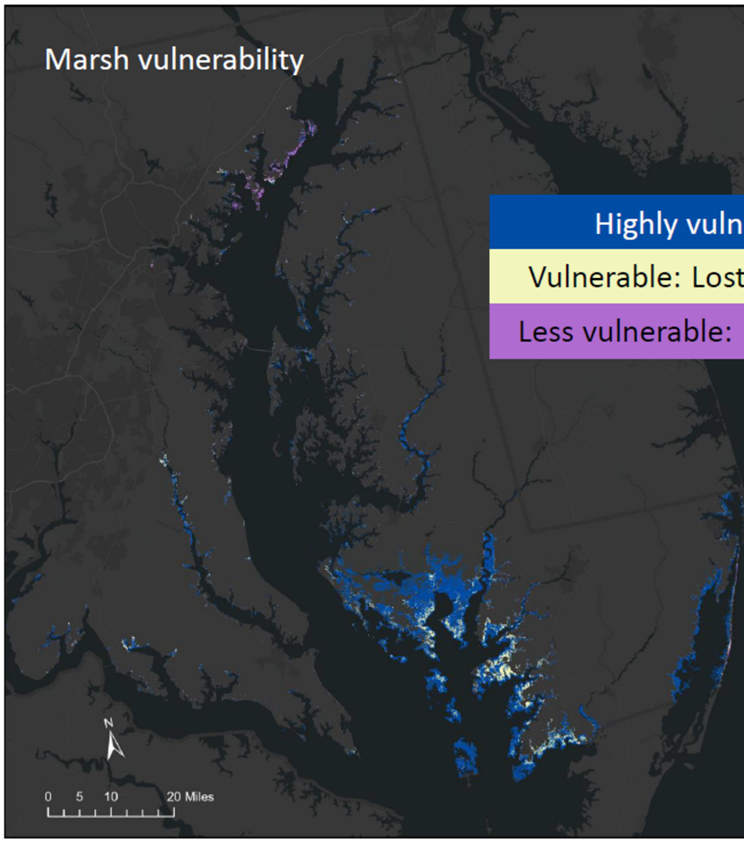
Ongoing Blue Carbon Research

- Where will the wetlands go?
- US Climate Alliance
  - Led by Duke University
  - Partnership of MD, NC, VA, DE, NJ, and NY
  - Models impact of wetland change on blue carbon through 2120
  - Preliminary results show wide range of outcomes, depending on emissions scenario
  - Loss of blue carbon likely by 2075

UNITED STATES
CLIMATE ALLIANCE
STATES UNITED FOR CLIMATE ACTION

Ongoing Blue Carbon Research

Habitat vulnerability to SLR



Highly vulnerable: Lost by 2050
Vulnerable: Lost between 2050 and 2073
Less vulnerable: Persists until at least 2073

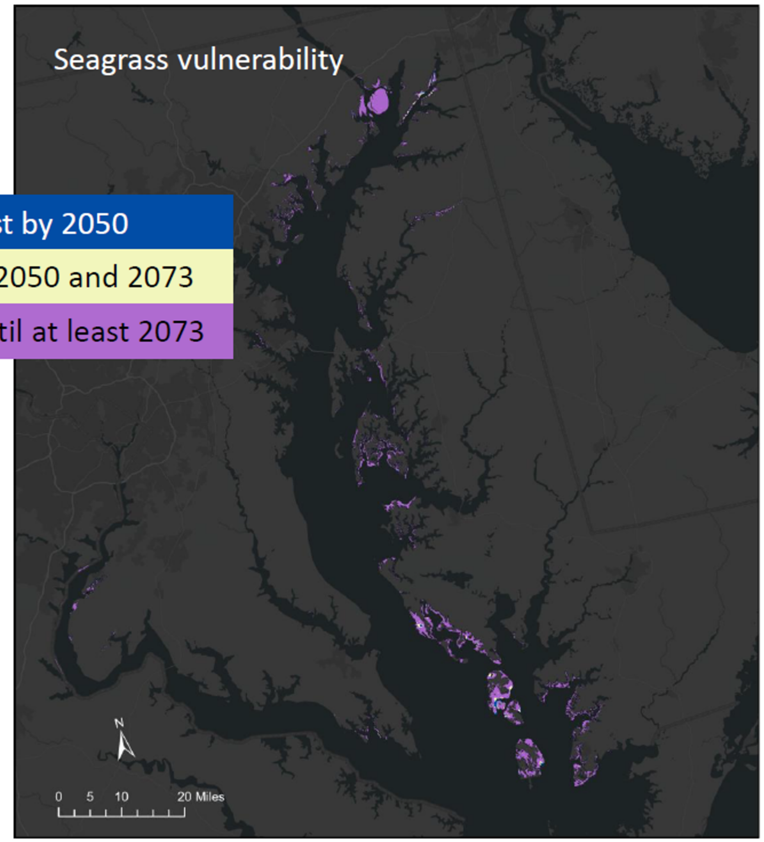
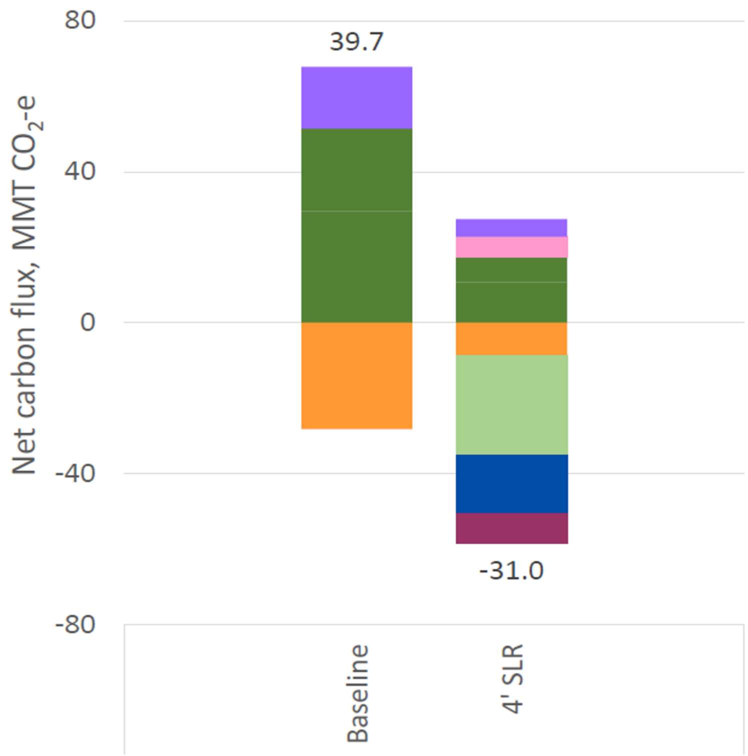


Image Credit: Warnell, presentation of USCA project preliminary results

Ongoing Blue Carbon Research

MD: Net blue carbon flux with and without SLR



Carbon sequestration	Carbon emissions
Original salt marshes	Lost original salt marshes
Original seagrass	Lost original seagrass
Terrestrial habitats in the migration space	Freshwater wetlands in the migration space
	Conversion of terrestrial habitats to salt marsh in the migration space
Salt marsh in the migration space	Lost salt marsh in the migration space

Image Credit: Warnell, presentation of USCA project preliminary results

Markets and More Pilot Studies

- Quantify impact/resilience to SLR (accounting for permanence)
- Overcome cost constraints (high implementation costs)
- Increase financial incentive (feasibility of carbon + resilience credits)
- Evaluate project implementation in nearby states (lessons learned)
- Allow state projects to generate credits (increase eligibility)
- Assess opportunities for blue carbon on state land, state funded restoration projects (Maryland DNR "Blue Carbon Team")

Deep Dive with Fall Series

- Three-part series on Blue Carbon in Maryland
- Blue Carbon Initiative with UMCES, RAE & COMPASS
  - *Webinar 1*: State-of-the-Science for GGRA Planning & GHG Inventory
  - *Webinar 2*: Role of Conservation Finance in Enabling Restoration
  - *Workshop*: Lessons Learned from Project Implementation
- Outcome: Written assessment identifying potential next steps for further integrating blue carbon into state policy and planning
- Invitation to MWG to participate

Contact

Rachel Lamb, PhD

MDSG State Science Policy Fellow

Climate Change Program

Maryland Department of the Environment

rachel.lamb@maryland.gov